Chapter 3

Affected Environment, Analysis of Potential Impacts, and Mitigation Measures

DRAFT ENVIRONMENTAL IMPACT STATEMENT

CITY OF SHORELINE

Chapter 3—Affected Environment, Analysis of Potential Impacts, and Mitigation Measures

3.1 Land Use Patterns, Plans, and Policies

This section describes the affected environment, analyzes potential impacts, and provides recommendations for mitigation measures for land use patterns, plans, and policies. Information about the resulting community character associated with the alternatives also is presented.

3.1.1 Affected Environment

The analysis of the affected area was completed based on field work in the subarea, as well as review of existing data and information, such as the City of Shoreline Comprehensive Plan and other plans such as the City's adopted Transportation Master Plan, Southeast Neighborhoods Subarea Plan, and other plans and documents. Applicable elements of the City's Municipal and Development Codes and their relationship to potential action under the subarea plan also have been reviewed.

Station Subarea Context

For development of the 145th Street Station Subarea Plan and environmental analysis purposes, the City of Shoreline Planning Commission determined study area boundaries for land use and mobility with consideration of factors such as topography, the ability to walk and bike to and from the station, policy direction from Shoreline City Council, access to arterial streets, opportunity sites, environmental assets, and other existing conditions and influences. **Figure 3.1-1** illustrates the two study areas that together comprise the subarea. While this is the focus area for station subarea planning, land use alternatives may extend beyond this area for analysis.

The subarea includes portions of the Parkwood, Ridgecrest, and Briarcrest neighborhoods of Shoreline. Bordering areas include the City of Seattle to the south, and incorporated areas of Shoreline to the north, west, and east. The City of Lake Forest Park is located to the east of the subarea.

N-NE 145th Street is the most prominent corridor in the subarea, also functioning as State Route (SR) 523 and the boundary between the City of Seattle and the City of Shoreline. Currently, Seattle owns the eastbound lane, King County owns the westbound lane, and Shoreline begins at the back edge of the sidewalk.

The subarea generally extends approximately one-half mile north of the 145th corridor, with the western boundary at Meridian Avenue N and the northern boundary at N-NE 155th Street. Alternative 2—Connecting Corridors extends beyond these streets, west to the Aurora Avenue N corridor and north to N-NE

165th Street. This reflects a concept raised during community workshops that in addition to N-NE 145th Street, 5th Avenue NE or N-NE 155th Street could potentially serve as strong connecting corridors in the subarea, lined with mixed use (shops and services at the ground floor with housing above).

Alternatively, the idea of concentrating density in a more compact form around the planned light rail station was another concept that came out of the community workshop sessions. Alternative 3—Compact Community reflects this approach.

Many participants in the community workshops were interested in improving pedestrian and bicycle connectivity throughout the subarea, as well as enhancing parks, open space, streams, wetlands, and other natural resources. This concept is reflected in the Green Network that is included in both action alternatives.

Another idea that shaped development of the Green Network was an expressed interest in arranging new redevelopment and housing around key park and open space assets in the subarea. The analogy used to describe this idea was that if parks are the jewels of the neighborhoods, the Green Network could connect them like the chain in a necklace. Denser areas near parks are reflected in both action alternatives, Alternative 2—Connecting Corridors, and Alternative 3—Compact Community.

Traffic Analysis Zones Used for Planning and Analysis

For purposes of population, housing, and employment projections and transportation planning, traffic analysis zone (TAZ) boundaries in proximity to the subarea also have been referenced in this analysis. Because TAZ boundaries align with census tract boundaries, they are commonly used for planning and analysis purposes. Refer to Section 3.2 Population, Housing, and Employment and Section 3.3 Multimodal Transportation for additional information and a map of the TAZ boundaries.

Proposed Sound Transit Light Rail Station Facilities

Through a separate environmental process, Sound Transit identified the potential light rail station location. The preferred option for the station location is just to the north of NE 145th Street on the east side of and immediately adjacent to the Interstate 5 (I-5) corridor. A park-and-ride structure, also to be constructed by Sound Transit, potentially would be located also on the east side of I-5, just to the north of the light rail station.

The City of Shoreline supports the station location proposed by Sound Transit, and identifies the location in the City's Comprehensive Plan Land Use Map. **Figures 3.1-2a** through **3.1-2d** show exhibits from the Lynnwood Link DEIS (published by Sound Transit and the Federal Transit Administration in July 2013). These figures show conceptual level plans and cross section view of the potential 145th Street Station and park-and-ride structure.

A second potential Sound Transit light rail station in Shoreline is planned to be located immediately north of NE 185th Street, adjacent to the east side of I-5. The primary connecting routes between the 145th and 185th light rail station subareas include the north-south corridors of 5th Avenue NE , 8th Avenue NE, 10th Avenue NE, and 15th Avenue NE.

Past and Present Land Use Patterns in the Subarea

Past and present land use patterns in the subarea are described below and on the following pages, including a summary of the history of settlement of the general community of Shoreline.

History and Settlement of the Area

Early accounts of Shoreline tell how Native Americans traveled along the shores of Puget Sound and local streams collecting swordfern and kinnikinnick at Richmond Beach, and wild cranberries at what are now Ronald Bog and Twin Ponds parks. Controlled fires were set in the Richmond Highlands and North City areas to create meadows for the cultivation of certain wild plants and to provide inviting, open spaces for small game.

In the 1880s, the US Government opened the region to homesteading after railroad fever gripped the Northwest. Speculators planned towns in anticipation of the transcontinental railroad route. Among these was Richmond Beach, platted in 1890. The arrival of the Great Northern Railroad in Richmond Beach in 1891 spurred the growth of the small town and increased the pace of development in the wooded uplands.

Construction of the Seattle to Everett Interurban trolley line through Shoreline in 1906, and the paving of the North Trunk Road with bricks in 1913, made travel to and from Shoreline easier, increasing suburban growth. People could live on a large lot, raise much of their own food and still be able to take the Interurban, train, or (beginning in 1914) the bus to work or high school in Seattle. Children could attend one of two local elementary schools, and general stores provided most of the goods that could not be grown at home. Local produce from fruit orchards, chicken farms, and strawberry crops was transported via the Interurban or the train. The Fish family's Queen City Poultry Ranch on Greenwood at 159th was a prosperous chicken farm that attracted many visitors. Ronald Station along the trolley line was located near present-day Park at Town Center.

During the early twentieth century, Shoreline attracted large developments drawn by its rural yet accessible location, including the Highlands and Seattle Golf Club (circa 1908). The Firland Tuberculosis Sanitarium (circa 1911), which is now Crista Ministries, also developed during that era. Commercial centers formed around Interurban stops at Ronald (175th Street and Aurora Avenue N) and Richmond Highlands (185th Street and Aurora Avenue N). Car travel facilitated settlement, which increased considerably by the mid-1920s. Although large tracts of land were divided into smaller lots in the 1910s in anticipation of future development, houses were still scattered.

A precursor to Interstate 5, Highway 99 was constructed to stretch from Mexico to Canada, offering more convenient access than ever before to America’s new auto travelers. Originally known as the Pacific Highway, but later named Aurora Speedway and Aurora Avenue, there are conflicting histories of the source of the name “Aurora.” Some say the name was meant to honor Aurora, Illinois, the hometown of Dr. Edward Kilbourne, a Fremont founder. Others say the name recognized the highway as a route north, toward the Aurora Borealis. Regardless of how the highway got its name, it changed the face of the area north of Seattle forever, and as more people took to the road in automobiles, there was less use of the old trolley line. The

Interurban made its last run in February of 1939. By the late 1930s and early 1940s, commercial development concentrated along Aurora Avenue, which saw steadily increasing use as part of the region's primary north-south travel route. Traffic on 99 swelled, particularly after the closing of the Interurban.

The Great Depression and World War II (1930-1945) slowed the pace of development. Many Shoreline families managed to live off land they had purchased in better times. During World War II, building materials were rationed and housing construction virtually stopped. The only major development in Shoreline during the war was the Naval Hospital (now Fircrest). At its peak in 1945, the hospital housed over 2,000 patients and 600 staff.

With the end of the war came a substantial demand for family housing. The late 1940s saw large housing developments such as Ridgecrest (NE 165th to 155th Streets, 5th to 10th Avenues NE) spring up seemingly overnight. Schools ran on double shifts as families with young children moved into the new homes. In the late 1940s, business leaders and residents began to see Shoreline as a unified region rather than scattered settlements concentrated at Interurban stops and railroad accesses.

In 1944, the name "Shoreline" was used for the first time to describe the school district. Coined by a student at the Lake City Elementary School, it defined a community that went from the Seattle city line to Snohomish county line and from the shore of Puget Sound to the shore of Lake Washington.

Shoreline continued to grow, becoming an attractive place to live in the central Puget Sound region due to the great neighborhoods, schools, parks, and other community features.

After it became clear that an additional north-south freeway would be needed to handle the cross-state traffic, Interstate 5 was constructed in the 1960s, with the final segment in Washington state opening on May 14, 1969. With its opening, motorists could travel without stopping from the northern California state line to the Canadian border, and Highway 99 became more of a regional route and alternate travel way to Interstate 5. The Interstate 5 corridor bisected the community that had become known as Shoreline, and made east-west travel on local roads more difficult.

Although known as “Shoreline” for decades, the community did not become officially incorporated city until 1995, and prior to that it remained an unincorporated area of King County north of Seattle. Today with 54,790 residents (2013 population), Shoreline is Washington's 15th largest city.

City of Shoreline Historic Preservation Program

The Shoreline community has an interesting historical background, as summarized. Recognizing this history and the potential for important historical and cultural resources that warrant preservation, the City of Shoreline administers a historic preservation program.

Historic preservation in Shoreline is guided by the Community Design Element Goal CD IV and policies CD38 through CD45 in the Comprehensive Plan, as well as adopted provisions of Title 15.20 of the Shoreline Municipal Code. The preface and purposes of Title 15.20 based on City Council findings are described as follows.

A. The protection, enhancement, perpetuation, and use of buildings, sites, districts, structures and objects of historical, cultural, architectural, engineering, geographic, ethnic and archeological significance located in the city of Shoreline are necessary for the prosperity, civic pride and general welfare of the residents of the city.

B. Such cultural and historic resources are a significant part of the heritage, education and economic base of the city , and the economic, cultural and aesthetic well being of the city cannot be maintained or enhanced by disregarding its heritage and by allowing the unnecessary destruction or defacement of such resources.

C. In the absence of an ordinance encouraging historic preservation and an active program to identify and protect buildings, sites and structures of historical and cultural interest, the City will be unable to ensure present and future generations of residents and visitors a genuine opportunity to appreciate and enjoy the city's heritage.

D. The purposes of this chapter (15.20 Historic Preservation of the Shoreline Municipal Code) are to:

1. Designate, preserve, protect, enhance, and perpetuate those sites, buildings, districts, structures and objects which reflect significant elements of the city of Shoreline's, county's, state's and nation's cultural, aesthetic, social, economic, political, architectural, ethnic, archaeological, engineering, historic and other heritage;
2. Redesignate two sites in the city of Shoreline, previously designated as historic landmarks by the King County historic preservation commission, as City of Shoreline historic landmarks **(note: because neither of these two sites are in the station subarea, this provision is not applicable)**;
3. Foster civic pride in the beauty and accomplishments of the past;
4. Stabilize and improve the economic values and vitality of landmarks;
5. Protect and enhance the city's tourist industry by promoting heritage-related tourism;
6. Promote the continued use, exhibition and interpretation of significant sites, districts, buildings, structures, and objects for the education, inspiration and welfare of the people of the City of Shoreline;
7. Promote and continue incentives for ownership and utilization of landmarks;
8. Assist, encourage and provide incentives to public and private owners for preservation, restoration, rehabilitation and use of landmark buildings, sites, districts, structures and objects; and
9. Work cooperatively with other jurisdictions to identify, evaluate, and protect historic resources in furtherance of the purposes of this chapter.

Shoreline's Historic Inventory—In review of the historic inventory compiled by the City of Shoreline in 2013, there are five properties in proximity to the subarea noted as having the potential for eligibility for landmark designation (although not yet designated) as historic landmarks by Shoreline, which coordinated with the King County Landmarks Preservation Program. These five potentially eligible properties are all single family lots with houses and structures built from the period of 1908 to 1939. The inventory identifies one of the properties as the Sheppard Residence built in 1939; others are not identified and appear to be privately owned.

Properties included in the inventory that are potentially eligible for landmark designation may require historic review if alterations or demolition are proposed, but such changes are allowed to inventoried properties. More information about Shoreline history is available at the following websites/webpages:

- City of Shoreline Historic Preservation http://www.cityofshoreline.com/government/departments/planning-community-development/planning-projects/historic-preservation
- Shoreline Historical Museum http://shorelinehistoricalmuseum.org/
- King County Historic Preservation Program http://www.kingcounty.gov/property/historic-preservation.aspx
- 4Culture http://www.4culture.org/

Present-Day Land Use Patterns

The subarea today consists primarily of single family neighborhoods zoned as R-6 (residential, six units per acre) and developed at an average density of 3.2 units per acre. In addition to single family residential uses, there are several churches, parks, schools, and school properties within and in proximity to the subarea. For example, just northeast of the subarea a large contiguous area of land contains Hamlin Park, Kellogg Middle School, Shorecrest High School, Washington State Public Health Lab, and Fircrest Campus, although these parcels are owned and operated by various agencies (see Key Opportunity Sites in the Subarea for more information).

Most of the neighborhoods in the subarea were developed as single-family housing in the decades following World War II, primarily from the mid- to late 1940s through the 1970s, when the area was part of unincorporated King County. When the neighborhoods were originally developed, street standards did not require sidewalks, and as such, most of the local streets today do not have sidewalks or bike lanes. Surface water management standards also were less intensive than they are today and as such, there are frequently drainage issues in the subarea. Stormwater facilities are generally below the standard now required by the Department of Ecology, and there are very few low impact development facilities such as rain gardens.

The City of Shoreline, incorporated in 1995, now has jurisdiction over this area and works with the community to prioritize capital transportation and infrastructure improvements throughout the city. Although some improvements have been made in the subarea in recent years, budget constraints have limited the level of street and utility improvements completed to date.

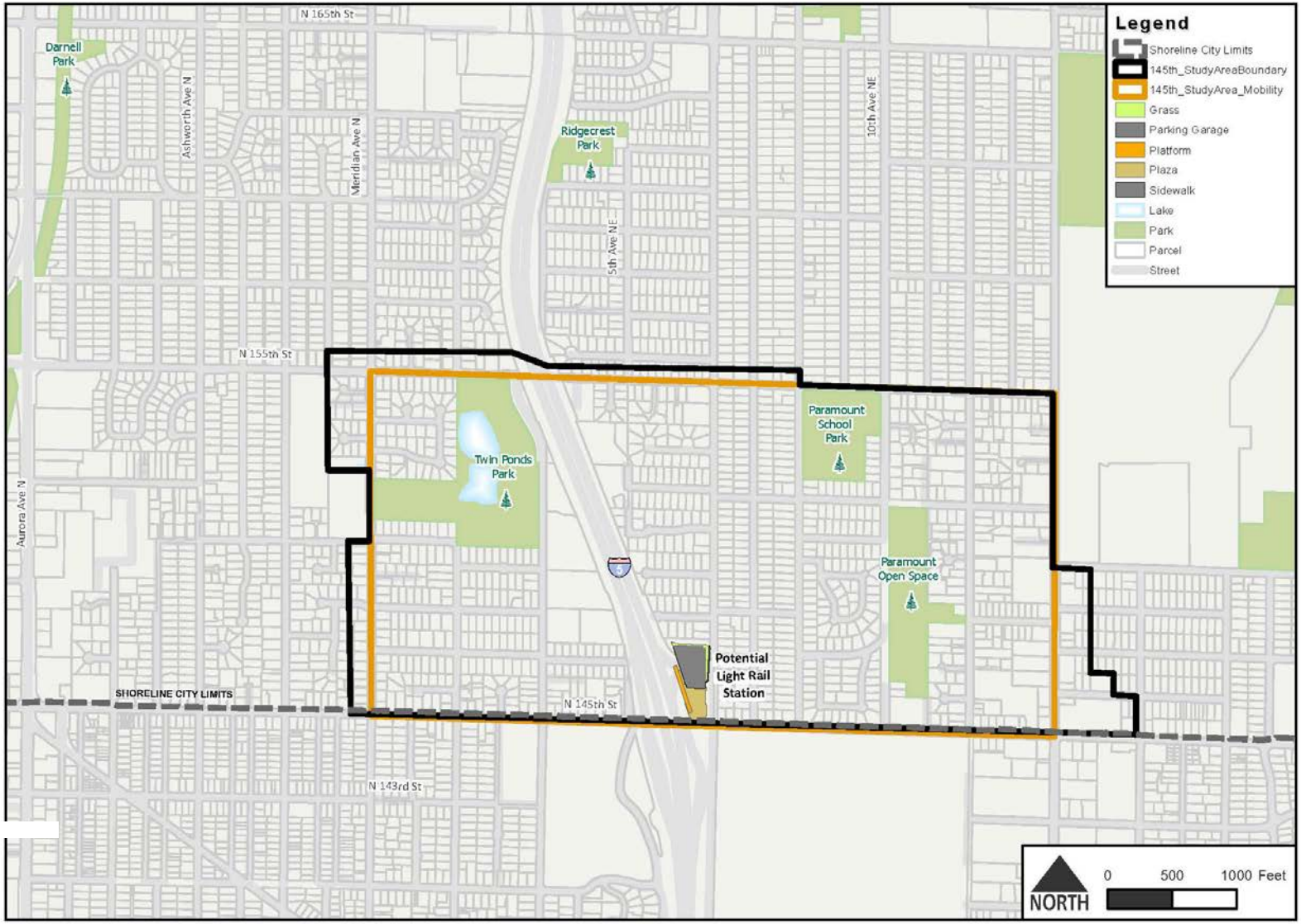


Figure 3.1-1 Land Use (Black) and Mobility (Gold) Study Area Boundaries, which Together Comprise the Subarea

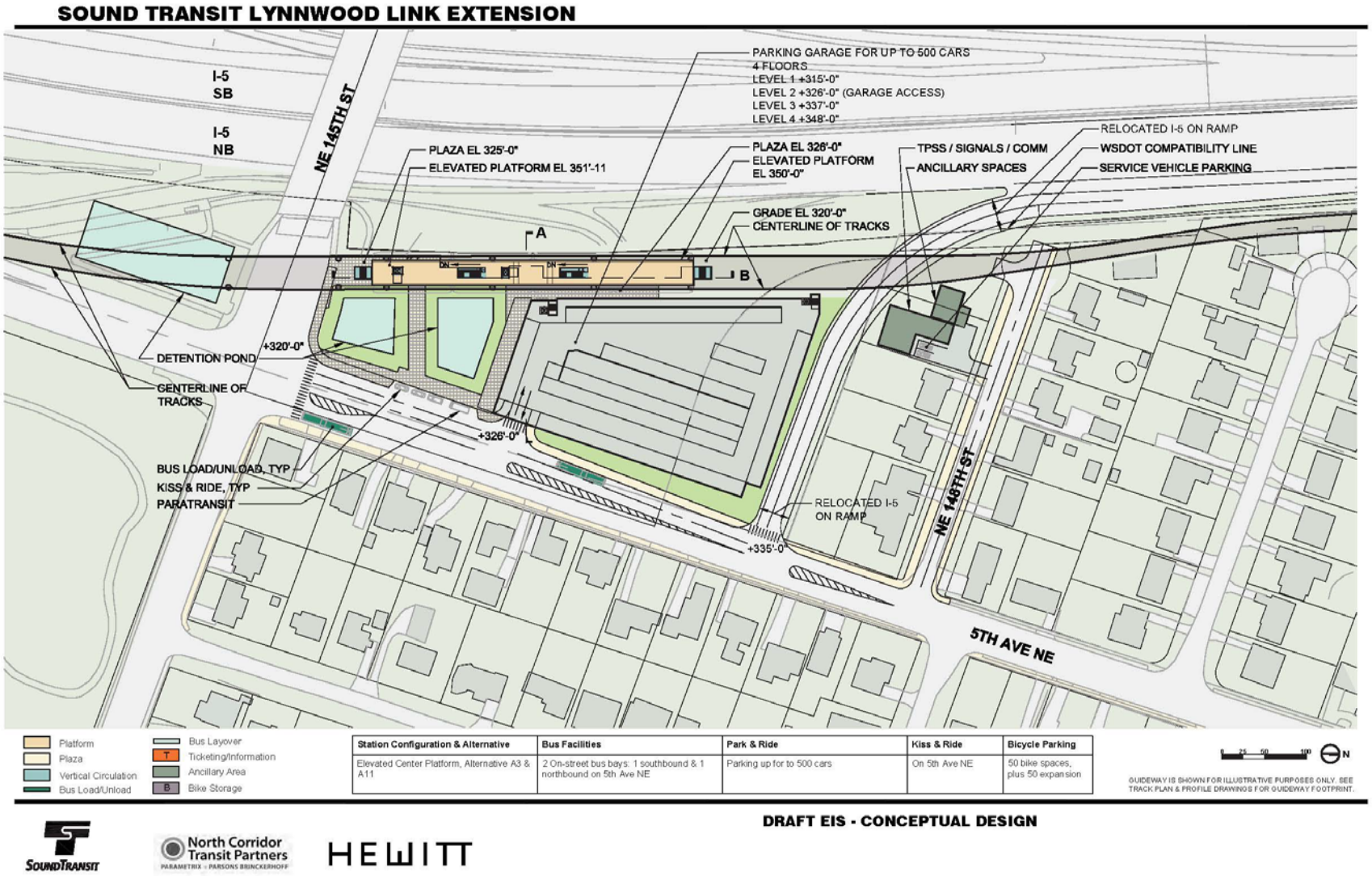


Figure 3.1-2a Sound Transit's Conceptual Design Plan (Plan View) for the 145th Street Station
(Source: Lynnwood Link Extension Draft Environmental Impact Statement, Sound Transit and Federal Transit Administration, July 2013)

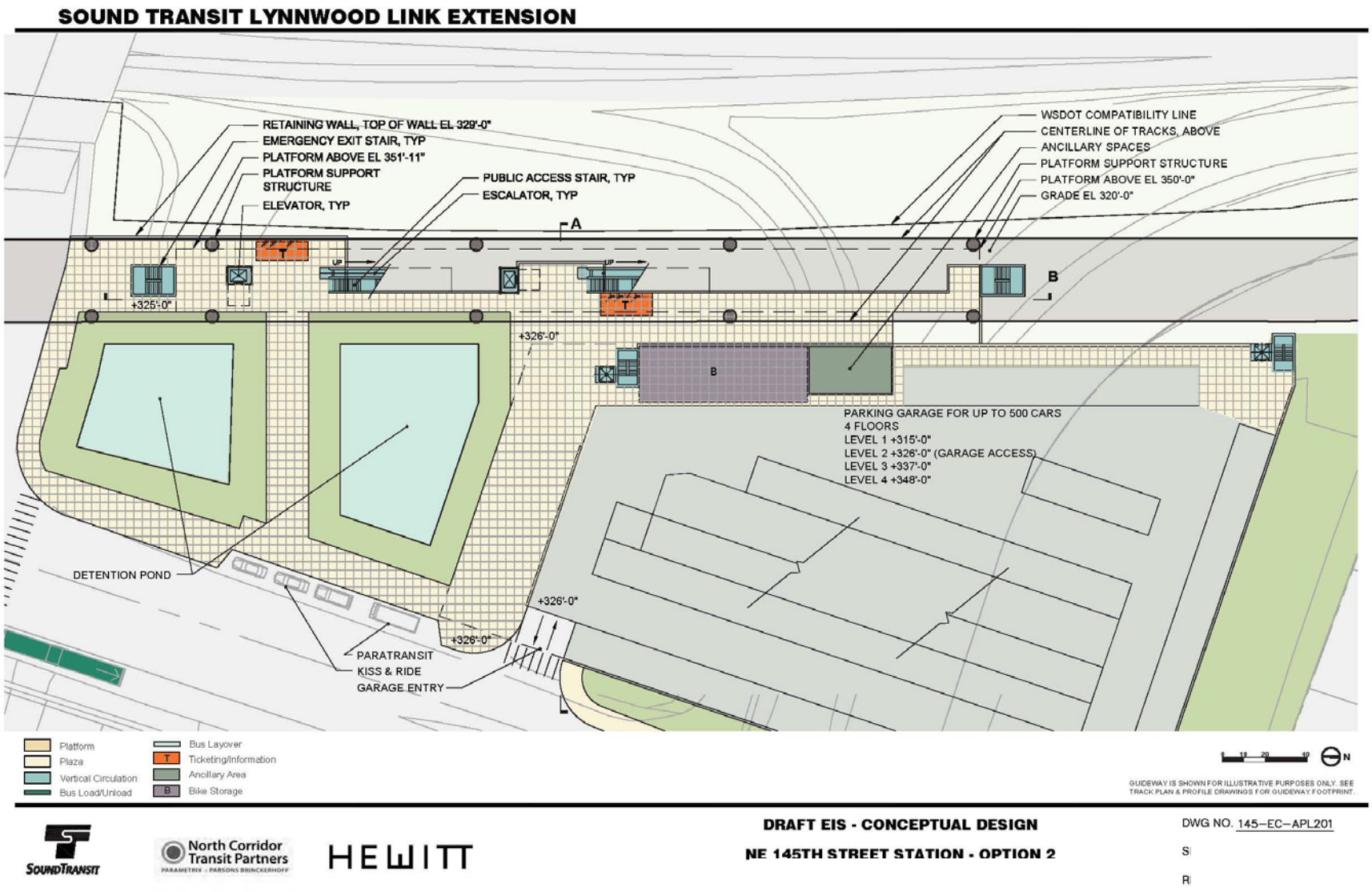


Figure 3.1-2b Sound Transit's Conceptual Design Plan (Enlarged Plan View) for the 145th Street Station
(Source: Lynnwood Link Extension Draft Environmental Impact Statement, Sound Transit and Federal Transit Administration, July 2013)

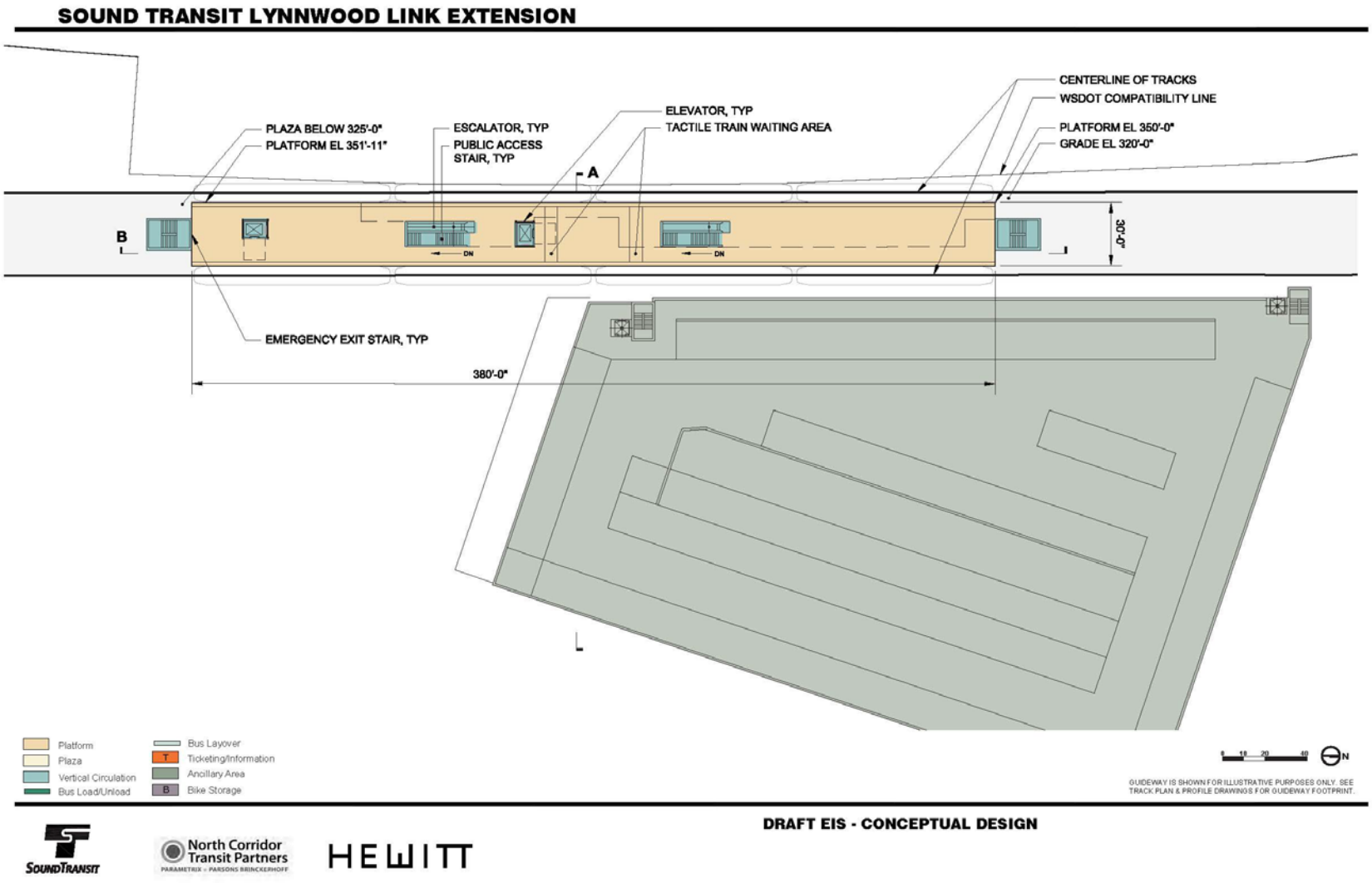


Figure 3.1-2c Sound Transit's Conceptual Design Plan (Platform Level Plan) for the 145th Street Station
(Source: Lynnwood Link Extension Draft Environmental Impact Statement, Sound Transit and Federal Transit Administration, July 2013)

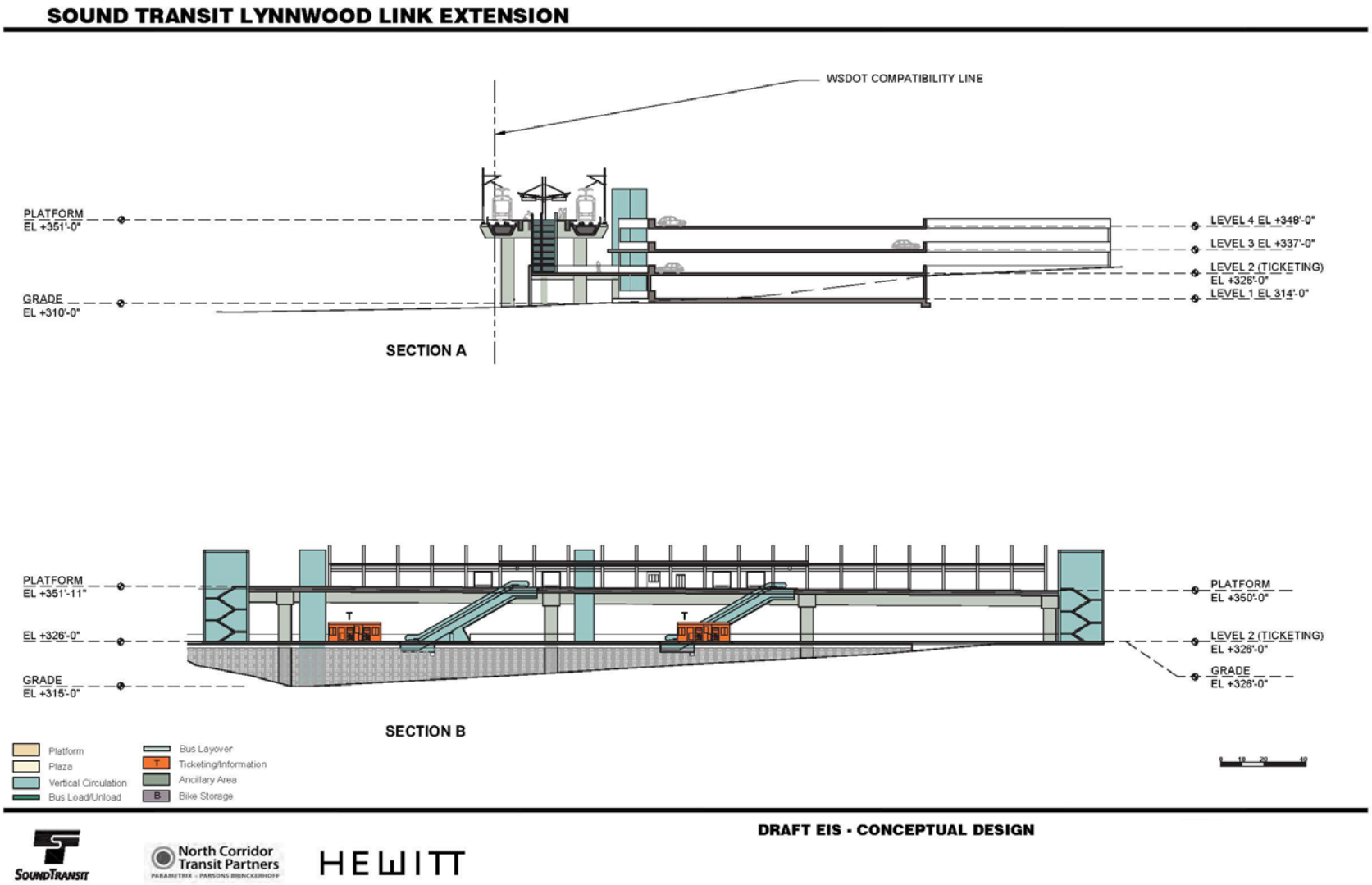


Figure 3.1-2d Sound Transit's Conceptual Design Plan (Cross Section Views) for the 145th Street Station
(Source: Lynnwood Link Extension Draft Environmental Impact Statement, Sound Transit and Federal Transit Administration, July 2013)

In the coming years, the City intends to leverage the regional investment made to implement light rail and prioritize improvements in the station subarea to serve proposed growth.

Growth and change over the past 50 years in the subarea has been minimal, limited to areas that are zoned to accommodate redevelopment into a mix of residential, commercial, retail, and office uses, such as 15th Avenue NE. Refer to Section 3.2 for a discussion of population, housing, and employment, including existing conditions, trends, and growth forecasts and targets. While the focus of planning is in the vicinity of the future light rail station, existing commercial/retail and multifamily land uses and zoning in proximity to the NE 145th Street and 15th Avenue NE intersection and along the 15th Avenue NE corridor are within the TAZ boundaries analyzed for population, housing, and employment.

Current Neighborhoods in the Subarea

The subarea includes the following defined Shoreline neighborhoods:

- Parkwood
- Ridgecrest
- Briarcrest (Only a small portion of this neighborhood is within the subarea boundaries, specifically the parcels adjacent to the east of 15th Avenue NE.)

Other neighborhoods on the periphery of the subarea include Westminister Triangle, Meridian Park, and North City. **Figure 3.1-3** illustrates the neighborhood area boundaries in proximity to the subarea.

Shoreline's neighborhoods are very engaged in the community and maintain active neighborhood associations . Shoreline's Council of Neighborhoods consists of two representatives from each of the neighborhood associations (including those listed above). The Council of Neighborhoods meets monthly to network, learn about other neighborhood happenings and meet with City representatives. This two-way communication allows neighborhood associations to provide community input and the City to present information on programs and projects. Brief descriptions, including historical information, for the three primary neighborhoods in proximity to the subarea follow.

Parkwood Neighborhood—Located at the southern edge of Shoreline, the Parkwood Neighborhood extends from N 160th Street to NE 145th Street, and from Aurora Avenue N to Interstate 5. Twin Ponds Park is a key feature of the neighborhood. Twin Ponds Park contains two ponds, recreational facilities, and a natural area with a stream that feeds Thornton Creek. Parkwood lies within the headwaters of the Thornton Creek watershed, a complex system of small streams and peat bogs, where wild cranberries were known to grow. Early accounts of the area mention how Native Americans would visit the area that is now Twin Ponds Park to collect the wild cranberries. The Interurban Trail crosses through the northwest corner of the neighborhood.

The Parkwood Neighborhood, like other neighborhoods of Shoreline, was primarily agriculture and forest with a few residential homes in the early 20th century. Businesses such as wood cutting, grocery, poultry, and fur animal husbandry took place. Extensive peat mining occurred in the Parkwood area as well. Eventually construction of roads such as North Trunk Road (now Aurora Avenue N) led to easier access between the neighborhood and Seattle, increasing the neighborhood's desirability.

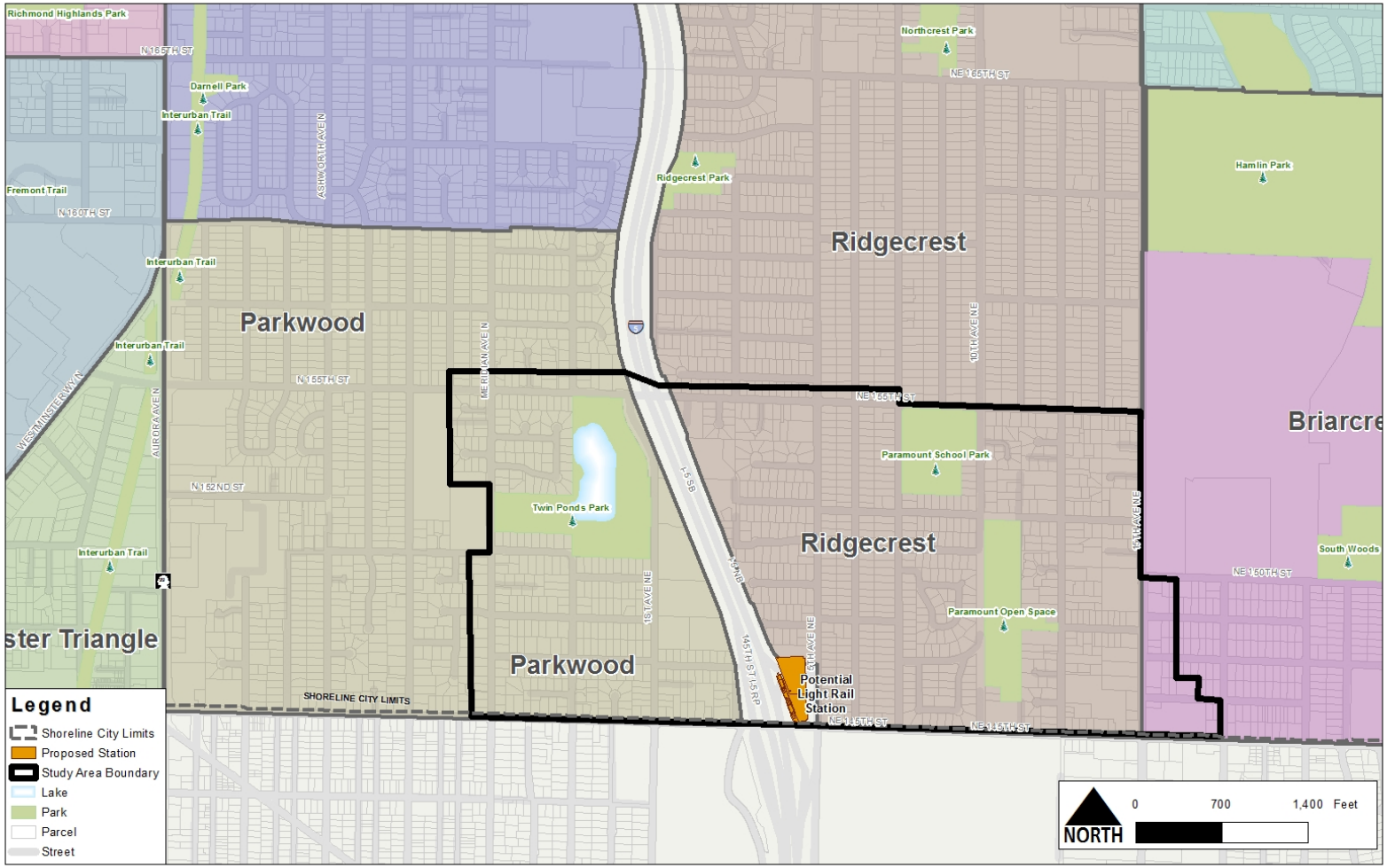


Figure 3.1-3 Existing Neighborhoods in the Vicinity of the 145th Street Station Subarea

The area saw steady increases in population until the Great Depression and during World War II, when housing development slowed. After the war was a different story as families began to migrate to homes in the suburbs. Developers such as the Western Land Company platted and built homes in the Parkwood area, and other neighborhoods in Shoreline, forming much of the land use character that is still visible today. The area's population boomed from the 1950s through the 1960s, drawn by its reputation as a great place to live with high quality schools and parks. Today, the predominant land use in Parkwood still consists of single family homes, with the exception of commercial uses along Aurora Avenue N, and public recreational facilities in Twin Ponds Park. In addition to single family homes, multifamily and assisted living residences also exist in the neighborhood. Parkwood's 2014 population was estimated to be 2,562.

Ridgecrest Neighborhood—Ridgecrest Neighborhood extends from I-5 east to 15th Ave NE, and from the southern boundary of NE 145th Street to the northern boundary of NE 175th Street. The planned light rail station and park-and-ride structure is located in this neighborhood.

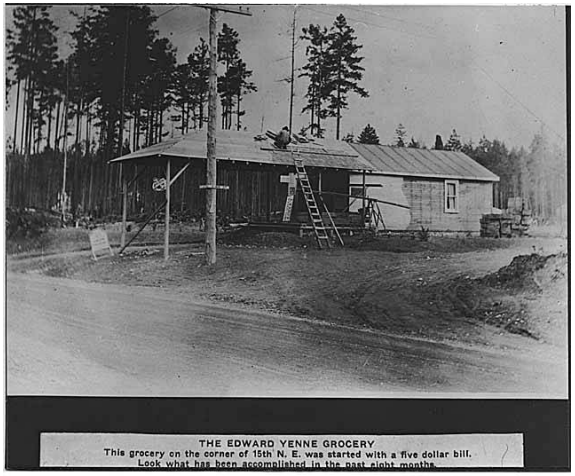
The first major housing development in the neighborhood happened in the mid 1940s, near the end of World War II. Returning soldiers could purchase any one of the 100 houses that were built in 100 days. So many families with school age children moved to the neighborhood that the newly completed Ridgecrest Elementary School had to run double shifts. The majority of the single family housing stock was built in the late 1940s to early 1950s on large lots, set well back from the streets. Although some homes in this neighborhood were built earlier, including a log cabin built in 1933 from trees logged from the property that still stands today.

Today, Ridgecrest is a primarily a middle income, working class neighborhood that is both multi-cultural and multi-generational. According to the 2010 US Census, Ridgecrest had 6,116 residents and 2,175 homes, making it one of the most populated neighborhoods in Shoreline. The neighborhood also has nine churches and four parks, as well as Shoreline's only theatre and skate park and the oldest operating 7-11 store in the State of Washington.

Briarcrest Neighborhood—Briarcrest Neighborhood is located in the southeast corner of the city, east of the Ridgecrest neighborhood, and extends to the eastern city limits, adjacent to Lake Forest Park. A large portion of Briarcrest was originally part of the Hamlin homestead acquired by the Hamlin family in 1895. The land was logged and farmed for decades. Much of the land of the original homestead was sold and developed. In 1939 Seattle Trust and Savings Bank donated 8 acres to King County, which became Hamlin Park. Hamlin Park is considered the oldest official park in the King County park system (but today is part of the City of Shoreline's park system). Over the years, the park was expanded through land dedications, and an area to the east was acquired by the Shoreline School District. Today, the 80-acre Hamlin Park contains ball fields, public art, picnic areas, and forest.

In addition to Hamlin Park, South Woods Park is another important open space in the neighborhood, consisting of a lowland forest with maintained trails, and pedestrian improvements. In addition to the two parks, predominant land uses within the neighborhood include single family residential homes, Shorecrest High School, Kellogg Middle School, and Acacia Cemetery.

Historic Photos of Shoreline and Subarea Vicinity



Property of Shoreline Historical Museum

The historic image in the upper left, circa 1910, shows the old Interurban Streetcar line looking northwest. The image in the lower left, circa 1925, is the Edward Yenne Grocery store in Ridgecrest. The image in the upper right, circa 1922, is the Carlson Family in their potato field in the Parkwood neighborhood. (Photos courtesy of the Shoreline Historical Society)

NOTE: While some historical scenes are from locations outside the station subarea, they provide context of the history of development of the Shoreline area.

Historic Photos of Shoreline and Subarea Vicinity

The image in the upper left, circa 1948 shows a flood on Aurora Ave N and 160th St. near the entrance of Coefield's Fountain. The image in the lower left, circa 1939, is of the Interurban car on Pershing Bridge. The historic image in the upper right, circa 1915, shows the Fish family house on the Queen City Poultry Ranch. The image in the lower right, circa 1914, is of Mae Newkirk feeding her chickens. (Photos courtesy of the Shoreline Historical Society)

NOTE: While some historical scenes are from locations outside the station subarea, they provide context of the history of development of the Shoreline area.

Existing Conditions in the 145th Street Station Subarea

Looking North to 145th Street and 5th Ave intersection

View of proposed light rail station site from 145th Ave & I-5 overpass

North Jackson Park and Ride Entrance at 5th Ave NE

Twin Ponds Park – East Entrance

Twin Ponds Park – North Entrance

Intersection of 5th Ave and 155th St looking south

Southeast corner of South Woods Park

Shorecrest High School

Hamlin Park

Briarcrest is primarily a residential community today with two-thirds of residents living in single family homes and one-third living in apartments and condominiums. The estimated population of the Briarcrest neighborhood was 3,014 people in 2014.

Key Sites and Assets of the Subarea

Twin Ponds Park

Located just across I-5 and slightly to the north of the proposed station is Twin Ponds Park. This park is seen as a key feature, being the only major green-space and recreational area in the subarea west of I-5. The park is irregular in shape and surrounded by primarily single family homes, as well as an assisted living center across the street to the east.

The park was originally referred to as South Central Park by King County. The name was changed to Twin Ponds at some point, likely named after the two ponds that are the dominant feature of the park. In the 1940s and 1950s the property was mined for peat.

Recent improvements to Twin Ponds Park were implemented through a bond approved by voters in 2006. The bond acquired park property and made improvements to its soccer fields. Improvements included installation of synthetic turf to replace a formerly sand field. This also improved surface water quality and drainage. The Twin Ponds Community Garden is an organic P-Patch-style garden in the SE corner of Twin Ponds Park. It consists of 36 10' x 10' raised beds and two 4' x 10' accessible beds. "The Giving Garden" is located in the center of the community garden and is dedicated to growing food for donation to the local food bank, Hopelink Shoreline. The Giving Garden is run entirely by volunteers. Twin Ponds Park and Twin Ponds Community Garden are owned and operated by the City of Shoreline.

Paramount Open Space and Paramount Park

Paramount Park and Open Space are located about five blocks east of the planned light rail station. Paramount Park is located just to the north of Paramount Open Space. Paramount Open Space is a wooded area available for passive recreation use with soft-surface trails, pond access, and interpretive and plant identification signage. Paramount Park has been improved to accommodate more active recreation and contains baseball/softball fields, restrooms, playground, skate park, a trail that circumnavigates the park, and picnic shelters. The park and open space areas are frequently used by area residents.

Protection of Parks and Open Space Assets

The City of Shoreline fully intends to preserve and protect existing park and open space lands in the subarea. As such, no change in land use is proposed for these areas. In community workshops during the planning process, participants stated that parks and open space areas would continue to provide valuable green space to future residents as the subarea redevelops and that land use alternatives should look to maximize access to these features. Participants also were concerned that the natural resources and habitat areas of the park be sufficiently protected to avoid impacts from population growth and more intensive use over time.

Church Properties

There are a few church properties within the station subarea. These properties are larger in size than the single family parcels that make up most of the subarea. These properties could become potential transit-oriented development sites, due to their size and location along arterial and collector streets. If the property owners are willing and interested, portions or all of these sites have the potential to be redeveloped over time, converting all or portions of the site to mixed use with housing (including affordable options). Proposed zoning under the action alternatives studied in this DEIS would accommodate this redevelopment. These properties could either be redeveloped directly by the owners or sold to interested developers in the future at the owners' discretion.

Southeast Neighborhoods Subarea

The Southeast Neighborhoods Subarea is bounded on the south by NE 145th Street, on the west by 8th Avenue NE, on the north by NE 155th and NE 150th Streets, and on the east by Bothell Way.

The City of Shoreline developed a subarea plan for the Southeast Neighborhoods, which was adopted in May 2010. The plan was developed several years before the preferred location for the 145th Street light rail station was identified, but makes reference to a potential future light rail stop in the subarea. Updated land use designations were adopted in the subarea, allowing more medium and high density residential as well as mixed use and community business. Several policies in the plan pertaining to Natural Environment; Land Use; Housing; Transportation; Parks, Recreation & Open Space; Economic Development; and Community Design are relevant to the 145th Street Station Subarea Plan, as summarized in Chapter 2 of this DEIS.

Home-based Businesses and Interest in Converting from Single Family Use

There are a few small neighborhood businesses in the subarea, and an interest in more flexibility to convert single family homes to office and small business use. As with other urbanizing areas, there will be a growing need for more neighborhood services and businesses in the subarea, under the action alternatives studied in the DEIS. There is also an increasing trend in teleworking, with more people interested in having home-based businesses and offices. This growing need can be addressed through adjustments to zoning regulations to provide more flexibility to convert single family homes to business and office uses. Refer to discussion later in this section about proposed zoning and development provisions that would accomplish this under the action alternatives.

Aurora Square Community Renewal Area

Aurora Square is a shopping district built in the 1960s at the crossroads of Aurora Avenue N and N 155th Street, outside the subarea, but within the retail service area of existing and future residents of the subarea. The 70-acre site was designated as a Community Renewal Area (CRA) by Shoreline City Council, recognizing that economic renewal would deliver multifaceted public benefits. A Renewal Plan for the CRA was developed in 2013 and calls for several key actions as part of redevelopment and revitalization of the area. More aspects of this plan are summarized in Chapter 2, but the key opportunity related to the station subarea is proximity and access to the shopping center (in

its current form as well as to potential future new uses there) via N-NE 155th Street. Public amenities and infrastructure redevelopment at Aurora Square could be resources for future station subarea residents. For example, a grand public space is envisioned with redevelopment of the shopping center, which could become an important destination for subarea residents. Also the CRA plan calls for implementation of district energy and eco-district solutions. Infrastructure in N-NE 145th Street and/or N-NE 155th Street built for district energy conveyance could possibly be designed to extend to future customers in the station subarea. Good multimodal connections between Aurora Square and the station subarea will be important as planning, design, and implementation of redevelopment projects proceed. More information about the plan is available at: http://www.cityofshoreline.com/business/aurora-square-community-renewal-area.

The Fircrest Campus

The Fircrest Campus is state-owned property that is not in the subarea, but located immediately to the east. Fircrest School, located at the campus, is a state-operated residential habilitation center for individuals with developmental disabilities. The Adult Training Program offers Fircrest residents vocational training and supported employment opportunities.

As with Aurora Square, redevelopment at the Fircrest Campus could offer land uses that are compatible and cohesive with the new redevelopment in the station subarea over time. However, any decisions about potential development on this campus would be up to the State, and entail a master planning process that would include extensive public involvement, and an act of the Legislature. The City is unaware of any such proposal, and is not considering any change in use or zoning regarding Fircrest as part of this subarea process

Redevelopment Potential Based on Market Analysis and Recent Trends

Redevelopment opportunities in the subarea are based on a specific station subarea market assessment prepared for the City of Shoreline by Leland Consulting Group (August 2014). Information from Sound Transit's Lynnwood Link Extension Station Area Transit-Oriented Development Potential report (April 2013) also was reviewed. Redevelopment opportunities consider the long-range potential for growth and change in the station subarea consistent with Shoreline's vision and the regional objective to maximize the number of people living and working in proximity to high-capacity transit.

Key findings of the station subarea market assessment completed by Leland Consulting Group include the following.

- An increased demand in multifamily and various types of housing as Shoreline continues to attract residents of varying income levels. While the market assessment prepared by Leland Consulting Group for the 145th Street Station Subarea identified a potential demand for approximately 800 residential units or more through 2035, additional demand for housing could occur during the next twenty years depending on changes in the market, opportunities provided elsewhere, property owners' willingness to redevelop or sell their properties for redevelopment, and other factors. Certainly, the demand for housing would continue beyond twenty years, and may grow higher depending on these factors.

- New demand for retail and commercial services, most likely being pulled into place as part of mixed-use projects. Challenges with this development would be accommodating the growing need for parking associated with these services.

- The office market in the area will most likely not grow significantly because this type of land use is generally attracted to denser areas and transportation nodes.

- Health care facilities, higher or primary education, government facilities, and other uses are also potential candidates for the station subarea, but are not considered market driven.

- The 5th Ave NE corridor has potential to be seen as a "neighborhood boulevard".

The Lynnwood Link Extension Station Area Transit-Oriented Development Potential report completed by Sound Transit in 2013 included a preliminary market assessment of the demand for office space, multifamily housing, retail space, and lodging. The findings of the TOD Development Potential report were generally consistent with the findings of the subarea market assessment described above.

The Urban Land Institute (ULI), a national professional organization for developers, real estate investors and land use professionals researches and tracks trends in redevelopment across the nation. In a 2014 forecast of "development prospects," ULI ranked infill housing and urban mixed use redevelopment as the two highest prospects. Retiring baby boom generation and the emerging generation of home buyers and renters (also known as the Millennials or Generation Y) are creating a higher demand for urban infill housing and mixed use.

Based on recent studies by ULI and others, both of these types of consumers are seeking active neighborhoods and in many cases are looking for more compact, connected urban lifestyles. While urban central cities are projected to do well in the coming years based on this demand, places that mix the best of suburban and compact, mixed use qualities may be most desirable. In a recent national survey "American in 2013: Focus on Housing and Community" ULI found that among adults polled (including Baby Boomers and Millennials/Gen Y-ers), the quality of public schools, parks and recreation facilities, walkability, and short distance to work or school all ranked as important or very important.

Shoreline's reputation as a livable community, with good schools, parks, trails, and other amenities, will continue to attract residents in the coming decades. However, the potential timing and pace of redevelopment is difficult to predict given the influences of market forces, property owner interests, the need to assemble large enough parcels for redevelopment, and many other factors described earlier.

For more information on market analysis and trends refer to the report prepared by BAE Urban Economics, available at: http://www.cityofshoreline.com/Home/ShowDocument?id=15704 as well as the analysis prepared by Leland Consulting Group for the 145th Street Station Subarea, available at: http://www.cityofshoreline.com/home/showdocument?id=17855.

Relationship of the City of Shoreline Comprehensive Plan and Code Provisions to the Subarea Plan

The 145th Street Station Subarea Plan would become an adopted element of the City of Shoreline Comprehensive Plan. The City of Shoreline Comprehensive Plan contains extensive goals and policies that are relevant to the subarea and planned action, including specific framework policies for the light rail station areas and Land Use Element policies that guide station subarea planning. Relevant goals and policies of the Comprehensive Plan, as well as the plan's land use designations, and other applicable provisions are summarized in Chapter 2 of this DEIS. While the proposed changes in land use are consistent with Comprehensive Plan policies, some amendments to the Comprehensive Plan would be required to support implementation of the subarea plan (such as amendments to the land use map and descriptions).

The City's Development Code, a section of the Shoreline Municipal Code, includes requirements, standards, and guidelines for zoning and development, including private and public facilities. Specific revisions and updates to the Development Code would be required with adoption of the subarea plan. Since light rail is a new form of transit service coming to the community with unique opportunities, Development Code revisions have been created to support transit-oriented development opportunities, with new and unique regulations to implement the City's vision for the subarea. Development Code amendments to support the 145th Street Station Subarea Plan would create new zoning designations and provisions to address building setbacks, architectural step-backs of buildings, building heights, design standards, allowable uses, housing types, transition standards between land uses, parking requirements, and affordable housing provisions. These are described in more detail in Section 3.1.3 Mitigation Measures.

3.1.2 Analysis of Potential Impacts

This section of the DEIS analyzes potential impacts related to land use of the three alternatives: Alternative 1—No Action, Alternative 2—Connecting Corridors, and Alternative 3—Compact Community. **Figure 3.1-4**,**Figure 3.1-5, and Figure 3.1-6** later in this section depict these alternatives. The concept creating a green network of pedestrian and bicycle friendly streets, trails, stormwater management and low impact development facilities in public rights-of-way is proposed under each of the action alternatives. This concept is described in more detail in Section 3.6 of this DEIS. **Figure 3.1-7** shows a conceptual illustration of the proposed green network.

Necessary Plan and Code Amendments

Adoption of any of the action would require updates to the Shoreline Comprehensive Plan and Shoreline Municipal Code (including the Development Code and zoning provisions). This is an expected outcome of the subarea planning process, and the City is prepared to make these amendments.

Comprehensive Plan amendments effective upon adoption of the subarea plan would revise the Land Use Map to correspond with zoning designations. Goals and policies of the Land Use Element, including those pertaining specifically to Mixed Use and Commercial Land Use and Light Rail Station Subareas would be revised to more closely align with the subarea plan and its

proposed policies as part of the 2015 docket cycle. Because Comprehensive Plan policies listed in Chapter 2 of this DEIS are applicable to the subarea, the subarea plan will likely include a nominal number of proposed policies, which would provide direction regarding implementation or further study.

Both action alternatives would require amendments to the zoning and Development Code provisions. City zoning maps would need to be amended, and zoning descriptions and requirements related to the new zoning categories would need to be integrated into the City's Code. Proposed zoning is described later in this section.

Additional Development Code amendments, many developed through the 185th Street Station Subarea Planning process, include more flexibility for converting single family homes to exclusive business or office use, design and transition standards, and incentives and requirements for green building and affordable housing.

Regulations that allow for development agreements could be applied within the MUR-85'and MUR-65' zones. With a Development Agreement, bonus density/height could be granted by the City with the provision of specific features. Required elements would include affordable housing, provision of park space, structured parking, and green building.

Other development standard amendments address requirements such as height, setbacks, step backs in buildings, architectural treatments, and a variety of other provisions applicable to the MUR-85', MUR-65', MUR-45', and MUR-35' zoning.

Recommended Development Code amendments are described under 3.1.3 Mitigation Measures, and will be encompassed within the future Planned Action Ordinance created for the subarea.

Alternative 1—No Action would not amend existing zoning or development standards.

Proposed Zoning Categories and Descriptions

Four new zoning categories are being introduced for the subarea. These would be applicable under any new zoning adopted for the subarea.

- MUR-85': Mixed use residential with 85-foot building height *
- MUR-65': Mixed use residential with 65-foot building height*
- MUR-45': Mixed use residential with 45-foot maximum building height; based on R-48 zoning
- MUR-35': Mixed use residential with 35-foot maximum building height; based on R-18 zoning

*Potential exceptions are described later in this section.

These new zoning designations were developed to support neighborhood-serving businesses and additional housing styles. They represent a change from the current system of defining zoning by density maximums to using height limits instead. The City is updating Code provisions to add these zones and define allowed uses; dimensional, design, and transition standards; mandatory requirements; and incentives for desired amenities. Existing single-family homes are protected under all new zoning

designations. Refer to the illustrations at the end of this section for illustrations of potential housing styles that could be built within these zoning categories.

MUR-85'

Mixed-Use Residential—85-foot base height: This zone would allow building heights of 85 feet (generally seven stories tall). Building types would typically be mixed use with residential and/or office uses above commercial or other active use at the ground floor level. This zone would accommodate mixed use with residential and/or office uses above commercial or other active use at the ground floor level. Building types would generally be 5 over 2 (five levels of wood-frame construction over a two level concrete podium base with these two levels typically consisting of active uses and parking).

MUR-65'

Mixed-Use Residential—65-foot base height: This zone would allow building heights of 65 feet (generally five to six stories tall). This zone would accommodate mixed use with residential and/or office uses above commercial or other active use at the ground floor level. Building types would generally be 5 over 1 (five levels of wood-frame construction over a one level concrete podium at the ground floor level).

Potential Height Bonus with Development Agreements in MUR-85' and MUR-65' Zones

The Planning Commission discussed, and included in draft regulations, provisions for developer agreements that could award additional height/density for projects that provide a mix of required and optional amenities. See additional discussion later in the section and draft development regulations for more information. This would only be applicable to development projects in the MUR-85' and MUR-65' zones. The next feasible building height for construction after the 5 over 2 building type requires steel frame construction, which is significantly more expensive, and usually requires twelve stories to cover costs. As such, the allowable maximum height for buildings in the MUR-85' and MUR-65' zones with development agreements would be 140 feet, which would allow twelve to fourteen stories. For purposes of analysis in this DEIS, it was assumed that 25 percent of the properties zoned MUR-85' in Alternative 3 and MUR-65' in Alternative 2 would be developed to the 140-foot height at build-out, although this assumption is likely high.

It is anticipated that is could take many years to implement redevelopment at the density allowed in the MUR-85' zoning. Redevelopment of this type (supporting building heights of seven stories or more with development agreements) would require aggregation of a large number of parcels. Given current market forces, which generally do not support construction of tall buildings in single-family neighborhoods, it is more likely that lower-density styles would occur initially through infill development. However, more intense uses may be appropriate in the long-term.

MUR-45'

Mixed-Use Residential—45-foot height limit: Similar to the existing zoning category R-48 that allows 48 dwelling units per acre, this zone would allow multi-family building types. The height limit for MUR-45' would be 45 feet (differing from the height limit of R-48, which currently varies from 40 feet if adjacent to single family zones, 50 feet if adjacent to multi-family

zones, and 60 feet with a Conditional Use Permit). The new MUR-45' zone would be limited to 45 feet regardless of adjacent zoning, which equates to a four story building. The MUR-45' zone would allow housing styles such as mixed use buildings with three levels of housing over an active ground floor/commercial level. Buildings such as row houses, townhomes, live/work lofts, professional offices, apartments, etc. also could be developed in MUR-45', and single family homes could be converted to commercial and professional office uses like in MUR-35'.

MUR-35'

Mixed-Use Residential—35-foot height limit: Similar to the existing zoning category R-18 that allows 18 dwelling units per acre, this zone would allow multi-family and single family attached housing styles such as row houses and townhomes. The height limit for this zone is 35 feet, which is the same as single-family R-6 zones, and equates to a 3-story building. MUR-35' also would allow commercial and other active uses along streets identified as arterials. These types of buildings might include live/work lofts, professional offices, and three-story mixed use buildings (two levels of housing over one level of commercial). This also would allow conversion of existing homes to restaurants, yoga studios, optometrist offices, and other uses.

Retention of Existing Zoning Designations

The action alternatives would retain varying portions of the subarea in existing zoning designations. Existing zoning categories in the subarea are listed in Chapter 2. For more information about these zoning designations, refer to the Shoreline Municipal Code: http://www.codepublishing.com/wa/shoreline/.

Consistency with Plans and Policies

The Washington State Growth Management Act (GMA) requires participating jurisdictions to conduct capital facilities planning for six and twenty year planning horizons. The 145th Street Station Subarea Plan will summarize capital facilities improvements that would be needed to support implementation of rezoning (redevelopment) in the station subarea over the next twenty years. The subarea plan and Planned Action Ordinance will set a growth target that provides a framework for anticipated population, household, and employment growth between 1.5 percent and 2.5 percent annually. By identifying an area for initial focus, capital improvements can be better defined to serve that area.

If growth were to exceed the overall average of 1.5 percent to 2.5 percent and occur more quickly, achieving the twenty year growth target earlier, the City would update capital facilities improvements planning to support additional growth beyond the twenty year target. The City updates its capital facilities plans on a regular basis anyway, and would continue to closely monitor improvement needs in the subarea as growth and change occur over the next twenty years to ensure that sufficient infrastructure (transportation, utilities, etc.) is in place to support redevelopment as it occurs.

Alternative 1—No Action is not consistent with or supportive of the City's adopted Comprehensive Plan or policies of other plans adopted by the City. Alternative 1 also it is not consistent with plans and policies adopted at the regional, state, and federal levels, it is not a viable option for meeting the purpose and need of the planned action.

The First Twenty Years of Implementation under Either Action Alternative

Both action alternatives are consistent with existing plans and policies. Implementation requirements related to planning and development regulations over the first twenty years would be similar under either Alternative 2—Connecting Corridors or Alternative 3—Compact Community, the anticipated pace of growth and change would be similar. While Alternative 2 would cover a broader geographic extent than Alternative 3, the level of ongoing implementation and regulation activities would be similar under either action alternative.

Alternative 2—Connecting Corridors is consistent with and supportive of adopted plans and policies at the local, regional, state, and federal level. Alternative 2 spreads the level of potential change out over more geography by lining the 5th Avenue NE and N-NE 155th Street corridors with mixed use zoning (primarily MUR-35' and MUR-45'). The mixed use along these corridors would provide more opportunities for neighborhood retail and services over time and would result in more employment opportunities than under Alternative 3. As such, Alternative 2 would help to support some of the City's policies related to economic development more fully than Alternative 3.

Alternative 3—Compact Community is consistent with and supportive of adopted plans and policies at the local, regional, state, and federal level. Alternative 3 would result in more intensive and vibrant urban development around the light rail station and more housing opportunities than under Alternative 2 at full build-out. As such, Alternative 3 would help to support some of the City's policies related to housing more fully than Alternative 2. As discussed in Section 3.2, both action alternatives would provide opportunities to better balance housing and jobs in Shoreline. Alternative 2 would result in more employment than Alternative 3, and as such, could help to achieve the jobs-to-housing balance more effectively at full build-out than Alternative 3. However, Alternative 3 would provide a greater level of diverse housing opportunities (including affordable options), addressing another important need in Shoreline.

Land Use Patterns and Compatibility between Land Uses

Under all alternatives, it is anticipated that the subarea would experience growth and change. Alternative 2—Connecting Corridors would result in the greatest extent of geographic change and the highest level of employment opportunities at full build-out. Alternative 3—Compact Community would result in the highest level of population and housing levels at full build-out. That said, it is anticipated that the pace of change during the first twenty years after adoption would generally be the same with either of the action alternatives (averaging around 1.5 percent to 2.5 percent annually).

Alternative 1—No Action would retain existing zoning. However***, "No Action" does not translate to "No Change" in the subarea.*** With the implementation of light rail, there would be greater demand for land uses in proximity to the station, particularly for housing. The current zoning for much of the subarea is R-6. The R-6 zoning allows six units per acre. The average number of units per acre currently in the subarea is 3.2. As such a substantial number of new housing units (more than double the current number) could be constructed over time in the subarea under the current zoning. Attached single family

homes (such as duplexes, triplexes, and townhouses) and accessory dwelling units (attached or detached, maximum one per lot) are allowed in the R-6 zone if proposed redevelopment meets certain criteria (refer to Shoreline Municipal Code 20.40.510). The current maximum height for buildings in the R-6 zone is 35 feet.

Much of the housing stock in the subarea is reaching an age of 50 to 60 years or more, and some residents have made substantial renovations to their homes or have demolished existing homes to build new ones. This trend likely would continue under Alternative 1. With the anticipated demand for more housing that will occur with light rail, as homesites are redeveloped in the subarea in the future (under Alternative 1—No Action), the community could expect to see either larger and taller single family homes or combinations of various types of attached multiple-unit single family buildings and accessory dwelling units.

Most homes in the subarea are currently one story or two stories in height (approximately 15 to 25 feet high). New residential buildings, including accessory dwelling units, could be constructed to a maximum height of 35 feet (approximately 3 to 3.5 stories). For comparative purposes, throughout north Seattle, there has been significant construction of this type over the last twenty years, which has changed the character of single family neighborhoods.

It is also important to note that redevelopment under Alternative 1—No Action would not be consistent with the adopted vision for the light rail station area as a vibrant, equitable transit-oriented district. Single family redevelopment under the No Action Alternative would provide fewer opportunities for new affordable housing than proposed under Alternatives 2 or 3, as well as a significantly lower overall quantity of various types of housing to fit diverse income levels, and substantially less mixed use/neighborhood commercial at street level. Increased housing choice and affordability will be needed to serve the growing demand in the subarea over the long term.

Without zoning changes to require higher densities, single family home development would continue to be the focus in the subarea. Transit-oriented redevelopment opportunities with a variety of housing choices and mixed use development would not occur.

Investments in infrastructure and street improvements in the subarea would be very limited under Alternative 1—No Action compared to the two action alternatives.

The First Twenty Years of Implementation under Either Action Alternative

It is anticipated that Alternative 2—Connecting Corridors would change land use patterns over a broader geographic extent than Alternative 3—Compact Community over the first twenty years of implementation. That said, the MUR-35' and MUR-45' zoning along 5th Avenue NE and 155th Street in Alternative 2 would result in multifamily development that could be designed to be generally compatible with existing land uses in the subarea (building heights of 35 feet and 45 feet are generally compatible with the current allowed building height of 35 feet over most of the subarea). Setback requirements, landscaping, and design

guidelines in City Code regulations would help to enhance compatibility.

Alternative 3 calls for more overall density and taller base height in the vicinity surrounding the planned light rail station than Alternative 2 calls for. This means that a greater level of change to land use patterns in the area around the planned light rail station could occur over the next twenty years under Alternative 3 than under Alternative 2. That said, market forces may not support the full level of transit-oriented development proposed under the MUR-65' and MUR-85' zoning for decades, and the need to assemble properties to accommodate larger parcels for development of the taller buildings under either alternative could take many years, slowing the progress of redevelopment.

Alternative 2—Connecting Corridors proposes more geographic extent of change than Alternative 3 in comparison of the two action alternatives. However, less density is proposed in proximity to the planned light rail station with the MUR-65' zoning (vs. MUR-85' in Alternative 3). More retail/commercial use and office use would be expected under Alternative 2, than under Alternative 3 based on the extent of mixed use proposed zoning.

The pattern of proposed zoning would result in appropriate transitions between land uses. For example, MUR-45' is typically located between MUR-85' and MUR-35' zoning. MUR-35' zoning is typically located between MUR-45' and single family zoning such as R-6. Even with these provisions, as change occurs throughout the subarea, there could be incompatibilities between new redevelopment and existing homes. The City's development standards provide setbacks, landscaping requirements, and other provisions to provide buffers between land uses that would help to address these issues.

Alternative 3—Compact Community would create change in a smaller geographic area than under Alternatives 2 in comparison of the two action alternatives. However, Alternative 3 would permit taller buildings than Alternative 2 via the MUR-85' designation in proximity to the planned light rail station.

Alternative 3 includes the same transitions in zoning as described above under Alternative 2, and it would require the same development standards. As discussed for Alternative 2, the same potential incompatibilities would be expected as the subarea redevelops and the same proposed development standards would be applied under Alternative 3 as under Alternative 2. Alternative 3 potentially could have less capacity and flexibility to respond to market conditions and property owners' interests than Alternative 2 since less land area would be rezoned.

Potential Built Form and Neighborhood Character

Each of the two action alternatives proposes a mix of zoning under the MUR-85', MUR-65', MUR-45', and MUR-35' categories, along with retaining other existing zoning categories in the subarea. Over many decades the subarea likely would transform from a predominantly single family residential to a mix of housing types and neighborhood-serving retail and uses. While this would be a substantial change, the growth and related change would be expected to occur very gradually, similar to other urbanizing neighborhoods in the region such as Green Lake and Greenwood. Each phase of redevelopment would be evident as it occurs, but

the overall level of change would be less perceptible than if it were to occur within a shorter timeframe. Mitigation measures including a variety of development standards and transitional zoning provisions are proposed to help buffer existing land uses from new redevelopment in the subarea.

With redevelopment, neighborhood character would change, but the subarea also would see positive enhancements, such as improved streets, intersections, and streetscapes, additional public spaces, parks, trails, and recreation facilities, and community benefits such as sidewalk cafes, public art, plazas, and other amenities. Low impact development treatments such as rain gardens and stormwater planters would be envisioned as surface water management solutions. Regarding these positive changes to the neighborhood, Alternative 2 could result in the most amount of these over time due to the geographic extent of redevelopment proposed compared to Alternative 3.

Redevelopment of the subarea regardless of the alternative pursued would be subject to compliance with City policies and regulations, including historic preservation requirements as applicable.

Under Alternative 1—No Action, there would be minimal change to built form and neighborhood character. Streets, roadways, and public spaces would remain similar in character over the long term to today's conditions, although traffic congestion station subarea could become a growing problem due to limited roadway and intersection improvements.

Differences in Building Heights

Alternative 1—No Action would not change existing zoning and as such, existing building height requirements would remain. The vast majority of the subarea is currently zoned R-6 (Residential allowing six units per acre), and in the R-6 zone a maximum height of 35 feet is allowed. In other areas of the subarea zoned for community business and multifamily, taller buildings already are allowed under the current Code requirements.

The First Twenty Years of Implementation under Either Action Alternative— Alternative 2—Connecting Corridors could increase building heights over a broader geographic extent than Alternative 3—Compact Community over the first twenty years of implementation. The MUR-35' and MUR-45' zoning proposed along 5th Avenue NE and 155th Street in Alternative 2 would allow building heights of 35 feet and 45 feet compared to the current allowed building height of 35 feet over most of the subarea. Setback requirements, landscaping, and design guidelines in City Code regulations would help to enhance compatibility. Alternative 3 calls for more overall density and taller base height in the vicinity surrounding the planned light rail station than Alternative 2. However over the next twenty years under either action alternative, redevelopment to the MUR-65' or MUR-85' densities and heights would be expected to be impeded by the lack of larger parcels and the need to aggregate parcels with willing-seller interest.

Alternative 2—Connecting Corridors proposes MUR-65' zoning, which would allow a base building height of 65' with the potential for bonus height/density of up to 140 feet with development

agreements that ensure projects meet special requirements. The MUR-65' zone is located in proximity to the planned light rail station. This is a lower height than the MUR-85' proposed in this area under Alternative 3.

As discussed previously, if development projects incorporate characteristics such as green building, additional affordable housing, structured parking, and other amenities, they could have the ability to add bonus height/density to their projects, which could involve increases in height above the 65-foot level (but no greater than 140 feet) in all areas zoned MUR-65'. This would be a negotiated and public process.

For purposes of this analysis, population and household unit calculations liberally assume this could occur over approximately 25 percent of the area zoned MUR-65'. If over time the City observes a trend that could lead to more than 25 percent of buildings in height over 65 feet (and greater density), additional environmental analysis would need to be conducted to evaluate potential impacts and reassess project and program needs before additional development would be permitted.

Under Alternative 2 a greater extent of MUR-45' (45-foot maximum height) and MUR-35'(35-foot maximum height) is proposed than under Alternative 3. This means that while some building heights in the vicinity of the light rail station may be lower under Alternative 2 than under Alternative 3, overall throughout the subarea, the height of buildings would increase more, with a focus along the connecting corridors of N-NE 155th Street or 5th Avenue NE.

Alternative 3—Compact Community proposes MUR-85' zoning, which would allow a base building height of 85' with the potential for bonus height/density of up to 140 feet with development agreements that ensure projects meet special requirements, as discussed for Alternative 2. Population and household unit calculations in this DEIS assume this would occur over approximately 25 percent of the area zoned MUR-85'.

As with Alternative 2, if over time the City observes a trend that could lead to more than 25 percent of buildings in height over 85 feet (and greater density), supplemental environmental impact analysis would need to be conducted to evaluate potential impacts and reassess project and program needs before additional development would be permitted.

Market analysis has indicated that there may be minimal demand for mid-rise buildings in the subarea in the foreseeable future. However, over time this demand could grow. Zoning would preserve a broader range of possibilities for the subarea over the long term.

Under Alternative 3, there would be less MUR-45' and MUR-35' zoning along the N-NE 155th Street and 5th Avenue NE corridors, and as such building heights along these corridors would be expected to be lower at build-out than under Alternative 2.

As previously discussed, under Alternative 1, there could be a change in character over time to taller, more expensive single family homes. Many current homes are one story to two stories in height. Up to 35-foot-high homes are allowed, so taller homes could be constructed over time. Up to six units per acre are allowed under the current R-6 zoning. Because the current

density is typically 3.2 units per acre in the subarea, property owners may choose to add more units over time. Accessory dwelling units and/or conversion and reconstruction of homes into duplexes and triplexes would be permissible if certain requirements are met by Code.

Extent of Mixed Use Development

Mixed use development could occur with MUR-85', MUR-65', MUR-45', or MUR-35'. The ground floor of this type of construction typically includes active uses along the street with parking behind the active uses and below grade. The second level can be housing, office, or commercial use, or in some cases it can be structured parking. This is a common type of construction in the region for mixed use development. Active uses at the street level help to ensure a vibrant, walkable environment and typically include neighborhood retail uses and services.

MUR-45' (four/four and a half building levels above ground) and MUR-35' (three/three and a half building levels above ground) also could include active uses at the street level, and often would consist of various types of low-scale multifamily housing such as row houses, townhomes, live/work lofts, and other types of attached housing.

Under Alternative 2, more MUR-45' and MUR-35' zoning is proposed than under Alternative 3. As such more overall mixed use redevelopment could occur in the subarea than under Alternative 3 at full build-out. This also could result in more employment opportunities.

Potential Real Estate Speculation and Long-Term Predictability

Property owners have expressed concerns that real estate investors may be interested in purchasing single family homes and holding them as rentals until the time is right for redevelopment in the future. Many homeowners in both station subareas have already received letters offering fair market value, possibly because investors believe that properties will be less expensive before zoning changes or light rail service is operational. This type of speculative buying could occur regardless of whether or not the City was planning to rezone areas surrounding future stations immediately. One reason to implement zoning change sooner rather than later is to provide long-term predictability regarding what type of uses will be allowed where, and ample time for homeowners to become informed about the potential for change and determine their own long-range plans. For those that choose to sell, understanding the long-term potential of the property may allow them to capture additional value.

Graphic Models of Bulk and Height and Illustrative Examples

Each alternative has been modeled to show the expected built form (housing and mixed use development) that could result from implementation. Illustrations later in this section present simulated 3-D Sketch Up models for each alternative. These models conceptually illustrate the potential building form that could occur with full build-out of each alternative using the SketchUp model technique. The colors shown in the model graphics represent the MUR zoning designations described

previously. Photographic examples of the built form/housing types that could be constructed under the new MUR zoning categories also are presented.

Renderings also have been developed to show possible redevelopment concepts for various locations in the subarea and are presented later in this section, along with layout concepts of how potential redevelopment could be configured adjacent to existing and new streets in the subarea. It should be noted that these illustrations are conceptual and represent a point in time of phased development that could occur over many decades in the future.

3.1.3 Mitigation Measures

Proposed Mitigation Measures

The City intends to amend its Comprehensive Plan to reflect the proposed alternative adopted through the subarea plan, and the City will adopt revisions to the Shoreline Municipal Code, including amendments to zoning provisions and development standards to support implementation of the subarea plan. These would occur under any of the redevelopment alternatives.

Capital project investment would be expected to increase over time to support anticipated growth, and as a result subarea residents would benefit from transportation and infrastructure improvements. The Capital Facilities Element of the Comprehensive Plan also would need to be updated at the next opportunity to reflect priorities for the subarea to support the proposed growth.

With the proposal to adopt the planned action, redevelopment would be able to proceed through streamlined environmental review as long as it is consistent with the planned action thresholds for growth for the next twenty years. The planned action threshold also provides a checkpoint for monitoring growth and change in the subarea. If more growth occurs than expected, the City would need to reevaluate the environmental analysis in this DEIS and potentially implement additional mitigation measures.

As described earlier in this section of the DEIS and in Chapter 2, there are extensive policies already adopted by the City of Shoreline that would be supported by the subarea plan, regardless of which action alternative is implemented. Policies within the Shoreline Comprehensive Plan; Climate Action Plan; Environmental Sustainability Strategy; Economic Development Strategy; Transportation Master Plan; Parks, Recreation, and Open Space Plan; Surface Water Master Plan; Southeast Neighborhoods Subarea Plan; and other adopted plans would be furthered and supported by redevelopment of the subarea.

Action Alternatives: Alternative 2—Connecting Corridors and Alternative 3—Compact Community

Retaining and enhancing neighborhood character is important to residents in the station subarea and required by City of Shoreline Comprehensive Plan policies and Shoreline Municipal Code provisions. It will be important that new higher density residential and mixed use land uses in the station subarea provide buffering and transition when located adjacent to single family uses. Some of the transitions would be accomplished through the proposed zoning frameworks as discussed previously. In addition, the City is preparing amendments to zoning provisions and development

standards in the City's Code that would lead to improved neighborhood character and compatibility. Specific development regulations for the light rail station areas will be adopted. A brief summary of these anticipated provisions is provided below. For the full text of proposed amendments to the Code, refer to the planned action ordinance that will be adopted with the subarea plan.

- ***Development Agreements***—A new set of provisions is proposed allowing Development Agreements that would require specific elements from redevelopment projects in exchange for density/height increases. Elements such as affordable housing, green building standards, and structured parking would be required. Elements such as combined heat and power systems, provision of commercial uses, sidewalk cafes, provision of public open space, and other amenities would be encouraged.

- ***Affordable Housing—***Expanded provisions are being proposed for the Code to encourage and incentivize affordable housing as part of redevelopment projects.

- ***Mixed Use Residential and Live/Work—***Provisions related to mixed use residential development including additional requirements related to live/work units are proposed to encourage a vibrant transit-oriented community with a mix of housing and employment in proximity to the light rail station.

- ***Green Building—***Provisions are being developed to encourage green building and low impact development.

- ***Historic Preservation—***While no formally designated historic landmarks exist in the subarea, there are twelve parcels listed in the City's inventory that are potentially eligible. The mitigation for these potential historic resources would involve a review of historic and cultural resources as part of redevelopment affecting those parcels; however, prescriptive measures to mitigate impacts would need to be developed by the City.

- ***Greater Flexibility in Use of and Conversion of Single Family Homes to Business and Office Use***—Code provisions would allow more flexibility for business and office use in existing single family homes and conversion of homes to exclusively business/office use.

- ***Light Rail Station and Park-and-Ride Design—***The light rail station project including the station and park-and-ride structure design would be subject to a specific agreement with the City that would establish design and implementation provisions for the light rail facilities.

- ***Community and Social Amenities, Heritage Commemoration, Cultural Opportunities, and Public Art—***As the neighborhood grows and changes gradually over time, there will be an increased demand for community amenities, such as public gathering spaces for events, senior facilities, community meeting rooms, farmers markets, community gardens, interpretation and heritage projects that commemorate Shoreline's history, public art, and other social cultural opportunities and events.

These experiences for citizens and visitors are encouraged by City of Shoreline policies, and in addition, the City will consider potential regulations that would require provision of these elements with redevelopment projects. Mitigation measures for parks, recreation, open space are addressed in Section 3.4 of the DEIS. Also, see Section 3.2 for additional discussion of mitigation measures related to Housing Choice and Affordability.

- ***Updated Development Standards***—A variety of amendments to development standards are proposed to reflect the new MUR zoning categories and to require and encourage specific elements such as:
    - Revised front, rear, and side yard setbacks
    - Standards for transition areas, which include architectural step backs in the building design ("wedding cake" form), and landscaping requirements
    - Vehicular access oriented to side and rear rather than to the front along arterials
    - Traffic calming measures
    - Compatible architectural styles
    - Streetscape improvements and landscaping requirements
    - Open space and recreation facilities for residents
    - Parking quantity, access, and location standards
    - Reduced parking requirements in transit-oriented MUR zones
    - Shared parking, HOV, and EV parking encouraged
    - Vehicle circulation and access
    - Good pedestrian access
    - Bicycle parking facilities
    - Lighting to enhance safety and security
    - Building orientation to the street and transitions between buildings
    - Design of public spaces
    - Building façade articulation and compatible architectural form
    - Covered access ways
    - Preferences for architectural finishes and materials
    - Preferences for fencing and walls
    - Screening of utilities, mechanical equipment and service areas
    - Land clearing and site grading standards
    - Tree conservation encouraged with residential redevelopment (but exempt from commercial and MUR-85' redevelopment)
    - Signing requirements
    - Integration of public art, planters, water features, and other public amenities

Other Recommended Mitigation Measures

- ***Exploring Partnerships—***In the near term, the City could explore potential public/private and public/public partnership opportunities in the subarea to help encourage and catalyze redevelopment. These could include working with Sound Transit on the park-and-ride structure and potentially integrating other uses along its street frontage. Partnerships also could include involvement in implementing affordable housing and community uses in the subarea.

- ***Proactive Capital Investments***—The City intends to proactively seek funding for transportation and infrastructure improvements in the subarea, which will help to support redevelopment and enhance neighborhood character.

3.1.4 Significant Unavoidable Adverse Impacts

Proposed redevelopment of the subarea under either Alternative 2—Connecting Corridors or Alternative 3—Compact Community would result in substantial changes in neighborhood character over time. Intensification of development and higher buildings would occur incrementally. While the intensity of redevelopment in this area would be substantially greater than existing conditions, the new redevelopment would be consistent with the Shoreline Comprehensive Plan, and other local, regional, state, and federal plans and policies. Additional housing and employment opportunities would be created, and it is anticipated that a variety of positive neighborhood benefits would result through redevelopment.

Implementation of the planned action would set a threshold for growth and development in the subarea for the next twenty years that aligns with an expected level of capital improvements and investments to support the growth. This would allow the City to monitor change and would trigger additional environmental review if change occurs at a more aggressive pace than anticipated.

Keeping in mind that change in the subarea would be expected to occur gradually, over may decades, it is not anticipated that there would be significant unavoidable adverse impacts that could not be addressed through the mitigation measures discussed above and the City's ongoing proactive monitoring of conditions in the subarea.

Figure 3.1-4 Alternative 1—No Action (Existing Zoning is Shown in the Map)

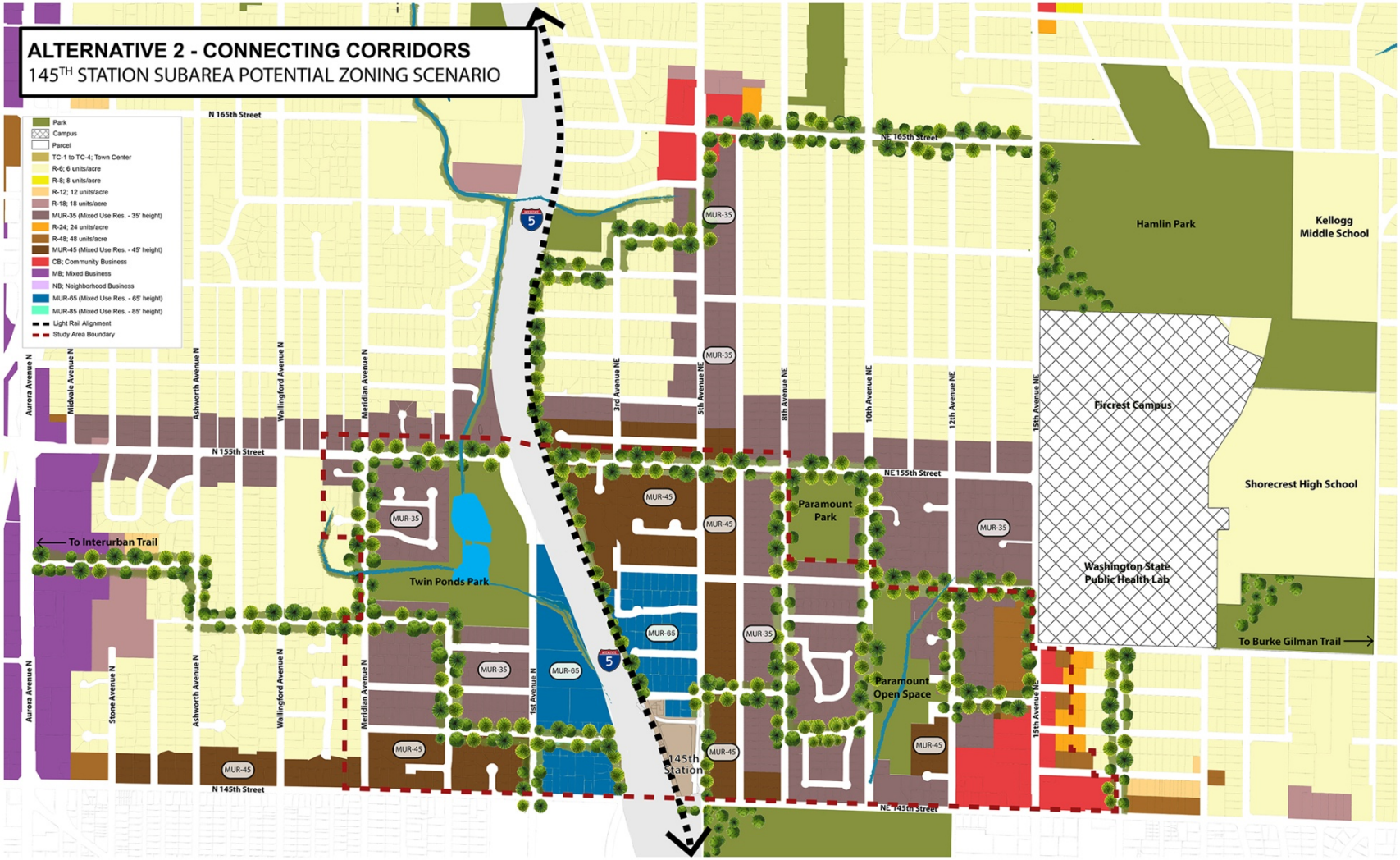


Figure 3.1-5 Alternative 2—Connecting Corridors

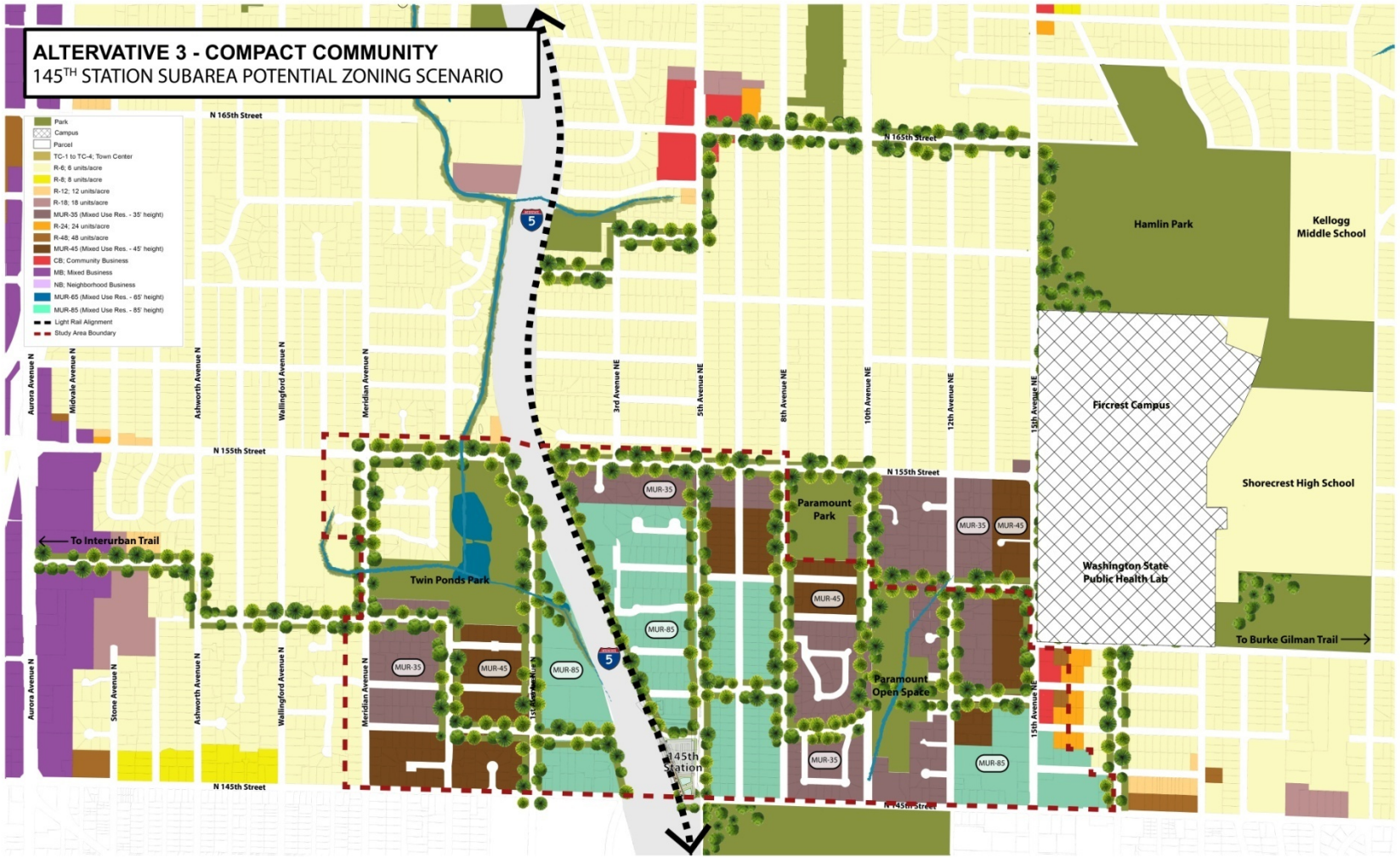
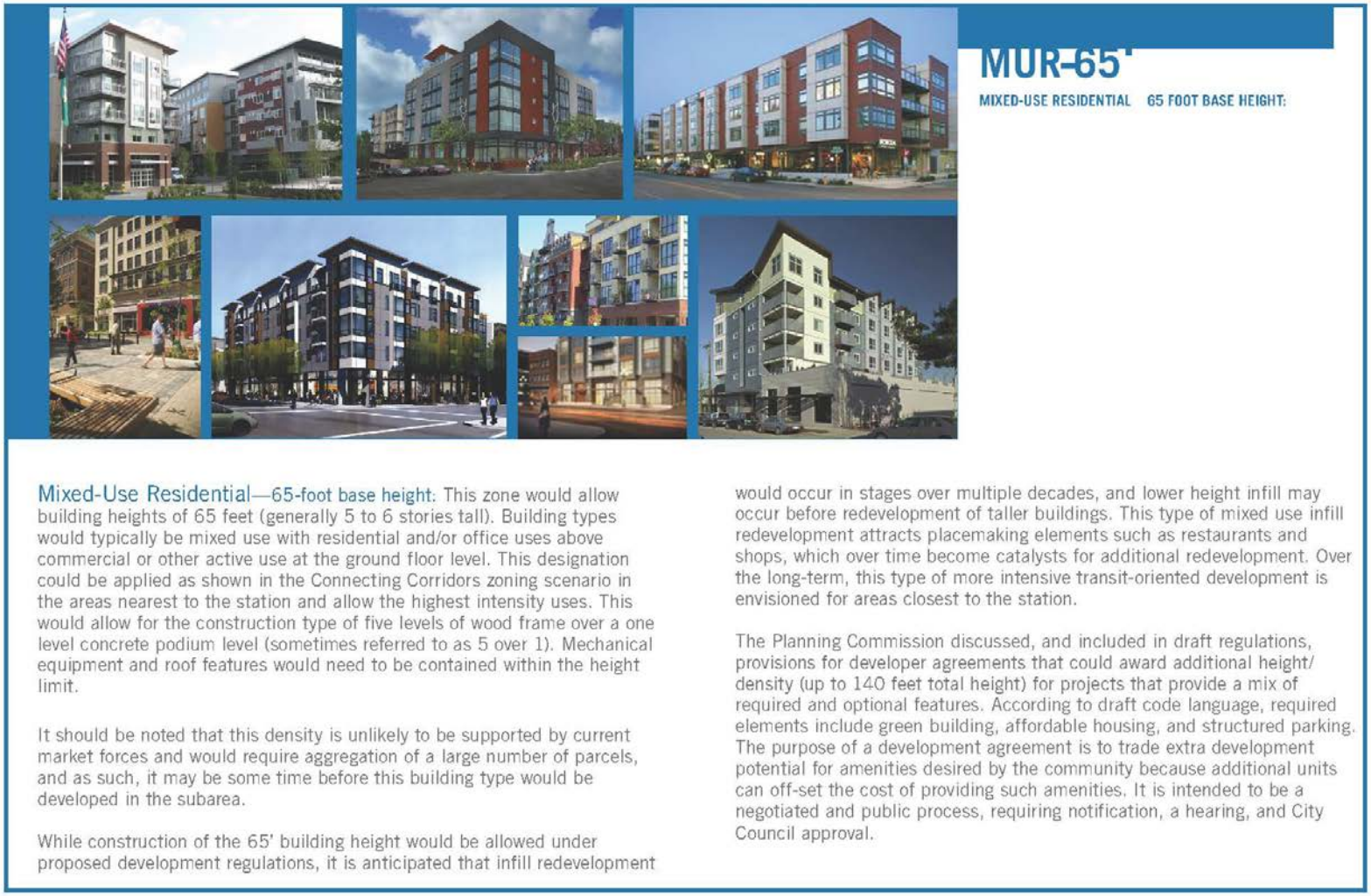


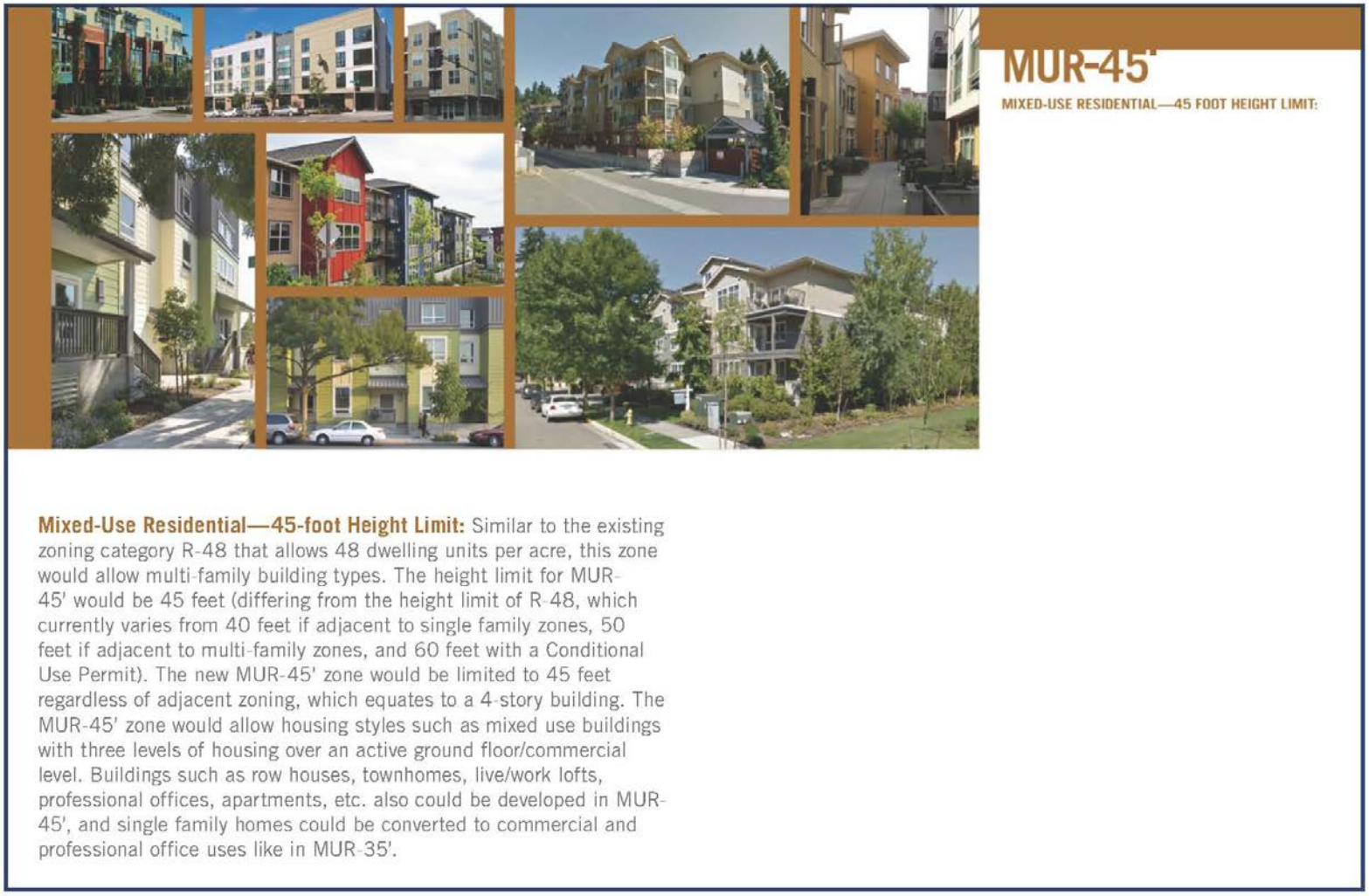
Figure 3.1-6 Alternative 3—Compact Community

Figure 3.1-7 The Green Network—Proposed Under the Action Alternatives

Example Housing and Mixed Use Building Styles-MUR-85' Zoning Designation



Example Housing and Mixed Use Building Styles-MUR-65' Zoning Designation

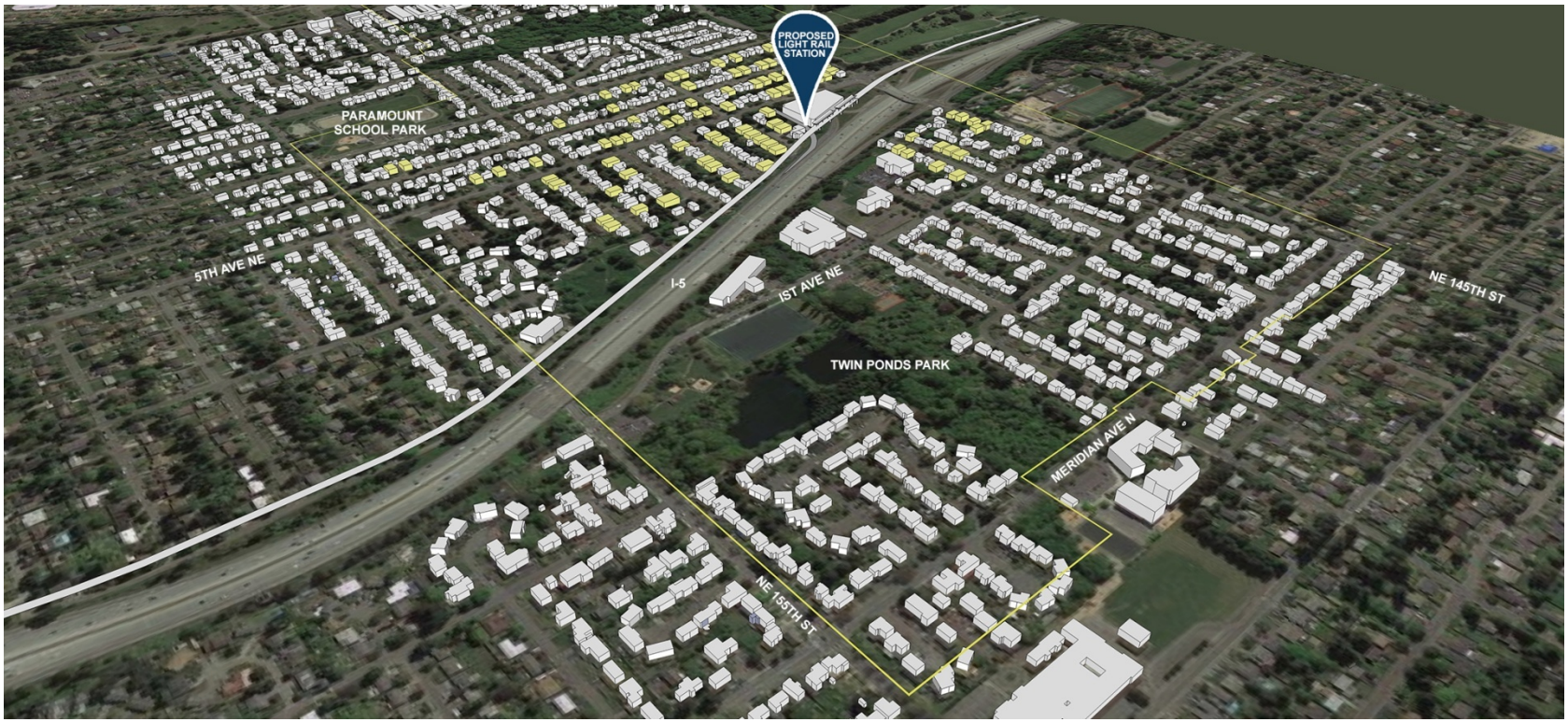


Example Housing and Mixed Use Building Styles-MUR-45' Zoning Designation

Example Housing and Mixed Use Building Styles-MUR-35' Zoning Designation

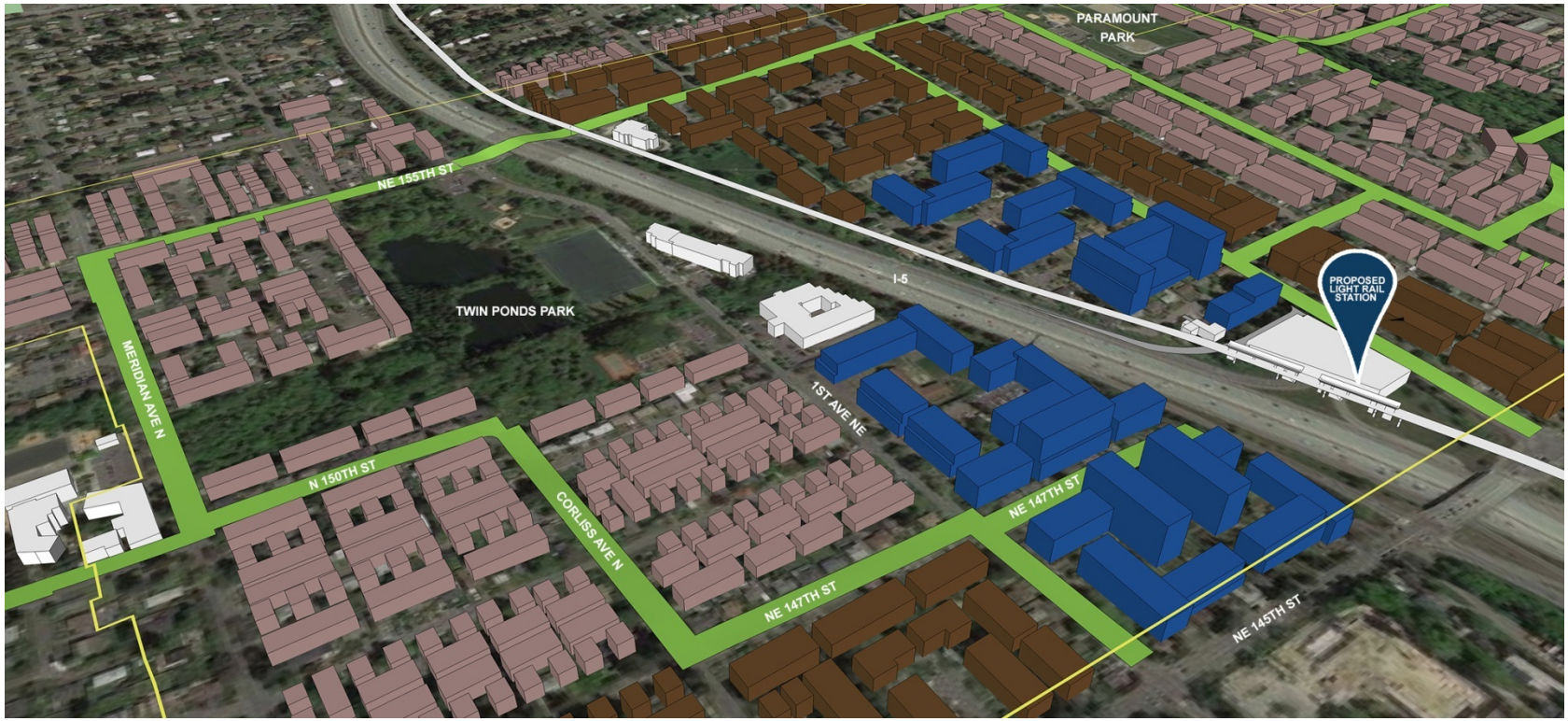
Sketch-Up Model View for Alternative 1—No Action, Looking Northwest toward the Planned Light Rail Station

Sketch-Up Model View for Alternative 1—No Action, Looking Eastward toward the Potential Light Rail Station



Sketch-Up Model View for Alternative 1—No Action, Looking Southeast toward the Planned Light Rail Station

Sketch-Up Model View for Alternative 2—Connecting Corridors, Looking Northwest toward the Planned Light Rail Station



Sketch-Up Model View for Alternative 2—Connecting Corridors, Looking Eastward toward the Planned Light Rail Station

Sketch-Up Model View for Alternative 2—Connecting Corridors, Looking Southeast toward the Planned Light Rail Station

Sketch-Up Model View for Alternative 3—Compact Community, Looking Northwest toward the Planned Light Rail Station

Sketch-Up Model View for Alternative 3—Compact Community, Looking Eastward toward the Planned Light Rail Station

Sketch-Up Model View for Alternative 3—Compact Community, Looking Southeast toward the Planned Light Rail Station

Conceptual possibility for redevelopment and improvements in the vicinity of 5th Avenue NE and NE 149th Street, looking southwest

Conceptual possibility for redevelopment and improvements along 5th Avenue NE in the vicinity of NE 160th Street

Conceptual possibility for an enhanced pedestrian and bicycle crossing of Interstate 5, view from planned light rail station

Conceptual illustration of the possibility of redevelopment in the background of the community gardens at Twin Ponds Park, looking southeast

Conceptual illustration of possible redevelopment surrounding the Paramount School Park site

Conceptual illustration of possible MUR-35' residential development near Paramount Open Space and including stormwater planters along street as part of the green network

3.2 Population, Housing, and Employment

This section describes the affected environment, analyzes potential impacts, and provides recommendations for mitigation measures for population, housing, and employment.

3.2.1 Affected Environment

Shoreline is known as a great place to live in the central Puget Sound region, based on the strong sense of community, good schools, and many parks and recreation opportunities provided throughout the city.

Existing Population and Trends

Shoreline's overall estimated population in 2013 was 54,790 based on information recently released by the US Census Bureau. An estimated 8,321 people live in the 145th Street Station Subarea, approximately 15.2 percent of the city's population. (Note: population is based on subarea boundaries that extend to the outer boundaries of the Traffic Analysis Zones of the subarea. See discussion on page 3-68 and 3-69.)

Shoreline's population increased in the 1980s and 1990s but remained fairly stable between 2000 and 2010. Although the total population of Shoreline did not increase substantially up to 2010, the city has grown an average of slightly over 1 percent per year since 2010 based on US Census Bureau estimations.

In review of the demographic composition of the population, two trends are occurring, including greater race/ethnic diversity and aging of Shoreline's population. The largest minority population is Asian-American, composed of several subgroups, which collectively made up 15 percent of the population as of the 2010 Census. The African-American population, comprising 2,652 people, had the largest percentage increase, at 45 percent between 2000 and 2010, followed by people of two or more races, at 15 percent. Hispanics may be of any race, and this demographic increased 41 percent to 3,493. Additionally, foreign born residents of Shoreline increased from 17 percent of the population to an estimated 19 percent by 2010, as measured by the American Community Survey.

The median age of community residents increased from 39 in 2000 to 42 in 2010. "Baby Boomers", those born between 1946 and 1964, comprise approximately 30 percent of the population. Shoreline has the second largest percent of people 65 and older among King County cities, at 15 percent. Among older adults, the fastest growing segment is people 85 and older, up one-third from 2000.

Families (two or more people related by birth, marriage, or adoption) declined from 65 percent to 61 percent of all households in Shoreline between 2000 and 2010. Non-family households increased from 35 percent to 39 percent of households. The number of people living in group quarters, such as nursing homes, adult family homes, and Fircrest increased by 9 percent between 2000 and 2010 based on the 2010 Census.

Population Growth Trends and Forecasts

The central Puget Sound region is one of the fastest growing metropolitan areas in America. Seattle, Shoreline's neighboring city to the south, grew faster than any other major American city in 2013, according to the US Census Bureau, with approximately 18,000 people moving to the city in the one-year period. Seattle

is the 21st largest city in the US. Seattle's growth rate from July 1, 2012 to July 1, 2013 was 2.8 percent, the highest rate among the 50 most populous US cities, bringing the total 2013 population to 652,405. From July 1, 2012 to July 1, 2013, the Seattle-Tacoma-Bellevue metropolitan area ranked tenth in numerical population growth of metropolitan areas of the US, adding 57,514 people. According to Puget Sound Regional Council's 2040 Transportation Plan, our region will add 1.4 million people and 1.1 million jobs by 2040.

Washington State's overall population is currently 6,951,785 and is forecasted to grow by just above 1 percent per year through 2025 and then at less than 1 percent per year through 2040 according to the Washington State Office of Financial Management.

In looking at growth rates of regional cities, communities in the Puget Sound region have grown at various rates, between less than 1 percent, to about 3 percent annually between 2010 and 2013.

In a review of other transit-oriented districts around light rail and high-capacity transit in the US, growth rates have varied greatly. However, average annual growth rates of around 2 percent are often achieved, but are influenced by a variety of factors.

Based on recent information released by the US Census Bureau, the 15 fastest growing cities in America with populations of 50,000 and larger (similar to Shoreline's size) grew between 3.8 percent (Pearland, Texas) and 8 percent (San Marcos, Texas) between 2012 and 2013.

While Shoreline's population was stable with little growth up to 2010, the population of the community is expected to continue to grow as more housing and employment opportunities are developed. Seattle and other regional cities also are forecasted to continue to grow over the next couple of decades.

The opportunity and potential for growth in the 145th Street Station Subarea would be higher with the adoption of the proposed mixed use zoning under the two action alternatives. However, growth would be moderated by potential challenges related to redevelopment, such as the need to aggregate parcels to create sites large enough for mixed use and multifamily housing, as discussed in Section 3.1. Uncertainty about the market and property owners' interests in redeveloping or selling their properties also moderates the forecast for growth.

With all of these considerations, the anticipated average annual growth forecasted for the subarea is around 1.5 percent to 2.5 percent. This is the assumed growth rate for purposes of subarea planning and environmental analysis.

Capacity Building for the Future and Focus of the Planned Action

Given the considerations discussed above, it is important to recognize that the 145th Street Station Subarea Plan would be a long-range plan to be achieved over many decades. The plan would create capacity and opportunity for redevelopment over the long term for current and future generations of residents in the subarea. Proposed rezoning allows flexibility for redevelopment to occur in a variety of locations in the subarea based on property owners' interests and development market influences.

While the 145th Street Station Subarea Plan will set the vision for what could occur over the long term, it also will define capital improvement and project priorities to support potential redevelopment over the next twenty years, which is the established planning horizon. The plan will address anticipated

phasing and locations of redevelopment and make specific recommendations for public investment in the subarea to support this first stage of growth.

In order to align the subarea plan, also called the "planned action," with the twenty-year planning horizon of 2035, twenty-year growth targets have been set for the Preferred Alternative. These are discussed later in this section and elsewhere in this DEIS.

Assigned Growth Targets for Shoreline

The King County Countywide Planning Policies (CPPs), adopted to implement the Growth Management Act (GMA), establish household growth targets for each jurisdiction within the county. Each target is the amount of growth to be accommodated during the 2006-2031 planning period. Shoreline's growth target for this period is 5,000 additional households; projected to 5,800 households by 2035 (200 households per year).

Applying Shoreline's current average household size of 2.4 people per residence, 5,800 new households equates to 13,920 new residents by 2035. Another recent target set by Puget Sound Regional Council (PSRC) calls for Shoreline to gain more than 7,200 new jobs by 2035, improving its jobs-to-housing ratio to 0.91. (Note: jobs-to-housing ratio and balance are discussed and defined later in this section.)

The City is required to plan for its assigned growth target and demonstrate that its Comprehensive Plan is able to accommodate the growth targets for households and employment. Sufficient land (zoning capacity) and strategies must be in place to show that there will be available housing and services for the projected population. The City of Shoreline has met these requirements through its Comprehensive Plan, which shows that growth targets can be met through housing and employment capacity, particularly along Aurora Avenue N.

Although the city has capacity to meet these growth targets with or without upzoning the station subarea, intensifying densities in proximity to the light rail station is smart growth, consistent with regional goals and policies, as well as those adopted by the City.

With more people living and working near high-capacity transit, Shoreline can better achieve the objectives of the Climate Action Plan and better meet the policies and provisions of the Comprehensive Plan and Transportation Master Plan. Adopted policies related to expanding housing and transportation choices and enhancing quality of life through better connectivity in the station subarea also can be realized.

The proposed zoning and proximity to high-capacity transit also could help to catalyze redevelopment and encourage higher rates of growth in the subarea than are currently being experienced citywide and regionally. A review of growth rates over the last ten years shows that the City has only recently been barely keeping pace with the growth target of 200 households per year within the last couple of years and is not yet meeting the jobs/employment growth target range.

Transit-supportive densities of housing and mixed use development are being proposed in the subarea under the two action alternatives studied in this DEIS. Even without changes in zoning, there would be growing pressure in the single family neighborhoods of the subarea and surrounding neighborhoods for additional households as more people will want to live near the station. As such, even without the adoption of higher densities, it would be expected that homeowners would renovate

or redevelop their properties to maximize density, as discussed in Section 3.1.

Under the proposed zoning, density would be added to the subarea through various types of multifamily and transit-oriented development (mixed use buildings, condominiums, apartments, townhomes, etc.) allowed under the proposed MUR-85', MUR-65', and MUR-45' zoning categories. Attached single-family homes, cottage housing, accessory dwelling units, duplexes, triplexes, and other multiplexes would be expected to develop as a result of the proposed MUR-35' zoning, and this area would serve as a transition between the more intensive density in the station vicinity and the traditional detached single family neighborhoods in outer areas.

Refer to Section 3.1 for a more detailed explanation of expected urban form and neighborhood character.

Redevelopment Potential and Timing

The potential for growth and timing of redevelopment would be influenced by various factors in the subarea, including development market factors and individual property owner decisions on the use of their properties. Proposed upzoning under Alternative 2—Connecting Corridors and Alternative 3—Compact Community would maximize opportunities for future redevelopment. While both alternatives would result in redevelopment and population increases, as well as economic development opportunities at full build-out, Alternative 3 would accommodate more households and population than Alternative 2. Alternative 2 would provide more job opportunities than Alternative 3.

There are church parcels of larger size west of I-5 and north of 145th St. NE that would be suitable for additional growth in the near term, if property owners are interested in redeveloping and incorporating additional uses and development onto their site, or are willing to sell to an interested developer.

Most other properties within the subarea are smaller sized single family residential lots and would need to be aggregated into larger parcels to create a site size suitable for redevelopment to the proposed zoning. As such, throughout the DEIS analysis, it is stated that growth in the subarea would be anticipated to occur very gradually over many decades. As an example, even if the higher average annual growth rate of 2.5 percent were to occur, it is estimated that it would take approximately 60 years to reach full build-out of Alternative 2—Connecting Corridors and 63 years to reach full build-out of Alternative 3—Compact Communities. At a 1.5 percent average annual growth rate, it would take 94 years to reach full build-out of Alternative 2 and 98 years to reach full build-out of Alternative 3.

Population Study Area for Purposes of the Subarea Plan and DEIS

While the subarea plan is focused on the study areas shown in Figures 1-1 and 1-2 in Chapter 1, for purposes of population and employment projection calculations the limits of Traffic Analysis Zones (TAZ) boundaries are assumed as the study area. In some cases, these boundaries extend beyond the land use and mobility study area boundaries designated for the subarea, and overall the area covers a broader geography. TAZs are the common methodology for analyzing demographics regionally in planning.

TAZs for the study area are depicted in **Figure 3.2-1**. It is important to note that the population figures throughout this DEIS (existing and forecasted) relate to the areas shown in this TAZ map, beyond the land use and mobility (multimodal transportation) study area boundaries. The existing estimated population within the 145th Street Station Subarea, including the TAZs associated with the subarea is 8,321. Population within

these TAZs has been a key factor in calculating potential impacts and demand for transportation, public services, utilities in this DEIS.

Recent plans for the Point Wells area have been presented by Snohomish County, which is going through a separate environmental impact analysis process to assess redevelopment opportunities. While potential population growth for Point Wells would occur outside the 145th Street Station Subarea, projected traffic in the subarea as a result of Point Wells development is assumed in this DEIS, as described and analyzed in Section 3.3 Multimodal Transportation.

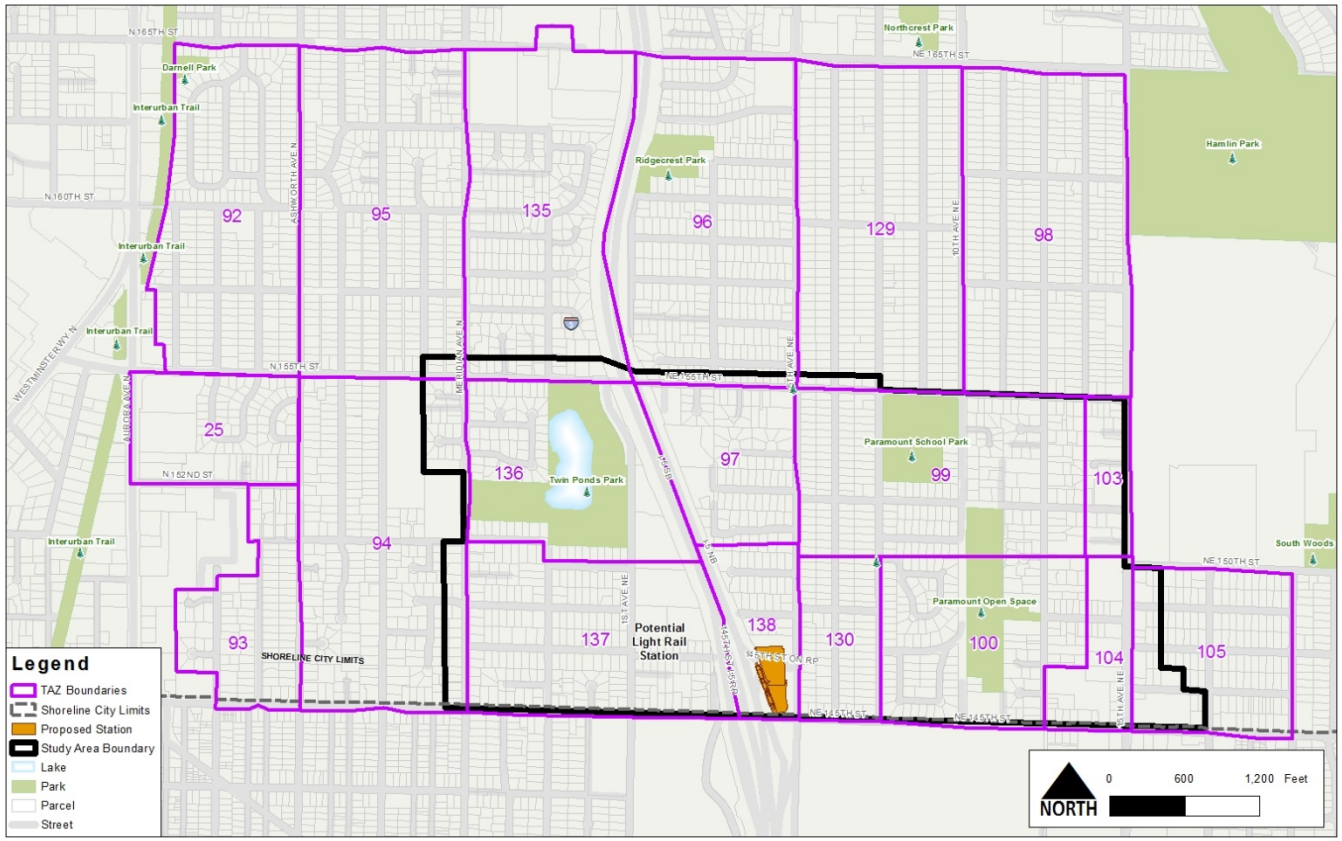


Figure 3.2-1 Traffic Analysis Zones (TAZs) in Proximity to 145th Street Station Subarea, Referenced for Population Calculations

Existing and Planned Housing and Household Characteristics

Planning for expected growth requires an understanding of current housing and household characteristics, as well as economic and market trends and demographics. A summary of the market assessment and economic trends was provided in Section 3.1. Below is a summary of current housing and household characteristics in Shoreline including conditions related to affordability. Much of the information presented is based on the supporting analysis in the 2012 Comprehensive Plan for the City of Shoreline.

Comprehensive Housing Strategy

The demand analysis and housing inventory developed to support the Housing Element of the 2012 Comprehensive Plan meets the requirements of the Growth Management Act (GMA) and Countywide Planning Policies (CPPs) and complements past planning efforts, including the City's Comprehensive Housing Strategy, adopted by Council in February 2008.

The Comprehensive Housing Strategy was the culmination of work by a Citizen Advisory Committee formed in 2006 to address the city's housing needs. The strategy contains recommendations for expanding housing choice and affordability while defining and retaining important elements of neighborhood character, educating residents about the importance and community benefit of increasing local choice and affordability, and developing standards to integrate a variety of new or different housing styles within neighborhoods.

Shoreline and Subarea Housing Inventory

Shoreline can be classified as a historically suburban community that is maturing into a more self-sustaining urban environment. Almost 60 percent of the current housing stock was built before 1970, with 1965 being the median year of home construction. Only 7 percent of homes (both single and multi-family) were constructed after 1999. Much of the housing stock is approaching 70 years of age and most is over 50 years old. More and more homeowners are either making substantial renovations to their homes or demolishing existing homes and replacing with new ones. This trend would likely continue absent upzoning in the subarea.

Over the last decade, new housing was created through infill construction of new single-family homes and townhouses, with limited new apartments in mixed-use areas adjacent to existing neighborhoods. Many existing homes were remodeled to meet the needs of their owners, contributing to the generally good condition of Shoreline's housing stock.

The characteristics of the 145th Street Station Subarea are consistent with these described for Shoreline overall, although the subarea has seen less infill construction and redevelopment activity than other areas of the city.

Quantity of Housing Units, Types, and Sizes

Single-family homes are the predominant type of existing housing and encompass a wide range of options, which span from older homes built prior to WWII to new homes that are certified through the Leadership in Energy and Environmental Design (LEED) program. Styles range from expansive homes on large view lots to modest homes on lots less than one quarter acre in size. In the station subarea, the predominant single family lot size is 8,000 to 10,000 square feet (with some lots around 6,000 square feet). Although much of the existing zoning in the subarea is

Residential, six units per acre (R-6), the current built density of the subarea is approximately 3.2 units per acre.

According to the 2010 Census, there were 21,561 housing units within the City of Shoreline, an increase of 845 since 2000. About 73 percent of these housing units are single-family homes. Compared to King County as a whole, Shoreline has a higher percentage of its housing stock in single-family homes. **See Table 3.2-1**. In the 145th Street Station Subarea, including the TAZs associated with the subarea, it is estimated that there are currently 3,467 households.

While there are an increasing number of households in Shoreline each year, population levels indicate a potential trend toward a decrease in the number of people per household. This is consistent with national trends. However, overall in King County, household size has remained stable since 1990 (see **Table 3.2-2**). Shoreline's average household size is currently 2.4 people per dwelling unit.

In Shoreline, the average number of bedrooms per unit is 2.8. Only 16 percent of housing units have less than 2 bedrooms. This compares with 21 percent of housing units with less than 2 bedrooms in King County. With larger housing units and a stable population, overcrowding has not been a problem in Shoreline.

The US Census reported only 1.6 percent of housing units with an average of more than one occupant per room, and no units that averaged more than 1.5 occupants per room (American Community Survey 2008-2010).

Affordable Housing Metrics for Shoreline

To understand affordability metrics, percentages of Area Median Income (AMI) are calculated. For example, The 2011 AMI for Shoreline was $66,476. Therefore, a household with that income would be making 100 percent of median; a household that made 50 percent of that amount ($33,238) would be classified at 50 percent AMI; a family making 30 percent of that amount ($19,943) would be classified at 30 percent AMI.

Families that pay more than 30 percent of their income for housing are considered "cost-burdened" and may have difficulty affording necessities such as food, clothing, transportation, and medical care.

Definition and Measure of Housing Affordability

The generally accepted definition of affordability is for a household to pay no more than 30 percent of its annual income on housing. When discussing levels of affordability, households are characterized by their income as a percent of the Area Median Income (AMI). The box above highlights information pertaining to affordable housing metrics in Shoreline. **Figure 3.2-2** shows wage/income levels for various professions.

Table 3.2-1 Number of Dwelling Units for Each Housing Type

Type of Housing	Shoreline (units)	Shoreline (percent)	King County (units)	King County (percent)
Single-family	16,295	72.5%	504,083	59.3%
Duplex	258	1.1%	16,727	2.0%
Triplex/4-plex	516	2.3%	37,876	4.5%
Multifamily (5+ units)	5,218	23.2%	269,949	31.9%
Mobile Homes	134	0.6%	17,385	2.1%
Other (boat, RV, van, etc.)	49	.02%	753	0.1%

Source: American Community Survey 2008-2010

Table 3.2-2 Average Household Size

	1980	1990	2000	2010
Shoreline	2.7	2.5	2.5	2.4
King County	2.5	2.4	2.4	2.4

Source: 1980 Census, 1990 Census, 2000 Census, 2010 Census

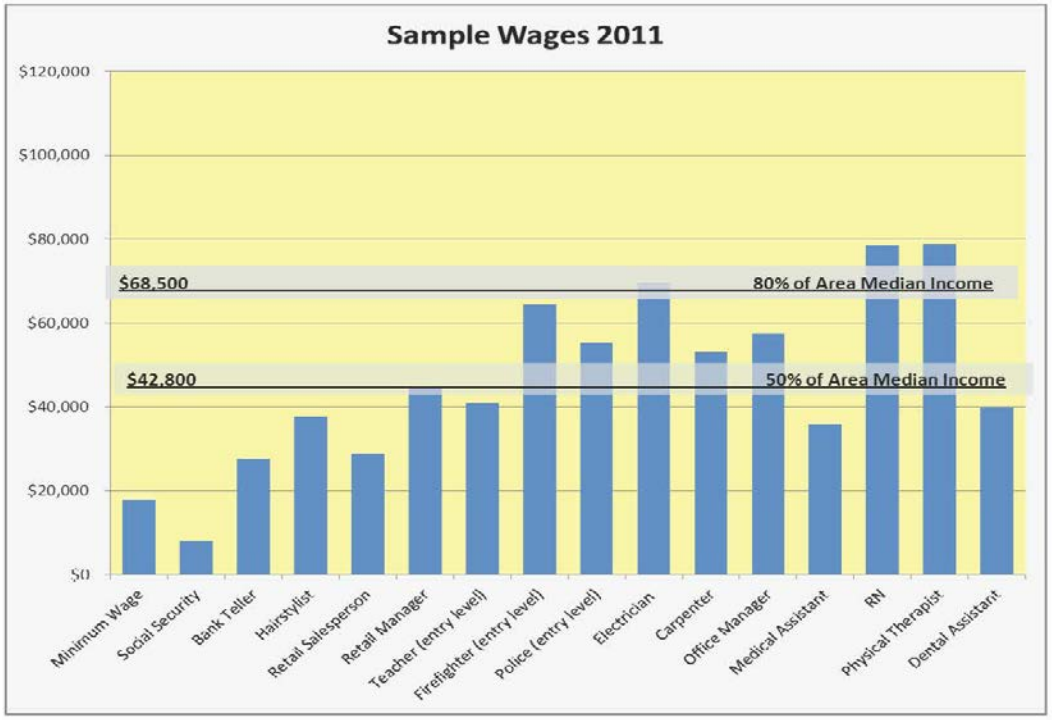


Figure 3.2-2 Income Levels/Wages of Various Professions

Table 3.2-3 Assisted Household Inventory

Provider	Units
King County Authority	669
HUD Subsidized Units	80
Tax Credit Properties **	272
Total	1,021

Source: City of Shoreline Office of Human Services, 2012

***The Low Income Housing Tax Credit program was created by Congress through passage of the Emergency Low-Income Housing Preservation Act in 1987. When the tax credits expire, these properties may be converted to market rate housing.*

Special Needs Housing and Homelessness

Group Quarters

Group quarters, such as nursing homes, correctional institutions, or living quarters for people who are disabled, homeless, or in recovery from addictions are not included in the count of housing units reported above. According to the 2010 Census, about 2.6 percent of Shoreline's population, or 1,415 people, live in group quarters. This is a slightly higher percentage than the 1.9 percent of King County residents living in group quarters. Fircrest in Shoreline, one of five state residential habilitation centers for people with developmental disabilities, provides medical care and supportive services for residents and their families. In 2011, Fircrest had about 200 residents. This reflects a decline from more than 1,000 residents 20 years ago, as many residents moved into smaller types of supported housing, such as adult family or group homes.

Financially Assisted Housing

As shown in **Table 3.2-3** financially assisted housing units for low- and moderate-income individuals and families exist in the City of Shoreline.

In addition to this permanent housing, King County Housing Authority provided 566 vouchers to Shoreline residents through the Section 8 federal housing program, which provides housing assistance to low income renters (City of Shoreline Office of Human Services, 2012).

Homelessness

According to the Shoreline School District, 123 students experienced homelessness during the 2010-2011 school year. According to the 2012 King County One Night Count of homeless individuals, 31 people were found living on the streets in the north end of King County.

Emergency and Transitional Housing Inventory

Five emergency and transitional housing facilities provide temporary shelter for their current maximum capacity of 49 people in the City of Shoreline. These facilities focus on providing emergency and transitional housing for single men, families, female-headed households, veterans, and victims of domestic violence. These facilities are listed in **Table 3.2-4**.

Housing Tenure and Vacancy

Historically, Shoreline has been a community dominated by single-family, owner-occupied housing. More recently, homeownership rates have been declining. Up to 1980, nearly 80 percent of housing units located within the original incorporation boundaries were owner-occupied.

In the 1980s and 1990s a shift began in the ownership rate. The actual number of owner-occupied units remained relatively constant, while the number of renter-occupied units increased to 32 percent of the city's occupied housing units in 2000, and nearly 35 percent in 2010. This shift was mainly due to an increase in the number of multi-family rental units in the community. Refer to **Table 3.2-5**.

A substantial increase in vacancies from 2000 to 2010 may partially be explained by apartment complexes, such as Echo Lake, that had been built but not yet occupied during the census count, or by household upheaval caused by the mortgage crisis. More recent data indicates that vacancies are declining (see discussion later in this section).

Housing Demand and Affordability

Housing demand is largely driven by economic conditions and demographics. Economic and market conditions have been assessed for the station subarea, and these are summarized in Section 3.1. Demographic characteristics influence market demand with regard to number of households; household size, make-up, and tenure (owner vs. renter); and preference for styles and amenities. For instance, young singles and retired people may prefer smaller units with goods, services, and transit within walking distance as opposed to a home on a large lot that would require additional maintenance and car ownership. It is important for Shoreline to have a variety of housing styles to accommodate the needs of a diverse population.

In 2010, about 61 percent of households were family households (defined as two or more related people), down from 65 percent in 2000. Approximately 30 percent were individuals living alone, an increase from 26 percent in 2000. The remaining 9 percent were in nonfamily households where unrelated individuals share living quarters. Households with children decreased from 33 percent of households in 2000 to 28 percent of households in 2010. Single-parent families also decreased from 7.4 percent to 6.9 percent of households, reversing the previous trend of increasing single-parent families. Shoreline now has a lower percentage of households with children than King County as a whole, where households with children account for about 29 percent of all households, down from 30 percent in 2000. **Table 3.2-6** summarizes the changing characteristics of households.

A Changing Community

In addition to the changes noted above, Shoreline's population is becoming more ethnically and racially diverse. In 2000, 75 percent of the population was white (not Hispanic or Latino). By 2010, this percentage dropped to 68 percent.

Shoreline's changing demographic characteristics may impact future housing demand. Newer residents may have different cultural expectations, such as extended families living together in shared housing. The increase in the number of singles and older adults in the community suggests that there is a need for homes with a variety of price points designed for smaller households, including accessory dwelling units or manufactured housing.

Demographic changes may also increase demand for multi-family housing. Such housing could be provided in single-use buildings (townhouses, apartments, and condominiums), or in mixed-use buildings. The need for housing in neighborhood centers, including for low and moderate income households is expected to increase. Mixed-use developments in central areas close to public transit will allow for easier access to neighborhood amenities and services, and could make residents less dependent on autos.

The Need for Affordable Housing

The GMA requires CPPs to address the distribution of affordable housing, including housing for all income groups. The CPPs establish low and moderate income household targets for each jurisdiction within the county to provide a regional approach to housing issues, and to ensure that affordable housing opportunities are provided for lower and moderate income groups. These affordable housing targets are established based on a percent of the City's growth target.

Table 3.2-4 Emergency and Transitional Housing Inventory

	# Occupants	Focus
Caesar Chavez	6	Single Men
Wellspring Project Permanency	14	Families
Home Step Church Council of Greater Seattle	4	Female Head-of-Household
Shoreline Veterans Center	25	Veterans
Confidential Domestic Violence Shelter	6	Victims of Domestic Violence

Source: City of Shoreline Office of Human Services, 2012.

Table 3.2-5 Housing Inventory and Tenure

	2000	2010	Change 2000-2010
Total Housing Units	21,338	22,787	+1,449
Occupied Housing Units	20,716	21,561	+845
Owner-Occupied Units	14,097 68.0% of occupied	14,072 65.3% of occupied	-25 0.2% decrease
Renter-Occupied Units	6,619 32.0% occupied	7,489 34.7% of occupied	+870 13.1% increase
Vacant Units	622 2.9% of total	1,226 5.4% of total	+612 99.7% increase

Source: 2000 Census; 2010 Census

Table 3.2-6 Changing Household Characteristics in Shoreline

	2000	2010	Change 2000-2010
Total Households	20,716	21,561	+845
Households with Children	6,775 32.7% of total	6,015 27.9% of total	-760 11.2% decrease
Single-person Households	5,459 26.5% of total	6,410 29.7% of total	+951 17.4% increase
Households with an Individual over 65	4,937 23.8% of total	5,509 25.6% of total	+572 11.6% increase

Source: 2000 Census; 2010 Census

Table 3.2-7 Households by Income Level in Shoreline and King County

	Shoreline	King County
Very Low Income (<30% AMI)	3,154 (15%)	53,784 (13%)
Low Income (30%-50% AMI)	2,580 (12%)	52,112 (11%)
Moderate Income (50%-80%AMI)	3665 (17%)	76,279 (16%)
80%-120% AMI	4,443 (21%)	97,116 (19%)
>120% AMI	7,520 (35%)	216,821 (41%)

Source: 2008-2010 American Community Survey; King County Comprehensive Plan

The CPPs more specifically state an affordability target for moderate income households (earning between 50 percent and 80 percent AMI) and low-income households (earning below 50 percent AMI). The moderate-income target is 16 percent of the total household growth target, or 800 units. The low income target is 22.5 percent of the growth target, or 1,125 units. Of the current housing stock in Shoreline, 37 percent is affordable to moderate-income households and 14 percent is affordable to low income households (King County Comprehensive Plan, Technical Appendix B).

Assessing affordable housing needs requires an understanding of the economic conditions of Shoreline households and the current stock of affordable housing. Estimated percentage of households at each income level is presented in **Table 3.2-7**.

Affordability Gap

The "affordability gap" is the difference between the percentage of city residents at a particular income level and the percentage of the city's housing stock that is affordable to households at that income level. A larger gap indicates a greater housing need. **Table 3.2-8** depicts the affordability gap.

Where affordability gaps exist, households must take on a cost burden in order to pay for housing. Cost-burdened households paying more than 30 percent of household income for housing costs comprise 39 percent of homeowners and 48 percent of renters in Shoreline. Very low income cost-burdened households are at greatest risk of homelessness and may be unable to afford other basic necessities, such as food and clothing. The substantial affordability gap at this income level suggests that the housing needs of many of Shoreline's most vulnerable citizens are not being met by the current housing stock. Closing this gap will require the use of innovative strategies to provide additional new affordable units and the preservation/ rehabilitation of existing affordable housing.

In order to assess the relative status of housing affordability in the city, comparison cities in King County were selected based on number of households and housing tenure. Two cities (Sammamish and Mercer Island) with few renters were selected for comparison, along with two cities (Kirkland and Renton) with a higher proportion of renting households. To compare Shoreline to these cities and to King County, the number of households in each income group countywide was compared to the number of housing units affordable at each income level. **Table 3.2-9** shows the comparison of affordability gaps in these communities to Shoreline's.

Figure 3.2-3 shows Affordable Housing Units by Income Group in a map that shows multiple factors related to housing affordability in various Shoreline neighborhoods, and this complexity warrants a description that is not included with other maps. The map shows average household income levels of various neighborhoods, by census tract. For each neighborhood, there is also a list that begins with the name of the neighborhood, and displays the number of houses whose assessed value would be considered affordable to various income groups. Recall that to be affordable, a mortgage and expenses, such as property tax, should not exceed 30 percent of the annual household income. The price range for housing that would be affordable for each income group is listed in the legend.

To provide an example, in the Meridian Park Neighborhood, one of the neighborhoods of the station subarea, the average household income in 2010 was $82,148. Within that neighborhood, there were 3 homes appraised below $99,720,

which is the price a very low income household would be able to afford without exceeding 30 percent of their income. There are 735 homes appraised between $99,720 and $265,999, which is the price a low income household would be able to afford without exceeding 30 percent of their income.

Falling Home Values

As in much of the rest of the country, home prices in Shoreline fell during the Great Recession years, but have recently started to rise again. After increasing rapidly for over a decade, median sales price reached a peak in June 2007 at $375,300. The median sales price in December 2011 was $262,600, a decrease of 30 percent. (See **Figures 3.2-4 and 3.2-5**).

While decreasing prices lower the affordability gap for prospective buyers, they can also increase risk of deferred maintenance, vacancy, and abandonment. Although home and property prices are now increasing again, they have yet to reach peak levels of 2007.

A Segmented Market

While home prices have decreased citywide since 2007 and recently have started to rise again, there is a large discrepancy in the value of homes in the city's various neighborhoods. **Table 3.2-10** presents data extracted from home sales records used by the King County Assessor to assess the value of homes in various sub-markets within the city (the Assessor excludes sales that are not indicative of fair market value). Citywide data suggests that home values have continued to decline since 2010, though regional trends suggest the rate of decline is now slowing.

Rising Rents

In contrast to the single-family market, apartment rents in Shoreline have stabilized near highs reached in 2009, and are likely to continue trending upward as vacancies decline. According to the most recent data available, the average rent increased from $859 in September 2007 to $966 in March 2012. Year-over-year trends in the Shoreline area rental market (which includes the cities of Shoreline and Lake Forest Park) are included in **Table 3.2-11** for 2008-2012. The increasing price of rental options may be limiting the city's attractiveness to new families, and the ability to provide affordable housing options for younger or fixed-income citizens and smaller households.

Neighborhood Quality and Housing Choice

Neighborhood quality and the availability of diverse housing choices to fit various income levels have a direct relationship to greater housing demand. The Citizen Advisory Committee of the Comprehensive Housing Strategy stressed the need to define and retain important elements of neighborhood character, while also providing housing choice. Some members of the community have expressed concern about density and design of infill developments and the impacts of these developments on existing neighborhoods. Some members of the community support additional density and infill development, either to preserve undeveloped land in rural areas, support transit, encourage business and economic development, increase affordability, and for other reasons. Regulations that implement policy recommendations in the Housing Element and Strategy should strive to balance these concerns and opportunities.

Housing choice refers to the ability of households in the city to live in the neighborhood and housing type of their own choosing. Housing choice is supported by providing a variety of housing that allows older adults to age in place and new families to be welcomed into existing neighborhoods.

Table 3.2-8 Affordability Gap

	Percent of Units Affordable to Income Group	Affordability Gap
Very Low Income (<30% AMI)	825 (3.9%)	11%
Low Income (30%-50% AMI)	2,116 (10%)	2%
Moderate Income (50%-80% AMI)	4,886 (23%)	N/A
80%-120% AMI	6,367 (30%)	N/A

Source: King County Comprehensive Plan

** Vacant units are not included in the analysis, since the affordability of vacant units is unknown.*

Table 3.2-9 Comparison of Affordability Gap

	Very Low Income Affordability	Low Income Affordability Gap	Moderate Income Affordability Gap	80%-120% AMI Affordability Gap
Sammamish	12.1%	9.6%	10.1%	2.1%
Mercer Island	10.1%	8.9%	6.0%	6.7%
Shoreline	**8.6%**	**1.2%**	**N/A**	**N/A**
Kirkland	9.9%	4.9%	N/A	N/A
Renton	8.8%	N/A	N/A	N/A
King County	8.4%	N/A	N/A	N/A

Source: King County Comprehensive Plan

** Discrepancy with Table H-8 results from use of Countywide household data for comparison with other cities and King County*

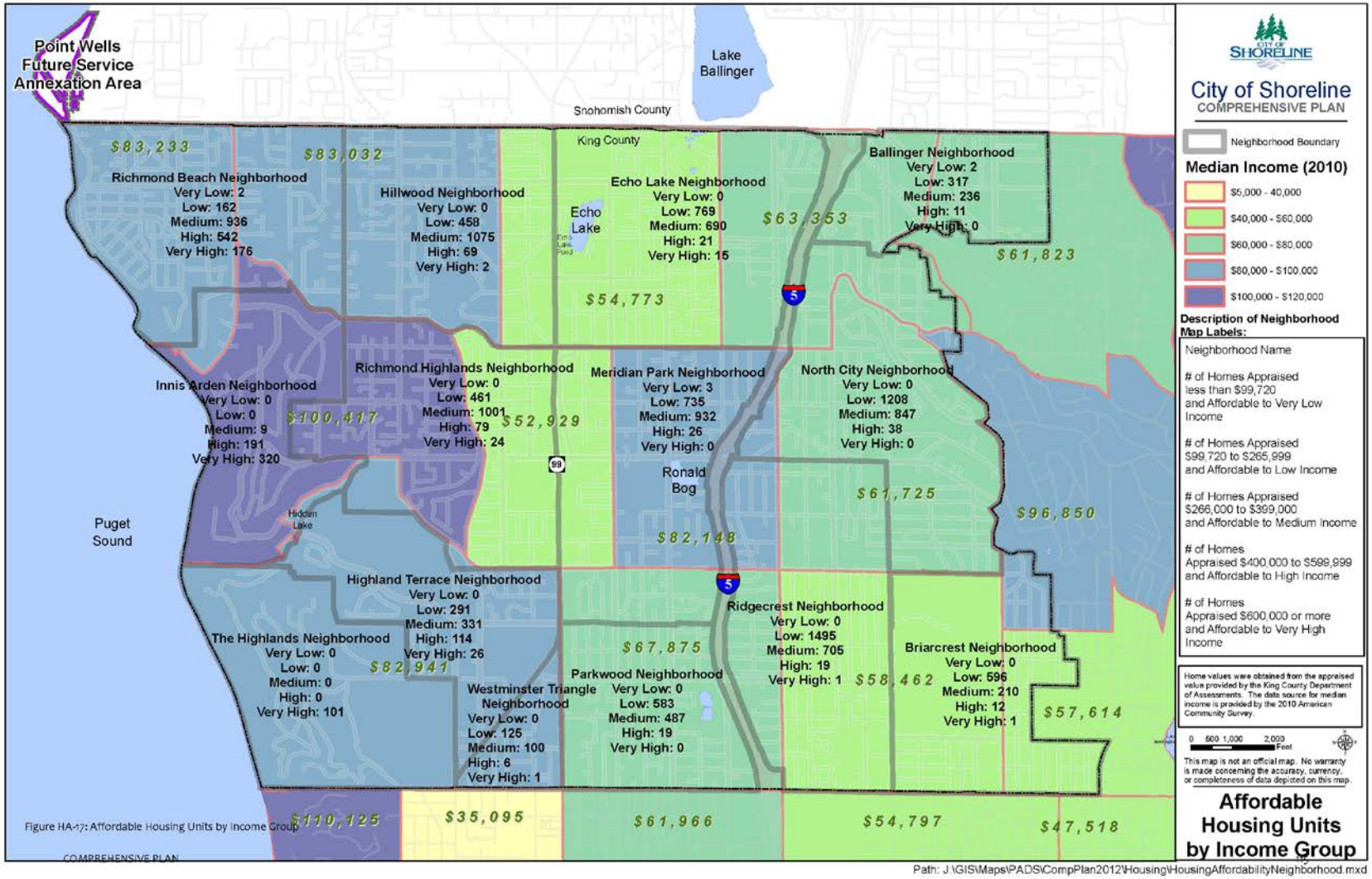


Figure 3.2-3 Affordable Housing Units by Income Group in Shoreline

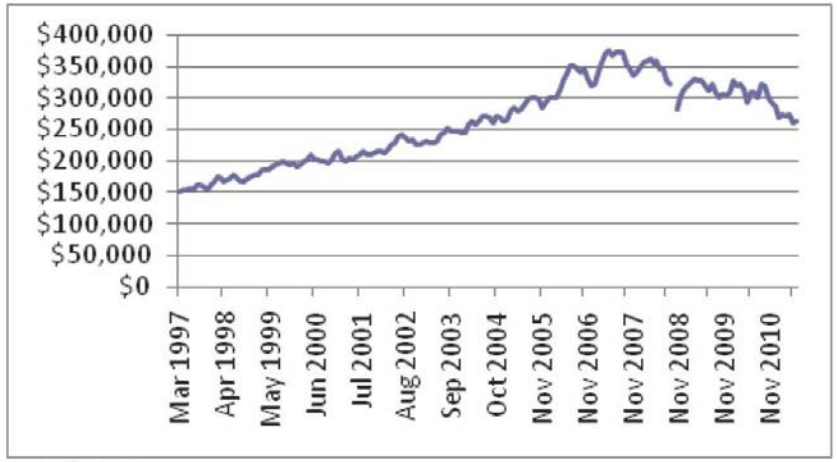


Figure 3.2-4 Median Sales Price of Homes in Shoreline

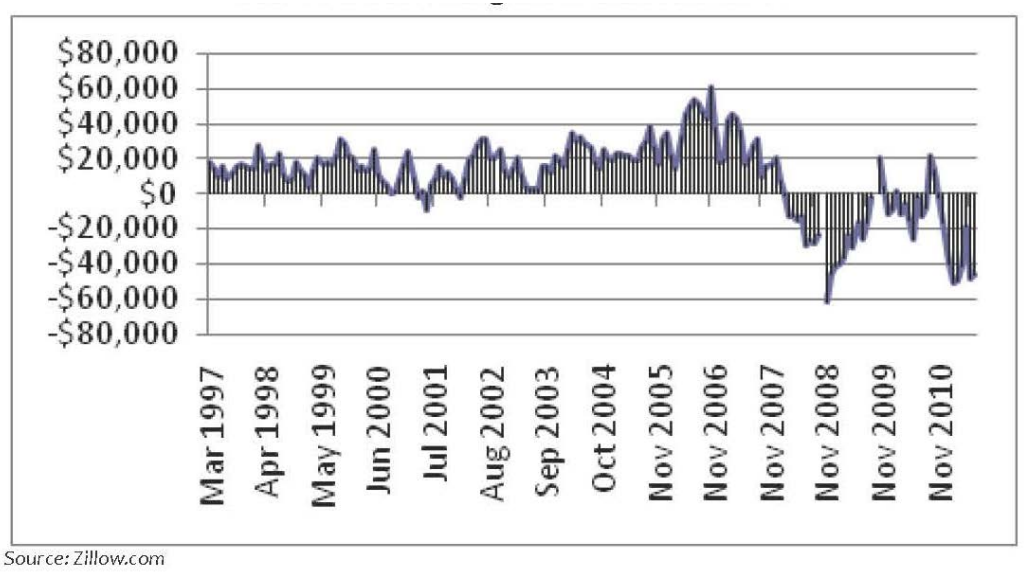


Figure 3.2-5 Year-Over-Year Change in Median Sales Price

Table 3.2-10 Single Family Housing Prices

Neighborhood Area	Median Sale Price, 2010	Affordable Income Level*	Average Change in Assessed Value, 2010-2011
West Shoreline	$500,00	>120% of AMI	-2.8%
West Central	$341,500	115% of AMI	-6.0%
East Central	$305,000	100% of AMI	-6.9%
East Shoreline	$290,000	100% of AMI	-5.2%

Sources: King County Assessor 2011 Area Reports, 2011 HUD Income Levels

**Figures given are the percent of 2011 typical family Area Median Income required to purchase a home at the 2010 median price. Affordable Housing Costs are based on 30% of monthly income. Figures are approximate. Additional assumptions were made in the affordability calculation.*

Table 3.2-11 Shoreline Area Rental Market Rents & Vacancy Rates

	2008	2009	2010	2011	2012
Average Rent	$897	$977	$949	$934	$966
Market Vacancy*	2.7%	4.6%	7.1%	5.0%	4.0%

Source: Dupre+Scott, The Apartment Vacancy Report

**Market Vacancy excludes units in lease-up and those undergoing renovation*

While Shoreline's single-family housing is in generally good condition and highly desirable for many, new housing close to neighborhood centers and high-capacity transit may be equally desirable to older adults, small households, or special-needs households with financial or mobility limitations.

Other benefits of locating housing in neighborhood centers and in close proximity to high-capacity transit include:

- Transportation cost savings;
- Improved fitness and health through increased walking;
- Lower costs for roads, utilities, and emergency services;
- Reduced road and parking costs;
- Reduced regional congestion;
- Energy conservation;
- Reduced emissions; and
- Preservation of open space.

GMA and Regional Policies Supporting Affordable Housing

The City of Shoreline's policies related to housing and relevant to potential development in the station subarea are summarized in Section 3.1. It is also important to consider state and regional policies as guidance for subarea planning. The GMA specifically states that its housing goal is to:

"Encourage the availability of affordable housing to all economic segments of the population of this state, promote a variety of residential densities and housing types, and encourage preservation of existing housing stock."

King County CPPs also encourage affordable housing and the use of innovative techniques to meet the housing needs of all economic segments of the population, and require that the City provide opportunities for a range of housing types.

The City's Comprehensive Housing Strategy, adopted in 2008, recommended increasing affordability and choice within local housing stock in order to accommodate the needs of a diverse population. Demographic shifts, such as aging "Baby Boomers" and increasing numbers of single-parent or childless households create a market demand for housing styles other than a single-family home on a large lot.

Puget Sound Regional Council (PSRC) administers the Growing Transit Communities Partnership (GTC). In accordance with the goals of the PSRC and GTC, high-capacity station areas should consider adopting the affordable housing policies and provisions stated in PSRC's VISION 2040. A few are included below, for the full list, read their report, available at: http://www.psrc.org/growth/growing-transit-communities/growing-communities-strategy/read-the-full-growing-transit-communities-strategy/

MPP-H-1 *Provide a range of housing types and choices to meet the housing needs of all income levels and demographic groups within the region.*

MPP-H-2 *Achieve and sustain — through preservation, rehabilitation, and new development — a sufficient supply of housing to meet the needs of low income, moderate-income, middle-income, and special needs individuals and households that is equitably and rationally distributed throughout the region.*

MPP-H-3 *Promote homeownership opportunities for low-income, moderate income, and middle-income families and individuals.*

City of Shoreline Affordable Housing Policies and Requirements—Chapter 20.40.230 of the Development Code currently includes limited provisions for affordable housing . These provisions are being revised for application in the light rail station subareas. In addition, the City has developed draft policies for the subarea that address affordable housing needs, including direction for further implementation work to develop programs. These policies and draft Development Code provisions are provided in Section 3.2.3 Mitigation Measures. Other Code provisions and development standards related to housing and mixed use development in the subarea are summarized in Section 3.1 of this DEIS.

Employment in Shoreline and the Subarea

In 2012, approximately 16,409 jobs existed in the City of Shoreline. Of these jobs, approximately 46 percent were service related; 17 percent were government; 16 percent were retail; 13 percent were education; 3 percent were construction; 3 percent were finance, insurance, and real estate; 1 percent was wholesale trade, transportation, and utilities; and 1 percent was manufacturing (PSRC Employment Database).

Most of these jobs were located along Aurora Avenue N. However, other employment clusters include the Shoreline Community College, and neighborhood business centers in North City, Richmond Beach Shopping Center, 5th Avenue NE and NE 165th Street, and 15th Avenue NE. Less obvious places of employment include home occupations (people working out of their homes).

Major employers within the community include (listed in alphabetical order):

- CRISTA Ministries
- Costco
- Fircrest Residential Habilitation Center
- Fred Meyer
- Goldie's Casino
- Home Depot
- Northwest Security
- Shoreline, City of
- Shoreline School District
- Shoreline Community College
- State Department of Transportation

In the 145th Street Station Subarea and nearby areas within the TAZ boundaries, there are currently 1,595 jobs, including jobs in the commercial center located at NE 145th Street and 15th Ave NE and near the Aurora corridor, at either end of the subarea. This is an estimated level of employment, which was also assumed in the City's Transportation Master Plan.

Employment Growth Trends and Targets

Employment within the city is a measure of the current economic activity. The following employment growth characteristics were summarized in the Economic Development Supporting Analysis to the City's 2012 Comprehensive Plan.

- Non-government employment in Shoreline is predominantly oriented toward services and retail. These two sectors comprised 62 percent of total employment as of 2010.

- Employment growth has been concentrated in services, which was the fastest growing sector between 2000 and 2010.
- The other non-government sectors in which employment grew in the last decade were manufacturing and construction/resources. Despite growth, the two sectors together accounted for only 4.4 percent of the total employment as of 2010.
- Total employment in Shoreline continued to grow over the past decade, though at a much slower pace than in the previous five years.

Encouraging employment growth within the city would improve Shoreline's jobs-to-housing ratio/balance. Jobs and housing are "balanced" at approximately 1.5 jobs per household. Jobs-to-housing ratio or balance is "a means to address travel demand by improving accessibility to jobs, as well as to goods, services, and amenities" (PSRC, Vision 2040). The creation of new jobs through economic development can help alleviate a mismatch between jobs and housing, reducing commute times and creating more opportunities for residents to work and shop within their own community.

Shoreline's jobs-to-housing ratio was 0.72 in 2010 compared to the desirable ratio of 1.5, highlighting the need for job growth and employment-supporting development.

The City conducted an analysis that compared its employment characteristics to other cities in the region and found that jobs-housing balance varies considerably throughout the region. Ratios of comparative cities in 2010 were:

- Lynnwood 1.53
- Tukwila 5.56
- Marysville 0.51
- Kirkland 1.27

King County's overall ratio was 1.29 and Snohomish County's was 0.82.

In comparing Shoreline's median household income, unemployment rate, and poverty rate to these same peer cities, Shoreline had the second highest median income (only Kirkland was higher); the second lowest unemployment rate (Kirkland was lower); and the second lowest poverty rate (Kirkland was lower).

The King County Countywide Planning Policies, adopted to implement the GMA, establish employment growth targets for each of the jurisdictions within the county. The employment target is the amount of job growth the jurisdiction should plan to accommodate during the 2006-2031 planning period. Shoreline's growth target for this period is 5,000 additional jobs, projected to 5,800 by 2035. This employment growth target was also adopted by the City. A more recent target set by PSRC calls for Shoreline to gain more than 7,200 new jobs by 2035, improving its jobs-to-housing ratio to 0.91.

Several factors constrain substantial commercial development (and resultant job growth) in Shoreline, including the limited number of large tracts of developable land available for commercial or industrial uses.

In the past, Shoreline was considered a "bedroom community" from which residents travelled elsewhere for higher-wage jobs and more complete shopping opportunities. Recognizing new and innovative ways to support the local economy will assist efforts to plan for the addition of new jobs. The quality of Shoreline's economy is affected by reliable public services, the area's natural

and built attractiveness, good schools, strong neighborhoods, efficient transportation options, and healthy businesses that provide goods and services. Maintaining the community's quality of life requires a strong and sustainable economic climate.

Other Economic Conditions Pertinent to Growth and Economic Development Opportunities

Revenue Base—Sales Tax and Property Tax

The revenue base of the City is another measure of the strength of the local economy. A strong revenue base supports necessary public facilities and services for an attractive place to live and work. Two major elements of the revenue base are taxable retail sales and the assessed valuation for property taxes. A review of Shoreline's taxable sales and assessed valuation compared with other cities yielded the following observations.

- Compared to the peer cities and King County, Shoreline has a relatively low revenue base. Among peer cities, Shoreline had the second lowest per capita taxable sales and second lowest per capita assessed valuation in 2010.
- Growth in assessed valuation has been moderate over the past decade, averaging a 6.7 percent annual increase. This could be due to a relative lack of new construction in comparison to a younger community, such as Marysville.
- Retail sales growth has averaged 1.5 percent annually. This is the second highest rate of increase among the peer cities and higher than King County as a whole.

Other Revenue Sources

Other sources of revenue for the City include the gambling tax, utility tax, permit fees, grants, and other fees. Gambling taxes are collected at a rate of 10 percent of gross receipts for card rooms in the city. Projected gambling tax revenue for 2012 equals 6 percent of the total forecasted general fund operating revenues. Thirteen percent of total forecasted general operating revenues are expected to come from the utility tax, and 8 percent from license and permit fees. This compares to 32 percent from property taxes, and 20 percent from sales taxes. The remaining revenue comes from contract payments, state and federal grants, and other sources.

Real Estate Market Conditions—Retail

Retail development meets two important economic development objectives. It provides the goods and services needed by residents and businesses, and it provides a major source of tax revenue, which could take pressure off of property taxes to maintain levels of service desired by the community.

Retail sales in Shoreline have grown over the past decade, yet they are still lower than sales in the peer cities used for comparison. While Shoreline is home to many retail establishments, there is a significant amount of sales "leakage" in some retail categories. Leakage refers to a deficit in sales made in the city compared with the amount of spending on retail goods by Shoreline residents. This leakage suggests that there are major retail opportunities in several areas, as shown below.

Percentage of Shoreline Resident Retail Dollars Spent Elsewhere (Leakage):

- Health and Personal Care Stores: 41.2 percent
- Clothing and Clothing Accessories Stores: 90.5 percent

- General Merchandise Stores: 71.2 percent
- Food Service and Drinking Places: 36.5 percent

Real Estate Market Conditions—Office

Shoreline has few large office concentrations or multi-tenant office buildings. New office development could provide locations for various service providers, as well as the management and support facilities for businesses with multiple outlets. The office vacancy rate for buildings listed on Officespace.com is approximately 25 percent. However, there is little or no new Class A office space in the city available to prospective tenants.

Real Estate Market Conditions—Residential

New residential development in Shoreline provides housing for the local workforce and creates new opportunities for families to live in the city. Permit activity for new residential development has been increasing since 2010. The Countywide Planning Policies (CPPs) for King County set a target for the City of Shoreline to grow by about 200 households per year. A faster pace of new residential development will be needed in Shoreline to achieve this goal, and to achieve the overall target of 5,800 additional households by 2035 (with the starting year of 2006). Market analysis completed for the subarea show a demand for residential use (see Section 3.1 for more information).

2012-2017 Economic Development Strategic Plan

The City of Shoreline's Office of Economic Development Strategic Plan for 2012-2017 is summarized in Chapter 2 of this DEIS. The plan seeks to achieve sustainable economic growth by supporting placemaking projects. The plan acknowledges Shoreline's two planned station subareas as key economic development opportunities.

3.2.2 Analysis of Potential Impacts

Population, Housing, and Employment Forecasts for Each Alternative

Under all alternatives, the number of households and jobs would increase. Alternative 2—Connecting Corridors and Alternative 3—Compact Community would increase population, housing, and jobs in Shoreline.

Either Alternative 2 or 3 would assist the City in meeting household and employment growth targets, consistent with the Countywide Planning Policies. Alternative 3—Compact Community would provide the most capacity to achieve housing targets over time, while Alternative 2 would provide the most flexibility in terms of zoned land area, to achieve the housing targets. Alternative 1 would have very limited ability to assist the City in meeting its housing growth targets.

Alternative 2 would result in more jobs than Alternative 3 and both action alternatives would provide substantially more job opportunities than Alternative 1—No Action.

Current population, households, and employment levels in the subarea are shown in **Table 3.2-12**. Forecasted growth in population, housing, and employment for each of the alternatives is summarized in more detail below and depicted in **Table 3.2-13**. The net change in population, households, and employment from current levels is shown in **Table 3.2-14**.

Table 3.2-12 Current (2014) Population, Households, and Employment Estimates for the Subarea

Estimated Totals for Subarea Based on Available GIS Data, 2014	
Population	8,321
Households	3,467
Employees	1,595

Note: the current estimated total population of the City of Shoreline is 54,790 (2013).

Table 3.2-13 Estimated Twenty-Year and Build-Out Population, Households, and Employment Projections

	Alternative 1—No Action	Alternative 2—Connecting Corridors	Alternative 3—Compact Community
2035 Population*	11,040	11,207 to 13,635	11,207 to 13,635
2035 Households*	4,600	4,670 to 5,681	4,670 to 5,681
2035 Employees*	2,325	2,180 to 2,678	2,180 to 2,678
Build-Out Population	**	34,643	36,647
Build-Out Households	**	14,435	15,270
Build-Out Employees	**	11,747	9,639
Build-Out Years	**	60 to 94 years 2075 to 2109	63 to 98 years by 2078 to 2113

* Projections assume 1.5 percent to 2.5 percent annual growth rate for the action alternatives from the time the rezoning is adopted.

** For Alternative 1—No Action, only projections through the twenty-year horizon of 2035 were analyzed. Build-Out was not analyzed because the timeframe is for this is unknown and difficult to approximate.

Table 3.2-14 Projected Net Increases in Population, Households, and Employment over Current (2015) Levels

	Alternative 1—No Action	Alternative 2—Connecting Corridors	Alternative 3—Compact Community
2035 Population	+2,719	+2,886 to +5,314	+2,886 to +5,314
2035 Households	+1,133	+1,203 to +2,214	+1,203 to +2,214
2035 Employees	+730	+585 to +1,083	+585 to +1,083
Build-Out Population		+26,322	+28,326
Build-Out Households		+10,968	+11,803
Build-Out Employees		+10,152	+8,044

The net increase in the number of households projected for the next twenty years would be 1,203 at 1.5 percent growth and 2,214 at 2.5 percent growth under all action alternatives. Although the market assessment projected a demand for 500-800 or more households through 2035, this was a conservative estimate. If the subarea supported 25 percent of the city's forecasted housing growth, the projection would be 1,450 additional units. There is also the potential that housing growth could occur more rapidly than projected given Seattle population growth in recent years. Zoning that provides more capacity for growth than projected provides flexibility to respond to market characteristics and homeowner preferences in the subarea.

The Next Twenty Years

By 2035, any of the action alternatives would be anticipated to grow at the same pace (applying the estimated annual growth rate of around 1.5 percent to 2.5 percent). It is anticipated that Alternative 2—Connecting Corridors or Alternative 3—Compact Community would build-out at a similar pace over time.

Over the next twenty years, under either of these two action alternatives, it is anticipated that the population of the subarea would grow to between 11,207 and 13,635 people. This would be 2,886 to 5,314 above the current population in the subarea (including population within the TAZ boundaries that encompass the subarea).

A total of 4,670 to 5,681 households would be expected by 2035, as well as approximately 2,180 to 2,678 jobs under either of the two action alternatives. This would be an increase in households

of approximately 1,203 to 2,214 and an increase in jobs of approximately 585 to 1,083 over today's levels.

Alternative 1—No Action

Under Alternative 1, based on recent population and employment growth forecasts studied in the development of the City's Transportation Master Plan (dispersed option for growth), population in the subarea would grow to approximately 11,040 people. Current population in the subarea is estimated at 8,321 people, so under Alternative 1—No Action, it is estimated that there would be an additional 2,719 people by 2035.

Assuming an average of 2.4 people per household, there would be 4,600 households and 2,325 jobs within the station subarea by 2035 under Alternative 1. This compares to a current levels of 3,467 households and 1,595 jobs in the station subarea. As such, under Alternative 1—No Action, an additional 1,133 households and 730 jobs would occur in the subarea by 2035 approximately.

The anticipated growth in employment would not be effective in helping to address Shoreline's target range of between 5,800 and 7,200 jobs by 2035 and achieving a better jobs-to-housing balance. Most growth in employment would need to occur elsewhere in the city. A review of citywide zoning confirms that the city does have the capacity elsewhere to accommodate the employment target range.

Alternative 2—Connecting Corridors

Under Alternative 2, the population would increase to 34,643 total at full build-out of the proposed zoning. Approximately 14,435 households and 11,747 jobs could be accommodated within the station subarea at full build-out. As such, this alternative would add potentially 26,322 people, 10,968 households, and 10,152 jobs to the subarea above the current levels. It is anticipated that full build-out of Alternative 2—Connecting Corridors would take approximately 60 to 94 years (2075 to 2109) to be realized.

Alternative 3—Compact Community

Under Alternative 3, the population would increase to 36,647, and approximately 15,270 households and 9,639 jobs could be accommodated in the station subarea at full-build out of proposed zoning. As such, this alternative would add potentially 28,326 people, 11,803 households and 8,044 jobs in the subarea above current levels. It is anticipated that full build-out would take approximately 63 to 98 years (2078 to 2113).

Consistency with Housing and Employment Policies and Housing Choice Opportunities

Consistency with plans and policies is addressed in Section 3.1 of this DEIS. It is worth emphasizing in this section, however, that Alternative 3—Compact Community would provide the most long term housing choice opportunities, as well as the greatest potential for affordable housing because it would result in the most households at full build-out. (Alternative 2 would have 835 fewer households at build-out than Alternative 3. Alternative 1—No Action would have substantially fewer households than either of the two action alternatives (see tables above).

With adoption of one of the action alternatives over time, a wider variety of housing types (multifamily and single family)

would be developed and there would be an increase in number households and increased diversity in the subarea. The range of housing types would be affordable to a wider diversity of income levels. With proposed density and building heights that support mixed use development with housing over several stories, there is a high likelihood that a variety of for sale and for rent housing accommodations would be offered.

The City intends to apply a variety of requirements and incentives to encourage affordable housing in the subarea. In addition the City will partner with other organizations to promote greater housing choice and affordability. One incentive includes transportation impact fee ordinance adopted by City Council in August 2014 that included an exemption for affordable housing. Other incentives would include reduced parking requirements for affordable housing and bonus height/density allowances (refer to 3.2.3 Mitigation Measures).

Economic Development Opportunities

The greatest opportunities for residentially-driven economic development (more residents in the area spending at local businesses, shops, restaurants, etc.) would occur under Alternative 3. The greatest opportunity for employment and jobs related economic development would occur under Alternative 2, because it would result in the most of jobs of the two action alternatives. However, the projected number of jobs under Alternative 3 is significant, and adoption of either of the action alternatives would help the City achieve its employment growth targets and improve its jobs-to-housing ratio. Increased population base and households would support funding for capital improvements and new development would provide jobs for residents of the neighborhood, Shoreline, and the region.

Under Alternative 1, economic development growth through increases in population and job opportunities would be minimal.

Property Values and Property Taxes

How implementation of light rail and rezoning might affect property values and property taxes in the subarea was a common question of existing homeowners during the subarea planning process.

The potential for a new transit station to increase land values for properties adjacent to it is a topic that has been researched extensively over the past two decades in conjunction with the construction of numerous light rail and heavy rail systems across the US, often in the context of determining a “value premium” that can be “captured” to contribute to system financing. While use of “value capture” for financing is not envisioned for the Lynnwood Link extension, the research that has been conducted on this topic provides information to address questions raised by Shoreline residents near the new station site as to what impact the station might have on their property values, and potentially their property taxes.

Value Premium Impacts

A substantial amount of research and analysis has been undertaken by policy experts to track and document the effects of fixed guideway transit systems (e.g., term includes heavy rail and light rail) on property values. This topic has commanded so

much attention because many policymakers believe that fixed guideway transit systems create a value premium, i.e. an increase in property values or related economic factors as a result of the increased access and desirability of the land served by the fixed guideway transit. If increased value can be linked to the transit investments, a portion of this increase sometimes has the potential to be "captured" up front in the transit development process, and converted to a funding source for public improvements that support the transit system. Numerous studies have used statistical models and other methods to examine whether premiums exist for real estate prices or lease rates near transit stops, particularly for commuter and light rail systems. A summary of various fixed guideway transit value premium studies was published in 2008 by the Center for Transit Oriented Development, a non-profit organization associated with Reconnecting America. Entitled *Capturing the Value of Transit,* the publication reviews the concepts associated with this topic, and summarizes the findings of more than 20 analyses of the effect of fixed guideway transit on different land uses around the US. Many of these studies, in turn, identified a range of value premiums associated with fixed guideway transit, and utilized a variety of techniques to come to this conclusion.

A 1995 study, by Dr. John Landis at the University of California, Berkeley, found that values for single family homes within 900 feet of light rail stations in Santa Clara County were 10.8 percent lower than comparable homes located further away, and no value premium could be identified for commercial properties within one-half mile of BART stations in the East Bay of the San Francisco Bay Area. Compared to other research though, the potential for decrease in values is rare and likely influenced by other factors.

One of the most thorough analyses conducted after 2000, when contemporary fixed guideway transit systems had established their resurgence as a modern, desirable form of transportation in urban America, was conducted by Dr. Robert Cervero at the University of California, Berkeley. This study, a survey of other studies covering only housing value premiums associated with fixed guideway transit, found that among the seven locations (Philadelphia, Boston, Portland, San Diego, Chicago, Dallas, and Santa Clara County), value premiums ranged from 6.4 to over 40 percent. The authors concluded that value premiums depended on a variety of factors, including traffic congestion, local real estate market conditions, and business cycles.

Transit in Europe can also provide insight to ways of measuring value capture. A study of 15 light rail systems in France, Germany, the United Kingdom, and North America measured housing prices, residential rent, office rent, and property values in each of the cities, concluding that there was a positive value premium in all but two cities. These two cities initially experienced negative value impacts from fixed guideway transit due to the noise associated with the light rail system. Technological improvements have since reduced noise levels and most modern light rail systems are fairly quiet.

One key aspect of the literature is the separation of fixed guideway transit's impacts on existing real estate versus its impacts on new development. In many situations, once a fixed guideway transit system is planned, local governments also increase zoning densities or implement policies that densify allowable development. This makes sense, because fixed guideway transit allows the movement of people without

commensurate automobile traffic impacts. However, studies of value premiums often face the challenge of controlling the analysis for changes in zoning (to allow for denser development) and the effects of related development policies. Conversely, increases in allowable development through denser zoning, even in the absence of fixed guideway transit, will almost always result in a higher land value, because a developer can build more units on the same site under the increase in allowed density.

Based on the analysis of value premiums, and considering the range of outcomes for previous projects, it would be reasonable to assume a potential value premium ranging from five percent up to 10 percent for properties located within one-half mile of the new transit station (one-half mile is considered the point at which resident interest in walking to a transit station substantially decreases). This value premium would represent a one-time increase in values that would be associated with a new transit station, and would also capture the benefit of changes in zoning and other City implementation actions to encourage TOD projects.

Property Tax Impacts

An increase in property values does not result in a proportional increase in property taxes (e.g., a five percent increase in property value leading to a five percent increase in property taxes) due to the overlapping effects of three state constitutional and statutory measures:

- One-Percent Constitutional Limit: the State Constitutions limits the regular combined property tax rate for all agencies to one percent, except for voter approved levies for schools or other agencies (such as the increase in the tax rate approved by Shoreline voters in 2010);

- Levy Increase Limit: Taxing districts, such as cities, are limited to a levy limit (limit on increase in property tax revenues) of no more than one percent of prior year property tax revenues, except for increases due to new construction, annexation, or voter approved increases; and

- Levy Amount Limit: There is a statutory limit on the maximum total levy for various types of taxing districts. The current maximum amount for cities is 0.59 percent of assessed value, excluding any voter-approved additional levies.

King County reassesses properties to fair market value on an annual basis. However, because of the One-Percent Constitutional Limit and Levy Amount and Levy Increase Limits, an increase in property values and assessed values does not automatically lead to an equivalent increase in property taxes.

For example, each taxing district must on an annual basis adjust its levy (property tax) rate so that the increase in property taxes, excluding new construction, annexations, or voter-approved increases, does not exceed one percent. Other adjustments to levy rates may need to be made to stay within the One-Percent Constitutional and Levy Amount limits.

As described previously, there may be a potential for a *one-time* increase of between five to ten percent in property values within one-half mile of the NE 145th Street Station. The one-time

increase in property values will need to be evaluated against overall changes in Shoreline property values to determine how it would impact property taxes for homeowners around the new NE 145th Street Station. For example, if the new NE 145th Street Station leads to a five percent increase in value, but this occurs in a hot real estate market where property values are increasing at a faster rate on an annual basis, the increase in assessed values for properties around the station may be driven more by market conditions than the new transit station.

Only in a flat market could homeowners around the new station possibly experience a one-time increase in property tax rates that could approach the rate of increase in property values. It should be noted that an increase in property values represents a 100 percent increase in homeowner equity.

Because of the complexity of the overlapping limits, it is not possible to make a specific forecast for how much property taxes might increase around the station area. Instead, one would need to run a series of multiple scenarios with varying assumptions for market-based increases in property values, the increase in the value of properties around a new transit station, and evaluation of how the constitutional and statutory limits affect Shoreline to determine a projection for a range of possible outcomes.

For homeowners who might be severely affected by a property tax increase, King County operates several programs to assist homeowners who may face difficulty paying property taxes for any reason. This includes a property tax exemption for senior citizens and disabled persons, based on household income, that freezes valuation and can create some exemptions from regular property taxes. Another program provides property tax deferrals for homeowners with limited income.

The State also provides a property tax deferral program, administered by county assessors, that allows for full or partial deferral of property taxes. Another State program provides means-tested direct grant assistance for property tax payments to seniors and disabled persons who are widows or widowers of veterans, which for eligible households could help offset an increase in property taxes if it occurs.

3.2.3 Mitigation Measures

Affordable Housing

With adoption of either action alternative, there would be an ongoing need to require and encourage affordable housing in the subarea. The City has drafted specific policies and development provisions for the subarea plan related to affordable housing. These are provided on the following pages for reference.

Draft Subarea Plan Policies for Housing

The following potential policies are DRAFT, under consideration by the City of Shoreline, and not yet adopted. Therefore, these policies may be subject to change prior to final adoption.

- Develop the systems necessary to implement and administer the City's new affordable housing program.
- Investigate financing and property aggregation tools to facilitate creation of affordable housing.

Note: This policy should not be construed to mean use of eminent domain. It provides guidance to examine potential tools recommended by partner organizations, which were more complex than those included in draft Development Code regulations for the subarea plan.

Draft Development Code Provisions Related to Housing

The following potential Development Code provisions are DRAFT, under consideration by the City of Shoreline, and not yet adopted. Therefore, these provisions may be subject to change prior to final adoption.

20.20.010 A definitions.

Affordable Housing
Housing reserved for occupancy to households whose annual income does not exceed a given percent of the King County median income, adjusted for household size, and have housing expenses no greater than thirty (30) percent of the same percentage of median income. For the purposes of Title 20, the percent of King County median income that is affordable is specified in SMC 20.40.235.

20.20.016 D definitions.

Dwelling, Live/Work
Live-work unit means a structure or portion of a structure: (1) that combines a commercial activity that is allowed in the zone with a residential living space for the owner of the commercial or manufacturing business, or the owner's employee, and that person's household; (2) where the resident owner or employee of the business is responsible for the commercial or manufacturing activity performed; and (3) where the commercial or manufacturing activity conducted takes place subject to a valid business license associated with the premises.

20.20.024 H definitions.

Housing Expenses, Ownership Housing
Includes mortgage and mortgage insurance, property taxes, property insurances, and homeowner's dues.

Housing Expenses, Rental Housing
Includes rent and appropriate utility allowance.

Household Income
Includes all income that would be included as income for federal income tax purposes (e.g. wages, interest income, etc.) from all household members over the age of eighteen (18) that reside in the dwelling unit for more than three (3) months of the year.

20.30.355 Development Agreement (Type L).

C. Development Agreement Contents for Property Zoned MUR-85' and potentially MUR-65' in order to achieve increased development potential: Each Development Agreement approved by the City Council for property zoned MUR-85' and MUR-65' shall contain the following:

1. 20 percent of the housing units constructed onsite shall be affordable to those earning less than 60 percent of the median income for King County adjusted for household size for a period of no less than 50 years. The number of affordable housing units may be decreased to 10 percent if the level of affordability is increased to 50 percent of the median income for King County adjusted for household size. A fee in lieu of constructing the units may be paid into the City's affordable housing program instead of constructing affordable housing units onsite. The fee is specified in SMC Title 3.

20.40.235 Affordable housing, Light Rail Station Subareas.

A. The purpose of this index criterion is to implement the goals and policies adopted in the Comprehensive Plan to provide housing opportunities for all economic groups in the City's Light Rail Station Subareas. It is also the purpose of this criterion to:

1. Ensure a portion of the housing provided in the City is affordable housing;
2. Create an affordable housing program that may be used with other local housing incentives authorized by the City Council, such as a multifamily tax exemption program, and other public and private resources to promote affordable housing;
3. Use increased development capacity created by the Mixed Use Residential zones to develop voluntary and mandatory programs for affordable housing.

B. Affordable housing is permitted and voluntary in MUR-35', and required in MUR-45', MUR-65', and MUR-85'. The following provisions shall apply to all affordable housing units required by, or allowed through, any provisions of the Shoreline Municipal Code:

1. The City provides various incentives and other public resources to promote affordable housing.

Specific regulations providing for affordable housing are described below:

Location	Use	Targeted Affordability Level and Incentives	Mandatory or Voluntary Program
Mixed Use Residential – MUR-85'	Residential	15% of rental units are affordable to families making 70% or less of the median income for King County adjusted for household size; or 15% of all owned units are affordable to households earning 80% or less of the	Mandatory*

		median income for King County adjusted for household size. **Incentives provided:** Eligible for Property Tax Exemption Program; and entitlement of 85 foot height and no density limits. **Bonus incentive:** 10% of the rental units affordable to households earning 80% or less the median income for King County adjusted for household size; or 10% of individual for sale/ownership units affordable to households earning 90% the median income for King County adjusted for household size for the first 300 units in the MUR-85' zone.	
Mixed Use Residential – MUR-65'	Residential	15% of rental units are affordable to families making 70% or less of the median income for King County adjusted for household size; or 15% of all owned units are affordable to households earning 80% or less of the median income for King County adjusted for household size. **Incentives provided:** Eligible for Property Tax Exemption Program; and entitlement of 65 foot height and no density limits. **Bonus incentive:** 10% of the rental units affordable to households earning 80% or less the median income for King County adjusted for household size; or 10% of individual for sale/ownership units affordable to households earning 90% the median income for King County adjusted for household size for the first 300 units in the MUR-65' zone.	Mandatory*
Mixed Use Residential – MUR-45'	Residential	15% of rental units are affordable to households earning 60% or less of the median income for King County adjusted for household size. 15% of all for sale/individual ownership units are affordable to households earning 80% or less of median income for King County adjusted for household size.	Mandatory*

		Incentive: Eligible for: Property Tax Exemption Program; Permit Fee reduction.	
Mixed Use Residential – MUR-35'	Residential	10% of rental units are affordable to families making 60% or less of the median income for King County adjusted for household size. 10% of all for sale/individual ownership units are affordable families making 80% or less of the median income for King County adjusted for household size. **Incentive:** Eligible for: Property Tax Exemption Program; permit fee reduction .	Voluntary

* Payment in lieu of constructing mandatory units is available. See SMC 20.40.235(E)(1)

C. **Mixed Use Residential Zone Affordable housing requirements.** The following provisions shall apply to all affordable housing units required by, or created through, any incentive established in the Shoreline Municipal Code unless otherwise specifically exempted or addressed by the applicable code section for specific affordable housing programs or by the provisions of an approved development agreement:

1. Duration: Affordable housing units shall remain affordable for a minimum of fifty (50) years from the date of initial owner occupancy for ownership affordable housing. At the discretion of the Director a shorter affordability time period, not to be less than thirty (30) years, may be approved for ownership affordable housing units in order to meet federal financial underwriting guidelines.

2. Designation of Affordable Housing Units: The Director shall review and approve the location and unit mix of the affordable housing units, consistent with the following standards, prior to the issuance of any building permit:

   a. Location: The location of the affordable housing units shall be approved by the City, with the intent that they are generally mixed with all other dwelling units in the development.

   b. Tenure: The tenure of the affordable housing units (ownership or rental) shall be the same as the tenure for the rest of the housing units in the development.

   c. Size (Bedroom): The affordable housing units shall consist of a range of the number of bedrooms

that are comparable to the units in the overall development.

d. Size (Square Footage): Affordable housing units shall be the same size as market housing units with the same number of bedrooms unless approved by the Director. The Director may approve smaller units when: (a) the size of the affordable housing is at least ninety (90) percent of the size of the market housing in the project with the same number of bedrooms; and (b) the affordable units are not less than five hundred (500) square feet for a studio unit, six hundred (600) square feet for a one (1) bedroom unit, eight hundred (800) square feet for a two (2) bedroom unit and one thousand (1,000) square feet for a three (3) bedroom unit.

3. Timing/Phasing: The affordable housing units shall be available for occupancy in a time frame comparable to the availability of the rest of the dwelling units in the development unless the requirements of this section are met through SMC 20.40.235(E), Alternative compliance. The affordable housing agreement provided for in SMC 20.40.235(D) shall include provisions describing the phasing of the construction of the affordable units relative to construction of the overall development. If the development is phased, the construction of the affordable units shall be interspersed with the construction of the overall development.

4. Development Standards:

a. Off-Street Parking: Off-street parking shall be provided for the affordable housing units consistent with SMC 20.50.390 unless reduced by the Director in accordance with SMC 20.50.400.

b. Recreation Space: The recreation/open space requirements for housing units affordable to families making 60% or less of Adjusted Median Income for King County shall be calculated at fifty (50) percent of the rate required for market housing.

5. Depending on the level of affordability provided the affordable housing units may be eligible for transportation impact fee waivers as provided in SMC 12.40.070(G).

6. In the event of a fractional affordable housing unit, payment in lieu in accordance with SMC 20.40.235(E)(1) is allowed for the fractional unit.

D. **Affordable housing agreement**. An affordable housing agreement shall be recorded with the King County Recorder's Office prior to the issuance of a building permit for any development providing affordable housing pursuant to the requirements or incentives of the Shoreline Municipal Code.

1. The recorded agreement shall be a covenant running with the land and shall be binding on the assigns, heirs and successors of the applicant.

2. The agreement shall be in a form approved by the Director and the City Attorney and shall address price restrictions, homebuyer or tenant qualifications, affordability duration, phasing of construction, monitoring of affordability and any other topics related to the provision of the affordable housing units.

3. The agreement may, at the sole discretion of the City, establish a monitoring fee for the affordable units. The fee shall cover the costs to the City to review and process documents to maintain compliance with income and affordability restrictions of the agreement.

4. The City may, at its sole discretion, agree to subordinate any affordable housing regulatory agreement for the purpose of enabling the owner to obtain financing for development of the property.

E. **Alternative compliance**. The City's priority is for residential and mixed use developments to provide the affordable housing on site. The Director, at his/her discretion, may approve a request for satisfying all or part of a project's on-site affordable housing with alternative compliance methods proposed by the applicant. Any request for alternative compliance shall be submitted at the time of application and must be approved prior to issuance of any building permit. Any alternative compliance must achieve a result equal to or better than providing affordable housing on site.

1. Payment in Lieu of constructing mandatory affordable units – Payments in lieu of constructing mandatory affordable housing units are subject to the following requirements:

a. Payments in lieu of constructing for sale/individual ownership units shall be based on the difference between the price of a typical market rate unit, and the price an income constrained household as defined in SMC 20.40.235(B)(1) can pay for the same unit adjusted for household size. Payments in lieu of construction for rental units shall be based on the present net value of the difference between the market and affordable rents as defined in SMC 20.40.235(B)(1) for the same units adjusted for household size. The fee shall be updated in the fee ordinance as part of the City's budget process.

b. The payment obligation shall be due prior to issuance of any certificate of occupancy for the project. Collected payments shall be deposited in the City's Housing Trust Fund account.

2. Any request for alternative compliance shall:

a. Include a written application specifying:
   i. The location, type and amount of affordable housing; and
   ii. The schedule for construction and occupancy;

b. If an off-site location is proposed, the application shall document that the proposed location:
   i. Is within a ¼ mile radius of the project triggering the affordable housing requirements or the proposed location is equal to or better than providing the housing on site or in the same neighborhood;

ii. Is in close proximity to commercial uses, transit and/or employment opportunities;

c. Document that the off-site units will be the same type and tenure as if the units were provided on site; and

d. Include a written agreement, signed by the applicant, to record a covenant on the housing sending and housing receiving sites prior to the issuance of any construction permit for the housing sending site. The covenants shall describe the construction schedule for the off-site affordable housing and provide sufficient security from the applicant to compensate the City in the event the applicant fails to provide the affordable housing per the covenants and the Shoreline Municipal Code. The intent is for the affordable housing units to be provided before, or at the same time as, the on-site market housing. The applicant may request release of the covenant on the housing sending site once a certificate of occupancy has been issued for the affordable housing on the housing receiving site.

20.40.245 Apartments

Apartments are allowed in the MUR zones. Microapartments are not allowed in the MUR zones. Microapartments are defined as a structure that contains single room living spaces with a minimum floor area of 120 square feet and a maximum floor area of 350 square feet. These spaces contain a private bedroom and may have private bathrooms and kitchenettes (microwaves, sink, and small refrigerator). Full scale kitchens are not included in the single room living spaces. These single room living spaces share a common full scale kitchen (stove, oven, full sized or multiple refrigeration/freezers), and may share other common areas such as bathroom, shower/bath facilities, and recreation/eating space.

Refer to Title 20 Development Code of the Shoreline Municipal Code, and in particular 20.30 General Development standards for additional information pertaining to regulations for housing and mixed use development.

Other Recommended Mitigation Measures

- The City would continue to monitor and support economic development opportunities in the subarea.
- The City would explore public/private and public/public partnerships for redevelopment that might help to encourage and catalyze growth.
- The City would prioritize investment of capital improvements related to transportation, infrastructure,

public parks, and other facilities in the subarea to support growth for the next twenty years and over the long term.

3.2.4 Significant Unavoidable Adverse Impacts

Implementation of either action alternative, Alternative 2—Connecting Corridors or Alternative 3—Compact Community would provide increased opportunities for housing, including affordable housing and a variety of housing choices to fit various income levels. Redevelopment also would create jobs and economic development opportunities over time. Overall at full build-out, Alternative 3 would provide the most housing opportunities and Alternative 2 would provide the most employment opportunities. These increases would help the City in achieving its established growth targets and improving the jobs-to-housing ratio.

With the planned growth in the subarea, some single family homeowners may decide to move because of concerns over how the neighborhood may change over time, and potential increases in property values could benefit them in this process. On the other hand, if property taxes increase, this could be an added burden on some residents.

Overall with the gradual pace of growth expected, continual monitoring of conditions in the subarea by the City, and implementation of the mitigation measures, significant adverse unavoidable impacts would not be anticipated.

The concern with implementing Alternative 1—No Action would be that it is not consistent with adopted goals, policies, and objectives at the state, regional, and local levels to support growth management and integrated land use and transportation planning in high-capacity station areas.

3.3 Transportation

This section describes the affected environment, analyzes potential impacts, and provides recommendations for mitigation measures for multimodal transportation, including motor vehicle traffic, transit, bicycle, and pedestrian modes. Parking conditions are also analyzed.

3.3.1 Affected Environment

Introduction

Existing conditions of the multimodal transportation network are described and illustrated on the following pages, along with planned conditions for the future as outlined in adopted transportation plans. They include an assessment of the current infrastructure and operating conditions for all transportation modes. Additionally in this section, impacts to transportation facilities and services resulting from the proposed land use alternatives are assessed to determine appropriate mitigation measures needed to accommodate the changes. In order to provide relevant details and constructive analysis, the project team conducted field visits, utilized existing data (such as traffic counts and transit timetables) and reviewed relevant plans for the area, including:

- 2013 Sound Transit Draft Environmental Impact Statement (DEIS) for the Lynnwood Link Extension
- City response letter to the 2013 Sound Transit Draft Environmental Impact Statement (DEIS) for the Lynnwood Link Extension
- 2011 Shoreline Transportation Master Plan (TMP) and amendments
- 2012 Shoreline Comprehensive Plan (CP)
- City of Shoreline Vision 2029 Plan
- 2013 PSRC Growing Transit Communities Report (GTC)
- 2012 King County Metro Strategic Plan
- 2011 Community Transit Long Range Plan
- 2014 Sound Transit Long Range Plan Update
- 2015-2020 Capital Improvement Plan (CIP)
- 2015-2020 Transportation Improvement Plan (TIP)

Existing Street Network

Regional Access

Interstate 5 (I-5) is a limited access freeway classified as a highway of statewide significance. It provides access from the transportation study area south to Northgate, the University District, Capitol Hill and Downtown Seattle and beyond as well as to Mountlake Terrace, Lynnwood and points north. Additionally, I-5 serves as the key corridor for express regional bus service in the area. The nearest access point to I-5 from the study area is the NE 145th Street interchange, located at the southern edge of the study area.

Subarea Street Network

SR 99/Aurora Avenue N is a managed access highway and is also classified as a highway of statewide significance. It serves as a principal arterial in Shoreline. It lies directly west of the study area, providing north-south mobility and business access along the corridor.

The principal arterials in the study area are N/NE 145th Street and 15th Avenue NE, which form the southern and eastern edges. NE 145th Street is a state highway (SR 523) from I-5 to SR 522. N/NE 145th Street is not located within the City of Shoreline. The northern half of the right-of-way is located in unincorporated King County and the southern half of the right-of-way is located in the City of Seattle. Minor arterials within the study area include Meridian Ave N, N/NE 155th Street and 5th Avenue NE. **Figure 3.3-1** highlights the street classifications of the roadways within the study area. The proposed light rail station location is identified on the map immediately east of I-5 and north of NE 145th Street. The area is composed of a mostly gridded network. The non-arterial street grid is broken in many places by the presence of parks. Crossings of I-5 are limited, with the only east-west connections located along N/NE 145th Street and N/NE 155th Street.

Existing Roadway Operations

Concurrency Management System

The Washington State Growth Management Act (GMA) includes a transportation concurrency requirement. This means that jurisdictions must provide adequate public facilities and services to keep pace with a community's growth over time to maintain the Level of Service (LOS) goals stated in a community's comprehensive plan. The improvements can include capital improvements, such as intersection modifications, or other strategies such as transit service expansion or transportation demand management. As part of the process, a jurisdiction evaluates the operations of roadway segments or intersections in order to determine the relative impact from new development on the transportation network. The City of Shoreline has an adopted concurrency methodology to balance growth, congestion, and capital investment.

Level of Service Criteria for Intersections

A common metric to evaluate intersection operations is average seconds of delay per vehicle, which can be translated into a grade for Level of Service (LOS) as shown in **Table 3.3-1**. An additional metric is the evaluation of a roadway segment via the volume-to-capacity (V/C) ratio, which compares a roadway's vehicle demand against the theoretical capacity of that segment. These V/C ratios can also be translated into LOS grades as shown in the table**.** The LOS concept is used to describe traffic operations by assigning a letter grade of A through F, where A represents free-flow conditions and F represents highly congested conditions. As shown in **Table 3.3-2**, the City has adopted LOS D for signalized intersections on arterials, unsignalized intersecting arterials and roadway segments on Principal and Minor Arterials[1]. Because it is not located within the City of Shoreline and is also a state highway between I-5 and SR 522, N/NE 145th Street is not subject to the City of Shoreline's LOS standards.

[1] Average delay at signalized intersections is based on all vehicles that approach the intersection. Average delay for unsignalized intersections is based on the delay experienced by vehicles at the stop-controlled approaches.

Table 3.3-1 Level of Service Criteria For Intersection And Roadway Analysis

Level of Service (LOS)	Signalized Intersection Delay per Vehicle (seconds)	Unsignalized Intersection Delay per Vehicle (seconds)	Roadway Segment Volume-to-Capacity ratio (V/C)
A	< 10	< 10	<.60
B	> 10 to 20	> 10 to 15	.60 - .70
C	> 20 to 35	> 15 to 25	.70-.80
D	> 35 to 55	> 25 to 35	.80 - .90
E	> 55 to 80	> 35 to 50	.90 – 1.0
F	> 80	> 50	> 1.0

Source: 2010 Highway Capacity Manual and the 2011 City of Shoreline Transportation Master Plan

Table 3.3-2 Level of Service Standards by Agency

Agency	LOS Standard
City of Shoreline	LOS D for signalized intersections LOS D for unsignalized intersecting arterials V/C ratio of .90 (LOS D) for principal and minor arterials[2]
City of Seattle	LOS D (goal)
WSDOT	LOS D for highways of statewide significance (HSS) LOS E/mitigated for regionally significant state highways (non-HSS)

[2] The City allows a V/C ratio of 1.10 for 15th Avenue NE, between NE 150th Street and NE 175th Street due to rechannelization for operational safety

Traffic Volumes

The existing conditions analysis uses data from the 2011 TMP update to describe current traffic operations and supplements it with more recent vehicle counts. Traffic counts were obtained from the City of Seattle, WSDOT, and the City of Shoreline and were also collected by the project team in July 2014. **Figure 3.3-2** and **Table 3.3-3** show existing traffic volumes and LOS values within the study area. N/NE 145th Street corridor has the highest east-west volume and carries over 30,000 vehicles per day. 15th Avenue NE is the busiest north-south corridor, with over 16,000 average daily trips (ADT). All segments in the study area currently operate within WSDOT or Shoreline LOS standards.

Intersection Evaluation

During the PM peak hour, all intersections within the study area currently operate within Shoreline and WSDOT adopted LOS standards as shown in **Figure 3.3-3**. The most congested intersection is located at NE 145th Street and 15th Avenue NE, which operates at LOS E. While most intersections along N/NE 145th Street operate at LOS D or better, some individual movements experience higher levels of delay than an overall intersection LOS D would suggest. This includes the northbound left and westbound through movements at the NE 145th Street / 5th Avenue NE intersection.

Collision History

As shown in **Figure 3.3-4**, some intersections in the study area have a relatively high number of vehicle collisions; experiencing a crash rate above 1.0 per million entering vehicles (MEV)[3]. The intersection of N 145th Street and Meridian Avenue N averaged 12 collisions per year, or 1.39 collisions per MEV (col/MEV), with a high number of rear-end, left-turn, right-angle, and sideswipe collisions. NE 145th Street and 5th Avenue NE experienced 16 collisions per year, a rate of 1.18 col/MEV. NE 145th Street and 15th Avenue NE had 12 collisions per year, a rate of .90 col/MEV. With a high number of rear-end and right-angle collisions. Additionally, the unsignalized intersection of 5th Avenue NE and the I-5 Northbound on-ramp averaged 7 collisions per year, a collision rate of 1.37 col/MEV. All other intersections in the study area averaged fewer than 10 collisions per year. The collision rate for the entirety of the 145th Street corridor is 6.03 per million vehicle miles of travel, more than two and a half times higher than the 2010 Northwest Region average collision rate of 2.27 for Urban Principal Arterials.

Between 2011 and 2013, there were 15 pedestrian and bicycle collisions within the study area, with five of the collisions located along N/NE 145th Street. Five collisions occurred along N 155th Street while three were located along 15th Avenue NE.

[3] Information provided by Sound Transit DEIS for the Lynnwood Link Extension using collision data from 2008 to 2011

Table 3.3-3 Average Daily Traffic and PM Peak Hour Congestion For Existing Conditions

Street	Segment	Average Daily Traffic	PM Peak Hour Volume[4]	PM Peak hour Volume-to-Capacity Ratio
East-West Corridors				
N/NE 145th Street	West of I-5	25,240	1,331	0.81
NE 145th Street	East of I-5	31,790	1,431	0.87
N 155th Street	West of I-5	11,640	538	0.60
NE 155th Street	East of I-5	9,900	486	0.61
North-South Corridors				
5th Avenue NE*	I-5 NB on-ramp to NE 155th Street	7,170	530	0.76
15th Avenue NE	NE 145th to NE 150th Street	16,130	1,038	0.52
15th Avenue NE**	NE 150th to NE 155th Street	14,240	881	0.73
Meridian Avenue N	145th to 155th Street	6,220	392	0.56

Source: 2011 City of Shoreline Transportation Master Plan and updated traffic counts from 2014

*Note that the portion of 5th Avenue NE between NE 145th Street and the I-5 northbound on-ramp is exempt from the City of Shoreline's concurrency standard due to the need to make modifications to an intersection that is currently outside of the City's jurisdiction.

**The City allows a V/C ratio of 1.10 for 15th Avenue NE, between NE 150th Street and NE 175th Street due to rechannelization for operational safety

[4] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-1 Street Classifications in the Study Area

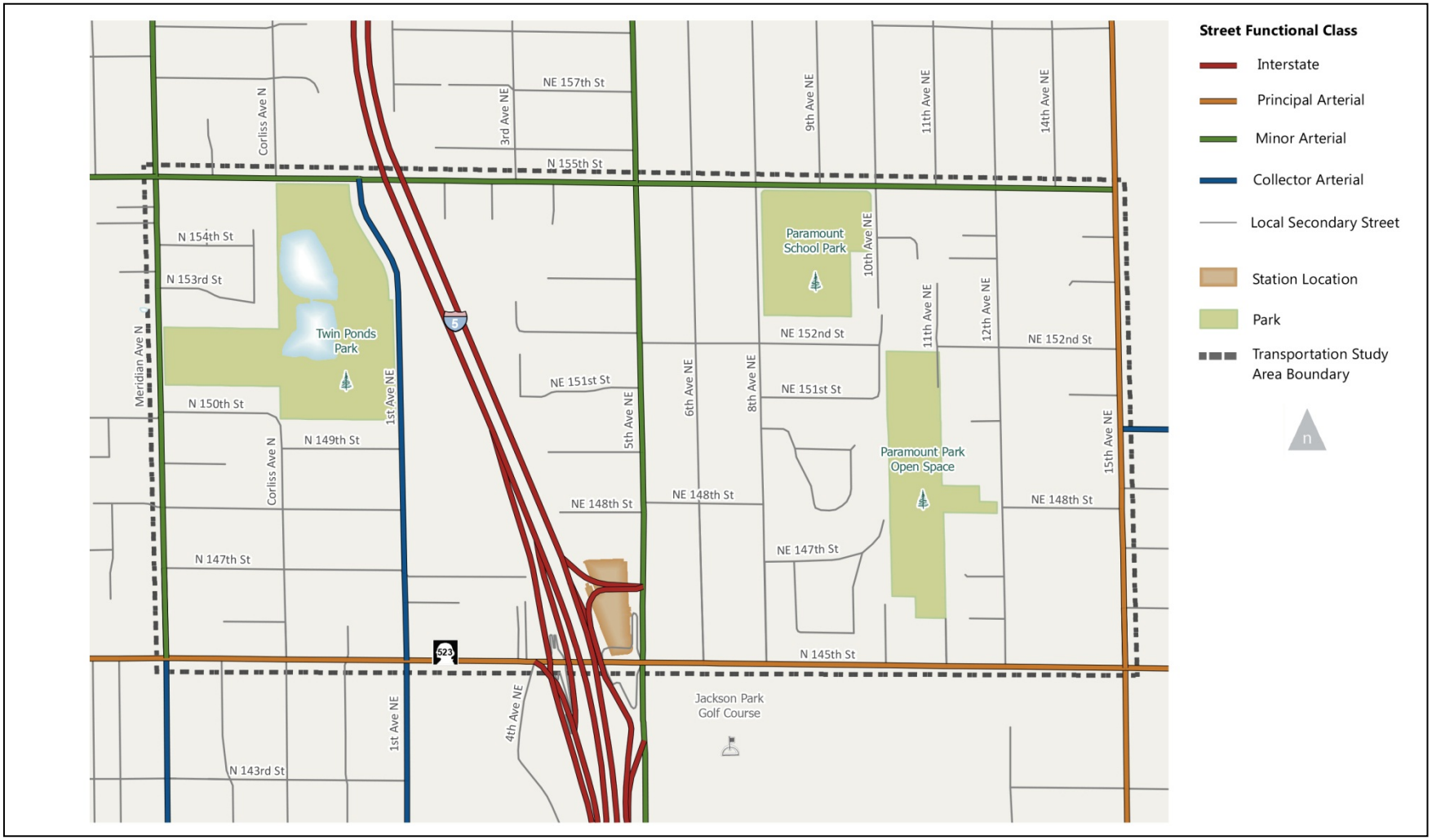
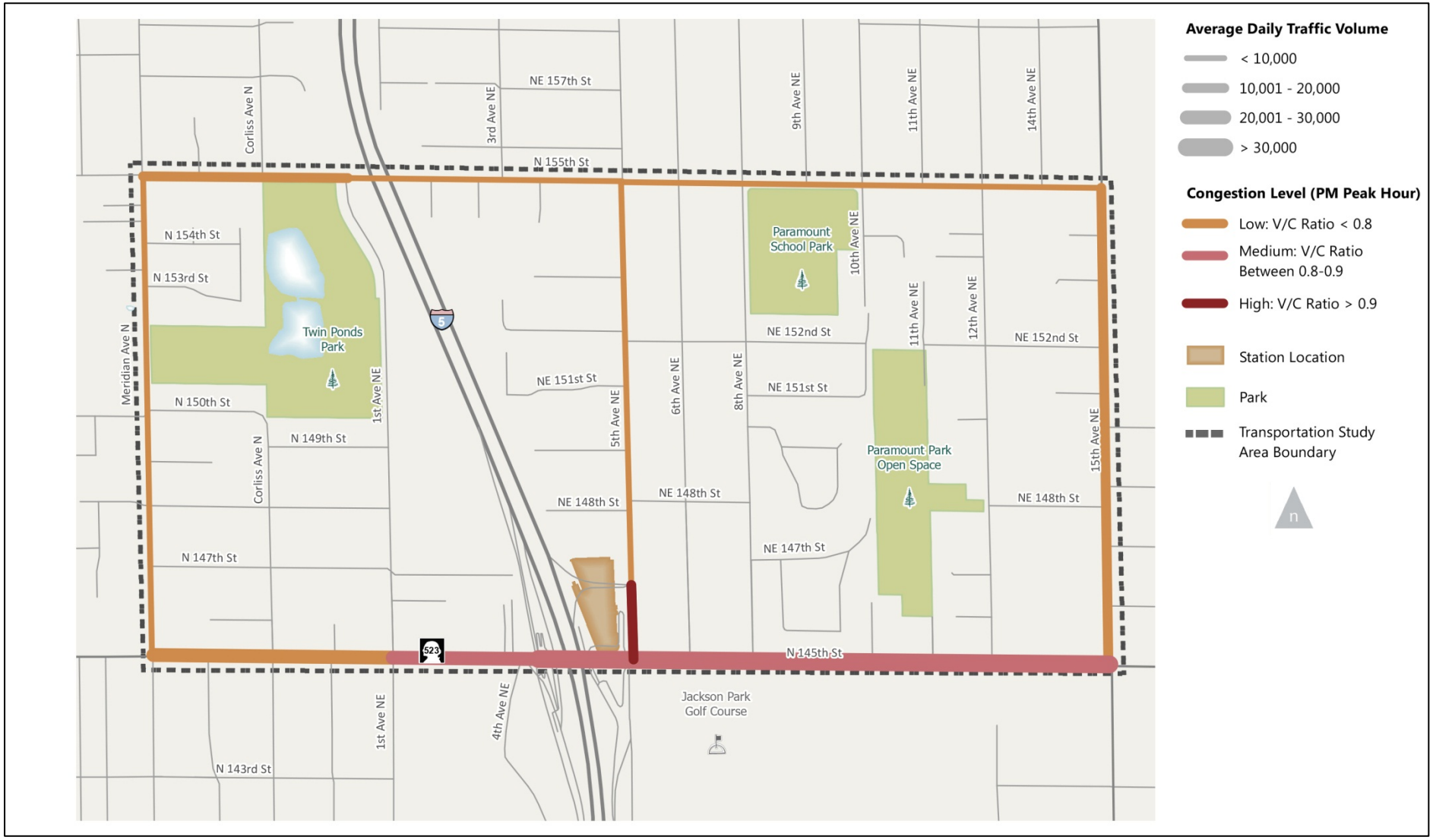
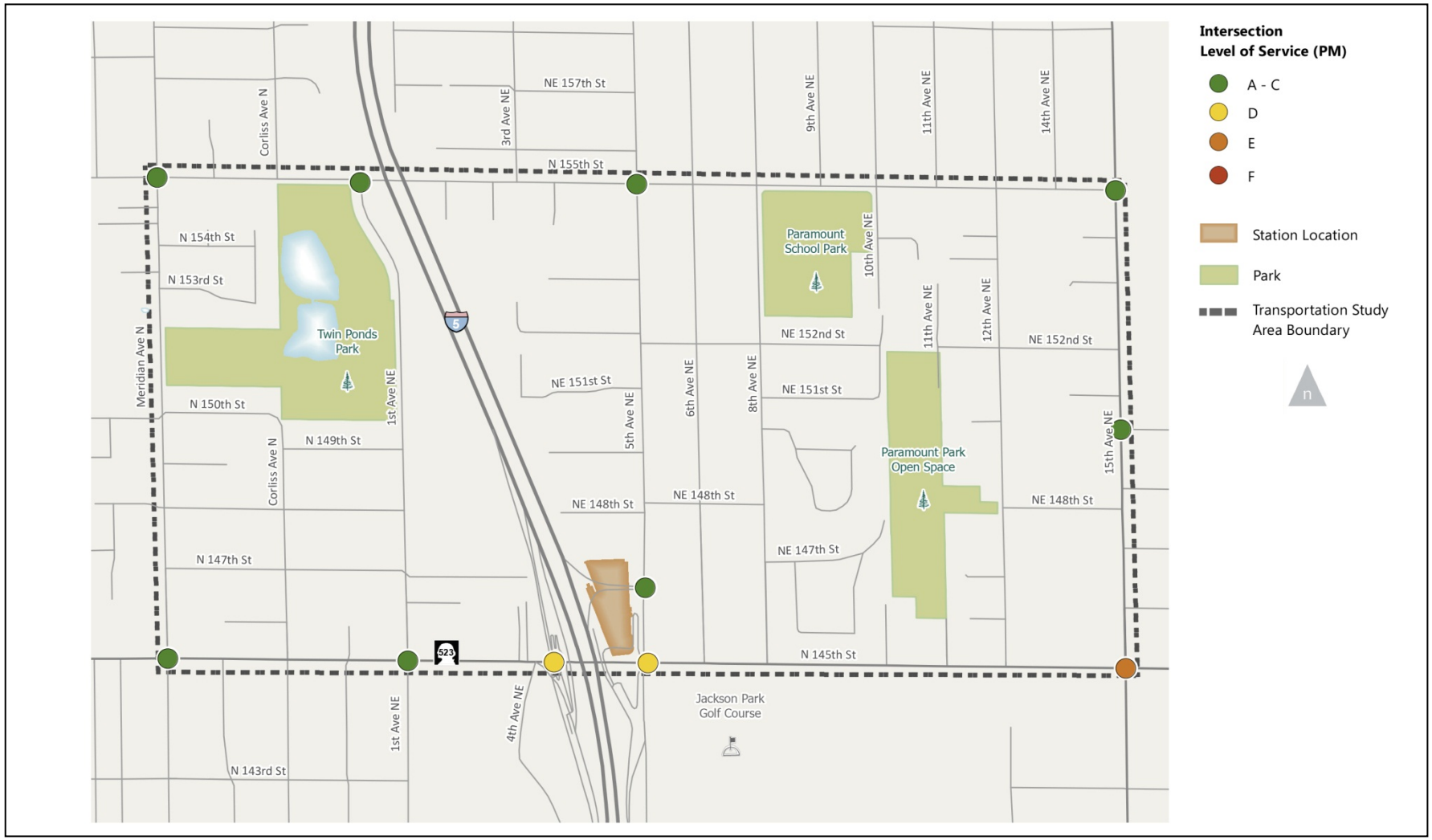


Figure 3.3-2 Average Daily Traffic and PM Peak Congestion (Existing Conditions)



Sources: City of Shoreline, WSDOT, City of Seattle and updated traffic counts from 2014

Figure 3.3-3 Intersection Level of Service (Existing Conditions)



Sources: City of Shoreline, WSDOT, City of Seattle and updated traffic counts from 2014

Figure 3.3-4 Accident Rate (Existing Conditions)

Sources: Sound Transit Lynnwood Link Extension DEIS ,WSDOT

Transit Service Provision

Existing Conditions

The transit coverage within the study area is provided by King County Metro and Sound Transit. **Table 3.3-4** details the current headways and destinations serviced by routes that traverse the area while **Figure 3.3-5** highlights the location of the routes. There are many transit routes with service within and in the vicinity of the study area, both in the peak and off-peak time periods. Peak-period routes connect the study area with regional growth centers such as Downtown Seattle, the University of Washington, Northgate, Bellevue and Redmond. All-day service is primarily provided along the north-south corridors within the study area. Sound Transit provides all-day service from downtown Seattle to Lynnwood and Everett, with a stop at the NE 145th Street freeway station. However this route does not serve the freeway station in the peak travel direction during the peak periods (i.e. there is no service at the southbound stop during the a.m. peak and there is no service at the northbound stop during the p.m. peak). There is no all-day east-west route that travels the entire length of the 145th Street corridor between Aurora Avenue and Lake City. The only east-west all day service in the study area is along N/NE 155th Street. While Sound Transit routes 510, 511 and 513 and a number of Community Transit routes pass by the study area along I-5, they do not stop at the 145th Street freeway station.

Planned Transit Service

While the City of Shoreline does not have direct control over the transit service within its borders, a number of conceptual modifications with light rail deployment are identified in the TMP. The TMP specifies that bus service be redirected to better connect to the station once service begins, especially along N/NE 145th Street. The City will be engaged with King County Metro and Sound Transit over the next two years as part of the development of a Transit Service Integration Plan. The Lynnwood Link Extension DEIS analysis assumed that three King County Metro routes would serve the NE 145th Street Station with 15 minute peak headways and 15-20 minute off-peak headways. Additionally, the DEIS forecast 2,200-3,400 daily light rail station boardings at the NE 145th Street Station. The DEIS noted that long-distance/commuter bus routes near the 145th Street Station could be rerouted to connect with the light rail station as a transfer point in order to provide a faster and more frequent trip.

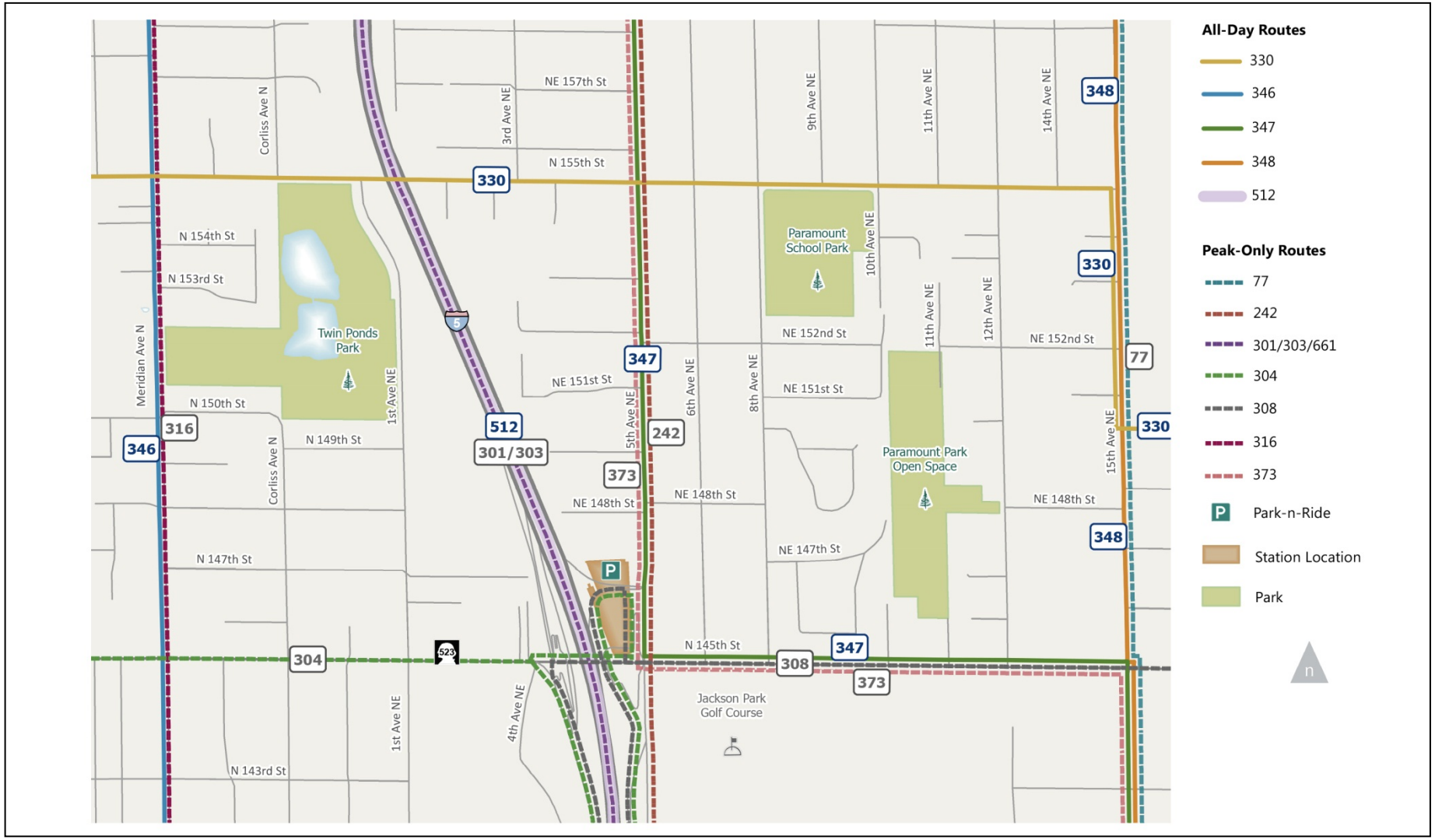
Table 3.3-4 Existing Transit Service

Route	Weekday Headways (in minutes)				Destinations Served
	AM Peak (6-9am)	Midday	PM Peak (3-6pm)	Evening	
All-day Routes					
KCM 330	60	60	60	60	Shoreline Community College, Lake City
KCM 346	30	30	30	60	Aurora Village, Meridian Park, Northgate
KCM 347	30	30	30	60	Northgate, Ridgecrest, North City, Mountlake Terrace
KCM 348	30	30	30	60	Richmond Beach, North City, Northgate
ST 512	15	15	15	15-30	Everett, Lynnwood, Mountlake Terrace, University District, Downtown Seattle
Peak Period Routes					
KCM 77	15-25	-	15-30	-	North City, Maple Leaf, Downtown Seattle
KCM 242	30	-	30	-	Northgate, Ravenna, Montlake, Bellevue, Overlake
KCM 301*	15**	-	15**	-	NW Shoreline, Aurora Village, Shoreline Park and Ride, Downtown Seattle
KCM 303	15	-	15	60**	Shoreline Park and Ride, Aurora Village Transit Center, Meridian Park, Northgate, Downtown Seattle, First Hill
KCM 304	20-30	-	20-30	-	Richmond Beach, Downtown Seattle
KCM 308	30	-	30	-	Lake Forest Park, Lake City, Downtown Seattle
KCM 316	15-20	-	15-25	-	Meridian Park, Bitter Lake, Green Lake, Downtown Seattle
KCM 373	15	-	15	60**	Aurora Village Transit Center, Shoreline Park and Ride, Meridian Park, University District

Source: King County Metro, 2014

* This route provides bi-directional service during the a.m. and p.m. peak periods. Not all trips serve the 145th Street freeway station during the peak periods.
**One outbound trip to Shoreline after 6 pm.

Figure 3.3-5 Existing Transit Service



Existing Parking Conditions

Existing On-Street Parking Conditions

A substantial portion of the study area is residential in character and does not have on-street parking restrictions. Streets within the study area where parking is restricted include the main corridor of N/NE 145th Street, portions of 1st Avenue NE between N 145th Street and N 155th Street, 5th Avenue NE south of the I-5 northbound on-ramp, and 15th Avenue NE between NE 145th Street and NE 155th Street. The Sound Transit DEIS evaluated parking supply and utilization for an area within a quarter-mile of the proposed station[5]. The study determined that there were 450 unrestricted on-street spaces and 350 off-street spaces in total with a utilization rate of 27 percent for the on-street spaces and 71 percent for the off-street locations.

Due to the limitations of the midday evaluation and the geographic area covered, a qualitative assessment was conducted for this DEIS during the periods in which residential on-street parking utilization is typically higher, such as evenings and weekends[6]. Within the study area, there are approximately 1,950 on-street spaces available. Utilization was observed to be between approximately 10 percent and 20 percent for a majority of the non-arterial streets, with higher utilization of 20 and 30 percent observed along 6th Avenue NE.

Park-and-Ride Facilities

King County Metro owns and operates the 68 space North Jackson Park park-and-ride lot at 14711 5th Avenue NE. This lot generally is 100% utilized[7]. As part of the Lynnwood Link Extension Preferred Alternative, a 500 space parking garage will be located on the eastern edge of I-5 just north of NE 145th Street in the WSDOT right-of-way and the existing park-and-ride area. The Sound Transit DEIS assumed that the garage would be fully utilized during the daytime hours. During the PM peak hour, the DEIS estimated that 180 vehicles would exit the garage and 45 would enter. During the AM peak hour, it was estimated that 200 vehicles would enter the garage and 50 would exit.

[5] Data were collected mid-week in May 2012. Utilization was counted between 9 am and 11 am and between 1 pm and 4 pm.

[6] Observations were conducted December 2014 on a Sunday between 7 am and 8 am.

[7] King County Metro Park and Ride utilization report Second Quarter 2014

Existing Pedestrian and Bicycle Facilities

Existing Conditions

Bicycle and pedestrian facilities are located sporadically throughout the study area . **Figure 3.3-6** details the current sidewalk and bicycle infrastructure. Sidewalks exist on both sides of most arterial streets including Meridian Avenue N, 5th Avenue NE, 15th Avenue NE N/NE 145th Street and N/NE 155th Street. The quality and condition of these sidewalks varies throughout the subarea. The sidewalks along N/NE 145th Street are typically less than five feet wide, provide little buffer from heavy vehicle traffic, are in various states of repair and are constricted by utility poles. The only existing bicycle facilities within the study area are on N/NE 155th Street between Meridian Avenue N and 5th Avenue NE and on 15th Avenue NE between NE 150th Street and NE 155th Street (these facilities continue beyond the study area boundary). Currently there is not a direct bicycle connection to the proposed station site.

The neighborhoods within the subarea were primarily developed from the 1940s through the 1970s when the area was part of unincorporated King County. The street standards at that time did not require sidewalks, and as such, most of the non-arterial streets today do not have them. This is also true of bicycle lanes which are not provided on non-arterial streets .

When the City of Shoreline incorporated in 1995, it assumed jurisdiction of the study area. The City works with the community to identify and prioritize capital transportation and infrastructure improvements throughout the City through development of the TMP, Transportation Improvement Plan and Capital Improvement Plan.

I-5 presents a barrier for east-west bicycle and pedestrian travel, as there are only crossings within the study area and they are approximately one-half mile apart. Bicycle lanes and sidewalks are present at N 155th Street. At the NE 145th Street interchange, the existing bridge has narrow, curbside sidewalks and no bicycle facilities. These minimal facilities, combined with heavy traffic volumes, the need for pedestrians to cross freeway on- and off-ramps and limited north-south crossings, create an uncomfortable environment for pedestrians and bicyclists.

Narrow and non-ADA compliant sidewalk facilities along NE 145th Street near 10th Avenue NE

Planned Multimodal Transportation Improvements

Pedestrian and Bicycle Improvements

The 2011 TMP identified a number of improvements to address the pedestrian and bicycle connectivity challenges described in the previous subsection. **Figure 3.3-7** highlights the planned bicycle improvements. **Figure 3.3-8** details the Pedestrian System Plan, as identified in the TMP. Within the study area, the Bicycle System Plan recommends adding bicycle lanes along 5th Avenue NE, Meridian Avenue NE and an extension of the current bicycle lanes along NE 155th Street to 15th Avenue NE. The extension of the bicycle lanes on NE 155th Street east of 5th Avenue NE as well as bicycle lanes on NE 150th Street between 15th Avenue NE and 25th Avenue NE are part of the Interurban / Burke-Gilman Trail Connectors project that is specified in the 2014-2019 Capital Improvement Program and scheduled for completion in 2015. Bicycle lanes along Meridian Avenue NE and 5th Avenue NE are scheduled for completion in 2016.

The Pedestrian System Plan specifies sidewalk facilities for the minor and collector arterials in the study area, including 1st Avenue NE, 5th Avenue NE, 15th Avenue NE, Meridian Avenue NE and NE 155th Street. While several of these streets already have sidewalks, many do not comply with the City's existing standards for materials, width and/or amenity zones[8].

Vehicle Traffic Improvements

Figure 3.3-9 highlights projects identified in the TMP as well as in the Lynnwood Link DEIS that are needed to accommodate future planned growth and maintain the City's adopted transportation level of service standard. The TMP calls for the reconfiguration of Meridian Avenue N to allow for a two-way left turn lane from N 145th Street to N 205th Street. NE 155th Street would have a similar treatment, extending the current 3-lane profile from 5th Avenue NE to 15th Avenue NE. Potential traffic improvements listed in Sound Transit's Lynnwood Link DEIS related to a 145th Street station alternative[9] are summarized below. It should be noted that the City of Shoreline has not agreed that these improvements are adequate mitigation for the proposed station.

- 5th Avenue NE: Two-way left-turn lane between NE 145th Street and the park-and-ride entrance along 5th Avenue NE
- 5th Avenue NE / I-5 northbound on-ramp: Relocate the on-ramp and intersection to the north of the proposed station parking garage and signalize the intersection
- NE 145th Street / 5th Avenue NE: Add a protected northbound right-turn phase
- NE 145th Street / 12th Avenue NE: Add a short refuge area on NE 145th Street for eastbound approach

[8] Sidewalk improvements along N/NE 145th Street were not identified in the TMP as the street right-of-way is not currently within the City of Shoreline.

[9] Mitigation measures recommended for a 155th Street station alternative are not included in this analysis as they would not be constructed with a 145th Street station in place.

Figure 3.3-6 Bicycle System Plan from the Transportation Master Plan

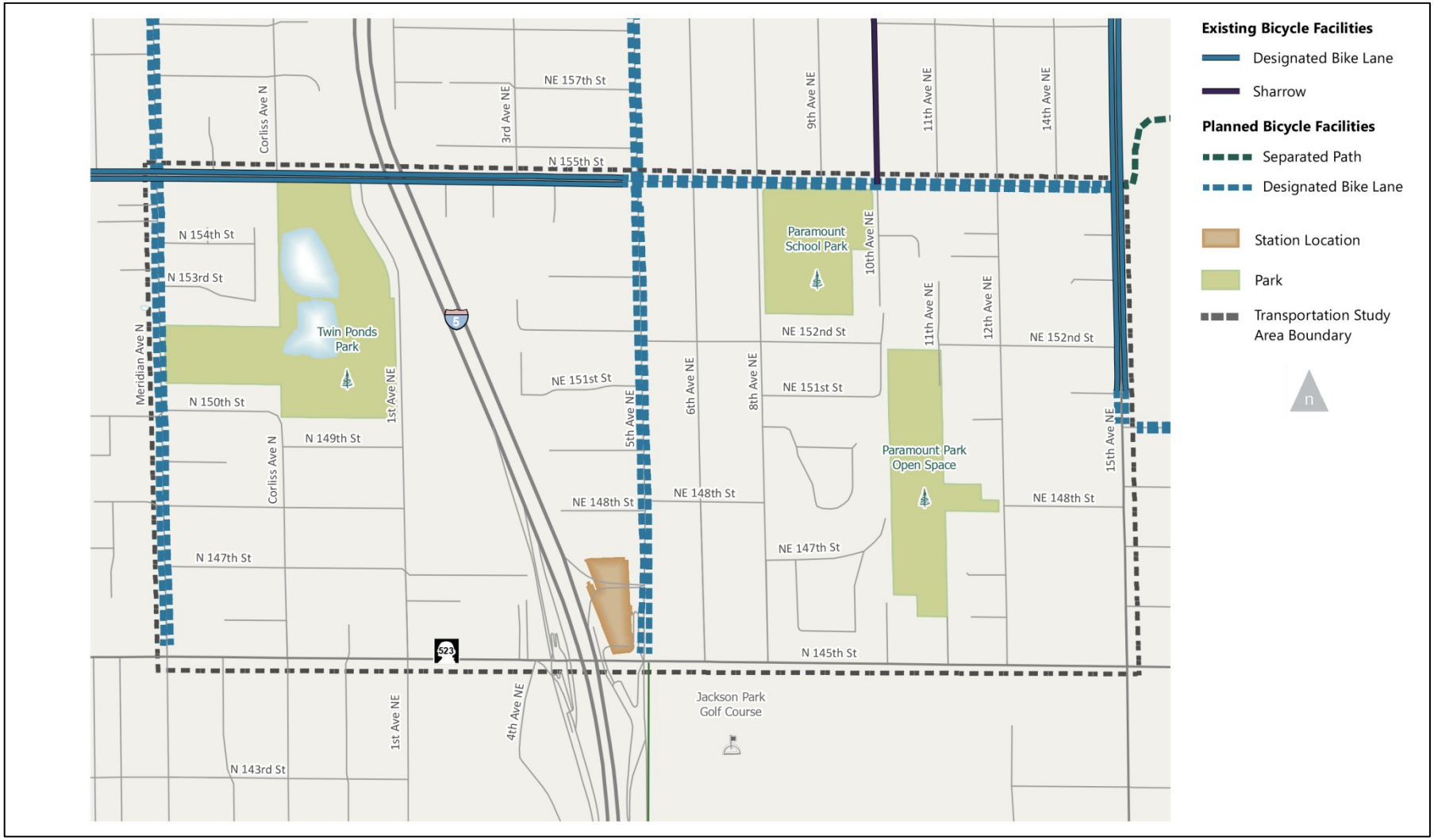


Figure 3.3-7 Pedestrian System Plan from the Transportation Master Plan

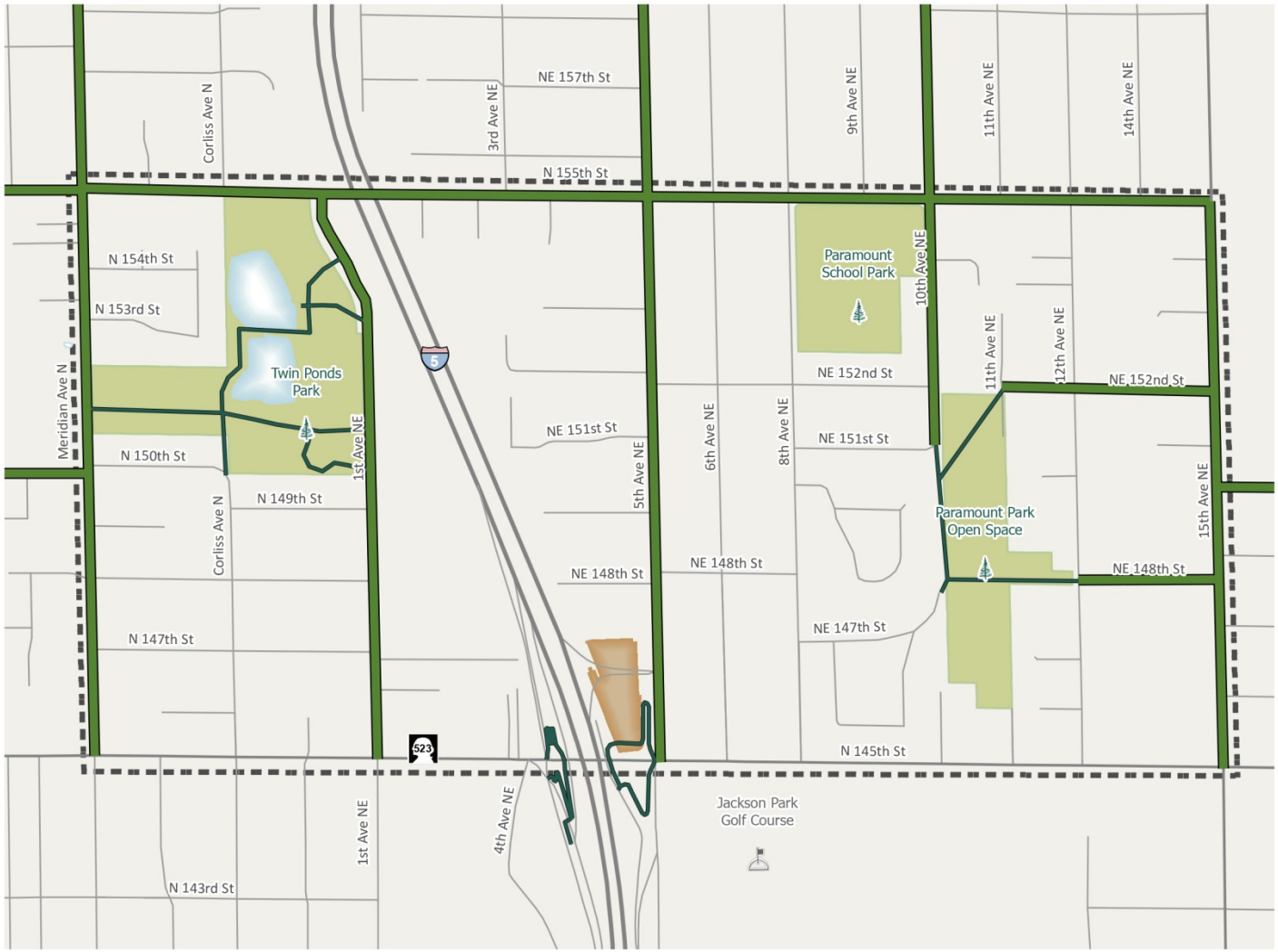
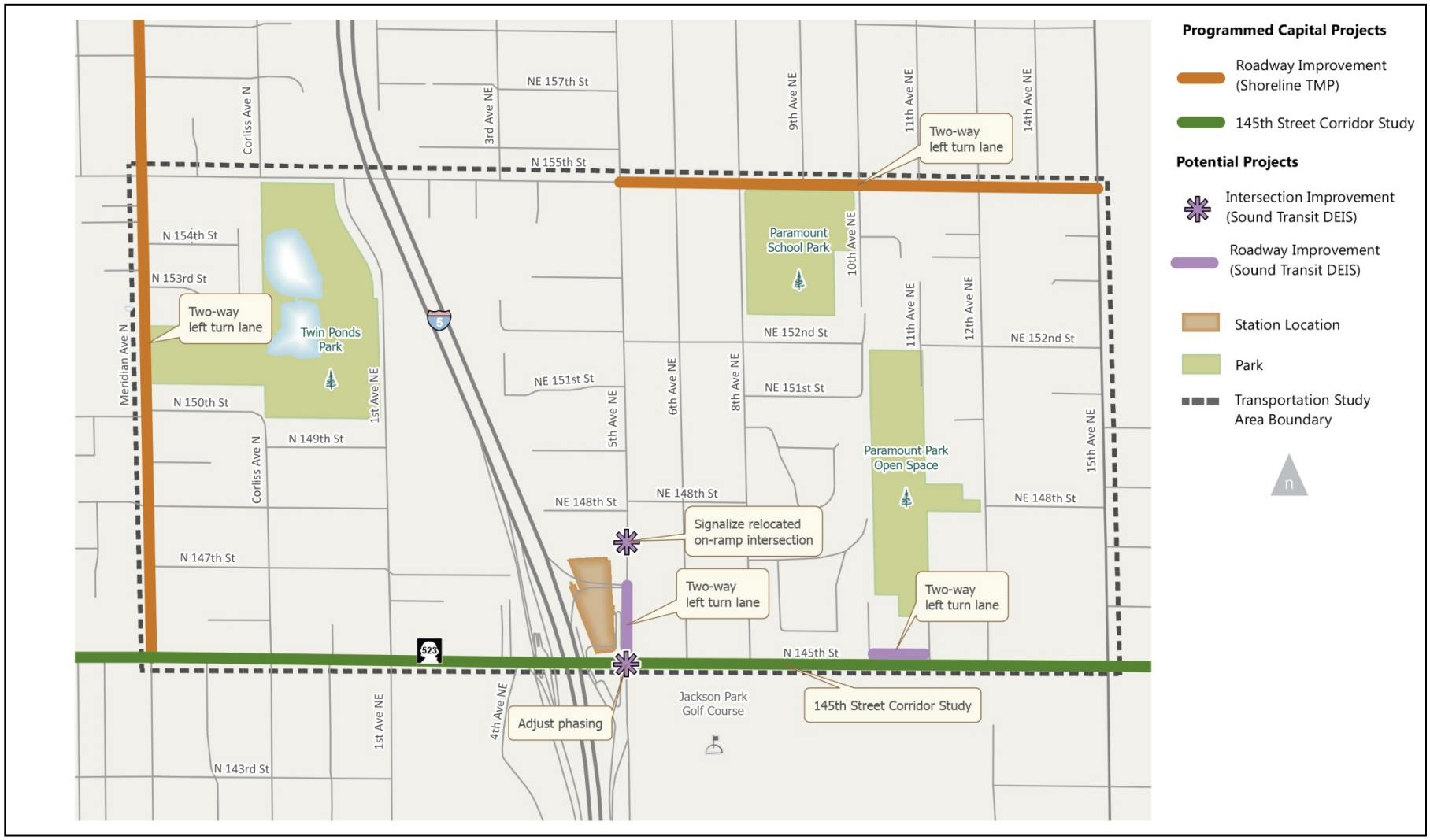


Figure 3.3-8 Roadway Improvements to Accommodate Growth Identified in the Transportation Master Plan and Sound Transit Lynnwood Link Extension Draft Environmental Impact Statement



*Note that the City of Shoreline has not agreed that the improvements identified in the ST DEIS are adequate mitigation for the proposed station.

3.3.2 Analysis of Potential Impacts

Introduction

This section describes potential impacts as a result of changes in land use within the study area. It includes a description of the forecast methodology as well as a detailed account of the results of the transportation impact analysis. The three alternatives evaluated during this process included:

- **Alternative 1—No Action**, which assumes that there would be minimal growth within the subarea based upon existing zoning designations with the total forecast of 4,600 households and 2,325 jobs.
- **Alternative 2—Connecting Corridors**, which envisions an additional 9,835 households and 9,422 jobs in the subarea above Alternative 1, building out over a 60-100 year horizon.
- **Alternative 3—Compact Community**, which envisions an additional 10,670 households and 7,314 jobs in the subarea above Alternative 1, building out over a 60-100 year horizon.

Forecasts

Baseline Forecasts

In order to determine the transportation-related impacts of the various land use alternatives, traffic volumes were forecast based on changes in development intensity within the study area. The 2011 TMP update included forecasts of year 2030 traffic volumes; however these forecasts were based on a transit-oriented land use scenario in which much of the city's future housing and employment growth was directed to multiple transit nodes within the city, including the 145th Street Station subarea.

Because current zoning is geared toward less transit-oriented uses (such as single family and other lower intensity development), the travel model developed for this DEIS was re-run utilizing a "Dispersed" land use scenario, which directed future growth more evenly throughout the city based on existing zoning and observed development patterns. The travel model provided forecast traffic volumes for year 2030 and traffic volumes were then increased by 0.5 percent to reflect estimated 2035 volumes in order to be consistent with the land use horizon year. These revisions to the travel model allow for a true "no action" alternative as a baseline for analyzing the potential impacts of the proposed land use changes in the subarea.

To analyze how the two growth alternatives (Alternatives 2 and 3) would result in different travel patterns due to their mix of land

Limited Access Control Standards

WSDOT has full control of access to roadways within 300 feet of a freeway ramp terminal. In the cast of the 145th Street Station, this is pertinent for 5th Avenue NE and the I-5 Northbound on-ramp. WSDOT policy states that any change to existing land use within this 300 foot boundary would need to be re-evaluated to determine if access can remain if the land use is changed.

Deviations from the policy would require the Federal Highway Administration, WSDOT, Sound Transit and the City of Shoreline to determine an appropriate course of action. This may pose as a constraint to the type of zoning change allowed directly adjacent to the station location.

uses and connectivity, the project team used an innovative trip generation analysis technique known as the mixed-use development (MXD) model. The MXD model is based on a growing body of research which focuses on the relationship between travel and the built environment. This method supplements conventional trip generation methods to capture effects related to built environment variables (known as the Ds) including **d**ensity, **d**iversity of land uses, **d**estinations (accessibility), **d**evelopment scale, pedestrian and bicycle **d**esign, **d**istance to transit services, and **d**emographics. The proposed height and density alternatives in the 145th Street Station Subarea incorporate changes in a number of these variables that, in turn, would influence the neighborhood's travel characteristics. In short, places with higher densities, a rich variety of land uses close to one another, and high quality pedestrian, bicycle, and transit environments have lower vehicle trip generation rates. People have more choices in terms of both the travel mode as well as how far they must travel to reach various destinations. The MXD method provides a more reasonable picture of how travel characteristics change over time by avoiding overestimates of the number of vehicle trips that infill projects generate.

> The MXD analysis is a method for vehicle trip forecasting that more accurately reflects the number of trips that can be completed within a given subarea due to complementary land uses such as residential and retail.

The MXD method was applied to the station subarea to calculate the number of walking, biking, transit and automobile trips generated from new development. **Table 3.3-5** highlights the mode split of the PM peak hour trips generated by full development within the subarea. As the table shows, the proposal to increase land use intensity for the Connecting Corridors and Compact Community Alternatives results in a higher proportion of short distance trips that could be made via walking, biking and transit. Due to the more compact nature of the Compact Community Alternative, a higher percentage of trips would be internal, and would remain within the study area as compared to the Connecting Corridors Alternative.

To evaluate how streets and intersections in the study area would operate under each of the alternatives, traffic volume estimates were developed with the following methodology. For the No Action Alternative, traffic volumes were generated from the "Dispersed" land-use model. Because the growth alternatives includes so much more land use than the No Action alternative, the analysis for each of the growth alternatives utilized the No Action traffic volumes plus the additional auto trips related to the land use changes for that alternative. The growth in trips was calculated using the MXD model recognizing a much higher portion of trips would be made by non-auto modes. Note that distribution of trips for all alternatives was based on existing travel patterns and expected shifts as a result of regional traffic growth.

The MXD method was also applied to the alternatives to evaluate transportation-related greenhouse gas (GHG) emissions associated with each. This GHG calculation considers emissions from motor vehicles only and does not include other emissions related to the built environment. While the Connecting Corridors and Compact Community Alternatives result in more GHG emissions than the No Action Alternative, it should be noted that the No Action Alternative assumed substantially less overall housing and employment. On a per unit basis, both growth alternatives have transportation-related GHG emissions. These

estimates are confirmed by outside studies have concluded that on average, denser mixed-use development generates 20 to 60 percent less greenhouse gas emissions per unit when compared to less dense development. To provide a more even comparison amongst the alternatives, a version of the "Dispersed" land-use model was run with housing and employment growth equivalent to the Compact Community Alternative. Under this scenario, the built environment would be similar to the No Action Alternative, which is less conducive to biking, walking, and transit and results in more overall vehicle travel. Similarly, this scenario would generate much higher levels of transportation-related GHG-emissions, as shown in **Table 3.3-5**. The forecast mode splits, trips generated and GHG emissions are also identified in **Table 3.3-5**.

Table 3.3-5 Percentage of Trips by Mode and GHG Emissions

Alternative	External[10] Walk/Bike Trips	External[10] Transit Trips	Internal[10] Trips	External[10] Auto Trips	Total PM Peak Trips Generated	External[10] PM Auto Trips Generated	Daily Transportation-Related GHG Emissions (metric tons)
Alternative 1 - No Action	4%	5%	15%	76%	6,261	**4,756**	**164**
Alternative 2 - Connecting Corridors	14%	10%	21%	55%	20,700	**11,408**	**240**
Alternative 3 - Compact Community	12%	10%	23%	55%	17,894	**9,978**	**213**
Dispersed Land-Use Model with Alternative 3 Population/Job totals	4%	5%	15%	76%	17,894	**13,599**	**328**

Roadway Improvement Assumptions

The TMP planned transportation projects and the projects from the Lynnwood Link DEIS outlined in the previous section were considered in all of the future year scenarios. These improvements included:

- Meridian Ave N: Two-way left-turn lane from N 145th Street to N 205th Street
- NE 155th Street: Two-way left-turn lane extended from 5th Avenue NE to 15th Avenue NE
- 5th Avenue NE / I-5 northbound on-ramp: Relocation of the on-ramp and intersection to the north and signalize the intersection
- NE 145th Street / 5th Avenue NE: Add a protected northbound right-turn phase

[10] External trips are assumed to start or end outside of the study area. By contrast, internal trips both start and end within study area.

Alternative 1—No Action

Street Access and Circulation

With no change in land use zoning, the current street access and circulation network would remain for Alternative 1—No Action.

Traffic Impact Analysis

Under Alternative 1—No Action, most signalized intersections would meet the WSDOT, City of Seattle and City of Shoreline LOS standards even with an increase in their average delay. These intersections are shown in **Figure 3.3-10** and **Table 3.3-6**. While some intersections along the 145th corridor would operate at LOS E (within WSDOT standards), the intersection at N 145th Street and 15th Avenue NE would operate at LOS F under this alternative due to added delay for the eastbound approach, the northbound approach and the left turning movement of the westbound approach.

Average Daily Traffic Volumes on Major Corridors

As shown in **Table 3.3-7**, average daily traffic volumes and congestion under Alternative 1—No Action are expected to grow along major roadway segments compared to today. **Figure 3.3-11** shows expected traffic volumes on roadways and the projected V/C ratios on principal and minor arterials within the subarea. 5th Avenue would operate at a V/C ratio of .96, while N/NE 155th Street and Meridian Avenue N would remain within the City's adopted threshold of .90. Note that 15th Avenue between 150th Street and 155th Street has a concurrency threshold of 1.10 as specified in the Transportation Master Plan.

Vehicle-Miles-Traveled and Greenhouse Gas Emissions

Based on the land use forecasts, the total vehicle-miles-traveled (VMT) generated from existing and future development within the subarea would amount to roughly 227,000 miles per day. This is based on a continuation of existing land-use patterns and current zoning. The suburban nature of development constrains the amount of trips that can be completed via non-auto modes such as walking, bicycling or transit because of the long distances between origins and destinations. In total, future land uses within the subarea would generate roughly 165 metric tons of carbon dioxide (CO_2) per day from additional transportation demand. In comparison, a similar amount of housing and retail with a density proposed in the Connecting Corridors Alternative would generate approximately 22,000 fewer daily VMT and 25 fewer metric tons of CO_2 per day.

Transit Service and Mobility

Under the Alternative 1—No Action, transit service would likely remain at current levels, as the existing land uses and densities would not support increases in transit service frequency. While the future light rail station would provide regional mobility, local bus service would primarily function to transport passengers to and from outside of the station subarea. The increased traffic along N/NE 145th Street may have an impact on overall transit reliability without any mitigating measures, such as transit signal priority, queue jumps or other intersection treatments.

Parking Conditions

Based on current supply and the expected limited growth in demand in the study area, parking conditions would remain similar to existing conditions. Peak parking demand generated by

land uses in the study area is forecast to be approximately 5,400 spaces. The parking minimums articulated in City code specify that any new development of single-family residential uses would be built with two spaces per unit. Any new development in retail or other commercial-related land use would require one space per 300 to 400 feet of leasable space and would be accommodated on-site. With little opportunity for development of complimentary uses, the amount of parking that could be shared would be limited. The current zoning code allows for a reduction of up to 25 percent required spaces if there is a shared parking agreement with adjoining parcels or if high-capacity transit service is available within a one-half-mile walk shed.

Pedestrian and Bicycle Mobility

Under the Alternative 1—No Action, the pedestrian and bicycle environment would improve with the planned improvements specified in the TMP. However, the dispersed land use would limit the amount of trips that could be completed via bicycling or walking.

Bicyclists could utilize N/NE 155th Street and 5th Avenue NE in order to connect to the station from the east and west. However, an east-west gap would still exist on 145th across I-5 due to the lack of facilities along 145th Street and the barrier created by I-5.

Table 3.3-6 PM Peak Period Intersection Level of Service for Alternative 1—No Action

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)
Signalized	145th St / Meridian Ave	B	16	D	55
Signalized	145th St / 1st Ave	B	18	E	57
Signalized	145th St / SB I-5	D	46	E	66
Signalized	145th St / 5th Ave	D	42	**F**	**81**
Signalized	5th Ave / I-5 NB On-ramp	A	<10	A	<10
Signalized	145th St / 15th Ave	E	60	**F**	**94**
Signalized	150th St / 15th Ave	B	16	C	21
Signalized	155th St / 15th Ave	C	30	D	37
Signalized	155th St / 5th Ave	B	10	B	17
Unsignalized	155th St / 1st Ave	C	21	**E**	**49**
Signalized	155th / Meridian Ave	B	14	C	27

Figure 3.3-9 Intersection Level of Service (Alternative 1—No Action)

Table 3.3-7 Average Daily Traffic Volumes and PM Peak Period Congestion for Alternative 1—No Action

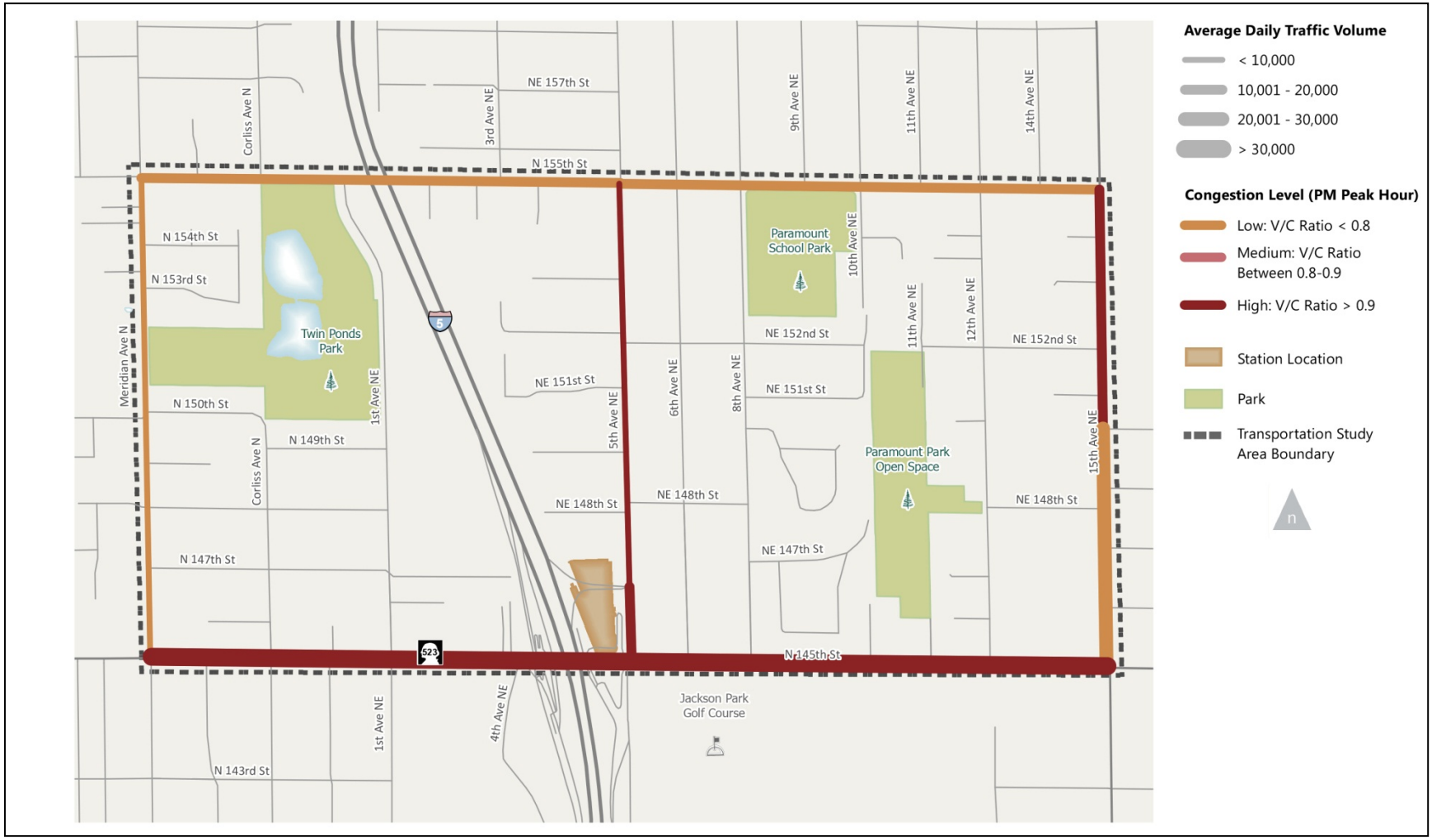
Street	Segment	Existing ADT	No Action ADT	Existing PM Peak Hour Volume[10]	No Action PM Peak Hour Volume[11]	No Action V/C Ratio
East-West Corridors						
N/NE 145th Street	West of I-5	25,240	30,430	1,331	1,650	1.00
NE 145th Street	East of I-5	31,790	37,650	1,431	1,630	0.99
N 155th Street	West of I-5	11,640	14,920	538	700	0.73
NE 155th Street	East of I-5	9,900	12,380	486	610	0.64
North-South Corridors						
5th Avenue NE*	I-5 NB on-ramp to 155th Street	7,170	9,230	530	670	**0.96**
15th Avenue NE	145th to 150th Street	16,130	20,060	1,038	1,290	0.65
15th Avenue NE**	150th to 155th Street	14,240	18,640	881	1,150	0.96
Meridian Avenue N	145th to 155th Street	6,220	9,310	392	650	0.78

*The portion of 5th Avenue NE between NE 145th Street and the I-5 northbound on-ramp is exempt from the City of Shoreline's concurrency standard due to the need to make modifications to an intersection that is currently outside of the City's jurisdiction

** The City allows a V/C ratio of 1.10 for 15th Avenue NE, between NE 150th Street and NE 175th Street due to rechannelization for operational safety

[11] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-10 Average Daily Traffic and PM Peak Congestion (Alternative 1—No Action)



Alternative 2 – Connecting Corridors

Street Access and Circulation

Changes in land use zoning, parcel consolidation and redevelopment would allow for the creation of new streets and paths along with the consolidation of access points along 5th Avenue NE, N/NE 155th Street and N/NE 145th Street. Transportation options would still be constrained by I-5, with east-west connections limited to N/NE 145th Street and N/NE 155th Street.

Traffic Volumes

Under Alternative 2—Connecting Corridors, with full build-out of the proposed zoning, most intersections would fail to meet City and WSDOT standards for LOS, operating at LOS E or F as shown in **Figure 3.3-12** and **Table 3.3-8**. Intersections along N/NE 145th and N/NE 155th Street would experience a large increase in average vehicle delay due to additional vehicle trips generated by development proposed under Alternative 2—Connecting Corridors. Provision of internal circulation routes including consolidated access points, would potentially lessen intersection and roadway impacts. The improvements needed to mitigate these impacts are described later in this document.

Collector Arterials and local secondary streets (such as 1st Avenue NE, 10th Avenue NE and 8th Avenue NE) were not explicitly analyzed since they are not subject to the City's concurrency standard for V/C ratios. As future travel patterns change, some of these streets may be candidates for potential traffic calming measures or for reclassification.

Average Daily Traffic Volumes on Major Corridors

Similarly, the increase in trips generated within the study area would result in substantial growth in ADT volumes along roadway corridors as shown in **Table 3.3-9** and **Figure 3.3-13**. N/NE 145th Street, N/NE 155th Street, Meridian Avenue N, 5th Avenue NE and 15th Avenue NE would all experience a large increase, with growth between 40 and 150 percent as compared to the No Action Alternative. V/C ratios for all of the major corridors would exceed .90 during the PM peak period.

Vehicle-Miles-Traveled and Greenhouse Gas Emissions

Based on the forecasts, the total VMT generated from land uses within the subarea under Alternative 2—Connecting Corridors would amount to roughly 626,000 miles per day. In total, future land use would generate roughly 240 metric tons of CO_2 per day. By comparison, an equivalent amount of housing and retail with a density similar to Alternative 1—No Action would generate approximately 740,000 daily VMT and 330 metric tons of CO_2 per day.

Transit Service and Mobility

The higher density provided under Alternative 2—Connecting Corridors would support more robust public transit service within the study area. The TMP recommends that frequency of service could be improved to enable more frequent connections to the proposed light rail station, including service on existing routes and newly directed feeder service to the station. The substantial growth in vehicle traffic would impact overall transit speed and reliability along N/NE 145th Street, N/NE 155th Street, Meridian Avenue N, 5th Avenue NE and 15th Avenue NE if no mitigation measures are implemented.

Parking Conditions

For Alternative 2—Connecting Corridors, peak parking demand generated by new development is expected to be approximately 29,200 spaces more than Alternative 1—No Action (a total of 34,600) in the subarea with a higher concentration near retail-uses. This amount is a 17 percent reduction from unadjusted demand due to the potential for shared parking among complementary uses. The current zoning code allows for a reduction of up to 25 percent required spaces if there is a shared parking agreement with adjoining parcels or if high-capacity transit service is available within a one-half-mile walk shed, conditions that future development would meet under Alternative 2—Connecting Corridors.

Pedestrian and Bicycle Mobility

Pedestrian and bicycle mobility should improve as new sidewalk and bicycle facilities are installed with new development. City code stipulates that any multifamily residential uses must have a minimum of one short-term bicycle parking space per 10 dwelling units and one long-term bicycle parking space per studio or 1-bedroom unit and two per unit having two or more bedrooms. Commercial development must have one short-term bicycle stall per 12 vehicle parking spaces and one long-term space per 25,000 square feet of commercial floor area. Additionally, conditions for development could be structured to allow for the creation of non-motorized paths within larger parcels to connect with other on- and off-street pedestrian and bicycle facilities. The increase in density surrounding the light rail station would lend itself to more bike and walk trips within the area due to compatible land uses such as residential and retail. Additionally, the substantial increase in vehicle traffic along N/NE 145th Street, N/NE 155th Street, Meridian Avenue N, 5th Avenue NE and 15th Avenue NE over time will impact bicycle stress along these streets. This may require more separated facilities, such as off-street trails or cycle tracks to make cycling a more comfortable experience for most riders.

Table 3.3-8 PM Peak Period Intersection Level of Service for Alternative 2—Connecting Corridors

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)	Connecting Corridors LOS	Connecting Corridors Delay (sec. / veh.)
Signalized	**145th St / Meridian Ave**	B	16	D	55	**F**	**730**
Signalized	**145th St / 1st Ave**	B	18	E	57	**F**	**920**
Signalized	**145th St / SB I-5**	D	46	E	66	**F**	**240**
Signalized	**145th St / 5th Ave**	D	42	**F**	**81**	**F**	**390**
Signalized	**5th Ave / I-5 NB On-ramp**	A	<10	A	<10	D	52
Signalized	**145th St / 15th Ave**	E	60	**F**	**94**	**F**	**290**
Signalized	**150th St / 15th Ave**	B	16	C	21	**E**	**59**
Signalized	**155th St / 15th Ave**	C	30	D	37	**F**	**460**
Signalized	**155th St / 5th Ave**	B	10	B	17	**F**	**670**
Unsignalized	**155th St / 1st Ave**	C	21	**E**	**49**	**F**	**>1000**
Signalized	**155th / Meridian**	B	14	C	27	**F**	**410**

Note: Large delay values (over 240 seconds) rounded to the nearest ten

Figure 3.3-11 Intersection Level of Service (Alternative 2—Connecting Corridors)

Table 3.3-9 Average Daily Traffic Volumes and PM Peak Period Congestion for Alternative 2—Connecting Corridors

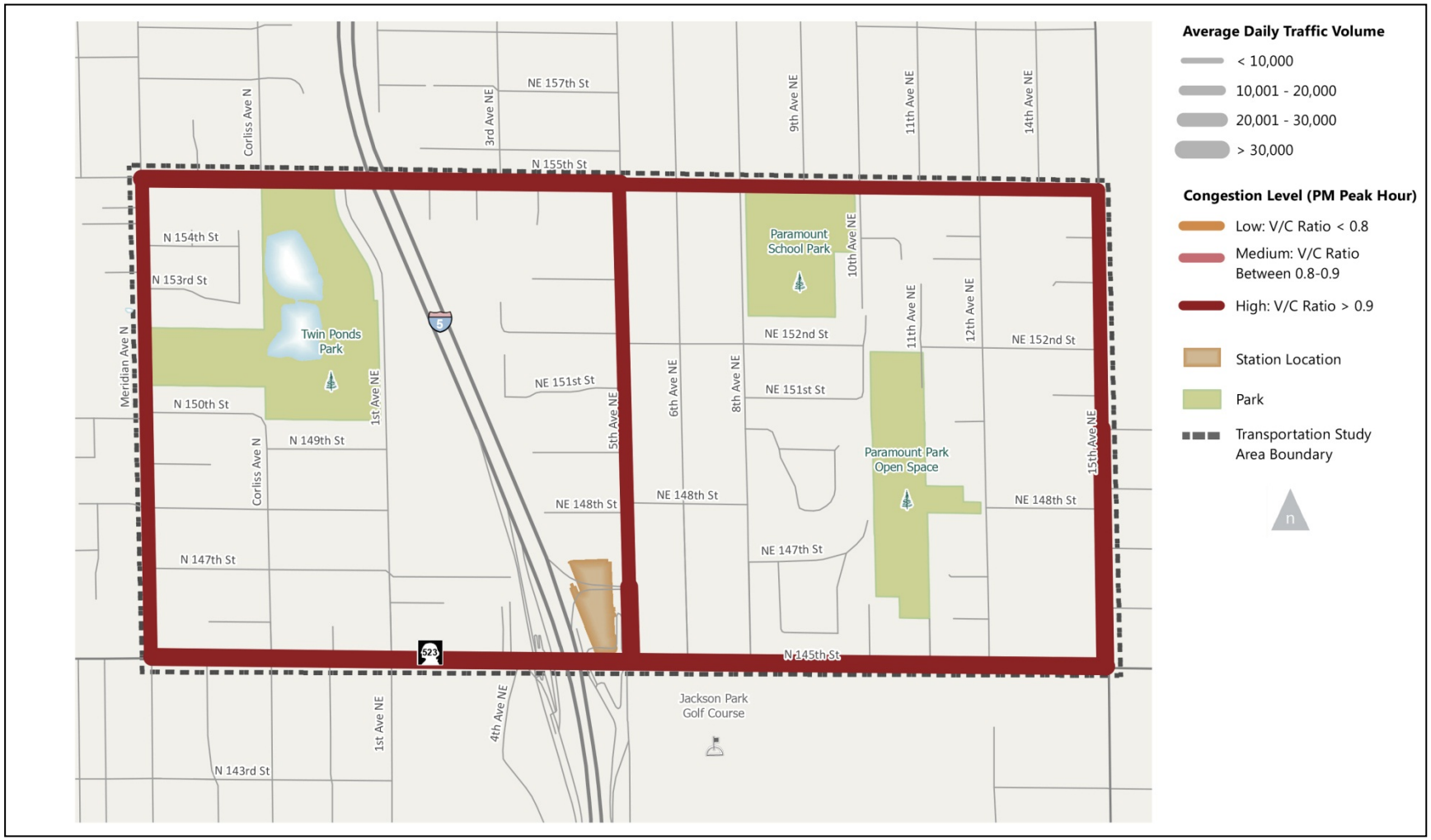
Street	Segment	Existing ADT	No Action ADT	Connecting Corridors ADT	No Action PM Peak Hour Volume[11]	Connecting Corridors PM Peak Hour Volume[12]	Connecting Corridors V/C Ratio
East-West Corridors							
N/NE 145th Street	West of I-5	25,240	30,430	55,340	1,650	2,900	**1.75**
NE 145th Street	East of I-5	31,790	37,650	60,810	1,630	2,600	**1.57**
N 155th Street	West of I-5	11,640	14,920	36,470	700	1,780	**1.87**
NE 155th Street	East of I-5	9,900	12,380	25,100	610	1,210	**1.27**
North-South Corridors							
5th Avenue NE*	I-5 NB on-ramp to 155th Street	7,170	9,230	22,620	670	1,270	**1.81**
15th Avenue NE	145th to 150th Street	16,130	20,060	31,950	1,290	1,890	**0.94**
15th Avenue NE**	150th to 155th Street	14,240	18,640	25,770	1,150	1,510	**1.26**
Meridian Avenue N	145th to 155th Street	6,220	9,310	23,450	650	1,380	**1.64**

*The portion of 5th Avenue NE between NE 145th Street and the I-5 northbound on-ramp is exempt from the City of Shoreline's concurrency standard due to the need to make modifications to an intersection that is currently outside of the City's jurisdiction

** The City allows a V/C ratio of 1.10 for 15th Avenue NE, between NE 150th Street and NE 175th Street due to rechannelization for operational safety

[12] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-12 Average Daily Traffic and PM Peak Congestion for Alternative 2—Connecting Corridors



Alternative 3—Compact Community

Street Access and Circulation

Similar to Alternative 2—Connecting Corridors, changes in land use zoning, parcel consolidation and redevelopment would allow for the creation of new streets and paths along with the consolidation of access points along 5th Avenue NE, N/NE 155th Street and N/NE 145th Street. The area would still be constrained by I-5, with east-west connections limited to N/NE 145th Street and N/NE 155th Street.

Traffic Volumes

Under Alternative 3—Compact Community, with full build-out of the proposed zoning, most intersections would fail to meet City and WSDOT standards for LOS, operating at LOS E or F as shown in **Figure 3.3-14** and **Table 3.3-10**. Intersections along N/NE 145th and N/NE 155th Street would experience a large increase in average vehicle delay due to additional vehicle trips generated by development proposed under Alternative 3—Compact Community. Provision of internal circulation routes, which consolidate access, would potentially lessen intersection and roadway impacts. The improvements needed to mitigate these impacts are described later in this document.

Collector Arterials and local secondary streets (such as 1st Avenue NE, 8th Avenue NE and 10th Avenue NE) were not explicitly analyzed since they are not subject to the City's concurrency standard for V/C ratios. As future travel patterns change, some of these streets may be candidates for potential traffic calming measures or for reclassification.

Average Daily Traffic Volumes on Major Corridors

Similarly, the increase in trips generated within the study area would result in substantial growth in ADT volumes along roadway corridors as shown in **Table 3.3-11** and **Figure 3.3-15**. N/NE 145th Street, N/NE 155th Street, Meridian Avenue N, 5th Avenue NE and 15th Avenue NE would all experience a large increase, with growth between 40 and 140 percent as compared to the No Action Alternative. V/C ratios for all of the major corridors would exceed .90 during the PM peak period.

Vehicle-Miles-Traveled and Greenhouse Gas Emissions

Based on the land use forecasts, the total VMT generated from land uses within the subarea under Alternative 3—Compact Community would amount to roughly 542,000 miles per day. In total, future land use and transportation would generate roughly 213 metric tons of CO_2 per day under Alternative 3—Compact Community. In comparison, a similar amount of housing and retail with a density similar to Alternative 1—No Action would generate approximately 725,000 daily VMT and 328 metric tons of CO_2 per day based on existing land use patterns and the anticipated amount of driving.

Transit Service and Mobility

The higher density provided under Alternative 3— Compact Community would support more robust public transit service within the study area. The TMP recommends that frequency of service could be improved to enable more frequent connections to the proposed light rail station, including service on existing routes and newly directed feeder service to the station The substantial growth in vehicle traffic would impact overall transit speed and reliability along N/NE 145th Street, N/NE 155th Street,

Meridian Avenue N, 5th Avenue NE and 15th Avenue NE if no mitigation measures are provided.

Parking Conditions

Within the subarea, peak parking demand generated by new development is expected to be approximately 28,100 spaces more than Alternative 1—No Action (a total of 33,500), with a higher concentration near retail-uses. This amount is a 17 percent reduction from unadjusted demand due to the potential for shared parking between complementary uses. The current zoning code allows for a reduction of up to 25 percent required spaces if there is a shared parking agreement with adjoining parcels or if high-capacity transit service is available within a one-half-mile walk shed, conditions that future development would meet under Alternative 3—Compact Community.

Pedestrian and Bicycle Mobility

Pedestrian and bicycle mobility should improve as new sidewalk and bicycle facilities are installed with new development. Consolidation of parcels may allow for nonmotorized paths to close current gaps in the roadway network. Alternative 3—Compact Community is more conducive to walk and bike trips compared to Alternative 2—Connecting Corridors due to a higher density of land use in a smaller area. However, a substantial increase in traffic volumes in the subarea may increase overall bicycle stress for a number of roadway segments including along N/NE 145th Street, N/NE 155th Street, Meridian Avenue NE, 5th Avenue NE and 15th Avenue NE. This may require more separated facilities, such as off-street trails or cycle tracks to make cycling a more comfortable experience for most riders.

Table 3.3-10 PM Peak Period Intersection Level of Service for Alternative 3—Compact Community

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)	Compact Community LOS	Compact Community Delay (sec. / veh.)
Signalized	145th St / Meridian Ave	B	16	D	55	**F**	**660**
Signalized	145th St / 1st Ave	B	18	E	57	**F**	**820**
Signalized	145th St / SB I-5	D	46	E	66	**F**	**250**
Signalized	145th St / 5th Ave	D	42	**F**	**81**	**F**	**390**
Signalized	5th Ave / I-5 NB On-ramp	A	<10	A	<10	D	38
Signalized	145th St / 15th Ave	E	60	**F**	**94**	**F**	**330**
Signalized	150th St / 15th Ave	B	16	C	21	**E**	**70**
Signalized	155th St / 15th Ave	C	30	D	37	**F**	**226**
Signalized	155th St / 5th Ave	B	10	B	17	**F**	**420**
Unsignalized	155th St / 1st Ave	C	21	**E**	**49**	**F**	**>1000**
Signalized	155th / Meridian	B	14	C	27	**F**	**390**

Note: Large delay values (over 240 seconds) rounded to the nearest ten

Figure 3.3-13. Intersection Level of Service for Alternative 3—Compact Community

Table 3.3-11 Average Daily Traffic Volumes and PM Peak Period Congestion for Alternative 3—Compact Community

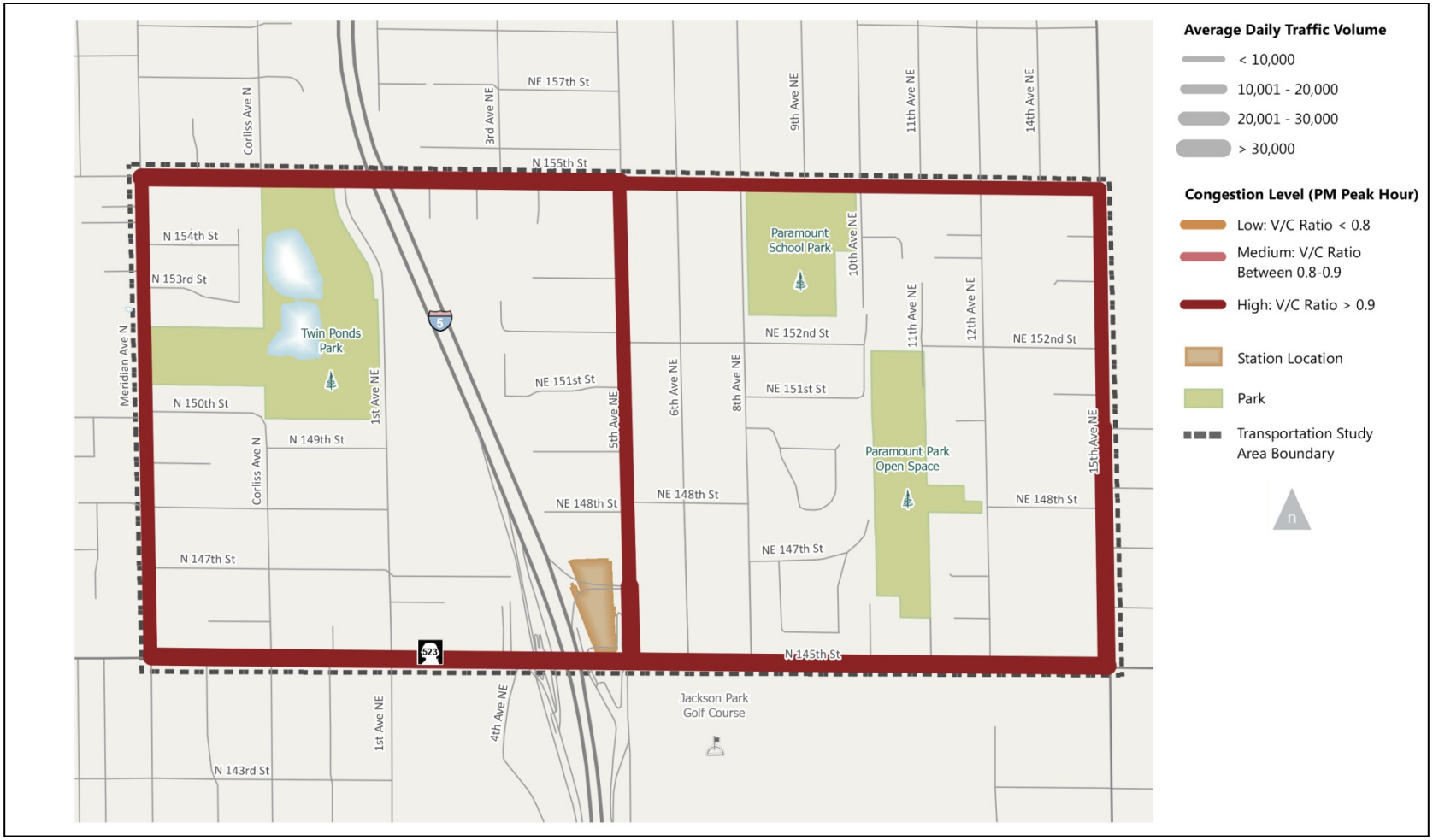
Street	Segment	Existing ADT	No Action ADT	Compact Community ADT	No Action PM Peak Hour Volume[12]	Compact Community PM Peak Hour Volume[13]	Compact Community V/C Ratio
East-West Corridors							
N/NE 145th Street	West of I-5	25,240	30,430	54,940	1,650	2,900	**1.76**
NE 145th Street	East of I-5	31,790	37,650	64,060	1,630	2,720	**1.65**
N 155th Street	West of I-5	11,640	14,920	34,550	700	1,650	**1.74**
NE 155th Street	East of I-5	9,900	12,380	22,770	610	1,140	**1.20**
North-South Corridors							
5th Avenue NE*	I-5 NB on-ramp to 155th Street	7,170	9,230	21,980	670	1,210	**1.73**
15th Avenue NE	145th to 150th Street	16,130	20,060	33,670	1,290	1,970	**0.98**
15th Avenue NE**	150th to 155th Street	14,240	18,640	26,220	1,150	1,530	**1.27**
Meridian Avenue N	145th to 155th Street	6,220	9,310	22,020	650	1,250	**1.49**

*The portion of 5th Avenue NE between NE 145th Street and the I-5 northbound on-ramp is exempt from the City of Shoreline's concurrency standard due to the need to make modifications to an intersection that is currently outside of the City's jurisdiction

** The City allows a V/C ratio of 1.10 for 15th Avenue NE, between NE 150th Street and NE 175th Street due to rechannelization for operational safety

[13] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-14. Average Daily Traffic and PM Peak Congestion
Alternative 3—Compact Community



3.3.3 Mitigation Measures

Introduction

This section describes the mitigation measures that would be needed to address impacts under each of the future year alternatives. It is important to note that the land use changes proposed and the traffic impacts identified in the previous section are based upon development scenarios that are anticipated to be very long term, particularly for Alternatives 2 and 3. Despite this long-term road to implementation, the mitigation measures proposed below identify the full scale of actions needed. In reality, these measures would gradually be incorporated as development occurs and would be continually monitored to address the most current conditions.

Applicable Regulations and Commitments

The Shoreline Municipal Code (SMC) contains a number of regulations and stipulations that would apply to all future alternatives. Under Chapter 14.10, the City of Shoreline currently manages a Commute Trip Reduction program that assists employers of a certain size to reduce their overall VMT and automobile trips. This program should continue with new employers in the area to leverage the availability of high capacity transit and reduce the net increase in automobile trips. Additionally, Chapter 20.50 in the Shoreline Municipal Code contains a number of stipulations for new development that aim to improve pedestrian and bicycle facilities while also reducing the amount of parking provided.

WSDOT Limited Access Control Standards

WSDOT has full control of access to roadways within 300 feet of a ramp terminal. In the cast of the 145th Street Station subarea plan, this is relevant for 5th Avenue NE and the I-5 Northbound on-ramp. WSDOT policy states that any change to existing land use within this 300 foot boundary would need to be re-evaluated to determine if access can remain if their land use changed. Deviations from that policy would require the Federal Highway Administration, WSDOT, Sound Transit and the City of Shoreline to determine a course of action.

145th Street Corridor Study

N/NE 145th Street will be a major conveyor for all modes to get to and from the proposed light rail station. Currently this corridor is not within the City of Shoreline, however, discussions are underway to annex the right-of-way. The City of Shoreline is conducting a study for the 145th Street corridor. The study will include development of a master plan for the proposed improvements to the corridor. Through the process, the City will evaluate several options for accommodating multiple travel modes, including vehicles, buses, pedestrians, bicyclists, and freight. As part of the process, the City will solicit input from partner agencies, adjacent jurisdictions, residents, property owners, business owners, community groups, and human service organizations. The corridor study is a key element that will conclude after the 145th Street Station Subarea planning efforts are completed and any mitigation required for N/NE 145th Street will be addressed within it.

Mitigation Measures for Street and Intersection Impacts

With full build-out, the level of development planned in Alternative 2—Connecting Corridors and Alternative 3—Compact Community would be extensive and would require substantial multimodal transportation investments to mitigate the impacts.

Additional mitigation measures may also be needed for Alternative 1—No Action to maintain the WSDOT's current LOS standards in 2035.

It is estimated that both Alternative 2—Connecting Corridors and Alternative 3—Compact Community would take 60 years or more to build out to the proposed zoning capacity. A later section of the DEIS provides a near-term 20-year growth scenario to compare conditions forecast for 2035. Additionally, through the EIS process, a Preferred Alternative will be identified for the Final EIS, with analysis provided for full build-out of the alternative and a 20-year growth scenario.

Multimodal transportation improvements required to support the growth of either of these alternatives could be funded incrementally through a variety of sources, including federal and state grants and cycles of capital improvement plans and as mitigation associated with new development. The length of time to build-out would enable the City to monitor growth and proactively plan for needed improvements over time.

The City also intends to pursue a variety of transportation demand management strategies to mitigate and minimize traffic congestion and reduce vehicle miles traveled, consistent with the Climate Action Plan and other City plans and policies. Measures can be taken to reduce the impact of additional vehicle traffic generated from an increase in density. For example, new development sites along the 5th Avenue NE and 155th Street corridors likely would be required to have access from the side streets and/or rear alleyways. This would reduce the amount of traffic that directly impacts theses corridors.

Access management strategies (reduced curb cuts/driveways), as well as a new system of well-connected blocks, road connections, non-motorized facilities and alleyways would serve corridor development, taking pressure off N/NE 155th Street and 5th Avenue NE. This would improve overall travel flow for all modes and enhance pedestrian and bicyclist safety.

Many of the projects identified as mitigation for the alternatives would require roadway widening near the intersection locations, and additional easements or right-of-way would need to be obtained. Again, the full build-out of the growth alternatives is not expected for 60 or more years.

As a means to reduce the amount of infrastructure necessary to accommodate future growth, the City may look to revise its concurrency standards.

In addition to the roadway improvements called out in the TMP[14] and the Sound Transit Lynnwood Link Extension DEIS, the following potential measures are highlighted to mitigate street and intersection impacts under the full build-out of each alternative assuming the City of Shoreline maintains the current intersection and roadway LOS standards.

Alternative 1—No Action

- Implement recommendations from the 145th Street Corridor Study
- Provide a right-turn pocket for the northbound approach at 155th Street and 1st Avenue NE.
- Extend the two-way left turn lane profile along 5th Avenue NE from the I-5 NB on-ramp to NE 155th Street

[14] For example, where the TMP recommends a center-turn lane along Meridian Avenue, that profile is assumed in addition to the recommended improvements stated in this section.

Alternative 2—Connecting Corridors and Alternative 3 – Compact Community

- Implement recommendations from the 145th Street Corridor Study
- Transportation demand management strategies and actions to minimize traffic congestion on N/NE 155th Street, Meridian Avenue N, 5th Avenue NE and other key corridors in the subarea
- Additional through-lanes in the eastbound and westbound direction along N/NE 155th Street to create a 5-lane profile from Aurora Avenue N to 15th Avenue NE
- Intersection improvements at N 155th Street and Meridian Avenue N including channelized right-turn lane for eastbound and westbound approaches and dual left-turn lanes for northbound and southbound approaches
- Right-turn lane for northbound approach to N 155th Street and 1st Avenue N
- Additional through-lanes in the northbound and southbound direction along 5th Avenue NE to create a 5-lane profile between 145th Street and 155th Street
- Dual left-turn lanes for eastbound approach at NE 155th Street and 5th Avenue NE
- Intersection improvements at NE 155th Street and 15th Avenue NE including a channelized right-turn lane for southbound approach E and dual left-turn lanes for the eastbound approach[15]
- Channelized right-turn lane for northbound approach at NE 150th Street and 15th Avenue NE
- Channelized right-turn lane for northbound approach at NE 150th Street and 15th Avenue NE

In addition to the projects which were based on the City's LOS standards, the City should engage as needed in traffic calming measures along non-arterial streets . The City of Shoreline has a Neighborhood Traffic Safety Program to help address the safety concerns on non-arterial streets stemming from higher speed and/or cut-through traffic. This program includes enhanced enforcement and education along with engineering solutions such as traffic circles, speed humps and narrowed lanes. Solutions to address traffic issues are discussed and implemented as part of a public process to ensure they appropriately address a given circumstance.

Transit Service Mitigation Measures

In the Lynnwood Link Extension DEIS, Sound transit assumed at least 24 buses will serve the future light rail station during the PM peak hour. Depending on final design of the station, ample bus facilities will be needed. The design of these facilities will need to consider impacts to both traffic and transit.

[15] Note that the southbound approach right-turn channelization is not needed for Alternative 3 – Compact Community

The City of Shoreline should continue coordinating with area transit agencies in the development of a transit service integration plan for the light rail station subarea. This coordination should coincide with traffic analysis to ensure transit service speed and reliability along the major corridors in the area. Transit reliability can be improved via a number of transit priority treatments including signal priority, bus bulbs and bus queue jump lanes. These measures should be evaluated as part of the transit service integration plan. Additionally, on-demand transport such as the King County Metro Access and the Hyde Shuttles should have direct service to the light rail station bus access point in order to improve service for those with mobility limitations.

Additional modes that could operate in coordination with transit include bike sharing or car sharing programs such as Zipcar, Car2Go or Puget Sound Bike Share ("Pronto"). An analysis of potential demand for these services will be needed to determine their relative feasibility.

Parking Mitigation Measures

While any new development is required by City code to provide ample off-street parking for the demand generated by its respective use, there are options to reduce the overall amount of parking supply created. City code stipulates that development may reduce its parking supply requirement by up to 25 percent by using a combination of the following criteria:

- Shared parking agreement with adjoining parcels and land uses that do not have conflicting parking demands
- High-occupancy vehicle (HOV) and hybrid or electric vehicle (EV) parking
- Conduit for future electric vehicle charging spaces, per National Electrical Code, equivalent to the number of required disabled parking spaces
- High-capacity transit service available within a one-half mile walk shed
- Concurrence with King County Right Size Parking data, census tract data, and other parking demand study results

While the two growth alternatives have more development and higher trip generation than the No Action, they also provide greater opportunity to take advantage of these code provisions. Alternative 1—No Action by contrast lends itself to more auto-oriented development that is not as conducive to measures like shared parking. Besides mitigating parking demand generated from new development, any on-street parking spillover generated from the proposed land uses or the light rail station may be mitigated via a Residential Parking Zone (RPZ) designation. An RPZ provides on-street parking permits to residents located within the zone to help discourage long-term parking by non-residents on non-arterial streets. An evaluation of parking demand in the area as it redevelops following implementation of light rail service should be conducted regularly to assess the need of an RPZ designation. Additional measures that may be taken to address parking impacts include:

- Install signage and driver information to direct commercial and light rail users towards available off-street parking garage locations near commercial development

- Implement variable parking time limits and paid parking with variable prices to moderate parking demand and ensure sufficient supply during peak parking periods

Pedestrian and Bicycle Facilities Mitigation Measures

Additional traffic along all of the principal and minor arterials along with increased bus service will create a higher potential for conflicts between bicyclists, pedestrians, transit vehicles and automobiles. Besides recommendations along 145th Street from the Route Development Plan, separated bicycle facilities along key corridors such as N/NE 155th and 5th Avenue NE may be necessary to reduce the number of conflicts. N/NE 155th Street is a part of the Interurban – Burke-Gilman trail connection and it would serve as a primary gateway for trail users to access the station. The "greenway" shown on the Alternatives map provides an east-west bicycle route along non-residential streets. The growth alternatives could improve overall pedestrian and bicycle connectivity by allowing for more dedicated pathways with parcel consolidation and expanded development. Any new development in the area under the proposed zoning should consider pedestrian and bicycle paths through the sites to allow for connections to the station and subarea amenities without the need to travel along busy arterials. All streets in the subarea, whether arterial or not should include sidewalks, and sidewalks will need to be included with all redevelopment activity.

The major barrier of I-5 restricting non-motorized connections requires improved bicycle and pedestrian access. The 145th Street Corridor Study will examine alternatives to improve the bicycle and pedestrian crossing of I-5 near the light rail station. Additionally, the large number of parks in the study area creates an opportunity to provide dedicated pathways between the parks and the light rail station. The City is interested in exploring opportunities for bicycle sharing and bicycle storage facilities near the station to encourage and enhance bike access to transit.

The Green Network

A concept proposed under either of the two action alternative calls for creation of a green network of sidewalks, trails, bicycle lanes, parks, stream corridors, wetlands, and natural areas throughout the subarea, implemented over time with redevelopment. Green infrastructure and low impact development stormwater management and water quality treatment facilities also would be a part of this network. For an enlarged illustration of the green network concept and more discussion, refer to Sections 3.1 and 3.5 of this DEIS.

The Green Network Concept—interconnecting trails, pedestrian, and bicycle facilities in green streets and parks throughout the subarea. This concept would greatly enhance pedestrian and bicycle access to and from the light rail station and within the subarea.

3.3.4 Phased Improvements

Introduction

While the impacts and mitigation measures specified for Alternative 2 – Connecting Corridors and Alternative 3 – Compact Communities would occur over the projected 60 to 100 year timespan, this section describes the mitigation measures that would be needed to address impacts in the near-term, specifically over a 20-year horizon.

Growth Forecast

The land use patterns of Alternative 2 – Connecting Corridors were used to generate the near-term growth estimates. This land use pattern is more dispersed throughout the study area as compared to Alternative 3 – Compact Community and represents a more conservative estimate of impacts to the transportation network. Based on a 2.5 percent growth rate over the next 20 years, a total of 2,678 jobs and 5,681 households would be located within the study area. The assumed growth rate is based on historical trends in the region and may fluctuate between 1.5 and 2.5 percent depending on actual market conditions. Additionally, while the analysis assumed an equal distribution of development throughout the study area, particular parcels may redevelop at a higher or lower rate than the average. Actual distribution of development would impact where and when specific roadways and areas would experience a change in travel patterns.

Average Daily Traffic and Intersection Level of Service

As shown in **Figure 3.3-16** and in **Figure 3.3-17**, additional trips resulting from redevelopment as part of the 20-year growth scenario for Alternative 2 would increase average vehicle delay at intersections and along roadways, particularly along N/NE 145th Street. However, many intersections would still operate at or better than LOS D during the P.M. peak period. **Table 3.3-12** and **Table 3.3-13** highlight the traffic volume and LOS values forecast for the 2035 time horizon.

Congestion along N/NE 145th Street and other streets would be influenced by actual development patterns and how this new development is accessed. While impacts from light rail implementation are addressed in the Lynnwood Link Extension DEIS, the following section identifies specific steps the city may take to address any potential impacts related to land use development within the study area over the next 20 years.

Table 3.3-12 PM Peak Period Intersection Level of Service for the 2035 Build-out of Alternative 2—Connecting Corridors

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)	2035 Build-out LOS	2035 Build-out Delay (sec. / veh.)
Signalized	145th St / Meridian Ave	B	16	D	55	**F**	**180**
Signalized	145th St / 1st Ave	B	18	E	57	**F**	**117**
Signalized	145th St / SB I-5	D	46	E	66	E	79
Signalized	145th St / 5th Ave	D	42	**F**	**81**	**F**	**129**
Signalized	5th Ave / I-5 NB On-ramp	A	<10	A	<10	A	<10
Signalized	145th St / 15th Ave	E	60	**F**	**94**	**F**	**118**
Signalized	150th St / 15th Ave	B	16	C	21	C	22
Signalized	155th St / 15th Ave	C	30	D	37	D	52
Signalized	155th St / 5th Ave	B	10	B	17	C	27
Unsignalized	155th St / 1st Ave	C	21	**E**	**49**	**F**	**129**
Signalized	155th / Meridian	B	14	C	27	D	53

Figure 3.3-15. Intersection Level of Service for the 2035 Build-out of Alternative 2 – Connecting Corridors

Table 3.3-13 Average Daily Traffic Volumes and PM Peak Period Congestion for the 2035 Build-out of Alternative 2—Connecting Corridors

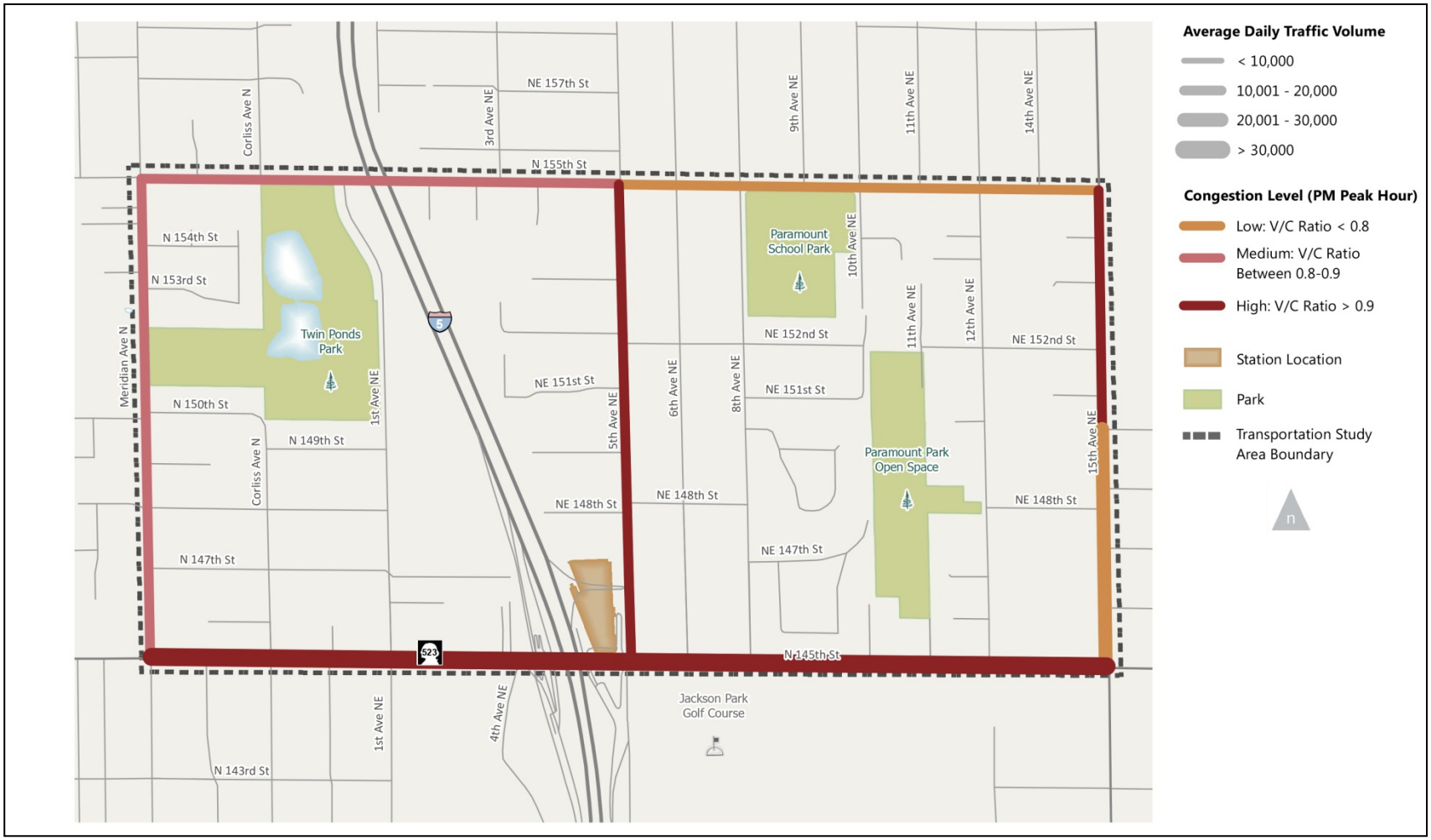
Street	Segment	Existing ADT	No Action ADT	2035 Build-out ADT	No Action PM Peak Hour Volume[12]	2035 Build-out PM Peak Hour Volume[16]	2035 Build-out V/C Ratio
East-West Corridors							
N/NE 145th Street	West of I-5	25,240	30,430	34,360	1,650	1,860	**1.12**
NE 145th Street	East of I-5	31,790	37,650	41,460	1,630	1,780	**1.08**
N 155th Street	West of I-5	11,640	14,920	17,950	700	830	0.87
NE 155th Street	East of I-5	9,900	12,380	13,760	610	670	0.71
North-South Corridors							
5th Avenue NE*	I-5 NB on-ramp to 155th Street	7,170	9,230	11,140	670	760	**1.09**
15th Avenue NE	145th to 150th Street	16,130	20,060	22,290	1,290	1,410	0.71
15th Avenue NE**	150th to 155th Street	14,240	18,640	19,700	1,150	1,210	1.01
Meridian Avenue N	145th to 155th Street	6,220	9,310	11,450	650	750	0.89

*The portion of 5th Avenue NE between NE 145th Street and the I-5 northbound on-ramp is exempt from the City of Shoreline's concurrency standard due to the need to make modifications to an intersection that is currently outside of the City's jurisdiction

** The City allows a V/C ratio of 1.10 for 15th Avenue NE, between NE 150th Street and NE 175th Street due to rechannelization for operational safety

[16] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-16. Average Daily Traffic and PM Peak Congestion for the 2035 Build-out of Alternative 2 – Connecting Corridors



Mitigation Measures

As stated in previous sections, the length of time until full build-out of the two growth alternatives would enable the City to monitor growth and proactively plan for needed improvements. This should occur as development proceeds in order to provide a sustainable and efficient transportation system within the study area. This section details specific actions the City may take to address growth that is forecast for 2035 Build-out scenario.

N/NE 145th Street

- Implement recommendations from the 145th Street Corridor Study

N/NE 155th Street

- Consistent with the TMP, extend the two-way left turn lane from 5th Avenue NE to 15th Avenue NE with bicycle lanes
- Construct a northbound right-turn pocket at the intersection of N/NE 155th Street and 1st Avenue NE
- Consider signalization at the intersection of N/NE 155th Street and 1st Avenue NE

5th Avenue NE

- Construct a two-way left turn lane from the I-5 NB on-ramp to N/NE 155th Street

Meridian Avenue N

- Consistent with the TMP, convert Meridian Avenue N to a three-lane profile with a two-way left-turn lane and bicycle lanes

3.3.5 Significant Unavoidable Adverse Impacts

Under all alternatives, the subarea would be anticipated to experience growth in traffic levels. Given that growth is expected to occur incrementally over many decades, the City and other agencies responsible for transportation services would be able to proactively monitor changes, update plans, and implement needed improvements to address the increased transportation demand. Behavioral changes in the way people travel (such as reduced vehicle household trips in a more walkable neighborhood, use of bike share and car share programs, and increased use of the high-capacity transit system) also would help to offset some of the demand over time. Given these considerations and with implementation of mitigation measures, no significant unavoidable adverse impacts would be anticipated.

3.4 Streams, Wetlands, and Surface Water Management

This section describes the affected environment, analyzes potential impacts, and provides recommendations for mitigation measures related to streams, wetlands, and surface water management.

3.4.1 Affected Environment

Service Provider

The City of Shoreline owns and maintains the public storm drain utility within City boundaries. The City of Shoreline Surface Water Master Plan (adopted in 2005 and updated in 2011) outlines the surface water management program adopted by the City.

Drainage Basin

Natural and constructed drainage systems within the City of Shoreline can be divided into seven major basins. The study area for the subarea zoning alternatives is located primarily within the Thornton Creek Basin, plus a small area of approximately 1.45 acres along 155th Street within the Boeing Creek Basin.

Thornton Creek

The Thornton Creek Basin is the largest within the City of Shoreline and drains approximately 2,304 acres in the southeast quarter of the City. South of Shoreline, Thornton Creek meanders roughly five miles through northeastern Seattle before discharging to Lake Washington; Thornton Creek also has a large drainage area within the City of Seattle before draining to Lake Washington.

The basin within City of Shoreline is almost completely developed, with primary land uses being single-family residences and roads. Commercial areas are the next most prevalent land use type, followed by institutional uses. Currently, there is a relatively small amount of multifamily use or apartments. Since I-5 intersects this basin, it and the resulting connector streets and on/off ramps contribute a large volume of impervious surface runoff to the basin.

The Thornton Creek basin drainage system within the City of Shoreline consists primarily of piped and channeled surface water conveyance. Many of the historical Thornton Creek basin watercourses and associated wetlands and floodplains were removed by development, typically during the 1950s and 1960s. The hydrologic benefits offered by these natural features, including aquatic habitat, water quality enhancement, and infiltration and storage of peak flows, have been greatly diminished. Very few natural infiltration or detention features remain within this basin to mitigate peak runoff flows.

Prior to more recent implementation of regulations to mitigate the runoff impacts of development, urbanization within the Thornton Creek basin increased the creek's peak flows, resulting in increased erosion and sedimentation. Development practices contributing to watershed degradation included building homes without adequate drainage systems, filling in drainage ways, and construction without sufficient erosion control measures.

The 145th Street Station Subarea drains to four Thornton Creek sub-basins within the City of Shoreline, as shown in 3.4-1. The subarea drains primarily to the Twins Ponds Sub-basin or the Littles Creek Sub-basin. The west portion of the subarea is within the Meridian Park Sub-basin, while a small portion of the eastern edge is within the Hamlin Creek Sub-basin.

The Twin Ponds Sub-basin is downstream of the Ronald Bog Sub-basin along the North Branch of Thornton Creek. South of Ronald Bog, Thornton Creek is mostly open channel with three long sections of piped conveyance. The first section of piped conveyance is directly south of Ronald Bog and second passes beneath the King County Metro Bus Facility. Thornton Creek flows into a Washington Department of Transportation (WSDOT)-owned piped conveyance system approximate 1200 feet north of the city limits and crosses under I-5 into the City of Seattle at the Jackson Park Golf Course.

Littles Creek flows southward roughly parallel to and approximately a half mile east of I-5. The Littles Creek-Thornton Creek confluence is located within the City of Seattle near 15th Avenue NE and NE 130th Place. This sub-basin collects drainage from mostly residential areas. The tributary originates at a small detention pond located at the southwest corner of 170th Street NE and 15th Avenue NE. The stream then flows southward for about a mile within a piped and channelized conveyance system (including 800 feet of private property backyard channel between NE 158th Street and NE 155th Street) to the Paramount Park Open Space, which has a 6.9-acre wetland system.

The Meridian Creek Sub-basin is approximately 350 acres with a piped conveyance system running southward along Wallingford Avenue N. West of Meridian Avenue N, Meridian Creek briefly enters an open channel system, flowing eastward into the south pond at Twin Ponds Park and joining the Thornton Creek North Branch.

The Hamlin Creek Sub-basin totals about 348 acres and includes the mostly forested Hamlin Park, the adjacent commercial and educational facilities of Fircrest Campus, and the surrounding residential neighborhood. Within the City of Shoreline, the creek is typically confined to a piped system and has intermittent flow. The Hamlin Creek confluence with Thornton Creek is within the City of Seattle.

Boeing Creek

The Boeing Creek Basin is the largest drainage basin entirely within the City of Shoreline with approximately 1,740 acres. The majority of the Boeing Creek open channel watercourse is contained within a forested ravine that has fairly good riparian conditions through Boeing Creek Park and through the private Boeing Creek Reserve. Land use is predominantly low-density residential but includes a few larger campus sites and a high-density commercial corridor along Aurora Avenue N from the N 145th Street to approximately N 183rd Street. Per the recent Boeing Creek basin plan, the basin is approximately 67 percent impervious surfaces and 90 percent developed.

The study area for the Connection Corridors Alternative extends approximately 1 block into the Boeing Creek watershed along N 155th Street with zoning revision proposed to seven parcels covering approximately 1.45 acres. There is limited measurable impact anticipated to the natural environment and stormwater management systems within the Boeing Creek Basin due to the

small size of the area with proposed changes in zoning. Half of this area is currently zoned Mixed Use, R-24 and R-12. The remaining four parcels are zoned as R-6. The proposed zoning revision to the 1.45 acre, under one of the two planned action alternatives are would be to MUR-45. Due to the relatively insignificant size of the area within the Boeing Creek Basin (less than 0.1% of the total basin), analyses of the minor impacts are not further evaluated within this study.

Wetlands

There are ten classified wetland areas within the Thornton Creek watershed in the City of Shoreline. Within the study area there are six wetland areas totaling approximately 14 acres, including: two within Twin Ponds Park (5.4 acres total); Peverly Pond east of Twin Ponds Park (>1 acre); a small 0.4 acres wetland near N 154th Street adjacent to Interstate 5; and two within Paramount Open Space (6.9 acres total).

Aquatic Habitat

The wetlands and stream riparian corridors within the subarea provide habitat for aquatic and migratory species. Protecting these resources is a high priority for the City. In general, fish habitat is relatively poor throughout the Thornton Creek basin, due primarily to fish passage barriers, riparian encroachment, and bank hardening. Natural stream systems provide a variety of functions such as facilitating food chain production, providing habitat for nesting, rearing and resting sites for aquatic, terrestrial and avian species, and maintaining the availability and quality of water. However within the Thornton Creek basin, existing piped stream sections and some portions of the open channel stream sections typically provide little in the way of stream function other than basic conveyance.

Species of fish observed at various locations in the Thornton Creek basin include cutthroat and rainbow trout, largemouth bass, carp, sculpin, dace, stickleback, and sunfish. Juvenile Chinook and Coho salmon have also been planted in the creek within Seattle. Many of the above-mentioned species can be found within small pond/wetland areas such as Ronald Bog, Twin Ponds, and Peverly Pond, which likely provide excellent food sources.

Surface Water Management

There are several natural stormwater features within the subarea. The wetlands and ponds within Twin Ponds Park provide some natural attenuation for peak stormwater flows as well as water quality enhancement. The wetland areas in the Paramount Park Open Space similarly provide some attenuation storage and water quality enhancement.

Additionally, there are several smaller-scale detention and water quality facilities within the subarea. These include underground stormwater detention tanks and vaults, both publicly and privately owned, of varying sizes at multiple locations. There are three existing City-owned low impact developmentLow Impact Development (LID) facilities within or directly adjacent to the subarea. These facilities are bioretention systems that provide water quality treatment. One bioretention system is along 17th Avenue NE, between NE 150th Street and NE 145th Street. A second bioretention swale, located at NE 148th Street and 5th Avenue NE, has recently been constructed. There is also a small bioretention facility at 15209 Wallingford Place, just west of the

subarea. Thornton Creek along the west side of I-5, including the ponds within Twin Ponds Park, is shown as a high risk flood area per the Proposed FEMA Floodplain Map, dated July 2012.

Surface Water Collection Systems

Table 3.4-1 summarizes the total surface water facilities managed and maintained by the City of Shoreline (taken from the Surface Water Master Plan). **Table 3.4-2** summarizes the surface water pipes within the subarea. The majority of pipes within the subarea are concrete; other common pipe materials include corrugated metal and plastic.

South of N 163rd Street and through the subarea, the main branch of Thornton Creek is within the Interstate 5 right-of-way owned by WSDOT. This includes the existing piped section of Thornton Creek, from approximately N 149th Street to the southern City limits. While the City was incorporated in 1995, most areas of Shoreline were originally developed by the 1970s. Consequently, the majority of the City's surface water infrastructure is over 40 years old and is approaching or has exceeded the typical 50-year life expectancy.

Many of the streets within the subarea do not possess curb and gutter. Runoff is typically collected by shallow, oftentimes informal roadside swales, raised pavement edges and asphalt berms, or with catch basins and conveyed along a series of ditches and pipes. In some areas lacking a formal drainage system, localized sheet flow runoff disperses to adjoining pervious areas. The typical conveyance system within the subarea consists of pipe conveyance along arterials (principal, minor, and collector) with ditches along the smaller local secondary streets. Within the subarea, Meridian Avenue N, 5th Avenue NE, 15th Avenue NE, and N/NE 155th Street have curb and gutter collection with piped conveyance.

Table 3.4-1 Surface Water Drainage System Infrastructure

Drainage System Component (City Wide)	Estimated Quantity	Unit
Surface water pipe	640,000	Linear Foot (LF)
Catch Basins	7,626	Each
Ditches	150,000	LF
City Owned Stormwater Facilities	34	Each
City Owned Water Quality Facilities	37	Each
Dams	5	Each
Privately Owned Stormwater Facilities	263	Each
Pump Stations	8	Each

Table 3.4-2 Surface Water Drainage System Infrastructure

Subarea Drainage System Components	Estimated Quantity	Unit
Surface water pipe (4" to 8" diameter)	5,400	LF
Surface water pipe (12" to 18" diameter)	29,200	LF
Surface water pipe (greater than 18" diameter)	8,000	LF

With development as projected within the subarea, many of the local secondary streets will be improved to accommodate higher volumes of vehicles and pedestrians. When this occurs, shallow swale and raised edge drainage collection areas and areas lacking formal drainage will be converted to curb, gutter, and sidewalk, requiring installation of new conveyance networks with detention and treatment facilities.

Per current City Municipal Code 20.70, redevelopment projects will generally require frontage improvements constructed at the developers expense. These improvements can include dedication of right-of-way, new curb and gutter, new or improved sidewalks, drainage improvements, pavement overlays or amenity zone landscaping. The amenity zone landscaping improvements could potentially included bioretention swales to provide water quality treatment and flow control mitigation for the adjacent public right-of-way. Further details regarding potential bioretention use for redevelopment-installed amenity zones within the right-of-way are yet to be determined by the City.

Current Demand

As part of this study, surface water runoff within the subarea was estimated using the Rational Method. The analysis provided a rough estimated change in unmitigated peak discharge through the City's surface water conveyance system within the subarea during a 25-year storm event, for each zoning option. Percent impervious surface area for the subarea under existing conditions was compared to proposed improvements. In order to assess surface water runoff generation within the subarea, this analysis references the Seattle Public Utilities methods for computing stormwater fees for residential units within the City of Seattle and neighboring communities. The SPU stormwater fee structure provides a relative impervious surface area based on average lot size and type of development. This DEIS study estimated the amount of stormwater reaching the municipal surface water collection system based the range of parcel sizes.

The analysis of change in peak discharge was for DEIS planning purposes only and does not reflect actual expected post-redevelopment conditions. The purpose of the study was to receive a relative understanding of a conservative ("worst-case scenario") unmitigated potential increase in surface water discharge potential zoning increases will have on the current surface water collection system. This simplified analysis has no bearing on the existing Surface Water Master Plan (SWMP). Actual improvements and exact size of conveyance infrastructure will not be known until extensive hydraulic modeling is completed for the subarea. More detailed future analysis will account for current redevelopment regulations (which typically lead to a net decrease in peak flows leaving the site).

Runoff from commercial and institutional development was analyzed based on the assumption that the majority of these developments will have similar impervious surface areas to very heavy residential units. Under this assumption the average runoff factor would be 0.76 (76 percent impervious). **Table 3.4-3** depicts the estimated percentage of impervious surface area for residential homes, based on size.

The City of Shoreline's surface water conveyance system was analyzed using the Rational Method, based on a 25-year storm event, and the percent of impervious surface area for each zone.

Calculations by area (in acres) were multiplied by the applicable average runoff factor in Table 3.4-2 for each zoning/density type. (Example: R-6 zone = 7,000 to 10,000 square foot lots, and has an average runoff factor of 0.48.)

Calculations were based on Chapter 3 of the 2009 King County Surface Water Design manual: 25-year, 24-hour isopluvial showed an average 2.75 inches of precipitation; typical time of concentration was estimated at 30-minutes for each sub-basin within the subarea. Surface water runoff rates were estimated based on the following rational method calculation

Peak Flow (cfs) = Runoff Factor (see Table 3.4-2) x Area (acres) x 2.75 (25-year storm precipitation amount in inches) x 0.29 (peak runoff factor for a 30-minute time of concentration)

Using the rational method provides a conservative estimate of the peak flows for each alternative. These flows were used as a comparison representing the percent increase for unmitigated flow due to the increased impervious area associated with the planned action alternatives. Medium- and large-sized redevelopment will trigger flow control mitigation requirements (see Section 3.4.3b) that would decrease net runoff from the redeveloped sites. Any potential net increase in post-development peak flows would need to be accommodated by the downstream conveyance system. Such an increase in net peak flows would likely require downstream implementation of flow control. In portions of the subarea without established conveyance systems, new conveyance system improvements would likely be needed as development occurs.

Table 3.4-3—Estimated Impervious Surface Area for Residential Homes

Small Lot Residential

Class	SF	% Impact	Avg. Runoff Factor
Tier A	<3,000	N/A	0.65
Tier B	3,000 to < 5,000	N/A	0.53
Tier C	5,000 to < 7,000	N/A	0.51
Tier D	7,000 to < 10,000	N/A	0.48
General Service/Large Lot Residential			
Undeveloped	Regular	0-15%	0.18
	Low Impact	0-15%	0.31
Light	Regular	16-35%	0.32
	Low Impact	16-35%	0.41
Moderate	Regular	36-65%	0.43
	Low Impact	36-65%	0.53
Heavy		65-85%	0.66
very Heavy		86%-100%	0.76

3.4.2 Analysis of Potential Impacts

3.4.2 a Impacts Common to All Alternatives

Both private redevelopment and public improvements within the right-of-way (including roadways and pedestrian/bicycle facilities) require stormwater system improvements for collection and conveyance, flow control, and water quality. A variety of stormwater improvements can address these needs, including conventional collection and conveyance, storage, and treatment infrastructure as well as LID facilities.

Redevelopment under both planned action alternatives are anticipated to decrease runoff to Thornton Creek and improve water quality in comparison to existing conditions. Redevelopment of parcels, per proposed zoning revisions, would require flow control and water quality mitigation following current stormwater regulations. Larger redevelopments would likely require stormwater mitigation for both new and replaced impervious surfaces within the improvement site. Current development was largely completed before extensive stormwater mitigation was required. Additionally, it should be noted that under the No Action alternative, redevelopment following current zoning would typically be smaller in scale and less likely to trigger significant flow control mitigation if impervious surface are not increase beyond minimum thresholds described in Section 3.4.3 b.

This analysis provides a planning-level assessment of the level of improvements that will be needed to accommodate growth under each of the action alternatives. The two action alternatives within the subarea would both result in redevelopment and change, requiring stormwater utility improvements to accommodate. Once the re-zoning is adopted, each development would be responsible for conducting detailed hydraulic and hydrologic analysis for the proposed changes in land use within the subarea, which would then be used to confirm potential adjustments to the stormwater system.

Since the majority of surface water collection pipes are reaching the end of their serviceable life, the Surface Water Utility will need to conduct systematic condition assessment of the subarea pipes (within the larger Thornton Creek basin). Once failing pipes have been identified, they will need to be addressed by the Stormwater Pipe Repair and Replacement Program, an ongoing capital improvement program project to repair and replace damaged pipes.

Undersized pipes will be identified through observation of problematically underperforming pipes as well as hydraulic and hydrologic modeling analyses. In order to adequately convey runoff at the City's targeted level of service, the 5,400 feet of existing stormwater pipes less than or equal to 8" diameter should receive special attention for potential upsizing.

Low Impact Development and Subregional Facilities

Redevelopment along streets and within public rights-of-way will bring the opportunity to implement LID such as bioretention swales, stormwater planters, filter systems, rain gardens, pervious pavements, and other features. Successful integration of

these elements will reduce the amount of conventional stormwater infrastructure improvements needed in the subarea. Implementation of a system of subregional surface water management facilities in the subarea could reduce the amount of facilities that need to be constructed on individual redevelopment sites. Benefits associated with subregional facilities are described in more detail under Mitigation Measures

3.4.2 b Future Growth Demand Forecasting

Future growth demand forecasting for surface water infrastructure was performed by Otak, Inc. The analysis is based on an estimated percent impervious for the projected residential and commercial population forecasting for each zoning alternative. The demand forecasting is used specifically for this EIS analysis for the subarea based on a planning level of analysis. Detailed hydraulic modeling would need to be completed by utility providers in the future as part of updating comprehensive plans/master plans. Demand was forecasted for build-out of each alternative (No Action, Connecting Corridors, and Compact Community), as described in Chapter 1, 2 and 3.1 of this DEIS.

Surface Water

Surface water management is not directly impacted by population; however, more development typically produces larger areas of impervious surface, which if unmitigated would cause an increase runoff volumes and peak flows, leading to downstream impacts.

It should be noted that redevelopment projects would be subject to Department of Ecology regulations for flow control and water quality. (Refer to discussion under 3.4.3b later in this section.) Integration of low impact development (LID) and green stormwater infrastructure into redevelopment projects can reduce the demand generated and have other environmental benefits. LID treatments are encouraged by policies in the City's Comprehensive Plan, as well as in the Subarea Plan and by Code.

Surface water management demand, based on precipitation rates for the 25-year peak storm event discussed in section 3.4.1c of this report, and percent increase in unmitigated stormwater flows each zoning alternative is shown in **Table 3.4-4**.

Redevelopment within the within the study area will decrease surface water runoff rates and improve water quality when the development triggers surface water mitigation requirements. Analyses of potential new or upsized conveyance systems are based on unmitigated stormwater flow as a percent increase over existing zoning build-out conditions. Conveyance needs based on unmitigated stormwater flows would be a conservative impact in areas where runoff is conveyed to a downstream subregional flow control facility, as described in Section 3.4.3 c. The changes in impervious area and associated increased peak runoff, based on the 25-year, 24-hour event, are based on the growth estimates per the Traffic Analysis Zones (TAZ), as described in Chapter 3.3 and shown in Figure 3.2-1 of this DEIS.

Alternative 3 is projected to create an unmitigated increase of surface water flow for each sub basin of Thornton Creek as shown in **Table 3.4-4**. Analysis per the TAZ growth estimates project the highest increase in unmitigated storm flow runoff would be

within TAZ 138 with an increased surface water peak of 321% over existing conditions.

Alternative 1—No Action

Alternative 1—No Action was assumed to have the same surface area as the existing system. Currently, the majority of the subarea is zoned R-6, and would remain so under Alternative 1—No Action. The total projected flow rate for Alternative 1—No Action is considered the base condition of storm water runoff for the peak 25-year, 24-hour event peak runoff flow. TAZs 94, 95, 96, and 135 are projected to have the highest surface water discharge rates due to current zoning densities.

Under Alternative 1—No Action, there would be limited redevelopment requiring LID techniques or investment in stormwater capital projects, so existing drainage issues would continue. Redevelopment following current zoning would be smaller in scale and may not trigger flow control mitigation if impervious surface are not increase beyond minimum thresholds described in Section 3.4.3 b.

Alternative 2— Connecting Corridors

Alternative 2 is projected to create an unmitigated increase of surface water flow for each sub-basin of Thornton Creek as shown in **Table 3.4-4**. The TAZs projected to see the most increase in storm flow runoff would be TAZs 138 with an increased surface water generation of 321% percent over existing conditions. The other TAZ with higher increase in peak flow include TAZ 130 with an increase of 37%, TAZ 97 with an increase of 33%, TAZ 99 with an increase of 33% percent, TAZ 100 with an increase of 30% percent, TAZ 137 with an increase of 25% percent, TAZ 103 with an increase of 19%, and TAZ 129 and TAZ 136 both with an increase of 14%. The other TAZ with zoning modifications are estimated to be less than a 10% increase.

Alternative 3—Compact Community

Alternative 3 is projected to create an unmitigated increase of surface water flow for each sub-basin of Thornton Creek as shown in **Table 3.4-4**. Analysis per the TAZ growth estimates project the highest increase in unmitigated storm flow runoff would be within TAZ 138 with an increased surface water peak of 321% over existing conditions. The other TAZ with higher increase in peak flow include TAZ 130 with an increase of 37%, TAZ 97 with an increase of 33%, TAZ 99 with an increase of 33% percent, TAZ 100 with an increase of 30% percent, TAZ 137 with an increase of 25% percent, and TAZ 103 with an increase of 19%. The other TAZ with zoning modifications are estimated to be less than a 10% increase.

Table 3.4-4—Unmitigated increase in Stormwater Flow, All Alternatives

	ALTERNATIVE 1—NO ACTION	ALTERNATIVE 2—CONNECTION CORRIDORS	ALTERNATIVE 3—COMPACT COMMUNITY
		% Increase from Existing*	% Increase from Existing*
Meridian Sub-Basin	Base Condition	6%	1%
Twin Ponds Sub-Basin	Base Condition	16%	11%
Littles Creek Sub-Basin	Base Condition	14%	11%
Hamlin Sub-Basin	Base Condition	2%	2%

* Percent increase in conveyance sizing for unmitigated stormwater flows with zoning revisions.

3.4.3 Mitigation Measures

3.4.3 a Incorporated Plan Features

Incorporated plan features include improvements to services and facilities that are already being planned per the Stormwater Master Plan Update. Additional improvements to the ones listed will be necessary to accommodate future development, depending on which land use plan is implemented. Refer to Section 3.4.3c for an approximate list of improvements necessary for each alternative in relation to the affected utility. Planned utility improvements in the subarea, along with additional recommended improvements to support implementation of the action alternatives (Alternatives 2 or 3) are illustrated in **Figures 3.4-1 through 3.4-2** at the end of this section.

Two drainage issues identified within the City's Surface Water Master Plan Update are within the subarea. There are a number of drainage improvements planned upstream of the study area, but changes for this study area would not impact the design of the upstream projects. The two, relatively isolated drainage issues, within the study area are along Little Creek and a flooding catch basin near NE 148th Street and 15th Avenue NE. The NE 148th Street Infiltration Facilities CIP is planned to be constructed in the near future to address this localized drainage issue. If future growth occurs within the subarea, the capacity of the conveyance systems will need to be further evaluated.

There are also nine aquatic stream or wetland problems that have been indentified within the study area in the vicinity of Twin Ponds, including multiple of structural fish-passage barriers as well as invasive plant species encroaching into restoration areas. These aquatic improvement projects are not directly linked to the planned action alternatives, but stream or wetland enhancements within the subarea could potentially address some of these existing impacts.

3.4.3 b Applicable Regulations and Commitments

Critical Area Ordinances

Through City of Shoreline Municipal Code, Chapter 20.80 –Critical Areas, the City has identified six critical areas that require protection and development buffers to protect the environmentally critical areas while accommodating the rights of property owners to use their property in a reasonable manner. The six environmentally critical areas are geologic hazard areas, fish and wildlife habitat conservation areas, wetlands, flood hazard areas, streams, and aquifer recharge areas.

Washington State Department of Ecology and City of Shoreline Surface Water Management Requirements

The City of Shoreline Municipal Code, Chapter 13.10 – Surface Water Utility, adopts the most recent version of the Stormwater Management Manual for Western Washington (SWMMWW) published by the Washington State Department of Ecology. This manual requires flow control and water quality treatment for new and redevelopment projects that exceed specific hard surface area thresholds. Water quality mitigation is required for hard surfaces that are considered pollution generation surfaces.

Redevelopment projects that add 5,000 square feet or more of new hard surface area are required to implement flow control and water quality mitigation. Additionally, redevelopment projects for which the total of new and replaced hard surfaces is 5,000 square feet or more and the assessed value by greater than 50 percent are required to provide flow control and water quality mitigation for new and replaced hard surface areas. Redevelopment projects that add or replace greater than 2,000 square feet and less than 5,000 square feet or hard surface are required to utilize on-site stormwater management to minimize runoff leaving the site.

Integration of LID and green stormwater infrastructure into redevelopment projects can help manage stormwater with a similar process to that within natural systems. Bioswales, rain gardens, and other features capture and retain water onsite, allowing time for it to soak into the soil, where it is naturally filtered. This process also captures pollution and improves water quality. LID treatments are encouraged by policies in the City's Comprehensive Plan, as well as in this Subarea Plan, and are required mitigation element in the SWMMWW.

The City of Shoreline has adopted a Western Washington Phase II National Pollutant Discharge Elimination System (NPDES) Permit to control pollutant loads and reduce peak flows from developed sites and municipal facilities within the city. There are five program components pertaining to the NPDES Permit. Components 1 through 3 are Public Education and Outreach, Public Involvement and Participation, and Illicit Discharge Detection and Elimination. These three components would not change under the three alternatives. The extent of implementation of the remaining two components, as described below, would vary depending on development growth within the subarea.

NPDES Component #4 – Controlling Runoff from New Development, Redevelopment, and Construction Sites

This goal requires that the City of Shoreline develop, implement, and enforce a program to reduce pollutants in stormwater runoff from new development, redevelopment, and construction site activities. The NPDES Permit prioritizes LID as the preferred and commonly used approach to site development.

Another major aspect of this component is ongoing maintenance and inspection of surface water facilities. The City is currently meeting this goal by enforcing that private developers maintain their private surface water facilities permitted since 2007. The City of Shoreline inspects several hundred surface water facilities on a rotating inspection cycle to ensure all surface water facilities are functioning as designed.

Additionally, in 2009 the City of Shoreline adopted the Department of Ecology Low Impact Development Manual, which requires that best practices be used unless shown to be infeasible.

NPDES Component #5 – Municipal Operations and Maintenance

This goal requires that the City of Shoreline reduce potential impacts to water quality through its operations and maintenance division of public infrastructure. The Roads Division of the City of Shoreline follows guidance from the ESA Regional Road Maintenance Program Guidelines. The Surface Water Division implements a rigorous stormwater system inspection, maintenance, and cleaning program. The Parks Department adopted an Integrated Pest Management Program. Additionally, all City Maintenance Yards operate under a Surface Water Pollution Prevention Plan (SWPPP) and are regularly inspected to assure compliance with the SWPPP.

A major aspect of this component is inspecting all municipally owned and operated catch basins and inlets at least once before August 1, 2017. Additionally, the City of Shoreline is committed to using applicable best management practices (BMPs) associated with runoff control during routine maintenance, and using a Work Order software program to track inspections and maintenance/repair activities.

These two program components are applicable to future development within the subarea, in that future growth will require additional infrastructure, both public facilities and private. Through the NPDES permit, pursuit of LID improvements to help manage and mitigate surface water runoff is encouraged. The conventional approach to manage stormwater runoff has limitations for recovering adequate storage and distributed flow paths necessary to more closely match pre-development hydrologic function and protect aquatic resources from adverse effects of development.

LID principles and applications present a significant conceptual shift from a structural approach to a source reduction approach. LID improvements utilize native soils, vegetation protection areas, and landscaping strategically distributed throughout the project to slow, store, and infiltrate storm flows. LID improvements are designed into the project as amenities, as well as hydrologic controls. Types of LID improvement include

vegetated roofs, rainwater harvesting, rain gardens, permeable pavement, and bio-retention swales.

New development within the City of Shoreline will need to conform to regulations within the NPDES Permit and the Ecology LID Manual provisions of the Development Code. Development will be required to utilize LID improvements to reduce flows, infiltrate where applicable, and treat stormwater before discharging to the City's surface water network. The City is required to monitor these facilities to verify they are working properly, and maintain LID improvements installed within public right-of-way unless an agreement has been reached with adjacent property owners.

3.4.3 c Other Potential Mitigation Measures

Surface Water Infrastructure

With development projected within the subarea, many of these streets will be improved to accommodate higher volumes of vehicles and pedestrians, and may be developed into a more urban street network. When this occurs, many of the ditches and sheet flow dispersion areas will be converted to curb, gutter, and sidewalk, requiring installation of new or upsized conveyance system with detention and treatment facilities. The conveyance systems may be bioretention swales or enclosed pipe networks. Dispersed LID facilities should be implemented to the extent feasible within the subarea.

Table 3.4-5 contains a list of surface water conveyance improvements projected to manage future runoff and the increased impervious surface associated with development from each alternative. Locations that would require potential upsizing the existing conveyance systems are based on unmitigated stormwater flow comparisons between the planned action alternatives and current zoning. Increased pipe or swale capacity would primarily be required in locations where runoff is conveyed to a potential downstream subregional flow control facility. New conveyance systems are indentified in areas of the subarea that do not have established conveyance systems under existing conditions or areas where improved pedestrian facilities would likely impact the current drainage flow paths.

Many of the existing streets currently contain ditches and swales at the edges of the roadway. When new developments are constructed within the subarea, many of the streets will be improved to accommodate the added influx of users. When this occurs, many of the open ditches will be converted to a closed pipe network or LID feature. Due to the limited growth projected through the No Action alternative, significant public infrastructure improvements are not anticipated.

Table 3.4-5—Surface Water Conveyance Improvements

Alternative	New Conveyance (LF)	Upsized Existing Conveyance (LF)	Improved Conveyance Totals (LF)
#1 — No Action	0	0	0
#2 — Connecting Corridors	8,950	14,400	23,350
#3 — Compact Community	8,050	13,000	21,050

Alternative 1—No Action

Since Alternative 1—No Action would contain the same zoning as under existing conditions, no additional conveyance improvements are projected within the subarea. The creation of new households or infill redevelopment could occur under Alternative 1—No Action. New sites and households would be required to manage stormwater related to individual redevelopment when mitigation thresholds are triggered, even though there would be no capital improvements at a larger scale. Under the No Action alternative, pipe replacement would still occur as the service life of the existing stormwater infrastructure is reached. Per the City's Surface Water Master Plan Update, the replacement of pipes is either as facilities fail or through an opportunistic replacement as other roadway or improvements projects are completed adjacent to the required pipe upgrades.

Twenty Year Improvements

The total length of conveyance improvements that are necessary to accommodate the projected population in 2035 is approximately 6,200 feet. These represent new conveyance systems per the more expansive infrastructure impacts associated with Connection Corridors Alternative with population growth rate estimated at 2.5 percent. New conveyance systems in areas with a minor change in percent runoff between the twenty year growth and existing conditions, less than 10 percent, are not included in the areas of proposed conveyance systems that are listed for the full build-out impacts.

The following new conveyance pipe runs may need to be installed to accommodate the projected population in 2035. 12" diameter or larger pipes or bioretention swales may be necessary under the Twenty Year Improvements:

a. 1,350 feet along 8th Avenue NE from NE 155th Street to NE 150th Street
b. 1,800 feet along 6th Avenue NE from NE 152nd Street to NE 145th Street
c. 2,200 feet along 12th Avenue NE from NE 148th Street to NE 145th Street, and along NE 145th Street to 17th Avenue NE
d. 550 feet along NE 151st Street from 8th Avenue NE to 10th Avenue NE
e. 300 feet along NE 145th Street from 6th Avenue NE to 5th Avenue NE.

Alternative 2—Connecting Corridors

23,350 feet of new and/or upsized conveyance systems may be needed to handle projected surface water runoff from future development.

The following existing pipes and ditches may need upsized conveyance systems in the form of larger bioretention swales or pipe networks replaced with a larger diameter pipe to accommodate the increase in impervious surfaces under total build-out of Preferred Alternative #2:

a. 450 feet along N 150th Street from Meridian Avenue N to Corliss Avenue N
b. 900 feet along Corliss Avenue N from N 150th Street to N 147th Street
c. 600 feet along N 149th Street from Corliss Avenue N to 1st Avenue NE
d. 600 feet along N 148th Street from Street from Corliss Avenue N to 1st Avenue NE
e. 800 feet along 3rd Avenue Ne from NE 151st Street to NE 153rd Street
f. 400 feet along NE 151st Street from 3rd Avenue
g. 2,050 feet along 5th Avenue NE from NE 155th Street to NE 145th Street
h. 1,450 feet along 5th Avenue NE from NE 160th St to NE 155th Street
i. 1,100 feet along 12th Avenue S south from NE 155th Street to NE 150th Street
j. 850 feet along N 152nd Street east from 11th Avenue NE to 13th Avenue NE
k. 1,200 feet along 8th Avenue NE from NE 150th Street to NE 147th Street
l. 650 feet along NE 147th Street east from 8th Avenue NE to 10th Avenue NE
m. 400 feet along 146th feet from 9th Avenue NE to 9th Place NE500 feet along NE 155th Street from Wallingford Avenue NE to Meridian Avenue NE
n. 600 feet along NE 155th Street from Meridian Avenue NE to Corliss Avenue NE
o. 500 feet along NE 154th Street from Meridian Avenue NE to Corliss Avenue NE
p. 400 feet along NE 150th Street from Meridian Avenue NE to Corliss Avenue NE
q. 300 feet along NE 155th Street from 14th Avenue NE to 12th Avenue NE
r. 650 feet along 5th Avenue NE, from NE 160 Street to NE 145th Street used for private connections, assuming 50 feet per connection

The following new conveyance systems as bioretention swales or new pipe networks may need to be constructed to accommodate the increase in impervious surfaces under total build-out of Preferred Alternative #2:

a. 300 feet along NE 154th Street (Private Drive) from 3rd Avenue NE to 5th Avenue NE
b. 600 feet along NE 149th Street from 3rd Avenue NE to 5th Avenue NE
c. 900 feet along 6th Avenue NE from NE 155th Street to NE 152nd Street
d. 1,350 feet along 8th Avenue NE from NE 155th Street to NE 150th Street
e. 550 feet along NE 151st Street from 8th Avenue NE to 10th Avenue NE
f. 950 feet along NE 151st Street from 8th Avenue NE to 10th Avenue NE and along 10th Avenue NE to an existing outfall into Paramount Park
g. 2,200 feet along 12th Avenue NE from NE 148th Street to NE 145th Street, and along NE 145th Street to 17th Avenue NE

h. 1,800 feet along 6th Avenue NE from NE 152nd Street to NE 145th Street
i. 300 feet along NE 145th Street from 6th Avenue NE to 5th Avenue NE

Alternative 3—Compact Community

Approximately 21,050 feet of new and/or upsized conveyance systems may be needed to handle projected surface water runoff from future development.

The following existing pipes and ditches may need upsized conveyance systems in the form of larger bioretention swales or pipe networks replaced with a larger diameter pipe to accommodate the increase in impervious surfaces under total build-out of Preferred Alternative #3:

a. 450 feet along N 150th Street from Meridian Avenue N to Corliss Avenue N
b. 900 feet along Corliss Avenue N from N 150th Street to N 147th Street
c. 600 feet along N 149th Street from Corliss Avenue N to 1st Avenue NE
d. 600 feet along N 148th Street from Street from Corliss Avenue N to 1st Avenue NE
e. 800 feet along 3rd Avenue Ne from NE 151st Street to NE 153rd Street
f. 400 feet along NE 151st Street from 3rd Avenue
g. 2,050 feet along 5th Avenue NE from NE 155th Street to NE 145th Street
h. 1,450 feet along 5th Avenue NE from NE 160th St to NE 155th Street
i. 1,100 feet along 12th Avenue S south from NE 155th Street to NE 150th Street
j. 850 feet along N 152nd Street east from 11th Avenue NE to 13th Avenue NE
k. 1,200 feet along 8th Avenue NE from NE 150th Street to NE 147th Street
l. 650 feet along NE 147th Street east from 8th Avenue NE to 10th Avenue NE
m. 400 feet along 146th feet from 9th Avenue NE to 9th Place NE
n. 650 feet along 5th Avenue NE, from NE 160 Street to NE 145th Street used for private connections, assuming 50 feet per connection
o. 300 feet along NE 154th Street (Private Drive) from 3rd Avenue NE to 5th Avenue NE
p. 600 feet along NE 149th Street from 3rd Avenue NE to 5th Avenue NE

The following new conveyance systems as bioretention swales or new pipe networks may need to be constructed to accommodate the increase in impervious surfaces under total build-out of Preferred Alternative #3:

a. 900 feet along 6th Avenue NE from NE 155th Street to NE 152nd Street
b. 1,350 feet along 8th Avenue NE from NE 155th Street to NE 150th Street
c. 550 feet along NE 151st Street from 8th Avenue NE to 10th Avenue NE
d. 950 feet along NE 151st Street from 8th Avenue NE to 10th Avenue NE and along 10th Avenue NE to an existing outfall into Paramount Park
e. 2,200 feet along 12th Avenue NE from NE 148th Street to NE 145th Street, and along NE 145th Street to 17th Avenue NE

f. 1,800 feet along 6th Avenue NE from NE 152nd Street to NE 145th Street
g. 300 feet along NE 145th Street from 6th Avenue NE to 5th Avenue NE

Potential Regional or Subregional Stormwater Facility Implementation

Under Alternatives 2 and 3 there could be an opportunity to implement a regional or subregional stormwater facility project that would serve future growth. A subregional facility could provide mitigation for a smaller area, two to three blocks of redevelopment, with a regional system targeting a larger drainage area. This project could include construction of a centralized stormwater facilities funded through grants and capital improvement planning. Providing centralized facilities can help to catalyze redevelopment by reducing costs of stormwater infrastructure improvements to individual site development and increase the area of developable land on parcels. Similar centralized stormwater facilities have been implemented by other local municipalities, including at the proposed Light Rail Station within the Overlake Village Neighborhood of Redmond. Centralized facilities could provide both flow control and water quality mitigation or the water quality treatment could be implemented through disperse private and public treatment or LID systems.

Implementation of LID and green stormwater infrastructure solutions as part of public right-of-way improvements and onsite development would have a beneficial effect in reducing impacts in the subarea by enhancing stormwater treatment and management. These dispersed facilities would also decrease the potential size of a downstream regional of subregional facility.

Potential regional or subregional stormwater facility locations are preferably sited at locations downstream of anticipated development to provide the maximum benefit for the targeted area. However, stormwater mitigation through an area substitution process can be implemented for drainage areas that would be difficult to directly capture due to topography or available facility locations. These stormwater facilities would preferably be implemented within each subbasin for which significant redevelopment is anticipated. Centralized facilities could be collocated within a City park or within the parking lot of a larger commercial or mixed use residential parcel. Locations adjacent to existing or proposed conveyance collection mains would allow water to be directed to the facility with limited new conveyance infrastructure.

Collocation of stormwater facilities within existing or expanded parks or new public plazas would require coordination with through a Park Master Plan process. Collocation of a stormwater facility within Paramount Open Space may be possible pending critical area requirements and long-term City goals for the park. Partnering with Sound Transit to enlarge the proposed stormwater facility at the 145th Light Rail Station could also be explored as subregional stormwater facility alternative. The proposed Sound Transit facility could potentially maximize the use of the site as a stormwater vault with a plaza area located above.

Within the Twin Ponds sub-basin there are several a potential locations for a regional stormwater facility. A facility could be collocated within Twin Ponds Park or on one of the larger Mixed

Use Residential Sites located adjacent to existing stormwater conveyance mains on Meridian Avenue N or 1st Avenue N.

For the Littles Creek sub-basin, a parking lot for the larger mixed use residential or community business parcels along 15th Avenue NE could be used for a regional stormwater facility. The stormwater pipe along 15th Avenue NE provides conveyance for a significant upstream area.

Potential Stream Daylighting

There are a few locations within the subarea where the existing streams are still in piped conveyance systems that provide a barrier to fish passage. Daylighting opportunities of the streams within the subarea are not anticipated within the City's current CIP planning and budget, but there may be future opportunities to daylight as the subarea is redeveloped. Some potential daylighting projects would likely require partnering with other agencies or could be explored through updates to the parks master plans adjacent to the location that the current streams are located.

As described in the Thornton Creek Basin Plan, there are also a number of fish passage barriers along Thornton Creek that are downstream of the subarea and outside of the Shoreline city limits. As Thornton Creek crosses under I-5, the creek is piped for approximately 1,950 feet. A potential new alignment along the west side of I-5 parallel to the southbound exit to NE 145th Street could reduce the length of this pipe crossing. This improvement would require coordination with the Washington Department of Transportation (WSDOT) and adjacent property owners. Funding for a large-scale daylight project at this location is not currently available, but could be explored as a partnering opportunity with WSDOT or Sound Transit and/oor through grant funding opportunities.

There appears to be limited area along Meridian Creek with potential for daylighting pipes sections to an open channel system. Some of these isolated areas would require with acquisition of additional public land.

Littles Creek is within a piped conveyance system through the entire upper reach until the open channel south of NE 152nd Street that flows into Paramount Open Space. To daylight Littles Creek upstream of NE 152nd Street would likely require acquisition of private land adjacent to 12th Avenue NE or between private parcels between NE 155th Street to NE 158th Street.

Hamlin Creek is characterized as an intermittent stream in the Surface Water Master Plan. This stream would like have limited environmental benefit provided by daylighting improvements.

The Green Network

A concept proposed under either of the two action alternative calls for creation of a green network of sidewalks, trails, bicycle lanes, parks, stream corridors, wetlands, and natural areas throughout the subarea, implemented over time with redevelopment. Green infrastructure and low impact development stormwater management and water quality treatment facilities would be a part of this network. For an enlarged illustration of the green network concept and more discussion, refer to Sections 3.1 and 3.5 of this DEIS.

The green network would begin to be implemented within the next twenty years as redevelopment occurs in the station subarea, with the intent of full implementation over time with build-out of the proposed land uses of the subarea plan.

The Green Network Concept—interconnecting trails, pedestrian, and bicycle facilities in green streets and parks throughout the subarea. This concept would greatly enhance surface water management and water quality in the subarea, reducing flooding and improving habitat conditions.

3.4.4 Significant Unavoidable Adverse Impacts

Growth and change would be expected to occur gradually over many decades under both of the action alternatives. Implementation of full build-out of Alternatives 2 or 3 would likely take a number of decades. With application of the capital improvement projects discussed, along with regulatory requirements, no significant unavoidable adverse impacts would be anticipated.

Associated population growth would provide an impact on the existing streams and wetlands within the study area as more people would be visiting and exploring these areas. Measures to protect the natural environment by limiting public access to high habitat portions of the parks may be necessary through fences or constructed boardwalks. These could be implemented as an adaptive management approach.

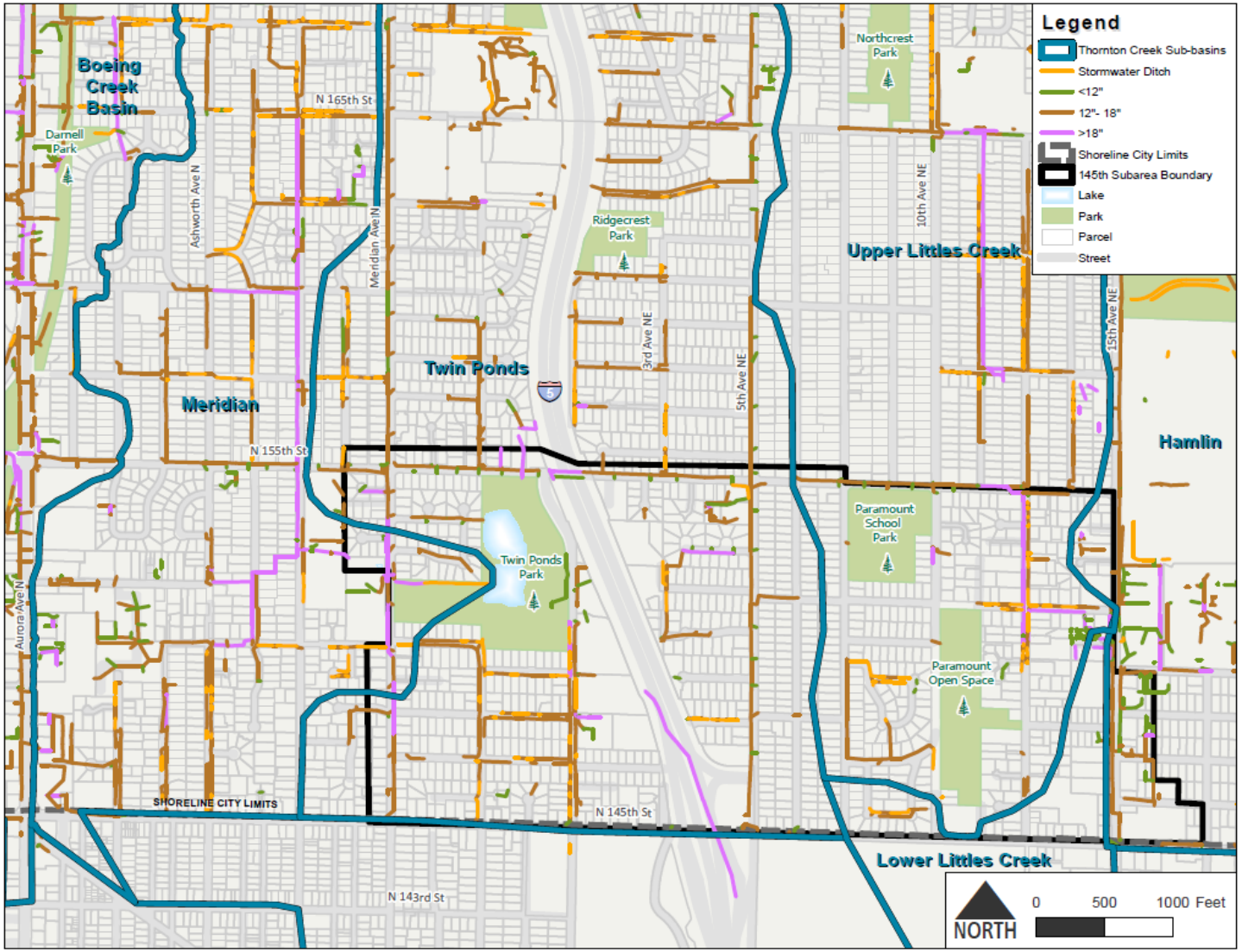


Figure 3.4-1 Existing Surface Water/Stormwater Facilities in the Subarea

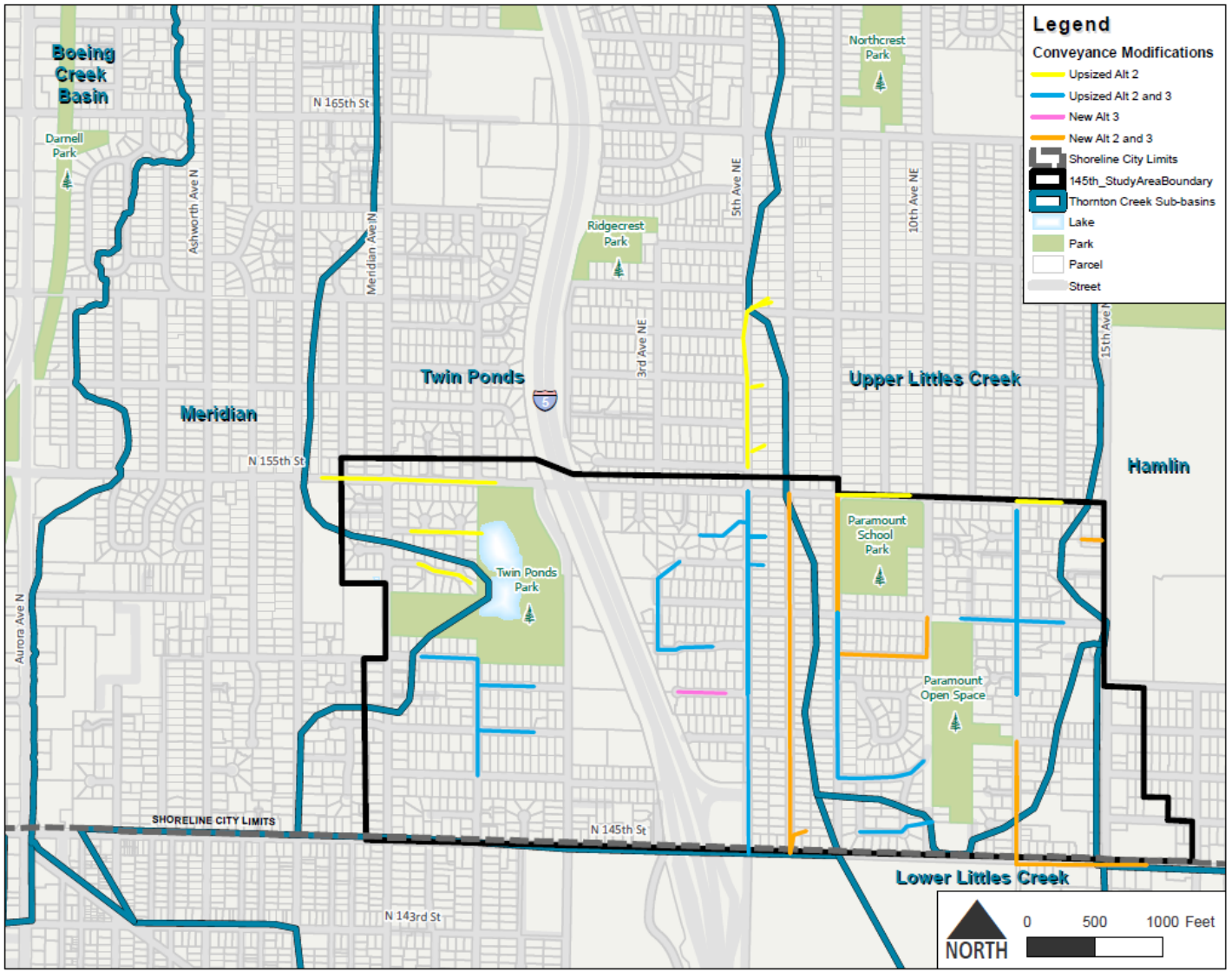


Figure 3.4-2 Planned and Recommended Surface Water/Storm Drainage Improvements in the Vicinity of the Subarea

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3.5 Parks, Recreation, Open Space, Natural Areas, and Priority Habitat Areas

This section describes the affected environment, analyzes potential impacts, and provides recommendations for mitigation measures for parks, recreation, open space, natural areas, and priority habitat areas. Refer to Section 3.4 for additional information related to streams, wetlands, and surface water management. Parks within and in the vicinity of the subarea are depicted on **Figure 3.5-1**.

3.5.1 Affected Environment

As of January 2015, there are over 413 acres of public parks, recreation sites, open space, and natural areas in Shoreline. These sites include passive and active recreation parks, open spaces, natural areas surrounding wetlands (including ponds and lakes), trails, and recreational facilities such as public pools and gyms.

The Parks, Recreation, and Cultural Services (PRCS) Department of the City of Shoreline oversees the city's 413 acres of public park properties and provides recreational opportunities for Shoreline residents and the communities in the surrounding region. The department consists of three divisions: Administration, Parks Operations, and Recreation.

The PROS Plan

From 2010 -2011, the City developed the 2011-2017 Parks, Recreation, and Open Space (PROS) Plan to build a framework for future maintenance and development of Shoreline's parks, recreation, and cultural service programs to serve the community as the population grows, demographics change, and financial situations evolve. The PROS Plan may be downloaded and reviewed for more information at: http://www.cityofshoreline.com/government/departments/parks-recreation-cultural-services/projects-and-plans/parks-recreation-and-open-space-plan

The PROS Plan articulates a vision and goals and policies for the City's parks, recreation, and cultural services program and facilities.

Vision—Provide quality parks, recreation, and cultural services to promote public health and safety; protect our natural environment; and enhance the quality of life of our community.

Goals and Policies:

1. The preservation, enhancement, maintenance, and acquisition of facilities
2. Diverse, affordable community-based recreational, cultural, and arts programs
3. Equitable distribution of resources
4. Partnerships that maximize the public use of all community resources
5. Community engagement in parks, recreation, and cultural service activities and decisions

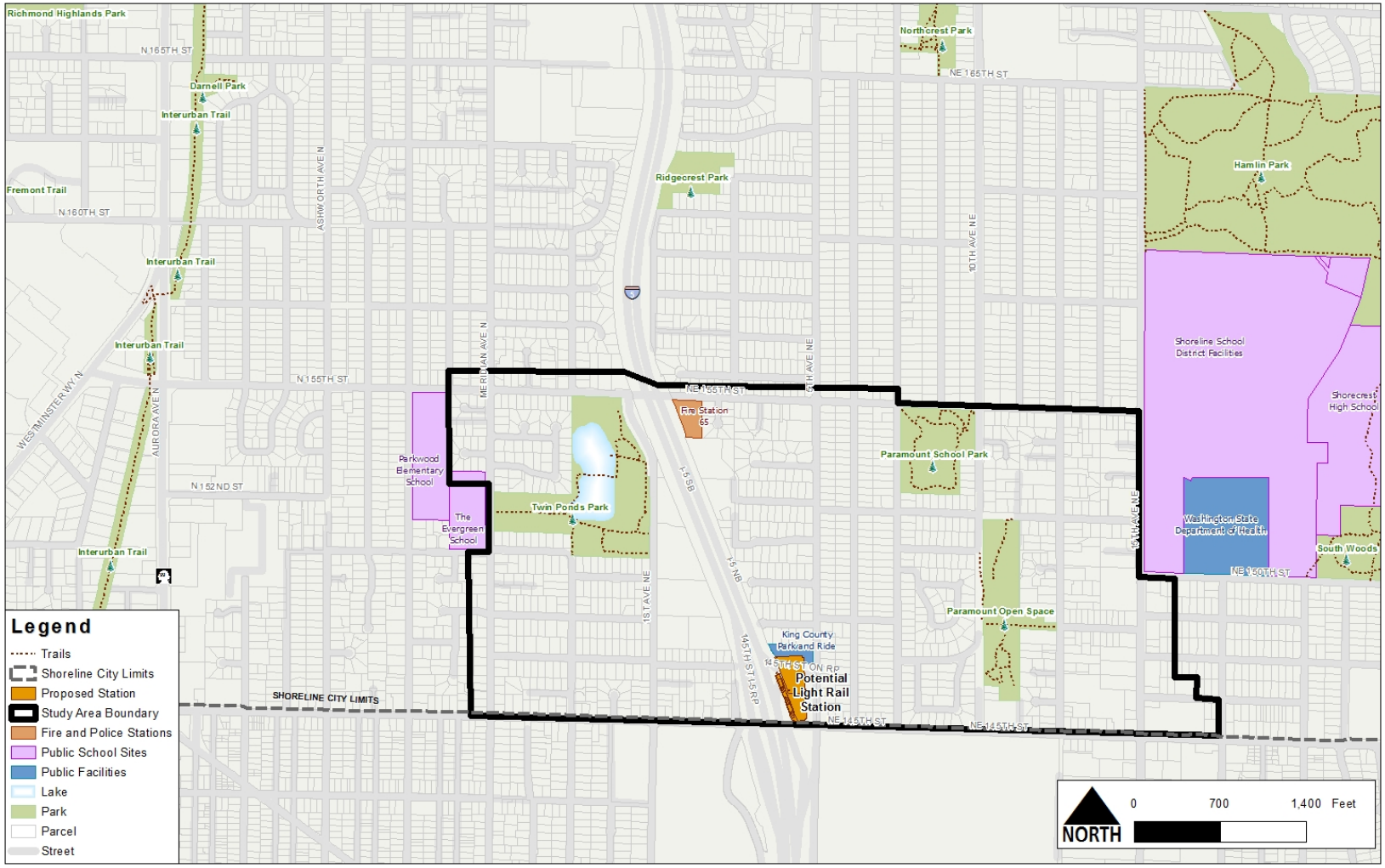


Figure 3.5-1 Parks and Other Community Facilities in the Vicinity of the Subarea

In order to the assess level of service of existing facilities, the PROS Plan classifies parks and recreation facilities into the following categories, described in more detail below.

- Regional Parks
- Large Urban Parks
- Community Parks
- Neighborhood Parks
- Natural Areas
- Special Use Facilities
- Street Beautification

Regional Parks: This park classification serves the city and beyond. These are often large parks and include a special feature that makes them unique. They also accommodate a mixture of active and passive activities and sometimes offer a wide range of amenities. Richmond Beach Saltwater State Park is Shoreline's only Regional Park at 32.4 acres of land. This facility provides a citywide level of service.

Large Urban Parks: These parks serve a broad purpose and population, and can serve neighborhood and community park functions. The focus is on providing a mixture of active and passive recreation opportunities that serve diverse interests. There are two parks in Shoreline with this classification, Hamlin and Shoreview, covering a total of 127.5 acres. A facility of this type provides a citywide level of service.

Community Parks: The purpose of a community park is to meet community based active, structured recreation needs and to preserve unique landscapes and open spaces. They are designed for organized activities and sports, although individual and family activities are also encouraged. Shoreline has seven community parks totaling over 101 acres. This type of facility typically provides a level of service to populations located within one and a half miles from the park.

Neighborhood Parks: A neighborhood park is a basic unit of the park system that serves as the recreational and social focus of the neighborhood within an estimated 15 minute walking time. The overall space is designed for impromptu, informal, unsupervised active and passive recreation as well as more intense recreational activities. Shoreline has seven neighborhood parks ranging in size from 1.8 – 4.5 acres and encompassing a total of 32.6 acres of land. Neighborhood parks typically serve populations located within one-half mile of the park.

Natural Areas: This category includes areas developed to provide aesthetic relief and physical buffers from the impacts of urban development, and to offer access to natural areas for urban residents. These areas may also preserve significant natural resources, wildlife habitat, native landscapes, and open spaces. These areas typically serve populations located within one-half mile from the area. Shoreline has 11 areas categorized as natural areas, which total 84 acres.

Special Use Facilities: These facilities provide unique, specific purposes, such as an off-leash Dog area, indoor pool, community recreation or civic center, botanic garden, regional or local trail connector and provide a citywide level of service. Special use facilities in Shoreline include the Shoreline Pool, Spartan Recreation Center, Kruckeberg Garden, and the Interurban and North Crosstown Connector Trails. These facilities are resources to existing and potential future residents of the subarea since they offer a citywide level of service.

Street Beautification: Street Beautification sites are small areas or street corridors that have been developed in and around the public right-of-way. These sites provide aesthetic relief, enhance pedestrian safety, and provide limited active recreational opportunities. In the subarea, these sites include Rotary Park, Aurora Corridor, and the North City Business Corridor. Small public gathering spaces, such as urban plazas, pocket parks, and parklets may be located along and adjacent to street corridors, particularly with neighborhood redevelopment.

There are more than 140 acres of park land and recreational facilities within the station subarea or in near proximity to it. Park and Shoreline Public School assets located in proximity to the subarea are described below.

- ***Hamlin Park:*** Although the Hamlin Park is located northeast of the subarea and not directly within its boundaries, it is an important resource to existing and future subarea residents. Its size and historical significance to the community are important aspects. The land the park contains was originally acquired by the Hamlin family in 1895.Hamlin Park is the oldest official park in the City's system (and was previously the oldest in King County's system when it was under the County's jurisdiction).

  Hamlin Park is classified Large Urban Park at 80.4 acres and was recently improved in 2010. There are several other public facilities adjacent to the park, including Kellogg Middle School, Shorecrest High School, the Fircrest Complex, Shoreline School District warehouse and kitchen, and a Shoreline Parks/Public Works maintenance facility. With a citywide service area, the park provides a variety of active and passive uses and natural areas. It includes several areas with public art, picnic areas, and forest. Recent improvements include new play equipment, picnic shelter, loop walking path, nature trail improvements, , and sport fields.

- ***Paramount Open Space:*** Classified as a Natural Area, this park is 10.69 acres of forest land located directly east of the proposed station. The site consists of hillsides and slopes as well as adjoining lowlands and wetlands, with streams crossing. There is a small developed area near the southern boundary of the site. Recent improvements include removal of invasive vegetation and construction debris, trail improvements, and a new dedication bench.

- ***Paramount School Park:*** Paramount School Park, owned by the Shoreline School District and maintained by the City, is 8.6 acres and located northeast of the proposed station, just south of NE 155th St. and northwest of Paramount Open Space. Designated a Community Park, this site is primarily open with a grouping of trees on its northern boundary. The site was master planned in 2000, a skate park completed in 2002, and the rest of the park was open to the public in 2003. The park was constructed on School District property. As part of the City of Shoreline/Shoreline School District Joint Use Agreement, the site could be reclaimed by the School District to develop a future school site to meet population demands. Any recreational assets could still be available to the public for use after school hours.

- ***Ridgecrest Park:*** This 3.9 acre park is located north of the subarea, and is classified as a Neighborhood Park. The site is located in the central area of the Ridgecrest Neighborhood and consists of both open and wooded areas. The park is adjacent to I-5, and contains steep slopes on the south and east edge. Currently the park is completely surrounded by single-family homes. Recently sports fields have been improved, and there are small maintenance measures planned for the future. This park will be directly impacted by light rail line construction. Sound Transit will be mitigating impacts by dedicating park land and enhancing the park entrance.

- ***South Woods:*** South Woods Park is a 15.6 acre open space parcel classified as a Natural Area. It is directly south of Shorecrest High School, and east of the subarea. The property was purchased by Shoreline in 2007, the City developed a pedestrian sidewalk in 2009. The site is now part of the city's park system. The site has received habitat restoration improvements since 2009.

- ***Twin Ponds Park:*** Twin Ponds Park is the only park west of I-5 within the subarea and mentioned in the report. This 21.6 acre site is designated a Community Park and contains two ponds, a wetland, recreational facilities, and a natural area with a stream. The area surrounding the park is completely developed and currently consists primarily of single-family homes, and Aegis Assisted Living Center to the east. Past improvements include a new community garden, invasive vegetation removal, tree planting, and other facilities improvements (including some parking lot paving and striping).

The Shoreline Public School District is an additional resource for neighborhood park amenities and facilities within and surrounding the subarea. Consideration of service from these facilities increases the availability of park assets to the subarea. In the subarea, school recreation facilities include:

- ***Kellogg Middle School***—full size turf, track-six lanes

- ***Shorecrest High School***—full size turf, track-eight lanes, turf baseball field, discus area (grass), shot put area, tennis courts (4)

- ***Parkwood Elementary School***—playground, and grass sports field, basketball court

Community Interests and the Projected Demand for Additional Parks, Recreation, and Open Space Facilities and Services

During development of the PROS Plan (completed in 2011), a community outreach process was used to identify community needs and inform potential improvements to level of service. The City conducted a Community Needs Assessment Survey. This survey will be updated in 2016 as part of PROS Plan update in 2017. Results of the outreach process and 2010 survey are summarized below.

- Park and recreation usage in the community is high.

- Additional restrooms and walking trails continued to be the most desired park improvements.

- While there are a wide range of park and recreation needs, the City of Shoreline is currently meeting most of

the needs of the community with paved walking and biking trails, playfields, and new neighborhood park amenities (such as picnic shelters, drinking fountains, playgrounds, and walking trails).

- Deficiencies exist between demand and assets with regard to the community's expressed desire for a new aquatic center and cultural arts facility.

- Community participants believed the future focus should be on improving and maintaining existing facilities and developing proactive partnerships.

Level of Service Assessment

The City uses a combination of community participation and review of the classifications and their service areas described above to assess demand. Classifications set the stage for analyzing need (also described as level of service). Level of service is a term that describes the amount, type, or quality of facilities that are needed in order to serve the community at a desired and measurable standard. The PROS Plan analyzed level of service based on geographic service area standards for community and neighborhood park classifications. (Neighborhood parks have a half mile service area and community parks have a one and one half mile service area.) The City's analysis also takes into consideration the inclusion of Shoreline School District property and other community and large urban parks that provide neighborhood park amenities.

Figures 3.5-2 and 3.5-3 from the PROS Plan illustrate community park and neighborhood park service areas in the City of Shoreline. As shown in these figures, all of the subarea is located with community park service areas and portions are located within neighborhood park service areas. Areas of the subarea not served by neighborhood parks or by Shoreline School District sites are in the central southern portion of the subarea, as shown in **Figure 3.5-4** (also from the PROS Plan).

In addition to City of Shoreline parks and recreation resources, the City of Seattle's Jackson Park Golf Course is located immediately south of the subarea, south of NE 145th Street. The golf course has walking trails and greenbelt areas that are used by subarea residents.

Planned Improvements and Desired Amenities

The PROS Plan identified the following projects are listed in the six-year capital improvement plan for 2012-2017 that potentially could include funding of parks and trails in the vicinity of the subarea:

- Parks repair and replacement funding
- Trail corridors
- King County Trails Levy funding

As part of twenty-year capital improvement planning, the PROS Plan also identifies potential new facilities, including the following in proximity to the station subarea. Several improvement projects identified in the plan have already been implemented, and as such these are not listed below.

Paramount School Park Pedestrian and bicycle improvements with signage between Paramount School Park and Paramount Open Space

- Picnic shelter reservation kiosk
- Basketball court
- Add picnic tables outside of existing shelter

- Field drainage improvements
- Loop trail mile-markers
- Tree and bench plan
- Frontage and fencing improvements along 155th Street at Paramount School Park
- On-street wayfinding signs

Paramount Open Space

- Neighborhood Park Plane
- Expand Paramount Open Space park through willing seller purchase opportunities
- Park entry improvements including monument signages
- Pedestrian and bicycle connections

Hamlin Park

- Internal and on-street wayfinding signs
- Trail mile markers
- Continuation of soft surface trail improvements
- Replace entry signs/improve park pedestrian entrances

Twin Ponds Park

- Sidewalk and right-of-way improvements along 1st Avenue NE from 155th Street to the south end of Twin Ponds Park
- Development of a neighborhood park plan and vegetation management plan (Phase 1)

South Woods Park

- Vegetation management plan implementation
- Development of a Neighborhood Park Plan
- Improvement of the entry from Shorecrest High School
- Interpretive signs
- On-street wayfinding signs

Existing community gardens at Twin Ponds Park

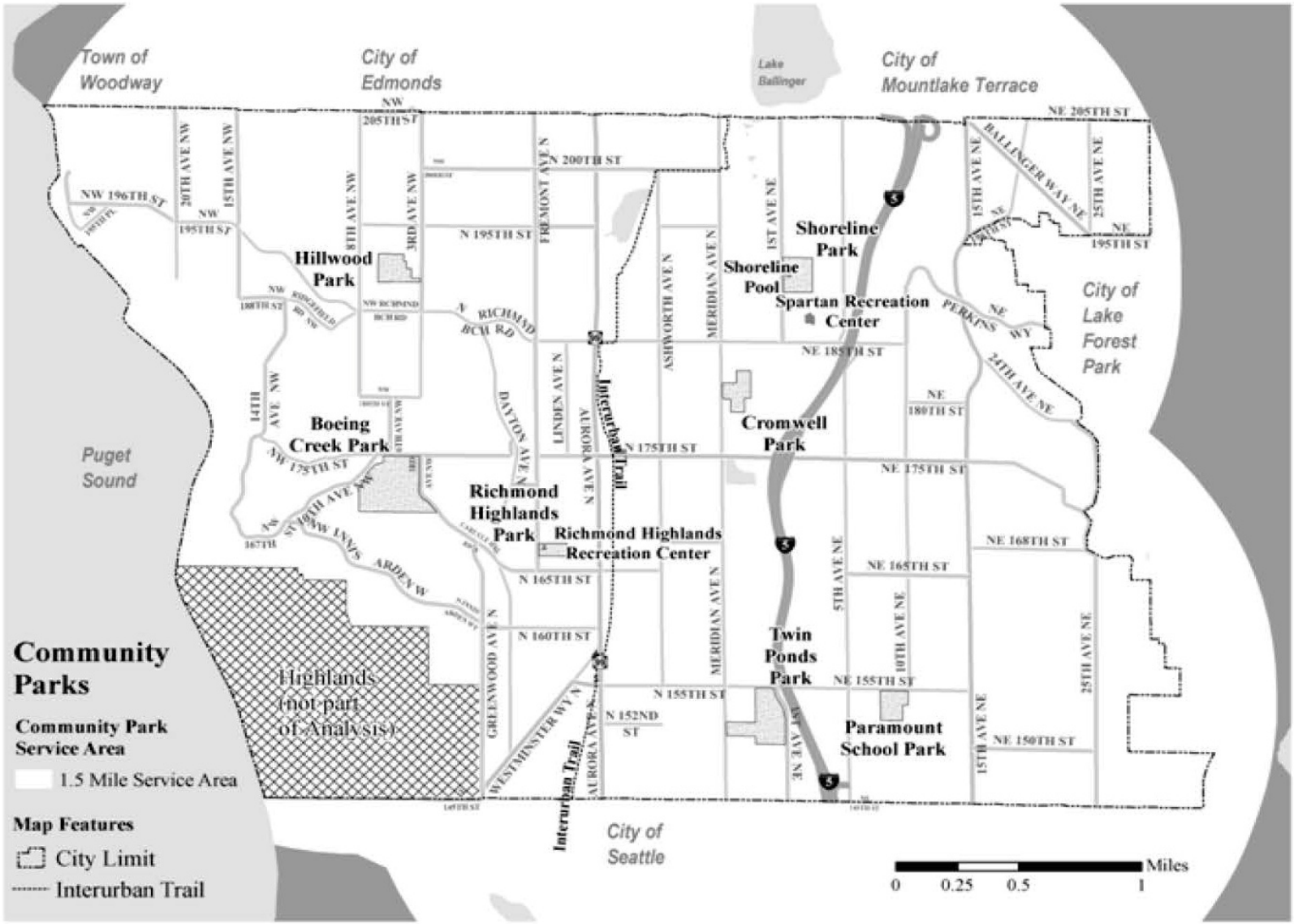


Figure 3.5-2 Community Park Service Area

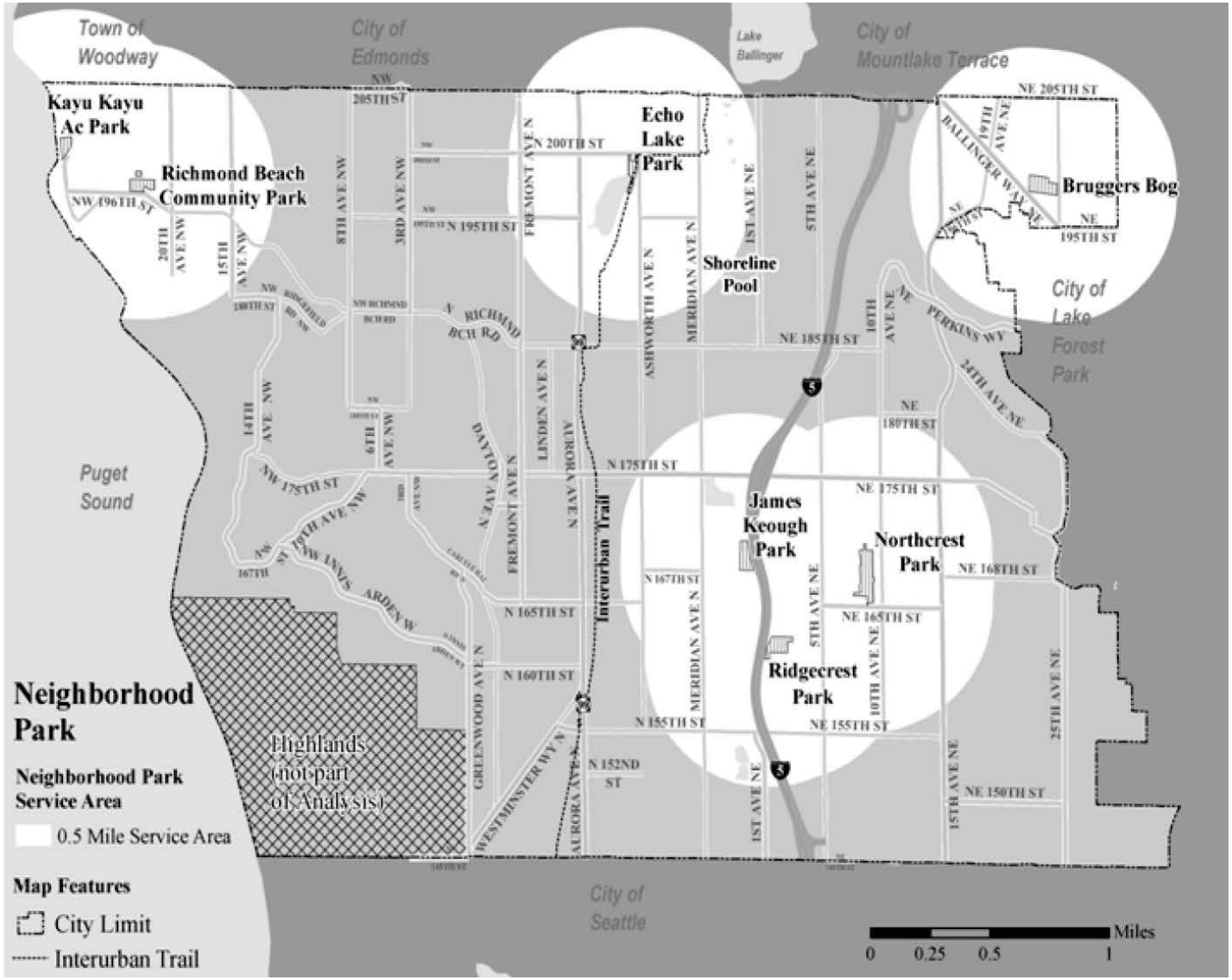


Figure 3.5-3 Neighborhood Park Service Area

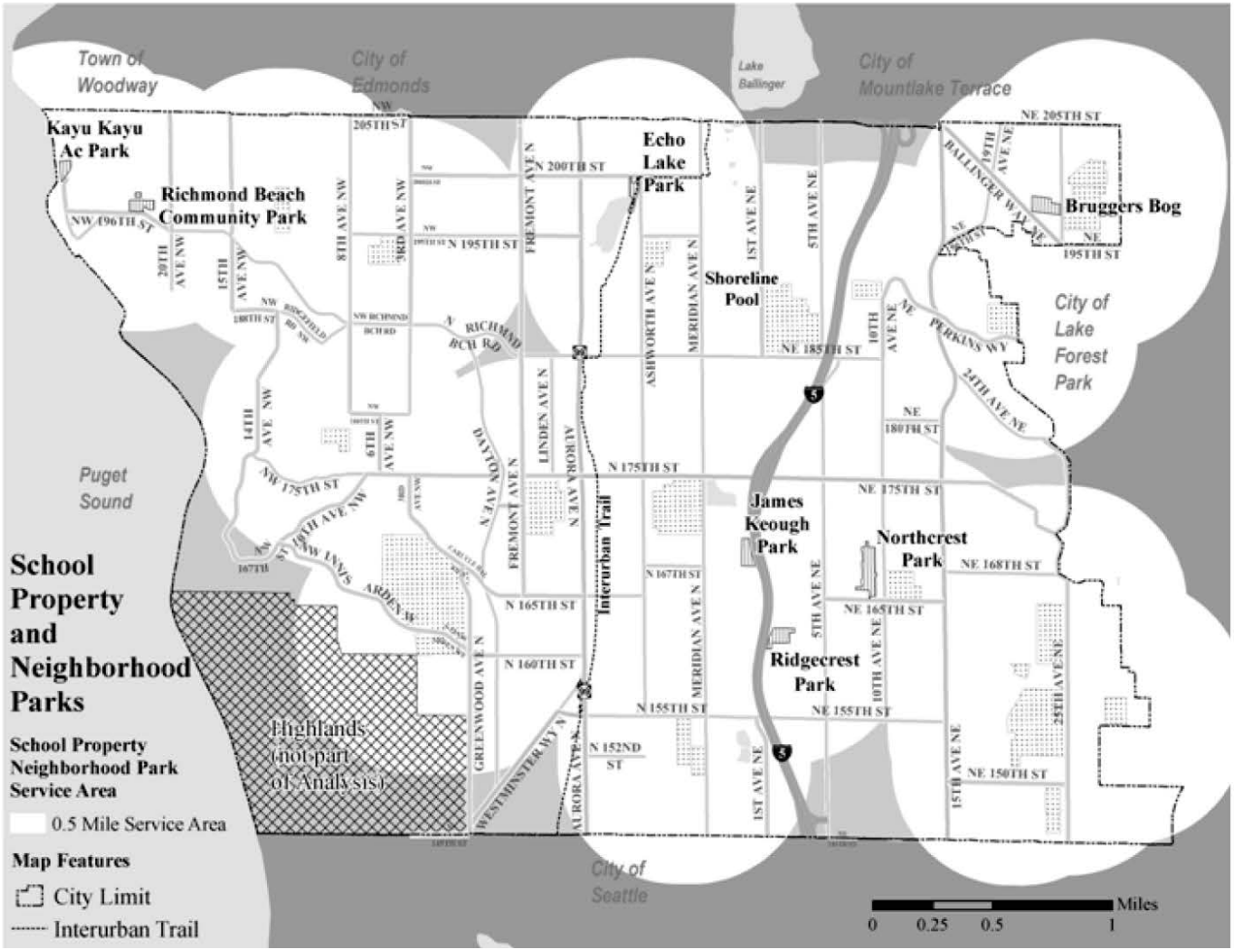


Figure 3.5-4 School District Amenities Service Area

The PROS Plan also identifies desired amenities as capital project ideas not necessarily associated with a specific site. Five major amenities were identified as partnership opportunities with other agencies, such as the Shoreline School District and others:

- Aquatic Facility
- Cultural Arts Center
- Environmental Learning Center
- Farmers Market (currently being hosted by a non-profit organization at City Hall on Saturdays, June through October)
- Trail Connectors

Other desired amenities identified in the PROS Plan include a variety of recreational facilities, such as:

- Basketball courts
- Barrier-free playground
- Community gardens
- Disc golf courses
- Signage (directional, entry, interpretive)
- Skate parks
- Spray parks
- Swings
- Freeride bike parks
- Off-leash dog areas
- Putt-putt golf course
- Pickleball courts
- Tennis courts
- Water trails
- Wi-Fi in parks

The PROS Plan provides twenty-year capital improvement recommendations focused on addressing the needs above. The scope of planned improvements to parks and recreation facilities ranges from master planning and conceptualization to design and implementation of improvements. Timing for these projects was categorized in the PROS Plan as short-term, mid-term, and long-term recommendations.

Open Space, Trees, Vegetation, and Habitat

Residents characterize Shoreline as a wooded community; this is often cited as a key reason for locating in the area. Large evergreen trees can be seen rising above residential neighborhoods, on hilltops, and even on the periphery of Aurora Avenue. As the city becomes more urbanized, it is a priority to maintain and enhance the tree canopy. In 2011 the City conducted a Urban Tree Canopy Assessment and in 2012, the City took steps to be recognized as a Tree City USA. The City has also developed Vegetation Management Plans for parks, and will track tree canopy over time to gauge the effect of policies related to tree retention and replacement.

Forested open space, wetlands, and native vegetation found on steep slopes and in open space areas are important resources that should be preserved. Trees help stabilize soils on steep slopes, and act as barriers to wind and sound. Plants replenish the soil with nutrients, generate oxygen, and clean pollutants from the air. Native vegetation provides habitat for wildlife. Wetlands and riparian vegetation provide surface water storage and help clean surface water of pollutants and sediment.
Aerial photos show that the community is a mosaic of various types of vegetation. The largest, most contiguous areas of native vegetation in Shoreline are primarily found in city parks, publicly owned open space, and privately owned open space areas. These areas include the highest quality wildlife habitat found in the city. However, areas of less intensive residential development also contain mature trees and other native vegetation, which provide secondary wildlife habitat and substantially contribute to the quality of life in Shoreline.

Lakes and wetlands also provide valuable habitat in Shoreline.

There are two lakes in proximity to the subarea: Echo Lake and Ronald Bog. Shoreline's lakes contain pollutants and contaminated runoff, including fertilizers and pesticides from lawns and gardens; oils, greases, and heavy metals from vehicles; and fecal coliform bacteria. The quality of the water in the lakes is a concern to many residents and City staff. Ronald Bog was historically dredged. As urban development has occurred, the process by which the nutrient level and vegetation in these lakes increases has accelerated. It is anticipated that Ronald Bog will eventually revert to a bog.

Wetlands perform valuable functions that include surface and flood water storage, water quality improvement, groundwater exchange, stream base flow augmentation, and biological habitat support. With the exception of the Puget Sound estuarine system, all wetlands in the city are palustrine systems (freshwater). The largest palustrine system is Echo Lake, located to the northwest of the subarea. Ronald Bog also is a large wetland.

Most wetlands in the city are relatively isolated systems and surrounded by development. Under the Shoreline Municipal Code, wetlands are designated using a tiered classification system (from Type I to Type IV) based on size, vegetative complexity, and the presence of threatened or endangered species. No wetlands in the city have received a Class I rating. All wetlands, regardless of size, are regulated under the Shoreline Municipal Code. When a development is proposed on a site with known or suspected wetlands, a wetland evaluation is required to verify and classify wetlands and delineate boundaries and buffer areas. The State Department of Ecology mandates minimum wetland buffer areas based on typology and other factors.

All of the documented wetlands within the city have experienced some level of disturbance as a result of development and human activity. Disturbances have included major alterations, such as wetland excavation, fill, or water impoundment. Some wetland areas occur within parks that receive constant use by people, impacting wetlands areas with human activity, such as trash and trampling of vegetation.

Habitat Protection

The process of urbanization can result in the conversion of wildlife habitat to other uses. The loss of certain types of habitat can have significant, adverse effects on the health of certain species. Fish and wildlife habitat conservation areas are those that are necessary for maintaining species within their natural geographic distribution so that isolated subpopulations are not created. Designated habitats are those areas associated with species that State or federal agencies have designated as endangered, threatened, sensitive, or candidate species. Currently in the Puget Sound, the bald eagle and Chinook salmon are listed as threatened species by the federal government under the Endangered Species Act.

Priority Habitat Areas— The Washington Department of Fish and Wildlife (WDFW) indicates bald eagle territory in the Richmond Beach and Point Wells areas, outside the subarea. WDFW maps and the City's stream inventory indicate the presence of Chinook salmon in portions of McAleer, Thornton, and Boeing Creeks, outside the subarea. Other sources have indicated the presence

of fish in other streams within the city, although the full extent of fish habitat has not been confirmed.

To help restore healthy salmon runs, local governments and the State must work proactively to address salmon habitat protection and restoration. WDFW has developed the Priority Habitats and Species (PHS) Program to help preserve the best and most important habitats, and provide for the life requirements of fish and wildlife. The City has developed mapping of PHS areas based on data provided by the WDFW and other mapping resources.

WDFW provides management recommendations for priority species and habitats that are intended to assist landowners, users, and managers in conducting land use activities in a manner that incorporates the needs of fish and wildlife. Management recommendations are developed through a comprehensive review and synthesis of the best scientific information available. The City has reviewed the PHS management recommendations developed by WDFW for species identified in Shoreline, and used them to guide the development of critical areas regulations that fit the existing conditions and limitations of Shoreline's relatively urbanized environment.

Refer to Figure 3.5-5 for a depiction of urban forest and priority habitat areas that the City has mapped in the vicinity of the subarea. Twin Ponds Park is the only designated priority habitat area in the subarea. Twin Ponds includes 6.4 acres of palustrine forested and palustrine emergent wetland area, according to information in the City's Comprehensive Plan. Stream, riparian, and upland habitats combine with the lower wetland areas to create a habitat mosaic providing habitat for a diverse community of wildlife including river otter, great blue heron, turtles, and various species of hawks. Dominant trees and vegetation include red alder, willow, cedar, cottonwood, red-osier dogwood, and salmonberry. Invasive vegetations such as Himalayan blackberry and morning glory are also found in the area. Emergent areas are dominated by cattail, skunk cabbage, and water parsley.

Urban forest areas are shown in green in Figure 3.5-5 and include Twin Ponds Park, as well as Paramount Open Space, South Woods Park, Hamlin Park, sloped topographic areas, and other locations in the vicinity of the subarea.

The City also has mapped steep slopes (areas above 40 percent sloping terrain). This mapping can be viewed in the Natural Areas supplemental information of the 2012 Comprehensive Plan.

Critical Areas Ordinance— The City of Shoreline has an adopted Critical Areas Ordinance and correlating Code requirements (Chapter 20.80). The ordinance specifies regulations related to habitat protection. For example Section 20.80.300 describes mitigation performance standards and requirements, as follows:

A. Relevant performance standards for other critical areas (such as wetlands and streams) that may be located within the fish and wildlife habitat conservation area, as determined by the City, shall be incorporated into mitigation plans.

B. The following additional mitigation measures shall be reflected in fish and wildlife habitat conservation area mitigation planning:

    1. The maintenance and protection of habitat values shall be considered a priority in site planning and design.

2. Buildings and structures shall be located in a manner that preserves and minimizes adverse impacts to important habitat areas. This may include clustering buildings and locating fences outside of habitat areas.

3. Retained habitat shall be integrated into open space and landscaping.

4. Where possible, habitat and vegetated open space shall be consolidated in contiguous blocks.

5. Habitat shall be located contiguous to other habitat areas, open space or landscaped areas both on and offsite to contribute to a continuous system or corridor that provides connections to adjacent habitat areas.

6. Native species shall be used in any landscaping of disturbed or undeveloped areas and in any enhancement of habitat or buffers.

7. The heterogeneity and structural diversity of vegetation shall be emphasized in landscaping.

8. Significant trees, preferably in groups, shall be preserved, consistent with the requirements of Chapter 20.50 SMC, Subchapter 5, Tree Conservation, Land Clearing and Site Grading, and with the objectives found in these standards. (Ord. 398 § 1, 2006; Ord. 238 Ch. VIII § 4(E), 2000).

Department of Ecology Surface Water Management Regulations—The Department of Ecology (DOE) requires surface water management compliance of development projects. DOE regulations list preservation of native trees, vegetation, and undisturbed ground, along with other tools and best practices, as effective methods for managing surface water runoff and enhancing water quality. More information about DOE regulations is provided in Section 3.4 of this FEIS.

Figure 3.5-5 Urban Forest and Priority Habitat Area (Twin Ponds Park) Mapped in the Vicinity of the Subarea

3.5.2 Analysis of Potential Impacts

The estimated demand for parks and recreation facilities under the alternatives is analyzed below. **Table 3.5-1** provides a summary of the estimated demand for parks under the alternatives.

Alternative 1—No-Action Alternative

Under Alternative 1—No Action, the 2035 subarea population growth would place greater demands on the areas park, recreation, and open spaces. The population of the subarea is anticipated to increase to 11,040 by 2035 under the No Action Alternative. This compares to a current population of 8,321 people, indicating an estimated population growth of 2,719 people without any changes to zoning.

Today there are 3,467 households in the subarea and this would increase to 4,600 by 2035 under the No Action Alternative, increasing the number of households by 1,133. There would also be a total of 2,325 employees in the subarea, 730 more than currently exist, and these workers also may have a need for parks and recreation facilities during lunch breaks and before and after the work day.

It is anticipated that the current level of park, recreation, and open spaces in the subarea would be sufficient to support the projected growth under Alternative 1—No Action, with implementation of the improvements in the PROS Plan, including neighborhood park enhancements at Paramount School Park, Paramount Open Space and South Woods.

In reviewing the locations of neighborhood parks in proximity to the subarea, it appears that there is a baseline demand for at least one neighborhood park to serve the subarea; however, this demand is mostly addressed by existing school facilities in the area and could be more fully addressed with planned improvements in the PROS Plan for the subarea.

The Next Twenty Years (Up to 2035) Under Either of the Action Alternatives

Under either of the two action alternatives, the projected total population of residents in the subarea would be 11,207 to 13,635 (assuming a 1.5 to 2.5 percent average annual growth rate) by 2035. There would be an estimated 4,670 to 5,681 total households and 2,148 to 2,614 total employees in the subarea by 2035. This is 2,886 to 5,314 new residents (as well as 1,203 to 2,214 new households and 553 to 1,019 new employees) above current levels in the subarea.

The projected 2035 population level would equate to demand for approximately one new neighborhood park in place by the end of the twenty-year horizon of 2035, if not before under either of the two action alternatives.

When considering the specific type of facilities the increased population would need under the action alternatives, it is important to consider a number of factors, including community involvement, availability of the different classifications of parks and open space, and level of service standards. Community involvement during the subarea planning process has confirmed that residents are interested in ensuring that neighborhood parks and other facilities (playgrounds, public gathering spaces, teen centers, etc.) are available to serve new residents as they move

to the area in the future. They are also interested in public art, enhanced streetscapes, and other amenities.

While there appear to be adequate regional and community parks in Shoreline to serve future growth, neighborhood parks will be needed in the subarea as the population increases. The PROS Plan analyzes the target level of service (LOS) for neighborhood parks, through an amenities-driven approach. Refer to pages 4-19 and 4-20 of the PROS Plan for more information.

Neighborhood parks can vary in size. The PROS Plan defines the size of neighborhood parks as being less than 10 acres. The City prefers that these parks be at least three acres in size, but recognizes that neighborhood parks smaller than three acres can sometimes serve special purposes.

Based on traditional National Park and Recreation Association (NPRA) standards, it is advisable to have a neighborhood park serving a half-mile area with population of up to 5,000 people. However, it should be noted that these standards are used with discretion in determining park needs, because every community is different and may have various types of recreation facilities that meet the demand even if they do not have the acreage.

With consideration of the NPRA standard, the number of new residents in the subarea under the action alternatives, and assuming that some existing facilities in the subarea and in surrounding areas are currently meeting neighborhood park needs, there likely would be an additional demand for one new neighborhood park in twenty years (by 2035) and additional neighborhood parks at build-out (see discussion below) Some of this demand could continue to be served by neighborhood school facilities as well as neighborhood parks in areas bordering the subarea. Most of the demand would need to be met by new parks, recreation, and open space facilities. Neighborhood parks potentially could be integrated into the redevelopment of large parcels and by adding property to existing parks and open space areas.

The City of Shoreline's amenities-driven approach to meeting the LOS neighborhood parks includes inclusion of larger community and urban park development with neighborhood park amenities and school property to meet need. Playfields, play equipment, recreation courts, and other facilities at schools are important to meeting the LOS. In the future, the use of schools sites such as Paramount School Park might change. The School District may need to use the site for school/educational purposes again with growth in the subarea. If this occurs, it will be important to coordinate with the School District to continue to provide public access to the school site and facilities to serve the neighborhood's needs.

It is envisioned that with redevelopment of the subarea, implementation of urban plazas, pocket parks, playgrounds, trail corridors, and other open space also could serve some of the demand for neighborhood park space.

It is important to remember that the other level of service standard referenced is for neighborhood parks to serve an area within one-half mile. As such, parks could be developed at the periphery of the subarea in the future that would serve residents' needs. If other types of parks, recreation, and open space facilities are provided as part of redevelopment, the level of service could be sufficient for an urban neighborhood. This assumes that existing neighborhood parks in areas near the subarea would be able to serve some of the growing population. In some cases, these existing neighborhood parks may need new facilities such as play equipment or other elements to improve their recreation capacity for use by the surrounding residents.

Smaller (one-half acre or less) dispersed urban park, open space and plazas which act as public gathering spaces, , could also help to serve the demand in the subarea if incorporated into redevelopment projects.

The required updates to the PROS Plan (every six years) create a way for the City to continue to monitor the need for parks as the neighborhood grows, and to seek funding to maintain and acquire property, and develop new neighborhood park facilities in the subarea to serve the growing population's needs. One of the important objectives of developing a subarea plan is to identify these key areas of need, so that the City and its partners can begin to proactively plan to serve these in the near term. Recognizing that future property values would likely increase in the subarea , it may be advantageous to seek property for parks and open space use in the near term. This would require examination of potential funding options, such as dedications, grants, bond levies, or other means. The current capital budget does not including funding for any near term acquisition.

Priority habitat areas such as at Twin Ponds Park are protected by local, state, and federal regulations. Areas of urban forest are more vulnerable to potential impacts associated with redevelopment in the subarea. The City's adopted critical areas ordinance calls for preservation of groups of mature trees, planting of native landscaping, and other provisions. DOE regulations related to surface water management also recognize preservation of natural areas as a best practice. Redevelopment projects in the subarea will be required to comply with these regulations as applicable.

Demand for Other Human Services/Community Support Facilities

Under either of the action alternatives, the growing population of the subarea also will generate demand for a wide range of other human services and community support facilities, such as community center facilities, community meeting and classroom facilities, recreation center facilities, etc. Refer to the previous Schools analysis in this section for more information.

Alternative 2 – Connecting Corridors at Build-Out

It is estimated that implementation of Alternative 2—Connecting Corridors would result a total population of 34,643 with 14,435 total households at full build-out. This growth level would not be expected to be reached for 60 to 94 years or more (by 2075-2109 or beyond). Alternative 2 would also result in a population of approximately 11,747 employees at build-out, who may have a need for parks and recreation facilities at some point during the

day or evening (although there likely would be some overlap between residents/employees living and working in the subarea).

The projected population under Alternative 2 would create a baseline demand for approximately six to seven total neighborhood parks in the subarea. (This would be approximately two to four new neighborhood parks given existing parks in the subarea.) This assumes that school facilities would continue to serve part of the demand, and given the lack of available land and space for new neighborhood parks, some of the demand potentially could be served by smaller neighborhood parks (at least 3 acres in size) and dispersed urban park, open space and plaza/public gathering spaces created as part of redevelopment sites or by adding or enhancing park amenities within existing parks and by expanding park and open spaces (adding adjacent property through acquisition or dedication by willing sellers/donors.

Alternative 3—Compact Community

Under the Alternative 3—Compact Community, the total population would be expected to rise to 36,647 people living in 15,270 households and 9,639 employees in the subarea. This growth level would not be expected to be reached for 63 to 98 years or more (by 2078-2113 or beyond).

Similarly to Alternative 2, the projected population under Alternative 3 would create a baseline demand for approximately six to seven total neighborhood parks in the subarea. (This would be approximately two to four new neighborhood parks given existing parks in the subarea.) As mentioned previously, it is assumed school facilities would continue to serve part of the demand, and given the lack of available land and space for new neighborhood parks, some of the demand potentially could be served by smaller-sized neighborhood parks and dispersed mini-parks, and urban plazas/public gathering spaces created as part of redevelopment sites. Adding to/enhancing amenities within existing parks and expanding existing parks and open spaces through dedications or acquisition (by willing donors/sellers) can also help to address the demand for parks and recreation.

Table 3.5-1
Estimated Demand for Parks

Time Frame	Alt. 3 Compact Community	Alt. 2 Connecting Corridors	Alt. 1 No Action
Twenty Years/ 2035	One New Neighborhood Park	One New Neighborhood Park	Improvements Implemented from the PROS Plan
Build-Out	Two to Four New Neighborhood Parks or a Combination of Facilities to Meet the Demand	Two to Four New Neighborhood Parks or a Combination of Facilities to Meet the Demand	Not Analyzed

3.5.3 Mitigation Measures

A number of park-related projects are currently in the PROS Plan recommendations list and the City's Capital Improvements Plan. The PROS Plan has short-term, mid-term, and long-term

recommendations along with community goals during the current planning period. In the future, these recommendations will be reviewed annually and appropriately considered during budgeting of the Capital Improvement Plan.

The PROS Plan likely will receive updates in 2017, 2023 and 2029. At those times, the City will reassess the demands and needs and may modify recommendations based on budgeting, available funding, or environmental changes. With those updates, the City should carefully evaluate the level of recent and pending changes in the station subarea and make recommendations for additional park, recreation, and open space facilities accordingly.

In addition to these activities that will help to ensure adequate parks, recreation, and cultural services are provided to the growing subarea, the following mitigation measures would be applicable to the two action alternatives: Alternative 2—Connecting Corridors and Alternative 3—Compact Community.

- The proposed subarea plan policies related to parks, recreation, and open space should be adopted to support the development of needed facilities for future residents in the subarea. The policies call for:
  - Considering potential acquisition of sites that are ill-suited for redevelopment due to high water table or other site specific challenges for new public open space or stormwater function. Where feasible, acquire land adjacent to existing parks and open spaces.
  - Explore a park impact fee or fee in-lieu of dedication program for acquisition and maintenance of new parks or open space and additional improvements to existing parks. Funds from this program would allow the City to purchase property and develop parks, recreation, and open space facilities over time to serve the growing neighborhood.
- Proposed development regulations for the light rail station area should be adopted to require and/or encourage the provision of public space and recreation facilities with redevelopment projects, as part of Development Agreements (Chapter 20.30.355) and site design (Chapter 20.50.240). New developments should be required to provide some level of park and open space use for residents, and the City should continually evaluate the best possible locations for creating new neighborhood parks as the subarea grows.
- Explore options for the next update to the PROS Plan to include strategies to address the projected population growth by exploring ways to increase land around adjacent parks, set standards for size and park development for new parks in the subarea and identify needed park and recreation facilities/amenities for future development negotiations.
- The City would continue to monitor parks, recreation, and open space needs in the subarea and update the PROS plan in the future to address these needs.
- City policies and Code regulations related to natural areas and critical areas will be required of redevelopment projects in the subarea as applicable.

The Green Network

Implementation of a green network of trails, sidewalks, bike lanes and other facilities in green streets, parks, and open spaces is envisioned for the subarea under either of the two action alternatives. The green network would be implemented over time as redevelopment occurs in the subarea. The network would also include stream corridors, wetlands, and other natural areas.

Improvements in the green network would enhance bicycle and pedestrian accessibility and safety and provide connectivity to and from the light rail station, as well as between homes, parks, school, and other community destinations in the subarea.

With stormwater management, green infrastructure/low impact development systems, stream corridor enhancement, and protection of wildlife habitat, the green network would provide a variety of environmental benefits.

The map on the next page, **Figure 3.5-6** illustrates a conceptual vision for the green network, and photos on page 3-190 show elements envisioned for the network.

3.5.4 Significant Unavoidable Adverse Impacts

Under any of the alternatives, there would be an increased in demand for parks, recreation, and open space areas in the subarea. Population growth over the next twenty years under either action alternative would require development of at least one new neighborhood park, compared to the No Action Alternative, which likely could be served by existing facilities (with improvements recommended in the PROS Plan). At full build-out the demand for parks would be substantially higher under Alternatives 2 or 3 than under Alternative 1.

As changes in population occur throughout the city, the PROS Plan and the Capital Improvement Program should be updated to adjust priorities and support accommodation of the needs in the station subarea. The City also will be exploring a potential park impact fee program and/or dedication program. New redevelopment projects will be required to provide public open space and recreation amenities.

Anticipated increases in population would be expected to be manageable since they would occur over several decades. The City would have the ability to monitor growth over time and plan, prepare for, and secure resources to increase the level of parks, open space, and recreation facilities to serve the population as needed. Ongoing monitoring of opportunities to create neighborhood parks and facilities in the subarea will be critical.

Existing policies and regulations of the City of Shoreline and State of Washington, as well as those of the federal government protect wetlands, streams, and high priority habitat areas, such as Twin Ponds Park. Site development regulations administered through the City, which apply Washington State DOE stormwater requirements strictly mandate practices to preserve habitat, wildlife, and fish related to changes in water quality and quantity. The City's Critical Areas Ordinance protects stream corridors, wetlands, and their buffer areas.

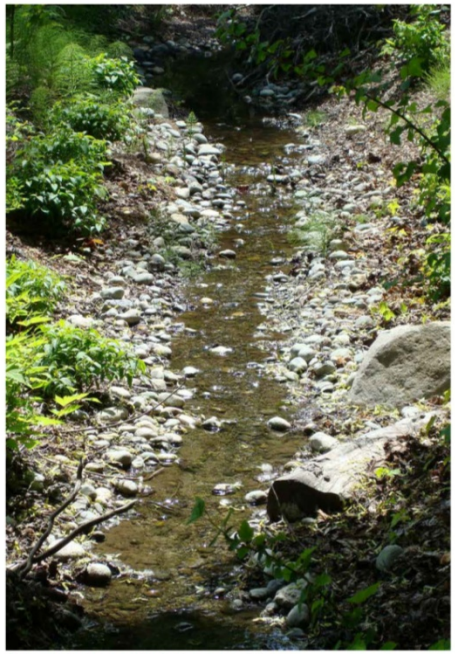
Given all of these considerations, no significant unavoidable adverse impacts would be expected to parks, recreation, open space, and sensitive natural areas and resources.

Figure 3.5-6 The Green Network Concept Map

Green streets with pedestrian sidewalks and bike ways

Protected wetlands and wildlife habitat

Preservation of existing trees to be encouraged



Enhanced water quality in stream corridors

Envisioned Green Network Elements

3.6 Schools, Police, Fire, and Other Public Services

This section describes the affected environment, analyzes potential impacts, and provides recommendations for mitigation measures for public school services and facilities, police, fire and emergency services, solid waste management, and other public services and facilities. Schools in the vicinity of the subarea are depicted in **Figure 3.6-1**.

This section is organized slightly differently from other sections in this chapter for better flow and readability of the subject matter. Affected Environment, Analysis of Potential Impacts, and Mitigation Measures are discussed under each public service topic area.

3.6.1 Public School Services and Facilities

Affected Environment

Shoreline Public School District Number 412 provides kindergarten through twelfth grade (K-12) public education services for the cities of Shoreline and Lake Forest Park. The school district is known as one of the best in the region, and as such, these communities are known for having good schools and being desirable places to live for families with school children. Goals in Shoreline's Comprehensive Plan highlight the community's commitment to continue to support exceptional schools and opportunities for lifelong learning, as well as to strengthen partnerships with schools and volunteers.

The school district encompasses a sixteen square mile area, bounded by Puget Sound on the west, Lake Washington to the east, the Seattle city limits to the south of 145th Street, and the King/Snohomish County line to the north. The school district operates sixteen public schools, a transportation center, and the Shoreline Center. A few of these facilities are located in proximity to the subarea (either located within the subarea boundaries or within less than a mile of these boundaries). Residents of Shoreline are served by all district schools, except Brookside Elementary School and Lake Forest Park Elementary School.

The school district operates seven elementary schools, two middle schools, two high schools, the Shoreline Center (see more detail, next page), a public preschool facility, and two additional surplus properties located within the city. In addition to these facilities, the school district maintains a transportation center (also known as the bus barn) located adjacent to the Ridgecrest Elementary School site, and a warehouse with a central kitchen located adjacent to Hamlin Park, just northeast of the study area. The schools that serve the subarea, as well as the overall district are discussed later in this section.

Public Schools

Public school facilities are listed in **Table 3.6-1.** It should be noted that while this environmental analysis focuses on public services and facilities, there are several private schools located in Shoreline that also provide education services to the population.

The currently mapped school attendance areas directly affected by the subarea are Parkwood, Briarcrest, and Ridgecrest. Parkwood Elementary, Briarcrest Elementary, and Ridgecrest

Elementary are the designated elementary schools for the subarea. Attendance at middle schools and high schools is determined by where the student resides (either east or west of Interstate 5). Students in the subarea east of Interstate 5 currently attend Kellogg Middle School and Shorecrest High School. Students in the subarea west of Interstate 5 currently attend Einstein Middle School and Shorewood High School.

For the 2012-2013 school year, district enrollment was counted at 8,714 students. Given that there are an estimated 26,600 households in the district (combining households in Shoreline and Lake Forest Park), the estimated ratio of students per household is .33 students/household. It should also be noted that of the total enrollment in schools, approximately 81 percent are generated by Shoreline households and 19 percent by Lake Forest Park households. **Table 3.6-2** shows the approximate breakdown of enrollment per high school, middle school, and elementary school.

Recently Improved and Planned School District Facilities

The school district substantially renovated its two high schools, Shorecrest and Shorewood, between 2011 and 2014 to meet standards of the Washington Sustainable Schools Protocol. In February of 2014, a special election approved replacement levies for educational programs, maintenance, and operations, and capital for technology improvements and support.

The programs, maintenance, and operations levy provides the district with approximately 26 percent of its general fund operating revenue. It pays for the basic education programs not supported by state and federal funding, including nurses, family advocates, librarians, and instructional materials. It helps support special education, highly capable, remedial and vocational education programs, building maintenance and utilities, and transportation. Funds are also used to support extra-curricular student activities, including music, drama, and athletics.

The technology improvements and support levy is used to meet the district's ongoing technology needs for capital improvements. This includes student computers and expanded online curriculum for classroom use, instructional specialists, equipment upgrade and replacement (including lab and library computers, printers, classroom audio-visual equipment), professional development and training, server and network replacements and upgrades, administrative software systems, online and subscription resources, and virus and firewall protection.

In 2012, the school district concluded a three-year bond for construction projects. Those improvements included construction of the new Shorewood High School and Shorecrest High School, mechanical system, field and site upgrades, fire and security upgrades, traffic improvements, electronic and communications improvements, upgrades to finishes, and central kitchen upgrades.

The district anticipates that replacement levies would allow for continued stability of school tax collections for the next four years. The proposed levy amounts are unchanged from the expiring 2010 Capital Levy for Technology Improvements and Support.

In recent years, a number of elementary school sites have been converted to other uses (Aldercrest Annex and Cedarbrook, North City, and Sunset elementary school sites). The school district

intends to retain these properties in case they are needed for future school use. Although the school district currently has no plans for building new schools, it is recognized that additional schools and facilities may be needed in the future to serve growth in the subarea.

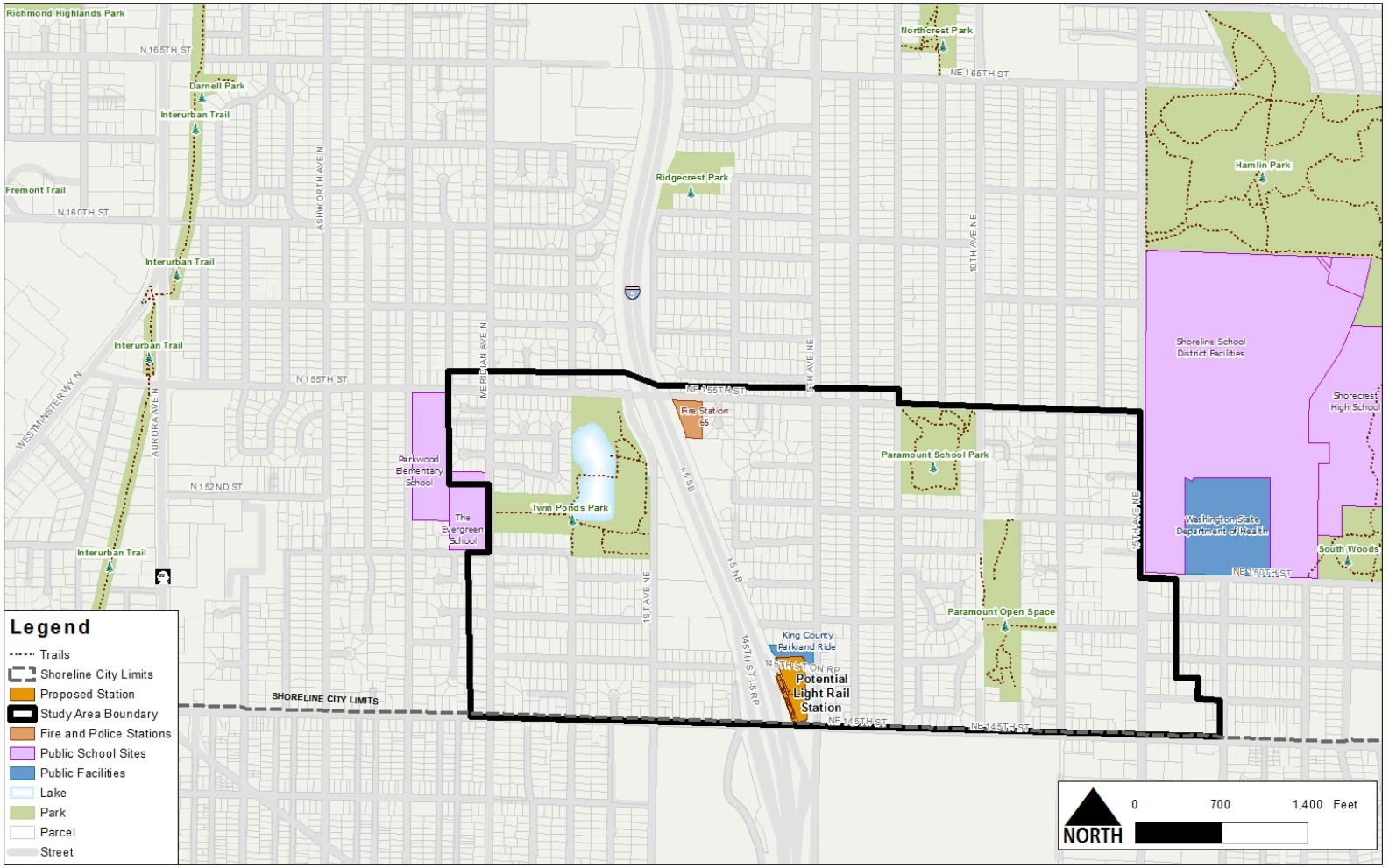


Figure 3.6-1 Public and Community Facilities in the Vicinity of the Subarea

Table 3.6-1
Public Schools and School District Facilities

	School Name	Grades Served	2013 Enrollment	Location
Preschool/Daycare Centers[1]				
	Shoreline Children's Center	N/A		1900 N 170th Street
	School Name	**Grades Served**	**2013 Enrollment**	**Location**
Elementary Schools				
	Echo Lake Elementary	K-6	481	19345 Wallingford Avenue N
	Meridian Park Elementary	K-6	450	17077 Meridian Avenue N
	Ridgecrest Elementary	K-6	475	16516 10th Avenue NE
	Briarcrest Elementary	K-6	715	2715 NE 158th Street
	Brookside Elementary	K-6	513	17447 37th Avenue NE
	Highland Terrace Elementary	K-6	433	100 N 160th Street
	Parkwood Elementary*	K-6	444	1815 N 155th Street
	Syre Elementary	K-6	523	19545 12th Avenue NW
Middle Schools				
	Einstein Middle School	7-8	700	19343 3rd Avenue NW
	Kellogg Middle School*	7-8	625	16045 25th Avenue NE
High Schools				
	Shorecrest High School*	9-12	1,500	15343 25th Avenue NE
	Shorewood High School	9-12	1,600	17300 Fremont Avenue N

Table 3.6-1
Public Schools and School District Facilities,
Continued

Other Facilities

Cascade (Alternative Learning Choice School)	K-8	145	17077 Meridian Avenue N.
The Shoreline Center			18560 1st Avenue NE
Home Education Exchange			816 NE 190th Street
Transportation Center			124 NE 165th Street
Warehouse and Central Kitchen			2003 NE 160th Street

Notes:

* These facilities are located in proximity to the subarea (either within or nearby) and serve existing subarea residents.

1 This school is publicly operated by the Shoreline School District. There are several additional privately operated preschools and daycare centers within and in proximity to the subarea including the North City/Shoreline Cooperative Preschool, which is located in the subarea.

Table 3.6-2
Enrollment by School Level—Shoreline School District
(2012-2013 School Year)

School Level	Number of Students	Percentage of Total
Elementary School	4,289	49.22%
Middle School	1,325	15.21%
High School	3,100	35.57%
Total Number of Students	**8,714**	**100%**

Analysis of Potential Impacts

Regardless of growth alternatives analyzed, school enrollment trends are affected by a variety of factors, including population growth, housing availability, economic conditions, and prevailing birth rates. However, it is generally accepted that growth in population equates to a greater demand for educational services.

While most of this demand would be for public school services provided by Shoreline School District, not all the projected students would attend public schools; some would attend private schools or may be home-schooled. In addition to increased student enrollment, population increases would create a higher demand for other types of public school services, such as preschool and extracurricular activities.

It is also important to consider the potential influence of anticipated housing types on school enrollment projections. There would be a greater diversity of housing types in the station subarea, including a variety of multi-family and single family attached residences. Traditionally, families with higher ratios of students per household have tended to live in single family residences in the region. However, this trend has been changing in recent years, with more fluctuation in household sizes. More people are choosing to live in smaller-sized residences including multi-family homes. At the same time, household sizes overall in the US have seen a decline over the last ten years.

The factor of .33 students per household being applied in the subarea in this DEIS analysis represents an overall average for all households in Shoreline. While this factor could potentially be less in the subarea with future build-out given the trends described above, it is being applied to this analysis to plan for the greatest potential. Since Shoreline is a desirable community for families and the school district, the community could tend to attract more families as a result of providing new and varied housing opportunities.

Alternative 1 - No-Action

Under Alternative 1—No Action, there would be no changes to zoning, but ongoing population growth and new housing construction in the subarea would place additional demands on school services and facilities. The population of the subarea would be anticipated to increase to 11,040 by 2035 under the No Action Alternative. This compares to a current population of 8,321 people, indicating a population growth of 2,719 people without any changes to zoning. Today there are 3,467 households in the subarea, and these would increase to 4,600 by 2035 under the No Action Alternative, increasing the number of households by 1,133. For Alternative 1, it is estimated that of 374 new students generated over the period from 2014 to 2035, there would be:

- 184 elementary school students
- 57 middle school students
- 133 high school students.

In comparing these projected levels to current enrollment levels in existing schools as a portion of the total enrollment generated citywide and by Lake Forest Park households, it would appear that these students could be accommodated within the existing school facilities; however, it should be noted that the School District is continually monitoring facilities needs and provision of the ongoing level of service is contingent upon funding levels keeping pace with growth.

The Next Twenty Years (Up to 2035) Under Either Action Alternative

Under either of the two action alternatives, there would be an increased demand for schools and school facilities over the next twenty years. It is estimated that there would be the following total student populations in the subarea per school level:

- 770 to 946 elementary students
- 238 to 292 middle school students
- 556 to 684 high school students

The Shoreline School District will review these numbers as part of their ongoing planning for school facilities and begin to determine how to address the population growth in the coming years.

Alternative 2 – Connecting Corridors

Under the Alternative 2—Connecting Corridors, population and housing growth would place increased demands on the school district, creating the need for additional facilities and employees. This increased demand would be higher than under Alternative 1, but less than Alternative 3. The total population would be expected to increase to 34,643 people living in 14,435 households under Alternative 2—Connecting Corridors. This is 26,322 more people and 10,968 more households than under today's levels. Using the .33 students/household factor, approximately 3,619 students would be generated by the anticipated growth. Applying the proportional factors per school level based on today's demographics, this would equate to the following estimated student population:

- 1,781 elementary school students
- 550 middle school students
- 1,287 high school students.

In addition to increased student enrollment, Alternative 2 would create a higher demand for other types of public school services, such as preschool and extracurricular activities than under Alternative 1 and similar to Alternative 3.

Full build-out under Alternative 2 would occur gradually over many decades and would not be expected to be reached for 60 to 94 years or more (by 2075 to 2109 or beyond). This estimated pace of growth is based on market factors, property characteristics, and current population growth trends in Shoreline and the region.

The projected student populations at the elementary, middle, and high school levels due to increased population in the subarea under Alternative 2—Connecting Corridors at full build-out would require the need for additional schools and supporting facilities, as well as staff, facility, and ancillary services related to education. Because projected build-out would be expected to occur slowly, over the course of many decades, the School District would be able to monitor growth, plan for, and procure resources for additional facilities and services based on growth trends over the course of many years.

Alternative 3—Compact Community

Under the Alternative 3—Compact Community, the total population would be expected to rise to 36,647 people living in 15,270 households under Alternative 3—Compact Community. This is 28,326 more people and 11,803 more households than under today's levels.

Using a factor of .33 students per household based on current enrollment in the district, approximately 5,039 students would be

generated by the anticipated growth. While it is not known exactly how this student population would be assigned to various levels in the school system, based on the breakdown in current enrollment (Table 3.6-2), assumptions can be made as to the proportion of potential students per school level. This is an estimation only, as future demographics may be different from current demographics.

Applying the proportional factors per school level based on today's demographics, this would equate the following student population at build-out (based on current attendance at each school level):

- 2,480 elementary school students
- 766 middle school students
- 1,792 high school students.

In addition to increased student enrollment, Alternative 3 would create a higher demand for other types of public school services, such as preschool and extracurricular activities, than under the other alternatives. Full build-out under Alternative 3 would not be anticipated to occur by 2035. Based on market factors, property characteristics, and current population growth trends in Shoreline and the region, this level of growth would be anticipated to occur over many decades, not reaching build-out levels for 63 to 98 years or more (or by 2078 to 2113 and beyond).

The projected student populations at the elementary, middle, and high school levels due to increased population in the subarea under Alternative 3—Compact Community would require the need for additional schools and supporting facilities, as well as staff, facility, and ancillary services related to education. Because projected build-out would be expected to occur slowly, over the course of many decades, the School District would be able to monitor growth, plan for, and procure resources for additional facilities and services based on growth trends over the course of many years.

Mitigation Measures

Background Considerations

In February 2014, two replacement levies were approved to extend financial support for educational programs, maintenance and operations, and technology improvements. These levies would need to be renewed in the future in order for the district to continue to provide a level of service consistent with current conditions. The voting population has been supportive of school district levies, and it is anticipated (but not certain) that as more households with students move into the district, voters would continue to be supportive of future levies.

Mitigation measures that would address the potential impacts described above follow.

- The school district will continue to monitor growth levels within its service area, including the station subarea and document trends in student enrollment in order to plan, prepare, and secure resources for the addition of facilities and services to support the growth.

- The school district retains properties for future uses that may be needed. The school district facility west of Shorecrest High school currently being used as a warehouse and central kitchen should be retained for future potential school use to serve the growth projected for the subarea.

- For classroom expansion needed on an ongoing basis, the school district owns several portables for siting at impacted schools. If necessary, the school district could purchase or lease more, although this is not a preferred long-term operation scenario.

- The district also has the ability to alter or shift special program assignments to available space to free up space for core programs: gifted programs, special education, arts, activities, and others.

- Boundary adjustments could occur to reallocate the area from which individual schools draw attendance. As completed recently with the high schools, expansion of affected schools, if feasible, without eliminating required playfields or parking, could be a planned improvement to accommodate increases in demand.

- The City of Shoreline does not currently charge impact fees to new development applications for school facilities. The City should coordinate with the Shoreline School District to monitor and determine the potential need for an impact fee program over time. For example, King County charges school impact fees to development projects in unincorporated areas. Impact fees are adopted annually by ordinance following a thorough review by the School Technical Review Committee and the King County Council of the each district's capital facility plan and enrollment projections. Fees vary per school district and are assessed and collected for every new residential dwelling unit. Low-income housing, senior housing, and community residential facilities are exempt from the fee program.

Significant Unavoidable Adverse Impacts

Under either of the action alternatives, population growth and increased numbers of households would create additional demand for public school services and facilities. The anticipated increases in student population would be expected to manageable since they would occur over several decades. The School District would have the ability to monitor growth in enrollment over time and plan, prepare for, and secure resources to increase the level of services and facilities to serve additional students as needed. Advancements in technology, educational programs, and teaching methods may also play a factor in accommodating the anticipated increases in demand on the public school system.

3.6.2 Police, Fire, and Emergency Services

Shoreline is known region-wide for the effectiveness of its police force and for programs that encourage troubled people to pursue positive activities, and provide alternative treatment for non-violent and non-habitual offenders. Police protection in the subarea is provided by the Shoreline Police Department, King County Sheriff's Office, and Washington State Patrol. The Shoreline Fire Department provides fire protection and emergency medical services to the City of Shoreline. Servicing the community with fire suppression, prevention techniques, public outreach, and plan review and inspection services, they are committed to improving life safety and protection in Shoreline.

Affected Environment

Police Protection

The Police Station was built in 1956 and purchased by the City shortly after incorporation in 1995. The Station is located in the subarea at 1206 N 185th Street. The building is 5,481 square feet, and is constructed of unreinforced masonry that has not been retrofitted to earthquake standards. In 2012, the City initiated a feasibility study to analyze potential locations of a new facility. This need was identified during the City's 2009 Hazard Mitigation Planning effort.

As of 2014, there are 52 full-time employees assigned to the Shoreline Police Department. A majority of the officers are in the patrol division; additionally, there is a traffic unit, burglary-larceny detectives, special emphasis team (undercover) detectives, school resource officer, community services officer, professional support staff, sergeants, two captains and a police chief. In 2012, the average response time to emergency calls for service for Shoreline Police was 3.39 minutes compared to the national standard of 5 minutes. Shoreline partners with the King County Sheriff's Office for specialized services, homicide/robbery investigations, SWAT, K9, air support, bomb technicians, and other services.

Police services are provided to Shoreline through a year-to-year "City Model" contract with King County in three major areas:

- City Services: staff is assigned to and works within the city. In 2012, there were 52 FTEs dedicated to the city.
- Regional Services: staff is assigned within the King County Sheriff's Office, and deployed to the city on an as-needed basis (e.g., criminal investigations and special response teams).
- Communications: The City contracts with King County for dispatch services through the King County 911 Communications Center.

There are no City-managed jail cells located within the city. The Shoreline Police maintain two holding cells at the Police Station on N 185th Street to detain suspects until they can be transferred to the King or Snohomish County jail facilities.

Special Emphasis Team (SET)—The Shoreline Police Department Special Emphasis Team (SET) consists of one sergeant and four detectives. All four of the detectives are solely dedicated to the day to day operations of the SET Unit.

The responsibilities of the unit vary and are flexible to address identified crime trends in the city. This unit typically works in a plain clothes (undercover) capacity and drives unmarked cars to enhance surveillance abilities. The SET Unit has received extensive training in surveillance techniques, case development, interviewing techniques, and vice and narcotic investigations.

The Shoreline SET Unit works closely with other neighboring police agencies, local and state federal task forces, and the King County Sheriff's Office on a regular basis. SET detectives follow up on all narcotics and vice related complaints and arrests in Shoreline, and all Narcotic Activity Reports (NARs) generated from citizens.

The SET Unit is also actively involved with the Citizens Academies, Community Landlord Tenant Training, community meetings, and problem solving projects.

***Criminal Investigations Unit*—**The Criminal Investigations Unit is comprised of one sergeant and four detectives. Three of the detectives are responsible for investigation and follow-up on most felony crimes committed in the city, with the exception of homicide/special assault and major accident investigations, which are handled by the King County Sheriff's Office Major Crimes Unit.

The fourth detective works exclusively on fraud and forgery investigations originating in Shoreline. This detective is also assigned on a part-time basis to a Secret Service Task Force. His participation in this task force brings extra support to the City of Shoreline for any complicated investigations that include counterfeiting of US currency, internet and computer investigations, and money laundering cases. Additionally, this detective also investigates Adult Protection referrals for financial exploitation of vulnerable adults in Shoreline.

***Community Service Officer*—**The Shoreline Police Department has one Community Service Officer (CSO). The CSO provides non-law enforcement services to the community, relieving police officers of some tasks that do not require police legal authority.

The CSO's main function is that of community outreach. They are familiar with the various social services in the area and work closely with these agencies to provide needed services to citizens. They also work closely with the courts, domestic violence victims, and the Adult Protective Services concerning Shoreline's adult vulnerable population.

***Active Shooter and Patrol (ASAP) Teams*--**In the last decade, law enforcement on a national level has experienced a spike in violent criminal behavior that has targeted vulnerable locations, such as schools, shopping centers, and movie theaters. The Shoreline Police Department has worked hard to develop and implement appropriate tactics by drawing on the expertise of multiple sources. They have designed a program that can be adjusted as needed to fit a wide range of scenarios. One of the highest priorities is partnership with the school district. The Shoreline Police Department strives to provide a safe environment for students.

***Shoreline District Court (Non-City-Managed)*—**The Shoreline District Court, located at 18050 Meridian Avenue N, is supportive of police services provided to the City through an interlocal agreement with King County. The District Court provides City-managed court services for the prosecution of criminal offenses committed within the incorporated city limits. The District Court serves several other jurisdictions as well.

Police Level of Service

The Shoreline Police department strives to maintain the level of service of 1 patrol officer per 1,000 residents. In 2012 level of service was 0.99 commissioned officers per 1,000 Shoreline residents. The total number of commissioned officers includes full-time dedicated officers, plus officers who work in supervisory or other non-patrol related positions, as well as officers that work in specialty units that are on-call for the city. Although the number of Shoreline's dedicated officers may stay the same from

year to year, the number of officers that respond to calls for service can change with the city's needs. Therefore, the number of total commissioned officers can increase or decrease depending on Shoreline's service needs from year to year.

Planned Police Facilities

The Police Department recently closed two storefront neighborhood centers that were staffed by community volunteers. Closing those facilities is associated with future plans to consolidate services into one facility. Scheduled for early 2016, the Police Department will close their precinct at N 185th Street and relocate to the Civic Center on the first floor of City Hall. Long-term plans include constructing a critical and essential infrastructure building for emergency related equipment, generators, and emergency communication systems.

Requests have been made for patrol officers to have available electric motorcycles that are environmentally friendly and quieter, which is beneficial when patrolling urban areas and parking structures. The department currently plans to maintain an approximate ratio of .85 commissioned officers per 1,000 residents (population) based on the City's adopted level of service standard/policy. The department reports it is currently operating at a ratio of approximately 1 commissioned officer per 1,000 residents.

Fire and Emergency Services

The Shoreline Fire Department is a non-City-managed service providing Fire Protection and Medical Emergency Services across an area slightly larger than the incorporated boundaries of the City of Shoreline (serving the full current population of Shoreline plus some additional). The Fire Department provides fire suppression services City of Shoreline residents as well as to Point Wells in Snohomish County on a contractual basis. The Shoreline Fire Department maintains five stations located at 17525 Aurora Avenue N (Station 61), 719 N 185th Street (Station 64), 1851 NW 195th Street (Station 62-Children's Safety Center), 145 NE 155th Street (Station 65), and 1410 NE 180th Street (Station 63). The department also maintains five pumpers, three advanced life support units, three basic life support units, and one ladder truck. Station 65 is located in the subarea, and Stations 61, 63, and 64 are adjacent to or within close proximity to the subarea.

The Fire Department currently employs twenty-nine full-time firefighter/paramedics who provide professional 24-hour advanced life support services. Station 61 has six command and support staff and no operations officers. Station 63 has a minimum of four staff including one officer, two fire fighters, and one medical service officer. Station 64 provides a minimum staff of eight including one officer and two fire fighters on an engine, two fire fighters on an aid car, two paramedics, and a Battalion Chief. Station 65 has a minimum of three staff including one officer and two fire fighters. In addition, Shoreline Medic One staffs one full-time medic unit serving Northshore, Lake Forest Park, and Bothell.

Emergency medical services make up the largest number of 911-responses. Shoreline Fire Department provides two levels of medical care: Basic Life Support and Advanced Life Support. Firefighter/EMT's (Emergency Medical Technicians) and Firefighter/Paramedics provide a total team approach and provide distinct yet complementary care.

City of Shoreline Emergency Operations Center (EOC)—The City assumes responsibility of emergency management for their jurisdiction. The City has established its Emergency Operations Center at the Shoreline Fire Headquarters (Station 61) through a Memorandum of Understanding (MOU) signed by the City Manager and Fire Chief. The City supports the equipment needed to operate from the Fire Department's community room. The need for a more permanent EOC was also discussed in the 2009 Hazard Mitigation Planning process. This could potentially be included in the planning for a new police facility, and is considered a "critical facility" during emergencies.

Fire and Emergency Level of Service

The Shoreline Fire department determines their level of service by call volumes defining staffing and station demands and needs. The type of calls and location of the call relates to reliability or availability of the first due station to provide coverage. The department is operating at a very high level of service with about one call/incident annually for every 8 to 10 people. A typical level of service standard is approximately one call for every 30 people.

Planned Fire Facilities

The Shoreline Fire Department recently completed construction of two new neighborhood fire stations and a training/support services/administrative facility. Future projects are anticipated with expected population growth but specific projects are not currently programmed. Station 63 is most likely to receive improvements since it is one of the older facilities and is designated as the first due station associated with the subarea. Improvements to this facility would provide an increase in response and allow for housing of appropriate equipment and response vehicles.

Analysis of Potential Impacts

Alternative 1—No-Action

Under the Alternative 1—No Action, population growth and construction of new housing and businesses in the study would be less than under the action alternatives, but there would still be some additional demands for police, fire, and emergency services. Under the No-Action Alternative, the City's population growth would impact fire protection with an estimated total population in the subarea of 11,040, an increase of 2,719 people over the current population of 8,321.

For police protection, Alternative 1—No-Action would increase demand for police, fire, and emergency services. Related to police services, if Shoreline Police maintained the level of policy standard ratio of .85 commissioned officers per 1,000 residents, the additional population would require approximately 2.3 additional commissioned police officers. Additional impacts may be incurred depending on the involvement and future continued support by the King County Sheriff's Department.

Redevelopment under the No-Action population increase is less likely to include advanced technology to support emergency service and security systems in connection with the dispatch service.

For fire and emergency services, the population increase would equate to an additional 272 to 340 calls/incidents annually. With the fire and emergency services already under a substantial burden to serve the current population and responding to three

times more calls than typical service levels, any increases in population would require additional services and facilities.

The Next Twenty Years (Up to 2035) Under Either Action Alternative

Under any of the action alternatives, the projected 2035 population of new residents would be 3,054 to 5,655 (in 1,273 to 2,356 households), above the current number of residents and households in the subarea. This would create a demand for approximately 2.6 to 4.8 new commissioned police officers by 2035 (over today's levels) to address arising needs such as increased crimes and offenses and to provide added patrol and protection services.

Fire and emergency service providers would need to increase staffing, equipment, and facilities to handle approximately 305 to 707 new calls annually in the subarea by 2035.

Alternative 2—Connecting Corridors

For the level of population growth projection expected under Alternative 2—Connecting Corridors, at full build-out there would be a much higher demand for fire protection and emergency service facilities, equipment, and staff than under current conditions and under Alternative 1, and comparable to Alternative 3. Based on current incidents/calls per population, an additional 2,632 to 3,290 calls per year would be expected with the population growth of 26,322 additional people.

Full build-out of Alternative 2—Connecting Corridors would impact the Shoreline Police Department facilities and services by creating an increased demand for approximately 22 additional commissioned officers maintaining the level of service ratio of .85 commissioned officers per 1,000 residents at full build-out. This staffing increase would help to address arising needs such as increased crimes and offenses and to provide added patrol and protection services.

Given the level of existing services and facilities compared to the potential future demand, additional funding and resources would be needed to support increases in the level of service provided by police, fire, and emergency services. Modern technology incorporated into new medium to high density developments is likely to increase efficiencies within the communication, call, and dispatch services within the subarea, benefiting police, fire, and emergency services.

Because build-out would be expected to occur very gradually over several decades (60 to 94 years or more; by 2075 to 2109 or beyond), the service providers would be able to monitor growth in their activities, proactively plan for, and seek funding and resources to adjust services as needed to respond over time.

Alternative 3—Compact Community

For the higher level of population growth projection expected under Alternative 3—Compact Community, at full build-out there would be a much higher demand for police protection as well as fire and emergency service facilities. Both the police and fire departments would require additional staff, equipment, and facilities to serve the growing population.

The total population would be expected to rise to 36,647 people living in 15,270 households under Alternative 3—Compact

Community. This is 28,326 more people and 11,803 more households than under today's levels.

Full build-out under Alternative 3 would not occur by 2035. Based on market factors, property characteristics, and current population growth trends in Shoreline and the region, this level of growth would be anticipated to occur over many decades, not reaching build-out levels for 63 to 99 years or more (or by 2078 to 2113 or beyond).

There is the potential with increased population density that there could also be increases in crimes and offenses in the subarea that would need to be addressed through added police protection and patrols.

The population growth of Alternative 3—Compact Community would result in a demand for approximately 28 new commissioned police officers would be needed at full build-out (incrementally increasing over many decades up to that amount). With further evaluation and planning, the City could consider the potential for a satellite police station in the subarea over the long term future.

For fire and emergency services this population increase would result in an additional 2,833 to 3,541 calls annually at full build-out (again increasing incrementally over many decades up to that amount).

With the building heights and types proposed under Alternative 3 (as with Alternative 2), there would be a need for emergency and fire service providers to evaluate current equipment and vehicles to determine if additional resources would be needed. For example, increased ladder height may be needed, and rescue and evacuation training needs may change.

Given the level of existing services and facilities compared to the potential future demand, additional funding and resources would be needed to support increases in the level of service provided by police, fire, and emergency services. Modern technology incorporated into new medium to high density developments is likely to increase efficiencies within the communication, call, and dispatch services within the subarea, benefiting police, fire, and emergency services.

Because build-out would be expected to occur very gradually over several decades, it is anticipated that the service providers would be able to monitor growth in their activities, proactively plan for, and seek funding and resources to adjust services as needed to respond over time.

Mitigation Measures

- The demand for police protection could be reduced through requirements for security-sensitive design of buildings and Crime Prevention through Environmental Design (CPTED) principles for surrounding site areas.

- Additionally, provisions of onsite security services could reduce the need for police protection, and revenues from increased retail activity and increased property values could help offset some of the additional expenditures for providing additional officers and response to incidents.

- The Fire Department places a lot of emphasis on fire prevention tactics and community education to reduce

unintentional injuries and the loss of life and property from fire, accidents, and natural disasters by increasing public awareness.

- Implementation of advanced technology features into future development could increase response time and improve life safety in emergency situations.

- Behavioral changes through education and increased use of outreach, as well as volunteer services such as neighborhood watch programs also could help to reduce demand for some services.

- The increases in households and businesses in the subarea will result in increased tax revenue, which could help to offset some of the additional costs associated with providing increased services and the need for additional facilities related to police, fire, and emergency services.

- With further evaluation and planning, the City could consider the potential for a satellite police station in the subarea over the long term future.

Significant Unavoidable Adverse Impacts

There would be an increase in demand on police, fire, and emergency services under any of the alternatives, but to more substantial levels under Alternative 3—Compact Community and Alternative 2—Connecting Corridors than under Alternative 1—No Action. With increased population there would likely be an increase in crime, as well as in emergency incidents that require more service from police, fire, and emergency professionals.

Because the growth under any of the action alternatives would be expected to occur gradually, over many decades, department and district planning for services and facilities should be able to proactively plan for and keep pace with the growth to allocate resources (staffing, buildings, equipment, etc.). However, funding levels for fire and emergency services would need to be increased and keep pace with growth in the subarea to maintain the level of service required to respond to increased calls.

Police Protection has been able to manage an acceptable industry level of service for years and plans to continue achieving that service standard during population growth. However, increased population or other changes in the community may require alteration of specific unit development within the Police Department or may require changes in support from the King County Sheriff's department or Washington State Patrol.

Adequate funding for provision of services, as well as procurement of equipment and resources would need to be allocated over time to support population growth in the subarea. With this investment it is anticipated that potential adverse impacts would be mitigated, and there would not be significant unavoidable adverse impacts.

3.6.3 Solid Waste Management Services

Affected Environment

City Contracted Services through Recology Cleanscapes

Solid waste, recycling, and food scraps and yard waste collection services in Shoreline are provided under contract with Recology Cleanscapes. Typically the solid waste and recycling services are contracted by the City of Shoreline for a period of seven years, but the contract timeframe can vary depending on the specific service and contracting agency. Residential customers receive curbside garbage collection every week. Recycling and food and yard waste collection occurs every other week. The schedule for collecting recycling is offset from the food and yard waste collection week. Recology Cleanscapes will haul bulky waste items (e.g. refrigerators, sofas, mattresses, etc.) curbside for an additional charge. After collection the solid waste is transported to the King County Recycling and Transfer Station in Shoreline. The food and yard waste is taken to Lenz Recycling Compost Facility in Stanwood, Washington. The recycling materials are transported to Recology Cleanscape's own materials recycling facility in Seattle, Washington.

King County Solid Waste Division

A King County Recycling and Transfer Station is located at 2300 N 165th Street. This facility receives solid waste and a variety of recycling materials from the Shoreline community and surrounding cities. The Shoreline Transfer Station accepts large appliances and fluorescent light bulbs, which aren't disposable at other area facilities. Waste consolidated at the transfer station is hauled to the Cedar Grove Regional Landfill in Maple Valley, Washington.

The King County Comprehensive Solid Waste Management Plan completed in 2013 provided an estimate of the amount of waste generated per customer (household or commercial address) and the recycling rate for communities in the county. For Shoreline, the average amount of garbage disposed per week was 23 pounds per customer. This was lower than many other communities in the county and lower than the countywide average of 25 pounds per week. Shoreline's recycling level was 57 percent, which was higher than many other communities and higher than the countywide average of 55 percent. The Shoreline community is managing solid waste in an above average manner. Also, in Shoreline and countywide, average weekly disposal amounts are trending downward, while recycling levels are increasing.

Analysis of Potential Impacts

Under all the alternatives, population increase in the subarea would increase demand for solid waste, recycling, and food and yard waste collection services over the course of the time the population reaches build-out levels.

Under Alternative 1—No Action, the demand for additional solid waste services covering the need of 1,133 additional households and businesses in the subarea by 2035.

Levels of solid waste generated and correlating service demands would be similar under either of the two action alternatives over

the next twenty years (up to 2035), given the expected pace of growth.

Under Alternative 2—Connecting Corridors, an additional 10,968 households, as well as various businesses and other land uses, also could develop at build-out and create increased demand for services in the subarea.

Under Alternative 3—Compact Community, an additional 11,803 households, as well as businesses and other land uses could develop at build-out.

Table 3.6-3 displays estimated waste generation levels per alternative based on today's known calculations for Shoreline. It should be noted that these amounts are likely high given trends toward solid waste reduction and increased levels of recycling.

Table 3.6-3
Solid Waste Generation per Alternative

Time Frame	Alt. 3 Compact Community	Alt. 2 Connecting Corridors	Alt. 1 No Action
Twenty Years/ 2035	109,020 to 133,929 pounds per week of solid waste generated	109,020 to 133,929 pounds per week of solid waste generated	105,800 pounds per week of solid waste generated
Build-Out	351,210 total pounds per week of solid waste generated	332,005 total pounds per week of solid waste generated	Not Analyzed

More landfill space may be needed to support waste management at the levels listed, particularly for Alternative 2 or 3. There would need to be intense management of solid waste levels including actions to divert waste to avoid this outcome.

Mitigation Measures

As discussed previously in this section, full build-out of the action alternatives would be expected to occur gradually, over many decades into the future. As a contracted public service, the City would need to allocate additional funding to solid waste services to serve the growth in population. It is anticipated that increases in households and businesses in the subarea would result in increased tax revenue, which could help to offset some of the additional costs associated with providing increased solid waste services.

- To reduce construction related waste, the City could require development applicants to consider recycling and reuse of building materials when redeveloping sites, and as part of their application require them to explain what measures are included.
- The City may condition Planned Action applications to incorporate feasible recycling and reuse measures.
- Using solid waste, recycling, and food and yard waste collection storage and container size requirements would mitigate impacts associated with all of the alternatives.
- Currently the City of Shoreline hosts two recycling events typically in the fall and the spring. These events provide a place for homeowners to recycle materials commonly not collected at the curb. With population growth, increasing

the number of events per year could mitigate additional demand on the recycling collection vendor.

- The City or other entities involved in solid waste management could increase outreach to educate residents and businesses about the importance of waste reduction and recycling. Programs to encourage more composting, conversion of waste to energy, reuse, recycle, barter/trade, etc. could be intensified over time. These efforts could lead to behavioral shifts in the subarea that might then help offset some of the increased demand for services.

- Solid waste services are paid through fees. Additional customers would increase the revenue base for solid waste management services. In addition, the City and its contractor could manage the fee structure and potentially increase fees in the future if needed to address the additional demand for services. It is anticipated that this would be a last resort if outreach and education do not result in reduced solid waste levels.

- The City would work with King County and regional waste management entities to monitor the ongoing potential need for additional landfill space.

Significant Unavoidable Adverse Impacts

Implementation of any of the action alternatives would increase demand for solid waste services due to increases in residential and employment population in the subarea. With additional budget allocation to contracted services supported by increased tax revenue from new households and businesses over several decades, the increased demand for services would be addressed. As such, no significant unavoidable adverse impacts would be anticipated.

3.6.4 Other Public Services and Facilities

Affected Environment

City Hall/Shoreline Civic Center/City Services

The Shoreline Civic Center and City Hall are located at 17500 Midvale Ave. N. This is new facility is a 67,000 square feet, LEED Gold certified building with an expected lifespan of 50-100 years, located in the heart of Shoreline's Town Center. It offered the ability for the City to consolidate services to one location, and will further that goal to better serve the community by welcoming the new police department in the near term. City Hall currently includes the Executive, City Clerk, Attorneys, Finance, Administrative Services, Human Resources, Parks and Cultural Services, Public Works, and Planning and Community Development. City Hall has a count of 135 FTEs. The current level of service for the City calculates to approximately 2.52 employees per 1,000 residents, which is lower than most Puget Sound cities. If the City assumes additional responsibilities in the future, such as jurisdiction over utility systems, this ratio could change with more employees per 1,000 residents.

Historical Museum/Arts and Culture

The Shoreline Historical Museum is located north the subarea at the intersection of N 185th Street and Linden Avenue N. It is managed and operated by a non-profit organization with a

mission dedicated to preserving, recording and interpreting the heritage of the historic Shoreline area and its relationship to the Northwest region.

Various arts and cultural groups are active in the community and provide a variety of community services.

Libraries

The Shoreline Library is a King County District Library located north of the subarea at 345 NE 175th Street. It is a 20,000-square-foot facility opened in 1993, replacing the 15,000-square-foot library built in 1975, and offers additional features that the recent previous facility did not include, such as two meeting rooms and two study rooms.

Postal Buildings

United States Postal Service offices are located at Aurora Avenue N and N 145th Street as well as 17233 15th Avenue NE. These locations provide full service to the surrounding community with hours from 8:30 – 5:30 Monday through Friday, and open from 8:30 to 3:00 on Saturdays. Lobby areas are open 24 hours for PO Box access, mail drop off, and other self service features. The demand for postal services has been in general decline in the US for several years due to the reliance of the public on other communication methods such as email services and social media.

Human and Social Services

A Washington Department of Public Health Laboratory is located in Shoreline at 1610 NE 150th Street. The location is just east of the subarea, but provides diagnostic and analytical services for the assessment and surveillance of infectious, communicable, genetic, and chronic diseases, and environmental health concerns to the surrounding community. Other types of human services provided in Shoreline include services for seniors such as the senior center and social service programs and facilities. Social and community services would include the need for community center uses, additional meeting space, and other facilities.

Analysis of Potential Impacts

Population growth under all of the alternatives would increase demand for City services and other public services, but there would be the need for expanded services and facilities over time with build-out of either of the two action alternatives. Redevelopment over time would necessitate ongoing needs for new regulations, planning and development review, and capital projects, as well as City public works and maintenance personnel and other employees. Based on the additional population growth anticipated under the various action alternatives, the following increases in demand for other types of public and community services would be expected.

Alternative 1—No Action

Under Alternative 1, there would be an estimated population increase of 2,719 people by 2035, which could generate demand for:

- 6.85 additional FTE City employees would be needed to serve this growth by 2035
- Minimal increased demand for library, museum, arts and culture, postal, and human/social services by 2035

The Next Twenty Years (Up to 2035) Under Either Action Alternative

Either action alternative would add 2,886 to 5,314 more people to the subarea. This level of new population would result in:

- Demand for 7.7 to 14.25 additional FTE City employees by 2035
- 5.3 percent to 9.9 percent increase in demand for other services such as library, museum, arts and culture, postal, and human/social services by 2035

Alternative 2—Connecting Corridors

Alternative 2 would increase population by an additional 26,322 people, which would result in:

- Demand for an additional 66.33 FTE City employees at build-out
- 17.5 percent increase in demand for library, museum, arts and culture, postal, and human/social services at build-out

Alternative 3—Compact Community

Alternative 3 would result in addition of 28,326 people. This level of new population would result in:

- Demand for 71 additional full-time-equivalent (FTE) City employees at build-out (incrementally increasing over many decades up to that amount), applying the current ratio of 2.52 city employees per 1,000
- 440 percent increase in demand for other services such as library, museum, arts and culture, postal, and human/social services (a new library or satellite library may be needed at build-out)

Mitigation Measures

All alternatives would increase population in the subarea and require additional public services, including the need for a variety of services. For all public services, it is anticipated that increases in households and businesses in the subarea would result in increased tax revenue, which could help to offset some of the additional costs associated with providing increased services and facilities to serve the growing population. Also, because growth would happen gradually over many decades, it is anticipated that the demand could be monitored, planned for, and served in a manageable way over time.

- The City may consider increases in development application review fees to cover costs associated with increased redevelopment activities in the subarea.

- The City should continue to provide outreach and communication to other public service entities listed above to make them aware of the potential for growth over time and the gradual increased demand for services that may accompany the growth.

- The City and other human/community services providers should monitor the need for additional services and facilities as growth occurs over time and properly plan for and allocate resources toward expanding and enhancing services to address increased demand.

Significant Unavoidable Adverse Impacts

Under all alternatives, the subarea would experience population growth. Under the two action alternatives, the level of growth at full build-out would be substantially higher than under Alternative 1—No Action. The relative incremental pace of growth would be expected to be similar under any of the action alternatives, occurring gradually, over many decades. The City and service providers would have opportunities to monitor growth, update plans, and prepare for and respond appropriately with additional services to accommodate the increased demand. As such, no significant unavoidable adverse impacts would be anticipated.

3.7 Utilities and Energy Use

This section describes the affected environment, analyzes potential impacts, and provides recommendations for mitigation measures related to utilities, including water, wastewater, electricity, natural gas, and communications.

3.7.1 Affected Environment

3.7.1 a Water

Service Providers

Two water purveyors provide service in Shoreline: North City Water District and Seattle Public Utilities. Water service in the subarea is split, with Seattle Public Utilities roughly serving west of Interstate 5, and North City Water District serving roughly east of Interstate 5. A map of the water service area is provided as **Figure 3.7-1.** Note all maps are provided at the end of this section.

Water Supply

Seattle Public Utilities

The Seattle Public Utilities is the primary water purveyor in the area. In addition to the City of Shoreline, SPU services the City of Seattle, and a number of communities and wholesale water purveyors within King County and southern Snohomish County. Seattle Public Utilities current supply estimate is 172 million gallons per day (mgd). Based on Seattle Public Utilities Comprehensive Plan, SPU's source of supply is adequate for demand forecast until 2060.

Water entering the distribution system from the SPU's water sources is treated at a number of treatment facilities. Current water quality readings are adequate for the water system at various water quality sampling locations. In the future, SPU will be evaluating contract extension options for the Tolt and Cedar Water Treatment Facilities.

The planned subarea is located within the Seattle Public Utilities 590 Pressure Zone. Water is withdrawn from the Tolt supply line via a pump station at the corner of NE 145th Street and 5th Avenue N, to service the SPU portion of the study area, in conjunction with the Bitter Lake Water Reservoir.

North City Water District

North City Water District along with sixteen other water utility districts purchase water wholesale from Seattle Public Utilities. In January 2012, North City Water District completed a new connection with the Seattle Public Utilities NW regional supply, which draws water from both the Tolt and Cedar River Watersheds. The Tolt Watershed acts as the main water supply for the North City Water District, with the Cedar River Watershed as a backup water source.

The Tolt River Watershed is located in the foothills of the Cascades in East King County. It supplies about 30% of the drinking water for 1.4 million people in the greater Seattle area. The Tolt Reservoir captures water and snow from the Tolt watershed.

The City of Seattle's Cedar River Municipal Watershed is managed to supply drinking water to 1.4 million people in the greater Seattle Area.

In 2013, the North City Water District entered into a new agreement with the Seattle Public Utilities to supply 3,330 gallons per minute (gpm) of water to its customers. In conjunction with the new withdrawal rate, The North City Water District conducted an analysis of water currently available to customers within their system. **Table 3.7-1** contains an analysis of their existing and projected water supply demands for the water source feeding pressure zone 515, and all other zones associated with this source.

As indicated in Table 3.7-1, under the North City Water District's current demand projections (estimated growth without the inclusion of the 145th Street Station Subarea Rezoning Option), the District would have a surplus of 882 gpm under peak demands for the year 2030. According to the North City Water District 2011 Comprehensive Plan, the District does not currently forecast to have a deficiency in source capacity through the year 2030.

The North City Water District contains seven pressure zones. The North City Water District's portion of the subarea is located within the 590 pressure zone. The subarea is located at the southwest corner of the North City Water District's service area. This section of the system is located the furthest distance away from a source of supply, limiting water circulation within the water mains. According to the District's 2011 Comprehensive Plan, a new source of supply is being proposed within the vicinity of the subarea. The new source of supply, Supply Station #5 will create a new pressure zone for the District. The planned subarea makes up almost the entire new Pressure Zone 515. Supply Station #5 zone will withdraw water directly from the Tolt River Transmission Main without pumping. The proposed 515 pressure zone will receive water predominately from this supply station, with the existing water storage tanks as backup.

Table 3.7-1—Water Source Analysis

Year	ERUs[1]	MDD[2] (GPM)	FSS[3] Replenishment Rate (GPM)	Source (GPM)		
				Required	Existing/Proposed	Surplus (Deficit)
2013	7,745	1,836	250	2,086	3,330	1,244
2016	7,977	1,891	250	2,141	3,330	1,189
2030	9,275	2,198	250	2,448	3,330	882

1. ERU = Equivalent Residential Unit is used to convert commercial units and multifamily dwellings to equivalent single family residential units for water demand forecasting purposes
2. MDD = Max Daily Demand
3. FSS = Fire Suppression Storage

Water Storage

Seattle Public Utilities

The Seattle Public Utility District owns and operates a number of water storage facilities within the City of Shoreline. The subarea is primarily serviced by the Bitter Lake open reservoir, which contains 21.3 million gallons of available water storage. A $31-million project was completed in 2002 to cover the Bitter Lake and Lake Forest reservoirs, both of which serve areas within the Shoreline city limits. Seattle Public Utilities is currently in the process of replacing a number of existing surface reservoirs with underground structures. In 2020, the floating covers on Bitter Lake and Lake Forest Park Reservoirs will be evaluated for their remaining service life and possible replacement.

Modeling of the water conveyance system has verified that the Lake Forest Park reservoir is currently adequately sized for the population. No upsizing of the reservoir is projected in the near future.

North City Water District

The North City Water District owns two reservoirs in the area. The reservoirs contain 5.7 million gallons of water collectively. The largest of the storage facilities contains 3.7 million gallons of water storage. This reservoir directly serves the pressure zone in which the subarea is located. The 2011 North City Water District's Comprehensive Plan performed an analysis on this reservoir, and determined it has adequate capacity for the 2030 forecasted demand scenario. Once the Supply Source #5 is connected into the system, and the area around the subarea is placed in its own 515 pressure zone, the water reservoirs will only act as backup water storage to this portion of the District's service area.

Table 3.7-2 contains a summary of the water storage available to the system in millions of gallons (MG) for Equivalent Residential Units (ERU). An ERU is a unit of measure used to equate non-residential or multi-family residential water usage to a specific number of single-family residences. For example, if a system has sufficient physical capacity to serve 100 ERU's, then that system would have sufficient capability to meet the projected needs of 100 full-time single-family residences. That same system would also be able to serve any combination of customers (residential, customers, etc.) provided the quantity of water used is equivalent to the projected needs of 100 single-family homes (100 ERUs).

In addition to the reservoirs, the North City Water District contains four source withdrawals and two booster pump stations that work in conjunction to supply water to its customers. The Tolt Booster Station 1 has a capacity of 2,000 gpm with alternating pumps, and Tolt Booster Station 2 has a capacity of 2,300 gpm with alternating pumps.

In 2013, the North City Water District installed Supply Station #4 into their network. Even without the inclusion of Proposed Supply Station #5 (proposed in 2020), the District projects to have adequate water storage capabilities for the forecasted demand of 2,448 gpm in year 2030, with the two existing booster pump stations, the new Supply Station #4, and the 3.7-million-gallon reservoir.

Table 3.7-2—Water Storage Analysis

Year	ERUs	Grouped Zone Gross Vol. (MG)	Storage Component Volume (MG)					Effective Volume (MG)[5]	Storage Surplus (Deficit) (MG)[6]
			Dead Storage[1]	Standby Storage[2,4]	Fire Suppression Storage[3,4]	Equalizing Storage	Operational Storage		
2016	7977	3.7	0	2.72	1.08	0.16	0	3.7	0.82
2030	9275	3.7	0	3.17	1.08	0.23	0	3.7	0.3

1. Dead Storage includes the stored volume that is not available to all customers at a minimum design pressure. The construction and operation of the North City Pump Station will make use of the dead storage in the 3.7 MG reservoir.
2. Standby Storage determined by Department of Health (DOH) recommendation to provide storage for two days of the system's average day demand (ADD). DOH recommends at a minimum, 200 gallons/ERU.
3. Fire Suppression Storage is a volume available at a minimum pressure of 20 psi to all customers and includes the volume consisting of the highest minimum required fire flow rate and duration.
4. Standby and Fire Suppression Storage are consolidated (nested).
5. Effective Volume is the total volume of the reservoir less any dead storage.
6. Storage Surplus is the Effective Volume, less the larger of the Standby and Fire Suppression Storages, less the Equalizing Storage.

Water Distribution

Seattle Public Utilities

Pipe diameter ranges from 2" distribution mains to 30" transmission mains within the subarea. Within the Seattle Public Utilities region of the subarea, there are 5,000 feet of water mains less than 6" in diameter, 23,800 feet of water mains between 6" and 12", and 18,700 feet of water mains greater than 12". The majority of pipe diameters less than 6" in diameter were installed before 1960. A 24" steel water transmission main runs along NE 145th Street, from the supply pump station withdrawing water from the primary 60" Tolt supply main, runs under I-5, and continues to Greenwood Avenue N. A 24" steel main branches off at the intersection with Aurora Avenue N, and continues north to NE 185th Street. The 24" steel transmission main was installed in 1933 and relined in 1986. The 24" main is the primary transmission main feeding the Seattle Public Utilities portion of the subarea.

North City Water District

According to the North City Water District's Comprehensive Plan, over 50% of the District's mains were installed between 1966 and 1968. The North City Water District's distribution and transmission main inventory identified approximately 10% of their network as 4" mains or less, 54% as 6" mains, 35% as 8"–12" mains, and less than 3% as larger than 12" mains. In order to ensure adequate fire flow within the system, when a new

development is constructed, they are required to upsize all public water mains adjacent to their development to a minimum 8" diameter to provide adequate fire suppression.

In order to ensure adequate fire flow within the system, prior to starting a new development, an applicant is required to apply for a Certificate of Water Availability. Once the application is complete and the fees paid, the District will conduct a Fire Flow Analysis using a computer hydraulic model to determine the amount of flow and pressure available at the property in question. If the result of the analysis indicates there is sufficient fire flow, the Certificate of Water Availability will be issued to the property owner. If the result of the analysis indicates there is insufficient fire flow, improvements will be required.

The North City Water District's portion of the subarea contains a series of 6" diameter through 12" diameter mains, most of which are in a looped system.

Current Demand for Water

Residential water demand is based on a survey generated by Seattle Public Utilities regarding wholesale water customers. The study includes the North City Water District residential demand per household. A comparison of residential water demand for the North City Water District, Seattle Public Utilities District, and Seattle's Wholesale customers is shown in **Table 3.7-3**

For the purposes of this analysis, the average water consumption of 171 gpd per single family residential household will be used for the residential demand calculations. Commercial water use is based on Equivalent Residential Units (ERUs), with 171 gpd per ERU. For the purposes of this study, 1 ERU is equivalent to 2.4 employees.

Table 3.7-3—Water Consumption Analysis

	2008	2009	2010	2011	2012
North City Water District	169	171	171	140	139
Wholesale Average	179	193	164	165	172
Seattle	140	145	145	128	130

With these demand figures, the North City Water District supplies 361,000 gallons per day of water during peak season operations to their portion of the subarea, and Seattle Public Utilities supplies 329,000 gpd to their portion of the subarea. The total demand within the subarea under current conditions is estimated to be 690,000 gpd.

Fire Flow

According to Seattle Public Utilities (SPU), all fire hydrants were tested in their section of Shoreline in 2012. The "Modeled ADD Fire Flow in Shoreline August 30, 2012" map depicts the available fire flow in the SPU region of the city. According to the map, the subject area is within the 590 feet of elevation pressure zone. Current fire flow for the area primarily ranges from 2,000 gpm to over 4,000 gpm. Three fire hydrants located on a loop south of NE 155th Street, between Stone Avenue N, NE 153rd St, and Interlake Avenue N provide between 500 to 1,000 gpm of fire suppression flow. These streets are at the eastern limits of the

subarea, and the fire hydrants are located on a 4" main installed in 1947. In order to supply sufficient fire suppression, these mains need to be upsized.

3.7.1.b Wastewater

Service Provider

The City of Shoreline is served by the Ronald Wastewater District for collection of the wastewater. The Ronald Wastewater District is a municipal utility governed by elected officials. A joint merger between the City of Shoreline and the Ronald Wastewater District is currently underway, which will make the wastewater system a City owned and operated utility.

The subarea is located within three sewage drainage basins, all of which drain via gravity systems to the King County's West Point Treatment Plant. All of the wastewater flows to the south from Ronald's wastewater system into King County's or Seattle Public Utilities systems. A map of the wastewater lines in the subarea is provided as **Figure 3.7-2** at the end of this section.

Wastewater Treatment Facilities

Wastewater collected from the Ronald Wastewater District is treated at two separate treatment facilities; King County's West Point Treatment Plant and the City of Edmonds Treatment Plant. Roughly the southern two thirds of the City of Shoreline discharges to the King County Treatment Plant; and the northern third of the City discharges to the City of Edmonds Treatment Plant. The entire subarea is located at the south end of the City of Shoreline and drains to the King County's West Point Treatment Plant.

King County's West Point Treatment Plant treats wastewater from homes and businesses in Seattle, Shoreline, North Lake Washington, North King County, and parts of South Snohomish County. The treatment plant treats 90 million gallons per day (mgd) of sewage during the dry months, and up to 440 mgd during the rainy season. The Ronald Wastewater District currently pays King County based on the number of residential customer equivalents within the District, which are tributary to the West Point Treatment Plant. There is currently no cap on the amount of wastewater the Ronald Wastewater District is allowed to discharge to the West Point Treatment Plant. Currently an estimated 3.82 mgd of wastewater is transported from the Ronald Wastewater District to the West Point Treatment Facility.

Wastewater Collection Systems

Two primary wastewater collection systems run through the subarea. A 30" concrete main begins at the corner of NE 155th Street and I-5, and runs south paralleling the I-5 corridor. Wastewater collects from north, west, and east of this transmission main through a series of 8" to 24" mains. The 30" transmission main leaves the City's limits at the corner of NE 145th Street and I-5.

The second primary collection system runs south from NE 165th Street and 11th Avenue NE through the subarea, and out of the City limits through an easement between 9th Avenue NE and 9th Place NE, through a series of 15" and 18" concrete transmission mains.

Both transmission mains ultimately connect to the King County's West Point Treatment Plant.

Current Demand

The wastewater demand for the City of Shoreline is based on a study performed by CHS Engineers, LLC for the Ronald Wastewater District's 2010 Comprehensive Plan. Residential wastewater generation is estimated at 85 gpd per person. Commercial wastewater generation is estimated at 187 gpd per Equivalent Residential Unit (ERU) with 2.4 employees per ERU. The subarea currently contains 1,421 jobs/employees, and 3,442 households. Based on these generation quantities, the average daily wastewater demand within the subarea under current conditions is estimated at 813,000 gpd.

Wastewater Reclamation

Reclaimed wastewater is a way to reduce wastewater discharge, as well as reduce potable water demand. Treated wastewater effluent can be distributed back to the communities for non-potable uses, such as industrial water use, landscaping, and flushing toilets. Treated wastewater is never reused for drinking purposes in the Puget Sound area.

Typically reclaimed water is transported through a network of "purple pipes". The cost of building infrastructure to move water from reclaimed water plants to customers is one of the most significant challenges to the distribution and use of reclaimed water. Legislative approval is needed for an expanded grant program to fund reclaimed wastewater treatment and transportation/distribution facilities.

King County made reclaimed water available for on-site industrial processes and landscape irrigation at two wastewater treatment plants in 1997. King County's current reclaimed water program produces 284 million gallons of Class A reclaimed water per year at these two regional wastewater plants. All of the wastewater produced within the subarea is transported to the West Point Treatment Plant, which has the potential to produce up to 0.70 mgd of Class A reclaimed water from an average capacity of 133 million gallons per day.

Seattle Public Utilities performed a study on the viability and cost analysis of installing a new and much larger reclaimed water distribution system from the Brightwater Treatment Facility, which went online in 2011. The analysis examined the benefits and disadvantages of installing reclaimed "purple pipes" to facilities in North Seattle and Shoreline. The study analyzed potential commercial customers which could benefit from reclaimed water. The study identified 60 potential reclaimed water customers divided into five categories within the North Seattle and Shoreline communities:

Golf Courses	4
Cemeteries	7
Parks	19
Schools	20
Other	7
Total	60

It was estimated that the full life-cycle cost of building and operating a distribution system to deliver reclaimed water from the Brightwater Treatment Facility to potential customers in North Seattle and Shoreline would be about $109 million.

The potential benefits of this reclamation project were found to be minimal. Calculations showed that the project would reduce peak season demand from Seattle's regional water supply system by up to 0.70 mgd. By itself, this amount is too small to have a detectable positive impact on regional water supply, reliability, or environmental conditions in the Cedar River and Tolt River. The project would reduce the peak season withdrawals of self-supplied irrigators from their own local supplies by up to 1-mgd. This might provide small improvements in habitat conditions for several streams in the area, though it would not be expected to result in significant increases in biological productivity. The project would reduce the discharge of pollutants from King County treatment plants into Puget Sound by about 0.04%.

Although the analysis determined that a purple pipe distribution system would not be cost effective to serve a large number of relatively small customers, dispersed over a large area, as areas redevelop, this type of system could become more cost effective. Other alternatives are currently being pursued to minimize wastewater discharge and reduce water consumption in the area. Currently, the two existing water reclamation facilities are the only facilities in operation. There could be the potential to introduce future water reclamation facilities within the King County wastewater system. However, this is not currently being actively pursued.

The City of Shoreline should coordinate with service providers to monitor advancements in water reclamation systems regionally on an ongoing basis in the future, and to determine opportunities to use these systems with new development/redevelopment as feasible. The potential to convert existing systems also should be evaluated with advancements in the use of this technology in the region over time.

3.7.1 c Electricity

Electricity is supplied by Seattle City Light. The Seattle City Light service area includes all of the City of Seattle, portions of the cities of Burien, Tukwila, SeaTac, Shoreline, Lake Forest Park, and Renton, as well as portions of unincorporated King County.

Electricity Sources

Seattle City Light obtains energy from a mix of sources. **Table 3.7-4** shows the distribution of energy sources used by Seattle City Light.

Table 3.7-4 Energy Sources Used by Seattle City Light

Generation Type	Percentage
Hydroelectric	89.8% *
Nuclear	4.4%
Wind	3.9%
Coal	0.8%
Landfill Gases	0.5%
Other	0.6%

*50% from the Skagit and Pend Oreille Rivers

Transmission Corridor

The transmission corridor servicing the City of Shoreline runs southeast through tracts and easements through Snohomish County until it reaches NE 185th Street, within the City of

Shoreline. At NE 185th Street, the transmission corridor turns due south and runs parallel to 8th Avenue NE. At the intersection of 8th Avenue NE and NE 145th Street, the transmission corridor exits the City of Shoreline, and after crossing NE 145th Street, enters a tract on the Jackson Park Golf Course within the city limits of Seattle.

Distribution Network

Seattle City Light does not provide service area maps of their distribution network. The distribution network within the subarea is currently a mix of overhead and underground facilities. The majority of the area is serviced by overhead electricity lines, which share the space with telecommunication networks within the area. Typically transferring electricity lines from overhead to underground occurs only when either building setbacks are too tight to allow overhead lines, new developments pay for undergrounding within their development area, cities undertake capital improvement projects (CIPs), or neighborhoods agree to pay for underground improvements. There is current work being done to underground a large portion of lines between NE 145th Street and NE 205th street, along Aurora Avenue N.

Current Demand

Current demand projections are based on a study prepared by the US Energy Information Administration. In 2009, a nationwide survey was conducted, depicting residential energy usage for different demographics throughout the United States. According to the survey, residents in Washington used on average 5% less electricity per capita than the average for all Pacific Coast users. Based on an average 2.4 persons per household, the average household uses 31.84 million British Thermal Units (BTUs) per year. This equates to 87.23 thousand BTUs per household per day. The total residential demand currently projected within the subarea is 721 million BTUs per day.

Commercial energy demands were based on a US Department of Energy survey of various commercial, government, and institutional building usage types. **Table 3.7-5** presents a summary of the information.

Table 3.7-5 US Department of Energy Survey on Energy Demand Commercial Sector Energy Consumption, March 2012

Building Type	Thousand BTUs/SF/Year
Health Care	345.9
Food Sales	535.5
Lodging	193.1
Office	211.7
Mercantile	223.6
Education	159
Service	151.6
Food Service	522.4
Religious	77
Public Order	221.1
Warehouse	94.3
Public Assembly	180
Vacant	33.1
Other	318.8
Average	**233.36**

Based on these figures, the average annual energy use for commercial developments is 233.36 thousand BTU/SF of space

per year, or 0.64 thousand BTU/SF per day. The total daily commercial energy demand, based on four office workers per 1,000-square feet is 227 million BTUs per day. The total estimated demand on the system within the subarea is 948 million BTUs per day.

3.7.1 e Natural Gas

Puget Sound Energy provides natural gas service to the residents of the City of Shoreline. The City maintains a franchise agreement (Ordinance #308) with Puget Sound Energy through October 31, 2017.

Sources

Puget Sound Energy purchases natural gas from other regions and manages the distribution of natural gas to customers within its service area. They regulate pressure, and develop and maintain distribution lines within their service areas.

PSE purchases 100% of the natural-gas supplies needed to serve its customers. About half the gas is obtained from producers and marketers in British Columbia and Alberta, and the rest comes from sources within the Rocky Mountains.

After purchasing natural gas, PSE controls its gas supply by storing gas in large underground facilities, and withdrawing gas in the winter when customer usage is highest. PSE co-owns the largest natural gas storage facilities in the Pacific Northwest in Jackson Prairie, Washington. The storage facility can hold about 44 billion cubic feet of natural gas, and can meet up to 25% of the Pacific Northwest's peak demand on the coldest days in winter. PSE also stores 12.9 billion cubic feet of natural gas in a facility in Clay Basin, Utah. From these storage facilities, PSE transports gas through main pipelines to its service areas in the Puget Sound region, where it is distributed to customers in the region through 21,000 miles of service lines.

Washington State Utilities and Transportation Commission (WUTC) does not define natural gas as an essential service. Therefore, Puget Sound Energy is not required to provide services.

Extension of service is based on individual requests and the results of an analysis to determine if revenues from a developer extension will offset the cost of construction. Overall, Puget Sound Energy does not foresee any problems that would limit the supply of natural gas to the City of Shoreline in the future.

Transmission Main

Natural gas is currently supplied to most areas within the City of Shoreline through 136 miles of natural gas mains. Gas flows through the system through a 16 inch high pressure force main located along 5th Avenue NE. As of December 2011, Puget Sound Energy serves approximately 11,556 customers in the City of Shoreline with natural gas.

Distribution Network

Within the subarea, 4 to 8 inch high pressure mains run along Aurora Avenue N, NE 145th Street, 8th Avenue NE (between NE 145th Street and NE 155th Street), NE 155th Street, and 9th Avenue N (North of NE 155th Street). The majority of residential connections are through 5/8 inch laterals. A series of 1-1/4" to 2" distribution mains stem off the transmission mains, serving all

side streets within the subarea. **Figure 3.7-3** illustrates existing natural gas service in the subarea.

Current Demand

Puget Sound Energy serves approximately 760,000 natural gas customers in 10 counties within Washington State. Natural gas connections are extensive within the subarea. No demand quantities are presently available. Based on visual observation, the current configuration adequately services the subarea. Nearly all streets within the subarea contain a natural gas line; however, upsizing lines and connecting stub-outs to form loops may be necessary if the area is further developed.

3.7.1 f Communications

Purveyors

According to the Shoreline Comprehensive Plan, there are multiple communications companies operating within the City of Shoreline. Service within the city is provided through a network of overhead and underground services. Service providers that serve residential and commercial customers in the City of Shoreline are summarized below.

Comcast

Comcast provides land-line cable television, internet service, and Voice over Internet Protocol (VoIP) or digital telephone service. The City of Shoreline maintains a franchise agreement with Comcast to maintain and operate their cable and fiber optic network within the city limits. Comcast currently serves the entire City of Shoreline. No maps of Comcast's distribution network are currently available.

Frontier Communications

Frontier Communications provides land-line cable television, internet service, VoIP, and local telephone service to the community. The City of Shoreline maintains a franchise agreement with Frontier Communications to maintain and operate their cable and fiber optic network within the city limits. There is currently no franchise agreement with Frontier for the local telephone service. Frontier Communications does not serve the subarea. Their main service area is west of Meridian Avenue N and north of N 160th Street/NW Innis Arden Way. Frontier Communications currently has a duct bank running through the subarea, though the duct bank is only a tie-in from their service area in the northwest portion of the City of Shoreline and their Seattle Main Switch. Based on a conversation with a network engineer for Frontier Communications, there are no plans to extend services beyond their current service area.

CenturyLink

CenturyLink provides local telephone service to the area east of Meridian Avenue N, and south of N 160th Street/NW Innis Arden Way. CenturyLink serves the majority of the population within the subarea, serving everyone west of Meridian Avenue N. Currently, they do not have a franchise agreement with the City of Shoreline.

Integra Telecom

Integra Telecom provides a fiber optic data network within the City of Shoreline. They have a franchise agreement with the City

through July 24, 2026. They primarily serve commercial and institutional users. Their network is primarily along overhead lines. The network enters the City of Shoreline at the intersection of NE 145th Street and 5th Avenue N, runs east on NE 145th Street, and North on 8th Avenue NE. A service line continues along NE 155th Street across I-5, and south along 1st Avenue NE to NE 145th Street, where it continues east out of the subarea. Currently there are very few end users within the City of Shoreline. With the potential for future growth within the subarea, Integra Telecom has the potential for more service connections and possibly expanding their network in the future.

Zayo Group (formerly AboveNet Communications)

Zayo Group provides a fiber optic data network within the City of Shoreline. Prior to being purchased by Zayo Group, AboveNet Communications had a franchise agreement with the City of Shoreline, through September 9, 2021. Zayo Group is a global provider of bandwidth infrastructure services, including dark fiber, wavelengths, SONET, Ethernet, and IP services. They have network in seven countries and 45 states. They primarily serve commercial and institutional users. Zayo Group owns a Metro Dark Fiber Run along the west coast of the United States. The run continues along Aurora Avenue N, just west of the subarea limits. One service lateral branches off at the intersection of NE 165th Street and Aurora Avenue N, continues east along NE 165th Street, then south along Wallingford Avenue N. The service lateral continues along NE 155th Street though the subarea, and north along 8th Avenue N to NE 165th Street. The dark fiber provides a secure major bandwidth fiber optic connection for commercial and institutional users. Along with Integra Telecom, Zayo Group has the potential for future service connections within the subarea, if future commercial development growth occurs.

Communications Network

Figure 3.7-4 at the end of this section shows partial mapping of existing communications lines located within the subarea, as made available for this analysis. There are extensive communication lines and facilities located in the subarea that are not shown in the figure because this information was not made available for the purposes of this analysis.

Undergrounding of Utility Lines in the City of Shoreline

It is the goal of the City of Shoreline to facilitate undergrounding of utilities including power and communications lines in order to promote the health, safety, and general welfare of the residents of the community by:

- Removing potential hazards and blockages from the right-of-way;
- Achieving a more aesthetically pleasing community while improving property values; and
- Decreasing the vulnerability of service delivery due to the effects of natural disasters and storm events.

A proposed policy for the 145th Street Subarea Plan calls for developing a strategy for undergrounding overhead utilities in the subarea. As more capital improvements occur within transportation rights-of-way to facilitate future growth, more of the current overhead utilities could be relocated underground in coordination with the utility providers.

3.7.2 Analysis of Potential Impacts

3.7.2 a - Impacts Common to All Alternatives

The two action alternatives within the subarea would result in population growth. Any significant growth would ultimately require some improvements or upsizing of utilities to serve projected demands. Recommended improvements within this study are based on a planning level of analysis of each utility in relation to the area of rezoning and projected growth. The following recommendations represent an estimate of improvements likely to be necessary within the subarea under either of the action alternatives. Refer to Section 3.7.2b for an in-depth analysis of demand impacts for each rezoning alternative. A brief synopsis of certain facilities impacted by both the 145th Street and 185th Street subaresas is included in Section 3.7.5

Once the rezoning is adopted, each utility provider would be responsible for conducting more detailed modeling reflecting projected changes in land use in the subarea. With the more detailed modeling, upsizing and other facility improvement needs would be confirmed more definitively. The following improvements would need to be implemented regardless of which alternative is adopted.

Water

Seattle Public Utilities believes fire suppression is currently adequate within the service area with the exception of three fire hydrants on a 4" diameter pipe south of NE 155th Street, along Stone Avenue N, NE 153rd Street, and Interlake Avenue N. These three fire hydrants currently provide less than 1,000 gpm of fire flow. The International Fire Code (IFC), Appendix B requires a minimum of 1,000 gpm of fire flow suppression from all hydrants within a pipe network. Regardless of which alternative is selected, this pipe run of 1,300 feet will need to be upsized in order to provide fire suppression flow in the future. The Seattle Public Utilities also contains many water mains 6" or less in diameter, which many end in dead-end stub outs and do not currently contain fire hydrants. If new developments within the Seattle Public Utilities region of the subarea require a higher level of fire suppression, these pipes will need to be upsized and include additional fire hydrants.

The North City Water District contains many 6" diameter water mains with dead end stub outs. These pipes may need to be upsized to provide adequate fire suppression if development occurs within the North City Water District region of the subarea.

Wastewater

All mainline pipes within the subarea are 8" in diameter or larger. Many of the 8" diameter pipes may need to be upsized to provide suitable collection capacity for sewer flows from new developments when the subarea is rezoned and demand is increased. The subarea is served by gravity mains, and is located at the southern limits of the City of Shoreline. Many neighborhoods and developments feed into the wastewater collection system, including a portion of the 185th Street Subarea. Calculations regarding upsizing of the mainlines were based on the 145th Street Rezoning Alternatives only. Demand forecasting for areas outside the study area were not included.

Electricity

No capacity constraints were provided for the electricity network within the City of Shoreline. New development within the subarea may require sections of the overhead electricity lines be placed underground. Costs for undergrounding projects are typically placed on the developers, unless the project is part of a capital improvement project undertaken by the City, in which all utilities are required to be placed underground to accommodate the City's roadway improvements.

Natural Gas

No demand projections were available under existing conditions, so the capacity of the network could not be analyzed. In order to better serve future development within the subarea, many of the smaller gas mains could be connected to form loops. This information is based on observation. Future improvements and additions to the natural gas network are based solely on future customer requests for service.

Communications

None of the communications providers provided demand projections within the subarea, so the capacity of each network could not be analyzed.

Frontier Communications recently completed a major utility project within the City of Shoreline. They do not anticipate any improvements in the foreseeable future. The company currently serves only the western portion of the subarea, west of Meridian Avenue N. Their system is currently serving 25% of their projected capacity. They have the ability to take on 300% more customer base within their portion of the subarea.

Integra Telecom and Zayo Group serve primarily commercial and institutional customers. Under Alternative 2, 3, or 4, considerably more commercial development is projected within the subarea. With additional commercial development, these communication networks may extend their branch lines further within the subarea. Future improvements are based on forecasted development and anticipated customer request for service.

The only expense projected for communication networks is undergrounding their facilities that currently share poles with overhead electricity lines. Communication networks will be required to place their systems underground if developers or the City of Shoreline decides to underground existing utilities within a section of the city.

3.7.2 b - Future Growth Demand Forecasting

Future growth demand forecasting for each utility was performed by Otak, Inc. The analysis is based on an estimated utility demand multiplied by projected residential and commercial population forecasting for each zoning alternative. The demand forecasting is used specifically for this EIS analysis for the subarea based on a planning level of analysis. Detailed hydraulic modeling would need to be completed by utility providers in the future as part of updating comprehensive plans/master plans. Demand was forecast for build-out of each alternative. Recommended mitigation measures (including improvements) needed to serve build-out of each alternative is presented later in this section.

Water

Estimated water demand rates were projected for the three alternatives for the projected population in 2035, based on per capita demand rates discussed in section S.5.1a of this report. **Table 3.7-6** shows the demand for water related to the alternatives.

This analysis, as that for other utilities, was based on review of projected development and population within Traffic Analysis Zones (TAZs) served by the Seattle Public Utilities and North City Water District. Referencing of TAZs, which correlate to census tract population data, is a common practice in planning and assessment of potential impacts as part of environmental analysis. A map of the TAZs related to the subarea and included in the analysis is provided as **Figure 3.7-5** at the end of this section. Refer to this map in review of the discussion below, which describes assumptions related to TAZ areas.

The following recommendations for each alternative are based on a planning level of analysis of the system and review of supply and demand presented in the most current Comprehensive Plan for both the Seattle Public Utilities and North City Water District. Once the rezoning has been adopted for the subarea, both the North City Water District and Seattle Public Utilities would need to update their hydraulic model in congruence with their comprehensive master plans to determine exact upsizing and necessary improvements required to serve the forecasted population and land use.

Alternative 1—No Action

Based on water demand projections and population growth rates for 2035, implementation of Alternative 1—No Action would have little to no effect on the existing water system. The TAZ with the most improvements would be TAZ 96 and 104 within the North City Water District portion of the subarea, with 110% increase in demand for each zone, and TAZ 93 within the SPU portion, with a 230% increase in growth. The majority of improvements would most likely be upsizing 2" and 4" undersized mains within the subarea to provide adequate fire suppression for new developments.

Alternative 2— Connecting Corridors

Seattle Public Utilities

Complete build-out of Alternative 2, within the Seattle Public Utilities portion of the subarea would generate more demand over a larger area than projected under Alternative 3, with an increase over existing conditions by 320%. TAZ 137 is projected to see the most growth, with an increase of 1,380% over existing conditions; however, all the TAZs are projected to see an increase in population growth. Due to this, improvements would most likely be necessary throughout the Seattle Public Utilities portion of the subarea, including upsizing 2" and 4" mains and upsizing mains along NE 155th Street where a large portion of demand generation is forecasted.

North City Water District

Complete build-out of Alternative 2—Connecting Corridor would potentially increase water demand by up to 430% of the current demand within the North City Water District's portion of the subarea. Demand generation is very similar to Alternative 3, and

though less demand is forecasted in total under Alternative 2, improvements may be more extensive than under Alternative 3, due to the fact that Alternative 2 is projected to generate demand over a larger area. Specifically, north of NE 155th Street, Alternative 2 is projected to generate more demand and require additional improvements over Alternative 3. All TAZs within the North City Water District would receive growth and increased demand.

Alternative 3—Compact Community

Seattle Public Utilities

The only TAZ projected to see a major increase in demand within the SPU portion of the subarea is TAZ 137, with a 1,620% increase in demand.

North City Water District

The majority of demand generation will occur within the North City Water District portion of the subarea. All TAZs within the North City Water District portion would experience growth and increased demand, with the most growth occurring in TAZ 97, 99, 100, 104, 130, and 138, with an average growth increase of 1,550% over existing conditions. These TAZs are located south of NE 155th Street. Upsizing would most likely be necessary for all lateral mains within this region as the majority are 6" mains, and may not be large enough to accommodate the increase in population or provide adequate fire suppression under total build out of either action alternative.

Table 3.7-6—Demand for Water Service, All Alternatives

	EXISTING CONDITIONS	ALTERNATIVE 1—NO ACTION		ALTERNATIVE 2—CONNECTING CORRIDORS		ALTERNATIVE 3—COMPACT COMMUNITY	
	Total Water Demand (gpd)	Total Water Demand (gpd)	% Growth from Existing	Total Water Demand (gpd)	% Growth from Existing	Total Water Demand (gpd)	% Growth from Existing
Seattle Public Utilities:							
Totals	329,000	388,000	18%	1,379,000	320%	1,128,000	243%
North City Water District:							
Totals	361,000	538,000	49%	1,926,000	433%	2,170,000	501%
Total of Both Water Systems	690,000	926,000	34%	3,305,000	379%	3,298,000	378%

Wastewater

Estimated wastewater demand rates were projected for the three alternatives for the projected population in 2035, based on per capita demand rates discussed in section S.5.1b of this report. The following recommendations for each alternative are based on a visual analysis of the system and review of supply and demand presented in the 2010 Comprehensive Sewer Plan for the Ronald Wastewater District. Once the rezoning alternative has been decided upon for the subarea, Ronald Wastewater District will need to update their hydraulic model to determine exact upsizing and necessary improvements required to serve the forecasted population. **Table 3.7-7** shows the demand for wastewater related to the alternatives.

Alternative 1—No Action

Based on wastewater demand projections and population growth rates for 2035, implementation of Alternative 1—No Action would have little to no effect on the wastewater system, with 34% increase in projected demand over the existing system. The TAZs which would generate the most demand would be TAZ 93, 96, 104 and 105. Growth projections for Alternative 1—No Action should not require the upsizing of any pipes within the system.

Alternative 2—Connecting Corridors

Alternative 2—Connecting Corridors is projected to create an increase of wastewater demand by approximately 375% from existing. Increased demand generation would occur throughout the subarea, and all the TAZs are projected to see a substantial increase in demand throughout the subarea. Demand increases are projected to be highest in TAZs along the I-5 corridor, including 96, 97, 99, 100, 104, 130, 137, and 138. Demand increases would most likely extend north along 5th Avenue NE, and east along NE 155th Street and NE 145th Street. The entire subarea is projected to generate 3.86 million gallons of wastewater per day.

Alternative 3—Compact Community

Complete build-out of Alternative 3—Compact Community would have the largest demand generation forecasted for wastewater collection within the subarea, with a 376% increase in flow rates over the existing system; however, due to the compact zoning improvements, Alternative 2 would require a larger number of improvements. Under Alternative 3, increased demand is projected along the I-5 corridor, with improvements extending easterly to 15th Avenue NE, and some growth and improvements projected along NE 155th Street. Forecasted demand is expected to be highest in TAZs 97, 99, 100, 104, 105, 130, 137, and 138.

Table 3.7-7—Demand for Wastewater Service, All Alternatives

	EXISTING CONDITIONS	ALTERNATIVE 1—NO ACTION		ALTERNATIVE 2—CONNECTING CORRIDORS		ALTERNATIVE 3—COMPACT COMMUNITY	
	TOTAL SEWER DEMAND (gpd)	TOTAL SEWER DEMAND (gpd)	% Growth from Existing	TOTAL SEWER DEMAND (gpd)	% Growth from Existing	TOTAL SEWER DEMAND (gpd)	% Growth from Existing
Totals	813,000	1,090,000	34%	3,860,000	375%	3,866,000	376%

Electricity

Estimated demand rates for electricity were projected for the three alternatives for the projected population. **Table 3.7-8** shows the demand for electricity related to the alternatives.

Alternative 1 – No Action

Based on energy demand projections and population growth rates for 2035 Alternative 1 – No Action would have little to no effect on the electricity system network. The TAZs with the most demand generation would be TAZ 93, 96, 104,105, and 129.

Alternative 2—Connecting Corridors

Alternative 2—Connecting Corridors is projected to create an increase of energy demand by approximately 417% from existing. Nearly all the TAZs are projected to see a substantial increase in demand throughout the subarea. Demand increases are projected to be highest in TAZs along the I-5 corridor, including 96, 97, 99, 100, 130, 137, and 138. Demand increases would most likely extend north along 5th Avenue, and east along NE 155th Street and NE 145th Street. The entire subarea is projected to generate a demand of 4.90 billion BTUs per day.

Alternative 3—Compact Community

Alternative 3—Compact Community is projected to create an increase of energy demand by approximately 400% from existing. The zones projected to receive a substantial increase in demand include TAZ 25, 97, 99, 100, 103, 104, 130, 137, and 138. The entire subarea is projected to generate a demand of 4.74 billion BTUs per day.

Table 3.7-8—Demand for Electricity Service, All Alternatives

EXISTING CONDITIONS	ALTERNATIVE 1—NO ACTION		ALTERNATIVE 2—CONNECTING CORRIDORS		ALTERNATIVE 3—COMPACT COMMUNITY	
Energy (Thousand BTU/Day)	Total Energy (Thousand BTU/Day)	% Growth from Existing	Energy (Thousand BTU/Day)	% Growth from Existing	Energy (Thousand BTU/Day)	% Growth from Existing
948,000	1,285,000	36%	4,900,000	417%	4,737,000	400%

3.7.3 Mitigation Measures

3.7.3 a - Incorporated Plan Features

Incorporated plan features include improvements to services and facilities that are already being planned by the utility providers. These are described below to the extent that information was made available by existing providers. Additional improvements to the ones listed will be necessary to accommodate future development, depending on which land use plan is implemented. Refer to Section 3.7.3c for an approximate list of improvements necessary for each alternative in relation to the affected utility. Planned utility improvements in the subarea, along with additional recommended improvements to support implementation of the action alternatives (Alternatives 3, 2, or 1) are illustrated in **Figures 3.7-9 through 3.7-12** at the end of this section.

Water

Seattle Public Utilities

The SPU 2013 Water System Plan describes general funding allocation for different aspects of the water system. Due to the broad overview of the SPU 2013 Water System Plan, details were not specific to the Shoreline area, and in particular the region surrounding the subarea.

The only major capital improvement project that will affect the SPU portion of the subarea is the removal of the Foy Standpipe. The standpipe was constructed in 1933, and according to the 2013 Water System Master Plan, the standpipe was planned to be decommissioned in 2013. The standpipe is located at the intersection of NE 145th Street and Dayton Avenue N. The standpipe assisted serving the surrounding community with water storage. Due to the Foy Standpipe's proximity to the Bitter Lake Reservoir, located two blocks to the southeast, the standpipe was determined to no longer be a beneficial storage facility to the community.

The standpipe is located outside of the subarea, but demand generated from the subarea could be served by the Foy Standpipe and/or the Bitter Lake Reservoir. The section of the subarea that would be directly impacted by the Foy Standpipe will generate very little demand in relation to the rest of the subarea under all three scenarios, and the removal of the standpipe should have no effect on supplying potable water to the subarea.

North City Water District

The North City Water District is in the process of completing their ten-year Capital Improvement Plan from 2016 through 2026. The district is currently installing a new pump station to improve fire flow, and increase water circulation to portions of the North City Water District's service area. The addition of the new pump station will change their current hydraulic model. Once the pump station is running and they calibrate their hydraulic model, they plan to finalize their updated Capital Improvement Plan for the next 10 to 20 years, by the end of 2016. The following list of projects affecting the subarea is from their 2011 Water System Master Plan containing the most current published CIP list. The list contains recently completed and planned capital projects within the subarea for a 30-year improvement plan. Several of these projects have already been completed. The CIP list may change once their hydraulic model is updated.

1. Create the new 515 Pressure Zone. The North City Water District's portion of the subarea will predominately be within this new pressure zone. The total estimated cost to create the new pressure zone is $2,212,000, and is proposed for the year 2020. In order to create the new zone the following items need to occur:
    - **a.** New supply station feeding directly off the Tolt Transmission Main. The new supply station would be located near the intersection of NE 145th Street and 5th Avenue N. The estimated cost is $330,000.
    - **b.** New transition main along NE 155th Street from 6th Avenue N to 9th Avenue N, to provide looping at zone boundary and maintain fire flow capacity. This will provide zone separation between the new 515 Pressure Zone and the 615 Pressure Zone. The estimated cost is $169,000.
    - **c.** New parallel 8" and 10" transmission mains for a total length of 2,640 feet, along NE 158th Street and NE 160th Street, between 10th Avenue N and 15th Avenue N. Work includes installing a Pressure Reducing Valve (PRV) and new meter between the two pressure zones. The estimated cost is $1,162,000.
    - **d.** New 8" transmission main along NE 160th Street, between 26th Avenue NE and 27th Avenue NE for a total length of 1,000 feet, including a new PRV and backflow check valve between the two pressure zones. The project is not located within the subarea, but would assist the formation of the new pressure zone, ultimately assisting service within the subarea. The estimated cost is $462,000.
    - **e.** New 8" parallel transmission line along 5th Avenue NE, between NE 155th Street and NE 156th Street, for a total length of 210 feet. The project will provide looping at the pressure zone boundary and assist with fire flow capacity. The estimated cost is $89,000.

This project will greatly affect the subarea. Demand projections associated with the selected alternative should be entered into the North City Water District's hydraulic model to help project demand on the entire system, and determine the extent of improvements necessary to create the new 515 Pressure Zone, including

verifying the necessary withdrawal rate needed from the proposed Supply Station #5.

2. Replace 1,380 feet of 4" main with an 8" main along NE 151st Street and NE 152nd Street between 8th Avenue NE and 10th Avenue NE, to meet fire flow velocity criteria. The estimated cost of improvements is $619,000, and is proposed for 2026.

This improvement will greatly affect the subarea, especially for Alternatives 2 and 3 in TAZ 99, where the area is projected to see a 680% increase in water demand generation under Alternative 2 and 880% increase in water demand generation under Alternative 3. Depending on the alternative selected, this section of pipe may need to be increased to a larger diameter pipe to accommodate future demands.

3. Connect two 8" dead end mains near the intersection of 10th Avenue NE and NE 152nd Street with 140 feet of new pipe to improve water quality and flow within the pipe network. The estimated cost is $74,000, and is proposed for 2026.

Similar to item 2, this improvement will greatly affect the subarea, especially for Alternatives 2 and 3, located in TAZ 99, where the area is projected to see a 680% increase in water demand generation under Alternative 2, and 880% increase in water demand generation under Alternative 3. Depending on the alternative selected, not only may these water mains need to be connected, but the entire section of pipe may need to be increased to a larger diameter pipe to accommodate future demands.

The following CIP projects for the North City Water District will have little effect on the subarea. However depending on the zoning alternative selected, the subareas projected demands may impact these CIP projects. The North City Water District may need to reevaluate these projects' size and location depending on hydraulic modeling with the selected alternative's demands incorporated into the model:

1. Install 600 feet of new 12" transmission main along NE 160th Street, between 8th Avenue NE and 10th Avenue NE. This project will help section off the 615 Pressure Zone, located just north of the subarea. The estimated cost is $116,000, and is proposed for 2020.

2. Provide separation for the 615 Pressure Zone by closing existing valves at seven locations. One location is at the intersection of NE 156th Street and 5th Avenue NE, one block north of the subarea. The estimated cost is $113,000, and is proposed for 2020.

3. Provide separation for the 615 Pressure Zone at the intersections of 12th Avenue NE and NE 180th Street, 5th Avenue NE and NE 155th Street, and 3rd Avenue NE and NE 157th Street. The estimated cost is $114,000, and is proposed for 2020.

These three proposed CIP projects are located just north of the subarea. Alternative 2 – Connecting Corridors would have the most effect on these three projects, as growth is

projected around these locations. These projects are located within TAZs 96 and 129. Alternative 2 is projected to generate a 300% increase in demand within these two TAZs. Additional demand within the vicinity may change the design of these three projects.

Wastewater

Ronald Wastewater currently has no capital improvement projects proposed within the subarea.

Electricity

Seattle City Light does not generate a comprehensive plan of capital improvement projects. The main project underway within the City of Shoreline is undergrounding a section of electricity lines running along the Aurora Avenue N (Hwy 99) corridor. This project will abut the subarea, but should not have any major effect on rezoning within the subarea.

Natural Gas

Puget Sound Energy does not generate a comprehensive plan of improvement projects. Additionally, Washington State Utilities and Transportation Commission (WUTC) does not define natural gas as an essential service. Therefore, Puget Sound Energy is not required to provide service. Extension of service is based on individual requests. Overall, Puget Sound Energy does not foresee any problems that would limit the supply of natural gas to the City of Shoreline in the future.

Communications

Future Telephone Services and Facilities

According to the City of Shoreline's Comprehensive Plan, Washington Utilities Trade Commission regulations require CenturyLink and Frontier to provide adequate telecommunications service on demand; and Section 480-120-086 of the Washington Administrative Code (WAC) requires CenturyLink and Frontier to maintain adequate personnel and equipment to handle reasonable demand and traffic. Because CenturyLink and Frontier provide service on demand, there are no limits to future capacity. Additionally, telephone service should only be restricted by bandwidth constraints on fiber optic networks that provide this digital service.

Future Cable Television and Broadband Services and Facilities

Although the demand for cable television is likely to continue to increase as population grows, access to cable television in Shoreline is likely to increase at the same pace as population growth. However, the demand for broadband services, including cable television, telephone and internet services, is likely to continue to grow as networks are supported with additional bandwidth. This growth will most likely occur relative to internet service, as more content becomes accessible online, and as people continue to communicate and interact online. These broadband services can be provided over fiber optic, cable, or telephone networks.

3.7.3 b - Other Potential Mitigation Measures

Water

Seattle Public Utilities

Table 3.7-9 contains a list of distribution and transmission main improvements projected to accommodate future demands associated with each alternative.

Table 3.7-9
Seattle Public Utilities – Water System Upgrades

Alternative	8" Main (Feet)	12" Main (Feet)
#1—No Action	1,600	0
#2—Connecting Corridors	11,200	7,200
#3—Compact Community	6,100	4,100

Alternative 1—No Action

With only an 18% increase in demand over current conditions, minimal improvements are anticipated under Alternative 1 – No Action. TAZ 93 is projected to have 230% increase over existing conditions, and a few 4" dead-end mains may need to be upsized to 8" mains to provide adequate service to residences. Additionally, a loop of 4" mains within TAZ 25, along Stone Avenue N, N 153rd Street, and Interlake Avenue N may need to be upsized to 8" mains even though no rezoning is projected for TAZ 25. This section of water main contains three fire hydrants that do not supply adequate fire flow suppression to meet the current fire code. Upsizing this section of pipe to 8" mains is probable under all three alternatives. Approximately 1,600 feet of water mains may need to be upsized to 8" diameter mains under Alternative 1.

Alternative 2 & 3—20 Year Improvements

Alternatives 2 and 3 are projected to generate very similar demands within the subarea through 2035. For the next 20 years, increased demand within the Seattle Public Utilities portion of the subarea would primarily be within TAZ 137, converting primarily R-6 zones to Mixed Use Residential (MUR) developments of 35 to 85 feet depending on which alternative is selected. A number of the existing pipes within this TAZ are 4" and 6" diameter pipes, which may not be adequate for fire flow or water circulation under either alternative 2 or 3. Approximately 6,600 feet of existing 4" and 6" diameter mains may need to be upsized to 8" mains within the next 20 years, including the following:

1. 400 feet of pipe along NE 153rd street from Meridian Avenue N to Corliss Place N.
2. 600 feet of pipe along Corliss Avenue N, from NE 149th Street to NE 148th Street. This section of pipe may need to be upsized to 12" diameter mains under full build-out of either scenario.
3. 400 feet of pipe along NE 150th Street, from Meridian Avenue NE to Corliss Avenue NE. This section of pipe may need to be upsized to 12" diameter mains under full build-out of either scenario.
4. 500 feet of pipe along NE 148th Street from Meridian Avenue NE to Corliss Avenue NE.
5. 350 feet along Corliss Avenue NE, from NE 148th Street to NE 147th Street.

6. 700 feet along NE 147th Street, from Corliss Avenue NE to 1st Avenue NE.
7. 450 feet along 1st Avenue NE, from NE 147th Street to NE 145th Street. This section of pipe may need to be upsized to 12" diameter mains under full build-out of either scenario.
8. 600 feet along NE 147th Street, from the edge of the cul-de-sac to 1st Avenue NE.
9. 350 feet along NE 146th Street, from the edge of the cul-de-sac to Corliss Avenue NE.
10. 1,250 feet within the loop south of NE 155th Street, along NE 153rd Street to Stone Avenue NE to Interlake Avenue NE. Demand is not projected to be extensive within this neighborhood; however fire hydrants within this loop currently do not meet current standards for fire flow, and may need to be upsized regardless of which alternative is selected.

Alternative 2—Connecting Corridors

A 24" diameter high pressure main runs along NE 145th Street from a supply station at the intersection o f NE 145th Street and 5th Avenue N to Greenwood Avenue N, and along Aurora Avenue N, from NE 145th Street to NE 185th Street. The 24" diameter pipe was constructed in 1933 and relined in the 1980s. The 24" main serves as the main transmission main serving SPU's section of the subarea. The 24" main appears to have enough capacity to serve the growing community, though a hydraulic analysis should be completed with forecasted demands, based on the selected alternative, to evaluate the ability of the 24" main to serve the community in the future.

Alternative 2 – Connecting Corridors would generate more demand within the SPU portion of the subarea over a greater area than Alternative 3. Improvements to pipes within TAZs 136 and 137 would be very similar to Alternative 3, with added improvements to NE 154th Street, Corliss Place N, and NE 153rd Street, all within TAZ 126. Rezoning is proposed along NE 155th Street and NE 145th Street under Alternative 2. This may require upsizing a large portion of 8" water main along NE 155th Street, to 12" mains between Aurora Avenue N and Meridian Avenue N. Additionally, a number of dead-end 2" and 4" mains currently serving R-6 zones may need to be upsized to 8" mains if the zoning changes to a more urban development under this alternative. Approximately 11,200 feet of water mains may need to be upsized to 8" diameter, and 7,200 feet of mains may need to be upsized to 12" diameter to serve the projected demands.

Alternative 3—Compact Community

Alternative 3 – Compact Community has a relatively small area of direct impact within the Seattle Public Utilities District boundary. The region expected to receive the most growth would be within TAZs 136 and 137, and would be bounded by Meridian Avenue N to the west, I-5 to the east, NE 155th Street to the north, and NE 145th Street to the south. A number of undersized 2" and 4" mains may need to be upsized throughout the SPU's region of the subarea, especially within TAZ 137. A number of mains may need to be upsized to 12" diameter pipes to connect the existing 8" main along NE 155th Street to the 24" transmission main along NE 145th Street, through TAZ 136 and 137 to increase water circulation and improve fire flow for the projected demands. Approximately 6,100 feet of water mains may need to be upsized

to 8" pipes and 4,100 feet of water mains may need to be upsized to 12" diameter to serve the projected demands.

North City Water District

Table 3.7-10 contains a list of distribution and transmission main improvements projected to accommodate future demands associated with each alternative. The analysis performed was based on existing conditions. If the North City Water District creates the 515 Pressure Zone in the future, system upsizing may be different, based on proximity to a source of supply, and different pressure gradients.

The majority of the subarea is located within the North City Water District's 590 pressure zone. While the subarea is currently zoned primarily residential, redevelopment under any of the action alternatives (3 or 2) would introduce more intensive residential uses as well as neighborhoods-supporting commercial/retail. This change in land use would create a substantial increase in demand within this pressure zone.

Table 3.7-10
North City Water District – Water System Upgrades

Alternative	8" Main (Feet)	12" Main (Feet)
#1—No Action	4,600	0
#2—Connecting Corridors	20,700	21,300
#3—Compact Community	10,900	24,100

The North City Water District generated historical and projected water demands for the system, for each pressure zone. **Table 3.7-11** contains a comparison of the 2030 projected demand on the 590 pressure zone based on the existing growth rates, and demand estimated for the study are based on the rezoning alternatives.

According to this comparison, Alternatives 3 and 2 would generate far more demand than the entire pressure zone generates. Major system improvements likely would be necessary to accommodate the influx of demand generation within the North City Water District's portion of the subarea. Improvements to the water system are determined based on projected development growth and land use type.

Table 3.7-11
North City Water District – Demand Comparison

		ADD (MGD)[1]
Pressure Zone 590 - Year 2030		0.41
Subarea	Existing Conditions	0.36
	Alternative 1—No Action	0.54
	Alternative 2—Connecting Corridors	1.93
	Alternative 3—Compact Community	2.17

1. MGD = Million Gallons per Day

The potential improvements for each alternative are based on a planning level of analysis of the system. Utility providers would need to conduct detailed hydraulic modeling as part of future comprehensive planning/master planning updates to determine specific upsizing and facility improvement needs. The analysis

shows the potential demand on the system assuming the subarea is completely built out to the adopted zoning code.

Recommendations are based a conceptual schematic of what improvements likely would be necessary once the subarea is constructed to the limits of the proposed zoning area. Twenty year improvement needs are projected based on an anticipation of what would be needed to serve growth up to 2035, but assuming that some upsizing to levels that would serve full build-out may be needed. (It is not assumed that the utility providers would continually upgrade facilities multiple times, but rather would install facilities to serve the longest periods of growth possible

As part of future planning and analysis, utility providers would complete their own analyses to determine the appropriate phasing of improvements in the most efficient manner to serve growth over the next twenty years and beyond.

Alternative 1—No Action

Improvements necessary for Alternative 1 would coincide with the Capital Improvements Plan adopted by the District. Other improvements may include upsizing the 6" main along 10th Avenue N from N 155th Street to N 160th Avenue to accommodate demands generated in TAZs 98 and 129. Also improvements may need to occur in TAZ 105, which would receive an 86% increase in demand generation over existing conditions. This may require upsizing mains along NE 146th through 148th Streets and possibly installing a new pipe along 16th Avenue N between NE 145th Street and NE 150th Street to help circulate flow within the system. Approximately 4,700 feet of pipe may need to be upsized or installed to serve the projected demands.

Alternative 2 or 3—Twenty Year Improvements

Similar to the Seattle Public Utilities portion of the subarea, Alternatives 2 and 3 are projected to generate very similar demands within the subarea through 2035. Within the next 20 years, the North City Water District portion of the subarea is projected to increase demand by 88% percent, with the most demand projected within TAZs 97, 99, 100, 104, 130, and 138. Approximately 12,000 feet of existing 6" diameter mains may need to be upsized to 8" mains within the next 20 years, including the following:

1. 350 feet along NE 153rd Street, from the edge of cul-de-sac to 5th Avenue NE. This section of pipe may need to be upsized to 12" diameter mains under full build-out of either scenario.
2. 1,900 feet within the loop west of 5th Avenue NE, along NE 151st Street, 3rd Avenue NE, and NE 152nd Street. This section of pipe may need to be upsized to 12" diameter mains under full build-out of either scenario.
3. 2,000 feet along NE 152nd Street , from 5th Avenue NE to 12th Avenue NE. This section of pipe may need to be upsized to 12" diameter mains under full build-out of either scenario.
4. 550 feet along 8th Avenue NE, from NE 147th Street to NE 145th Street. This section of pipe may need to be upsized to 12" diameter mains under full build-out of either scenario.
5. 500 feet along NE 149th Street, from the end of the cul-de-sac to 5th Avenue NE. This section of pipe may need to be upsized to 12" diameter mains under full build-out of either scenario.

6. 1,150 feet within the loop south of NE 147th Street, along 9th Avenue NE, NE 146th Street, and 9th Place NE.
7. 1,400 feet within the loop east of 8th Avenue NE, along NE 150th Street, 9th Place NE, NE 148th Street, and 9th Avenue NE.
8. 900 feet along 10th Avenue NE, from NE 155th Street to NE 152nd Street.
9. 650 feet along NE 151st Street, from 8th Avenue NE to 10th Avenue NE.
11. 2,650 feet along 12th Avenue NE, from NE 155th Street to NE 145th Street. This section of pipe may need to be upsized to 12" diameter mains under full build-out of either scenario.

Alternative 2—Connecting Corridors

Alternative 2 – Connecting Corridors would generate high demands within TAZs 97, 99, 100, 103, 104, 130, and 138, with nearly the same amount of demand as generated in Alternative 3, most likely requiring a number of the existing 6" and 8" water to be upsized, and dead end mains connected into loop networks to improve pressure distribution and fire flow suppression throughout the region bounded by NE 155th Street to the north, NE 145th Street to the south, I-5 to the west, and 16th Avenue to the east.

Under alternative 2, demand generation would expand past the northern boundary of NE 155 Street within TAZs 96, 98, and 129, potentially requiring water main upsizing to extend along 3rd, 5th, 6th, 9th, 10th, 11th, 12th, and 14th Avenues. Additionally to close the loop between 10th Avenue and 15th Avenue, an additional 8" water main may need to be installed along NE 158th Street (currently within the North City Water District's Capital Improvement Plan). Approximately 20,700 feet of water mains may need to be upsized to 8" pipes and 21,300 feet of water mains may need to be upsized to 12" diameter to serve the projected demands. In addition, the storage reservoirs servicing the applicable pressure zone within the subarea should be analyzed to verify adequate storage is accessible to residents for fire suppression and recommended two-day standby storage if a water source becomes off line.

Alternative 3—Compact Community

Similar to Alternative 2, high demands projected within TAZs 97, 99, 100, 103, 104, 130, and 138, would most likely require a number of the existing 6" and 8" water mains to be upsized, and dead end mains connected into loop networks to improve pressure distribution and fire flow suppression throughout the region bounded by NE 155th Street to the north, NE 145th Street to the south, I-5 to the west, and 16th Avenue to the east. The 8" main along 8th Avenue NE and along NE 147th Street and NE 148th Street may need to be upsized to 12" mains to accommodate demands, due to the change from R-6 zoning to Mixed Use Residential with 35 foot to 45 foot high buildings throughout this portion of the subarea. Approximately 10,900 feet of water mains may need to be upsized to 8" pipes and 24,100 feet of water mains may need to be upsized to 12" diameter to serve the projected demands. In addition, the storage reservoirs servicing the applicable pressure zone within the subarea should be analyzed to verify adequate storage is accessible to residents for fire suppression and recommended two-day standby storage if a water source becomes off line.

Wastewater

Table 3.7-12 contains a list of sewer main improvements projected to accommodate future demands associated with each alternative.

Ronald Wastewater District – System Upgrades

Table 3.7-12

Alternative	12” to 15" Main[1]	18" or Larger Main[2]	Potential Upsize of 18” Trunk Main	Potential Upsize of 30” Trunk Main
#1 — No Action	0 ft	0 ft	0 ft	0 ft
#2 — Connecting Corridors	8,800 ft	3,000 ft	130ft	1,400 ft
#3 — Compact Community	8,400 ft	2,300 ft	130 ft	1,400 ft

Alternative 1—No Action

Potential demand generation from the Alternative 1—No Action would create a 34% increase in wastewater generation. No pipe upsizing should be necessary to accommodate future growth, based only on demand projections within the subarea. The analysis did not consider wastewater generated outside of the subarea in combination with the projected demands. No costs are associated with the adoption of Alternative 1.

Alternative 2 or 3—Twenty Year Improvements

Alternatives 2 and 3 are projected to generate very similar demands within the subarea through 2035. Within the next 20 years, Ronald Wastewater District is projected to increase demand by 68% percent within the subarea, with the most demand projected within TAZs 97, 99, 100, 104, 130, 137, and 138. Based on the assumption of maximum sewer flow rates with minimum pipe slope for demand generated solely from development within the subarea, all pipes within the subarea are of adequate size to accommodate the projected population for the next 20 years, with the exception of one pipe run.

According to the most recent GIS information, supplied by the City of Shoreline, the trunk main collecting wastewater for basin #24, located, through an easement east of 9th Avenue NE, reduces from an 18” diameter pipe to a 10” diameter pipe between NE 146th Street and NE 145th Street. This 130 foot section of pipe would most likely need to be upsized to an 18” diameter pipe if Alternative 2 or 3 is selected. Before complete build-out of either Alternative 2 or 3, this section of pipe would need to be reevaluated, and may need to be upsized to a 24” diameter pipe. The pipe run enters the City of Seattle, on the south side of NE 145th Street. Additional evaluation will need to occur to verify the pipe diameter is adequate with the inclusion of additional flows from customers in Seattle.

Alternative 2—Connecting Corridors

Alternative 2 – Connecting Corridors would generate nearly the same amount of demand as generated in Alternative 3. Under Alternative 2, demand generation would expand past the northern boundary of NE 155 Street within TAZs 96, 98 and 129, potentially requiring sewer main upsizing to extend along 8th Avenue NE from NE 160th Street to NE 150th Street, increasing the pipe diameter to a 12” diameter pipe; and from NE 150th Street to NE 145th Street, where it may need upsizing to an 18” diameter pipe.

A 30" diameter trunk main runs along the eastern edge of the I-5 corridor, collecting wastewater flow from as far north as NE 190th Street, down through regions within the subarea, and exiting the City at NE 145th Street. Disregarding all wastewater collection north of the subarea, the 30" pipe may need to be evaluated for capacity based solely on the projected wastewater collection within the subarea. Based on the observed collection area connecting to the 30" transmission main, and a multiplier of 4 to convert average daily demand to peak demand, the 30" trunk main may receive up to 13.4 cubic feet per second (cfs) of wastewater. According to Table 28.3 of the Civil Engineering Reference Manual, 12th Edition, a 30" diameter pipe flowing full at a minimum slope can handle 9.96 cfs. Since slope of the 30" trunk main was not evaluated, a conservative assumption was used that the pipe was constructed with a minimum slope. For purposes of quantifying improvements, approximately 1,400 feet of the 30" trunk main was assumed to need upsizing to a 36" main, from NE 149th Street to NE 145th Street. The pipe was not evaluated south of NE 145th Street, as this is where it enters the City of Seattle. Once the main crosses south of NE 145th Street, it is owned and operated by King County.

The trunk main located between NE 146th Street and NE 145th Street, through an easement east of 9th Avenue NE leaves the City of Shoreline through a series of 18" diameter mains. This trunk main is the primary transmission main collecting wastewater from basin #24 within the Ronald Wastewater District. Within the easement between NE 146th Street and NE 145th Street, the pipe is reduced to a 10" diameter main. This main will most likely need to be upsized. To accommodate the projected flows from Alternative 2, excluding additional flow from outside of the subarea, the pipe may need to be upsized to a 24" main. The pipe was not evaluated south of NE 145th Street, as this is where it enters the City of Seattle. Approximately 130 feet of this trunk main may need to be upsized to 24" diameter pipe.

The existing 12" main under Interstate-5 along NE 149th Street may need to be upsized to an 18" diameter main to accommodate potential flow from TAZs 94, 136, and 137.

The same evaluation from the Civil Engineering Reference Manual, 12th Edition was performed on all main collection pipes within the subarea. The existing 8" diameter mains along 5th Avenue NE and 6th Avenue NE, from NE 152nd Street to NE 145th Street; and along 15th Avenue NE, from NE 148th Street to NE 145th Street may need to be upsized to 12" mains. Also upsizing may need to occur along NE 155th Street from Ashworth Avenue N to Meridian Avenue N through a combination of 12" and 18" diameter mains.

In total, approximately 8,800 feet of sewer mains should be upsized to 12" diameter mains, 3,000 feet of sewer mains should be upsized to 18" diameter mains, 130 feet of the 10" diameter sewer trunk main may need to be upsized to a 24" diameter main, and 1,400 feet of the 30" trunk main may need to be upsized to a 36" diameter main under Alternative 2.

Alternative 3—Compact Community

Alternative 3 is projected to increase demand primarily between Meridian Avenue N to the west, 15th Avenue NE to the east, NE 155th Street to the north, and NE 145th Street to the south.

The 30" trunk main along the I-5 corridor may need to be upsized to a 36" diameter main, from NE 149th Street to NE 145th Street based solely on demand projections within the subarea.

130 feet of the 10" diameter trunk main through the easement east of 9th Avenue NE, between NE 146th Street to NE 145th Street may need to be upsized to a 24" diameter main. Also the two existing pipes under I-5, connecting pipe runs within TAZs 136 and 137 along NE 149th Street and NE 147th Street may need to be upsized to accommodate the increase in flow.

Additionally 8" mains located along 5th Avenue NE, and 6th Avenue NE, from NE 155th Street to NE 145th Street; along 8th Avenue NE, from NE 155th Street to NE 150th Street; and along 15th Avenue NE, from NE 148th Street to NE 145th Street may require upsizing. These pipes, under minimum slope and full flow condition may require upsizing to 12" pipes, based solely on projected demand within the subarea.

In total, approximately 8,400 feet of sewer mains should be upsized to 12" diameter mains, 2,300 feet of sewer mains should be upsized to 18" diameter mains, 130 feet of the 10" diameter sewer trunk main may need to be upsized to a 24" diameter main and 1,400 feet of the 30" trunk main may need to be upsized to a 36" diameter main under Alternative 3.

Electricity

Although no data was made available for Seattle City Light's existing distribution network, primary improvement to the system would be undergrounding existing overhead lines when new developments are constructed within the subarea, as feasible.

Alternative 1—No Action

The primary energy demand increase would occur in TAZs 93, 96, and 105. Though nowhere near the demand generation projected under Alternative 2 or 3, these areas are located at the far ends of the subarea, away from Seattle City Light's transmission corridor. These areas may require additional distribution lines and transformers to provide adequate service to customers.

Alternative 2—Connecting Corridors

Alternative 2 would create a spread out demand generation over all of the TAZs. The TAZs that are projected to see the most increase in demand are TAZ 25, 96, 97, 99, 100, 130, 137, and 138. The majority of demand generation is projected near the transmission corridor along 8th Avenue N, requiring minimal upsizing of power lines. However, extensive demand generation would occur as far away as Aurora Avenue N under this zoning scenario. Increased demand is projected predominately along NE 155th Street and NE 145th Street, potentially requiring additional distribution lines and transformers along these streets, as well as connections across Interstate 5.

Alternative 3—Compact Community

The majority of the subarea would see a substantial increase in energy use under Alternative 3 at build-out, but this would occur gradually over many decades. TAZs 25, 97, 99, 100, 103, 104, 130, 137, and 138 are projected to increase substantially in electricity demand. These TAZs are located around the I-5 Corridor, between NE 155th Street to the north, NE 145th Street to the south, Meridian Avenue N to the west, and 15th Avenue N to the east. Electricity demand generation is projected to increase by 1,600% collectively for these TAZs. All the mentioned TAZs, with

the exception of TAZ 137 are located East of I5, near the Seattle City Light Transmission Corridor. Power line upsizing and distribution line coverage within these TAZs would be relatively simple, do to their proximity to the transmission main corridor. Increasing power to TAZ 137 and 136 may require upsizing the connection underneath I-5. No issues are anticipated in acquiring the additional energy supply to serve the subarea. Zones west of I-5 are located further from the Seattle City Light transmission corridor and may require upsized distribution lines and transformers to adequately serve these areas.

Natural Gas

No data was provided to support analysis of demand for Puget Sound Energy natural gas. Puget Sound Energy is a privately owned company. All improvements are based on future customer requests, and funding for future growth would be financed by customer fees within the region. Because natural gas is readily available to the area, it is not anticipated that there would be any issues in extending service to accommodate future growth.

Energy Efficiency and District Energy Considerations

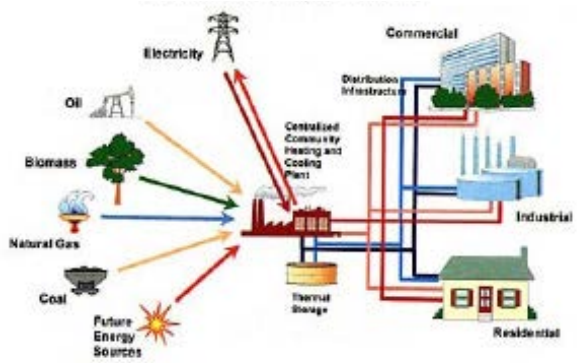
Related to energy use, including electricity and natural gas, technological advancements in building systems and design are improving efficiency on an ongoing basis. New developments are more commonly integrating green building and alternative energy systems (solar, geothermal, etc.), as well as more energy efficient design and fixtures. These approaches will maximize energy conservation and help the region and city achieve Climate Action Plan goals, in addition to reducing impacts on energy providers. The City intends to explore the potential implementation of district energy and encourage combined heat and power systems with redevelopment as called for in the Subarea Plan policies. The City also intends to pursue a solarization program, community solar, or other innovative ways to partner with local businesses and organizations to promote installation of photovoltaic systems.

Potential District Energy Systems

Community and district energy systems refer to the technologies for local generation, distribution and efficient end-use of energy in residential, commercial, industrial, and municipal structures, infrastructure and processes. A comprehensive district energy system also entails the strategic alignment of land uses and urban design features to optimize energy technology performance and to reduce transportation fuel consumption. These include smart-growth features, and in particular mixed-use and transit-oriented development, as they create spatial conditions enabling the economical use of distributed generation and co-generation energy technologies. However, for the purpose of this section, we will focus on centralized community thermal – combined heating and cooling systems, also known as "district energy systems".

District energy systems contribute to community sustainability and security by maximizing the efficient use of a variety of fuels to co-generate and deliver electricity and thermal energy, locally. Because district energy thermal networks aggregate and link the heating and cooling requirements of dozens or hundreds of buildings, they create a greater scale of thermal energy use in a community that facilitates fuel flexible solutions at a central plant or plants and allow for thermal storage applications that would not otherwise be functionally or economically feasible on an individual building basis. In addition to fossil fuels, district energy systems can utilize a combination of locally available renewable

resources such as municipal solid waste, community wood waste; landfill gas, wastewater facility methane, biomass, geothermal; lake or ocean water and solar energy. District energy systems also improve local economies by increasing energy reliability, stabilizing energy costs, attracting new businesses to the district served by the system, increasing property values and ultimately, by re-circulating energy dollars in the local economy through capital investment, construction and operation and maintenance jobs water and solar energy. District energy systems also improve local economies by increasing energy reliability, stabilizing energy costs, attracting new businesses to the district served by the system, increasing property values and ultimately, by re-circulating energy dollars in the local economy through capital investment, construction and operation and maintenance jobs.



Diagrammatic components of a district energy system

The City of Shoreline will be conducting an opportunity study to determine the potential for implementation of district energy in the light rail station subareas and potentially other locations where land uses will be transforming in the future.

Communications

No data was provided for any of the communication companies' distribution networks. The primary improvement to the system would be undergrounding existing overhead lines when new developments are constructed within the subarea. All communication networks are privately owned entities. Funding to serve future growth would be financed by customer fees within the region. As such, there would not be adverse impacts associated with providing communication services in the future under any of the alternatives.

3.7.4 Significant Unavoidable Adverse Impacts

Increased demand for utilities services and facilities within the subarea would occur under all three alternatives. Though Alternative 3 typically generates the most demand for each utility, improvements would be concentrated between Meridian Avenue N to the west, 5th Avenue N to the east, NE 155th Street to the north, and 145th Street to the south. Alternative 2 generates demand within a much larger area, extending to Aurora Avenue N to the west and NE 165th Street to the north, potentially requiring more costly and extensive improvements to accommodate projected growth in the extended subarea. Alternative 1 would produce the least amount of demand generation, requiring little to no improvements outside of the currently planned CIP projects outlined in each utility's comprehensive plan. As the subarea grows in population, households, and businesses, existing utilities will need to upgrade their systems to accommodate future growth.

Growth and change would be expected to occur gradually over many decades under either of the action alternatives. Implementation of full build-out of Alternative 3—Compact Community would take 63 to 98 years. Alternative 2—Connecting Corridors would take 60 to 94 years to reach full build-out. As such, utility service providers would be able to monitor growth and adapt management, services, and facilities to serve increases in demand over time, assuming that funding keeps pace with growth. Given these long timeframes, it is also likely that technological innovations, behavioral changes, and more stringent building and energy codes may also mitigate impacts related to utilities. Energy efficiency may be achieved through combined heat and power systems, the potential use of solar power and/or geothermal, and other applications.

With application of the capital improvement projects proposed by each utility district and upsizing facilities discussed above, along with regulatory requirements, no significant unavoidable adverse impacts would be anticipated.

3.7.5 Combined Subarea Improvements Effect on Infrastructure

The 145th Street Station EIS and 185th Street Station EIS were analyzed as standalone rezoning alternatives. Depending on which alternative is selected for each subarea, the resultant zoning policy would have a combined effect on the supporting infrastructure.

Water

Seattle Public Utilities

The Seattle Public Utilities portion of both subareas are within its own 590 Pressure Zone, and fed by the same supply stations, booster pumps, and storage reservoir. Due to the extensive nature of the Seattle Public Utilities water system, a proper analysis could not be performed between the two subareas and connecting appurtenances. Once the desired alternatives have been selected, the hydraulic model should be updated to properly evaluate all supply stations, booster pumps, and reservoirs connected to the system. **Table 3.7-13** provides a side by side analysis of the two study areas water demand rates.

Seattle Public Utilities - Combined Subarea Water Demand Analysis
Table 3.7-13

145th Street Subarea					
	Existing Conditions	Alternative 1	Alternative 2	Alternative 3	
Withdrawal Rate (GPM)	228	269	958	783	
Recommended Storage (MGPD)	0.66	0.78	2.76	2.26	
185th Street Subarea					
	Existing Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Withdrawal Rate (GPM)	216	244	813	1,644	1,710
Recommended Storage (MGPD)	0.62	0.70	2.34	4.74	4.92

North City Water District

One concern with the combined effect of both subareas on the existing system is the North City Water District's current approved rate of withdrawal from Seattle Public Utility's Tolt River Transmission Main. The current approved maximum withdrawal rate from the transmission main is 3,300 gallons per minute. **Table 3.7-14** provides a comparison of the two study areas to the maximum withdrawal rate.

This analysis does not include demand from the rest of the North City Water District, which relies on this withdrawal rate as well. Based only on the two subareas, if the highest population density zoning alternatives are selected for both subareas, the North City Water District will have a deficit in their current water withdrawal rate. Seattle Public Utilities has ample capacity to provide more water to the North City Water District, and the peak flow allocation can be revised as needed to meet the growing demand, as the City of Shoreline develops.

Table 3.7-14
North City Water District - Source of Supply Analysis for Alternatives

North City Water District Maximum Withdrawal Rate (GPM)			3,300	
145th Street Subarea				
Existing Conditions (GPM)	Alt 1 (GPM)	Alt 2 (GPM)	Alt 3 (GPM)	
251	374	1,338	1,507	
185th Street Subarea				
Existing Conditions (GPM)	Alt 1 (GPM)	Alt 2 (GPM)	Alt 3 (GPM)	Alt 4 (GPM)
249	274	536	1,228	1,846

Currently, both the 145th Street Subarea and 185th Street Subarea are within the 590 Pressure Zone, and fed by the same supply stations, booster pumps, and storage reservoir. If the highest population density zoning alternatives are selected for both subareas, all connecting appurtenances will need to be analyzed in conjunction with the demand generated from the surrounding community. If the new pressure zone, 515 is constructed around the 145th Street Subarea, the two subareas will no longer be connected, and the only resource used by both communities would be the 3.7-million gallon storage reservoir located near the intersection of 15th Avenue NE and NE 177th Street. This reservoir currently serves the 615 and 590 pressure zones, and would serve as backup storage for the proposed 515 Pressure Zone. The reservoir would still need to supply standby storage of two times the average daily demand for all three pressure zones. **Table 3.7-15** contains a comparison of maximum available storage within the reservoir to two times the average daily demand for both subareas under each scenario. Based on this information, the storage reservoir may be undersized for full build-out of the highest population density zoning alternative selected for both subareas.

North City Water District - Standby Storage Analysis
Table 3.7-15

North City Water District Available Effective Storage (Millions of Gallons)[1]				
3.7				
145th Street Subarea - Average Daily Demand x 2				
Existing Conditions - 2 x ADD (MGPD)[2]	Alt 1 - 2 x ADD (MGPD)	Alt 2 - 2 x ADD (MGPD)	Alt 3 - 2 x ADD (MGPD)	
0.72	1.08	3.85	4.34	
185th Street Subarea - Average Daily Demand x 2				
Existing Conditions - 2 x ADD (MGPD)	Alt 1 - 2 x ADD (MGPD)	Alt 2 - 2 x ADD (MGPD)	Alt 3 - 2 x ADD (MGPD)	Alt 4 - 2 x ADD (MGPD)
0.72	0.79	1.54	3.54	5.32

1.) Effective Storage was taken as the entire volume of the 3.7 million gallon reservoir, assuming nested standby and fire suppression storage, and not factoring in equalizing storage for the purposes of this report.
2.) Million Gallons Per Day (MGPD)

Wastewater

The primary concern with the combined effect of both subareas on the existing system is a possible lack of carrying capacity of the prime trunk main collecting wastewater from both subareas. The majority of the 185th Street and 145th Street subareas collect wastewater within basins 16, 17, and 18. The trunk main begins at NE 175th Street and Meridian Avenue N in the 185th Street subarea, as a 24" diameter pipe, collecting wastewater from as far north as NE 190th Street, as far west as Ashworth Avenue N, and as far east as 15th Avenue NE. This trunk main continues south along Meridian Avenue N, Corliss Avenue N, and along the I-5 Corridor, collecting wastewater from a large portion of the City of Shoreline as it heads south. The trunk main turns into a 30" main at the intersection of NE 155th Street and I-5, as it enters the 145th Street Subarea. **Table 3.7-16** provides a comparison of the estimated peak flow (4 x average daily demand) for the two subareas entering this trunk main.

Table 3.7-16
Ronald Wastewater - Basin #23 Combined Subarea Peak Wastewater Estimated Flow Analysis

145th Street Subarea				
Existing Conditions (CFS)	Alt 1 (CFS)	Alt 2 (CFS)	Alt 3 (CFS)	
3.04	3.96	14.36	13.38	
185th Street Subarea				
Existing Conditions (CFS)	Alt 1 (CFS)	Alt 2 (CFS)	Alt 3 (CFS)	Alt 4 (CFS)
2.24	2.50	3.93	11.70	13.58

This analysis does not include demand from the rest of sewer collection basins, which drain into this trunk main. Based only on the two subareas, if the highest population density zoning alternatives are selected for both subareas, the Ronald Wastewater District may need to upsize a large portion of this pipe. Additionally, this pipe is owned and operated by King County once it crosses south of NE 145th Street. SPU will need to evaluate the capacity of this pipe once it enters their system, based on the projected demand from the selected alternatives.

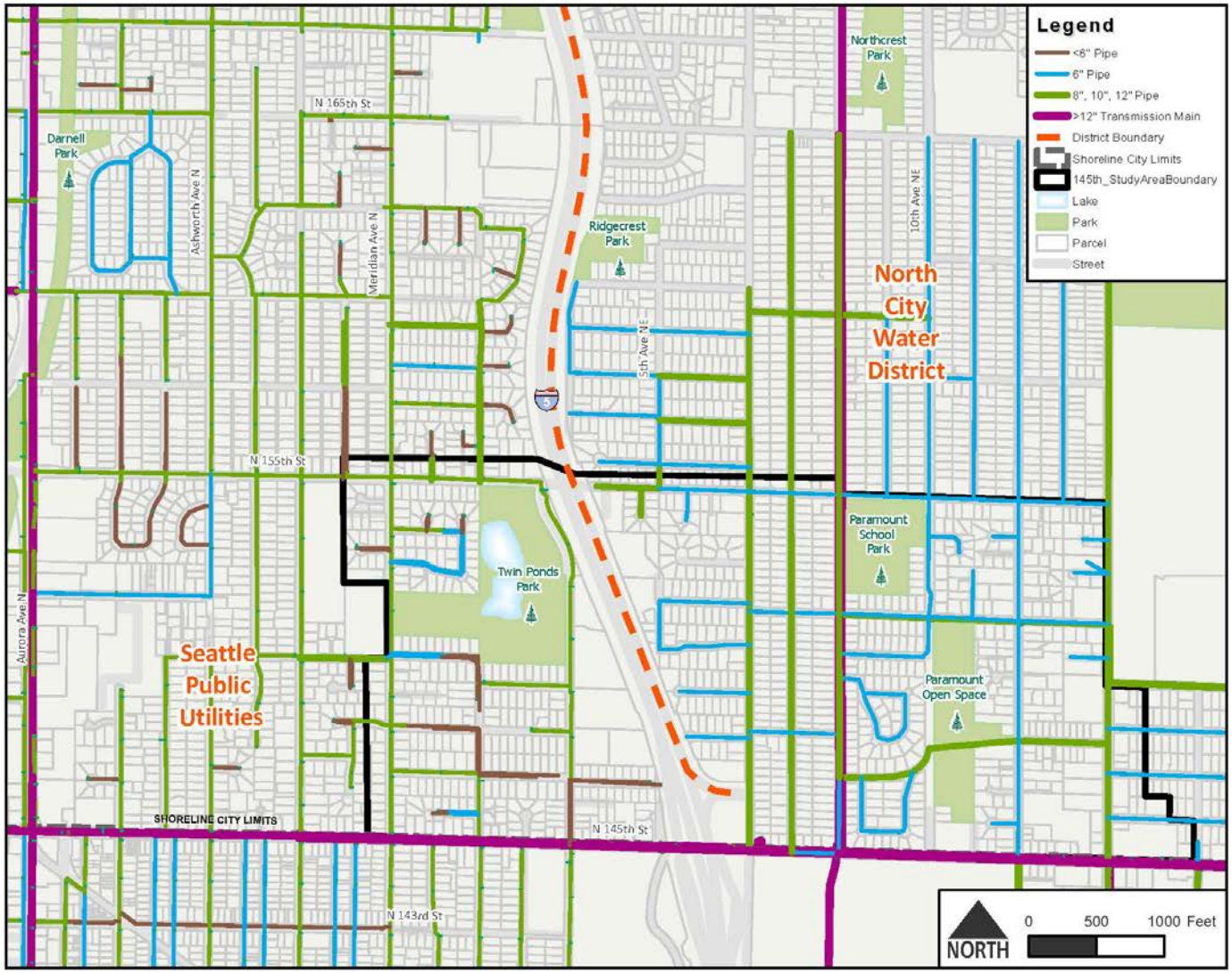


Figure 3.7-1 Existing Water Facilities in the Subarea

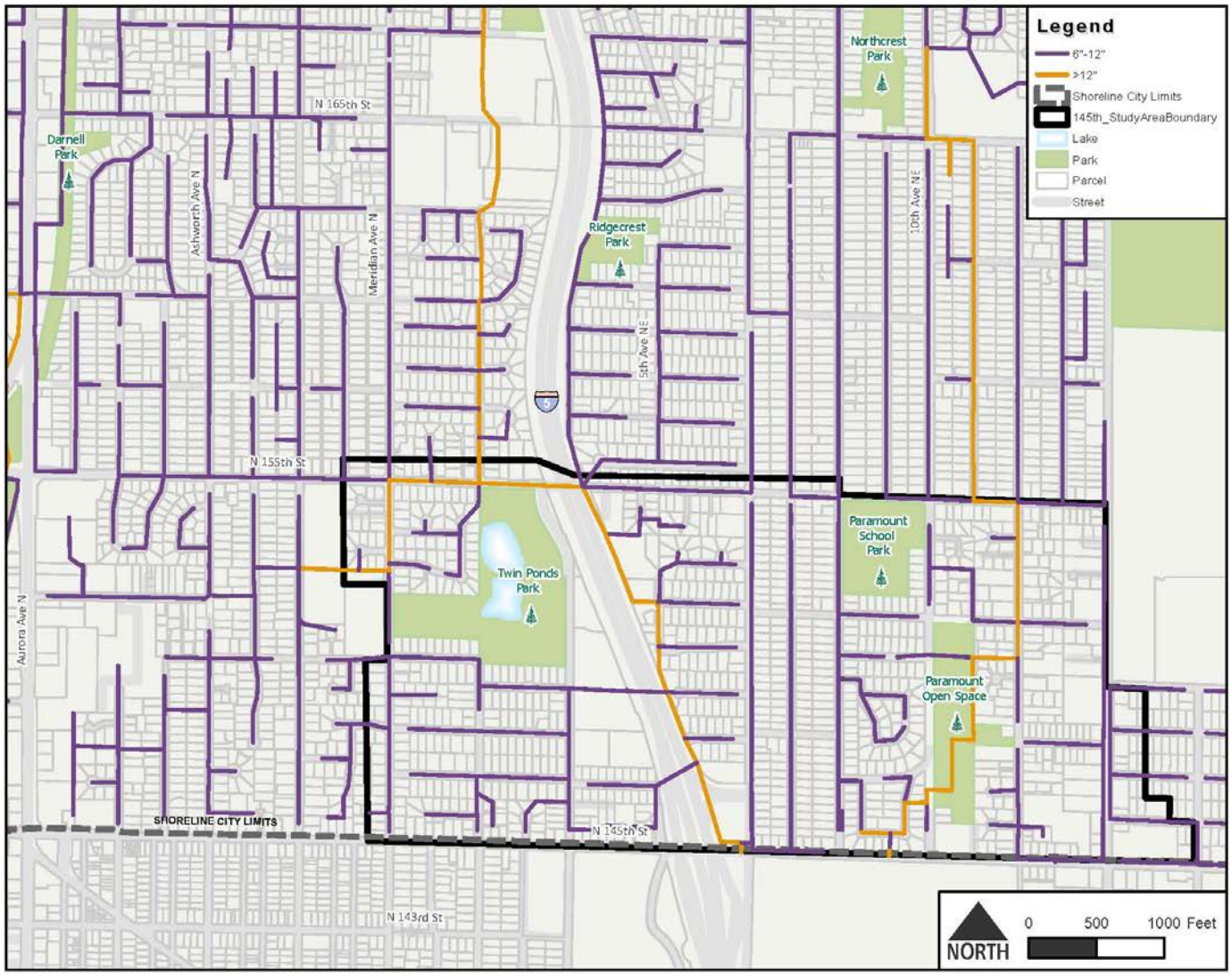


Figure 3.7-2 Existing Wastewater Facilities in the Subarea

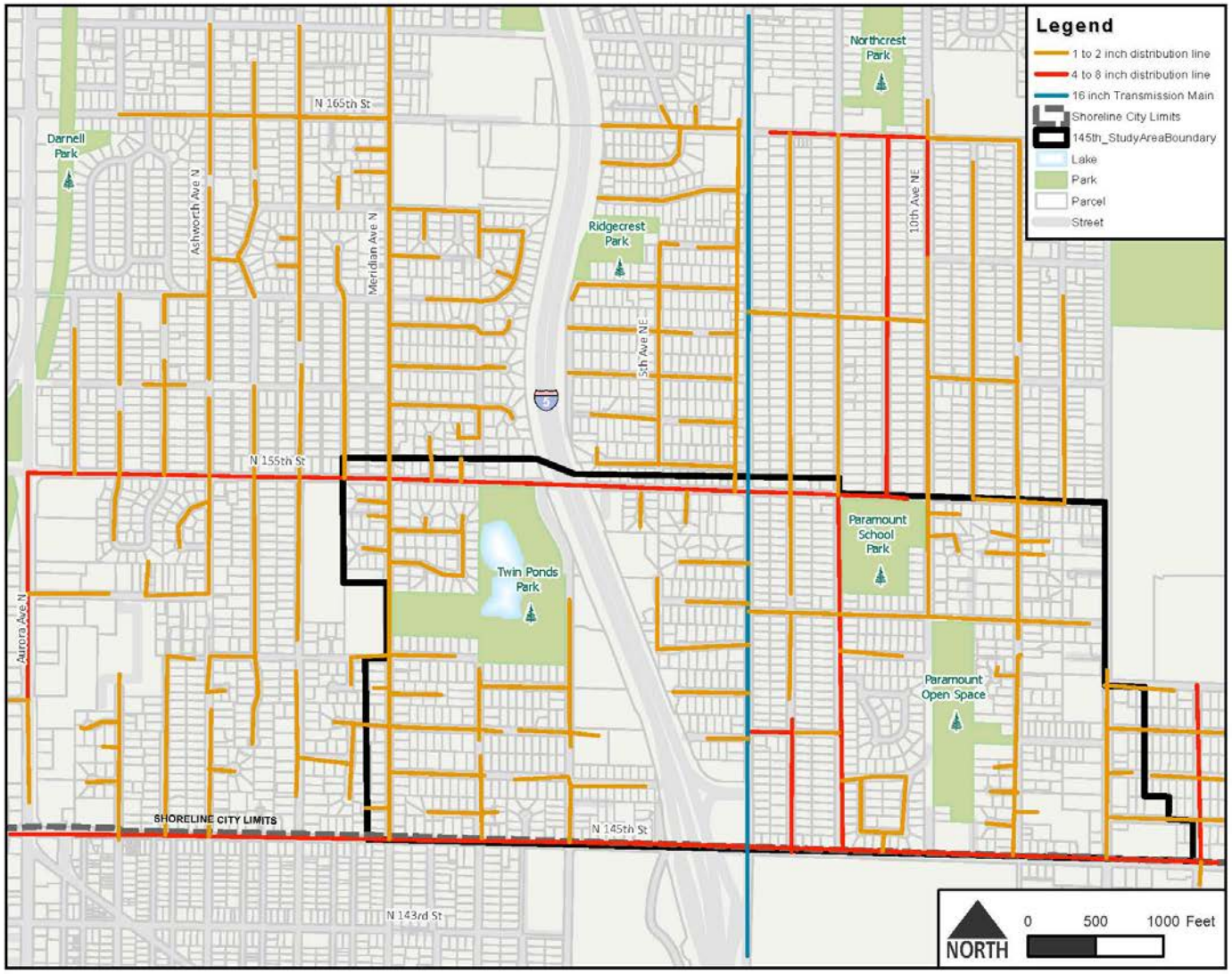


Figure 3.7-3 Existing Natural Gas Facilities in the Subarea

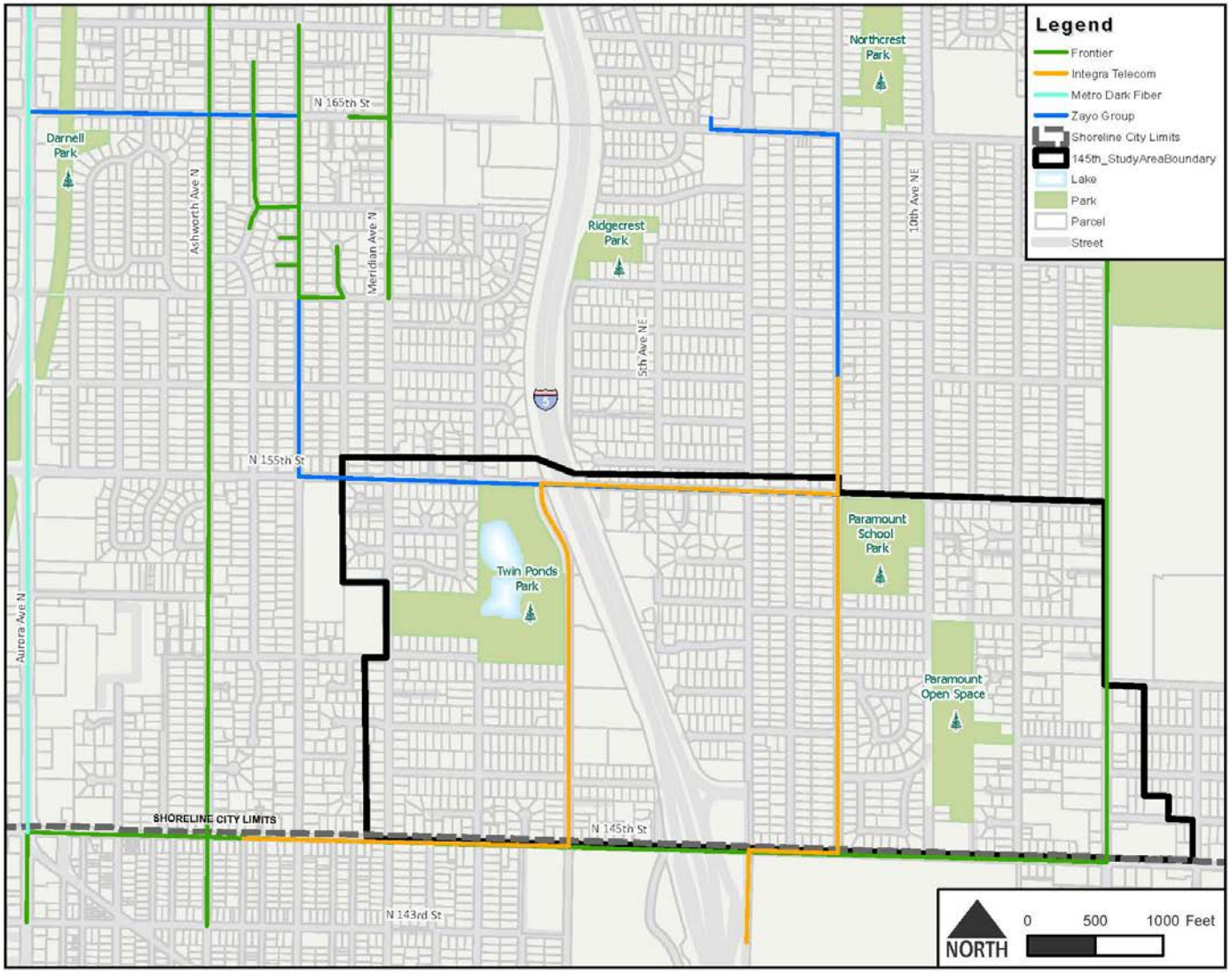


Figure 3.7-4 Existing Communications Facilities in the Subarea

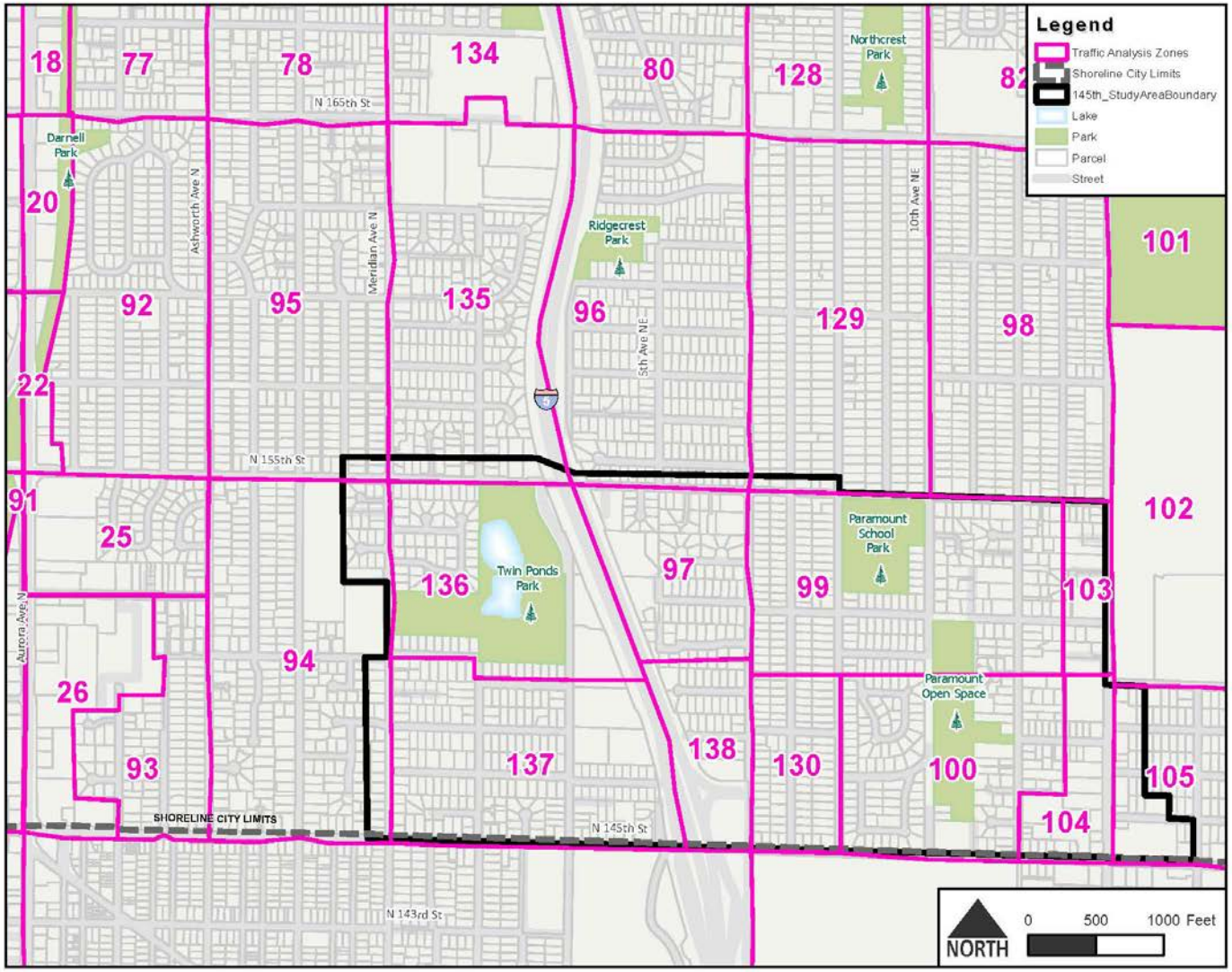


Figure 3.7-5 Traffic Analysis Zones (TAZs) in the Subarea

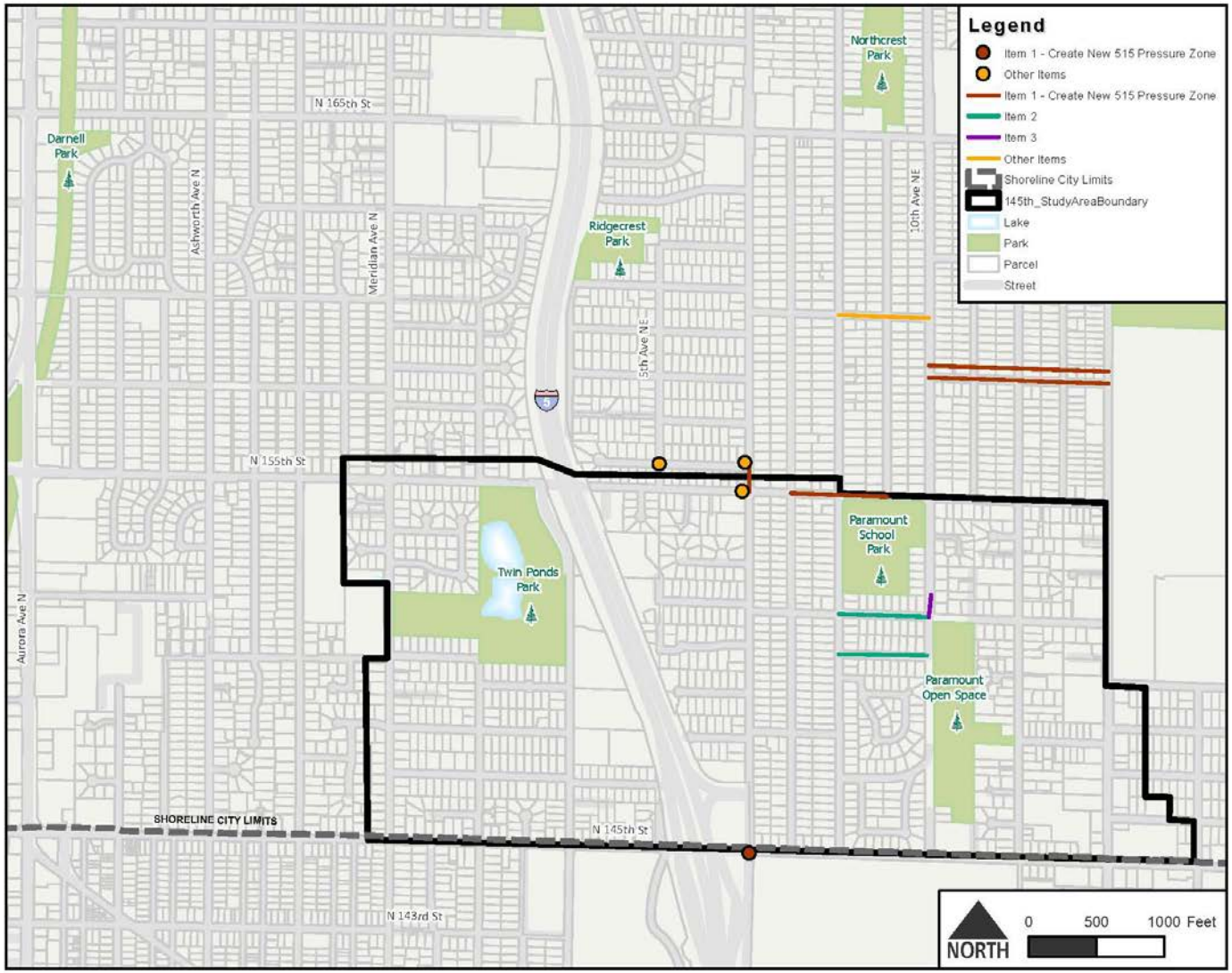


Figure 3.7-6 Planned Water Improvements in the Vicinity of the Subarea

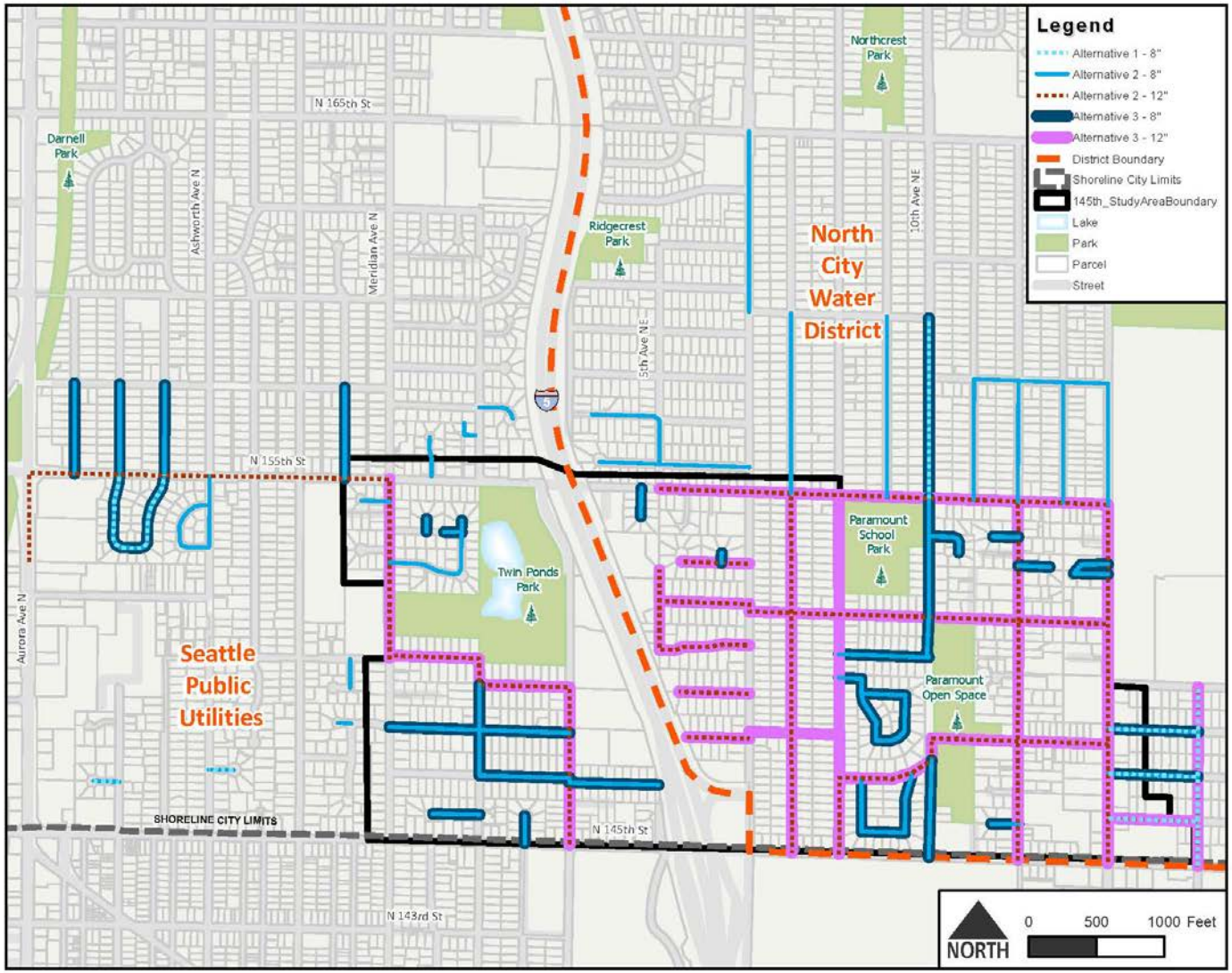


Figure 3.7-7 Other Recommended Future Water Improvements for Mitigation of the Action Alternatives

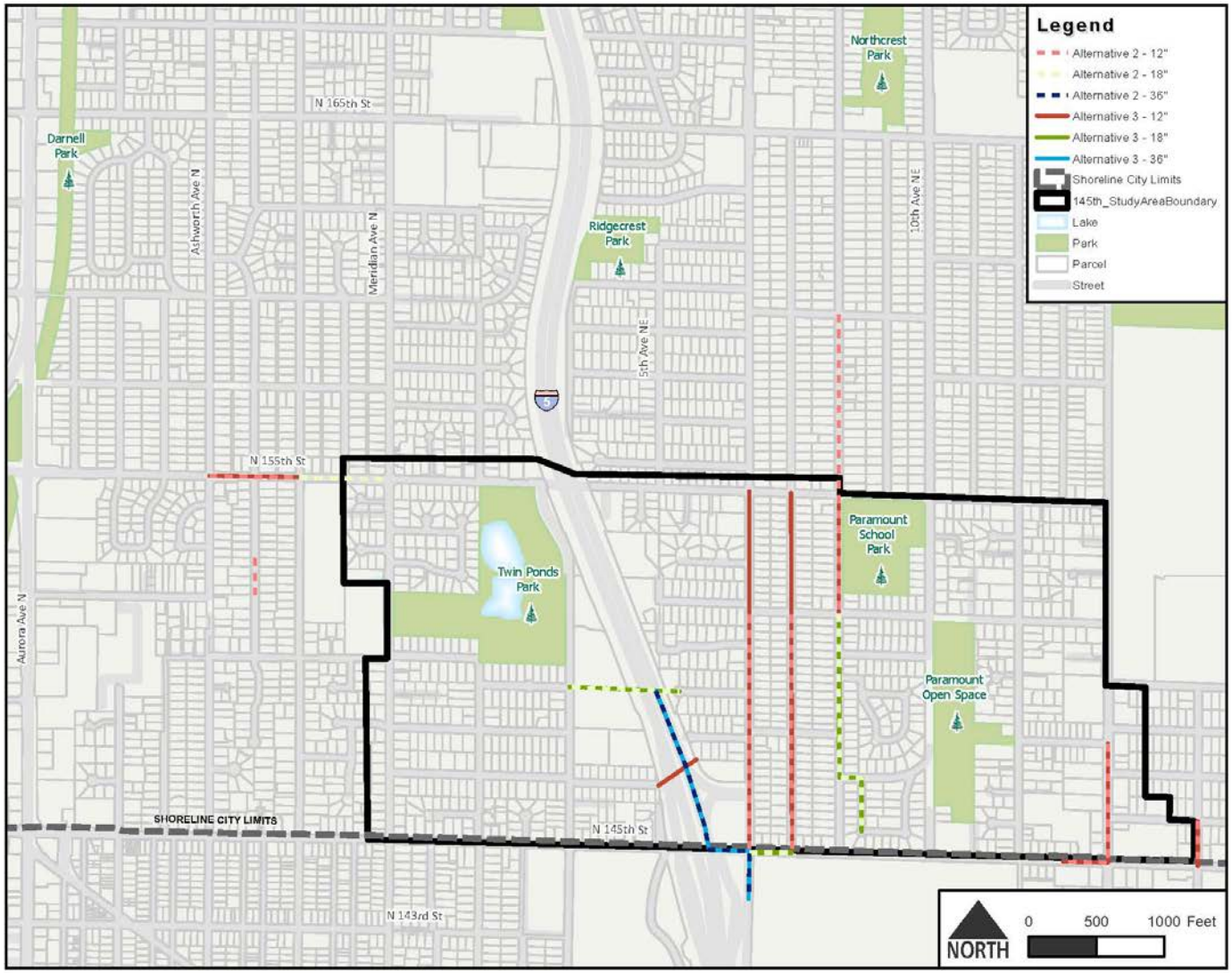


Figure 3.7-8 Recommended Future Wastewater Improvements for Mitigation of the Action Alternatives