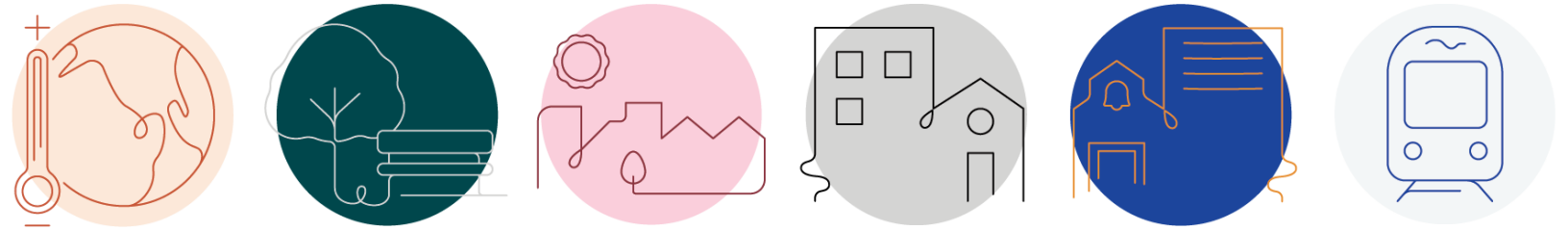
3 ENVIRONMENT, IMPACTS, & MITIGATION MEASURES



Source: City of Seattle, 2023.

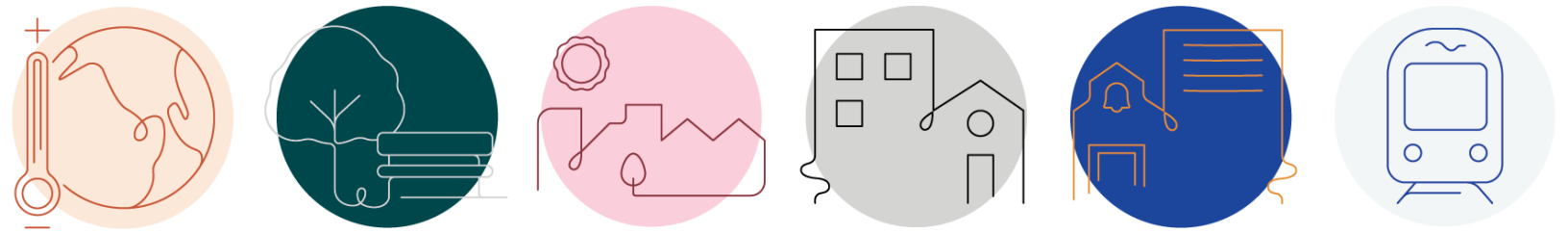
This chapter describes the affected environment, potential impacts, and mitigation measures for the following topics:

- **Section 3.1 Earth & Water Quality**
- **Section 3.2 Air Quality & GHG Emissions**
- **Section 3.3 Plants & Animals**
- **Section 3.4 Energy & Natural Resources**
- **Section 3.5 Noise**
- **Section 3.6 Land Use Patterns & Urban Form**
- **Section 3.7 Relationship to Plans, Policies, & Regulations**
- **Section 3.8 Population, Housing, & Employment**
- **Section 3.9 Cultural Resources**
- **Section 3.10 Transportation**
- **Section 3.11 Public Services**
- **Section 3.12 Utilities**

Following a description of current conditions (affected environment), the analysis compares and contrasts the alternatives and provides mitigation measures for identified impacts. It also summarizes whether there are significant unavoidable adverse impacts.

The analysis is broad, areawide, and comparative, considering the non-project proposals (WAC 197-11-442). Where there is a potential for more than a moderate adverse impact on environmental quality (WAC 197-11-794), existing or potential mitigation measures are posed. Consistent with the non-project analysis, mitigation measures are policy, plan, regulation, or program activities that the City could undertake to limit impacts.

3.1 Earth & Water Quality



Source: City of Seattle, 2023.

This section discusses critical land areas and water resources in the study area, including:

- Landslide hazard areas
- Steep slopes
- Potential soil settlement areas
- Surface waters (streams, lakes, and marine waters)
- Shorelines
- Groundwater

Thresholds of significance of this earth and water resources impact analysis involve comprehensive planning changes that could result in the following:

- Runoff Increases: Impervious surface expansions that would increase runoff flow volumes and durations to streams by magnitudes resulting in bank scour and erosion;
- Surface Water Quality: Increases in amount of pollution to receiving waters that would impair their designated uses (such as human contact and fish habitat);
- Groundwater Recharge: Impervious surface expansions that would decrease groundwater recharge beyond designated limits;
- Groundwater Quality: increases in amount of pollution discharged to levels that would contaminate groundwater supplies;
- Environmental Earth and Soil Hazards: Disturbances of existing contaminated areas to levels that could endanger human health or the environment;
- Climate Change—Extreme Precipitation: Growth concentrated into areas that are reasonably expected to be at risk for future flooding and landslides; and
- Climate Change—Sea-level Rise: Growth concentrated into areas that are reasonably expected to be at risk for future sea-level rise.

3.1.1 Affected Environment

Citywide

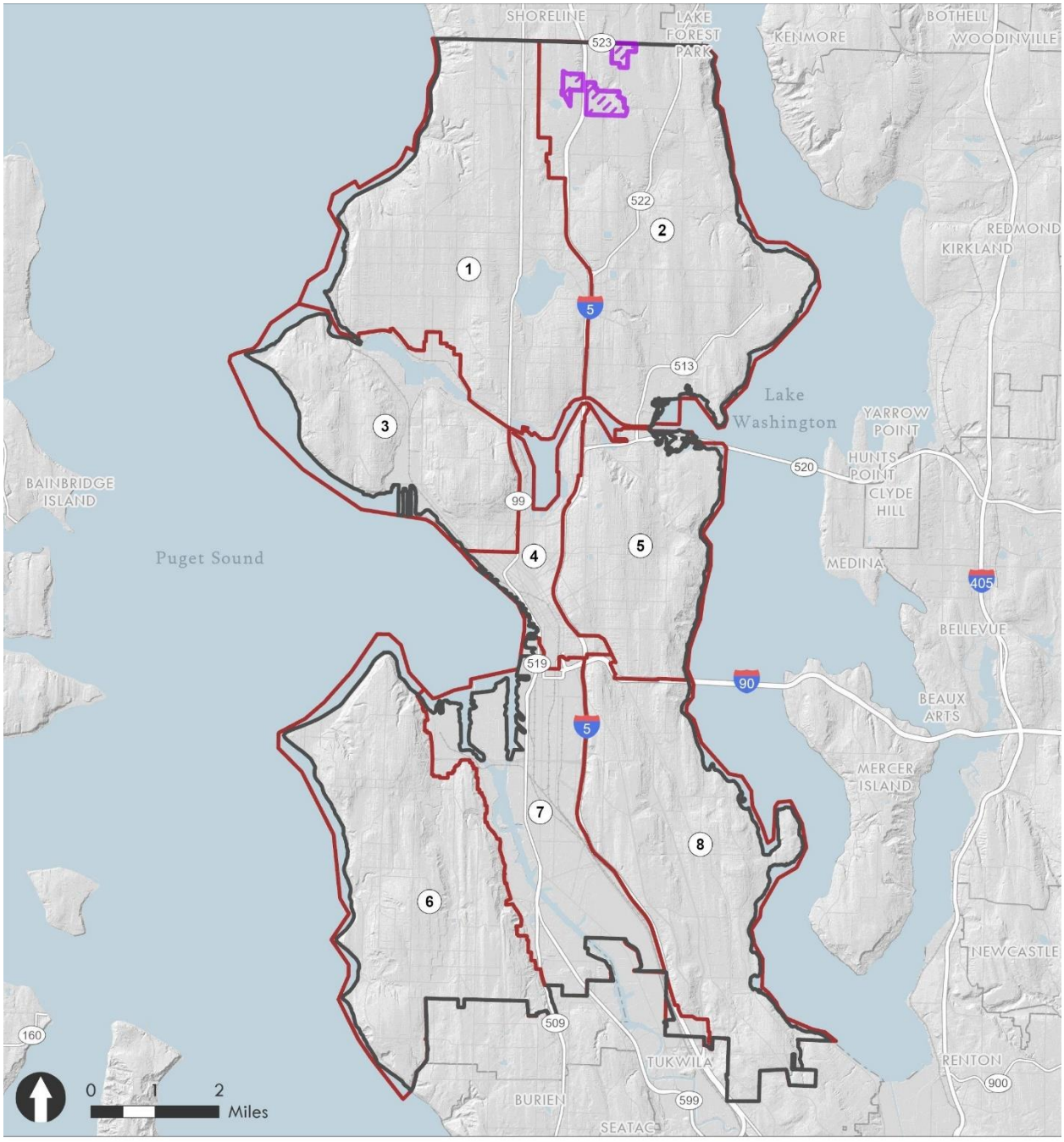
Critical Land Areas

Seattle's landforms consist of glacial-influenced, generally hilly terrain, bounded by Lake Washington on the east and Elliott Bay and Puget Sound on the west. City topography is presented in **Exhibit 3.1-1**. Areas around the Duwamish Waterway, Interbay, and the Thornton Creek valley contain alluvial or sandy soil conditions that pose a higher risk of movement and/or liquefaction during major earthquake events. In addition, steep slopes and known landslide locations have been documented throughout the city, with focus along shorelines and stream corridors. There are also Category 1 and Category 2 peat settlement-prone areas throughout the city, with Category 1 classified as higher quality environment with stricter protections than Category 2. Critical land areas in the city are shown in **Exhibit 3.1-2**.

Landcover & Hard Surfaces

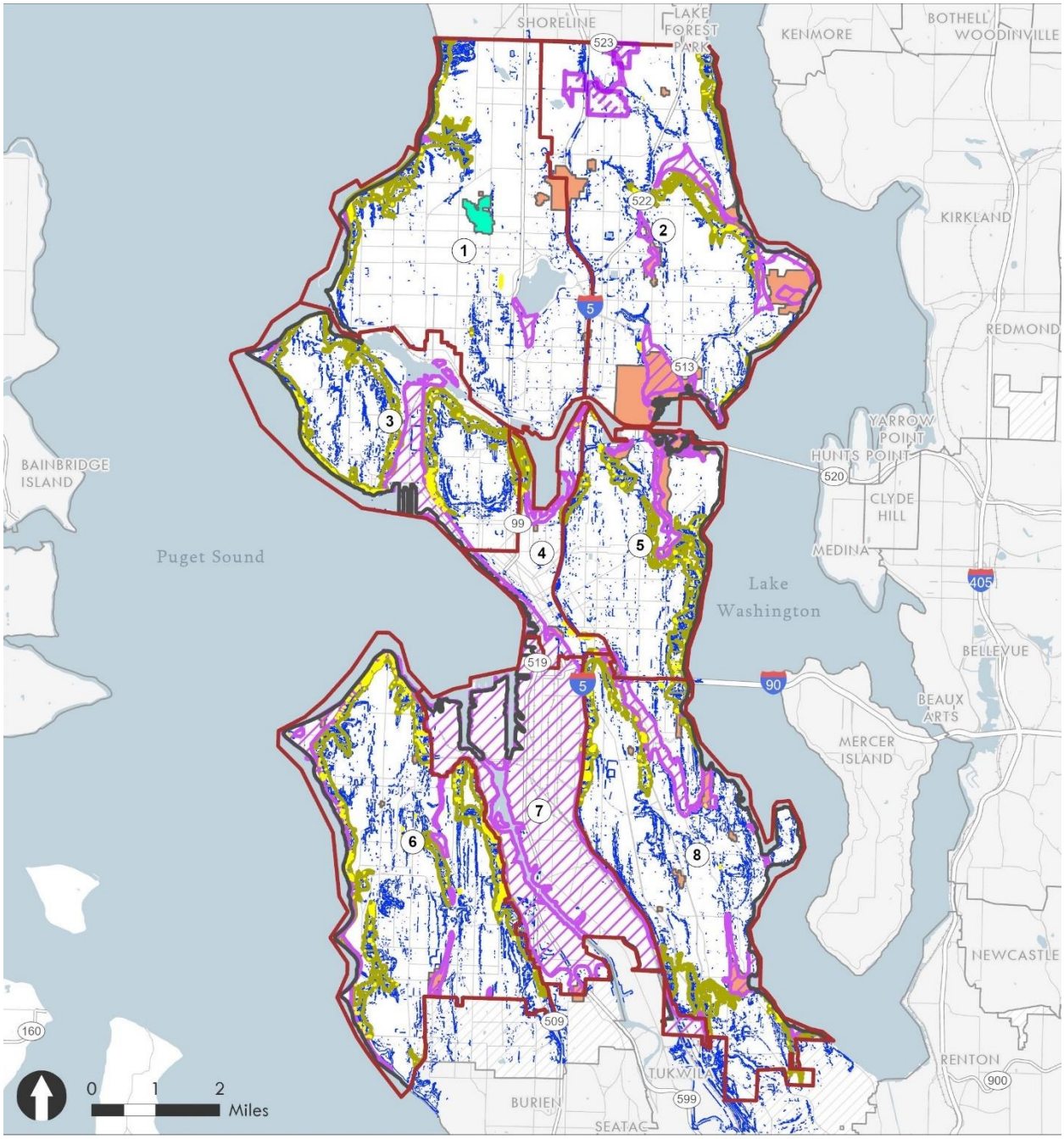
Landcover across most of the city has been extensively modified for over a century by development. The Washington State Department of Ecology has mapped areas in the state that have had over 40% impervious cover for about the last 40 years, and many of these areas are concentrated in Seattle as shown in **Exhibit 3.1-3**.

Exhibit 3.1-1. Topography



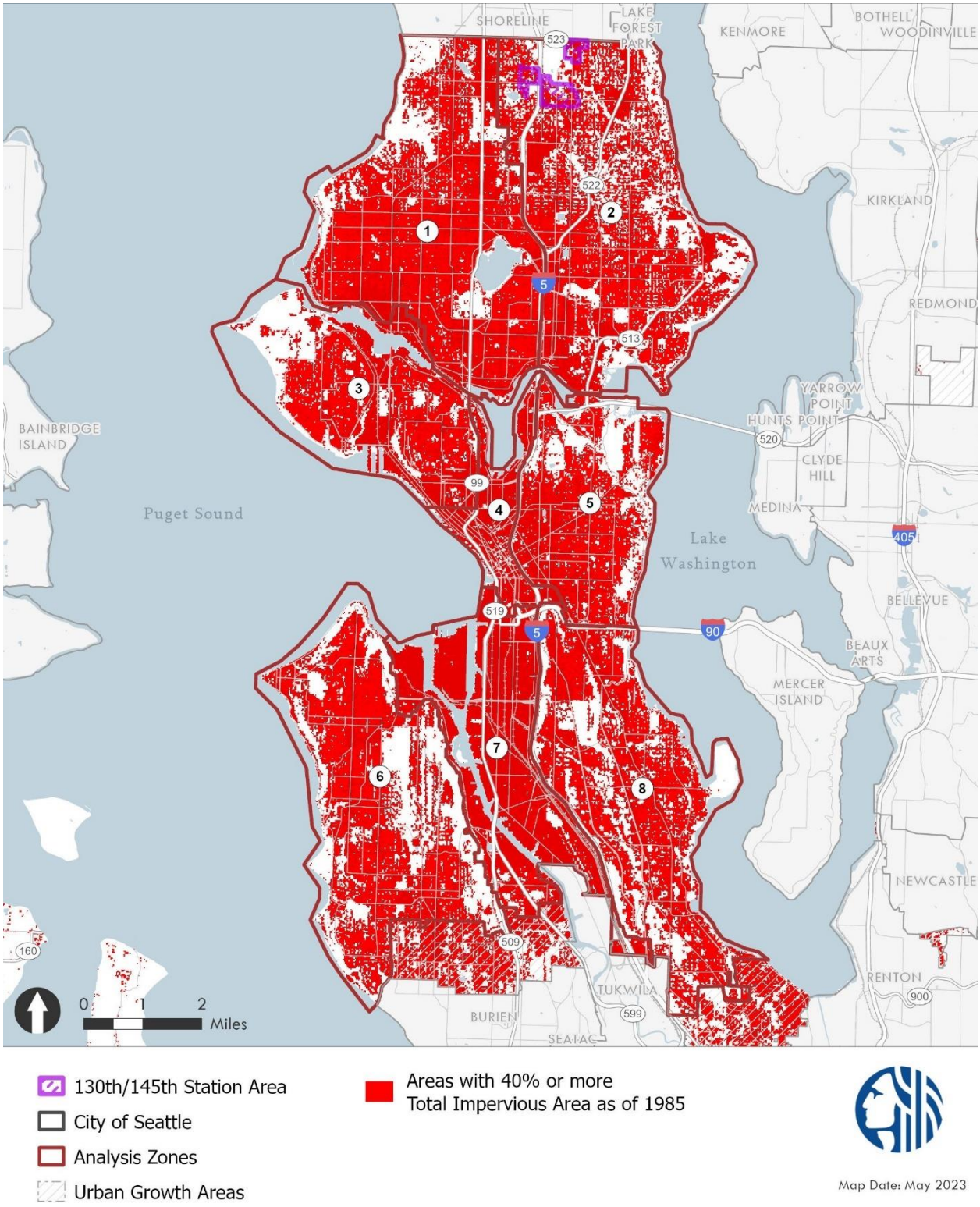
Sources: King County 2023a; Seattle, 2023.

Exhibit 3.1-2. Critical Land Areas



Source: Seattle, 2023.

Exhibit 3.1-3. Historically Impervious Surfaces



Sources: Ecology, 2019a; Seattle, 2023.

Surface Water

The City categorizes surface waters in four regulated classifications. These categories and an overview of their associated water bodies are summarized in **Exhibit 3.1-4**. Mapping of relevant surface water features, floodplains, water quality, and other characteristics is shown in **Exhibit 3.1-5** through **Exhibit 3.1-8.** Surface water fish presence, habitat, and wetland protections are discussed in **Section 3.3 Plants & Animals**. The municipal drainage system and combined sewer treatment areas are discussed in **Section 3.12 Utilities**.

Shorelines

Seattle has a major saltwater shoreline along its western boundary with Puget Sound, Elliott Bay, and the Duwamish Waterway. Along the city's eastern boundary, Lake Washington is classified as a Lake of Statewide Significance under WAC 173-20-370 and is protected against certain uses of its shoreline. Several of the city's shorelines have been impacted by port and industrial activities around Elliott Bay, Lake Union, and Ballard; and engineering activities such as the construction of the Ballard Locks, Montlake Cut, Harbor Island; and modifications to the Duwamish Waterway. Other shorelines across the city have low-density residential development while others are in more natural conditions**. Exhibit 3.1-9** depicts city shoreline environments.

Groundwater

As previously discussed, the land across the city has been heavily modified through development over the past 100 years. As such, groundwater recharge is limited. Also, groundwater use is generally limited to emergency and industrial supply wells for non-drinking use, with wells shown in **Exhibit 3.1-10**. No drinking water wells, wellhead protection areas, critical aquifer recharge areas, or sole source aquifers are identified in the study area.

Sea Level Rise

Areas of the city most susceptible to sea level rise are shown in **Exhibit 3.1-11.**

Socioeconomic Environmental Health Disparity

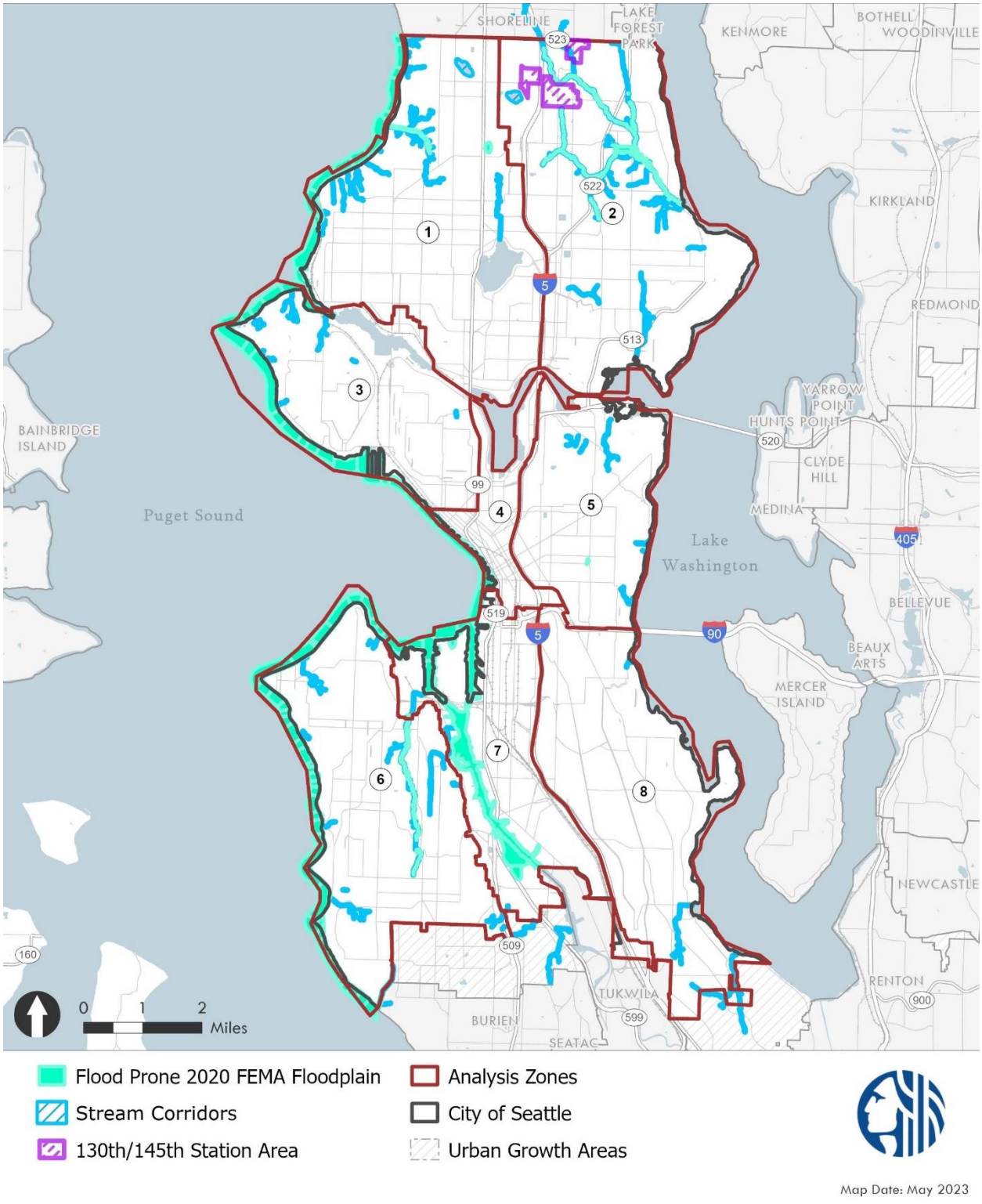
The Washington State Department of Health (WA DOH) has compiled state and national data to map over a dozen indicators of community and environmental health, including factors like proximity to hazardous waste facilities, proximity to wastewater discharges, income, and race. The data have been combined into a cumulative score to compare environmental and socioeconomic risk factors across all of Washington US census tracts. The compiled environmental health disparity scores for the US census tracts in Seattle are shown in **Exhibit 3.1-12.**

Exhibit 3.1-4. Seattle Surface Waters

City Category	Water Body	Water Quality Impairments	Flow Control Standards
Listed creeks	▪ Blue Ridge Creek ▪ Broadview Creek ▪ Discovery Park Creek ▪ Durham Creek ▪ Frink Creek ▪ Golden Gardens Creek ▪ Kiwanis Ravine/Wolfe Creek ▪ Licton Springs Creek ▪ Madrona Park Creek ▪ Mee-Kwa-Mooks Creek ▪ Mount Baker Park Creek ▪ Puget Creek ▪ Riverview Creek ▪ Schmitz Creek ▪ Taylor Creek ▪ Washington Park Creek	▪ Taylor Creek—temperature	Generally stricter flow control standards for development that require meeting forested-condition targets.
Non-listed creeks	▪ Fauntleroy Creek ▪ Longfellow Creek ▪ Piper's Creek ▪ Thornton Creek ▪ Any other stream not listed	▪ Fauntleroy Creek—bacteria ▪ Longfellow Creek—bacteria, dissolved oxygen, temperature ▪ Piper's Creek—bacteria ▪ Thornton Creek—bacteria, dissolved oxygen, temperature	Standards for development to meet forested-condition targets only when the existing condition is forested.
Small lakes	▪ Bitter Lake ▪ Green Lake ▪ Haller Lake	(None listed by Ecology)	Flow control requirements for development over a certain size threshold.
Designated receiving waters	▪ Duwamish River ▪ Elliott Bay ▪ Puget Sound ▪ Portage Bay ▪ Union Bay ▪ Lake Union ▪ Lake Washington ▪ Lake Washington Ship Canal ▪ Other City-identified and Ecology-approved waters	▪ Duwamish River—ammonia, bacteria, benzenes, bioassay, dibenzofuran, dioxins, dissolved oxygen, metals, PAHs, pesticides, pH, phenols, plasticizers, rubberizers, temperature ▪ Puget Sound—bacteria, benzenes, dioxins, furans, metals, PAHs, PCBs, phenol ▪ Lake Union—metals, PAHs, PCBs, temperature ▪ Lake Washington—Bacteria, dioxins, metals, PAHs, PCBs, pesticides, phenol ▪ Lake Washington Ship Canal—bacteria, PAHs, PCBs, pesticides, metals, temperature	Determined to have sufficient capacity to receive discharges of rainwater runoff without flow control.

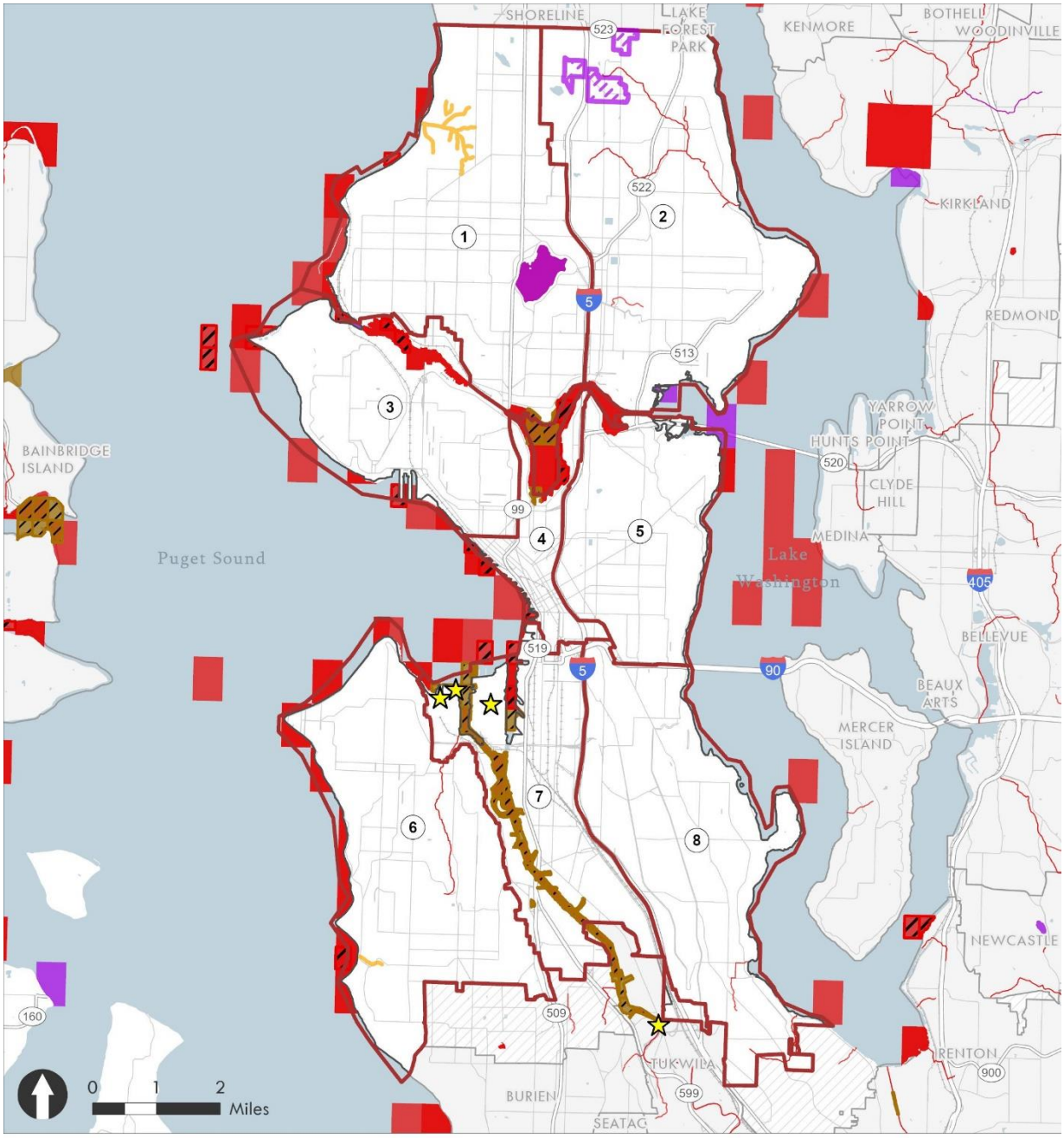
Notes: Metals include arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc; PAHs: polycyclic aromatic hydrocarbons; PCBs: polychlorinated biphenyls. Water quality treatment requirements are the same throughout the city regardless of the receiving water body.
Sources: Ecology, 2018; Seattle, 2021.

Exhibit 3.1-5. Water Resources



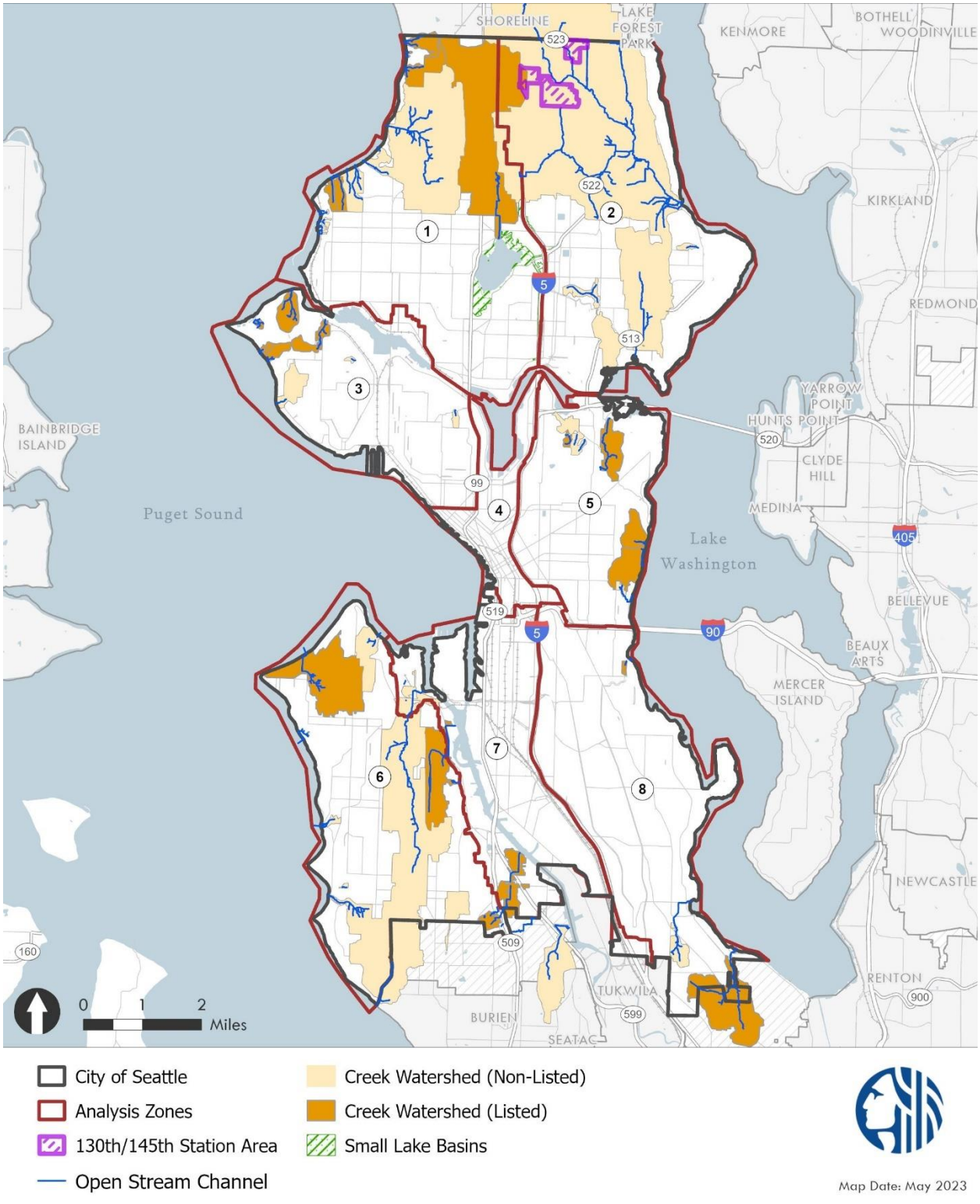
Source: Seattle, 2023a.

Exhibit 3.1-6. Impaired Water Bodies



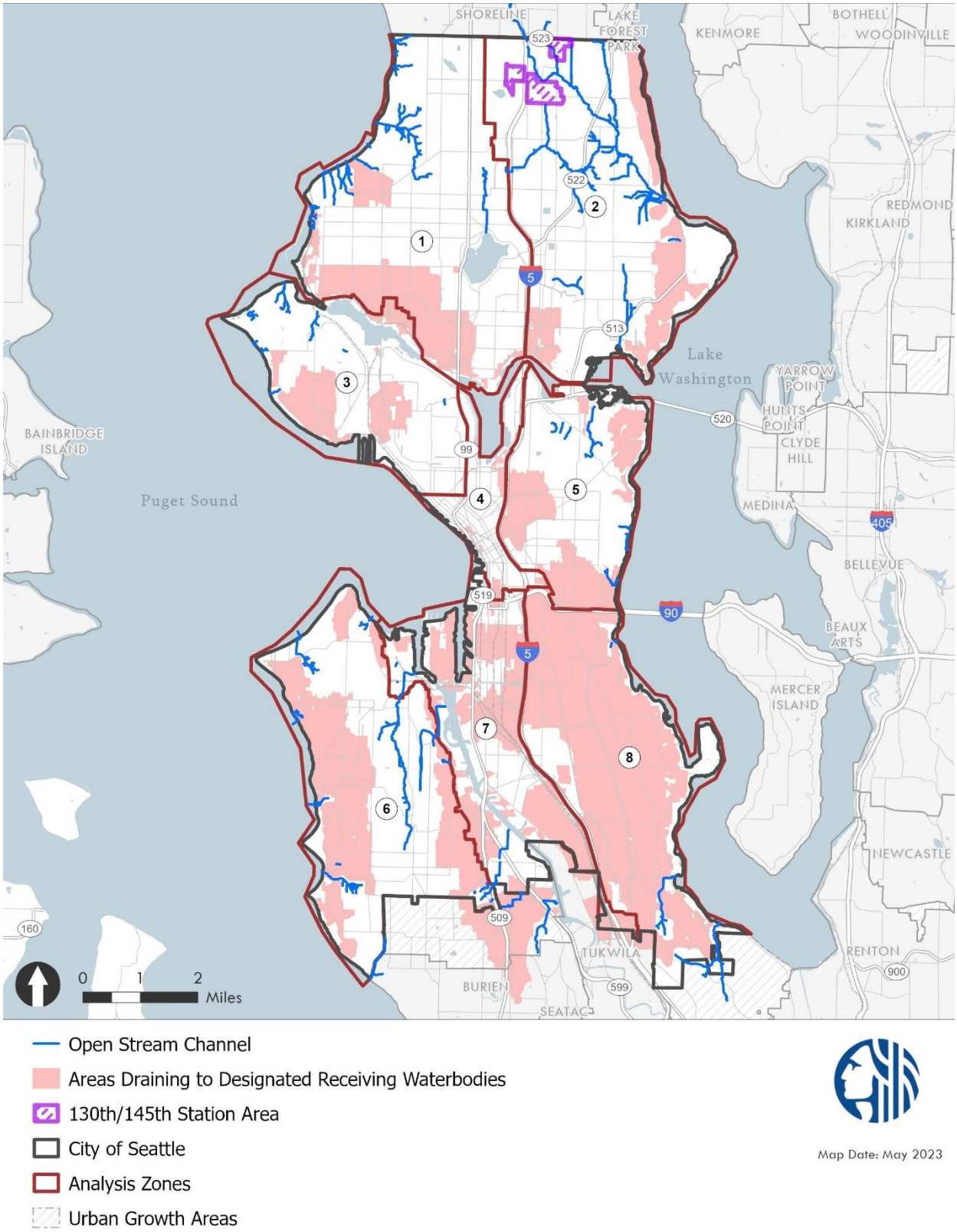
Source: Ecology, 2018; U.S. EPA, 2023.

Exhibit 3.1-7. Regulated Stream and Lake Watersheds



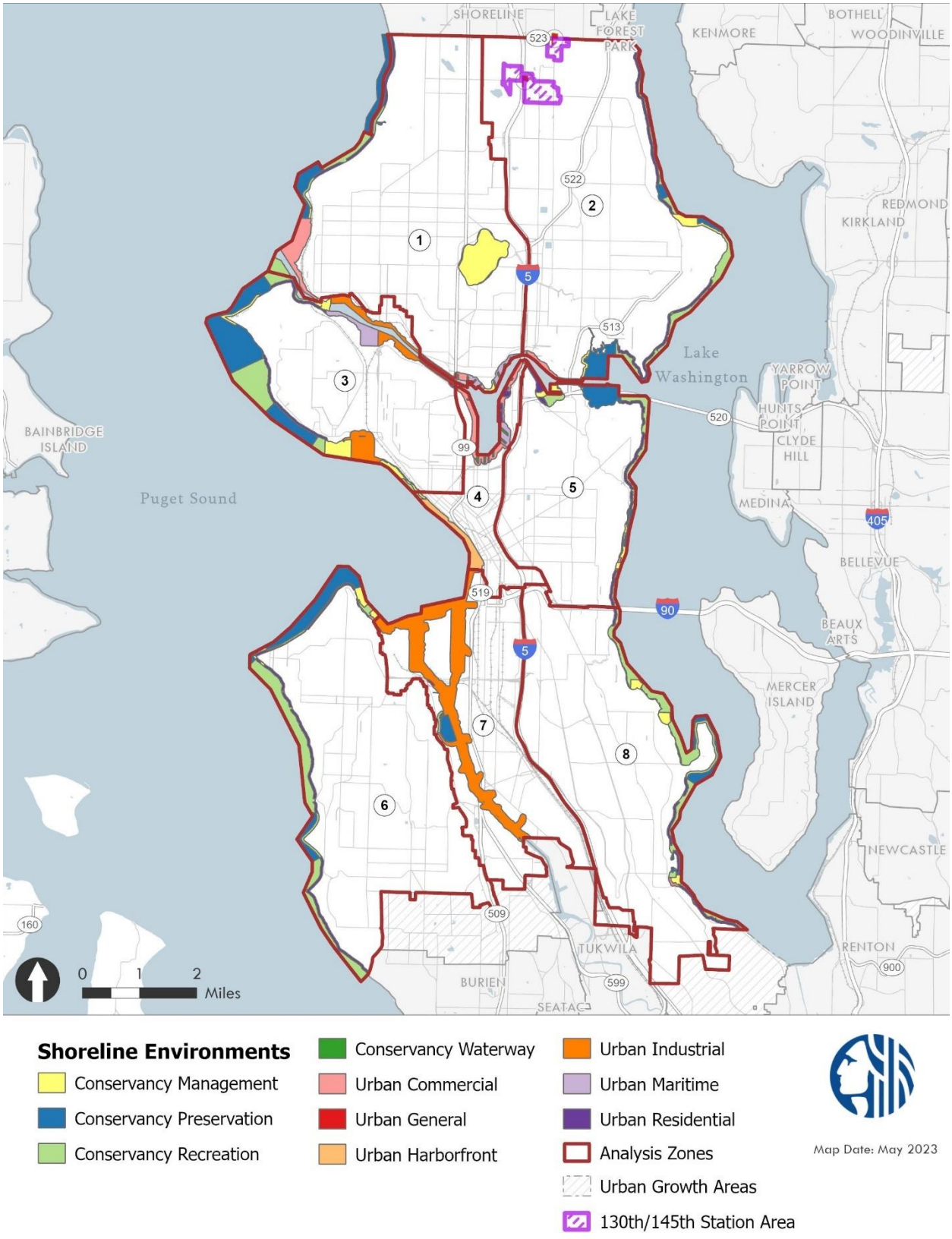
Source: Seattle, 2021.

Exhibit 3.1-8. Areas Draining to Receiving Waters Not Requiring Flow Control



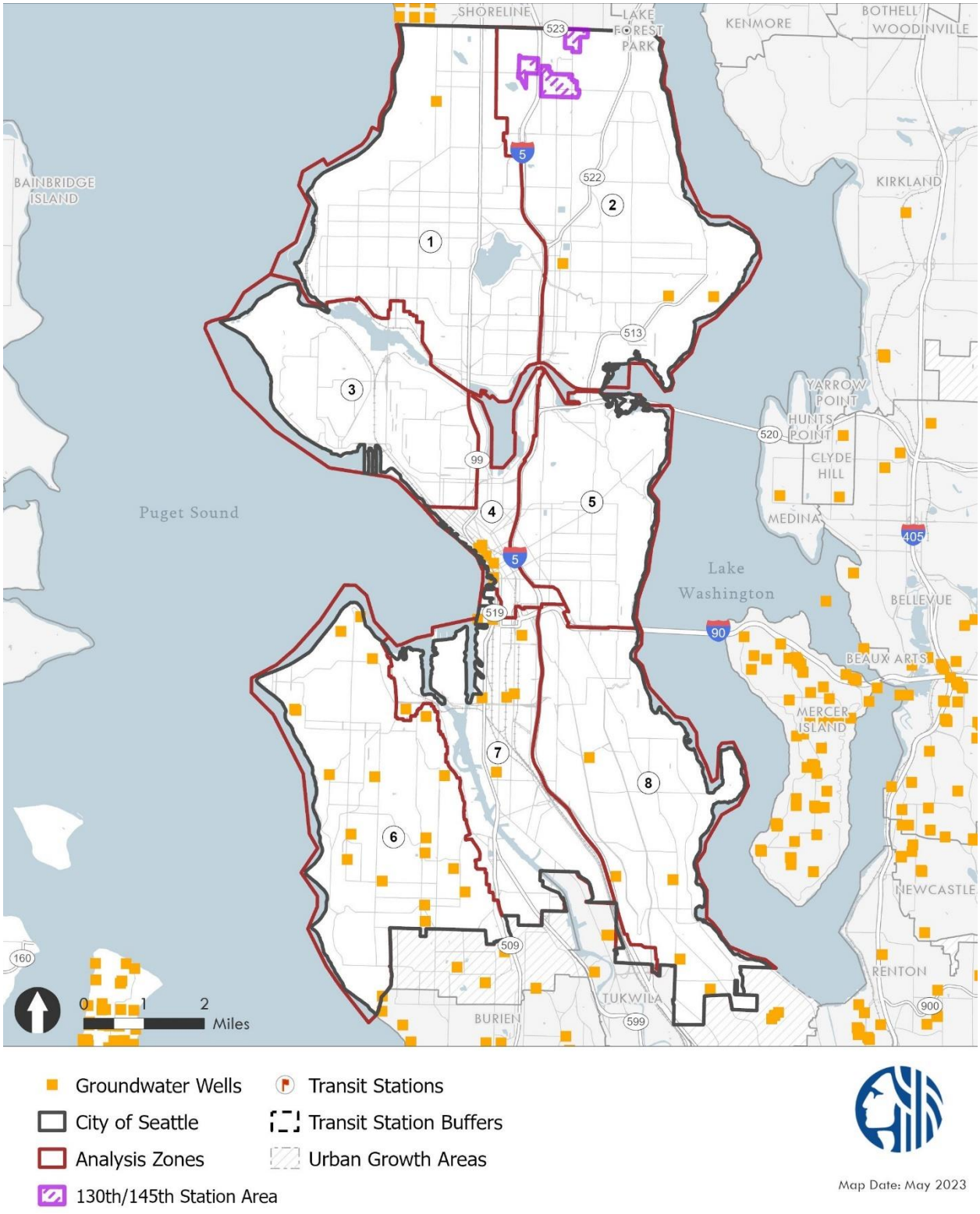
Source: Seattle, 2021.

Exhibit 3.1-9. Shoreline Areas



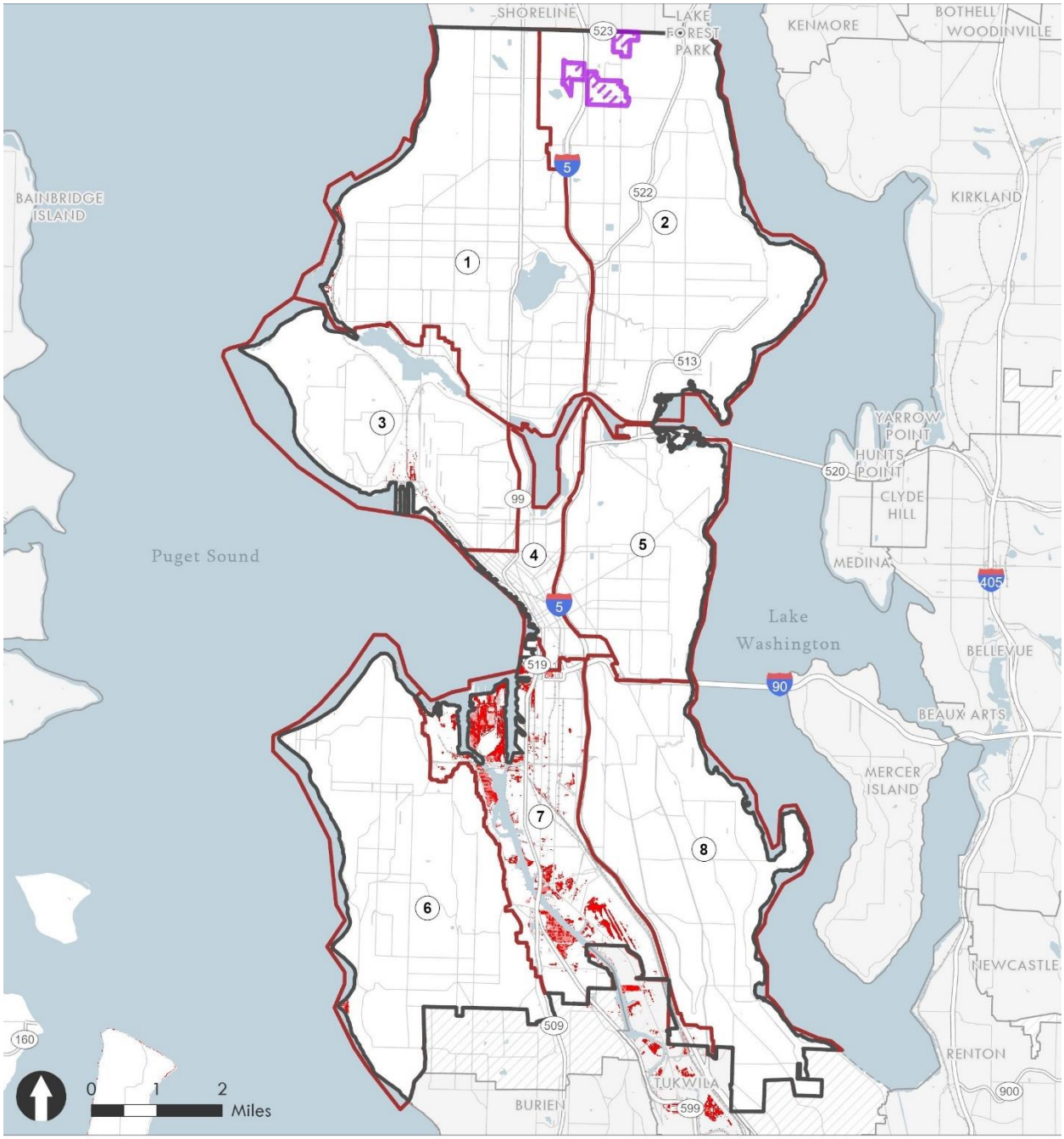
Source: Seattle, 2023a.

Exhibit 3.1-10. Groundwater Wells



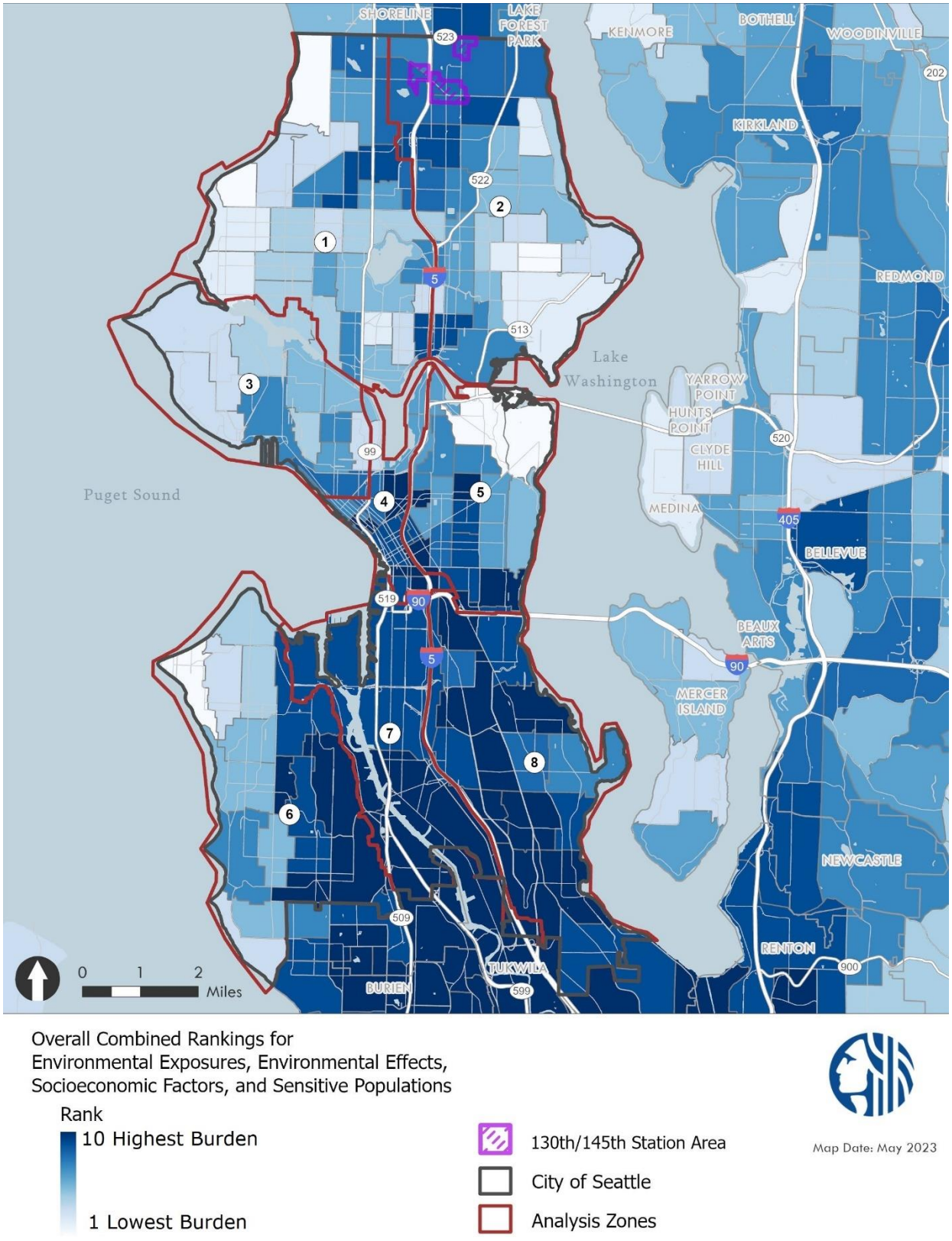
Sources: King County 2023b; Seattle, 2023a.

Exhibit 3.1-11. Forecasted Sea Level Rise



Source: NOAA, 2023; Seattle, 2023b.

Exhibit 3.1-12. Environmental Health Disparities



Source: WA DOH, 2023.

Analysis Areas

In addition to the citywide earth and water resources identified above, features unique to each area are identified in the following sections.

Area 1: NW Seattle

Key surface waters in and around Area 1 include:

- Blue Ridge Creek
- Broadview Creek
- Golden Gardens Creek
- Licton Springs Creek
- Piper's Creek
- Bitter Lake
- Green Lake
- Lake Union
- Lake Washington Ship Canal
- Puget Sound

Area 1 is the only area in the city with Category 1 peat settlement-prone areas, and also contains one of the largest areas of listed-creek watersheds in the city.

Area 2: NE Seattle

Key surface waters in and around Area 2 include:

- Thornton Creek
- Haller Lake
- Portage Bay
- Union Bay
- Lake Washington Ship Canal
- Lake Washington

Area 2 also contains more areas of Category 2 peat settlement-prone soils than any other area in the city.

130th/145th Study Area

The key surface water resource in and around 130th/145th Study Area is the north fork of Thornton Creek. The areas around the stream in the 130th/145th Study Area are classified as steep slopes, liquefaction-prone areas, and flood-prone areas.

Area 3: Queen Anne/Magnolia

Key surface waters in and around Area 3 include:

- Discovery Park Creek
- Kiwanis Ravine/Wolfe Creek
- Lake Washington Ship Canal
- Puget Sound

The center of Area 3 along the Interbay valley is categorized as liquefaction-prone. Also, Area 3 has the largest amount of Conservancy Preservation and Conservancy Recreation shoreline in the city.

Area 4: Downtown/Lake Union

Key surface waters in and around Area 4 include:

- Lake Union
- Lake Washington Ship Canal
- Elliott Bay

Area 4 is also the location of Downtown Seattle, the most densely developed area in the city.

Area 5: Capitol Hill/Central District

Key surface waters in and around Area 5 include:

- Frink Creek
- Madrona Park Creek
- Washington Park Creek
- Portage Bay
- Union Bay
- Lake Washington Ship Canal
- Lake Washington

Area 5 contains some of the largest areas of listed-creek watersheds in the city. In addition, Area 5 has the largest share of area mapped as not having been 40% impervious or more since 1985.

Area 6: West Seattle

Key surface waters in and around Area 6 include:

- Durham Creek
- Fauntleroy Creek
- Longfellow Creek
- Mee-Kwa-Mooks Creek
- Puget Creek
- Riverview Creek

- Schmitz Creek
- Elliott Bay
- Puget Sound

Area 6 contains some of the largest areas of listed-creek watersheds in the city.

Area 7: Duwamish

Key surface waters in and around Area 7 include:

- Duwamish River
- Elliott Bay

Topographically, the Duwamish River and Waterway corridor that makes up most of Area 7 is the flattest terrain in the city and almost all of it is classified as liquefaction-prone. Also, as shown in **Exhibit 3.1-11**, Area 7 is the most at-risk to effects from sea level rise out of any area in the city. This area has a long history of industrial use, the Duwamish River is identified as being impaired for more pollutants than any surface water in the city, and Area 7 contains 4 Superfund sites (the only area in the city to contain any). As shown in **Exhibit 3.1-12**, almost all census tracts in Area 7 are highly ranked (in the upper half of the range) for environmental health disparity.

Area 8: SE Seattle

Key surface waters in and around Area 8 include:

- Mount Baker Park Creek
- Taylor Creek
- Lake Washington

Area 8 has the largest amount of area draining to designated receiving waters (water bodies that are large enough to not be impacted by receiving runoff without flow control) in the city. Also, as shown in **Exhibit 3.1-12**, almost all census tracts in Area 8 are highly ranked (in the upper half of the range) for environmental health disparity.

3.1.2 Impacts

Impacts Common to All Alternatives

Direct

This section discusses impacts to earth and water resources that are common to all alternatives. It should be noted, though, that most impacts of future development projects on earth and water resources would be avoided or minimized through compliance with the City's Stormwater Code, Critical Areas Code, and other applicable regulations discussed in **Section 3.1.3**.

Big Picture Impacts

The comprehensive future planning associated with the plan alternatives would focus growth in the city's already developed area as opposed to allowing that same growth to impact more rural, undeveloped areas outside of the city. This is expected to help prevent impacts to higher-quality earth and water resources throughout the region.

The impacts to earth and water resources common to all plan alternatives are:

- Construction impacts—Construction activities can involve removal of vegetation and soil disturbance, causing erosion, water quality impacts, and potential for soil contamination. Construction activities and associated rainfall runoff controls are required to meet permitting requirements that should prevent or minimize adverse impacts.
- Vehicle Use—All of the plan alternatives would result in increased vehicle use. Higher numbers of vehicle trips can potentially increase contamination of local receiving waters, depending on the level of stormwater runoff treatment provided to the roadways. Expected changes to single-occupancy vehicle trips are used as an indicator of potential increased pollution from vehicles. Increases in single-occupancy vehicle trips are presented in **Exhibit 3.1-13**, which is based on data from **Section 3.10 Transportation**.
- Hard Surfaces—All of the plan alternatives would result in an increase in the amount of hard surfaces (i.e., parking, buildings, etc., also known as impervious surfaces) in the city. The amount of hard surface versus vegetation in each place type impacts the way rainwater runoff mixes with potential pollution and soaks into the earth or is transported to natural receiving waters. Typically, areas with more hard surface and less vegetation produce greater impacts to earth and water resources. They increase runoff volumes, erode streams, increase stream temperatures, decrease groundwater recharge, and can increase flooding and habitat contamination. In places where some runoff does infiltrate into the ground, untreated stormwater that soaks into the earth could potentially contaminate groundwater. For the earth and water impacts analysis, factors that are used as gauges of increased hard surfaces are summarized in **Exhibit** 3.1-13 and include number of housing units and their distribution of housing (new development is assumed to create more hard surfaces when it is spread into areas like Neighborhood Residential rather than concentrated into urban centers). Additional considerations of changes in land cover, including changes in vegetation, are discussed in **Section 3.3 Plants & Animals**.

Exhibit 3.1-13. Impacts Based on Expected Pollution and Runoff Increases

Metric	Alt. 1	Alt.2	Alt.3	Alt.4	Alt.5
Pollution Indicator: Daily Single-Occupancy Vehicle Trips (millions)	1.78	1.85	1.85	1.85	1.91
Hard Surface Indicator: Housing Units	80,000	100,000	100,000	100,000	**120,000**
Hard Surface Indicator: Share of Developable Acres					
Existing Centers	58%	58%	58%	58%	58%
Additions: Centers and Corridors	0%	6%	0%	15%	**20%**
Neighborhood Residential	0%	0%	**29%**	0%	13%
Outside Subareas*	42%	36%	13%	27%	9%
Impact of Alternative Compared to No Action	**Baseline**	**Lowest Impact**	**Highest Impact**	**Moderate Impact**	**Highest Impact**

* "Outside Subareas" includes all areas outside the other listed geographies. No change to place type is proposed in these areas, though growth will continue to occur throughout the 20-year planning period.
Source: City of Seattle, 2023; BERK, 2023.

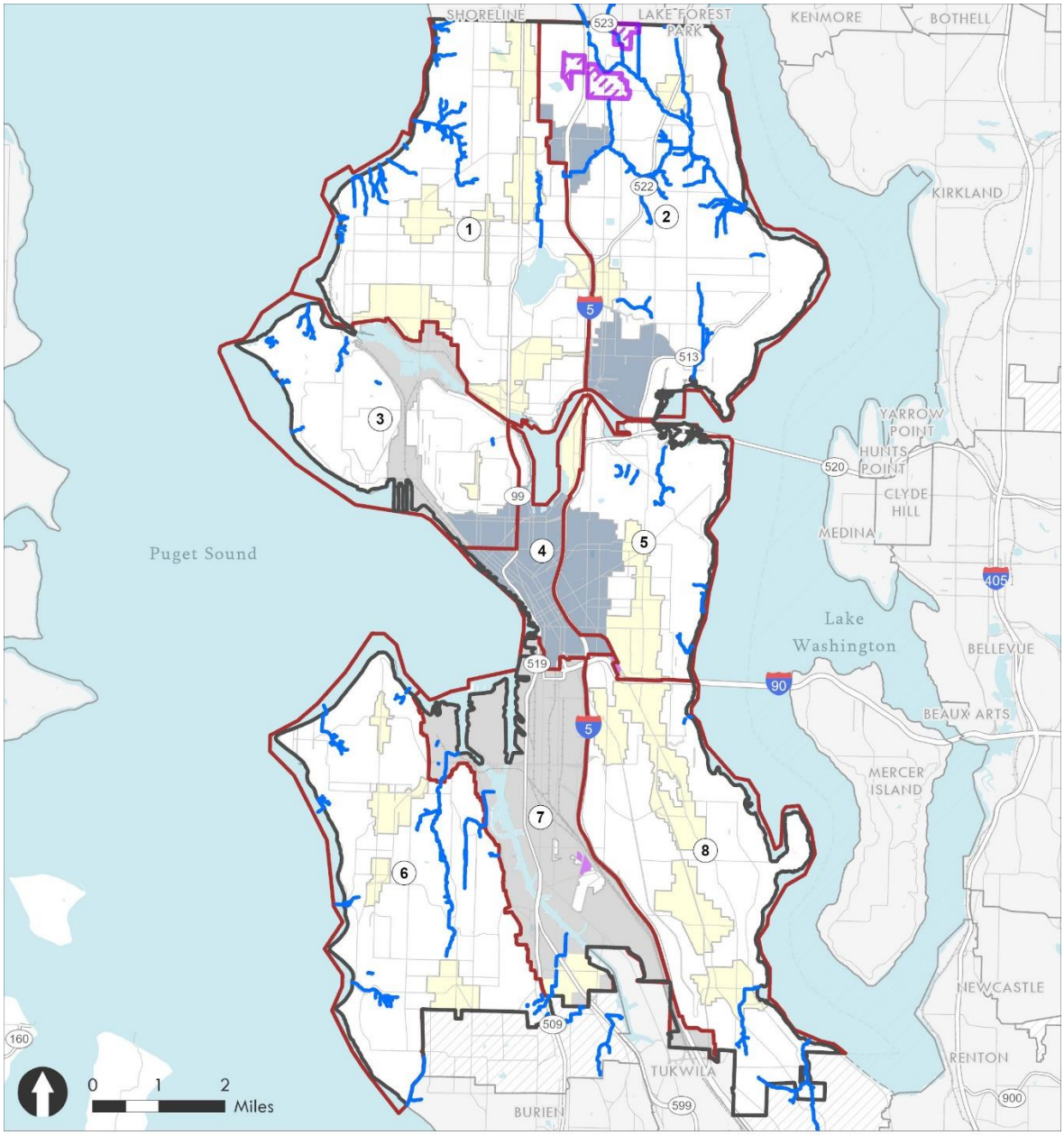
- Proximity to Water Resources—As discussed in **Section 3.1.1**, natural water resources (streams, lakes, and associated floodplains) exist throughout the city. Each of the plan alternatives could have increased impacts on these resources where development density is focused in closer proximity to these resources. The increased density associated with each alternative in proximity to water resources is shown in **Exhibit 3.1-14** and **Exhibit 3.1-15.** However, development within and near these surface water resources is regulated and impacts would be mitigated under the applicable City codes, as discussed in **Section 3.1.3**.

In summary, every alternative would increase density in the city boundary and likely result in increased vehicle use, increased hard surfaces, and focus additional development closer to water resources. However, as mentioned above, the redevelopment associated with each plan alternative would comply with City codes requiring stormwater management, critical area protections, building upgrades, and other measures to avoid or minimize potential impacts to earth and water resources.

Indirect

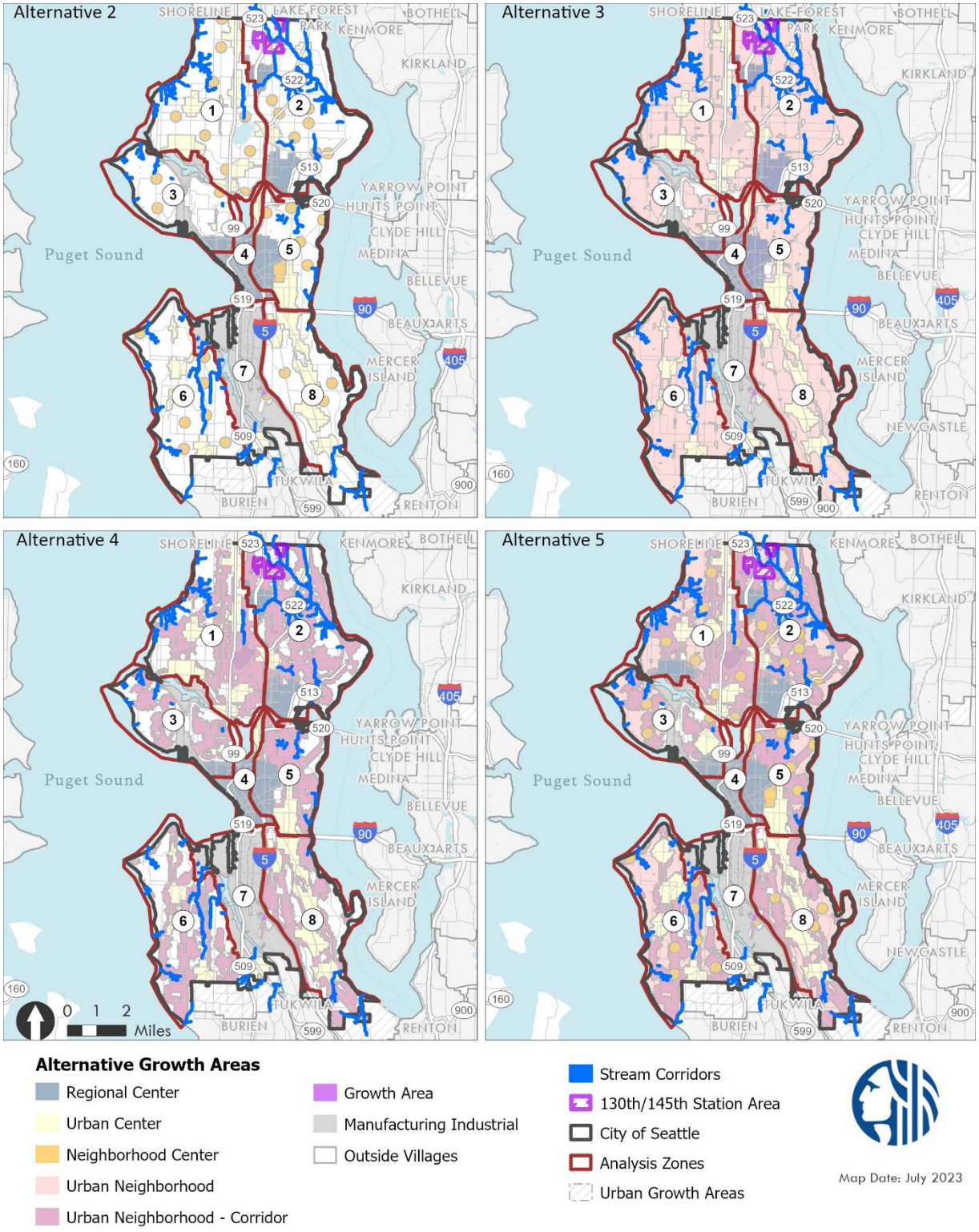
Indirect impacts potentially occur as a result of the proposed action and are reasonably foreseeable, but they occur later in time or farther removed in distance. Indirect impacts on earth and water resources generally come from each alternative's potential indirect changes to pollutant sources and land cover through changes to the pattern and locations of population density and growth rate. As outlined in Vision 2050 (PSRC, 2020), focusing growth in previously developed urban areas will result in less impact on regional earth and water resources than focusing the same growth in previously undeveloped areas outside of cities that add new impervious surfaces controlled under current standards. Expected changes to population density is presented in **Exhibit 3.1-14** and **Exhibit 3.1-15**, which are based on data from **Section 3.10 Transportation**. Overall, the indirect effect from every alternative is considered beneficial to earth and water resources in the region that includes the city and areas beyond.

Exhibit 3.1-14. Proximity of Increased Density to Water Resources (Alternative 1 No Action)



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: Seattle, 2023a; BERK, 2023.

Exhibit 3.1-15. Proximity of Increased Density to Water Resources (Alternatives 2 through 5)



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: Seattle, 2023a; BERK, 2023.

Equity & Climate Vulnerability Considerations

As shown in **Exhibit 3.1-12**, several areas of the city rank high (in the upper half of the scoring range) for environmental health disparities. Redevelopment in these areas associated with the plan alternative could have both beneficial and detrimental impacts to the population in these areas, as follows:

- Water Quality: As discussed in the sections that follow, areas of a city that have been developed for decades in the past may not have rainwater runoff management that captures pollution or controls flow volumes to the maximum extent practicable. Redevelopment often triggers requirements to upgrade stormwater management to meet current standards, which can either avoid impacts or result in a benefit to earth and water resources, and in turn to those living in the surrounding community. Also, newer stormwater infrastructure can be designed to be more resilient to changes in rainfall frequencies and volumes, thereby lowering the flood risks for the community. As such, in cities like Seattle with landcover that has been historically developed for centuries, redevelopment that is focused in areas with underserved populations can sometimes help address environmental inequities related to water quality. Considering the pattern of density in **Exhibit 3.1-14** and **Exhibit 3.1-15**, Alternative 1 would have the lowest level of redevelopment and Alternative 5 the most. If resources are directed equitably, it could reduce environmental inequities. However, as previously discussed and shown in **Exhibit 3.1-14** and **Exhibit 3.1-15**, each of the plan alternatives could have increased environmental impacts where development density is focused in closer proximity to water resources.
- Exposure to Contaminated Sites: Populations living near historically contaminated sites can be at risk from environmental hazard exposure, and disturbance of the ground surface in these areas can sometimes increase the risk. However, larger redevelopment in these areas can trigger site remediation to either more safely contain the contaminants up to current standards or remove the contaminants to a designated hazardous waste disposal site. Therefore, redevelopment can sometimes pose a risk of exposure from contaminated sites or motivate additional clean-up and protection, depending on the scale of the project. The City regulates development around known contaminated sites, as discussed further in **Section 3.1.3**.
- Exposure to Flooding and Landslides: Where redevelopment would trigger installation of newer stormwater infrastructure as described above, that infrastructure can be designed to be more resilient to changes in rainfall frequencies and volumes, thereby lowering the flood risks for the community. In addition, as discussed in **Section 3.1.3**, the City regulates development in areas that are landslide-prone, steep slope erosion hazards, and liquefaction-prone. While Alternative 1 retains current plans and regulations, the action alternatives advance the City's climate resilience with a new climate element based on a climate vulnerability assessment.
- Future Affect by Sea-Level Rise: As discussed in **Section 3.1.3**, the City limits development in designated shoreline areas, which are areas most likely to be affected by sea-level rise. However, the current codes are based on current water surface elevation metrics and may

not fully address resiliency to potential impacts from forecasted sea-level rise. As shown in **Exhibit 3.1-11**, the area more likely to continue to see coastal flooding is in Area 7, which is primarily used and planned for industrial purposes under all alternatives. Other areas that may also be affected by sea-level rise and storm surges include Ballard and Broadview (Area 1), Discovery Park and Lower Queen Anne (Area 3), Downtown (Area 4), and West Seattle (Area 6). Growth levels are similar in Downtown (Area 4) across alternatives but tend to be lower in Alternative 1 and higher in Alternative 5 in other areas. Depending on the location of growth, Alternative 5 could result in exposure of more people to sea level rise. Compared to Alternative 1 No Action, the action alternatives would potentially have less risk of sea level rise exposure to communities because of the new climate element required under the Growth Management Act (GMA) and climate resilience strategies included to direct growth away from shorelines.

Impacts of Alternative 1: No Action

Alternative 1 represents the No Action baseline against which all other alternatives are compared. It would allow a continuation of growth of 80,000 dwellings and 158,000 jobs on redevelopable and vacant lands, with most residential growth directed to urban centers and villages considering current place types. Alternative 1 No Action would have the lowest potential land cover conversions of vegetation to hard surface, the lowest expected increase in daily vehicle trips, lowest potential to locate growth in sea level rise hazard areas and would focus increased density farther away from water resources than all other alternatives. It would emphasize place types that have benefits; however, its lower amount of new housing in the city compared to the other plan alternatives could result in housing growth in the region beyond the city. This could indirectly result in adverse impacts to more pristine water resources throughout the region, as described under Impacts Common to All Alternatives.

130th/145th Station Area

The 130th/145th Station Area is in close proximity to Thornton Creek, and runoff from these areas is in the associated regulated stream basin. For the reasons described above, Alternative 1 No Action presents the lowest potential for direct impacts on earth and water resources within the 130th/145th Station Area.

Impacts of Alternative 2: Focused

Alternative 2 would have the least potential land cover conversions of vegetation to hard surface, the lowest expected increase in daily vehicle trips, and would focus increased density farther away from water resources than all other action alternatives. Therefore, Alternative 2 is expected to have the lowest potential for direct impacts to earth and water among the alternatives.

For sea level rise, Alternative 2 has a moderate potential to locate growth in sea level rise hazard areas outside of Area 7. In Area 3, its growth is similar to that of Alternative 5 and depending on growth location near shorelines could have a similar risk as Alternative 5 in that area.

Alternative 2 (along with Alternatives 3 and 4) offers a lower amount of new housing in the city among the action alternatives and could result in housing growth in the region beyond the city. Based on this, Alternative 2 could indirectly result in adverse impacts to some of the more pristine water resources throughout the region, as described under Impacts Common to All Alternatives.

130th/145th Station Area

The 130th/145th Station Area is in close proximity to Thornton Creek, and runoff from these areas is in the associated regulated stream basin. For the reasons described above, Alternative 2 presents the lowest potential for direct impacts on earth and water resources within the 130th/145th Station Area among the action alternatives.

Impacts of Alternative 3: Broad

Alternative 3 would have the highest potential land cover conversions of vegetation to hard surface, high expected increase in daily vehicle trips, and would focus a higher amount of increased density closer to water resources than other action alternatives. Therefore, (along with Alternative 5) Alternative 3 is expected to have the highest potential for direct impacts to earth and water among the alternatives.

For sea level rise, Alternative 3 has a moderate risk of growth in sea level rise hazard areas in Areas outside of Area 7.

Also, Alternative 3 (along with Alternatives 2 and 4) offers a lower amount of new housing in the city among the action alternatives and could result in housing growth in the region beyond the city. Based on this, Alternative 3 could indirectly result in adverse impacts to some of the more pristine water resources throughout the region, as described under Impacts Common to All Alternatives.

130th/145th Station Area

A station area plan would not be implemented under Alternative 3; designations and zoning would match the overall intent of Alternative 3 for more growth spread to urban neighborhoods.

Impacts of Alternative 4: Corridor

Alternative 4 would have the moderate potential land cover conversions of vegetation to hard surface, high expected increase in daily vehicle trips, and would focus some increased density

closer to water resources compared to the baseline. Therefore, Alternative 4 is expected to have the moderate potential for direct impacts to earth and water among the alternatives.

Like Alternative 3, there is a moderate risk of added growth from Alternative 4 in areas that may have a long-term potential risk of exposure to sea level rise.

Also, Alternative 3 (along with Alternatives 2 and 4) offers a lower amount of new housing in the city among the action alternatives and could result in housing growth in the region beyond the city. Based on this, Alternative 3 could indirectly result in adverse impacts to some of the more pristine water resources throughout the region, as described under Impacts Common to All Alternatives.

130th/145th Station Area

A station area plan would not be implemented under Alternative 4; designations and zoning would match the overall intent of Alternative 4 for more growth spread to corridors.

Impacts of Alternative 5: Combined

Alternative 5 would have high potential land cover conversions of vegetation to hard surface, the highest expected increase in daily vehicle trips, and would focus the highest amount of increased density closer to water resources than all other action alternatives. Therefore, (along with Alternative 3) Alternative 5 is expected to have the highest potential for direct impacts to earth and water among the alternatives.

Alternative 5 may expose more populations to sea level rise with storm surges, depending on the location of housing.

Among all of the alternatives, however, Alternative 5 offers the highest amount of new housing in the city, which would deter housing growth in the region beyond the city. Based on this, Alternative 5 could indirectly avoid adverse impacts to some of the more pristine water resources throughout the region, as described under Impacts Common to All Alternatives.

130th/145th Station Area

The 130th/145th Station Area is in close proximity to Thornton Creek, and runoff from these areas is in the associated regulated stream basin. For the reasons described above, Alternative 5 presents the highest potential for direct impacts on earth and water resources within the 130th/145th Station Area among the action alternatives.

3.1.3 Mitigation Measures

Incorporated Plan Features

None of the alternatives described in **Chapter 2** of this EIS include plan features that explicitly address earth and water resources. However, the Comprehensive Plan includes policies relevant to the city-wide protection and restoration of earth and water resources in the following sections:

- Growth Strategy—Natural Environment
- Land Use—General Development Standards
- Land Use—Environmentally Critical Areas
- Capital Facilities—Operations and Maintenance
- Utilities—Resource Management
- Utilities—Facility Siting and Design
- Environment—Land
- Environment—Water
- Environment—Climate

Action alternatives would amend all elements as part of the Periodic Update; this includes similar and improved policies addressing earth and water resources. The Draft One Seattle Plan includes a new climate element required under the Growth Management Act (GMA). It will include greenhouse gas reduction policies and climate resilience policies to avoid and adapt to climate risks including sea level rise, flooding, and risks of landslides due to extreme precipitation based on the Seattle Climate Vulnerability Assessment 2023.

Regulations & Commitments

Federal

- Clean Water Act, 33 United States Code (USC) 1251 et seq., including Sections 401—Water Quality Certification, 402—National Pollutant Discharge Elimination System, and 404—Permits for Dredge or Fill
- Coastal Zone Management Act, 16 USC 1451 et seq.
- Section 14 of the Rivers and Harbors Act of 1899, 33 USC 408 (Section 408)
- National Flood Insurance Act of 1968 and Flood Disaster Protection Act of 1973, 42 USC 4001 et seq.
- Floodplain Management Presidential Executive Order 11988
- Endangered Species Act (ESA) Biological Opinion for the Implementation of the National Flood Insurance Program in the State of Washington (National Marine Fisheries Service 2008)
- Safe Drinking Water Act, 42 USC 300 et seq., Chapter 6A

State & Regional

- Water Quality Standards for Surface Waters, Washington Administrative Code (WAC) 173201A
- Water Quality Standards for Groundwater, WAC 173-200
- Flood Control Management Act, Revised Code of Washington (RCW) 86
- Water Pollution Control Act, RCW 90.48
- Shoreline Management Act, RCW 90.58, WAC 173-26
- National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit (Washington State Department of Ecology [Ecology], 2021)
- National Pollutant Discharge Elimination System (NPDES) Western Washington Phase I Municipal Stormwater General Permit (Ecology, 2019b)
- Stormwater Management Manual for Western Washington (Ecology Manual) (Ecology, 2019a)
- Washington State Department of Transportation (WSDOT) Highway Runoff Manual (WSDOT, 2019a)
- WSDOT Hydraulics Manual (WSDOT, 2019b)
- Washington State Hydraulic Code, WAC 220-660

City of Seattle

The City is subject to the state regulations described above. In addition, the City has also enacted several local regulations that govern water quality in the study area, which are described below.

Stormwater Code and Manual—SMC Title 22, Subtitle VIII (22.800 to 22.808). To support implementation of the City's Stormwater Code and other applicable regulations, the Director of Seattle Public Utilities (SPU) and the Director of the Department of Planning and Development have promulgated rules that provide approved technical methodology, criteria, guidelines, and additional information pursuant to the Stormwater Code authority. Currently, there are four of these joint "Directors' Rules" covering source control, construction stormwater control, stormwater flow control and water quality treatment, and stormwater code enforcement. The City's Stormwater Manual is a compilation of the Directors' Rules (Seattle, 2021); as such, it describes guidance for complying with the Seattle Stormwater Code. Key aspects of the Stormwater Code and manual that may be applicable to the alternatives are summarized in the following sections.

- **Construction.** All projects that have ground-disturbing activity must develop and submit a Construction Stormwater Control and Soil Management Plan. The plan must outline how the project will apply BMPs in 18 specified categories identified in the manual to minimize project impacts, protect the public drainage system and receiving waters, prevent erosion and sedimentation, and manage pollution-generating activities and sources. The requirements of this plan are similar to those of the construction stormwater pollution

prevention plan required under Ecology's NPDES Construction Stormwater General Permit provisions; the City-required plan can be modified to meet the NPDES requirements.

- **Development.** Development projects that disturb certain ground area thresholds are required to install permanent stormwater management systems to mitigate potential impacts from changes to the site runoff. These required stormwater management measures are designed to minimize pollution at the source, remove or reduce the amounts of pollutants in the stormwater before it enters the receiving water, or manage the rate at which stormwater flows into a receiving water, the separated storm system, or the combined sewer system. Most development associated with the plan alternatives would likely require on-site (within the developed parcel) stormwater management (where determined feasible based on the project design), which includes controls like infiltration trenches, rain gardens, or permeable pavements. However, the plan alternatives would likely not include development that would trigger flow control facilities (like stormwater ponds or vaults) or water quality treatment facilities (like media filtration facilities). These Stormwater Manual requirements are summarized in **Exhibit 3.1-16**.

Exhibit 3.1-16. Seattle Stormwater Manual—Requirement Summary

Project Type[1]	Soil Amendment	On-site Stormwater Management	Flow Control and Water Quality Treatment
Single-Family Residential (SMC 22.805.030) Trail and Sidewalk (SMC 22.805.040) Parcel-Based (SMC 22.805.050)	Retain and protect undisturbed soil; and amend all disturbed or compacted soil with organic matter.	For projects where either the total new plus replaced hard surface is generally at least **1,500 square feet** (**750 square feet** for lots created in 2016 or after; **2,000 square feet** for trail and sidewalk) or the land disturbing activity is **7,000 square feet** or more.	Not required
Roadway (SMC 22.805.060)	Retain and protect undisturbed soil; and amend all disturbed or compacted soil with organic matter.	For **2,000 square feet** or more of new plus replaced hard surface or **7,000 square feet** or more of land disturbing activity.	Flow control is typically required for projects that change **5,000 square feet** or more of hard surfaces (plus other thresholds) that discharge to wetlands, creek basins, small lakes, or a capacity-constrained system. Water quality required for projects not discharging to the public combined sewer that generally change **5,000 square feet** or more of hard surfaces (plus other thresholds).

Notes: 1. Project types are shown for comparison. Single-family residential, sidewalk, and other parcel-based projects are those most likely to be associated with the alternatives. Roadway changes are not expected to be included in most of the development projects. Other project types may apply.
Source: Seattle, 2021.

Shoreline Master Program—SMC 23.60A. The City prohibits any development in designated shoreline areas (see **Exhibit 3.1-9**) without a review by the City that the development is consistent with the Seattle Shoreline Master Program outlined in SMC23.60A. The restrictions apply even if no shoreline substantial development permit is required. Most of the boundaries and elevation restrictions in the Shoreline Master Program are based on the Ordinary High-

Water Mark (the highest mark on the bank of a water body that presents scientific features of the regular presence of water).

Critical Areas Ordinance—SMC 25.09. The City prohibits any development in critical land areas (see **Exhibit 3.1-2**) without a review by the City that the development is consistent with the Critical Areas Ordinance outlined in SMC 25.09. In most cases, the types of activities that may be included as part of development in critical areas are restricted. Also, certain engineering, geotechnical, biological, or other scientific studies are often required before beginning work to determine areas that may require heightened protections, potential risks to areas deemed suitable for development, and appropriate mitigation measures. In addition, often when work is allowed it is restricted to certain portions of the critical area behind designated buffers. Subsections of the Critical Area Code pertain to the following protected and specially regulated lands:

- SMC 25.09.080—Landslide-Prone Areas
- SMC 25.09.090—Steep Slope Erosion Hazard Areas
- SMC 25.09.100—Liquefaction-Prone Areas
- SMC 25.09.110—Peat Settlement-Prone Areas
- SMC 25.09.160—Wetlands and Wetland Buffers
- SMC 25.09.200—Fish and Wildlife Habitat Conservation Areas
- SMC 25.09.220—Abandoned Landfills

Through compliance with the Critical Areas Ordinance, it is expected that potential risk of impacts to the above types of protected and specially regulated lands would be minimized or avoided.

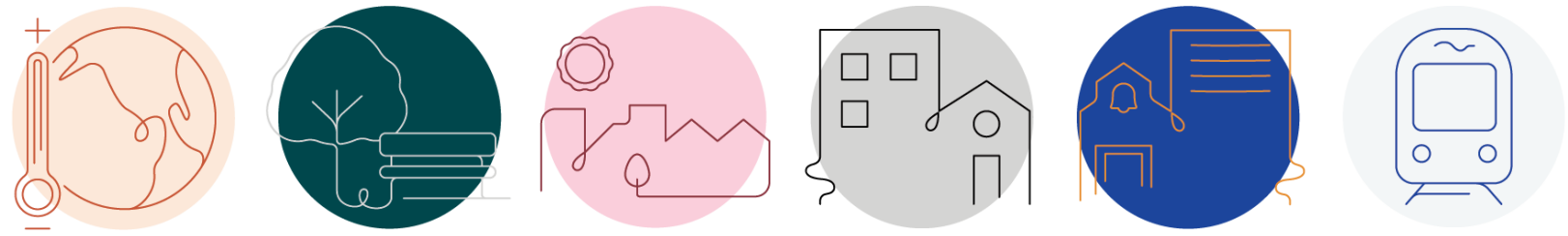
Other Potential Mitigation Measures

- Continued implementation of SDOT policy to avoid adding or expanding roadways through transit and other approaches.
- Strengthen critical areas ordinances and restore critical area buffers.
- Update the Shoreline Master Program to increase sea-level rise resiliency actions (such as construction of barriers or property acquisitions) by basing boundaries and elevation restrictions on the Mean Higher High Water Mark (the average of the higher daily tides) or some other metric higher than the Ordinary High Water Mark.
- Install updated stormwater controls on roadways, which are not likely to be upgraded as part of the parcel redevelopments included in the alternatives.
- Continue research and implementation of innovative stormwater best management practices, especially those focused water quality treatment in the most urban areas.
- Implement the Puget Sound Partnership Action Agenda and Water Resource Inventory Area Salmon Recovery/Habitat Protection plans.
- Continue to implement PSRC's Four-Part Strategy to reduce greenhouse gas emissions.

3.1.4 Significant Unavoidable Adverse Impacts

As discussed in **Section 3.1.1**, landcover across most of the city has been extensively modified for over a century by development, which has already resulted in long-term impacts to earth and water resources. Redevelopment of these areas associated with every project alternative would be required to install permanent stormwater management systems to mitigate potential impacts from changes to the site runoff. These required stormwater management measures are designed to minimize pollution at the source; remove or reduce the amounts of pollutants in the stormwater before it enters the receiving water; or manage the rate at which stormwater flows into a receiving water, the separated storm conveyance system, or the combined sewer system. Furthermore, the comprehensive future planning associated with the project alternatives that would focus growth in the city's already developed area as opposed to allowing that same growth to impact more rural, undeveloped areas is also expected to be beneficial to earth and water resources. Therefore, no significant unavoidable adverse impacts to earth and water resources are expected.

3.2 Air Quality & GHG Emissions



Source: City of Seattle, 2023.

This section evaluates the air quality impacts of implementing the alternatives considered in this EIS. The analysis focuses on two criteria air pollutants: carbon monoxide (CO) and particulate matter (PM) resulting from changes in land uses and transportation patterns. It also considers other criteria air pollutants such as ozone precursors (reactive organic gases, ROGs, and oxides of nitrogen, NOx) and Toxic Air Pollutants (TAPs).

This EIS examines potential air quality issues at a regional level. This analysis evaluates air quality and potential impacts on a citywide cumulative basis and, where appropriate, according to the EIS analysis areas. Transportation sources (fossil-fueled cars, trucks, trains, buses, etc.) can contribute to heightened localized concentrations of certain air pollutants. Therefore, for TAPs and fine particulate matter ($PM_{2.5}$), localized analyses are provided to the degree feasible to identify potential public health impacts from locating new "sensitive receptors" (such as residences) near to substantial sources of these pollutants within transportation corridor areas.

This section also provides an analysis of how implementation of the alternatives evaluated may contribute to global climate change through the emission of greenhouse gases (GHGs). Transportation systems contribute to climate change primarily through the emissions of certain greenhouse gases (CO_2, CH_4 and N_2O) from the combustion of nonrenewable energy sources (primarily gasoline and diesel fuels) used to operate passenger, commercial, and transit vehicles. Land use changes contribute to climate change through construction and operational use of electricity and natural gas, water, and waste production.

Consistent with the above descriptions, the thresholds of significance utilized in this impact analysis include:

- Air Pollution: Growth concentrated in areas with high exposure to air pollution.
- Per Capita GHG emissions: Increase in GHG emissions on a per capita basis.
- Consistency with other efforts: Actions would prevent or deter statewide, regional, or local efforts to reduce GHG emissions.

Data & Methods

The project team collected data from the following sources to support analysis of existing air quality conditions and potential effects of the project alternatives:

- U.S. Environmental Protection Agency Greenbook (EPA, 2021)
- Puget Sound Clean Air Agency (PSCAA) and Ecology Air Monitoring Network
- 2016-2021 PSCAA Air Quality Data Summaries (PSCAA)
- 2020 Community Greenhouse Gas Emissions Inventory (Seattle, 2022)
- Washington Department of Ecology Air Quality Standards and Greenhouse Gas Emissions Inventory (Ecology, 2022a and 2022b)

3.2.1 Affected Environment

Current Policy & Regulations

Air quality in the Puget Sound region including Seattle, is regulated and enforced by federal, state, and local agencies including the Environmental Protection Agency (EPA), Washington State Department of Ecology (Ecology), and the Puget Sound Clean Air Agency (PSCAA). Each of these agencies has their own role in air quality regulation and monitoring.

U.S. Environmental Protection Agency

The Clean Air Act, established in 1970 and amended in 1977 and 1990, was created to protect human health and the environment from air pollutants. The Clean Air Act required the EPA to establish National Ambient Air Quality Standards (NAAQS) to limit common and widespread pollutants. The six criteria pollutants are: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), and sulfur dioxide (SO_2). Particle pollution is differentiated based on the size of particulate matter; permissible levels of both PM_{10} (particles equal to or less than 10 microns in diameter) and $PM_{2.5}$ (particles that are less than or equal to 2.5 microns in diameter) have been established as part of the NAAQS.

These NAAQS are monitored according to primary and secondary standards. Primary standards relate to the effect on sensitive populations such as children, the elderly, or those with respiratory or other health conditions, while secondary standards relate to the public welfare, such as damage to crops, vegetation, and buildings. Standards are periodically reviewed and revised, with the most recent national standards listed in **Exhibit 3.2-1** below.

Exhibit 3.2-1. National Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level	Measurement Criteria
Carbon Monoxide (CO)	Primary	8 Hours	9 ppm (10.31 mg/m³)	Not to be exceeded more than once per year
		1 Hour	35 ppm (40.08 mg/m³)	
Lead (Pb)	Primary and Secondary	Rolling 3-Month Average	0.15 µg/ m³	Not to be exceeded
Nitrogen Dioxide (NO_2)	Primary	1 Hour	100 ppb (188.10 µg/m³)	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Primary and Secondary	1 Year	53 ppb (99.69 µg/m³)	Annual mean
Ozone (O_3)	Primary and Secondary	8 Hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years

Pollutant	Primary/ Secondary	Averaging Time	Level	Measurement Criteria
$PM_{2.5}$	Primary	1 Year	12.0 µg/m³	Annual mean, averaged over 3 years
	Secondary	1 Year	15.0 µg/m³	Annual mean, averaged over 3 years
	Primary and Secondary	24 Hours	35 µg/m³	98th percentile, averaged over 3 years
PM_{10}	Primary and Secondary	24 Hours	150 µg/m³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)	Primary	1 Hour	75 ppb (196.45 µg/m³)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3 Hours	0.5 ppm (1309.63 µg/m³)	Not to be exceeded more than once per year

Source: Ecology, 2022a.

The NAAQSs set limits on the level of the criteria pollutants in the air over specified time periods. These ambient air quality standards are designed to protect people that are most susceptible to respiratory distress, including children, the elderly, and people with compromised health or who engage in strenuous outdoor exercise. EPA designates areas that do not meet the NAAQS for one or more criteria as non-attainment areas. Areas that were once designated non-attainment areas but have since achieved the NAAQS are classified as maintenance areas, while areas that have air pollution levels below the NAAQS are classified as attainment areas. States must develop plans to reduce emissions in non-attainment areas to bring measurements of the criteria pollutants back into compliance with EPA standards.

The Clean Air Act also requires the EPA to regulate 188 hazardous air pollutants (HAPs), also known as air toxics, from both mobile and stationary sources. HAPs are pollutants known or suspected to cause cancer or other serious health effects or have adverse environmental effects. EPA later identified 21 of these air toxics as mobile source air toxics (MSATs) and then extracted a subset of seven priority MSATs: benzene, formaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, naphthalene, polycyclic organic matter and 1,3-butadiene. EPA enforces standards for controlling the emissions of HAPs from various sources within different industry groups, also known as source categories. Exposure to these pollutants in high concentrations for long durations increases the risk of cancer, damage to the immune system, neurological problems, reproductive, developmental, respiratory and other serious health problems.

The first phase of regulatory standards EPA develops for HAP sources are maximum achievable control technology (MACT) standards based on the level of emission control achieved by low-emitting sources in an industry. The second phase for controlling HAPs is a risk-based approach that occurs within eight years of the initial implementation of MACT standards. This residual risk review assesses the need for more health-protective standards.

The Clean Air Act is also the basis of most emissions-related regulations across the country, and has helped reduce GHGs from power plants, aircraft, and motor vehicles among other sources. EPA enacts standards for vehicle fuel efficiency and emissions and, as of December 31, 2021, has set the strictest standards for passenger vehicles and light-duty trucks. From model year (MY) 2023 to 2026, the stringency requirements were increased year-to-year, and the path forward from MY 2026 is set to continue that trend of tighter requirements. Fleetwide, MY 2026 vehicles are projected to produce 161 grams of CO_2 per mile, compared to 208 grams of CO_2 per mile as stated in the 2020 EPA regulations (NHTSA, 2020). Furthermore, MY 2026 vehicles will have a fleetwide fuel efficiency of 40 miles per gallon (MPG) compared to the 32 MPG required by 2020 regulations. EPA is also currently finalizing a Clean Trucks Plan to establish more stringent emissions standards on heavy-duty vehicles starting in MY 2027, specifically targeting NO_X emissions from diesel-powered trucks. EPA also establishes emissions standards from other mobile sources of pollution such as aircraft, aligning with the International Civil Aviation Organization to reduce GHG emissions in commercial aviation and large business jets.

Washington State

Washington Department of Ecology (Ecology) regulates over 430 toxic air pollutants from commercial and industrial sources in Washington state, prioritizing 21 of them due to the increased health risk and prevalence from common sources such as diesel emissions and wood smoke. Ecology is also responsible for monitoring statewide air quality and enforcing federal EPA standards through a State Implementation Plan (SIP), which includes Attainment SIPs (when an area doesn't meet NAAQS, i.e. non-attainment areas) and Maintenance SIPs (when an area must meet NAAQS for 20 years after a period of non-attainment). These SIPs also include specific state plans to address certain issues, such as the Regional Haze Plan, Smoke Management Program, and the Transportation Conformity Plan (TCP). The TCP ensures federal transportation funds support roadway and transit activities that align with SIPs for air quality. Attainment and Maintenance SIPs are also required to include enforceable limits on total pollution from all transportation sources, called "motor vehicle emissions budgets." These budgets put a cap on the total amount of transportation-related emissions that can be generated, including from projected future demand.

The State of Washington adopted the Climate Commitment Act (CCA) in 2021, which sets a statewide goal of a 95% reduction in carbon emissions by 2050 starting from a 1990 baseline year. One component of the CCA is a cap-and-invest program that caps the total emissions generated by the state and allows emitters to trade excess carbon emission budgets with one another. Emissions from gasoline, on-road diesel, and railroads are considered part of the 75% of "covered emissions" that would be incorporated into the cap-and-invest system. When these allowances are sold, the profits will be reinvested into projects that address air quality issues. The cap-and-invest program began in January 2023.

Washington State is also working to reduce mobile emissions through the 2020 Motor Vehicle Emissions Standards Law, which directs Washington to adopt vehicle emission standards set by the State of California—including the zero-emission vehicle (ZEV) standard, adopted in

November 2021. This requires 100% of all new passenger cars, light-duty trucks, and medium-duty vehicles sold in the state to be ZEVs starting in 2035, as well as setting stricter emission standards on medium- and heavy-duty trucks. Adopted in December 2022, Washington State adopted a new rule that requires new ZEV sales of passenger cars, light-duty trucks, and medium-duty vehicles to 100% starting in 2035.[7] It also requires cleaner, less polluting new heavy-duty internal combustion engines. In 2021, Governor Inslee signed the Clean Fuel Standard, which requires fuel suppliers to gradually reduce the carbon intensity of transportation fuels (gasoline, diesel) to 20% below 2017 levels by 2038.

Puget Sound Clean Air Agency

The Puget Sound Clean Air Agency (PSCAA) was formed in 1967 under the Washington Clean Air Act, with the authority to create regulations and to permit stationary air pollutant sources and construction emissions within King, Kitsap, Pierce, and Snohomish Counties. PSCAA contributes to statewide SIPs and adopted an updated Strategic Plan in January 2023. The updated Strategic Plan outlines goals and objectives through the year 2030. These Plans set goals and standards to implement a long-term vision for air quality and climate within the region. PSCAA also operates 20 ambient air quality monitoring stations throughout its four-county jurisdiction, and while most standards are in-line with Ecology and the EPA, after convening a "Particulate Matter Health Committee" in 1999, the PSCAA adopted a stricter health goal of 25 $\mu g/m^3$ for $PM_{2.5}$ versus 35 $\mu g/m^3$ in a 24-hour period.

City of Seattle

The City of Seattle was the first city in the United States to adopt a green building goal for all new municipal facilities, and in 2001 the City created a Leadership in Energy and Environmental Design (LEED) incentive program for new private projects. In 2011, the Seattle City Council adopted Resolution 31312, a long-term climate protection vision for Seattle with the goal of achieving net zero GHG emissions by 2050. In pursuit of this goal, in 2013 the City adopted the Climate Action Plan (CAP) to outline reduction targets for GHG emissions and to support City goals of building vibrant neighborhoods, driving economic prosperity, and furthering social equity. The plan identifies five main targets to be achieved by 2030, using the year 2008 as a baseline:

- 20% reduction in vehicle miles traveled;
- 75% reduction in GHG emissions per mile traveled by Seattle vehicles;
- 10% reduction in commercial building energy use;
- 20% reduction in residential building energy use; and
- 25% reduction in combined commercial and residential building energy use.

[7] See: https://ecology.wa.gov/Air-Climate/Reducing-Greenhouse-Gas-Emissions/ZEV#.

The Sustainable Buildings and Sites Policy (established by Resolution 31326) sets goals for City-owned properties to maximize the environmental quality, economic vitality, and social health of the City through design, construction, operation, maintenance, renovation, and decommissioning of City-owned buildings and sites.

Following the U.S.'s withdrawal from the Paris Climate Agreement in 2017, the City Council adopted Resolution 31757, directing the Office of Sustainability and Environment to identify additional actions necessary to limit global warming to an additional 1.5 degrees Celsius. Near-term priorities identified in the 2018 Climate Action Strategy are:

- Improving mobility through equitable road pricing policies;
- Passing of a new electric vehicle readiness ordinance;
- Creating a map of optimal distribution of an EV charging infrastructure;
- Converting 18,000 homes from heating oil to electric heat pumps;
- Doubling existing budget allocation for reducing energy in municipal buildings with the goal of reducing energy use by 40%;
- Scaling pay-for-performance efforts[8] and piloting innovative utility programming; and
- Providing programs and incentives to spur improved energy efficiency and reduced carbon emissions.

The City of Seattle also enacted the Green New Deal Resolution (Res 31895), with Mayor Jenny Durkan introducing the Green New Deal Executive Order (EO-2020-01) on January 8, 2020. Together, the resolution and executive order direct: (1) all City departments to work together with the Green New Deal Oversight Board, the Environmental Justice Committee, and other key stakeholders to establish goals and actions that advance the vision of a climate-pollution free city; (2) the Office of Sustainability & Environment (OSE) to work with City departments to identify actions to achieve the goals of the Green New Deal; (3) the OSE to work with Office of Intergovernmental Relations and the Mayor's Office to engage stakeholders on collaborative efforts to develop additional City policies, inform and support necessary funding and investments, and advance opportunities for partnership on actions that achieve the goals of the Green New Deal; (4) every new or substantially altered municipal building shall operate without fossil fuel systems and appliances (e.g., space heating and cooling, water heating, or cooking); (5) the OSE to work with stakeholders and City departments to determine key indicators that assist in the understanding of emissions trends; and (6) the Green New Deal team shall report progress on an annual basis.

The Green New Deal Oversight Board, established through Ordinance 125926, consists of representatives passionate about advancing an equitable transition to a clean energy economy and centering frontline communities and workers most impacted by climate change. The Green New Deal Oversight Board was entrusted with developing a workplan that:

[8] To address the "hard to reach" energy savings, Seattle City Light is developing programs specifically aimed at enabling greater levels of energy efficiency depth in buildings. Incentive payments are made over time based on measured energy savings and allow participants to bundle multiple projects and measures across capital, operational & maintenance, and behavioral improvements.

- Establishes a definition of what constitutes a policy, program or project that advances a Green New Deal for Seattle;
- Provides proposals for the design of new policies, programs, and projects and for modifications to existing policies, programs and projects to the Mayor, City Council, and City departments to advance a Green New Deal for Seattle;
- Supports the planning and implementation of individual City Departmental actions, policies, programs, and practices, to make Seattle climate-pollution free by 2030;
- Provides recommendations on City budget priorities and priority City actions; and
- Coordinates efforts with City departments and existing committees, boards, and commissions.

Executive Order 2021-09 (Driving Accelerated Climate Action) calls for all municipal buildings to operate without fossil fuel systems and appliances no later than 2035. In addition, EO 2021-09 calls for the acceleration of GHG emissions reduction from the city's transportation sector.

To reduce greenhouse gas emissions in the transportation sector, the City of Seattle adopted Executive Order 2018-02, which aims to have 100% of the City's fleet fossil-fuel free by 2030. This would mean rapid fleet electrification, or conversion to biofuels or renewable diesel/gasoline for municipal fleet vehicles.

Climate & Air Quality

Air quality is affected by pollutants from both natural and manmade sources. Vehicles and equipment that burn fossil fuels are typically among the largest contributors to transportation-related emissions and can contribute to regional and localized concentrations of CO, PM, NO_2, and O_3. State and federal standards regulate these pollutants along with the two other criteria pollutants (SO_2 and lead). The Puget Sound region is currently in attainment for all six criteria pollutants (Ecology, 2022a).

The City of Seattle is in the Puget Sound lowland. Buffered by the Olympic and Cascade mountain ranges and the Puget Sound, the lowland has a relatively mild, marine climate with cool summers and mild, wet, and cloudy winters.

The prevailing wind direction in the summer is from the north or northwest. The average wind speed is less than 10 miles per hour. Persistent high-pressure cells often dominate summer weather and create stagnant air conditions. This weather pattern sometimes contributes to the formation of photochemical smog.[9] During the wet winter season, the prevailing wind direction is from the south or southwest.

There is sufficient wind most of the year to disperse air pollutants released into the atmosphere. The region can be affected by wildfire smoke in the late summer and fall. Data

[9] See explanation: https://education.nationalgeographic.org/resource/smog/.

from these "exceptional events that are beyond the ability of air agencies to control" are excluded by the EPA for regulatory actions but are included in PSCAA and Ecology data collection.

Apart from wildfire events, air pollution is usually most noticeable in the late fall and winter, under conditions of clear skies, light wind and a sharp temperature inversion. Temperature inversions occur when cold air is trapped under warm air, thereby preventing vertical mixing in the atmosphere. These can last several days. If poor dispersion persists for more than 24 hours, the PSCAA can declare an "air pollution episode" or local "impaired air quality."

Pollutants of Concern

The largest contributors of pollution related to transportation construction projects and changes to travel patterns are construction equipment and vehicles traveling on roadways. The main pollutants emitted from transportation and non-transportation sources are CO, ozone precursors (VOC and NO_x), PM, GHGs, and HAPs. This section describes these pollutants and their effects on public health and the environment.

Carbon Monoxide (CO)

CO is an odorless, colorless, tasteless gas formed by the combustion of fuels containing carbon, with most CO emissions coming from motor vehicles, industrial activity, and wood burning. CO enters the bloodstream through the lungs and reduces the oxygen-carrying capacity of blood, affecting the function of organs and tissues. People with existing cardiovascular or respiratory issues may experience chest pains, nausea, fatigue, and dizziness when exposed to high levels of CO, though even healthy individuals may experience issues with alertness depending on the amount of exposure. As the most common source of CO emissions is motor vehicles, high concentrations are most present in urban areas, and it is the urban areas of Washington that have breached NAAQS in the past 30 years. The urban areas within Puget Sound were on attainment maintenance plans for CO from 1996 to 2016.

Nitrogen Dioxide (NO_2) & Ground-Level Ozone (O_3)

NO_2 is a red/brown reactive gas formed from the chemical reaction of nitrogen oxide (NO), hydroperoxy radical (HO_2), and alkylperoxy radical (RO_2) in the atmosphere. NO_2 and other nitrogen oxides (known as NO_x) can combine with volatile organic compounds (VOCs) in the atmosphere to form ozone. Vehicles such as automobiles and construction equipment are the most common sources of NO_X, along with marine vessels and industrial boilers and processes. While Washington has not violated NAAQS for NO_2, Ecology continues to measure NO_X levels at three sites within Seattle, as NO_X is a key contributor to ozone and fine particulate matter.

Ozone itself is a secondary air pollutant, produced in the atmosphere through a complex series of photochemical reactions involving VOCs (also sometimes referred to by some regulating agencies as reactive organic gases, or ROG), NO_X and sunlight. Ozone precursors are created

from combustion processes and the evaporation of solvents, paints, and fuels. Ozone levels are usually highest in the afternoon because of the intense sunlight and the time required for ozone to form in the atmosphere. Elevated concentrations of ground-level ozone can cause reduced lung function, respiratory irritation, and can aggravate asthma. Ozone has also been linked to immune system impairment. People should limit outdoor exertion if ozone levels are elevated, as even healthy individuals may experience respiratory issues on a high-ozone day. Ground-level ozone can also damage forests and agricultural crops, interfering with their ability to grow and produce food.

Currently all of Washington State is in attainment for NAAQS for ozone, with a complete maintenance plan for the Central Puget Sound Region in 2016.

Particulate Matter (PM_{10} & $PM_{2.5}$)

PM is a class of air pollutants that consists of a mixture of extremely small particles and liquid droplets such as acids, organic chemicals, metals, and soil or dust particles. PM takes three main forms depending on density—PM_{10} is considered "Coarse", with a diameter of 10µm or less. "Fine" particulate matter is also known as $PM_{2.5,}$ due to its diameter being 2.5µm or less. Lastly there are "Ultrafine" particles with a diameter less than 0.1µm, though these are not factored into EPA attainment designations. Particulate matter is a result of combustion, such as emissions from vehicles and industry, and from wood burning including wood stoves, fireplaces, and wildfires. In addition, particulate matter is generated from brake and tire wear from vehicles. High levels of particulate matter—especially $PM_{2.5}$—can result in a multitude of health impacts, including an increase in hospital visits for cardiovascular and respiratory problems, especially for sensitive populations. Decreased visibility may also derive from increased levels of particulate matter.

Currently, all of Washington is meeting air quality standards for both fine ($PM_{2.5}$) and coarse (PM_{10}) particulate matter, with maintenance plans for most of the state being completed recently. While there were extended periods of time when NAAQS were exceeded for particulate matter due to wildfires, the EPA allows data from days "influenced by exceptional events that are beyond the ability of air agencies to control" to be excluded for regulatory actions.

Other Pollutants

Since the phasing out of lead from gasoline in the U.S. in the 1980s, vehicle travel is no longer a major source of lead emissions, and lead emissions are not associated with changes in traffic volumes or travel patterns from implementation of the Seattle Comprehensive Plan.

SO_2 is produced by burning fuels that contain sulfur such as coal, oil, and diesel, or processing metals that contain sulfur. Historically, Washington has maintained very low measured levels of SO_2 and stopped most monitoring of SO_2 levels in the air. After EPA adopted a new SO_2 standard in 2010, Ecology evaluated ambient SO_2 levels throughout Washington, finding that all counties met that standard, apart from one area in Whatcom County (EPA, 2017). With the addition of

new emission control technologies, SO_2 from gasoline, diesel, and transportation-related sources have fallen over the past few decades due to a reduction of sulfur content in gasoline and diesel by nearly 90%. Changes in traffic volumes or travel patterns based on growth described in the Seattle Comprehensive Plan are not associated with changes in SO_2 generation.

Air toxic pollutant emissions or hazardous air pollutants (HAPs) are produced from both stationary and mobile sources, notably from motor vehicles in Seattle. EPA has been able to reduce benzene, toluene, and other air toxics emissions from mobile sources by placing stringent standards on tailpipe emissions and requiring the use of reformulated gasoline. However, changes in traffic volumes or travel patterns based on growth described in the Seattle Comprehensive Plan are likely to generate additional air toxics.

Greenhouse Gases & Climate Change

Generally, climate change can be described as the changing of the Earth's climate caused by natural fluctuations and anthropogenic activities (i.e., activities relating to, or resulting from the influence of human beings) that alter the composition of the global atmosphere. Changes in Earth's climate can include temperature, precipitation patterns; increases in ocean temperatures, sea level, and acidity; melting of glaciers and sea ice; changes in the frequency, intensity, and duration of extreme weather events and shifts in ecosystem characteristics, like the length of the growing season, timing of flower blooms, and migration of birds. Global mean temperatures in the United States have warmed during the 20th century and continue to warm into the 21st century.

The accumulation of GHGs in the atmosphere is a driving force in climate change. GHGs are gases that naturally trap heat by preventing the expulsion of solar radiation that hits the Earth, limiting the amount of radiation that is reflected back into space. This trapping of heat, known as the "greenhouse effect", keeps the earth's surface habitable. However, anthropogenic activities increase the concentrations of additional GHGs in the atmosphere, intensifying the natural greenhouse effect and increasing global average temperatures.

The principal GHGs of concern include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs). These GHGs have a long atmospheric lifespan (1 year to several thousand years), and their potential to trap heat varies widely. Anthropogenic activities that release GHGs of concern include the combustion of fossil fuels for transportation, heating, and electricity generation. Other activities such as agricultural processes, industrial processes, waste decomposition, and deforestation all contribute to climate change.

Based on data compiled by the EPA, GHG emissions from human activities in the United States in 2020 decreased by 20% from 2005, but only 7% compared to 1990 levels. Global data compiled by the EPA show a 43% increase of net GHG emissions between 1990 and 2015. Despite recent reductions, the total warming effect from greenhouse gases produced by human activity to the Earth's atmosphere increased by 45% between 1990 and 2019 (EPA, 2022). The

National Oceanic and Atmospheric Administration's (NOAA) 2021 Annual Climate Report indicates that combined global land and ocean temperatures have increased an average of 0.14 degrees Fahrenheit per decade since 1880 and an average of 0.32 degrees Fahrenheit since 1981 (NOAA, 2022).

Ecology estimates that GHG emissions in Washington State peaked in 1999 at 110 million metric tons and declined after the economic recession in 2008 but have been rising gradually in recent years. In 2019, Washington State's GHG emissions were at their highest levels since 2007, increasing nearly 7% since 2018 and reaching 102.1 million metric tons (Ecology, 2022b). According to the 2020 Community Greenhouse Gas Emissions Inventory, core citywide emissions consisting of transportation, buildings, and waste sectors were 3,012,800 $MTCO_2e$ in the year 2020 (City of Seattle, 2020). Expanded emissions include sources such as freight transportation and air travel. Expanded emissions in 2020 were 5,087,600 $MTCO_2e$.

Air Quality Information Sources, Monitoring, & Trends

Data from PSCAA, Ecology, and EPA were used to compare criteria pollutant levels over the past three years to current NAAQS as summarized in **Exhibit 3.2-2**. This includes days with excessive wildfire smoke that were excluded from EPA determinations regarding attainment. Therefore, some data points may exceed the NAAQS, but this did not factor into attainment determinations for the State or the region.

Criteria pollutants are measured at four monitoring stations within Seattle: 10th and Weller, Duwamish, South Park, and Beacon Hill. Measured criteria pollutant levels decreased from 2019 to 2021 at all monitoring stations apart from ozone at Beacon Hill, which did not change, and 24-hour averaging $PM_{2.5}$ at Beacon Hill, which increased, but remained below the NAAQS. Both CO and NO_2 levels were consistently higher at the 10th & Weller station in Subarea 4 than at the Beacon Hill station in Subarea 8. On average, measurements for $PM_{2.5}$ with 1-year averaging were highest at the South Park station in Subarea 7, while measurements for $PM_{2.5}$ with 24-hour averaging were highest at the 10th & Weller station in Subarea 4.

Exhibit 3.2-2. Criteria Pollutant Levels in the City of Seattle 2019-2021

Pollutant	Station	Primary/ Secondary	Averaging Time	NAAQS	2019 Value	2020 Value	2021 Value
Carbon Monoxide (CO)	Beacon Hill (Subarea 8)	Primary	8 hours	9 ppm	0.80	1.70	0.60
			1 hour	35 ppm	1.17	1.79	0.77
Carbon Monoxide (CO)	10th & Weller (Subarea 4)	Primary	8 hours	9 ppm	1.10	1.20	1.00
			1 hour	35 ppm	1.50	1.53	1.37
Nitrogen Dioxide (NO_2)	Beacon Hill (Subarea 8)	Primary	1 hour	100 ppb	43.05	42.10	41.16
		Primary and Secondary	1 year	53 ppb	10.56	8.60	9.25
Nitrogen Dioxide (NO_2)	10th & Weller (Subarea 4)	Primary	1 hour	100 ppb	61.30	58.51	53.59
		Primary and Secondary	1 year	53 ppb	18.10	15.81	15.80
Ozone (O_3)	Beacon Hill (Subarea 8)	Primary and Secondary	8 hours	0.07 ppm	0.05	0.05	0.05
$PM_{2.5}$	Beacon Hill (Subarea 8)	Primary	1 year	12 µg/m³	6.57	6.50	5.70
		Secondary	1 year	15 µg/m³			
		Primary and Secondary	24 hours	35 µg/m³	25.80	34.43	26.00
$PM_{2.5}$	10th & Weller (Subarea 4)	Primary	1 year	12 µg/m³	N/A	8.70	7.77
		Secondary	1 year	15 µg/m³			
		Primary and Secondary	24 hours	35 µg/m³	N/A	37.50	30.57
$PM_{2.5}$	Duwamish (Subarea 7)	Primary	1 year	12 µg/m³	8.73	8.9	8.37
		Secondary	1 year	15 µg/m³			
		Primary and Secondary	24 hours	35 µg/m³	31.83	35.60	27.57
$PM_{2.5}$	South Park (Subarea 7)	Primary	1 year	12 µg/m³	9.13	8.80	8.10
		Secondary	1 year	15 µg/m³			
		Primary and Secondary	24 hours	35 µg/m³	36.73	26.40	16.93
PM_{10}	Beacon Hill (Subarea 8)	Primary and Secondary	24 hours	150 µg/m³	N/A	58.67	32.33

Sources: PSCAA, 2019a; PSCAA, 2020; PSCAA, 2021.

Sources of Air Pollution in Seattle

Citywide

Equipment with heavy-duty fossil fuel burning engines, such as locomotives, large trucks, construction equipment, freighters, cruise ships, and ferries are the main sources of transportation-related air pollution within Seattle, largely due to emissions produced by diesel motors. According to 2019-2020 annual average daily traffic (AADT) roadway data from Washington State Department of Transportation (WSDOT), the roads with the highest percentage of heavy truck traffic within Seattle are sections of I-5, SR-99, SR-519, and SR-522. Ocean-going vessels, harbor support vessels, ferries, and cargo-handling equipment at marine facilities are sources of air pollution along the waterfront, Harbor Island, and in the Duwamish waterway.

Point sources of air pollution within the manufacturing and industrial centers include industrial and non-transportation emissions sources including manufacturing plants, heavy and general industrial facilities, and manufacturing uses. Many point sources require obtaining permits from the PSCAA to operate. Residential communities bordering manufacturing and industrial centers are exposed to increased pollutant emissions due to their proximity to both transportation and point sources of pollution.

Construction equipment use is variable, intermittent, and geographically temporary, being more heavily associated with certain phases (such as earthmoving and grading) of active construction. However, when emissions are examined over a longer time frame, say annually, impacts are fairly constant and ubiquitous on a citywide basis.

Sources of non-transportation-related emissions include energy consumption and solid waste. Energy consumption consists of emissions from consumption of electricity and natural gas. Primary uses of electricity and natural gas within the City would be for space heating and cooling, water heating, ventilation, lighting, appliances, and electronics. Solid waste releases GHG emissions in the form of methane when these materials decompose.

EIS Analysis Areas

The most substantial sources of air pollution in each area of the City are described below.

Area 1

Area 1, located in northwest Seattle, is heavily affected by on-road sources of air pollutants. I-5 runs north-south along the southern section of the eastern boundary of Area 1 and SR-99 runs north-south and transects Area 1. The main source of railway pollutants is from the freight trains that operate on the Burlington Northern Santa Fe (BNSF)-owned tracks that run along the southern, western, and eastern boundaries of Area 1. Industrial uses are located along and adjacent to the southern boundary of the area. (See the map of rail lines in **Section 3.5 Noise**.)

Area 2

Area 2 is located in northeast Seattle and is heavily affected by on-road sources of air pollutants. I-5 runs along the southwestern boundary of and through the northwestern portion of Area 2. In addition, SR-522 runs through the northern portion of Area 2. The main source of railway pollutants is from the freight trains that operate on the BNSF-owned tracks that run along the western boundaries of Area 2. (See the map of rail lines in **Section 3.5 Noise**.)

130th/145th Station Area

The 130th/145th Station Area is located in northern Seattle in Area 2. I-5 transects this area going north-south, and a railway runs through the vicinity of the 130th Street Light Rail Station. No other major sources of air pollution are located within the Area.

Area 3

Area 3, which is located in western Seattle, is heavily affected by on-road and rail sources of air pollutants. SR-99 runs along the eastern boundary of Area 3. The main source of railway pollutants is from the freight trains that operate on the BNSF-owned tracks that run through and along the southwestern boundary of Area 3. Other sources of air pollution include commercial cruise and other non-industrial operations at the Port of Seattle and industrial land uses.

Area 4

Area 4 is located centrally within the City of Seattle and is heavily affected by on-road and rail sources of air pollutants. SR-99 runs through the area and I-5 runs along the eastern boundary. The main source of railway pollutants is from the freight trains that operate on the BNSF-owned tracks that run through Area 4. Another source of air pollution is commercial cruise and other non-industrial operations at the Port of Seattle. (See the map of rail lines in **Section 3.5 Noise**.) Industrial uses are located at the northwestern and southern portions of Area 4.

Area 5

Area 5 is located centrally within the City of Seattle and is heavily affected by on-road sources of air pollutants. I-5 runs along the western boundary, SR-520 runs along the northern boundary, and I-90 runs along the southern boundary of Area 5. The main source of railway pollutants is from a streetcar that operates on the tracks that run through Area 5. (See the map of rail lines in **Section 3.5 Noise**.) Industrial uses are located at the southwestern corner of the Area.

Area 6

Area 6 is located in southwestern Seattle. While Area 6 would be subjected to on-road pollutants from roadways, no major sources of air pollution are located within the Area. SR-509 runs along a relatively small segment of the southeastern boundary of the Area. Sources of railway pollutants are from freight trains that operate on the BNSF-owned tracks that run along

a relatively small segment of the northeastern boundary of Area 6, adjacent to the industrial district operating along the southern portion of the Port of Seattle. (See the map of rail lines in **Section 3.5 Noise**.) The Area is bound to the east by Area 7, which consists primarily of industrial-zoned land.

Area 7

Southern Seattle includes Area 7 which consists primarily of industrial-zoned land and is heavily affected by on-road, rail, maritime, and aviation sources of air pollutants. I-5 runs along the eastern boundary of and SR-509 runs through Area 7. Area 7 is heavily affected by rail operations from BNSF-owned tracks that run through the Area, which includes an intermodal facility and industrial district at the Port of Seattle. (See the map of rail lines in **Section 3.5 Noise**.) The King County International Airport is located in the southwestern portion of Area 7, contributing aviation-related pollutants.

Area 8

Area 8 is located in southeast Seattle and is heavily affected by on-road sources of air pollutants. I-5 runs along the western boundary and I-90 runs along the northern boundary of Area 5. The main source of railway pollutants is from the freight trains that operate on the BNSF-owned tracks that run along the western and northern boundaries of Area 8. (See the map of rail lines in **Section 3.5 Noise**.) Although not located within Area 8, the King County International Airport is located adjacent to Area 8 to the southwest and the Seattle Intermodal facility, which is source of railway pollutants, is located adjacent to the west of Area 8.

Air Toxics

Air toxic pollutant emissions or hazardous air pollutants (HAPs) are of concern in Seattle because of projected growth in vehicle miles traveled. The Puget Sound Regional Council estimates that by 2050, the population of the Puget Sound region will grow by 38% (1.6 million people) to reach a population of 5.8 million people (PSRC 2021), with the highest population increase estimated to be in King County, resulting in increased vehicle miles traveled.

Construction Emissions

Exhaust emissions from diesel off-road equipment represent a relatively small percentage of the overall emission inventory in King County: 0.6% of countywide CO, 7.1% of countywide NO_X, 0.97% of countywide PM_{10}, 2.53% of countywide $PM_{2.5}$, and 0.39% of countywide VOC (EPA, 2017). The primary emissions of concern (greater than 1% contribution) with regard to construction equipment are NO_X and $PM_{2.5}$ (the latter a priority air toxic). NO_X is primarily an air quality concern with respect to its role in (regional) ozone formation and the Puget Sound air shed has long been designated as an attainment area (meeting standards) with respect to ozone.

Sensitive Populations

Sensitive populations are those who are the most at-risk of adverse effects from elevated levels of air pollutants, whether due to age, previous or ongoing illnesses, socioeconomic status (SES), or other conditions such as pregnancy. According to the U.S. EPA, these sensitive groups include people with heart and lung disease, older adults (those 65 years of age or older), children, people with diabetes, and people of lower SES (EPA, 2023). This also includes those experiencing breathing troubles, such as those who have/have had COVID-19, asthma, cystic fibrosis, or other respiratory ailments. Those of lower SES may be more vulnerable to air pollution due to proximity to industrial sources of air pollution, underlying health issues, poor nutrition, stress, and other factors contributing to increased health impacts.

Land uses with populations sensitive to air quality include residential areas, schools, daycare facilities, hospitals, and nursing and convalescent homes. Residential communities that border industrial areas may be at risk of increased impact from pollutants due to their proximity to both transportation and point sources of pollution.

The Washington Environmental Health Disparities Map is used to locate areas with high environmental health risks posed to sensitive populations across the state; see **Exhibit 3.1-12 Environmental Health Disparities** in **Section 3.1 Earth & Water Quality**. The map accounts for pollution measures such as diesel emissions and ozone and proximity to sources of pollution. The goal of the map is to provide insight on prioritization of public investments to buffer environmental health impacts on the state's communities, so that everyone may benefit from clean and healthy air, water, and environments. The map was created with 19 indicators, and these indicators are divided into four themes: environmental exposures, environmental effects, sensitive populations, and socioeconomic factors. The combination of these indicators informs the environmental health disparities map by census tract. The map shows communities that are experiencing a disproportionate share of environmental health burdens and that will need more assistance to reach equitable outcomes, with 1 indicating census tracts with the lowest disparities and 10 indicating tracts with the highest disparities.

According to the Washington Department of Health, living in areas with more environmental hazards and population vulnerabilities is associated with a shorter lifespan, where population in census tracts of rank 1 on average lived 5.3 years longer than those in census tracts with the highest environmental health disparities (rank 10) (Washington Department of Health, n.d.).

Downtown/Lake Union, Capitol Hill/Central District, Duwamish, and SE Seattle rank the highest (in the 8-10 range) compared to the other subareas. The subareas that rank the lowest are NW Seattle and NE Seattle, which have tracts that rank in the 3 to 6 range.

Greenhouse Gas Emissions in Seattle

The City of Seattle conducted a *Community Greenhouse Gas Emissions Inventory* study in 2020, which analyzed emissions data based on the national standards set forth by the International

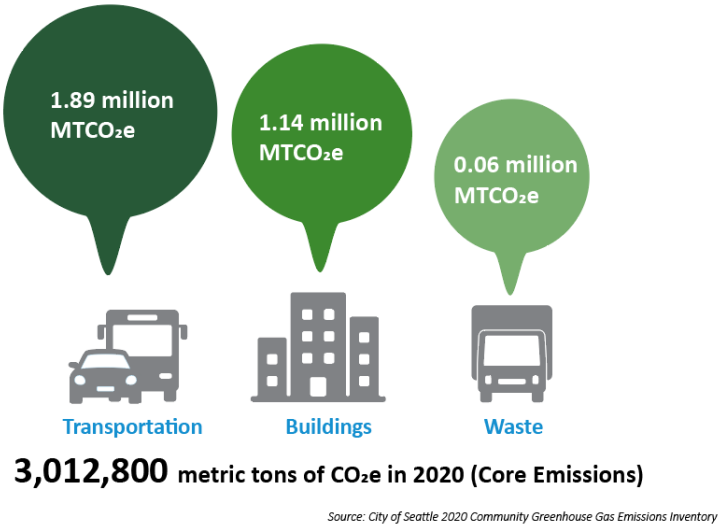
Council for Local Environmental Initiatives (ICLEI)—Local Governments for Sustainability. These standards make it easier to compare Seattle's emissions with other cities and past inventories.

GHGs were divided into core emissions and expanded emissions. Core emissions sources are those that the city can most directly and significantly impact, and most of the city's climate policies and programs are aimed at reducing core emissions. Core emissions include those from transportation, buildings, and waste sectors. Expanded emissions include all core emission sectors as well as additional sectors, subsectors, and categories. The additional category for expanded emissions includes industry-based emissions.

GHGs are measured by metric tons of carbon dioxide equivalents ($MTCO_2e$). The largest amount of core emissions in Seattle was contributed by the transportation sector, at 1.89 million $MTCO_2e$ (62%), followed by the buildings sector at 1.14 million MT, and waste at 0.06 million MT. A total of 3 million MT of CO_2e in core emissions were emitted in the city in 2020. CO_2e emissions in the transportation sector have decreased around 27.7% since 2008, when they measured 2.61 million MT. This decrease in emissions is due in part to improvements in vehicle efficiency standards, a decrease in vehicle miles traveled (VMT), and changes in travel patterns due to the COVID-19 pandemic in 2020.

For core emissions in the transportation sector, emissions are classified by roadway vehicle type as passenger emissions and truck emissions. Passenger emissions accounted for majority of emissions in the transportation sector at 1.68 million $MTCO_2e$, whereas truck emissions contributed only 207,000 $MTCO_2e$. Passenger emissions consist of both single- and high-occupancy vehicles, motorcycles, light trucks, and buses. Truck emissions consist of emissions from commercial trucks including light-, medium-, and heavy-duty commercial trucks (see **Exhibit 3.2-3**).

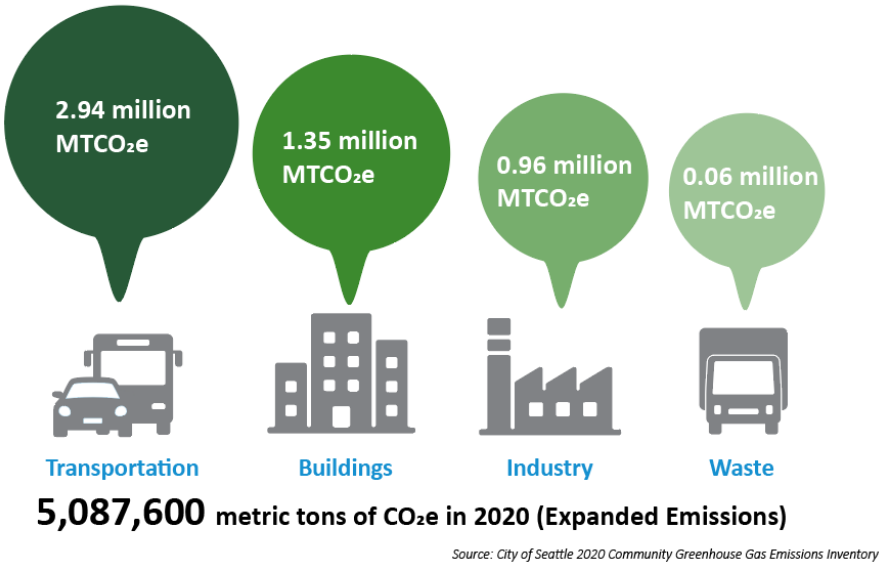
Exhibit 3.2-3. Core GHG Emissions in the City of Seattle



Source: City of Seattle, 2020.

For expanded emissions, the transportation sector also had the highest amount of CO_2e with 2.94 million MT (55%), followed by the buildings sector at 1.35 million MT, industry at 0.96 million MT, and waste at 0.06 million MT. A total of 5 million $MTCO_2e$ was emitted for expanded emissions in the city in 2020 (see **Exhibit 3.2-4**).

Exhibit 3.2-4. Expanded GHG Emissions in the City of Seattle



Source: City of Seattle, 2020.

Expanded emissions in the transportation sector are divided by air, marine, rail, passenger, and trucks. Passenger emissions still accounted for majority of emissions in the transportation sector at 1.68 million mt of CO_2e, while rail had the least amount at 27,000 MT CO_2e. Air transport and the industrial sector together comprised two of the largest sources of core and expanded emissions in 2020, approximately 844,000 mt of CO_2e (15.9% of total) and 962,000 mt of CO_2e (18.0% of total) respectively. Air transportation emissions have seen an uptick since 2008, due to increased economic activity and population growth.

3.2.2 Impacts

Impacts Common to All Alternatives

Construction Related Emissions

Future growth under any alternative would result in development of new residential, retail, light industrial, office, and community/art space. Most development projects in the city would entail demolition and removal of existing structures or parking lots, excavation and site preparation, and construction of new buildings. Emissions generated during construction activities would include exhaust emissions from heavy duty construction equipment, trucks used to haul construction materials to and from sites, worker vehicle emissions, as well as fugitive dust emissions associated with earth-disturbing activities, and other demolition and construction work.

Fugitive dust emissions are typically generated during construction phases. Activities that generate dust include building and parking lot demolition, excavation, and equipment movement across unpaved construction sites. The PSCAA requires dust control measures be applied to construction projects through Article 9, Section 9.15. Of these measures, those applicable to fugitive dust include (1) use control equipment, enclosures or wet suppression techniques, (2) paving or otherwise covering unpaved surfaces as soon as possible, (3) treating construction sites with water or chemical stabilizers, reduce vehicle speeds and cleaning vehicle undercarriages before entering public roadways and, (4) covering or wetting truck loads or providing freeboard in truck loads. In light of these requirements, impacts related to construction dust are concluded to be less than significant.

Criteria air pollutants would be emitted during construction activities from demolition and construction equipment, much of it diesel-powered, trucks used to haul construction materials to and from sites, and from vehicle emissions generated during worker travel to and from construction sites. Emissions are emitted in and around specific construction sites and are therefore dispersed geographically. The use of diesel-powered construction equipment would be temporary and episodic. The duration of exposure would be short and exhaust from construction equipment dissipates rapidly. Construction is temporary and would be transient throughout the site (i.e., move from location to location) and would not generate emissions in a fixed location for extended periods of time.

A number of federal regulations require cleaner off-road equipment. Specifically, the U.S. EPA has set emissions standards for new off-road equipment engines, classified as Tier 1 through Tier 4. To meet the Tier 4 emission standards, engine manufacturers will be required to produce new engines with advanced emission-control. By the time final Tier 4 regulations were fully implemented in 2015, PM and NO_X emissions had been reduced 99% compared to 1996 emissions (MTU, 2010). Consequently, it is anticipated that as the region-wide construction fleet converts to newer equipment the potential for health risks from off-road diesel equipment

will be substantially reduced. So, given the transient nature of construction-related emissions and regulatory improvements scheduled to be phased in, construction related emissions associated with all five alternatives of the Comprehensive Plan would be considered only a minor adverse air quality impact.

Greenhouse Gas Emissions

The scale of global climate change is so large that the impacts from any singular development project or programmatic action, even on the citywide scale of the development alternatives in this Draft EIS, would not have an individually discernible impact on global climate change. It is more appropriate to consider impacts on a "cumulative" scale. Thus, this EIS will consider how GHG emissions from future development in Seattle, in combination with emissions across the state, country, and planet to cumulatively contribute to global climate change.

Construction

GHGs would be emitted during construction activities from fossil-fueled demolition and construction equipment, trucks used to haul construction materials to and from sites, and from vehicle emissions generated during worker travel to and from construction sites. Construction and demolition emissions only represent approximately 2.71% of the emissions estimated in the 2020 GHG emissions inventory (City of Seattle, 2020).

Construction-related GHG emissions from any given development project that may occur in the next 20 years would be temporary and would not represent an on-going burden to the City's inventory. However, cumulatively it can be assumed that varying levels of construction activities within the city would be ongoing under any of the Plan alternatives and hence, cumulative construction related emissions would be more than a negligible contributor to GHG emissions within the city.

The City's Climate Action Plan recognizes the relevance of construction related GHG emissions and has included actions to be implemented by 2030 to address them. These include:

- Support new and expanded programs to reduce construction and demolition waste, such as creating grading standards for salvaged structural lumber so that it can be more readily reused;
- Expand source reduction efforts to City construction projects, and incorporate end-of-life management considerations into City procurement guidelines; and
- Phase-in bans on the following construction and demolition waste from job sites and private transfer stations: recyclable metal, cardboard, plastic film, carpet, clean gypsum, clean wood and asphalt shingles.

The City's *2022 Solid Waste Plan Update: Moving Upstream to Zero Waste* aligns its waste-related goals with the sustainability and climate goals of CAP. The 2022 Solid Waste Plan Update emphasizes the elimination or minimization of waste from the start. The 2022 Solid Waste Plan Update includes recommendations to increase public awareness to expand support of waste prevention and opportunities for reuse. Strategies to reduce waste include, but are not

limited to, reducing single-use items, food waste, require all single-use food services to use compostable packaging, and enhance diversion of construction and demolition debris at transfer stations.

Additionally, the West Coast Collaborative, a public-private partnership including the U.S. EPA, equipment manufacturers, fleet owners, state and local governments and non-profit organizations leverages federal funds to reduce emissions from the highest polluting engines. With Ecology and privately owned construction companies, the Collaborative installed diesel oxidation catalysts on construction equipment and trucks, reducing carbon emissions by 121.4 tons annually (West Coast Collaborative, 2023).

Although construction related emissions would not be negligible, because of the combination of regulatory improvements and parts of the Climate Action Plan that are under way, construction related GHG emissions associated with all alternatives would result in minor adverse climate impacts.

Operations—Transportation

Mobile emissions were estimated using the EPA's Motor Vehicle Emission Simulator (MOVES) model. The MOVES model is a state-of-the-science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants and GHG emissions. Projected vehicle miles traveled (VMT) by passenger vehicles, trucks, and buses were used to estimate criteria pollutant and GHG emissions.

The approach to estimating future year transportation related GHG emissions considers two factors:

- The projected change in VMT
- The projected change in fuel economy of the vehicle fleet

VMT in 2044. Travel demand models predict VMT in future years for various classes of vehicles (e.g., cars, trucks, buses). The model generally assumes continuation of current economic and demographic trends, with minor shifts toward shorter trips and more trips made by modes other than automobile travel. This will reduce VMT per capita, but total VMT in the region would continue to rise modestly due to population and employment growth. If emissions were projected based solely on the increase in VMT, with no changes assumed to fuel economy, emissions under each of the 2044 alternatives would increase compared to existing conditions. However, the trend toward more stringent federal standards means it is reasonable to assume improved fuel economy, and lowered GHG emissions, by 2044.

A mix of land uses is associated with reduced VMT (WSDOT, 2013). Diversity in land uses combined with increased density within an urban area can lead to shorter trip distances and greater use of walking, as well as the reduced need for vehicle ownership. Accessibility to a variety of trip purposes, as in mixed use developments, may induce additional trips; however, these trips are shorter and are more likely to be made by walking than trips in areas where mixed land uses are not available. Travel demand models include findings about projected VMT

in future years for various classes of vehicles (e.g., cars, trucks, buses). The model generally assumes continuation of current economic and demographic trends, with minor shifts toward shorter trips and more trips made by modes other than automobile travel. Improvements in fuel efficiency combined with reductions in VMT would contribute to reductions in emissions.

Fuel Economy in 2044. Federal programs are mandating improved fuel economy, which reduces GHG emissions, for passenger cars and light trucks. Transportation-related emissions in 2044 would be lower as compared to existing conditions due to improvements in fuel economy. The National Highway Traffic and Safety Administration (NHTSA) is responsible for establishing vehicle standards and for revising existing standards. Compliance with Federal fuel economy standards is not determined for each individual vehicle model. Rather, compliance is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. On March 31, 2022, the NHTSA finalized their Corporate Average Fuel Economy (CAFE) standards for model years 2024 to 2026. The final rule requires an industry-wide fuel average of approximately 49 miles per gallon (mpg) for passenger cars and light trucks in model year 2026 by increasing fuel efficiency by 8% annually for model years 2024 and 2025 and 10% for model year 2026 (NHTSA, 2023). The NHTSA estimates that final standards will reduce emissions of CO, VOC, NO_X, and $PM_{2.5}$ emissions attributable to the light-duty on-road fleet dramatically between years 2020 and 2050 (NHTSA, 2022).

As discussed above, Washington State adopted a new rule in December 2022 that requires new ZEV sales of passenger cars, light-duty trucks, and medium-duty vehicles to 100% starting in 2035. It also requires cleaner, less polluting new heavy-duty internal combustion engines. ZEVs do not release tailpipe air pollution. A ZEV continues to run clean throughout its life, unlike a standard petroleum-powered vehicle, which typically pollutes more as it ages and parts wear out. Progress toward 100% ZEV sales in 2035 would increase the rate of registration of ZEVs in Seattle, resulting in reduced tailpipe emissions and the need for charging infrastructure.

Results. All four 2044 alternatives for which VMT data was provided result in roughly the same annual GHG emissions, as shown in **Exhibit 3.2-5**. Alternative 5, which includes the most concentrated growth, is expected to have the highest total GHG emissions and the lowest GHG per capita among the alternatives. Alternative 1, the No Action Alternative, is expected to have the lowest total GHG emissions and the highest GHG emissions per capita. However, the variation is within approximately one half of one percent. This is because the projected improvements in fuel economy outweigh the projected increase in VMT. Therefore, roadway emissions are considered a minor adverse impact.

Exhibit 3.2-5. Total Citywide Road Transportation Emissions GHG ($MTCO_2e$) by Alternative

	Existing	Alternative 1	Alternative 2	Alternative 3	Alternative 4*	Alternative 5
Total	**31,070**	**29,408**	**30,235**	**30,235**	**30,235**	**31,246**

* Traffic data is not available for Alternative 4 because the projected VMT would fall between Alternative 2 and Alternative 3. For purposes of the analysis, it has been assumed that Alternative 4 VMT is equivalent to Alternative 2, which is higher than Alternative 3.
Source: Kimley-Horn, 2023.

Operations—Energy

GHG emissions from electrical use are generated when energy is generated by the non-renewable sources of an electrical supplier such as Seattle City Light. However, Seattle City Light is carbon neutral and, consistent with the City's Climate Action Plan, no emissions related to electricity are assumed because Seattle City Light will maintain its commitment to carbon neutrality.

GHG emissions from natural gas are direct emissions resulting from on-site combustion for heating and other purposes. All-electric space and water heating is required by the 2022 Washington Energy Code. However, all-electric cooking appliances has not been required. According to household end-use consumption data, approximately 13% of natural gas consumption in residential uses is for purposes other than space and water heating (U.S. EIA, 2015). Natural gas usage has been estimated by dividing total natural gas consumption by residential uses in the State of Washington in 2020 (before all-electric space and water heating is required) by the total housing units in the state in 2020 (U.S. EIA, 2023 and U.S. Census, 2020). Based on the assumption that 13% of natural gas consumption is used for purposes other than space and water heating, natural gas consumption has been adjusted accordingly (see **Appendix D** for detailed calculations). GHG emissions from natural gas demand are calculated using the CalEEMod land use model (version 2020.4.0). This model is recognized by the Puget Sound Clean Air Agency as an estimation tool (PSCAA, 2019).

Operations—Solid Waste

Solid waste-related emissions are generated when the increased waste generated by new development and infrastructure is disposed in a landfill where it decomposes. Future growth within the city would result in increase in solid waste disposal. GHG emissions associated with solid waste disposal has been estimated using CalEEMod (version 2020.4.0). Increased emissions from solid waste generation were estimated using Ecology solid waste and recycling data (Ecology, 2018). These emissions were then adjusted to account for waste diversion implemented through waste reduction, recycling and composting fostered by the City's carbon-neutral goal target of 70% waste diversion by 2030. Impacts related to energy-generated GHGs would be considered a minor adverse impact.

Equity & Climate Vulnerability Considerations

Exposure to Air Pollution

Future growth and development patterns under Comprehensive Plan growth strategies would affect future residences' (or other "sensitive receptors") relationships to mobile and stationary sources of air toxics and particulate matter $PM_{2.5}$. The degree of potential for adverse impacts on new sensitive receptors would depend on proximity to major sources of these pollutants, the emissions from these sources, and the density of future sensitive development.

Portions of Seattle located along major roadways (freeways and the most-traveled highways) are exposed to relatively high levels of air borne toxics, resulting in high cancer risk values. In 2008, the Washington State Department of Health conducted a study of cancer risks in the Duwamish Valley. Results of the analysis indicate that on-road mobile sources contribute to the highest cancer and non-cancer risks near major roadways over a large area of south Seattle and that risks and hazards are greatest near major highways and drop dramatically at approximately 200 meters (approximately 656 feet) from the center of highways (WSHA, 2008). Modeling indicates increased cancer risks in existing residential areas of up to 800 in one million.[10] Risks above 100 per one million persons (100 excess cancer risk) is a criterion identified by U.S. EPA guidance for conducting air toxic analyses and making risk management decisions at the facility and community-scale level. Risks and hazards drop dramatically in places farther than 200 meters (656 feet) from the center of highways. A similar phenomenon occurs in proximity to rail lines that support diesel locomotive operations. Given this, it would be prudent to consider risk-reducing mitigation strategies. Because the authority to set standards for locomotives and heavy-duty on-road vehicle emissions lies exclusively with the U.S. EPA, the only strategies available to the City for consideration are related to reducing exposure. As discussed above, measures such as setbacks for residential and other sensitive land uses from major traffic corridors and rail lines are effective. Other measures to protect sensitive land uses from being exposed to substantial levels of toxic air contaminants include requirements for enhanced air filtration, restricting open spaces and operable windows near to the source of toxic air contaminants, and siting intake vents as far from substantial sources as practicable.

Portions of Seattle are also exposed to relatively high cancer risk values from stationary sources and near port operations where ship emissions and diesel locomotive emissions and diesel forklift emissions can all occur. Similarly, distribution centers that involve relatively high volume of diesel truck traffic can also represent a risk hazard to nearby sensitive land uses. This is considered a moderately adverse impact to air quality. The City has identified measures for receptors proposed in areas proximate to manufacturing industrial centers to reduce the potential risk through the Seattle Industrial and Maritime Lands Final EIS (2022), such as implementing buffer areas of 500 to 1,000 feet and enhanced air filtration systems.

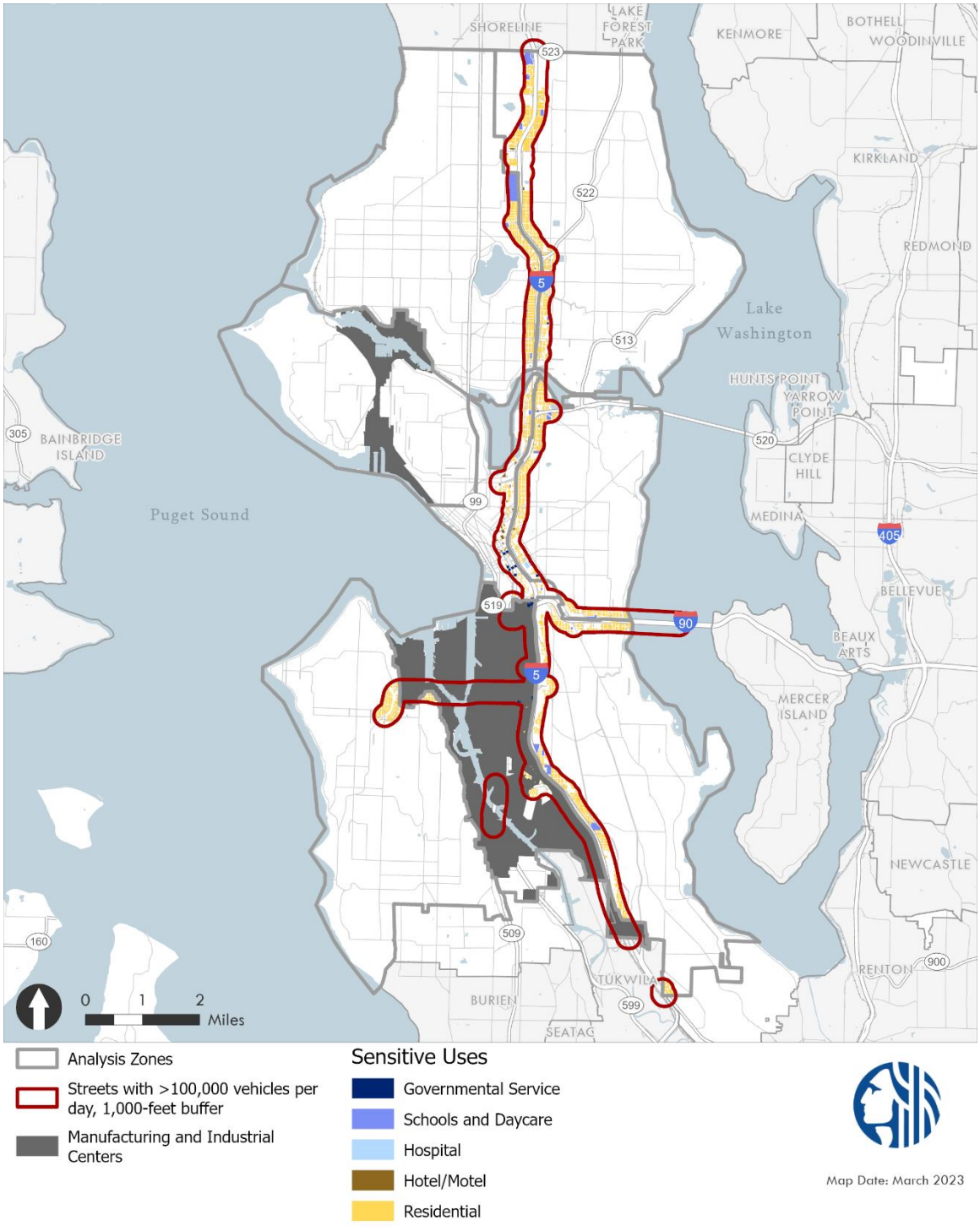
[10] These risks should not be interpreted as estimates of disease in the community, only as a tool to define potential risk.

Although, as discussed above, risks and hazards drop dramatically in places farther than 200 meters (656 feet) from the center of highways, a buffer area of 500 to 1,000 feet has been considered to reduce the potential exposure of sensitive populations to air toxics (City of Seattle, 2022). **Exhibit 3.2-6** shows a 1,000-feet buffer around roadways and highways with daily trips greater than 100,000 vehicles. This shows that existing uses along Interstate 5 (I-5) north of Interstate 90 (I-90) consist primarily of residential uses, within 1,000 feet of transportation sources of air pollutants. Under any alternative, increased residential densities could be expected within this buffer. Variations in potential density increases in these areas under each alternative are discussed further below.

This potential increased exposure to cancer risk is considered a potential moderate adverse impact related to air quality.

To address the impact, the City could consider risk-reducing mitigation strategies such as setbacks for residential and other sensitive land uses from major traffic corridors, rail lines, port terminals and similar point sources of particulates from diesel fuel and/or to identify measures for sensitive populations proposed to be in areas near such sources such as upgraded air filtration systems.

Exhibit 3.2-6. 1,000-Feet Buffer Around Freeways and Roadways with Greater than 100,000 Daily Vehicles



Source: Kimly-Horn, 2023.

Impacts of Alternative 1: No Action

Under Alternative 1 future growth would continue based on continuation of the 2035 Comprehensive Plan, with a target housing growth of 80,000 dwelling units. New housing would consist primarily of rental apartments concentrated in existing mixed-use areas. Approximately 46% of housing growth would occur within urban centers and approximately 18% would occur within residential urban villages.

Construction

As discussed above, emissions generated during construction activities would include exhaust emissions from heavy duty construction equipment, trucks used to haul construction materials to and from sites, worker vehicle emissions, as well as fugitive dust emissions associated with earth-disturbing activities, and other demolition and construction work. Emissions associated with future development cannot be determined on a program level as construction activities are project-specific. Therefore, a comparative discussion of construction emissions is based on projected housing units demolished and target housing growth under each of the alternatives. Alternative 1 would result in the least amount of demolished housing units and the lowest target growth compared to all other alternatives. Therefore, emissions associated with heavy-duty construction equipment, trucks, worker vehicles, and fugitive dust would likely be the lowest among all alternatives.

Operations

Transportation-Related Air Quality Emissions

VMT within the City of Seattle would increase as a result of population and employment growth under Alternative 1. Projected changes in VMT were extracted from the projected travel demand model for cars, trucks, and buses. The travel demand model generally assumes existing economic and demographic trends continue with minor changes due primarily to mode share shifts and shortened trips due to increased density. These changes cause projected VMT per capita to decline slightly by 2044. However, total VMT would continue to rise modestly due to population and employment growth.

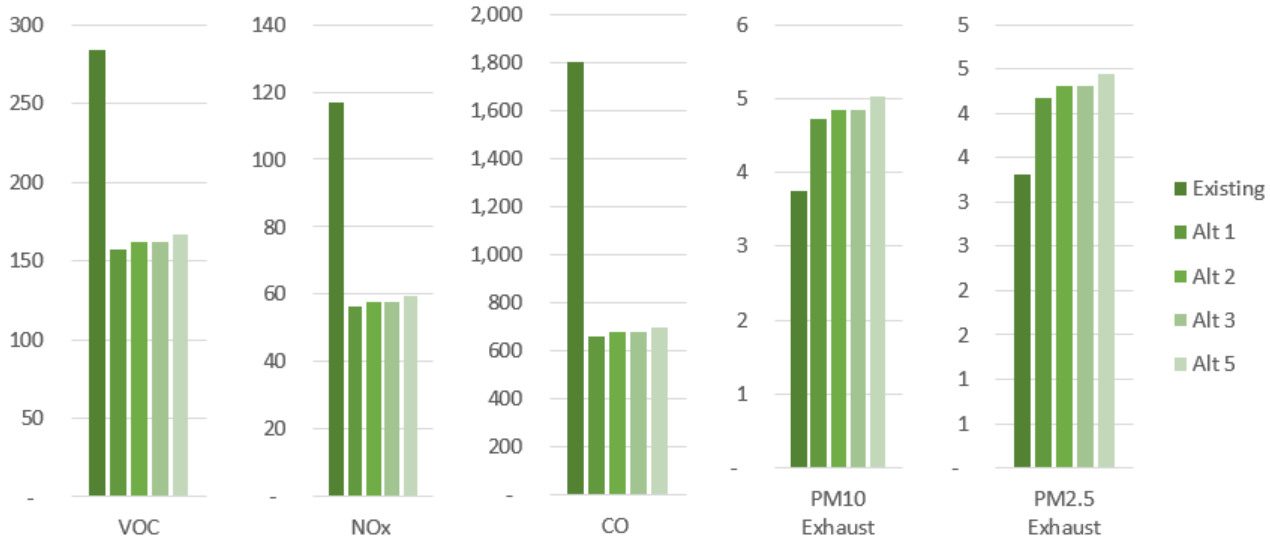
All of the 2044 alternatives are expected to generate lower air pollutant emissions than in 2018, resulting in a net decrease in transportation-related emissions of VOC, CO, and NO_X. This is because the projected improvement in fuel economy outweighs the projected increase in VMT for those criteria pollutants. Transportation-related air pollutant emissions under existing conditions and each of the four alternatives with VMT data are presented in **Exhibit 3.2-7** and **Appendix D**. Note that these emissions are City-wide assuming development under each alternative.

In addition to the tailpipe emissions presented in **Exhibit 3.2-7**, vehicle travel would also generate PM_{10} and $PM_{2.5}$ through tire and brake wear and, more significantly, from entrained

road dust. These non-tailpipe emissions would not benefit from future improvements to the vehicle fleet as a whole or from improvements to fuel composition. Therefore, PM_{10} and $PM_{2.5}$ emissions attributable to fugitive dust is not represented in **Exhibit 3.2-6** (see **Appendix D**).

As can be seen from **Exhibit 3.2-7** regional VOC, CO, and NO_X emissions under Alternative 1 would be substantially lower than under 2018 background conditions. This is because the projected improvement in fuel economy, emission controls and fuel composition will outweigh the projected increase in VMT. Emissions of PM_{10} and $PM_{2.5}$ would be approximately 1 ton/year greater than under existing conditions, which is a nominal increase. This would represent a beneficial future air quality outcome due to significant decreases in VOC, CO, and NO_X emissions. As indicated in **Exhibit 3.2-7**, Alternative 1 would have the lowest criteria pollutant emissions of the five alternatives.

Exhibit 3.2-7. Road Transportation Pollutant Emissions

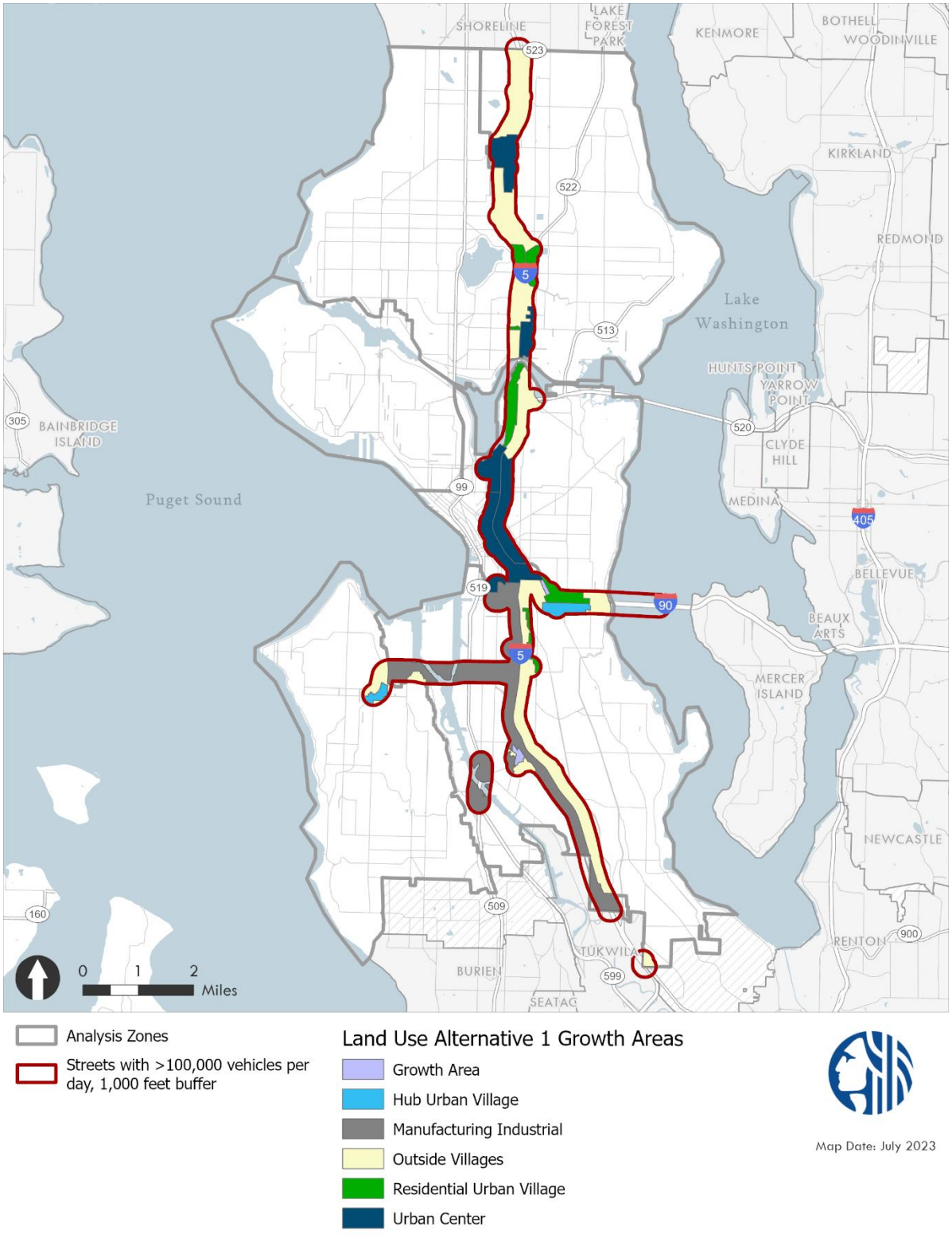


Source: Kimley-Horn, 2023.

Equity & Climate Vulnerability Considerations

As shown in **Exhibit 3.2-8**, several urban centers and urban villages are located within 1,000-feet of roadways with greater than 100,000 daily vehicles. Collectively these urban centers and villages represent 56% of all projected residential growth in the city through 2044. Only a portion of each center or village is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. Compared to all other alternatives, the number of units within the affected urban centers and villages would be the lowest (same as Alternative 3 and 4).

Exhibit 3.2-8. 1,000-Feet Buffer Around Freeways and Roadways with Greater than 100,000 Daily Vehicles—Alternative 1



Source: Kimley-Horn, 2023.

Greenhouse Gas Emissions

Changes in operational GHG emissions associated with growth under Alternative 1 would result from increases in VMT and improvements to the vehicle fleet, electrical and natural gas usage, and solid waste generation. GHG emissions from electrical usage are generated when energy consumed is generated by the non-renewable resources of an electrical supplier such as Seattle City Light. However, Seattle City Light is carbon neutral and, consistent with the City's Climate Action Plan, no emissions related to electricity are assumed because City Light will maintain its commitment to carbon neutrality. GHG emissions from natural gas are direct emissions resulting from on-site combustion for heating and other purposes. Solid waste-related emissions are generated when the increased waste generated by development is disposed in a landfill where it decomposes, producing methane gas.[11]

Operational GHG emissions from Alternative 1 are presented in **Exhibit 3.2-9** and **Appendix D**. The transportation emissions reductions from existing emissions due to implementation of Alternative 1 would be the greatest of any of the five alternatives, largely as the result of lower VMT compared to other alternatives which is a reflection of the lowest overall housing growth target and the concentration of that growth within urban centers and urban villages. Reflecting the lowest overall housing growth target, the building and waste emissions associated with Alternative 1 would be the lowest of all the alternatives.

Exhibit 3.2-9. Per Capita GHG Emissions—Alternative 1

	Emissions ($MTCO_2e$)
Transportation	-1,662
Buildings	48,422
Waste	60,834
Total Alternative 1	107,594
Population Growth Estimate	164,000
Per Capita GHG Emissions	**0.66**

Notes: Population growth calculated using City GIS data for total housing units and population (total units/population = persons per household), assuming 2.05 persons per household
Source: Kimley-Horn, 2023.

Per capita GHG emissions due to target growth is calculated by dividing the total GHG emissions by the anticipated population growth. According to the Seattle 2020 Community GHG Inventory, citywide core per capita emissions was 4.09 $MTCO_2e$ per resident in 2020 (City of Seattle, 2020). As shown in **Exhibit 3.2-9**, Alternative 1 would result in per capita emissions of 0.66 $MTCO_2e$, which is significantly lower than the existing per capita rate.

[11] CH4 from decomposition of municipal solid waste deposited in landfills is counted as an anthropogenic (human-produced) GHG

130th/145th Station Area

Zoning designations under Alternative 1 would be retained within the 130th/145th Station Area and no new areas will be designated for mixed-use or higher density than exists under existing conditions. The future light rail station at 130th would be developed in an area that would allow three-story single-purpose residential development and four- to eight-story multifamily surrounding the future 145th BRT Station. Implementation of Alternative 1 assumes a growth potential of 840 housing units and 716 jobs in proximity to the future light rail and BRT stations.

Construction

Station Area growth under Alternative 1 would be the lowest compared to all other alternatives. Therefore, emissions associated with heavy-duty construction equipment, trucks, worker vehicles, and fugitive dust would likely be the lowest among all alternatives.

Operations

Criteria Pollutant Emissions

Transit has been identified as the most frequent and successful tool in reducing VMT (WSDOT, 2022). Transit improvements overall provide a VMT reduction of up to 2.6% (WSDOT, 2022). Therefore, transit service and connectivity provided by the future light rail and BRT stations in combination with Alternative 1 growth potential, in comparison to baseline conditions, would result in improved transit service and connectivity when compared to existing conditions, providing greater potential for VMT reduction and reductions in criteria pollutants.

Greenhouse Gas Emissions

As stated above, transit service and connectivity provided by the future light rail and BRT stations in combination with Alternative 1 growth potential, in comparison to baseline conditions, would result in improved transit service and connectivity when compared to existing conditions, providing greater potential for VMT reduction and reductions in GHG emissions. In addition, the housing growth potential under Alternative 1 would be the lowest compared to all other alternatives. Therefore, GHG emissions associated with building energy use and solid waste would be lowest under Alternative 1.

Equity & Climate Vulnerability Considerations

The 130th/145th Station Area is located in northern Seattle in Area 2. I-5 transects this area going north-south, and a railway runs through the vicinity of the 130th Street Light Rail Station. Target growth under Alternative 1 within the Station Area would be lowest among all other alternatives and would place the least number of residents within close proximity to transportation-related pollutants along I-5.

Impacts of Alternative 2: Focused

Under Alternative 2, areas of focused growth called neighborhood centers would create more housing around shops and services, allowing for a wide range of housing types. The target housing growth under this alternative is 100,000 dwelling units. Approximately 37% of housing growth would occur within regional centers and approximately 24% would occur within neighborhood centers.

Construction

Alternative 2 would result in a greater number of demolished housing units compared to Alternative 1 and less than Alternative 3, 4, and 5. Alternative 2 would result in greater target growth compared to Alternative 1, the same as Alternative 3 and 4, and less than Alternative 5. Therefore, emissions associated with heavy-duty construction equipment, trucks, worker vehicles, and fugitive dust under Alternative 2 would likely be greater than Alternative 1 and lower than Alternative 3, 4, and 5.

Operations

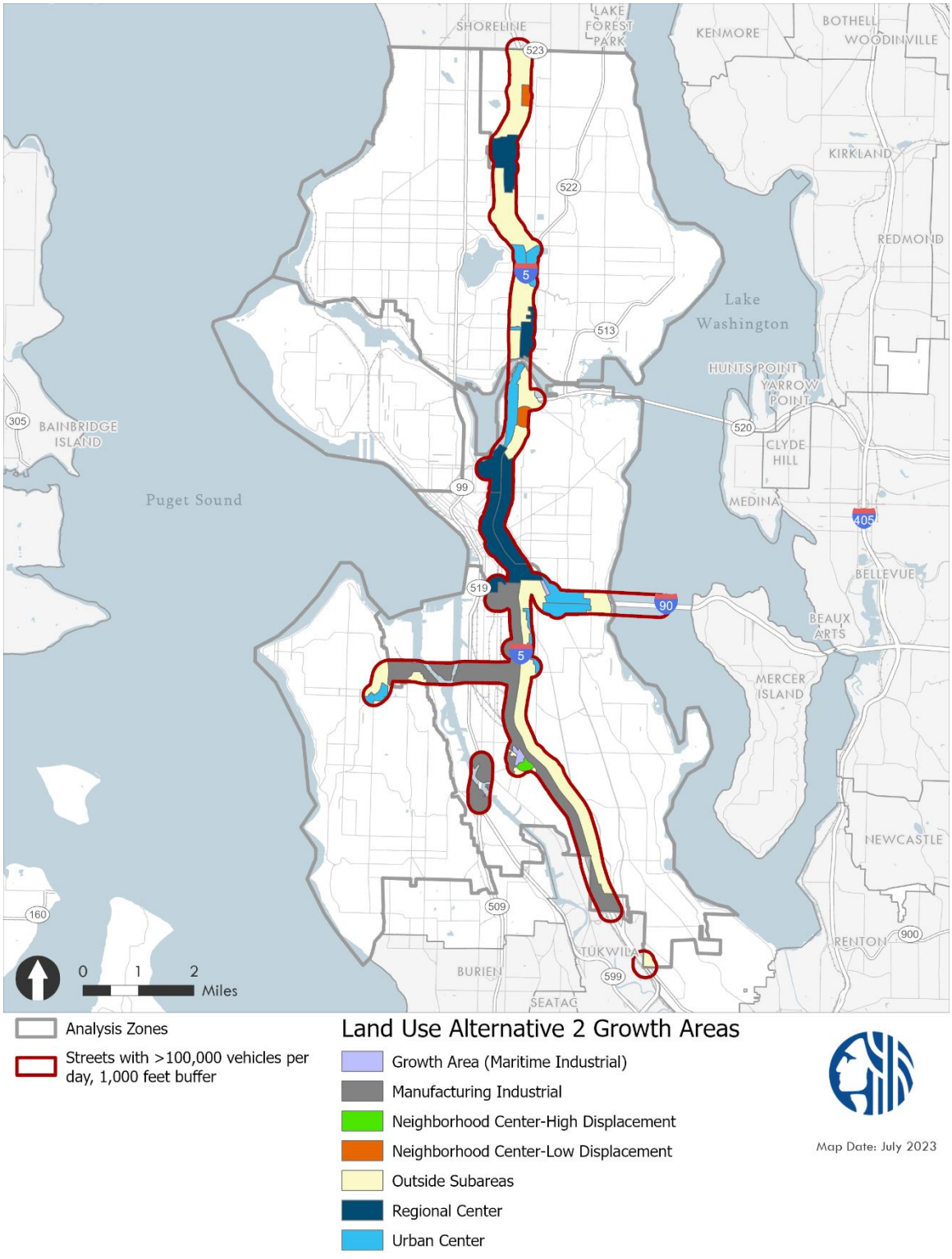
Transportation Air Quality Emissions

Transportation-related air pollutant emissions under existing conditions and each of the four alternatives are presented in **Exhibit 3.2-7** and **Appendix D**. As can be seen from **Exhibit 3.2-7,** regional emissions of VOC, CO, and NO_X under Alternative 2 would be substantially less compared to existing background conditions. This is because the projected improvement in fuel economy, increase in ZEV use, emission controls and fuel composition will outweigh the projected increase in VMT. This would result in a beneficial future air quality outcome. As indicated in **Exhibit 3.2-7**, transportation emissions from Alternative 2 would be slightly higher than those from Alternative 1, mostly because reductions in transportation emissions (from existing background conditions) realized from implementation of Alternative 2 would be slightly less than those of Alternative 1.

Equity & Climate Vulnerability Considerations

In addition to the regional centers and villages that would be within the 1,000-feet buffer under Alternative 1, Alternative 2 would place additional neighborhood centers units within the buffer, as shown in **Exhibit 3.2-10**. Included in the additional units is the 130th/145th Station Area. Although a greater number of units would be closer to transportation sources of pollution and thus at higher risk than under Alternative 1, overall units within these regional centers, urban center, and neighborhood centers consists of 46% of overall projected growth, which is higher than that of Alternative 1. Only a portion of each center is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. Alternative 2 would place a greater number of units within the 1,000-foot buffer when compared to Alternative 1, 3, and 4, but fewer units compared to Alternative 5.

Exhibit 3.2-10. 1,000-Feet Buffer Around Freeways and Roadways with Greater than 100,000 Daily Vehicles—Alternative 2



Source: Kimley-Horn, 2023.

Greenhouse Gas Emissions

GHG emissions under development of Alternative 2 were calculated using the same methodologies as those described for Alternative 1 but reflect the increases in target housing growth in neighborhood centers throughout the city. Operational GHG emissions from Alternative 2 are presented in **Exhibit 3.2-11** and **Appendix D**. Alternative 2 would result in less reductions in transportation GHG emissions compared to Alternative 1, largely as the result of greater VMT which is a reflection of the greater housing growth target. However, under Alternative 2, the additional growth is focused in neighborhood centers, including transit-oriented developments that would potentially decrease trip lengths. Therefore, as shown in **Exhibit 3.2-11**, the per capita GHG emissions associated with Alternative 2 growth targets would be 0.55 $MTCO_2e$, lower than the per capita emissions under Alternative 1. Emissions related to building energy and solid waste would be greater than Alternative 1. Although target housing and employment growth would be the same under Alternative 2, 3, and 4, building and waste emissions would be lower for Alternative 2 due to variations in housing type mix and associated emissions factors.

Exhibit 3.2-11. Per Capita GHG Emissions—Alternative 2

	Emissions ($MTCO_2e$)
Transportation	-834
Buildings	50,489
Waste	64,053
Total Alternative 2	113,708
Population Growth Estimate	205,000
Per Capita GHG Emissions	**0.55**

Notes: Population growth calculated using City GIS data for total housing units and population (total units/population = persons per household), assuming 2.05 persons per household
Source: Kimley-Horn, 2023.

130th/145th Station Area

Under Alternative 2, changes in land use designations focus on addressing transit-oriented developments, designating the station areas as neighborhood centers. Growth would be clustered in small mixed-use nodes near transit, resulting in denser and taller buildings with heights of up to 80 feet. Implementation of Alternative 2 assumes a growth potential of 2,208 housing units, which is greater than the growth potential with Alternative 1.

Construction

Station Area growth under Alternative 2 would be higher than Alternative 1 and lower than Alternative 5. Emissions associated with heavy-duty construction equipment, trucks, worker

vehicles, and fugitive dust would likely be greater than Alternative 1 and less than Alternative 5 based on the target growth in dwelling units.

Operations

Criteria Pollutant Emissions

Increased growth potential within neighborhood centers combined with improvements to transit service and connectivity, when compared with Alternative 1, would result in greater potential for VMT reduction and reductions in criteria pollutant emissions.

Greenhouse Gas Emissions

As stated above, increased growth potential within neighborhood centers combined with improvements to transit service and connectivity, when compared with Alternative 1, would result in greater potential for VMT reduction, resulting in reductions in GHG emissions. However, target growth within the Station Area under Alternative 2 would be greater than Alternative 1, resulting in higher emissions related to building energy consumption and solid waste generation.

Equity & Climate Vulnerability Considerations

The 130th/145th Station Area is located in northern Seattle in Area 2. I-5 transects this area going north-south, and a railway runs through the vicinity of the 130th Street Light Rail Station. Target growth under Alternative 2 within the Station Area would be greater than Alternative 1 and would place a greater number of residents within close proximity to transportation-related pollutants along I-5. Compared to Alternative 5, Alternative 2 would place a fewer number of residents within close proximity to transportation-related pollutants along I-5.

Impacts of Alternative 3: Broad

Under Alternative 3, a wider range of low-scale housing options in urban neighborhood areas would be allowed, expanding housing choices and allowing housing options near existing parks and other amenities. The target housing growth under this alternative is 100,000 dwelling units. Approximately 37% of housing growth would occur within regional center and approximately 22% would occur within urban neighborhood areas.

Construction

Alternative 3 would result in the greatest number of demolished units when compared to all other alternatives. Alternative 3 would result in greater target growth compared to Alternative 1, the same as Alternative 2 and 4, and less than Alternative 5. Although Alternative 3 would result in 763 greater demolished units than Alternative 5, target growth for Alternative 3 includes 20,000 fewer units. Therefore, emissions associated with heavy-duty construction

equipment, trucks, worker vehicles, and fugitive dust would likely be greater than Alternative 1, 2, and 4 and lower than Alternative 5.

Operations

Transportation Air Quality Emissions

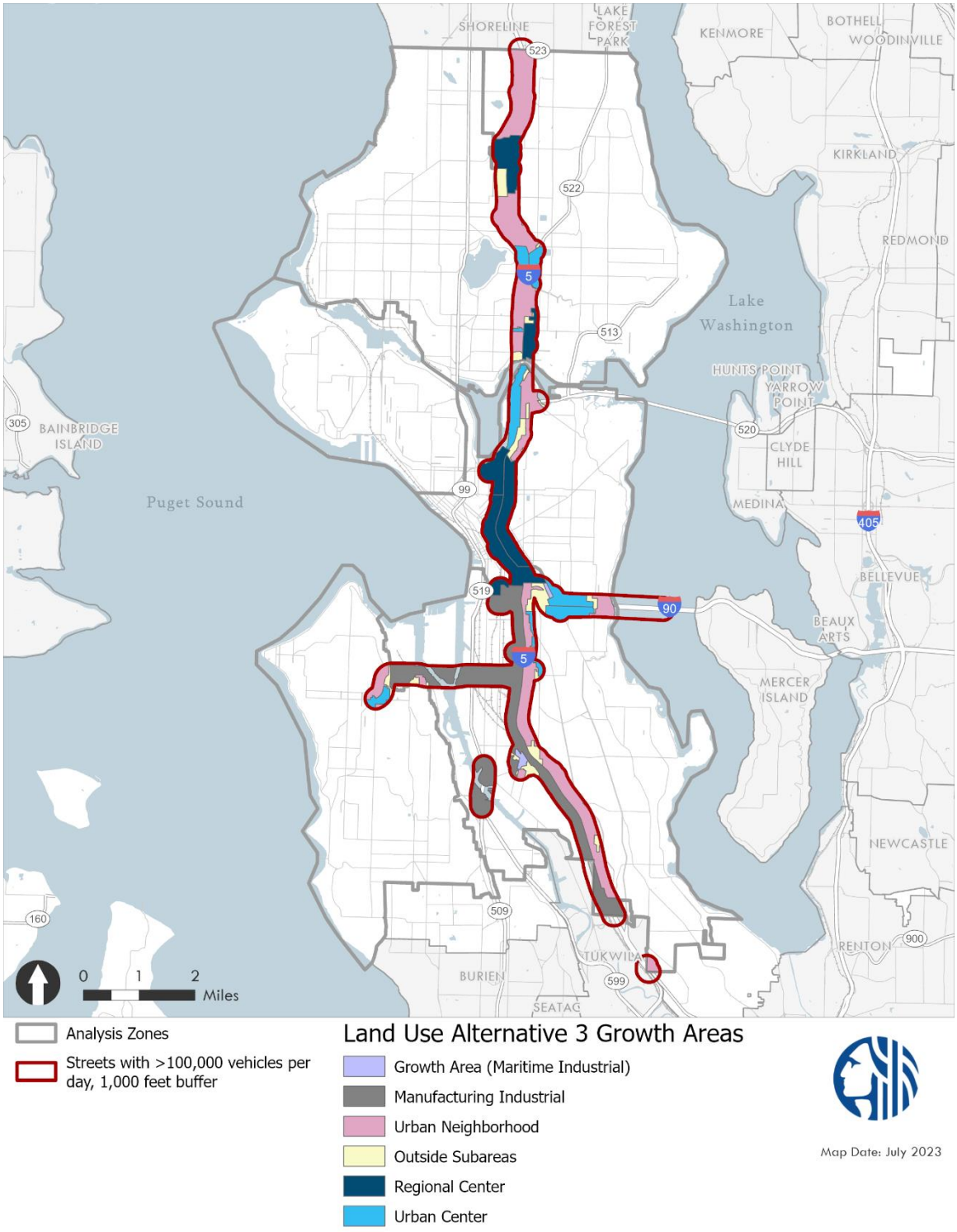
Transportation-related air pollutant emissions under existing conditions and each of the four alternatives with VMT data are presented in **Exhibit 3.2-7** and **Appendix D**.

As can be seen from **Exhibit 3.2-7,** regional emissions of VOC, CO, and NO_X under Alternative 3 would be substantially less than under existing background conditions. This is because the projected improvement in fuel economy, increase in ZEV use, emission controls and fuel composition will outweigh the projected increase in VMT. This would result in a beneficial future air quality outcome. As indicated in **Exhibit 3.2-7**, transportation emissions from Alternative 3 would be slightly higher than those from Alternative 2, mostly because reductions in transportation emissions (from existing background conditions) realized from implementation of Alternative 3 would be the same as those of Alternative 2 but less than those of Alternative 1.

Equity & Climate Vulnerability Considerations

As shown in **Exhibit 3.2-12**, the regional centers and villages within the 1,000-feet buffer under Alternative 3 would be the same as Alternative 1, collectively representing 56% of all projected residential growth in the city through 2044. Only a portion of each center or village is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. A greater proportion of city-wide growth would be located in close proximity to transportation-related emissions when compared to Alternative 2. Alternative 3 would place the fewest number of units (the same as Alternative 1 and 4) within the 1,000-foot buffer when compared to Alternative 2 and 5.

Exhibit 3.2-12. 1,000-Feet Buffer Around Freeways and Roadways with Greater than 100,000 Daily Vehicles—Alternative 3



Source: Kimley-Horn, 2023.

Greenhouse Gas Emissions

GHG emissions under development of Alternative 3 were calculated using the same methodologies as those described for Alternative 1 but reflect the increases in target housing growth in urban neighborhoods throughout the city. Operational GHG emissions from Alternative 3 are presented in **Exhibit 3.2-13** and **Appendix D**. Alternative 3 would result in fewer reductions in transportation emissions compared to Alternative 1 and similar to those of Alternative 2 and 4. Emissions related to building energy and waste would be greater than Alternatives 1, 2, and 4 and less than Alternative 5. Per capita emissions of 0.56 $MTCO_2e$, as shown in **Exhibit 3.2-13**, are the same as Alternative 4, greater than Alternative 2 and 5, and less than Alternative 1.

Exhibit 3.2-13. Per Capita GHG Emissions—Alternative 3

	Emissions ($MTCO_2e$)
Transportation	-835
Buildings	50,926
Waste	64,294
Total Alternative 3	114,385
Population Growth Target	205,000
Per Capita GHG Emissions	**0.56**

Notes: Population growth calculated using City GIS data for total housing units and population (total units/population = persons per household), assuming 2.05 persons per household
Source: Kimley-Horn, 2023.

130th/145th Station Area

The station area plan would not be implemented under Alternative 3; it would grow based on the applicable citywide place types.

Impacts of Alternative 4: Corridor

Alternative 4 would accommodate a wider range of housing options only in corridors to focus growth near transit and amenities. The target housing growth under this alternative is 100,000 dwelling units. Approximately 37% of housing growth would occur within regional centers and approximately 21% would occur within corridors.

Construction

Alternative 4 would result in the demolition of a greater number of housing units than Alternative 1 and 2 and less than Alternatives 3 and 5. Alternative 4 would result in greater target growth compared to Alternative 1, the same as Alternative 2 and 3, and less than

Alternative 5. Therefore, emissions associated with heavy-duty construction equipment, trucks, worker vehicles, and fugitive dust would likely be greater than Alternative 1 and 2 and lower than Alternative 3 and 5.

Operations

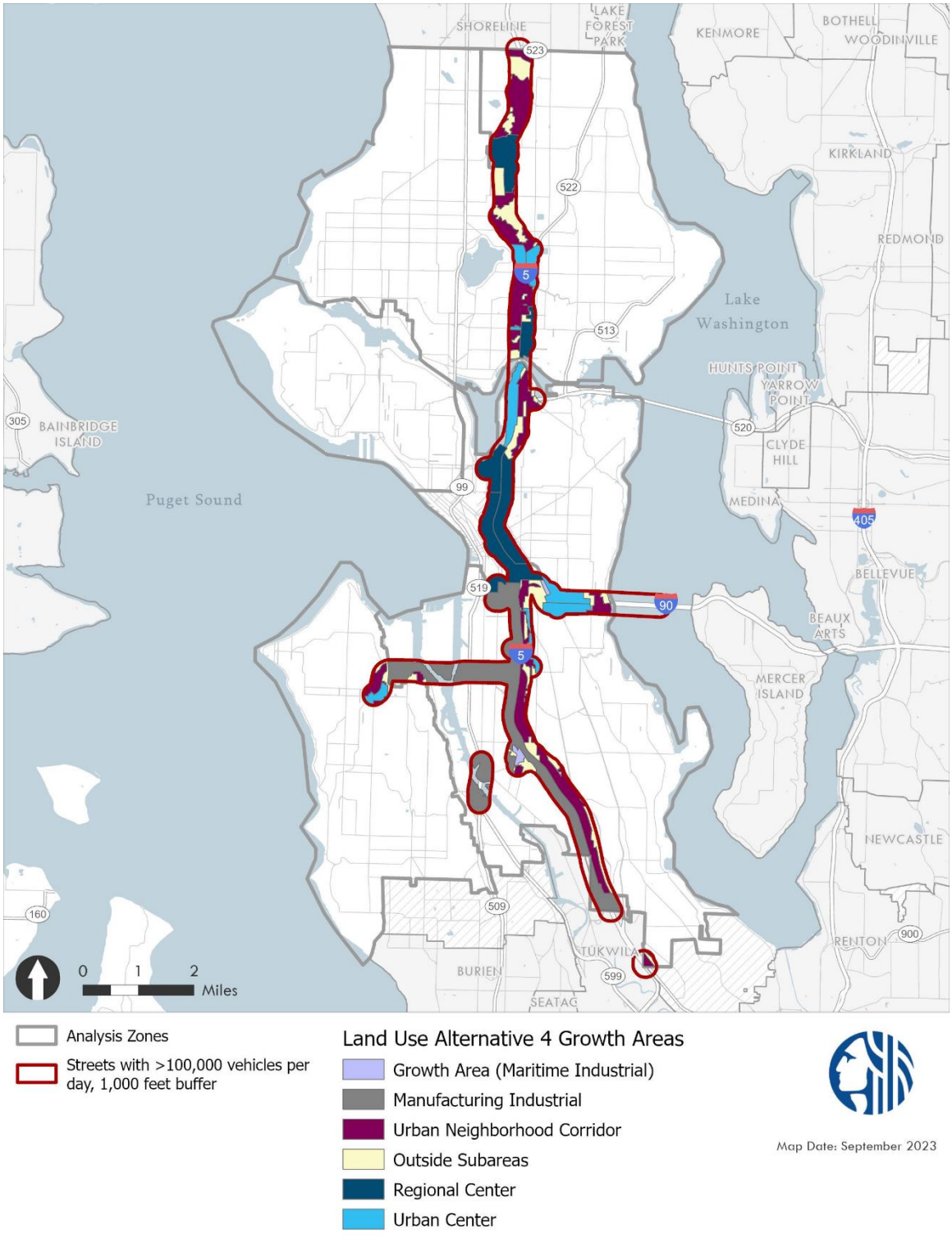
Transportation Air Quality Emissions

Transportation-related air pollutant emissions under existing conditions and each of the four alternatives with VMT data are presented in **Exhibit 3.2-7** and **Appendix D**. The housing growth target under Alternative 4 would be the same as Alternative 2 and Alternative 3 and the geographical distribution of that housing growth under Alternative 4 would be to similar areas of the city as Alternative 3 as well. Therefore, VMT data has not been modeled for Alternative 4 and it is assumed that regional pollutant emissions under Alternative 4 would be the same as Alternative 3, which would be substantially less than under existing background conditions, greater than Alternative 1, and less than Alternative 5.

Equity & Climate Vulnerability Considerations

As shown in **Exhibit 3.2-14**, the regional centers and villages within the 1,000-feet buffer under Alternative 4 would be the same as Alternative 1 and Alternative 3, collectively representing 56% of all projected residential growth in the city through 2044. Only a portion of each center or village is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. A greater proportion of city-wide growth would be located in close proximity to transportation-related emissions when compared to Alternative 2. Alternative 4 would place the fewest number of units (the same as Alternative 1 and 3) within the 1,000-foot buffer when compared to Alternative 2 and 5.

Exhibit 3.2-14. 1,000-Feet Buffer Around Freeways and Roadways with Greater than 100,000 Daily Vehicles—Alternative 4



Source: Kimley-Horn, 2023.

Greenhouse Gas Emissions

GHG emissions under development of Alternative 4 were calculated using the same methodologies as those described for Alternative 1 but reflect the land use differences of increased density of residential development in the corridors throughout the city. Operational GHG emissions from Alternative 4 are presented in **Exhibit 3.2-15** and **Appendix D**. The transportation emissions reductions realized from implementation of Alternative 4 would be similar to those of Alternative 2 and Alternative 3. Emissions related to building energy and solid waste would be greater than Alternative 1 and 2 and less than Alternative 3 and 5. Per capita emissions of 0.56 $MTCO_2e$ (as shown in **Exhibit 3.2-15**) are the same as Alternative 3, higher than Alternative 2 and 5, and lower than Alternative 1.

Exhibit 3.2-15. Per Capita GHG Emissions—Alternative 4

	Emissions ($MTCO_2e$)
Transportation	-835
Buildings	50,654
Waste	64,294
Total Alternative 4	114,113
Population Growth Estimate	205,000
Per Capita GHG Emissions	**0.56**

Notes: Population growth calculated using City GIS data for total housing units and population (total units/population = persons per household), assuming 2.05 persons per household
Source: Kimley-Horn, 2023.

130th/145th Station Area

The station area plan would not be implemented under Alternative 4; it would grow based on the applicable citywide place types.

Impacts of Alternative 5: Combined

Alternative 5 anticipates the largest increase in supply and diversity of housing units within the City. In addition to the growth strategies of Alternatives 2, 3, and 4, Alternative 5 would promote a greater range of rental and ownership housing and address past underproduction of housing and rising housing costs. The target housing growth under this alternative is 120,000 dwelling units. While most housing would continue to be in regional centers (36% of housing growth) and urban centers (19% of housing growth), the combined growth in neighborhood centers and corridors would be substantial (24%).

Construction

Alternative 5 would result in a greater number of demolished units than Alternative 1, 2, and 4 and less than Alternative 3. Alternative 5 would result in the greatest target growth compared to all other alternatives. Therefore, emissions associated with heavy-duty construction equipment, trucks, worker vehicles, and fugitive dust would likely be the greatest out of all give alternatives.

Operations

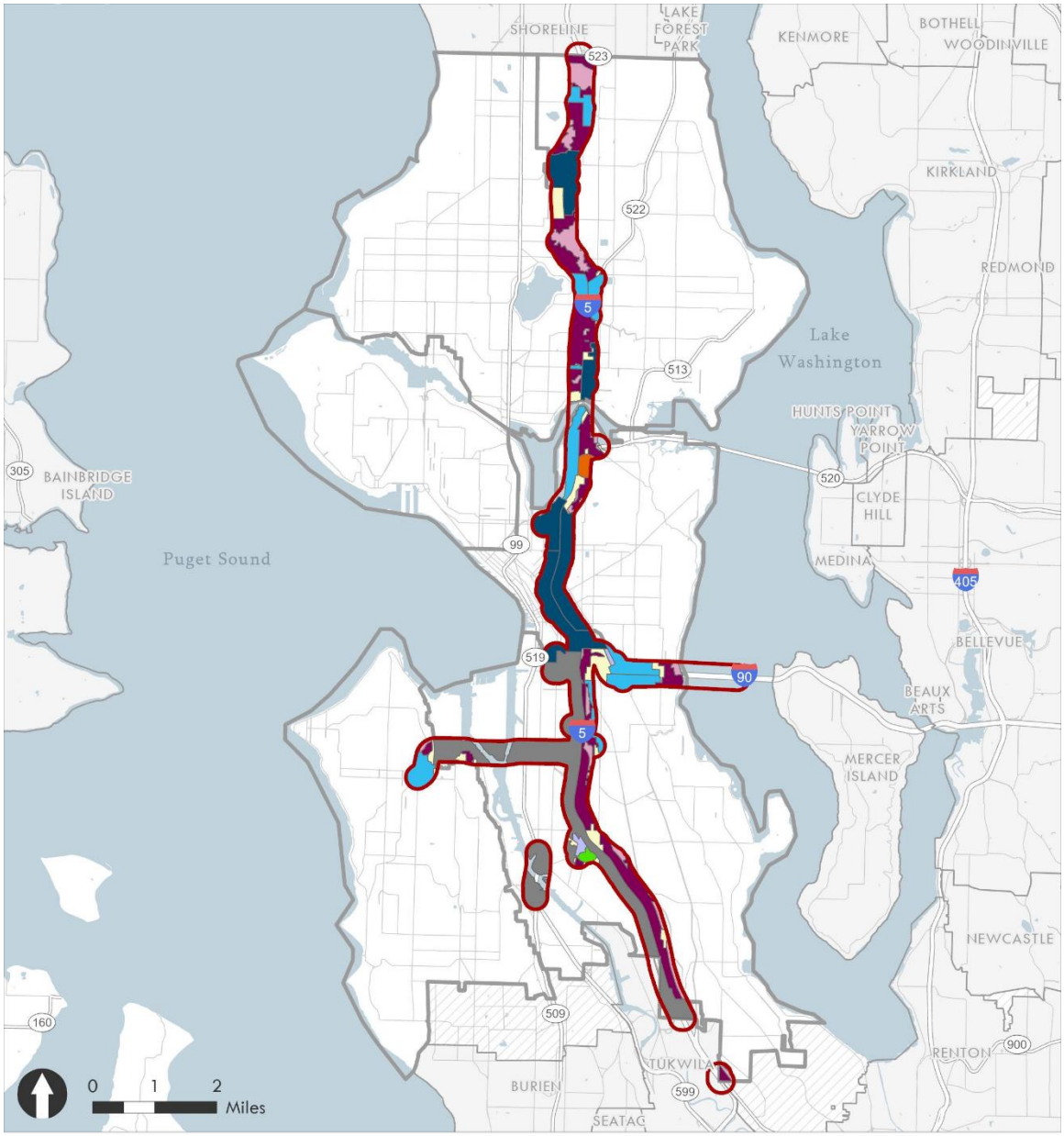
Transportation Air Quality Emissions

Transportation-related air pollutant emissions under existing conditions and each of the four alternatives with VMT data are presented in **Exhibit 3.2-7** and **Appendix D**. As can be seen from **Exhibit 3.2-7**, emissions of VOC, CO, and NO_X under Alternative 5 would be substantially less than under existing background conditions. This is because the projected improvement in fuel economy, increase in ZEV use, emission controls and fuel composition will outweigh the projected increase in VMT. This would result in a beneficial future air quality outcome. As indicated in **Exhibit 3.2-7**, transportation emissions from Alternative 5 would be higher than those from all other alternatives, mostly because Alternative 5 has the highest housing and jobs targets, resulting in the highest VMT, compared to all other alternatives.

Equity & Climate Vulnerability Considerations

This alternative would place the emphasis for growth near transit centers, with the 130th Street station designated as an urban center. In addition, additional neighborhood center units would be located in close proximity to transportation-related emissions as shown in **Exhibit 3.2-16**. Consistent across all alternatives, the highest amount of projected growth would be within the Downtown Regional Center and First Hill/Capitol Hill Regional Center. Alternative 5 has the highest housing growth target among the five alternatives. As a result, the proportion of city-wide growth that would be located in close proximity to transportation-related emissions is the lowest (39%) under this alternative while the total amount of collective growth would be the greatest. Only a portion of each center or village is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. Alternative 5 would place the greatest number of units within the 1,000-foot buffer when compared to the other alternatives.

Exhibit 3.2-16. 1,000-Feet Buffer Around Freeways and Roadways with Greater than 100,000 Daily Vehicles—Alternative 5



Source: Kimley-Horn, 2023.

Greenhouse Gas Emissions

GHG emissions under development of Alternative 5 were calculated using the same methodologies as those described for Alternative 1 but reflect the land use differences of increased density of residential development in the regional centers, urban centers, neighborhood centers, and urban neighborhood areas. Operational GHG emissions from Alternative 5 are presented in **Exhibit 3.2-17** and **Appendix D**. Transportation emissions from target growth associated with Alternative 5 would be the greatest out of all five alternatives and would result in increases in transportation emissions in comparison with existing conditions. However, due to increased density of residential development, the Alternative results in a reduction in per capita VMT. Alternative 5 results in per capita GHG emissions of 0.49 $MTCO_2e$, see **Exhibit 3.2-17**. Therefore, while Alternative 5 results in the highest overall housing growth and VMT, resulting in the highest GHG emissions associated with transportation, building energy, and waste compared to the other alternatives, per capita emissions would be the lowest.

Exhibit 3.2-17. Per Capita GHG Emissions—Alternative 5

	Emissions ($MTCO_2e$)
Transportation	176
Buildings	52,785
Waste	67,917
Total Alternative 5	120,878
Population Growth Estimate	246,000
Per Capita GHG Emissions	**0.49**

Notes: Population growth calculated using City GIS data for total housing units and population (total units/population = persons per household), assuming 2.05 persons per household
Source: Kimley-Horn, 2023.

130th/145th Station Area

Under Alternative 5, an urban center designation on both the west and east sides of the 130th Station Area would merge with an existing commercial node to expand residential mixed use near the station. Growth would be accommodated in more mixed-use buildings, providing greater housing types in buildings with heights of up to 95 feet. Implementation of Alternative 5 assumes a growth potential of 2,703 housing units, which is greater than all other alternatives.

Construction

Station Area growth under Alternative 5 would be the greatest compared to all other alternatives. Therefore, emissions associated with heavy-duty construction equipment, trucks, worker vehicles, and fugitive dust would likely be the highest among all alternatives.

Operations

Criteria Pollutant Emissions

Increased growth potential within urban centers combined with improvements to transit service and connectivity provided by the stations associated with Alternative 5, when compared with all the other alternatives, would result in greatest potential for per capita VMT reduction and reductions in criteria pollutant emissions.

Greenhouse Gas Emissions

As stated above, Station Area growth under Alternative 5 would result in the greatest potential for VMT reduction and reductions in transportation-related GHG emissions. However, Station Area growth would be the highest under Alternative 5, likely resulting in the highest emissions related to building energy consumption and solid waste generation.

Equity & Climate Vulnerability Considerations

The 130th/145th Station Area is located in northern Seattle in Area 2. I-5 transects this area going north-south, and a railway runs through the vicinity of the 130th Street Light Rail Station. Target growth under Alternative 5 within the Station Area would be the greatest compared to all other alternatives and would potentially place the greatest number of residents within close proximity to transportation-related pollutants along I-5.

3.2.3 Mitigation Measures

Incorporated Plan Features

Under action alternatives the City will update its Comprehensive Plan policies for land use, transportation, and others with an opportunity to increase residential compatibility in proximity to major air emission sources.

Regulations & Commitments

Air Quality

Several federal, state, and regional regulations or efforts apply to construction and allowed land uses:

- NAAQS: As described above, the EPA established NAAQS and specifies future dates for states to develop and implement plans to achieve these standards.
- Washington State: Ecology established state ambient air quality standards for the same size pollutants (CO, VOCs, NO_2, PM, SO_2, and ozone) that are at least as stringent as the national standards.

- PSCAA Regulations: All construction sites in the Puget Sound region are required to implement emission controls to minimize fugitive dust and odors during construction, as required by PSCAA Regulation 1, Section 9.15, Fugitive Dust Control Measures.

  PSCAA manages permitting of stationary air pollutant sources and all industrial and commercial air pollutant sources in the Puget Sound region are required to register with the PSCAA.

Greenhouse Gases & Climate Change

- Washington State Energy Code: Development in the study area would be subject to the requirements of the Washington State Energy Code, which regulates the energy-use features of new and remodeled buildings.
- The City's 2013 CAP and the 2018 Climate Strategy include strategies and actions to limit atmospheric warming to 1.5 degrees Celsius. The strategies and actions focus on road transportation and building energy, which comprise the majority of local emissions, and which are the dominant sources of GHG emissions in the City.
- All buildings with 50,000 square feet or more of nonresidential space (excluding parking) must comply with the Building Tune-Ups requirement every five years (Seattle Municipal Code 22.930). Building Tune-Ups involve assessment and implementation of operational and maintenance improvements to achieve energy (and water) efficiency, which helps to reduce GHG emissions.
- The City of Seattle Building Energy Code eliminates the use of fossil fuels like gas and electric resistance from most water heating and space heating systems in new construction and substantial alterations for commercial and multifamily uses.
- Seattle's Energy Benchmarking Law (Seattle Municipal Code 22.290) requires the owners of non-residential and multifamily buildings (20,000 square feet or larger) to track and report (annually) energy performance.
- Seattle's Transportation Electrification Blueprint includes initial steps for reducing climate pollution in the transportation sector. Goals include 100% of shared mobility being zero emission, 90% of all personal trips to be zero emission by 2030, 30% of goods delivery to be zero emission, 100% of City fleet to be fossil-fuel free, and electrical infrastructure.
- Action alternatives provide for a new Climate Element in the One Seattle Comprehensive Plan addressing GHG reduction policies and climate resilience policies.

Other Potential Mitigation Measures

Although mitigation strategies are not required due to a lack of significant adverse impact findings, to address the potential exposure of residences and other sensitive land uses to air toxic risk areas, discussion of potential mitigation measures is included below.

Transportation-Related Emissions

Transportation-related emissions make up a large portion of criteria pollutant emissions. On-road mobile sources account for approximately half of the overall CO and NO_X emissions within King County (U.S. EPA, 2017). Improvements in fuel efficiency combined with reductions in VMT would contribute to reductions in all criteria pollutant emissions. Replacing fossil-fueled vehicles with ones powered by renewable or cleaner sources of energy (electric, hydrogen, etc.) would result in reductions in CO, NOx, and VOCs.

Vehicle Miles Traveled

Potential VMT-reduction strategies are discussed below.

- **Pedestrian Facilities.** A household activity survey conducted by the Puget Sound Regional Council (PSRC) in 2006 tested the effect of sidewalks on travel patterns and the relationship between sidewalk availability and VMT (SDOT and WSDOT, 2011). Results of the study provide evidence that sidewalk availability combined with land use mix was associated with reduced VMT.
- **Bicycle Improvements.** According to the NCST, bicycle infrastructure has the potential to reduce VMT by encouraging a shift from driving (NCST, 2017). The U.S. EPA estimates that bicycle paths/lanes/routes would provide less than 0.1% reductions in VMT (U.S. EPA, 2014).
- **Transit Improvements.** Transit has been identified as the most frequent and successful tool in reducing VMT (WSDOT, 2022). Transit improvements overall provide a VMT reduction of up to 2.6% (U.S. EPA, 2014).
- **Congestion Pricing, Roadway Fees, and Tolls.** Congestion pricing includes the use of fees for the specific purpose of reducing congestion, such as during peak periods of congestion. Examples include roadway fees and tolls. Congestion pricing has the potential to reduce VMT by approximately 10 to 44% (SDOT, 2019).
- **Land Use Mix and Compactness.** A mix of land uses together with more compact development around transit is associated with reduced VMT (WSDOT, 2022). Diversity in land uses combined with increased density within an urban area can lead to shorter trip distances and greater use of walking, as well as the reduced need for vehicle ownership. Access to a variety of trip purposes may induce additional trips; however, these trips are shorter and are more likely to be made by walking than trips in areas where mixed land uses are not available.

Electric Vehicles

Electric vehicles (EVs) do not create tailpipe emissions (U.S. EPA, 2021). Replacement of gasoline- and diesel-fueled vehicles with EVs would reduce tailpipe emissions within the City of Seattle. However, fugitive dust emissions from brake wear and tire wear would remain the same. Implementation of the Seattle Comprehensive Plan does not directly affect the percentage of EVs within the City. However, implementing goals for EV use including increased

charging infrastructure would facilitate and encourage future EV adoption. A combination of charging infrastructure and incentives would encourage electric vehicles in private and public fleets (PSRC, 2020). One of the main barriers to EV adoption is the lack of off-street parking for charging (City of Seattle, 2014). Increased EV penetration would require an expansion of charging options for those without access to charging facilities in their home. Seattle City Light is currently investing in grid upgrades and EV charging infrastructure to enable a rapid transition to an electrified transportation system (SCL, 2023), including Level 2 EV chargers at curbside locations offering service to residents who cannot access off-street parking to charge their vehicles (SCL, 2023). The City could adopt regulations to support the placement of infrastructure for charging electric vehicles in applicable new developments (including commercial and industrial).

Building-Related Emissions

Building energy emissions are a large source of GHG emissions. Decarbonization of buildings by eliminating the combustion of natural gas and other fossil fuels would reduce residential and commercial building emissions (CARB, 2022). All-electric space and water heating is required by the 2022 Washington Energy Code. However, all-electric cooking appliances have not been required. Combined with increasing energy efficiency, building electrification in new buildings would reduce building-related emissions.

To lower the GHG contribution from industrial and commercial uses, policies that encourage or mandate new construction projects in the City to incorporate any of the following into their design:

- Achieve one of the following green building standards: Leadership in Energy and Environmental Design (LEED) in Motion: Industrial Facilities, Built Green, the Living Building Challenge, or the Evergreen Sustainable Development Criteria.
- Use low-embodied carbon construction material types, such as low-carbon concrete mixes.
- Limit carbon-intensive materials or incentivize use of lower carbon alternatives such as a wood structure instead of steel and concrete, or agricultural products that sequester carbon.
- Salvage materials like brick, metals, broken concrete, or wood.
- Use high-recycled content materials.
- Prioritize adaptive reuse for existing buildings to avoid additional embodied carbon emissions.

Residential Strategies

On-road, railway, port, and aviation activity are main sources of pollutant emissions. The following strategies can reduce the potential levels of air toxics:

- Where the City has authority to do so, the designation of truck routes serving industrial and manufacturing areas away from residential areas would increase buffer areas between some residential neighborhoods and roadways highly travelled by diesel trucks.

- Add denser tree canopy near high-volume roadways and industrial areas, specifically a double-row of long-needle conifers allowing no line-of-site.
- Incorporate standards for more frequent street sweeping to reduce roadway dust associated with increased VMT on high-travelled roadways within 1,000 feet of residential uses.
- Consider zoning standards that identify location, building, and site design provisions that support reduced exposure to potential air toxics.

Improved Air Filtration

The City could adopt new development standards that require or incentivize enhanced air filtering and circulation to address transportation-generated particulates for residences and other sensitive uses (e.g., schools, daycare, hospitals, etc.). For sensitive lands uses in close proximity to industrially zoned areas or highways or other high-traffic roadways, ventilation systems that are capable of filtering fine particulate pollutants (from industrial or transportation sources) could be integrated into HVAC systems to improved indoor quality and reduce exposure to air contaminants. Ventilation systems with a higher Minimum Efficiency Reporting Value (MERV) are capable of removing finer particulate matter from indoor air. Specifically, U.S. EPA recommends higher efficiency filters with a MERV rating of 13 or higher for HVAC filtration (U.S. EPA, 2023). The 2016 ASHRAE handbook for HVAC Systems and Equipment includes air cleaners with MERV ratings in the E-2 range (MERV 9 -12) for application in better residential and industrial air cleaning, which are effective for particulates in the 1.0 to 3.0 μm size range, while those in the E-1 range (MERV 13 – 16) control finer particulates (ASHRAE, 2016).

130th/145th Station Area

Alternatives 2 and 5 would introduce increases in population within the Station Area, to take advantage of the reduction in emissions inherent to transit-oriented development. Transit-oriented development is a key strategy for achieving the City's goal to be carbon neutral by the year 2050. However, because the area is also adjacent to heavily used roadways, such as I-5, increasing residential densities in the Station Area could result in increasing the number of residents potentially exposed to elevated levels of air toxics. As shown in **Exhibit 3.2-6,** I-5 is a heavily traveled roadway, with greater than 100,000 vehicles per day. The following strategies can reduce the potential levels of air toxics at residential uses within the Station Area:

- Incorporation of development standards including requirements for enhanced air filtration and circulation for residential units within the Station Area and site intake vents as far from substantial sources as practicable.
- Building design strategies to minimize the number of residential units facing I-5.
- Planting of trees along streets with residential development and along commercial corridors including but not limited to the reforestation plan for the Lynnwood Link Extension.
- Restrict open spaces such as balconies near the source of toxic air contaminants.
- Restrict operable windows near sources of toxic air contaminants.

3.2.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to air quality and greenhouse gas emissions are anticipated. Through mitigation implementation, local and state climate actions, and expected continued regulatory changes, the alternatives may result in lower GHG emissions on a per capita basis compared to existing conditions. The alternatives would not prevent or deter statewide, regional, or local efforts to reduce GHG emissions. While each alternative would generate GHG emissions from growth and development within the city, the benefit of channeling development to targeted areas that might otherwise occur in peripheral areas of the city or region could serve to offset these impacts.

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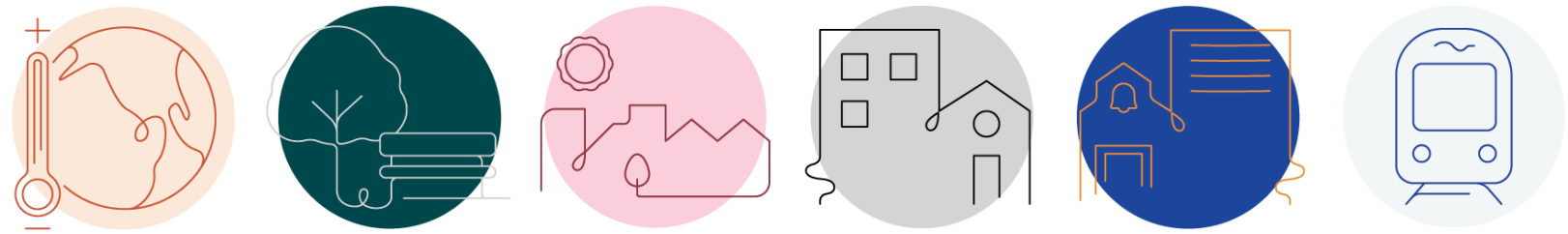
3.3 Plants & Animals



Alki Beach Park. Source: City of Seattle, 2023.

Discussions in this section evaluate, at a broad, programmatic level, the potential impacts of the One Seattle Comprehensive Plan Update proposal and alternatives on plants and animals.

Analyses in this EIS consider all plants and animals that may be affected by the alternatives, with particular emphasis on tree canopy cover and on streams that may receive stormwater runoff from pollution-generating impervious surfaces. This emphasis reflects heightened concern about those two elements of the environment. During the public scoping process, many stakeholders expressed concern about the loss of tree canopy cover in the city. With regard to stormwater, a growing field of research is finding that stormwater runoff contains contaminants that are harmful to fish, including species that are listed as threatened or endangered under the Endangered Species Act (ESA).

Thresholds of significance utilized in this impact analysis include:

- Impacts that would reduce the likelihood of survival or recovery of a plant or animal species in the wild, compared to the No Action alternative;
- A substantially increased potential for tree canopy cover loss, compared to the No Action alternative; and
- An appreciable increase in the delivery of stormwater contaminants to fish-bearing streams, compared to the No Action alternative.

Proposals studied in this EIS are focused on a new growth strategy, particularly housing, while employment is fairly constant across alternatives. For the manufacturing industrial centers, employment growth was considered in relation to plants and animals including aquatic and terrestrial species in the Seattle Industrial and Maritime Lands Final EIS, completed September 29, 2022. That Final EIS is hereby incorporated by reference, in particular Section 3.3 Plants & Animals.[12]

3.3.1 Affected Environment

The following subsections provide overviews of general concerns relating to plants and animals citywide, with special attention to tree canopy cover and contaminants in stormwater runoff. These overviews are followed by brief descriptions of the tree canopy cover and the presence of fish-bearing streams in the eight analysis subareas and the 130th and 145th Street Station Area.

Citywide

Habitats in Seattle support a wide range of plant and animal communities. The abundance and diversity of species in any given area vary with the degree of urban development. More intensely developed areas (parcels dedicated to commercial and/or industrial uses, for example) generally have little vegetative cover and support a comparatively small number of

[12] See project documents, available: https://www.seattle.gov/opcd/ongoing-initiatives/industrial-and-maritime-strategy#projectdocuments.

wildlife species that are adapted to high levels of human activity. Many of the plants and animals in such areas are not native to the region. More diverse assemblages of plants and animals, including native species, may be found in less-developed areas—parks and open spaces, for example. Trees offer structural diversity that provides habitat for a wide range of species; areas in the city with extensive tree canopy cover are likely to support comparatively diverse plant and animal communities. Parks and undeveloped stream corridors may provide movement corridors for mammals and amphibians.

Many residential areas include trees and other vegetation (native or non-native) interspersed with buildings and impervious surfaces. These conditions generally support plant and animal communities that are intermediate between intensely developed areas and parks and open spaces, in terms of diversity and abundance. At the scale of an individual parcel, as the proportion of a lot that is occupied by buildings and impervious surfaces increases, the amount of vegetative cover—and, by extension, the lot's capacity to help support diverse and abundant communities of plants and animals—typically decreases.

The plant and animal species found in Seattle are widespread in the region; some are globally abundant. Areas in the city limits represent a very small proportion of the total amount of habitat available to any given species. The only ESA-listed or state-listed species known or expected to use habitats in the city are fish (steelhead and Chinook salmon).

Tree Canopy Cover

Canopy cover is the percentage of the city's land area that is covered by trees, as seen in an aerial view. Canopy cover is an important management tool for planners to understand the extent and distribution of trees in Seattle. The city's goal, established in 2007, is to have 30% tree canopy cover by 2037.

Trees are critical infrastructure that provide essential benefits, including the following:

- Sequestering carbon (i.e., capturing and storing carbon dioxide from the atmosphere, reducing the input of a key greenhouse gas)
- Providing shade and reducing heat
- Absorbing pollution
- Improving physical and mental health
- Providing habitat for plants and animals
- Intercepting a portion of rainfall, reducing overall stormwater runoff

Trees play a vital role in moderating temperatures in urban areas. Tree canopy provides cooling both through shading and through evapotranspiration. Shading blocks incoming heat energy and prevents impervious surfaces from absorbing it and radiating back into surrounding areas. Evapotranspiration is the process by which plants absorb water through their roots and release it as vapor through their leaves. This process of converting liquid to gas uses heat from surrounding areas and thus cools the air. In general, areas with more canopy

cover have cooler temperatures, compared to areas with less canopy cover. Increasing canopy in low-canopy neighborhoods is a critical aspect of the City's long-term heat preparedness strategy (Seattle Office of Sustainability & Environment 2022).

In 2022, the Seattle Office of Sustainability & Environment completed a citywide review of tree canopy cover. The study used lidar data to determine the extent of tree canopy cover in 2016 and 2021 and to identify areas where cover increased or decreased during that 5-year period. The study also identified parcels that were redeveloped during that period, to allow an assessment of the amount of canopy change that might be attributable to housing projects versus other causes. Sites were considered redeveloped if they included any new housing units.

Key findings of the canopy cover assessment included the following:

- Canopy cover decreased by 255 acres between 2016 and 2021—an area roughly the size of Green Lake. As canopy cover decreases, the benefits identified above are diminished.
- The city is below its goal for canopy cover. Total cover in 2021 was 28%, compared to a goal of 30%.
- Loss is happening inequitably. Neighborhoods impacted by racial and economic injustice started with less canopy and lost more than the citywide average.
- The greatest net losses occurred in parks and natural areas and on residential parcels where development projects did not occur.
- Climate change poses serious challenges for trees, while also making trees more essential. Climate change brings new pests and diseases, along with increased watering and maintenance needs. At the same time, trees are critical climate infrastructure, protecting us from extreme heat and improving air quality.

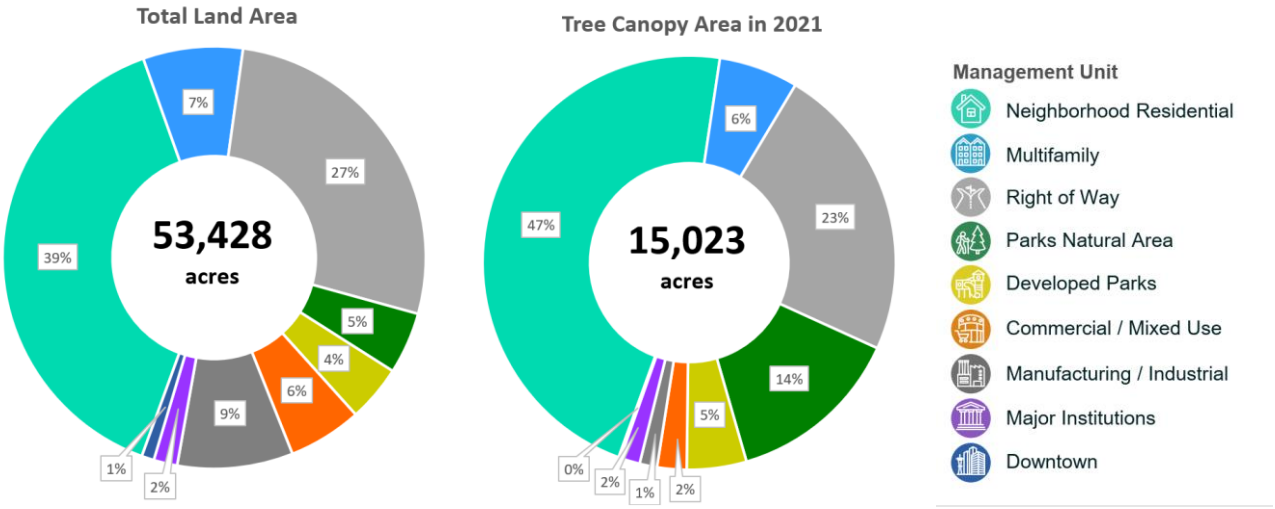
Many factors contributed to citywide losses of tree canopy cover during the study period. Examples include:

- Natural mortality: in any urban forest, a certain portion of trees are likely to die or be removed as they become hazardous. As trees age, they are more likely to lose large branches, become hazardous, or succumb to pests, disease, or drought stress.
- Climate change: hotter, drier summers exacerbate drought stress.
- Forest management: in some parks and natural areas, aging deciduous trees are dying or being removed to allow for the establishment of conifers that provide more ecosystem benefits. Invasive species are also making it difficult for new trees to establish themselves.
- Public safety: in some areas, aging or unhealthy trees pose a risk to residents or park users and must be removed.
- Competing uses: trees are removed due to resident preferences, residential and commercial development projects, and infrastructure changes such as transportation and utilities.

These losses were partially offset by gains as existing trees grew taller and broader. Trees less than 8 feet tall were excluded from the analysis, so most newly planted trees were not factored into the calculation of tree canopy gains.

The tree canopy cover assessment divided the city into nine management units, based on land uses. The different management units have different proportions of tree canopy cover (**Exhibit 3.3-1**). For example, only 5% of the city is in the Parks and Natural Areas management unit, but 14% of the city's tree canopy cover is in that management unit. Conversely, the management units that support more high-intensity land uses (Commercial/Mixed Use, Manufacturing/Industrial, Major Institutions, Downtown) represent more than 17% of the city's total land area but provide only 5% of the tree canopy cover. The Neighborhood Residential management unit encompasses the largest proportion of the city's total land area, and it provides an even larger proportion of the city's tree canopy cover (**Exhibit 3.3-1**).

Exhibit 3.3-1. Land Area and Tree Canopy Cover, by Management Unit

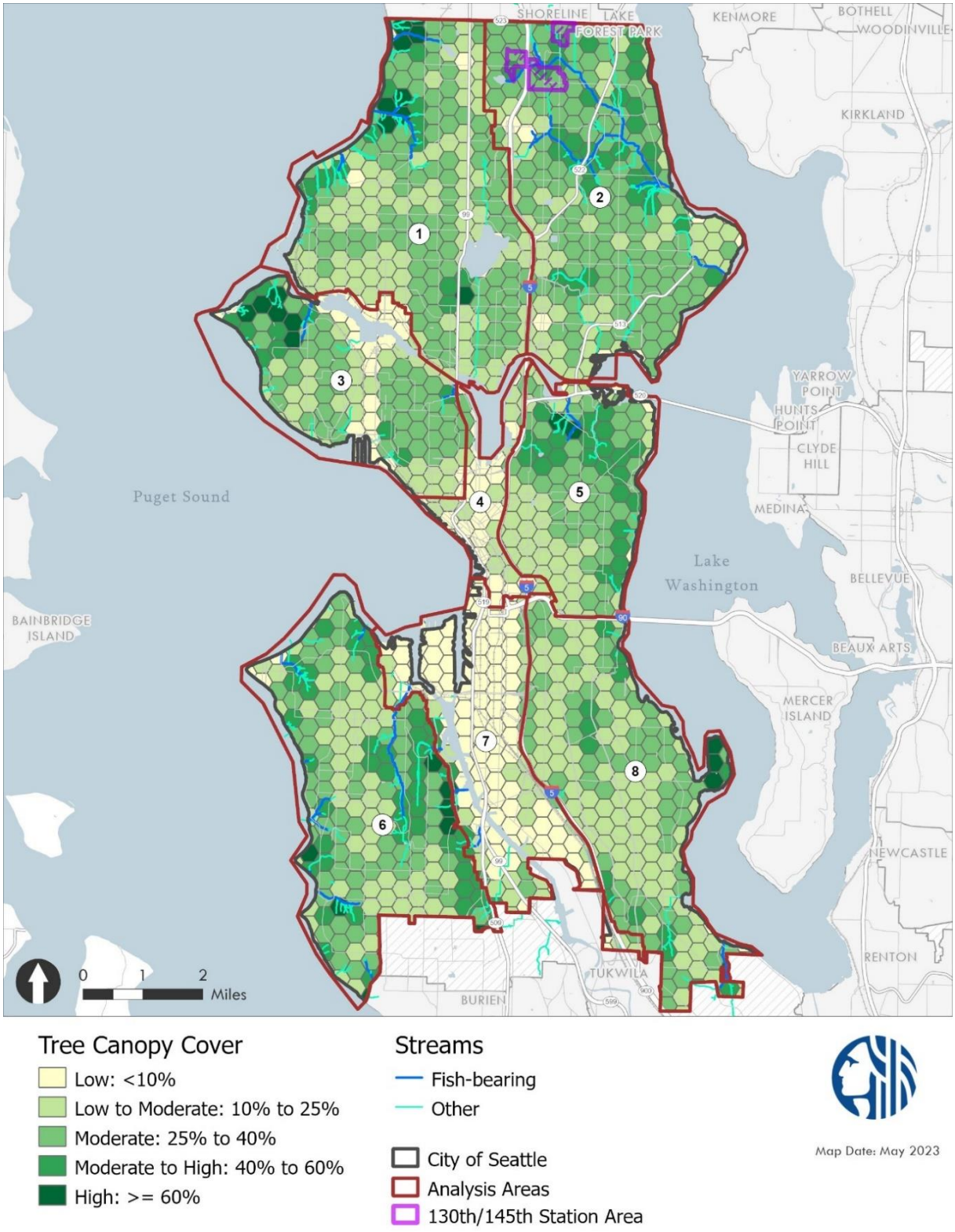


Source: Seattle Office of Sustainability & Development, 2022.

Trees in public rights-of-way play an important role in contributing to canopy cover citywide. Rights-of-way make up 27% of the city's land area, and trees in this management unit contribute 23% toward the city's canopy cover—second only to the Neighborhood Residential management unit (**Exhibit 3.3-1**). Given the constraints of limited space and soil volume that planting strips can provide, trees in this management unit face extra challenges. Soil quality can also be a challenge, particularly in areas that have been used for parking or other activities that compact soil (Seattle Office of Sustainability & Development 2022). These challenges mean that frequent maintenance and care for existing trees in rights-of-way is essential. Most trees in the Right of Way management unit (around 84%) are privately managed by adjacent landowners; the remainder are managed by the City (Seattle Office of Sustainability & Development 2022).

Broadly speaking, the areas with the greatest proportion of tree canopy cover are in and near parks and natural areas, particularly those near the shorelines of Lake Washington and Puget Sound (**Exhibit 3.3-2**). Forested areas are also present in ravines and along the steep slopes of the city's major hills, such as Magnolia, Queen Anne Hill, Beacon Hill, Boeing Hill, and West Seattle. Tree canopy is largely absent from Downtown and major industrial areas along the Duwamish Waterway and in Interbay.

Exhibit 3.3-2. Existing Tree Canopy Cover in Seattle



Sources: Seattle Office of Sustainability & Development, 2022; Washington Department of Natural Resources, 2023.

Between 2016 and 2021, tree canopy cover decreased in all management units except Downtown, where it remained essentially unchanged (**Exhibit 3.3-3**). The greatest acreage of canopy loss—more than three-quarters of the total loss—occurred in the Parks and Natural Areas and Neighborhood Residential management units. Notably, most canopy loss was not associated with development activities; only 14% of the canopy loss occurred on parcels that underwent development during that period (**Exhibit 3.3-3**). Of the approximately 35 acres (14% of 256 acres) of canopy loss that occurred on parcels that underwent development, almost all (31 acres) happened on parcels in the Neighborhood Residential or Multifamily management units. In 2023 (i.e., after the tree canopy study was completed), the city's tree ordinance was updated (see **Section 3.3.3**). It is anticipated that these updates will decrease the rate of canopy loss associated with residential and commercial development.

Exhibit 3.3-3. Total Area and Proportion of Tree Canopy Loss on Parcels That Underwent Development, by Management Unit

Management Unit	Tree Canopy Loss, 2016-2021 (acres)	Percentage of That Loss Occurring on Parcels That Underwent Development
Neighborhood Residential	87	19%
Multifamily	19	75%
Right of Way	10	1%
Parks and Natural Areas	111	0%
Developed Parks	5	0%
Commercial/Mixed Use	6	63%
Manufacturing/Industrial	6	7%
Major Institutions	12	0%
Downtown	0	0%
Total	**256**	**14%**

Source: Seattle Office of Sustainability & Development, 2022.

Of the 511 acres that underwent development during the study period, 291 acres (57%) were on parcels in the Multifamily or Neighborhood Residential management units. However, those two management units saw 88% of the total tree canopy loss on parcels that underwent development (31 of 35 acres). Most of the remaining 12% of development-related canopy loss happened on parcels in the Commercial/Mixed Use management unit (Seattle Office of Sustainability & Development 2022).

The disproportionate amount of development-related canopy loss on Multifamily and Neighborhood Residential parcels may be a product of the greater amount of tree canopy cover in those management units. In 2021, the total canopy cover for areas in the combined Multifamily and Neighborhood Residential management units was approximately 32%; canopy cover for areas in the Commercial/Mixed Use management unit was 11% (Seattle Office of

Sustainability & Development 2022). Parcel size may also play a role. On average, Multifamily and Neighborhood Residential are smaller than Commercial/Mixed Use parcels. Logistical constraints make it difficult to avoid impacts to trees when developing a small parcel.

Notably, more than 80% of the canopy loss that occurred in the Neighborhood Residential management unit happened on parcels where development did not take place (**Exhibit 3.3-3**). This may indicate that much of the canopy loss in the Neighborhood Residential management unit resulted from natural mortality or from actions (e.g., pruning, tree removal) unrelated to development activities.

The City aims to prioritize urban forestry efforts in low-canopy areas. Many of these areas also have disadvantaged populations, as indicated by race, language, origin, socioeconomic conditions, and health issues. The 2022 City of Seattle Tree Canopy Assessment also found that, in 2016, areas with disadvantaged populations had 16% less canopy cover than other areas. The disparity was exacerbated by canopy loss between 2016 and 2021. By 2021, areas with disadvantaged populations had 20% less canopy cover than other areas.

Residential areas with a combination of disadvantaged populations and low canopy cover are primarily in Area 4 (Belltown, International District, South Lake Union), Area 6 (South Delridge and Highland Park neighborhoods), Area 7 (South Park and Georgetown neighborhoods), and Area 8 (Beacon Hill, Brighton, and Rainier Beach neighborhoods). Additional neighborhoods with that combination include Atlantic (Area 5), Bitter Lake (Area 1), and Greenwood (Area 1).

Stormwater Runoff

Since the 1990s, biologists studying salmon in urban streams have documented alarmingly high numbers of coho salmon dying before being able to spawn (e.g., McCarthy et al. 2008). Studies in several Seattle-area streams (including Longfellow, Thornton, Piper's, Taylor, and Fauntleroy creeks) have found rates of pre-spawning mortality in excess of 86% (Scholtz et al. 2011). More recent research has found 6PPD-quinone, a contaminant found in runoff from roadways, to be a major contributor to pre-spawning mortality in coho salmon (Tian et al. 2021). Other contaminants, such as metals and polycyclic aromatic hydrocarbons, are also associated with adverse effects on salmonids and their prey. Contaminants in stormwater runoff have also been found to have harmful effects on ESA-listed Chinook salmon and steelhead (National Marine Fisheries Service 2022).

Some types of stormwater treatment facilities, such as bioretention facilities, prevent the acute lethal effects of stormwater on salmonids (Spromberg et al. 2015). Other types of facilities, such as compost-amended bioswales, are also effective at removing a variety of contaminants from runoff, including metals and polycyclic aromatic hydrocarbons (Fardel et al. 2020; McIntyre et al. 2015). However, residual contaminants in stormwater runoff can still harm fish, even after the water has been treated to reduce pollutant loads. In addition, the capacity of treatment facilities may be exceeded during major storm events, and untreated stormwater may bypass the facilities.

Based on the above, the discharge of stormwater runoff to fish-bearing streams has the potential to harm fish, including ESA-listed species. As noted above, the only ESA-listed or state-listed species known or expected to use habitats in the city are fish. Directing runoff to treatment facilities reduces the risk of harm, but it may not eliminate that risk altogether.

Stormwater runoff also has the potential to affect stream flows. During storm events, rainwater rapidly runs off from impervious surfaces and into pipes and other systems that deliver the water directly to streams. This results in high-volume, rapid peak flows that damage stream habitat and contribute to erosion and sedimentation. These impacts can be reduced by directing stormwater to facilities that detain runoff and allow it to enter streams more gradually.

Section 3.1.1 in **Earth & Water Quality** identifies the streams that receive stormwater runoff from impervious surfaces (including pollution-generating surfaces) in the city. The following subsections provide information about the known or expected presence of fish in these streams. Discussions in this EIS emphasize salmonids—anadromous salmonids in particular—because these species are a management concern due to habitat degradation and population declines.

Note that stormwater runoff can enter fish-bearing streams that are a considerable distance away. Pipes and ditches can convey runoff for several miles, discharging contaminated water to a stream in a different area. Conversely, stormwater from many parts of the city is piped to King County's West Point Wastewater Treatment Plant in Discovery Park. Treated effluent from the plant is discharged to Puget Sound approximately 3,600 feet offshore of West Point and is extremely unlikely to contribute to pre-spawning mortality in salmonids.

Areas

The following subsections provide a general overview of tree canopy cover in each of the eight analysis subareas and the 130th and 145th Street Station Area. Discussions also identify areas of notably heavy tree canopy cover, as well as streams with documented or potential fish use.

Area 1

Northwest Seattle includes some of the most densely forested areas in the city. Parks (e.g., Golden Gardens Park, Carkeek Park), greenspaces, and residential areas along the bluffs bordering Puget Sound include several areas with more than 60% canopy cover (**Exhibit 3.3-2**). Woodland Park also includes some areas with relatively high canopy cover. Neighborhoods with moderate to high canopy cover (generally 25 to 60%) include Broadview, Bitter Lake, Blue Ridge, North Beach, Phinney Ridge, Green Lake, Fremont, and Wallingford.

Mapping provided by the Northwest Indian Fisheries Commission (NWIFC) indicates that Piper's Creek in Carkeek Park supports coho salmon and ESA-listed Chinook salmon (NWIFC 2023). Using a topography-based model, the Washington Department of Natural Resources (WDNR) identified two additional potentially fish-bearing streams in this area, both of which

are unnamed tributaries to Puget Sound (WDNR 2023). One drains westward from Bitter Lake, and the other drains northward from North Beach Park.

Area 2

Most of northeast Seattle has a relatively high proportion of tree canopy cover (generally more than 30%; **Exhibit 3.3-2**). The areas with the greatest canopy cover are in parks (e.g., Matthews Beach Park), greenspaces, and residential areas near Thornton Creek and its tributaries and along Lake Washington. Additional areas of comparatively high canopy cover include Northacres Park and Ravenna Park. Nearly all neighborhoods in Area 2 have moderate to high canopy cover. The exceptions are the neighborhoods with substantial commercial centers (e.g., Northgate, Roosevelt, University District), as well as Magnuson Park.

Almost all of northeast Seattle is in the Thornton Creek watershed. According to NWIFC (2023), Thornton Creek and its tributaries provide spawning habitat for ESA-listed Chinook salmon as well as coho and sockeye salmon. Cutthroat trout and ESA-listed steelhead have also been documented in the watershed. Chinook, coho, and sockeye salmon also have the potential to be present in Yesler Creek, a tributary to Union Bay near the western edge of the Laurelhurst neighborhood. These species are also present in Lake Washington, which receives stormwater runoff from parts of Area 2.

WDNR (2023) identifies two additional potentially fish-bearing streams in this area. One is an unnamed tributary that flows from Haller Lake to the north branch of Thornton Creek, and the other is an unnamed tributary that enters Lake Washington immediately south of Magnuson Park.

130th/145th Study Area

The 130th/145th Study Area consists of two units: an approximately 65-acre area near the intersection of 15th Ave NE and NE 145th Street and an approximately 218-acre area spanning I-5 near the Sound Transit light rail station at NE 130th Street. Both units include areas of comparatively high canopy cover near Northacres Park (NE 130th Street unit) and along the north branch of Thornton Creek near Jackson Park Golf Course (both units).

Reaches of the north branch of Thornton Creek in this area have the potential to provide habitat for Chinook, coho, and sockeye salmon. Steelhead and cutthroat trout have been documented in these reaches (NWIFC 2023).

Area 3

The West subarea includes two neighborhoods with relatively high levels of tree canopy cover (Magnolia and Queen Anne), separated by the Interbay industrial area (**Exhibit 3.3-2**). The areas with the greatest canopy cover are Magnolia bluff, Discovery Park, Kiwanis Memorial Preserve Park, Kinnear Park, and greenbelts along the western and northern slopes of Queen Anne Hill.

NWIFC (2023) does not identify any fish-bearing streams in Area 3. WDNR (2023) identifies two potentially fish-bearing streams, both of which are tributaries to the Ship Canal. One is Wolfe Creek (a small stream that flows north from Kiwanis Memorial Preserve Park), and the other is an unnamed tributary that originates on the northern slopes of Queen Anne Hill near Mayfair Park. Chinook, coho, and sockeye salmon are present in the Ship Canal, which receives stormwater runoff from parts of Area 3.

Area 4

The Downtown/South Lake Union subarea does not contain any areas with more than 10% tree canopy cover. Several species of salmonids (Chinook, coho, and sockeye salmon, steelhead, cutthroat trout) have been documented in Lake Union, which receives stormwater runoff from parts of this area (NWIFC 2023). No streams with documented or potential fish use have been identified in this area (NWIFC 2023; WDNR 2023).

Area 5

Areas with relatively high levels of tree canopy cover include Volunteer Park, Interlaken Park, Washington Park Arboretum, Frink Park, Leschi Park, and residential areas along the shores of Lake Washington. Areas dominated by commercial/mixed uses and multifamily housing (primarily west of 23rd Avenue and south of Volunteer Park) generally have less canopy cover than the rest of the subarea.

NWIFC (2023) does not identify any fish-bearing streams in Area 5. WDNR (2023) identifies one potentially fish-bearing stream in the area: an unnamed tributary to Union Bay, originating in Interlaken Park. According to NWIFC (2023), Chinook, coho, and sockeye salmon, steelhead, cutthroat trout have been documented in Lake Washington (including Union Bay and Portage Bay), which receives stormwater runoff from parts of this area.

Area 6

Areas with relatively high proportions of tree canopy cover include parks, greenspaces, and residential areas along Puget Sound and on hillslopes west of the Duwamish Waterway (**Exhibit 3.3-2**). Areas with the greatest density of canopy cover include Lincoln Park, Fauntleroy Park, the West Duwamish greenspace, and the Arroyo Heights natural area. Neighborhoods with moderate to high canopy cover include North Admiral, Riverview, Fauntleroy, Arbor Heights, and Highland Park. Areas with lower canopy cover include commercial and residential areas near the West Seattle Junction, along California Ave SW, and in the High Point and South Delridge neighborhoods.

According to NWIFC (2023), Longfellow Creek supports spawning by coho salmon. Cutthroat trout have also been documented in the stream, and Chinook salmon, chum, salmon, and steelhead could potentially use habitats in the Longfellow Creek system. With the exception of

cutthroat trout, all of these species could potentially use habitats in Puget Creek, a small stream that enters the Duwamish Waterway near the Duwamish Longhouse and Cultural Center.

The two other Area 6 streams with documented fish use are Fauntleroy Creek (coho salmon and cutthroat trout) and a small stream that enters the Duwamish Waterway near the 1st Avenue South Bridge (coho salmon). Species present in the Duwamish Waterway (which receives stormwater runoff from parts of Area 6) include Chinook, chum, coho, pink, and sockeye salmon, steelhead, and cutthroat trout.

WDNR (2023) identifies six additional potentially fish-bearing streams in Area 6:

- Fairmont Creek (a small stream that originates in the North Admiral neighborhood and drains to Elliott Bay)
- An unnamed tributary that enters the Duwamish Waterway approximately 0.5 mile north of the 1st Avenue South Bridge
- An unnamed tributary that enters Puget Sound at Seola Park in the southwestern corner of the city
- An unnamed tributary that enters Puget Sound at Lowman Beach Park north of Lincoln Park
- An unnamed tributary that enters Puget Sound approximately 0.5 mile south of Mee-Kwa-Mooks Park
- An unnamed tributary that originates in Schmitz Preserve Park and drains to Puget Sound

Area 7

The Duwamish Manufacturing Industrial Center subarea contains almost no areas with more than 10% tree canopy cover. The exceptions are in residential areas. Some Neighborhood Residential and Multifamily areas in the Georgetown neighborhood have approximately 15% canopy cover. Ares with greater canopy cover—25 to 30%—occur in residential areas in the South Park neighborhood.

Several streams that originate in Area 6 briefly pass through Area 7 before discharging to the Duwamish Waterway. These are Longfellow Creek, Puget Creek, and the two unnamed tributaries that enter the waterway near and approximately 0.5 mile north of the 1st Avenue South Bridge. Runoff from most of Area 7 discharges to the Duwamish Waterway. Some is piped several miles north to King County's West Point Wastewater Treatment Plant in Discovery Park.

Area 8

Much of southeast Seattle is characterized by areas with comparatively low canopy cover (**Exhibit 3.3-2**). In contrast to other parts of the city, this is true even in residential areas. The exceptions are the residential areas bordering Lake Washington, where canopy cover is moderate to high. Away from Lake Washington, areas with relatively high canopy cover are largely limited to greenspaces and parks associated with ravines and the steep slopes of Beacon Hill.

NWIFC (2023) does not identify any fish-bearing streams in Area 8, while WDNR (2023) classifies Taylor Creek as potentially fish-bearing. Monitoring studies have confirmed that the lowermost reaches of Taylor Creek (between Rainier Avenue South and Lake Washington) provide rearing habitat for juvenile Chinook and coho salmon from other stream systems (Tabor and Moore 2020). The same study found juvenile Chinook and coho salmon in a recently daylighted reach of Mapes Creek downstream of Seward Park Avenue South.

3.3.2 Impacts

Under any of the alternatives, the potential for adverse effects on plants and animals would be avoided, minimized, documented, and mitigated to the greatest extent possible through regulatory reviews and permitting processes that apply to individual projects (see **Section 3.3.3**). None of the alternatives propose any modifications to those processes. For these reasons, all five alternatives would have the same potential for adverse effects on special-status plants and animals citywide and in the various analysis subareas. The action alternatives would include policies to maintain and enhance tree canopy in rights of way and city property and to expand tree canopy throughout the community, prioritizing residential and mixed-use areas with the least current tree canopy. These policies could lead to beneficial effects for some species.

In addition, given that habitats in the city limits represent a very small proportion of the total amount of habitat available to any species, differences in the availability or distribution of habitats in the city would be unlikely to result in any appreciable impacts on regional populations of plants or animals. Based on these considerations, none of the alternatives would be expected to result in impacts that would reduce the likelihood of survival or recovery of a plant or animal species in the wild.

Development and redevelopment projects would, however, have the potential for localized impacts on plant and animal communities. Projects that entail vegetation clearing would likely reduce the diversity and/or abundance of plants and animals on and near the affected parcels. These impacts would be expected to diminish over time as vegetation regrows in temporarily disturbed areas. Projects that increase the area of individual parcels occupied by buildings and impervious surfaces would be expected to result in long-term (but localized) reductions in the diversity and/or abundance of plant and animal communities in the affected areas.

In addition to providing protection for plants and animals in general, existing regulations, policies, and practices encourage the retention and expansion of tree canopy and the minimization of contaminants delivered to fish-bearing streams. Applicable regulations include those restricting the removal of trees on private property (SMC Chapter 25.11, Tree Protection), limiting disturbance and requiring mitigation in Environmentally Critical Areas (SMC Chapter 25.09 and 23.60A), regulating street trees, requiring landscaping and tree planting, and implementing stormwater requirements (see **Section 3.3.3** for more details).

Even though several of these regulatory requirements directly or indirectly limit tree removal, the results of the 2022 City of Seattle Tree Canopy Assessment demonstrate that the regulations

in effect at that time did not prevent development and redevelopment projects from contributing to tree canopy loss. After that study was completed, however, the City updated its regulations to implement stronger tree planting requirements and to require street trees to be planted as part of development in Neighborhood Residential zones. With the current regulations, it is expected that a substantial amount of development-related loss of tree canopy would be reversed over time as replacement trees grow larger. Since some tree placement would occur off-site through the fee-in-lieu option, this could also result in a shifting of canopy cover onto public property and the right-of-way where the City might have more control over tree establishment and maintenance. See **Section 3.3.3** for additional discussion of the mitigative potential of Seattle's current regulations. Based on the potential for reductions in canopy cover, projects that entail tree clearing could slow progress toward achieving the City's canopy cover goal.

Impacts Common to All Alternatives

The One Seattle Comprehensive Plan Update proposal and alternatives address where residential and commercial development will happen within the city limits. Based on the results of the citywide review of tree canopy cover, development projects on parcels in the Neighborhood Residential or Multifamily management units are likely to result in more loss of tree canopy, compared to development on parcels in other management units (see **Section 3.3.1**). This is particularly true of parcels with lower-density residential designations, where existing canopy cover is higher than elsewhere (**Exhibit 3.3-1**). As such, strategies that convert parcels with lower-density residential designations to higher-density designations could reduce the total amount of tree canopy cover in the city. As discussed above, however, a substantial portion of development-related reductions in canopy cover would be reversed over time as replacement trees grow, and the potential for any such reductions would be limited by regulations that protect existing trees and require replacement of trees that are removed from private parcels. For this analysis, it is assumed that the potential for reductions in tree canopy cover would be affected by the amount of area available for conversion to higher-density uses and the amount of area redeveloped for housing.

Exhibit 3.3-4 summarizes the amount of area that would be assigned to various place types under the alternatives. The values in this exhibit are drawn from **Exhibit 2.4-3**, **Exhibit 2.4-8**, **Exhibit 2.4-14**, **Exhibit 2.4-17**, and **Exhibit 2.4-20** in **Chapter 2**. Analyses in this section are based on the expectation that reducing the amount of area dedicated to lower-density residential uses (and, by the same token, increasing the amount of area available for conversion to higher-density uses) would lead to an elevated risk of impacts to vegetation (including loss of tree canopy) on redeveloped parcels and in nearby road rights-of-way. In other words, a higher value in the "New place types" row in **Exhibit 3.3-4** indicates a higher potential for development-related impacts to vegetation.

Exhibit 3.3-4. Comparison of Impacts from Each Alternative

Place Type	Size in Acres (Approx)				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Existing Centers and Villages[1]	10,131	10,131	10,131	10,131	11,528
New place types[2]	0	2,923	32,581	20,420	32,294
Place types not changing in alternative[3]	33,633	30,768	1,052	13,213	0
Manufacturing/Industrial	5,896	5,896	5,896	5,896	5,896
Place types not changing in all alternatives[4]	3,854	3,854	3,854	3,854	3,854

Notes:
[1] Includes areas designated as urban centers or urban villages (under Alternative 1, No Action) or as regional centers or urban centers (under the action alternatives).
[2] Includes areas that would be classified as neighborhood centers, urban neighborhoods, or corridors under the action alternatives. It is assumed for this analysis that most such areas are currently zoned for single-family residential or other low-density uses and would remain so under Alternative 1, No Action.
[3] Includes areas classified as "Outside Subareas" in **Exhibit 2.4-3**, **Exhibit 2.4-8**, **Exhibit 2.4-14**, **Exhibit 2.4-17**, and **Exhibit 2.4-20**.
[4] Consists of areas classified as "Outside Subareas" common to all alternatives in **Exhibit 2.4-3**, **Exhibit 2.4-8**, **Exhibit 2.4-14**, **Exhibit 2.4-17**, and **Exhibit 2.4-20**.
Sources: City of Seattle, 2023; BERK, 2023.

Under Alternative 5, in addition to the areas in the "new place types" category, approximately 1,400 more acres would fall in the "existing centers and villages" category, compared to the other alternatives (**Exhibit 3.3-4**). Most parcels in the areas that would be converted to the "existing centers and villages" category are currently zoned for lower-density residential uses. Therefore, it is assumed for this analysis that the converted areas would face a higher potential for development-related impacts to vegetation under Alternative 5, compared to the other alternatives.

The total number of demolitions under each alternative is summarized in **Exhibit 3.8-44**. These numbers can provide a high-level indication of the amount of land that would be redeveloped over a 20 year period, particularly in existing Neighborhood Residential zones where the number of units per lot area does not vary substantially. Alternatives 3 and 5 would result in the largest number of demolitions which would tend to result in more area of redevelopment.

Canopy cover loss could also occur due to non-residential development. However, the amount of tree loss due to non-residential development is not likely to vary substantially between the alternatives as total job growth would not vary between the alternatives and because urban development associated with new jobs would tend to occur in existing commercial and industrial areas under all the alternatives.

Development or redevelopment projects may create or replace impervious surfaces, including some pollution-generating impervious surfaces. If runoff from these surfaces enters fish-bearing streams, contaminants in the runoff may harm or kill fish. As discussed in **Section 3.1.2** in **Earth & Water Quality**, on-site stormwater management would likely be required for

development or redevelopment projects within the city limits. Implementation of required stormwater management would occur under any of the alternatives and would prevent or minimize the delivery of contaminants to fish-bearing streams. This, in turn, would avoid or minimize the potential for adverse impacts on aquatic species and habitats.

The locations, design, and performance standards of stormwater facility improvements would be determined on a project-by-project basis and cannot be predicted for a programmatic review such as this. For this analysis, it is assumed that the potential for stormwater contaminants to be delivered to streams would be proportional to the amount of area available for conversion to higher-density uses. This assumption is based on the reasoning that a greater amount of area available for redevelopment projects would translate into a greater potential that there may be some projects for which it is not possible to avoid adverse impacts on water quality altogether.

Encouraging residential and commercial development within the urban environment of Seattle could indirectly benefit plants and animals by easing development pressure in less-developed areas outside the city. Tree canopy assessments such as i-Tree show that, compared to urban areas, suburban and rural areas generally have more tree canopy and lower levels of human activity. Development projects in such areas typically entail the conversion of vegetated or minimally disturbed areas to impervious surfaces and areas with elevated levels of human activity. In contrast, most currently undeveloped properties in Seattle are in protected areas (e.g., parks, greenspaces) and are unlikely to be developed during the timeframe of this analysis.

Equity & Climate Vulnerability Considerations

As discussed in **Section 3.3.1**, areas with disadvantaged populations tend to have less canopy cover than other areas. In addition, these area lost more canopy cover, on average, compared to other neighborhoods, during the 5-year study period of the City's tree canopy assessment. For these reasons, alternatives with a higher likelihood of contributing to canopy cover loss in areas with a combination of disadvantaged populations and low canopy cover would have an elevated risk of adverse effects on disadvantaged populations. Many areas with extensive multifamily development (e.g., apartment complexes) have this combination. Therefore, alternatives that concentrate growth in areas where extensive multifamily development is already present may have a higher likelihood of contributing to canopy cover loss in areas with disadvantaged populations.

Conversely, changes that allow lower-cost housing options in areas that are currently zoned for low-density development could allow more disadvantaged populations to live in areas with higher canopy cover and access to large parks. Also, with the requirement for street trees to be planted as part of development in Neighborhood Residential zones, new development could result in more tree canopy in public rights-of-way. In contrast to trees on private parcels, the benefits of trees in public rights-of-way are available to more people, including those from disadvantaged populations. Finally, disadvantaged communities would be expected to benefit from policies that prioritize the protection, maintenance, and expansion of tree canopy in residential and mixed-use areas where tree canopy is currently low. These factors would offset

some of the potential adverse effects that might arise from concentrating growth in areas where extensive multifamily development is already present.

As discussed in **Section 3.3.1**, trees play a vital role in moderating temperatures in urban areas. Alternatives with a higher likelihood of contributing to canopy cover loss in areas with low canopy cover would have an elevated risk of exacerbating local heat island[13] impacts. Alternatives that concentrate growth in areas where extensive multifamily development is already present may have a higher likelihood of exacerbating climate vulnerability.

Impacts of Alternative 1: No Action

Under Alternative 1, 80,000 new housing units would be added in Seattle by 2044 to meet regionally set growth targets. More than 66,000 (83%) of these would be in areas with high-density designations (e.g., urban centers, urban villages, industrial areas). Several of these areas also have a combination of disadvantaged populations and low canopy cover, including the following:

- **Area 1:** The Aurora Avenue North corridor north of N 85th Street
- **Area 2:** Northgate, Lake City
- None in Area 3
- **Area 4:** Downtown core, South Lake Union
- **Area 5:** Yesler Terrace, Judkins Park
- **Area 6:** Highland Park/White Center
- **Area 7:** South Park
- **Area 8:** North Beacon Hill, Holly Park, Dunlap

Continued redevelopment in these areas could have the effect of reducing tree canopy cover where it is needed most, both in terms of livability and of climate resiliency.

In portions of urban centers and urban villages where the existing canopy cover is relatively high, redevelopment projects may not have substantial adverse effects on livability. However, projects that entail clearing on canopy-rich parcels could impede progress toward the City's canopy cover goal. Currently, few areas with relatively high canopy cover are found in areas designated as urban centers or urban villages; this would likely continue to be the case under Alternative 1.

Alternative 1 would result in fewer new housing units than any of the other alternatives, and it would have the smallest amount of area available for conversion to higher-density uses (**Exhibit 3.3-4**). This would be the case both at the citywide scale and within seven of the eight analysis subareas. The exception is Area 4 (Downtown/South Lake Union), where the same number of housing units would be added under all five alternatives. For these reasons, Alternative 1 would be expected to result in a lower potential for development-related tree

[13] A heat island is an area that experiences higher temperatures than other areas due to concentrations of buildings, roads, and other infrastructure that absorbs and re-emit the sun's heat more than natural landscapes such as forests and water bodies. The heat island effect can result in daytime temperatures up to 7° Fahrenheit higher than temperatures in outlying areas.

canopy cover loss than any of the action alternatives, both citywide and in the individual analysis subareas.

Compared to the action alternatives, Alternative 1 would result in less growth in the city overall but tend to focus that growth in areas where extensive multifamily development is already present. As a result, Alternative 1 would have a moderate risk of contributing to adverse effects on disadvantaged populations or exacerbating climate vulnerability compared to the action alternatives.

Based on the amount of area where development or redevelopment may result in losses of vegetated areas, Alternative 1 would also likely have the lowest potential for short-term and long-term decreases in the diversity and/or abundance of plant and animal communities in areas where development or redevelopment projects occur.

Based on the anticipated amount of area likely to be redeveloped, Alternative 1 would also have a lower potential of leading to increased delivery of stormwater contaminants to streams, compared to the other alternatives.

130th/145th Station Area

The 130th/145th Station Area does not include any neighborhoods where areas with a high-density designation under Alternative 1 would overlap areas with a combination of disadvantaged populations and low canopy cover. In addition, no areas with relatively high canopy cover are found in areas that would continue to be designated as urban centers or urban villages in the 130th/145th Station Area under Alternative 1.

No areas currently zoned primarily for single-family residential uses in the 130th/145th Station Area would be converted to higher-density designations under Alternative 1. As such, Alternative 1 would have a lower potential of leading to increased delivery of stormwater contaminants to streams in this area, compared to the other alternatives.

Impacts of Alternative 2: Focused

Under Alternative 2, 100,000 new housing units would be added in Seattle by 2044—20,000 more than under Alternative 1. Almost 91,000 of the new housing units would be in areas with high-density designations (regional centers, urban centers, industrial areas, neighborhood centers). As under Alternative 1, several of these areas also have a combination of disadvantaged populations and low canopy cover. Development or redevelopment projects in neighborhood centers established under Alternative 2 could contribute to tree canopy loss in the following areas with a combination of disadvantaged populations and low canopy cover:

- **Area 1:** Greenwood Ave N and N 145th Street
- None in Areas 2, 3, 4, or 5
- **Area 6:** 35th Ave SW and SW Morgan Street, 35th Ave SW and SW Barton Street

- **Area 7:** Georgetown
- **Area 8:** Rainier Ave S and S Graham Street, Beacon Ave S and S Columbian Way (west of Beacon Ave S)

Canopy loss in these areas would be in addition to the canopy loss in the regional centers and urban centers identified in the analysis of Alternative 1. Not all areas with a combination of disadvantaged populations and low canopy cover would experience increased density (and resultant impacts on tree canopy) associated with the establishment of neighborhood centers. Examples include portions of the Licton Springs, High Point, Mid Beacon Hill, and South Beacon Hill neighborhoods.

Development or redevelopment projects in neighborhood centers established under Alternative 2 could also contribute to tree canopy loss in areas with relatively high proportions of existing canopy cover, potentially impeding progress toward the City's canopy cover goal. Such losses may occur in the following neighborhood centers (underlining indicates areas that also have disadvantaged populations):

- **Area 1:** Holman Rd NW and 3rd Ave NW (north of Holman Rd NW), N 56th Street and Keystone Place N
- **Area 2:** 15th Ave NE and NE 145th Street, 8th Ave NE and Roosevelt Way NE, 15th Ave NE and NE 125th Street, Roosevelt Way NE and NE 90th Street, 40th Ave NE and NE 55th Street, 40th Ave NE and NE 55th Street, Princeton Ave NE and Sand Point Way NE, 25th Ave NE and NE 65th Street, 35th Ave NE and NE 75th Street, 35th Ave NE and NE 85th Street, Sand Point Way NE and NE 45th Street
- **Area 3:** 34th Ave W and W Emerson Street, 33rd Ave W and W McGraw Street
- (None in Area 4)
- **Area 5:** 10th Ave E and E Boston Street, 24th Ave E and E Calhoun Street, 29th Ave E and E Madison Street, 42nd Ave E and E Madison Street, 34th Ave and E Union Street
- **Area 6:** Delridge Way SW and SW Dakota Street, Delridge Way SW and SW Brandon Street, Delridge Way SW and SW Orchard Street
- (none in Area 7)
- **Area 8:** Beacon Ave S and S Columbian Way (east of Beacon Ave S)

Under Alternative 2, about 3,000 acres of currently lower-density parcels may be converted to higher-density uses (neighborhood centers), the smallest area of conversion among the action alternatives (**Exhibit 3.3-4**). Growth would be focused in neighborhood centers. Among the action alternatives, Alternative 2 would thus have the lowest potential for development-related impacts to vegetation (including loss of tree canopy cover) citywide.

Many of the neighborhood centers added under Alternative 2 would be near existing centers and villages or include neighborhood business districts, where extensive multifamily development is already present. However, the focused-growth strategy would limit the number of such areas where additional growth would occur. As a result, Alternative 2 would have a

relatively higher risk of contributing to adverse effects on disadvantaged populations or exacerbating climate vulnerability than Alternative 3.

Based on the amount of area where development or redevelopment may result in losses of vegetated areas, Alternative 2 would also likely have the lowest potential, among the action alternatives, for short-term and long-term decreases in the diversity and/or abundance of plant and animal communities in areas where development or redevelopment projects occur.

The differences between Alternative 2 and the other action alternatives would not be distributed evenly across all analysis subareas. These differences in distribution are most noticeable when Alternative 2 is compared to Alternatives 3 and 4, all of which would add the same number of new housing units (100,000) in the city. Compared to those two alternatives, Alternative 2 would add 5,000 to 5,500 fewer households in Areas 2, 6, and 8 (combined), and it would add 5,000 to 5,500 more households in the other analysis subareas (combined). Increasing the number of households in any given area would be expected to result in an elevated potential for adverse impacts on plants and animals in that area. As such, compared to Alternatives 3 and 4, Alternative 2 would have a lower risk of adverse effects in Areas 2, 6, and 8, and a higher risk of adverse effects in Areas 1, 3, 5, and 7. Area 4 has the same growth in all the alternatives.

The differences in the geographic distribution of potential impacts are not as noticeable in comparison to Alternative 5 because Alternative 5 would add 20,000 more housing units citywide than Alternative 2 would. In all eight analysis subareas, the risk of adverse effects under Alternative 2 would be less than or essentially equal to that of Alternative 5.

Based on the anticipated amount of area likely to be redeveloped, Alternative 2 would have a lower potential of leading to increased delivery of stormwater contaminants to streams, than the other action alternatives, but a slightly higher potential than Alternative 1.

130th/145th Station Area

None of the Alternative 2 neighborhood centers in the 130th/145th Station Area would overlap areas with a combination of disadvantaged populations and low canopy cover. All three of the neighborhood centers that would be established in the 130th/145th Station Area under Alternative 2 would partially overlap areas with moderately high canopy cover.

Approximately 117 acres in the 130th/145th Station Area (52 acres in the NE 130th Street unit and the full 65-acre area of the NE 145th Street unit) would be designated as neighborhood centers. Current zoning in much of the area that would be redesignated under Alternative 2 encourages high-density uses, such as commercial and multifamily residential. Areas that are currently zoned primarily for single-family residential uses and that would be converted to higher-density designations under Alternative 2 make up approximately one-half of the 117-acre area that would be designated as neighborhood centers. As such, Alternative 2 would have a higher potential than Alternative 1, leading to increased delivery of stormwater contaminants to streams in this Area 1, but a lower potential than the other action alternatives.

Impacts of Alternative 3: Broad

Under Alternative 3, as under Alternative 2, 100,000 new housing units would be added in Seattle by 2044, and the vast majority (more than 89,000) would be in areas with high-density designations (regional centers, urban centers, industrial areas, urban neighborhood areas). Compared to Alternative 2, a substantially larger area of currently lower-density parcels—approximately 32,500 acres—may be converted to higher-density uses in urban neighborhood areas (**Exhibit 3.3-4)**. Such parcels would be distributed throughout the city.

Based on the amount of area where currently low-density parcels may be converted to higher-density uses, Alternative 3 would be expected to have the higher potential for loss of tree canopy (and, by extension, a higher potential to impede progress toward the City's canopy cover goal) than Alternatives 2 and 4.

While distributing growth throughout the city (particularly in lower-density areas) would affect more tree canopy cover than the other alternatives, this approach would also minimize the amount of growth in areas where extensive multifamily development is already present. As a result, compared to the other action alternatives, Alternative 3 would have the lowest risk of contributing to adverse effects on disadvantaged populations or exacerbating climate vulnerability.

Based on the amount of area where development or redevelopment may result in losses of vegetated areas, Alternative 3 would have the second-highest potential (second to Alternative 5) for localized short-term and long-term decreases in the diversity and/or abundance of plant and animal communities. As discussed above, Alternative 3 would have a higher risk than Alternative 2 of adverse effects in Areas 2, 6, and 8, and a lower risk of adverse effects in Areas 1, 3, 4, 5, and 7.

Based on the anticipated amount of area likely to be redeveloped, Alternative 3 would have the second-highest potential (second to Alternative 5) leading to increased delivery of stormwater contaminants to streams.

130th/145th Station Area

Under Alternative 3, a station area plan would not be implemented. Growth would occur based on the citywide place types assigned to the station vicinity. Based on the widespread distribution of areas where currently lower-density parcels may be converted to higher-density uses, the impacts of Alternative 3 the 130th/145th Station Area would be as described for the citywide analysis, above.

Approximately 200 acres of parcels that are currently zoned primarily for single-family residential uses in the 130th/145th Station Area would be converted to higher-density residential designations (i.e., urban neighborhood) under Alternative 3. This includes roughly 20 acres in the NE 145th Street unit and roughly 180 acres in the NE 130th Street unit. Alternative 3 would thus have the highest potential of leading to increased delivery of stormwater contaminants to streams in this area, compared to the other alternatives.

Impacts of Alternative 4: Corridor

Under Alternative 4, as under Alternative 2, 100,000 new housing units would be added in Seattle by 2044; approximately 88,000 of these would be in areas with high-density designations (regional centers, urban centers, industrial areas, corridor areas). The area of currently lower-density parcels that may be converted to higher-density uses in corridor areas would be approximately 20,500 acres—more than under Alternative 2 (3,000 acres) and less than under Alternative 3 (32,500 acres) (**Exhibit 3.3-4**).

The distribution of the areas likely to experience development-related canopy cover loss would be less focused than under Alternative 2 and less widespread than under Alternative 3. As a result, in areas with relatively high proportions of existing canopy cover, the impacts of Alternative 4 would also likely lie between those of Alternatives 2 and 3. Among the action alternatives, Alternative 4 would thus result in a moderate potential for loss of tree canopy cover.

Alternative 4 would emphasize growth in corridors which include arterial streets where multifamily development is present and surrounding areas where it is less common. The distribution of these neighborhood residential-corridor areas would be more widespread than the neighborhood centers of Alternative 2. As a result, Alternative 4 would have a higher risk of contributing to adverse effects on disadvantaged populations or exacerbating climate vulnerability than Alternative 3 and a lower risk than Alternative 2.

Based on the amount of area where development or redevelopment may result in losses of vegetated areas, the potential for localized short-term and long-term decreases in the diversity and/or abundance of plant and animal communities under Alternative 4 would be intermediate between those of Alternative 2 and Alternative 3. As discussed in the analysis of Alternative 2, Alternative 4 would have a higher risk than Alternative 2 of adverse effects in Areas 2, 6, and 8, and a lower risk of adverse effects in Areas 1, 3, 4, 5, and 7.

Based on the anticipated amount of area likely to be redeveloped, Alternative 4 would have a higher potential than Alternative 2 of leading to increased delivery of stormwater contaminants to streams, and a lower potential than Alternative 3.

130th/145th Station Area

Alternative 4 does not include implementation of a station area plan and the corridor-focused alternative would apply similar place types as for other areas of the city. As described for the citywide analysis above, the impacts of Alternative 4 the 130th/145th Station Area would likely be greater than those anticipated for Alternative 2 and less than those anticipated for Alternative 3.

Similar to Alternative 3, Alternative 4 would convert approximately 200 acres of parcels that are currently zoned primarily for single-family residential uses in the 130th/145th Station Area to higher-density designations. As such, Alternative 4 would be expected to have the same potential as Alternative 3 of leading to increased delivery of stormwater contaminants to streams in this area.

Impacts of Alternative 5: Combined

Alternative 5 would implement a growth strategy that combines elements of the strategies from Alternative 2 (neighborhood centers), Alternative 3 (widespread redevelopment in urban neighborhood), and Alternative 4 (emphasis on redevelopment along major transportation corridors in urban neighborhood areas). Under Alternative 5, 120,000 new housing units would be added in Seattle by 2044—20,000 more than under any of the other action alternatives. More than 113,000 (94%) of these would be in areas with high-density designations. Alternative 5 would also include the creation of a new urban center near NE 130th Street and the expansion of the existing urban centers in the Greenwood-Phinney Ridge, Upper Queen Anne, Admiral, West Seattle Junction, Morgan Junction, and Othello areas. As a result, approximately 1,400 more acres would fall in the "Centers/high-density residential" category under this alternative, compared to the other alternatives (**Exhibit 3.3-4**).

Under Alternative 5, approximately 33,700 acres of currently lower-density parcels may be converted to higher-density uses—more than under any of the other alternatives (**Exhibit 3.3-4**).[14] These areas would be distributed throughout the city. As such, all areas with relatively high proportions of existing canopy cover would be likely to experience additional canopy loss.

Even though Alternative 5 would convert more lower-density parcels to higher-density uses, the potential for development-related canopy cover loss would likely be lower than under Alternative 3. This is because Alternative 5 would focus more development in neighborhood centers and corridors, rather than distributing it in urban neighborhoods throughout the city. Development or redevelopment projects in neighborhood centers and corridors would be expected to result in less canopy cover loss than would projects in areas classified as urban neighborhoods. Alternative 5 would thus have a lower likelihood than Alternative 3 of impeding progress toward the City's canopy cover goal, but a higher likelihood than Alternative 2 or Alternative 4.

Given the highest number of homes produced and the broadest range of areas affected, Alternative 5 would tend to have the highest potential for loss of tree canopy.

Based on the citywide distribution of these areas, combined with the greater number of housing units that would be added under this alternative, Alternative 5 could also have a higher risk of changes in canopy cover that contribute to adverse effects on disadvantaged populations or exacerbating climate vulnerability, compared to the other action alternatives.

Based on the amount of area where development or redevelopment may result in losses of vegetated areas, the potential for localized short-term and long-term decreases in the diversity and/or abundance of plant and animal communities under Alternative 5 would be greater than that of Alternative 3. In nearly all analysis subareas, the risk of adverse effects would be higher under Alternative 5 than under any of the other alternatives. The exceptions would be Areas 2,

[14] This value includes approximately 32,300 areas in the "Place types identified for redevelopment" category, plus approximately 1,400 acres where parcels currently zoned for lower-density uses would be converted to urban centers.

3, and 4, where the number of housing units added under Alternative 5 (and, by extension, the potential for localized impacts on plants and animals) would be approximately equivalent to that of Alternative 2.

Based on the anticipated amount of area likely to be redeveloped, Alternative 5 would have a higher potential of leading to increased delivery of stormwater contaminants to streams, compared to the other alternatives.

130th/145th Station Area

As described for the citywide analysis above, Alternative 5 would have more impacts in the 130th/145th Station Area than any of the other alternatives. Neither the urban center at NE 130th Street nor the neighborhood center at 15th Ave NE and NE 145th Street would overlap any areas with a combination of disadvantaged populations and low canopy cover. However, both of these areas would partially overlap areas with moderately high canopy cover.

Similar to Alternatives 3 and 4, Alternative 5 would convert approximately 200 acres of parcels that are currently zoned primarily for single-family residential uses to higher-density designations. However, the housing target for these areas would be higher than under any of the other alternatives. As a result, more redevelopment projects would be expected to occur in these areas under Alternative 5 than under the other alternatives, and Alternative 5 would thus have a higher potential of leading to increased delivery of stormwater contaminants to streams in this area, compared to the other alternatives.

3.3.3 Mitigation Measures

Incorporated Plan Features

The action alternatives amend the Comprehensive Plan to address a new climate element including climate resilience strategies that include reducing heat islands and increasing tree canopy. In addition, In addition, the action alternatives include policies to maintain and enhance tree canopy. Examples of plan polices that would contribute to achieving the City's goal of at least 30% tree canopy cover include the following:

Policies that directly address tree canopy:

- LU 2.7: Encourage the preservation and expansion of the tree canopy throughout the city for the aesthetic, health, and environmental benefits trees provide, considering first the residential and mixed-use areas with the least tree canopy in order to more equitably distribute the benefits to residents.
- CE 12.3: Regularly update the tree canopy analysis to monitor changes and trends in the amount, distribution, and condition of the urban forest and use this information to shape urban forestry management plans, decisions, and actions.

- CE 12.6: Preserve, restore, maintain, and enhance tree canopy on City property and rights-of-way.
- CE 12.8: Encourage the protection, maintenance, and expansion of tree canopy throughout the community, prioritizing residential and mixed-use areas with the least current tree canopy to equitably distribute benefits.

Other policies that likely to contribute to the protection and maintenance of tree canopy:

- CE 9.3: Expand tree canopy and greenspace, especially in communities that experience disproportionate impacts of extreme heat and smoke events.
- P 1.17: Maintain and expand cooperative agreements with Seattle Public Schools and other public or private agencies to provide or expand access to open spaces they control and increase the tree canopy and green space they provide.
- P 5.1: Protect, restore, and expand urban forests and tree canopy on City-owned land, including rights-of-way, prioritizing frontline communities.
- T 4.10: Enhance the public street tree canopy and landscaping in the street right-of-way.

Maximizing tree canopy cover—particularly in areas with disadvantaged populations—would support the City's goal of developing a growth strategy that results in more equitable outcomes and reduces harm. By reducing the urban heat island effect, tree canopy cover enhances climate resiliency.

Regulations & Commitments

Under any of the alternatives, development projects would be designed and built in accordance with applicable federal, state, and local statutes and regulations (**Exhibit 3.3-5**). Many of these involve review and permitting processes to ensure impacts to the environment (including environmentally critical areas important to plants and animals) are avoided, minimized, documented, and mitigated to the greatest extent possible. The procedures associated with these regulations also create opportunities for public notice and comment on projects before implementation. Regulations and commitments that address stormwater runoff are identified in **Section 3.1.3** in **Earth & Water Quality**.

Exhibit 3.3-5. Federal, State, and Local Regulations, Permits, and Processes Related to the Protection of Plants and Animals

Authority	Agencies with Jurisdiction	Requirements
Federal		
Migratory Bird Treaty Act	U.S. Fish and Wildlife Service (USFWS)	Prohibits the taking, killing, or possession of migratory birds or any parts, nests, or eggs of such birds, except as authorized by USFWS.
Bald and Golden Eagle Protection Act	USFWS	Prohibits the taking (including disturbance) of eagles or their nests, except as authorized by USFWS.
Clean Water Act Section 404	U.S. Army Corps of Engineers	Requires authorization for excavating, land clearing, or discharging dredged or fill material into waters of the United States, including wetlands.

Authority	Agencies with Jurisdiction	Requirements
Marine Mammal Protection Act	National Marine Fisheries Service (NMFS)	Prohibits injury or harm (including disturbance) to marine mammals, except as authorized by NMFS.
Endangered Species Act Section 7 Consultation	NMFS and/or USFWS	Requires federal agencies to ensure that actions they authorize (e.g., through issuance of a permit), fund, or carry out are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat for those species.
Magnuson-Stevens Fishery Management and Conservation Act Consultation	NMFS	Requires a federal agency to consult with NMFS on a proposed activity authorized, funded, or undertaken by the agency, if the activity may adversely affect essential fish habitat (EFH) for federally managed commercially harvestable fish.
Washington State		
State Environmental Policy Act	Various	Requires state and local agencies to review proposals and identify environmental impacts; permits and approvals can be conditioned or denied, to mitigate or avoid the impacts identified through SEPA review.
State Hydraulic Code	Washington Department of Fish and Wildlife (WDFW)	Regulates activities that use, divert, obstruct, or change the natural flow or bed of waters (marine or fresh); project proponents must obtain a Hydraulic Project Approval, which ensures the work is done in a manner that protects fish life.
Clean Water Act Section 401	Washington State Department of Ecology	Requires certification for any projects that may result in a discharge into waters of the United States to ensure that the discharge complies with applicable state water quality requirements.
City of Seattle		
Environmentally Critical Areas Ordinance	City of Seattle Department of Construction & Inspections (SDCI)	Protects and regulates activities on or adjacent to critical areas; critical areas include geologic hazard areas, flood-prone areas, wetlands, and fish and wildlife habitat conservation areas (which include streams, riparian corridors, wildlife habitats mapped or designated by WDFW, corridors connecting priority habitats, and areas that support species of local importance).
Shoreline Master Program	SDCI	Regulates activities in and near major water bodies (e.g., rivers, large lakes, marine waters), establishes requirements for maintaining native vegetation.
Tree Protection Ordinance	SDCI	Limits the number, size, and type of trees that may be removed from private property and establishes requirements for replacing trees that are cut down.
City of Seattle SEPA Plants and Animals Policy	SDCI	Allows DPD to grant, condition, or deny construction and use permit applications for public or private proposals subject to SEPA review, with the goal of minimizing or preventing loss of wildlife habitat.
Land Use Regulations	SDCI	Specifies Green Factor requirements and street tree requirements for development in the Multifamily and Commercial zones and establishes tree requirements for development in Neighborhood Residential zones.

Source: Parametrix, 2023.

In March 2023, Mayor Harrell issued an Executive Order that addresses trees on City-owned property, identifying six measures for increasing the city's urban tree canopy:

- Create a One Seattle Tree Fund, collected from fee-in-lieu payments from developers and private property owners. The fund will target new tree plantings in areas with low canopy cover, specifically historically underserved communities, along with parks and publicly owned rights-of-way.
- Expand public-private partnerships to support new, innovative funding mechanisms to maintain and expand urban forest on public lands and in publicly owned rights-of-way.
- Replace every healthy, site-appropriate tree removed from City-owned property within city limits with a minimum of three trees; replace every tree on City-owned property within city limits that has died or is otherwise hazardous or invasive with a minimum of two trees.
- Remediate unhealthy trees and trees creating conflicts.
- Steward City-managed forested watersheds outside of urban areas for the long-term provision of ecosystem services to the communities we serve, based on principles of diversity, equity, and inclusion and best available scientific knowledge.
- Report on urban area tree canopy expansion and protection progress through the annual Urban Forestry Progress Report.

Also, in May 2023, the Seattle City Council passed an ordinance that updates the existing Tree Protection Code and addresses urban forest on private property. The ordinance includes the following actions:

- Lower the size thresholds and provide stronger protections for trees subject to regulation.
- Increase planting requirements.
- Fund tree planting programs and address the lack of trees in historically underserved communities through establishment of a payment-in-lieu program to provide flexibility for homebuilders.
- Provide for development standard modifications through incentives to help avoid impacts to trees when possible.
- Create clear standards for tree protection during the review process.
- Expedite the permitting process.
- Establish a more simple and clear naming convention for tree categories.
- Restrict removal of heritage trees.
- Require the planting of street trees in urban neighborhood zones on parcels that are redeveloped.

Taken together, these policies and regulations are expected to minimize the potential for tree canopy loss in several ways. Enhanced restrictions on tree removal will reduce related canopy loss on private parcels, and tree replacement requirements will ensure that a substantial portion such losses are reversed over time. Moreover, requirements for tree planting in road rights-of-way may create opportunities for additional tree canopy development in areas that currently lack street trees.

The potential for canopy losses to affect disadvantaged populations will be reduced through the payment-in-lieu program. Revenue generated through that program will be used to plant and maintain new trees with a priority in census tracts with tree canopy cover of 25 percent or less and on planting in public places. Given that areas with disadvantaged populations tend to have less canopy cover than other areas, the emphasis on planting in areas with low canopy cover will generate benefits for those populations.

Tree planting through the payment-in-lieu program may also provide some ecological and social benefits that would not be realized through on-site tree replacement. The program will allow the City to identify sites where restoration or creation of forest canopy will generate public benefits. For example, it will be possible to plant and maintain stands of trees in public places. Trees growing in groups or stands provide shade and habitat more effectively than single, isolated trees. In addition, when trees are planted in public places, benefits related to physical and mental health are more widely available. Moreover, the commitment of public resources to maintaining planted trees increases the likelihood of long-term survival. Such planning and coordination is not possible when individual trees are replaced on private parcels. By creating the opportunity for coordinated and consolidated planting and maintenance of trees, the payment-in-lieu program opens the door to strategic efforts that maximize the public benefits of trees.

Finally, the City was recently awarded $12.9 million in grant funding, to restore forested places near schools, parks, and low-income housing. The projects implemented through this funding will be designed to offset the effects of climate change, improve access to nature, and support green careers for young people.

Other Potential Mitigation Measures

Measures that may increase and enhance tree canopy cover include the following:

- Add an amenity area requirement in Neighborhood Zones, encouraging space for trees. (As of Spring 2024, the City anticipates adopting new zoning standards in Neighborhood Residential zones to allow for middle housing types).
- Utilize an adaptive management policy to collect, monitor, analyze, and learn from the results of code application and to assess the Tree Protection Code's effectiveness in achieving the goals of retaining or replanting trees and increasing canopy cover while allowing for more housing options. This policy fits with the City's goal of conducting citywide tree cover assessments every 5 years, which can inform adaptive management.
- Encourage attached units rather than detached units, which could result in more plantable area by eliminating small corridors between buildings. This option may be feasible in areas that would be classified as neighborhood center, urban neighborhood, or corridor under the action alternatives.
- Increase funding for City-led tree planting and maintenance in parks and rights-of-way, particularly in areas identified as heat islands.

- Expand existing programs such as Trees for Neighborhoods, which provides trees and support for people who want to plant trees on their property or in the adjacent right-of-way.
- Develop a comprehensive plan for investment in the equitable distribution and resilience of the urban forest.
- Investigate technologies such as flexible pavement, soil cells, expanded tree pits, and appropriate soil types in City-owned rights-of-way.
- Pursue creative approaches for maximizing green infrastructure in appropriate locations in City-owned rights-of-way—for example, installing planted bike lane and curb line buffer strips between curbs and sidewalks, or replacing parking spots and curb bulbs to support park-scale street trees.
- Collaborate with Seattle Public Schools and organizations such as Green Schoolyards America to increase tree cover on school grounds.

Potential measures for avoiding, minimizing, and mitigating development-related impacts on water quality are identified in **Section 3.1.3** in **Earth & Water Quality.** Possible additional measures for reducing the risk of delivering contaminants to fish-bearing streams include the following:

- Retrofit existing stormwater facilities to increase storage capacity and improve water quality treatment.
- Adopt stormwater detention standards that require new parcel development to detain larger volumes of stormwater runoff on-site and in a manner that mimics predeveloped stormwater patterns.
- Set lower development size thresholds to require more parcel projects to install on-site stormwater management.
- Set lower limits for the maximum percentage of a new development that could be covered with impervious surfaces.
- Encourage expanded use of soil amendments to facilitate stormwater infiltration (i.e., low-impact development practices) where technically feasible.
- Sponsor or encourage public education about the threats posed to fish by contaminants in stormwater runoff.
- Provide a stronger program for maintaining stormwater treatment and detention facilities.

3.3.4 Significant Unavoidable Adverse Impacts

Under any of the alternatives, population growth in Seattle will drive development and redevelopment of residential and commercial properties. As discussed above, differences in the availability or distribution of habitats in the city would be unlikely to result in any appreciable impacts on regional populations of plants or animals. Based on this consideration, combined with the existing statutory and regulatory requirements that provide protection for plants and

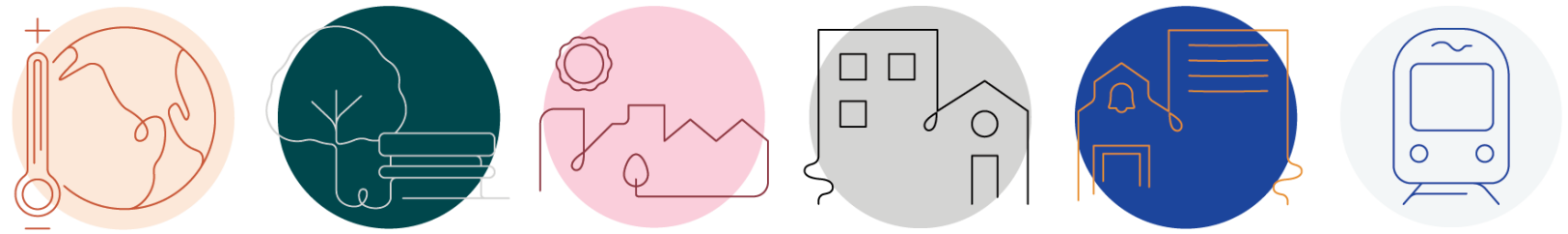
animals, none of the alternatives would be expected to result in impacts that would reduce the likelihood of survival or recovery of a plant or animal species in the wild.

Similarly, none of the action alternatives would be expected to have significant, unavoidable adverse impacts on aquatic species and habitats. On-site stormwater management would likely be required for development or redevelopment projects within the city limits (see **Section 3.1.4** in **Earth & Water Quality**). Implementation of required stormwater management would occur under any of the alternatives. For these reasons, none of the action alternatives would be expected to result in an appreciable increase (compared to the No Action alternative) in the delivery of stormwater contaminants to fish-bearing streams.

Also, none of the action alternatives would be expected to have significant, unavoidable adverse impacts on tree canopy cover. As discussed in **Section 3.3.3**, the City's current tree protection regulations minimize the potential for development-related loss of tree canopy cover and require mitigation for such tree loss. In addition, the potential for canopy loss due to other factors would be the same under all alternatives.

Finally, as discussed in the analysis of impacts common to all alternatives, encouraging residential and commercial development within the urban environment of Seattle could indirectly benefit tree canopy cover regionally by easing development pressure in less-developed areas outside the city. Increasing density in the city—particularly given the City's requirements for tree protection and replacement—would have fewer adverse impacts than would the conversion of undeveloped parcels in suburban areas to low-density residential uses.

3.4 Energy & Natural Resources



Source: City of Seattle, 2023.

This section addresses the affected environment, impacts to the environment, mitigation measures, and significant unavoidable adverse impacts related to energy and other natural resources for the One Seattle Comprehensive Plan Update.

Thresholds of significance utilized in this impact analysis include:

- Energy usage in excess of projected supply availability.
- Conflict with energy policies adopted by the City of Seattle.

3.4.1 Affected Environment

This section characterizes the affected environment with respect to energy and natural resources for the City of Seattle, beginning with a summary of the major regulations relating to energy and a review of existing energy resources.

Current Policy & Regulatory Framework

Federal

National Energy Conservation Policy Act

The National Energy Conservation Policy Act serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1975, it has been regularly updated and amended by subsequent laws and regulations. Pursuant to the Act, the National Highway Traffic Safety Administration is responsible for establishing additional vehicle standards. In 2012, new fuel economy standards for passenger cars and light trucks were approved for model years 2017 through 2021 (77 Federal Register [FR] §§62624–63200). Fuel economy is determined based on each manufacturer's average fuel economy for the fleet of vehicles available for sale in the United States.

Energy Policy Act of 2005

The Energy Policy Act of 2005 seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under this Act, consumers and businesses can obtain federal tax credits for purchasing fuel-efficient appliances and products, including buying hybrid vehicles, building energy-efficient buildings, and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

Regional Plans & Regulations

The Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act) (16 U.S. Code [U.S.C.] Chapter 12H; Public Law No. 96-501) was passed in 1980 and amended in 1996-97. The intent of the law is to promote and support:

- Conservation and efficiency in the use of electrical power
- Development of renewable resources within the Pacific Northwest
- Adequate, efficient, economical, and reliable power supplies for the region
- Orderly planning for regional power systems
- Development of regional plans and programs related to energy conservation, renewable resources; and protection, mitigation, and enhancement of fish and wildlife resources

This law includes specific requirements for utilities to undertake energy conservation programs, pay for mitigation of impacts caused by power transmission and distribution, and develop renewable resources as part of their overall resource mix. It also established the Northwest Power Planning Council (NPPC) as the regional planning agency for Idaho, Montana, Oregon, and Washington. The NPPC goals, as defined by the Northwest Power Act, are to work cooperatively with the states to manage the hydroelectric generating capacity and natural resources of the Columbia River Basin as well as other regional energy systems.

The NPPC's energy planning for the region is guided by the *Northwest Conservation and Electric Power Plan*, now in its eighth revision, which was updated in 2021 (NPCC, 2022). The plan includes detailed recommendations and strategies for furthering already active conservation programs by state and local governments, for ensuring research and development (as well as implementation and funding) of renewable energy resources, and for protecting the environment from impacts associated with electric power generation.

State Regulations

The Washington State Energy Code (Chapter 19.27A RCW) was adopted in 1990. Its intent was to establish building standards that bring about the common use of energy-efficient building methods and to assure that such methods remain economically feasible and affordable.

The energy code is designed to require new buildings to meet a specified level of energy efficiency while allowing flexibility in building design, construction, and heating equipment efficiencies within that framework. The standards of the energy code primarily dictate requirements for building insulation and in a 2022 update, now include the use of all-electric space and water heating in new commercial and multifamily construction.

Local Regulations & Policies

City of Seattle Energy Code

Seattle's building and energy codes include energy-efficiency standards for residential and nonresidential buildings. Similar to state regulations, these standards also dictate requirements for building insulation and fuel efficiency for heat sources. Under state law, all local jurisdictions must adopt the requirements of the Washington State Energy Code, although the code allows for local standards to prevail if they are more restrictive than the state standards.

The 2021 update to the 2018 Seattle Building Code is effective beginning July 1, 2023. Updates apply to commercial and large multifamily buildings (4+ stories) and include the elimination of gas and most electric resistance space heating systems, eliminates gas water heating in large multifamily buildings and hotels, improves building exteriors to improve energy efficiency and comfort, creates more opportunity for solar power, and requires electrical infrastructure necessary for future conversion of any gas appliances in multifamily buildings (City of Seattle, 2021).

Seattle Climate Action Plan

The 2013 Seattle Climate Action plan laid groundwork for buildings emissions targets for 2030 (City of Seattle, 2013). This included target distinctions between building types. Commercial buildings have a goal of 45% reduction in CO_2e emissions and a 10% reduction in energy use by 2030 as compared to 2008 baseline emissions. Residential buildings have similar goals, with a 32% reduction in CO_2e and 20% reduction in energy use by 2030. For both combined commercial and residential, greenhouse gas intensity, measured in $MTCO_2e$ per British Thermal Unit (BTU) have a reduction target of 25% by 2030. For multifamily residential and commercial buildings, there is also the target for 50% of permitted new construction projects achieve one of the following green building standards by 2025: Living Building Challenge, Built Green, LEED, Evergreen Sustainable Development Standard, or Passive House.

The 2018 updated climate action strategy offered additional measures, such as the goal of buildings to be carbon neutral by 2050 (City of Seattle, 2018). The Seattle City Council also enacted the Green New Deal Resolution which calls for a Seattle free of climate pollutants by 2030 (City of Seattle, 2022). See **Section 3.2 Air Quality & GHG Emissions** for more detail.

Building Tune-Ups

A key piece of the Seattle Climate Action Plan is the Tune-Ups legislation (Seattle Municipal Code 22.930), adopted March 2016. Through building tune-ups, energy and water performance can be optimized by identifying low- or no-cost actions related to building operations and maintenance. Examples of operation tune-ups to an existing building include changes to thermostat set points or adjusting lighting or irrigation schedules. Tune-ups also review HVAC, lighting, and water systems to identify needed maintenance, cleaning, or repairs. On average, building tune-ups can generate 10 to 15% savings in energy costs (City of Seattle, 2023). Tune-ups are required every five years for commercial buildings 50,000 square feet or larger.

Building Emissions Performance Standards

Existing buildings must meet building performance standards (BPS) over time to improve energy efficiency and reduce climate impacts. Seattle has recently enacted legislation to create a Building Emissions Performance Standard (BEPS)for existing commercial and multifamily buildings larger than 20,000 square feet (City of Seattle, 2023). This Building Emissions Performance Standard (BEPS) includes standard greenhouse gas intensity targets (GHGITs) for different building activity types (e.g., office, retail, multifamily) for each compliance interval until net-zero emissions targets in 2050 (City of Seattle, 2023). The BEPS sets required GHGITs through 2035 and provisional targets from 2036-2050 to enable owners to plan, while allowing the later targets to be revised, if needed, by future rules updates.

Energy Benchmarking

Buildings account for more than one third of Seattle's core greenhouse gas emissions (City of Seattle, 2023). Owners of non-residential and multifamily buildings (20,000 square feet or larger) are required to track energy performance and report annually to the City of Seattle pursuant to Seattle's Energy Benchmarking Law (Seattle Municipal Code 22.920). Through this tracking and reporting program, inefficiencies and opportunities to reduce energy waste and emissions are highlighted. Other benefits of benchmarking include:

- Shows how buildings are used—and wasting—energy.
- Helps businesses and consumers make more informed decisions that take energy costs into account when buying or renting property.
- Lowers energy costs, reduces greenhouse gas impacts, and creating jobs in the energy services and construction trades.
- Establishes energy performance ranges for Seattle building types based on their reported energy use.
- Allows the City of Seattle to track its energy reduction goals and target incentive dollars by market sector.

Regional Availability of Energy

Transportation Energy

Refined petroleum products such as gasoline and diesel are used primarily for transportation purposes. Approximately 54% of petroleum resources delivered to the State of Washington refineries are from domestic crude oil (primarily Alaska) and approximately 30% is imported from Canada with Canadian supplies making up for declines in supply from Alaska (Washington Department of Commerce, 2013). The production and pricing of petroleum products is driven by global demand and consumption. Unpredictable events such as the state of the global financial system, political turmoil, and refinery and pipeline accidents can affect production and pricing.

Seattle City Light

Seattle City Light (SCL) is one of the nation's largest municipally owned utilities serving more than 420,000 homes and 49,000 businesses throughout Seattle, Shoreline, Lake Forest Park, Burien, Renton, Tukwila, SeaTac, Normandy Park, and Unincorporated King County (Seattle City Light, 2023a).

SCL owns seven hydroelectric facilities in Washington and delivers electricity through a network of approximately 2,330 miles of distribution circuit and 16 major substations (Seattle City Light, 2023b). Power resources consist of 90% hydropower with approximately half of which is supplied by facilities owned by Seattle City Light. The remaining is purchased from the Bonneville Power Administration (BPA) (Seattle City Light, 2022). The Integrated Resource Plan (IRP) anticipates baseline load forecasts for the next 10 years to be an increase of approximately 0.5% per year. A rapid electrification scenario was considered, based on the Electric Power Research Institute's 2022 Electrification Assessment, which has the load increase by 32% compared to the baseline scenario. To account for this, a top portfolio plan of new resource additions was created. Long term demand during summer peaks when hydroelectric resources run low is met through solar energy from eastern Washington and Oregon.

The 2022 IRP also outlines the need to pursue acquisition of additional resources such as local commercial or community solar projects that will diversify sources of weather-dependent generation and transmission uncertainty, offshore and Montana wind in the 2030s with winter peaking generation profiles to help meet expected increases in seasonal demand and demand response programs, which will help the utility manage short-term peaks in electricity demand.

Anticipated increases in winter peak demands due to electrification (reduced use of natural gas for heating) combined with an increasing frequency of weather extremes associated with climate change additional resources such as batteries, hydrogen, geothermal, small modular/advanced nuclear, etc., could be considered to maintain current levels of grid reliability.

Puget Sound Energy

Puget Sound Energy (PSE) is Washington state's oldest local energy company and serves approximately 900,000 natural gas customers in 6 counties (PSE, 2023b). These include parts of King (not Enumclaw), Kittitas (not Ellensburg), Lewis, Pierce, Snohomish, and Thurston counties.

PSE controls its gas-supply costs by acquiring gas, under contract, from a variety of gas producers and suppliers across the western United States and Canada. About half the gas is obtained from producers and marketers in British Columbia and Alberta, and the rest comes from Rocky Mountain states. Once PSE takes possession of the gas, it is distributed to customers through more than 26,000 miles of gas mains and service lines (PSE, 2023a).

Energy Usage

Building Energy

Energy usage is typically quantified using Btu. Development within the City of Seattle under all alternatives will primarily be comprised of commercial, industrial, and residential. Energy consumption of these land use types is by the energy use intensity (EUI), which is defined as a building's energy use as a function of its size or other characteristics and is measured by thousand Btu per square foot (kBtu/sf). The lower the EUI, the better the energy performance of a building. As discussed above, owners of non-residential and multifamily buildings (20,000 square feet or larger) are required to track energy performance and report annually to the City of Seattle pursuant to Seattle's Energy Benchmarking Law (Seattle Municipal Code 22.920). **Exhibit 3.4-1** lists the median EUI by land use type based on 2020 benchmarking data.

Exhibit 3.4-1. Energy Usage by Land Use, Excluding Single Family

Land Use Type	Building EUI (kBTU/sf)
Laboratory	197.2
Hospital	191.8
Supermarket/Grocery Store	183.6
Restaurant	150.8
Medical Office	73.9
College/University	73.4
Other	62.7
Mixed Use Property	56.3
Hotel	48.7
High-Rise Multifamily	44.6
Large Office	43.2
Retail Store	43.2
Small- and Mid-Sized Office	42
Refrigerated Warehouse	37.8
Residence Hall/Dormitory	35.7
Mid-Rise Multifamily	33.1
K-12 School	32.9
Low-Rise Multifamily	29.8
Worship Facility	29.8
Non-Refrigerated Warehouse	29.2
Distribution Center	24.5
Self-Storage Facility	11.8

Source: City of Seattle, 2020.

Total energy usage in Washington was 1,779.4 trillion Btu in 2020 (U.S. EIA, 2020). Electricity and natural gas in Washington are generally consumed by stationary users such as residences, commercial, and industrial facilities, whereas petroleum consumption is generally accounted for by transportation-related energy use. The electricity and natural gas consumption attributable to the State is provided by the U.S. Energy Information Administration (U.S. EIA) data. In the year 2020, Washington State consumed approximately 1,779 trillion btu of electricity (U.S. EIA, 2020a) and approximately 339 trillion btu of natural gas (U.S. EIA, 2023).

Automotive Fuel

Automotive fuel consumption for all on-road transportation in the State of Washington provided by the U.S. Energy Information Administration (U.S. EIA) data. According to the U.S. EIA, the State of Washington consumed approximately 258.2 trillion Btu of motor gasoline, 150 trillion Btu of diesel, 0.1 trillion Btu of natural gas (for motor fuel), and 20.3 trillion Btu of fuel ethanol in 2020 (U.S. EIA, 2020a and U.S. EIA, 2023).

Federal programs are mandating improved fuel economy for passenger cars and light trucks. Transportation-related emissions in 2044 would be lower as compared to existing conditions due to improvements in fuel economy. The National Highway Traffic and Safety Administration (NHTSA) is responsible for establishing vehicle standards and for revising existing standards. Compliance with Federal fuel economy standards is not determined for each individual vehicle model. Rather, compliance is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. On March 31, 2022, the NHTSA finalized their Corporate Average Fuel Economy (CAFÉ) standards for model years 2024 to 2026. The final rule requires an industry-wide fuel average of approximately 49 miles per gallon (mpg) for passenger cars and light trucks in model year 2026 by increasing fuel efficiency by 8% annually for model years 2024 and 2025 and 10% for model year 2026 (NHTSA, 2023).

Washington State adopted a new rule in December 2022 that requires new ZEV sales of passenger cars, light-duty trucks, and medium-duty vehicles to 100% starting in 2035. ZEVs do not require diesel, gasoline, natural gas, or ethanol. Progress toward 100% ZEV sales in 2035 would increase the rate of registration of ZEVs in Seattle, resulting in reduced automotive fuel consumption and the need for charging infrastructure.

3.4.2 Impacts

Impacts Common to All Alternatives

Construction Impacts

Future growth under any alternative would result in development of new residential, retail, light industrial, office, and commercial use. Construction of future development within the City would result in the consumption of energy in two general forms: (1) the fuel energy consumed by construction vehicles and equipment; and (2) bound energy in construction materials, such as asphalt, steel, concrete, pipes, and manufactured or processed materials such as lumber and glass.

Fossil fuels for construction vehicles and other energy-consuming equipment would be used. Fuel energy consumed during construction would be temporary in nature and would not represent a significant demand on energy resources. Some incidental energy conservation would occur during construction through compliance with engine emissions standards implemented by the United States Environmental Protection Agency (EPA).

Substantial reductions in energy inputs for construction materials can be achieved by selecting building materials composed of recycled materials that require substantially less energy to produce than non-recycled materials. The incremental increase in the use of energy bound in construction materials would not substantially increase demand for energy compared to overall local and regional demand for construction materials. It is reasonable to assume that production of building materials would employ all reasonable energy conservation practices in the interest of minimizing the cost of doing business.

Operational Impacts

Transportation Energy Demand

As discussed in **Section 3.2 Air Quality & GHG Emissions**, mobile emissions were estimated using the EPA's Motor Vehicle Emission Simulator (MOVES) model. The MOVES model defaults include assumptions for vehicle fuel type including gasoline, diesel, compressed natural gas (CNG), and ethanol. Projected vehicle miles traveled (VMT) by passenger vehicles, trucks, and buses were used to estimate annual transportation energy usage.

A mix of land uses is associated with reduced VMT (WSDOT, 2013). Diversity in land uses combined with increased density within an urban area can lead to shorter trip distances and greater use of walking, as well as the reduced need for vehicle ownership. Accessibility to a variety of trip purposes, as in mixed use developments, may induce additional trips; however, these trips are shorter and are more likely to be made by walking than trips in areas where mixed land uses are not available. Travel demand models include findings about projected VMT in future years for various classes of vehicles (e.g., cars, trucks, buses). The model generally

assumes continuation of current economic and demographic trends, with minor shifts toward shorter trips and more trips made by modes other than automobile travel. Improvements in fuel efficiency combined with reductions in VMT would contribute to reductions in transportation fuel demand on a per capita basis.

Exhibit 3.4-2 summarizes VMT associated with each alternative. See **Exhibit 3.4-3** for a comparison of annual fuel usage for existing, Alternative 1, Alternative 2, Alternative 3, and Alternative 5 in units of trillion British Thermal Units (Btu). The difference between Existing and Alternative 1 (no action) is the increase in annual vehicle miles traveled over the 20-year planning horizon.

Exhibit 3.4-2. Annual Vehicle Miles Traveled by Alternative

	Existing	Alternative 1	Alternative 2	Alternative 3	Alternative 4*	Alternative 5
Cars	20,332,000	22,213,000	22,532,000	22,382,000	22,532,000	22,920,000
Trucks	1,871,300	2,144,100	2,166,900	2,211,100	2,166,900	2,202,100
Buses	68,930	77,150	77,140	77,140	77,140	77,140
Total VMT**	**22,272,230**	**24,434,250**	**24,776,040**	**24,670,240**	**24,776,040**	**25,199,240**

* Traffic data is not available for Alternative 4 because the projected VMT would fall between Alternative 2 and Alternative 3. For purposes of the analysis, it has been assumed that Alternative 4 VMT is equivalent to Alternative 2, which is higher than Alternative 3.
VMT in **Section 1.6.10 and **Section 3.10 Transportation** excludes buses.
Source: Fehr & Peers, 2023.

Exhibit 3.4-3. Annual Transportation Fuel Usage (Trillion Btu)

	Existing	Alternative 1	Alternative 2	Alternative 3	Alternative 4*	Alternative 5
Gasoline	0.3471	0.34	0.35	0.35	0.35	0.36
Diesel	0.0141	0.02	0.02	0.02	0.02	0.02
CNG	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002
Ethanol	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007

* Traffic data is not available for Alternative 4 because the projected VMT would fall between Alternative 2 and Alternative 3. For purposes of the analysis, it has been assumed that Alternative 4 VMT is equivalent to Alternative 2, which is higher than Alternative 3.
Source: Kimley-Horn, 2023.

Building Energy Demand

Increases in development would increase population and employment in the City of Seattle and would increase energy consumption. Development within the City of Seattle under all alternatives will primarily be comprised of commercial, industrial, and residential. All new development or redevelopment would be designed and constructed to meet the applicable state and City building and energy conservative code requirements which would reduce energy consumption as

compared to prior structures which likely used more energy consumption on a pro rata basis. A mixture of newer and older development would likely be more energy efficient than existing development, based on changes to building codes, innovations in building and technologies, and compliance with City energy conservation measures such as regular building tune-ups.

Residential energy demand for each alternative has been estimated based on EIA annual end-use consumption data for various housing types in the western United States (U.S. EIA, 2015).

All-electric space and water heating is required by the 2022 Washington Energy Code. According to household end-use consumption data, approximately 13% of natural gas consumption in residential uses is for purposes other than space and water heating (U.S. EIA, 2015). Natural gas consumption from new building square footage due to target growth under each alternative is summarized in **Exhibit 3.4-5**. See **Appendix E** for detailed calculations and assumptions.

Non-residential consumption has been estimated based on 2020 data on building energy benchmarking for industrial and commercial uses (all non-industrial uses have been assumed to be commercial) (City of Seattle, 2020). Based on benchmark data, it is assumed that commercial uses would consume approximately 47.1 kBtu/SF of electricity and 16.6 kBtu/SF of natural gas and industrial uses would consume approximately 20.8 kBtu/SF of electricity and 10.4 kBtu/SF of natural gas. Estimated increases in electricity usage from new building square footage due to target growth under each alternative is summarized in **Exhibit 3.4-4**. Compared to existing energy per capita energy usage of 0.0002 trillion Btu electricity and 0.00004 trillion Btu natural gas per capita in the State, per capita energy demand of all alternatives would be lower.[15] See **Appendix E** for detailed calculations and assumptions.

Exhibit 3.4-4. Increase in Building Energy Demand—Electricity (trillion Btu)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Residential	1.29	1.58	1.64	1.61	1.91
Commercial	1.56	1.56	1.56	1.56	1.56
Industrial	0.37	0.37	0.37	0.37	0.37
Total Demand	3.22	3.51	3.58	3.54	3.84
Percent of Statewide Consumption	0.18%	0.20%	0.20%	0.20%	0.22%
Per Capita Electricity Demand*	**0.000020**	**0.000017**	**0.000017**	**0.000017**	**0.000016**

* Per capita demand based on projected population increase.
Source: Kimley-Horn, 2023.

[15] Statewide per capita energy demand calculated based on U.S. EIA consumption data (2020) and 2020 Census population estimates.

Exhibit 3.4-5. Building Energy Demand—Natural Gas (trillion Btu)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Residential	0.17	0.21	0.21	0.21	0.25
Commercial	0.55	0.55	0.55	0.55	0.55
Industrial	0.18	0.18	0.18	0.18	0.18
Total Demand	0.90	0.94	0.95	0.94	0.98
Percent of Statewide Consumption	0.27%	0.28%	0.28%	0.28%	0.29%
Per Capita Natural Gas Demand*	**0.0000055**	**0.0000046**	**0.0000046**	**0.0000046**	**0.0000040**

* Per capita demand based on projected population increase.
Source: Kimley-Horn, 2023.

All future development would be required to adhere to energy efficiency standards combined with increased efficiency through performance requirements fostered by the Climate Action Plan and all-electric space and water heating required by the 2022 Washington Energy Code.

Equity & Climate Vulnerability Considerations

Based on the City's Climate Change Vulnerability Assessment (2023), the effect of climate change on buildings and energy and the community include energy supply disruptions, electricity transmission damage and interruptions, and energy demand increases. Some highlights of potential effects include:

- Seattle has a relatively higher percentage of households without air conditioning (46%), and the lack of cooling capacity could affect residents particularly in older buildings. As new buildings are constructed, measures to promote building and site design that promote passive cooling may be appropriate. All alternatives have this potential to address cooling needs with Alternative 1 having lower numbers of dwellings than Alternatives 2-4 and Alternative 5 the most.
- Extreme heat events will create increased energy demand for cooling while decreasing capacity and efficiency of energy systems as transmission lines and substations are stressed.
  - Energy demand from buildings is lowest under Alternative 1 and greatest under Alternative 5 due to the range of housing growth estimated 80,000 to 120,000 new units. **Exhibit 3.4-4** and **Exhibit 3.4-5**. Among Alternatives 2 through 4 with the same growth of 100,000 new dwellings but different patterns and types of housing, Alternatives 2 and 4 have lower building energy demand with more compact housing types in neighborhood centers and corridors compared to Alternative 3 with more distributed housing in urban neighborhoods.
  - The Climate Change Vulnerability Assessment notes that energy systems in south Seattle are most likely to be affected because this area is more prone to urban heat islands and the impacts of extreme heat. Under all alternatives, there is a potential to modify urban heat islands through the addition or reduction of tree canopy additions. Alternatives 5

and 3 have higher residential growth planned in Area 8 than Alternatives 1, 2, and 4. See **Section 3.3 Plants & Animals**.

- Businesses would be subject to increasing costs for insurance, energy, and materials. Small businesses are more vulnerable to climate change impacts than larger businesses. Businesses would be affected by lost labor hours due to extreme heat events. There may be additional burden on some small businesses that may experience brown outs or demand-driven energy price increase. Downtown in Area 4 has the highest number of small businesses presently. While housing growth in Area 4 is the same across the alternatives the action alternatives assume 15% of jobs would be distributed in proportion to residential growth which would increase retail and services jobs to serve the neighborhoods likely in the form of small businesses. Climate vulnerability strategies to address small businesses could support existing and new businesses in all areas.

Impacts of Alternative 1: No Action

Under Alternative 1 future growth would continue based on continuation of the 2035 Comprehensive Plan, with a target housing growth of 80,000 dwelling units for the planning horizon to 2044. New housing would consist primarily of rental apartments concentrated in existing mixed-use areas. Approximately 46% of housing growth would occur within urban centers, approximately 18% would occur within residential urban villages, approximately 16% would occur within hub urban villages, approximately 3% would occur in manufacturing industrial and maritime industrial areas, and the remaining 17% of growth would occur outside designated villages.

Construction Energy Use

As discussed above, construction of future development would result in the consumption of energy in two general forms: (1) the fuel energy consumed by construction vehicles and equipment; and (2) bound energy in construction materials. Implementation of the project is considered a non-project action. Energy demand associated with future development cannot be determined on a program level as construction activities are project-specific. Therefore, a comparative discussion of construction energy consumption is based on projected housing units demolished and target housing growth under each of the alternatives. Alternative 1 would result in the least amount of demolished housing units and the lowest target growth compared to all other alternatives. Therefore, energy consumption associated with construction vehicles and construction materials would likely be the lowest among all alternatives.

Operational Energy Use

Transportation Energy Use

As shown in **Exhibit 3.4-2**, growth associated with Alternative 1 would generate approximately 24.4 million VMT for cars and trucks and approximately 77,000 VMT for buses. Based on model

outputs, Alternative 1 would require 0.34 trillion Btu of gasoline, 0.02 trillion Btu of diesel, 0.0002 trillion Btu of natural gas, and 0.0006 Btu of ethanol to accommodate projected citywide VMT.

As shown in **Exhibit 3.4-6,** implementation of Alternative 1 would result in a reduction in gasoline and ethanol fuel consumption and an increase in diesel and CNG consumption with regards to transportation fuel compared to existing conditions. Although Alternative 1 would result in an increase in VMT when compared to existing conditions, reductions in fuel consumption are largely due to improvements in fuel efficiency standards and increase electrification. In addition, net fuel consumption associated with Alternative 1 growth would constitute less than 1% of statewide fuel consumption. Therefore, increases in transportation energy associated with Alternative 1 implementation would not result in consumption of energy in excess of projected supply availability.

Exhibit 3.4-6. Net Annual Transportation Fuel Usage—Alternative 1 (Trillion Btu)

	Existing	Alternative 1	Net Change in Fuel Consumption	% of Statewide (2020) Consumption
Gasoline	0.3471	0.3381	-0.0090	-0.003%
Diesel	0.0141	0.0202	0.0065	0.004%
CNG	0.0001	0.0002	0.0001	0.448%
Ethanol	0.0006	0.0006	-0.0013	-0.006%

Source: Kimley-Horn, 2023

Building Energy Use

As discussed above, a total of 1,779.4 trillion Btu of electricity was consumed statewide in 2020. A total of 3.22 trillion Btu per year will be required to serve the target housing and employment growth under Alternative 1 on an annual basis. This constitutes approximately 0.18% of statewide usage in 2020, which is nominal compared to existing statewide demand. Therefore, increases in electricity consumption associated with Alternative 1 implementation would not result in consumption of energy in excess of supply availability and would result in a less than moderate impact.

As discussed above, a total of 339.3 trillion Btu of natural gas was consumed statewide in 2020. A total of 0.90 trillion Btu per year will be required to serve the target housing and employment growth under Alternative 1. This constitutes approximately 0.27% of statewide usage, which is nominal compared to existing statewide demand. Therefore, increases in natural gas consumption associated with Alternative 1 implementation would not result in consumption of energy in excess of supply availability and would result in a less than moderate impact.

130th/145th Station Area

Under Alternative 1, zoning designations would be retained within the 130th/145th Station Area and no new areas will be designated for mixed-use or higher density than exists under existing

conditions. The future light rail station at 130th would be developed in an area that would allow three-story single-purpose residential development and four- to eight-story multifamily in the land surrounding the future 145th BRT Station. Implementation of Alternative 1 assumes a growth potential of 840 housing units and 716 jobs, requiring approximately 0.02 trillion Btu of electricity and 0.005 trillion Btu of natural gas per year. This constitutes approximately 0.001% and 0.001% of statewide electricity and natural gas usage, respectively. Therefore, impacts on supply availability related to existing conditions would be nominal.

Impacts of Alternative 2: Focused

Under Alternative 2, areas of focused growth called neighborhood centers would create more housing around shops and services, allowing for a wide range of housing types. The target housing growth under this alternative is 100,000 dwelling units. Approximately 37% of housing growth would occur within regional centers, approximately 24% would occur within neighborhood centers, 15% would occur within residential urban center, 13% would occur within hub urban center, 2% would occur within manufacturing industrial and maritime industrial, and 9% would occur outside designated villages.

Construction Energy Use

Alternative 2 would result in a greater number of demolished housing units compared to Alternative 1 and less than Alternative 3, 4, and 5. Alternative 2 would result in greater target growth compared to Alternative 1, the same as Alternative 3 and 4, and less than Alternative 5. Therefore, energy consumption associated with construction vehicles and construction materials under Alternative 2 would likely be greater than Alternative 1 and lower than Alternative 3, 4, and 5.

Operational Energy Use

Transportation Energy Use

As shown in **Exhibit 3.4-2**, growth associated with Alternative 2 would generate approximately 24.7 million VMT for cars and trucks and approximately 77,000 VMT for buses. Based on model outputs, Alternative 2 would require 0.35 trillion Btu of gasoline, 0.02 trillion Btu of diesel, 0.0002 trillion Btu of natural gas, and 0.0006 Btu of ethanol to accommodate projected VMT. Demand for Alternative 2 would be slightly higher than Alternative 1.

As shown in **Exhibit 3.4-7,** implementation of Alternative 2 would result in a reduction in ethanol fuel consumption and an increase in gasoline, diesel, and CNG consumption compared to existing conditions. Although Alternative 2 would result in an increase in VMT when compared to existing conditions and Alternative 1, increases in fuel consumption compared to Alternative 1 would be similar largely due to improvements in fuel efficiency standards and increase electrification. In addition, net fuel consumption associated with Alternative 2 growth

would constitute less than 1% of statewide fuel consumption. Therefore, increases in transportation energy associated with Alternative 2 implementation would not result in consumption of energy in excess of projected supply availability.

Exhibit 3.4-7. Net Annual Transportation Fuel Usage—Alternative 2 (Trillion Btu)

	Existing	Alternative 2	Net Change in Fuel Consumption	% of Statewide (2020) Consumption
Gasoline	0.3471	0.3478	0.0007	0.0003%
Diesel	0.0141	0.0207	0.0065	0.004%
CNG	0.0001	0.0002	0.00005	0.464%
Ethanol	0.0006	0.0006	-0.0013	-0.008%

Source: Kimley-Horn, 2023.

Building Energy Use

As discussed above, a total of 1,779.4 trillion Btu of electricity was consumed statewide in 2020. A total of 3.51 trillion Btu per year will be required to serve the target housing and employment growth under Alternative 2. This constitutes approximately 0.20% of statewide usage, which is nominal compared to existing demand. Although growth targets between Alternative 2, 3, and 4 would be the same, variations in housing unit type are associated with differing consumption factors. Although impacts on supply availability related to Alternative 2 would be slightly higher than Alternative 1, increases in electricity consumption associated with Alternative 2 implementation would not result in consumption of energy in excess of supply availability and would result in a less than moderate impact.

As discussed above, a total of 339.3 trillion Btu of natural gas was consumed statewide in 2020. A total of 0.94 trillion Btu per year will be required to serve the target housing and employment growth under Alternative 2. This constitutes approximately 0.28% of statewide usage, which although slightly greater than Alternative 1, is nominal compared to existing demand. Therefore, increases in natural gas consumption associated with Alternative 2 implementation would not result in consumption of energy in excess of supply availability and would result in a less than moderate impact.

130th/145th Station Area

Under Alternative 2, changes in land use designations focus on addressing transit-oriented developments, designating the station areas as neighborhood centers. Growth would be clustered in small mixed-use nodes near transit, resulting in denser and taller buildings with heights of up to 80 feet. The Station Area's share of the Alternative 2 housing growth target is approximately 2.2%.

Implementation of Alternative 2 assumes a growth potential of 2,208 housing units and 979 jobs, requiring approximately 0.05 trillion Btu of electricity and 0.009 trillion Btu per year of natural gas. This constitutes approximately 0.003% and 0.003% of statewide electricity and natural gas

usage, respectively, which are more than double the requirements of Alternative 1. However, impacts on supply availability in comparison with existing conditions would be nominal.

Impacts of Alternative 3: Broad

Under Alternative 3, a wider range of low-scale housing options in urban neighborhood areas would be allowed, expanding housing choices and allowing housing options near existing parks and other amenities. The target housing growth under this alternative is 100,000 dwelling units. Approximately 37% of housing growth would occur within regional centers, approximately 22% would occur within urban neighborhood areas, 15% would occur within residential urban centers, 13% would occur within hub urban centers, 2% would occur within manufacturing industrial and maritime industrial, and 11% would occur outside of designated villages.

Construction Energy Use

Alternative 3 would result in the greatest number of demolished units when compared to all other alternatives. Alternative 3 would result in greater target growth compared to Alternative 1, the same as Alternative 2 and 4, and less than Alternative 5. Although Alternative 3 would result in 763 greater demolished units than Alternative 5, target growth for Alternative 3 includes 20,000 fewer units. Therefore, energy consumption associated with construction vehicles and construction materials under Alternative 3 would likely be greater than Alternative 1, 2, and 4, and lower than Alternative 5.

Operational Energy Use

Transportation Energy Use

As shown in **Exhibit 3.4-2**, growth associated with Alternative 3 would generate approximately 24.6 million VMT for cars and trucks and approximately 77,000 VMT for buses. Based on model outputs, Alternative 2 would require 0.35 trillion Btu of gasoline, 0.02 trillion Btu of diesel, 0.0002 trillion Btu of natural gas, and 0.0006 Btu of ethanol to accommodate projected VMT. Demand for Alternative 3 would be similar to Alternative 2 for all fuel types and slightly higher than demand under Alternative 1.

As shown in **Exhibit 3.4-8,** implementation of Alternative 3 would result in a reduction in ethanol fuel consumption and an increase in gasoline, diesel, and CNG consumption compared to existing conditions. Although Alternative 3 would result in greater VMT when compared to existing conditions and Alternative 1 and lower VMT when compared to Alternative 2, increases in fuel consumption compared to Alternative 1 and 2 would be similar largely due to improvements in fuel efficiency standards and increase electrification. In addition, net fuel consumption associated with Alternative 3 growth would constitute less than 1% of statewide fuel consumption. Therefore, increases in transportation energy associated with Alternative 3 implementation would not result in consumption of energy in excess of projected supply availability.

Exhibit 3.4-8. Net Annual Transportation Fuel Usage—Alternative 3 (Trillion Btu)

	Existing	Alternative 3	Net Change in Fuel Consumption	% of Statewide (2020) Consumption
Gasoline	0.3471	0.3477	0.0006	0.0003%
Diesel	0.0141	0.0207	0.0065	0.0044%
CNG	0.0001	0.0002	0.00005	0.4644%
Ethanol	0.0006	0.0006	-0.0013	-0.0063%

Source: Kimley-Horn, 2023.

Building Energy Use

As discussed above, a total of 1,779.4 trillion Btu of electricity was consumed statewide in 2020. A total of 3.58 trillion Btu per year will be required to serve the target housing and employment growth under Alternative 3. This constitutes approximately 0.20% of statewide usage, which is nominal compared to existing demand. Although growth targets between Alternative 2, 3, and 4 would be the same, variations in housing unit type are associated with differing consumption factors. Although impacts on supply availability related to Alternative 3 would be slightly higher than Alternative 1, 2, and 4, increases in electricity consumption would not result in consumption of energy in excess of supply availability and would result in a less than moderate impact.

As discussed above, a total of 339.3 trillion Btu of natural gas was consumed statewide in 2020. A total of 0.95 trillion Btu per year will be required to serve the target and employment growth under Alternative 3. This constitutes approximately 0.28% of statewide usage, which is nominal compared to existing demand. Although impacts on supply availability related to Alternative 3 would be slightly higher than Alternative 1, 2, and 4, increases in natural gas consumption would not result in consumption of energy in excess of supply availability and would result in a less than moderate impact.

130th/145th Station Area

The station area plan would not be implemented under Alternative 3; the area would grow based on the applicable citywide place types.

Impacts of Alternative 4: Corridor

Alternative 4 would accommodate a wider range of housing options only in corridors to focus growth near transit and amenities. The target housing growth under this alternative is 100,000 dwelling units. Approximately 37% of housing growth would occur within regional centers, approximately 21% would occur within urban neighborhood-corridor areas, 15% would be within residential urban centers, 13% would be within hub urban centers, 2% would be within

manufacturing industrial and maritime industrial areas, and 12% would be outside of designated villages.

Construction Energy Use

Alternative 4 would result in the demolition of a greater number of housing units than Alternative 1 and 2 and less than Alternatives 3 and 5. Alternative 4 would result in greater target growth compared to Alternative 1, the same as Alternative 2 and 3, and less than Alternative 5. Therefore, energy consumption associated with construction vehicles and construction materials under Alternative 4 would likely be greater than Alternative 1 and 2 and lower than Alternative 3 and 5.

Operational Energy Use

Transportation Energy Use

As discussed above, VMT data was not generated for Alternative 4. Growth targets under Alternative 2, 3, and 4 are the same with respect to the number of housing units and jobs. Therefore, it has been assumed that VMT for Alternative 4 would generally be between VMT of Alternative 2 and 3. Demand for Alternative 2 and Alternative 3 would be similar for all fuel types except ethanol. Ethanol demand under Alternative 3 would be slightly higher than Alternative 2. Impacts on supply availability related to Alternative 4 would be similar to Alternative 2 and Alternative 3.

Building Energy Use

As discussed above, a total of 1,779.4 trillion Btu of electricity was consumed statewide in 2020. A total of 3.54 trillion Btu per year will be required to serve the target housing and employment growth under Alternative 4. This constitutes approximately 0.20% of statewide usage, which is nominal compared to existing demand. Demand associated with Alternative 4 would be less than Alternative 3 and 5, the same as Alternative 2, and greater than Alternative 1. Although impacts on supply availability related to Alternative 4 would be slightly higher than Alternative 1, increases in electricity consumption would not result in consumption of energy in excess of supply availability and would result in a less than moderate impact.

As discussed above, a total of 339.3 trillion Btu of natural gas was consumed statewide in 2020. A total of 0.94 trillion Btu per year will be required to serve the target housing and employment growth under Alternative 4. This constitutes approximately 0.28% of statewide usage, which is nominal compared to existing demand. Demand associated with Alternative 4 would be less than Alternative 3 and 5, the same as Alternative 2, and greater than Alternative 1. Although impacts on supply availability related to Alternative 4 would be slightly higher than Alternative 1, increases in natural gas consumption would not result in consumption of energy in excess of supply availability and would result in a less than moderate impact.

130th/145th Station Area

The station area plan would not be implemented under Alternative 4; the area would grow based on the applicable citywide place types.

Impacts of Alternative 5: Combined

Alternative 5 anticipates the largest increase in supply and diversity of housing units within the City. In addition to the growth strategies of Alternatives 2, 3, and 4, Alternative 5 would promote a greater range of rental and ownership housing and address past underproduction of housing and rising housing costs. The target housing growth under this alternative is 120,000 dwelling units. While most housing would continue to be in regional centers (36% of housing growth) and urban centers (19% of housing growth), the combined growth in neighborhood centers and urban neighborhood–corridors would be substantial (24%).

Construction Energy Use

Alternative 5 would result in a greater number of demolished units than Alternative 1, 2, and 4 and less than Alternative 3. Alternative 5 would result in the greatest target growth compared to all other alternatives. Therefore, energy consumption associated with construction vehicles and construction materials under Alternative 5 would likely be the greatest out of all five alternatives.

Operational Energy Use

Transportation Energy Use

As shown in **Exhibit 3.4-2**, growth associated with Alternative 5 would generate approximately 25.1 million VMT for cars and trucks and approximately 77,000 VMT for buses. Based on model outputs, Alternative 2 would require 0.36 trillion Btu of gasoline, 0.02 trillion Btu of diesel, 0.0002 trillion Btu of natural gas, and 0.0007 Btu of ethanol to accommodate projected VMT. Out of all five alternatives, demand for all fuel types would be the greatest under Alternative 5.

As shown in **Exhibit 3.4-9,** implementation of Alternative 5 would result in a reduction in ethanol fuel consumption and an increase in gasoline, diesel, and CNG consumption compared to existing conditions. As Alternative 5 would result in greater VMT when compared to existing conditions and all other alternatives, increases in fuel consumption would be slightly higher largely due to improvements in fuel efficiency standards, increase electrification, and increased densities resulting in reduced VMT per capita. In addition, net fuel consumption associated with Alternative 5 growth would constitute less than 1% of statewide fuel consumption. Therefore, increases in transportation energy associated with Alternative 5 implementation would not result in consumption of energy in excess of projected supply availability.

Exhibit 3.4-9. Net Annual Transportation Fuel Usage—Alternative 3 (Trillion Btu)

	Existing	Alternative 5	Net Change in Fuel Consumption	% of Statewide (2020) Consumption
Gasoline	0.3471	0.3596	0.0125	0.0048%
Diesel	0.0141	0.0212	0.0071	0.0047%
CNG	0.0001	0.0002	0.00005	0.4734%
Ethanol	0.0006	0.0007	-0.0013	-0.0064%

Source: Kimley-Horn, 2023.

Building Energy Use

As discussed above, a total of 1,779.4 trillion Btu of electricity was consumed statewide in 2020. A total of 3.84 trillion Btu per year will be required to serve the target housing and employment growth under Alternative 5. This constitutes approximately 0.22% of statewide usage, which is nominal compared to existing demand. Although impacts on supply availability related to Alternative 5 would be greater than Alternatives 1 through 4, increases in electricity consumption associated with Alternative 5 implementation would not result in consumption of energy in excess of supply availability and would result in a less than moderate impact.

As discussed above, a total of 339.3 trillion Btu of natural gas was consumed statewide in 2020. A total of 0.98 trillion Btu per year will be required to serve the target housing and employment growth under Alternative 5. This constitutes approximately 0.29% of statewide usage, which is nominal compared to existing demand although impacts on supply availability related to Alternative 5 would be greater than Alternatives 1 through 4, increases in natural gas consumption associated with Alternative 5 implementation would not result in consumption of energy in excess of supply availability and would result in less than moderate impact.

130th/145th Station Area

Under Alternative 5, an urban centers designation on both the west and east sides of the 130th Station Area would merge with an existing commercial node to expand residential mixed use near the station. Growth would be accommodated in more mixed-use buildings, providing greater housing types in buildings with heights of up to 95 feet. The Station Area's share of the Alternative 5 housing growth target is approximately 2.2%.

Implementation of Alternative 5 assumes a growth potential of 2,703 housing units and 1,004 jobs, requiring approximately 0.05 trillion Btu of electricity and 0.01 trillion Btu of natural gas per year. This constitutes approximately 0.003% and 0.003% of statewide electricity and natural gas usage, respectively. Energy requirements under this alternative would be slightly higher than Alternative 2 and impacts on supply availability in comparison with Alternative 2 would be nominal.

3.4.3 Mitigation Measures

Incorporated Plan Features

- Land Use and Transportation: Diversity in land uses combined with increased density within an urban area can lead to shorter trip distances and greater reliance on walking or mass transit trips, as well as the reduced need for vehicle ownership. Regardless of which alternative is chosen, implementation of the Seattle Comprehensive Plan would result in increased housing options and densities that, together with additional transit options would reduce VMT.
- Climate Element: action alternatives would result in a new One Seattle Comprehensive Plan including a new Climate Element addressing greenhouse gas emission reductions through VMT reductions and building energy use reductions, and a climate resilience sub-element addressing adaptation to climate change such as building retrofits and design to provide for cooling and energy demand reduction.

Regulations & Commitments

- The City of Seattle Building Energy Code eliminates the use of fossil fuels like gas and electric resistance from most water heating and space heating systems in new construction and substantial alterations for commercial and multifamily uses.
- Seattle's Energy Benchmarking Law (Seattle Municipal Code 22.290) requires the owners of non-residential and multifamily buildings (20,000 square feet or larger) to track and report (annually) energy performance.
- Compliance with the Seattle Building Tune-Ups Ordinance (Seattle Municipal Code 22.930) aims to optimize energy and water performance by identifying low- or no-cost actions related to building operations and maintenance, generating approximately 10-15% energy savings.
- Building Emissions Performance Standards (BEPS) (currently under development as of March 2023) sets energy and/or emissions targets existing buildings must meet over time to improve energy efficiency and reduce climate impacts. Seattle Mayor Harrell directed the Office of Sustainability and Environment to develop legislation for carbon-based performance standards for existing commercial and multifamily buildings 20,000 sq. ft or larger. Included in this was a plan to transition all city owned buildings off fossil fuels by 2035. This proposed Building Emissions Performance Standard (BEPS) includes standard greenhouse gas intensity targets (GHGITs) for 21 building activity types (e.g., office, retail, multifamily) for each compliance interval until net-zero emissions targets in 2050 (City of Seattle, 2023). The BEPS proposal sets required GHGITs through 2035 and provisional targets from 2036 – 2050 to enable owners to plan, while allowing the later targets to be revised, if needed, by future rules updates. All future development would be required to adhere to energy efficiency standards combined with increased efficiency through

performance requirements fostered by the Climate Action Plan and all-electric space and water heating required by the Washington Energy Code.

Other Potential Mitigation Measures

Strategies that could be further integrated into plans and programs include encouraging:

- Installation of solar (photovoltaic) and other local generating technologies would reduce demand on energy supplied from public generating and distribution facilities.
- Implementation of sustainable requirements including the construction and operation of LEED-compliant (or similar ranking system) buildings which would reduce the increase required in power systems.
- The use of passive systems and modern power saving units would reduce the use of power in building heating and cooling.
- Use of alternative forms of energy could be included in larger developments where installation is cost effective.
- Implementation of conservation efforts and renewable energy sources to conserve electricity in new developments, including energy efficient equipment (i.e., light bulbs, appliances, and heating and air conditioning), and could reduce energy consumption.

3.4.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts on energy are anticipated. The development capacities proposed under all alternatives would increase overall energy consumption. This is mitigated by applying energy codes to new development and VMT measures for building and transportation energy usage. Adherence to energy efficiency measures would ensure that future development would not result in the consumption of energy resources in excess of projected supply availability.

Average annual transportation fuel consumption would increase under all alternatives when compared to existing conditions by less than 1% due to the increase in total VMT associated with projected growth. However, with increased average vehicle fuel efficiency and providing the infrastructure and opportunity for people living and working in the City of Seattle to access alternative transportation modes, action alternatives would not result in the consumption of energy resources in excess of projected supply and would not conflict with energy policies adopted by the City of Seattle.

Since average annual energy use per capita is expected to decrease, the action alternatives would not conflict with energy policies adopted by the City of Seattle.

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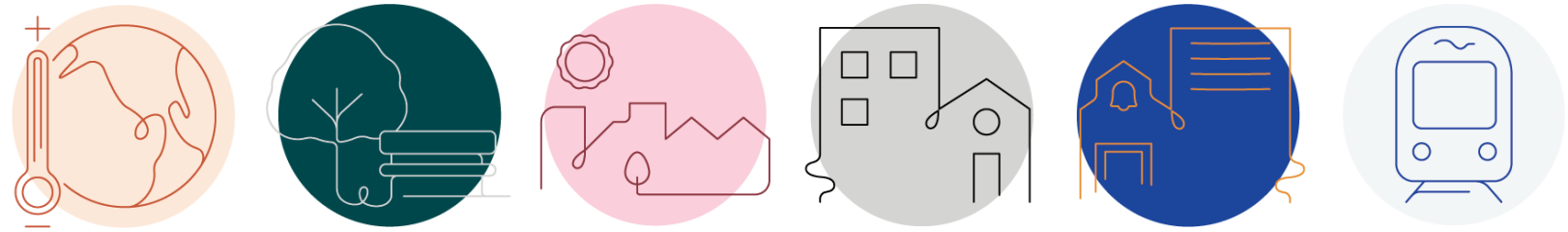
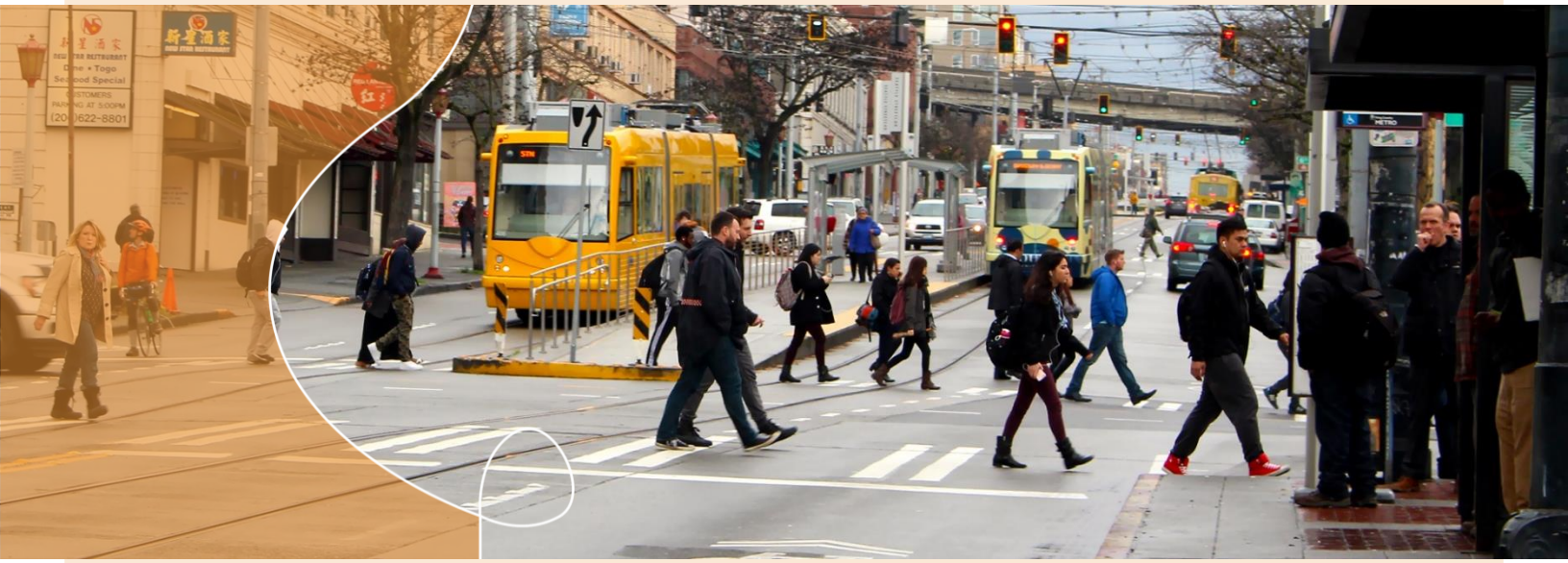
3.5 Noise





Source: City of Seattle, 2023.

This section assesses the potential noise/vibration impacts associated with implementing the alternatives considered in this EIS. The following includes acoustical terminology and background information, a presentation of applicable regulatory standards, assessment of acoustical impacts related to implementing the alternatives, and identification of potentially feasible noise mitigation measures where appropriate.

Thresholds of significance utilized in this impact analysis include:

- The alternative would cause future traffic noise levels of 10 dBA or more above existing noise levels.
- Noise-sensitive receivers are concentrated near noise-generating (non-residential) activities or major roadways.

Data & Methods

The project team used a range of data sources for this assessment of ambient, construction, and traffic noise listed below.

- Highway Construction Noise Handbook (FHWA 2006)
- Highway Traffic Noise: Analysis and Abatement Guidance (FHWA 2011)
- City of Seattle Municipal Code (SMC Chapter 25)
- State of Washington Administrative Code (Chapter 173-60 WAC)
- Port of Seattle Aircraft Noise Monitoring System (2022)

3.5.1 Affected Environment

Environmental Noise & Vibration Fundamentals

Sound & Fundamental Noise

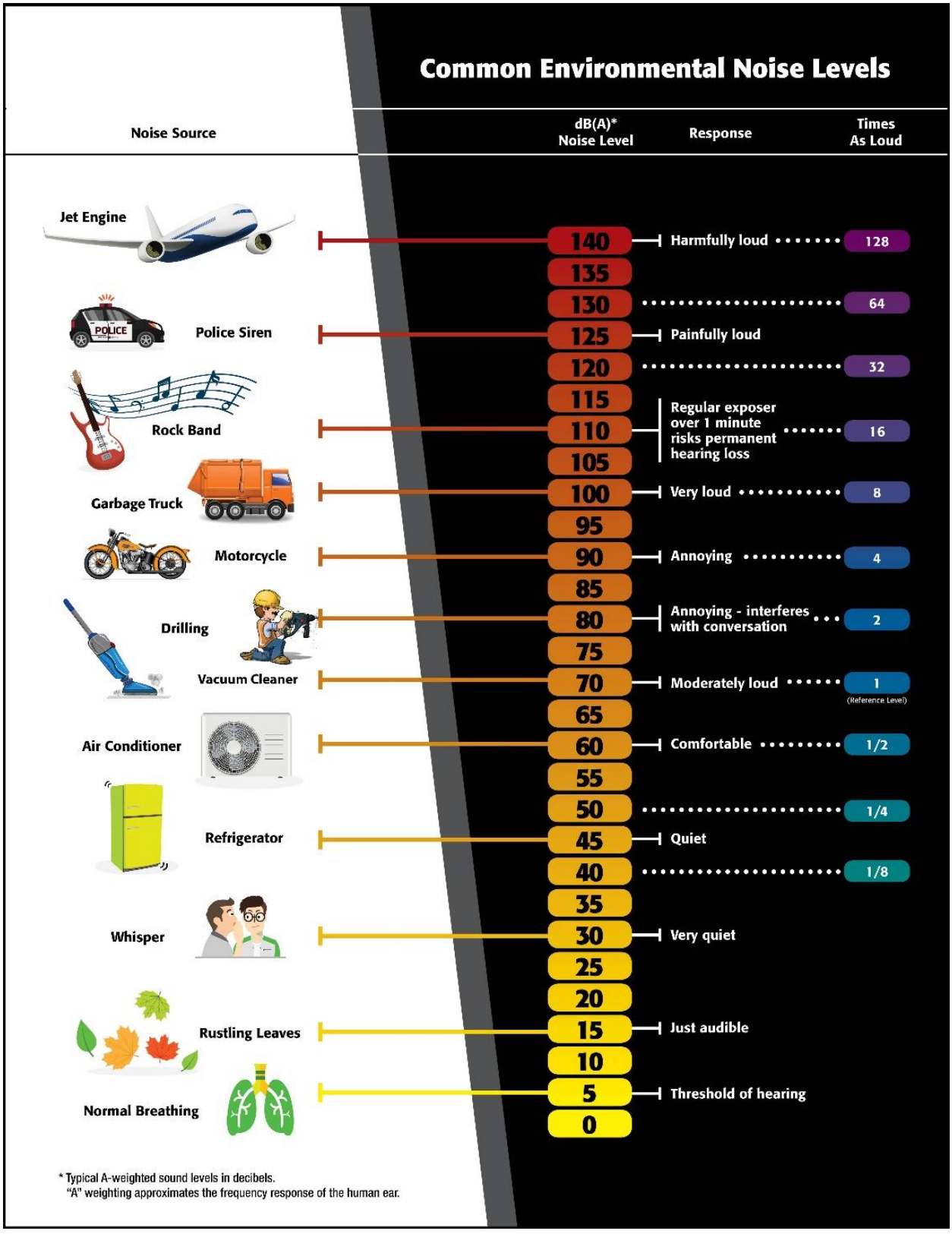
Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to a human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or unwanted sound. The fundamental acoustics model consists of a noise source, a receptor (or "receiver"), and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable

noise sources. The sound from individual local sources is superimposed on this background noise. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person. **Exhibit 3.5-1** depicts typical noise levels.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (μPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness.

Exhibit 3.5-1. Typical Noise Levels



Source: Kimley-Horn and Associates, Inc., 2020.

Noise Descriptors

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Most commonly, environmental sounds are described in terms of the equivalent noise level (L_{eq}) that has the same acoustical energy as the summation of all the time-varying events. While L_{eq} represents the continuous sound pressure level over a given period, the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 PM to 7:00 AM. Each is applicable to this analysis and defined in **Exhibit 3.5-2**.

Exhibit 3.5-2. Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in µPa (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 µPa). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 PM to 7:00 AM to account for noise sensitivity at nighttime. The

Term	Definitions
	logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA weighting during the hours of 7:00 AM to 10:00 AM and a 10 dBA weighting added to noise during the hours of 10:00 PM to 7:00 AM to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.

Because sound levels can vary markedly over a short period of time, a method for describing either the sound's average character (L_{eq}) or the variations' statistical behavior (L_{XX}) must be utilized. The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The predicted models' accuracy depends on various factors, such as the distance between the noise receptor and the noise source, the character of the ground surface (e.g., hard or soft), and the presence or absence of structures (e.g., walls or buildings) or topography, and how well model inputs reflect these conditions.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10 (Caltrans, 2013). When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance

would be 3 dBA higher than one source under the same conditions. Under the dB scale, three sources of equal loudness together would produce an increase of 5 dBA.

Sound Propagation & Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed in this report.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the noise receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm can reduce noise levels by 5 to 15 dBA (FHWA, 2006). The way older homes were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA (Cowan, 1994, and Harris, 1979). Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted (Caltrans, 2013 and 2017):

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter (U.S. Department of Labor, 1974).

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance (FICON, 1992).

Ground Borne Vibration

Sources of ground borne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or

negative peak of the vibration wave and is expressed in terms of inches-per- second (in/sec). The RMS velocity is defined as the average of the squared amplitude of the signal and is expressed in terms of velocity decibels (VdB). The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Exhibit 3.5-3 displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the individual's sensitivity. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where ground borne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for ground borne vibration are planes, trains, and construction activities such as earthmoving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

Exhibit 3.5-3. Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	—	Extremely fragile historic buildings, ruins, ancient monuments	—
0.01	Barely Perceptible	—	—
0.04	Distinctly Perceptible	—	—
0.1	Strongly Perceptible	Fragile buildings	—
0.12	—	—	Buildings extremely susceptible to vibration damage
0.2	—	—	Non-engineered timber and masonry buildings
0.25	—	Historic and some old buildings	--

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.3	—	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	—	—
0.5	—	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration
Source: California Department of Transportation, Transportation and Construction Vibration Guidance Manual, 2020 and Federal Transit administration, Transit Noise and Vibration Assessment Manual, 2018.

Current Policy & Regulatory Framework

Federal Guidelines

The U.S. Department of Housing and Urban Development (HUD) has established federal noise abatement and control standards (24 CFR Part 51, Subpart B) for new construction. These standards are widely used to assess the significance of noise impacts in residential communities. According to HUD standards, sites where community noise exposure exceeds a day-night average sound level (L_{dn}) of 65 dB (typically expressed as dBA for averages) are classified as noise-impacted, and interior noise levels within residences—typically 20 dB below exterior levels—should not exceed 45dB. Residential construction in noise-impacted areas require additional noise mitigation features for interior noise levels to meet the 45 dB standard.

In urban areas, noise from vehicles traveling on roads is a major source of noise, and changes in travel patterns and land use have the potential to affect traffic noise. Transportation facilities that receive federal funding (federal-aid projects) are subject to federal noise guidelines from the Federal Highway Administration (FHWA). FHWA also requires state departments of transportation such as the WSDOT to develop noise policies that will apply to projects within that state. WSDOT's 2020 Traffic Noise Policy and Procedures (WSDOT 2020) are consistent with the requirements of FHWA Code Federal Regulations 772 for roadway related traffic noise and are approved by FHWA for federal-aid projects in Washington.

FHWA guidelines require analysis of expected noise impacts and consideration of noise abatement by land use or Activity Category. FHWA applies different noise abatement criteria (NAC) to each Activity Category based on either exterior or interior noise levels. NAC of 67 dBA Activity Category B, which includes single- and multi-family residences, and Activity Category C, which includes places of worship, schools, recreation areas and other similar land uses. **Exhibit 3.5-4** describes WSDOT's NAC by land use category. Activity Category E includes including, hotels, motels, offices, restaurants, bars, or other developed lands with a NAC of 72 dBA. FHWA determines whether a noise impact is expected to occur when predicted future traffic noise

levels approach or exceed the established FHWA a particular Activity Category. The WSDOT definition of approach in this instance is within 1 dBA on the FWHA NAC, or 66 dBA for Activity Categories B and C or 71 dBA for Category E.

Exhibit 3.5-4. Noise Abatement Criteria by Land Use Category

Activity Category	$L_{eq(h)}$*dBA	Description
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Residential (single and multi-family units)
C	67 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F. Includes undeveloped land permitted for these activities.
F	—	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	—	Undeveloped lands that are not permitted

Source: WSDOT, 2020.

State Guidelines

Washington State Noise Control Act of 1974

In 1974, the Washington State legislature authorized the establishment of regulations for the abatement and control of noise pollution considering social and economic impacts (Revised Code of Washington 70A.20). Regulations in Washington Administrative Code (WAC) 173-06-040 established maximum permissible noise levels for specific areas or environments called Environmental Designation for Noise Abatement (EDNA), which vary based on the land use of the noise source and the receiving property. Maximum permissible noise levels are measured in decibels generated by the source or project at the property line of adjacent land uses, rather than the combined project and background noise. Maximum Permissible Environmental Noise Levels apply to a variety of activities and facilities including residences, hospitals, commercial services, storage facilities, warehouses and distribution facilities, and industrial property. However, electrical substations, certain industrial installations, mobile noise sources, vehicles traveling in

the public right of way, and warning devices (i.e., bells) are exempt. The state provisions have been adopted by most cities around the state, including the City of Seattle (SMC 25.08).

City Guidelines

Seattle Municipal Code 25.08 Noise Control

Operational Noise Standards

Chapter 25.08 of the Seattle Municipal Code (SMC) establishes exterior sound level limits for specified land use zones or "districts," which vary depending on the district of sound source and the district of the receiving property. The exterior sound limits based on noise source and receiving property in the City of Seattle Noise control ordinance are summarized in **Exhibit 3.5-5**.

Exhibit 3.5-5. Maximum Permissible Noise Level

	EDNA Receiver of Noise (Maximum Allowable Sound Level in dBA L_{eq})		
EDNA Source of Noise	Residential	Commercial	Industrial
Class A Residential	55	57	60
Class B Commercial	57	60	65
Class C Industrial	60	65	70

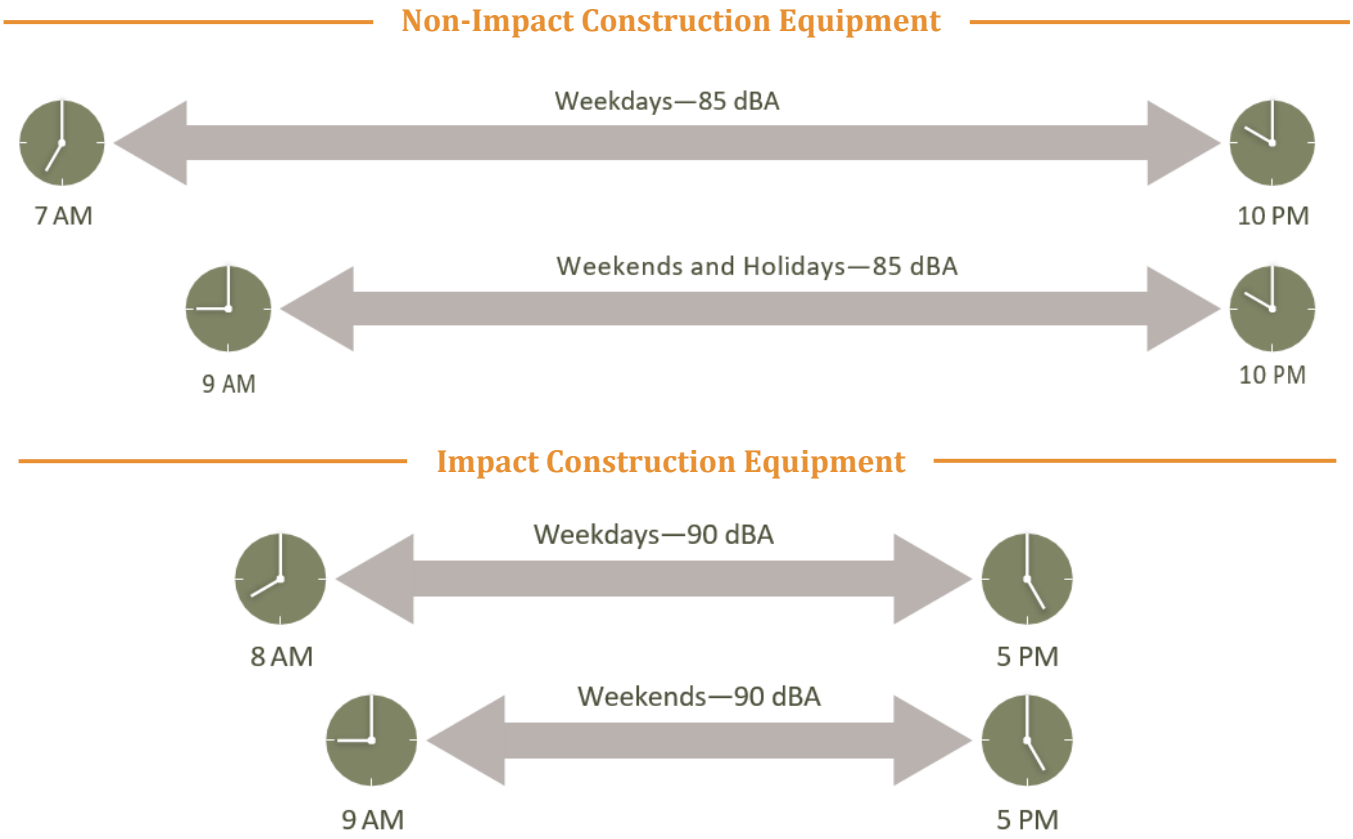
Source: City of Seattle Noise Control Ordinance SMC Chapter 25.08, 2023.

Between the hours of 10 PM and 7 AM on weekdays and 10 PM and 9 AM during weekends, the maximum limits for receivers within residential zones are to be reduced by 10 dBA. For noise of short duration, these limits can be exceeded by a maximum of 5 dBA for 15 minutes/hour, 10 dBA for 5 minutes/hour, or 15 dBA for 1.5 minutes/hour.

Construction Noise Standards

The City's Noise Control code allows the exterior sound level limits to be exceeded by certain types of construction equipment operating in most commercial districts between 7 AM and 10 PM on weekdays and between 9 AM and 10 PM on weekends and legal holidays (SMC 25.08.425; see **Exhibit 3.5-6**). The types of equipment that would usually exceed the exterior sound level limit of 60 dBA are tractors, loaders, excavators, and cranes. This equipment may exceed the applicable standard by up to 25 dBA (an 85 dBA standard) when measured at a reference distance of 50 feet. Use of impact equipment—such as a pile driver—is restricted to between 8 AM and 5 PM on weekdays and between 9 AM and 5 PM on weekends and holidays. It is also limited to a continuous noise level of 90 dBA and a maximum noise level of 99 dBA L_{max} when measured at a reference distance of 50 feet.

Exhibit 3.5-6. Construction Noise Time Limits



Source: City of Seattle Noise Control Ordinance SMC Chapter 25.08, 2023.

Current Conditions

Citywide

Traffic Noise Sources

Traffic noise exposure is comprised of several factors: the volume of vehicles per day, the speed of those vehicles, the number of those vehicles that are medium and heavy trucks, the distribution of those vehicles during daytime and nighttime hours, and the proximity of noise-sensitive receivers to the roadway. Existing traffic noise exposure is expected to be as low as 50 dB L_{dn} in the most isolated areas of the City, while receivers adjacent to interstate highways are likely to experience levels as high as 75 dB L_{dn} (U.S. Department of Transportation 2022). Traffic noise assessment in this analysis is also inclusive of bus transit, as buses are an assumed percentage of overall roadway volumes used in the calculation of roadside noise levels.

Exhibit 3.5-7 presents the distance to various noise contours for representative roadways within each subarea in Seattle. The modeled roadway segments were selected to provide an

estimate of traffic noise impacts from implementation of the alternatives and compare to the measured ambient noise levels provided in **Exhibit 3.5-7**. The values in **Exhibit 3.5-7** do not take into consideration the presence of existing sound barriers, topographical conditions or roadway elevation, all of which can vary by location. The 65 L_{dn} contour is important because it represents the exterior noise level which can be reduced to 45 dBA L_{dn} using standard construction techniques. An interior noise level of 45 L_{dn} is the commonly accepted maximum recommended interior noise level for residential uses (EPA, 2016).

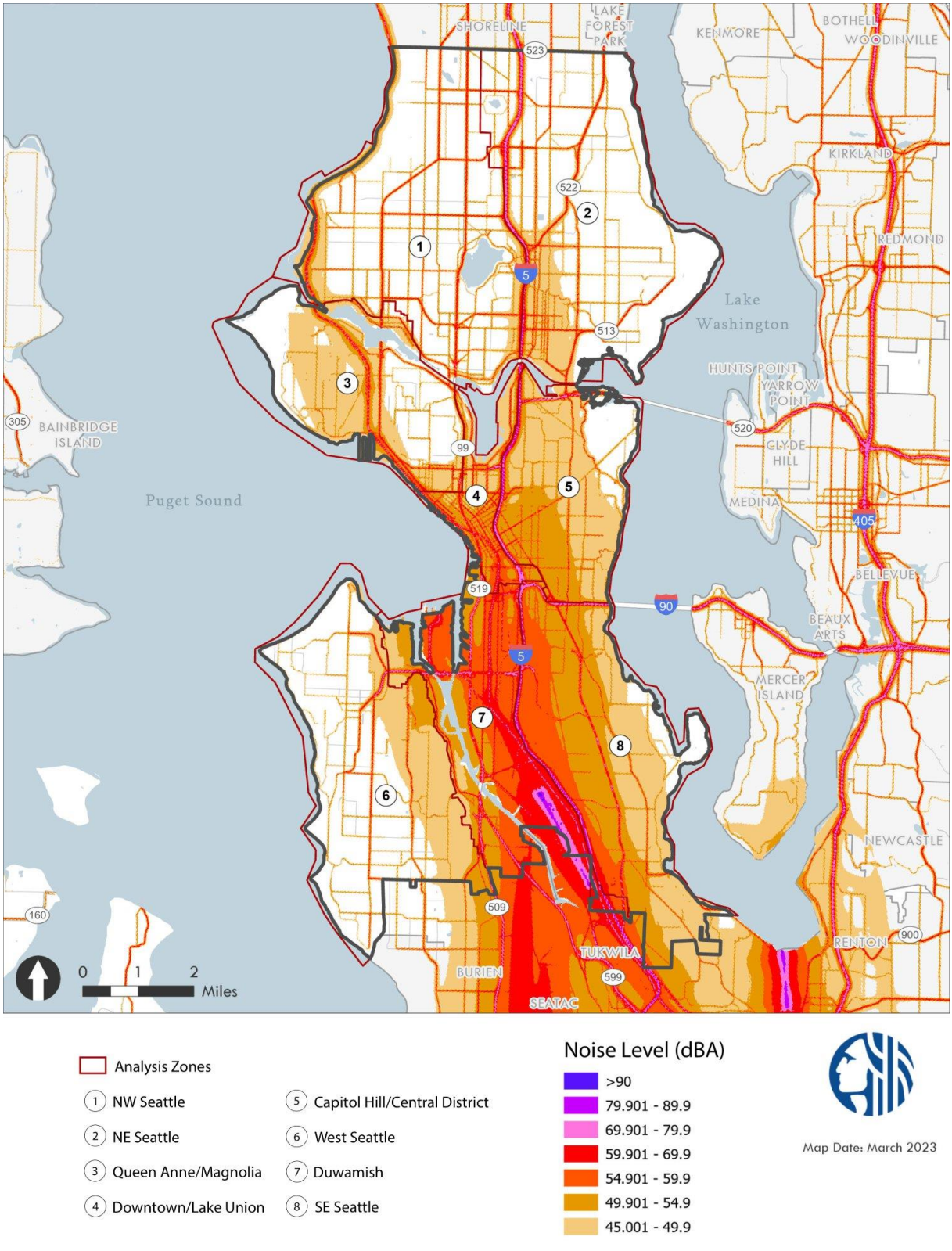
Exhibit 3.5-7. Existing Roadway Noise Levels

Roadway	Roadway Segment	Ldn at 150' from Roadway Center	Distance (feet) from Roadway Center to Noise Contours		
			65 dBA Ldn	60 dBA Ldn	55 dBA Ldn
Martin Luther King Jr Way S	Between S Jackson St and S Massachusetts St	58.4	33	105	332
	Between S Orcas St and S Graham St	59.7	—	139	440
Harbor Ave SW/Alki Ave SW	Between SW Admiral Way and California Way SW	57.5	—	83	264
Beacon Ave S	Between S Spokane St and S Columbian Way	54.8	—	46	144
34th Ave W	Between W Barrett St and W McGraw St	54.3	—	40	127
Roosevelt Way NE	Between NE Northgate Way and 80th St	56.7	—	70	220
Roosevelt Way NE	Between 5th Ave NE and 10th Ave NE	60.9	59	186	588
15th Ave NE	Between NE 135th St and NE 145th St	58.9	—	116	367

Source: Kimley-Horn, 2023.

According to the U.S. Department of Transportation National Transportation Noise Map, traffic noise levels along major highways and freeways in the City (e.g., I-5, I-405, I-90, and Highway 99) range from approximately 50 dBA L_{eq} to 75 dBA L_{eq} (U.S. Department of Transportation 2022). The National Transportation Noise Map is provided in **Exhibit 3.5-8**.

Exhibit 3.5-8. National Transportation Noise Map



Source: U.S. Department of Transportation, 2022.

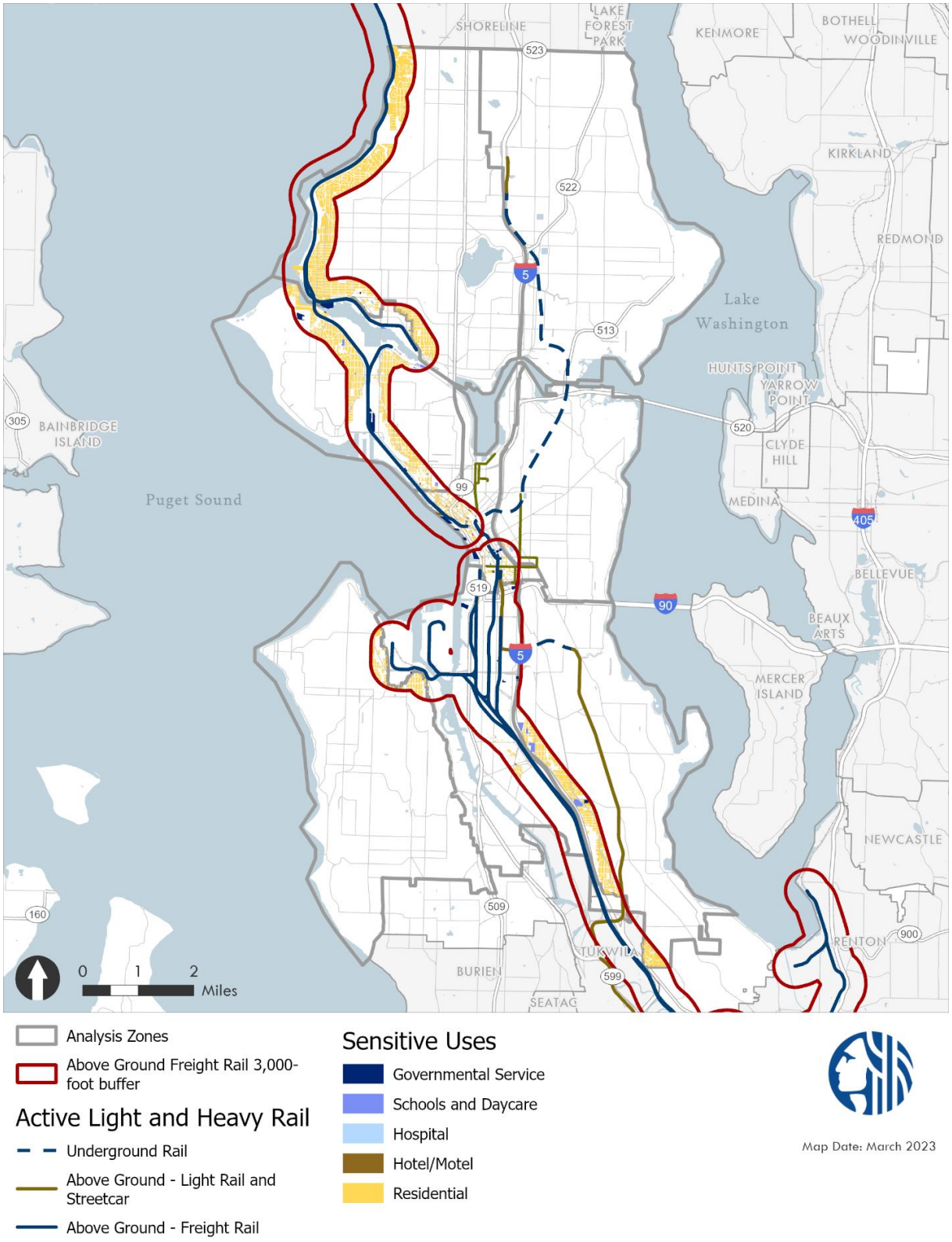
Rail Noise Sources

Seattle is also affected by noise from freight and passenger rail operations. While rail operations generate substantial noise levels in the immediate vicinity of railways, train operations are intermittent and area railways are widely dispersed. Sound Transit's light rail system operates frequently but thanks to electrification, lower speeds, and lighter loads, this results in overall lower noise levels than heavy rail systems. The contribution of rail noise to Seattle's ambient noise environment is relatively minor compared to other sources such as roadway traffic. However, areas near freight rail yards often experience higher noise levels due to the maintenance of rail vehicles, assembly of trains, and idling engines. Train operations can also be a source of significant ground-borne vibration near railroad tracks and yards. Vibration-sensitive receivers located within 100 feet of rail operations may be adversely affected by vibration exposure during train events (FTA, 2018). **Exhibit 3.5-9** shows active rail lines in the City of Seattle.

Aircraft Noise Sources

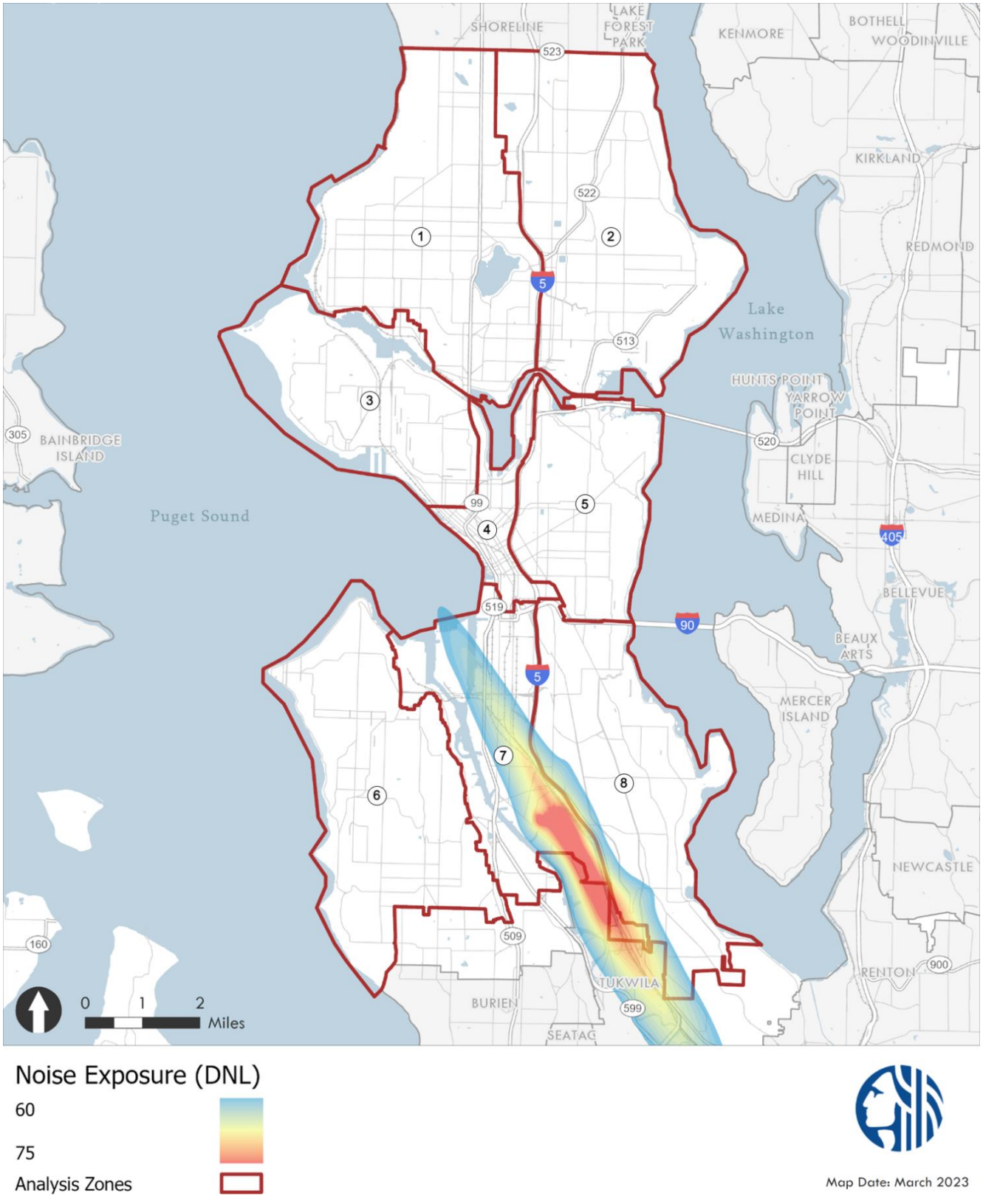
King County International Airport (also known as Boeing Field) is located in the southern portion of the City and generates approximately 500 aircraft operations a day. Aircraft originating from other airports such as Seattle-Tacoma International Airport frequently fly over Seattle. All these operations contribute to the overall ambient noise environment within the City. Similar to rail noise, the proximity of the receiver to the airport and aircraft flight path influences the noise level exposure. Other contributing factors include the type of aircraft operated, altitude of the aircraft, and atmospheric conditions. Atmospheric conditions may contribute to the direction of aircraft operations (flow) and affect aircraft noise propagation. The 60-75 DNL noise contours for Boeing Field are shown in **Exhibit 3.5-10**. As shown in **Exhibit 3.5-10**, the highest noise levels (up to 75 DNL) are concentrated near the central portion of the Boeing Field Airport where the runway is located. Lower noise levels (approximately 60-70 DNL) extend further to the northwest and southeast of the airport and follow the general flight path for airplanes departing/arriving at Boeing Field.

Exhibit 3.5-9. Active Rail Lines in Seattle



Source: Kimley Horn, 2023.

Exhibit 3.5-10. Boeing Field Noise Contours



Source: Kimley Horn, 2023.

Construction Noise Sources

Construction activities related to new development and transportation improvements can create high noise levels of relatively short duration. Noise generated by construction equipment varies greatly depending on factors such as the operation performed, equipment type, model, age, and condition. Noise from heavy equipment diesel engine operations can dominate the noise environment surrounding construction sites. Other stationary equipment sources such as generators, pumps, and compressors can also contribute significantly. Operation of impact equipment such as pile drivers generally produces the highest noise levels and may also produce significant vibration in the vicinity. Maximum noise exposure from typical construction equipment operations is approximately 75–100 dB (L_{max} at 50 feet), the highest noise production from heavy demolition and pile driving operations. Please refer to **Exhibit 3.5-11** for typical construction noise levels.

Exhibit 3.5-11. Typical Noise Levels from Construction/Demolition Equipment

Construction Equipment	Typical Noise Level at 50 ft from Source
Air Compressor	80 dBA
Backhoe	80 dBA
Compactor	82 dBA
Concrete Mixer (Truck)	85 dBA
Concrete Pump (Truck)	82 dBA
Concrete Vibrator	76 dBA
Crane	83 – 88 dBA
Dozer	85 dBA
Generator	82 dBA
Grader	85 dBA
Jack Hammer	88 dBA
Loader	80 dBA
Paver	85 dBA
Pile Driver (Impact)	101 dBA
Pneumatic Tool	85 dBA
Pump	77 dBA
Shovel	82 dBA
Truck	84 dBA

Source: FTA Transit Noise and Vibration Impact Assessment Manual, 2018.

Industry & Other Non-Transportation Noise Sources

A wide variety of industrial and other non-transportation noise sources are located in Seattle. These include manufacturing plants, marine shipping facilities, landfills, treatment plants (e.g., water), food packaging plants and lumber mills, and other general industrial facilities. Noise generated by these sources varies widely and are often intermittent but can exceed 80 dBA close to the source for some activities (City of Seattle, 2022). Noise generated by these sources varies widely, but in many cases may be a significant contributor to a local noise environment.

Noise Levels in Seattle

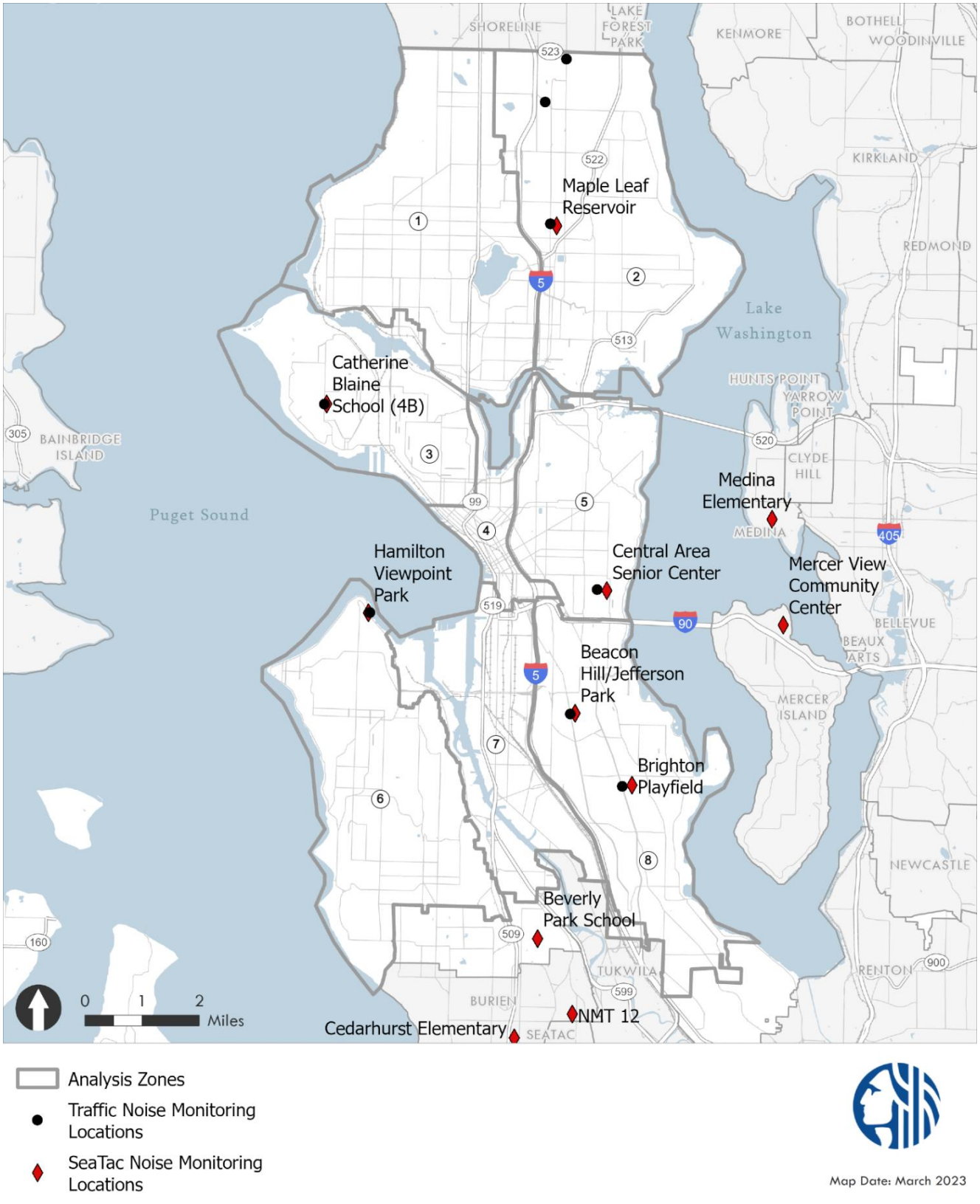
The most recent full year of ambient noise data in Seattle from the Port of Seattle's Aircraft Noise Monitoring System is shown in **Exhibit 3.5-12**. As indicated in **Exhibit 3.5-12**, measured ambient noise levels at various locations throughout the City range from 52.3 dBA L_{eq} to 62.0 dBA L_{eq} and are typical of developed urban areas. In addition, the average annual maximum (or instantaneous) noise levels reach 88.1 dBA but are short in duration and typically only last a few seconds; see **Exhibit 3.5-12**. Maximum noise levels can occur from cars or trucks passing by, train horns, emergency vehicle sirens, and other high-generating noise sources. It is noted there are slightly higher noise levels at the Jefferson Park noise monitoring station, which may reflect an increase of nearly 80,000 take-offs and landings at Seattle-Tacoma International airport between 2020 and 2021, a recovery in air traffic from the COVID-19 pandemic. This noise monitor is directly beneath the flight path for Seattle-Tacoma International Airport, and the Beacon Hill neighborhood of Seattle is more affected my aircraft noise than other areas within Seattle covered by the Port's noise monitoring system; see **Exhibit 3.5-13**.

Exhibit 3.5-12. Average Annual Noise Level (most recent complete year) for Selected Monitoring Locations in Seattle

Measurement Location (Noise Monitoring Location)	Avg Annual L_{eq} dBA	Avg Annual L_{max} dBA
NMT3: Maple Leaf Reservoir (2020)—Area 2: NE Seattle	54.7	83.4
NMT4: Catherine Blain School (2020)—Area 3: Queen Anne/Magnolia	52.3	80.6
NMT6: Hamilton Viewpoint Park (2020)—Area 6: West Seattle	58.1	82.9
NMT7: Central Area Senior Center (2020)—Area 5: Capitol Hill/Central District	54.7	83.4
NMT9: Jefferson Park (2021)—Area 8: SE Seattle	62.0	88.1
NMT10: Brighton Playfield (2020)—Area 8: SE Seattle	54.7	85.7

Source: Port of Seattle, 2022.

Exhibit 3.5-13. Noise Monitoring Locations



Source: Kimley Horn, 2023.

Sensitive Receivers

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses typically include residences, hospitals, schools, transient lodging, libraries, and certain types of recreational uses. Noise-sensitive residential receivers are found throughout the study area.

Analysis Areas

Area 1: NW Seattle

The predominant source of noise in the Northwest Seattle subarea is from transportation. The Sound Transit N line runs along the western edge of this area. The line operates locomotives, with anywhere from 2-7 passenger railcars. This railway also services BNSF freight locomotives and Amtrak passenger rail. The U.S. Department of Transportation National Transportation Noise Map (U.S. Department of Transportation, 2018) illustrates that areas near the rail line are typically in the upper 50 dBA LA_{eq} range for 24-hour noise levels. While rail operations generate significant noise levels in the immediate vicinity of the railways, train operations are infrequent and area railways are widely dispersed. In addition, the contribution of rail noise to the overall ambient noise environment in this subarea is relatively minor compared to other sources such as traffic. The most notable traffic noise sources in the Northwest Seattle area are from Highway 99, 15th Ave NW, and Holman Rd NW. The biggest contributor to noise in this area is proximity to I-5, with 24-hour LA_{eq} levels reaching over 70 dBA when in close proximity. For most areas outside major roadways, ambient noise levels are observed to be minimally affected by traffic noise. Industrial Marina areas are also present along the southern limit of the area near Lake Union and contribute to the existing noise environment.

Area 2: NE Seattle

The noise environment in the Northeast Seattle subarea is mainly comprised of roadway traffic and rail transit noise. A portion of the Sound Transit Link 1 Line traverses through the southernmost portion of this subarea in a northwest direction to Northgate, transitioning from a tunnel to an elevated track profile north of N 92nd Street in Maple Leaf. This area also has notable roadway traffic noise, primarily from Highway 522 and 513, and I-5 along the western border of this subarea trending in a north-south direction. The University District and the uses associated with the University of Washington are also a source of noise from road traffic and a concentration of human activity and sporting events. Marina areas are also present along the southern limit of the area near Lake Union and contribute to the existing noise environment.

130th/145th Station Area

The 130th/145th Station Area (Station Area) is located within the Pinehurst and Haller Lake neighborhoods. Most of the Station Area consists of a mix of single- and multi-family residential uses. However, approximately 16% of the area within a half mile of the Station Area is

comprised by the Jackson Park Golf Course, and a smaller portion of the Station Area is comprised of commercial and institutional (school) uses. The primary noise source in this area is road noise from I-5 freeway traffic and adjacent Sound Transit railways.

Area 3: Queen Anne/Magnolia

The same rail line that traverses Northwest Seattle (Sound Transit N Line) continues through the Queen Anne/Magnolia subarea, with Sound Transit Sounder Locomotives, Amtrak passenger rail and BNSF freight lines. Furthermore, the Balmer Yard in Interbay is an 80-acre rail yard with 41 parallel tracks. This industrial area that separates Queen Anne and Magnolia extends to the smith cove terminal, where cruise ships often dock. The National Transportation Noise Exposure Map shows that areas near the industrial sector experience noise levels up to 50 dBA for 24-hour LA_{eq} levels. Significant sources of roadway traffic noise include the Magnolia Bridge, 15th Ave W, Elliot Ave W, and Nickerson St.

Area 4: Downtown/Lake Union

The Downtown/Lake Union subarea has the highest concentration of roadway traffic noise of all subareas, which is to be expected with high traffic volumes in densely developed urban areas. Noise travels further and in various directions in this subarea due to the amount of sound reflective hard surfaces such as tall concrete buildings and a majority of concrete groundcover. I-5 is the largest contributor to traffic noise in the Downtown/Lake Union area; however, Alaskan Way, Mercer Street, and Aurora Ave/Highway 99 are also significant road noise sources, reaching into the 60-70 dBA range for 24-hour LA_{eq} levels. The National Transportation Exposure Map (Seto, 2023) shows noise levels within this subarea ranging from 50 dBA LA_{eq} in the central Downtown areas up to approximately 80 dBA LA_{eq} near I-5.

Area 5: Capitol Hill/Central District

I-5, Highway 90, and Highway 520 are the major sources of noise in the Capitol Hill/Central District subarea. 23rd Ave, Boren Ave, Madison St, and ML King Jr Way are also high-traffic roadways that are notable roadway noise sources. The Seattle Streetcar First Hill Line passes through this subarea, running north-south along Broadway. In addition, a portion of the Sound Transit Link 1 Line traverses through the western portion of this subarea in a north-south direction. This area is primarily residential, with very few industrial sources of noise.

Area 6: West Seattle

The significant roadway noise sources in the West Seattle subarea are the West Seattle Bridge, California Ave S, Fauntleroy Way SW, 35th Ave SW, Delridge Way SW, W Marginal Way, and SW Roxbury St. The northern areas of this subarea are located close to Terminal 5 and Harbor Island, both parts of the Port of Seattle. In this industrial area is also Nucro Steel, which along with the port, brings in additional freight train traffic.

Area 7: Duwamish

Boeing Field is located in the southeastern portion of the Duwamish subarea, and therefore this subarea has the highest levels of airplane noise. Areas near the airport experience noise levels in 75-80 dBA range, while the majority of the subarea is located within the 60-70 dBA noise level contour range. This area also contains two large rail yards, the Union Pacific Argo Yard and BNSF Stacy Yard. This area also contains a large portion of the Port of Seattle. These intermodal facilities run year-round every day. This subarea is predominantly comprised of industrial uses, with some residences located in the southern portion adjacent to the Boeing Field Airport and separated by the Duwamish waterway, which is roughly 500 feet in width. This area also includes the Sound Transit's Link OMF Central, which maintains the light rail trains that service Seattle. This area also has significant noise sources from Highway 99 and Highway 509, as well as the I-5 freeway.

Area 8: SE Seattle

The westernmost portion of the Southeast Seattle subarea is located within the 60-65 noise contour for Boeing Field, while the southwestern portion of this subarea is located within the 60-75 noise contour near the I-5 and Highway 90 interchange. The most notable roadway traffic noise sources are S Columbian Way, Martin Luther King Jr Way S and Rainer Ave S, as well as I-5 and I-90. The Sound Transit's Link Light Rail 1 line runs along Martin Luther King Jr Way S. The Beacon Hill Seattle Noise Project (Seto, 2018) collected 24-hour noise measurements during the spring and summer of 2018 and observed areas with high levels. The sites with the highest noise readings were located near the three notable roadways mentioned above (S Columbian Way, Martin Luther King Jr Way S and Rainer Ave S).

3.5.2 Impacts

Impacts Common to All Alternatives

Construction Noise & Vibration Impacts

The proposed alternatives envision future residential and job growth primarily within urban centers and villages, and also focus growth in compact, walkable, mixed-use neighborhoods linked by transit. Resulting construction activities associated with development of new residences, commercial and retail land uses, and mixed-use developments would have the potential to temporarily affect nearby sensitive receivers such as existing residences, schools, and nursing homes.

Temporary construction noise and vibration within the identified growth areas would occur in urban or suburban areas where ambient noise and vibration levels are influenced by roadway traffic and other transportation sources and would therefore be less noticeable to noise-sensitive receivers than if these activities were to occur in undeveloped areas of the City.

Section 25.08.425 of the Seattle Municipal Code establishes construction noise standards that limit construction activities to times when construction noise would have the least effect on adjacent land uses, and restrict the noise generated by various pieces of construction equipment. Development under the alternatives would range from the construction of high-rise residences in urban centers to townhomes and detached homes in corridors and residential neighborhoods. Consequently, depending on the extent of construction activities involved and background ambient noise levels, localized construction-related noise effects could vary widely.

Construction activities with the highest potential for construction-related noise or vibration impacts are those that require pile driving or other similar invasive foundation work. These types of construction activities are generally associated with high-rise development which all alternatives envision to occur within urban centers.

The Seattle noise ordinance restricts the use of impact equipment, such as pile drivers, to 8 AM to 5 PM on weekdays and 9 AM to 5 PM on weekends and holidays and limits their operation to a continuous noise level of 90 dBA and a maximum noise level of 99 dBA L_{max} when measured at a reference distance of 50 feet.

Because development within urban centers may require pile driving adjacent (within 50 feet) to other buildings that could be occupied by residents or other sensitive receptors, construction noise impacts in excess of 90 dBA within these areas are identified as a potential moderate noise impact and mitigation is identified.

The City of Seattle does not enforce quantitative vibration standards. Construction-related vibration impacts from pile driving and other construction equipment are generally assessed in environmental review documents using the methodology of the Federal Transit Administration (FTA) which includes standards for structural damage as well as for human annoyance.

Pile driving can result in peak particle velocities (PPV) of up to 1.5 inches per second (in/ sec) at a distance of 25 feet (FTA 2018), but typically average about 0.644 PPV. The FTA utilizes a threshold of architectural damage for conventional sensitive structures of 0.3 in/sec PPV for new residential structures and modern commercial buildings and 0.2 in/sec PPV for historic and older buildings. Therefore, a potentially significant vibration impact related to structural damage could occur when pile driving is proposed within 50 feet of a historic building. Thus, mitigation is recommended to reduce potential construction vibration impacts related to pile driving.

Vibration levels can also result in interference or annoyance impacts for residences or other land uses where people sleep, such as hotels and hospitals. The FTA methodology for vibration annoyance is dependent on the frequency of the events. When vibration events occur more than 70 times per day, as is typically the case with pile driving, they are considered "frequent events." Frequent events in excess of 72 VdB are considered to result in a significant vibration impact. However, the prohibited construction hours within the City's Ordinance are sufficient to avoid sleep interference impacts during times that most people sleep.

Land Use Compatibility

As discussed above, exterior noise levels in Seattle close to highways, freeways, and high traffic roadways can exceed 65 dBA L_{dn}. The 65 dBA L_{dn} noise level is important because it represents the exterior noise level which can be reduced to 45 dBA L_{dn} using standard construction techniques. An interior noise level of 45 L_{dn} is the commonly accepted maximum interior noise level for residential uses (HUD 2023). Most alternatives seek to locate residential uses near transit or highly traveled roadways to reduce vehicle miles traveled within the city. As indicated in **Exhibit 3.5-8** through **Exhibit 3.5-10** and **Exhibit 3.5-14**, new sensitive receptors (e.g., residential uses) could be located within noise contours up to 65 dBA L_{dn} (or greater) due to proximity to roadway, rail, and airport noise sources. Consequently, if residences or other noise-sensitive land uses are located in close proximity to major roadways or freeways or noise-generating industrial operations, additional insulation, window treatments, or noise abatement features may be warranted to reduce interior noise levels to acceptable levels. On the other hand, if an active industrial development is proposed adjacent to noise-sensitive land uses, noise compatibility problems could also arise. The potential for future or current to experience roadway noise or stationary noise from industrial or other noise-generating developments would be a potential moderate noise impact and mitigation measures could be considered.

As discussed below, traffic noise levels for all alternatives would increase by less than 1.5 dBA along all roadway segments modeled roadways. Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference, and a 5-dBA change is clearly perceptible and is typically considered substantial. Consequently, an increase of less than 1.5 dBA would be considered a minor impact on environmental noise. While the traffic noise impacts would not be discernible from background noise levels, all of the alternatives are anticipated to result in a cumulative noise increase from stationary sources (e.g., mechanical equipment, parking lot noise, conversations, etc.) due to the intensity, scale, and nature of development associated with these alternatives. Noise increases from the alternatives could worsen noise levels in some areas that experience high noise levels under existing conditions that are considered healthy for residential and other sensitive uses. However, noise levels from stationary sources would be required to comply with the exterior sound level limits outlined in the City's Noise Ordinance (SMC Chapter 25.08). Following compliance with the City's Noise Ordinance, stationary noise source impacts from all alternatives would not be significant.

130th/145th Station Areas

Operational noise impacts to sensitive receptors in the Station Area were evaluated in the Sound Transit Lynwood Link Extension Final Environmental Impact Statement (Sound Transit, 2015) (Lynwood Link Extension Final EIS) and SR 522 Bus Rapid Transit (BRT) SEPA Environmental Checklist (SR 522 BRT SEPA Checklist). According to the Lynwood Link Extension Final EIS and SR 522 BRT SEPA Checklist, operational noise levels from BRT buses at the 145th Station, and light rail pass-bys along the Lynwood Link Extension would result in unnoticeable changes in ambient noise at sensitive receptors in the Station Area. In addition, sound walls are proposed to the south of the 130th Street Station along the northbound I-5/Lynwood Link Extension line that would reduce transit and highway traffic noise levels at existing and future residential receptors.

Construction noise impacts were also evaluated in the Lynwood Link Extension Link Final EIS and SR 522 BRT SEPA Checklist. According to the construction noise analyses in these documents, some construction activities may exceed 80 dBA at residences closest to the Station Area construction sites. In addition, some construction activities might be required during nighttime hours because of the nature of the construction, to avoid daytime traffic impacts, or to accommodate adjacent land uses. Nighttime construction would require a noise variance from the City in order to proceed. Construction noise impacts and mitigation measures were identified for sensitive receptors closest to the stations and rail alignment areas in the Lynwood Link Extension Link Final EIS and SR 522 BRT SEPA Checklist. The One Seattle Comprehensive Plan would not result in additional construction noise impacts in the Station Area than those already identified in these environmental documents.

Equity & Climate Vulnerability Considerations

Exposure to Noise Pollution

Future growth and development patterns under Comprehensive Plan growth strategies would affect future residences' (or other "sensitive receptors" or "sensitive receivers) relationships to mobile and stationary noise sources. The degree of potential for adverse impacts on new sensitive receptors would depend on proximity to major sources of noise and the density of future sensitive development.

Portions of Seattle located along major roadways (freeways and the most-traveled highways) are exposed to relatively high noise levels. The U.S. Department of Housing and Urban Development (HUD) utilizes a screening distance of 1,000 feet of highways or major roadways, 3,000 feet for railroads, and 15 miles for FAA-regulated airfields to evaluate transportation noise effects at sensitive receivers. These distances represent the approximate minimum distance at which a "Normally Acceptable" noise level of 65 dBA L_{dn} is achieved in proximity to the aforementioned transportation noise sources (HUD 2023). Because the authority to set noise standards for off-road and other non-highway vehicles lies with the Washington State

Department of Ecology, and for locomotives with the Federal Rail Administration (FRA), the only strategies available to the City for consideration are related to reducing exposure. Measures such as setbacks for residential and other sensitive land uses from major traffic corridors and rail lines are effective. Other methods to protect sensitive land uses from being exposed to substantial transportation noise levels include noise abatement and insulation requirements for new sensitive uses, and site design measures to block or obstruct transportation noise sources from residences.

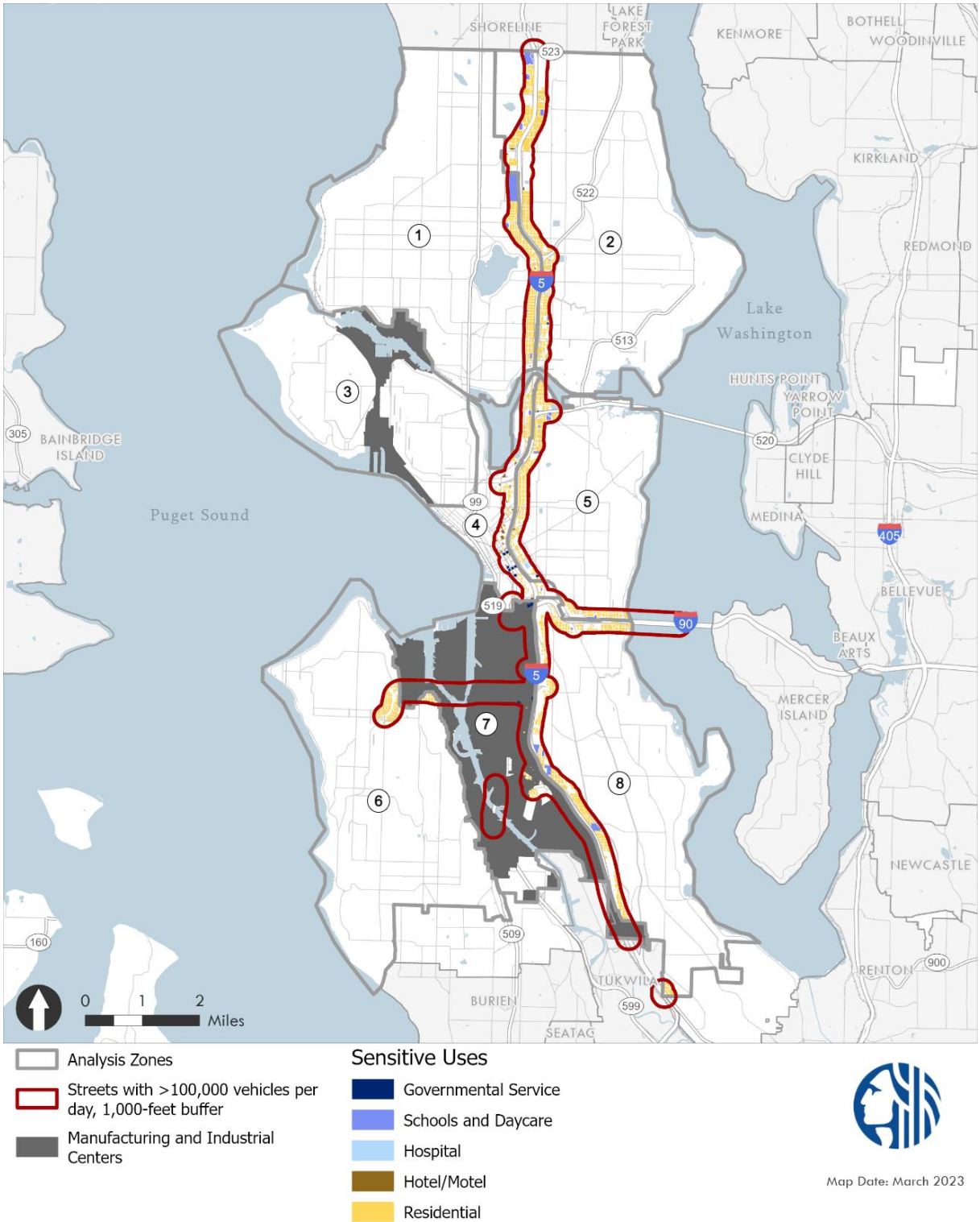
Portions of Seattle are also exposed to elevated stationary noise sources from industrial uses and ports where ships, heavy trucks, and mechanical equipment can result in increased noise levels at sensitive uses. This is considered a moderately adverse noise impact. The City has identified measures to reduce potential noise compatibility conflicts from industrial/maritime centers and noise-sensitive receivers through mitigation measures identified in the Seattle Industrial and Maritime Lands Final EIS (2022). Potential mitigation includes installing noise barriers, siting truck haul routes away from noise sensitive areas, and using green open spaces as noise buffers.

Exhibit 3.5-14 shows a 1,000-feet buffer around roadways and highways with daily trips greater than 100,000 vehicles. This shows that existing uses along Interstate 5 (I-5) north of Interstate 90 (I-90) consist primarily of residential uses, within 1,000 feet of transportation noise sources. **Exhibit 3.5-9** above shows a 3,000-foot buffer around above ground freight railways, which also indicates that residences are the primary noise-sensitive land use near freight railways.

This potential increased exposure to transportation noise is considered a potential moderate adverse impact.

To address the impact, the City could consider risk-reducing mitigation strategies such as setbacks for residential and other sensitive land uses from major traffic corridors, rail lines, port terminals, and similar sources of transportation and stationary noise, and/or to identify measures for sensitive receptors proposed to be in areas near such sources such as upgraded windows treatments, noise barriers, and noise insulation design features.

Exhibit 3.5-14 1,000-Feet Buffer Around Freeways and Roadways with Greater than 100,000 Daily Vehicles



Source: Kimley Horn, 2023.

Impacts of Alternative 1: No Action

Future development under Alternative 1 would result in increased vehicle traffic on roadways throughout the Seattle area. To quantify the degree of noise increases, traffic noise was modeled to assuming an annual growth rate of VMT of 0.37%, consistent with the transportation analysis. Resultant noise levels are presented in **Exhibit 3.5-15** and compared to existing conditions at the same roadside distance, 150 feet from the roadway center for major roadways throughout the city. As shown in **Exhibit 3.5-15**, Alternative 1 would result in traffic noise increases ranging from 0.1 dBA L_{dn} to 1.0 dBA L_{dn} and would not result in a significant (10 dBA or more) dBA noise increase.

Exhibit 3.5-15. Modeled Noise (L_{dn}) Levels at 150 Feet From the Roadway Center—Alternative 1 No Action (2044)

Roadway	Roadway Segment	Existing	2044 Alt. 1	dBA Difference Over Existing	Significant Increase?
Martin Luther King Jr Way S	Between S Jackson St and S Massachusetts St	58.4	59.4	1.0	No
	Between S Orcas St and S Graham St	59.7	60.6	0.9	No
Harbor Ave SW/Alki Ave	Between SW Admiral Way and California Way SW	57.5	57.9	0.4	No
Beacon Ave S	Between S Spokane St and S Columbian Way	54.8	55.2	0.4	No
34th Ave W	Between W Barrett St and W McGraw St	54.3	54.7	0.4	No
Roosevelt Way NE	Between NE Northgate Way and 80th St	56.7	57.0	0.3	No
Roosevelt Way NE	Between 5th Ave NE and 10th Ave NE	60.9	61.0	0.1	No
15th Ave NE	Between NE 135th St and NE 145th St	58.9	59.8	0.9	No

Notes: Road center to receptor distance is assumed to be 150 feet for values shown in this table. Noise levels were determined using the Federal Highway Administration (FHWA) traffic noise model. The average speed on these segments is assumed to be the posted speed for each roadway.
Source: Kimley-Horn, 2023

Equity & Climate Vulnerability Considerations

As shown in **Exhibit 3.2-8** in **Section 3.2 Air Quality & GHG Emissions**, Alternative 1 would locate several urban centers and urban villages within 1,000-feet of roadways with greater than 100,000 daily vehicles. Collectively these urban centers and villages represent 56% of all projected residential growth in the city through 2044. Only a portion of each center or village is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. Compared to all other alternatives, the number of units within the affected urban centers and villages would be the lowest (same as Alternative 3 and 4).

130th/145th Station Areas

Under Alternative 1, the current Comprehensive Plan and zoning designations would remain. Development around the 130th/145th Station Area would primarily be comprised of three-story single-purpose residential and some 4-8 story multifamily uses. The 130th/145th Station area would experience minimal traffic noise increases and stationary source noise levels (e.g., HVAC systems, parking noise, conversations, and other noise sources typical of urban areas) could increase, although not substantially due to the proximity to I-5, 145th Street, and other traffic noise sources that dominate the existing noise environment.

Impacts of Alternative 2: Focused

Development under Alternative 2 would result in increased vehicle traffic on roadways throughout the Seattle area. To quantify the degree of noise increases, traffic noise was modeled to assuming an annual growth rate of VMT of 0.43%, consistent with the transportation analysis. Resultant noise levels are presented in **Exhibit 3.5-16** and compared to existing conditions at the same roadside distance, 150 feet from the roadway center for major roadways throughout the city. As shown in **Exhibit 3.5-16**, Alternative 2 would result in traffic noise increases ranging from 0.4 dBA L_{dn} to 1.1 dBA L_{dn} and would not result in a significant (10 dBA or more) dBA noise increase. It should also be noted that the traffic noise levels shown in **Exhibit 3.5-16** would result in a minimal increase when compared to the No Action alternative (Alternative 1).

Exhibit 3.5-16. Modeled Noise (L_{dn}) Levels at 150 Feet From the Roadway Center—Alternative 2 (2044)

Roadway	Roadway Segment	Existing	2044 Alt. 2	dBA Difference Over Existing	Significant Increase?
Martin Luther King Jr Way S	Between S Jackson St and S Massachusetts St	58.4	59.5	1.1	No
	Between S Orcas St and S Graham St	59.7	60.6	0.9	No
Harbor Ave SW/Alki Ave	Between SW Admiral Way and California Way SW	57.5	57.9	0.4	No
Beacon Ave S	Between S Spokane St and S Columbian Way	54.8	55.4	0.6	No
34th Ave W	Between W Barrett St and W McGraw St	54.3	55.1	0.8	No
Roosevelt Way NE	Between NE Northgate Way and 80th St	56.7	57.4	0.7	No
Roosevelt Way NE	Between 5th Ave NE and 10th Ave NE	60.9	61.3	0.4	No
15th Ave NE	Between NE 135th St and NE 145th St	58.9	60.0	1.1	No

Notes: Road center to receptor distance is assumed to be 150 feet for values shown in this table. Noise levels were determined using the Federal Highway Administration (FHWA) traffic noise model. The average speed on these segments is assumed to be the posted speed for each roadway.
Source: Kimley-Horn, 2023.

Equity & Climate Vulnerability Considerations

In addition to the regional centers and villages that would be within the 1,000-feet buffer under Alternative 1, Alternative 2 would place additional neighborhood center units within the buffer, as shown in **Exhibit 3.2-10** in **Section 3.2 Air Quality & GHG Emissions**. Included in the additional units is the 130th/145th Station Area. Although a greater number of units would be closer to transportation noise sources and thus at higher risk than under Alternative 1, overall units within these regional centers, urban centers, and neighborhood centers consists of 46% of overall projected growth, which is higher than that of Alternative 1. Only a portion of each center is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. Alternative 2 would place a greater number of units within the 1,000-foot buffer when compared to Alternative 1, 3, and 4, but fewer units compared to Alternative 5.

130th/145th Station Areas

Under Alternative 2, the 130th/145th Station Area would be designated as neighborhood center and would include a mix of low-rise residential, midrise residential, and neighborhood commercial uses. The 130th/145th Station area would experience some traffic noise increases and stationary source noise levels could increase, although not substantially due to the proximity to I-5, 145th Street, and other traffic noise sources that dominate the existing noise environment. It is also noted that Alternative 2 would site residents and commercial/retail uses near transit hubs, which would likely reduce traffic and traffic noise levels associated with increased development in the area.

Impacts of Alternative 3: Broad

Development under Alternative 3 would result in increased vehicle traffic on roadways throughout the Seattle area. To quantify the degree of noise increases, traffic noise was modeled to assuming an annual growth rate of VMT of 0.41%, consistent with the transportation analysis. Resultant noise levels are presented in **Exhibit 3.5-17** and compared to existing conditions at the same roadside distance, 150 feet from the roadway center for major roadways throughout the city. As shown in **Exhibit 3.5-17**, Alternative 3 would result in traffic noise increases ranging from 0.5 dBA L_{dn} to 1.1 dBA L_{dn} and would not result in a significant (10 dBA or more) dBA noise increase. It should also be noted that the traffic noise levels shown in **Exhibit 3.5-17** would result in a minimal increase when compared to the No Action alternative (Alternative 1).

Exhibit 3.5-17. Modeled Noise (L_{dn}) Levels at 150 Feet From the Roadway Center—Alternative 3 (2044)

Roadway	Roadway Segment	Existing	2044 Alt. 3	dBA Difference Over Existing	Significant Increase?
Martin Luther King Jr Way S	Between S Jackson St and S Massachusetts St	58.4	59.4	1.0	No
	Between S Orcas St and S Graham St	59.7	60.7	1.0	No
Harbor Ave SW/Alki Ave	Between SW Admiral Way and California Way SW	57.5	57.9	0.4	No
Beacon Ave S	Between S Spokane St and S Columbian Way	54.8	55.6	0.8	No
34th Ave W	Between W Barrett St and W McGraw St	54.3	55.0	0.7	No
Roosevelt Way NE	Between NE Northgate Way and 80th St	56.7	57.5	0.8	No
Roosevelt Way NE	Between 5th Ave NE and 10th Ave NE	60.9	61.4	0.5	No
15th Ave NE	Between NE 135th St and NE 145th St	58.9	60.0	1.1	No

Notes: Road center to receptor distance is assumed to be 150 feet for values shown in this table. Noise levels were determined using the Federal Highway Administration (FHWA) traffic noise model. The average speed on these segments is assumed to be the posted speed for each roadway.
Source: Kimley-Horn, 2023.

Equity & Climate Vulnerability Considerations

As shown in **Exhibit 3.2-12** in **Section 3.2 Air Quality & GHG Emissions**, the regional centers and villages within the 1,000-feet buffer under Alternative 3 would be the same as Alternative 1, collectively representing 56% of all projected residential growth in the city through 2044. Only a portion of each center or village is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. A greater proportion of city-wide growth would be located in close proximity to transportation-related noise sources when compared to Alternative 2. Alternative 3 would place the fewest number of units (the same as Alternative 1 and 4) within the 1,000-foot buffer when compared to Alternative 2 and 5.

130th/145th Station Areas

The station area plan would not be implemented under Alternative 3; the area would grow based on the applicable citywide place types.

Impacts of Alternative 4: Corridor

The planned housing and job totals are similar in Alternative 4 as for Alternative 3, and traffic associated with Alternative 4 would be similar to (or less than) Alternative 3. For the purposes of this analysis, the traffic noise levels and increases from Alternative 3 also apply to Alternative 4. Therefore, traffic noise level increases from Alternative 4 would not be significant (10 dBA or more) as discussed above.

Alternative 4 would focus more growth near transit and major highways/roadways than Alternatives 1 through 3. Due to the density of development near major transportation noise sources, the potential for noise compatibility issues from Alternative 4 is profound, and a moderately adverse noise impact would occur. However, implementation of mitigation measures would reduce this noise impact as discussed below.

Equity & Climate Vulnerability Considerations

As shown in **Exhibit 3.2-14** in **Section 3.2 Air Quality & GHG Emissions**, the regional centers and villages within the 1,000-feet buffer under Alternative 4 would be the same as Alternative 1 and Alternative 3, collectively representing 56% of all projected residential growth in the city through 2044. Only a portion of each center or village is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. A greater proportion of city-wide growth would be located in close proximity to transportation-related noise sources when compared to Alternative 2. Alternative 4 would place the fewest number of units (the same as Alternatives 1 and 3) within the 1,000-foot buffer when compared to Alternative 2 and 5.

130th/145th Station Areas

The station area plan would not be implemented under Alternative 4; the area would grow based on the applicable citywide place types.

Impacts of Alternative 5: Combined

Development under Alternative 5 would result in increased vehicle traffic on roadways throughout the Seattle area. To quantify the degree of noise increases, traffic noise was modeled to assuming an annual growth rate of VMT of 0.51%, consistent with the transportation analysis. Resultant noise levels are presented in **Exhibit 3.5-18** and compared to existing conditions at the same roadside distance, 150 feet from the roadway center for major roadways throughout the city. As shown in **Exhibit 3.5-18**, Alternative 3 would result in

traffic noise increases ranging from 0.5 dBA L_{dn} to 1.3 dBA L_{dn} and would not result in a significant (10 dBA or more) dBA noise increase. It should also be noted that the traffic noise levels shown in **Exhibit 3.5-18** would result in a minimal increase when compared to the No Action alternative (Alternative 1).

Exhibit 3.5-18. Modeled Noise (L_{dn}) Levels at 150 Feet From the Roadway Center—Alternative 5 (2044)

Roadway	Roadway Segment	Existing	2044 Alt. 5	dBA Difference Over Existing	Significant Increase?
Martin Luther King Jr Way S	Between S Jackson St and S Massachusetts St	58.4	59.5	1.1	No
	Between S Orcas St and S Graham St	59.7	60.8	1.1	No
Harbor Ave SW/Alki Ave	Between SW Admiral Way and California Way SW	57.5	58.0	0.5	No
Beacon Ave S	Between S Spokane St and S Columbian Way	54.8	55.8	1.0	No
34th Ave W	Between W Barrett St and W McGraw St	54.3	55.0	0.7	No
Roosevelt Way NE	Between NE Northgate Way and 80th St	56.7	57.5	0.8	No
Roosevelt Way NE	Between 5th Ave NE and 10th Ave NE	60.9	61.5	0.6	No
15th Ave NE	Between NE 135th St and NE 145th St	58.9	60.2	1.3	No

Notes: Road center to receptor distance is assumed to be 150 feet for values shown in this table. Noise levels were determined using the Federal Highway Administration (FHWA) traffic noise model. The average speed on these segments is assumed to be the posted speed for each roadway.
Source: Kimley-Horn, 2023.

The growth strategy of Alternative 5 would result in the densest concentration of sensitive uses near major highways/roadways, transit facilities, and industrial/maritime uses. As a result, the highest conflict of noise and land use compatibility would occur with implementation of Alternative 5, and a moderately adverse noise impact would occur. However, implementation of mitigation measures would reduce this noise impact as discussed below.

Equity & Climate Vulnerability Considerations

This alternative would place the emphasis for growth near transit centers, with the 130th Street station designated as an urban center. In addition, additional neighborhood center units would be located in close proximity to transportation-related noise sources as shown in **Exhibit 3.2-16** in **Section 3.2 Air Quality & GHG Emissions**. Consistent across all alternatives, the highest amount of projected growth would be within the Downtown regional centers and First Hill/Capitol Hill regional center. Alternative 5 has the highest housing growth target among the five alternatives. As a result, the proportion of city-wide growth that would be located in close proximity to transportation-related noise sources is the lowest (39%) under this alternative while the total amount of collective growth would be the greatest. Only a portion of each center

or village is within the 1,000-feet buffer, so the potentially affected portion of the new residents would be smaller. Alternative 5 would place the greatest number of units within the 1,000-foot buffer when compared to the other alternatives.

130th/145th Station Area

Noise impacts at the Station Area would be most substantial under Alternative 5, which includes the strategies for encouraging housing growth in Alternatives 2, 3, and 4 plus some additional changes to existing regional center and urban center boundaries and changes to place type designations. Under this alternative, an urban center would be created on both the west and east sides of I-5 at the Sound Transit light rail station. As a result, the 130th/145th Station Area would experience higher traffic noise and stationary source noise increases than Alternatives 1 through 4.

3.5.3 Mitigation Measures

Incorporated Plan Features

The City will update its Comprehensive Plan policies for land use, transportation, and others with an opportunity to increase noise compatibility with sensitive receptors in proximity to significant transportation and industrial noise sources.

Regulations & Commitments

City noise regulations establish exterior sound level limits for various land use zones with the limits varying depending on the source zone and the receiving zone (**Exhibit 3.5-5**). These limits are intended to result in acceptably low interior noise levels for residences and other sensitive noise receptors. City noise regulations also address construction noise, limiting the times during the day when construction noise, both impact and non-impact, can exceed exterior noise limits (**Exhibit 3.5-6**).

Other Potential Mitigation Measures

Measures to Reduce Construction-Related Noise and Vibration Impacts

In addition to restrictions on the hours of construction in accordance with the Seattle Noise Ordinance, other mitigation that could be applied includes:

- Installing barriers to shield noise sensitive receptors and enclosing stationary work
- Selecting haul routes to avoid noise sensitive areas
- Using fully baffled compressors, or preferably electric compressors

- Using fully mufflered construction equipment
- Use low-noise emission equipment
- Monitor and maintain equipment to meet noise limits
- Prohibit aboveground jack hammering and impact pile driving during nighttime hours.

To reduce potential moderate adverse noise impacts from impact pile driving activities adjacent to noise-sensitive land uses (within 50 feet) or moderate adverse vibration impacts to historic structures, the One Seattle Comprehensive Plan could consider adoption of a policy recommending the Seattle Noise Ordinance be updated to require best practices for noise control, including "quiet" pile-driving technology (such as pre-drilling of piles, use of sonic or vibratory drivers instead of impact pile drivers, where feasible); and using temporary sound walls or cushion blocks to dampen impact noise from pile driving).

Measures to Reduce Land Use Compatibility Noise Impacts

Although mitigation measures are not required due to a lack of significant adverse impact findings, to reduce the potential for exposure of residences and other noise-sensitive land uses to incompatible environmental noise, the One Seattle Plan could consider adoption of a policy that recommends that residences and other noise-sensitive land uses (i.e., schools, day care) be separated from freeways, railways, ports, and other active industrial facilities where exterior noise environments exceed 65 dBA L_{dn}. If sensitive land uses are proposed in such areas, a policy addressing the need for additional mitigation strategies could be considered to achieve an interior noise performance standard of 45 dBA L_{dn}. The types of implementation measures that could help to accomplish this include:

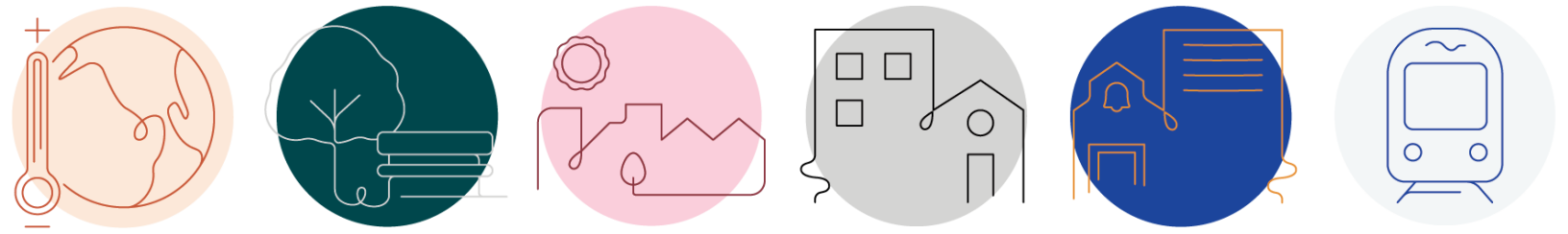
- Coordination with WSDOT on sound wall construction where major highways pass through residential areas.
- Use of appropriate building materials such as walls and floors with an STC rating of 50 or greater as necessary to achieve this performance standard.
- Site design measures, including use of window placement to minimize window exposure toward noise sources, avoid placing balcony areas in high noise areas, and use of buildings as noise barriers.
- Use of acoustically rated building materials (insulation and windows).

In addition, zoning land use criteria or boundaries could be established, while meeting other planning goals, to limit the proximity of new residential development to known or anticipated sources of high noise levels.

3.5.4 Significant Unavoidable Adverse Impacts

Under all studied alternatives, increased residential and employment growth could result in increased traffic volumes, though the resulting noise increases are not anticipated to exceed 3dBA, the threshold of change that is perceptible. The location of noise sensitive receivers (e.g., residential uses) near traffic, rail, or industrial noise sources could occur under all alternatives, particularly Alternatives 4 and 5. Implementation of residential noise mitigation described in the previous subsection should adequately reduce noise experienced by noise-sensitive receivers. With the application of mitigation measures described above, no significant unavoidable adverse noise impacts would occur under any of the alternatives.

3.6 Land Use Patterns & Urban Form



Source: City of Seattle, 2023.

This section summarizes the affected environment—including the current policy and regulatory frameworks, current land and shoreline uses, physical form, and views—and compares impacts of the alternatives on land use patterns and urban form in the city. The analysis focuses on changes in activity levels and compatibility of change in land use and shoreline patterns, as well as potential changes to physical conditions and views. This includes a review of land use patterns and compatibility, urban form (height, bulk scale, transitions, and tree canopy), shadows, and views in the study area and at the analysis area level (where applicable) as well as resulting equity and climate vulnerability considerations. Details of the thresholds of significance are shared in **Section 3.6.2**. Mitigation measures and a summary of any significant unavoidable adverse impacts are included following the impacts analysis.

3.6.1 Affected Environment

This section begins with a discussion of the historical context of planning and land use decisions in Seattle. This is followed by a summary of the existing policy and regulatory frameworks—including policies and regulations regarding the height, bulk, and scale of development as well as shadows, and public views—and the resulting general development patterns citywide and by analysis area. The summary addresses land use patterns and development character in Seattle and provides a baseline for analyzing the impacts of the alternative growth scenarios. **Section 3.7 Relationship to Plans, Policies, & Regulations** addresses related topics in greater detail, including the Washington State Growth Management Act (GMA), PSRC's VISION 2050 and Multi-County Planning Policies (MPPs), King County's County-Wide Panning Policies (CPPs), and the City's current Comprehensive Plan.

Overview of Historical Planning & Land Use Decisions

The study area was inhabited extensively by Coast Salish peoples for thousands of years prior to the presence of White settlers in the region. Before European contact, the region was one of the most populated centers in North America. The Indians of the Eastern Puget Sound lived in relatively small, autonomous villages and spoke variations of Lushootseed (*txʷəlšucid*, *dxʷləšúcid*), one of the Coast Salish languages. Many tribes were affiliated through intermarriage, political agreement, trade, and material culture. Indigenous people lived in permanent villages of longhouses or winter houses, and traditionally left their winter residences in the spring, summer, and early fall in family canoes to travel to temporary camps at fishing, hunting, and gathering grounds. At the time of the first White settlements around 1850, natives were living in more than 90 longhouses in at least 17 villages in modern-day Seattle.

This section incorporates evaluation written by City staff from the 2022 Seattle Industrial and Maritime Strategy Final EIS. Additional context was added here to expand the discussion citywide beyond industrial and maritime areas.

See **Section 3.9 Cultural Resources** for a more detailed history of indigenous and non-indigenous people in Seattle as well as an overview of historic, archaeological, and other cultural resources in the study area.

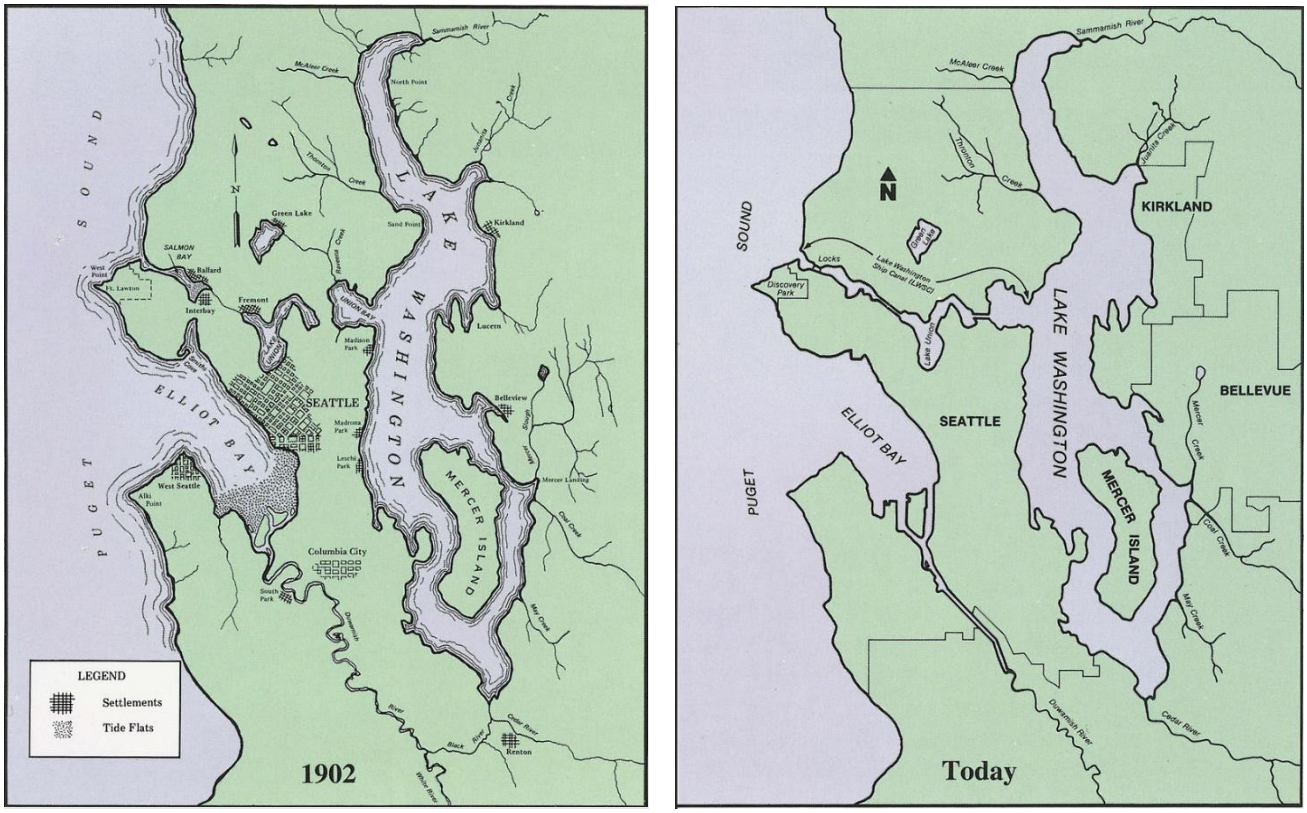
Waterways were central to the cultures and livelihoods of native people. "Duwamish" is the Anglo-Europeanized word which meant "people of the inside", *dxʷdəwʔabš*, referencing the interior waters of the Duwamish, Black and Cedar rivers. The Suquamish take their name from the Lushootseed phrase for “people of the clear salt water”, and the people living around Lake Washington were collectively known as *hah-choo-AHBSH* or *hah-chu-AHBSH* or *Xacuabš*, People of *HAH-choo* or *Xachu*, "People of a Large Lake" or "Lake People."

Early Alterations to Seattle’s Lands & Waterways

Seattle was incorporated in 1869, eighteen years after the first white settlers arrived. Physical alteration of the land and waterways by white settlers is important context for a discussion of land use today. Seattle’s land and waterways looked very different prior to construction of the Lake Washington ship canal and other alterations. A series of separate lakes that natives transited with over-land portages, for example, were previously in the location of present day Lake Union. The Lushootseed name for present day Lake Union was *tenas Chuck* or *XáXu7cHoo* ("small great-amount-of-water"), present day Lake Washington was called *hyas Chuck* or *Xacuabš* ("great-amount-of-water"), and the present-day area of the Montlake Cut was called "Carry a Canoe."

Early development viewed Seattle’s topography as an obstacle to growth. Construction on a system of locks and cut waterways connecting east to west began in 1911 and culminated in 1916 (see **Exhibit 3.6-1**). Waters were connected from Lake Washington’s Union Bay to Lake Union to Salmon Bay though a series of locks to Shilshole Bay. Lake Washington’s waters were partially drained as a result, lowering the level of the lake by 8.8 feet and drying up more than 1,000 acres of wetlands. Construction of the ship canal and locks resulted in further changes to rivers flows at the south end of Lake Washington. Prior to the alterations, Lake Washington emptied from its south end into the Black River (which no longer exists). The Black River is connected to the Duwamish River, which outlets as it does today to Elliott Bay. The Cedar River—which had previously flowed into the Black River in Renton—was diverted in 1912 directly into the south end of Lake Washington to reduce flooding in Renton. The remaining portion of the Black River dried up in 1916 when Lake Washington’s level dropped. Several Indigenous villages were located near the confluence of the Black and Duwamish rivers and the area was long used as a place of refuge. When the Black River vanished, native people were displaced from the area.

Exhibit 3.6-1. Seattle's Shoreline Over Time



Source: Burke Museum, The Waterlines Project, 2009.

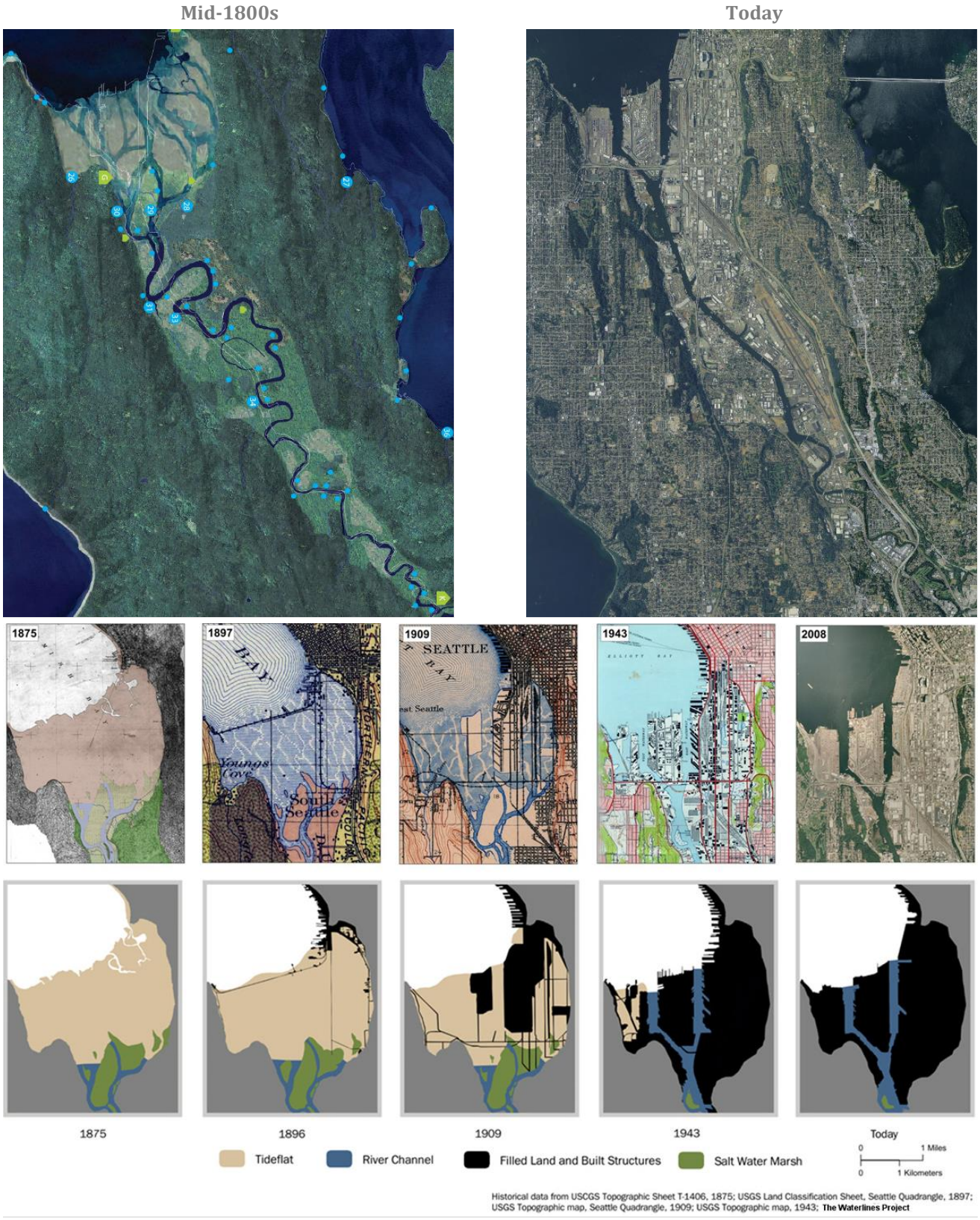
The Great Seattle Fire of 1889 prompted a vigorous period of rebuilding with more substantial, and fire-resistant materials like brick and stone. In an effort to create more buildable land for the expanding city, Seattle's city engineers began to regrade large chunks of land with hydraulic hoses. The Denny Hill regrade was one of the single largest efforts in reshaping Seattle's landscape, taking place between 1897 and 1930. Denny Hill originally topped out at about 220 feet in elevation, about half the height of hills such as Queen Anne, Capitol, and Magnolia; by the time regrading ended, the hill's high point had been lowered by more than 100 feet to create the mostly flat land now known as the Denny Regrade (**Exhibit 3.6-2**). Runoff and sediment from the Denny Regrade were primarily funneled west into Elliott Bay with some transported to the area around Pine and Olive Streets (creating the smoothed out, relatively gentle slope that now ascends past the Paramount Theater to Capitol Hill).

Exhibit 3.6-2. Denny Regrade Before and After, 1907-1909

Note: Regrade before and after, 2nd Avenue looking north from Pine Street, Seattle, 1907-1909
Sources: Courtesy Washington State Historical Society (1994.1.1.42) via HistoryLink.org Essay 21204.

Hundreds of acres of tide flats were filled in during the first decades of the 20th century to create dry land. After completion of the man-made Harbor Island in 1909, the mouth of the Duwamish River was divided into two channels. A subsequent series of major public works projects straightened and dredged the Duwamish riverbed, both to open the area to commercial use and to alleviate flooding. Beginning in 1913, the river was altered to remove oxbows and meanders to maintain high water flows and turning ships and by 1920, 4.5 miles of the Duwamish Waterway had been dredged to a depth of 50 feet, with 20 million cubic feet of mud and sand going into the expansion of Harbor Island. The shallow, meandering, 9-mile-long river became a 5-mile engineered waterway capable of handling ocean-going vessels and the Duwamish basin transitioned into Seattle's industrial and commercial core area. See **Exhibit 3.6-3**.

Exhibit 3.6-3. The Transformation of the Duwamish Estuary and River



Source: Burke Museum, The Waterlines Project, 2009.

Native villages on the Duwamish were completely supplanted by white settlement and commercial use through the massive alterations of the land and waterways, the destruction of wildlife and fish habitats it caused, and by the occupation of land. White settlers also deliberately removed native settlements as evidenced by burning of Indian longhouses in 1893. Duwamish people continued to work and fish in the area, using man-made "Ballast Island" on the Seattle waterfront as a canoe haul-out and informal market, but by the mid-1920s, most remnants of traditional life along the river had disappeared.

Racially Restrictive Covenants & Zoning Laws

Racially restrictive covenants came into popular use in Seattle after 1920. Covenants were used by property owners, subdivision developers, or realtors to bar the sale or rental of property to specified racial or ethnic groups. Property deeds in predominantly White neighborhoods or desirable areas of new housing development often explicitly stated that no Asian, Black, and Indian people shall be permitted to occupy the property. Seattle residential areas with restrictive covenants include but are not limited to Victory Heights, Queen Anne, Capitol Hill, Blue Ridge, and Hawthorne Hills. Such neighborhoods are located away from the city's industrial areas. By excluding all but White households from covenant-restricted residential areas, eligible locations for homes for Black, Asian, and Indigenous households were more likely to be in close proximity to industrial areas, such as Delridge, South Park, and South Beacon Hill (Honig, 2021; University of Washington, 2020).

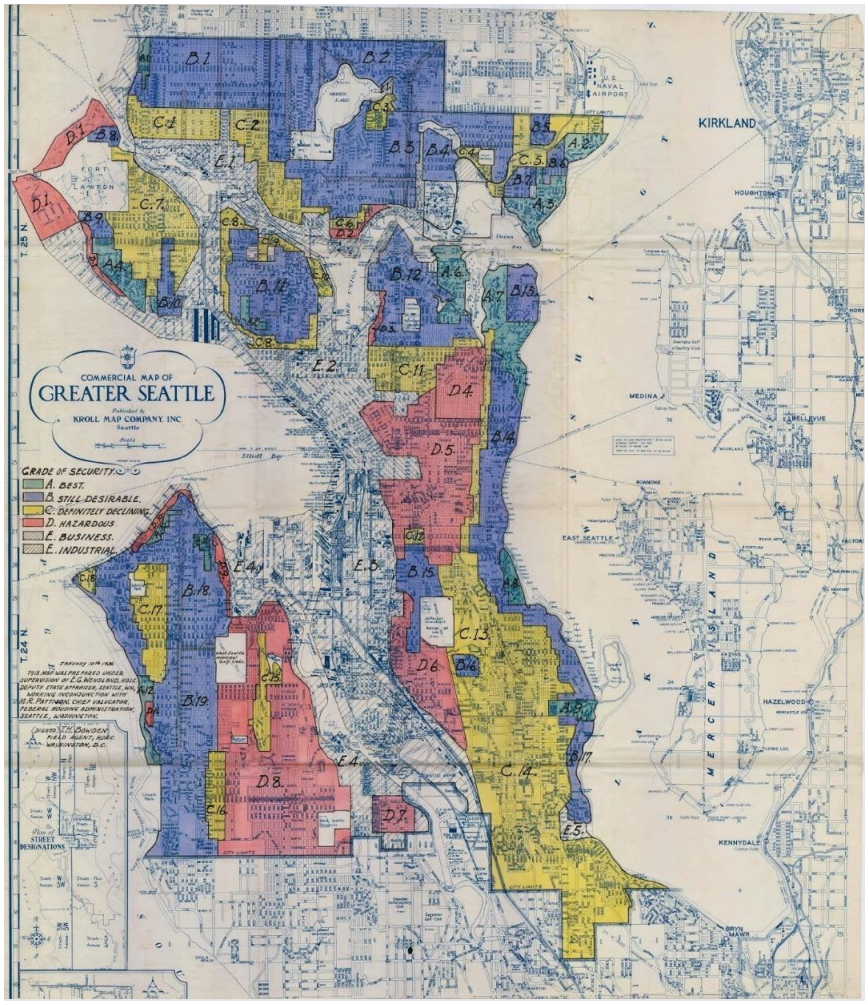
See also **Section 3.8 Population, Housing, & Employment** and the Seattle Municipal Archives (Redlining in Seattle) for more discussion of redlining and displacement.

In the late 1930s the practice of redlining was used to discriminate against racial minorities as the federal Home Owners' Loan Corporation (HOLC) evaluated mortgage risks in cities across the country. It rated neighborhoods as "best," "still desirable," "definitely declining," and "hazardous" (**Exhibit 3.6-4**). Neighborhoods with concentrations of Black, Asian, and Indian households were deemed financially risky and were marked in red so that mortgage lenders were discouraged from financing property there. The HOLC maps promoted racial inequality because it made mortgages difficult to obtain and expensive for minority households who sought to buy homes where they lived, preventing them from accumulating wealth. Additionally, lenders refused to provide mortgages for Black, Asian, and Indian households in predominantly White neighborhoods rated "best" or "still desirable." On the 1936 HOLC map of Seattle, neighborhoods adjacent to the Duwamish industrial areas including Delridge, South Park, and South Beacon Hill were rated "hazardous," while neighborhoods closely adjacent to the Ballard and Interbay industrial areas including the lower slopes of Magnolia, Queen Anne, and portions of Ballard were rated "definitely declining."

Prior to Seattle's first zoning ordinances, multifamily land uses were allowed broadly throughout the city, with no areas reserved exclusively for single-dwelling housing. Seattle's first ordinance was adopted in 1923, with a major update in 1956. Multi-family residential districts were located at the edges of rail lines, industrial districts, and manufacturing districts

as part of the 1956 update and caused environmental justice harms. These ordinances prevent new development in large areas of the city, particularly more affluent areas, and pushed multifamily to less desirable areas. The effect of this zoning was that Black, Asian, Indian, and relatively less affluent renters were exposed to noise and air quality and other impacts, while single family districts further from industrial areas were not. This pattern of multi-family housing and zoning districts bordering MICs continues to be evident today in areas including Interbay and the northeast edge of Ballard.

Exhibit 3.6-4. Commercial Map of Greater Seattle With "Grade Of Security" Designations, 1936



Source: Honig, 2021 (HistoryLink Essay No. 21296).

Annexation & Regional Transportation Corridors

Many of the City's early connections to the region and nation and resulting land use decisions were dependent on water access. This dependency shifted in the late 1800s with expansion of the roadway and rail network. Seattle's first electric streetcars opened in 1889 and by 1892, the city had 48 miles of electric streetcars and 22 miles of cable railway. In 1902, the Seattle-

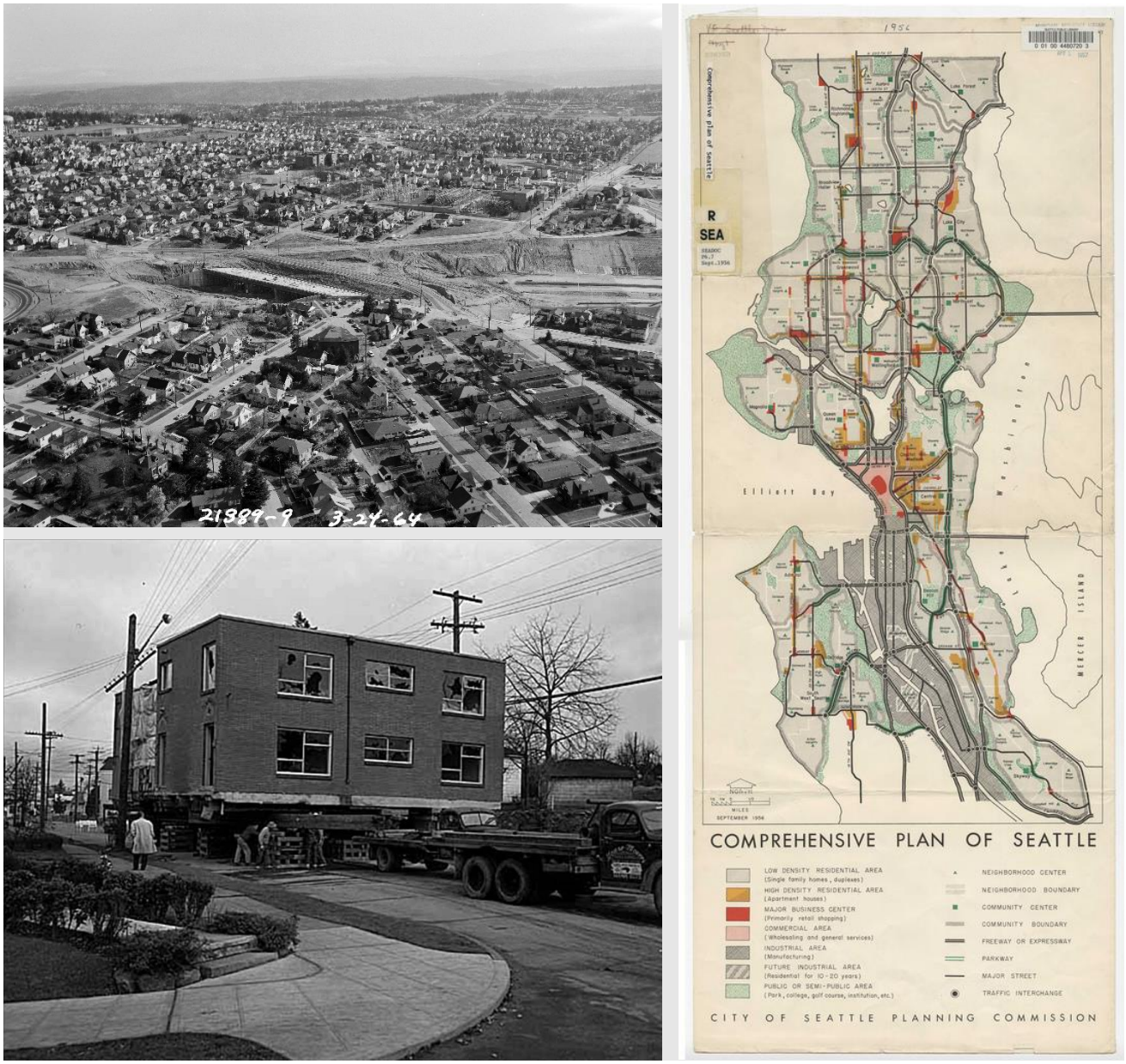
Tacoma Interurban Railway opened—which included stops in Rainier Beach, Renton, and Kent—and a Mount Vernon-to-Bellingham line opened by 1910. Street cars exposed new territory to speculative commercial and residential development and the city expanded through extensive annexation during the first part of the 20th century. As of 1891, the city extended from present-day Beacon Hill to the University District (then known as Brooklyn). Between 1905 and 1910, eight small towns (Ballard, Columbia, Georgetown, Laurelhurst, Rainier Beach, Ravenna, South Park, and West Seattle) were annexed to the City of Seattle, nearly doubling the physical area of the city. After Georgetown was annexed in 1910, no large annexations were made until the early 1950s. Much of the city north of N 85th Street was added during postwar annexation as major road networks accelerated the decentralization of the city.

Major transportation corridors constructed during the 20th century fundamentally changed Seattle's land use patterns and the neighborhoods bisected by them. These included the Pacific Highway built in the 1920s (later renamed US 99 and then SR 99 after construction of I-5), the George Washington Memorial Bridge (the Aurora Bridge) completed in 1932, the elevated Alaskan Way completed in 1936 and subsequent double-deck Alaskan Way Viaduct built in three phases from 1949 through 1959, and the Seattle Freeway (now I-5) constructed in the 1960s.

When the viaduct opened in 1953, it offered the first route around Seattle's congested central business district. The expressway relieved traffic on city streets, eased the movement of through traffic, and improved connections between growing southwest Seattle neighborhoods and downtown. Despite its utility, the viaduct was long viewed as a physical and visual barrier between downtown and the city's waterfront. Various groups and individuals argued and planned for its demise over several decades but the lack of a viable alternative for handling the tens of thousands of daily users stymied their efforts. The 2001 Nisqually earthquake significantly damaged the viaduct's joints and foundations and furthered the discussion. After a decade of studying, planning, and public discussion, the idea for a deep-bore tunnel garnered enough support to move forward. The southern end of the viaduct was demolished in October 2011 and tunnel boring took place from 2013-2017. The viaduct closed to traffic in January 2019, the new tunnel opened in February, and the remaining span of the viaduct was demolished later that year. New development along the waterfront in downtown Seattle—including a park promenade—are scheduled to be completed in 2025.

The Seattle Freeway, now known as I-5, also altered the landscape of Seattle's neighborhoods when it was constructed in the 1960s. Due to unique geographical and topographical constraints, the freeway's route was ultimately drawn directly through the center of the city, breaking east to avoid Green Lake and then bending west around Beacon Hill before continuing south (see **Exhibit 3.6-5**). Communities within or adjacent to the future construction path were sliced in half and severely impacted by the resulting displacement while communities on the western and eastern shores of the city remained intact. For example, eight square blocks of land demolished in the heart of the Chinese International District left the district divided and with an unpleasant edge condition for future redevelopment to contend with. In all, 20.5 miles of the route—or about 4,500 parcels of land (most of which were improved with homes, apartment buildings, or businesses)—were cleared for the construction.

Exhibit 3.6-5. I-5 Construction Through Seattle and the Planned Seattle Freeway System



Top left: Construction of I-5, 1964; Courtesy of the Seattle Municipal Archives. Bottom left: Apartment building being moved due to I-5 construction, 1960; HistoryLink Essay 4168 via MOHAI (1986.5.4007). Right: City of Seattle 1957 Comprehensive Plan; Seattle Public Libraries Special Collection.

Seattle's Freeway Revolt—one of a number of such uprisings across the U.S. in the 1960s and 70s—halted two other major freeways in the city and significantly downsized a third. Along with I-5, the City's Comprehensive Plan called for a parallel freeway on the Lake Washington side (the RH Thomson Expressway) that would have run from the Duwamish neighborhood in the south to Bothell in the north, and the Bay Freeway that would have connected Seattle Center to I-5 with a highway via a massive viaduct that cut through South Lake Union (see **Exhibit 3.6-5**). If built as planned, the RH Thompson Expressway would have cut through the

heart of the largely Black Central District Neighborhood, demolished as many as 3,000 homes, and displaced up to 8,000 people. The planned 14-lane interchange with I-90 alone (via an open trench on Mount Baker Ridge) would have displaced an estimated 4,000 residents and many businesses (as opposed to the existing tunnels that currently connect I-90 to I-5). A diverse consortium of activists faced the Seattle City Council and Highway Department head on to stop both of the planned freeways, which were eventually removed from the City's Comprehensive Plan in the 1970s and struck down by public referendum.

Century 21: the Seattle World's Fair and post-Exposition Civic Center

The Century 21 Exposition, also known as the Seattle World's Fair, was held between April 21 and October 21, 1962, and drew almost 10 million visitors. The 1962 Seattle World's Fair gave visitors a glimpse of the future and left Seattle with a lasting legacy, giving Seattle world-wide recognition and effectively "putting it on the map." Though the fair was primarily administered by the non-profit private Century 21 Exposition, Inc., substantial efforts were made to integrate the planning of the municipal, state, and private entities involved. In addition, the City of Seattle was deeply involved in development and execution. The City oversaw a number of fair-based building projects both within and beyond the fairgrounds, including the Monorail line, the International Fountain, and a 1,500-car garage along Mercer Street. Ultimately, the fair left the city a permanent legacy in the Seattle Center and its complex of performance, sports, and entertainment halls, as well as the Pacific Science Center, the Monorail, and the Space Needle.

The Modern Comprehensive Plan: Land Use Policies & Implementation

In 1957, Seattle adopted it first Comprehensive Plan "in principle" presented in the form of an illustrated map (see **Exhibit 3.6-5**). The Plan focused primarily on transportation, specifically the automobile, and protecting single-family homes. Per the adopting resolution, the Plan addressed "the most appropriate use of land, lessening traffic congestion and accidents, making provision for adequate light and air, avoiding undue concentration of population, promoting a coordinated development of vacant areas, encouraging the formation of neighborhood and community units, and the conservation and restoration of natural resources (Resolution 17488)." Various amendments were made to the 1957 Comprehensive Plan until 1978 when the City started relying instead on land use policies. The last major revision was made in 1965 and the City stopped issuing its own comprehensive plan in 1978, relying instead on land use policies, until the State adopted the 1990 Growth Management Act (GMA). Those land use policies drove a significant review of the City's land use regulations, resulting in the adoption of new zoning policies and regulations that supported mixed-use development through the 1980s.

The GMA was adopted in 1990 to address concerns about the impacts of uncoordinated growth on Washington communities and the environment and provides a framework for land use planning and development regulations in the state. As part of the GMA, most cities and counties in Washington (including Seattle) are required to adopt

See also **Section 3.8 Population, Housing, & Employment.**

comprehensive plans coordinated with regional and countywide planning. In 1994, the City adopted its first GMA mandated comprehensive plan developed around an "urban village strategy." This strategy focuses growth in walkable, mixed-use neighborhoods with good access to jobs, transit, and services. The City Council also adopted 37 neighborhood plans during the 1990s as part of this planning effort in response to concerns regarding the impact of the urban village strategy on neighborhoods.

The Comprehensive Plan and many neighborhood plans have been revised since the 1990s, but the City's overall urban village growth strategy has remained consistent. Growth has largely adhered to the plan with 83% of new homes built in urban centers or villages over the last 10 years (half of all housing was built in Downtown, South Lake Union, First Hill, and Capitol Hill). Substantial public and private investments have further supported the growth strategy in several villages, including Sound Transit's expansion of the light rail system and bio-tech sector growth in South Lake Union. Overall, the urban village strategy has guided residential, office, and retail development into a small number of compact, walkable, mixed-use neighborhoods linked by transit.

At the same time, the city's growth has led many neighborhoods to become increasingly exclusive and has contributed to a dearth of affordable housing for its working population, while endemic issues of racism, social injustice, and a warming planet continue to inspire demands for change. Many neighborhoods outside urban center and village boundaries have few housing options beyond detached homes. With the cost of these homes rising dramatically in the last 10 years, these neighborhoods are out of reach for most people who don't already own a home. The urban village strategy has also resulted in few new homeownership opportunities inside centers and villages since it focuses development in areas zoned primarily for apartments and retail.

Current Policy & Regulatory Frameworks

This section describes the future land use and zoning framework (including overlay districts), policies and regulations regarding urban form and aesthetics (height, bulk, and scale, transitions, tree canopy, shadows, and views), and current land use conditions. Current policy and regulatory framework regulating land use in the City of Seattle flows from the GMA, the PSRC's VISION 2050 and MPPs, King County's CPPs, the City's current Comprehensive Plan, and implementation actions including development standards in the Seattle Municipal Code (SMC) and the Shoreline Master Program (SMP). Several other regulatory measures affect land use including localized overlay districts and design guidelines. Most state, regional, and local land use policies are reviewed and evaluated in **Section 3.7 Relationship to Plans, Policies, & Regulations** with policies and regulations specific to urban form and aesthetics discussed below.

Future Land Use & Zoning

The City of Seattle's Future Land Use Map (FLUM) is part of the Comprehensive Plan and expresses spatially the 20-year vision of preferred land use patterns to guide development within the city. Four land use area types implement the urban village strategy—urban centers, hub urban villages, residential urban villages, and manufacturing/industrial centers (MICs). Four other land use types—neighborhood residential areas, multi-family residential areas, commercial/mixed-use areas, and industrial areas—are meant to suggest specific uses outside of the urban villages. The FLUM also designates major institutions, cemeteries, and city-owned open space.

The future land use designations are implemented by a corresponding range of zoning districts and development regulations established in Title 23 of the Seattle Municipal Code (SMC). There may be different levels of zoning within each land use area that provide more detail about what can be built. Zoning overlays also exist in certain locations, such as around major institution overlay districts and in master planned communities. Property located within an overlay district is subject both to its zone classification regulations and to additional requirements imposed for the overlay district. The overlay district provisions apply if they conflict with the provisions of the underlying zone. **Exhibit 3.6-6** summarizes future land use designations and corresponding implementing zones. See also **Appendix G.1** for a summary of general zoning categories and overlay districts detailed in SMC Title 23.

Exhibit 3.6-6. Existing Future Land Use Designations and Typical Implementing Zones

Future Land Use Designation	Typical Implementing Zones[1]
Urban Centers[2] Urban centers are the densest Seattle neighborhoods. They act as both regional centers and local neighborhoods that offer a diverse mix of uses, housing, and employment opportunities.	▪ Downtown (DH1, DH2, DMC, DMR, DOC1, DOC2, and DRC) ▪ Pike Market Mixed (PMM), Pioneer Square Mixed (PSM), and International District Mixed and Residential (IDM and IDR) ▪ Seattle Mixed (SM) ▪ Lowrise, Midrise, and Highrise Multifamily (LR3, MR, and HR) ▪ Neighborhood Commercial (NC2, and NC3) ▪ Commercial (C1 and C2)
Hub Urban Villages[2] Hub villages are communities that offer a balance of housing and employment but are generally less dense than urban centers. These areas provide a mix of goods, services, and employment for their residents and surrounding neighborhoods.	▪ Residential Small Lot (RSL) ▪ Lowrise Multifamily (LR1, LR2, and LR3) ▪ Midrise Multifamily (MR) ▪ Neighborhood Commercial (NC1, NC2, and NC3) ▪ Commercial (C1 and C2)
Residential Urban Villages[2] Residential villages are areas of residential development, generally at lower densities than urban centers or hub urban villages. While they are also sources of goods and services for residents and surrounding communities, for the most part they do not offer many employment opportunities.	▪ Residential Small Lot (RSL) ▪ Lowrise Multifamily (LR1, LR2, and LR3) ▪ Midrise Multifamily (MR) ▪ Neighborhood Commercial (NC1, NC2, and NC3)

Future Land Use Designation	Typical Implementing Zones[1]
Manufacturing Industrial Centers (MICs) Manufacturing industrial centers are home to the city's thriving industrial businesses. Like urban centers, they are important regional resources for retaining and attracting jobs and for maintaining a diversified economy. Most of the city's shipping, manufacturing, and freight-distribution activities take place in the city's two manufacturing/industrial centers.	▪ Industrial (MML, II, UI, IC)
Neighborhood Residential Areas Neighborhood residential areas provide opportunities for detached single-family and other compatible housing options that have low height, bulk, and scale in order to serve a broad array of households and incomes and to maintain an intensity of development that is appropriate for areas with limited access to services, infrastructure constraints, fragile environmental conditions, or that are otherwise not conducive to more intensive development.	▪ Neighborhood Residential (NR1, NR2, and NR3)
Multi-Family Residential Areas The city's multi-family areas contain a variety of housing types. You might find duplexes or townhouses, walk-up apartments, or highrise towers. Overall, these areas offer more choices for people with different living styles and a wider range of incomes than single-family zones.	▪ Lowrise Multifamily (LR1, LR2, and LR3) ▪ Midrise Multifamily (MR)
Commercial / Mixed Use Areas Commercial/mixed-use areas are places meant to provide jobs and services. Most of these areas also allow housing.	▪ Neighborhood Commercial (NC1, NC2, and NC3) ▪ Commercial (C1 and C2)
Industrial Areas In limited industrial areas outside the two MICs, City zoning rules allow industrial activity such as manufacturing, warehousing, and shipping of goods through waterways, railways, and highways.	▪ Industrial (MML, II, UI, IC)
Major Institutions	▪ Major Institution Overlay District. Underlying zoning varies depending on the surrounding community.
Cemetery	▪ Neighborhood Residential (NR2 and NR3) ▪ Lowrise Multifamily (LR3)
City-Owned Open Space	▪ Neighborhood Residential (NR1, NR2, and NR3)

1 See **Appendix G.1** for more detailed summaries of general zoning categories and overlay districts, respectively.
2 See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Sources: City of Seattle Future Land Use Map, 2022; BERK, 2023.

Shoreline Master Program

The Washington State Shoreline Management Act (SMA) requires all counties and most towns and cities to plan for how shorelines in their jurisdiction will develop through a Shoreline Master Program (SMP). Seattle's SMP applies to the shorelines and all waters of the state, as document in the City's Official Land Use Map (SMC 23.32). The Shoreline District includes all land within 200 feet of the city's major water bodies—Puget Sound, Lake Washington, Lake Union, the Lake Washington Ship Canal, and the Duwamish River—as well as hydrologically connected wetlands and all submerged land. The adopted Seattle SMP is comprised of the goals and policies in the Shoreline Areas Element of the Comprehensive Plan, SMP regulations in the Land Use Code (SMC 23.60A), maps of the locations of shoreline environments, and the Shoreline Restoration and Enhancement Plan.

The SMP must address a wide range of physical conditions and development settings along areas of the shoreline. Seattle's SMP prescribes different environmental protection measures, allowable use provisions, development standards, and other policy and regulatory measures based on the environmental designation of each area in the Shoreline District. Shoreline environment designations within Seattle's Shoreline District are divided into two broad categories—Conservancy and Urban—and then subdivided further within these two categories. The conservancy shoreline environments are less developed and provide for areas of navigation, recreation, and habitat protection. The urban shoreline environments are areas that are more developed and provide for single-family houses and water-dependent and water-related uses. SMC 23.60A.220(D) details the purpose and locational criteria of each environment designation.

Urban Form

Height, Bulk, & Scale

Development regulations govern what uses are permitted, as well as the physical form (such as heights and setbacks) of development, which influences urban character. Policies guiding height, bulk, and scale in the Land Use Element of the Comprehensive Plan include:

> ***LU 5.3*** *Control the massing of structures to make them compatible with the area's planned scale, provide a reasonable ratio of open to occupied space on a site, and allow the building to receive adequate natural light.*
>
> ***LU 5.4*** *Use maximum height limits to maintain the desired scale relationship between new structures, existing development, and the street environment; address varied topographic conditions; and limit public view blockage. In certain Downtown zones and in industrial zones, heights for certain types of development uniquely suited to those zones may be unlimited.*
>
> ***LU 5.5*** *Provide for residents' recreational needs on development sites by establishing standards for private or shared amenity areas such as rooftop decks, balconies, ground-level open spaces, or enclosed spaces.*

> ***LU 5.6*** *Establish setbacks in residential areas as needed to allow for adequate light, air, and ground-level open space; help provide privacy; promote compatibility with the existing development pattern; and separate residential uses from more intensive uses.*

These policies are reiterated in SMC 25.05.675.G Specific Environmental Policies – Height, bulk, and scale, which set environmental review policies to provide for "smooth transition between industrial, commercial, and residential areas, to preserve the character of individual City neighborhoods, and to reinforce natural topography by controlling the height, bulk, and scale of development." Specifically, SMC 25.05.675.G.2 includes height, bulk, positioning, design, and other mitigation techniques and states the following intent:

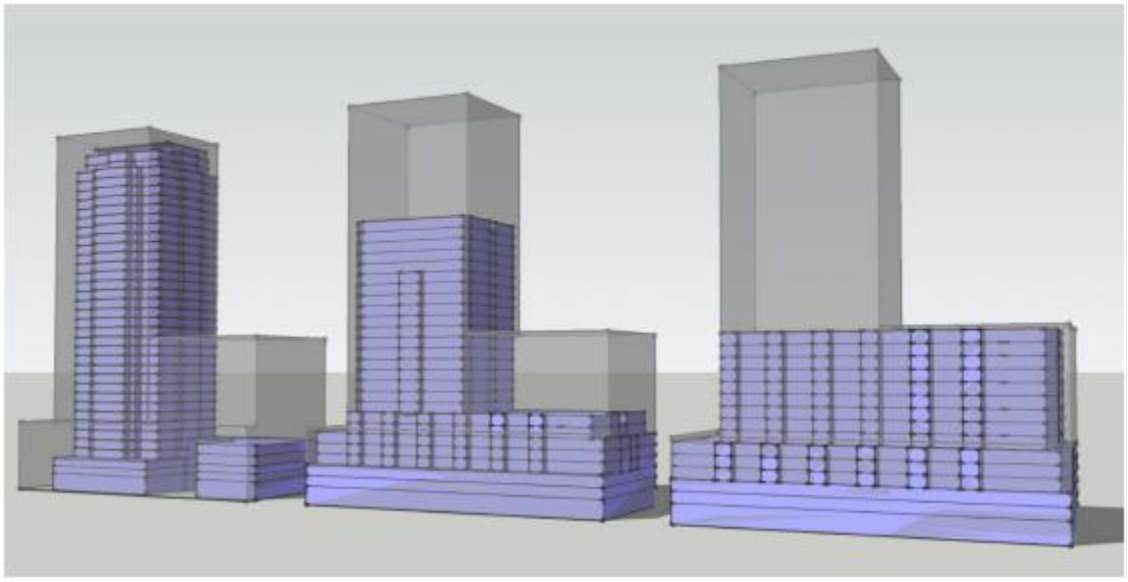
> *It is the City's policy that the height, bulk, and scale of development projects should be reasonably compatible with the general character of development anticipated by the goals and policies set forth in the Land Use Element, Growth Strategy Element, and Shoreline Element of the Seattle Comprehensive Plan; the procedures and locational criteria for shoreline environment redesignations set forth in Sections 23.60A.060 and 23.60A.220; and the adopted land use regulations for the area in which they are located, and to provide for a reasonable transition between areas of less intensive zoning and more intensive zoning.*

The height, bulk, scale, and character of development vary considerably across Seattle. Seattle's zoning regulations include limits on building height, as well as other characteristics, including density, floor area ratio (FAR), minimum setbacks, and maximum lot coverage. All of these qualities contribute to the overall intensity of development at any given location. Building height and FAR limits are two of the most important code elements that directly influence how intense a development feels in a given location. FAR is the ratio of a building's floor area to the size of the lot where it is located. For most zoning districts, the City of Seattle has established both a maximum allowed height and a maximum allowed FAR. The relationship between building height and FAR can be viewed as a shorthand for assessing the "bulkiness" of building. For example, a tall building with a low FAR will take up a smaller proportion of its building site than a relatively short building with a higher FAR (see **Exhibit 3.6-7** and **Exhibit 3.6-8**).

Exhibit 3.6-7. Zoning Envelopes and Floor Area Ratios

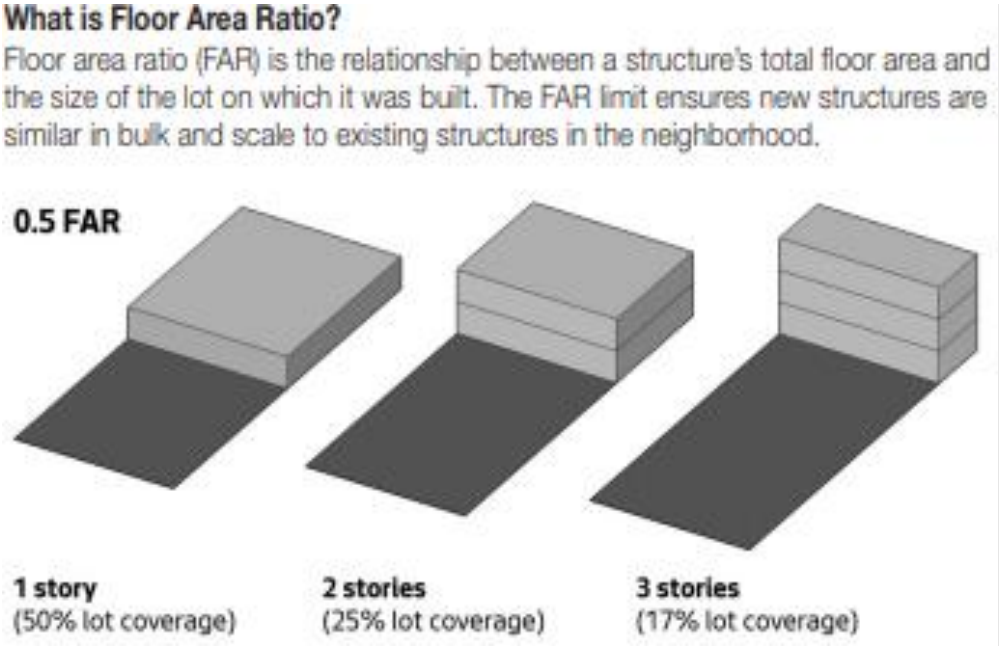
Gray: *hypothetical "zoning envelopes" established by setbacks, height limits, tower floorplate limits, minimum tower separation and other development standards.*

Blue: *possible building configurations within the allowed zoning envelope, limited by a floor area ratio (FAR) of 12. All three buildings have the same amount of floor area but they configure the space differently.*



Note: A floor plate is the horizontal plane of the floor of a building, measured to the inside surface of exterior walls. Floor area ratio is the ratio of the total square feet of a building to the total square feet of the property on which it is located. Building floor area / Lot size = Floor Area Ratio
Source: City of Seattle, 2013.

Exhibit 3.6-8. Understanding Floor Area Ratios and Lot Coverage



Source: City of Seattle, 2019.

In neighborhood residential zones, Seattle limits FAR to (SMC 23.44.011.B):

1. *The FAR limit on lots developed with a single-family dwelling unit as the principal use in NR1, NR2, and NR3 zones, is 0.5, except that lots with less than 5,000 square feet of lot area can include up to 2,500 square feet of total chargeable floor area. The applicable FAR limit applies to the total chargeable floor area of all structures on the lot.*
2. *The FAR limit in RSL zones is 0.75. The applicable FAR limit applies to the total chargeable floor area of all structures on the lot.*

Transitions

The Growth Strategy Element of the Comprehensive Plan includes the following policy on urban design transitions:

> ***GS 3.11*** *Use zoning tools and natural features to ease the transitions from the building intensities of urban villages and commercial arterials to lower-density developments of surrounding areas.*

Other elements of the Comprehensive Plan also mention the importance of smooth transitions around urban villages and industrial areas. Smooth transitions are also mentioned in SMC 25.05.675.G Specific Environmental Policies (see **Height, Bulk, & Scale** above).

While transitions are achieved primarily through decisions about where different zones are applied, there are also some existing development code regulations that are intended to limit the impacts of zone transitions, including regulations regarding setbacks and upper-story step backs and appurtenances and nuisances. These are described in more detail below.

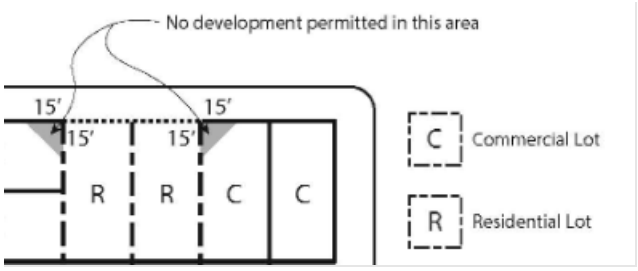
Setbacks & Upper-Story Setbacks (by Zone)

Multifamily zones. SMC 23.45.518 regulates setbacks in multifamily zones and requires a 12-foot setback required for all portions of development in the lowrise zones above 34 feet that abut a neighborhood residential zone. For religious organizations building affordable housing, SMC 23.45.550 establishes FAR and height bonuses and requires a 10-foot setback on sites adjacent to neighborhood residential zones.

Commercial zones. SMC 23.47A.014 regulates setbacks in commercial zones, with the following provisions:

- Required corner setbacks of 15 feet, but not side setbacks, in commercial zones where they abut residentially zoned parcels. See **Exhibit 3.6-9**.

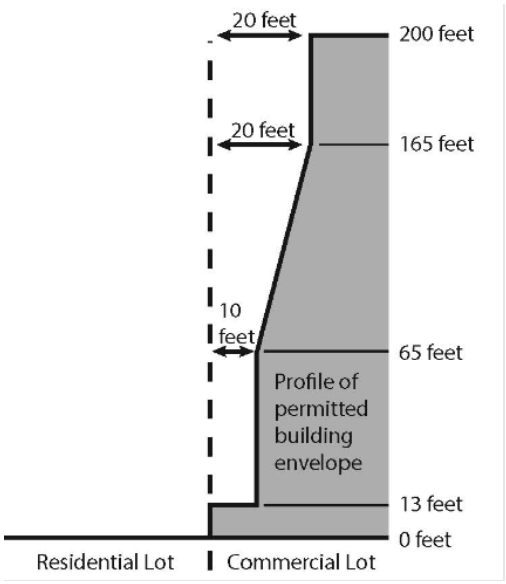
Exhibit 3.6-9. Corner Setbacks Required in Residential/Commercial Transitions



Source: Seattle Municipal Code Exhibit A for 23.47A.014.

- Required 10-foot setbacks for all portions of development above 13 feet, up to 65 feet, on parcels abutting residential or commercially zoned lots. Above 65 feet, an additional one-foot setback is required for each additional 10 feet of height to 165 feet, at which point no further setbacks are required. See **Exhibit 3.6-10**.

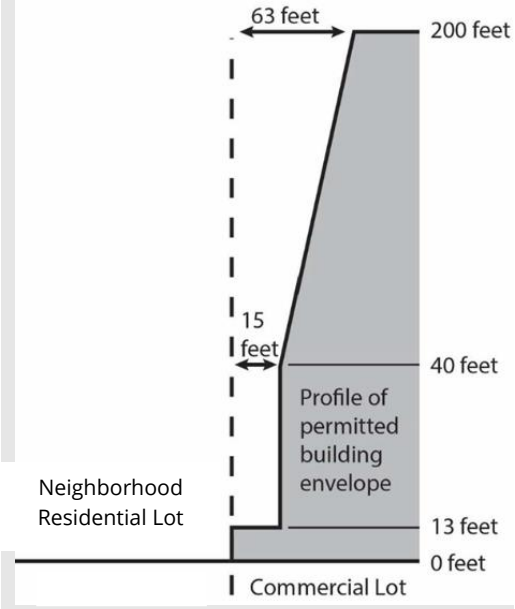
Exhibit 3.6-10. Upper Setbacks Required on Commercial Lots



Source: Seattle Municipal Code Exhibit B for 23.47A.014.

- Required 15-foot setbacks for all portions of development above 13 feet, up to 40 feet, on parcels abutting lots zoned neighborhood residential. Above 40 feet, an additional 3-foot setback is required for each additional 10 feet of height. See **Exhibit 3.6-11**.

Exhibit 3.6-11. Upper Setbacks Required: Commercial Adjacent to Neighborhood Residential



Note: Upper setbacks required on commercial lots adjacent to neighborhood residential lots
Source: Seattle Municipal Code Exhibit C for 23.47A.014.

Appurtenances & Nuisances

SMC 23.45.570 ensures that institutions located in Lowrise (LR) zones do not site noisy or visually harsh infrastructure like HVAC units, game courts, or kitchen ventilation within 20 feet from properties zoned neighborhood residential. In commercial zones, street-level use restrictions, setbacks, conditional use restrictions, and/or landscape screening requirements apply to specific uses or site elements like warehouses, drive-throughs, dumpsters, and drinking establishments near residential zones.

Tree Canopy

See **Section 3.3 Plants & Animals** for information about existing regulations and tree canopy patterns.

Tree protection. Seattle's tree code protects existing trees through rules established in Seattle Municipal Code 25.11.

Street trees. In most zones, Seattle also requires existing street trees to be retained unless the Director of SDOT approves their removal and for street trees to be planted with redevelopment, with some exceptions (SMC 23.45.524.B). Green Factor requirements are also required to be met for most new development in multi-family and commercial zones.

In the 130th/145th Station Area, street designations, which set standards for street tree planting areas, for key streets include:

- NE 130th St (east of Roosevelt Way NE): Neighborhood Yield Street—5-8-foot green stormwater infrastructure landscape strip

- Roosevelt Way NE, 15th Ave NE, NE 125th St, and NE 145th St: Urban Center Connector, Principal Arterial—6-12-foot landscape/furniture zone

Maximum lot coverage regulations are relevant to tree canopy because they have limited building mass in Seattle's lowest density zones for decades, leaving more space for vegetation. **Exhibit 3.6-12** lists maximum lot coverage limitations in Seattle's neighborhood residential zones.

Exhibit 3.6-12. Neighborhood Residential Maximum Lot Coverage

Zone	Lot Size	Maximum Lot Coverage
NR1, NR2, and NR3	Less than 5,000 square feet	1,000 square feet plus 15 percent of lot area
	5,000 square feet or more	35 percent of lot area
RSL	All lots	50 percent of lot area

Source: SMC 23.44.010.

Shadows

Seattle's environmental policies address shadows on public open spaces. Specific environmental policies – Shadows on Open Spaces (SMC 25.05.675.Q.2) states:

> *It is the City's policy to minimize or prevent light blockage and the creation of shadows on open spaces most used by the public.*
>
> *a. Areas outside of downtown to be protected are as follows:*
> *1) Publicly owned parks;*
> *2) Public schoolyards;*
> *3) Private schools which allow public use of schoolyards during non-school hours; and*
> *4) Publicly owned street ends in shoreline areas.*
>
> *b. Areas in downtown where shadow impacts may be mitigated are:*
> *1) Freeway Park;*
> *2) Westlake Park and Plaza;*
> *3) Market (Steinbrueck) Park;*
> *4) Convention Center Park; and*
> *5) Kobe Terrace Park and the publicly owned portions of the International District Community Garden.*

However, the policies also include, "due to the scale of development permitted in downtown, it is not practical to prevent such blockage at all public open spaces downtown" and "it is impractical to protect private properties from shadows through project-specific review" (SMC 25.05.675.Q.1).

Views

The Comprehensive Plan and Land Use Code establish policies and regulations for the protection of public views of important landmarks and natural features, as well as views from

specific designated viewpoints within the city and scenic qualities along mapped scenic routes. The Land Use Element of the Comprehensive Plan establishes the importance of public view preservation:

> ***LU 5.15*** *Address view protection through*
> - *zoning that considers views, with special emphasis on shoreline views;*
> - *development standards that help to reduce impacts on views, including height, bulk, scale, and view corridor provisions, as well as design review guidelines; and*
> - *environmental policies that protect specified public views, including views of mountains, major bodies of water, designated landmarks, and the Downtown skyline.*

The Land Use Element contains policies to regulate alteration and use of the shorelines in the City to provide substantial public access through visual or physical means and to promote interest and preservation of the physical and aesthetic qualities of the shorelines of the city. The Land Use Element also encourages the protection of views through policies related to building height limits and minimization of building bulk.

The Comprehensive Plan lists the following as important landmarks for public views:

- Downtown skyline
- Major bodies of water
- Shoreline areas
- Elliott Bay
- West Seattle
- Mount Rainier
- Olympic Mountains
- Space Needle
- Puget Sound
- Lake Washington
- Lake Union
- Portage Bay

SMC 25.05.675.P establishes environmental review policies for public view protection, specifically:

> *It is the City's policy to protect public views of significant* ***natural and human-made features****: Mount Rainier, the Olympic and Cascade Mountains, the downtown skyline, and major bodies of water including Puget Sound, Lake Washington, Lake Union and the Ship Canal, from public places consisting of… [a lengthy list of] specified viewpoints, parks, scenic routes, and view corridors….*
>
> *It is the City's policy to protect public views of* ***historic landmarks*** *designated by the Landmarks Preservation Board that, because of their prominence of location or contrasts of siting, age, or scale, are easily identifiable visual features of their neighborhood or the City and contribute to the distinctive quality or identity of their neighborhood or the City.*

Additional policies protect views of the Space Needle (25.05.675.P.2.c) from:

- Alki Beach Park (Duwamish Head)
- Bhy Kracke Park
- Gasworks Park
- Hamilton View Point
- Kerry Park
- Myrtle Edwards Park
- Olympic Sculpture Park
- Seacrest Park
- Seattle Center
- Volunteer Park

In Downtown, there are also view corridors to be protected through upper-level building setbacks in future development along the following streets (SMC 23.49.024):

- Broad, Clay, Vine, Wall, Battery, and Bell Streets west of First Avenue; and
- University, Seneca, Spring, Madison, and Marion Streets west of Third Avenue.

While the Comprehensive Plan and the Seattle Municipal Code establish the importance of view corridors and view preservation, in many cases the precise requirements for individual development projects are not strictly defined in the development regulations and protection of public views is deferred to consideration during project reviews and the design review process.

Major Land Use Policy Changes Currently Under Consideration

Seattle Transportation Plan Update & EIS

The City of Seattle is currently updating its long-term vision for the future of transportation in Seattle. The Seattle Transportation Plan (STP) and associated EIS address mobility, access, and public space needs in a single document as a unified system. This effort will incorporate several city initiatives like Seattle's Vision Zero, the Race and Social Justice Initiative, the Climate Action Plan, the Transportation Electrification Blueprint, and others. Additionally, it will reference plans created by other regional transportation agencies.

Seattle Parks and Open Space Plan Update

The City of Seattle's Parks and Open Space Plan (POS) was adopted in 2017 and is updated every 6 years, with the next major update planned for 2024. It provides an inventory of existing parks and open space, objectives for future actions, demand and need analysis including demographic and recreation trends, and recommended capital projects.

Current Conditions

Citywide

Future Land Use & Zoning

Land area in the City of Seattle encompasses approximately 83.83 square miles (53,651 acres).[16] The largest future land use designation category in the city is neighborhood residential, accounting for 52% of the city. Another one-quarter of the city is designated as a center or village (28%) with 6% in urban centers, 3% in hub urban villages, 8% in residential urban villages, and 11% in MICs. Of the remaining quarter of the city, 10% is designated as city-owned open space, 5% is designated as multi-family residential, 3% is designated as commercial/mixed-use, 1% is designated as major institution, and land designated as cemeteries or industrial areas outside the MICs account for less than 1% each. See **Exhibit 3.6-14** and **Appendix G.1**.

There are currently six urban centers, six hub urban villages, 18 residential urban villages, and two manufacturing industrial centers (MICs) in the city. The six urban centers (Downtown, Uptown, South Lake Union, First Hill/Capitol Hill, University Community, and Northgate) and two MICs (Greater Duwamish MIC and Ballard–Interbay–Northend MIC (BINMIC)) are also designated PSRC Metro Regional Growth Centers (RGCs) and Employment MICs, respectively. These regionally designated centers are part of the regional growth strategy in VISION 2050 to focus growth in urban areas with access to transit.

Countywide Planning Policies were amended in 2021 to allow for designation of countywide centers based partially on size and activity levels. The City has not formally proposed countywide centers but may do so with the Comprehensive Plan Update. Thus, the size and activity units for both regional and countywide level centers are described below. Existing acreage and activity units per acre in each center and village are listed in **Exhibit 3.6-13.** Locations where the acreage or densities fall outside King County's countywide center

Section 3 of PSRC's 2018 Regional Centers Framework Update includes designation criteria for Metro RGCs. Among other criteria, this includes a minimum density of 30 existing activity units and 85 planned activity units. Metro RGCs are also expected to be between 320–640 acres in size (or larger if served by an internal, high-capacity transit system).

Appendix 6 of the King County Countywide Planning Policies (CPPs) includes designation criteria for countywide growth centers although none are currently designated in King County. The criteria include an existing density of at least 18 activity units and planned density of at least 30 activity units. Countywide growth centers are also expected to be between 160–500 acres in size.

See also **Section 3.7 Relationship to Plans, Policies, & Regulations** for more discussion of PSRC Metro Regional Growth Centers and King County Countywide Centers.

[16] OFM Estimates of April 1 Population Density and Land Area by City and Town, 2022.

designation criteria of 160–500 acres or below the minimum existing 18 activity units per acre are highlighted. All existing urban villages except the South Park Residential Urban Village in Area 7 meet the King County threshold of 18 existing activity units per acre. Several urban villages are below the minimum size threshold of 160 acres (the Lake City Hub Urban Village and the Admiral, Green Lake, Greenwood–Phinney Ridge, Madison–Miller, Morgan Junction, and Upper Queen Anne residential urban villages) and one is above the maximum size threshold of 500 acres (the 23rd & Union Jackson Residential Urban Villages). Note that PSRC's MIC designation criteria do not include an activity unit density threshold and so existing activity units per acre are not calculated for the two MICs.

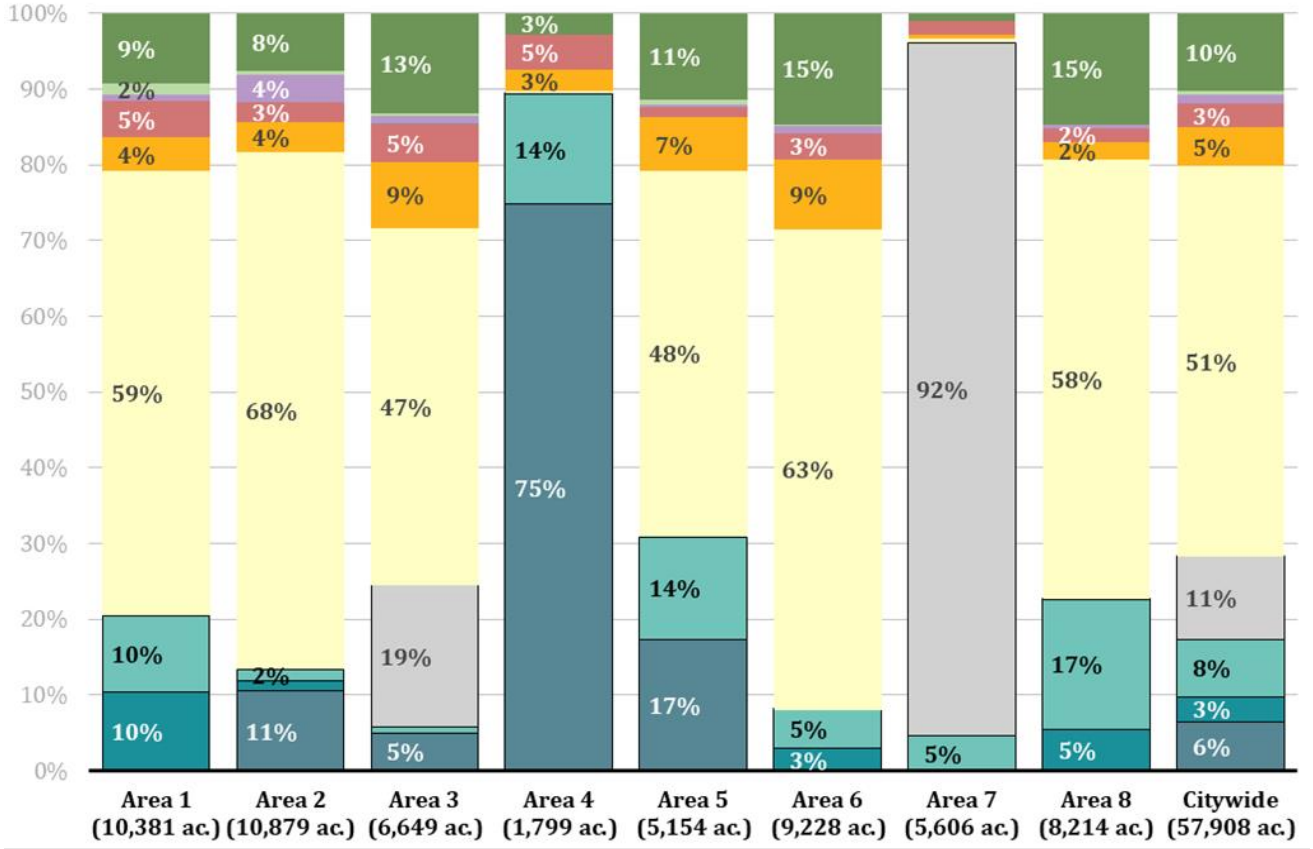
Adopted aggregate Future Land Use designations in Seattle are mapped in **Exhibit 3.6-15**. Outside of centers and villages, commercial, mixed-use, and multi-family designations generally follow main arterials such as Holman Rd NW/15th Ave NW/15th Ave W, SR 99, Greenwood/Phinney Ave N, 15th Ave NE, Lake City Way NE, Sand Point Way NE, Westlake Ave N, E Madison St, Alki Ave SW, California Ave SW, Delridge Way SW, MLK Jr Way S, and Rainier Ave S. Neighborhood residential areas fill the intervening areas, along with city-owned open space and major institutions. This is consistent with existing land use patterns (discussed below). Industrial designations outside the MICs are typically adjacent to the MICs or other major roadways (e.g., the north shore of Lake Union, near Smith Cove, and near the I-5/I-90 interchange).

Exhibit 3.6-13. Centers and Villages—Existing Location, Size, and Activity Units

Center/Village	Analysis Area	Existing Acres	Existing AU	Existing AU/Ac.
Urban Centers[1]				
Downtown	4	952	359,361	377.4
First Hill/Capitol Hill	5	916	127,812	139.5
University Community	2	753	41,085	54.5
South Lake Union	4	340	80,456	236.7
Uptown	3	333	43,759	131.3
Northgate	2	412	23,611	57.3
Hub Urban Villages[1]				
Ballard	1	495	33,565	67.7
Bitter Lake Village	1	364	16,015	44.0
Fremont	1	214	15,431	71.9
Lake City	2	142	8,197	57.6
Mt Baker	8	491	17,689	36.0
West Seattle Junction	6	269	18,972	70.4
Residential Urban Villages[1]				
23rd & Union–Jackson	5	625	24,348	38.9
Admiral	6	98	4,842	49.2
Aurora–Licton Springs	1	327	14,428	44.1
Columbia City	8	335	11,352	33.9
Crown Hill	1	271	6,863	25.3
Eastlake	4	199	13,986	70.2
Green Lake	1	109	7,675	70.6
Greenwood–Phinney Ridge	1	94	7,956	84.5
Madison–Miller	5	145	9,488	65.3
Morgan Junction	6	113	3,865	34.1
North Beacon Hill	8	267	7,506	28.1
Othello	8	499	11,824	23.7
Rainier Beach	8	346	7,967	23.0
Roosevelt	2	170	10,448	61.4
South Park	7	263	3,879	14.7
Upper Queen Anne	3	53	4,709	89.5
Wallingford	1	258	10,868	42.2
Westwood–Highland Park	6	275	7,668	27.9
MICs				
Ballard–Interbay–Northend	3	932	17,660	NA
Greater Duwamish	7	4,953	62,335	NA

1 See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Note: Activity units (AU) is the sum of residential population and jobs. Assumes an average household size of 2.05 per the King County Growth Management Planning Council. Highlighted densities or size fall outside King County's countywide center designation criteria of 160-500 acres or below the minimum 18 existing AU per acre (note PSRC's MIC designation criteria does not include an activity unit density threshold).
Sources: City of Seattle, 2023; BERK, 2023.

Exhibit 3.6-14. Future Land Use Designations—Percent Citywide and by EIS Analysis Area (Acres)

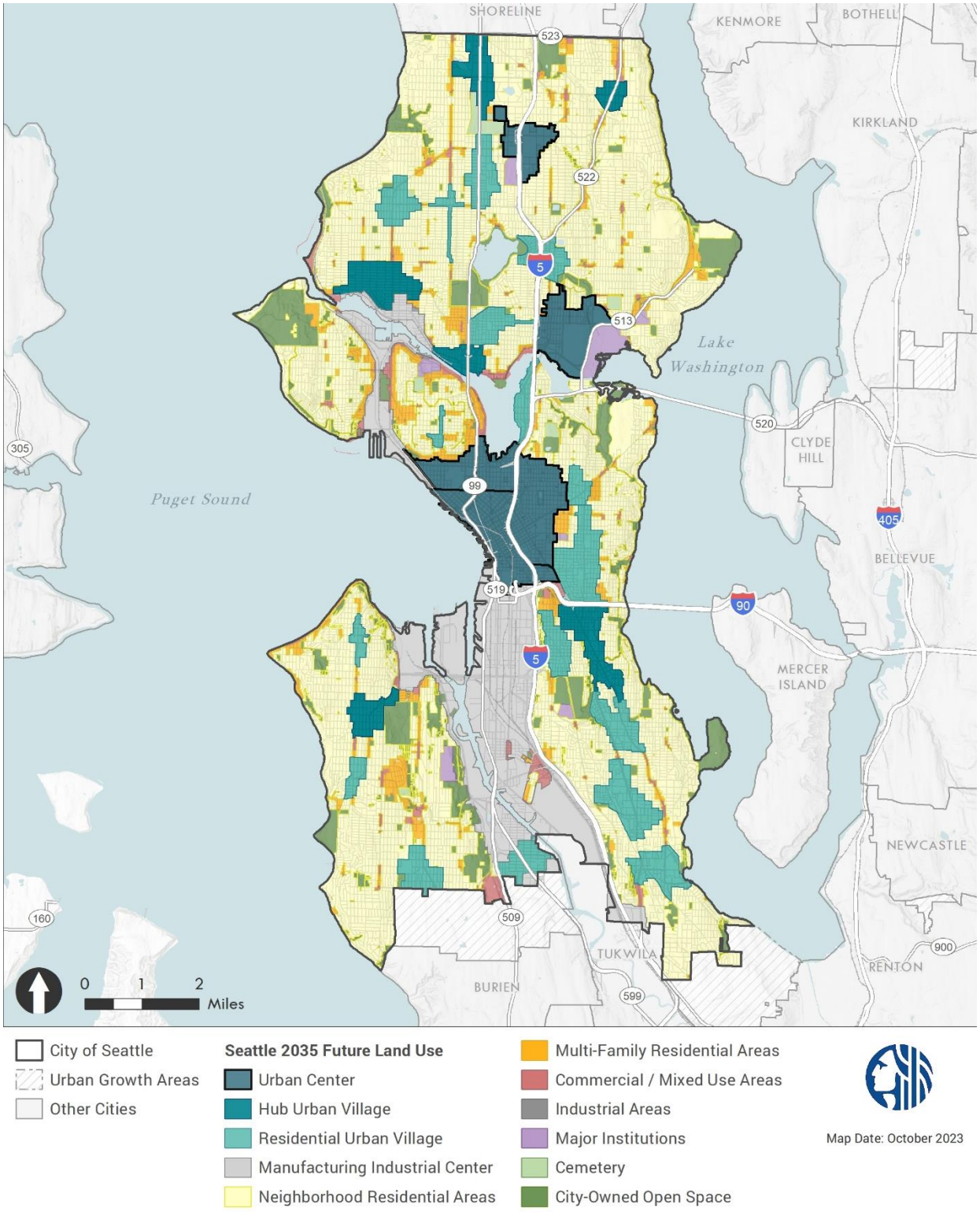


Seattle 2035 Future Land Use

- Urban Center
- Hub Urban Village
- Residential Urban Village
- Manufacturing Industrial Center
- Neighborhood Residential Areas
- Multi-Family Residential Areas
- Commercial/Mixed Use Areas
- Industrial Areas
- Major Institutions
- Cemetery
- City-Owned Open Space

Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Sources: City of Seattle, 2022; BERK, 2023.

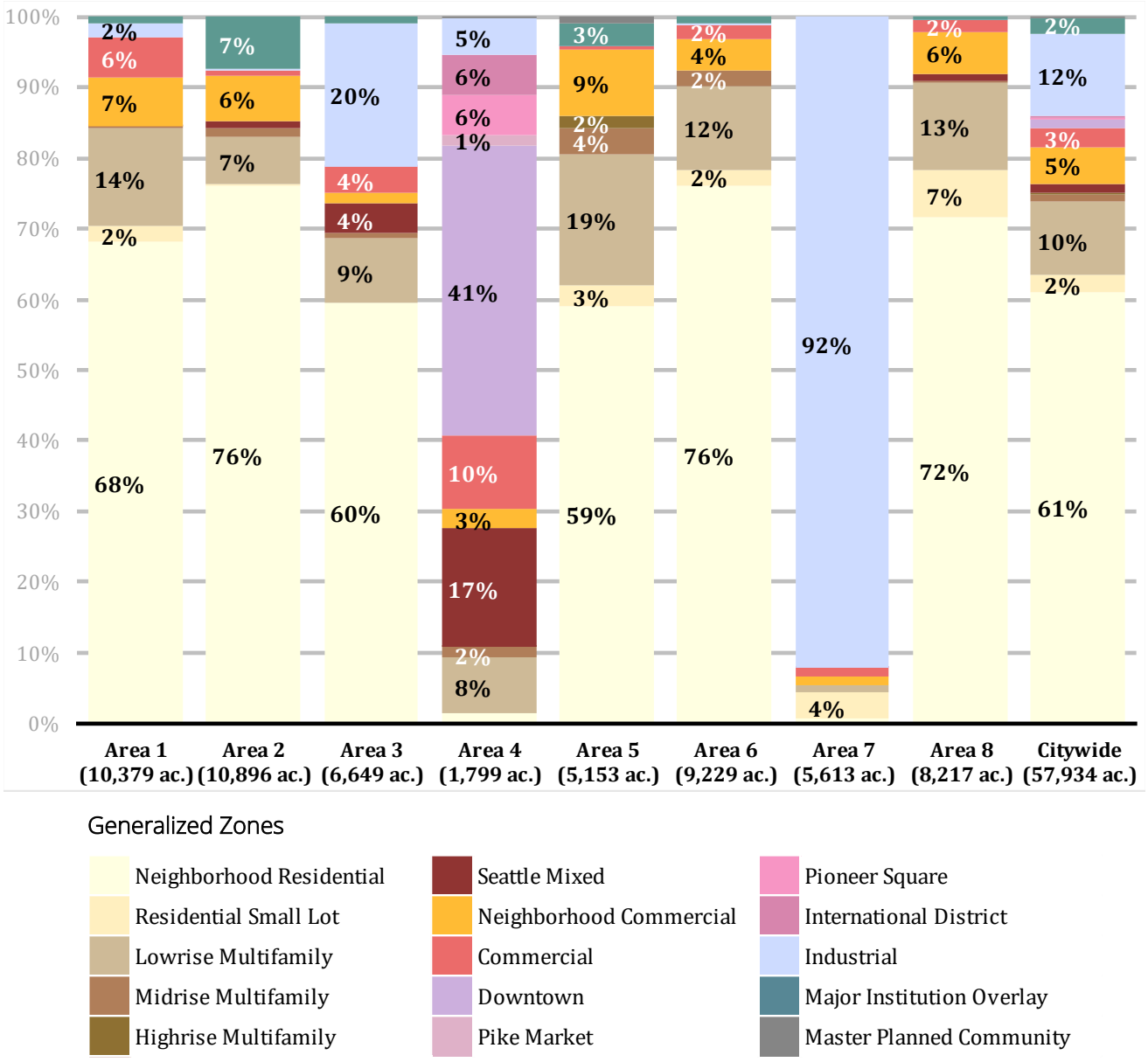
Exhibit 3.6-15. Citywide Future Land Use Designations



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Sources: City of Seattle, 2022; BERK, 2023.

About three-quarters of the city is zoned for residential development, of which 61% is zoned Neighborhood Residential, 2% Residential Small Lot, and 12% zoned Multi-family. About 12% of the city is zoned industrial, 5% neighborhood commercial, and 3% commercial. The remaining zones account for about 5% of land in the city. See **Exhibit 3.6-16** and **Appendix G.1**.

Exhibit 3.6-16. Generalized Zoning—Percent Citywide and by EIS Analysis Area (Acres)

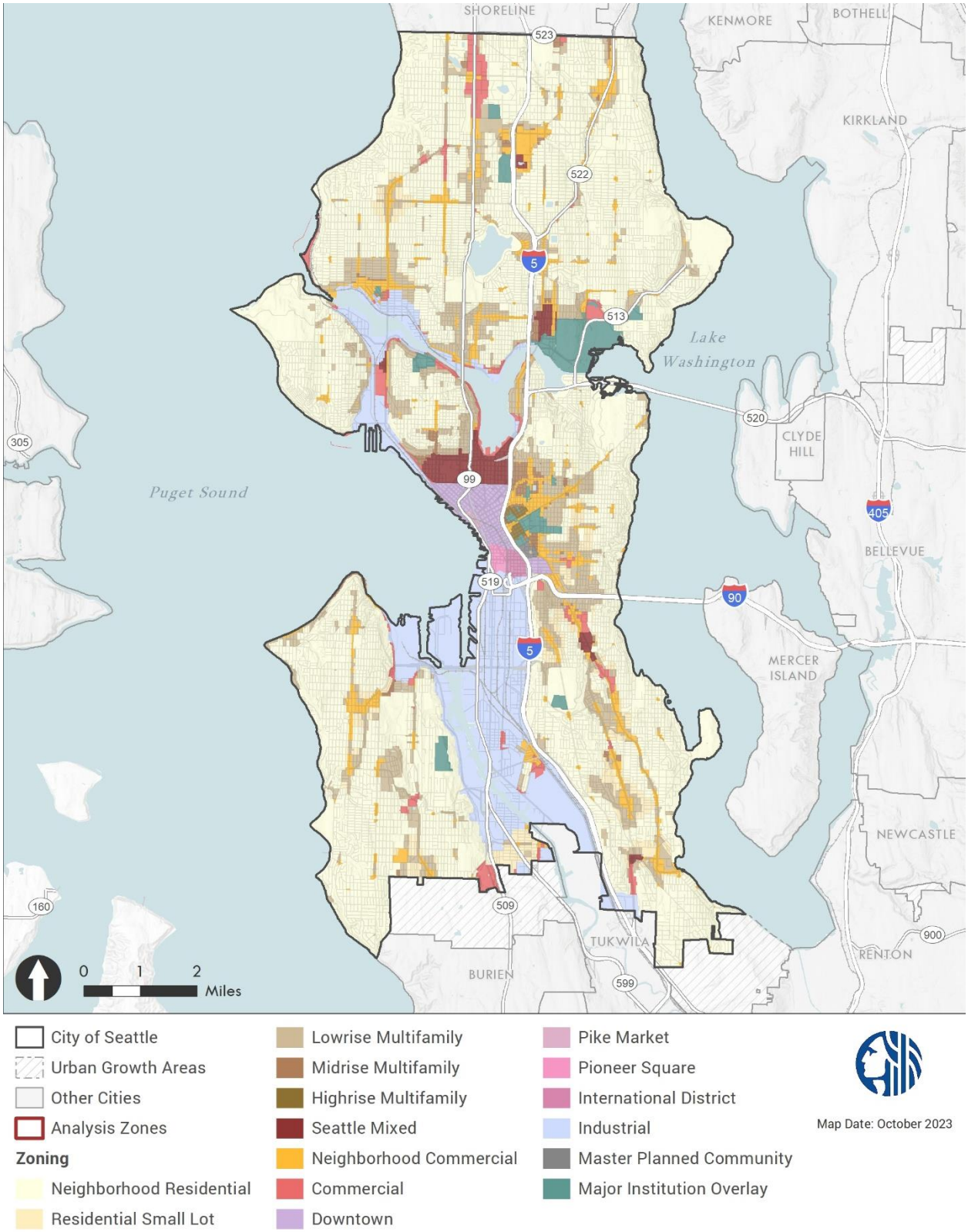


Sources: City of Seattle, 2022; BERK, 2023.

Generalized zoning in Seattle is mapped in **Exhibit 3.6-17**. Most areas designated and zoned for commercial/mixed-use or multifamily residential uses are located in centers or villages. The general commercial zones tend to be found on major arterials and are more auto-oriented. Neighborhood Commercial and Seattle Mixed zones use development standards intended to produce more walkable environments and are better for housing development. Commercial and multifamily zoning outside centers or villages tends to be concentrated around major arterials. Industrial zoning is concentrated in the two MICs. City zoning rules in these areas allow industrial activity such as manufacturing, warehousing, and shipping of goods through waterways, railways, and highways.

Most areas outside center, village, and MIC boundaries are zoned for neighborhood residential use. Neighborhood Residential zones cover much of the city. While these areas are commonly considered residential neighborhoods, they also include various uses beyond housing. For instance, most of the public park land is found in these zones, as are many schools, cemeteries, and fire stations. In most of these areas, houses are usually three stories or less in height and typically have yards and open space around them. Much of the land in these areas has been built to the densities allowed under current zoning rules.

Exhibit 3.6-17. Citywide Generalized Zoning



Sources: City of Seattle, 2022; BERK, 2023.

Shorelines

Shorelines designations overlay the primary future land use designations and zoning regulations. The Shoreline District encompasses 7,447 acres in the study area citywide and is regulated through zoning and shoreline environment designations. A little less than two-thirds of the shoreline citywide is within a conservancy shoreline environment (61%) and a little more than one-third is within an urban shoreline environment (39%). About 25% of the shoreline is designated Conservancy Recreation (CR), 22% is designated Conservancy Preservation (CP), and 10% is designated Conservancy Management (CM). Conservancy environments are typically located in waterways and on shorelines bordering neighborhood residential areas and city-owned open space. The other conservancy shoreline environments are concentrated in waterways such as Green Lake, Lake Union, the Lake Washington Ship Canal, and Smith Cove. About 19% of the shoreline is designated Urban Industrial (UI), primarily within the Greater Duwamish MIC and BINMIC. Urban Residential accounts for another 10% of the shoreline and is mostly located on the inland 200 feet of neighborhood residential areas. The other urban shoreline environments are concentrated around the Downtown waterfront and on the borders of Lake Union and the Lake Washington Ship Canal. **Exhibit 3.6-18** summarizes the acreage of each designation citywide and within each EIS Analysis Area. See also the **Shoreline Master Program** section for more detail about the SMP and the purpose of each environment designation.

Exhibit 3.6-18. Shoreline Environment Designations—Acres Citywide and by EIS Analysis Area

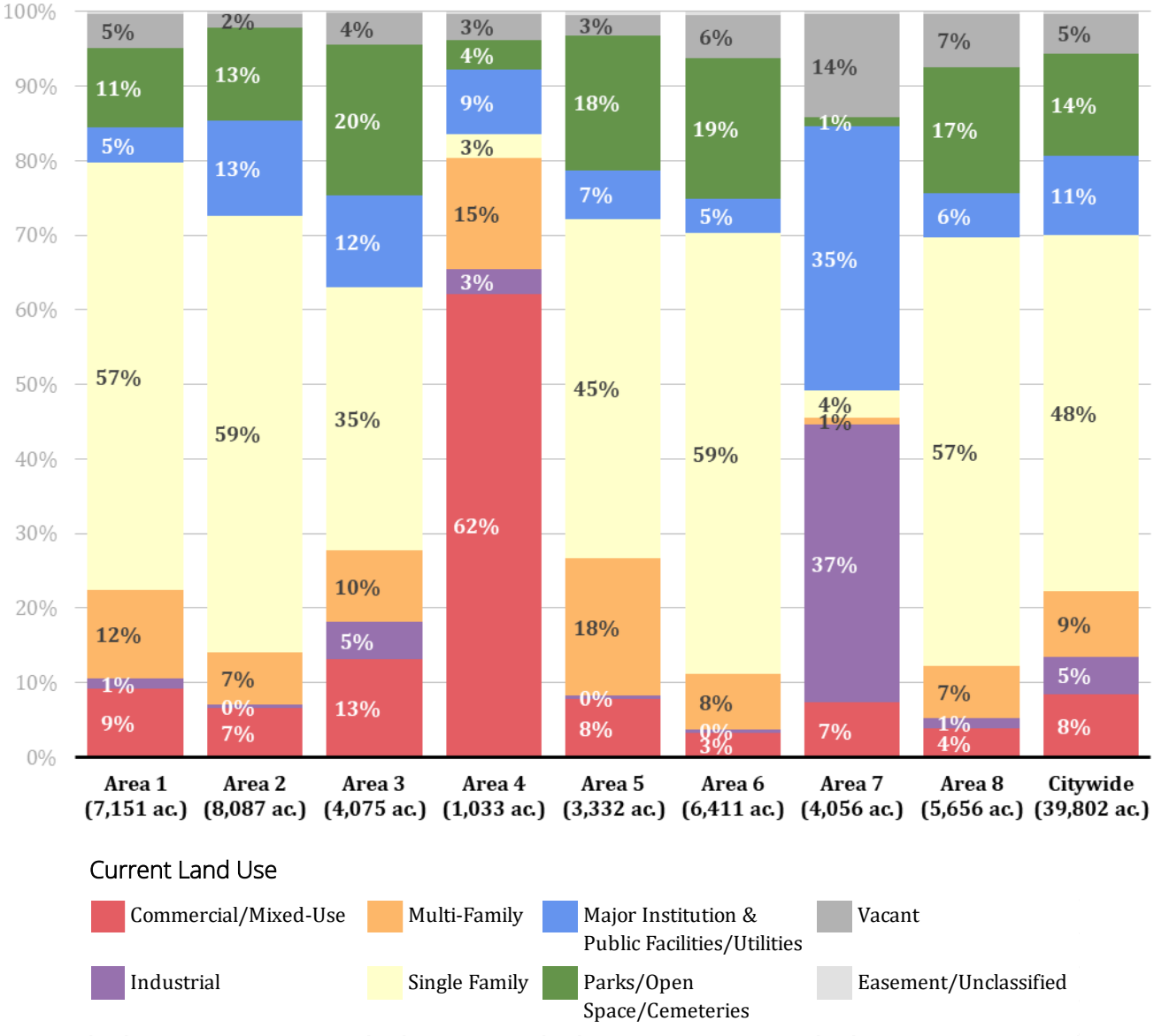
	EIS Analysis Area								
Shoreline Designation	1	2	3	4	5	6	7	8	Citywide
Conservancy Management	339 ac. (32.4%)	80 ac. (10.5%)	168 ac. (9.5%)	5 ac. (1.2%)	61 ac. (11.9%)	44 ac. (4.0%)	1 ac. (0.1%)	57 ac. (8.4%)	754 ac. (10.1%)
Conservancy Navigation	82 ac. (7.9%)	3 ac. (0.4%)	140 ac. (7.9%)	3 ac. (0.9%)	2 ac. (0.4%)	0.2 ac. (0.0%)	0.2 ac. (0.0%)	2 ac. (0.4%)	234 ac. (3.1%)
Conservancy Preservation	150 ac. (14.3%)	199 ac. (26.1%)	615 ac. (34.7%)	—	160 ac. (31.2%)	337 ac. (30.6%)	58 ac. (4.9%)	112 ac. (16.5%)	1,632 ac. (21.9%)
Conservancy Recreation	132 ac. (12.7%)	293 ac. (38.5%)	336 ac. (19.0%)	6 ac. (1.5%)	164 ac. (31.9%)	548 ac. (49.7%)	12 ac. (1.0%)	402 ac. (59.3%)	1,894 ac. (25.4%)
Conservancy Waterway	13 ac. (1.3%)	1 ac. (0.1%)	—	22 ac. (5.7%)	—	—	—	—	36 ac. (0.5%)
Urban Commercial	182 ac. (17.4%)	32 ac. (4.1%)	—	160 ac. (41.0%)	3 ac. (0.6%)	11 ac. (1.0%)	—	8 ac. (1.1%)	395 ac. (5.3%)
Urban General	20 ac. (1.9%)	—	21 ac. (1.2%)	0.3 ac. (0.1%)	—	—	4 ac. (0.3%)	—	44 ac. (0.6%)
Urban Harborfront	—	—	—	130 ac. (33.3%)	—	—	—	—	130 ac. (1.7%)
Urban Maritime	56 ac. (5.3%)	3 ac. (0.4%)	97 ac. (5.5%)	35 ac. (9.0%)	—	—	—	—	191 ac. (2.6%)
Urban Residential	70 ac. (6.7%)	151 ac. (19.8%)	86 ac. (4.8%)	28 ac. (7.3%)	123 ac. (23.9%)	162 ac. (14.7%)	—	97 ac. (14.3%)	716 ac. (9.6%)
Urban Industrial	2 ac. (0.2%)	—	309 ac. (17.4%)	0.2 ac. (0.1%)	—	0.1 ac. (0.0%)	1,110 ac. (93.7%)	—	1,421 ac. (19.1%)
Total Acres & Percent of Citywide Total	**1,045 ac. (14%)**	**761 ac. (10%)**	**1,772 ac. (24%)**	**390 ac. (5%)**	**513 ac. (7%)**	**1,102 ac. (15%)**	**1,185 ac. (16%)**	**678 ac. (9%)**	**7,447 ac. (100%)**

Sources: City of Seattle, 2022; BERK, 2022.

Existing Land Use Pattern

Exhibit 3.6-19 summarizes percent of existing land use acreage citywide and by analysis area, excluding water bodies and public right-of-way. Citywide, the largest existing land use category is single family residential, which comprises about 48% of existing land uses. Parks and open space/cemeteries account for about 14% and major institutions and public facilities and utilities account for about 11% of existing land uses. Multi-family and commercial/mixed-use comprise 9% and 8%, respectively, while industrial and vacant land uses each comprise 5% of total existing uses in Seattle.

Exhibit 3.6-19. Current Land Use—Percent Citywide and by EIS Analysis Area (Acres)



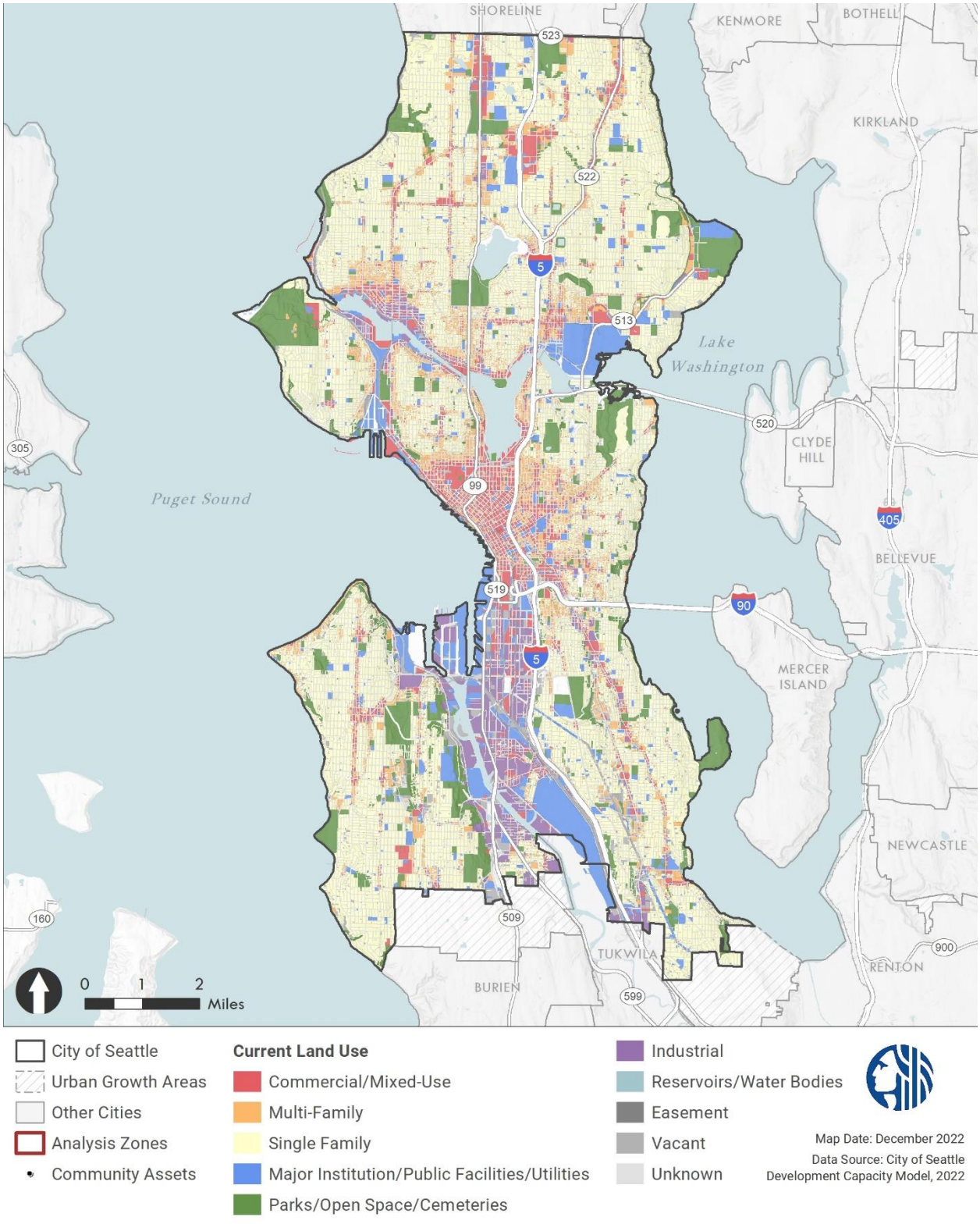
Sources: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-20 maps existing land use distribution across the city. The highest concentrations of commercial, mixed-use, and multi-family development are in the four urban centers that constitute the area sometimes called the "center city" (Downtown, First Hill/Capitol Hill, South Lake Union, and Uptown). Housing in these areas might be built as a stand-alone structure or along with commercial space. Mixed-use areas or projects contain residential and commercial uses and often have offices or stores on the ground floor with housing above. Other centers, villages, and smaller nodes around the city also contain varying levels of commercial, mixed-use, and multi-family development.

Outside of the centers and villages, concentrations of commercial, mixed-use, and multifamily development generally follow main arterials such as Holman Rd NW/15t Ave NW/15th Ave W, SR 99, Greenwood/Phinney Ave N, 15th Ave NE, Lake City Way NE, Sand Point Way NE, Westlake Ave N, E Madison St, Alki Ave SW, California Ave SW, Delridge Way SW, MLK Jr Way S, and Rainier Ave S.

Single-family residential neighborhoods fill the intervening areas, along with parks, open space, and major institutional uses. Industrial development is concentrated in the Greater Duwamish MIC in south central Seattle and in the BINMIC northwest of Downtown (along the Duwamish River's historic meandering flood plain, Elliott Bay, Lake Union, and Salmon Bay). Only 5% of land is vacant, most of which is located near industrial areas or rail lines, along shorelines with critical areas, or adjacent to major utility easements or trails (such as the Chief Sealth Trail in Area 8). Some additional vacant lands are scattered throughout the single family areas.

Exhibit 3.6-20. Citywide Current Land Use



Sources: City of Seattle, 2022; BERK, 2022.

Height, Bulk, & Scale

The FLUM (**Exhibit 3.6-15**) illustrates the general building massing pattern across the city. Greater allowed height, bulk, and mass are generally concentrated in centers and villages. The manufacturing/industrial areas allow a range of heights, but most new development doesn't maximize the height allowance. Most of the city is zoned neighborhood residential with most of the buildings being 1- and 2-story detached homes.

Transitions

Existing development patterns for transitions between scales—both from one zone to another and within a single zone—vary across the city. Many areas with long established zone boundaries exhibit stark transitions between multi-family or commercial buildings and low-density residential areas. This is especially true in relatively recently developed areas of the city and areas that have seen intense development in recent decades, like Ballard. See **Exhibit 3.6-21**.

Exhibit 3.6-21. Urban Village Boundary (Black Dashed Line) In Ballard

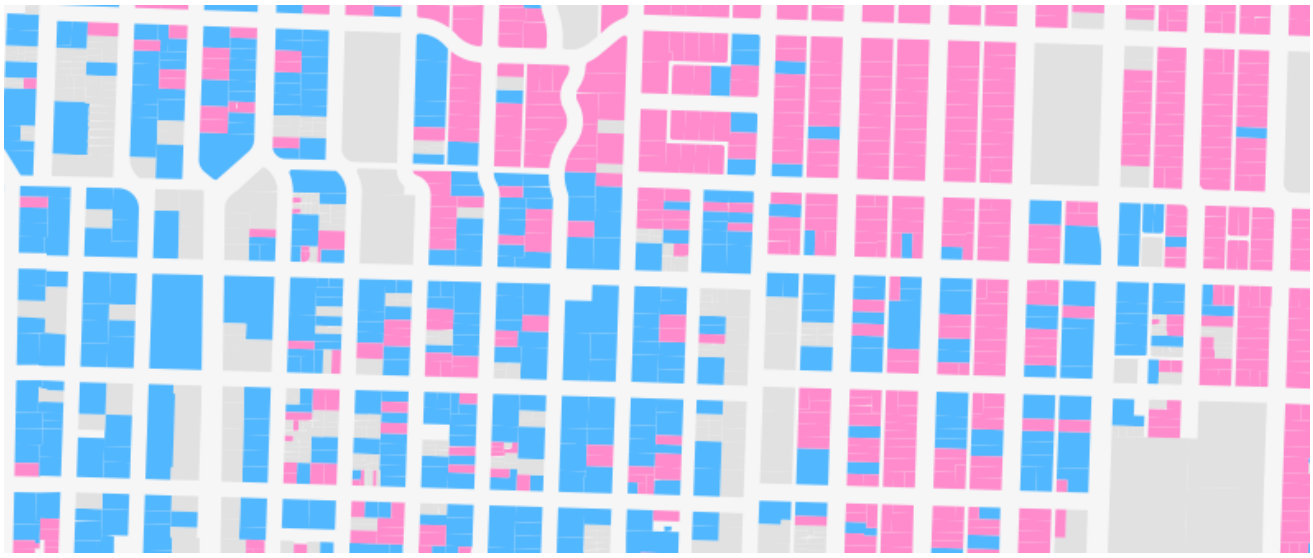
Source: Image: Landsat/ Copernicus. Data: SI, NOAA, US Navy, NGA, GEBCO Data LDEO-Columbia, NSF, NOAA.

Some older areas exhibit gradual transitions from more to less intensive development types based on pre-zoning development patterns, with more intensive uses more likely to be developed near transit routes and amenities like parks and views. More and less intense buildings within a single zone intermingle more in older neighborhoods, where a variety of apartment/condo developments are regularly found adjacent to single family houses. See **Exhibit 3.6-22** and **Exhibit 3.6-23**.

Exhibit 3.6-22. Intermingling Development Types

Source: MAKERS, 2022.

Exhibit 3.6-23. Gradual Transition of Residential Uses In Capitol Hill



Note: Shows gradual transition from multi-family (blue) to single family (pink) uses in Capitol Hill.
Source: King County Assessor, 2021; MAKERS, 2023.

In recent years, development in centers and villages where parking is not required (primarily close to transit service) has created less disruptive transitions to the low-density residential scale, compared to areas where abundant car parking is required. Parking infrastructure like garages and surface parking presents a visual contrast with typical building design in low-density residential areas, where parking is visible, but not visually prominent. See **Exhibit 3.6-24**.

Exhibit 3.6-24. Driveways and Garages Visual Impacts

Note: Left: Infill development with new driveways and garages. Right: Nearby low-density neighborhood. Parking is visible, but less prominent.
Source: Google Maps Streetview. © Google 2023.

Tree Canopy

Seattle's residential lots currently provide much of Seattle's tree canopy. However, as Seattle becomes denser to meet the needs of a growing population, new buildings cover more ground, especially when surface parking is provided, causing removal of existing trees and/or reducing space available for new trees. Private property currently provides about 72% of tree canopy, while 28% is provided on public property including street rights-of-way, parks, and other City-owned land.[17] Since 2016, the City of Seattle saw an overall net loss of urban tree canopy (255 acres, 1.7%) while the goal is to increase tree canopy. The biggest losses were in parks (111 acres, 5.1%) and Neighborhood Residential areas (87 acres, 1.2%). Seattle's *Canopy Cover Assessment* states, "Loss is not equitable—Neighborhoods impacted by racial and economic injustice started with less canopy and lost more than the citywide average."[18]

Shadows

Seattle's hilly topography plays a major role in the prevalence of shadows. Generally, the north side of a hill or areas within a valley experience shadows during longer periods of the day. Trees, especially large, dense evergreens, cast significant shadows year-round. Building heights

[17] City of Seattle, Seattle Tree Canopy Assessment, 2016.
[18] City of Seattle, Urban Forestry Results Summary *Seattle's Canopy Cover Assessment*, 2023.

also play a major role, with buildings over 2 stories typically casting shadows onto the sidewalk for most of the winter. Unique shadow conditions are noted in the Analysis Area descriptions.

Views

Viewpoints and scenic routes are found throughout the city. As to be expected, they concentrate along waterfronts and/or topographically high points. The Duwamish lacks SEPA-protected viewpoints (though it does have protected "shoreline viewpoints"), likely due to the area being at a low point and public access being discouraged in the industrial area. North Seattle also has fewer protected viewpoints, despite existing high point views such as from Phinney Ridge overlooking Ballard and the Puget Sound. Factors that may influence a lack of viewpoints in north Seattle may include a combination of topography with fewer natural viewpoints, large trees blocking views, and limited public space at high points. A similar situation may exist in Rainier Valley, where land is topographically lower.

Analysis Areas

Area 1: NW Seattle

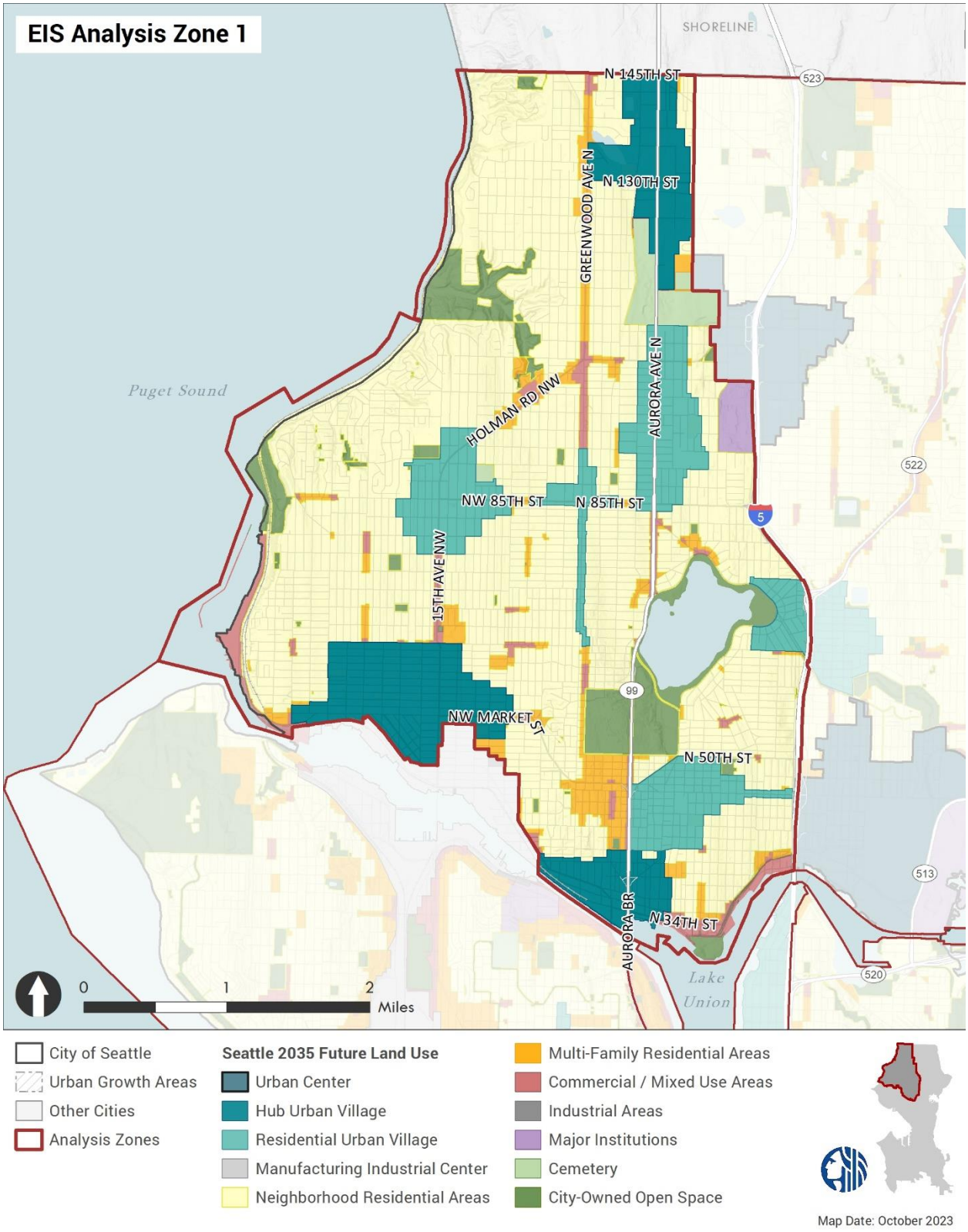
Future Land Use, Zoning, & Shorelines

Area 1 includes the northwest portion of Seattle that is west of I-5 and north of the Lake Washington Ship Canal. It includes approximately 7,151 acres of buildable lands, or 18% of the buildable lands citywide, and includes three hub urban villages and five residential urban villages: the Ballard, Bitter Lake, and Fremont hub urban villages and the Aurora-Licton Springs, Crown Hill, Green Lake, Greenwood-Phinney Ridge, and Wallingford residential urban villages. Most commercial, mixed-use, and lowrise multi-family future land use and zoning designations are concentrated in the urban villages with commercial designations generally adjacent to major arterials and lowrise multi-family designations on the edges of the urban village boundaries.

Outside of the urban villages, commercial, mixed-use, and multi-family future land use and zoning designations generally follow major arterials including SR 99, Greenwood/Phinney Ave N, and 15th Ave NW/Holman Rd NW. A small portion of the land along the north shore of Lake Union is designated and zoned industrial. Major parks and open space in the area include Woodland Park Zoo, Green Lake Park, Golden Gardens, Carkeek Park, and Gas Works. North Seattle College is also located adjacent to I-5 in the central eastern portion of the analysis area. Neighborhood residential future land use and zoning designations fill in the intervening areas. Future land use and zoning acreage within the analysis area are detailed in **Exhibit 3.6-14** and **Exhibit 3.6-16** and mapped in **Exhibit 3.6-25** and **Exhibit 3.6-26**.

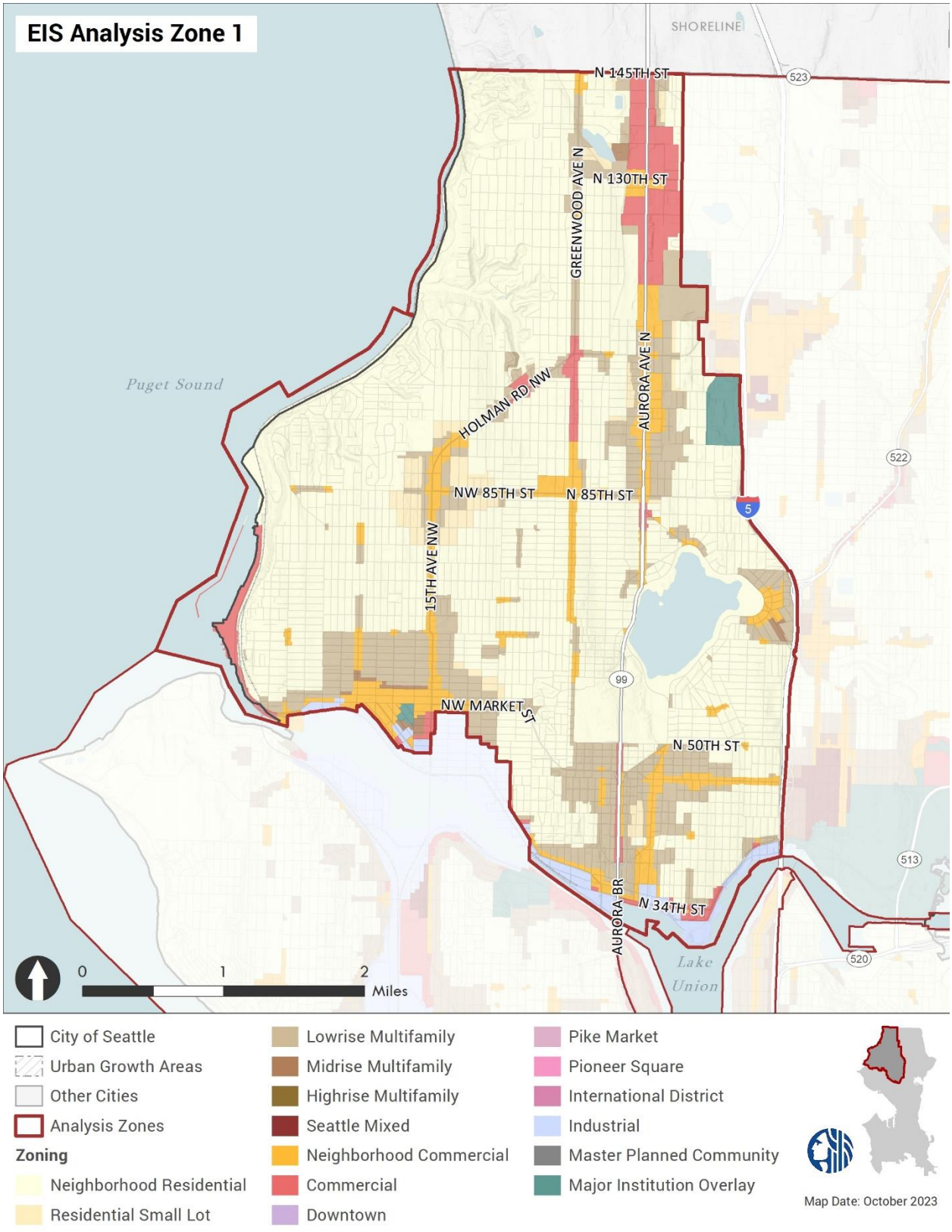
Area 1 includes about 14% of the city's designated shoreline district (1,045 acres). A little over two-thirds of this area is within a conservancy shoreline environment, including Conservancy Management (32%) in Green Lake and a combination of Conservancy Preservation (14%) and Recreation (13%) on Puget Sound from Golden Gardens north to the city limit. Another 29% of this area is designated Urban Commercial (near Shilshole Bay), Urban Maritime (along the north shore of Lake Union), and Urban Residential (inland along Puget Sound north of Golden Gardens). Designated shoreline acreage within the analysis area is detailed in **Exhibit 3.6-18** and mapped in **Exhibit 3.6-27.**

Exhibit 3.6-25. Area 1: NW Seattle—Future Land Use Designations



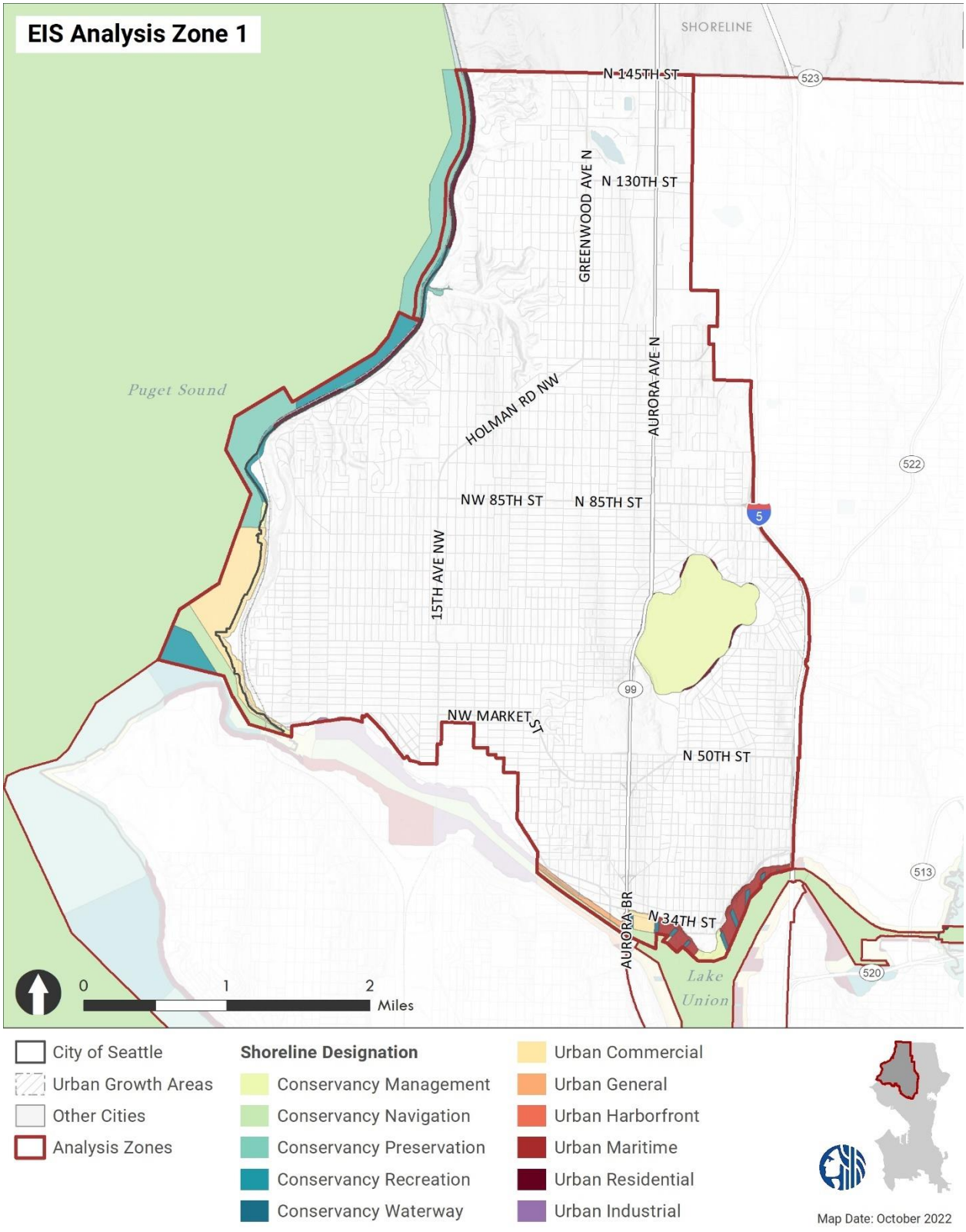
Source: City of Seattle, 2022; BERK, 2022.

Exhibit 3.6-26. Area 1: NW Seattle—Zoning



Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-27. Area 1: NW Seattle—Shoreline Designations



Source: City of Seattle, 2022; BERK, 2022.

Existing Land Use & Urban Form

Existing Uses

The largest existing land use category is single family residential, which comprises about 57% of existing uses (versus 48% citywide). A slightly higher percentage of land uses are also multi-family residential (12% versus 9% citywide). Existing commercial, mixed-use, and multi-family uses as well as community assets are primarily within the urban village boundaries, with the densest concentrations in the Ballard, Bitter Lake, and Fremont hub urban villages. Commercial uses in Bitter Lake are typically larger-scale big-box retailers while those in Ballard and Freemont are smaller scale. Additional concentrations of commercial, mixed-use, and multi-family uses run adjacent to major roadways between the urban villages and along the Lake Washington Ship Canal and Shilshole Bay.

Most industrial uses in the analysis area are near Lake Washington Ship Canal in Ballard and along the north shore of Lake Union or on SR 99 in the Bitter Lake and Aurora-Licton Springs urban villages. The BNSF railway also runs along Puget Sound throughout the analysis area.

Current land use acreage is detailed in **Exhibit 3.6-19** and mapped in **Exhibit 3.6-28**.

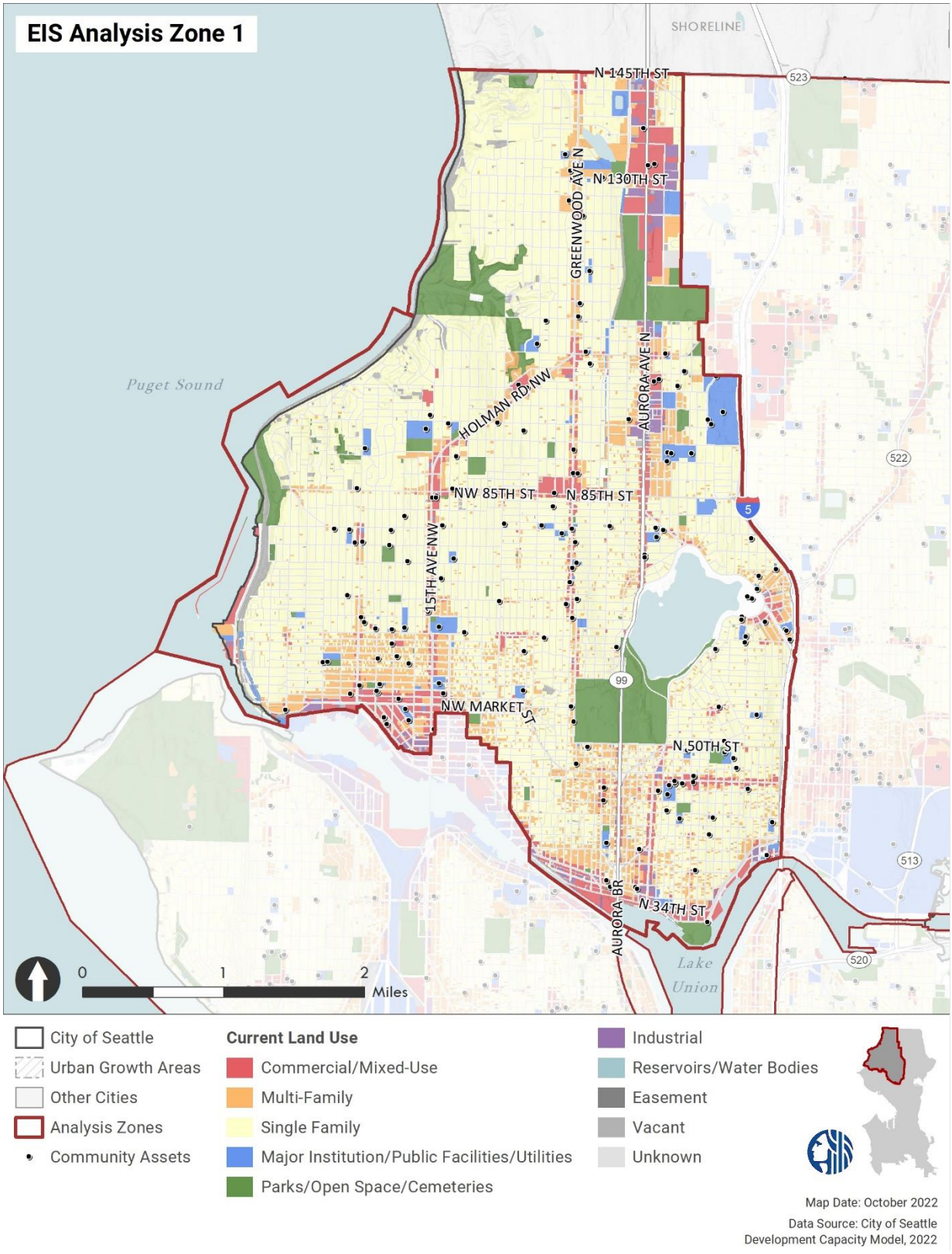
General Urban Form

Areas north of 85th St were largely developed prior to annexation to the City of Seattle in 1954. These areas tend to have a more automobile-oriented character than areas further south; in many places sidewalks are absent, and buildings are designed around automobile access. These trends are especially pronounced on Aurora Ave/SR-99 where pedestrian-hostile design is compounded by long-term disinvestment in buildings and public facilities, creating an environment that can feel unsafe for many people. However, this harsh environment can also serve as a haven for those who have been pushed out of other areas of the city due to high housing costs.

Height

The tallest buildings in Area 1 are found in the Ballard, Fremont, and Bitter Lake urban villages. These three urban villages have a significant number of 6- to 8-story buildings located along and south of NW 56th St in Ballard, along N 34th St and Stone Way in Fremont, and along Aurora Ave in Bitter Lake. Additionally, there are some 5- to 6-story buildings along Greenwood Ave, 3- to 5-story buildings in the Green Lake Residential Urban Village, and 3-story townhomes in Crown Hill. However, most of the area is zoned neighborhood residential and has building heights of 1 to 2 floors.

Exhibit 3.6-28. Area 1: NW Seattle—Current Land Use



Source: City of Seattle, 2022; BERK, 2022.

Area 2: NE Seattle

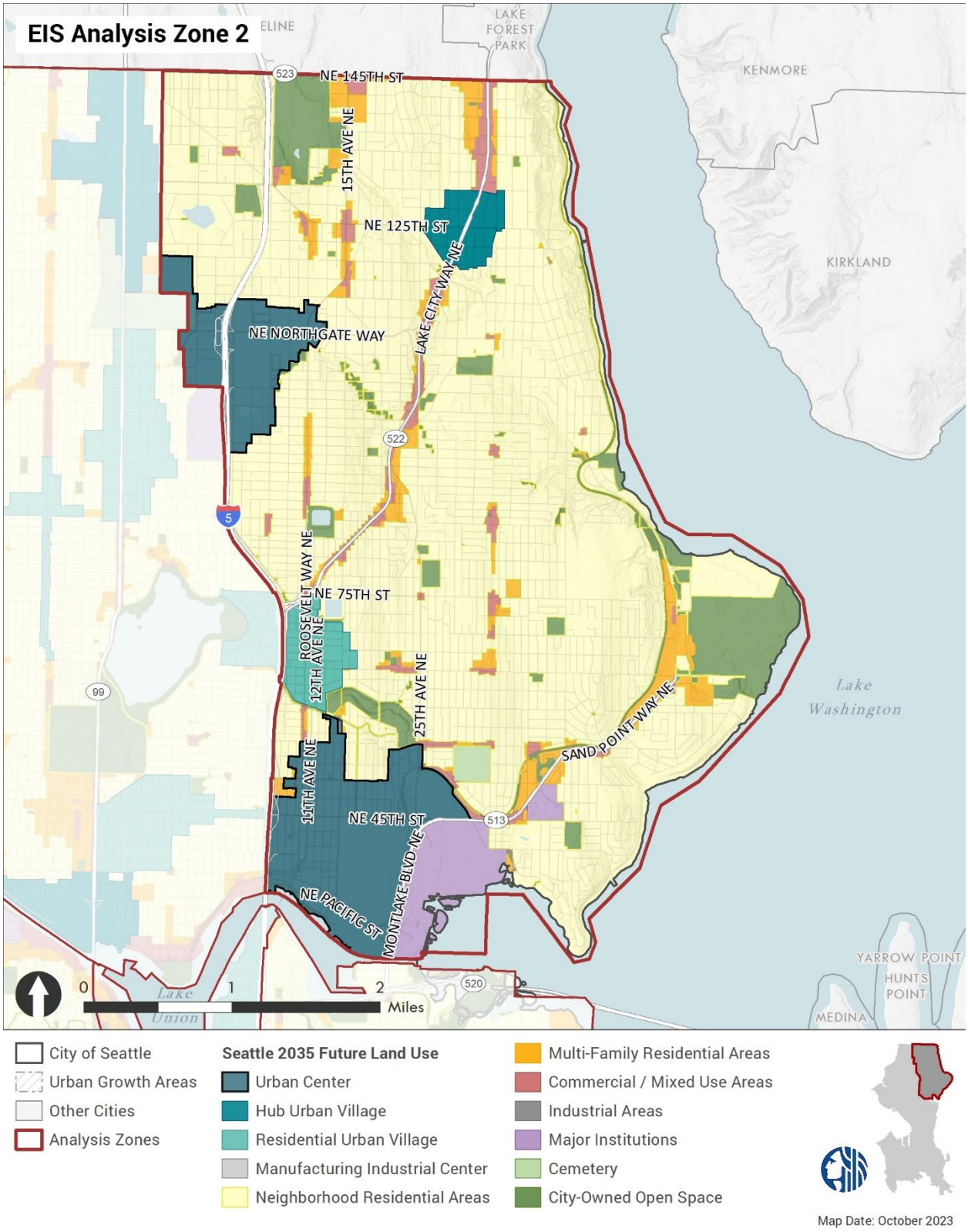
Future Land Use, Zoning, & Shorelines

Area 2 includes the northeast portion of Seattle east of Interstate 5, south of NE 145th Street (Seattle's northern most boundary), and north of Portage Bay and the Montlake Cut. It includes approximately 8,087 acres of buildable land, or 20% of the buildable lands citywide. Additionally, Area 2 includes the Northgate and University Community Urban Centers, the Lake City Hub Urban Village, and the Roosevelt Residential Urban Village. A majority of the commercial, mixed-use, and multi-family future land use and zoning designations are concentrated in the centers and villages with commercial and multi-family designations adjacent to major arterials running between center and village boundaries.

Outside of the centers and villages, commercial, mixed-use, and multi-family future land use and zoning designations generally follow Sandpoint Way NE, Lake City Way NE, Roosevelt Way NE, 15th Ave E, and 35th Ave NE. Major parks and open space in the area include Cowen and Magnuson Parks, the Calvary Cemetery, Sand Point County Club, and Jackson Park Golf Course. The University of Washington is located within a major institution overlay, which is a key regulatory feature of this subarea. Neighborhood residential future land use and zoning designations fill in the intervening areas. Future land use and zoning acreage within the analysis area are detailed in **Exhibit 3.6-14** and **Exhibit 3.6-16** and mapped in **Exhibit 3.6-29** and **Exhibit 3.6-30**.

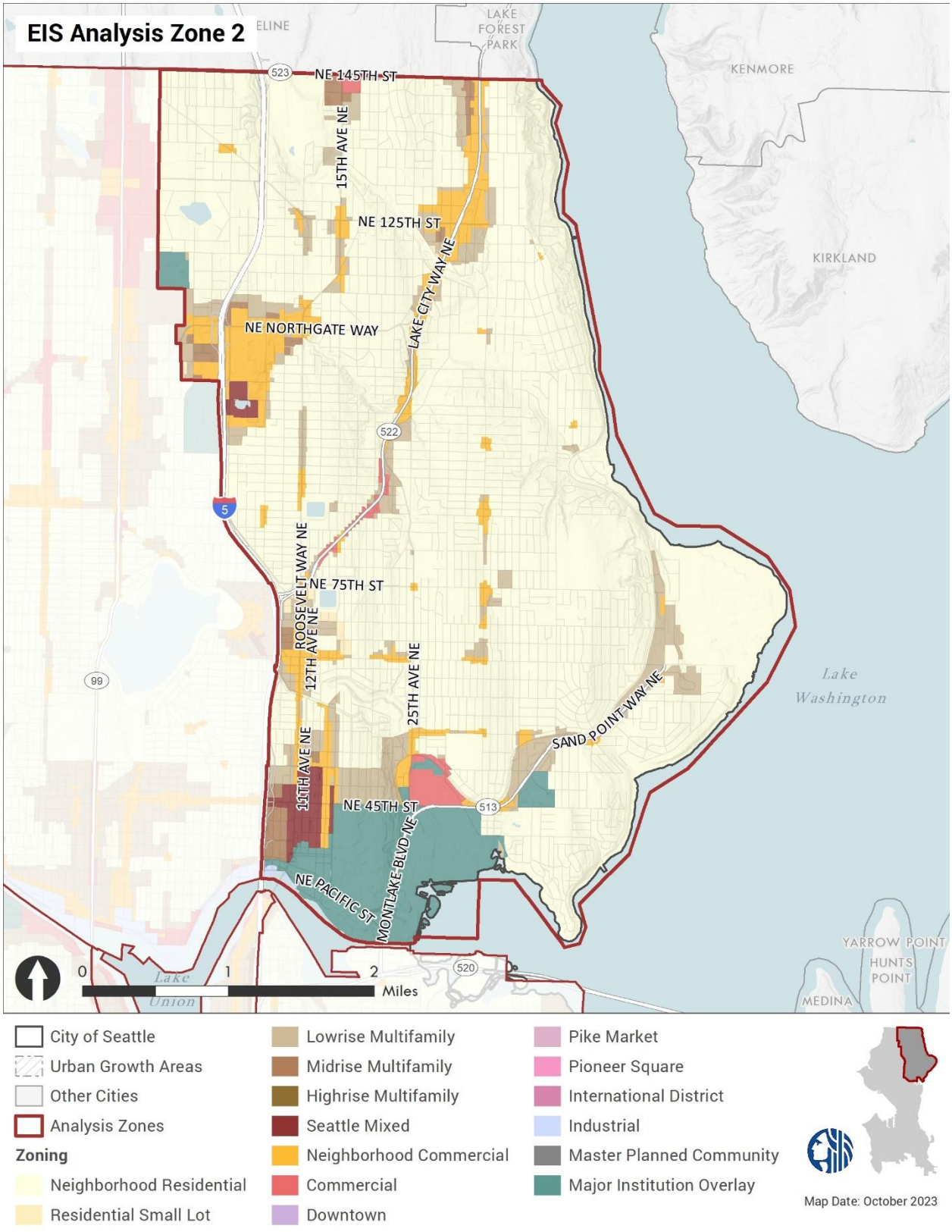
Area 2 includes about 10% of the city's designated shoreline district (761 acres). Nearly 75% of this area is within a conservancy shoreline environment, including Conservancy Management (11%) on the northern shoreline of Magnuson Park, Conservancy Preservation (26%) across the extent of Union Bay just SW of Laurelhurst neighborhood, and Conservancy Recreation (39%) on the eastern and southern shoreline of Magnuson Park. Another 19% are designated as Urban Residential extending north from Magnuson Park to the NE 145th St and south of Magnuson Park to the western most boundary of Laurelhurst. Designated shoreline acreage within the analysis area is detailed in **Exhibit 3.6-18** and mapped in **Exhibit 3.6-31**.

Exhibit 3.6-29. Area 2: NE Seattle—Future Land Use Designations



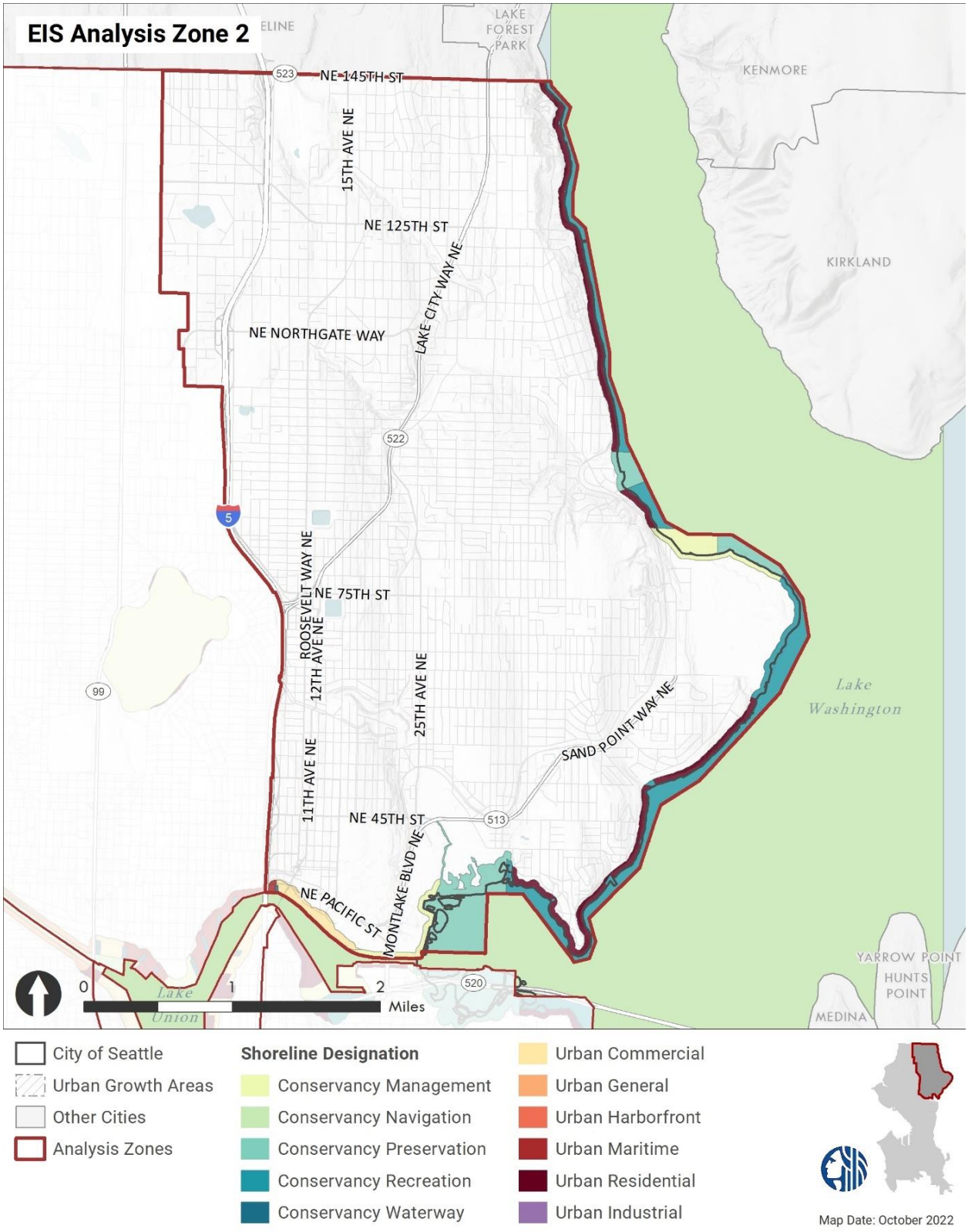
Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-30. Area 2: NE Seattle—Zoning



Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-31. Area 2: NE Seattle—Shoreline Designations



Source: City of Seattle, 2022; BERK, 2022.

Existing Land Use & Urban Form

Existing Uses

The largest existing land use category is single family residential, which accounts for 59% of the land (versus 48% citywide). Existing commercial, mixed-use, and multi-family uses, as well as a majority of the community assets, are located within the existing center and village boundaries. Commercial and mixed uses found in the Roosevelt and Lake City urban villages are typically vertically dense apartment buildings with ground-floor commercial around a main commercial corridor that supports essential neighborhood amenities. In comparison, the University Community and Northgate urban centers have denser and more intensive land uses which are often at a greater scale than is found in urban villages. Outside of the center and village boundaries, commercial and multi-family development is concentrated along the extents of Sandpoint Way NE, Lake City Way NE, Roosevelt Way NE, 15th Ave E, and 35th Ave NE.

Major institutions and public facilities account for 13% of the existing land uses including the University of Washington and the National Oceanic and Atmospheric Administration Western Regional Center. Parks, open space, and cemeteries account for another 13% of the analysis area consisting of Cowen and Magnuson Parks, the Calvary Cemetery, Sand Point County Club, and Jackson Park Golf Course. The share of industrial land uses in the analysis area is lower than the city overall (0.4% versus 5%).

Current land use acreage is detailed in **Exhibit 3.6-19** and mapped in **Exhibit 3.6-32**.

General Urban Form

Areas north of NE 85th St (west of 20th Ave NE) and NE 65th St (east of 20th Ave NE) were largely developed prior to annexation to the City of Seattle in 1954. These areas tend to have a more automobile-oriented character than areas further south; in many places sidewalks are absent, and buildings are designed around automobile access. Lake City Way, a major arterial and designated state highway (SR 522), runs through the northern half of Area 2. The road has been upgraded and expanded continuously since it opened in 1909 and combines elements of separated highway, urban arterial, and commercial main street character. Because some segments have fewer design improvements to slow drivers, driver behavior can create a hostile and unpredictable pedestrian environment in Lake City Way's neighborhoods and business districts.

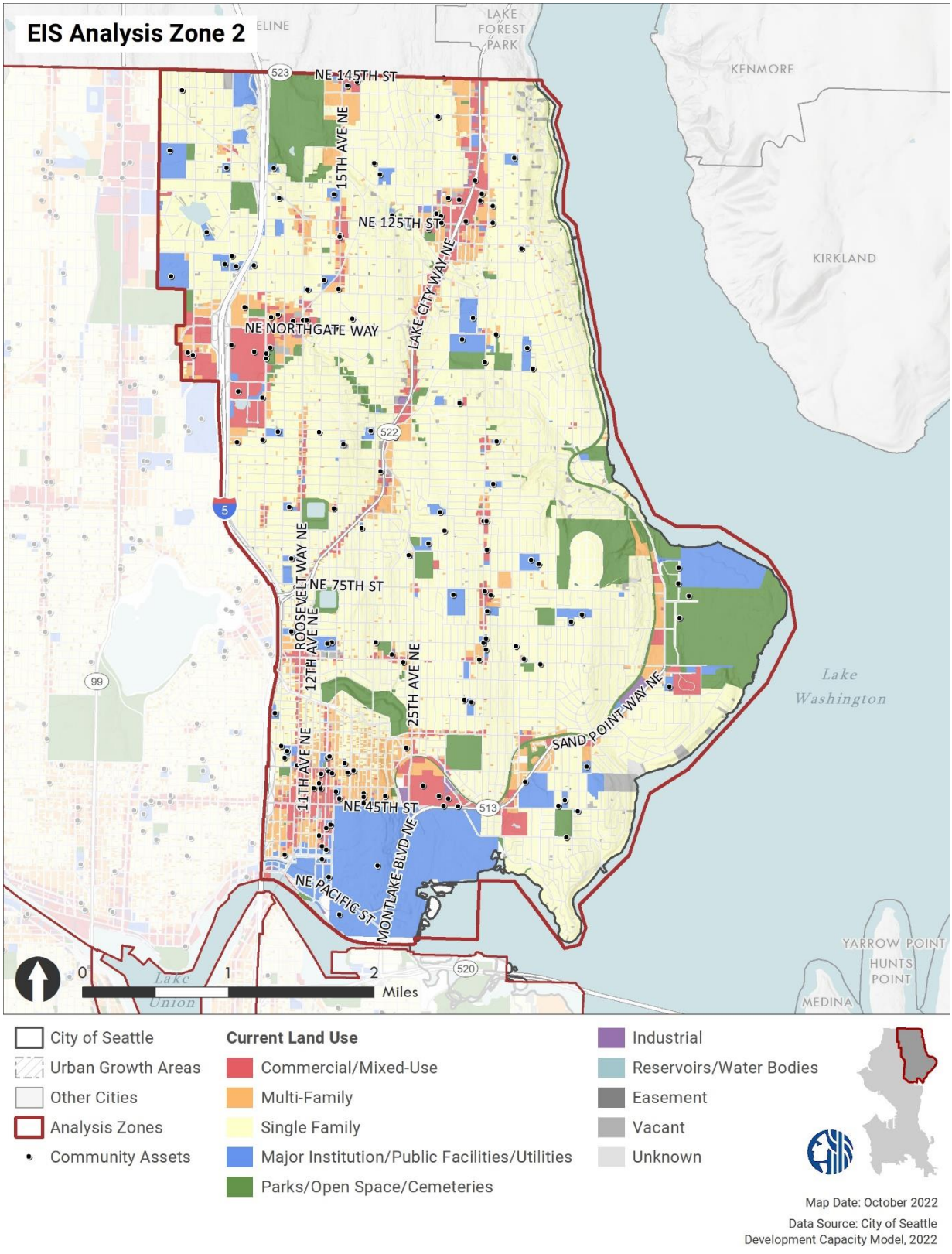
Heights

Building heights in the Northgate Urban Center, Lake City Hub Urban Village, and around the Roosevelt light rail station are between 6- to 8-stories, while the University Community Urban Center is experiencing high-rise development of buildings twenty stories or more. The rest of the analysis area is predominantly 1- to 2-story buildings.

Transitions

A major transition between intensities occurs between the University Community Urban Center and low-density residential areas to the north.

Exhibit 3.6-32. Area 2: NE Seattle—Current Land Use



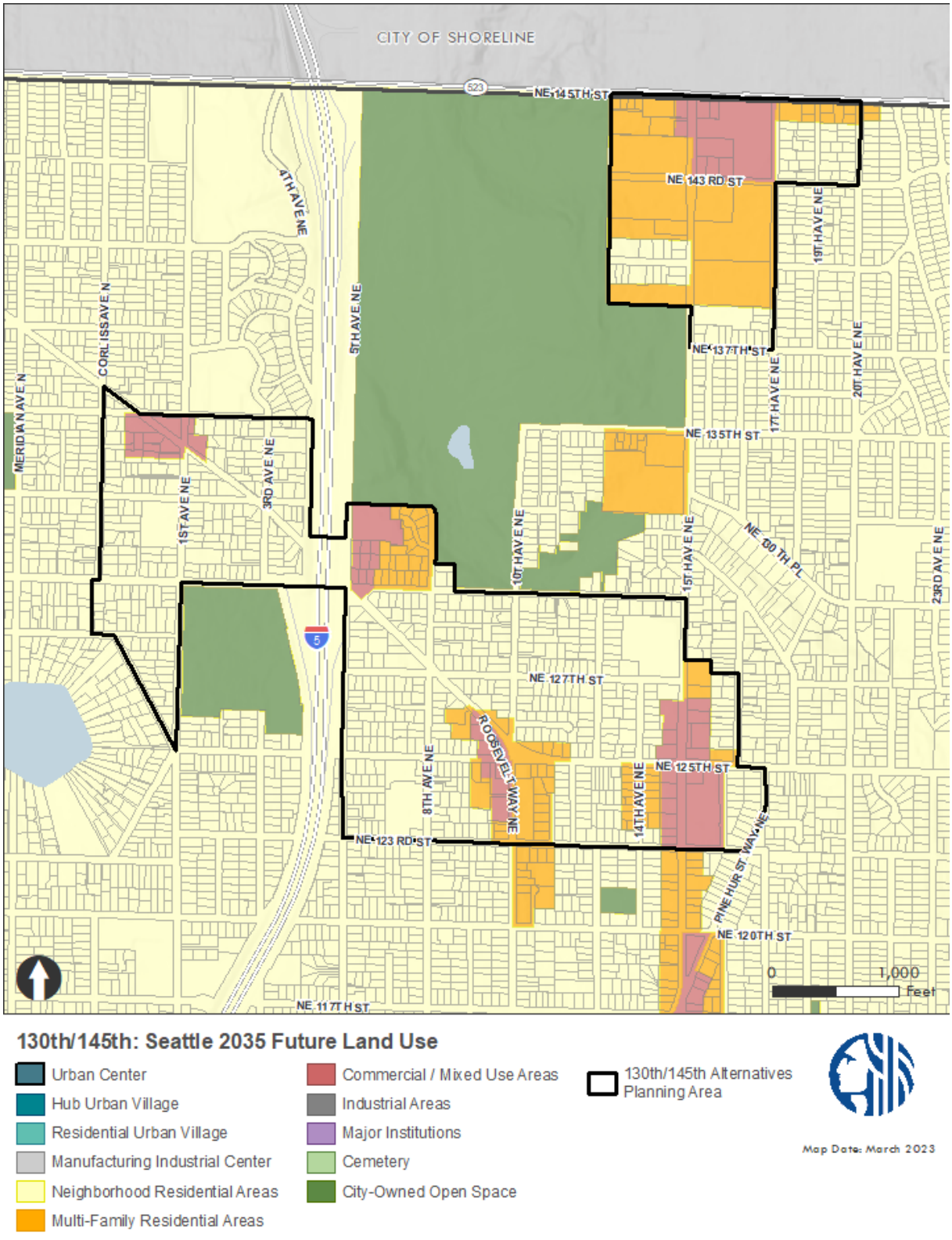
Source: City of Seattle, 2022; BERK, 2022.

130th/145th Station Area

Future Land Use, Zoning, & Shorelines. Future land use and zoning in the 130th Station Area is primarily neighborhood residential with some commercial, mixed-use, and multi-family designations near 130th Street and Roosevelt Way to the east of I-5 and around 125th Street. Future land use and zoning in the 145th Station Area is primarily commercial, mixed-use, and multi-family along 15th Ave with some neighborhood residential on the station area perimeter. There are no designated shorelines in either station area. See **Exhibit 3.6-33** and **Exhibit 3.6-34**.

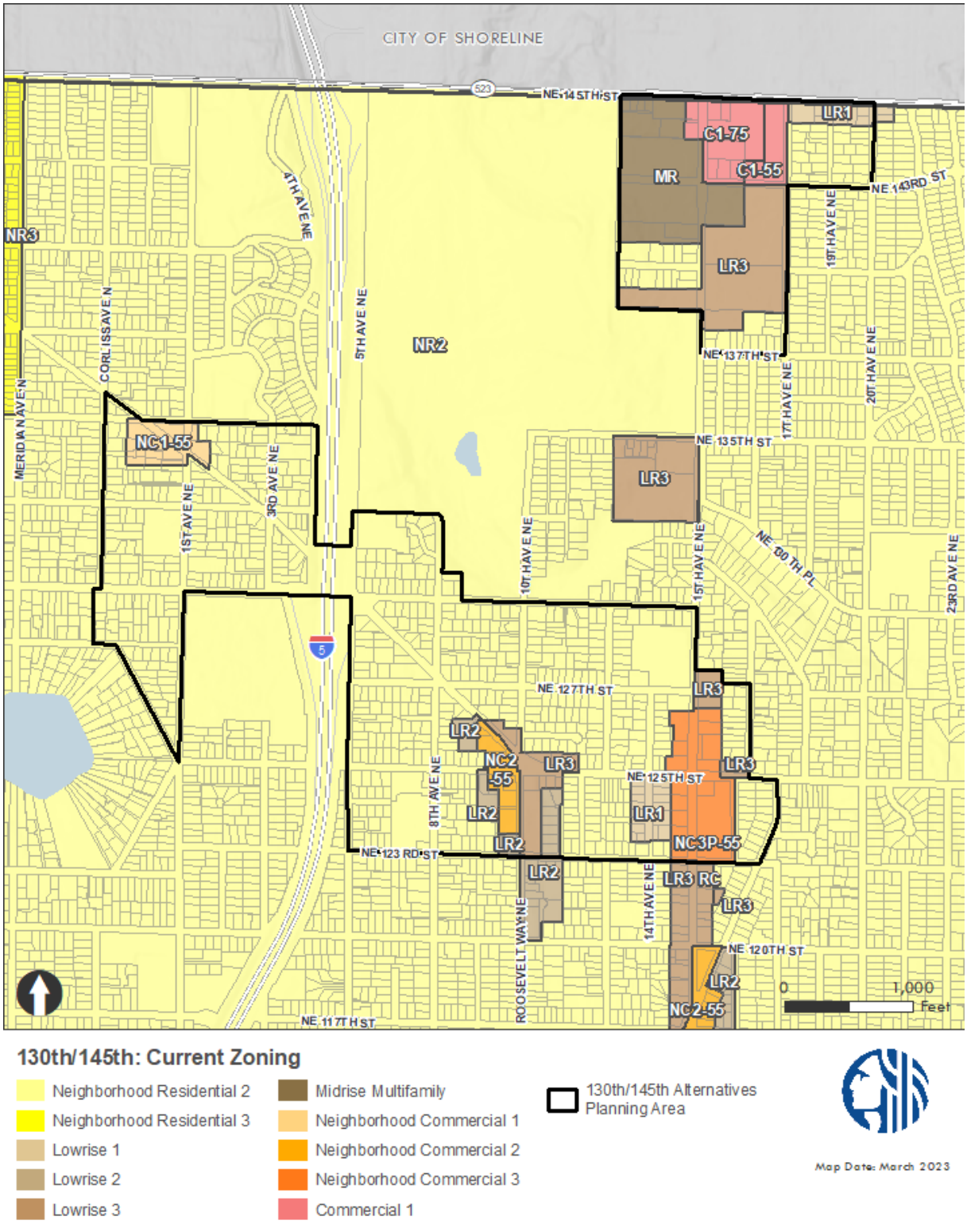
Existing Land Use. Existing commercial, mixed-use, and multi-family uses are concentrated around 130th Street and Roosevelt Way to the east of I-5, around 125th Street and 15th Ave, and within the 145th Station Area. These generally consist of single-story commercial or 3-4 story multi-family development with a limited amount of mixed-use near Roosevelt and 125th Street. A portion of the Jackson Park Golf Course is within both station areas. Other parks and open space in the 130th Station Area include Northacres Park, the Flicker Haven and Licorice Fern Natural Areas on Thornton Creek, and the eastern edge of Haller Lake (which is surrounded by single family development but is accessible by a public street end on the west of the lake outside the Station Area). Billings Middle School, Lakeside Middle School, and several churches are also within the 130th Station Area. Single family uses fill in the intervening areas and comprise the majority of the 130th Station Area. See **Exhibit 3.6-35**.

Exhibit 3.6-33. 130th/145th Station Area—Future Land Use Designations



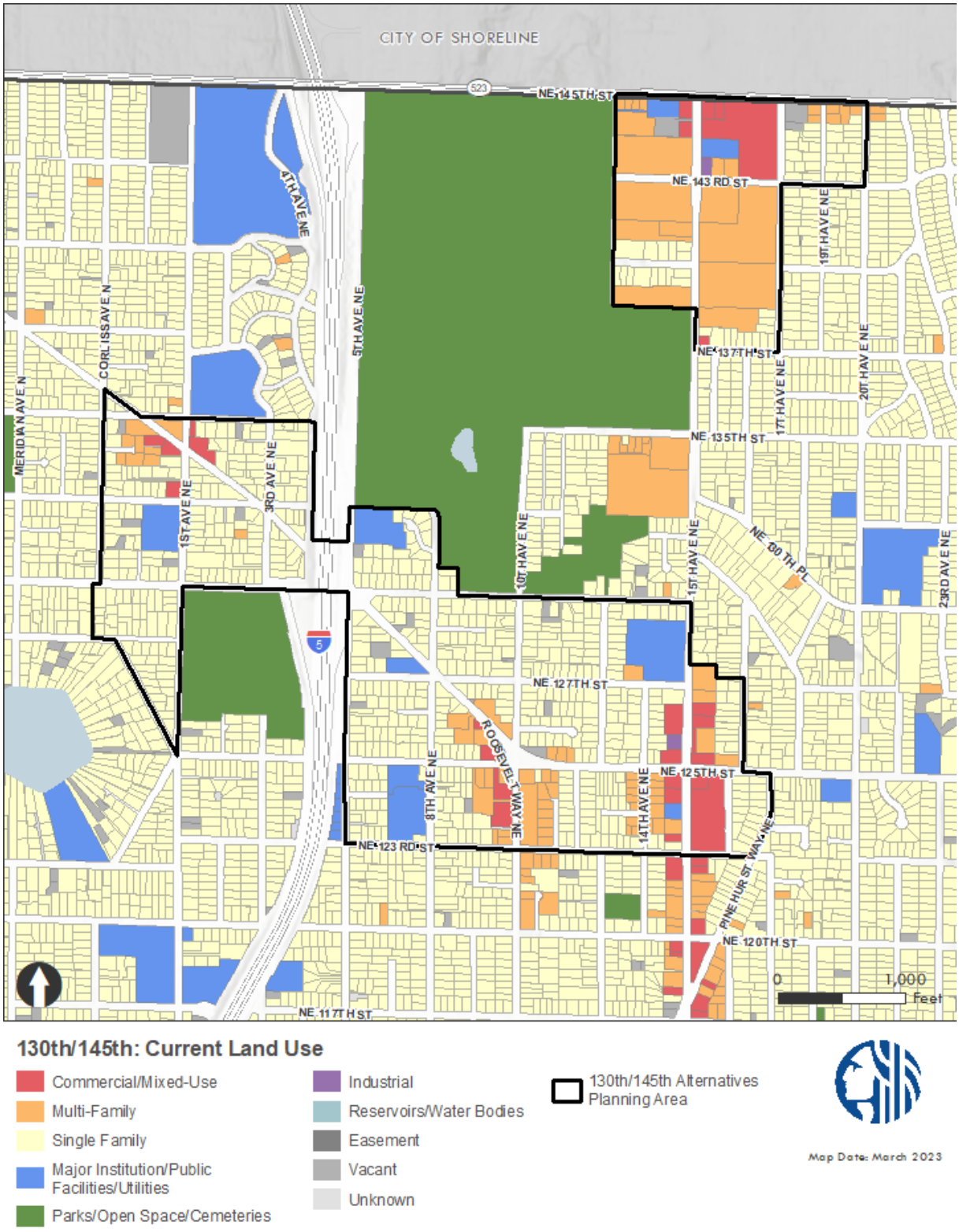
Sources: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-34. 130th/145th Station Area—Current Zoning



Sources: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-35. 130th/145th Station Area—Current Land Use



Sources: City of Seattle, 2022; BERK, 2023.

Heights. Buildings around the 130th light rail station are mostly 1- and 2-story as much of the area is zoned neighborhood residential. At the 145th bus rapid transit station, building south of 145th are mostly 3-story apartments. Additionally, close to the 130th station is the Pinehurst area, where the tallest buildings are 3- and 4-story buildings. See **Exhibit 3.6-36**.

Exhibit 3.6-36. Typical Buildings in the 130th/145th Station Area

Source: MAKERS, 2023.

Views. Although no SEPA-protected views exist in the area, the 8th Ave NE right-of-way/utility corridor provides a unique view looking north into Jackson Park. See **Exhibit 3.6-37**.

Exhibit 3.6-37. 8th Ave NE View to Jackson Park

Source: MAKERS, 2023.

Area 3: Queen Anne/Magnolia

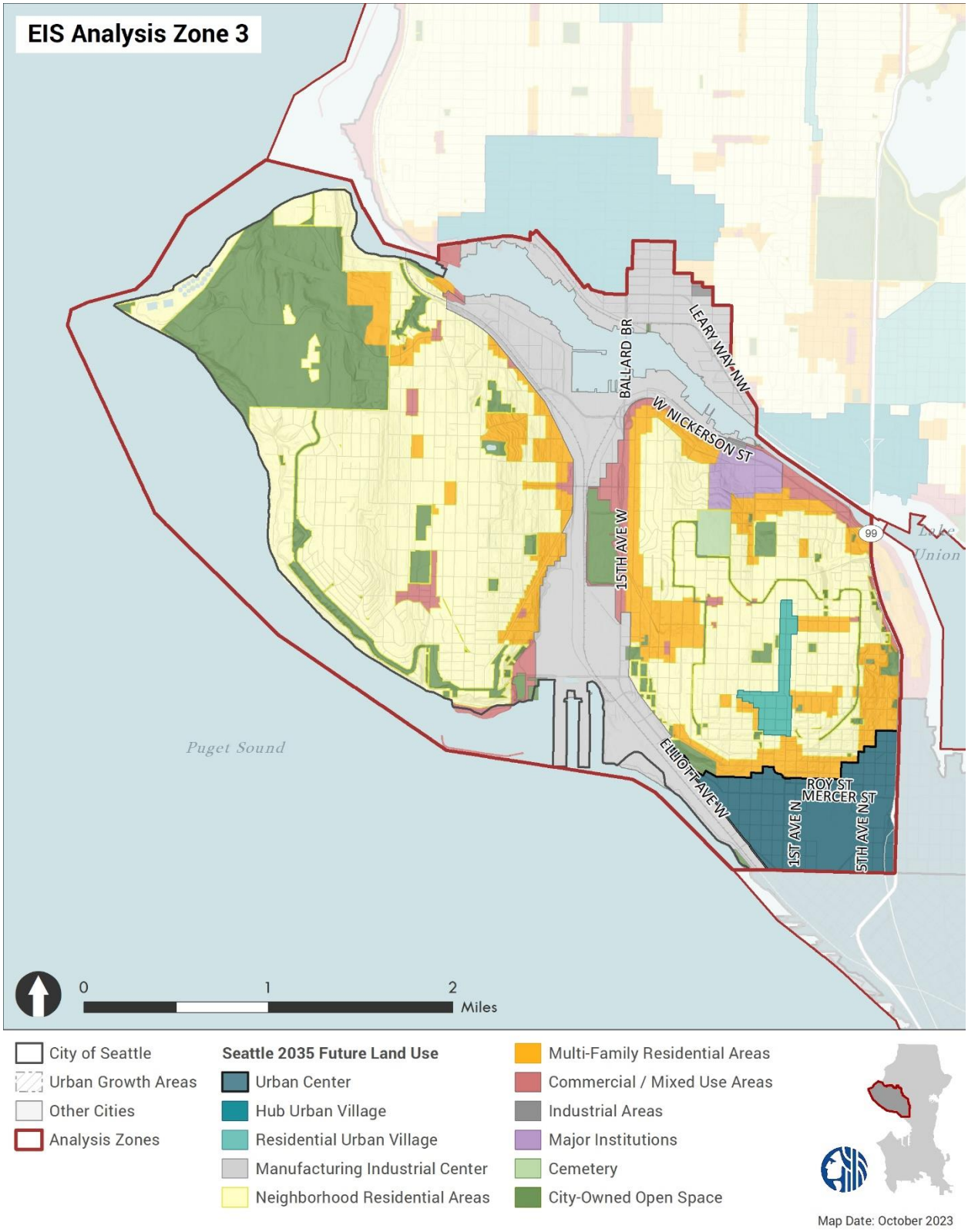
Future Land Use, Zoning, & Shorelines

Area 3 includes the portion of Seattle that is west of State Route 99, north of Denny Way, and south of the Lake Washington Ship Canal as well as the lands in the BINMIC that are north of the Lake Washington Ship Canal. It includes approximately 4,075 acres of buildable lands, or 10% of the buildable lands citywide. In addition to the BINMIC, Area 3 also includes the Uptown Urban Center and the Upper Queen Anne Residential Urban Village.

Topography plays a role in future land use designations within this analysis area. The crest of the Magnolia and Queen Anne neighborhoods support commercial/mixed-use and multi-family residential uses along a primary commercial corridor. Commercial/mixed-use designations are centered at the intersection of 32nd Ave W and W McGraw St in Magnolia, organized along Queen Anne Ave N in Upper Queen Anne Residential Urban Village, and along Mercer St in the Uptown Urban Center. Multi-family residential designations are located at the foot of both hills, lying between the neighborhood residential areas and the industrial uses in the BINMIC. Future land use and zoning acreage within the analysis area are detailed in **Exhibit 3.6-14** and **Exhibit 3.6-16** and mapped in **Exhibit 3.6-38** and **Exhibit 3.6-39**.

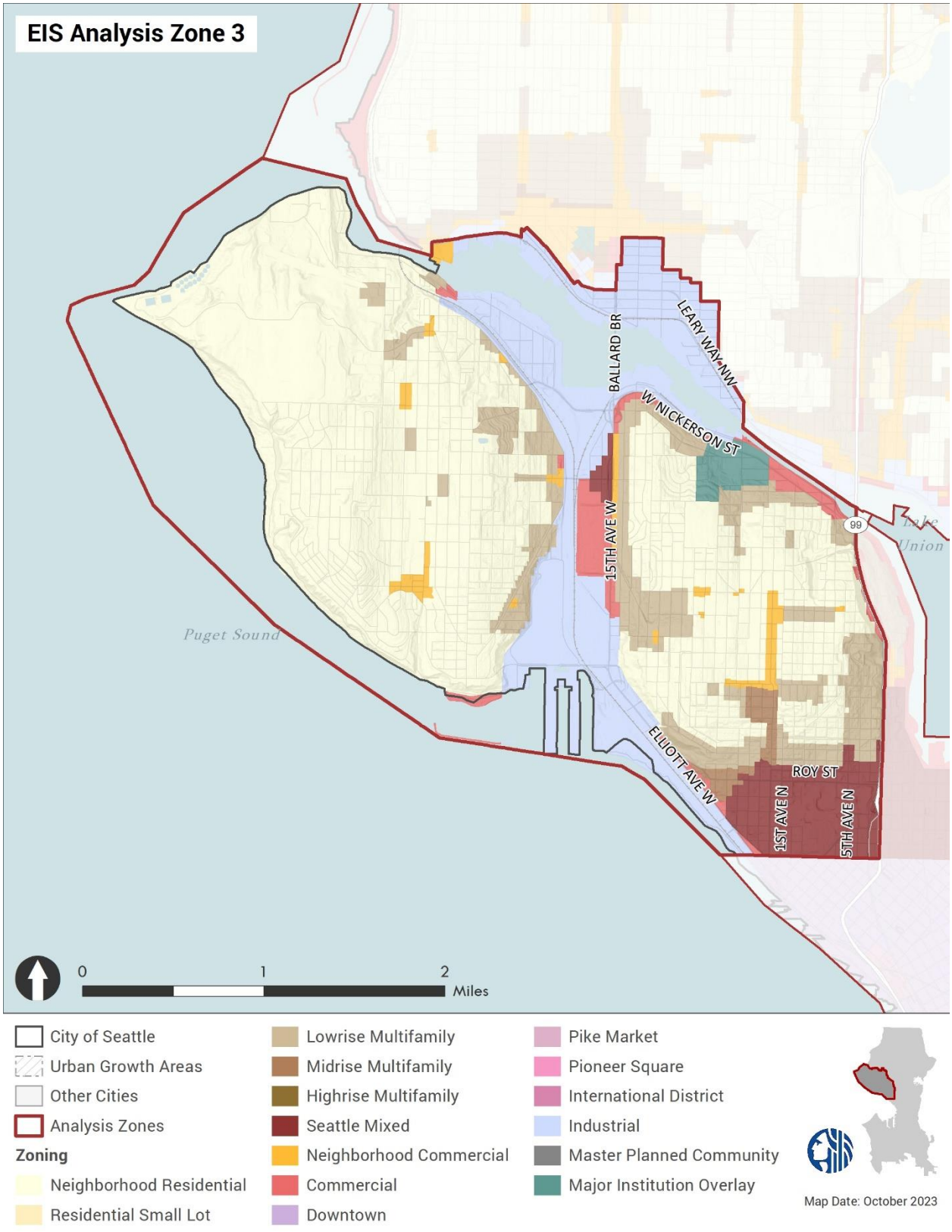
Area 3 includes about 24% of the city's designated shoreline district (1,772 acres). Nearly three-quarters of this area is within a conservancy shoreline environment, including Conservancy Management (10%) east of the Ballard Locks and on both sides of the Smith Cove Waterway, Conservancy Navigation (8%) along the Lake Washington Ship Canal, and a mix of Conservancy Preservation (35%) and Conservancy Recreation (19%) following the shoreline along the Magnolia neighborhood. Another 17% is designated Urban Industrial on the north shore of the Lake Washington Ship Canal and surrounding Smith Cove Waterway and 6% is designated as Urban Maritime near Fisherman's Terminal. Designated shoreline acreage within the analysis area is detailed in **Exhibit 3.6-18** and mapped in **Exhibit 3.6-40**.

Exhibit 3.6-38. Area 3: Queen Anne/Magnolia—Future Land Use Designations



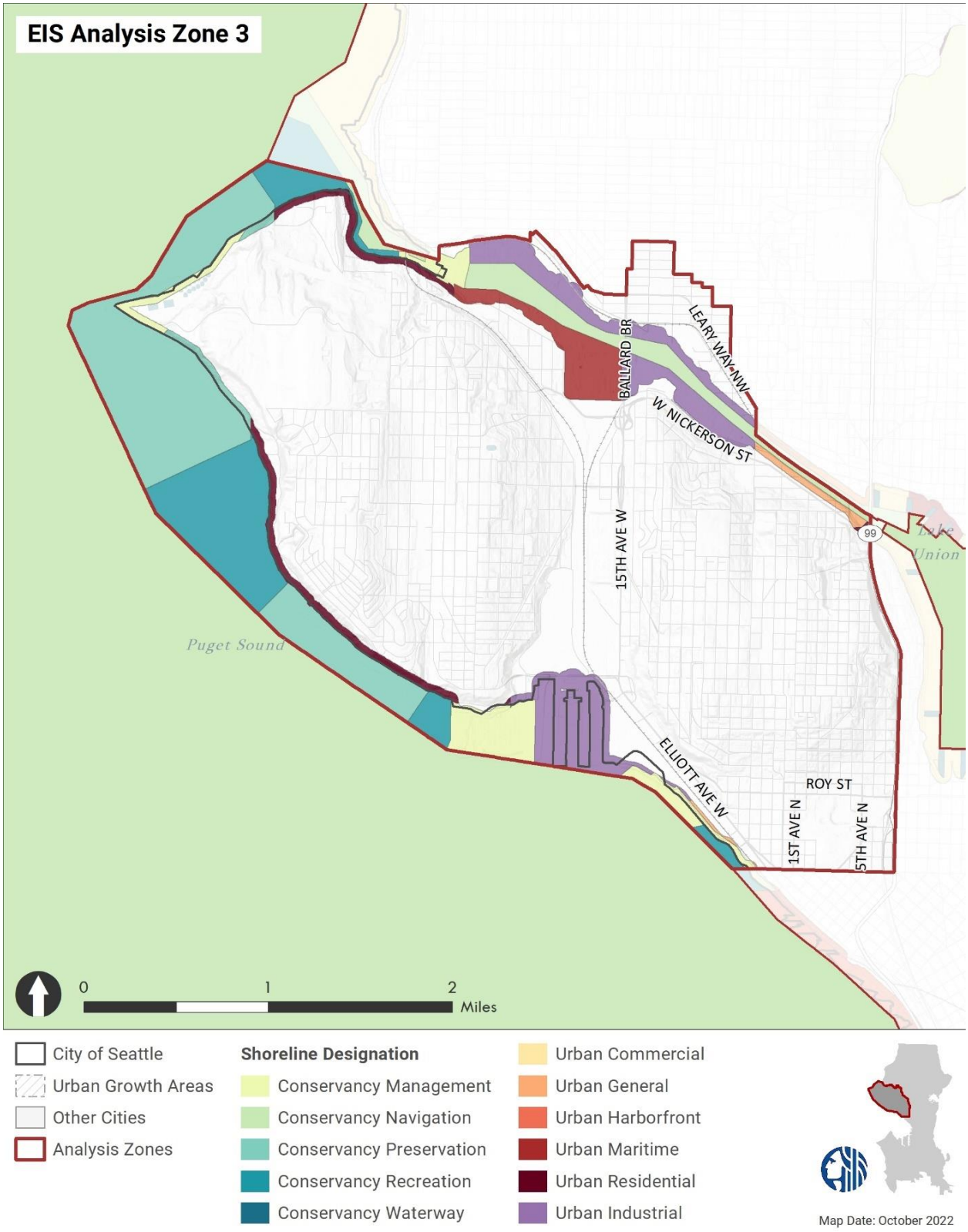
Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-39. Area 3: Queen Anne/Magnolia—Zoning



Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-40. Area 3: Queen Anne/Magnolia—Shoreline Designations



Source: City of Seattle, 2022; BERK, 2022.

Existing Land Use

Existing Uses

The largest existing land use category is single family residential which accounts for 35% of existing uses versus 48% citywide. A higher share of commercial/mixed-use land uses are present in the study area (13%) compared to the 8% citywide. Commercial/mixed-use land uses are centered in the Uptown Urban Center and the Upper Queen Anne Residential Urban Village with a smaller portion allocated in the Magnolia Village along the W McGraw St commercial corridor. Mixed-use buildings in the centers and villages are typically organized around a liner commercial corridor and consist of 4- to 5-story residential buildings with ground floor retail.

Major institutions, public facilities, and utilities account for 12% of the existing uses primarily due to the presence of the BINMIC and Seattle Pacific University. Parks, open space, and cemeteries account for another 20% of the land uses in the analysis area. The largest uses in this category include Discovery Park, Interbay Athletic Complex, Mt. Pleasant Cemetery, and neighborhood parks including David Rodgers, Smith Cove, and Ella Bailey Parks.

Current land use acreage is detailed in **Exhibit 3.6-19** and mapped in **Exhibit 3.6-41**.

Heights

Area 3 has a pocket of taller 5- to 7-story buildings in the Uptown Urban Center and along Queen Anne Avenue. However, most of the area is zoned neighborhood residential and has building heights of 1 to 2 floors.

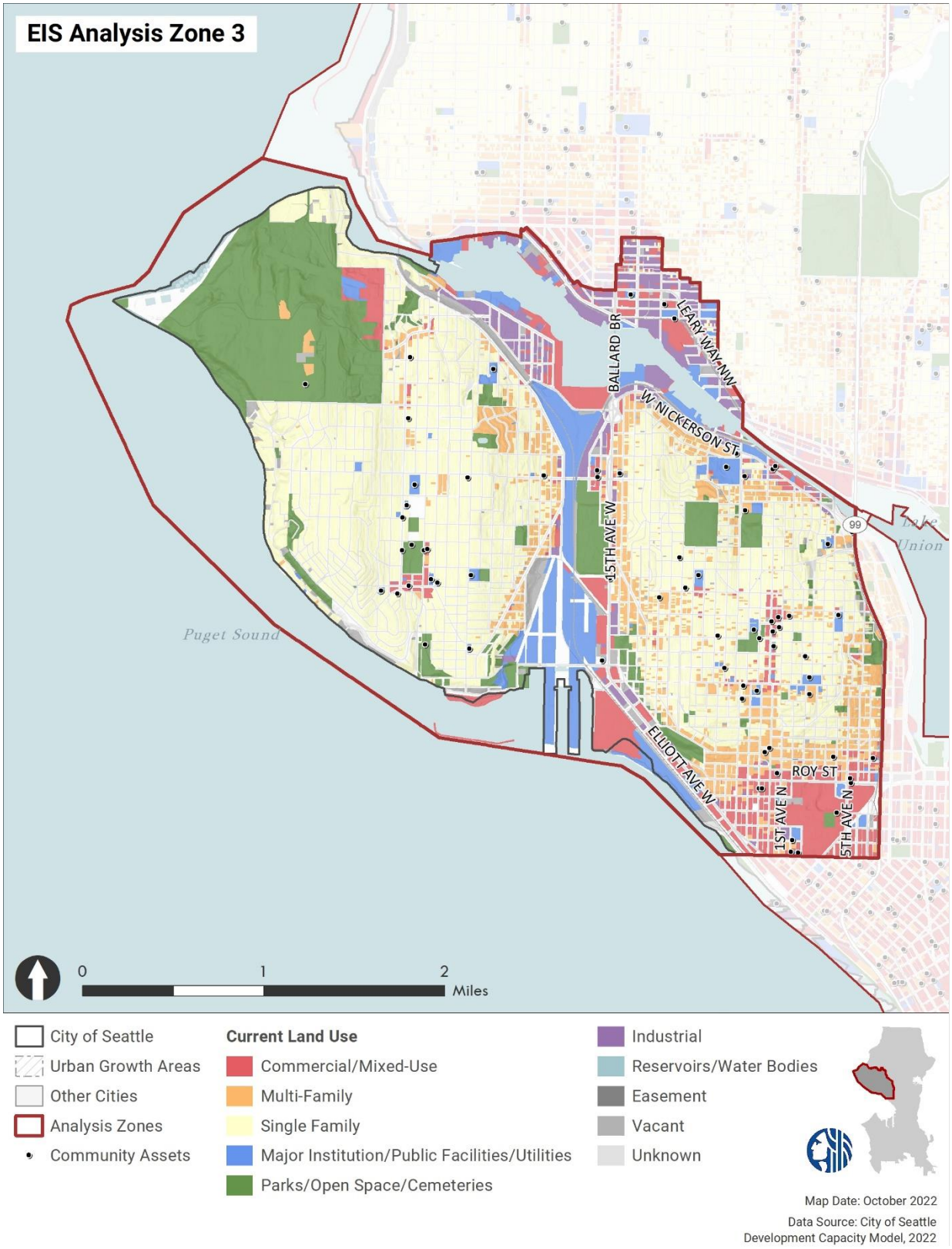
Transitions

The shift from the greater Downtown Urban Center north to lower density residential areas is a major transition in building intensity. However, this is likely to be mitigated by the steep south slope of Queen Anne hill, providing good access to light and views for even low-scale buildings. In Interbay, industrial uses abut residential areas that have seen increasing moderate density housing construction in recent years.

Shadows

The north side of Queen Anne Hill and Magnolia experience a shadier environment because of topography blocking southern sun exposure.

Exhibit 3.6-41. Area 3: Queen Anne/Magnolia—Current Land Use



Source: City of Seattle, 2022; BERK, 2022.

Area 4: Downtown/Lake Union

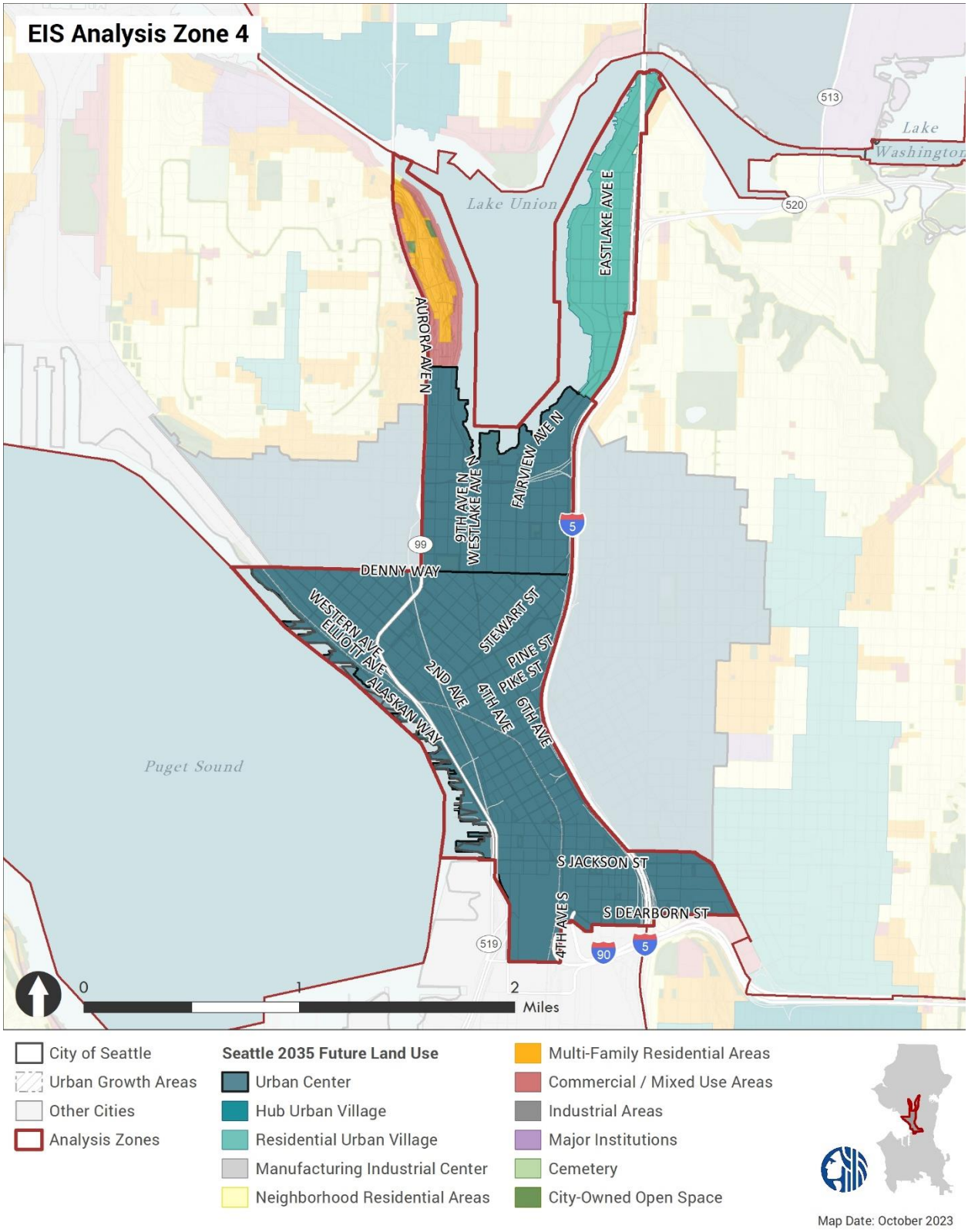
Future Land Use, Zoning, & Shorelines

Analysis Area 4 includes the portion of Seattle east of State Route 99, west of Interstate 5, and north of Interstate 90. The study area is also bounded by its shoreline fronting Elliott Bay and Lake Union. It includes approximately 1,033 acres of buildable lands, or 3% of the buildable lands citywide including the Downtown and South Lake Union Urban Centers and the Eastlake Residential Urban Village.

Four distinct future land use designations are present in the analysis area. The Downtown Urban Center, South Lake Union Urban Centers, and Eastlake Residential Urban Village account for nearly 90% of planned uses. Denny Way separates the Downtown Urban Center from the South Lake Union Urban Center. The remaining commercial/mixed use and multi-family designations are located east of Aurora Ave N and north of Galer Street in the Westlake neighborhood. Commercial/mixed-use designations are concentrated along Westlake Ave N and Aurora Ave N with multi-family residential future land use and zoning designations filling in the intervening areas. Future land use and zoning acreage within the analysis area are detailed in **Exhibit 3.6-14** and **Exhibit 3.6-16** and mapped in **Exhibit 3.6-42** and **Exhibit 3.6-43**.

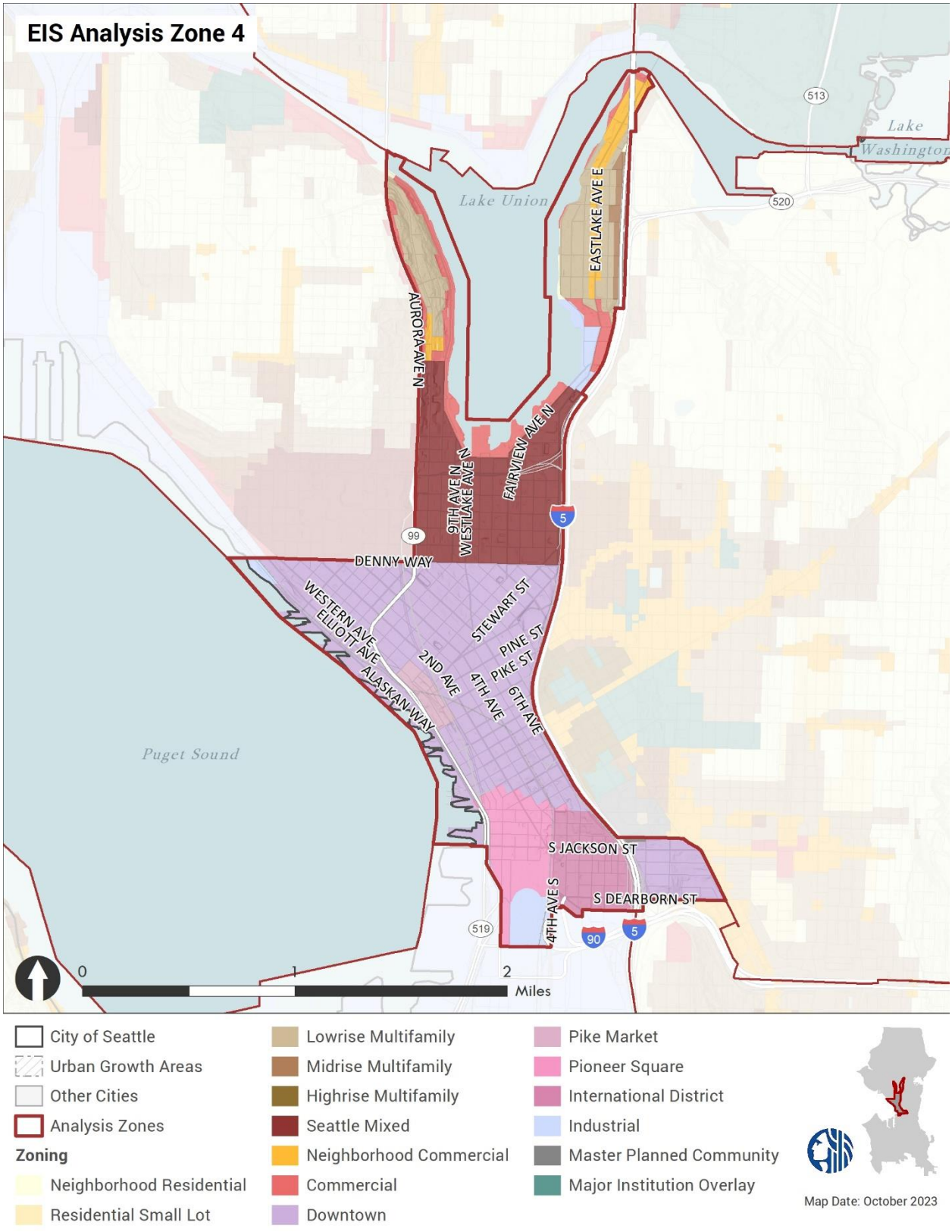
Analysis Area 4 includes about 5% of the city's designated shoreline district (390 acres). Less than 10% of this area is within a conservancy shoreline environment. A majority of the shoreline is designated as Urban including: Urban Commercial (41%) lining a majority of Lake Union from the Aurora Bridge to Lake Union Drydocks, followed by Urban Harborfront (33%) fronting Elliott Bay, Urban Marine (9%) in the southeastern corner of Lake Union, and Urban Residential (7%) on the eastside of Lake Union. Designated shoreline acreage within the analysis area is detailed in **Exhibit 3.6-18** and mapped in **Exhibit 3.6-44**.

Exhibit 3.6-42. Area 4: Downtown/Lake Union—Future Land Use Designations



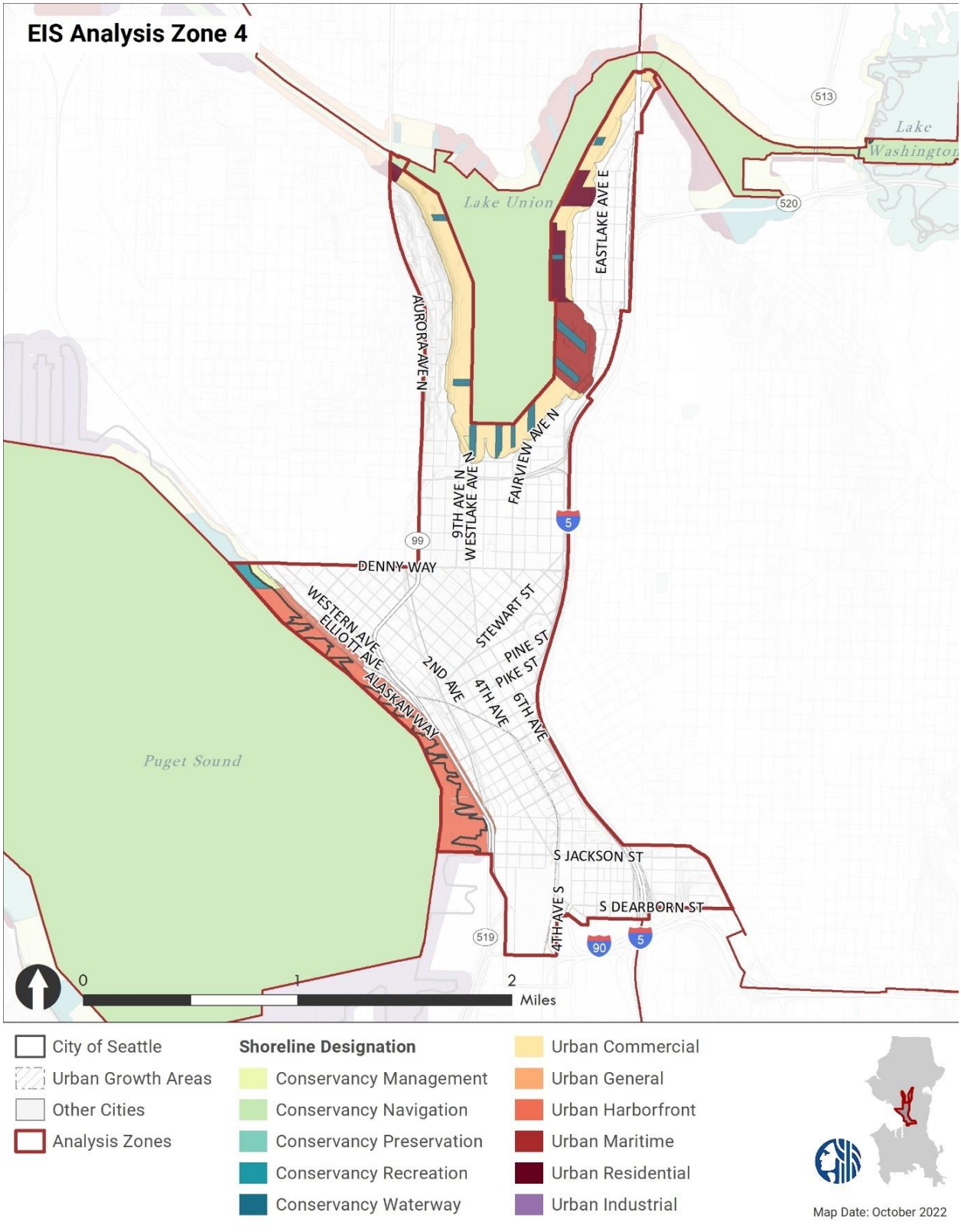
Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-43. Area 4: Downtown/Lake Union—Zoning



Source: City of Seattle, 2022; BERK, 2022.

Exhibit 3.6-44. Area 4: Downtown/Lake Union—Shoreline Designations



Source: City of Seattle, 2022; BERK, 2022.

Existing Land Use

Existing Uses

The largest existing land use category is commercial/mixed-use which accounts for 62.1% of existing uses versus 8.4% citywide. The analysis area includes the commercial and financial center of Seattle and houses its densest and tallest commercial and mixed-use buildings. Commercial/mixed-use land uses are centered in the Downtown and South Lake Union urban centers with a smaller portion of multi-family uses centered in the Belltown and Eastlake neighborhoods. The Eastlake Residential Urban Village has a main commercial corridor along Eastlake Ave E, which is buffered by multi-family and single family uses.

Major institutions, public facilities, and utilities account for 9% of existing uses in the analysis area, including the Seattle City Light Denny Substation, King County Courthouse, Administration and Detention facilities, and the Washington State Convention Center. Parks, open space, and cemeteries account for only 4% of current land uses in the analysis area compared to 14% citywide. The largest uses in this category include Lake Union Park, Denny Park, Cascade Playground, and part of the newly rehabilitated waterfront along Elliot Bay.

Current land use acreage is detailed in **Exhibit 3.6-19** and mapped in **Exhibit 3.6-45**.

General Urban Form

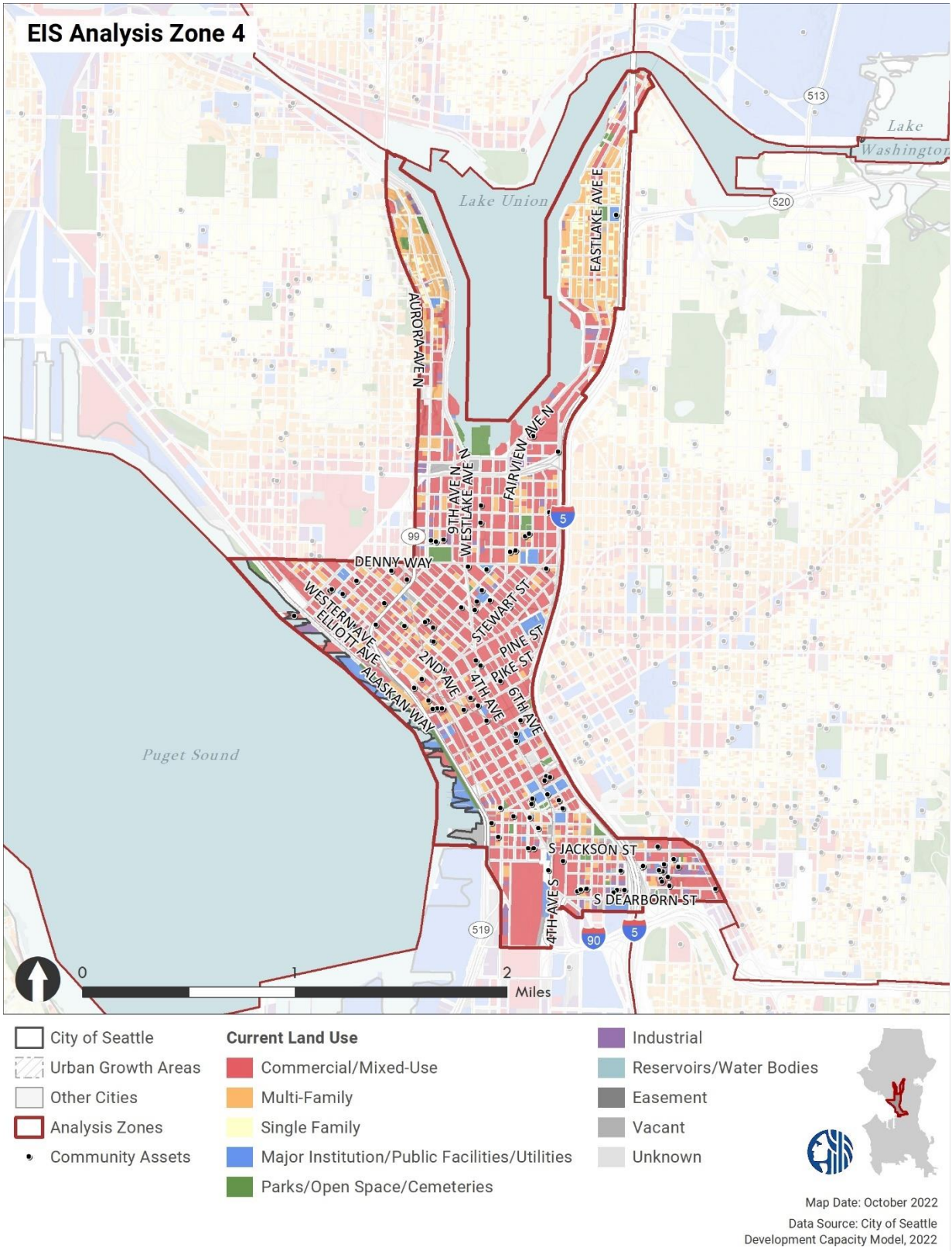
The urban form of Area 4 has deep roots, stretching back to the early days of Euro-American settlement, when settlers with different land claims laid out separate street grids, each oriented to the shoreline along their land claim. Today, most land in the area is heavily built out, and the dense grid of streets creates a well-connected, if automobile-dominated, dense urban environment.

During early settlement, the land claim south of Yesler Way emerged as a lively, diverse, rough-and-tumble neighborhood. Non-White communities were better able to find a foothold here than in other areas and Asian and Black communities established in Pioneer Square but were pushed east to areas that later became Chinatown, Japantown, and Little Saigon, (together Chinatown-International District or "CID") and the Central District.[19]

Chinatown-International District emerged with a unique urban form combining elements of western boomtown urbanism, with large, externally ornamented but internally utilitarian brick buildings replacing wooden structures, and Chinese and Japanese influences in decorative style and internal layout of buildings. Some of these buildings were developed by transcontinental mutual aid societies such as the Kong Yick Investment Company. Many Japanese people lost their homes and businesses in Japantown (bounded by 4th Ave S, S Jackson St, Yesler Way, and then as far east as 23rd Ave) during Japanese internment in the 1940s.

[19] The Forging of a Black Community, Quintard Taylor, 1994

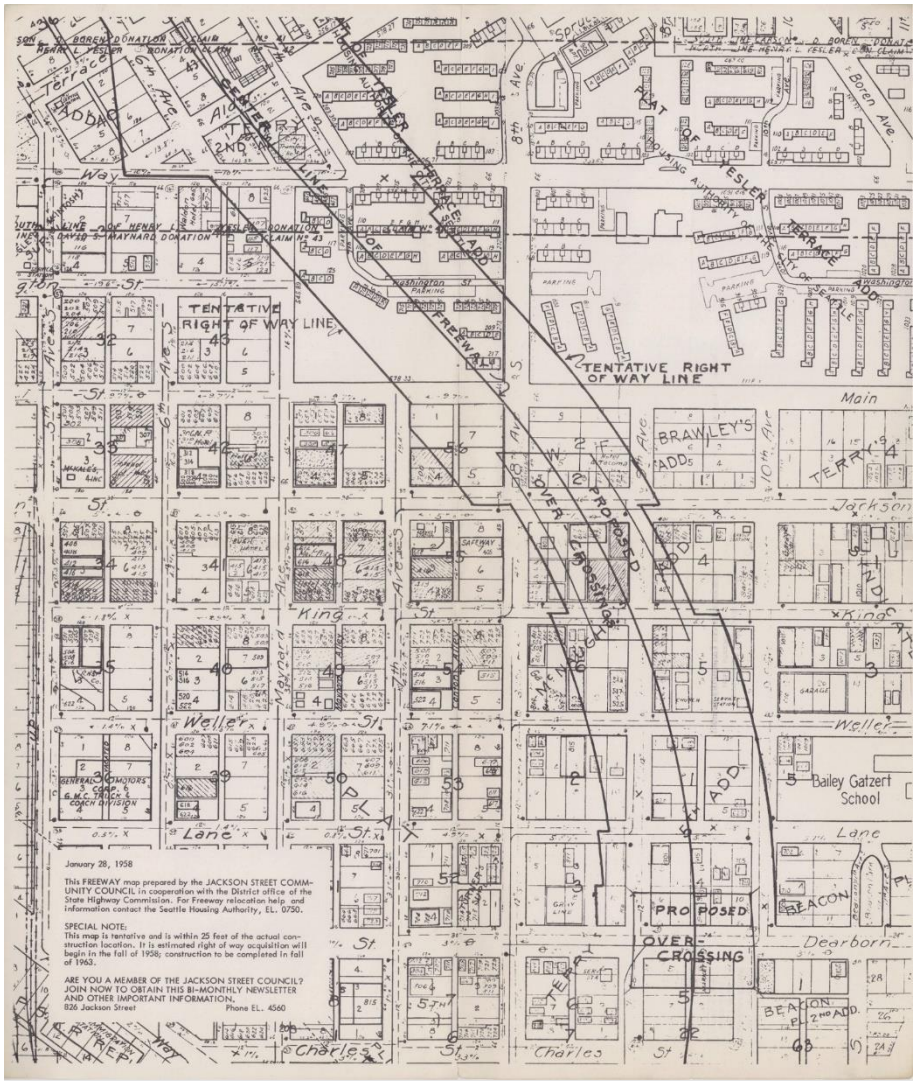
Exhibit 3.6-45. Area 4: Downtown/Lake Union—Current Land Use



Source: City of Seattle, 2022; BERK, 2022.

The area—with complex and changing demographics including Chinese, Japanese, Filipino, Black, and White communities—was significantly altered by the construction of I-5 in the 1960's, which involved the partial or complete demolition of 16 city blocks between Yesler Way and S Dearborn St and created a major sensory barrier between uphill and downhill parts of the neighborhood. Uphill portions of the neighborhood (now known as Little Saigon) were largely redeveloped with lower-density, auto-oriented buildings in the mid-20th century. These became a foothold for Vietnamese immigrant communities beginning in the late 1970's, where investments by Chinese-American and Vietnamese-American property owners and developers helped create a lively shopping district featuring semi-outdoor markets and repurposed strip mall-style buildings. See **Exhibit 3.6-46**, **Exhibit 3.6-47**, and the **Annexation & Regional Transportation Corridors** discussion above.

Exhibit 3.6-46. Proposed Path of I-5 Freeway in Chinatown-International District, 1958



Note: This map was used by the Jackson Street Community Council to raise awareness of businesses and homes that would be displaced by freeway construction.
Source: Wing Luke Museum.

Exhibit 3.6-47. Interstate 5 Construction through Chinatown-International District, 1966

Source: Washington State Archives.

Heights

Area 4 includes the densest area of Seattle, where Belltown, Denny Triangle, South Lake Union, and the Business District have a range of high-rises to skyscrapers. Area 4 also includes Westlake, with 5- to 7-story buildings throughout, and Eastlake, which has a mix of 4- and 5-story buildings, 3-story townhouses, and 2-story houseboats.

Area 5: Capitol Hill/Central District

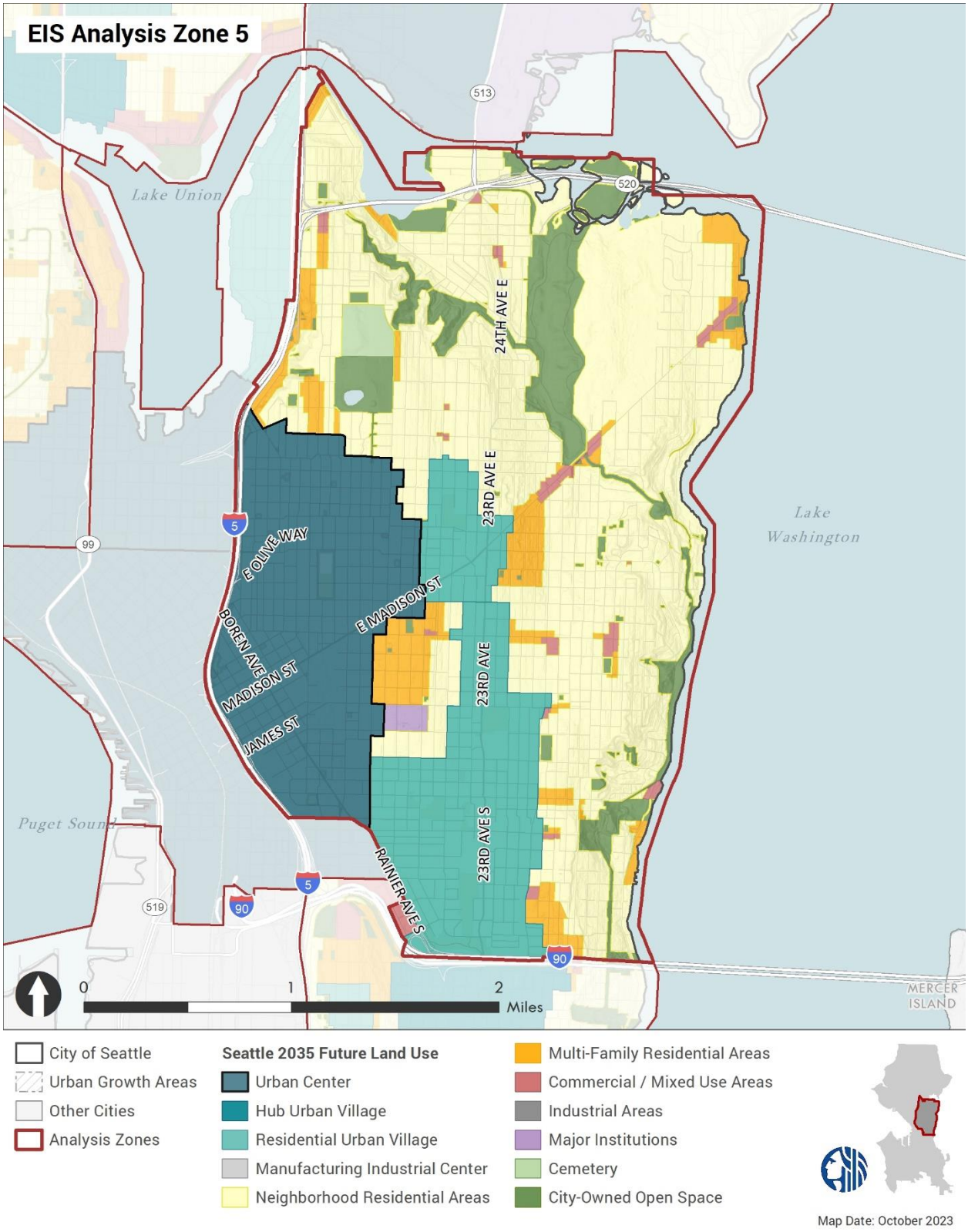
Future Land Use, Zoning, & Shorelines

Area 5 includes the portion of Seattle east of Interstate 5, north of Interstate 90, and south of the Montlake Cut. The analysis area is also bounded by its shoreline fronting Portage Bay and Lake Washington. It includes approximately 3,332 acres of buildable lands or 8% of the buildable lands city wide including the First Hill/Capitol Hill Urban Center and the 23rd & Union-Jackson and Madison-Miller Residential Urban Villages.

The urban center and urban village designations indicate where growth is to be concentrated in the future land use map including the First Hill/Capitol Hill Urban Center and the 23rd & Union-Jackson and Madison-Miller residential urban. Outside of the center and village boundaries, future multi-family residential and commercial/mixed-use areas are also planned along these streets. Seattle University accounts for a small pocket of major institution designation between the First Hill/Capitol Hill Urban Center and the 23rd and Union-Jackson Residential Urban Village. Neighborhood residential future land use designations fill in the other intervening areas. Future land use and zoning acreage within the analysis area are detailed in **Exhibit 3.6-14** and **Exhibit 3.6-16** and mapped in **Exhibit 3.6-48** and **Exhibit 3.6-49**.

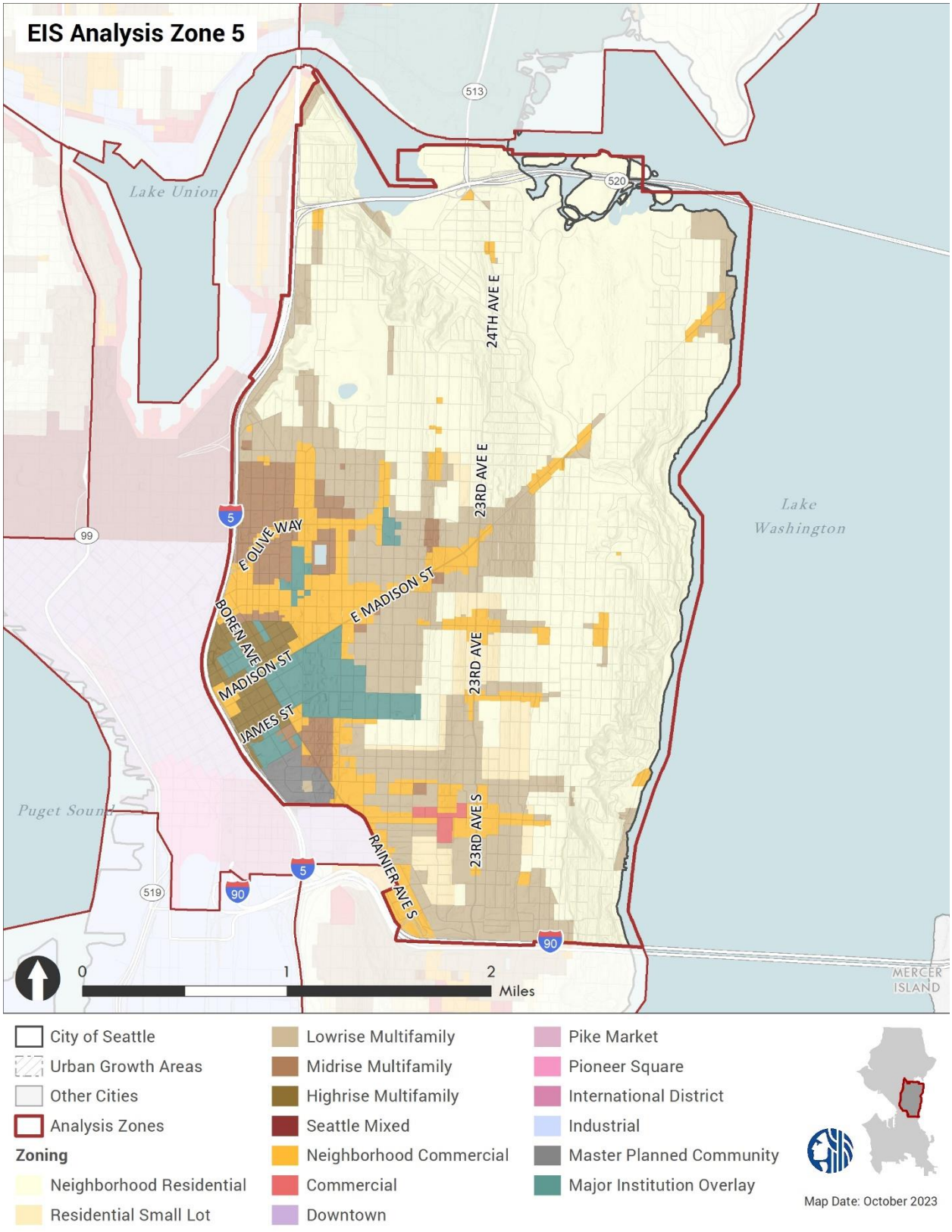
Area 5 includes about 7% of the city's designated shoreline district (513 acres). Nearly three-quarters of this area is within a conservancy shoreline environment, including Conservancy Management (12%) within the inner harbor of Portage Bay, Conservancy Preservation (31%) where Foster Island meets Union Bay, and Conservancy Recreation (32%) along the eastern frontage of the study area along Lake Washington. Another 24% is designated Urban Residential, predominantly along the shoreline of Lake Washington. Designated shoreline acreage within the analysis area is detailed in **Exhibit 3.6-18** and mapped in **Exhibit 3.6-50**.

Exhibit 3.6-48. Area 5: Capitol Hill/Central District—Future Land Use Designations



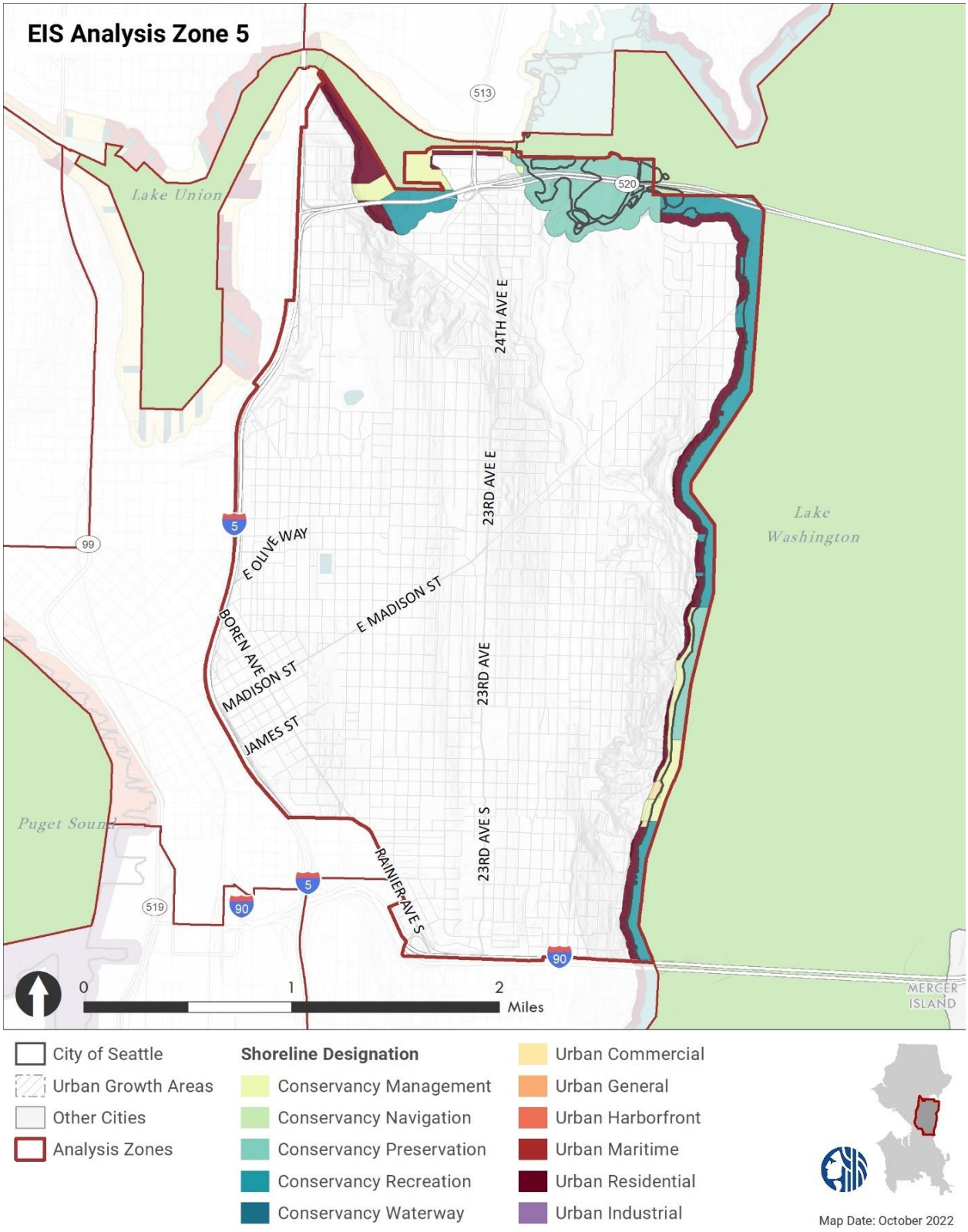
Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-49. Area 5: Capitol Hill/Central District—Zoning



Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-50. Area 5: Capitol Hill/Central District—Shoreline Designations



Source: City of Seattle, 2022; BERK, 2022.

Existing Land Use

Existing Uses

The largest existing land use category is single family residential which accounts for 46% of existing uses versus 48% citywide. Commercial/mixed-use areas are centered in the First Hill/Capitol Hill Urban Center and the 23rd & Union-Jackson and Madison-Miller residential urban villages. Approximately 18% of the analysis area is currently multi-family residential which is slightly more than double the proportion citywide (9%).

Major institutions, public facilities, and utilities account for 7% of the existing land uses in the analysis area. These uses include Seattle University, Seattle Central College, Garfield Highschool, Bailey Gatzert Elementary, Thurgood Marshall Elementary, and the King County Juvenile Detention Center. Parks, open space, and cemeteries account for 18% of the land uses in the analysis area compared to 14% citywide. The largest uses in this category include the Washington Park Arboretum, Volunteer Park, Cal Anderson Park, Frink Park, and Powell Barnett Park.

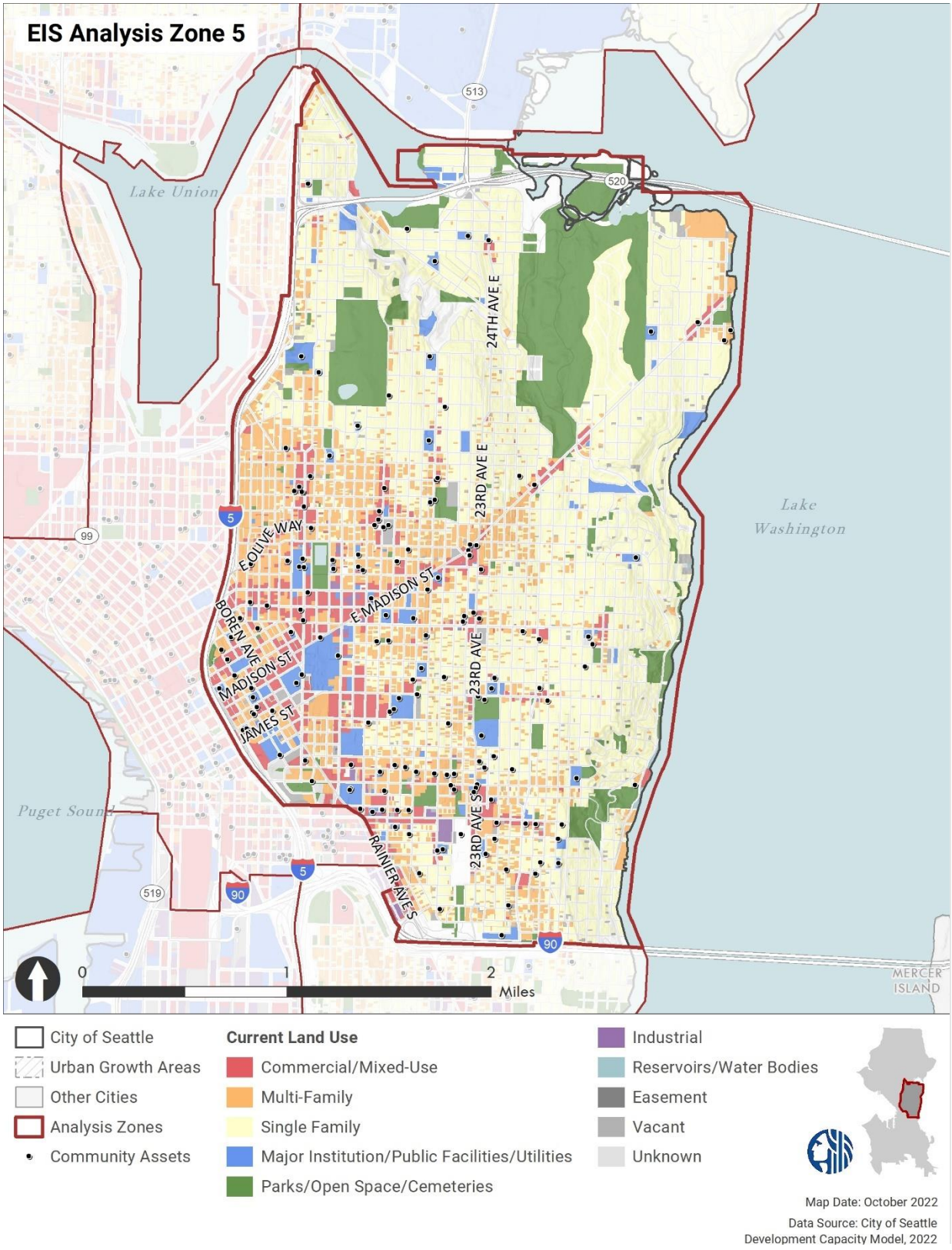
Current land use acreage is detailed in **Exhibit 3.6-19** and mapped in **Exhibit 3.6-51**.

General Urban Form

Area 5 was developed early in Seattle's post-colonial history as the city grew outward from the settlement on Elliott Bay. The well-connected street grid is complemented by organic growth patterns with larger, more intense buildings near downtown scaling gradually down to smaller buildings toward the lake, a pattern which was later locked in place through zoning.

In the twentieth century, the southern portion of the area, generally south of E Madison St and east of 12th Ave, known as the Central Area or Central District was redlined by banks and government institutions, making it nearly impossible for Black residents to live elsewhere in the city (see the **Racially Restrictive Covenants & Zoning Laws** discussion above). This racist practice resulted in high population density with severely limited investment in infrastructure and building stock. Community-supported investments in and construction of vernacular housing, churches, stores, and institutions such as banks still play an important role in the built form of the district, though many have been redeveloped in recent decades. During the late 1980s, construction of the long planned I-90 connection across Lake Washington and through the Central District resulted in the demolition of several blocks of homes and businesses in the Atlantic neighborhood, the southern part of Area 5. This project, long stalled by community advocates who successfully sued under environmental protection laws, ultimately led to the construction of a freeway lid with 15 acres of parkland. Highway construction created a significant gap in the built fabric between the Central District and Rainier Valley and Mount Baker neighborhoods to the south. See **Exhibit 3.6-52** and the **Annexation & Regional Transportation Corridors** discussion above.

Exhibit 3.6-51. Area 5: Capitol Hill/Central District—Current Land Use



Source: City of Seattle, 2022; BERK, 2022.

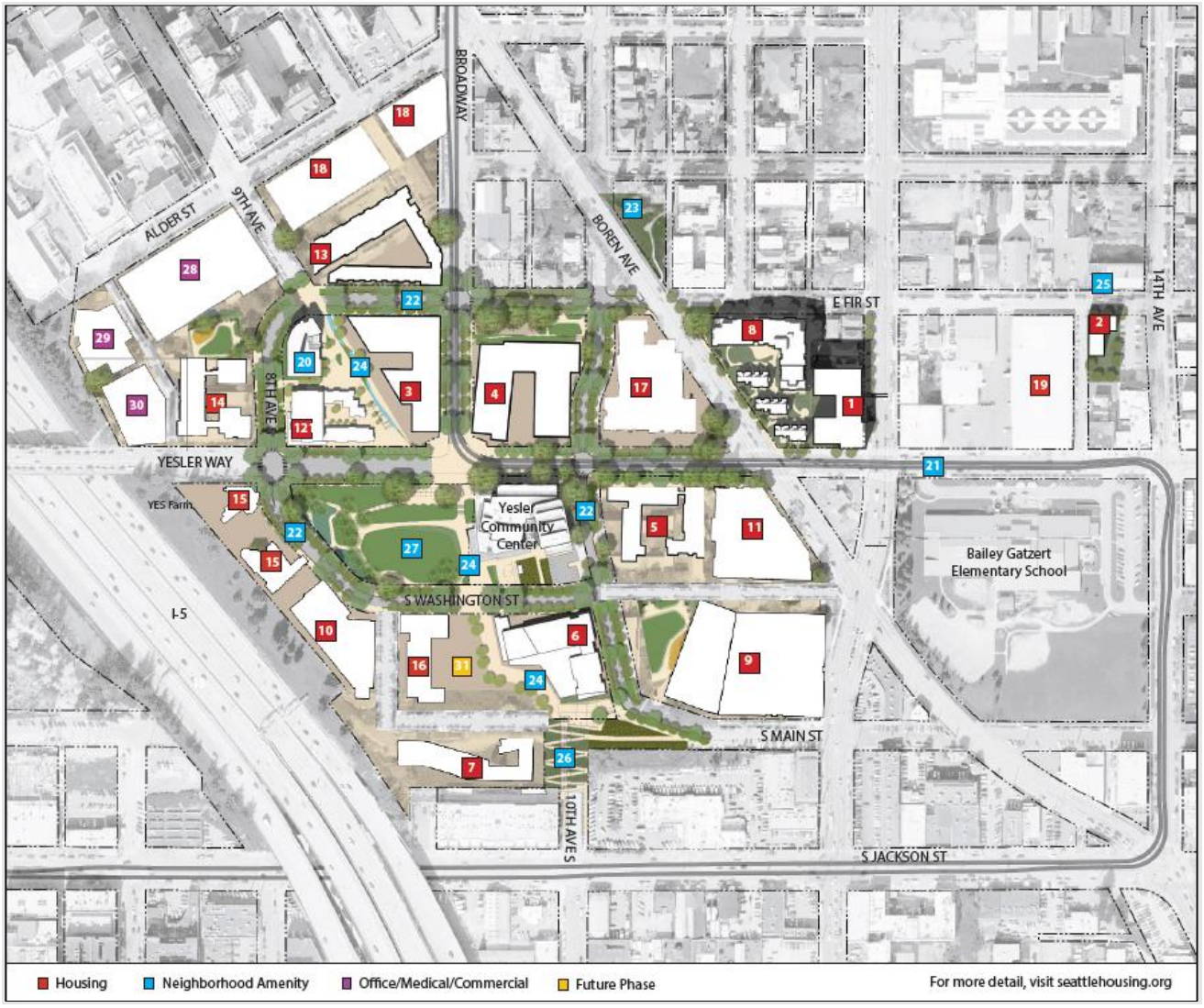
Exhibit 3.6-52. Left: High-Density Vernacular Housing in the Central District Circa 1951. Right: I-90 Immediately After Construction in 1991

Sources: Left: University of Washington Manuscript Division. Right: Nakano Associates.

At the heart of the Central District, a few blocks around 23rd and Union have redeveloped with greater intensity mixed-use development over the last 5 years. An OPCD-led planning effort to establish community-created Central Area Design Guidelines, as well as a Community Roots Housing-led (then Capitol Hill Housing) design process for the Liberty Bank (the first Black-owned bank in the Pacific Northwest) redevelopment, has led to place-based architecture and public art that feels connected to the neighborhood's historical roots as a Black cultural hub.

In 2013, Seattle Housing Authority began redeveloping its 30-acre Yesler Terrace public housing site in the southwestern corner of Area 5. When completed, the new development will have around 5,000 mixed-income units (including a one-for-one replacement of the former subsidized units) as well as a community center, commercial space, parks, and parking. Its design includes view corridors to Mt Rainier and downtown, a trail, transit access, hillclimb to Chinatown-International District, and public art. See **Exhibit 3.6-53**.

Exhibit 3.6-53. Yesler Terrace Redevelopment



Source: Seattle Housing Authority, 2022.

Heights

The tallest buildings in Area 5 are in First Hill, where there are several high-rises. Capitol Hill, Yesler Terrace, and the Central District along 23rd Avenue have many buildings in the 4- to 7-story range. There are 3-story townhouses scattered around the Central District and Judkins Park. However, most of the rest of the area is zoned neighborhood residential and has building heights of 1 to 2 floors.

Transitions

The border between the greater Downtown and First Hill/Capitol Hill urban centers and less intense neighborhoods to the east and northeast is a major transition from greater to lesser intensity.

Area 6: West Seattle

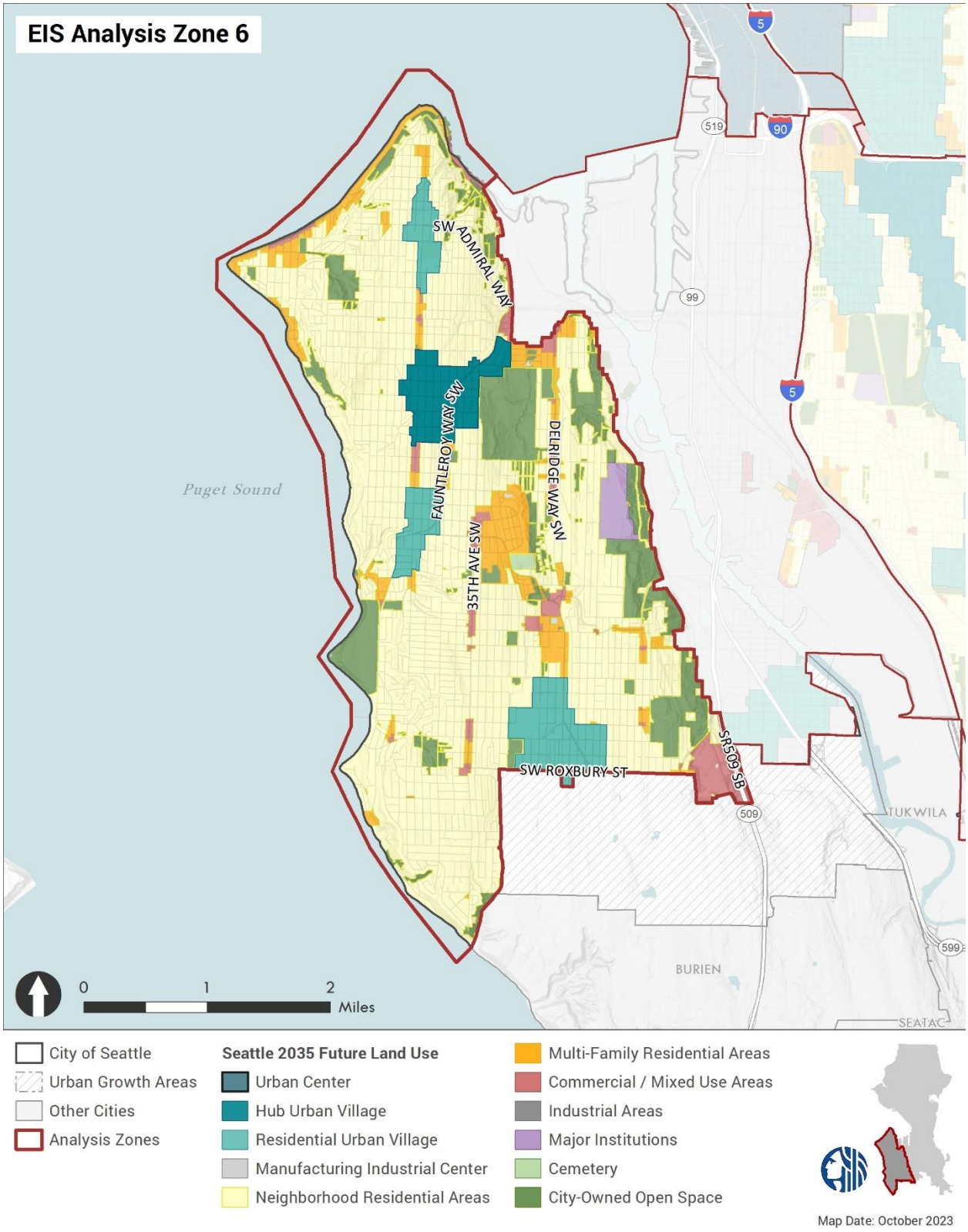
Future Land Use, Zoning, & Shorelines

Area 6 includes the portion of Seattle west of the Duwamish Waterway and State Route 509, north of SW Roxbury St, and is bounded by the Puget Sound at its western and northern extents. It includes approximately 6,411 acres of buildable land, or 16% of the buildable lands city wide. Additionally, Area 6 includes the West Seattle Junction Hub Urban Village as well as the Westwood-Highland Park, Morgan Junction, and Admiral residential urban villages.

About 8% of the analysis area is designated as an urban village. Outside of the urban villages, commercial/mixed-use and multi-family designations generally follow California Ave SW, Alki Ave SW, Delridge Way SW, and Fauntleroy Way SW. Neighborhood residential designations fill in the intervening areas accounting for 63% of future land use designations in the analysis area. Future land use and zoning acreage within the analysis area are detailed in **Exhibit 3.6-14** and **Exhibit 3.6-16** and mapped in **Exhibit 3.6-54** and **Exhibit 3.6-55**.

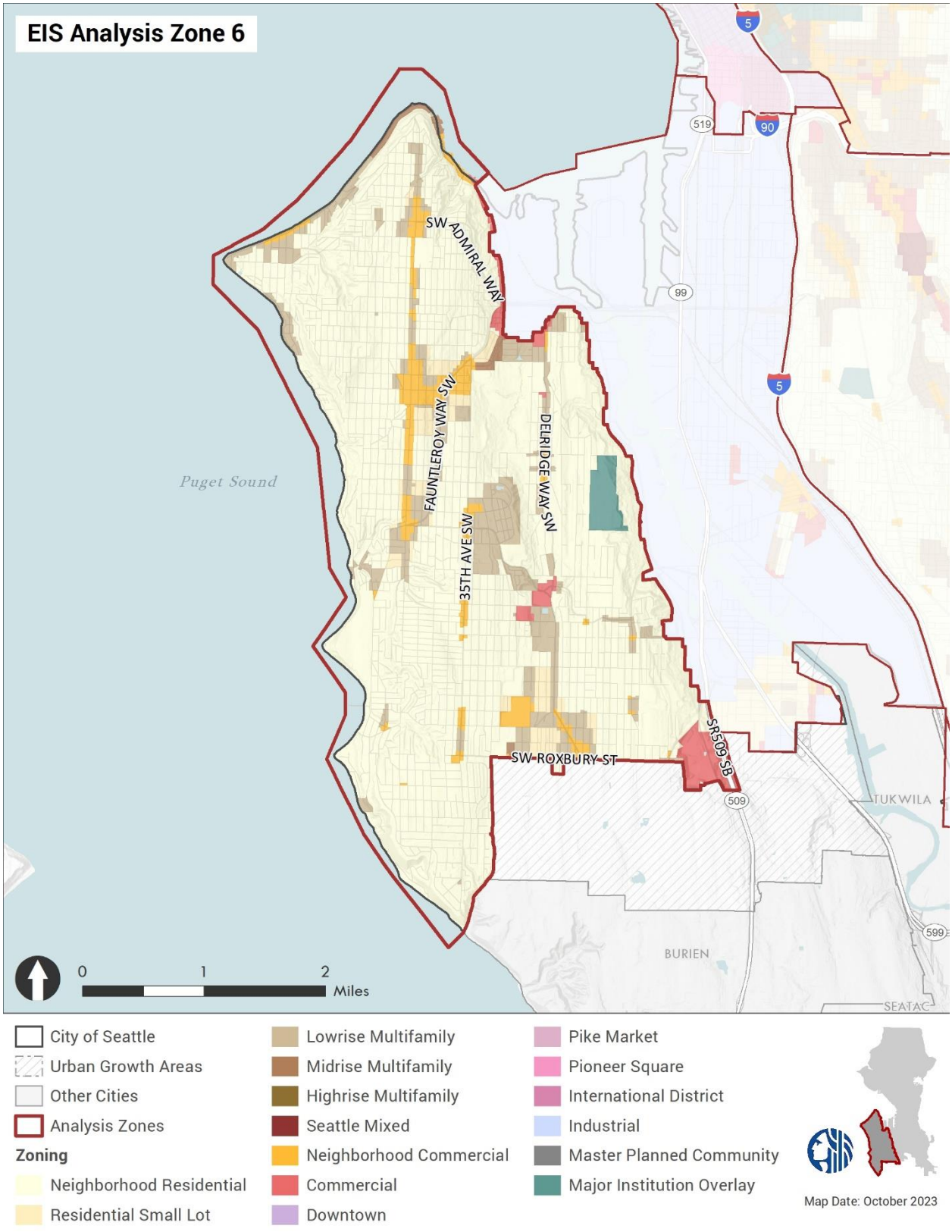
Area 6 includes about 15% of the city's designated shoreline district (1,102 acres). Nearly 85% of this area is within a conservancy shoreline environment, including Conservancy Management (4%) on the northeastern shoreline fronting Elliott Bay, Conservancy Preservation (31%) on the northern edge of Alki Beach and surrounding Lincoln Park, and Conservancy Recreation (50%) on a majority of the eastern shoreline fronting the Puget Sound. Another 15% is designated as Urban Residential infilling between the public lands of Lincoln Park and Alki Beach. Designated shoreline acreage within the analysis area is detailed in **Exhibit 3.6-18** and mapped in **Exhibit 3.6-56**.

Exhibit 3.6-54. Area 6: West Seattle—Future Land Use Designations



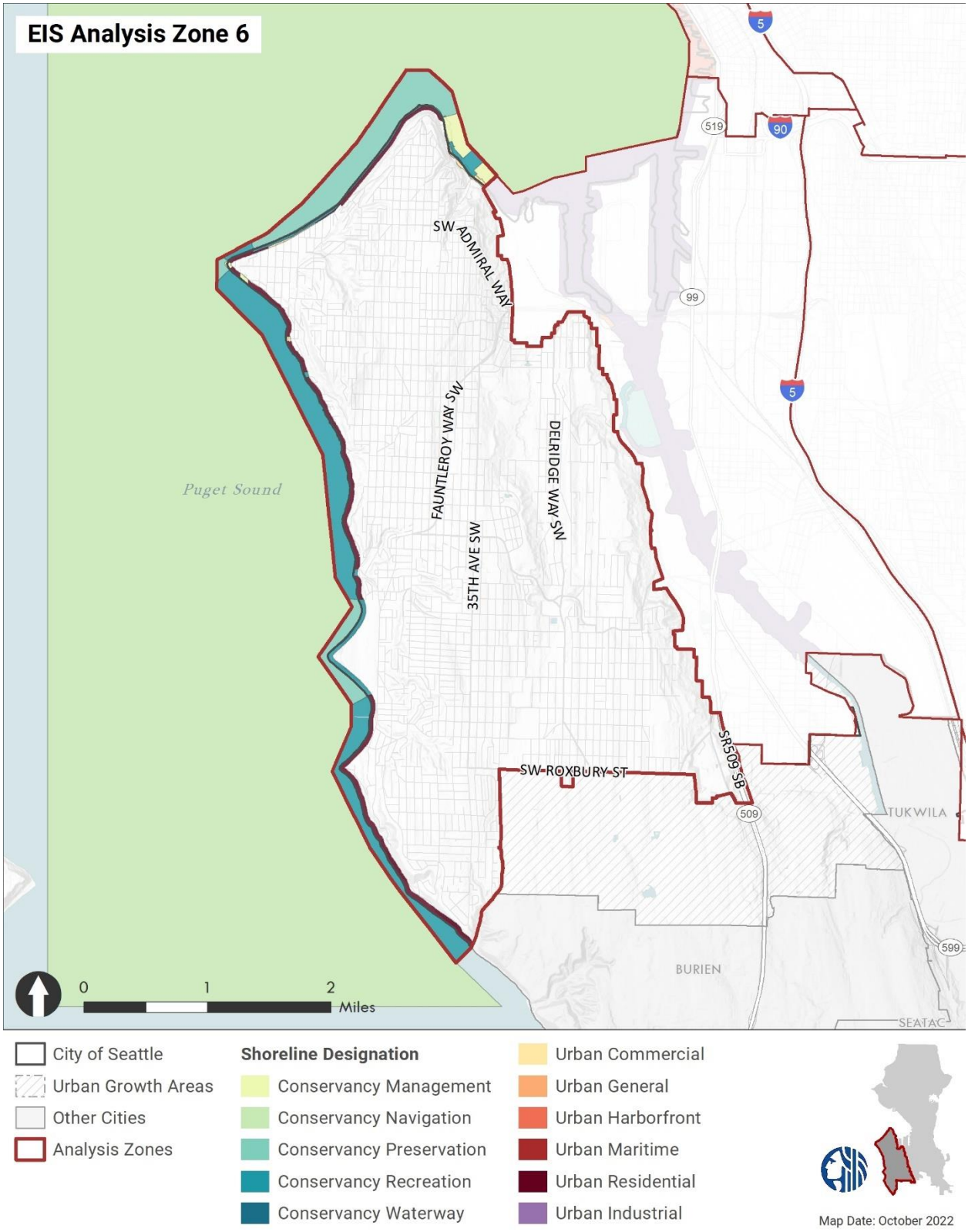
Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-55. Area 6: West Seattle—Zoning



Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-56. Area 6: West Seattle—Shoreline Designations



Source: City of Seattle, 2022; BERK, 2022.

Existing Land Use & Urban Form

Existing Uses

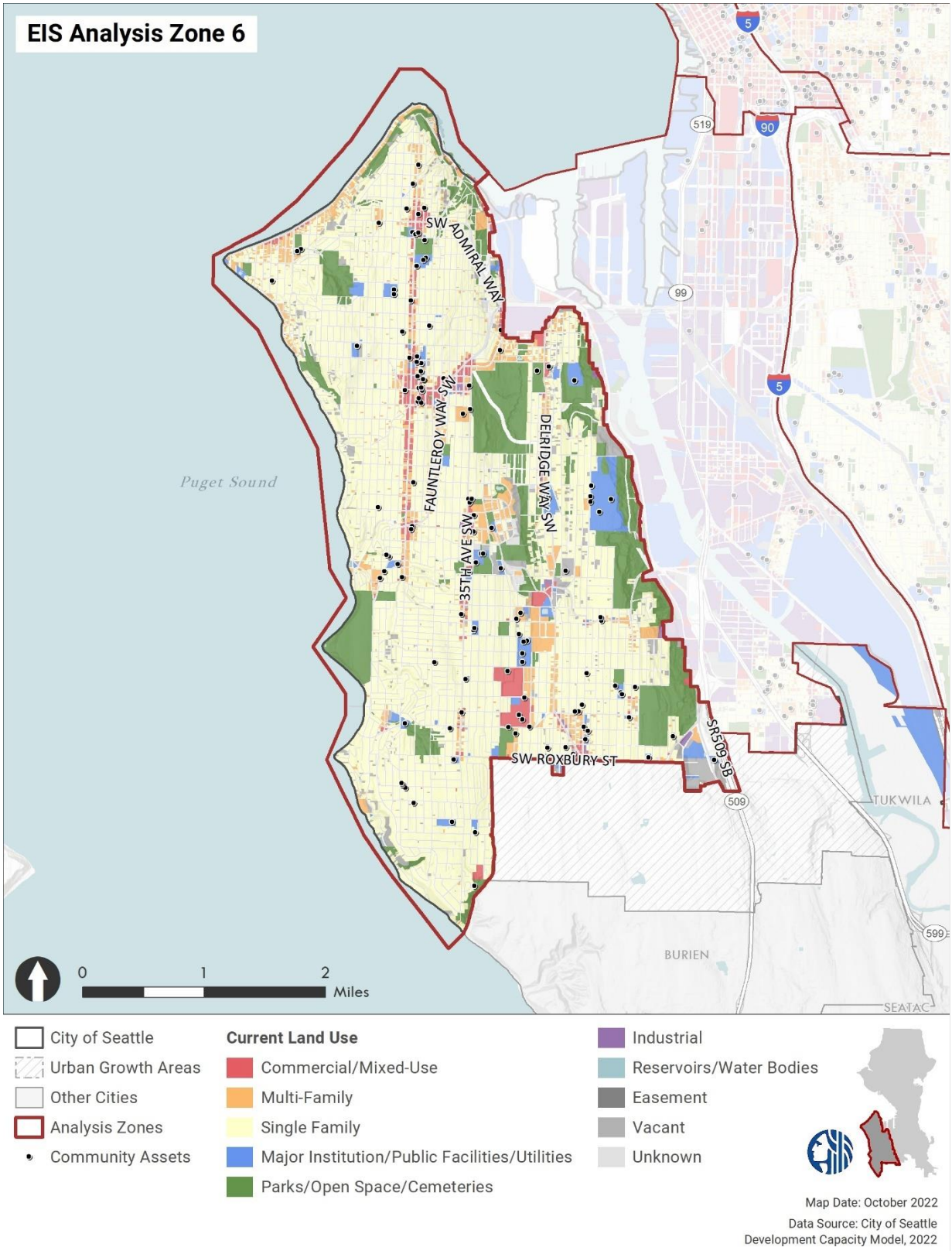
The largest existing land use category is single family residential, which accounts for 59% of the land (versus 48% citywide). Existing commercial/mixed-use and multi-family uses, as well as a majority of the community assets, are located within the existing urban village boundaries oriented along California Ave SW. Commercial/mixed-use land uses found within the urban village boundaries are typically medium-density apartment buildings with ground floor commercial around a main commercial corridor that supports essential neighborhood amenities. California Ave SW still maintains a majority of its historic urban fabric supporting single-story retail uses whereas the Westwood-Highland Park Residential Urban Village is comprised of newer, master-planned big box development. Outside of the urban village boundaries, multi-family development is concentrated around the Alki Beach, Highpoint neighborhoods, and along California Ave SW.

Major institutions and public facilities account for 5% of the existing land uses versus 11% citywide. The largest uses in this category are educational institutions including South Seattle College, Pathfinder K-8 School, Denny International Middle School, Madison Middle School, and West Seattle Highschool. Parks, open space, and cemeteries account for an additional 18% consisting primarily of West Duwamish Greenbelt, West Seattle Golf Course, and Lincoln, Schmitz Preserve, and Fauntleroy Parks.

The share of industrial land uses in the analysis area is lower than the city overall (0.3% versus 5%) and consist primarily of a public storage facility on the southern border of Seattle.

Current land use acreage is detailed in **Exhibit 3.6-19** and mapped in **Exhibit 3.6-57**.

Exhibit 3.6-57. Area 6: West Seattle—Current Land Use



Source: City of Seattle, 2022; BERK, 2022.

General Urban Form

Most of Area 6 was developed in the first half of the twentieth century following streetcar suburb development patterns, featuring commercial and mixed-use main streets surrounded by rectangular lower-density residential blocks. By contrast, in the east part of the area, industrial uses expanded up the Delridge valley from the Duwamish area, notably including the Youngstown steel plant, which attracted workers who settled in the valley. The legacy of mixed industrial commercial and residential uses, relatively dense working-class dwellings, and racial diversity continues to shape the neighborhood's built form.

Heights

The tallest buildings in Area 6 are found in the northern part of the analysis area. Buildings in the West Seattle Junction Hub Urban Village are generally 5- to 7-stories, while buildings in the Admiral and Morgan Junction residential urban villages and along the strip on Alki Beach are 3- to 5-stories. The rest of the analysis area consists mainly of 1- and 2-story buildings.

Transitions

The central location of part of the West Seattle Junction Hub Urban Village at the top of the hill accentuates building height and creates a potential risk for stark transitions in building scale to adjacent low-density residential areas.

Shadows

The West Seattle Junction Urban Village's northeastern portion is in a small valley. Tall, wide buildings combined with slopes to the south and west create abundant shade during winter months.

Area 7: Duwamish

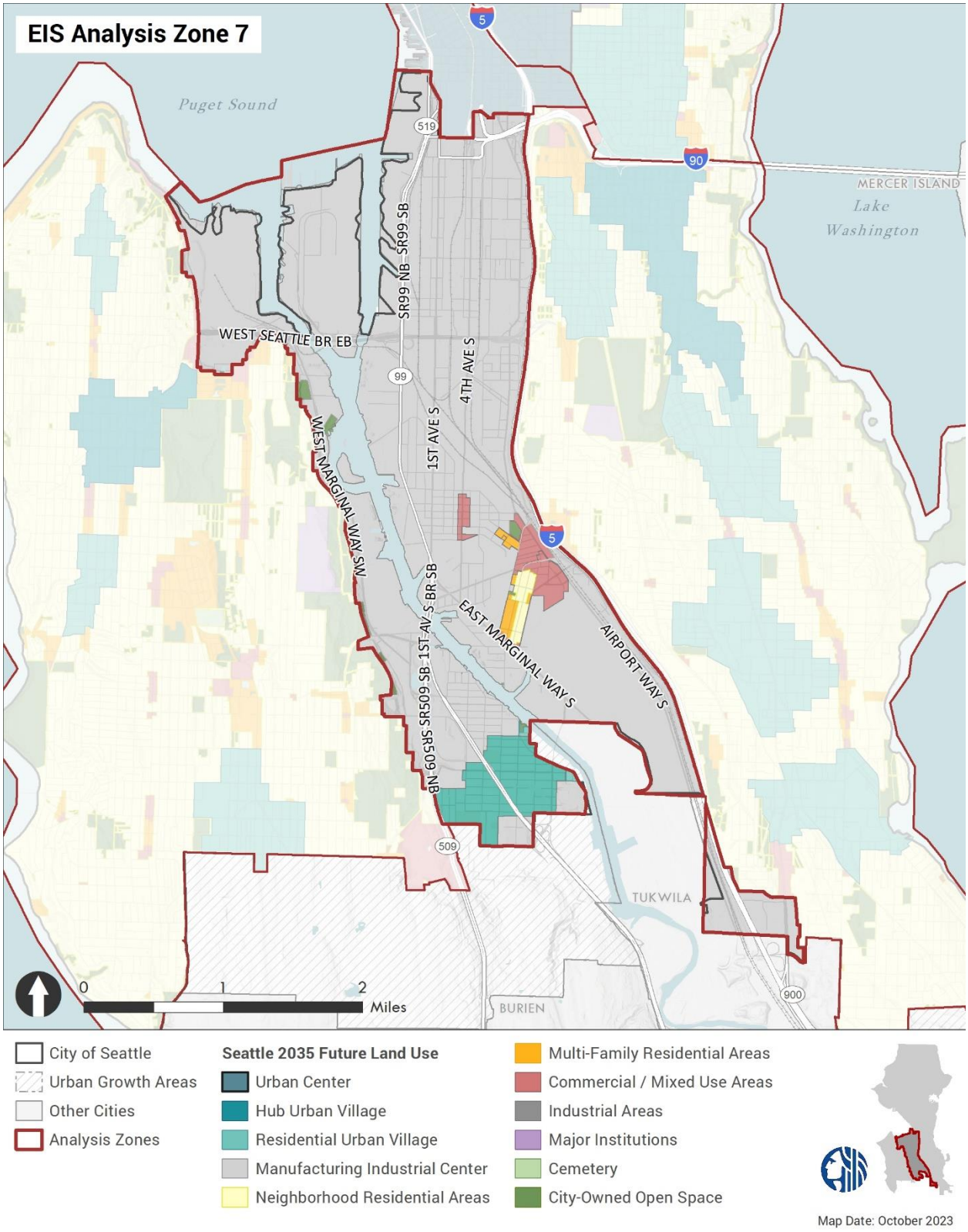
Future Land Use, Zoning, & Shorelines

Area 7 includes a portion of Seattle bordering the Duwamish Waterway west of Interstate 5, east of W Marginal Way SW, sharing its northern boundary with the Elliott Bay. It includes approximately 4,056 acres of buildable land, or 10% of buildable lands citywide. Additionally, Area 7 includes the South Park Residential Urban Village and the Greater Duwamish MIC.

Nearly 92% of Area 7 is designated as a manufacturing industrial center on the future land use map. The remainder is allocated towards the South Park Urban Village at the southeastern corner of the analysis area, and the residential/commercial mix around the Van Asselt neighborhood in Georgetown. Future land use and zoning acreage within the analysis area are detailed in **Exhibit 3.6-14** and **Exhibit 3.6-16** and mapped **Exhibit 3.6-58** and **Exhibit 3.6-59**.

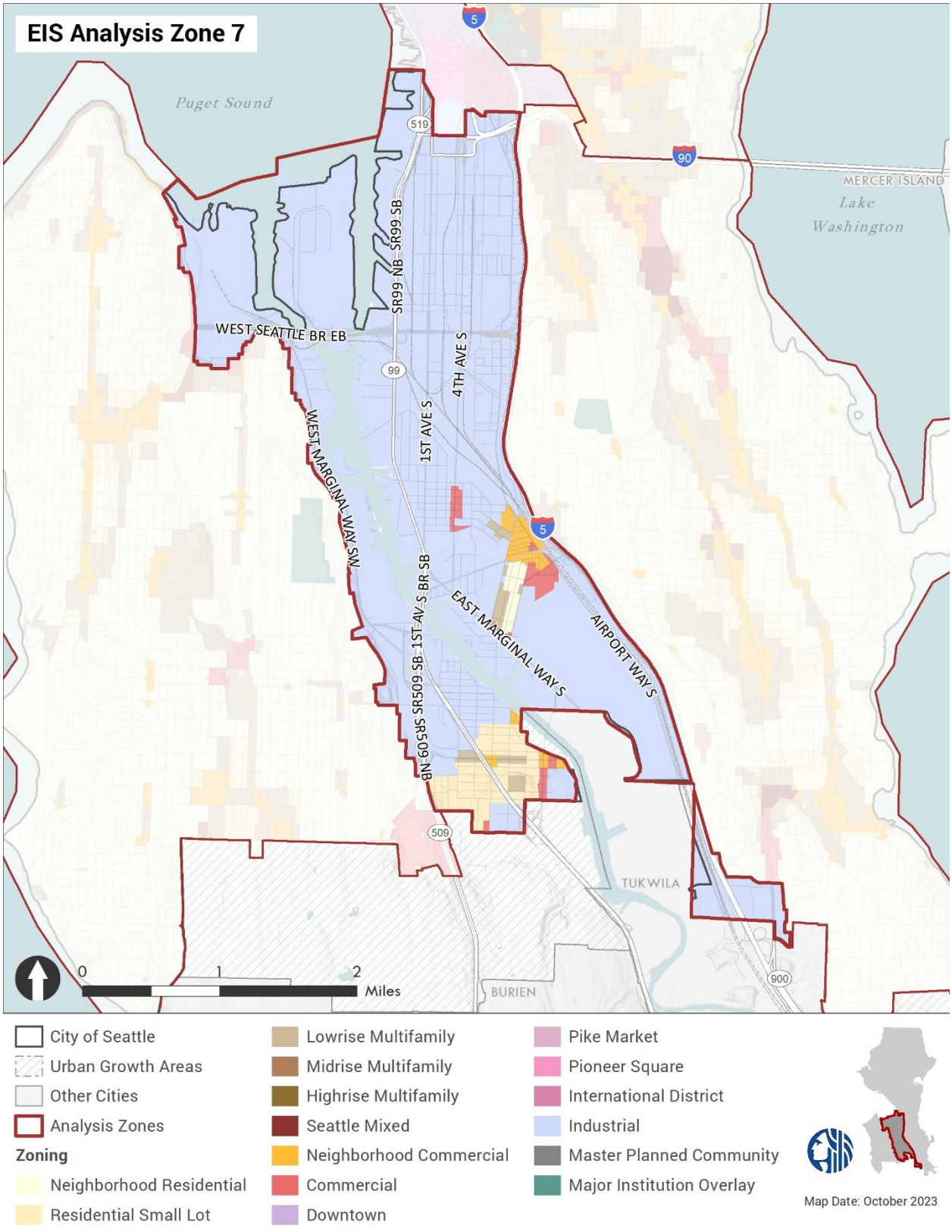
Area 7 includes about 16% of the city's designated shoreline district (1,185 acres). Nearly 95% of this area is within the Urban Industrial designation surrounding Harbor Island and spanning both side of the shoreline along the Duwamish Waterway. The reminder is within the Conservancy Preservation designation on the western shoreline adjacent to Kellogg Island. Designated shoreline acreage within the analysis area is detailed in **Exhibit 3.6-18** and mapped in **Exhibit 3.6-60**.

Exhibit 3.6-58. Area 7: Duwamish—Future Land Use Designations



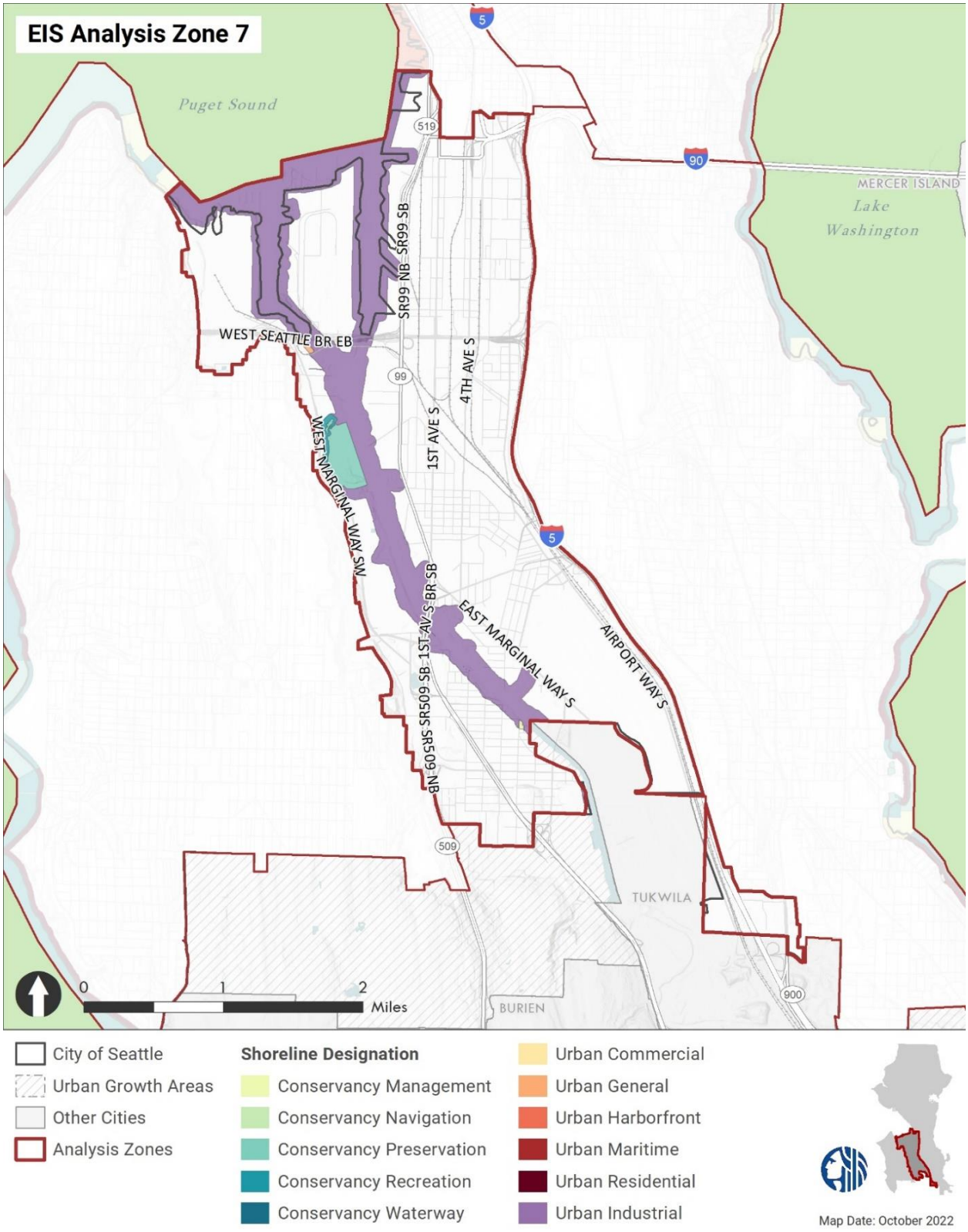
Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-59. Area 7: Duwamish—Zoning



Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-60. Area 7: Duwamish—Shoreline Designations



Source: City of Seattle, 2022; BERK, 2022.

Existing Land Use & Urban Form

Existing Uses

The largest existing land use category within Area 7 is industrial, which accounts for 37% of the land (versus 5% citywide). The analysis area contains the entirety of the Greater Duwamish Manufacturing Industrial Center and supports the Port of Seattle's primary marine shipping area. Vacant land accounts for nearly 14% of the land use as compared to 5% citywide. This is largely because of unbuildable land adjacent to railway corridors running throughout the analysis area and parcels paved for staging and storage uses including the First Study Bus Yard.

Existing commercial/mixed-use land uses account for 7% of existing land uses in the analysis area. These are located throughout the analysis area as a result of specific commercial uses currently allowed in industrial zoned areas of the city. Commercial/mixed use land uses found in the South Park Residential Urban Village follow a more traditional pattern—these are spatially organized along 14th Ave S and support at-grade commercial uses. In comparison, commercial/mixed use land use located throughout the MIC are not organized by any spatial logic and support a variety of more intense and less pedestrian friendly uses such as auto dealerships and wholesale retailers.

Major institutions and public facilities account for an additional 35% of existing uses consisting primarily of Port of Seattle, King County International Airport, and Sound Transit properties. Parks, open space, and cemeteries account for only 1% of existing land uses, primarily attributed to the Georgetown and South Park Playfields as well as Marra-Desimone Park. This is the lowest allocation of parks, open space, and cemetery uses across the eight analysis areas.

Single family and multi-family uses account for 5% of the existing land use, centered exclusively within the South Park Residential Urban Village and the Van Asselt neighborhood.

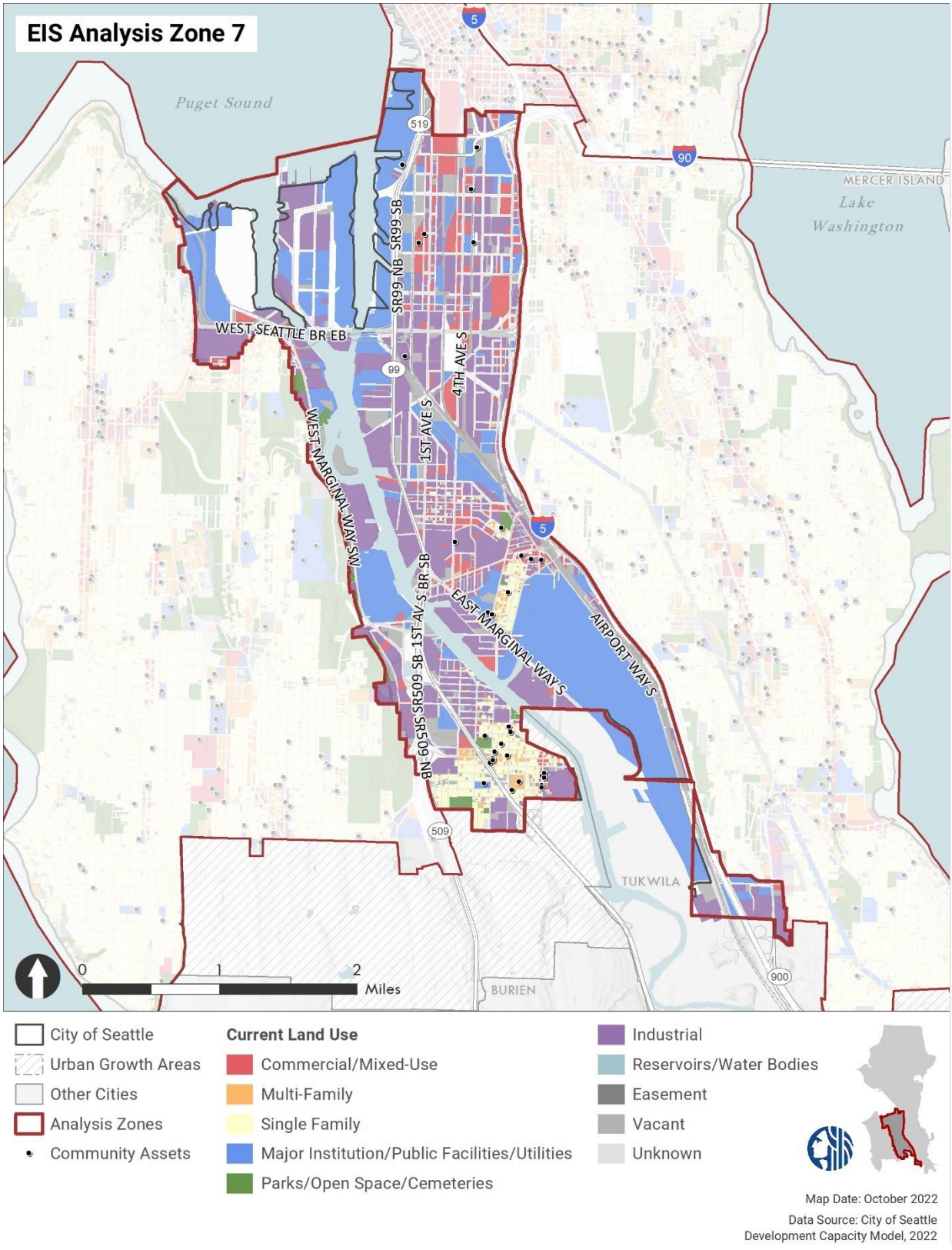
Current land use acreage is detailed in **Exhibit 3.6-19** and mapped in **Exhibit 3.6-61**.

General Urban Form

Area 7 is almost entirely composed of land that was formerly part of the Duwamish River floodplain and tidal flats. This was a rich, constantly shifting landscape with abundant plant and animal life that was essential to the lifeways of the Duwamish people, who lived in villages near the water.

During the first century of Seattle settlement, American settlers gradually straightened, dredged, hardened, and diverted the river and filled in tide flats to create developable land near the harbor (see the **Overview of Historical Planning & Land Use Decisions** discussion above). Changes to the river initially unlocked agriculture in the rich alluvial soils of the valley surrounding the small agricultural/industrial towns of Georgetown and South Park. Industrial growth spread southwards from Seattle, converting the large open parcels of farmland to industrial uses, and leaving these two neighborhoods isolated in a largely industrial landscape with near total hardscape coverage and large, freight-oriented roadways.

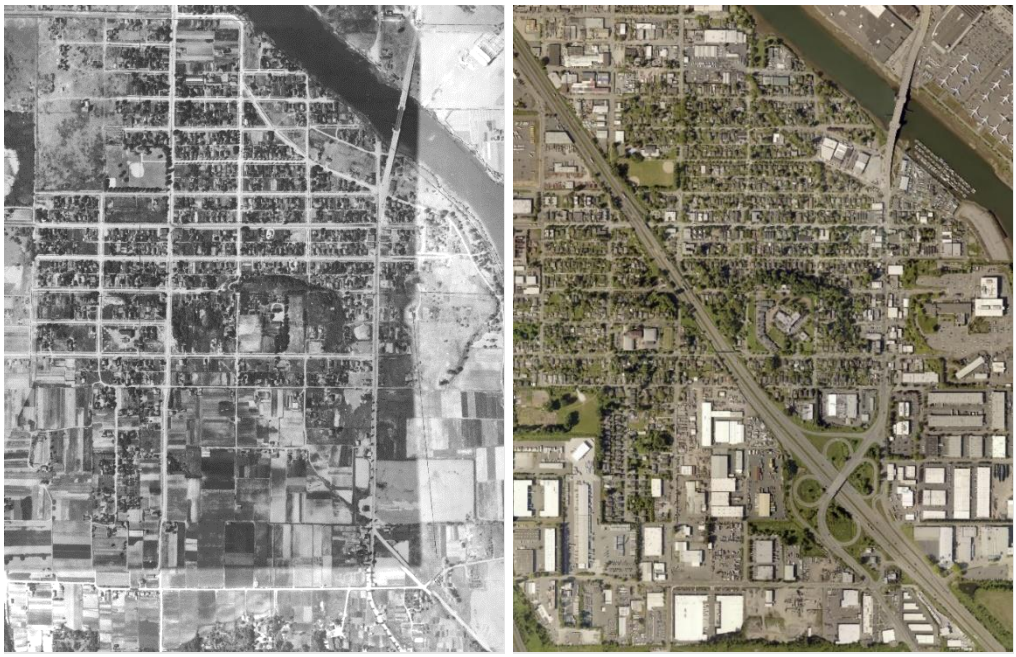
Exhibit 3.6-61. Area 7: Duwamish—Current Land Use



Source: City of Seattle, 2022; BERK, 2022.

Development of Highway 99 and I-5 through the neighborhoods resulted in demolition of existing homes and businesses and created physical and sensory barriers within the neighborhoods. In 2023, the community group Reconnect South Park was awarded $1.6 million to study removing part of Highway 99 to reconnect the neighborhood. See **Exhibit 3.6-62** and the **Annexation & Regional Transportation Corridors** discussion above.

Exhibit 3.6-62. Left: Aerial View of South Park in 1936. Right: Aerial View of South Park in 2021



Sources: Left: King County Public Works; Right: Eagleview Technologies © 2022

Heights

Area 7 consists mainly of 1- and 2-story buildings although zoning currently allows taller buildings.

Transitions

In general, potential transition impacts in Area 7 are limited due to nearly uniform industrial zoning and geographic barriers like I-5 and the Duwamish Waterway. Two exceptions to this are the South Park and Georgetown neighborhoods, which are surrounded by industrial zoning and currently exhibit a stark contrast in lot and building size between residential and industrial areas. Elements like street trees, sidewalks, and small public parks help to soften these transitions. Steep forested slopes and major roadways to the east and west of Area 7 generally provide ample buffers between industrial areas and residential areas in Beacon Hill and West Seattle. However, industrial uses intrude into north Delridge in an area where median household income is lower than the citywide median.[20]

[20] Median household income in Census tract 99 (which includes North Delridge) was $86,663 versus the citywide median of $105,391 in 2021. Source: American Community Survey 5-Year Estimates (2017-2021): S1901 Income in the past 12 months (in 2021 inflation-adjusted dollars).

Area 8: SE Seattle

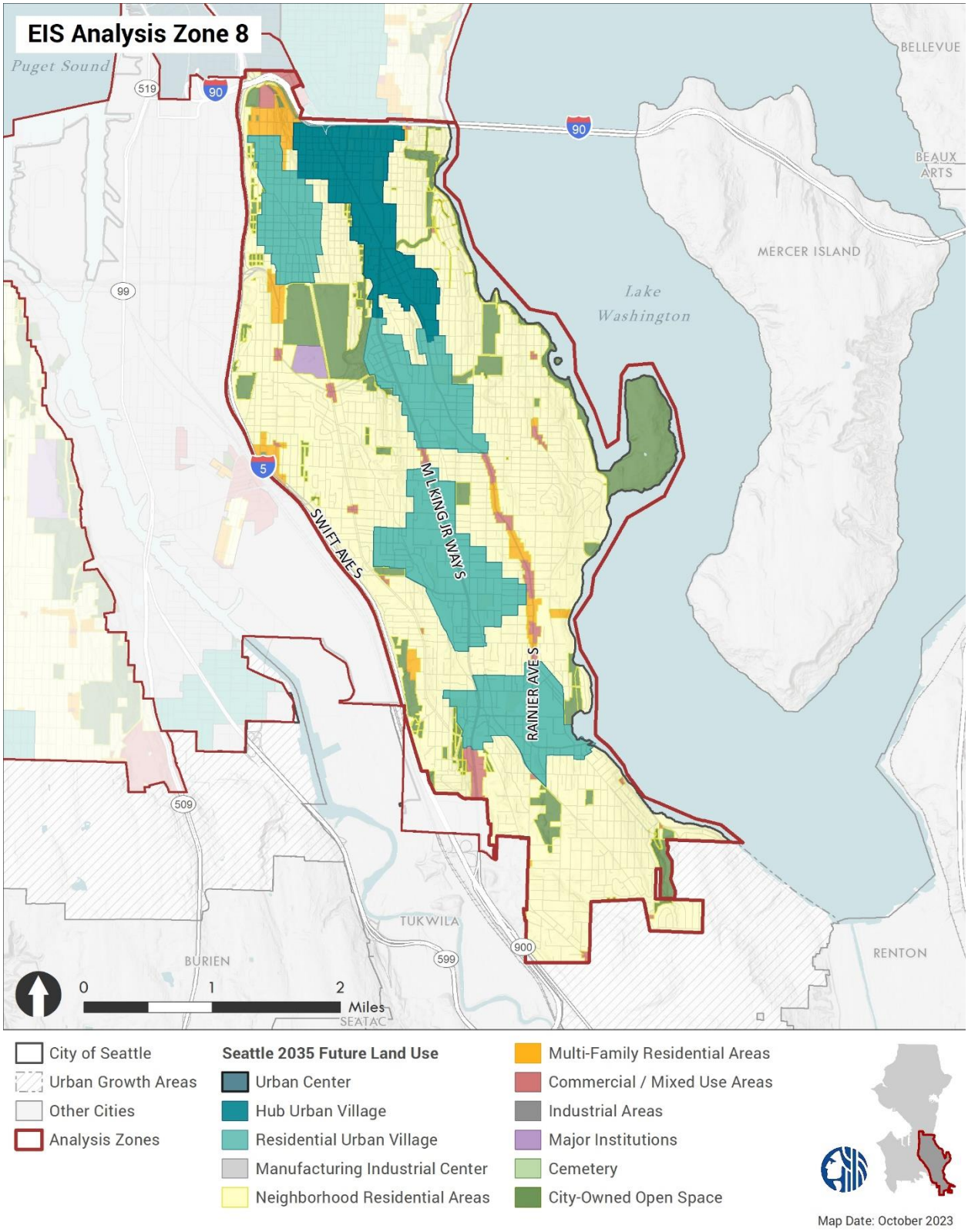
Future Land Use, Zoning, & Shorelines

Area 8 includes the portion of Seattle east of Interstate 5, south of Interstate 90, and shares its eastern frontage with Lake Washington. It includes approximately 5,656 acres of buildable land, or 14% of the buildable land citywide. Additionally, the analysis area includes the Mt Baker Hub Urban Village and the North Beacon Hill, Columbia City, Othello, and Rainier Beach Residential Urban Villages. Nearly 23% of Area 8 is designated as either a residential or hub urban village.

Outside of these urban village boundaries, a majority of the commercial/mixed-use and multi-family future land use and zoning designations are concentrated adjacent to major arterials running between urban village boundaries. Outside of the urban villages, commercial/mixed-use and multi-family designations generally follow Beacon Ave S, Rainier Ave S, and MLK Jr Way S. Neighborhood residential designations fill in the intervening areas. Future land use and zoning acreage within the analysis area are detailed in **Exhibit 3.6-14** and **Exhibit 3.6-16** and mapped in **Exhibit 3.6-63** and **Exhibit 3.6-64**.

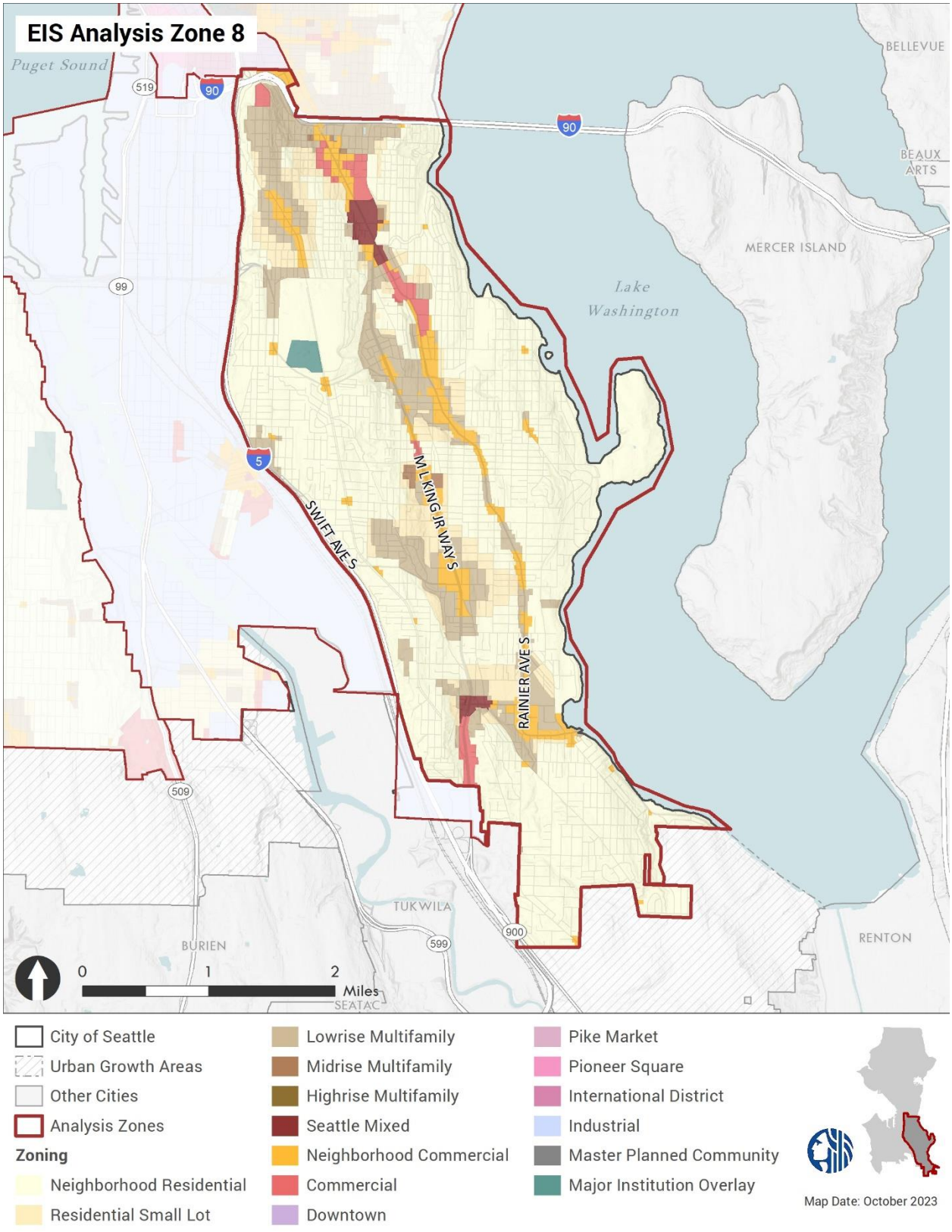
Area 8 includes about 9% of the city's designated shoreline district (678 acres). Nearly 85% of this area is within a conservancy shoreline environment including Conservancy Management (8%) around the Stan Sayres Boat Launch, Lakewood Marina, and Parkshore Arena, Conservancy Preservation (17%) surrounding Seward Park, and Conservancy Recreation (59%) spanning the remainder of the shoreline. Another 14% is designated as Urban Residential covering the lakefront properties south of I-90 and north of Coleman Beach, and lakefront properties between Seward Park and the southern extent of the City of Seattle. Designated shoreline acreage within the analysis area is detailed in **Exhibit 3.6-18** and mapped in **Exhibit 3.6-65**.

Exhibit 3.6-63. Area 8: SE Seattle—Future Land Use Designations



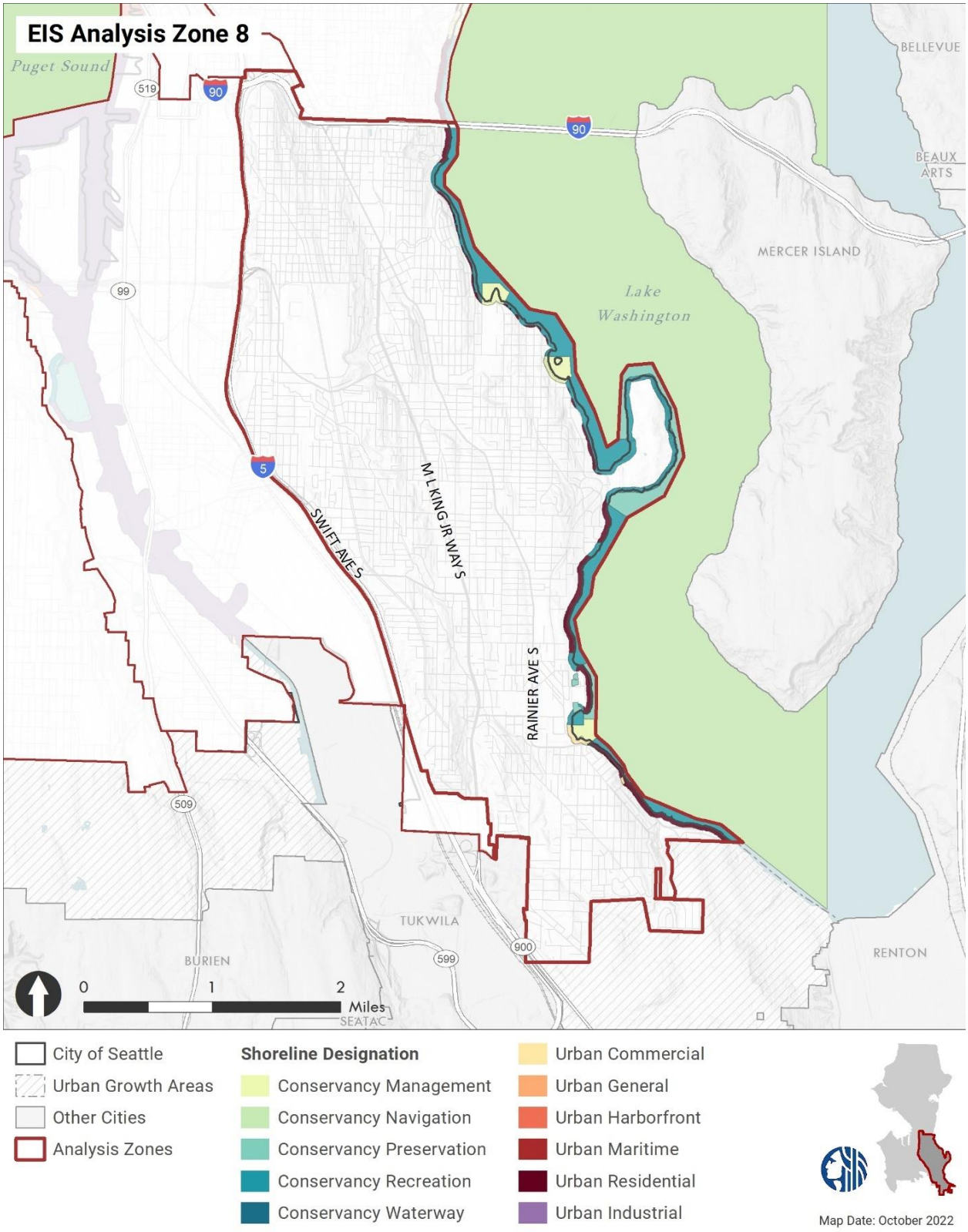
Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-64. Area 8: SE Seattle—Zoning



Source: City of Seattle, 2022; BERK, 2023.

Exhibit 3.6-65. Area 8: SE Seattle—Shoreline Designations



Source: City of Seattle, 2022; BERK, 2022.

Existing Land Use & Urban Form

Existing Uses

The largest existing land use category is single family residential, which accounts for 57% of the land (versus 48% citywide). Existing commercial/mixed-use and multi-family uses, as well as a majority of the community assets, are located within the existing urban village boundaries.

Major institutions and public facilities account for 6% of the existing land uses consisting primarily of the Veterans Administration Campus and Hospital, the high voltage power easement running NW to SE diagonally through the analysis area, and public schools including Emerson Elementary, Kimball Elementary, Mercer Middle School, Rainier Beach Highschool, Cleveland Highschool, and Franklin Highschool. Parks, open space, and cemeteries account for an additional 17% of current land uses and consist of mostly large urban parks including Seward Park, Jefferson Park and the Jefferson Park Golf Course, the Cheasty Natural Area, and Kubota Garden.

Vacant land accounts for a higher share of current use in the analysis area versus vacant use citywide (7% versus 5%). This is largely because of the high voltage power easement running through the analysis area as well as unused lands adjacent to the Sound Transit Light Rail line.

Current land use acreage is detailed in **Exhibit 3.6-19** and mapped **Exhibit 3.6-66**.

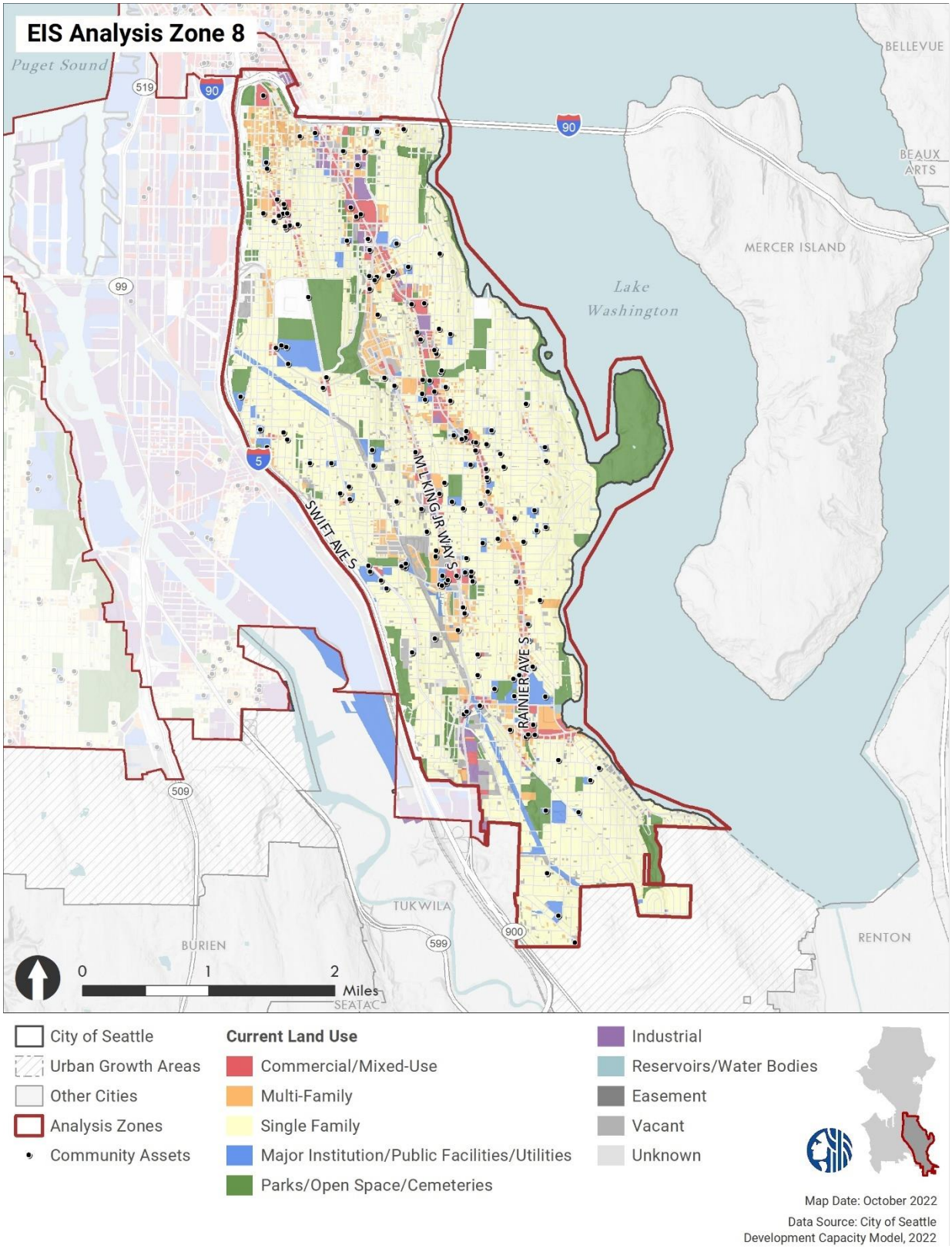
General Urban Form

Urban form in the Rainier Valley is relatively disjointed and more auto-oriented compared to most areas of the city. This is likely a result of multiple factors including:

- Topography that cuts against the standard north–south street grid in most places.
- Historic disinvestment.
- The legacy of redlining and racist real estate practices.
- Construction of I-90 through the Atlantic neighborhood in the late 20th century.

Redevelopment of the light rail station areas over the last decade has and continues to dramatically change urban form. Notably, five large sites in the immediate Othello station area redeveloped with 6- to 7-story mixed-use buildings. Rainier Beach is also seeing multiple 4- to 6-story apartment/condo buildings and 3-story townhouses constructed and/or in the development process. See **Exhibit 3.6-67**.

Exhibit 3.6-66. Area 8: SE Seattle—Current Land Use



Source: City of Seattle, 2022; BERK, 2022.

Exhibit 3.6-67. Five Major Redevelopments at Othello, 2009-2022

Source: Google Earth, Image US Geological Survey, Imagery Date 4/30/2009 and 8/21/2022.

Heights

The tallest buildings in Area 8 are found along the light rail alignment near stations and in the North Rainier, North Beacon Hill, and Columbia City urban villages. Building heights in these areas are generally 5- to 7-stories right off of Rainer Avenue, Martin Luther King Jr Way, and next to light rail stations. Heights drop to 3- and 4-story buildings 1 to 2 blocks from the major arterials. However, most of the rest of the analysis area is zoned Neighborhood Residential and has building heights of 1 to 2 floors.

Shadows

The location of Mt Baker, Columbia City, Othello (east side), and Rainier Beach (north side) urban villages in a valley with slopes to the south and west creates a relatively shady environment in winter months.

3.6.2 Impacts

Local land development patterns and zoning policies fundamentally affect many of the critical factors that shape the form and character of Seattle and the neighborhoods within, directly affecting people's access to housing, jobs, schools, open space, public services, and transportation. Restrictions on density or large-lot requirements, for example, affect housing supply and price, while limiting where families with low incomes can afford to live and attend school. Overly restrictive land use regulations can also narrow economic opportunities for workers or encourage expansion outward, increasing travel by car and greenhouse gas emissions (GHSs). This section focuses on the potential impacts—including equity and climate vulnerability considerations—of changes in land use patterns, permitted uses, or development intensities. Impacts are discussed based on the following categories:

- **Land use patterns** consider the distribution of growth and intensity of planned uses as well as resulting activity levels.
- **Land use compatibility** considers changes in use type between adjacent areas and any likely incompatibilities. Land use incompatibilities could be related to health and safety (such as noise levels or odors), activity levels at various times of day/night, or conflicting movement patterns.
- **Height, bulk, and scale** considers the physical form, aesthetic, and character of development (such as massing, setbacks, height, and FAR).
- **Transitions** consider visual changes in physical form between adjacent areas.
- **Tree canopy** considers how urban form affects tree canopy.
- **Shadows** consider shading of public open space or rights-of-way as a result of allowed development and the possible implications related to health, urban heat, and the human experience.
- **Views** consider the protection of public views of important landmarks and natural features, as well as views from specific designated viewpoints within the city and scenic qualities along mapped scenic routes.

Impacts Common to All Alternatives

Land Use Patterns

Seattle will likely continue to experience housing and employment growth under all alternatives consistent with the planning estimates described in **Chapter 2**. Activity levels would increase across the city with new residents, businesses, and employees. The alternatives differ primarily in the distribution and intensity of growth across the city and the projected land use patterns. The actual pace and distribution of future growth would be influenced in part by the implementation of comprehensive plan policies, related regulations and actions, and decisions made by individual property owners and developers.

In general, all alternatives would focus most future growth into centers currently characterized by higher densities, more compact building forms, and a more diverse mix of uses than other areas of the city. Under all alternatives, 80,000 new housing units would be distributed based on past growth and Comprehensive Plan targets, resulting in growth primarily in existing centers and villages. In the action alternatives, 20,000 or 40,000 additional housing units would be accommodated in new place types or expanded center boundaries located throughout the city depending on the alternative. All alternatives assume the same overall growth in jobs with a little over half of job growth in Downtown/South Lake Union (Area 4) and about 9% in the Duwamish Manufacturing Industrial Center (Area 7). Alternatives 2, 3, and 4 assume a small job shift from the larger centers towards other place types to reflect local demand with the distribution of new housing. The distribution of jobs and housing under Alternative 5 would be a combination of the other alternatives after accounting for expanded urban village boundaries and potential changes to place type designations.

See also **Section 3.7 Relationship to Plans, Policies, & Regulations** for more discussion of PSRC Metro Regional Growth Centers and King County Countywide Centers.

The six urban centers and two MICs are currently designated PSRC Metro Regional Growth Centers and Employment MICs, respectively, and would retain these designations under all alternatives. The City could also seek to designate the other urban villages as countywide growth centers under King County CPP framework. Activity units per acre would increase in all of the centers under Alternatives 1-4 and in most centers under Alternative 5. The boundary of some regional and urban centers (currently called urban centers and urban villages) would be expanded under Alternative 5 to meet the minimum size threshold resulting in a decrease in activity units per acre within the boundaries of West Seattle Junction, Admiral, Greenwood–Phinney Ridge, Morgan Junction, and Upper Queen Anne. Future activity units per acre are discussed in more detail under each alternative.

As a result of these growth distributions, Seattle's land use pattern—broadly defined—would continue to emphasize:

- Growth leading to a denser and more continuous pattern of intensive land uses in the city's geographic center (Downtown plus the surrounding neighborhood districts including Uptown, South Lake Union, Capitol Hill, and First Hill).
- Business and port-related activity and employment growth within two central Port and industrial-use centers (Greater Duwamish MIC and BINMIC). All alternatives studied in this EIS include changes implemented as part of the Industrial and Maritime Strategy.
-
- Growth in a wide range of other mixed-use centers such as Fremont, Columbia City and West Seattle Junction distributed through the various sectors of the city, including centers located along major transportation corridors (such as Aurora Avenue, Lake City Way, MLK Jr Way, Rainier Avenue, and California Avenue) that radiate through the various geographic sectors and industrial-use centers.
- More residents, employees, and buildings would be exposed to increased climate risks in many of the centers without additional mitigation. For example, the Downtown/South Lake

Union (Area 4) and Duwamish Manufacturing Industrial Center (Area 7) are generally "heat islands" with more pavement and almost no areas with more than 10% tree canopy cover (see **Section 3.3 Plants & Animals** and **Section 3.11 Public Services**).

Land use patterns in areas outside of the centers would vary depending on the alternative as discussed below.

Land Use Compatibility

Housing and employment growth under all alternatives will result in additional development and redevelopment activity citywide. Future growth under all alternatives is likely to increase the frequency of different land use types locating close to one another, and similarly likely to increase the frequency of land use patterns that contain mixes of land uses with differing levels of intensity, both within the centers and, to a varying extent, in other areas of the city. Mixing uses in centers is a goal of the current Comprehensive Plan because having a variety of uses near one another allows people to conduct more of their daily business without driving and reduce GHG emissions; however, some adjacencies could potentially cause adverse compatibility impacts on less intense uses. Over time, infill development and redevelopment would occur throughout the city to accommodate increased growth under all alternatives, gradually increasing the intensity of development in areas not currently developed to their full zoning capacity. The extent of these conflicts varies by alternative and would continue to be mitigated through the application of existing development regulations.

New mixed-use development may also be introduced under any of the alternatives to areas originally developed under zones which previously allowed only one type of use. This could occur in centers where zoning has already changed since original construction, or where zoning could potentially change under an alternative if rezones to mixed use zones occur in the future. More mixing of uses increases the likelihood of localized adverse spillover effects (such as residential or commercial activities that might lead to increased noise). These compatibility challenges would not be an uncommon or new phenomenon within Seattle's more urbanized centers, but they would represent a potential adverse land use impact of future growth under any alternative. Such impacts can be avoided or mitigated by continuing to implement land use policies and zoning patterns that consider the potential for land use incompatibilities and avoid them through use of transitions in intensity, use restrictions, and/or avoiding proximity of certain kinds of zones. Noise, nuisance, and public safety codes would also continue to provide protection against some of the potential impacts.

Ballard Urban Village & Ballard-Interbay MIC: Land Use Compatibility Conflicts

Most of the southern boundary of the Ballard Urban Village is adjacent to the Ballard-Interbay MIC. Land use compatibility conflicts near this boundary are anticipated under all alternatives and would be similar to those already occurring. Existing land uses in the Ballard MIC north of Leary Way, for example, include a diverse array of industrial, commercial/retail (including a high concentration of breweries and tap rooms), office storage, and some residential uses in

blocks flanking 14th Ave NW. These currently abut larger multifamily development on the south side of NW Market St, commercial development on 15th Ave NW, and 1- to 3-story residential east of 11th Ave NW outside the MIC (in the Ballard Urban Village and in multi-family residential areas).

Redevelopment under all alternatives in the urban village and portions of the MIC are expected to be fueled by proximity to light rail. Within the MIC, blocks recently rezoned Industry and Innovation (II) as part of the Industrial and Maritime Strategy legislation (effective on October 23, 2023) would likely be developed with a significant amount of dense employment in multistory structures, including some towers, with dedicated space for ground floor light industry. This generally includes the area between 15th Ave NW and 11th Ave NW north of Leary Way adjacent to the Ballard Urban Village (the 14th Ave corridor). Per the Industrial and Maritime Strategy Final EIS, redevelopment in the 14th Ave corridor would contribute to an agglomeration of daytime employment uses in conjunction with nearby activity in the Ballard Urban Village that would generate higher volumes of daytime workers unrelated to industrial operations.

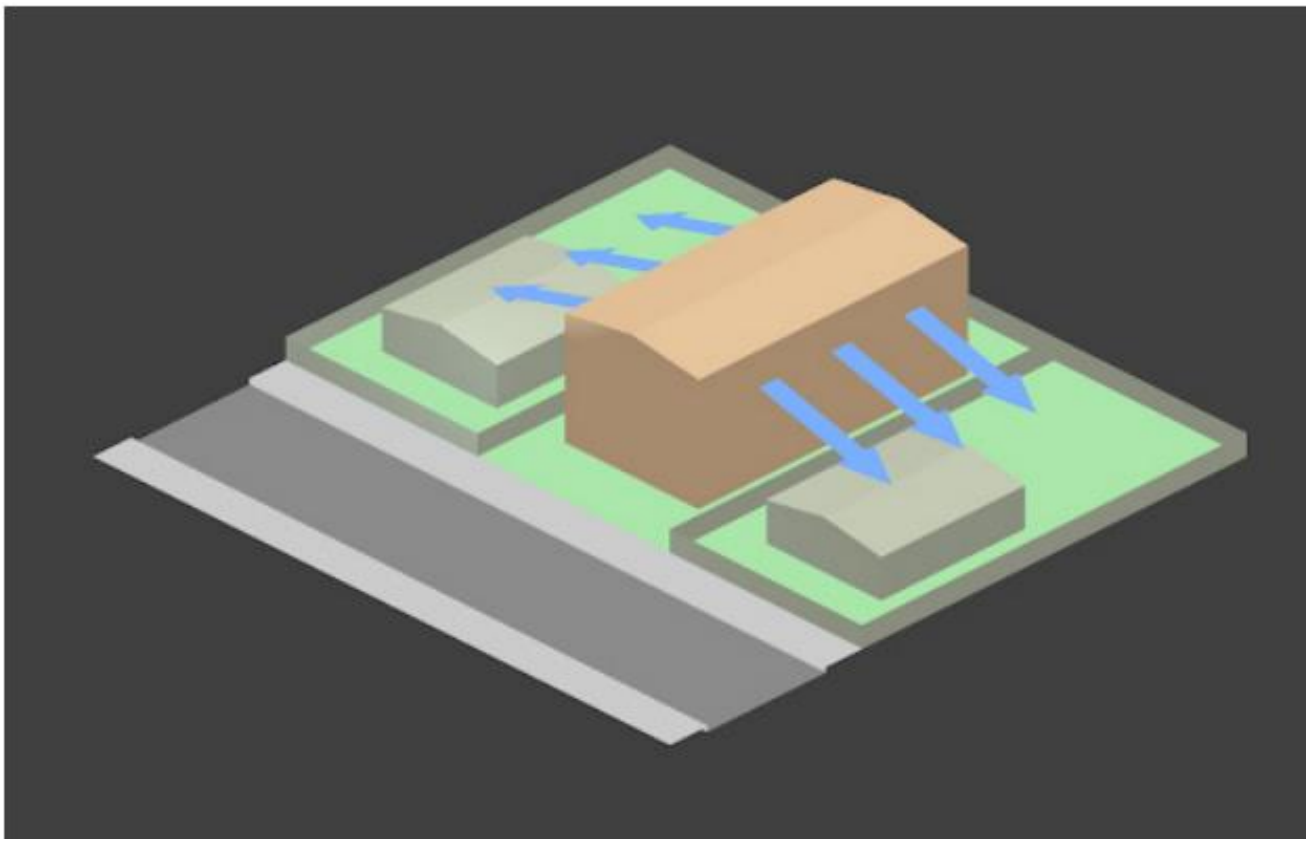
Urban Form

Height, Bulk, & Scale

Future growth and development directed into existing centers under all alternatives would result in a moderate amount of additional height and bulk in these commercial and mixed-use nodes. The overall height, bulk, and scale implications from such development would likely be consistent with that experienced during growth over the last 20 years (e.g., mid- and high-rise buildings for both housing and employment uses in urban centers and low- and mid-rise buildings in urban villages). Residential areas will see limited changes to height, but more development of ADUs will add more buildings to these areas.

The present combination of height, FAR, and setback regulations with small to regular sized lots generally leads to bulky buildings that take up most of the lot (see **Exhibit 3.6-68**). Some characteristics that can be found in bulkier buildings include windows that primarily face neighboring properties, thin strips of outdoor space that struggle to be functional, and spots of semi-permanent shade (The Coalition for More Homes, 2021).

Exhibit 3.6-68. Bulky Buildings



Note: Bulkier buildings are sometimes referred to as sausage flats. Image is an illustration of some of the characteristics found with bulky buildings.
Source: The Coalition for More Homes—New Zealand, 2021

Transitions

Gradual redevelopment of new buildings that are larger than those they replace is likely to occur under all alternatives, especially in urban centers and villages. This redevelopment could lead to starker transitions between individual properties and between different zones and place types.

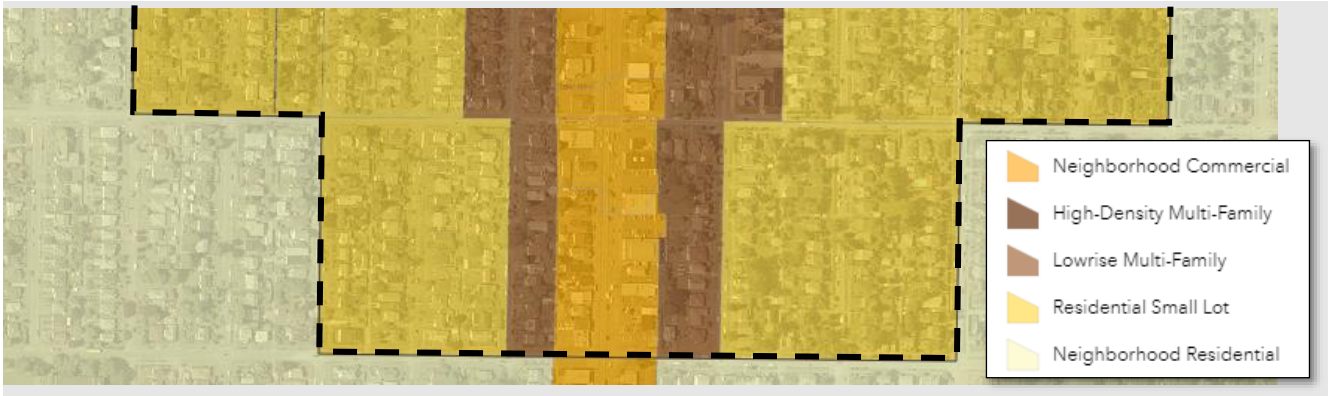
Redevelopment would create a potential for localized adverse compatibility issues as existing, lower-intensity uses transition to higher-intensity development forms. For example, areas predominately composed of detached homes may experience more occurrences of sharper transitions in urban form as new, more intensive forms—such as townhomes and apartments—could be built alongside existing structures.

Redevelopment could also result in sharper transitions between zones and place types. The urban centers and villages typically include a range of zones with mixed-use zones (usually Neighborhood Commercial (NC)) at the core, surrounded by residential zones at progressively lower densities (Midrise (MR), Lowrise (LR), and Residential Small Lot (RSL)). **Exhibit 3.6-69** shows a typical zoning pattern. This arrangement of zones moderates transitions in height and

bulk from the core to the rest of the infill area, and from the infill area boundary to surrounding low-density areas.

Over time, edges between low-density areas and centers may become increasingly stark depending on the alternative. Alternatives with little or no expansion of infill areas may see more concentrated infill and starker contrasts in transitional areas between growth and surrounding areas. Alternatives that expand urban centers or villages may see more gradual transitions. The border between the Downtown and First Hill/Capitol Hill urban centers and less intense neighborhoods to the east and northeast will continue to be a major transition from greater to lesser intensity under all alternatives.

Exhibit 3.6-69. Typical Urban Village Zones



Notes: The map shows a typical progression of zones from the edge (dashed line), with lower height and intensity zones, to the core of the village, with the greater intensity zones. See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle, 2023.

Tree Canopy

Bulkier development under all alternatives would likely displace some trees on private property, especially in residential zones. At the same time, the number of street trees may increase where they are required with redevelopment. See **Exhibit 3.6-70** and **Exhibit 3.6-71**. The City's ownership of rights of way, community facilities, and parks also offer great opportunity to add trees to meet the City's 30% tree canopy goal and reduce heat islands.[21]

[21] Tress in public rights-of-way play an important role in contributing to canopy cover citywide—rights-of-way currently make up 27% of the city's land area and trees in the rights-of-way contribute 23% toward the city's canopy cover. See **Section 3.3 Plants & Animals**.

Exhibit 3.6-70. Street Trees with Redevelopment

Note: Recent townhouse developments in Seattle with street trees provided, even when it means shifting the sidewalk onto private property. Two photos on left have alley access, while the photo on the right has driveways.
Sources: MAKERS, 2023.

Exhibit 3.6-71. Townhouses with Retained Tree

Sources: MAKERS, 2023.

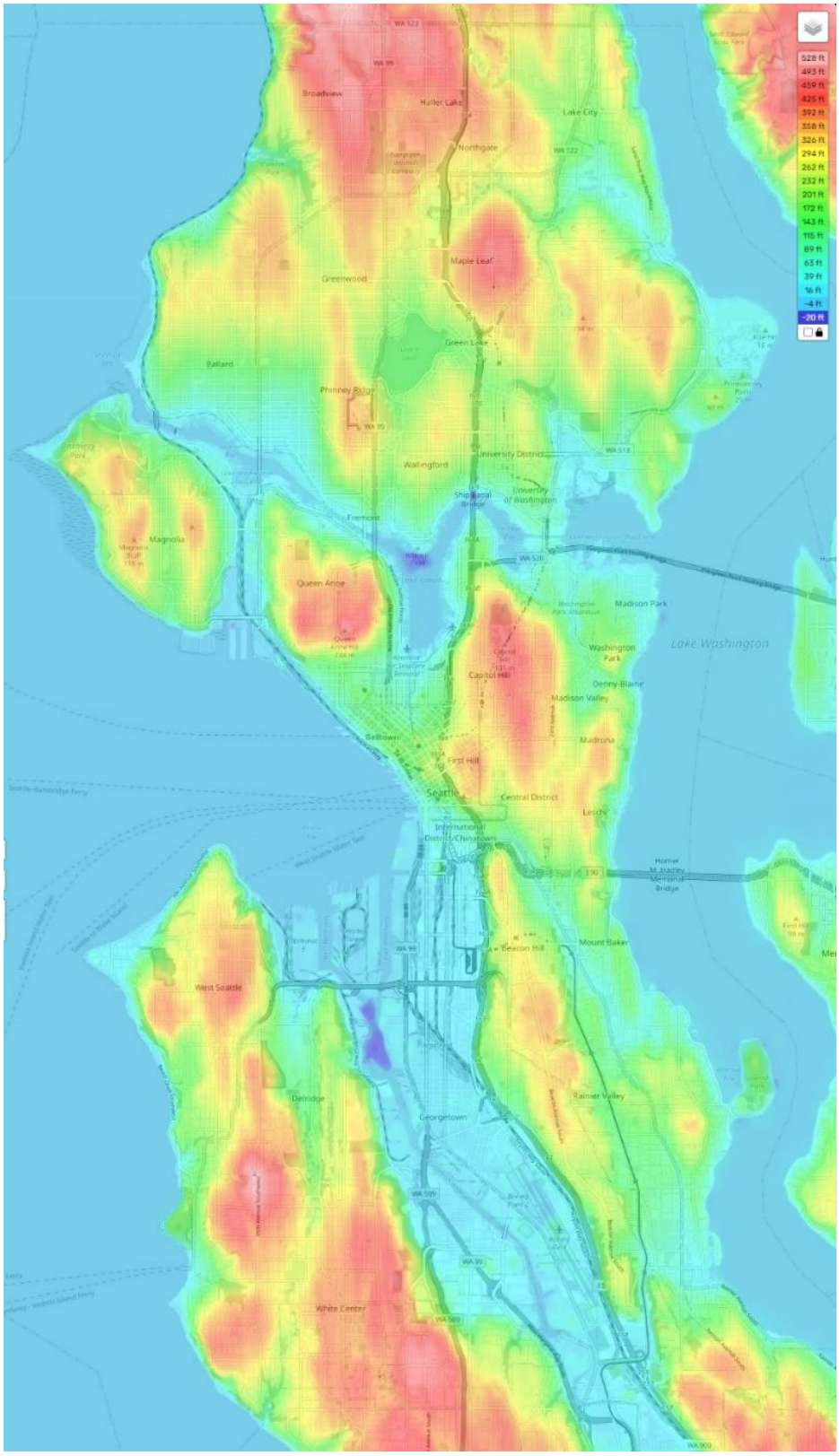
Shadows

Under any alternative, redevelopment will generally be taller and often bulkier than the existing building. Taller buildings cast longer shadows, and bulkier buildings cast wider shadows. A combination of tall and wide can mean large areas become shaded during much or all of the day, especially during winter.

In addition, shadows falling downhill cover greater distances, meaning that buildings toward the top of a north-facing hill can be especially impactful in casting shadows downhill. Likewise, buildings on east-facing hills have strong impacts on afternoon solar access downhill, and buildings on west-facing hills have strong impacts on morning sunlight downhill. **Exhibit 3.6-72** show the topography of Seattle with warmer colors representing higher elevations and cooler colors representing lower elevations. Several hills, combined with taller buildings, would have greater shadow impacts on their generally north sides, such as Crown Hill, Maple Leaf, View Ridge, Wallingford/Tangletown, Magnolia, Queen Anne, Capitol Hill, Washington Park, First Hill, Madrona, West Seattle, High Point, Highland Park, Beacon Hill, Graham Hill, and Rainier View.

Existing trees accustomed to full sun, whether in public right-of-way or on private property, may be harmed if their solar access is reduced which could limit growth or reduce the health of the tree. For streets already shaded, new street trees are selected for their tolerance to lower direct sunlight levels (Seattle Right-of-Way Improvements Manual 3.7 Street Trees). Building shadows may fall on existing solar panels or sites of future panels, but the buildings themselves may provide new opportunities for solar. Given the citywide scale, this analysis does not address this potential impact.

Exhibit 3.6-72. Seattle Topographic Map

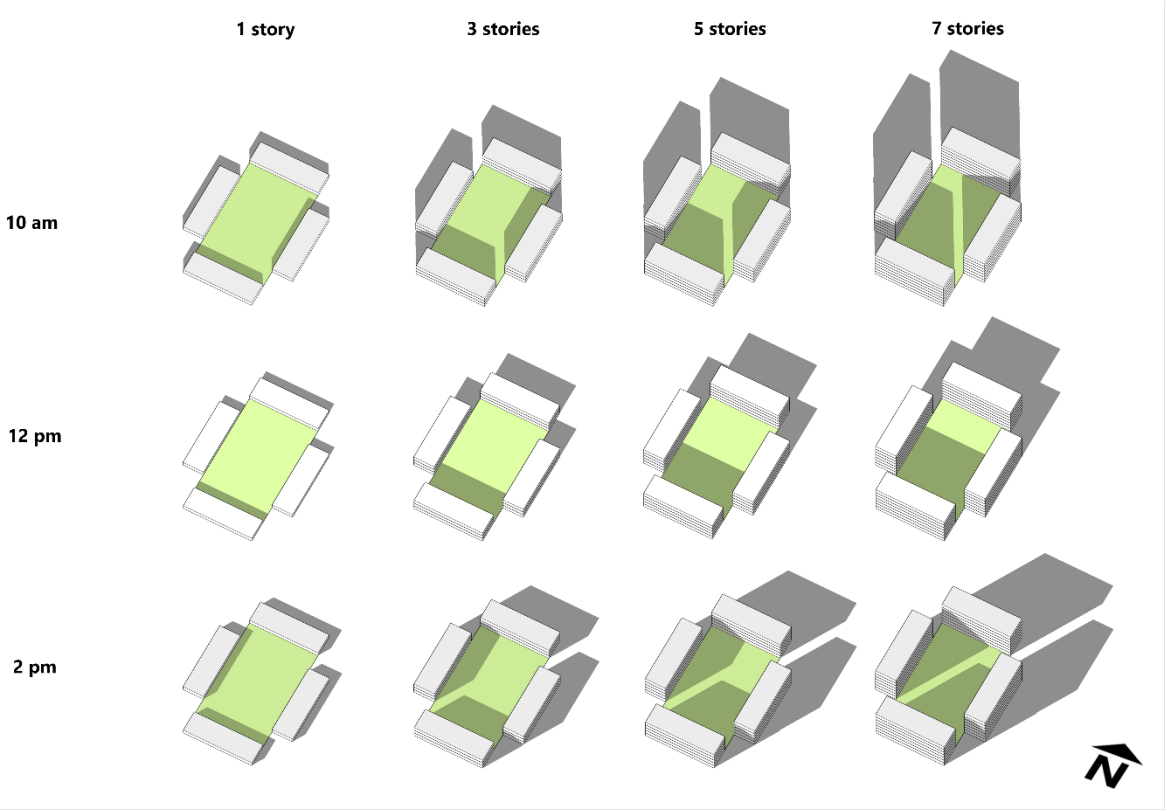


Source: World Topographic Map, TessaDEM, and Open Street Map, 2023 (CC-BY-SA 3.0).

Shadows on Public Parks

Some development would likely occur adjacent to parks under all alternatives. As **Exhibit 3.6-73** illustrates, an adjacent southern building is most impactful throughout the day. For afternoon sunlight (which is often a desired time to visit plazas and parks), adjacent southern and western buildings cast long shadows into a park. Winter solar access can be limited when buildings are 5 or more stories.

Exhibit 3.6-73 Building Height Impact on Shadows over Example Park on Winter Solstice

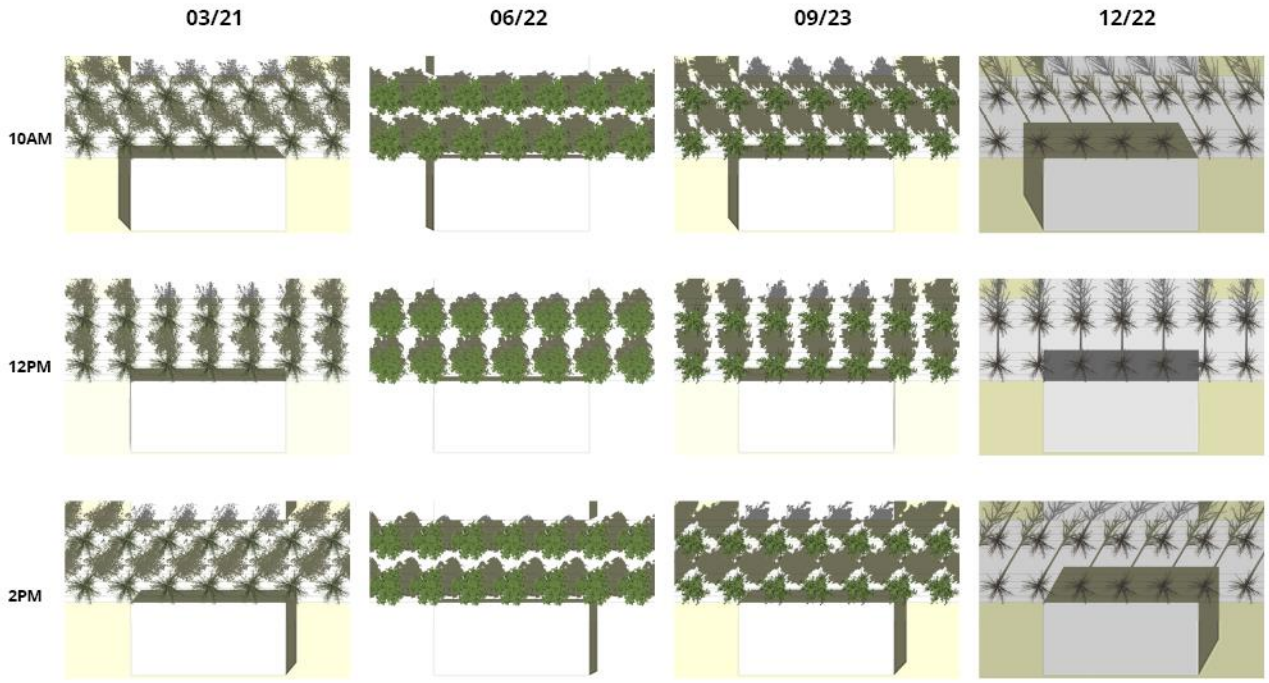


Note: The diagram shows "worst-case" shadows taking place on winter solstice. The illustration shows an example park approximately 200 feet by 300 feet, buildings with a 15-foot ground floor and 10-foot upper stories, and buildings approximately 60 feet wide.
Source: MAKERS, 2022

Shadows on Rights-of-Way

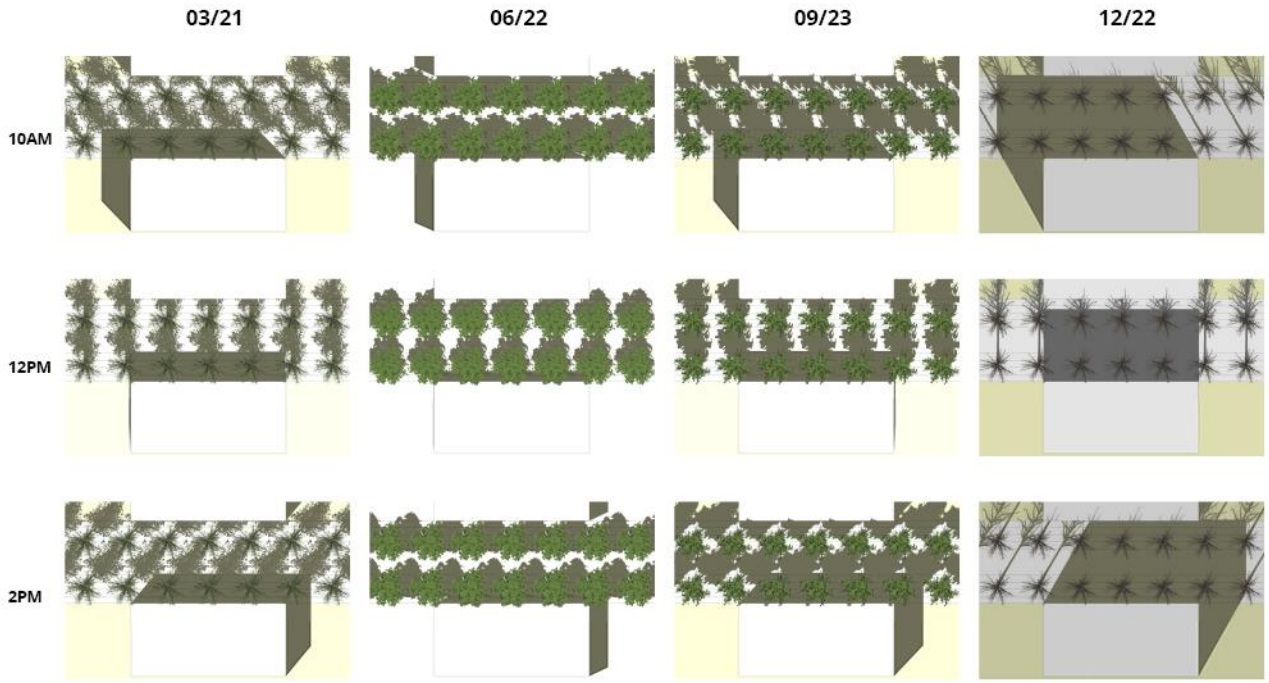
Height limits and street widths vary throughout Seattle, but in all cases, east-west-oriented streets are challenging for solar access, especially during wintertime. In most cases, the 3-story and taller buildings on the south side would shade the southern side of the street throughout the year except summertime and may shade both sides of the street throughout a winter day. Other street orientations would also experience increased shadows with taller redevelopment, but to a lesser degree. See **Exhibit 3.6-74**, **Exhibit 3.6-75**, and **Exhibit 3.6-76**.

Exhibit 3.6-74. 1-Story Building's Shadows on Street



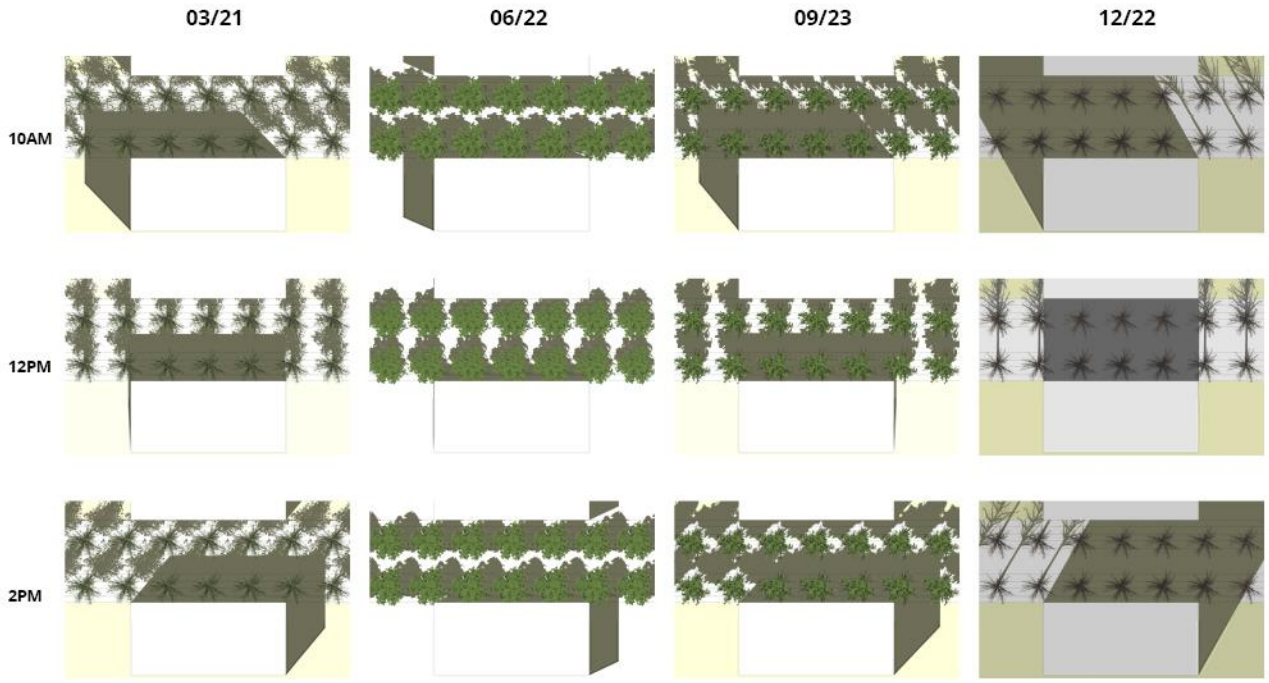
Sources: MAKERS, 2023.

Exhibit 3.6-75. 3-Story Building's Shadows on Street



Sources: MAKERS, 2023.

Exhibit 3.6-76. 5-Story Building's Shadows on Street



Sources: MAKERS, 2023.

Views

Under all alternatives, new buildings would develop with greater height and bulk, and, with these increases, development may interfere with publicly protected views. Because these views are protected under current regulations, views would remain unobstructed as long as potential impacts are identified during permit review. Of note, the number of SEPA-protected viewpoints, scenic routes, and Seattle-designated historic landmarks means that view corridors impact development capacity on many sites.

Impacts to protected views in many places would likely be fairly minor because most, although not all, SEPA-protected public viewpoints are located away from centers and villages instead capturing scenic views at edges of hillsides, parks, beaches, and schools. Likewise, many shoreline viewpoints are nestled on the coastlines within semi-secluded sites, providing uninterrupted view of the Puget Sound, Lake Washington, and Lake Union.

Views from defined scenic routes are more difficult to generalize but are often views down corridors to distant features (such as Mount Rainier or the Seattle skyline) and/or are episodic in nature, meaning only certain places along the routes have the best scenic qualities that might be adversely affected by future development. The precise nature and degree of potential future view disruptions along scenic routes would depend upon specific locational view qualities and individual project designs.

Landmarks are generally clustered in urban centers with some in urban villages and some dispersed elsewhere. There is no meaningful relationship between the protected viewpoints/scenic routes and the landmarks. Each historic landmark and site has unique conditions and would need to be evaluated at the project, not programmatic, scale.

130th/145th Station Area

The 130th/145th Station Areas will likely redevelop under all alternatives, although the scale, location, and intensity of that development would vary by alternative. Some commonalities include:

- **Height/bulk/scale.** Large superblocks (longer than 600 feet) lacking a connected internal path or street network mean that direct routes to access the station will be challenging without regulations to encourage or require through-connections with redevelopment. Redevelopment at the light rail station would occur in a physically bifurcated, uncomfortable human environment (at 5th Ave NE, Roosevelt Way, and I-5) and could miss an opportunity to celebrate and activate the station entry.
- **Tree canopy.** Plentiful evergreens, steep slopes, Thornton Creek, and environmentally critical areas near the 130th Station Area make development here unique, and perhaps more constrained, than many other Seattle areas. Existing large evergreen trees make residential areas feel set in hillside woods. Tree preservation could impact development capacity, and redevelopment with a loss of existing trees would have a noticeable effect on the human experience and sense of being set in nature.
- **Shadows.** In general, the existing tall evergreens, combined with steep slopes, significantly shade many residential areas. Shadow impacts from increases in building heights would be less noticeable in these residential areas because of those existing shadows. The north-south orientation of 15th Ave NE, as well as to a lesser extent the diagonal orientation of Roosevelt Way NE, allows for greater solar access for longer hours throughout the year, even with increases in building heights.

Specific land use and urban form impacts in the station areas are described under each alternative below.

Equity & Climate Vulnerability Considerations

Housing policy and zoning laws have a history of causing harm to Black, Indigenous, and People of Color in Seattle (see **Racially Restrictive Covenants & Zoning Laws** above). Additionally, the high cost of housing makes it very difficult for people to find housing near jobs, schools, friends, and family and perpetuates existing inequalities. The land use patterns proposed under each alternative, as well as potential resulting compatibility conflicts, are evaluated below for their likelihood to intensify or lessen these historical inequities.

Height and Density: Relationship to Housing Supply & Affordability

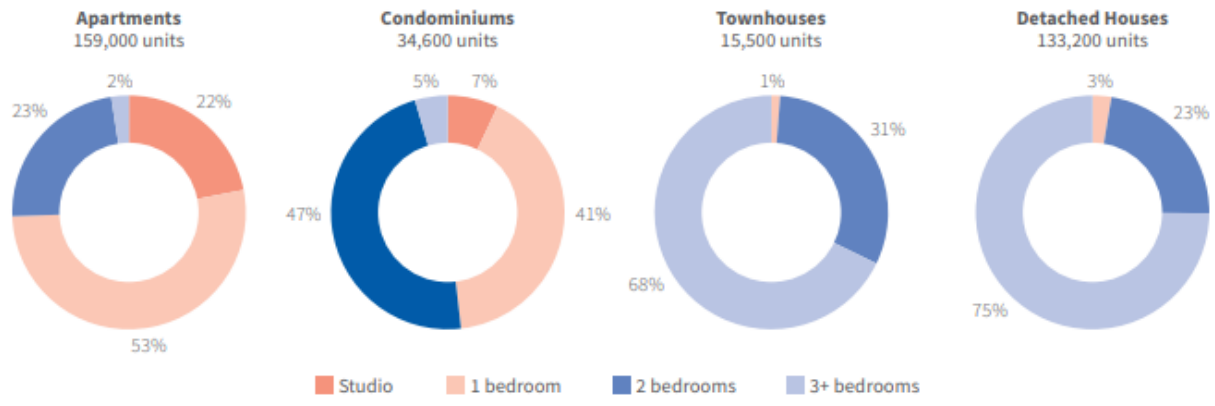
The height of a residential building is an important indicator of how many housing units can fit in one building and is strongly correlated with density. Taller buildings are generally denser and have more units than shorter buildings. Dense housing splits the cost of housing development among more households meaning the cost per household is more economical than low density housing.

The large area (about 80%) of Seattle's residential land being zoned for shorter, low-density housing constricts the choices people have on where they can live in Seattle. A broad, citywide approach to allowing increased density with taller buildings would likely have more equitable impacts to housing choice, a more varied urban form, and more opportunity for vibrant neighborhoods.

See also **Section 3.8 Population, Housing, & Employment** for more discussion of the relationship between housing and equity and climate vulnerability considerations.

The present combinations of allowed height, FAR, and setbacks found in Seattle's zoning regulations generally led to denser housing with many studio and 1-bedroom units over the last 20 years. As **Exhibit 3.6-77** indicates, 2% of apartments and 5% of condominiums in Seattle have 3+ bedrooms (City of Seattle & King County Department of Assessments, 2019). This has meant family size housing or units large enough for households with children is consistently scarce in Seattle and also unaffordable to most households with children or looking to have children. The lack of 3+ bedroom multi-family housing means that children and families are limited in housing choices in the city limits or means that families crowd into smaller units. However, allowing a wide variety of housing types may open up opportunities for more multi-family housing that is child and family friendly.

Exhibit 3.6-77. Bedroom Unit Diversity in Seattle Housing Stock



Source: City of Seattle, Housing Choices Background Report, 2019.

Relationship to Active Transportation

See also **Section 3.10 Transportation**.

In general, the regional center, urban center, and neighborhood center place types, as well as increased density overall, would allow more people to live in walkable/bikeable/rollable communities with improved access to transit. This would mitigate climate impacts and improve chances at social connectedness:

- Density decreases reliance on cars, enables easier mode shift, and lowers vehicle miles traveled (VMT) (IPCC, 2022). A broad, citywide approach to allowing increased density would likely improve Seattle's response to climate change. See **Section 3.2 Air Quality & GHG Emissions**.
- Development that improves conditions for active, human-powered travel and public transportation use decreases social isolation and increases chances for social interaction and wellbeing (Mattison et al., 2015; Holt-Lunstad, 2020; National Academies of Sciences, Engineering, and Medicine, 2020). A broad, citywide approach to allowing increased density would likely have more equitable impacts to human health and wellbeing.

Relationship to Street-level Community-building Spaces

A lively, vibrant neighborhood center is dependent on having a robust residential population nearby. The expected patterns of development, with increased height, bulk, and scale, could improve the ability to gather in public places and cultural anchors (i.e., culturally relevant businesses, services, religious institutions, arts, etc.), as long as commercial space displacement is mitigated and appropriate gathering spaces are provided. Upzones in high displacement risk areas may have a greater immediate impact on the street-level experience with construction impacts and potential displacement of cultural anchors. However, in the long term, with appropriate mitigation, equitable development could improve conditions. The Africatown development at 23rd and Union in the Central District is an example of this, where the Liberty Bank Building honors Black resilience to redlining, affordable housing is marketed to Black people who had been displaced from the Central District, and affordable commercial space for Black-owned businesses and services and a plaza for community gathering are provided.

Residential Design for Social Wellbeing & Sociability

A lack of social connections increases the risk of many health issues and chronic stress (CDC, 2021). Loneliness is most prevalent in low-density areas where commuting by car reduces opportunities for social interactions and high-rise buildings if residential design does not promote community and relationship building (Mattisson et al., 2015; Kalantari and Shepley, 2021).

To promote social connection, Health Affairs recommends policies such as, "Diversify housing design to incorporate communal and workspaces to encourage social interaction and reduce commute times, urban design that balances public and private space, housing to better serve changing demographics" (Health Affairs, 2020). A broad, citywide approach to allowing increased density would likely support policy recommendations from Health Affairs.

Happy Cities' *Designed to Engage* report and *Happy Homes Interactive Toolkit* offer policy and development standard recommendations for designing multi-family housing to promote sociability, such as missing middle and diverse housing types, social corridors in multi-family buildings, open/amenity space open only to residents, and breaking down the number of households using a shared entrance or corridor (Happy Cities, 2020). Taller, thin, small lot, dense multi-family housing, such as point access block apartments, are building types that align well with residential design for sociability. Seattle's building code allows up to four units off of one stairwell, allowing for opportunities for social interaction with neighbors and the ability to build trust with neighbors. Thinner buildings allow for more open space. A broad, citywide approach to allowing increased density with taller buildings would likely improve residential design for sociability and social wellbeing.

Climate Change

Like the greater Puget Sound region, Seattle is already experiencing extreme climate events consistent with climate change projections. Areas of the city that could pose greater risks to residents and businesses include sea level rise particularly along the Duwamish River as well as along marine waters of Areas 1, 3, 4, and 6. Along the edges of the city and water bodies are geologic hazard areas like landslides or erosion hazard areas where extreme precipitation could increase the land affected (see **Section 3.1 Earth & Water Quality**). Locations where there could be greater exposure to extreme heat include places with more impervious area and less tree canopy. Tree canopy, for example, is largely absent from Downtown and major industrial areas along the Duwamish Waterway and in Interbay (see **Section 3.3 Plants & Animals**). The alternatives vary in their proposed concentration of growth in areas vulnerable to climate risks or in their level of opportunity to incorporate additional climate resilience strategies. Most population will be concentrated in centers or corridors away from most hazards, especially under Alternatives 1, 2, and 4. Distributing more growth in urban neighborhoods under Alternatives 3 and 5 could increase the potential for populations to be closer to hazards or affected by interruptions in access to their neighborhoods. All action alternatives include a new Environment and Climate Element that incorporate mitigation and adaptation strategies and include policies regarding tree canopy protection or enhancement and critical area regulations. Utility providers are also developing system plans that anticipate climate change effects (e.g., stormwater plans) to help reduce effects.

Impacts of Alternative 1: No Action

Land Use Patterns & Compatibility

Alternative 1 No Action would maintain the status quo of focusing most housing and jobs within existing centers and villages with limited change to land use patterns outside of those proposed as part of the recent Industrial and Maritime Strategy EIS. See **Exhibit 2.4-4.**

Homes and jobs would be distributed across the city based on observed growth between 2010 and 2020 and the distribution of growth in the Seattle 2035 Comprehensive Plan (current future land use designations are mapped citywide in **Exhibit 3.6-15**). New housing would continue to be primarily rental apartments concentrated in existing mixed-use areas with land outside the centers and villages limited primarily to high-cost detached houses. Most new housing would be in Area 4 encompassing the Downtown and South Lake Union urban centers, followed by Area 1 which contains the Ballard Urban Village and Area 5 which contains the First Hill/Capitol Hill Urban Center. New jobs would continue to be located primarily in existing centers and villages. Over time, infill development and redevelopment would occur throughout the city to accommodate increased growth, gradually increasing the intensity of development in areas not currently developed to their full zoning capacity. Growth would continue to be limited by existing zoned capacity (current generalized zoning is mapped citywide in **Exhibit 3.6-16**).

Future planned activity units per acre in each center and village under the No Action Alternative are listed in **Exhibit 3.6-78**. Like all alternatives, the six urban centers and two MICs would retain their designations as PSRC Metro Regional Growth Centers (RGCs) and Employment MICs, respectively, under the No Action Alternative. Most of the urban villages would meet King County's threshold of 30 future activity units per acre with the exception of Othello and Rainier Beach in Area 8 and South Park in Area 7. No center or village boundary changes are proposed as part of the No Action Alternative—several urban villages would continue to be outside the 160–500 acre size thresholds as described under **Impacts Common to All Alternatives**.

Land use incompatibilities would be similar to those observed today and described under **Impacts Common to All Alternatives** but could become more severe over time with continuing trends. Mixing of new and existing uses could generate adverse localized incompatibilities, either within centers and villages or at their periphery where more intense development could occur adjacent to low-intensity uses outside the center or village (see also the **Transitions** section below). Increased development intensity and the pace of change may result in localized compatibility conflicts. These conflicts would continue to be managed by the application of existing development regulations and design standards. No significant adverse impacts are anticipated with respect to land use compatibility under the No Action Alternative.

Exhibit 3.6-78. Future Activity Units (AU)—Alternative 1: No Action

Center/Village	Existing AU/Ac.	Alt 1. Acres	Alt. 1 AU	Alt. 1 AU/Ac.
Urban Centers[1]				
Downtown	377.4	952	450,509	473.2
First Hill/Capitol Hill	139.5	916	149,746	163.4
University Community	54.5	753	52,890	70.2
South Lake Union	236.7	340	116,965	344.1
Uptown	131.3	333	53,775	161.3
Northgate	57.3	412	30,946	75.1
Hub Urban Villages[1]				
Ballard	67.7	495	48,030	96.9
Bitter Lake Village	44.0	364	20,147	55.4
Fremont	71.9	214	18,892	88.1
Lake City	57.6	142	10,719	75.4
Mt Baker	36.0	491	23,288	47.4
West Seattle Junction	70.4	269	26,981	100.2
Residential Urban Villages[1]				
23rd & Union-Jackson	38.9	625	29,080	46.5
Admiral	49.2	98	5,943	60.4
Aurora-Licton Springs	44.1	327	16,796	51.4
Columbia City	33.9	335	15,442	46.1
Crown Hill	25.3	271	8,509	31.4
Eastlake	70.2	199	16,337	82.0
Green Lake	70.6	109	9,500	87.4
Greenwood-Phinney Ridge	84.5	94	9,566	101.6
Madison-Miller	65.3	145	12,368	85.1
Morgan Junction	34.1	113	4,711	41.6
North Beacon Hill	28.1	267	9,196	34.5
Othello	23.7	499	14,480	29.0
Rainier Beach	23.0	346	9,015	26.0
Roosevelt	61.4	170	13,819	81.2
South Park	14.7	263]	4,860	18.5
Upper Queen Anne	89.5	53	5,814	110.5
Wallingford	42.2	258	13,274	51.5
Westwood-Highland Park	27.9	275	8,962	32.6

1 See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Note: Activity units (AU) is the sum of residential population and jobs. Assumes an average household size of 2.05 per the King County Growth Management Planning Council. Highlighted densities or size fall outside King County's countywide center designation criteria of 160–500 acres or below the minimum 18 existing AU or 30 future AU per acre. MIC designation criteria from PSRC does not include an AU density threshold.
Sources: City of Seattle, 2023; BERK, 2023.

Urban Form

Height, Bulk, & Scale

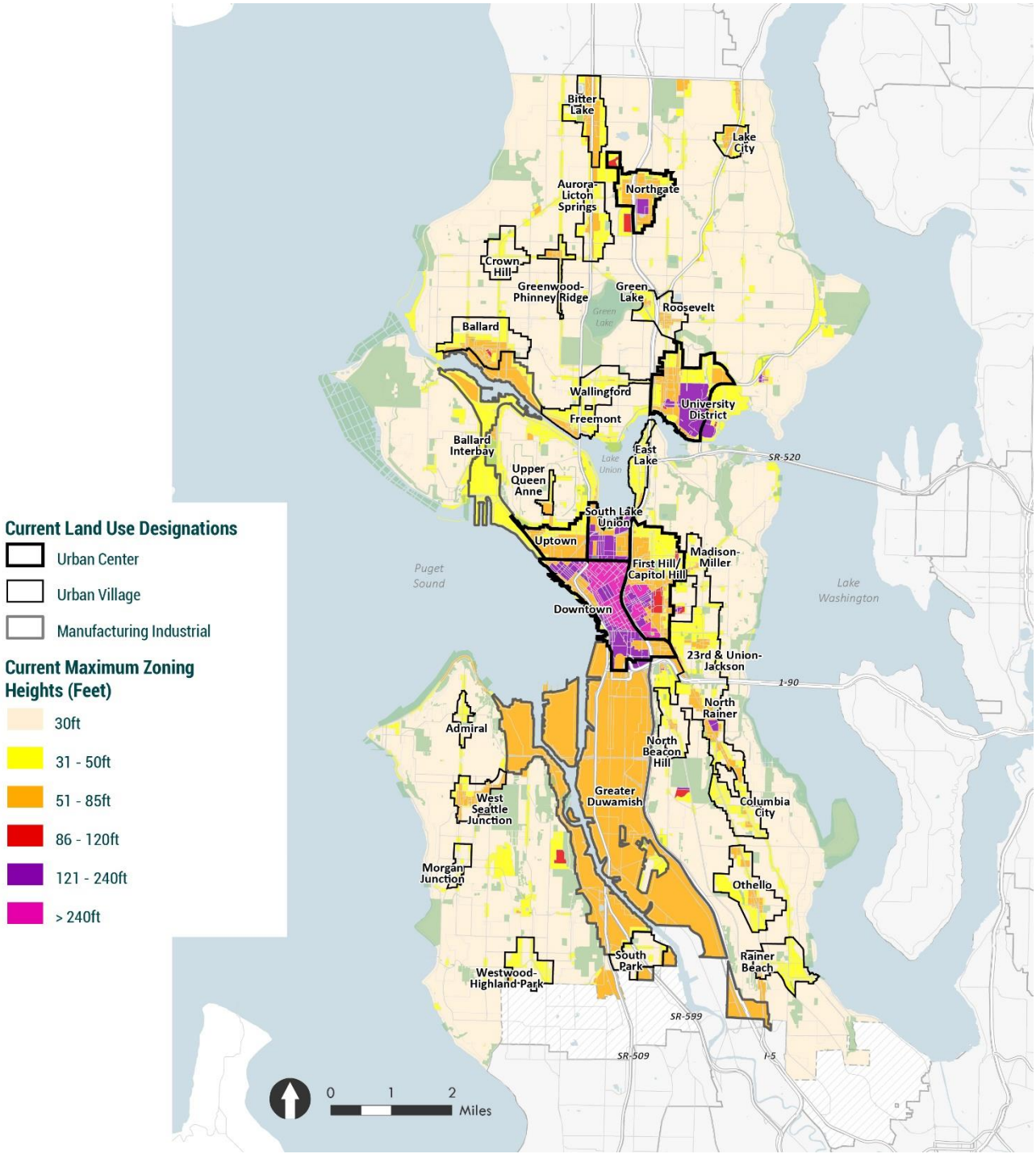
Impacts to height, bulk, and scale under Alternative 1 would be similar to the existing pattern described under Citywide Affected Environment. As growth is directed into existing centers and villages, a moderate amount of additional height and bulk would result from future development in these commercial and mixed-use nodes. The overall height, bulk, and scale implications from such future development would likely be consistent with that experienced during growth over the last twenty years.

As shown on **Exhibit 3.6-79**, urban centers allow the greatest building heights, particularly Downtown and South Lake Union, which results in mid- and high-rise buildings for both housing and employment uses. Urban villages allow a range of moderate and medium scale buildings, with building heights ranging from 30 feet to 85 feet, which results in low- and mid-rise buildings. Areas surrounding centers and villages are primarily zoned neighborhood residential which has a maximum height of 30 feet. Neighborhood residential zones would likely see more development of accessory dwelling units (ADUs) over the next 20 years. **Exhibit 3.6-80** shows 1-4 unit development that could happen in Neighborhood Residential zones under Alternative 1.

Related to the height of buildings, the bulk and size of building are influenced by zoned FAR. Urban centers allow the greatest FARs, followed by urban villages, and neighborhood residential. The relationship between height and FAR in many of Seattle's zones have led to a significant number of buildings developed during the last 20 years to be larger lot developments, which result in bulkier buildings than smaller lot developments. However, the City's existing development regulations and design review process are anticipated to be sufficient to reduce impacts to height, bulk, and scale to less than significant levels.

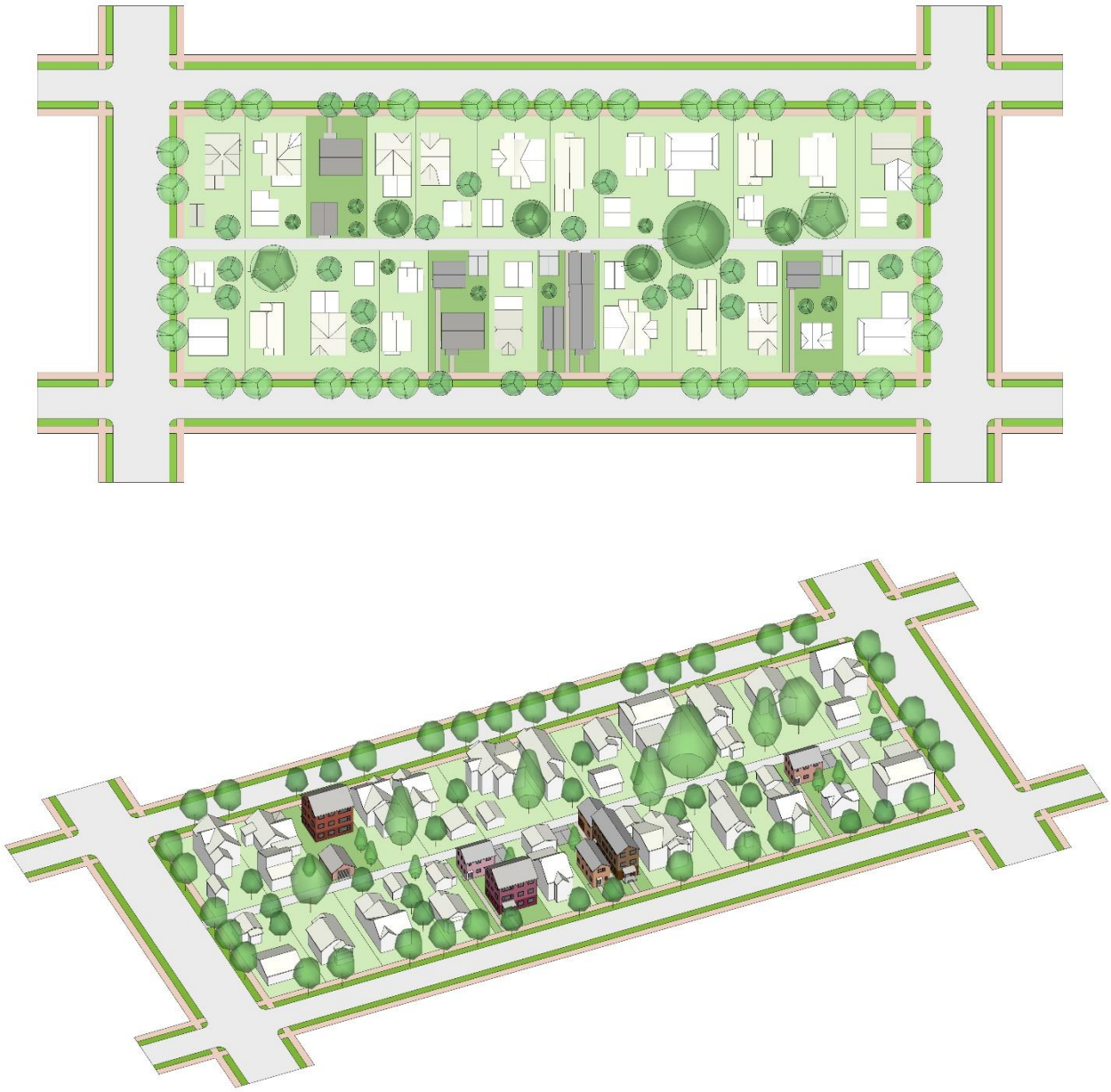
Exhibit 3.6-80, **Exhibit 3.6-81**, and **Exhibit 3.6-82** illustrate likely amounts and types of development in Neighborhood Residential zones over the next 20 years. Building types already allowed in these zones include attached and detached accessory dwelling units and in Residential Small Lot zones, multiple detached houses. The models show prototypical Seattle neighborhood blocks (no precise location) that include alleys, no alleys, and steeper terrain (with and without alleys).

Exhibit 3.6-79. Current Maximum Height Limits—Alternative 1: No Action



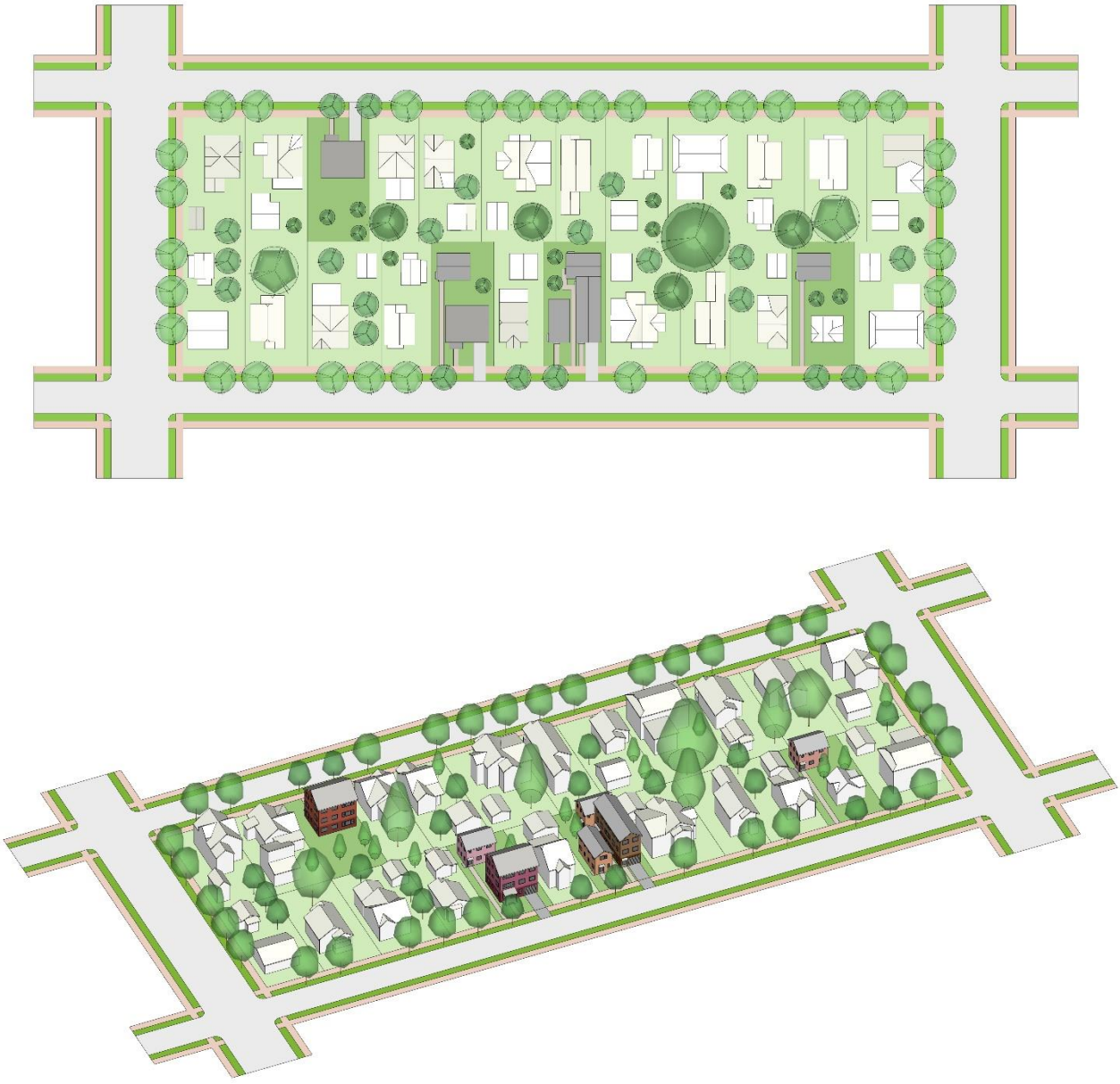
Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle, 2023; MAKERS, 2023.

Exhibit 3.6-80. Example Neighborhood Residential Block with an Alley Redevelopment—Alternative 1: No Action



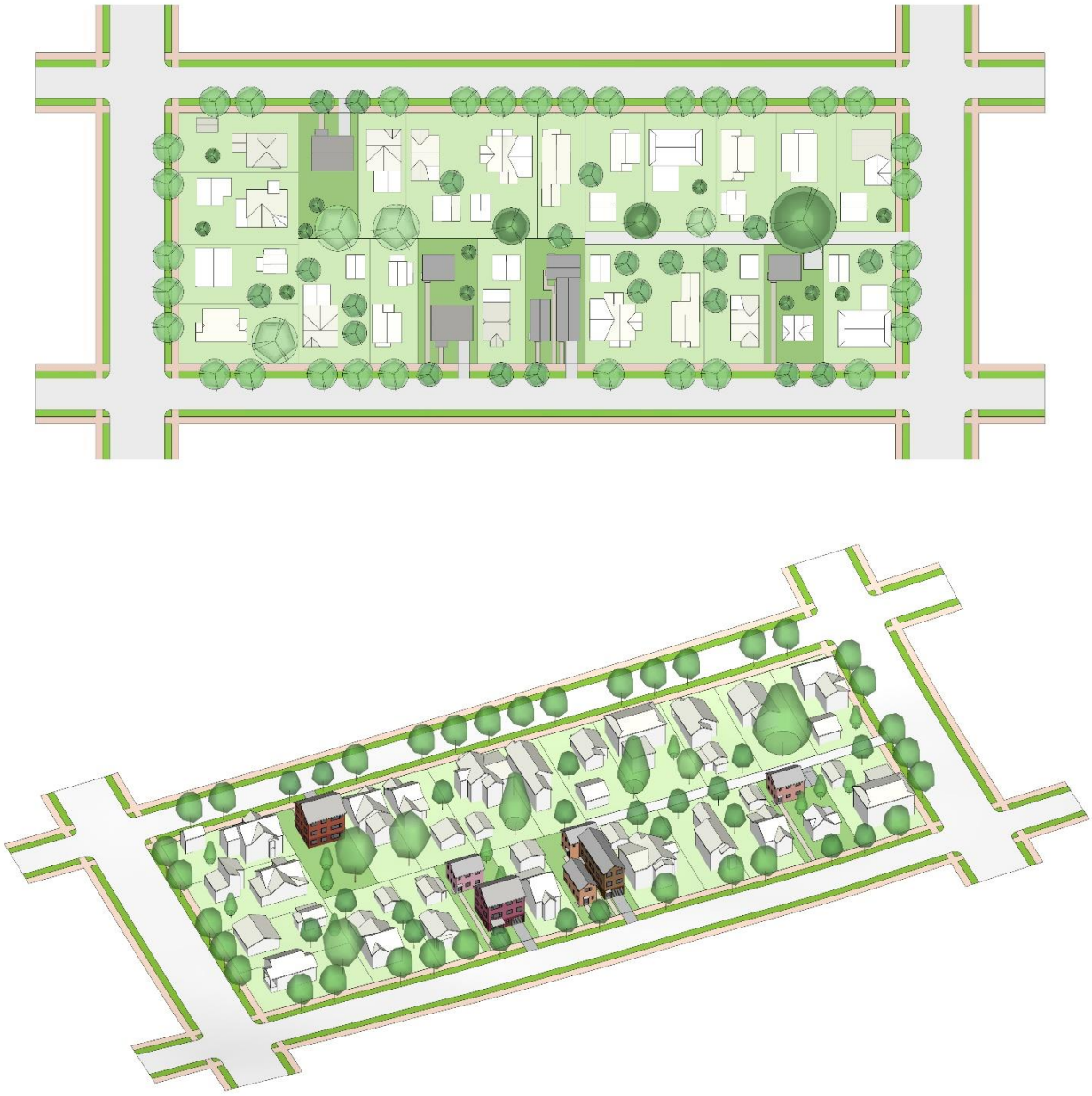
Note: This model illustrates potential redevelopment over the next 20 years under current Neighborhood Residential zoning. It is not intended to show the exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023

Exhibit 3.6-81. Example Neighborhood Residential Block without an Alley Redevelopment—Alternative 1: No Action



Note: This model illustrates potential redevelopment over the next 20 years under current zoning. It is not intended to show the exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023

Exhibit 3.6-82. Example Hilly Neighborhood Residential Block Redevelopment—Alternative 1: No Action



Note: This model illustrates potential redevelopment over the next 20 years under current zoning. It is not intended to show the exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023

Transitions

Continued infill development in established centers and villages would likely create increasingly stark contrasts with surrounding lower-scale areas. In villages with existing RSL and low-rise transition zones, the effect may be less pronounced, but widespread development of townhouses and cottage clusters may show an abrupt shift as one crosses the urban village boundary. Development in centers and villages where parking is required would likely create more abrupt transitions to the low-density residential scale compared to areas where parking is not required.

Tree Canopy

No additional impacts to tree canopy are anticipated under Alternative 1 above those described under **Impacts Common to All Alternatives**.

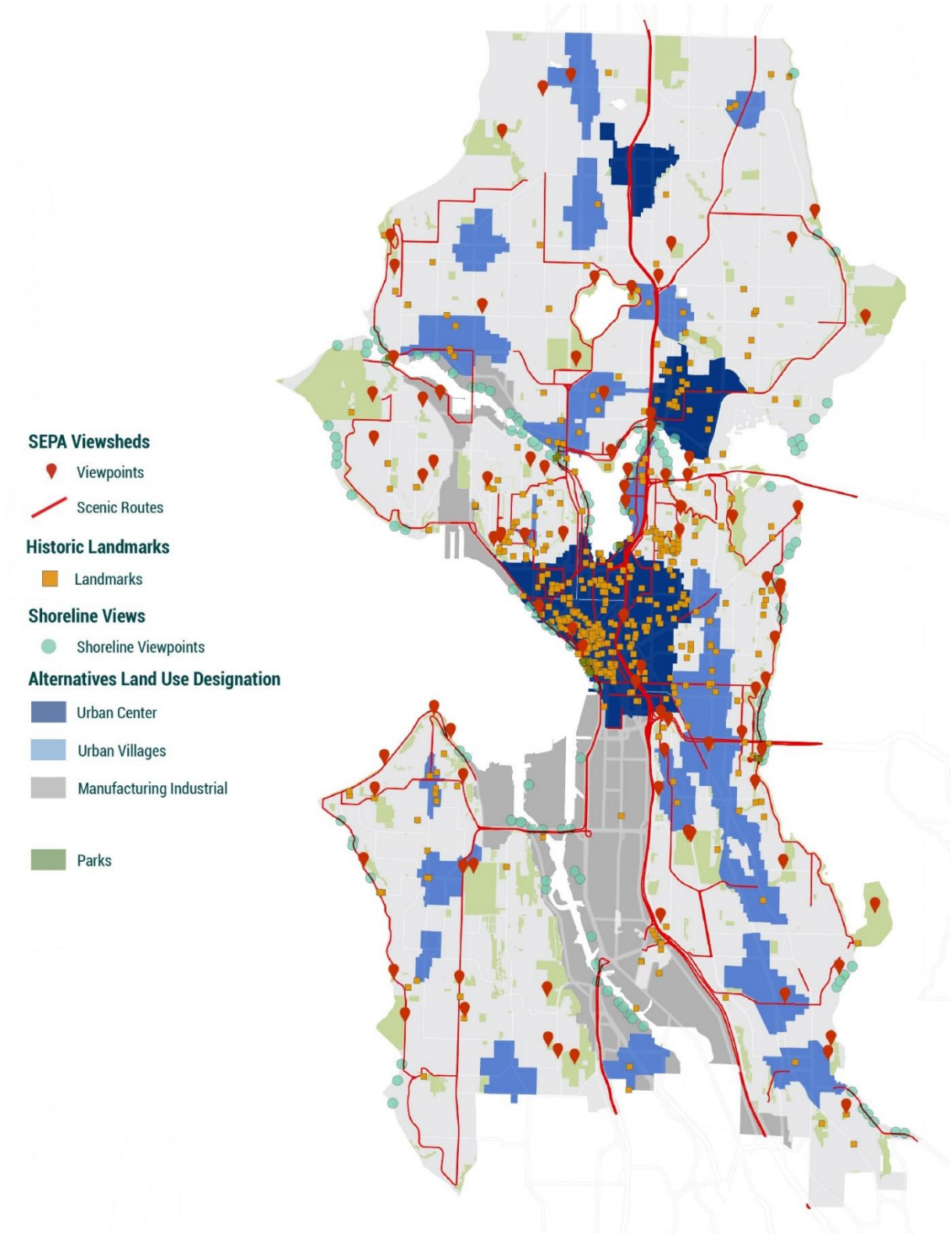
Shadows

Redevelopment in centers and villages would likely have taller heights than existing buildings, and thus cast longer shadows. Urban villages that sit on the north side of a hill, which could then cast shadows further, include northern Queen Anne, Admiral, and Othello. Nearly every center or village contains or is adjacent to parks, so redevelopment may cast longer shadows on parks. Also, urban villages with east-west-oriented main streets will see greater shadows on their central street and any associated public spaces. Most urban villages have north-south orientations, but a few have at least one central street running east-west, including Ballard (Market St) in Area 1, Wallingford (45th St) in Area 1, 23rd and Union-Jackson (Union St) in Area 5, Othello (Othello St and Graham St) in Area 8, and Rainier Beach (Henderson St) in Area 8.

Views

Future development under Alternative 1 would present limited disruptions to public views as growth would continue to concentrate in centers and villages, which tend to contain few viewpoints. Some exceptions include three viewpoints in Downtown that are not along the waterfront, one in Othello, two near West Seattle Junction, one at Ballard High School on the north side of Ballard, one in Bitter Lake, and Rainbow Point north of Green Lake-Roosevelt. See **Exhibit 3.6-83**.

Exhibit 3.6-83. Seattle Views Map—Alternative 1: No Action



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle, 2023; MAKERS, 2023.

130th/145th Station Area

Land Use Patterns & Compatibility

Current Comprehensive Plan and zoning designations would be retained under the No Action Alternative in the 130th/145th Station Area. Zoning would continue to allow 3-story single-purpose residential development around the future light rail station at 130th and some 4- to 8-story multi-family uses near the 145th BRT station. Housing and job growth around both station areas would be modest and based on existing land use and zoning designations—194 housing units and 109 jobs would be added around NE 130th St and 646 housing units and 607 jobs would be added around 145th. Existing future land use and zoning designations in the station areas are mapped in **Exhibit 3.6-33** and **Exhibit 3.6-34**. Growth would increase activity unit density from 18.4 (existing) to 20.7 around NE 130th Street and from 35.3 (existing) to 64.9 around 15th and 145th. See **Exhibit 3.6-84**.

Exhibit 3.6-84. Station Area Share of Targets 2024-2044—Alternative 1

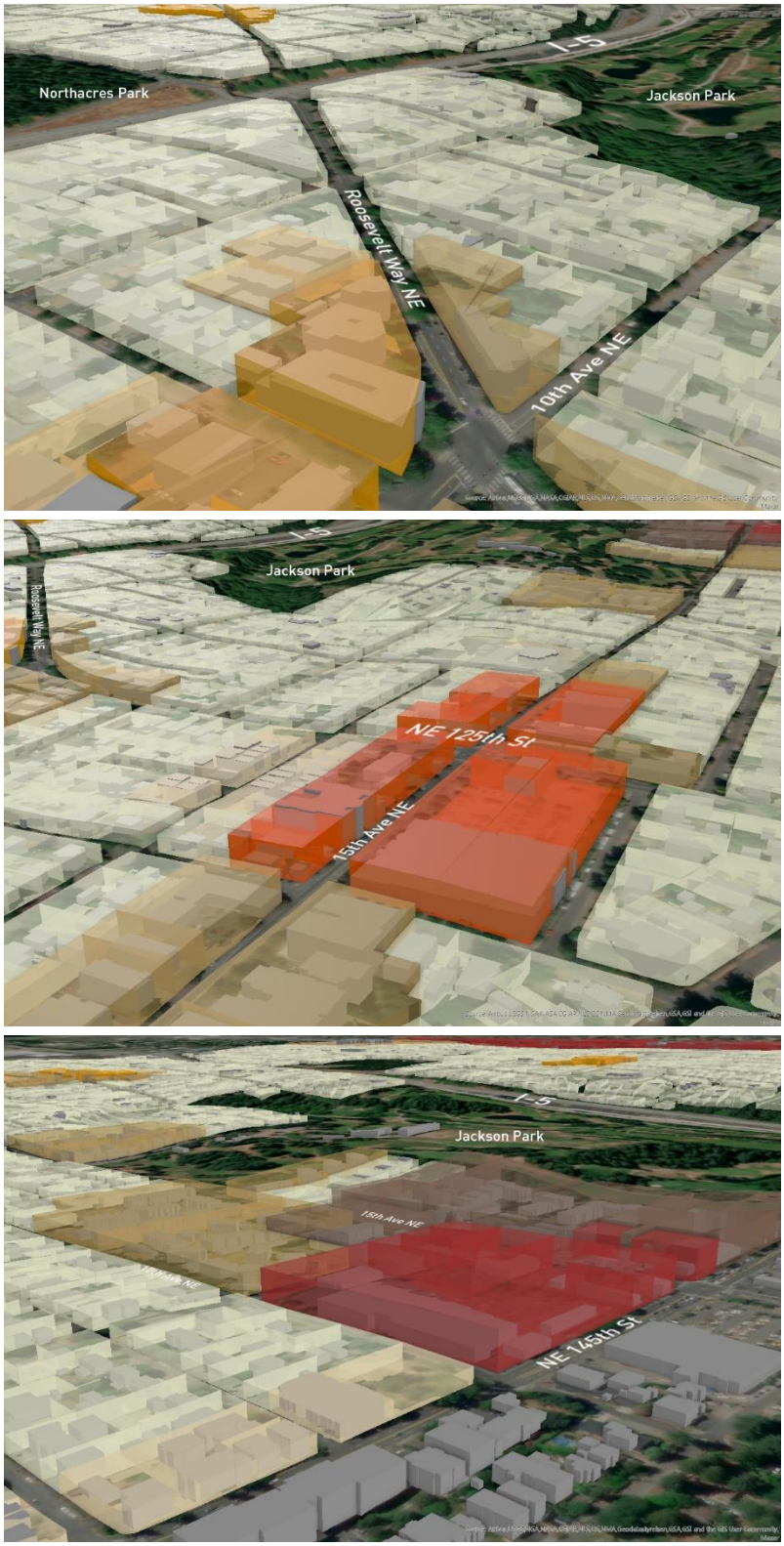
Location	New Housing Units*	New Jobs*	Existing AU/Ac.	Future AU/Ac.
NE 130th Street	194	109	18.4	20.7
15th & 145th	646	607	35.3	64.9

* The growth estimates consider the growth concept under the No Action Alternative within a common maximum boundary (Alternative 5).
Source: City of Seattle, 2023; BERK, 2023.

Urban Form

As seen in **Exhibit 3.6-79**, **Exhibit 3.6-85**, and **Exhibit 3.6-86**, the height around the 130th station would continue to be mostly 1- and 2-story buildings under Alternative 1, with the potential for some residential lots to see 3 stories. Under the existing zoning that offers limited capacity for development, few parcels would be likely to fully redevelop, though more may see additions (e.g., ADUs) and rebuilds. Though a light rail station would sit at the confluence of NE 130th St, Roosevelt Way NE, 5th Ave NE, and I-5, the station area would continue to feel like a low-density residential area and not like an active urban area. Few people would be within walking/biking/rolling distance of the station. Streets would not be activated with commercial uses, many streets would continue to lack sidewalks, and connectivity within the block bounded by 5th Ave NE, NE 130th St, 8th Ave NE, and Jackson Park would continue to be disjointed. In addition, 5th Ave NE would remain an uncelebrated public entry to a major transit investment (see **Exhibit 3.6-87)**. **Exhibit 3.6-85** and **Exhibit 3.6-86** illustrate potential redevelopment over 20 years; exact amount, locations, and design of redevelopment may vary. It would likely happen incrementally (i.e., site by site) as property owners choose to develop their property and/or aggregate properties for larger redevelopments.

Exhibit 3.6-85. 130th/145th Station Area Allowed Building Heights—Alternative 1: No Action



Note: This model illustrates allowed building heights under existing zoning. Building envelopes would also be influenced by FAR, setback, and upper story step back regulations.
Source: MAKERS, 2023.

Exhibit 3.6-86. 130th Station Area Massing Illustration—Alternative 1: No Action

Note: This model illustrates potential redevelopment over the next 20 years and building massings that maximize allowed FAR and heights while adhering to setback and zone transition regulations. Possible redevelopment is shown in pale yellow on an approximate amount of parcels likely to fully redevelop and is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur. Additional modest changes (e.g., additions of ADUs, rehabilitation/remodels, and rebuilds) may occur under existing zoning.
Source: City of Seattle, 2023; MAKERS, 2023.

Exhibit 3.6-87. 5th Ave NE and 130th Station under Construction

Source: MAKERS, 2023.

Greater change would occur in the areas currently zoned for more intense development, including the 145th BRT station area and Pinehurst area. The 145th BRT station could incentivize further development in the area. The apartments southwest of the BRT station could redevelop from 3-story buildings to 5- to 8-story buildings. This area includes many established trees (see **Exhibit 3.6-88**). The east side of 15th Ave NE could redevelop with 75-foot tall buildings.

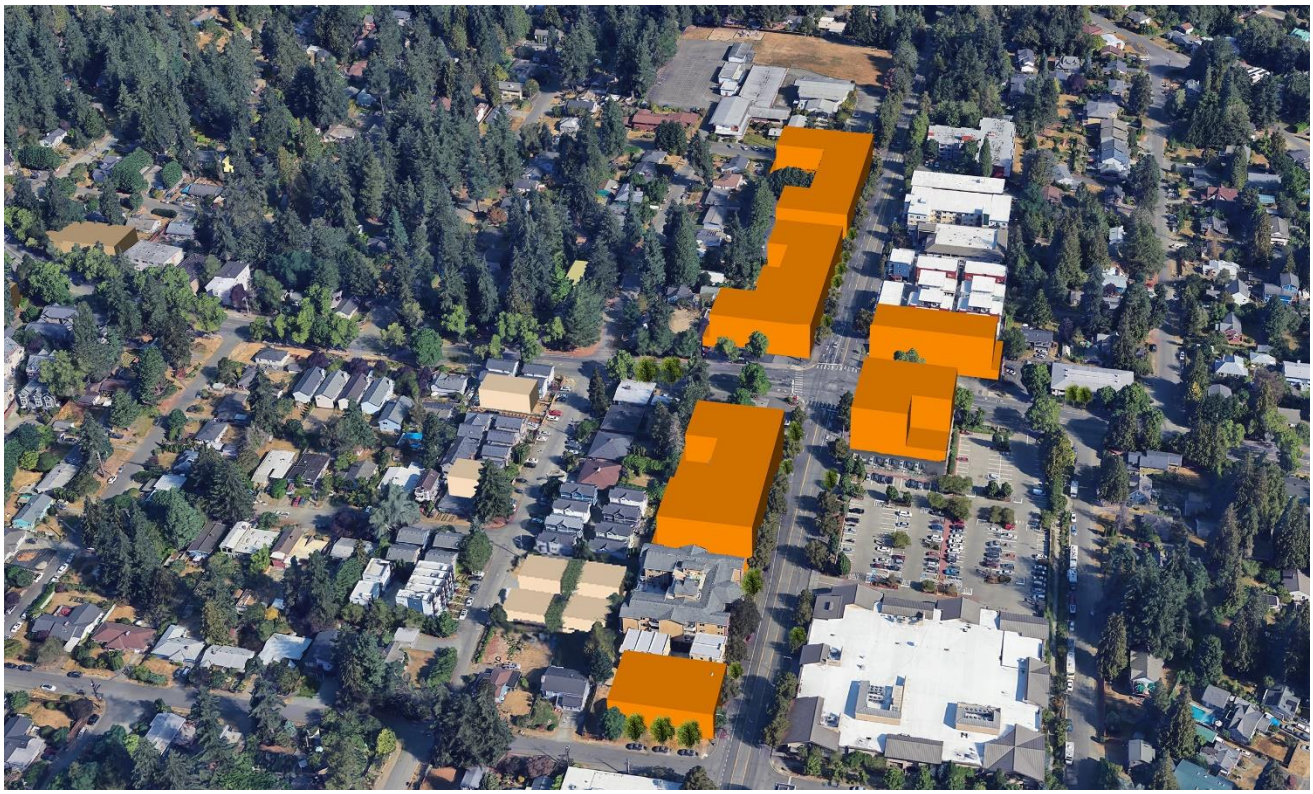
Exhibit 3.6-88. Existing 3-story Apartments Southwest of the 145th BRT Station

Source: MAKERS, 2023.

The Pinehurst area around 15th Avenue NE and NE 125th Street would continue to see similar development of 5-story mixed-use buildings in the NC3 zone along the main streets and 3- to 5-story residential buildings in the LR zones (**Exhibit 3.6-89**). With an urban center connector street designation on 15th Ave NE and NE 125th St, these streets would likely see street tree gaps filled with redevelopment, although trees may be in small landscape strips or grates with more space given to bus and pedestrian furniture, a protected bike lane, and street parking (if

remaining). Smaller streets off of the main arterials would meet Neighborhood Yield Streets standards, likely adding consistent landscape strips (6-8 feet wide) and street trees.

Exhibit 3.6-89. Pinehurst Massing Illustration—Alternative 1: No Action



Note: This model illustrates potential redevelopment over the next 20 years and building massings that maximize allowed FAR and heights while adhering to setback and zone transition regulations. Possible NC redevelopment is shown in orange and LR redevelopment in beige. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Equity & Climate Vulnerability Considerations

Housing Type Variety and Choice

The housing type variety and housing choice under Alternative 1 would be similar to the existing pattern described under Citywide Affected Environment and **Impacts Common to All Alternatives**. Although there would continue to be new housing built over the next 20 years, the mix of housing types under Alternative 1 would likely continue to struggle serving a broad range of households.

Relationship to Active Transportation

Alternative 1's increase in density around transit and amenities would continue to support opportunities for active transportation as described in **Impacts Common to All Alternatives**.

Relationship to Social Wellbeing & Sociability

No additional impacts to social wellbeing and sociability are anticipated under Alternative 1 above those described under **Impacts Common to All Alternatives**. The focus on higher densities in select places could result in more high-rise buildings (as opposed to a greater variety of building types in Alternative 3, 4, and 5) to meet housing needs. This could result in small areas of apartments with small, less expensive units surrounded by large areas with high-cost detached homes. This division could limit social wellbeing and sociability. At the same time, these higher densities close to transit and amenities increase opportunities for active living, which in turn increases chances for sociability and wellbeing.

Climate Change

No additional impacts to climate change are anticipated under Alternative 1 above those described under **Impacts Common to All Alternatives**. Growth under the No Action Alternative would be concentrated in existing centers and villages away from most hazards. The No Action Alternative would not include the new Environment and Climate Element with mitigation and adaptation strategies or policies regarding tree canopy protection or enhancement and critical area regulations.

Impacts of Alternative 2: Focused

Land Use Patterns & Compatibility

Alternative 2 would designate additional areas of focused growth called neighborhood centers to create more housing around shops and services (see **Exhibit 2.4-10**). Neighborhood centers would be similar to urban centers in that they would allow a wide range of housing types and commercial uses with more compact building forms, but with a smaller geographic size and lower intensity of allowed development. About 3,000 acres currently in neighborhood residential zoning would be designated as neighborhood centers.

Alternative 2 studies total housing growth of 100,000 housing units (20,000 more than the No Action Alternative) to account for potential additional housing demand that could be met within the neighborhood centers. As described under **Impacts Common to All Alternatives**, most new growth would be focused within the regional and urban centers currently characterized by higher densities and a more diverse mix of uses than other areas of the city. Housing growth within the regional and urban centers would be the same as the No Action Alternative. Activity levels and activity units per acre would be similar to those described under the No Action Alternative, although future activity units per acre would be marginally lower under Alternative 2 as a result of the slight jobs shift to neighborhood centers (see **Exhibit 3.6-90**). Land use patterns and potential compatibility impacts within the regional and urban centers and at their periphery (where more intense development could occur adjacent to low-intensity uses outside the center) would be similar to those described under **Impacts Common to All Alternatives**. Compared to the No Action Alternative, adverse compatibility impacts at the periphery of regional and urban centers could be lessened where a new neighborhood center with moderate-scale development abuts an existing center designation (see also the **Transitions** section below).

Under Alternative 2, neighborhood centers would accommodate the second highest share of anticipated housing growth behind regional centers (see **Chapter 2**). About half (49%) of housing growth in neighborhood centers would be directed into neighborhood centers with low displacement risk in areas 1 and 2. Area 4 would still receive the greatest overall share of new housing growth (19%) followed by Area 1 and Area 2 (about 18% each). A small number of jobs and commercial space would also shift from the larger centers towards the new neighborhood centers to reflect local demand consistent with the distribution of new housing. All neighborhood centers already contain areas zoned for commercial or mixed-use development. Additional jobs and commercial space in these areas, however, could increase more quickly due to the local demand from new housing.

Over time, overall land use patterns within the neighborhood centers would become more dense and mixed use. This could result in localized land use compatibility impacts within the neighborhood centers or with adjacent urban neighborhood areas where newer development is of greater height and intensity than existing development (see also the **Urban Form** section below). Such impacts would be mitigated through application of the City's existing development regulations and design review process. The SMP would also continue to apply where new neighborhood centers overlap the shoreline jurisdiction (e.g., north of Green Lake in Area 1, on Alki in Area 6, and on Lake Washington in Area 5).

Exhibit 3.6-90. Future Activity Units (AU)—Alternative 2

Center	Existing AU/Ac.	Alt. 1 AU/Ac.	Alt. 2 Acres	Alt. 2 AU	Alt. 2 AU/Ac.
Regional Centers[1]					
Downtown	377.4	473.2	952	448,614	471.2
First Hill/Capitol Hill	139.5	163.4	916	149,645	163.3
University Community	54.5	70.2	753	52,773	70.0
South Lake Union	236.7	344.1	340	116,153	341.8
Uptown	131.3	161.3	333	53,695	161.1
Northgate	57.3	75.1	412	30,860	74.9
Hub Urban Centers[1]					
Ballard	67.7	96.9	495	47,906	96.7
Bitter Lake Village	44.0	55.4	364	20,086	55.2
Fremont	71.9	88.1	214	18,883	88.0
Lake City	57.6	75.4	142	10,700	75.2
Mt Baker	36.0	47.4	491	23,196	47.2
West Seattle Junction	70.4	100.2	269	26,927	100.0
Residential Urban Centers[1]					
23rd & Union-Jackson	38.9	46.5	625	29,059	46.5
Admiral	49.2	60.4	98	5,935	60.3
Aurora-Licton Springs	44.1	51.4	327	16,784	51.3
Columbia City	33.9	46.1	335	15,411	46.0
Crown Hill	25.3	31.4	271	8,499	31.4
Eastlake	70.2	82.0	199	16,329	82.0
Green Lake	70.6	87.4	109	9,495	87.3
Greenwood-Phinney Ridge	84.5	101.6	94	9,548	101.4
Madison-Miller	65.3	85.1	145	12,357	85.0
Morgan Junction	34.1	41.6	113	4,706	41.5
North Beacon Hill	28.1	34.5	267	9,175	34.4
Othello	23.7	29.0	499	14,503	29.1
Rainier Beach	23.0	26.0	346	9,007	26.0
Roosevelt	61.4	81.2	170	13,808	81.2
South Park	14.7	18.5	263	4,847	18.4
Upper Queen Anne	89.5	110.5	53	5,806	110.3
Wallingford	42.2	51.5	258	13,258	51.4
Westwood-Highland Park	27.9	32.6	275	8,948	32.5

1 See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Note: Activity units (AU) is the sum of residential population and jobs. Assumes an average household size of 2.05 per the King County Growth Management Planning Council. Highlighted urban villages fall outside King County's countywide center designation criteria of 160–500 acres or below the minimum 18 existing AU or 30 future AU per acre. MIC designation criteria from PSRC does not include an AU density threshold.
Sources: City of Seattle, 2023; BERK, 2023.

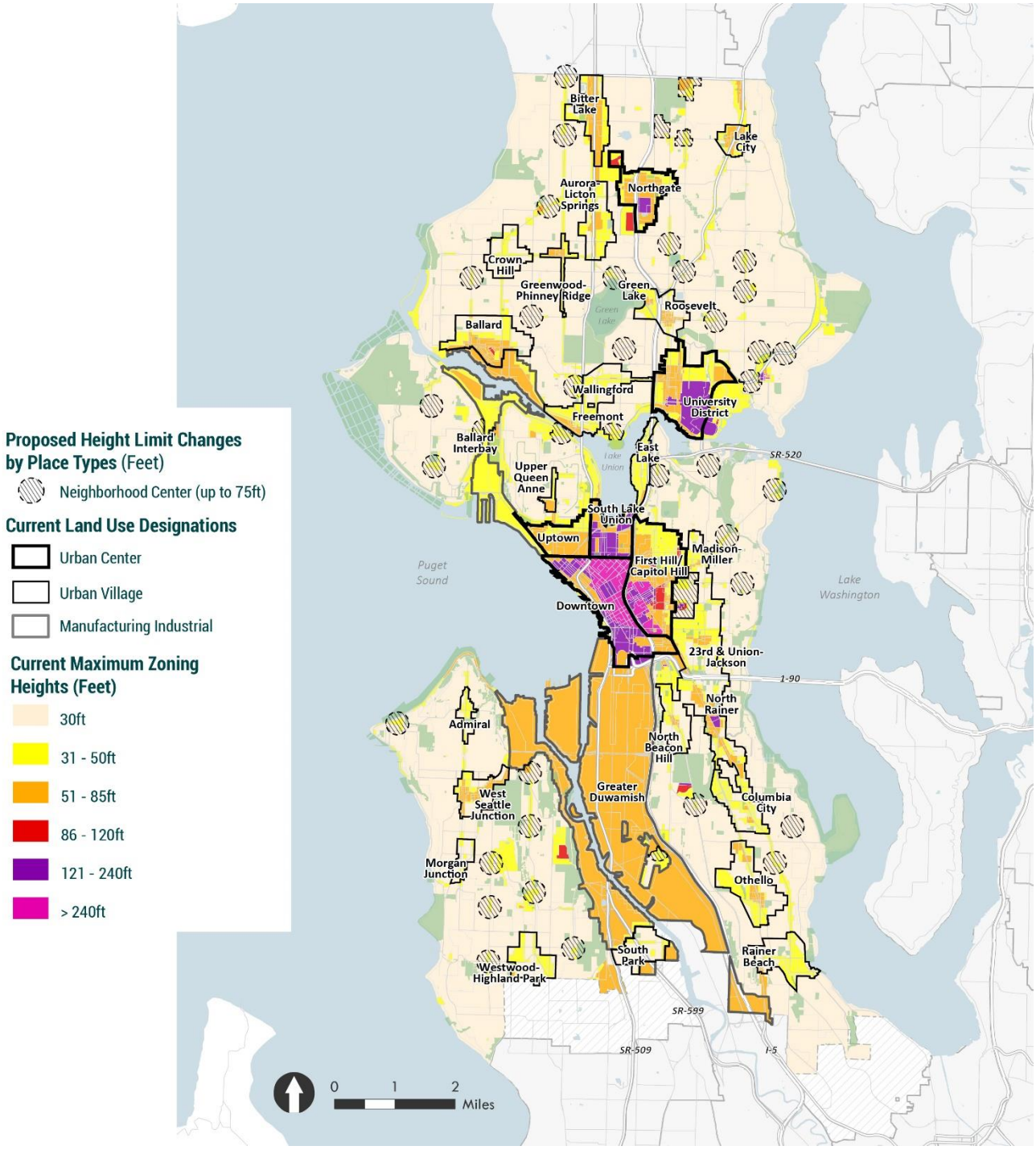
Urban Form

Height, Bulk, & Scale

Neighborhood centers could contain a mix of residential and mixed-use development from townhouses to 7-story apartments and mixed-use buildings. See **Exhibit 3.6-91**. Over time, overall building height and bulk in the new neighborhood center areas would likely increase with new development. Areas that are currently primarily 1- and 2-story buildings would be allowed to develop up to 5- to 8-story buildings. Localized impacts could occur as the areas transition to a more intense development pattern, with this conflict most likely being more pronounced in areas where neighborhood centers are being added.

Alternative 2 could also result in height, bulk, and scale impacts between properties in neighborhood centers where areas that are predominately 1- and 2-story detached houses might experience gradual redevelopment with multifamily homes as tall as 7 stories. Differences in massing on adjacent properties are not likely to be significantly more intense than those already occurring in many regional and urban centers but would occur in new areas.

Exhibit 3.6-91. Proposed Height Limit Changes—Alternative 2



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle and MAKERS, 2023.

Transitions

Alternative 2 introduces a new kind of infill area: neighborhood centers. These will bring some moderate-scale development at neighborhood locations where it is not currently allowed, reducing the existing contrast between regional and urban centers (that see widespread development of large buildings) and surrounding areas (with broad areas that see minimal development). Designating neighborhood centers could create new contrasts in building heights and intensity with surrounding areas in the places where they are applied.

Tree Canopy

Increased development pressure in previously low-density residential zones may displace trees on private property faster, while adding street trees.

Shadows

In neighborhood centers, the increase in height limits from 30 feet to 75 feet would mean that existing single-story buildings could be replaced with taller and wider buildings. These would cast longer shadows over a greater portion of the day. As noted in the **Affected Environment**, building shadows can be considered positive for climate adaptation to reduce summertime heat, but can be negative for human health and wellbeing (especially during winter) and the health of existing trees if accustomed to full sun.

Shadows on Public Parks

Neighborhood center upzones that increase height limits above 30 feet that could result in increased shadows on public parks including:

- NE 145th and 15th Ave NE on Jackson Park
- 130th Station Area on Jackson Park
- Holman Rd NW and 3rd Ave NW on Carkeek Park
- 15th Ave NE and Lake City Way on Maple Leaf Reservoir Park
- Sand Point Way and 50th Ave NE on Burke-Gilman Trail and Playground Park
- NE 45th St/Sand Point Way and 36th Ave NE on Burke-Gilman Trail
- Tangletown on Keystone Place
- Lawton Park on Discovery Park
- Magnolia on Magnolia Playfield
- Madison Park on Madison Park and Madison Park Beach
- Washington Park/Broadmoor on Broadmoor Golf Club
- Madrona on Madrona Playground and Alvin Larkins Park
- Alki on Alki Beach Park
- North Delridge on Dragonfly Garden and Pavilion

- Delridge Way SW and SW Brandon St on Cottage Grove Park, Delridge P-Patch Community Gardens, and Greg Davis Park
- Delridge Way SW and Sylvan Way SW on Delridge and Myrtle
- 9th Ave SW and SW Henderson St on Highland Park Playground and Westcrest Park
- Beacon Ave S and S Columbian Way on Jefferson Park Golf Course

Shadows on the Delridge P-Patch are important to note because of their potential impact to plant productivity.

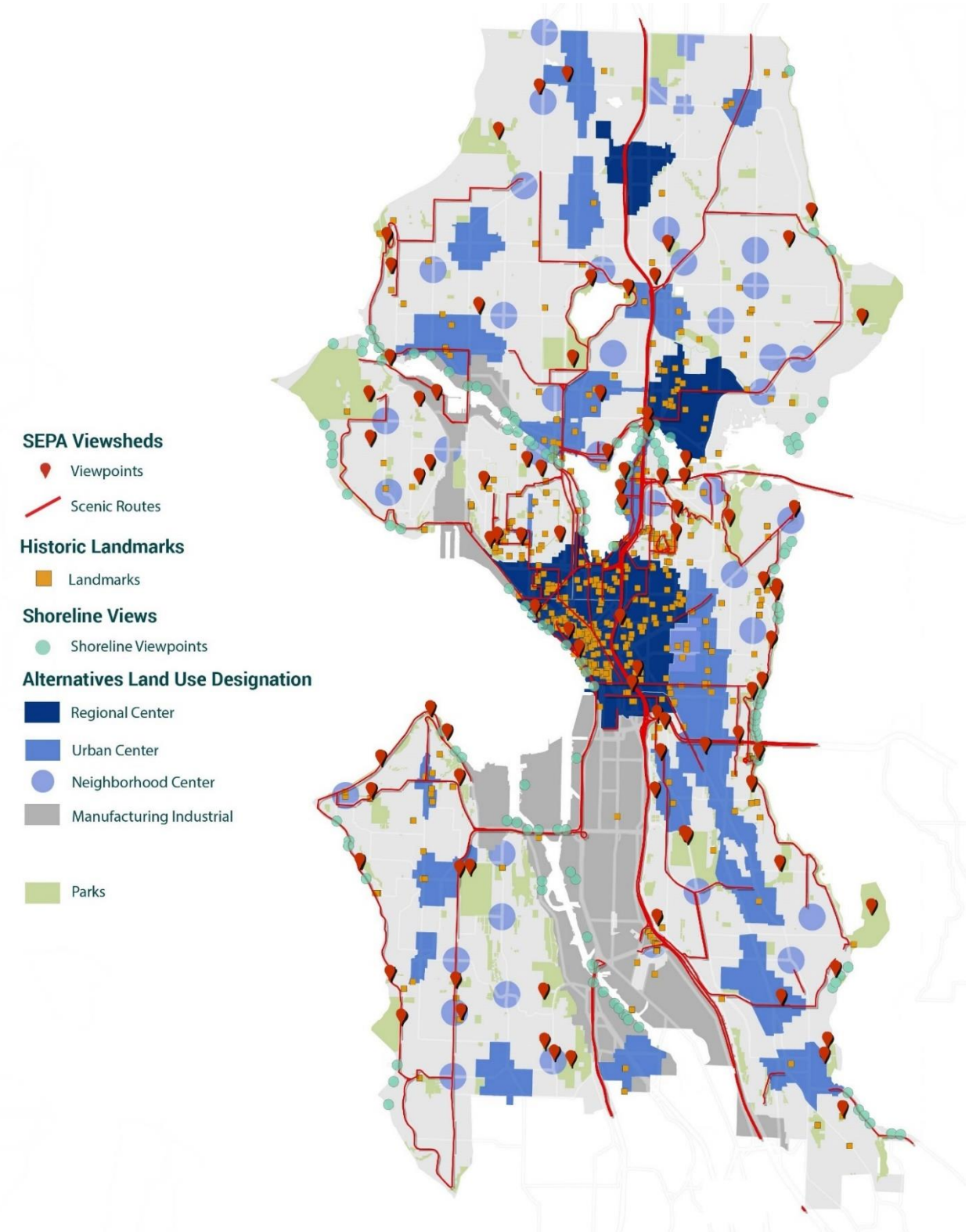
Shadows on Public Rights-of-Way

Impacts would be greatest along east-west-oriented neighborhood main streets with taller developments on the south side, though they would impact any orientation to varying degrees. See **Exhibit 3.6-74**, **Exhibit 3.6-75**, and **Exhibit 3.6-76** for shadow patterns at various times and seasons with different building heights. Many neighborhood main streets have 1-story existing buildings, so the increase to 3- or 5-stories would have noticeable impacts on shadows to the sidewalks. Street trees accustomed to full sun, especially if shorter than new buildings, may be impacted. Selection of future street trees and vegetation would need to consider future solar impacts.

Views

The expected development pattern in neighborhood centers is unlikely to significantly impact protected views beyond the potential impacts of the No Action Alternative. Most public viewpoints, including shorelines and landmarks, are not located within the neighborhood centers, and no zoning changes are proposed between most viewpoints and the landmark view. See **Exhibit 3.6-92**.

Exhibit 3.6-92. Seattle Views Map—Alternative 2



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle, 2023; MAKERS, 2023.

130th/145th Station Area

Land Use Patterns & Compatibility

Under Alternative 2, there would be three neighborhood centers designated in the station area near 130th Street and Roosevelt Way to the east of I-5, 125th Street and 15th Ave (Pinehurst), and 145th Street and 15th Ave. Zoning to implement the centers would include a combination of Low-rise Residential, Midrise Residential, and Neighborhood Commercial (NC3). Future development would be more mixed use near the 145th Station Area (with NC3) compared to the No Action Alternative and heights would be greater at up to 7 stories, particularly along the 145th Station Area.

Both stations areas would see more growth clustered in the newly designated neighborhood centers under Alternative 2 compared to the No Action Alternative. However, housing and job growth would be relatively modest—1,049 housing units and 284 jobs would be added around 130th Street and 1,159 housing units and 695 jobs would be added around 145th Street. Growth would increase activity unit density from 18.6 (existing) to 29.9 around NE 130th Street and from 35.7 (existing) to 83.3 around 15th and 145th. Land use patterns and compatibility impacts would be similar to those described above within other neighborhood centers.

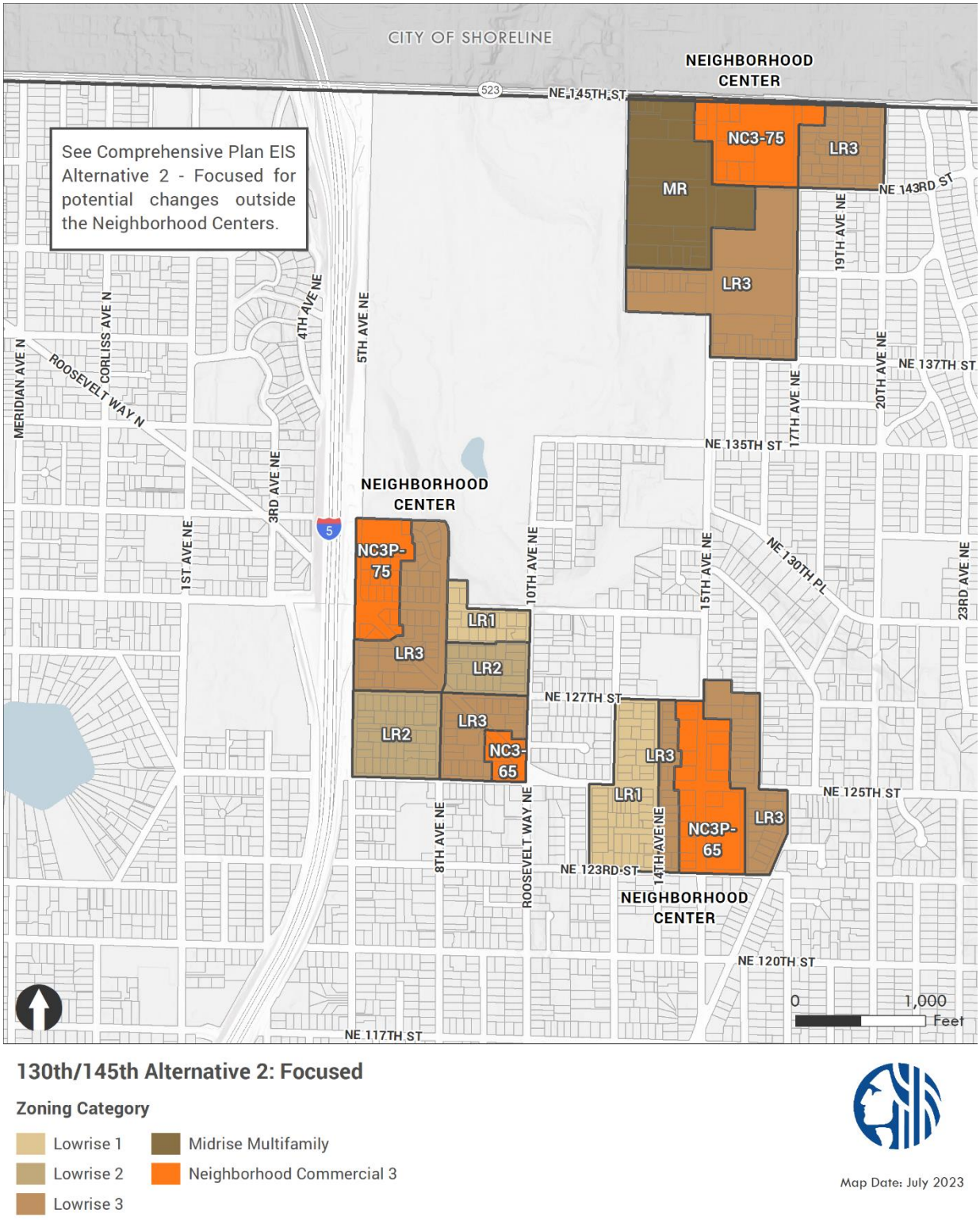
See **Exhibit 3.6-93** and **Exhibit 3.6-94**.

Exhibit 3.6-93. Station Area Share of Targets 2024-2044—Alternative 2

Location	Place Type*	New Place Acres**	New Housing Units**	New Jobs**	Existing AU/Ac.	Future AU/Ac.
NE 130th Street	Neighborhood Center	52	1,049	284	18.4	29.6
15th & 145th	Neighborhood Center	65	1,159	695	35.3	82.4

* See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
** New place acres are the total acres within the neighborhood center boundary under Alternative 2. The growth estimates consider the proposed growth concept under Alternative 2 within a common maximum boundary (Alternative 5). The 130th Street and Pinehurst Neighborhood Centers in Alternative 2 are both part of the 130th Street Urban Center in Alternative 5 and so are listed under NE 130th Street in this table.
Source: City of Seattle, 2023; BERK, 2023.

Exhibit 3.6-94. 130th/145th Station Area Zoning Concept—Alternative 2



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle, 2022; BERK, 2022.

Urban Form

Height, bulk, and scale. The station areas could see extensive changes to height, bulk, and scale as a result of proposed zoning capacity increases combined with proximity to the new light rail station. Building heights immediately next to the 130th light rail station would likely redevelop from primarily 1- and 2-story buildings up to 7 stories. The heights of buildings surrounding the 130th station would develop into a mix of 3-story townhomes and 4- and 5-story buildings. **Exhibit 3.6-95** and **Exhibit 3.6-96** illustrate potential redevelopment over 20 years; exact amount, locations, and design of redevelopment may vary. It would likely happen incrementally (i.e., site by site) as property owners choose to develop their property and/or aggregate properties for larger redevelopments.

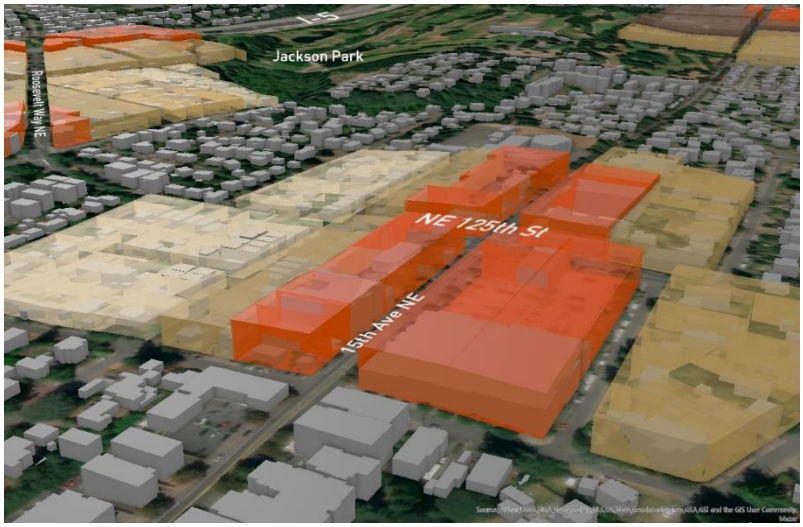
The core of the 145th station area would likely redevelop into a mixed-use node with buildings up to 7 stories, while heights in the surrounding area would be similar to the No Action Alternative. Zoning around Pinehurst would allow for more multi-family than the No Action Alternative but new development would likely continue to see a mix of 3- to 5-story buildings.

Specific impacts include:

- **Urban design and active transportation: Intersite connectivity.** The block bounded by 5th Ave NE, NE 130th St, 8th Ave NE, and Jackson Park is approximately 660 feet by 690 feet and currently has no through access; NE 131st Place is a private access drive and 8th Ct NE is a short dead-end right-of-way. With redevelopment, the lack of an existing finer-grained and connected network of streets means that redevelopment, without requirements for greater connectivity, could result in development that is fractured and doesn't have great connections to existing streets and the light rail station.
- **Street-level community building: Lack of focused public realm.** Similarly, because of the limited street grid, piecemeal redevelopment could result in individual, unrelated, disconnected developments lacking a cohesive orientation toward public streets, a focused public realm, or opportunities for shared social gathering. Building entries could be hidden or facing different directions within a block accessed by long, private driveways.
- **Street level community building: Affordable commercial space.** 15th Ave NE, both in the 145th station area and Pinehurst, as well as NE 125th St at 15th Ave NE and Roosevelt Way NE south of NE 125th St, would likely see greater levels of activity, enlivening the street level experience. However, many small commercial spaces currently exist in strip malls or in adapted houses in these areas. With redevelopment, maintaining affordable commercial space in the area for local and BIPOC-owned businesses may be challenging, impacting the social and cultural ties to these neighborhood centers.

Transitions. Development of high-intensity buildings in the immediate vicinity of the 130th station area under Alternative 2 may create abrupt local transitions in scale between existing detached houses and new larger construction. Over time, an evolution of the station area into more consistently intensely used land, combined with smaller scale redevelopment in surrounding low-rise zones would likely soften these transitions. See **Exhibit 3.6-96** and **Exhibit 3.6-97**.

Exhibit 3.6-95. Proposed 130th/145th Station Area Allowed Building Heights—Alternative 2

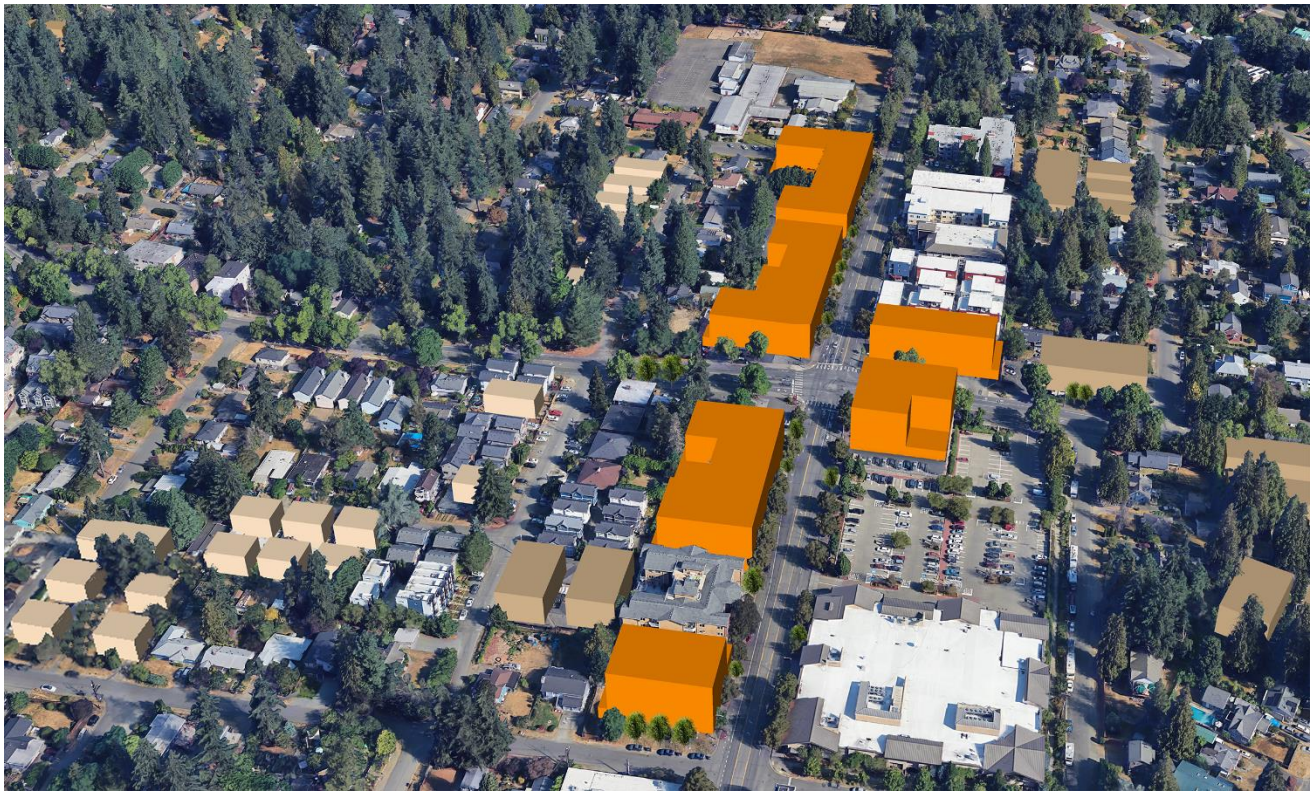


Note: This model illustrates proposed building height limits in proposed neighborhood centers. Building envelopes would also be influenced by FAR, setback, and upper story step back regulations.
Source: City of Seattle, 2023; MAKERS, 2023.

Exhibit 3.6-96. 130th Station Area Massing Illustration—Alternative 2

Note: This model illustrates potential redevelopment over the next 20 years and building massings that maximize allowed FAR and heights while adhering to setback and zone transition regulations. Possible NC redevelopment is shown in orange and LR redevelopment in beige. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Exhibit 3.6-97. Pinehurst Massing Illustration—Alternative 2



Note: This model illustrates potential redevelopment over the next 20 years and building massings that maximize allowed FAR and heights while adhering to setback and zone transition regulations. Possible NC redevelopment is shown in orange and LR redevelopment in beige. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Tree Canopy. Similar to the No Action Alternative, any redevelopment would fill gaps in street trees along the frontage. In the station areas, large-scale redevelopment would significantly impact the existing tree canopy. Alternatively, if trees are protected "exceptional" trees, development capacity would be constrained.

Shadows on Public Parks. Increased height limits above 30 feet in the NE 145th and 15th Ave NE and 130th Station Area neighborhood centers could result in increased shadows on Jackson Park. However, the human experience of the park would not significantly change as tall evergreens already shade the park boundaries.

Views. The I-5 scenic corridor traverses the 130th Station Area. However, I-5 in this area is below grade and/or has noise barrier walls blocking much of the view. In addition, the light rail infrastructure (above ground) is visually prominent and blocks or impacts much of the eastward views. More buildings would be visible, especially on the east side of I-5 at NE 130th St/Roosevelt Way NE, but they would be a minor part of the view.

Equity & Climate Vulnerability Considerations

Housing Type Variety and Choice

The housing type variety and housing choice under Alternative 2 would be similar to the existing pattern described under **Affected Environment** and **Impacts Common to All Alternatives**.

Relationship to Active Transportation

Alternative 2 would introduce neighborhood centers, which are similar to urban centers but are smaller geographically. The increase in housing types and commercial uses in a more compact urban form could increase the amount of people walking and rolling to their destinations, both in the neighborhood center and to those adjacent to it, helping mitigate climate change.

Relationship to Social Wellbeing & Sociability

Impacts would be similar to Alternative 1, but an increase in compact urban form of more housing and commercial uses could provide more spaces and locations where social interactions can happen than under Alternative 1. See also **Section 3.8 Population, Housing, & Employment** for a discussion of cultural displacement risk and its potential impact on wellbeing.

Climate Change

No additional impacts to climate change are anticipated under Alternative 2 above those described under **Impacts Common to All Alternatives**. Growth under Alternative 2 would be concentrated in existing centers and the new neighborhood centers away from most hazards. Like the other action alternatives, Alternative 2 would include a new Environment and Climate Element with mitigation and adaptation strategies as well as policies regarding tree canopy protection or enhancement and critical area regulations. See Alternative 2's **Tree Canopy** section for impacts related to trees, which would influence urban heat and potentially flooding.

Impacts of Alternative 3: Broad

Land Use Patterns & Compatibility

Alternative 3 would allow a wider range of low-scale housing options—like triplexes and fourplexes—in all urban neighborhood areas (see **Exhibit 2.4-16**). This alternative studies total housing growth of 100,000 housing units (20,000 more than the No Action Alternative) to account for the potential additional housing demand that could be met with broad zoning changes. As described under **Impacts Common to All Alternatives**, most new growth would be focused within the regional and urban centers currently characterized by higher densities and a more diverse mix of uses than other areas of the city. Housing growth within the regional and urban centers would be the same as the No Action Alternative and Alternative 2. Activity levels and activity units per acre would be similar to those described under Alternative 2 as a result of the slight jobs shift to urban neighborhood areas (see **Exhibit 3.6-98**). Land use patterns and potential compatibility impacts within the regional and urban centers would be similar to those described under **Impacts Common to All Alternatives**. Compared to the No Action Alternative, adverse compatibility impacts at the periphery of most centers could be minimized as the abutting urban neighborhood areas redevelop with denser development patterns (see also the **Transitions** section below).

Under Alternative 3, urban neighborhood areas would accommodate the second highest share of anticipated housing growth behind regional centers (see **Chapter 2**). More than half (53%) of the additional new housing growth in urban neighborhood areas would be directed into areas 1 and 2. However, this growth would be more spread throughout the analysis areas rather than into the focused neighborhood center nodes of Alternative 2. Area 2 would receive the greatest overall share of new housing growth under Alternative 3 (20%), followed by Area 4 (19%) and Area 1 (18%). A small number of jobs and commercial space would shift from the larger centers towards urban neighborhood areas to reflect local demand consistent with the distribution of new housing. Alternative 3 also allows more flexibility for commercial space in these areas (such as allowing corner stores or making it easier to operate at-home businesses) to support the development of neighborhoods where more people can walk to everyday needs.

Over time, overall land use patterns would become denser within the urban neighborhood areas. Most of this development would continue to be residential in nature with limited additional local retail and commercial activity. This could result in localized land use compatibility impacts within the urban neighborhood areas where the height or intensity of new development exceeds existing development (although the maximum height allowed for market-rate development in these zones would remain 30 feet; see also the **Urban Form** section below). Additional flexibility for commercial spaces could also result in localized land use compatibility impacts where commercial uses result in noise, traffic, or other impact due to deliveries, customer traffic, outdoor cafes, or other activities associated with commercial use. Such impacts would be mitigated through application of the City's development regulations.

Exhibit 3.6-98. Future Activity Units (AU)—Alternative 3

Center[1]	Existing AU/Ac.	Alt. 1 AU/Ac.	Alt. 3 Acres	Alt. 3 AU	Alt. 3 AU/Ac.
Regional Centers[1]					
Downtown	377.4	473.2	952	448,614	471.2
First Hill/Capitol Hill	139.5	163.4	916	149,645	163.3
University Community	54.5	70.2	753	52,773	70.0
South Lake Union	236.7	344.1	340	116,153	341.8
Uptown	131.3	161.3	333	53,696	161.1
Northgate	57.3	75.1	412	30,860	74.9
Hub Urban Centers[1]					
Ballard	67.7	96.9	495	47,906	96.7
Bitter Lake Village	44.0	55.4	364	20,086	55.2
Fremont	71.9	88.1	214	18,883	88.0
Lake City	57.6	75.4	142	10,700	75.2
Mt Baker	36.0	47.4	491	23,196	47.2
West Seattle Junction	70.4	100.2	269	26,927	100.0
Residential Urban Centers[1]					
23rd & Union-Jackson	38.9	46.5	625	29,059	46.5
Admiral	49.2	60.4	98	5,935	60.3
Aurora-Licton Springs	44.1	51.4	327	16,784	51.3
Columbia City	33.9	46.1	335	15,411	46.0
Crown Hill	25.3	31.4	271	8,499	31.4
Eastlake	70.2	82.0	199	16,329	82.0
Green Lake	70.6	87.4	109	9,495	87.3
Greenwood-Phinney Ridge	84.5	101.6	94	9,546	101.3
Madison-Miller	65.3	85.1	145	12,357	85.0
Morgan Junction	34.1	41.6	113	4,706	41.5
North Beacon Hill	28.1	34.5	267	9,175	34.4
Othello	23.7	29.0	499	14,503	29.1
Rainier Beach	23.0	26.0	346	9,007	26.0
Roosevelt	61.4	81.2	170	13,808	81.2
South Park	14.7	18.5	263	4,847	18.4
Upper Queen Anne	89.5	110.5	53	5,806	110.3
Wallingford	42.2	51.5	258	13,258	51.4
Westwood-Highland Park	27.9	32.6	275	8,948	32.5

1 See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Note: Activity units (AU) is the sum of residential population and jobs. Assumes an average household size of 2.05 per the King County Growth Management Planning Council. Highlighted urban villages fall outside King County's countywide center designation criteria of 160–500 acres or below the minimum 18 existing AU or 30 future AU per acre. MIC designation criteria from PSRC does not include an AU density threshold.
Sources: City of Seattle, 2023; BERK, 2023.

Urban Form

Height, Bulk, & Scale

Alternative 3 would allow missing middle housing types such as duplexes, triplexes, fourplexes, sixplexes, and three-story stacked flats in urban neighborhood areas. Seattle is exploring various zoning concepts for middle housing including some focused more on detached and attached housing and others on stacked flats.

While additional housing typologies would be allowed compared to the No Action Alternative, the maximum height allowed for market-rate development in these zones would remain 3-stories for market-rate development. Slight increases in FAR could also allow for slightly bigger buildings and could encourage taller buildings if building taller makes it easier to maximize FAR. See **Exhibit 3.6-99**.

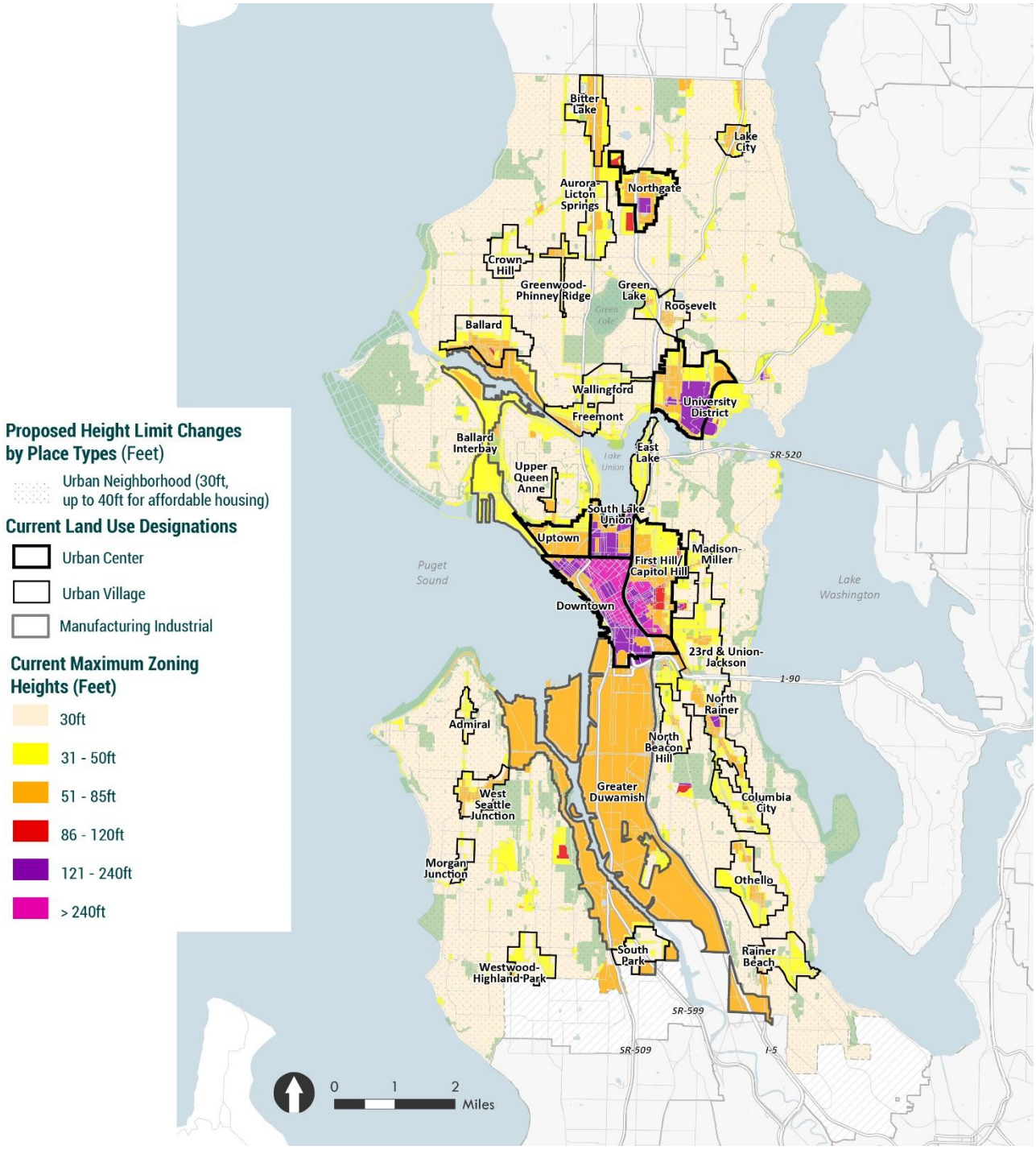
Height, bulk, and scale impacts between buildings on adjacent parcels would be minimal as market-rate development would continue to have a 3-story height limit. However, changes to allow additional housing types could encourage redevelopment in these areas and increase the number of 3-story buildings located next to existing 1- and 2-story buildings. See **Exhibit 3.6-99**.

Alternative 3 would also allow potential height, floor area, or density bonuses for affordable housing projects. This means that some redevelopment may be up to 4 stories, such as 4-story stacked flats.

Middle housing street-level experience. The broad allowances for middle housing proposed in Alternative 3 would change some aspects of how people currently experience neighborhoods, from the street-level/sidewalk experience to how neighbors interact within a development and the larger community. **Exhibit 3.6-100** to **Exhibit 3.6-105** illustrate the types of middle housing expected under a range of concepts. For any middle housing types that would replace existing houses, the increased allowances would likely result in more buildings closer to the street and taller than exist today, which could change the relationship of the building to the sidewalk. When an existing house is preserved and units are added behind it, less change would be experienced from the sidewalk.

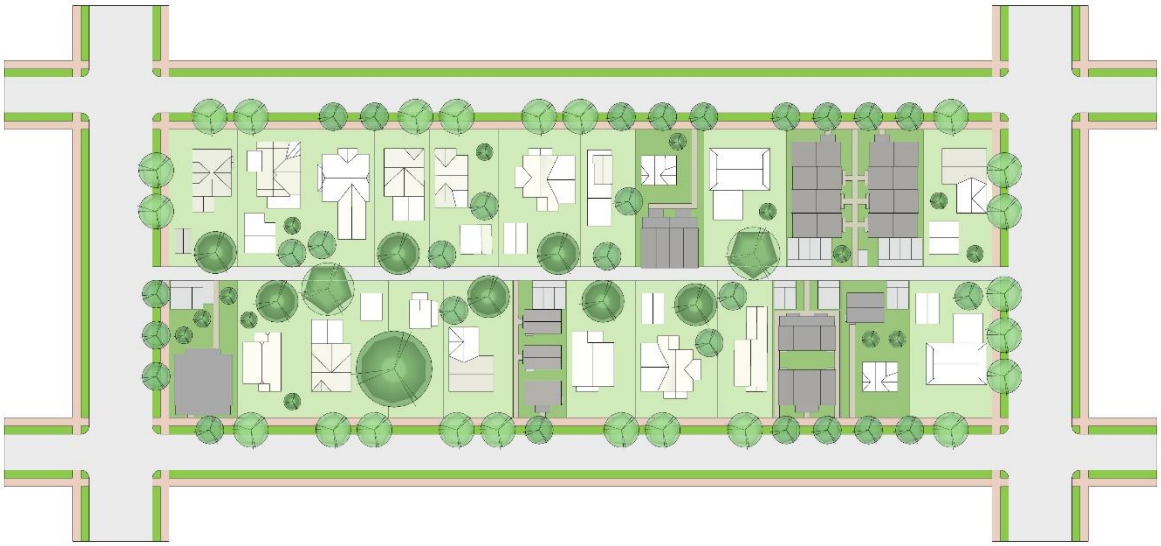
Building-to-street relationship. Existing front setbacks in urban neighborhood areas are generally about 20 feet from the front lot line. The updated Neighborhood Residential zones would require front setbacks of 10 feet. A 10- to 15-foot distance from the sidewalk improves chances for social interactions, providing adequate distance for people to feel comfortable using their front stoop and ground-level rooms facing the street. That distance also keeps upper-story windows and balconies close enough to the street for passive surveillance. Ground-related units with entries facing the street also increase the chances for social interaction at the sidewalk. However, for lots without alleys, an increase in driveways and garages facing the street would reduce these chances (as well as impact general aesthetics). Reduced parking requirements could improve this situation.

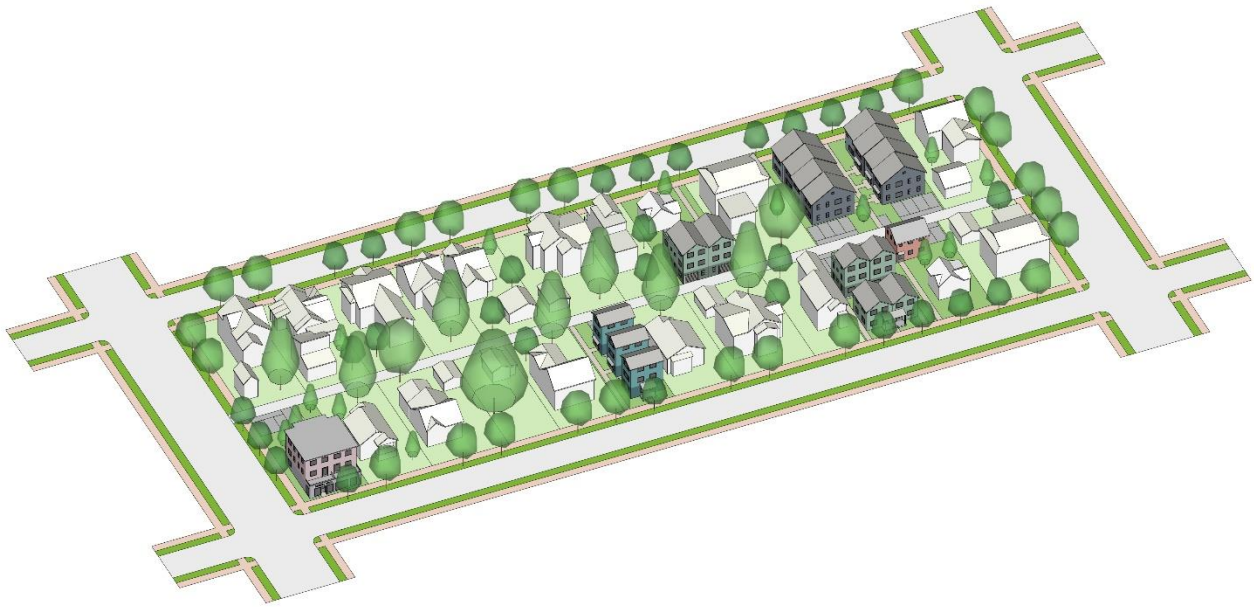
Exhibit 3.6-99. Proposed Height Limit Changes—Alternative 3



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle, 2023; MAKERS, 2023.

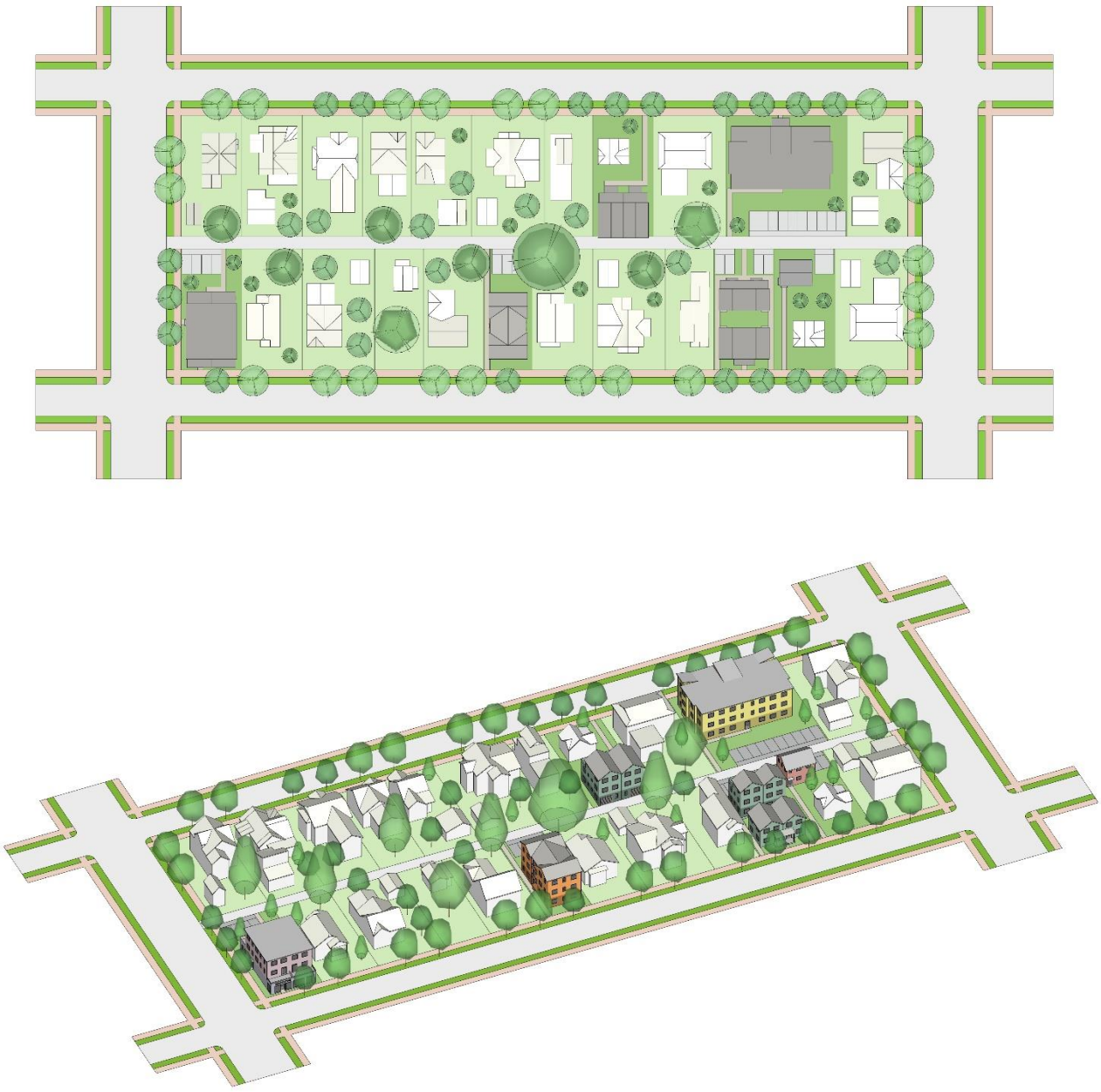
Exhibit 3.6-100. Example Neighborhood Residential Block with an Alley Redevelopment—Detached/Attached Units Focus





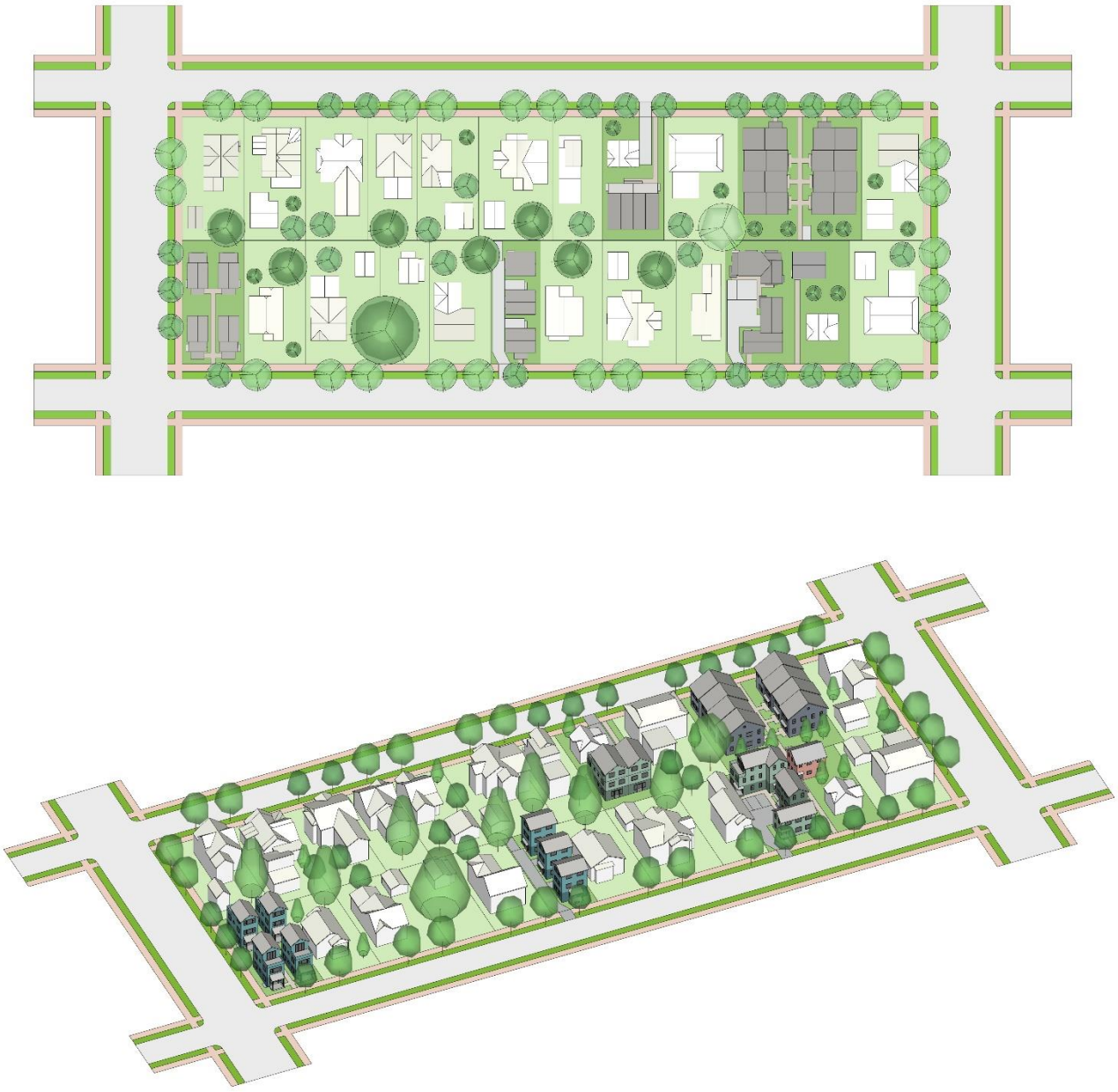
Note: This model illustrates potential redevelopment over the next 20 years with greater allowances for detached unit middle housing types. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Exhibit 3.6-101. Example Neighborhood Residential Block with an Alley Redevelopment—Stacked Flats Focus



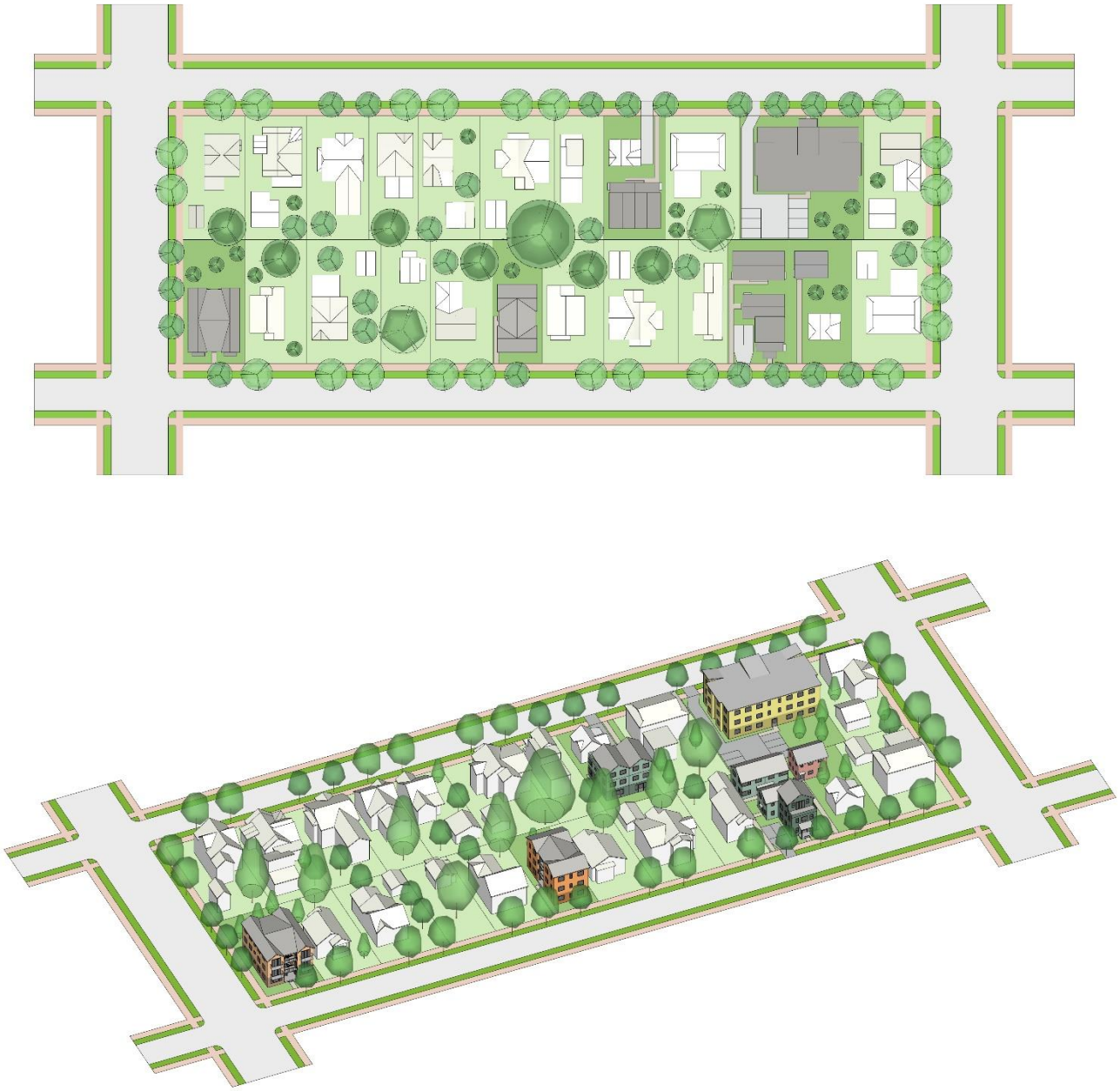
Note: This model illustrates potential redevelopment over the next 20 years with greater allowances for stacked flat middle housing types. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Exhibit 3.6-102. Example Neighborhood Residential Block without an Alley Redevelopment—Detached/Attached Units Focus



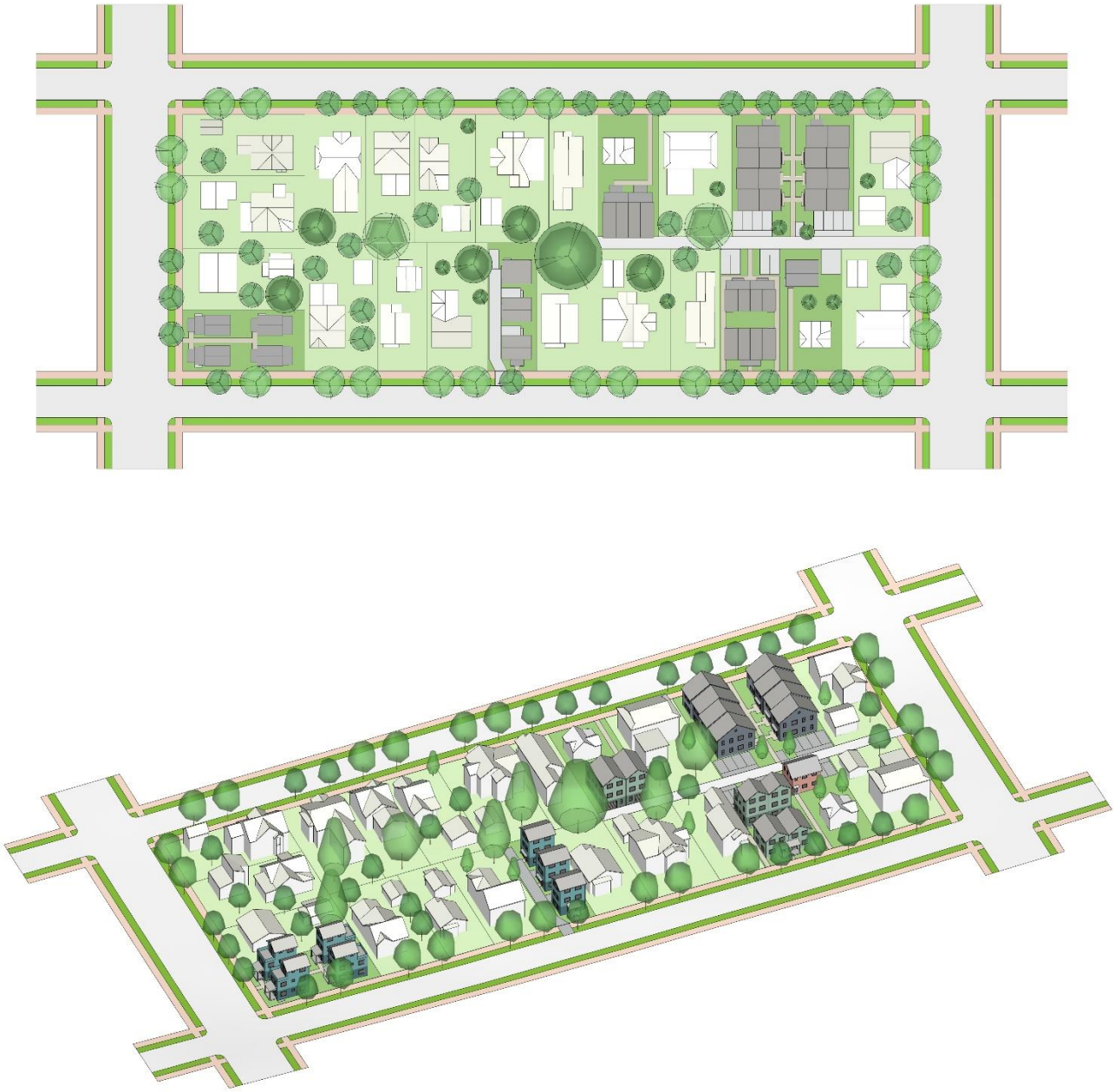
Note: This model illustrates potential redevelopment over the next 20 years with greater allowances for detached unit middle housing types. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Exhibit 3.6-103. Example Neighborhood Residential Block without an Alley Redevelopment—Stacked Flats Focus



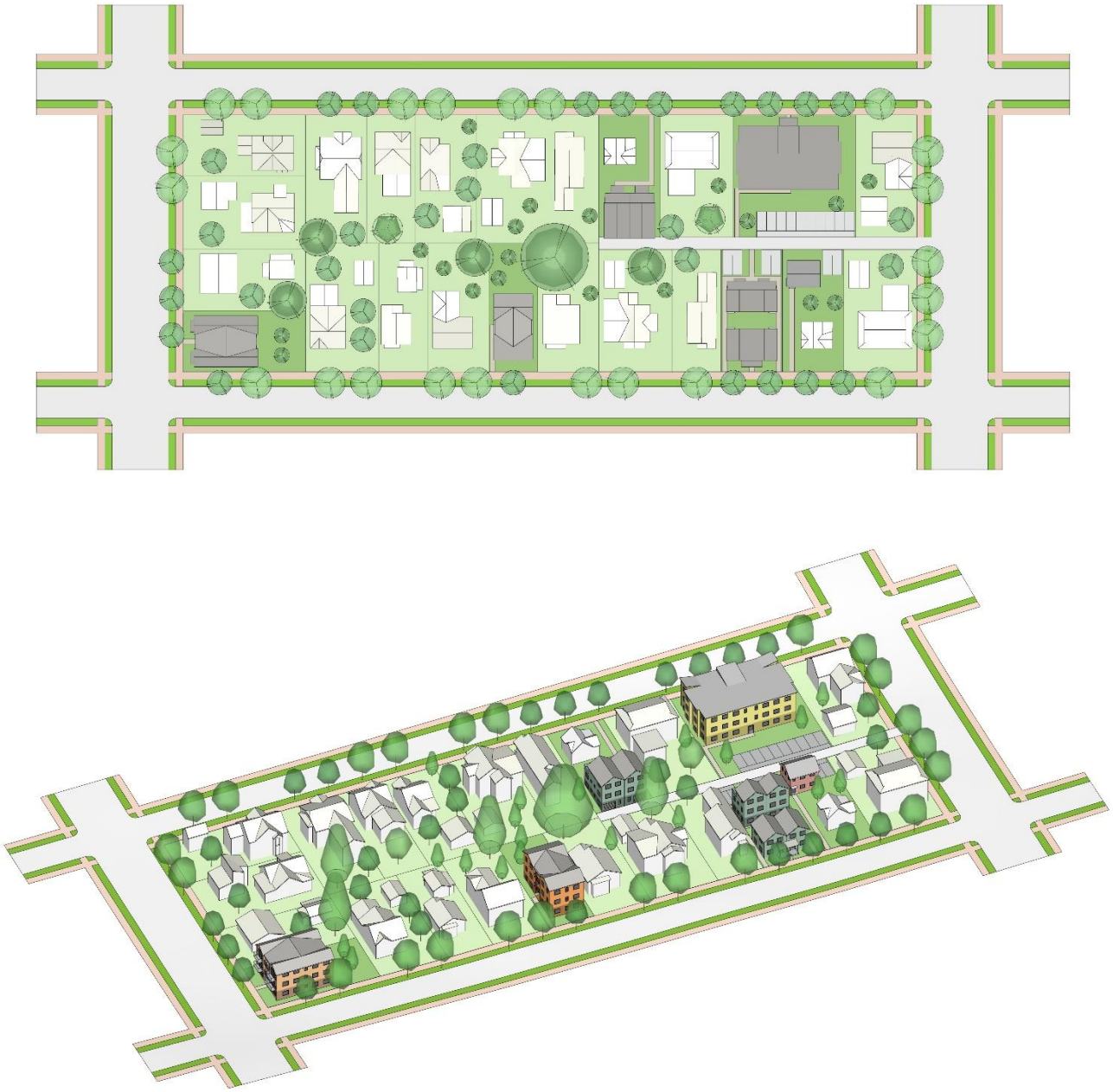
Note: This model illustrates potential redevelopment over the next 20 years with greater allowances for stacked flat middle housing types. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Exhibit 3.6-104. Example Hilly Neighborhood Residential Block Redevelopment—Detached/Attached Units Focus



Note: This model illustrates potential redevelopment over the next 20 years with greater allowances for detached unit middle housing types. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Exhibit 3.6-105. Example Hilly Neighborhood Residential Block Redevelopment—Stacked Flats Focus



Note: This model illustrates potential redevelopment over the next 20 years with greater allowances for stacked flat middle housing types. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Privacy. With more buildings redeveloping up to 3 stories, often stretching further along the side lot lines than existing houses, modest changes to sense of privacy may occur. Because side setbacks would be required, builders would likely include windows along the side lot line, and some balconies may face neighboring properties. Neighbors may feel that more people can look towards their yard or house. This may be mitigated with landscaping and window placement, and impacts would not likely be more significant or adverse than development already allowed in Neighborhood Residential zones.

Usable open space. Greater allowances for the height, bulk, and scale of middle housing buildings in Alternative 3 could impact the amount of usable open space on neighborhood residential lots. For purposes of our analysis, "useable" open space was defined as open space that meets a minimum of 10 feet in both directions or 13 feet in both directions when the open space includes a path leading to multiple units. Existing detached houses often have fairly large rear yards and sometimes large front yards. The usable open space of development prototypes allowed in existing Neighborhood Residential zones that were studied ranged from 21% to 72% of the lot. The useable open space of the middle housing prototypes studied ranged from 22% to 45% of the lot.

The open space configurations vary with some sites having opportunities for shared common outdoor space amongst neighbors and others having smaller outdoor spaces accessible to individual units. In general, attached units and stacked flat types, especially when combined with alley parking and/or low parking ratios, allow for greater contiguous open spaces (as shown in **Exhibit 3.6-101, Exhibit 3.6-103,** and **Exhibit 3.6-105**). These could serve as shared spaces amongst neighbors and provide enough space for a variety of activities, such as children's play and larger group socializing. Detached types generally separate the open space into smaller areas that would provide enough space for activities like barbecues and small group socializing (as shown in **Exhibit 3.6-100, Exhibit 3.6-102,** and **Exhibit 3.6-104**). See **Exhibit 3.6-106** for example open space layouts.

Mixed-use environment. Allowing small commercial uses only on corner lots (as illustrated in **Exhibit 3.6-100** and **Exhibit 3.6-101**) could result in modest visual changes from a residential character to a slightly more mixed-use environment. This change would likely enhance the street level experience with ground floor activities and building design that is more public in nature than private homes, adding visual interest and attractions and allowing for stronger building-to-street relationships.

The following diagrams illustrate likely amounts and types of development over the next 20 years with greater allowances for a range of middle housing types. The models show prototypical Seattle neighborhood blocks (no precise location) that include alleys, no alleys, and steeper terrain (with and without alleys). For each block type, the first model shows concepts focused more on detached units, and the second model shows more detached/attached and stacked flats concepts.

Transitions

Alternative 3 would increase intensity in currently low-intensity neighborhood residential zones but would retain a height gap between neighborhood residential zones and most zoning

in regional and urban centers. In general, transitions under Alternative 3 are likely to be less intense between urban neighborhood areas and regional and urban centers than under the No Action Alternative. Depending on development outcomes, new middle housing may help soften transitions to existing neighborhood commercial zones or in areas with pre-zoning non-conforming uses.

Tree Canopy

The increase in size and number of buildings allowed on a lot in Alternative 3 will likely decrease the amount of space available for trees on neighborhood residential lots. Prototypes that preserve contiguous open space (e.g., stacked flats, small apartments, or attached units) are likely better able to avoid impacts to existing trees and retain more contiguous planting areas for new trees. Detached and semi-attached prototypes tended to have most of their open space in the front, rear, and side setbacks. The narrow (5-foot) side setbacks have limited value for plantings or performing stormwater functions. See **Exhibit 3.6-106**.

Existing trees may also be impacted by construction activities outside of the building and parking area footprints (grading, utility locations, etc.). Prototypes with multiple detached buildings are likely to be more impactful on existing trees due to excavation and foundation construction, multiple utility connections, and other construction impacts.

Impacts to impervious surface coverage is also an important consideration. In the middle housing types studied, we identified the impervious surfaces of structures, surface parking, driveways, outside trash storage areas, and pathways. Of the types studied, the impervious surface area ranged from 47 to 78% percent. In other words, between 22% and 53% of the site remained pervious area to help with water absorption and stormwater runoff. Several prototypes would surpass the existing lot coverage maximum of 35% in Neighborhood Residential zones. Parking areas increased the total impervious surfaces significantly for most prototypes. Requiring new paved surfaces to be permeable, reducing or eliminating parking requirements, and encouraging parking solutions that minimize impervious surface could mitigate some of the additional impervious surface cover change.

Shadows

Height limits do not increase (or only increase modestly with an affordability bonus) under Alternative 3, so shadow impacts would not likely increase significantly over the No Action Alternative. However, greater bulk on more sites may cast shadows on more places.

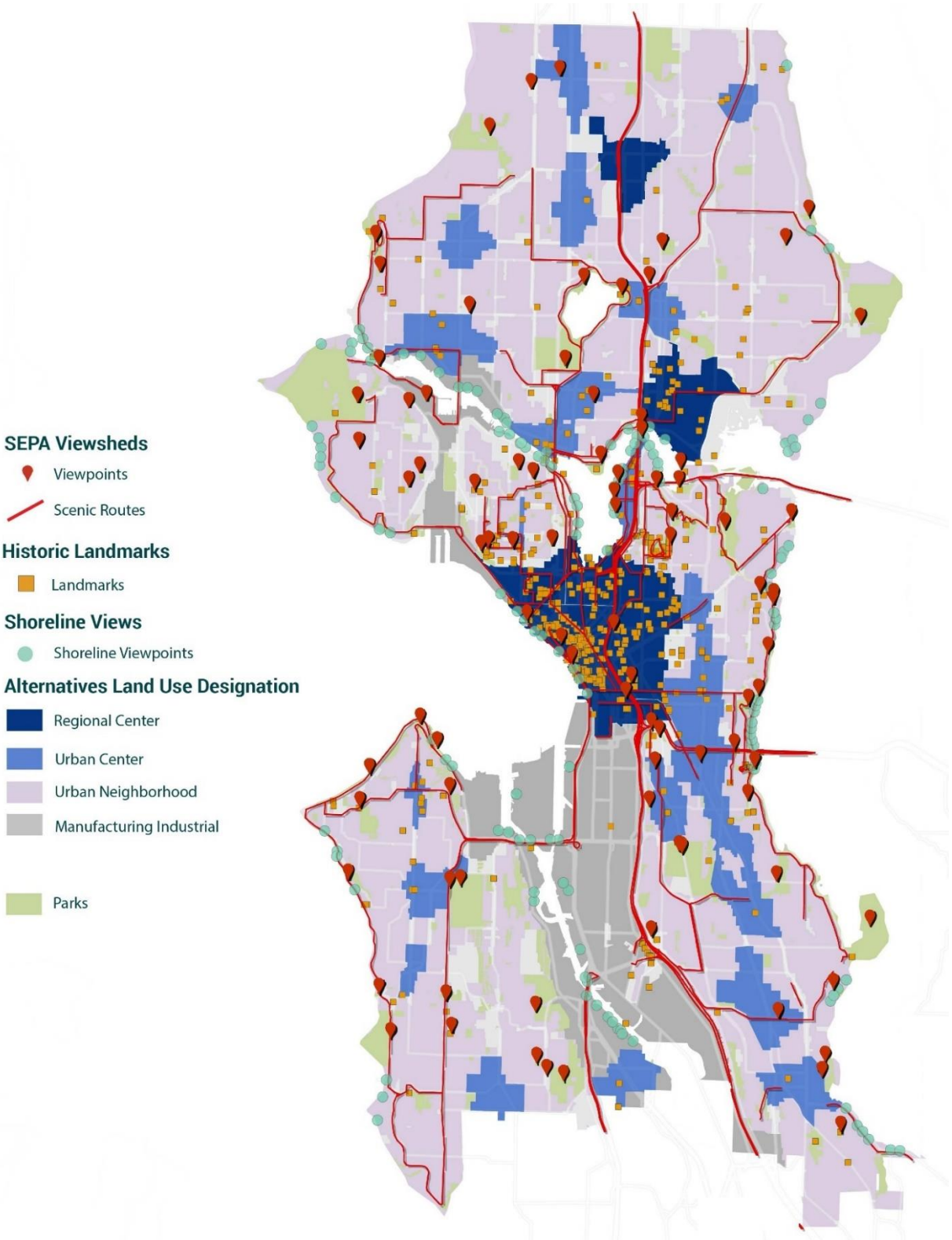
Views

Alternative 3 is unlikely to have impacts on views beyond the No Action Alternative as it would have no height increase for market-rate development and a minimal height increase for affordable housing. The potential for more people to live near the viewpoints may increase awareness and recognition of these public amenities and neighborhood parks. See **Exhibit 3.6-107**.

Exhibit 3.6-106. Relationship of Middle Housing Types and Useable Open Space

Source: MAKERS, 2023.

Exhibit 3.6-107. Seattle Views Map—Alternative 3



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle and MAKERS, 2023

Equity & Climate Vulnerability Considerations

Housing Type Variety and Choice

Alternative 3 would allow middle housing types such as duplexes, triplexes, fourplexes, sixplexes, and stacked flats in all Neighborhood Residential zones. The likely increase in housing type variety would provide more options for people to stay in their community over a lifetime and across generations as their needs change. Housing configurations that cluster more units together on a site provide more opportunities for intergenerational families to live near each other. Increasing the amount and types of housing allowed across the city also lets more people live in areas from which they are economically excluded in Alternative 1.

Relationship to Active Transportation

Alternative 3 could slightly increase density throughout the city but could also introduce commercial spaces and corner stores into more areas of the city. Nearby commercial spots provide locations where people can walk and roll for their shopping and leisure needs. Such a change would help mitigate climate impacts and improve chances at social connectedness.

Relationship to Social Wellbeing & Sociability

Alternative 3 could change some aspects of how neighborhoods are currently experienced, from the street level/sidewalk experience as described in Alternative 3's **Height, Bulk, & Scale** section and illustrated in **Exhibit 3.6-100** through **Exhibit 3.6-105**. In general, social interaction opportunities would likely increase.

Although possible future development of middle housing may lead to less open space on lots than under Alternative 1, more units would surround and share the available open space, which would increase opportunities for sociability amongst neighbors. See Alternative 3's **Height, Bulk, & Scale** section.

Climate Change

Most growth under Alternative 3 would continue to be concentrated in existing centers, away from most hazards, with additional growth spread throughout the urban neighborhood place type. Compared to the No Action Alternative and Alternative 2, distributing more growth in urban neighborhoods could increase the potential for populations to be closer to areas susceptible to flooding, sea-level rise, or landslides or affected by interruptions in access to their neighborhoods. Alternative 3 may also decrease pervious area and space for tree planting in neighborhood residential zoned areas, which may have impacts on flooding and urban heat (see **Tree Canopy**). Like the other action alternatives, Alternative 3 would include a new Environment and Climate Element with mitigation and adaptation strategies as well as policies regarding tree canopy protection or enhancement and critical area regulations. See also the discussion under **Impacts Common to All Alternatives**.

Impacts of Alternative 4: Corridor

Land Use Patterns & Compatibility

Alternative 4 would introduce corridors as a new place type that focuses a wider range of housing options and growth near transit and amenities (see **Exhibit 2.4-19**). Corridors are defined as areas within a 10-minute walk from a light rail station and a 5-minute walk from frequent bus transit service and entrances to large parks. Under this definition, corridors include about 50% of areas currently zoned Neighborhood Residential, excluding parks. These areas could allow a wide range of housing types ranging from detached homes to duplexes, triplexes, and fourplexes or 5-story buildings closer to transit and limited 6- and 7-story buildings in or adjacent to areas already zoned multifamily or commercial. Corridors also include some areas already zoned for multi-family and commercial use.

Alternative 4 studies total housing growth of 100,000 housing units (20,000 more than the No Action Alternative) to account for potential additional housing demand that could be met within corridors. As described under **Impacts Common to All Alternatives**, most new growth would be focused within existing centers currently characterized by higher densities and a more diverse mix of uses than other areas of the city. Housing growth within the centers would be the same as the No Action Alternative and Alternatives 2 and 3. Activity levels and activity units per acre would be similar to those described under Alternatives 2 and 3 as a result of the slight jobs shift to corridors (see **Exhibit 3.6-108**). Land use patterns and potential compatibility impacts within the centers would be similar to those described under **Impacts Common to All Alternatives**. Compared to the No Action Alternative, adverse compatibility impacts at the periphery of most centers could be minimized as the abutting corridors redevelop with moderate-scale development (see also the **Transitions** section below).

Under Alternative 4, corridors would accommodate the second highest share of anticipated housing growth behind regional centers (see **Chapter 2**). More than half (57%) of the additional new housing growth in corridors would be directed into areas 1 and 2. However, compared to Alternative 3, this growth would be focused to densify corridors rather than all neighborhood residential zones. Area 2 would receive the greatest overall share of new housing growth under Alternative 4 (21%), followed by Area 4 (19%) and Area 1 (17%). A small number of jobs and commercial space would shift from the larger centers towards corridors to reflect local demand with the distribution of new housing.

Over time, overall land use patterns would become denser within the corridors. This could result in localized land use compatibility impacts within the corridors or on the border with adjacent residential areas where newer development is of greater height and intensity than existing development (see also the **Urban Form** section below). Such impacts would be mitigated through application of the City's development regulations (including shoreline regulations) and design review process where applicable.

Exhibit 3.6-108. Future Activity Units (AU)—Alternative 4

Center	Existing AU/Ac.	Alt. 1 AU/Ac.	Alt. 4 Acres	Alt. 4 AU	Alt. 4 AU/Ac.
Regional Centers[1]					
Downtown	377.4	473.2	952	448,614	471.2
First Hill/Capitol Hill	139.5	163.4	916	149,645	163.3
University Community	54.5	70.2	753	52,773	70.0
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Uptown	131.3	161.3	333	53,696	161.1
Northgate	57.3	75.1	412	30,860	74.9
Hub Urban Centers[1]					
Ballard	67.7	96.9	495	47,906	96.7
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Fremont	71.9	88.1	214	18,883	88.0
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Residential Urban Centers[1]					
23rd & Union-Jackson	38.9	46.5	625	29,059	46.5
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Columbia City	33.9	46.1	335	15,411	46.0
Crown Hill	25.3	31.4	271	8,499	31.4
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South Park	14.7	18.5	263	4,847	18.4
Upper Queen Anne	89.5	110.5	53	5,806	110.3
Wallingford	42.2	51.5	258	13,258	51.4
Westwood-Highland Park	27.9	32.6	275	8,948	32.5

1 See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Note: Activity units (AU) is the sum of residential population and jobs. Assumes an average household size of 2.05 per the King County Growth Management Planning Council. Highlighted urban villages fall outside King County's countywide center designation criteria of 160–500 acres or below the minimum 18 existing AU or 30 future AU per acre. MIC designation criteria from PSRC does not include an AU density threshold.
Sources: City of Seattle, 2023; BERK, 2023.

Urban Form

Height, Bulk, & Scale

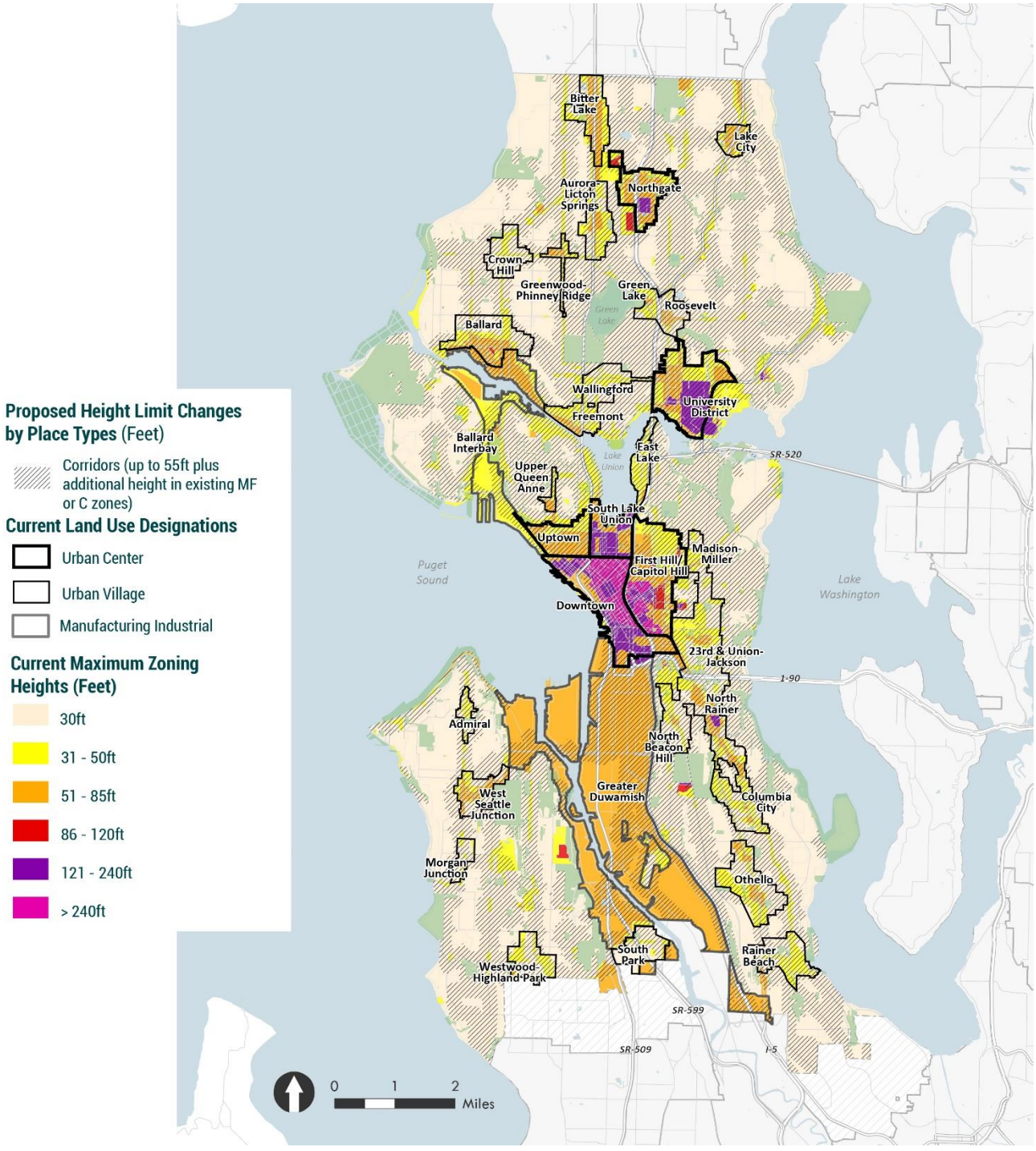
Corridors could contain a mix of residential and mixed-use development from duplex, triplex, and fourplexes to 5-story apartments and mixed-use buildings. Corridors also include some areas already zoned for multi-family and commercial development where height limits could be up to 6- or 7-stories. See **Exhibit 3.6-109**. Over time, overall building height and bulk in the new corridor areas would likely increase with new development. Similar to Alternative 2, urban neighborhood areas that are currently primarily 1- and 2-story buildings would be allowed to develop up to 4- to 5-story buildings. The scale of the area where changes in height and bulk would be allowed is similar to Alternative 3, as about 50% of urban neighborhood area would become a corridor place type. Localized impacts could occur as the areas transition to a more intense development pattern. However, future development in corridors adjacent to regional and urban centers would likely be more similar to current development happening in those areas and register as less stark impacts.

Alternative 4 could also result in height, bulk, and scale impact between properties in corridors where areas that are predominately 1- and 2-story detached homes might experience gradual redevelopment with multifamily homes of 4- and 5-stories on a site-by-site basis. Differences in massing on adjacent properties could be especially larger on sites with existing multifamily and commercial zones where new development could be as high as 7-stories. These transitions between parcels are not likely to be significantly more intense than those already occurring in many regional and urban centers but would occur in new areas.

Like Alternatives 2 and 3, Alternative 4 would introduce a new type of infill area (corridors) on the low end, potentially reducing contrast between regional and urban centers and other areas. Corridor areas already differ from most parts of low-intensity neighborhoods in terms of traffic, noise, impervious surfaces, and in many cases building scale. As a result, Alternative 4 would likely heighten contrasts between corridor areas and adjacent lower intensity areas, especially in parts of the city where few transit corridors are present, like West Seattle. In areas where a high number of transit corridors are already present—like the Central District and Ravenna—the overall effect may be to create smoother transitions because overlapping corridors will create continuous areas of zoning at the scale of 4-6 stories.

Alternative 4 could also lessen transitions along arterial streets where Neighborhood Commercial zoning occupies a half-block along the arterial and Neighborhood Residential zoning exists on the other half of the block. New zoning under this alternative could result in a more gradual transition from Neighborhood Commercial zoning to lower-density areas.

Exhibit 3.6-109. Proposed Height Limit Changes—Alternative 4



Source: City of Seattle and MAKERS, 2023

Transitions

Tree Canopy

With more widespread redevelopment than No Action, private property may see a greater loss of existing tree canopy than No Action. At the same time, street frontage improvements with redevelopment would likely include street tree plantings.

Shadows

Height limits would increase from 30 feet to 55 feet in the corridor areas under Alternative 4. Height limits in areas currently zoned multifamily or commercial could increase to a higher overall height, although the change may be less since these areas are generally zoned for higher heights today. Because corridors cover large swaths of the city, shadow impacts would be widespread.

Shadows on Public Parks

Corridor areas are found on the south, west, and east sides (the sides most impactful to casting long-lasting shadows on the park) of nearly every park in Seattle under Alternative 4. Most parks would likely see increased shadows.

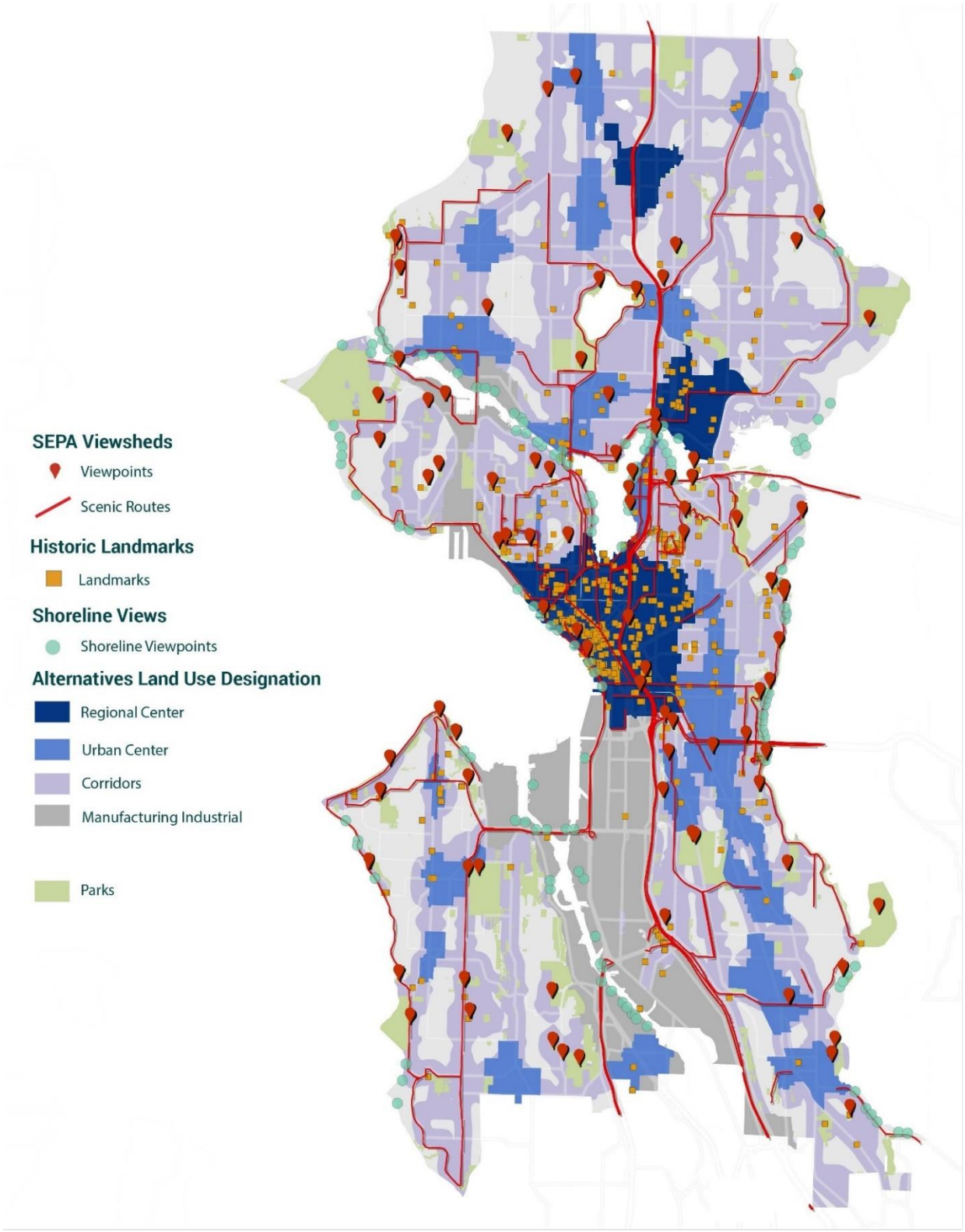
Shadows on Public Rights-of-Way

Taller buildings would likely develop in more areas in Seattle under Alternative 4, increasing the streets that would experience more time in shade. Shadows would particularly impact east-west streets (especially when development is on the south side) and the north faces of hills, with lesser impacts throughout.

Views

Most of the protected viewpoints and scenic routes are within or adjacent to the more intense development expected in the corridor place type. Thus, Alternative 4, with height increases from 30 feet to 45-55 feet may impact protected views. Only limited viewpoints will have minor degrees of potential future view disruptions. The low-impacted sites depend upon specific locational qualities such as along rights-of-way, near bodies of water, and at naturally high elevations. See **Exhibit 3.6-110**.

Exhibit 3.6-110. Seattle Views Map—Alternative 4



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle, 2023; MAKERS, 2023.

Equity & Climate Vulnerability Considerations

Housing Type Variety and Choice

Alternative 4 offers a wider range of housing types ranging from detached homes, middle housing (e.g., duplexes, fourplexes, etc.), and 5-story buildings close to transit and parks. The likely increase in housing type variety would provide more options for people to stay in their community over a lifetime and across generations as their needs change. Increasing housing type options across half of neighborhood residential zones in the city also increases the opportunities for people to live in parts of the city economically closed off to them in Alternative 1.

Relationship to Active Transportation

Alternative 4 could moderately increase density near transit and large parks. Nearby parks provide locations where people can walk and roll for their play and leisure needs. More people living within a 10-minute walk from light rail and a 5-minute walk from frequent bus transit likely increases the number of people walking, rolling, and using transit. Such a change would help mitigate climate impacts and improve chances at social connectedness.

Relationship to Social Wellbeing & Sociability

More housing within a 5-minute walk to large parks under Alternative 4 would likely increase opportunities for social interactions and social wellbeing. At the same time, the number of people living along inhospitable arterials, where social interactions can be inhibited by traffic's impact on sense of safety, air quality, and noise would likely increase.

Climate Change

Growth under Alternative 4 would be concentrated in existing centers and in corridors away from most hazards. More people living within a 10-minute walk from light rail and a 5-minute walk from frequent bus transit likely increases the number of people walking, rolling, and using transit. Such a change would help mitigate climate impacts. Like the other action alternatives, Alternative 4 would include a new Environment and Climate Element with mitigation and adaptation strategies as well as policies regarding tree canopy protection or enhancement and critical area regulations. Also see Alternative 4's **Tree Canopy** section for potential tree-related impacts, which could impact urban heat and flooding, and the discussion under **Impacts Common to All Alternatives**.

Impacts of Alternative 5: Combined

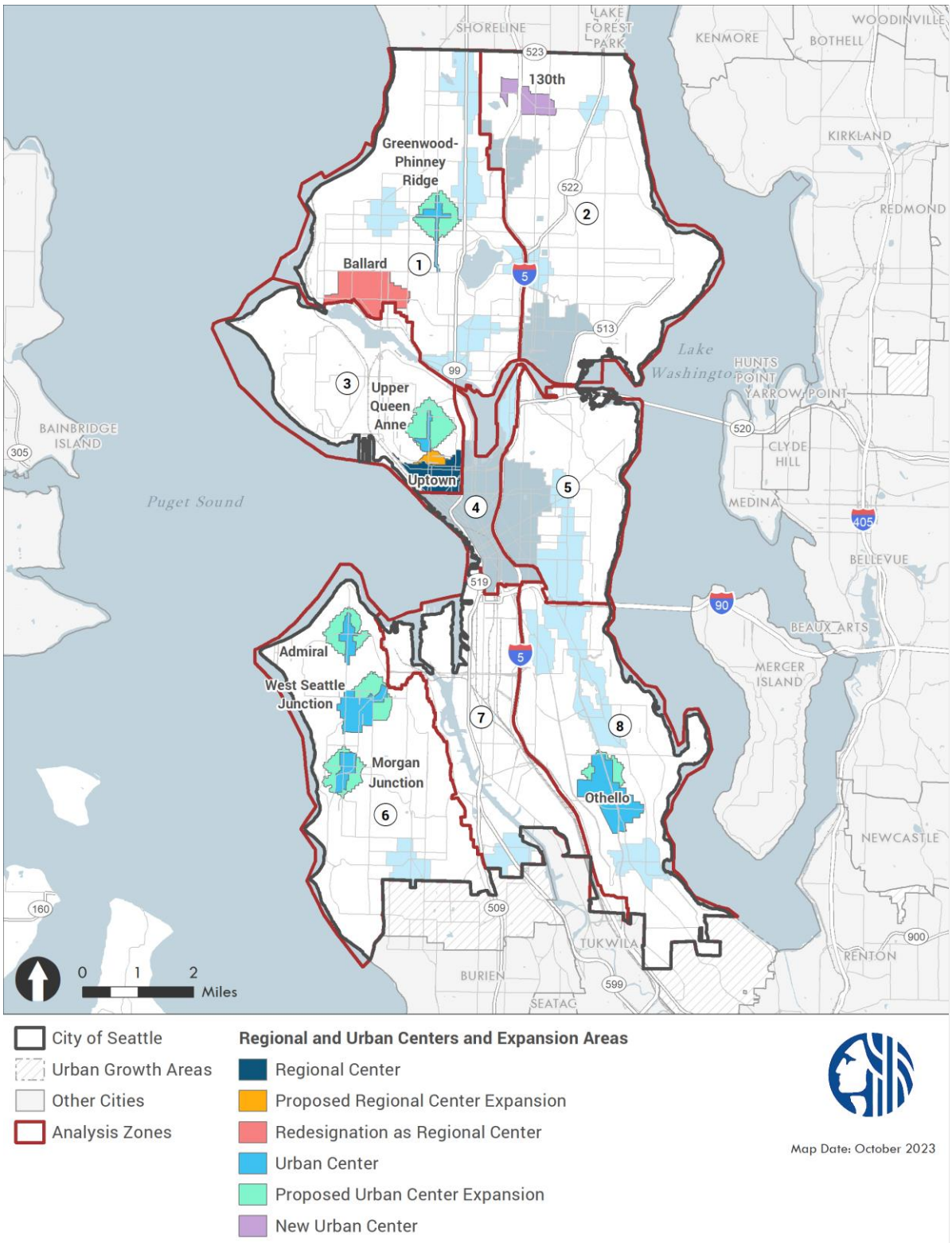
Land Use Patterns & Compatibility

Alternative 5 anticipates the largest increase in supply and diversity of housing across Seattle. It includes the strategies for encouraging housing growth in Alternatives 2, 3, and 4 plus some additional changes to existing center boundaries and changes to place type designations (see **Exhibit 2.4-22**). Alternative 5 also expands the boundaries of seven centers (the Uptown Regional Center, West Seattle Junction, Admiral, Greenwood-Phinney Ridge, Morgan Junction, Othello, and Upper Queen Anne Urban Centers), designates the NE 130th Street Station Area as a new urban center, and re-designates Ballard as a regional center (see **Exhibit 3.6-111**).

Alternative 5 studies total housing growth of 120,000 housing units (40,000 more than the No Action Alternative and 20,000 more than Alternatives 2, 3, or 4) to account for potential additional housing demand that could be met within the areas of change. As described under **Impacts Common to All Alternatives**, most new growth would still be focused within the centers currently characterized by higher densities, more compact building forms, and a more diverse mix of uses than other areas of the city. Housing growth within the centers, however, would be higher under Alternative 5 than the other alternatives. Residential urban centers would accommodate the second highest share of anticipated housing growth behind regional centers (see **Chapter 2**).

Land use patterns and potential compatibility impacts within most of the centers would be similar to those described under **Impacts Common to All Alternatives**. The six expanded center boundaries consist primarily of single-family residential areas neighboring mixed-use and commercial development nodes within the existing center boundaries. Over time, these areas would gradually convert to denser multifamily residential and mixed-use patterns of development. The Uptown Regional Center expansion area primarily consists of existing multifamily development—as a result, future land use patterns would likely be similar in scale and intensity to the No Action Alternative even if the area redevelops with more mixed use. Adverse compatibility impacts at the periphery of most centers would be minimized the most under Alternative 5 as the abutting neighborhood center, corridors, and urban neighborhood areas redevelop (see also the **Transitions** section below).

Exhibit 3.6-111. Expanded, Redesignated, and New Regional and Urban Centers—Alternative 5



Note: See **Exhibit 2.1-1** in **Chapter 2** for a crosswalk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle, 2023; BERK, 2023.

Activity levels and activity units per acre would vary from the other alternatives as a result of the increased overall growth and change in center boundaries. Under Alternative 5, the redesignated Ballard Regional Center would meet PSRC's Metro Regional Growth Center size and activity unit density criteria. Unlike the other alternatives, Othello, Rainier Beach, and South Park would also meet King County's minimum density criteria for Countywide Centers. However, Admiral, Morgan Junction, and Upper Queen Anne would fall below planned density criteria and Othello would be above the size threshold as a result of their increased size. 23rd & Union-Jackson, Green Lake, Lake City, and Madison-Miller would also still be outside the size threshold. See **Exhibit 3.6-112**.

PSRC Metro RGCs require a minimum density of 30 existing activity units and 85 planned activity units and are expected to be between 320–640 acres in size (or larger if served by an internal, high-capacity transit system). King County countywide centers require an existing density of at least 18 activity units and planned density of at least 30 activity units and are expected to be between 160–500 acres in size. See also **Section 3.7 Relationship to Plans, Policies, & Regulations**.

Under Alternative 5, neighborhood centers would accommodate the third highest share of anticipated housing growth behind regional centers and urban centers (see **Chapter 2**). Like Alternative 2, about half (49%) of housing growth in neighborhood centers would be directed into those with low displacement risk in areas 1 and 2 and about 11% would be directed into neighborhood centers with high displacement risk (notably in Area 6). Housing growth in the corridors and urban neighborhood areas would be focused in Area 2 followed by Areas 8, 6, and 1. Land use patterns and potential adverse compatibility impacts within the new place types would be similar to those described under Alternatives 2, 3, and 4.

Overall, Alternative 5 distributes more growth to a greater number of locations than any other alternative. This is likely to result in a denser land use pattern citywide with focused growth in the centers and smaller mixed-use nodes in the new neighborhood centers and along corridors with frequent transit. Impacts would be mitigated through application of the City's development regulations (including shoreline regulations) and design review process.

Exhibit 3.6-112. Future Activity Units (AU)—Alternative 5

Center	Existing AU/Ac.	Alt. 1 AU/Ac.	Alt. 5 Acres	Alt. 5 AU	Alt. 5 AU/Ac.
Regional Centers[1]					
Downtown	377.4	473.2	952	447,351	469.9
First Hill/Capitol Hill	139.5	163.4	916	149,578	163.3
University Community	54.5	70.2	753	52,695	69.9
South Lake Union	236.7	344.1	340	115,612	340.2
Uptown[2]	131.3	161.3	391	53,723	137.2
Northgate	57.3	75.1	412	30,803	74.7
Ballard[2]	67.7	96.9	495	50,047	101.0
Hub Urban Centers[1]					
Bitter Lake Village	44.0	55.4	364	20,044	55.1
Fremont	71.9	88.1	214	18,877	88.0
Lake City	57.6	75.4	142	10,688	75.1
Mt Baker	36.0	47.4	491	23,135	47.1
West Seattle Junction[2]	70.4	100.2	449	26,934	59.9
Residential Urban Centers[1]					
130th Street[2]	18.4	20.7	218	7,733	35.5
23rd & Union-Jackson	38.9	46.5	625	29,046	46.5
Admiral[2]	49.2	60.4	288	6,886	23.9
Aurora-Licton Springs	44.1	51.4	327	16,775	51.3
Columbia City	33.9	46.1	335	15,390	46.0
Crown Hill	25.3	31.4	271	8,492	31.3
Eastlake	70.2	82.0	199	16,323	81.9
Green Lake	70.6	87.4	109	9,492	87.3
Greenwood-Phinney Ridge[2]	84.5	101.6	315	9,579	30.4
Madison-Miller	65.3	85.1	145	12,349	85.0
Morgan Junction[2]	34.1	41.6	281	7,169	25.5
North Beacon Hill	28.1	34.5	267	9,161	34.3
Othello[2]	23.7	29.0	584	17,894	30.6
Rainier Beach	23.0	26.0	346	12,893	37.3
Roosevelt	61.4	81.2	170	13,801	81.1
South Park	14.7	18.5	263	7,951	30.2
Upper Queen Anne[2]	89.5	110.5	329	5,857	17.8
Wallingford	42.2	51.5	258	13,248	51.4
Westwood-Highland Park	27.9	32.6	275	9,386	34.1

1 See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
2 Proposed new center, redesignated center, or boundary expansion.
Note: Activity units (AU) is the sum of residential population and jobs. Assumes an average household size of 2.05 per the King County Growth Management Planning Council. Highlighted urban villages fall outside King County's countywide center designation criteria of 160–500 acres or below the minimum 18 existing AU or 30 future AU per acre. MIC designation criteria from PSRC does not include an AU density threshold.
Sources: City of Seattle, 2023; BERK, 2023.

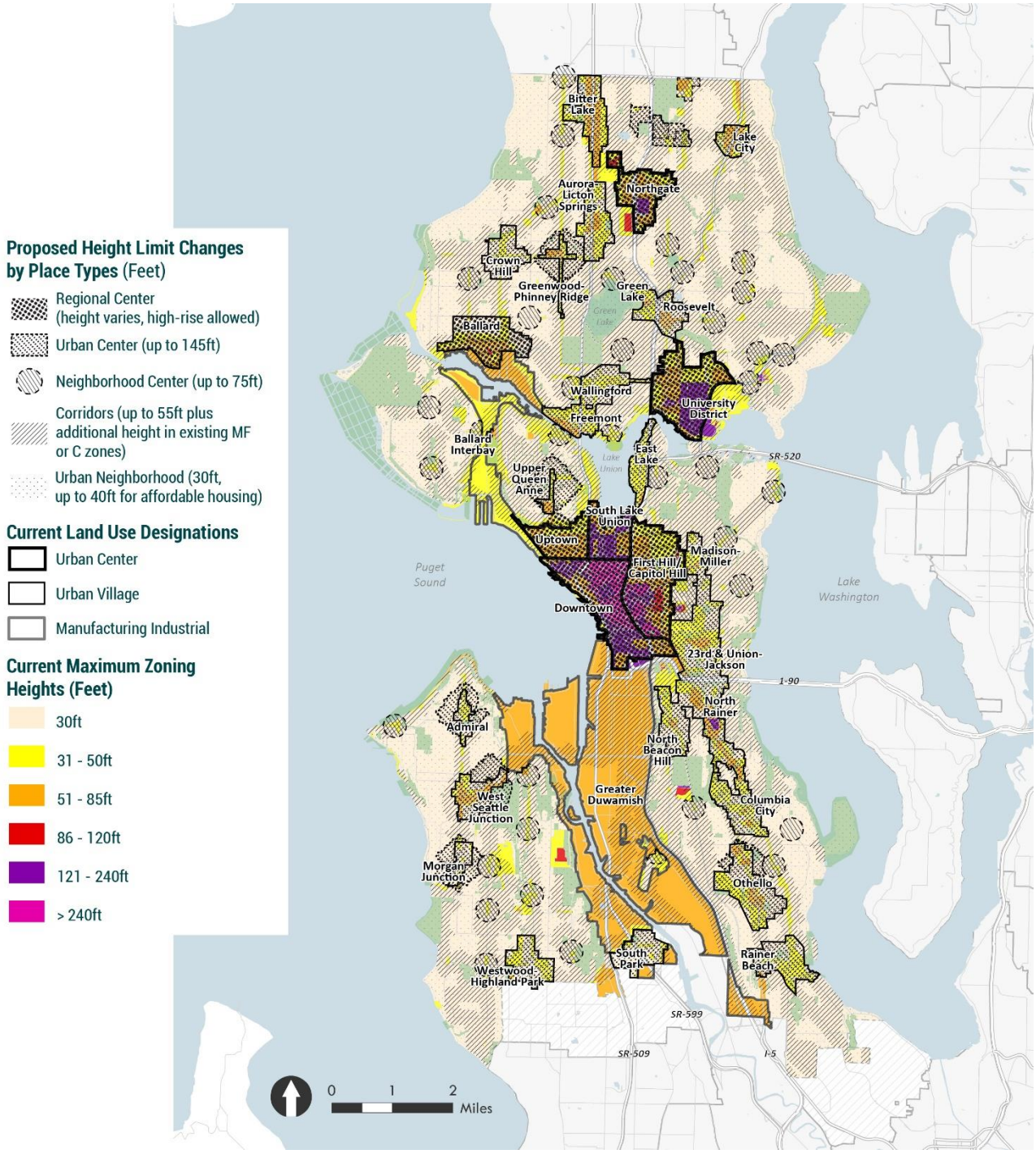
Urban Form

Height, Bulk, & Scale

Alternative 5 is a combination of Alternatives 2, 3, and 4, meaning no residential area in the city would be zoned exclusively for detached housing. Over time, overall building height and bulk in the city would likely increase with new development under Alternative 5 (see **Exhibit 3.6-113**). Under its new designation as a regional center, Ballard could be considered for heights above the current maximum of eight stories as part of future planning work since the Comprehensive Plan designates regional centers as appropriate for high-rise development. Expanded urban centers—such as the three in West Seattle, Greenwood-Phinney Ridge, Othello, and Upper Queen Anne—would allow higher development in areas that are currently zoned neighborhood residential with existing buildings that are predominately 1- and 2-story. Under Alternative 5, localized conflicts could occur as areas transition to a more intense development pattern. However, unlike other alternatives, the changes in height, bulk, and scale under Alternative 5 would occur over a larger area. Consequently, localized impacts may be more distributed throughout the city.

Alternative 5 could also result in height, bulk, and scale impacts between properties in neighborhood centers, corridors, and expanded regional and urban centers where areas that are predominately 1- and 2-story detached homes might experience gradual redevelopment with larger multifamily homes on a site-by-site basis. Differences in massing could be especially larger where affordable housing projects use potential height and floor area bonuses. Differences in massing on adjacent properties are not likely to be significantly more intense than those already occurring in many regional and urban centers, but the area in which they might occur would be the largest among the alternatives.

Exhibit 3.6-113. Proposed Height Limit Changes—Alternative 5



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Sources: City of Seattle, 2023; MAKERS, 2023.

Transitions

The addition of two new types of infill areas (neighborhood centers and corridors) as well as middle housing in urban neighborhood areas will overall create smoother and more varied transitions in intensity throughout the city. As development occurs piecemeal, stark contrasts in building scale may appear, but over time feathered gradations of intensity will fill in around corridors, nodes of activity, neighborhood amenities, and urban villages.

Tree Canopy

With the most redevelopment potential, losses to existing tree canopy on private property could be greatest under Alternative 5. However, required frontage improvements may increase street tree plantings.

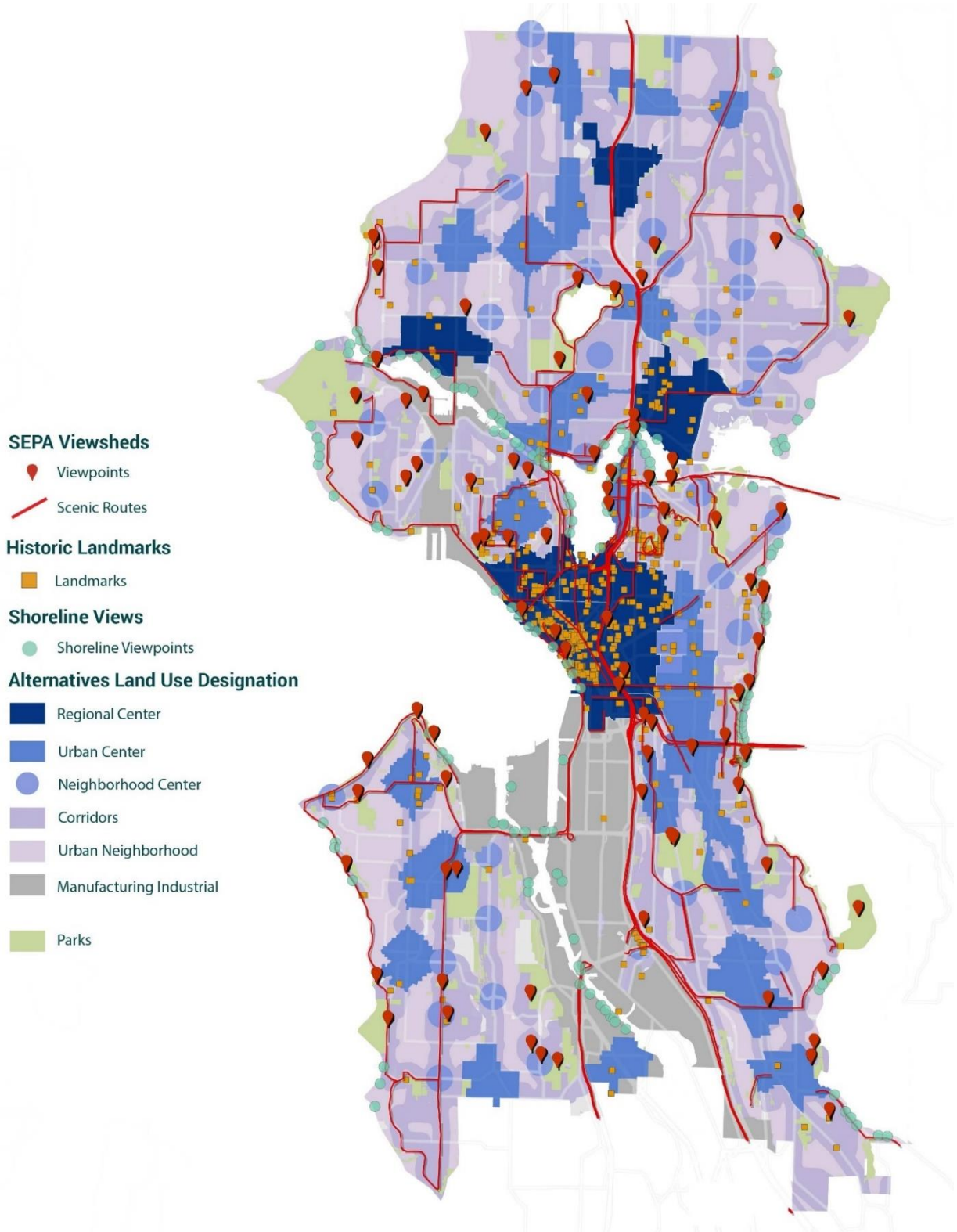
Shadows

Shadow impacts under Alternative 5 would include all the impacts discussed under the other alternatives. In addition, expanded regional and urban center boundaries under Alternative 5 would increase areas with potential shadows on public rights-of-way and parks.

Views

Impacts to views under Alternative 5 would be similar to those described under Alternative 4, with additional effects on scenic and landmark view sites captured in potential expansion and designation of regional and urban centers, such as the proposed extension of three urban centers in West Seattle and newly defined Ballard Regional Center. Allowing additional height for affordable housing development citywide could also create additional view impacts but would be limited by the number of affordable housing projects that are expected to be developed. Adverse impacts to Seattle's view corridors would likely occur under Alternative 5 due to substantial increased growth and development citywide. See **Exhibit 3.6-114**.

Exhibit 3.6-114. Seattle Views Map—Alternative 5



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Source: City of Seattle, 2023; MAKERS, 2023.

130th/145th Station Area

Land Use Patterns & Compatibility

Under Alternative 5, a new urban center would be designated on both the west and east sides of I-5 at the Sound Transit light rail station, with zoning including Low-rise Residential, Midrise Multifamily, and Neighborhood Commercial (2 and 3). This area would include an existing commercial node around Pinehurst and an expanded residential mixed-use area closer to the station. Housing and job growth in the new 130th Street Residential Urban Village would be greatest under Alternative 5, with more growth clustered in the newly designated urban village.

Growth in the 145th Station Area would be similar to Alternative 2. Buildings would be denser than Alternative 2 with more mixed-use buildings and a wider variety of housing types allowed.

Over time, the station areas would likely redevelop into mixed-use nodes with a greater intensity of development than any of the other alternatives. Growth would increase activity unit density from 18.6 (existing) to 35.9 around NE 130th Street and from 35.7 (existing) to 79.4 around 15th and 145th. This increased density would represent a potential adverse land use impact of future growth in the station areas under Alternative 5. Such impacts would be mitigated through application of the City's development regulations and design review process. In addition, increased density citywide would lessen potential adverse compatibility impacts on the periphery of all new urban centers and neighborhood centers, including the station areas (see also the **Transitions** section below).

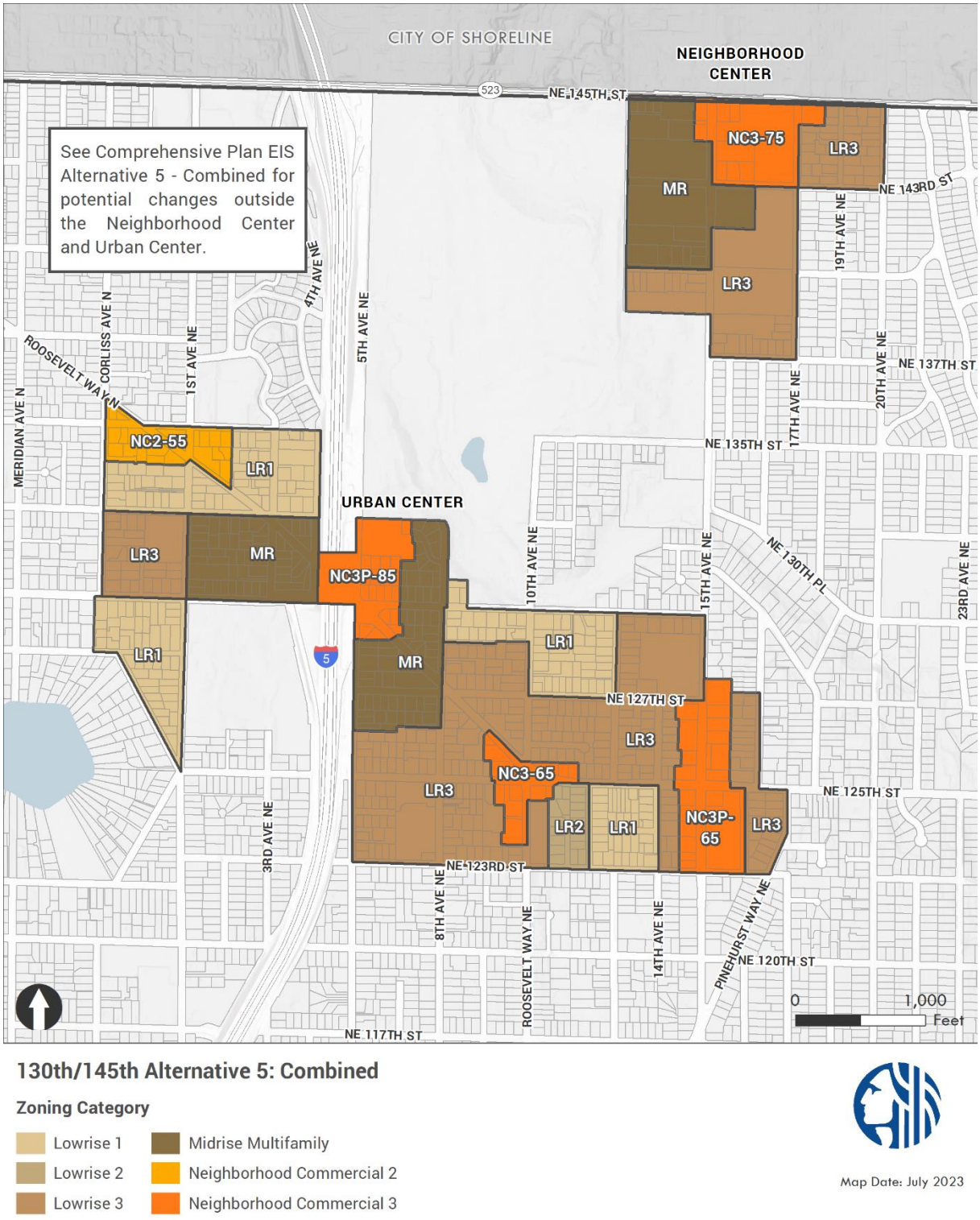
See **Exhibit 3.6-115** and **Exhibit 3.6-116**.

Exhibit 3.6-115. Station Area Share of Targets, 2024-2044—Alternative 5

Location	Place Type	Acres	New Housing Units	New Jobs	Existing AU/Ac.	Future AU/Ac.
NE 130th Street	Urban Center	218	1,644	356	18.4	35.5
15th & 145th	Neighborhood Center—Low Risk*	65	1,059	648	35.3	78.5

Note: The 130th Street and Pinehurst Neighborhood Centers from Alternative 2 are both part of the 130th Street Urban Center in Alternative 5. See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
*Risk of displacement.
Source: City of Seattle, 2023; BERK, 2023.

Exhibit 3.6-116. 130th/145th Station Area Zoning Concepts—Alternative 5: Combined



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Sources: City of Seattle, 2022: BERK, 2022.

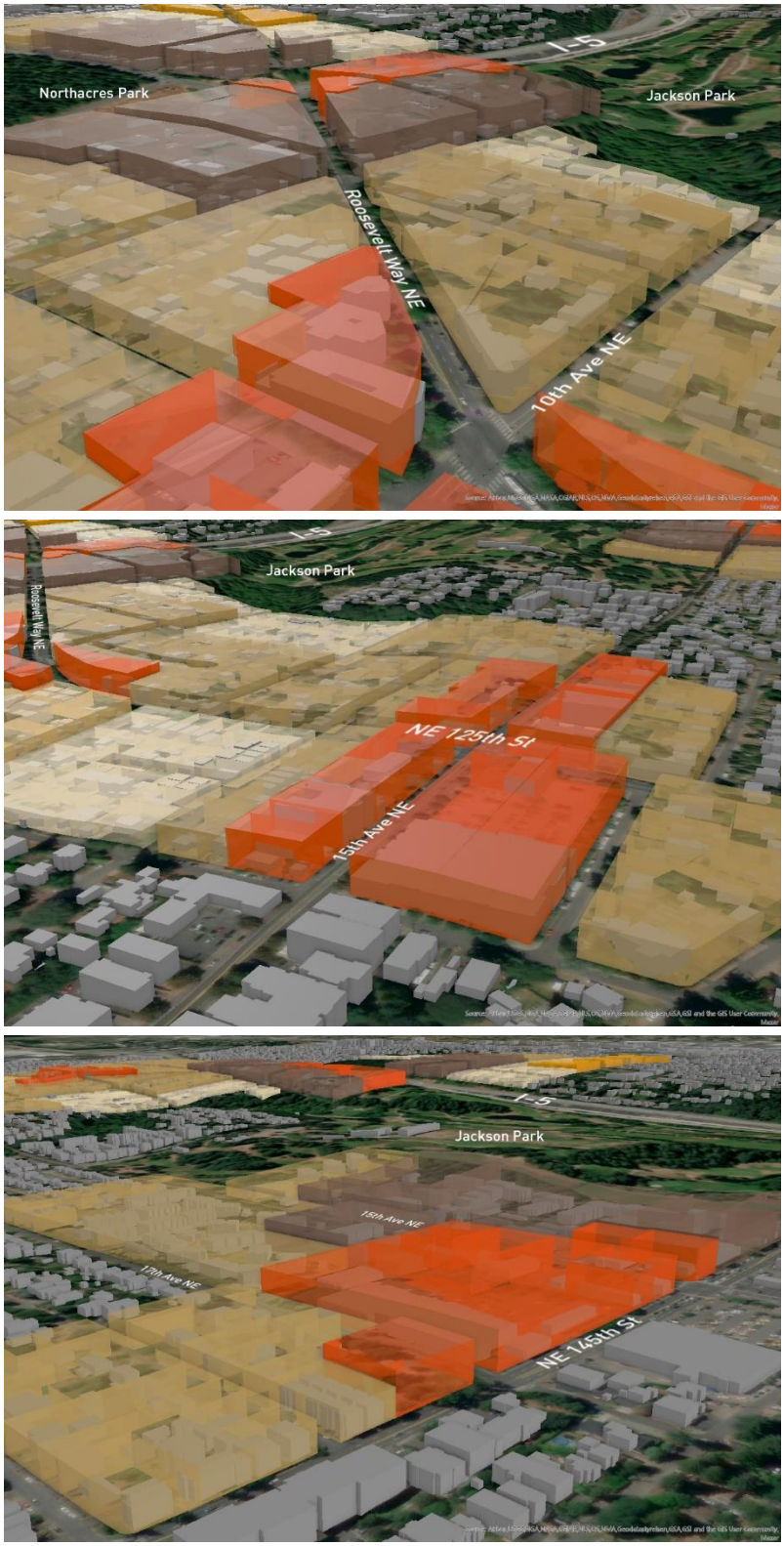
Urban Form

Height, bulk, and scale. Under Alternative 5, the area immediately next to the 130th light rail station could transition from primarily 1- and 2-story buildings up to 7- and 8-story buildings. The heights of buildings surrounding the 130th station, both to the east and the first block west of I-5 along 130th Street, could also develop over time into 6- to 8-story buildings. The core of the 145th station area would likely redevelop into a mixed-use node with buildings up to 7- and 8-stories, while heights in the surrounding area would be similar to the No Action Alternative. In the rest of the new urban center area, many existing 1- and 2-story buildings would likely develop over time into 3- to 5-story buildings. **Exhibit 3.6-117** and **Exhibit 3.6-118** illustrate potential redevelopment over 20 years; exact amount, locations, and design of redevelopment may vary. It would likely happen incrementally (i.e., site by site) as property owners choose to develop their property and/or aggregate properties for larger redevelopments.

Like Alternative 2, specific height/bulk/scale impacts would include:

- **Urban design and active transportation: Intersite connectivity.** This challenge may be more pronounced than Alternative 2 as even greater intensities develop near the station without direct routes.
- **Street-level community building: Lack of focused public realm.** Similarly, with more areas expected to redevelop, this challenge may be more widespread as more parcels redevelop without a cohesive street/path network.
- **Street level community building: Affordable commercial space.** With even greater redevelopment expected, the potential displacement of small and BIPOC-owned businesses may impact cultural and social gathering spaces more than Alternative 2.

Exhibit 3.6-117. Proposed 130th/145th Station Area Allowed Building Heights—Alternative 5



Note: These model views illustrate proposed building height limits in proposed neighborhood centers and urban centers. Building envelopes would also be influenced by FAR, setback, and upper story step back regulations.
Source: MAKERS, 2023.

Exhibit 3.6-118. 130th Station Area Massing Illustration—Alternative 5

Note: This model illustrates potential redevelopment over the next 20 years and building massings that maximize allowed FAR and heights while adhering to setback and zone transition regulations. Possible NC redevelopment is shown in orange, MR in brown, and LR in beige. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Transitions. Under Alternative 5, development of high-intensity buildings in the immediate vicinity of the 130th station area (proposed NC zone), as well as the larger proposed MR area, may create abrupt local transitions in scale between existing detached houses and new larger construction, even more so than Alternative 2. Over time, an evolution of the station area into more consistently intensely used land, combined with smaller scale development in surrounding low-rise zones would result in a more gradual transition. See **Exhibit 3.6-119**.

Views. Changes to views along the I-5 scenic corridor, which are mostly blocked because of noise walls and/or I-5 being below grade, would be similar to Alternative 2. More buildings would be visible on both sides of I-5, but they would be a minor part of the view.

Exhibit 3.6-119. Pinehurst Massing Illustration—Alternative 5

Note: This model illustrates potential redevelopment over the next 20 years and building massings that maximize allowed FAR and heights while adhering to setback and zone transition regulations. Possible NC redevelopment is shown in orange and LR in beige. It is not intended to show exact locations of development but that market-driven, incremental redevelopment over time would occur.
Source: City of Seattle, 2023; MAKERS, 2023.

Equity & Climate Vulnerability Considerations

Housing Type Variety and Choice

Alternative 5 combines the place types found in Alternatives 2-4 and therefore could provide the most housing type variety and choice amongst all the alternatives. The likely increase in variety would provide more options for people to stay in their community over a lifetime and across generations as their needs change. Housing configurations that cluster more units together on a site could provide more opportunities for intergenerational families to live near each other. Increasing housing type options across the city also increases the opportunities for people to live in parts of the city economically closed off to them in Alternative 1.

Relationship to Active Transportation

Among all alternatives, Alternative 5 could increase density the most across the city, near transit, and near large parks. Nearby parks, commercial, and office areas provide locations where people can walk and roll for their work, shopping, play, and leisure needs. More people

living within a 10-minute walk from light rail and a 5-minute walk from frequent bus transit likely increases the number of people walking, rolling, and using transit. Such a change would help mitigate climate impacts and improve chances at social connectedness.

Relationship to Social Wellbeing & Sociability

Alternative 5, with the increase in middle housing types and variety throughout the city and fewer concentrated extremes of higher and lower density areas, would likely have overall positive impacts on social wellbeing and social interactions, similar to Alternative 3. Impacts described in Alternative 4's **Relationship to Social Wellbeing & Sociability** section related sociability along arterials would also pertain to Alternative 5, but perhaps to a lesser degree with development opportunities more dispersed in Alternative 5.

Climate Change

No additional impacts to climate change are anticipated under Alternative 5 above those described under the other action alternatives. Growth under Alternative 5 would be concentrated in centers and corridors, away from most hazards, with additional growth spread throughout the urban neighborhoods. Like Alternative 3, distributing more growth in urban neighborhoods could increase the potential for populations to be closer to hazards or affected by interruptions in access to their neighborhoods. Like the other action alternatives, Alternative 5 would include a new Environment and Climate Element with mitigation and adaptation strategies as well as policies regarding tree canopy protection or enhancement and critical area regulations. See also the discussion under **Impacts Common to All Alternatives**.

Summary of Impacts

Exhibit 3.6-120, **Exhibit 3.6-121**, and the following text summarize and compare adverse land use impacts citywide and within the 130th/145th station areas under each alternative.

Citywide

Exhibit 3.6-120. Summary of Land Use and Urban Form Impacts by Alternative—Citywide

Impact	No Action	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Land Use Patterns	▽	▼	▽	▼	▼
Land Use Compatibility	▽	▼	▼	▼	▽
Height, Bulk, & Scale	▽	▼	▼	▼	▼
Transitions	▼	▽	▲	△	▲
Tree Canopy	▽	▽	▼	▼	▼
Shadows	▽	▼	▽	▽	▼
Views	—	—	—	▽	▽

Note: Impacts are considered either unavoidable adverse (▼▼), adverse but able to be mitigated (▼), impact but less than adverse (▽), limited or none (—), moderately positive (△), or positive (▲).

Sources: BERK, 2023; MAKERS, 2023.

Land use patterns. Growth under all alternatives would increase activity levels and land use intensities across the city resulting in likely adverse impacts to land use patterns. All alternatives focus most future growth into centers currently characterized by higher densities, more compact building forms, and a more diverse mix of uses than other areas of the city. Land use patterns in the neighborhood centers and corridors would intensify more under Alternatives 2 and 4, respectively, than under the No Action Alternative. Under Alternative 3, overall land use patterns would become denser over time within the Neighborhood Residential zones but most of this development would continue to be residential in nature and would be more spread throughout the analysis areas than the other action alternatives. Alternative 5 includes the most growth overall and incorporates elements of the other action alternatives—the intensity of land use patterns would shift most dramatically under Alternative 5 as activity levels increase over time.

Land use compatibility. Future growth under all alternatives is likely to increase the frequency of different land use types locating close to one another, and similarly likely to increase the frequency of land use patterns that contain mixes of land uses with differing levels of intensity, both within the centers and, to a varying extent, in other areas of the city. Land use incompatibilities under the No Action Alternative would be similar to those observed today but could become more severe over time with continuing trends. Under the action alternatives, denser and more mixed-use land use patterns in the new place types could result in localized

land use compatibility impacts within the place types or on the border with adjacent residential areas. All neighborhood centers, for instance, already contain areas zoned for commercial or mixed-use development but additional jobs and commercial space could increase more quickly in these areas due to the local demand from new housing. However, adverse compatibility impacts at the periphery of most existing centers would also be minimized as the new place types redevelop with denser development—this would be most noticeable over the long term under Alternative 5 as the abutting neighborhood center, corridors, and urban neighborhood areas redevelop. See also the summary of transitions below.

Height, bulk, and scale. Height, bulk, and scale impacts would likely occur under all alternatives as development occurs. Future growth and development directed into existing centers under all alternatives would result in a moderate amount of additional height and bulk in these commercial and mixed-use nodes generally consistent with that experienced during growth over the last 20 years. Under the action alternatives, building heights, bulk, and/or scale in the new place types would likely increase with new development. These impacts would be more pronounced in the neighborhood centers and corridors where height limits would be increased up to 5-7 stories. Where middle housing is allowed in urban neighborhood areas, more properties may develop with 3-story (or 4-story if affordable) buildings adjacent to 1- and 2-story buildings. The alternatives vary in the likelihood of localized impacts (Alternative 1, 2, and to some extent 4) versus more distributed impacts (Alternative 3 and 5).

Transitions. Continued infill development in established centers and villages under the No Action Alternative would likely create increasingly stark contrasts with surrounding lower-scale areas. The new place types introduced under the action alternatives would generally reduce existing contrasts between centers (that see widespread development of large buildings) and surrounding areas (with broad areas that see minimal development). Over time, edges under Alternatives 3 and 5 would be softened the most as feathered gradations of intensity fill in around nodes of activity, neighborhood amenities, and existing centers.

Tree canopy. Bulkier development under all alternatives would likely displace some trees on private property, especially in residential zones. At the same time, the number of street trees may increase where they are required with redevelopment. Private property may see a greater loss of existing tree canopy under the action alternatives with more widespread redevelopment. For example, the increase in size and number of buildings allowed on a lot in Alternatives 3 and 5 will likely decrease the amount of space available for trees on neighborhood residential lots.

Shadows. Under any alternative, taller and often bulkier redevelopment will cast longer and/or wider shadows than existing development. Building shadows can be considered positive for climate adaptation to reduce summertime heat but can be negative for human health and wellbeing (especially during winter) and the health of existing trees if accustomed to full sun. Over time, increased height limits in the neighborhood centers under Alternatives 2, 4, and 5 would likely result in longer shadows over a greater portion of the day compared to the other

alternatives and may be most impactful where shadows would fall downhill or on east-west oriented neighborhood main streets.

Views. Future development under Alternatives 1, 2, and 3 would present limited disruptions to public views. Growth would continue to concentrate in centers (which tend to contain few viewpoints). Most public viewpoints are outside the neighborhood centers in Alternative 2. There would be no height increase for market-rate development and a minimal height increase for affordable housing in the Neighborhood Residential zones under Alternative 3. Most of the protected viewpoints and scenic routes are within or adjacent to the more intense development expected in the corridor place type under Alternatives 4 and 5, and a few are in or near the expanded regional and urban centers in Alternative 5. Development under these alternatives may disrupt views in more places.

130th/145th Station Areas

Exhibit 3.6-121. Summary of Land Use and Urban Form Impacts by Alternative—130th/145th Station Areas

Impact	No Action	Alt. 2	Alt. 5
Land Use Patterns	—	▼	▼
Land Use Compatibility	▼	▼	▽
Height, Bulk, & Scale	▽	▼	▼
Transitions	▼	▽	▲
Tree Canopy	▽	▽	▼
Shadows	▽	▼	▼
Views	—	—	▽

Note: Impacts are considered either unavoidable adverse (▼▼), adverse but able to be mitigated (▼), impact but less than adverse (▽), limited or none (—), moderately positive (△), or positive (▲).
Sources: BERK, 2023; MAKERS, 2023.

Land use patterns and compatibility. No adverse impacts to land use patterns are expected in the station areas under the No Action Alternative. Under this alternative, no new areas would be designated for mixed-use or higher density and building types outside existing commercial zoning would remain primarily single purpose with some multi-family uses near the 145th BRT station. Few parcels around 130th would be likely to fully redevelop under the No Action Alternative, though more may see additions (e.g., ADUs) and rebuilds consistent with the existing land use patterns. However, the area may still see increased activity under the No Action Alternative over time as people seek to access the light rail station which could result in compatibility impacts with surrounding lower density residential development. Greater change would occur in the areas currently zoned for more intense development, including the 145th BRT station area and Pinehurst area.

Under Alternatives 2 and 5, both station areas would likely redevelop into mixed-use nodes with more growth at greater heights clustered in the newly designated neighborhood centers (Alternatives 2 and 5) and urban center (Alternative 5). Activity levels and land use intensities would increase resulting in greater impacts to land use patterns than the No Action Alternative. Compatibility impacts would be similar to those described citywide for neighborhood and urban centers.

Height, bulk, and scale. Changes to height, bulk, and scale would be limited under the No Action Alternative and primarily within the 145th station area. Under Alternatives 2 and 5, the station areas could see extensive changes to height, bulk, and scale as a result of proposed zoning capacity increases combined with proximity to the new light rail station. Heights could reach up to 7-8 stories immediately adjacent to the 130th light rail station and in the core of the 145th station area. 15th Ave NE (both in the 145th station area and Pinehurst) as well as NE 125th St at 15th Ave NE and Roosevelt Way NE south of NE 125th St would likely see greater levels of activity, enlivening the street level experience. However, many small commercial spaces currently exist in strip malls or in adapted houses in these areas.

Under all alternatives, large superblocks (longer than 600 feet) lacking a connected internal path or street network also mean that direct routes to access the station will be challenging without regulations to encourage or require through connections with redevelopment. Redevelopment at the light rail station would occur in a physically bifurcated, uncomfortable human environment (at 5th Ave NE, Roosevelt Way, and I-5) and could miss an opportunity to celebrate and activate the station entry.

Transitions. Transitions impacts in the station areas would be similar to those described citywide for the No Action Alternative and Alternatives 2 and 5. Under Alternatives 2 and 5, development of high-intensity buildings in the immediate vicinity of the 130th station area may create abrupt local transitions in scale between existing detached houses and new larger construction. Over time, an evolution of the station area into more consistently intensely used land, combined with smaller scale redevelopment in surrounding low-rise zones, would likely soften these transitions.

Tree canopy. Numerous evergreens, steep slopes, Thornton Creek, and environmentally critical areas near the 130th Station Area make development here unique, and perhaps more constrained, than many other Seattle areas. Existing large evergreen trees make residential areas feel set in hillside woods. Tree preservation could impact development capacity, and redevelopment with a loss of existing trees would have a noticeable effect on the human experience and sense of being set in nature. Under all alternatives, any redevelopment would fill gaps in street trees along the frontage. Large-scale redevelopment under Alternatives 2 and 5 in the station areas (more so under Alternative 5) would significantly impact the existing tree canopy.

Shadows. Under all alternatives, the existing tall evergreens, combined with steep slopes, significantly shade many residential areas. Shadow impacts from increases in building heights would be less noticeable in these residential areas because of those existing shadows. The

north-south orientation of 15th Ave NE, as well as to a lesser extent the diagonal orientation of Roosevelt Way NE, allows for greater solar access for longer hours throughout the year, even with increases in building heights. Under Alternatives 2 and 5, increased height limits could result in increased shadows on Jackson Park. However, the human experience of the park would not significantly change as tall evergreens already shade the park boundaries.

Views. Impacts to public views in the station areas under the No Action Alternative and Alternative 2 would be limited. Increased height limits near the 130th light rail station under Alternatives 2 and 5 could have limited impacts on the adjacent I-5 scenic corridor.

3.6.3 Mitigation Measures

Incorporated Plan Features

All alternatives would focus most future growth into the existing urban centers and villages. Compatibility challenges would not be an uncommon or new phenomenon in these areas and can be avoided or mitigated by continuing to implement the Land Use Code (Title 23). New place types and/or expanded housing options in existing Neighborhood Residential zones proposed as part of the action alternatives would introduce localized land use and urban form impacts where newer development is of greater height and intensity than existing development. These impacts, if they occur, are likely temporary and will be resolved over time or reduced by the application of existing or new development regulations and design standards. Overall, the new place types would create smoother and more varied transitions in intensity throughout the city (especially adjacent to urban center and village boundaries).

Existing building and land use policies, programs, and codes that promote compact building forms and energy efficient, low-carbon, green building techniques—such as the City's green building permit incentives for private development and the Sustainable Buildings and Sites policy for City-development—would continue to apply under all alternatives as discussed below under **Regulations & Commitments**.

Under the action alternatives, the City could also update Comprehensive Plan policies to further address the effects of climate change, particularly for communities more vulnerable to the effects of climate stress than others or located in areas in the city that may experience larger effects from climate change (including "heat islands" with more pavement and fewer trees, floodplain and landslide hazard areas, and areas with limited access to transit). For example, the action alternatives focus additional residential growth in areas 1, 2, and 6 which have relatively high levels of existing tree canopy cover. Required frontage improvements could increase the number of street trees with redevelopment, though more and bulkier development under all alternatives would likely displace some trees on private property and reduce tree canopy coverage overall. Potential mitigation measures to minimize tree canopy loss are described in **Section 3.3 Plants & Animals** and could include shared open space (see **Other**

Potential Mitigation Measures below) or adding open space requirements in Neighborhood Residential zones (see also **Section 3.11 Public Services**).

Regulations & Commitments

Seattle's municipal code contains regulations for land use and urban form. Below is a summary of these regulations as well as existing supporting policies and programs which would serve to mitigate impacts associated with the alternatives.

SEPA Policies. Title 25 of the Seattle Municipal Code contains policies governing the issues to be addressed during development review under the State Environmental Policy Act (SEPA). SMC 25.05.675 contains policies related to specific environmental issues, including land use compatibility, noise, height, bulk, and scale, shadows, and views.

Development Regulations. The Seattle Municipal Code contains zoning and development regulations for the city. These development regulations contain provisions governing the design of buildings, site planning, restrictions within the shoreline jurisdiction, and provisions to minimize land use incompatibilities and impacts associated with height, bulk, and scale. Each zone contains unique provisions for urban design such as setbacks, upper-story setbacks, open space requirements, building height, FAR, screening, and landscaping, etc. They also contain standards for landscaping, tree protection, and stormwater which support the retention and planting of trees and vegetation.

Seattle Design Review Program. The Seattle Design Review Program provides oversight of private development projects in Seattle that meet certain criteria in terms of development size or where a departure from a development standard is requested. Design Review Boards are designated for eight areas of the city; each board is responsible for reviewing larger development projects in their defined area for compliance with Seattle's adopted Design Guidelines and recommending design changes to make projects more consistent with the guidelines. Smaller projects are reviewed administratively. The Design Guidelines define desirable qualities with regard to architecture, urban design, and public space, and the overall goal of the program is to encourage excellence in the design of new commercial and multi-family development in Seattle. In addition to citywide standards, several sets of neighborhood-specific design guidelines supplement the Citywide and Downtown design guidelines.

Design Standards. Projects below the threshold for Design Review are subject to more prescriptive design standard regulations. These regulations are intended to ensure that smaller projects still meet the City's design objectives without imposing a level of delay and uncertainty that might be inappropriate for small projects.

Streets Illustrated, Seattle's Right-of-Way Improvements Manual. Streets Illustrated establishes and documents the policies, procedures, and practices for how the City manages physical improvements in the street right-of-way. It attempts to provide a comprehensive resource for all procedures, standards, and guidelines affecting physical changes in the street

right-of-way. The manual also designates streets throughout Seattle for their modal priorities and purpose in their context, provides design guidance and standards to be implemented with redevelopment, and guides street tree selection and provision.

Green Building Incentives. The City's green building incentives aim to create more efficient buildings that center around clean electric energy, water, and resource conservation with a focus on human health. Projects can gain additional height, floor area, or a faster building permit in exchange for meeting specific green building goals and certification. Incentives include:

- *Priority Green Expedited:* Available for all new construction projects. Offers faster building permit review and processing for projects that meet green building requirements with a focus on clean energy, resource conservation, indoor air quality, and lead hazard reduction.
- *Green Building Standard:* Gives additional development capacity in specific zones in exchange for meeting green building requirements.
- *Living Building Pilot Program:* Offers additional height, floor area ratio (FAR), and Design Review departure requests for projects that meet aggressive energy and water requirements and Living Building Petal Certification.
- *2030 Challenge:* Offers additional height, FAR, and Design Review departure requests for projects that meet the 2030 Challenge.
- *Innovation Advisory Committee:* This group of experts reviews energy efficient proposals not covered in the technical codes.

Sustainable Buildings and Sites Policy. The City's Sustainable Buildings and Sites Policy for municipal facilities aims to maximize the environmental quality, economic vitality, and social health of the city through the design, construction, operation, maintenance, renovation, and decommissioning of City-owned buildings and sites. Sustainable buildings and sites support overall City objectives by making efficient use of energy, water, and material resources; reducing climate change; minimizing pollution and hazardous materials; creating healthy indoor environments; reinforcing natural systems; providing habitat; creating vibrant spaces for people; and contributing to Seattle's neighborhoods. The Policy sets the following goals for City-owned properties:

- New construction and major renovations 5,000 ft^2 or greater must meet LEED Gold as well as key performance requirements for energy and water efficiency, waste diversion, and bicycle facilities.
- Tenant Improvements 5,000 ft^2 or greater with a scope of work that includes mechanical, electrical, and plumbing must meet LEED Gold as well as water efficiency and waste diversion requirements.
- Small projects—either new construction, renovations, or tenant improvements—are to utilize Capital GREEN, a green design and construction evaluation tool developed by FAS, in project planning and development.
- All new and existing sites projects shall follow best management practices.

Other Potential Mitigation Measures

Although not required to address identified impacts, the City could pursue the following kinds of actions if it wishes to address possible future land use and urban form conditions.

Urban Form

In addition to the changes to policies and regulations described in **Chapter 2** relevant to urban form (development standards for balconies, roofs, tree protection, ground floor open space, shared open space, reduced residential parking and more), the City could further expand or extend the concepts as follows:

Changes to Development Standards. Changes to development standards such as updated design standards, allowances for porches and balconies, and bonuses for pitched roofs could improve the design of future development and mitigate the impact of new buildings.

Trees on private property. Options for mitigating potential tree loss in Neighborhood residential zones include updating existing requirements for planting trees on private property.

Funding for Trees. Invest in efforts to plant, maintain, and preserve of trees such as:

- Increasing funding to maintain and steward City-owned trees.
- Develop a tree stewardship program to provide expertise to residents on the care and maintenance of their trees.
- Increase stewardship and active management of forested parks through the Green Seattle Partnership.
- Expand partnership approaches to plant and maintain trees on private property like the Trees for Neighborhoods program.
- Plant more trees in the right of way and parks.
- Test technologies like flexible surfaces and expanded tree pits and explore creative uses of the right of way for trees and green infrastructure.

Incentives for Ground Floor Open Space. Allowing additional height (but not FAR) for projects that provide more ground level open space could create more space for trees and make the ground floor environment more open and inviting.

Point access blocks to achieve narrower building footprints. Seattle's building code allows up to 6-story point access block buildings (i.e., each building has just one staircase/elevator core instead of units surrounding a double-loaded corridor) which can support dense housing using narrow floorplates. Raising awareness about this type of housing, as well as allowing more than two per lot, could provide the flexibility for incremental development over time to achieve community needs and urban design goals better and more quickly than traditional processes of parcel assembly and development of large, bulky buildings.

Additionally, tall point access block buildings allow for housing development to have the necessary density to pencil while also allowing for greater unit diversity in the building. This means 3+ bedroom units are more viable to develop and multifamily housing is friendlier to children and families.

New combinations of allowed height, FAR, and setbacks found in Seattle's zoning regulations could lead to denser housing that is taller but still improves wellbeing, livability, and sociability for those living in the housing, while also easing some aesthetic, size, and shade concerns from neighbors. New or adjusted zones that allow 5- to 8-story midrise buildings, while having FARs closer to current low-rise 3- and 4-story buildings, and that relax side and front setbacks, could allow for point access block or single stair buildings.

Shadows

Shadows on street trees. Select future trees and vegetation with future shadow conditions in mind.

Views

Investments to support public viewpoints. Additional funding for viewpoints on public property to draw attention to key viewpoints could help make better use of existing views.

Street trees. Select future trees and vegetation with existing viewpoints in mind.

130th/145th Station Area

- **Urban design and active transportation: Transit celebration**. Incentivize or require development to relate to, enhance, celebrate, and activate the station entry with transit-oriented commercial and public space.
- **Urban design and active transportation: Intersite connectivity.** Incentivize or require new development to provide new paths or streets to break down large blocks and provide direct, short routes to the station.
- **Street-level community building: Lack of focused public realm.** Undertake a community design effort to develop a cohesive approach toward development of public streets, public realm, or opportunities for shared social gathering that could be implemented through a combination of private development and public projects.
- **Street-level community building: Affordable commercial space.** Implement the 130th & 145th Station Area Planning Plan displacement mitigation strategies.
- **Child-friendly city and social wellbeing: Shared open space.** Incentivize or require outdoor gathering spaces, especially children's play areas, that are oriented away from air and noise pollutants. Consider allowing zero-lot line development to allow for incremental development of interlocking buildings that create an active and varied street front—that can also block air and noise—while consolidating privately shared gathering space internally.

- **Sociability: Small social spaces.** Incentivize or require social corridors and/or shared entries amongst a small group of units in residential development to promote trust-building and social connections. Consider allowing more than 2 single-stair buildings per lot to maximize opportunities for shared entries amongst smaller groups of neighbors.

3.6.4 Significant Unavoidable Adverse Impacts

Over time, additional growth and development will occur in Seattle and a generalized increase in development intensity, height, bulk, and scale is expected under all alternatives—this gradual conversion of lower-intensity uses to higher-intensity development patterns is unavoidable but an expected characteristic of urban population and employment growth. No significant unavoidable adverse impacts to land use patterns, compatibility, or urban form are expected under any alternative.

Future growth is likely to result in temporary or localized land use impacts as development occurs. The potential impacts related to these changes may differ in intensity and location in each of the alternatives and many are expected to resolve over time. Application of the City's adopted or new development regulations, zoning requirements, and design guidelines are anticipated to sufficiently mitigate these impacts.

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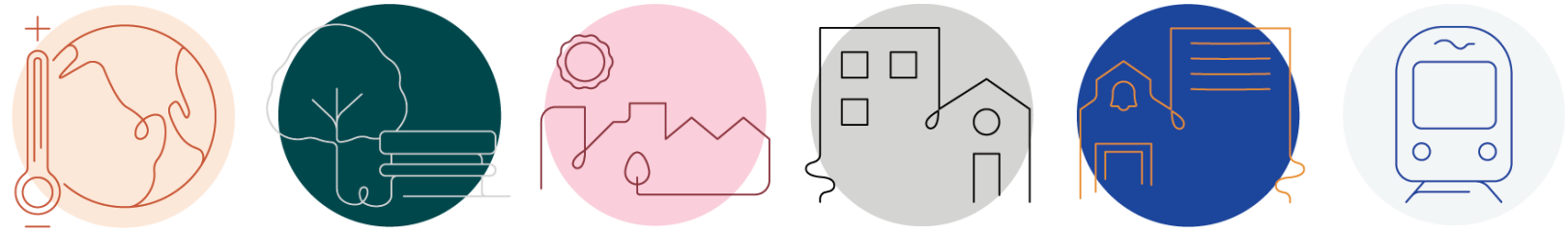
3.7 Relationship to Plans, Policies, & Regulations



Source: City of Seattle, 2023.

The City of Seattle's last periodic update of the Comprehensive Plan was approved in 2016. The One Seattle Comprehensive Plan Update is the next major periodic review to evaluate the Comprehensive Plan for continued consistency with the latest provisions of the State of Washington Growth Management Act (GMA), Puget Sound Regional Council's (PSRC's) VISION 2050, Countywide Panning Policies (CPPs), and the community's vision. This section reviews adopted state, regional, and City plans and policies that guide growth in Seattle and reviews the proposed alternatives for consistency with the adopted plans and policies—an impact is identified if the proposal would result in an inconsistency with adopted plans and policies. Mitigation measures to address identified adverse impacts and a summary of any significant unavoidable adverse impacts follow the description of existing conditions (affected environment) and impacts analysis.

Thresholds of significance utilized in this impact analysis include:

- Inconsistency with adopted plans and policies.

Per WAC 365-196-210, consistency means: *no feature of a plan or regulation is incompatible with any other feature of a plan or regulation. Consistency is indicative of a capacity for orderly integration or operation with other elements in a system*.

3.7.1 Affected Environment

The current policy and regulatory framework regulating land use in Seattle flows from the GMA, PSRC's Multi-County Planning Policies (MPPs) contained in VISION 2050, King County's CPPs, the City's current Comprehensive Plan, and implementation actions including development standards in the Seattle Municipal Code (SMC) and the Shoreline Master Program (SMP). Several other regulatory measures affect land use including localized overlay districts and design guidelines.

State & Regional Framework

Growth Management Act

Comprehensive Plans and development regulations within the City of Seattle must be consistent with the provisions of the Growth Management Act (GMA). The GMA was adopted in 1990 to address concerns about the impacts of uncoordinated growth on Washington communities and the environment and provides a framework for land use planning and development regulations in the state. The GMA directs coordinated regional and countywide planning, which then inform the locally adopted comprehensive plans and development regulations of individual cities and counties. Key provisions of the GMA include:

- Planning Goals
- Land Designations
- Multicounty Planning Policies (MPPs)

- Buildable Lands Program
- Countywide Planning Policies (CPPs)
- Local Comprehensive Planning

The GMA is primarily codified under Chapter 36.70A RCW. In 2021, GMA goals and element requirements regarding housing were amended to require jurisdictions to plan for and accommodate housing that is affordable to all economic segments of the population and to identify and address racially disparate impacts (see **Section 3.8 Population, Housing, & Employment**). The Washington State Department of Commerce (Commerce) published a summary of amendments to the GMA from 1995 through 2022.[22]

Relationship between the GMA, VISION 2050 and MPPs, CPPs, and local comprehensive plans. Source: PSRC, 2022.

The GMA includes 15 planning goals, in no particular order, to help guide the development and adoption of local comprehensive plans and development regulations. The fifteenth goal references goals and policies of the Shoreline Management Act. These goals direct most population and employment growth to be focused in urban areas to avoid sprawl, provide efficient and effective services and infrastructure within adopted levels of service, and protect environmentally critical areas. See **Exhibit 3.7-1**.

Exhibit 3.7-1. GMA Goals

GMA Goal	Text
(1) Urban growth	Encourage development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner.
(2) Reduce sprawl	Reduce the inappropriate conversion of undeveloped land into sprawling, low-density development.
(3) Transportation	Encourage efficient multimodal transportation systems that will reduce greenhouse gas emissions and per capita vehicle miles traveled and are based on regional priorities and coordinated with county and city comprehensive plans.
(4) Housing	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.

[22] Available online at https://www.commerce.wa.gov/about-us/rulemaking/gma-laws-rules/.

GMA Goal	Text
(5) Economic development	Encourage economic development throughout the state that is consistent with adopted comprehensive plans, promote economic opportunity for all citizens of this state, especially for unemployed and for disadvantaged persons, promote the retention and expansion of existing businesses and recruitment of new businesses, recognize regional differences impacting economic development opportunities, and encourage growth in areas experiencing insufficient economic growth, all within the capacities of the state's natural resources, public services, and public facilities.
(6) Property rights	Private property shall not be taken for public use without just compensation having been made. The property rights of landowners shall be protected from arbitrary and discriminatory actions.
(7) Permits	Applications for both state and local government permits should be processed in a timely and fair manner to ensure predictability.
(8) Natural resource industries	Maintain and enhance natural resource-based industries, including productive timber, agricultural, and fisheries industries. Encourage the conservation of productive forestlands and productive agricultural lands and discourage incompatible uses.
(9) Open space and recreation	Retain open space, enhance recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks and recreation facilities.
(10) Environment	Protect the environment and enhance the state's high quality of life, including air and water quality, and the availability of water.
(11) Citizen participation and coordination	Encourage the involvement of citizens in the planning process, including the participation of vulnerable populations and overburdened communities, and ensure coordination between communities and jurisdictions to reconcile conflicts.
(12) Public facilities and services	Ensure that those public facilities and services necessary to support development shall be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.
(13) Historic preservation	Identify and encourage the preservation of lands, sites, and structures that have historical or archaeological significance.
(14) Climate change and resiliency	(14) Ensure that comprehensive plans, development regulations, and regional policies, plans, and strategies … adapt to and mitigate the effects of a changing climate; support reductions in greenhouse gas emissions and per capita vehicle miles traveled; prepare for climate impact scenarios; foster resiliency to climate impacts and natural hazards; protect and enhance environmental, economic, and human health and safety; and advance environmental justice.
(15) Shorelines	For shorelines of the state, the goals and policies of the shoreline management act as set forth in RCW 90.58.020 shall be considered an element of the county's or city's comprehensive plan.

Sources: RCW 36.70A.020 and RCW 36.70A.480 (1), 2023.

Jurisdictions planning under the GMA are required to balance these goals in the development and adoption of their comprehensive plans and development regulations. Counties and cities in most parts of the state—including Central Puget Sound—must prepare comprehensive plans that include objectives, principles, standards, and a future land use map. Required elements of the comprehensive plan include land use, housing, capital facilities plan, utilities, rural (for counties), transportation, economic development, parks and recreation, and climate change and resiliency. Local governments may include other elements if they wish. Development

regulations, such as zoning, must be consistent with the local government's Comprehensive Plan. Counties and cities must be up to date with the requirements of the GMA, including the periodic update requirements, to be eligible for grants and loans from certain state infrastructure programs.

VISION 2050 & Multicounty Planning Policies

Puget Sound Regional Council (PSRC) develops policies and coordinates decisions about regional growth, transportation, and economic development planning within King, Pierce, Snohomish, and Kitsap counties. VISION 2050 is the long-range growth management, environmental, economic, and transportation strategy for the four-county Puget Sound region. It was adopted by PSRC in October 2020 and is endorsed by more than 100 member cities, counties, ports, state and local transportation agencies, and Tribal governments within the region. PSRC reviews local plans for consistency with VISION 2050 and the Regional Transportation Plan.

VISION 2050 includes the GMA required multicounty planning policies (MPPs) for the four counties and a regional strategy for accommodating growth through 2050. The MPPs provide direction for more efficient use of public and private investments and inform updates to countywide planning policies and local comprehensive plan updates. VISION 2050 includes 216 MPPs organized by the topic area goals in **Exhibit 3.7-2**.

Exhibit 3.7-2. VISION 2050 Topic Area Goals

Topic Area	VISION 2050 Goal
Regional Collaboration **15 MPPs**	The region plans collaboratively for a healthy environment, thriving communities, and opportunities for all.
Regional Growth Strategy **16 MPPs**	The region accommodates growth in urban areas, focused in designated centers and near transit stations, to create healthy, equitable, vibrant communities well-served by infrastructure and services. Rural and resource lands continue to be vital parts of the region that retain important cultural, economic, and rural lifestyle opportunities over the long term.
Environment **22 MPPs**	The region cares for the natural environment by protecting and restoring natural systems, conserving habitat, improving water quality, and reducing air pollutants. The health of all residents and the economy is connected to the health of the environment. Planning at all levels considers the impacts of land use, development, and transportation on the ecosystem.
Climate Change **12 MPPs**	The region substantially reduces emissions of greenhouse gases that contribute to climate change in accordance with the goals of the Puget Sound Clean Air Agency (50% below 1990 levels by 2030 and 80% below 1990 levels by 2050) and prepares for climate change impacts.
Development Patterns **54 MPPs**	The region creates healthy, walkable, compact, and equitable transit oriented communities that maintain unique character and local culture, while conserving rural areas and creating and preserving open space and natural areas.
Housing **12 MPPs**	The region preserves, improves, and expands its housing stock to provide a range of affordable, accessible, healthy, and safe housing choices to every resident. The region continues to promote fair and equal access to housing for all people.

Topic Area	VISION 2050 Goal
Economy **23 MPPs**	The region has a prospering and sustainable regional economy by supporting businesses and job creation, investing in all people and their health, sustaining environmental quality, and creating great central places, diverse communities, and high quality of life.
Transportation **32 MPPs**	The region has a sustainable, equitable, affordable, safe, and efficient multimodal transportation system, with specific emphasis on an integrated regional transit network that supports the Regional Growth Strategy and promotes vitality of the economy, environment, and health.
Public Services **30 MPPs**	The region supports development with adequate public facilities and services in a timely, coordinated, efficient, and cost-effective manner that supports local and regional growth planning objectives.

Source: PSRC VISION 2050, 2020.

The regional growth strategy in VISION 2050 calls for focusing new housing, jobs, and development within regional growth centers and near high capacity transit. The strategy also aims to keep rural areas, farmland, and forests healthy and thriving. Regional growth centers have been a central strategy of regional planning for decades, although centers have been designated through different procedures depending on when they were first designated. Seattle's six urban centers and two manufacturing industrial centers (MICs) are also designated PSRC Metro Regional Growth Centers (RGCs) and Employment MICs, respectively, in VISION 2050. See **Exhibit 3.7-3**.

Exhibit 3.7-3. PSRC Regional Growth Centers in Seattle

Center	VISION 2050 Center Designation
Downtown	Regional Growth Center—Metro
First Hill/Capitol Hill	Regional Growth Center—Urban
University District	Regional Growth Center—Urban
South Lake Union	Regional Growth Center—Urban
Uptown	Regional Growth Center—Urban
Northgate	Regional Growth Center—Urban
Ballard-Interbay	Manufacturing Industrial Center—Growth
Duwamish	Manufacturing Industrial Center—Growth

Source: PSRC VISION 2050, 2020.

VISION 2050 includes updated regional geographies and modified classifications for cities and unincorporated urban areas based on size, function, and access to high-capacity transit. The updated regional geographies are:

- Metropolitan Cities
- Core Cities
- High-Capacity Transit (HCT) Communities
- Cities & Towns

- Urban Unincorporated Areas
- Rural
- Resource Lands
- Major Military Installations
- Indian Reservation Lands

The City of Seattle is considered a Metropolitan City, which is a civic, cultural, and economic hub with convenient access to high-capacity transit. Per VISION 2050, Metropolitan Cities (including Seattle) are to take a large share of the four-county growth (36% of population and 44% of jobs). VISION 2050 further encourages these cities to accommodate more growth that improves jobs/housing balances, if possible.

Countywide Planning Policies

The GMA requires counties and cities to collaboratively develop countywide planning policies (CPPs) to set the general framework for coordinated land use and population planning between a county and its cities to ensure comprehensive plans are consistent with each other (RCW 36.70A.210). The role of the CPPs is to coordinate comprehensive plans of jurisdictions in the same county regarding regional issues and issues affecting common borders (RCW 36.70A.100).

The King County CPPs were adopted December 14, 2021, and last amended December 6, 2022, and are consistent with PSRC's MPPs and Regional Growth Strategy. The CPPs aim to promote sustainable and equitable growth, protect the environment, and enhance the quality of life for residents. Key topics covered by the CPPs include urban centers, housing, transportation, public facilities, and economic development. The policies encourage compact and coordinated land use patterns, with a focus on preserving open spaces and natural areas. They also promote the use of public transportation and encourage the development of walkable communities.

The CPPs aim to increase the availability of affordable housing for all residents, with a focus on providing housing for low- and moderate-income households. The policies encourage the development of diverse housing options that are accessible to a range of household types, including single-family homes and apartments, as well as middle housing such as townhouses, duplexes, and accessory dwelling units (ADUs). The CPPs' economic vision emphasizes providing opportunities for everyone, including BIPOC[23]-, immigrant-, and women-owned businesses.

The CPPs also set housing and job growth targets for each jurisdiction within the county for the planning period between 2019 and 2044. Other policies related to expanding housing options and neighborhood choice, however, may result in cities needing to increase capacity further to encourage a variety of housing typologies. Seattle's minimum growth targets as set in the CPPs are for 112,000 new housing units and 169,500 new jobs between 2019 and 2044.[24] The City of Seattle has adjusted the growth targets to a 20 year time frame by accounting for constructed

[23] Black, indigenous, persons of color
[24] See Table DP-1 on page 23 of the King County CPPs.

growth in recent years and prorating growth in future years. In spring 2023, a set of amendments to housing affordability targets was developed. For Seattle the units and emergency beds are shared in **Exhibit 3.7-4**. **Section 3.8 Population, Housing, & Employment** provides a discussion of affordable housing.

Exhibit 3.7-4. Net New Housing Units and Emergency Housing Needed, 2019-2044

Total Housing Need	0 To ≤30%		>30 To ≤50%	>50 To ≤80%	>80 To ≤100%	>100 To ≤120%	>120%	Emergency Housing
	Non-PSH	PSH						Beds
112,000	28,572	15,024	19,144	7,986	5,422	6,150	29,702	21,401

Legend: PSH = permanent supportive housing
Source: King County, 2023.

Appendix 6 of the CPPs also includes designation criteria for countywide growth centers. Countywide growth centers are intended to serve important roles as places for equitably concentrating jobs, housing, shopping, and recreational opportunities. These are often smaller downtowns, high-capacity transit station areas, or neighborhood centers that are linked by transit. Countywide growth centers provide a mix of housing and services and serve as focal points for local and county investment. The criteria include an existing density of at least 18 activity units and planned density of at least 30 activity units. Countywide growth centers are also expected to be between 160–500 acres in size, include frequent all-day transit service, and demonstrate evidence of the center's regional or countywide role and future market potential to support the planned densities. No countywide growth centers are formally designated in King County although several have received preliminary approval. See **Section 3.6 Land Use Patterns & Urban Form** for additional analysis of Seattle's existing and proposed urban villages in relation to the activity unit and size designation criteria.

Exhibit 3.7-5. King County Countywide Planning Policies

Chapter/Element	Vision/Goals
Vision for King County 2050	It is the year 2050 and our county has changed significantly in the roughly 60 years that have elapsed since the first Countywide Planning Policies were adopted in 1992. In 2050, ▪ Communities across King County are welcoming places where every person can thrive. ▪ All residents have access to opportunity and displacement from development is lessened. ▪ The cities are vibrant and inviting hubs for people with a safe, affordable, and efficient transportation system that connects people to the places they want to go. ▪ Housing is characterized by a full range of options that are healthy, safe, affordable, and open to all. ▪ The county's critical areas are protected and have been restored. ▪ Open spaces are well distributed and inviting to all users. ▪ The Rural Area is viable and permanently protected with a clear boundary between urban and rural areas. ▪ The county boasts of bountiful agricultural areas and productive forest lands. ▪ The economy provides opportunities to everyone and includes Black, Indigenous, and other People of Color-owned businesses; immigrant- and women-owned businesses; locally owned businesses; and global corporations.

Chapter/Element	Vision/Goals
Environment	Overarching Goal: The quality of the natural environment in King County is restored and protected for future generations.
Development Patterns	Overarching Goal: Growth in King County occurs in a compact, centers-focused pattern that uses land and infrastructure efficiently, connects people to opportunity, and protects Rural and Natural Resource Lands.
Housing	Overarching Goal: Provide a full range of affordable, accessible, healthy, and safe housing choices to every resident in King County. All jurisdictions work to: ▪ preserve, improve, and expand their housing stock; ▪ promote fair and equitable access to housing for all people; and ▪ take actions that eliminate race-, place-, ability-, and income-based housing disparities.
Economy	Overarching Goal: All people throughout King County have opportunities to prosper and enjoy a high quality of life through economic growth and job creation.
Transportation	Overarching Goal: The region is well served by an integrated, multimodal transportation system that supports the regional vision for growth, efficiently moves people and goods, and is environmentally and functionally sustainable over the long term.
Public Facilities and Services	Overarching Goal: County residents in both Urban and Rural Areas have timely and equitable access to the public services needed to advance public health and safety, protect the environment, and carry out the Regional Growth Strategy.

Source: BERK Consulting, Inc.

Local Framework

Seattle's Existing Comprehensive Plan

Seattle's current Comprehensive Plan, *Seattle 2035*, is a 20-year vision and roadmap for Seattle's future. The plan guides City decisions on where to build new jobs and houses, how to improve the transportation system, and where to make capital investments such as utilities, sidewalks, and libraries. Seattle 2035 is the framework for most of Seattle's big-picture decisions on how to grow while preserving and improving the city's neighborhoods.

The Comprehensive Plan was first adopted in 1994 consistent with the GMA. Less extensive revisions and updates are incorporated on an annual basis and major "periodic reviews" were completed in 2004 and 2016. The current plan was last amended in 2022.

The One Seattle Comprehensive Plan Update is the next major periodic review.

Volume 1 of the Comprehensive Plan 2035 consists of fourteen major elements—all of these will be reviewed and updated as part of the proposal:

1. Growth Strategy Element
2. Land Use Element
3. Transportation Element
4. Housing Element
5. Capital Facilities Element
6. Utilities Element

7. Economic Development Element
8. Environment Element
9. Parks and Open Space Element
10. Arts and Culture Element
11. Community Well-Being Element
12. Community Engagement Element
13. Container Port Element
14. Shoreline Element

The four core values of Seattle's Comprehensive Plan are:

- **Race and Social Equity**—limited resources and opportunities must be shared; and the inclusion of under-represented communities in decision-making processes is necessary.
- **Environmental Stewardship**—protect and improve the quality of our global and local natural environment.
- **Community**—developing strong connections between a diverse range of people and places.
- **Economic Opportunity and Security**—a strong economy and a pathway to employment is fundamental to maintaining our quality of life.

Volume 2 of the Comprehensive Plan consists of the City's 38 adopted neighborhood plans.

Urban Villages Strategy & Distribution of Growth

The urban village strategy is the foundation of Seattle's Comprehensive Plan. It is the City's unique approach to meeting the state GMA requirement and is similar to VISION 2050's growth centers approach. This strategy encourages most of the city's expected future growth to occur in specific areas that are best able to absorb and capitalize on that growth. The City has designated four types of areas (represented in Alternative 1 No Action[25]), each of which has a different function and character with varying amounts and intensity of growth and mixes of land uses:

1. **Urban centers** are the densest Seattle neighborhoods. They act as both regional centers and local neighborhoods that offer a diverse mix of uses, housing, and employment opportunities.
2. **Hub urban villages** are communities that offer a balance of housing and employment but are generally less dense than urban centers. These areas provide a mix of goods, services, and employment for their residents and surrounding neighborhoods.
3. **Residential urban villages** are areas of residential development, generally at lower densities than urban centers or hub urban villages. While they are also sources of goods and

[25] See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5. Alternative 1 No Action would retain the City's Seattle 2035 urban village strategy and center/village designations—the existing urban centers and villages are categorized here according to the new place types proposed under Alternatives 2-5 for comparison purposes only. Ballard would remain a "Hub Urban Village" under Alternative 1, would be called an "Urban Center" under Alternatives 2-5, and would be redesignated as a Regional Center (as shown here) under Alternative 5.

services for residents and surrounding communities, for the most part they do not offer many employment opportunities.

4. **Manufacturing/industrial centers (MICs)** are home to the city's thriving industrial businesses. Like urban centers, they are important regional resources for retaining and attracting jobs and for maintaining a diversified economy.

The urban village strategy is designed to support the Comprehensive Plan's core values by directing growth to existing urban centers and villages, contributing to the vibrancy of neighborhood centers, and reinforcing the benefits of City investments in transit, parks, utilities, community centers, and other infrastructures.

Land Use Element

The Land Use Element includes goals and policies guiding the physical form and activities allowed in the city. The goals address the City's urban village strategy, housing densities, mixed-use areas, commercial and industrial areas, historic preservation, and critical areas. See **Exhibit 3.7-6**.

Exhibit 3.7-6. Seattle 2035 Land Use Element Goals

Goal	Text
LU G1	Achieve a development pattern consistent with the urban village strategy, concentrating most new housing and employment in urban centers and villages, while also allowing some infill development compatible with the established context in areas outside centers and villages.
LU G2	Provide zoning and accompanying land use regulations that • allow a variety of housing types to accommodate housing choices for households of all types and income levels; • support a wide diversity of employment-generating activities to provide jobs for a diverse residential population, as well as a variety of services for residents and businesses; and • accommodate the full range of public services, institutions, and amenities needed to support a racially and economically diverse, sustainable urban community.
LU G3	Allow public facilities and small institutions to locate where they are generally compatible with the function, character, and scale of an area, even if some deviation from certain regulations is necessary.
LU G4	Provide opportunities for locating radio and television broadcast utilities (major communications utilities) to support continued and improved service to the public and to address potential impacts to public health.
LU G5	Establish development standards that guide building design to serve each zone's function and produce the scale and character desired, while addressing public health, safety, and welfare.
LU G6	Regulate off-street parking to address parking demand in ways that reduce reliance on automobiles, improve public health and safety, reduce greenhouse gas emissions, lower construction costs to reduce the cost of housing and increase affordable housing, create attractive and walkable environments, and promote economic development throughout the city.
LU G7	Provide opportunities for detached single-family and other compatible housing options that have low height, bulk, and scale in order to serve a broad array of households and incomes and to maintain an intensity of development that is appropriate for areas with limited access to services, infrastructure constraints, fragile environmental conditions, or that are otherwise not conducive to more intensive development.
LU G8	Allow a variety of housing types and densities that is suitable for a broad array of households and income levels, and that promotes walking and transit use near employment concentrations, residential services, and amenities.
LU G9	Create and maintain successful commercial/mixed-use areas that provide a focus for the surrounding neighborhood and that encourage new businesses, provide stability and expansion opportunities for existing

Goal	Text
	businesses, and promote neighborhood vitality, while also accommodating residential development in livable environments.
LU G10	Provide sufficient land with the necessary characteristics to allow industrial activity to thrive in Seattle and protect the preferred industrial function of these areas from activities that could disrupt or displace them.
LU G11	Promote Downtown Seattle as an urban center with the densest mix of residential and commercial development in the region, with a vital and attractive environment that supports employment and residential activities and is inviting to visitors.
LU G12	Provide flexibility in standard zone provisions or supplement those provisions to achieve special public purposes in areas where unique conditions exist, such as shorelines, historic and special review districts, and major institutions.
LU G13	Encourage the benefits that major institutions offer the city and the region, including health care, educational services, and significant employment opportunities, while mitigating the adverse impacts associated with their development and geographic expansion.
LU G14	Maintain the city's cultural identity and heritage.
LU G15	Promote the economic opportunities and benefits of historic preservation.
LU G16	Promote the environmental benefits of preserving and adaptively reusing historic buildings.
LU G17	Maintain a regulatory system that aims to • protect the ecological functions and values of wetlands and fish and wildlife conservation areas; • prevent erosion on steep slopes; • protect public health, safety, and welfare in areas subject to landslides, liquefaction, floods, or peat settlement, while permitting reasonable development; • protect the public by identifying seismic and volcanic hazard areas; and • avoid development that causes physical harm to people, property, public resources, or the environment.

Source: Seattle 2035, 2022.

Policies underneath the goals provide direction on how these goals should be implemented.

The Land Use Element also includes a Future Land Use Map with several designations (illustrated in Alternative 1 No Action[26] in **Chapter 2**).

- Urban Center
- Hub Urban Village
- Residential Urban Village
- Manufacturing / Industrial Center
- Neighborhood Residential Areas
- Multi-Family Residential Areas
- Commercial / Mixed Use Areas
- Industrial Areas
- Major Institutions
- Cemetery
- City-Owned Open Space

[26] See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5. Alternative 1 No Action would retain the City's Seattle 2035 urban village strategy and center/village designations—the existing urban centers and villages are categorized here according to the new place types proposed under Alternatives 2-5 for comparison purposes only. Ballard would remain a "Hub Urban Village" under Alternative 1, would be called an "Urban Center" under Alternatives 2-5, and would be redesignated as a Regional Center (as shown here) under Alternative 5.

Capital Facilities Element & Capital Improvement Program

The City includes a Capital Facilities Element with goals that are carried forward with specific projects and matching revenues in a Capital Improvement Program:

- CF G1 Develop and manage capital facilities to provide long-term environmental, economic, social, and health benefits for all residents and communities when using public investments, land, and facilities.
- CF G2 Reduce ongoing resource consumption and day-to-day costs of the City's capital facilities, and protect their long-term viability, while serving the needs of the people who use them.
- CF G3 Locate capital facilities to achieve efficient citywide delivery of services, support an equitable distribution of services, minimize environmental impacts, and maximize facilities' value to the communities in which they are located.
- CF G4 Design and construct capital facilities so that they are considered assets to their communities and act as models of environmental, economic, and social stewardship.
- CF G5 Make efficient use of resources when investing in facilities and service delivery that involve other agencies and organizations.

Annually the City adopts a capital improvement program addressing a six-year period and includes major repair and replacement and capacity projects addressing growth. The current one is 2023-2028. It addresses improvements towards:

- Culture & Recreation: Parks and Recreation, Seattle Center, The Seattle Public Library
- Transportation
- Seattle City Light
- Seattle Public Utilities: Drainage & Wastewater, Solid Waste, Water, Technology Projects
- Administration: Finance and Administrative Services, Information Technology

Comprehensive Plan Racial Equity Analysis

The City, in collaboration with the organization PolicyLink, developed an equity evaluation of the 2035 Comprehensive Plan based on a Community Engagement Report using targeted conversations and a Racial Equity Analysis Findings and Recommendations. The review identified persistent racial disparities in Seattle related to:

- Housing affordability, choice, and ownership
- Access to neighborhoods of opportunity (incl. parks, schools, healthy environment)
- Housing insecurity and displacement risk
- Access to Seattle's economic prosperity

PolicyLink identified the following recommendations for Comprehensive Plan update:

- **Growth strategy:** Allow more housing types across the city with equitable access to wealth building and neighborhood opportunities.

- **Affordable housing:** Support tools to increase supply of affordable housing with community control and long-term affordability.
- **Displacement:** More and stronger anti-displacement policies and tools, including preservation of cultural communities.
- **Inclusive economy:** Data-informed tools to promote equitable economic opportunity, e.g., training and hiring preferences.
- **Community engagement:** Provide financial/technical support for sustained BIPOC involvement around comp plan update.

130th/145th Station Area Plan

The *130th and 145th Station Area Plan*, adopted in July 2022, outlines the community and City's concepts for land use, mobility and other policies and investments to support a regional vision for integrating fast and reliable transit with compact walkable communities. The Plan is intended to guide decisions for public and private investment near these high-capacity transit stations. Topics addressed in the plan include land use, mobility, housing, open space, and other community needs. Goals, strategies, and early actions included in the Plan are guided by the following vision:

> *The 130th and 145th Station Area is a lively, walkable and welcoming North Seattle neighborhood. Major streets have roomy, tree-lined sidewalks, and other green infrastructure. Bicycle infrastructure makes everyday trips to transit stations, schools and neighboring urban villages enjoyable and safe. An array of housing offers options affordable to a broad range of incomes and lifestyles. Small shops and cafes near the station cater to locals, commuters, students and visitors. Local and citywide lovers of nature, recreation and culture treasure the abundant greenspaces and unique cultural events so easily reached by walking, biking or transit.*

The station area in the *130th and 145th Station Area Plan* includes the area within ½ mile (about a 10-minute walk) of the 130th and 145th Link stations, and within ¼ mile (about a 5-minute walk) of the 145th/15th Ave Stride bus rapid transit (BRT) station. The Plan also considers a larger study area that includes communities that can access the stations by a longer walk or a short bike or bus ride.

3.7.2 Impacts

Impacts Common to All Alternatives

Growth Management Act

Seattle adopted its Comprehensive Plan complying with the GMA in 1994 and it has been amended periodically since that time. The plan contains the elements required by the GMA and the City has adopted land use and environment regulations (Title 23 and Title 25 in the SMC) that implement the plan.

The action alternatives would each adopt a new growth strategy and each element of the Comprehensive Plan would be updated. The plan would continue to focus growth in an urban area with a range of public services and multimodal transportation options, provide for parks and recreation, and protect critical areas and historic resources consistent with the GMA.

The Draft EIS alternatives each accommodate the 2044 growth targets and examine different ways the City could distribute its 2044 forecast growth with varying degrees of concentration. Focusing growth within urban areas in this manner is consistent with GMA policies that seek to prevent sprawl and preserve rural areas and resource lands. All alternatives have sufficient zoned vacant and redevelopable land to accommodate the minimum 20-year population, housing, and job allocations. See **Exhibit 3.7-7**.

Exhibit 3.7-7. Growth Management Act Goals—Alternative Evaluations

GMA Goal	Discussion
(1) Urban growth	Each studied alternative would serve growth with city or municipal services.
(2) Reduce sprawl	Each studied alternative would focus on redevelopment in an urban environment.
(3) Transportation	Each studied alternative would place most growth in centers and around transit investments. Alternatives 2 and 5 support a station area plan at 130th and 145th Street Station Areas. Alternatives 4 and 5 further emphasize a range of housing types along corridors.
(4) Housing	All alternatives accommodate housing growth targets and Alternatives 3-5 add more emphasis on middle housing and other housing types. See also **Section 3.8 Population, Housing, & Employment** for a discussion of how the alternatives impact housing and address new GMA housing requirements in HB 1220.
(5) Economic development	All alternatives accommodate job targets. Most jobs would be located in Area 4 Downtown und all alternatives and the action alternatives spread a slightly higher share of retail/service jobs in neighborhoods in support of greater residents.
(6) Property rights	All alternatives support a reasonable use of property.
(7) Permits	All alternatives would implement City policies promoting fair permitting. Alternatives 2 and 5 could include a planned action or other facilitated environmental review process for the 130th and 145th Station Areas.
(8) Natural resource industries	There are no designated resource lands in the city limits. Alternatives 2-5 would concentrate more housing growth in balance with jobs, which could help reduce the

GMA Goal	Discussion
	potential regionally for low-density development outside of the city and other urban areas.
(9) Open space and recreation	All alternatives create a demand for parks and recreation under adopted levels of service. The updated Comprehensive Plan could include an updated level of service standard. See **Section 3.11 Public Services**.
(10) Environment	All alternatives would add redevelopment that could implement improved water quality; see **Section 3.1 Earth & Water Quality**. The potential for tree canopy loss or gain is addressed in **Section 3.3 Plants & Animals**.
(11) Citizen participation and coordination	Alternative 1 No Action was based on an engagement process and annual docket evaluation that involved the public in the last periodic review. Relevant to the action alternatives, the One Seattle public participation plan outlines how the City intends to engage community members in the plan update. See the Summary of the scoping process for this EIS in **Chapter 2 Proposal & Alternatives**.
(12) Public facilities and services	All alternatives would allow for growth that increases demand for public services with Alternative 1 the least and Alternative 5 the most. The City and municipal providers regularly plan for capital facilities to meet current and projected needs. See **Section 3.11 Public Services** and **Section 3.12 Utilities**.
(13) Historic preservation	Each alternative could result in redevelopment that has the potential to alter eligible historic resources or result in ground disturbing activities that could affect cultural resources. See the evaluation and mitigation measures in **Section 3.9 Cultural Resources**.
(14) Climate change and resiliency	Action alternatives include a new Environment and Climate element to advance GHG reduction and climate adaptation measures. The No Action Alternative would continue existing city plans and programs meant to address climate change but were not designed to meet the new HB 1181 requirements in full.
(15) Shorelines	The City maintains a shoreline master program under the Shoreline Management Act. It is updated periodically under a different timeline. The City must be consistent with the shoreline goals of environmental conservation, public access, and shoreline-oriented uses.

Source: BERK, 2023.

VISION 2050 & Multicounty Planning Policies

VISION 2050 policies and alternatives' consistency are evaluated in **Exhibit 3.7-8**. Highlights are described below.

VISION 2050 Regional Growth Strategy, Development Pattern, and Housing Policies: The action alternatives would update the Comprehensive Plan to meet VISION 2050 policies. The No Action Alternative would not update the Comprehensive Plan policies, though the growth capacity would still meet minimum growth targets expected of a Metropolitan city. The action alternatives provide for more growth and could add capacity to meet additional policies and objectives in VISION 2050 including improved balance of jobs and housing, creating opportunities for middle housing, focusing more growth around transit investments, and contributing to a pattern of growth that supports regional climate goals. See **Section 3.8 Population, Housing, & Employment** for a discussion of how the alternatives impact housing and address new GMA housing requirements in HB 1220.

VISION 2050 Climate Policies: All studied alternatives would increase greenhouse gas emissions associated with buildings and waste. The growth levels of Alternatives 2 through 4 combined with anticipated reductions in fuel emissions would reduce transportation emissions. Alternative 5 would slightly increase transportation emissions. The region-wide benefit of channeling development that might otherwise occur in peripheral areas of the city or region to targeted areas could serve to offset these impacts. Additionally, all alternatives appear to result in lower GHG emissions on a per capita basis compared to existing conditions, and action alternatives would have lower per capita rates compared to the No Action Alternative. See **Section 3.2 Air Quality & GHG Emissions**.

VISION 2050 Environment Policies: All alternatives would result in redevelopment that could improve water quality but depending on design could remove tree canopy. Mitigation measures in **Section 3.1 Earth & Water Quality** and **Section 3.3 Plants & Animals** could reduce such impacts. Growth in Seattle that is more balanced between housing and jobs could be beneficial for overall growth patterns in the region and reduce development pressures in other non-urban areas.

VISION 2050 Public Services Policies: All alternatives would increase the demand for public services and utilities, requiring capital facility planning. The No Action Alternative would increase the demand the least and Alternative 5 the most. See **Section 3.11 Public Services** and **Section 3.12 Utilities**.

Exhibit 3.7-8. VISION 2050—Alternatives Evaluation

Topic Area	VISION 2050 Goal	Evaluation
Regional Collaboration **15 MPPs**	The region plans collaboratively for a healthy environment, thriving communities, and opportunities for all.	All alternatives would plan for growth that meets countywide planning policies, which helps promote consistency with other jurisdictions. All alternatives address growth focused on high-capacity transit and centers. This is further emphasized citywide under Alternatives 4 and 5 around corridors and the redesignated Ballard Regional Center under Alternative 5, as well as the urban center in Alternatives 2 and 5 for the 130th and 145th Street Station Areas. *MPP-RC-8 Direct subregional funding, especially county-level and local funds, to countywide centers, high-capacity transit areas with a station area plan, and other local centers. County-level and local funding are also appropriate to prioritize to regional centers.*
Regional Growth Strategy **16 MPPs**	The region accommodates growth in urban areas, focused in designated centers and near transit stations, to create healthy, equitable, vibrant communities well-served by infrastructure and services. Rural and resource lands continue to be vital parts of the region that retain	All alternatives meet MPP-RGS-9 to focus growth in regional growth centers and meet minimum housing growth targets. The action alternatives increase housing growth above minimum growth targets to better balance jobs and housing and to provide for middle housing as well as focus growth around high-capacity transit, especially

Topic Area	VISION 2050 Goal	Evaluation
	important cultural, economic, and rural lifestyle opportunities over the long term.	Alternatives 4 and 5. This is consistent with MPP-RGS-7 that suggests greater housing in Metropolitan Cities like Seattle and MPP-RGS-12 that shows a priority of growth around high-capacity transit. *MPP-RGS-7 Provide additional housing capacity in Metropolitan Cities in response to rapid employment growth, particularly through increased zoning for middle density housing. Metropolitan Cities must review housing needs and existing density in response to evidence of high displacement risk and/or rapid increase in employment.* *MPP-RGS-9 Focus a significant share of population and employment growth in designated regional growth centers.* *MPP-RGS-12 Avoid increasing development capacity inconsistent with the Regional Growth Strategy in regional geographies not served by high-capacity transit.*
Environment **22 MPPs**	The region cares for the natural environment by protecting and restoring natural systems, conserving habitat, improving water quality, and reducing air pollutants. The health of all residents and the economy is connected to the health of the environment. Planning at all levels considers the impacts of land use, development, and transportation on the ecosystem.	All alternatives would add redevelopment that could implement improved water quality; see **Section 3.1 Earth & Water Quality**. The potential for tree canopy loss or gain is addressed in **Section 3.3 Plants & Animals**.
Climate Change **12 MPPs**	The region substantially reduces emissions of greenhouse gases that contribute to climate change in accordance with the goals of the Puget Sound Clean Air Agency (50% below 1990 levels by 2030 and 80% below 1990 levels by 2050) and prepares for climate change impacts.	Growth could increase emissions such as in buildings and waste sources; transportation emissions would decrease for all alternatives except Alternative 5. Overall, the No Action Alternative would decrease per capita greenhouse gas emissions and the action alternatives would smaller rates of per capita emissions than the No Action Alternative. See **Section 3.2 Air Quality & GHG Emissions**.
Development Patterns **54 MPPs**	The region creates healthy, walkable, compact, and equitable transit oriented communities that maintain unique character and local culture, while conserving rural areas and creating and preserving open space and natural areas.	All alternatives would focus growth in centers and near transit investments, especially Alternatives 4 and 5. There are no designated resource lands in the city limits. Alternatives 2-5 would concentrate more housing growth in balance with jobs, which could help the region to reduce the potential for low-density development outside of urban areas.
Housing **12 MPPs**	The region preserves, improves, and expands its housing stock to provide a range of affordable, accessible, healthy,	All alternatives meet total housing growth targets and Alternatives 2-5 add more emphasis on middle housing and other housing types,

Topic Area	VISION 2050 Goal	Evaluation
	and safe housing choices to every resident. The region continues to promote fair and equal access to housing for all people.	particularly Alternatives 3-5. See also **Section 3.8 Population, Housing, & Employment** for a discussion of how the alternatives impact housing and address new GMA housing requirements in HB 1220. *MPP-H-1 Plan for housing supply, forms, and densities to meet the region's current and projected needs consistent with the Regional Growth Strategy and to make significant progress towards jobs/housing balance.*
Economy **23 MPPs**	The region has a prospering and sustainable regional economy by supporting businesses and job creation, investing in all people and their health, sustaining environmental quality, and creating great central places, diverse communities, and high quality of life.	All alternatives accommodate job targets. Most jobs would be located in Area 4 Downtown. The action alternatives spread a slightly higher share of retail/service jobs in neighborhoods in support of greater residents.
Transportation **32 MPPs**	The region has a sustainable, equitable, affordable, safe, and efficient multimodal transportation system, with specific emphasis on an integrated regional transit network that supports the Regional Growth Strategy and promotes vitality of the economy, environment, and health.	Each studied alternative would place most growth in centers and around transit investments. Alternatives 2 and 5 support a station area plan at 130th and 145th Street areas. Alternatives 4 and 5 further emphasize a range of housing types along corridors. Transportation improvements would be multimodal. More investments would be needed with greater growth. See **Section 3.10 Transportation**.
Public Services **30 MPPs**	The region supports development with adequate public facilities and services in a timely, coordinated, efficient, and cost-effective manner that supports local and regional growth planning objectives.	All alternatives would allow for growth that increases demand for public services with Alternative 1 the least and Alternative 5 the most. The City and municipal providers regularly plan for capital facilities to meet current and projected needs. See **Section 3.11 Public Services** and **Section 3.12 Utilities**.

Source: BERK, 2023.

Countywide Planning Policies

Each alternative would provide capacity to meet minimum growth targets for housing and jobs. See **Exhibit 3.7-9**. The ability to produce housing at affordability levels is described in **Section 3.8 Population, Housing, & Employment**. The County would also meet minimum standards for the countywide center of 130th Avenue Station Area by total area and activity units under Alternatives 2 and 5.

Exhibit 3.7-9. Countywide Planning Policies, Major Goals—Alternatives Evaluation

Chapter/ Element	Goals	Evaluation
Environment	Overarching Goal: The quality of the natural environment in King County is restored and protected for future generations.	All alternatives would add redevelopment that could implement improved water quality; see **Section 3.1 Earth & Water Quality**. The potential for tree canopy loss or gain is addressed in **Section 3.3 Plants & Animals**.
Development Patterns	Overarching Goal: Growth in King County occurs in a compact, centers-focused pattern that uses land and infrastructure efficiently, connects people to opportunity, and protects Rural and Natural Resource Lands.	In general, all alternatives[27] would focus the majority of future growth into urban centers and villages. An additional 80,000 housing units would be added consistent with past growth and existing plan goals which would occur primarily in existing urban centers and villages under all alternatives. The additional 20,000 or 40,000 housing units added under the action alternatives would be accommodated within new place types or expanded urban center and village boundaries located throughout the city depending on the alternative.
Housing	Overarching Goal: Provide a full range of affordable, accessible, healthy, and safe housing choices to every resident in King County. All jurisdictions work to: ▪ preserve, improve, and expand their housing stock; ▪ promote fair and equitable access to housing for all people; and ▪ take actions that eliminate race-, place-, ability-, and income-based housing disparities.	The Countywide Planning Policies include housing targets by affordability bands. ▪ 0-30% Area Median Income (AMI): 6% ▪ 31-50% AMI:10% ▪ 51-80% AMI: 17% ▪ Over 80% AMI: 66% All alternatives meet total housing growth targets. Considering the match of unit types to income bands, action alternatives perform better particularly Alternatives 5 with the greatest opportunity to provide a range of housing types at different income levels. Please see **Section 3.8 Population, Housing, & Employment** for a discussion of how the alternatives impact housing.
Economy	Overarching Goal: All people throughout King County have opportunities to prosper and enjoy a high quality of life through economic growth and job creation.	All alternatives would accommodate job targets and would promote economic opportunity in the city and region. Most jobs would be located in Area 4 Downtown and the action alternatives spread a slightly higher share of retail/service jobs in neighborhoods in support of greater residents. The action alternatives would include additional policies related to workforce development, supporting and growing neighborhood commercial districts, sustaining a healthy climate for growing and emerging industries, and supporting the city's competitive advantage in the industrial and maritime sectors. The action alternatives would also incorporate policies to ensure equitable access to living-wage careers for all residents, and particularly BIPOC communities to be able to share equally in the benefits of Seattle's growing economy.

[27] See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5. Alternative 1 No Action would retain the City's Seattle 2035 urban village strategy and center/village designations. Ballard would remain a "Hub Urban Village" under Alternative 1, would be called an "Urban Center" under Alternatives 2-5, and would be redesignated as a Regional Center under Alternative 5.

Chapter/ Element	Goals	Evaluation
Transportation	Overarching Goal: The region is well served by an integrated, multimodal transportation system that supports the regional vision for growth, efficiently moves people and goods, and is environmentally and functionally sustainable over the long term.	Each studied alternative would place most growth in centers and around transit investments. Alternatives 2 and 5 support a station area plan at 130th and 145th Street areas. Alternatives 4 and 5 further emphasize a range of housing types along corridors. Transportation improvements would be multimodal. More investments would be needed with greater growth. See **Section 3.10 Transportation**.
Public Facilities and Services	Overarching Goal: County residents in both Urban and Rural Areas have timely and equitable access to the public services needed to advance public health and safety, protect the environment, and carry out the Regional Growth Strategy.	All alternatives would allow for growth that increase demand for public services with the least amount of growth and new demand under the No Action Alternative and the most under Alternative 5. The City and municipal providers regularly plan for capital facilities to meet current and projected needs. See **Section 3.11 Public Services** and **Section 3.12 Utilities**.

Source: BERK, 2023.

130th/145th Station Area

Each alternative differs in its treatment of the 130th/145th Station Area Plan. See the discussions below.

Equity & Climate Vulnerability Considerations

The action alternatives would adopt a new Comprehensive Plan with a new growth strategy and new Housing Element incorporates the newest requirements to address racially disparate impacts in housing and provide opportunities for housing under a range of income categories per HB1220. The growth strategies under the alternatives would respond to HB1220 requirements as well as PolicyLink recommendations to allow "more housing types across the city with equitable access to wealth building and neighborhood opportunities."

The action alternatives allocate a similar or greater amount of growth to villages as the No Action Alternative. Additional growth over the No Action Alternative is planned in Neighborhood Residential areas and is either clustered (in neighborhood centers under Alternative 2 or in corridors under Alternative 4) or distributed across single family areas with middle housing types (Alternatives 3 and 5).

In addition, the action alternatives include new climate policies focused on reducing emissions from buildings and transportation and making the city more capable of withstanding the impacts of climate change. The action alternatives would allow more growth and could increase emissions locally per **Section 3.2 Air Quality & GHG Emissions**; however, the region-wide benefit of channeling development that might otherwise occur in peripheral areas of the city or region to targeted areas could serve to offset these impacts.

Long-range policies are meant to bring Seattle closer to being carbon neutral by 2050 and help to build a city that adapts and is resilient to rising seas, heat waves, flooding, and more extreme storms. Seattle is committed to working with partners to reach county, regional, and statewide goals (City of Seattle, 2022).

Impacts of Alternative 1: No Action

Alternative 1, No Action, would meet GMA goals regarding compact growth served by multimodal transportation and municipal services. It would not meet new GMA requirements to amend the Housing Element to address new requirements in HB1220 regarding housing opportunities by income band and the removal of racially disparate impacts. Likewise, new housing targets by income band and special needs housing required in Countywide Planning Policies would not be met. Alternative 1 could perhaps conflict with Countywide Planning Policies that direct cities to provide a full range of affordable, accessible, healthy, and safe housing choices to every resident in King County as it would continue to limit the range of housing options in many areas of Seattle.

The No Action Alternative would provide capacity to minimum housing and growth targets consistent with VISION 2050, but other elements of the Comprehensive Plan would not reflect more recent VISION 2050 policies regarding equity, climate change, and others. The No Action Alternative would not include a new climate element to meet GMA requirements or VISION 2050 policies nor address the findings of the equity evaluation of Seattle 2035 plan.

Greenhouse gas emissions could increase for buildings and waste and less so for transportation under the No Action Alternative; per capita air emissions would be slightly higher than under the action alternatives but still lower than existing per capita rates. See **Section 3.2 Air Quality & GHG Emissions**.

130th/145th Station Area

The *130th and 145th Station Area Plan* and its vision and strategies would not be implemented under the No Action Alternative. Housing and job growth around both station areas would be minimal.

Impacts of Alternative 2: Focused

Policies: All the action alternatives, including Alternative 2, would update the Comprehensive Plan policies to meet state and regional requirements. Areas of focus include the following:

- **Climate Change:** The Comprehensive Plan will include new climate policies focused on reducing emissions from buildings and transportation and making the city more capable of withstanding the impacts of climate change. Long-range policies will bring Seattle closer to being carbon neutral by 2050 and adapt to climate exposures despite rising seas, heat waves, flooding, and more extreme storms. Seattle is committed to collaborating with partners to reach county, regional, and statewide goals.

- **Economic Development:** The Economic Development Element will seek to support and grow neighborhood commercial districts, sustain a healthy climate for growing and emerging industries, and support the city's competitive advantage in the industrial and maritime sectors. The update will include policies to ensure equitable access to living-wage careers for all residents and allow BIPOC communities to be able to share equally in the benefits of Seattle's growing economy.
- **Housing:** A new element would meet new GMA requirements and address additional housing types and affordability levels. The intent is to address the City's severe housing shortage and increasing rents and home sales prices, provide resources for low-income housing, address the underproduction of smaller and lower cost homes, remove racial disparities in housing access and homeownership, reduce displacement risks, and reduce the risks of becoming homeless.
- **Parks and Open Space:** The City will develop strategies that expand, connect, improve, and maintain Seattle's public space network. The effort centers racial equity to support the health and well-being of all communities. The work will include identifying how public space can help provide resilience to climate change. The Plan will also look at ways Seattle can deliver green improvements to neighborhoods that are vulnerable to displacement in ways that support community stability.
- **Transportation:** The Transportation Element contains broad policy guidance for a transportation system that meets the city's mobility needs and advances climate, safety, and equity goals. The element will address growth across Seattle by supporting improvements to benefit walking, biking, transit, and freight mobility. The Comprehensive Plan is being updated at the same time as the Seattle Transportation Plan, which will provide more details about strategies and actions Seattle will take to fulfill a collective transportation vision.
- **Environment and Climate Element:** A chapter of the plan will address new requirements of HB 1181 to provide a climate change and resiliency element including GHG reduction and resiliency sub-elements. Goals include becoming carbon neutral by 2050 and being prepared for direct and indirect impacts of climate change and other natural hazards.

Growth Targets and Strategies: Alternative 2 would provide more housing in areas of focused growth than Alternative 1 which would support an improved jobs/housing balance.

Allowing for greater growth in Metropolitan Cities to provide more housing types and support transit is consistent with VISION 2050. See also **Section 3.8 Population, Housing, & Employment** for a discussion of how Alternative 2 impacts housing and addresses new GMA housing requirements in HB 1220.

Consistency with State and Regional Environmental Goals: Alternative 2 would allow for improved water quality where new development implements modern stormwater standards. More growth could accelerate loss of tree canopy unless development standards are modified as noted in **Section 3.3 Plants & Animals** and **Section 3.6 Land Use Patterns & Urban Form**. Air quality results show slightly reduced per capita emissions compared to the No Action Alternative including reduced transportation emissions (see **Section 3.2 Air Quality & GHG Emissions**).

130th/145th Station Area

Land use designations, zoning, and policies under Alternative 2 would implement the *130th and 145th Station Area Plan* vision and strategies. Both stations areas would see more growth clustered in the newly designated neighborhood centers compared to the No Action Alternative and existing conditions. Growth would increase activity units from 18.6 (existing) to 29.9 around NE 130th Street and from 35.7 (existing) to 83.3 around 15th and 145th.

Impacts of Alternative 3: Broad

Impacts under Alternative 3 are similar to those described under Alternative 2, except that more attention to middle housing types would occur in Neighborhood Residential Areas. This could help implement VISION 2050 policies that allow for more housing capacity in Metropolitan cities to support middle housing types.

130th/145th Station Area

Not applicable. The *130th and 145th Station Area Plan* would not be implemented.

Impacts of Alternative 4: Corridor

Impacts under Alternative 4 are similar to those described under Alternative 2. Allowing for additional housing types around high-capacity transit corridors would help implement VISION 2050 policies that allow for more housing capacity in Metropolitan cities to address transit investments.

130th/145th Station Area

Not applicable. The *130th and 145th Station Area Plan* would not be implemented.

Impacts of Alternative 5: Combined

Alternative 5 would update the Comprehensive Plan to meet state and regional requirements. It would provide the greatest capacity for housing to meet affordability and jobs/housing balance goals, benefiting the region's environmental conservation goals.

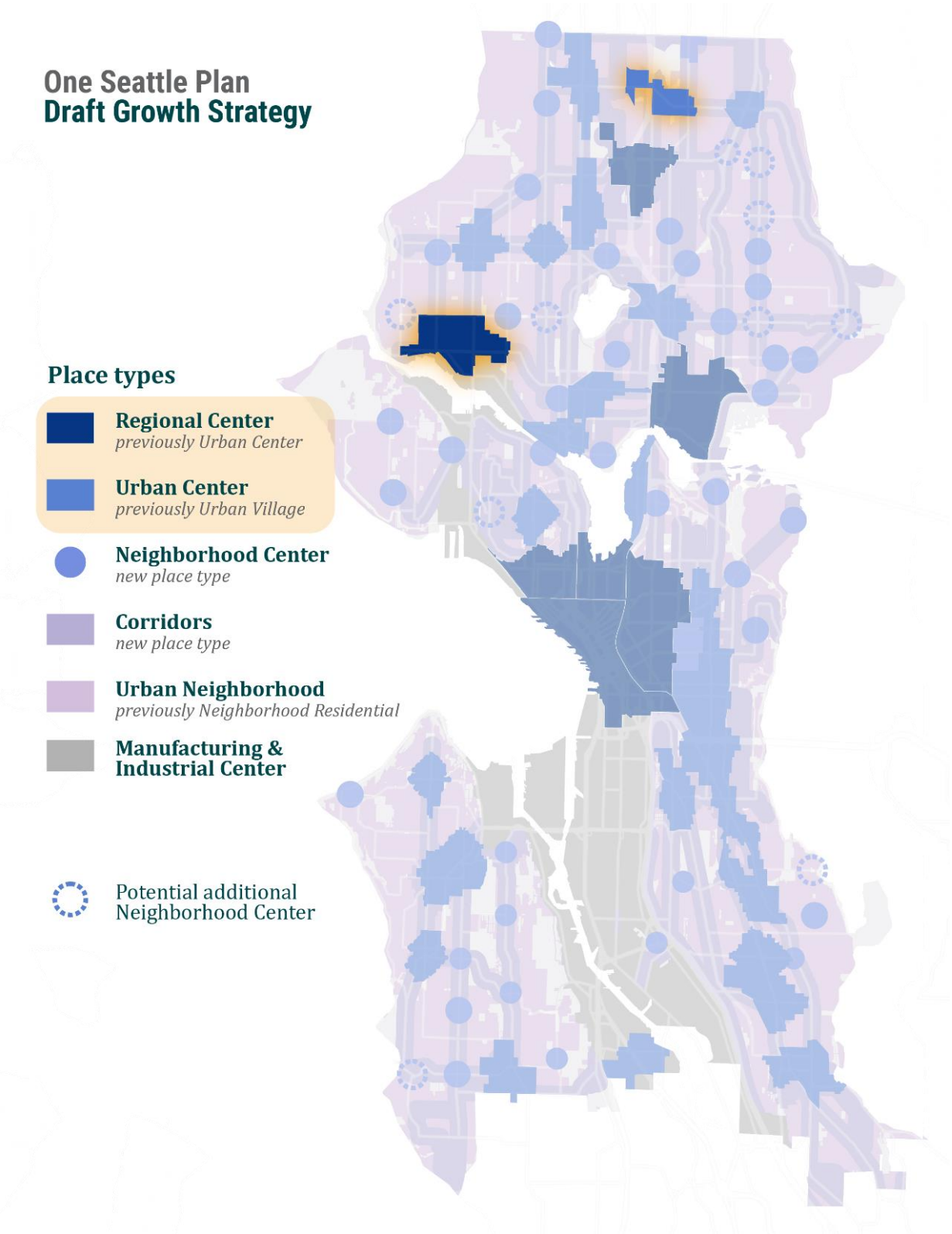
The City intends to designate two new centers under Alternative 5—one under PSRC's VISION 2050 plan and one under the CPP countywide centers, though it must be nominated in the countywide planning policies (DP-32). See **Exhibit 3.7-10** and **Section 3.6 Land Use Patterns & Urban Form**:

- The existing **Ballard** Hub Urban Village would be redesignated as a regional center. It would likely be proposed to be designed as a regional center by the Puget Sound Regional Council as part of future processes. The proposed regional growth center in Ballard would meet

PSRC designation criteria for size and existing and planned future activity units with a study area of 495 acres and 67.7 existing and 101.0 planned activity units by 2044.

- The **NE 130th Street Station Area** would be designated a new urban center. It would likely be proposed to be designated as a Countywide Center as part of future processes. The proposed center at NE 130th Street Station Area would meet countywide center designation criteria for existing and planned future activity units with 18.4 exiting and 35.5 planned activity units by 2044.

Exhibit 3.7-10. Proposed Redesignated and New Centers—Alternative 5



Source: City of Seattle, 2023.

The Alternative also expands existing urban centers and villages.[28] The boundary expansions for regional and urban centers are intended to allow them to comply with Countywide Center criteria for size. The Admiral, Morgan, and Upper Queen Anne centers do not meet activity units for Countywide Centers (30 activity unit threshold) in Alternative 5 though their size would meet standards. A preferred alternative, if included in the Final EIS, could allocate more growth in those center locations such as by moving housing and job allocations from corridors or other place types. See **Exhibit 3.7-11** and **Exhibit 3.7-12**.

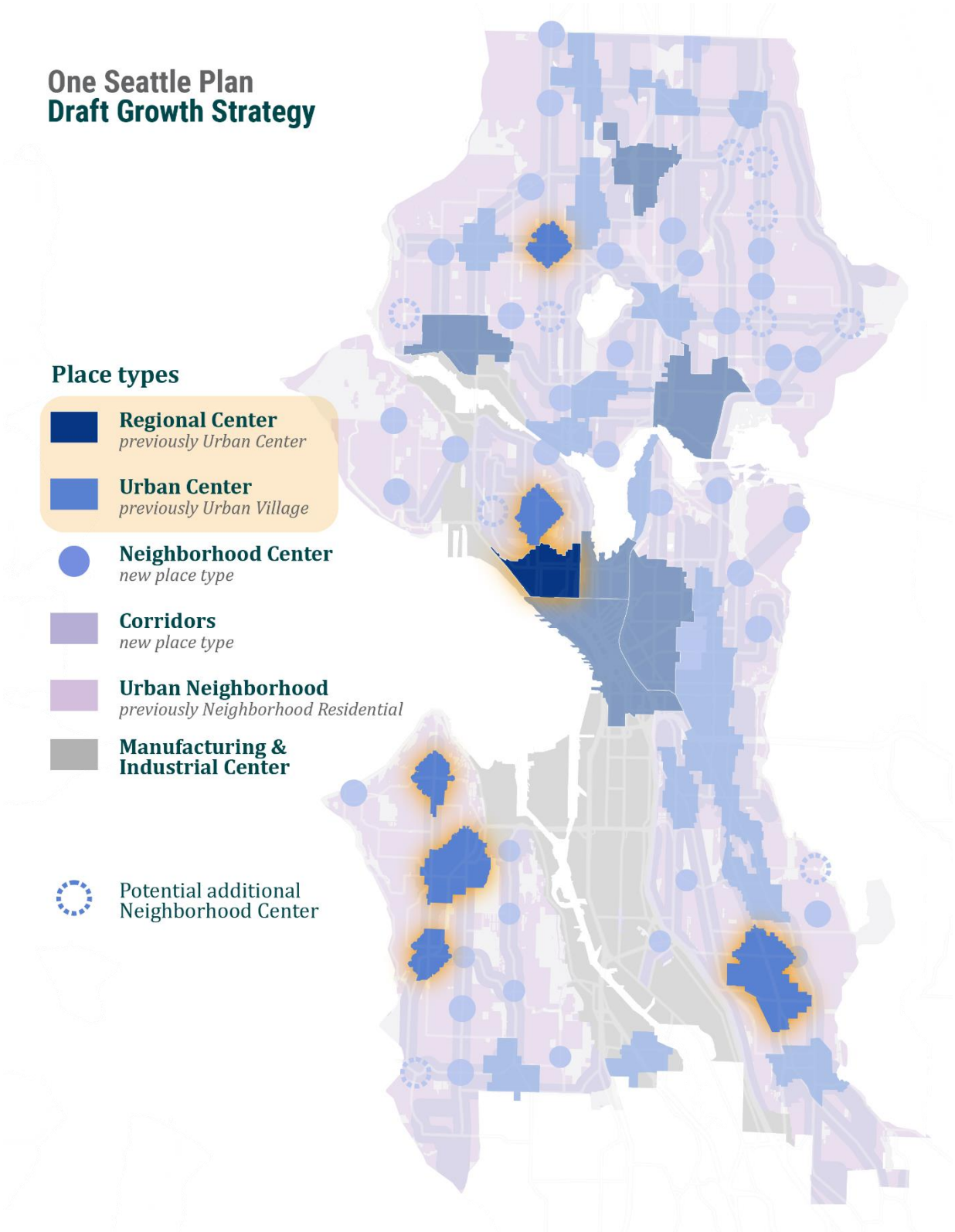
Exhibit 3.7-11. Proposed Center Expansions—Alternative 5

Type of Expansion	Centers	Size and Activity Units
Expand centers too small to meet **Countywide Center criteria** to include all areas within a 7.5-minute walk (2,000 feet) of central intersection	▪ Greenwood–Phinney Ridge ▪ Upper Queen Anne ▪ Admiral ▪ Morgan Junction	▪ Greenwood–Phinney Ridge: 315 Acres, 30.7 Activity Units ▪ Upper Queen Anne: 329 Acres, 17.8 Activity Units ▪ Admiral: 288 acres, 23.9 Activity Units ▪ Morgan Junction: 281 acres, 25.5 Activity Units
Expand centers with **new light rail stations** to include all areas within a 10-minute walk (half-mile) of light rail station	▪ Uptown ▪ Graham Street (Othello) ▪ West Seattle Junction at Avalon if station approved by ST board	▪ Uptown: 391 acres, 137.2 Activity Units ▪ Graham Street (Othello): 584 acres, 30.6 Activity Units ▪ West Seattle Junction at Avalon: 449 acres, 59.9 Activity Units

Source: City of Seattle, 2023; BERK 2023.

[28] See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5. Alternative 1 No Action would retain the City's Seattle 2035 urban village strategy and center/village designations—the existing urban centers and villages are categorized here according to the new place types proposed under Alternatives 2-5 for comparison purposes only. Ballard would remain a "Hub Urban Village" under Alternative 1, would be called an "Urban Center" under Alternatives 2-5, and would be redesignated as a Regional Center (as shown here) under Alternative 5.

Exhibit 3.7-12. Expanded Regional & Urban Centers—Alternative 5



Source: City of Seattle, 2023.

The City may also seek countywide center designation for all urban villages under Alternative 5 to help facilitate infrastructure investments and be locations for facilitated environmental review. This includes responding to SB 5412 which allows for an infill exemption for housing and mixed-use development when considered in an EIS for a Comprehensive Plan. As part of this EIS process state agencies including WSDOT have been consulted and mitigation measures both current regulations and other proposed mitigation could apply to reduce impacts. See **Appendix C** for a list of codes providing mitigation for environmental impacts.

See also **Section 3.8 Population, Housing, & Employment** for a discussion of how Alternative impacts housing and affordability.

130th/145th Station Area

The 130th and 145th Station Areas would have a high intensity of growth around the transit investment under Alternative 5 that would help fulfill the station area plan vision and strategies. A Planned Action Ordinance or other SEPA facilitation options could help advance the vision and implementation of strategies as development occurs.

3.7.3 Mitigation Measures

Incorporated Plan Features

The action alternatives propose a new growth strategy with the following goals:

- **Growth**: Accommodate new housing and jobs over the next 20 years and beyond
- **Housing**: Increase the supply, diversity, and affordability of housing to reduce upward pressure on prices and expand choices for diverse households
- **Equity**: Redress harms from neighborhood exclusion and housing discrimination, meet the housing needs of BIPOC households, and support wealth building opportunities
- **Displacement**: Prevent the displacement of existing residents due to direct impacts and market forces.
- **Complete, climate-friendly neighborhoods**: Create and support communities where more people can access transit, shops, and services by walking and biking.
- **Encourage a diverse mix of businesses and jobs** in neighborhoods across the city and help existing business remain in place.

The action alternatives also propose new housing and place types to help meet affordable housing needs and address racially disparate impacts in support of the City's response to HB1220 (see **Section 3.8 Population, Housing, & Employment**). The action alternatives promote housing types in other bills relevant to middle housing HB 1110 and accessory dwelling units in HB 1137.

A new Environment and Climate Element would meet requirements of HB 1181.

Regulations & Commitments

As required by GMA, the City must submit proposed Comprehensive Plan amendments and updated regulations for review and comment by the State prior to final adoption.

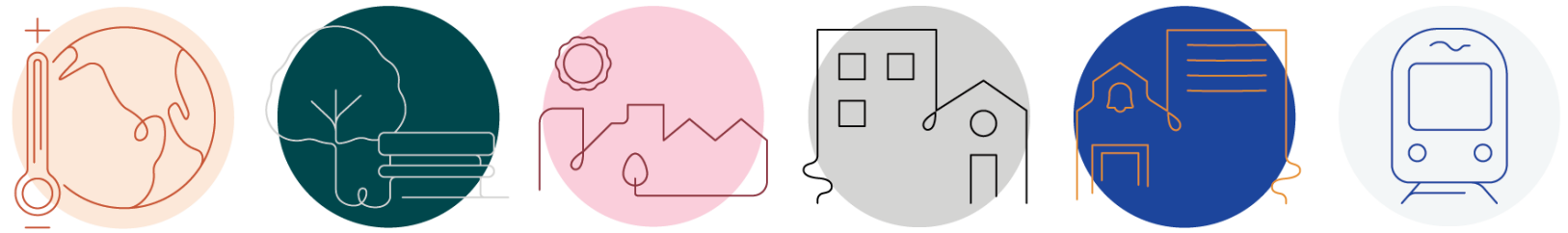
Other Potential Mitigation Measures

When a Preferred Alternative is developed, it should be evaluated for conformity to state and regional plans and policies. It may include reallocating growth assumptions in place types while being in the range of the studied alternatives (e.g. to meet Countywide Center or Regional Growth Center criteria).

3.7.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts are anticipated with respect to plans and policies. Inconsistencies with new regional plans and state requirements and the regional growth strategy under the No Action Alternative would be avoided through amendments to the Comprehensive Plan proposed under the action alternatives.

3.8 Population, Housing, & Employment



Source: City of Seattle, 2023.

This section addresses population, employment, and housing, as well as the historical context of racial segregation that has contributed to today's demographic patterns. A review of these aspects of the affected environment—on a citywide scale and for each analysis area—will serve as a baseline for analyzing the impacts of the five alternatives.

The analysis of impacts addresses likely outcomes of each alternative on Seattle's population, employment, and housing stock. A primary focus of this analysis is the evaluation of how effectively each alternative achieves three objectives:

- Increase the supply, diversity, and affordability of market-rate housing.
- Increase the supply of income-restricted housing.
- Reduce residential displacement.

This analysis also evaluates the potential for increased physical displacement compared to the No Action Alternative. Such an adverse impact is considered significant if the projected number of physically displaced renter households exceeds the projected number of new income-restricted affordable housing units that would be created through Seattle's Mandatory Housing Affordability (MHA) and Multifamily Tax Exemption (MFTE) programs.

Mitigation measures and a summary of any significant unavoidable adverse impacts are included following the impacts analysis.

3.8.1 Affected Environment

Citywide

Population

The City of Seattle's population as of 2022 was 762,500.[29] Population growth in Seattle has been rapid compared to previous decades. Between 2010 and 2020 the city's population grew by more than 20%. In the previous decade, Seattle experienced population growth of 8% (see **Exhibit 3.8-1**).

Exhibit 3.8-1. Total Population of Seattle, 2000-2020

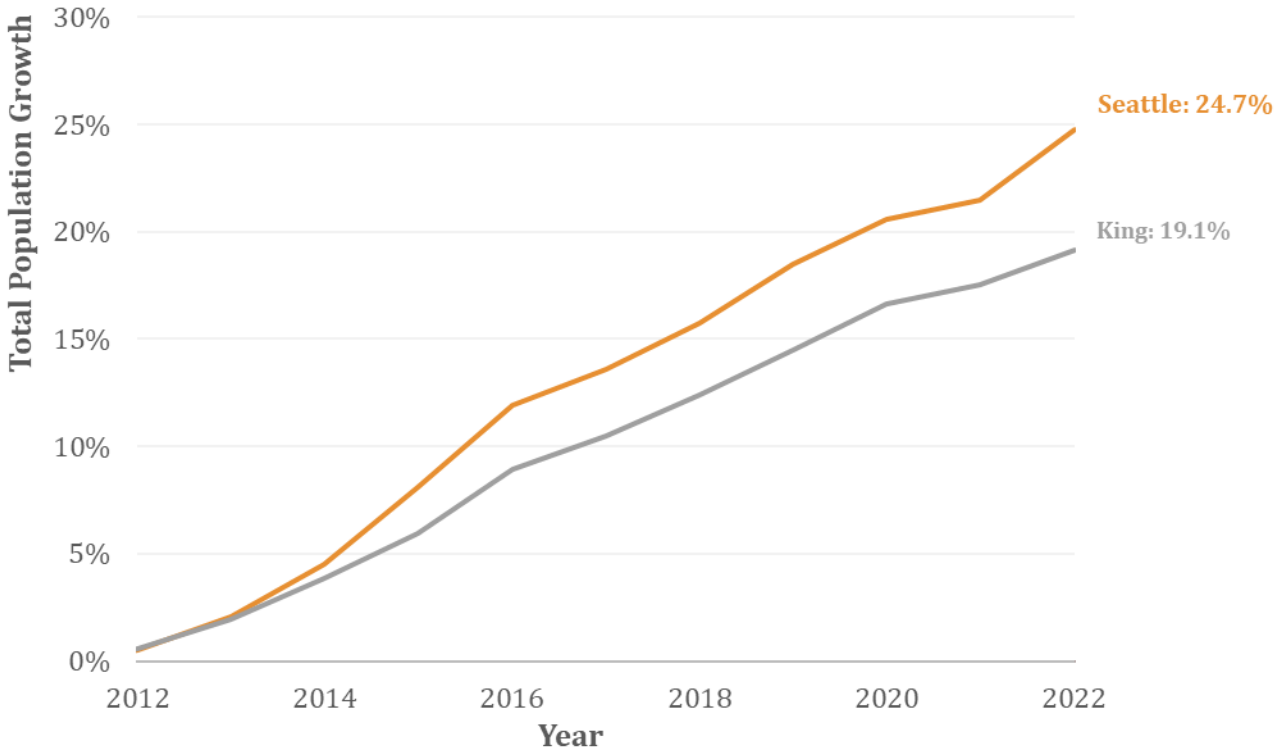
Census Year	Population	% Increase over previous 10 years
2000	563,374	
2010	608,660	8%
2020	737,015	21%

Sources: US Census Bureau, 2000, 2010, 2020.

[29] Washington State Office of Financial Management, 2022.

Over the last decade, Seattle's has grown faster than King County as a whole (about 25% from 2012 to 2022 compared to 19%; see **Exhibit 3.8-2**). Seattle's rapid population growth has been driven in large part by strong job growth and in-migration. Between 2010 and 2020, Seattle gained nearly 176,000 net new jobs. Many of these new jobs attracted foreign-born workers. As of 2021, Seattle's foreign-born population was over 140,000 people (almost one in five Seattle residents) of whom 46% were naturalized U.S. citizens.[30]

Exhibit 3.8-2. Population Growth in Seattle and King County, 2012-2022



Sources: Washington Office of Financial Management, 2022; BERK, 2023.

Exhibit 3.8-3 shows population by analysis area. The population is not evenly distributed among the areas. Areas 1 (Northwest Seattle) and 2 (Northeast Seattle) each have approximately 150,000 residents, compared to under 9,000 in Area 7, which includes the maritime and industrial areas along the Duwamish River. Slightly less than half (46%) of Seattle's residents live in Neighborhood Residential zones, where the predominant housing type is detached homes. The remainder live in zones that feature a greater diversity of housing types, such as apartments or townhomes.

[30] Source: American Community Survey 5-Year Estimates (2017-2021): S0502 SELECTED CHARACTERISTICS OF THE FOREIGN-BORN POPULATION BY PERIOD OF ENTRY INTO THE UNITED STATES

Exhibit 3.8-3. Population by EIS Analysis Area, 2020

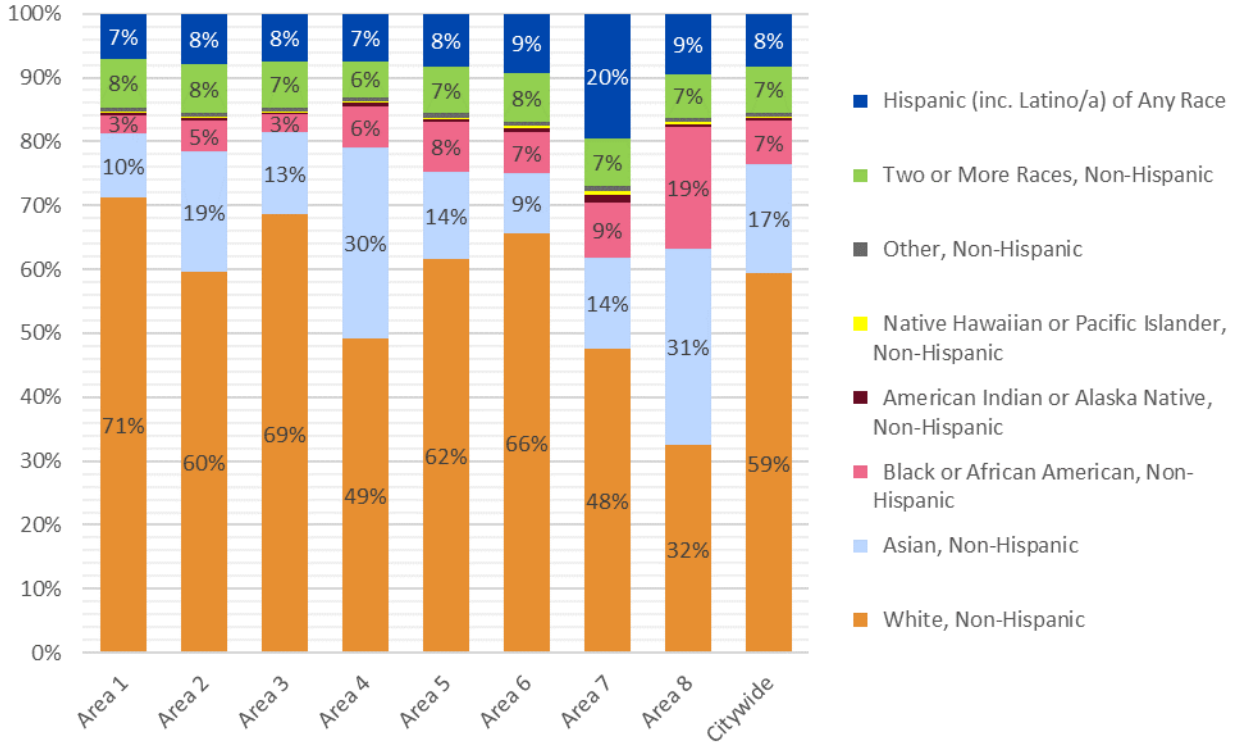
	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Citywide
Population	151,708	148,334	68,927	63,298	108,053	93,220	8,767	94,708	737,015
Percent of total population	21%	20%	9%	9%	15%	13%	1%	13%	

Source: 2020 U.S. Census, Table P2: Hispanic or Latino, and Not Hispanic or Latino by Race; City of Seattle, 2023.

Race & Ethnicity

In 2020, approximately two in five Seattle residents (41%) and more than half of youth under 18 (51%) were people of color.[31] This includes all residents who identify as a race or ethnicity other than White Non-Hispanic.[32] As of 2020, 8% of Seattle residents identified as Hispanic or Latino, 7% as Black or African American, Non-Hispanic; 17% as Asian, Non-Hispanic, and more than 10% as Two or More Races, Non-Hispanic, as shown in **Exhibit 3.8-4**.

Exhibit 3.8-4. Shares of Population by Race and Ethnicity, 2020



Note: Percentage values less than 2% are not labeled for readability.
Sources: US Census (Table P2: Hispanic or Latino, and Not Hispanic or Latino by Race), 2020; City of Seattle, 2023.

[31] Source: 2020 U.S Census, Table P2: Hispanic or Latino, and Not Hispanic or Latino by Race.
[32] Note, the Census group people who identify as "Hispanic" and "Latino" in a single category. References to "Hispanic" in this report are inclusive of persons who identify as Latino or Latina.

The breakdown of population by race varies across the city, as shown in **Exhibit 3.8-4**. The percentage of population that identifies as White, Non-Hispanic ranges from 34% in Area 8 (Southeast Seattle) to 73% in Area 1 (Northwest Seattle). There is also variation by place type. About 67% of residents in Neighborhood Residential zones identify as White, Non-Hispanic, compared to 54% of residents living outside of these zones.[33]

Historical Context of Racial Segregation

Seattle and the Puget Sound Region have a long history of discrimination shaping where people of color could live, own property, and sustain their culture, beginning with the arrival of white European settlers in the Pacific Northwest in the 1840s. At that time, Washington was part of the Oregon Territory and therefore subject to Black exclusion laws, which effectively prohibited Black people from settling or owning property in the territory as a way of ensuring the region's early development was primarily white. In 1855, the Treaty of Point Elliott was signed, establishing tribal reservations and guaranteeing the Tribes hunting and fishing rights in exchange for ceding tens of thousands of acres of their land to European-American settlers. Just ten years later, one of the City of Seattle's first laws after incorporation (Ordinance 5) barred Native people from living within City limits unless employed by a non-Native person.

Exclusion and forced relocation of certain groups continued through the end of the 19th and into the 20th century with anti-immigrant, especially anti-Asian, policies: the 1882 Chinese Exclusion Act and subsequent anti-Chinese riots in Seattle; the Alien Land Law enshrined in Washington's first constitution that prohibited land ownership by "aliens ineligible for citizenship," targeting Asian people whom Congress ruled in 1875 could not become citizens; and forced incarceration of Japanese and Japanese-Americans during World War II. Displacement also resulted from various city building efforts. The creation of the Ship Canal and Ballard Locks in the 1910s lowered the level of Lake Washington by more than eight feet and caused the Black River, on which many Duwamish lived and depended for fishing, to disappear. The construction of Interstate 5 through downtown Seattle resulted in the loss of homes, businesses, and cultural anchors in the Chinatown–International District.

The 20th century saw both the public and private sector turn to land use and housing as tools to protect and concentrate property ownership and wealth within white communities. Zoning was one of the first contemporary practices used to establish and solidify exclusion. In the early 1900s, U.S. cities began to control the type and intensity of land use in cities across the U.S., with Los Angeles and New York as early adopters of standards to separate uses and regulate building form. Shortly after, first Baltimore and then other cities began employing zoning to segregate neighborhoods explicitly on the basis of race. After this practice was ruled unconstitutional in 1917, city officials substituted other standards like minimum lot size and prohibitions on multifamily housing—both still present in Seattle's zoning today—as covert ways to shield white neighborhoods from lower-income residents and people of color.

[33] Sources: US Census (Table P2: Hispanic or Latino, and Not Hispanic or Latino by Race), 2020; City of Seattle, 2023.

While Seattle never had explicit racial zoning, its first zoning ordinance, adopted in 1923, was promoted by the City's own zoning commission as a way to prevent "lowering…the standard of racial strength and virility" and crafted by a planner who touted zoning's power to "preserve the more desirable residential neighborhoods" and prevent movement into "finer residential districts … by colored people." Before the advent of zoning, Seattle's building code regulated development, and dwellings with multiple families were allowed citywide. The 1923 zoning ordinance established and mapped the "First Residence District" where only "detached buildings occupied by one family" were allowed. In the subsequent decades, periodic downzoning expanded the extent of restrictive zoning into areas that previously allowed a mix of housing types. For a century, zoning in Seattle has curtailed access to many neighborhoods by barring lower-cost, denser housing like apartments, thus raising the financial bar to afford housing and reinforcing racial segregation since people of color have disproportionately lower incomes and less wealth due to structural racism.

Furthering this pattern of exclusion were racially restrictive covenants, the use of which arose in response to the Supreme Court's ruling on municipal racial zoning. Racial covenants were enforceable contract language written into deeds, plats, and homeowners association bylaws restricting the sale and use of property based on someone's race, ethnicity, and religion. As some residential areas began to diversify in the 1910s, racial covenants became widespread in Seattle, especially after the Supreme Court validated their use in 1926. Many neighborhoods prohibited the sale or occupancy of property to Asian Americans, Jewish people, and Black people, or even more broadly to anyone "other than one of the White or Caucasian race." One such covenant for the Windermere neighborhood said, "No person or persons of Asiatic, African or Negro blood, lineage or extraction, shall be permitted to occupy a portion of said property, or any building thereon; except domestic servant or servants may be actually and in good faith employed by white occupants of such premises." This practice excluded people of color from much of Seattle and from the opportunity to pursue homeownership, which was emerging in the 20th century as a common pathway to stability and wealth.

Alongside private deeds defining where people of color could not live, the Federal practice of redlining rendered them ineligible for government-backed home mortgages in the few areas where they could. As the U.S. emerged from the Great Depression, the National Housing Act was adopted in 1934 to boost housing stability and expand homeownership by underwriting and insuring home mortgages. To determine eligibility for those loans and delineate ideal areas for bank investment, the Home Owners Loan Corporation (HOLC), a Federal agency, created maps that appraised the creditworthiness of entire neighborhoods based in part on their racial composition. Areas deemed too risky for mortgage lending were shaded in red or "redlined," with a rationale explicitly referencing their racial composition. The neighborhood of Windermere, for example, was touted as "protected…by racial restrictions," while the Central Area redlined because "it is the Negro area of Seattle" and "composed of mixed nationalities." In appraisal standards that undergirded its lending decisions, the Federal Housing Administration (FHA) also employed a "whites-only" requirement, making racial segregation an official requirement of the federal mortgage insurance program and depriving people of color of the opportunity to own a home and build and pass on wealth.

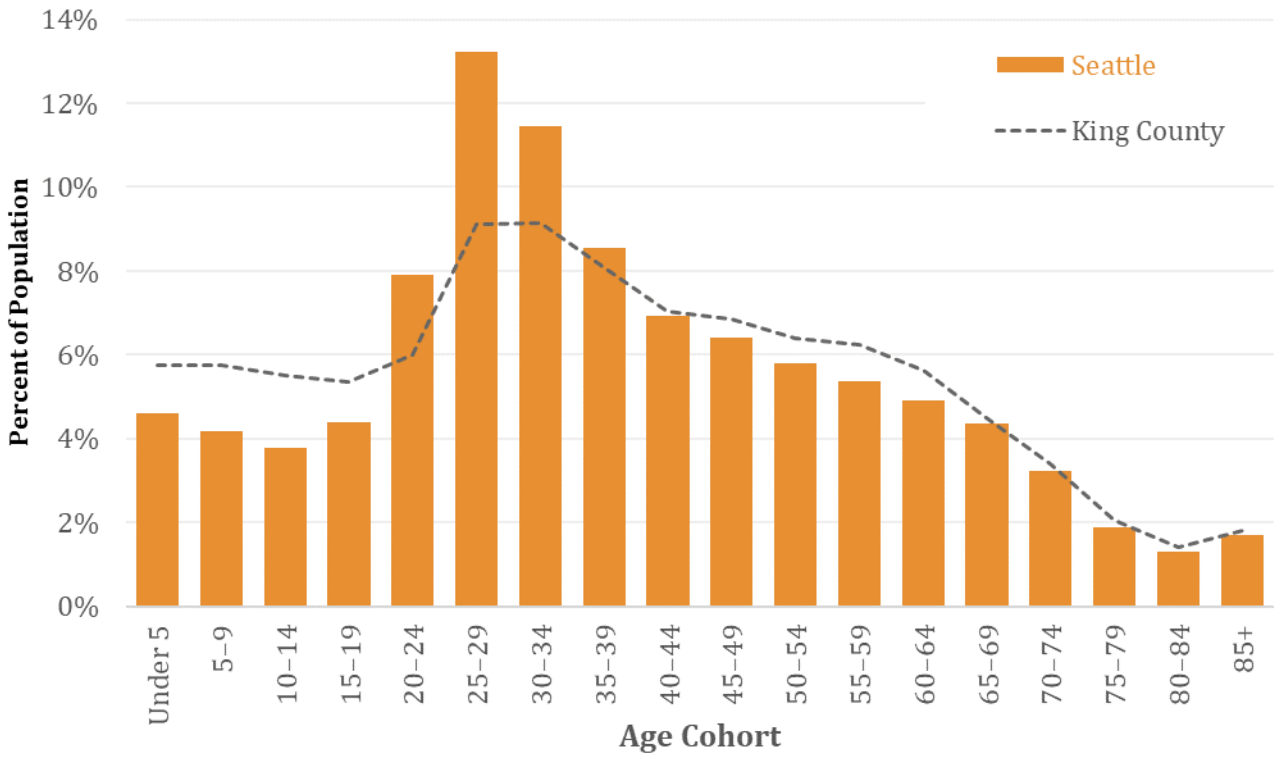
Informal practices and unwritten rules also contributed to housing discrimination. Real estate agents typically didn't show houses in predominantly white neighborhoods to people of color, and, even if they did, purchasing that housing was difficult for a buyer of color. Discrimination in the sale or rental of housing was legal until Congress passed the Fair Housing Act in 1968. But earlier in the decade, local discussions had begun of a potential City ordinance prohibiting housing discrimination. In 1963, Seattle's newly created Human Rights Commission drafted an open housing ordinance with criminal penalties for acts of housing discrimination on the basis of race, ethnic origin, or creed. The City Council referred the legislation to a public vote. Opponents organized and advertised heavily, and in March 1964 the measure failed two-to-one. Seattle eventually adopted Open Housing legislation in 1968, extending its protections against discrimination first in 1975 and as recently as 2017 to other identities and groups.

The legacy of these practices persists in several quantifiable ways that reveal where lasting exclusion and inequality remain. In areas with NR zoning where detached homes predominate, residents are disproportionately White, Non-Hispanic. Households of color generally and Black households in particular are much less likely to own their home compared to White, Non-Hispanic households (35% and 26% compared to 51%, respectively), and in recent years homeownership among people of color has declined faster than for white households, especially for Black households, whose homeownership rate dropped from 37% in 1990 to 23% in 2020. Similarly, Black households in Seattle today are twice as likely as white households to have zero or negative net worth (17.7% versus 33.1%, respectively). These and myriad other disparities originated in the explicit racism of the 19th and 20th centuries, hardened through 100 years of exclusionary zoning, and today persist in large part due to the market pressures of an increasingly unaffordable city.

Age Profile

Exhibit 3.8-5 shows Seattle's population by age range in 2020, with comparison to the age profile of King County. Seattle has a notably higher concentration of young adults, with about a third of its total population in the 19- to 34-year-old range. King County as a whole has a slightly greater share of its population under age 19 or between 45 and 64.

Exhibit 3.8-5: Shares of Population by Age in Seattle and King County, 2020

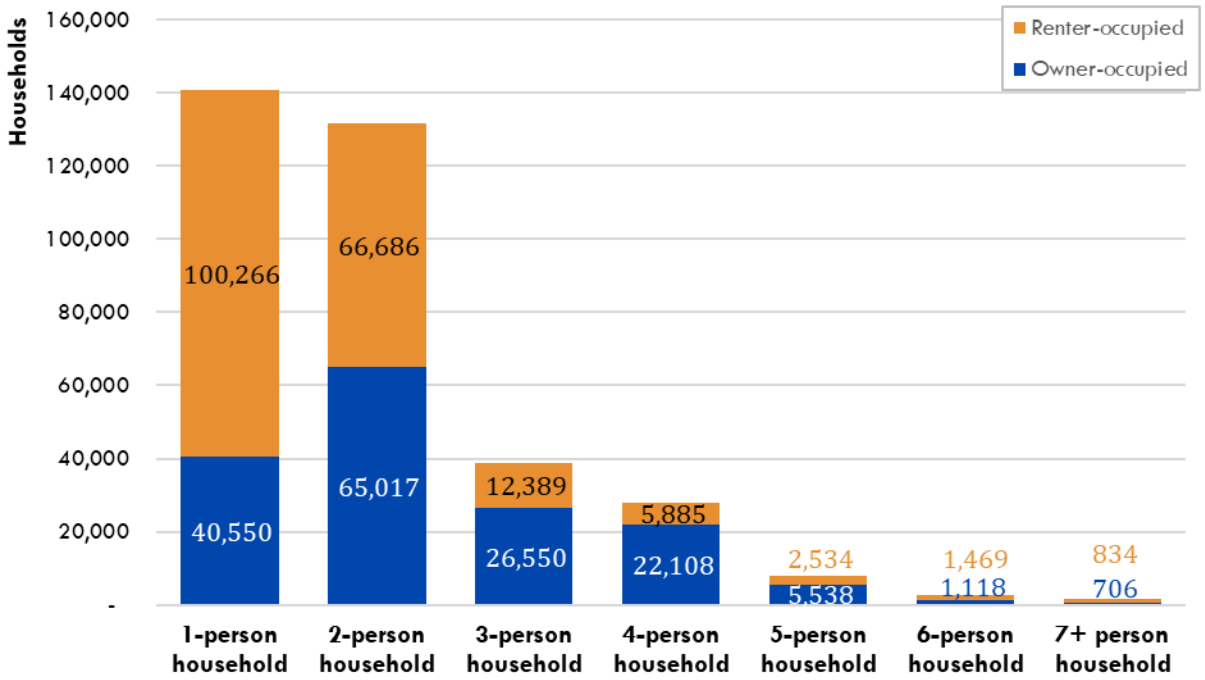


Source: ACS 5-Year Estimates, 2016-2020.

Household Characteristics

In 2021, Seattle had 337,361 households, with an average household size of 2.08.[34] After declines between 1980 and 2000, household size in Seattle has remained relatively steady over the last two decades. In 2021, about 45% of housing units were owner-occupied and 55% renter-occupied,[35] while in 2010 about 49% of households owned their homes.[36] This decline in homeownership rate is at least partly a reflection of new housing in Seattle, three-quarters of which are apartments (see **Exhibit 3.8-7**, below). **Exhibit 3.8-6** breaks down all households in Seattle by tenure and household size. More than three-quarters of Seattle households have only one or two members.

Exhibit 3.8-6. Households by Tenure and Household Size, 2021

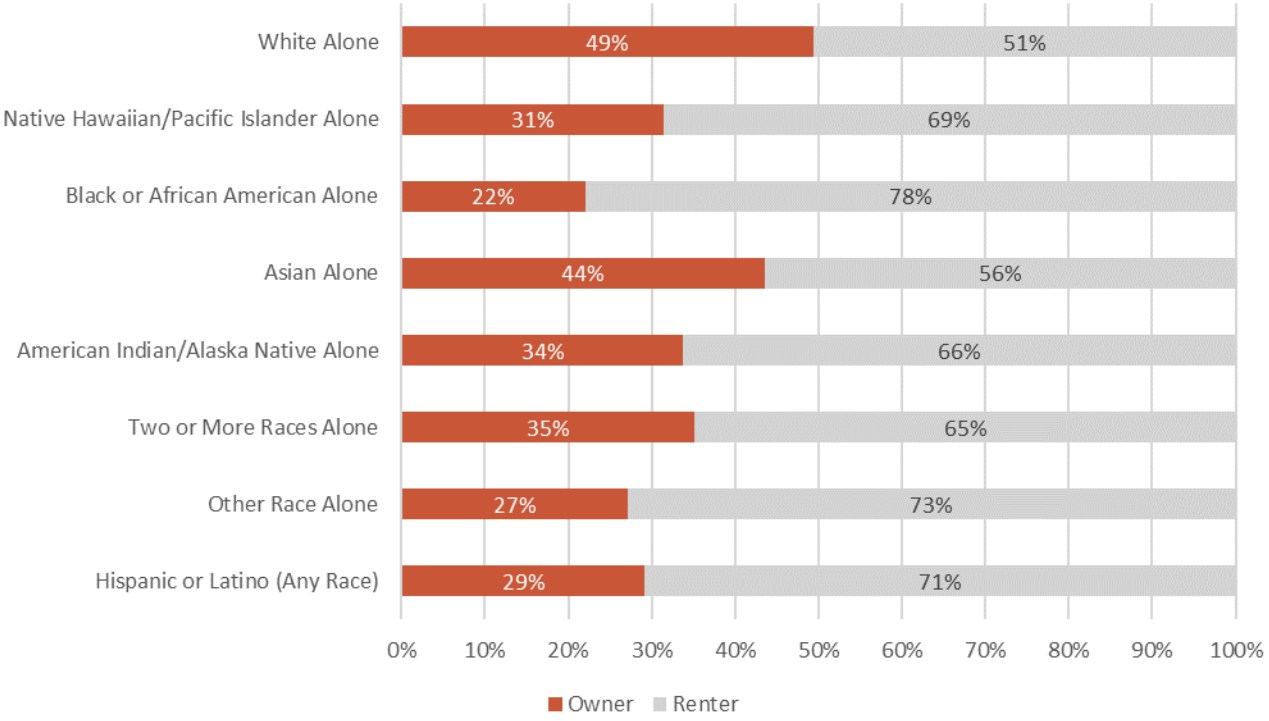


Sources: ACS 5-Year Estimates, 2017-2021 (Table B25009: Tenure by Household Size); BERK, 2023.

Homeownership bestows important benefits for stabilizing housing costs and providing long-term wealth generation potential. However, considerable disparities exist in Seattle's homeownership rate by householder race and ethnicity, as shown in **Exhibit 3.8-7**. Nearly half (49%) of White households in Seattle are homeowners, compared to only 22% of Black households and 29% of Hispanic or Latino households.

[34] Source: American Community Survey 5-Year Estimates (2017-2021): S1101 Households and Families
[35] Source: American Community Survey 5-Year Estimates (2017-2021): B25003: Tenure
[36] Source: American Community Survey 5-Year Estimates (2006-2010): B25003: Tenure

Exhibit 3.8-7. Housing Tenure by Householder Race and Ethnicity, 2021

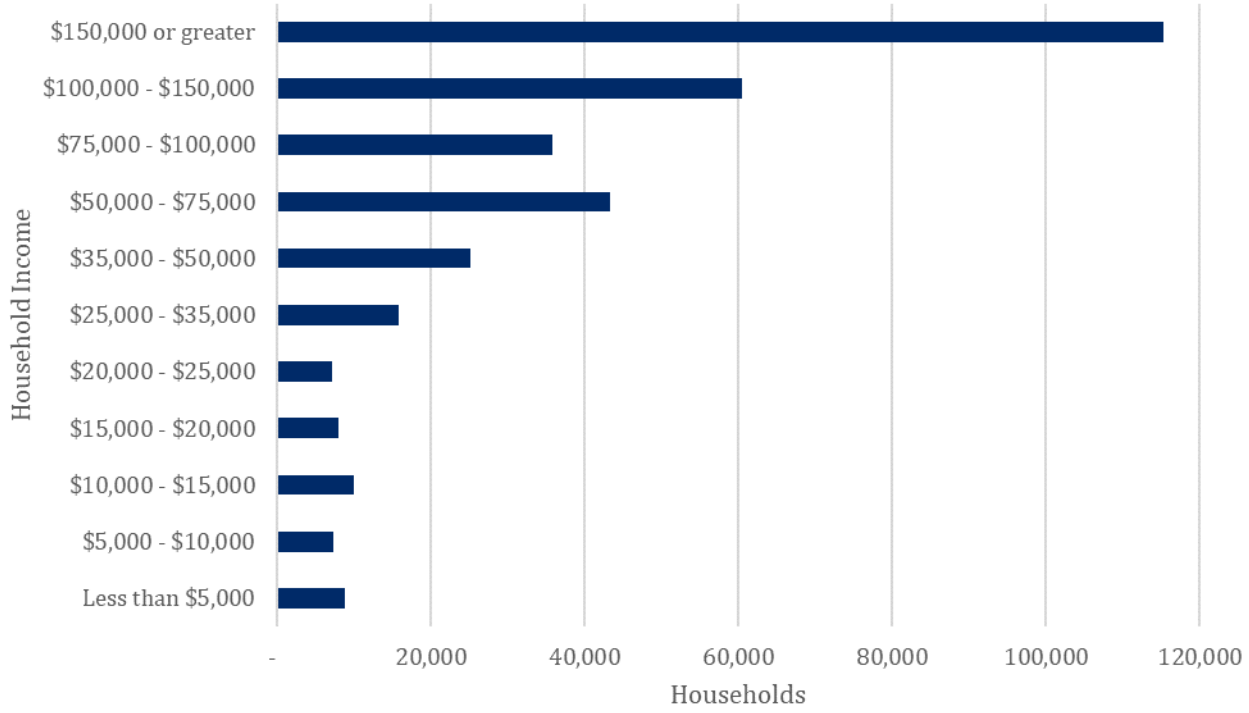


Sources: ACS 5-Year Estimates, 2017-2021 (Table S2502: Demographic Characteristics for Occupied Housing Units); BERK, 2023.

In 2021, the median income of all households in Seattle was $105,391.[37] **Exhibit 3.8-8** shows the distribution of Seattle households by income level. **Exhibit 3.8-9** shows the wide variation in incomes by race and ethnicity of householder. The median income for both Black households and American Indian or Alaskan Native households is less than half that of non-Hispanic White and Asian households.

[37] Source: American Community Survey 5-Year Estimates (2017-2021): S1901 Income in the past 12 months (in 2021 inflation-adjusted dollars).

Exhibit 3.8-8. Seattle Households by Income Level, 2021



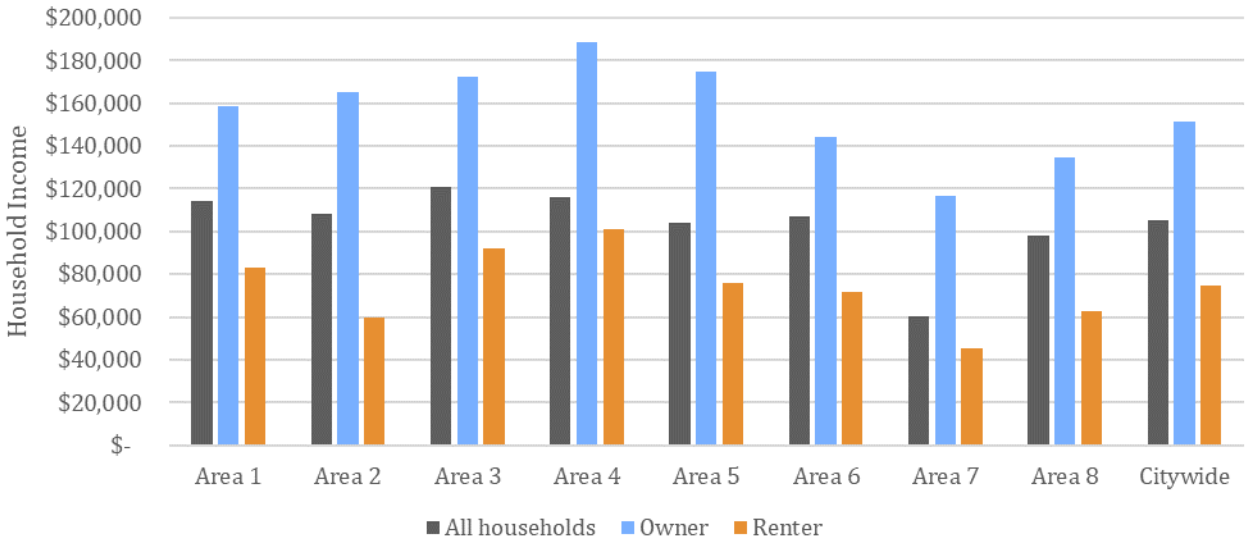
Sources: ACS 5-Year Estimates, 2017-2021, Table S1901: Income in the past 12 months (in 2021 inflation-adjusted dollars); BERK, 2023.

Exhibit 3.8-9. Median Income by Householder Race or Ethnicity, 2021

Sources: ACS 5-Year Estimates, 2017-2021, Table B19013: Median Household Income in the past 12 months (in 2021 Inflation-Adjusted Dollars); BERK, 2023.

Household income also varies substantially across the city and by tenure. **Exhibit 3.8-10** below shows median household income for owner, renter, and all households by analysis area. For all households, average income ranges from $60,000 for the roughly 3,500 occupied units in Area 7 (Port of Seattle and Harbor Island) to more than $180,000 in Area 4 (Downtown Seattle), which has about 40,000 occupied units. Citywide, the median income of owner households ($151,430) is more than twice the median income of renter households ($74,580).

Exhibit 3.8-10. Median Household Income by Tenure and EIS Analysis Area, 2021

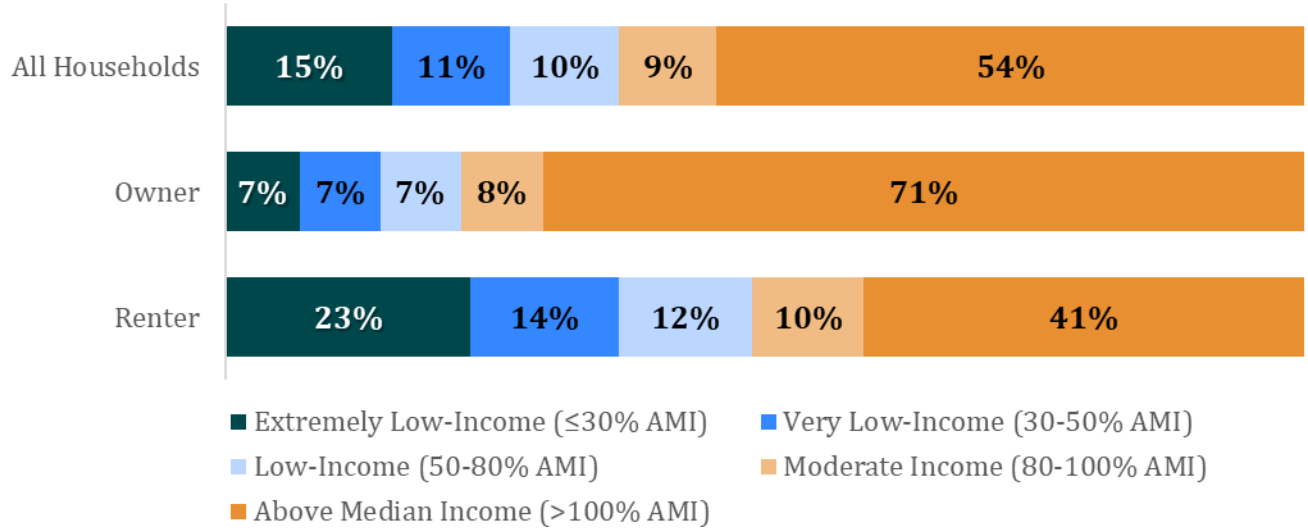


Sources: ACS 5-Year Estimates, 2017-2021 (Table B25119: Median Household Income the past 12 months (in 2021 inflation-adjusted dollars) by Tenure); City of Seattle, 2023; BERK, 2023.

The 2022 HUD Median Family Income (also known as Area Median Income, or AMI) in the Seattle metropolitan area was $134,600.[38] AMI is typically higher than median income reported by the ACS because AMI is based only on the incomes of family households (which may have multiple working-age adults rather than a single person living alone) and is projected forward to the current year. Income limits are typically set relative to AMI when determining eligibility for income-restricted affordable housing. These income limits are also adjusted for household size. **Exhibit 3.8-11** presents the percentage of all households by income level relative to AMI and by tenure. It shows significant income disparities between owner and renter households, with a much higher percentage of owner households having incomes above AMI.

[38] Source: HUD, 2022. https://www.huduser.gov/portal/datasets/il/il2022/2022MedCalc.odn.

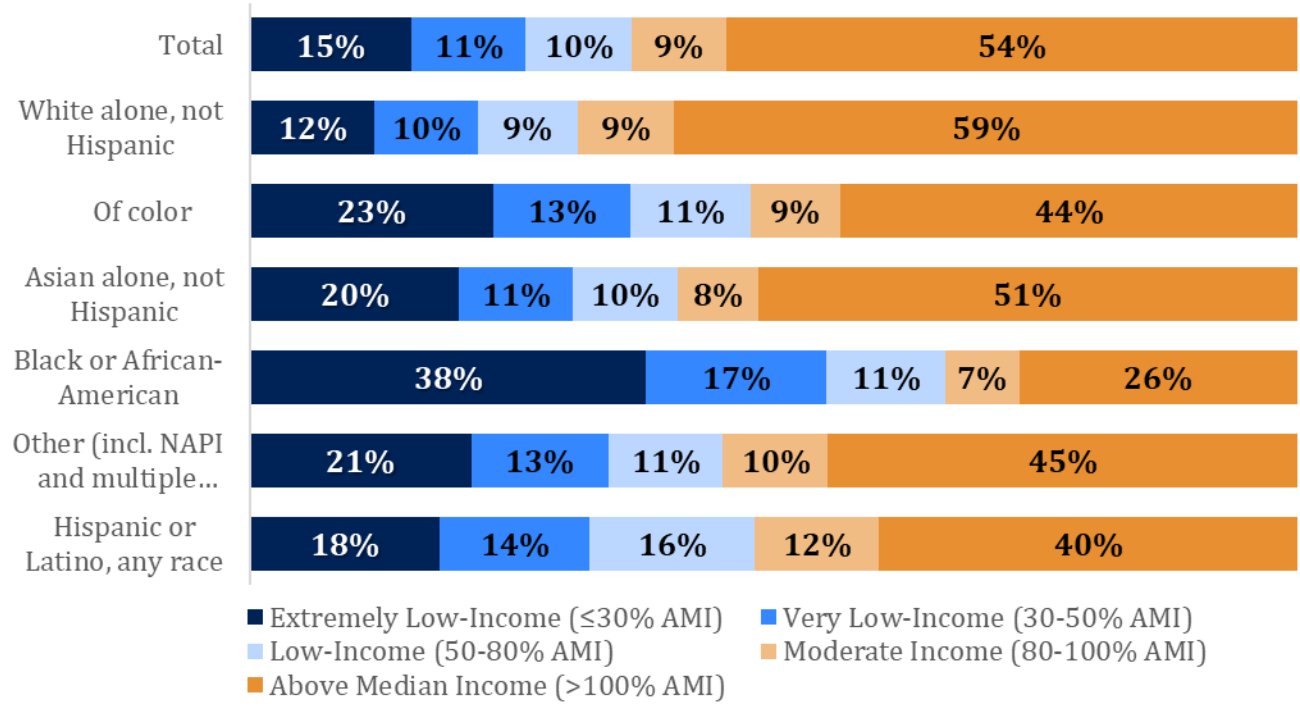
Exhibit 3.8-11. Household Income Level by Tenure, 2015-2019



Sources: US HUD CHAS data, 2015–2019; BERK, 2023.

Household income in Seattle varies considerably by race and ethnicity, as shown in **Exhibit 3.8-12**. As of 2019, only 41% of White, non-Hispanic households had incomes below AMI, compared to 74% of Black or African American households and 64% of all households of color.

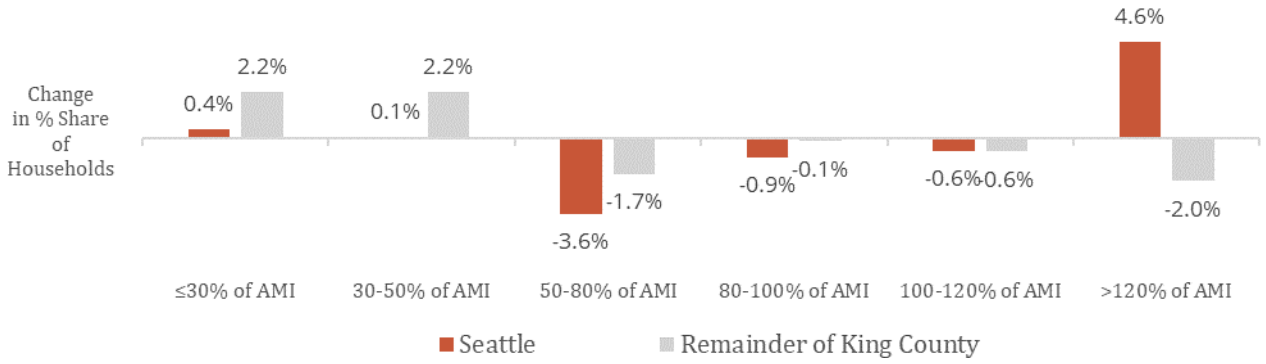
Exhibit 3.8-12. Household Income Level by Race and Ethnicity, 2019



Sources: US HUD CHAS data, 2015–2019; BERK, 2023.

Over the past decade, the distribution of households by income level has changed. **Exhibit 3.8-13** shows the percent change in share of households by income level in both Seattle and the remainder of King County.[39] It shows that much of the increase in new households in Seattle has been among those at the highest income level, while the remainder of King County saw a reduction in the share of these households. During the same period, the share of households with incomes between 50% and 120% of AMI declined in both Seattle and the remainder of King County, although the declines among 50-80% AMI households were much more significant in Seattle. The lowest income bands (0-50% AMI) remained mostly steady in Seattle as a share of total households but increased dramatically in the remainder of King County. These trends suggest that lower-income households are increasingly looking to the remainder of King County for housing, possibly due to the lack of affordable options in Seattle.

Exhibit 3.8-13. Change in Household Income Distribution 2010 5-Year Period to 2019 5-Year Period, Seattle and Remainder of King County



Source: CHAS tabulations of 2006-2010 and 2015-2019 ACS 5-year estimates, U.S. Census Bureau and HUD.

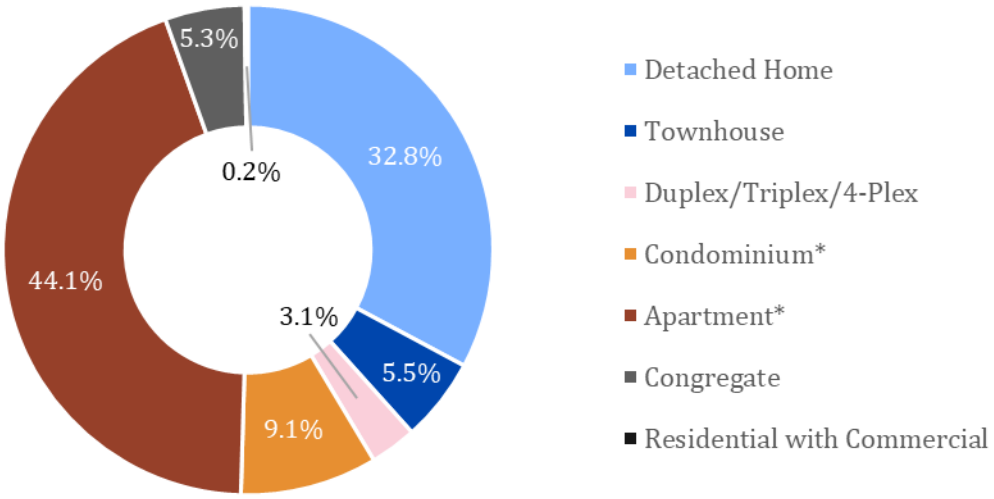
Housing Supply

As of 2022, Seattle had 385,745 housing units and 21,402 congregate residences, such as dormitories, group homes, and certain kinds of senior housing. **Exhibit 3.8-14** breaks down Seattle's housing inventory by type. More than three-quarters of all homes are detached homes (33%) and apartments (44%).

Between 2018 and 2022, more than 46,000 new housing units were built in Seattle.[40] **Exhibit 3.8-15** breaks down these newly constructed homes by housing type. More than three-quarters were apartment units, while townhouses and accessory dwelling units (ADUs) combined comprised 17% of the new inventory. Detached homes accounted for 5%.

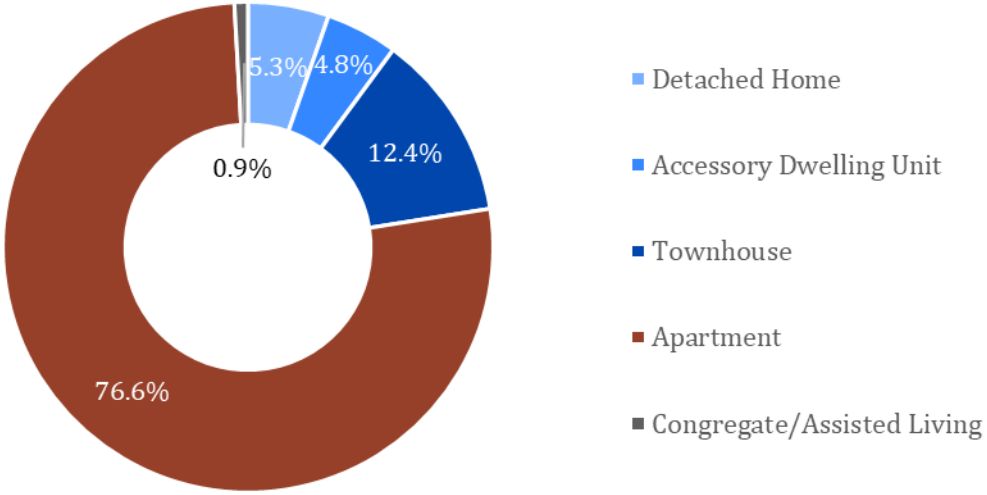
[39] Note that this chart does not show the absolute percentage gain or loss of households by income level. Rather it shows the change in percentage share of total households. So, for example, Seattle may have had a slight decline in share of households at 100-120% AMI while seeing a growth in the total number of these households overall.
[40] Source: Seattle OPCD summary of permit completions from Department of Construction and Inspections, Permit Tracking System. Residential Permitting Trends, 2023.

Exhibit 3.8-14. Housing Unit Inventory by Housing Type, 2022



Note: Condominiums in apartment use are categorized as apartments in this summary. Duplex/Triplex/4-Plex refers to all lots with 2-4 units that are not unit lot subdivided. This includes a combination of detached and attached units.
Sources: King County Department of Assessments, compiled by City of Seattle, July 2022; BERK 2023.

Exhibit 3.8-15. Units in Completed Housing Permits by Housing Type, 2018-2022



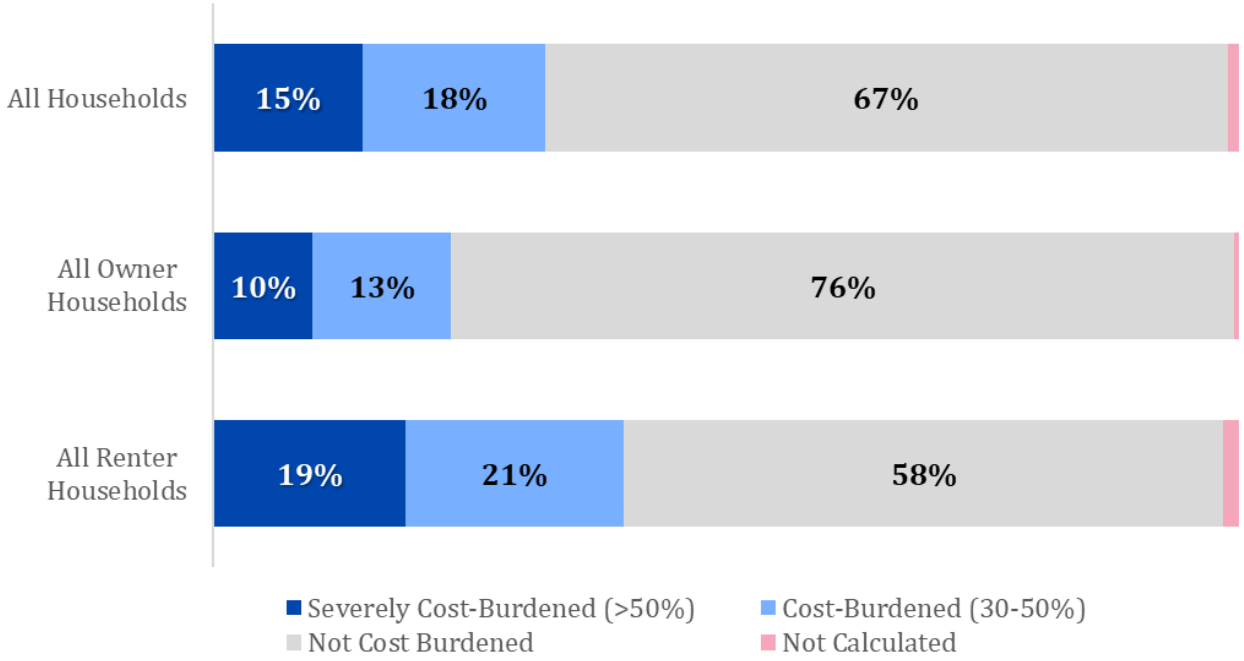
Sources: Seattle OPCD summary of permit completions from Department of Construction and Inspections, Permit Tracking System. Residential Permitting Trends, 2023; BERK, 2023.

Housing Affordability

The affordability of housing depends on two factors: the cost of the housing and the income of the household living there. A broadly used standard considers housing costs that consume 30% or less of a household's income to be affordable. Households paying more than 30% of their gross income for housing costs may have difficulty affording necessities such as food, clothing, transportation, and medical care. HUD considers households to be "cost burdened" if they spend more than 30% of their gross income on housing costs and "severely cost burdened" if they spend more than 50%.

The most recent data about housing cost burden reflects conditions between 2015 and 2019. During that period, about one-third of all Seattle households were cost-burdened, and 15% of all households were severely cost-burdened. Renter households were almost twice as likely to be cost-burdened than owner households, as shown in **Exhibit 3.8-16**.

Exhibit 3.8-16. Proportion of Households by Cost Burden Status and Housing Tenure, 2019



Note: "Not Calculated" refers to households with no or negative income, and therefore degree of cost-burden cannot be calculated.
Sources: US HUD CHAS data, 2015–2019; BERK, 2023.

Rental Housing Affordability

Exhibit 3.8-17 breaks down renter household cost burden by income category. Not surprisingly, households with incomes at or below 50% AMI were most likely to experience cost burden. More than four out of five of these households were cost burdened, including those with no or negative income. Though these very low- and extremely low-income households represent 36% of all households, they represent 70% of cost-burdened households, suggesting substantial need to production and access to affordable housing for this segment of the population.

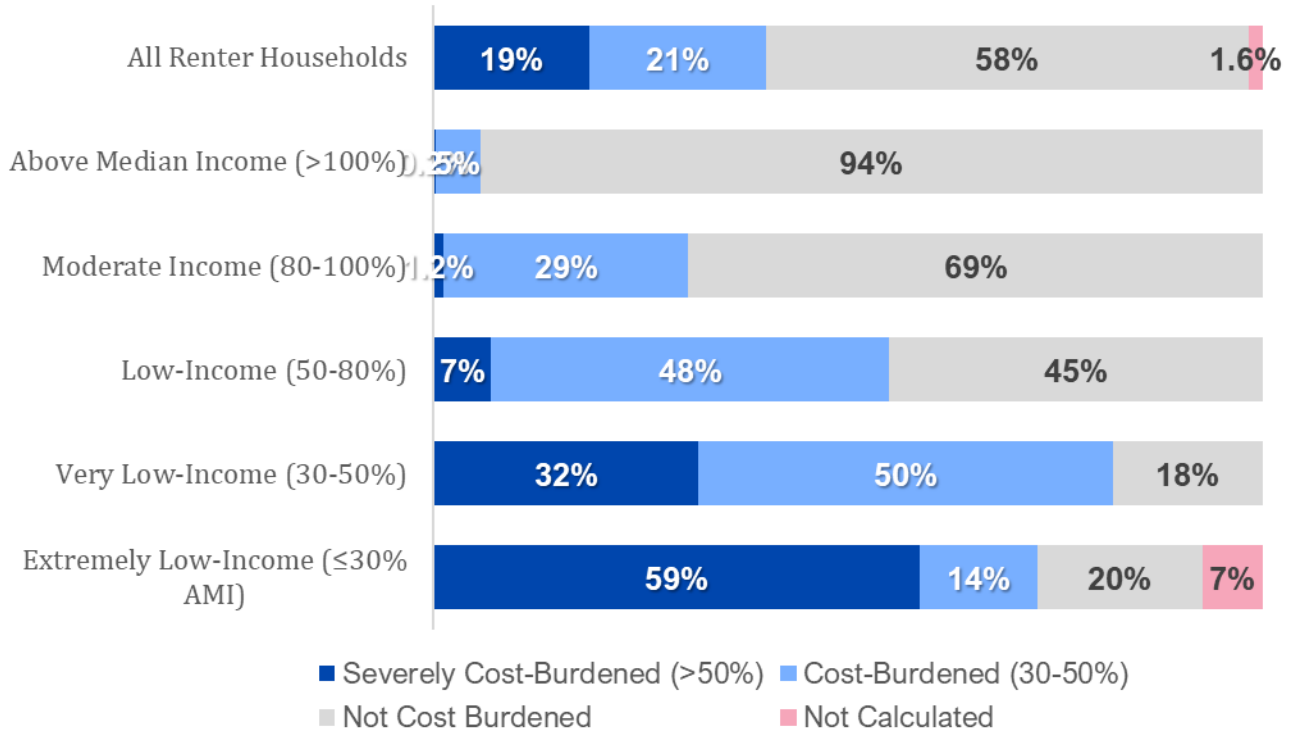
More than half of low-income renter households (50-80% AMI) were cost-burdened, and even in the moderate-income category (80-100% AMI), about a third of renter households experienced cost burden. We can conclude that gaps in affordable rental housing availability exist up to median family income levels. See **Exhibit 3.8-18**.

Exhibit 3.8-17. Renter Households by Income Level and Cost Burden Status, 2019

Income category (% of AMI)	Not cost burdened	Cost burdened (30-50% of income)	Severely cost burdened (>50% of income)	Not calculated	Total households
Extremely low-income (≤30%)	8,110	5,805	23,895	2,955	**40,760**
Very low-income (30-50%)	4,505	12,450	7,970	0	**24,925**
Low-income (50-80%)	9,975	10,655	1,545	0	**22,175**
Moderate-income (80-100%)	12,865	5,475	230	0	**18,570**
Above median income (>100%)	69,540	3,980	155	0	**73,675**
All renter households	**104,995**	**38,365**	**33,795**	**2,955**	**180,105**

Note: "Not calculated" refers to households with no or negative income, and therefore degree of cost-burden cannot be calculated.
Source: US HUD CHAS data, 2015–2019.

Exhibit 3.8-18. Share of Renter Households by Income Level and Cost Burden Status, 2019

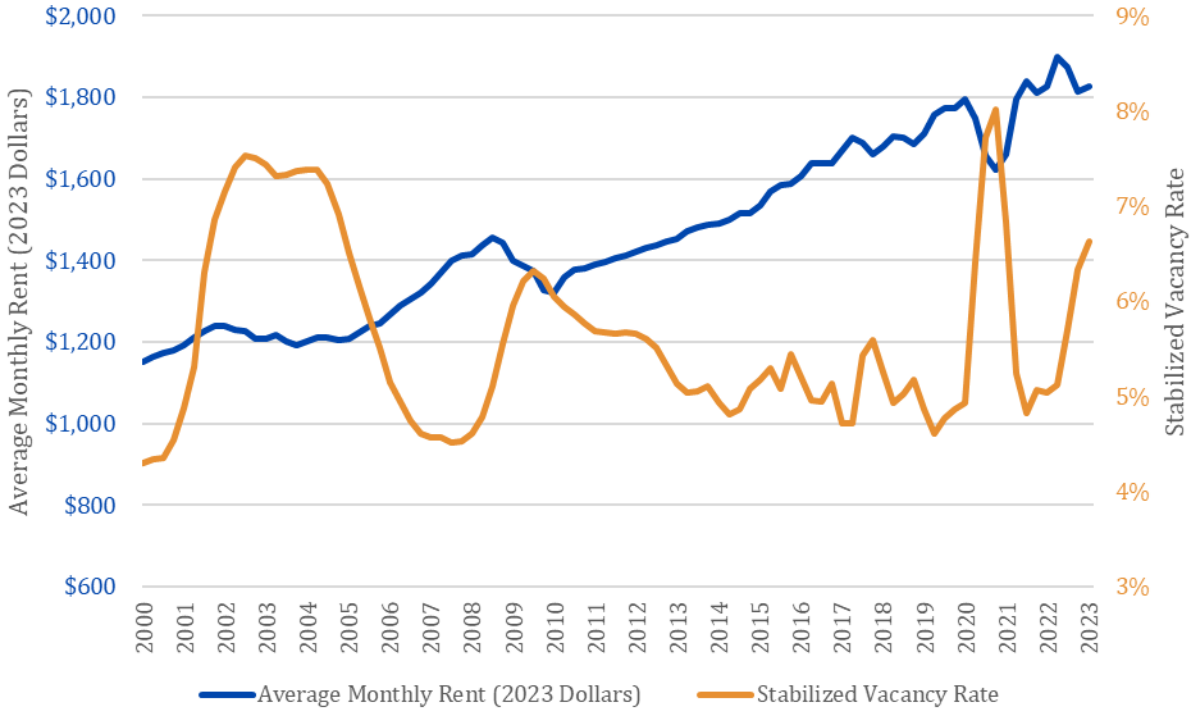


Note: "Not Calculated" refers to households with no or negative income, and therefore degree of cost-burden cannot be calculated.
Source: US HUD CHAS data, 2015–2019; BERK, 2023.

Substantial increases in rents are a key reason for the rise in the share of renter households that are cost burdened. Between 2012 and 2022, average monthly rents rose 32% after adjusting for inflation, from $1,430 to $1,897. Market housing rents typically rise when housing supply is insufficient to meet high demand. In Seattle, high housing demand is being driven in

large part by rapid job growth in Seattle and increased household preferences for in-city living. **Exhibit 3.8-19** shows inflation-adjusted rents in 2023 dollars and the stabilized rate of apartment vacancy.[41] Over the past 23 years, rents have increased most steeply during or slightly after periods when vacancy rates dipped to around 5% or lower. This is visible from 2000 to 2001, 2006 to 2009, 2012 to early 2020, and much of 2021.

Exhibit 3.8-19. Average Monthly Rent and Vacancy Rate, 2000-2022



Note: Rents are adjusted for inflation and are shown in 2023 dollars. The stabilized vacancy rate excludes properties that were still new and in the lease-up stage to ensure the sample is more representative of the full renter housing market.
Sources: CoStar, 2023; BERK, 2023.

Market rents typically vary by the age of the structure. **Exhibit 3.8-20** shows the affordability of apartment rents by age of structure and analysis area, as a percentage of AMI. On average, older apartments are more affordable than newer units. Citywide, the median rent for a one-bedroom apartment in a building constructed before 1994 is affordable at 57% AMI, compared to 86% AMI in newer buildings constructed after 2013.

[41] The stabilized vacancy rate excludes properties that were still new and in the lease-up stage to ensure the sample is more representative of the full rental housing market.

Exhibit 3.8-20. Percent of AMI Needed to Afford a Median Rent for a One-Bedroom Apartment by Year Built and EIS Analysis Area

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Citywide
All apartments	76%	65%	73%	91%	76%	69%	28%	71%	77%
Built 2013-2023	84%	74%	80%	98%	82%	79%	39%	79%	86%
Built prior to 1994	52%	54%	61%	70%	61%	57%	28%	52%	57%

Note: Percent AMI calculation assumes 1.5 person household, consistent with HUD methodology (Joice 2014).
Source: CoStar, 2023; City of Seattle, 2023; BERK, 2023.

Ownership Housing Affordability

Homeownership costs are far out of reach for the vast majority of Seattle and King County households. Most owner households in Seattle live in detached homes, the median sales price of which was $1,060,000 in 2022, as shown in **Exhibit 3.8-21**. Assuming a 20% down payment ($212,000)—which already excludes many households lack these resources—a household needs an annual income of at least $261,499 to afford this median-priced home. For a four-person household this is equivalent to 194% of AMI. A lower down payment would increase the income necessary to afford such a home.

Exhibit 3.8-21. Summary of Detached and Townhouse Sales Prices, 2022

	75th percentile sales price	Median sales price	25th percentile sales price	Average number of bedrooms	Assumed household size for AMI	Household Income required to purchase median home (% AMI)
Detached homes	$1,495,000	$1,060,000	$835,000	3.31	4	194%
Townhouses	$975,000	$816,250	$709,950	2.65	3	166%

Note: Affordability estimates assume 20% down payment and assumed household size. For households who lack the 20% down payment, the percentage of AMI needed to buy the home would be higher.
Sources: King County Assessor, 2023; City of Seattle, 2023.

The cost of housing varies by age. **Exhibit 3.8-22** shows the average affordability of detached homes by age of structure and analysis area as a percentage of AMI. The lowest value is for older homes (built before 1994) in Area 7, where the median sales price is equivalent to 122% of AMI. While older homes cost less than newer homes, in no area of the city is an older median value detached home affordable for a moderate-income household (80-120% AMI).

Exhibit 3.8-22. Percentage of AMI Needed to Afford a Median-Price Detached Home by Year Built

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Citywide
All detached homes	202%	202%	284%	276%	280%	163%	117%	155%	194%
New homes (built 2013-2023)	343%	312%	454%	237%	367%	227%	169%	209%	299%
Older homes (built before 1994)	192%	187%	264%	277%	257%	155%	110%	147%	182%

Note: Affordability level calculation assumes availability of a 20% down payment and 4-person household. For households who lack the 20% down payment, the percentage of AMI needed to buy the home would be higher.
Sources: King County Assessor, 2023; City of Seattle, 2023; BERK, 2023.

About 9% of Seattle's housing stock are condominiums that can also provide homeownership options. Most condominiums are in multifamily buildings similar to apartments. In 2022, the median sales price for this type of condominium in Seattle was $512,500. A household would need an annual income of at least $126,432 to afford this condo, assuming availability of a 20% down payment ($102,500). For a two-person household, this is equivalent to 117% of AMI.[42] Households that do not have $102,500 for a down payment would require higher income to afford the median-priced condo.

In recent years many new detached homes have included one or two accessory dwelling units on the same lot. These principal and accessory units are sometimes sold separately as a condominium units. In this study, these kinds of condominiums are referred to as non-stacked housing to differentiate them from condominiums that are stacked vertically in multistory buildings. **Exhibit 3.8-23** summarizes all non-stacked condominium units sold in 2022 by unit size. The affordability of these units is closely correlated with unit size, though even the 25th percentile sales price for small units was not affordable to moderate-income households.

[42] Since income thresholds are adjusted for household size, a smaller household (e.g., 1 or 2 people) would require a greater percentage of AMI to afford this purchase price.

Exhibit 3.8-23. Summary of Non-Stacked Homes Sold in 2022 by Unit Size

	Over 2,000 Sq. Ft.	>1,200-2,000 Sq. Ft.	≤1,200 Sq. Ft.
Number of units sold	378	111	114
Average sale price	$1,987,014	$1,044,382	$754,627
Average size (square feet)	3,114	1,624	995
Average number of bedrooms	3.96	3.05	2.10
Assumed household size for affordability analysis	4	4	3
75th percentile sales price	$2,499,999	$1,200,000	$825,000
Median sales price	$1,800,000	$981,000	$757,500
25th percentile sales price	$1,400,000	$787,950	$678,713
Household income required to purchase median home (% AMI)			
75th percentile sales price	458%	220%	168%
Median sales price	330%	180%	154%
25th percentile sales price	**257%**	**144%**	**138%**

Note: Affordability level calculation assumes availability of a 20% down payment and assumed household size. For households who lack the 20% down payment, the income needed to buy the home would be higher.
Sources: King County Assessor, 2023; City of Seattle, 2023; BERK, 2023.

The housing costs of many owner households exceeds HUD's definition of affordability. As shown in **Exhibit 3.8-24,** more than 35,000 owner-occupied households were cost burdened between 2015 and 2019,nearly a quarter of all owner-occupied households in Seattle. A much larger share of lower-income owner-occupied households experienced housing cost burden than households with incomes above AMI.

Exhibit 3.8-24. Owner-Occupied Households by Cost Burden Status, 2019

Income category (% of AMI)	Not cost burdened	Cost burdened (30-50% of income)	Severely cost burdened (>50% of income)	Not calculated	Total households
Extremely low-income (≤30%)	1,325	1,670	6,625	815	10,435
Very low-income (30-50%)	4,090	2,970	4,225	0	11,285
Low-income (50-80%)	6,260	3,225	1,825	0	11,310
Moderate-income (80-100%)	6,730	3,825	1,025	0	11,580
Above median income (>100%)	97,355	8,775	990	0	107,120
All owner households	**115,760**	**20,465**	**14,690**	**815**	**151,730**

Note: "Not calculated" refers to households with no or negative income, and therefore degree of cost-burden cannot be calculated.
Source: US HUD Comprehensive Housing Affordability Strategy (CHAS) data, 2015–2019.

Displacement

Displacement refers to a process wherein households are compelled to move from their homes involuntarily due to the termination of their lease, rising housing costs, or other factors. This is a different phenomenon than when a household voluntarily makes a choice to move from their home. Three kinds of displacement are occurring in Seattle. Physical displacement is the result of eviction, acquisition, rehabilitation, or demolition of property, or the expiration of covenants on rent- and income-restricted housing. Economic displacement occurs when residents can no longer afford rising rents or the costs of homeownership like property taxes. Cultural displacement occurs when residents are compelled to move because the people and institutions that make up their cultural community have left or are leaving the area.

The City has some data related to the physical displacement of lower income households with incomes earning up to 50% of AMI. Economic displacement is much more difficult to measure directly. Analysis of census data can provide important insights and a sense of the extent of displacement that is likely occurring. No formal data currently exists to measure cultural displacement quantitatively, despite signs that it is occurring in some neighborhoods. Previous studies have examined changes in cultural populations over time at a neighborhood level, like the sustained and significant loss of Black residents in the Central Area (Seattle OPCD, 2016; City of Seattle, 2017), and more recent data suggests that these trends are continuing. These phenomena are interrelated, and cultural displacement can result from and accelerate physical and/or economic displacement, with root causes in the rising cost of housing and real estate and income and wealth inequality.

Physical Displacement

Various circumstances can cause physical displacement. These circumstances include demolition of existing buildings to enable the construction of new buildings on the same site, rehabilitation of existing buildings, and expiration of rent restrictions. Strong demand for housing can encourage demolition to create new housing and the rehabilitation of existing buildings to attract higher-income tenants. Between 2015 and 2022, an average of 629 housing units were demolished each year.[43] However, not all demolitions resulted in the displacement of a household. For example, in some cases the owner-occupant of a home chose to sell the home to a developer or demolished it themselves to build a larger home.

The best data available about households that experienced physical displacement in Seattle comes from records of households eligible for tenant relocation assistance.[44] Seattle's Tenant

[43] Source: City of Seattle Department of Construction and Inspections, Permit Tracking System, 2023. Note that this data underestimates total demolition because some demolition permits never get "finaled" despite the demolition occurring. So, the permit ultimately expires without being counted.

[44] Not all households eligible for relocation assistance complete the TRAO application process. Factors complicating the process to complete a TRAO application may include language barriers or mental health. Data on the rate at which TRAO-eligible households complete the application process is not available. It should also be noted that TRAO data does not include all instances of eviction. Therefore, eviction as a cause of physical displacement is beyond the scope of this analysis. Furthermore, no information is available regarding what portion of households receiving TRAO are able to find other housing in the neighborhood or city. However, it is likely that many households displaced from a building also leave the neighborhood or city.

Relocation Assistance Ordinance (TRAO) requires developers to pay relocation assistance to tenants with incomes at or below 50% of AMI who must move because their rental will:

- Be torn down or undergo substantial renovation
- Have its use changed (for example, from apartment to a commercial use or a nursing home)
- Have certain use restrictions removed (for example a property is no longer required to rent only to low-income tenants under a Federal program)

Between 2015 and 2022, 1,200 households were eligible to receive assistance through TRAO, as shown in **Exhibit 3.8-25**. This was about 171 households per year on average, or about 2.6 out of every 1,000 renter households with incomes at or below 50% AMI.[45] Just over half of these displacements were due to the demolition of a housing unit, with substantial rehabilitation being the next most common cause.

Exhibit 3.8-25. Cause of Displacement among TRAO-Eligible Households, 2015-2022

EIS Analysis Area	Demolition	Substantial rehabilitation	Removal of use restrictions or change of use	Total
Area 1	126	77	—	203
Area 2	171	87	67	325
Area 3	56	49	1	106
Area 4	27	27	16	70
Area 5	113	126	16	255
Area 6	34	52	—	86
Area 7	16	15	—	31
Area 8	77	47	—	124
Total	**620**	**480**	**100**	**1,200**
% of total	**52%**	**40%**	**8%**	

Sources: Seattle Department of Construction & Inspections, 2023; BERK, 2023.

On average, about 14% of units demolished each year result in a TRAO-eligible displacement.[46] However, TRAO records do not cover every instance of physical displacement caused by demolition of a rental unit. For example, the program does not track displacement of households with incomes above 50% of AMI. In addition, until recently the program did not have mechanisms to deter developers from economically evicting tenants prior to applying for a permit to avoid paying relocation benefits, nor did it provide additional assistance to ensure households with language or other barriers can successfully navigate the application process.

[45] Source: US HUD Comprehensive Housing Affordability Strategy (CHAS) data, 2015-2019; BERK, 2023.
[46] Source: City of Seattle Department of Construction and Inspections, Permit Tracking System, 2023 and BERK calculations. Note that permit data underestimates total home demolition because some demolition permits never get "finaled" despite the demolition occurring. So, the permit ultimately end up expiring and not being counted. Therefore, the%age of demolished units that result in TRAO-eligible displacement is likely to be lower.

Finally, this data does not reflect the physical displacement of SHA tenants who receive relocation benefits outside of the TRAO process, generally relating to the redevelopment of public housing.

Economic Displacement

As discussed in the housing affordability section, market-rate housing costs are largely driven by the interaction of supply and demand in the regional housing market. Lower-income households living in market-rate housing are at greater risk of economic displacement when housing costs increase. This vulnerability disproportionately impacts households of color, whose incomes tend to be lower compared to non-Hispanic white households, as shown in **Exhibit 3.8-9**. This is particularly true for Black and Indigenous households, which have the lowest median household income among all major racial and ethnic groups. These disparities are rooted in the history described earlier of redlining, racially restrictive covenants, and other forms of discrimination that contributed to racialized housing patterns and long-lasting wealth inequality. This history, the economic disparities that remain to this day, and racial bias in the real estate, finance, and development systems together result in greater risks of economic displacement among communities of color (Seattle OPCD, 2016).

At the citywide scale, new housing development is critical for addressing Seattle's housing shortage. Increasing housing supply reduces the upward pressure on housing costs that otherwise results when a growing population competes for a finite number of homes. Given Seattle's historic underproduction of housing relative to demand and population growth, a substantial expansion of housing supply is necessary to address economic displacement pressures.

At a neighborhood level, however, the relationship between new development and displacement pressure is less straightforward and can vary in different types of neighborhoods. Growth can increase housing choices and support creation of income-restricted affordable housing, both of which make a neighborhood more accessible to low- and moderate-income households, particularly in areas where housing costs are very high and access has historically been limited for lower-income households and households of color. However, development can also contribute to economic displacement pressure at a local scale if new housing increases the desirability of a neighborhood, attracts higher-income households and businesses catering to them, and rents and home prices rise as a result.

The City has previously examined the historical relationship at a neighborhood scale between housing growth and changes in low-income households (Appendix M of Mandatory Housing Affordability FEIS. This section presents an updated version of this statistical analysis, which compares the amount of market-rate housing production in a Seattle census tract between 2010 and 2017 to the gain or loss of households at a particular income level in that census tract during that time. For each income level, **Exhibit 3.8-26** presents correlation coefficients that represent the strength of the relationship between market-rate housing production and the change in households. Market-rate housing production is calculated as total net housing units permitted between 2010 and 2017 minus income-restricted affordable housing built during that period. Coefficients have a range of -1 to 1. The closer the coefficient value is to 1 or -1, the

stronger the relationship, while coefficients closer to 0 have a weaker relationship. For instance, a value of ±0.7 indicates a strong relationship between variables. A value of ±0.5 indicates a moderate relationship. A value of ±0.3 indicates a weak relationship.

Exhibit 3.8-26. Correlation between Market-Rate Housing Production and Changes in Households by Income Level, 2010-2017

Household income	Correlation coefficient
0-30% AMI	0.12
0-50% AMI	0.22
0-60% AMI	0.18
0-80% AMI	0.19
50-80% AMI	-0.03
60-80% AMI	0.03
80-120% AMI	0.45
>120% AMI	0.81

Sources: HUD CHAS (based on ACS 5-year estimates 2008-2012 and 2005-2019); City of Seattle, 2023; King County, 2023

Overall, **Exhibit 3.8-26** and the scatterplot of the same data shown in **Exhibit 3.8-27** show that housing production tends to have a weak positive relationship with changes in low-income households at the neighborhood scale. This means that census tracts with relatively higher market-rate housing production during the 2010-2017 period were somewhat more likely than tracts with less housing production to retain or gain low-income households. The strength of this relationship varies when looking at specific income bands. For example, when focusing on households with incomes of 50-80% AMI, there is essentially no statistically significant relationship (positive or negative) between housing production and change in the number of these households between 2010 and 2017 (see **Exhibit 3.8-28**). This suggests that factors other than housing production may be affecting Seattle's ability to retain households at this income level.

Exhibit 3.8-27. Correlation between Market-Rate Housing Production and Changes in Households with Incomes of 0-50% of AMI, 2010-2017

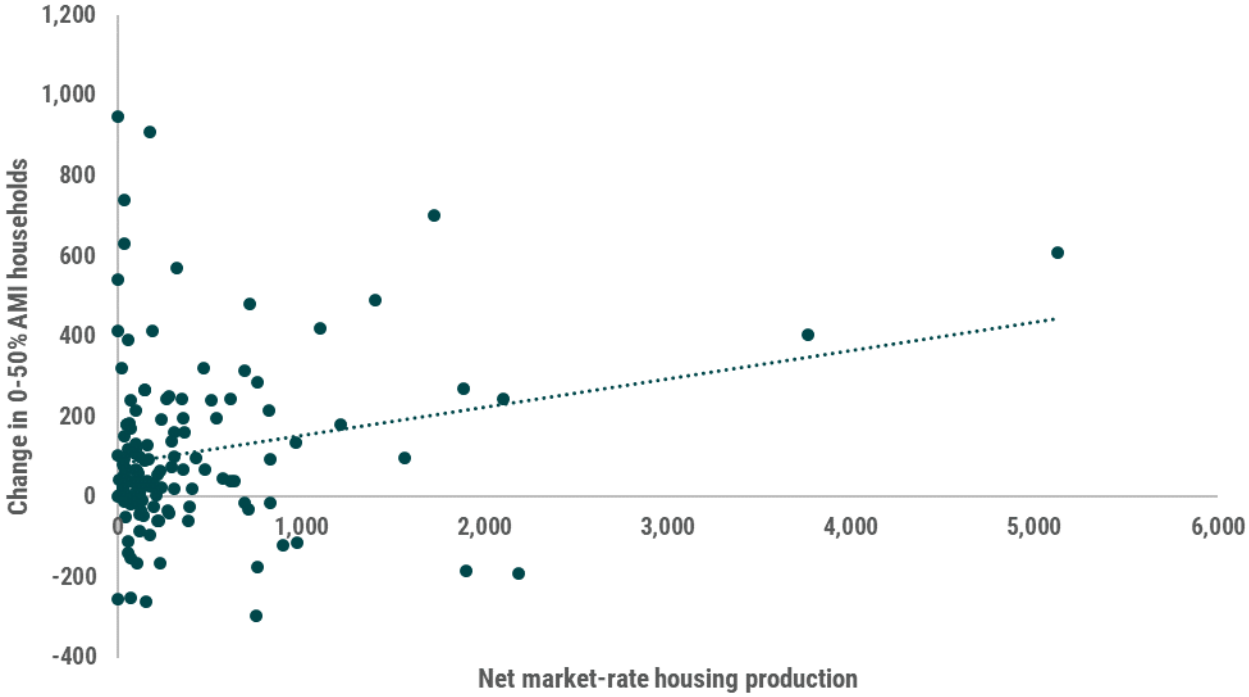
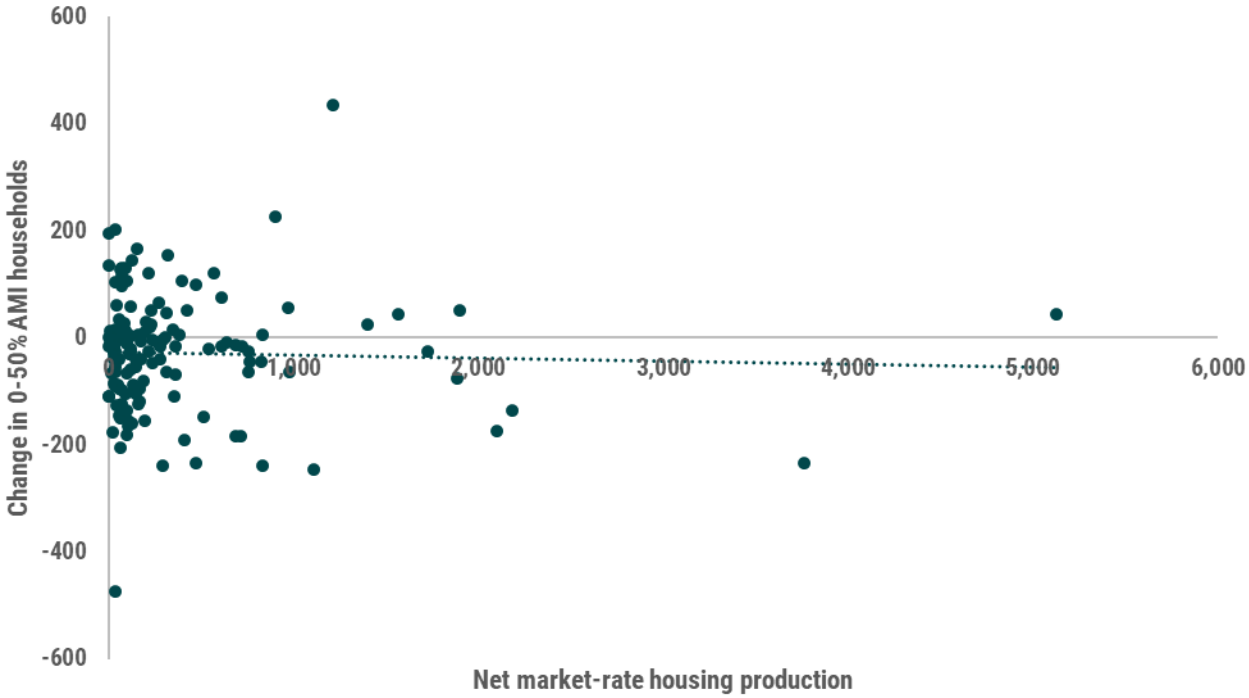


Exhibit 3.8-28. Correlation between Market-Rate Housing Production and Changes in Households with Incomes of 50-80% of AMI, 2010-2017



For middle- and higher-income households, market-rate housing production unsurprisingly has a strong positive correlation. This underscores that much of Seattle's new housing stock is relatively more affordable to and most directly serves relatively higher-income households. Overall, this historical analysis affirms previous findings that net market-rate housing production has not been associated with a loss of low-income households at a census tract level.

Cultural Displacement

Cultural displacement is even more challenging to quantify than physical and economic displacement. Because cultural displacement is caused by a confluence of factors and is driven by decisions about belonging and community, it is not practical to quantify the extent to which it is occurring. However, conversations with current and former residents of Seattle reveal that it is occurring. The City does track changes in population by race and ethnicity. While this information does not track the movement of individual households or why they might be moving, it can identify overall population shifts. The most current data available shows that, while the overall number of people of color in Seattle increased between 2010 and 2020 in absolute terms and as a percentage of Seattle's total population, the increase has been slower than in the rest of King County, and some racial and ethnic groups grew more slowly than others or lost population (see **Exhibit 3.8-29**). The Black population grew less than seven percent in Seattle but more than 40% in the remainder of King County. Populations that decreased or grew more slowly could reflect the impacts of physical displacement, economic displacement, and/or other factors. The physical or economic displacement of members of a community can also precipitate the cultural displacement of other members of the same community.

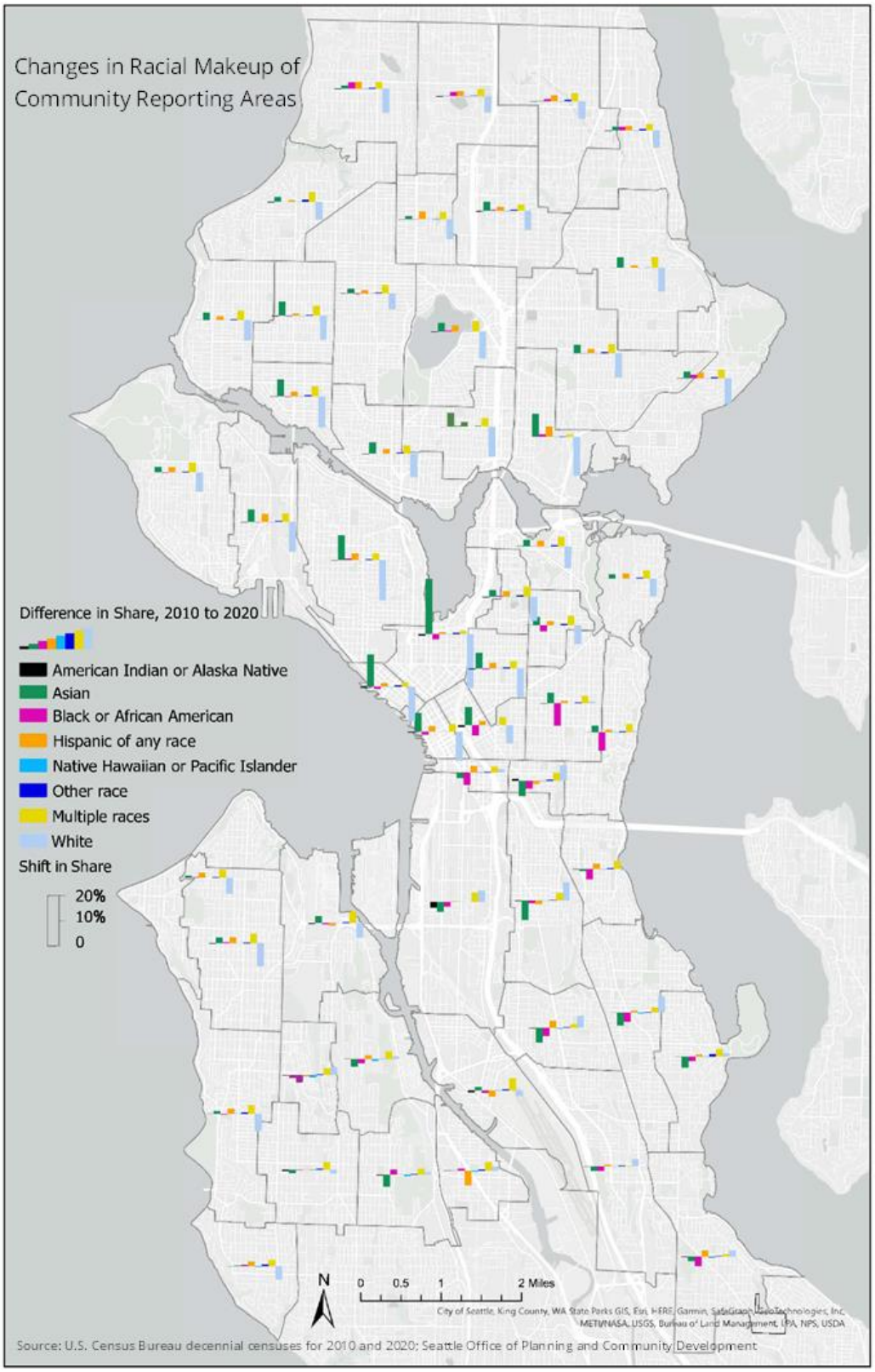
Exhibit 3.8-29. Change in Racial and Ethnic Composition of Seattle and Remainder of King County, 2010-2020.

	Seattle		Remainder of King County	
	2010 to 2020 Growth	2020 Population	2010 to 2020 Growth	2020 Population
Total population	21.1%	737,015	15.9%	1,532,660
People of Color	45.7%	298,847	55.9%	740,240
Black	6.6%	50,234	41.0%	97,597
Native American	-15.8%	3,268	49.3%	8,542
Asian	49.3%	124,696	65.4%	325,033
Pacific Islander	-13.6%	1,941	47.7%	17,458
Another race	205.5%	4,473	181%	9,065
Two or more races	102.4%	53,672	88.8%	100,087
Hispanic/Latino, of any race	50.2%	60,563	38.2%	182,458
White	8.6%	438,168	-6.5%	792,420

Sources: Decennial Census estimates, U.S. Census Bureau

Exhibit 3.8-30 shows neighborhood-level change in the racial and ethnic composition in Seattle between 2010 and 2020. Notable changes include a pronounced decline in the Black or African American population share in the Central Area, reduction in the Asian population share in Beacon Hill and marked increase in South Lake Union and Belltown, and a lower Hispanic/Latino population share in South Park.

Exhibit 3.8-30. Change in Racial and Ethnic Composition, 2010-2020



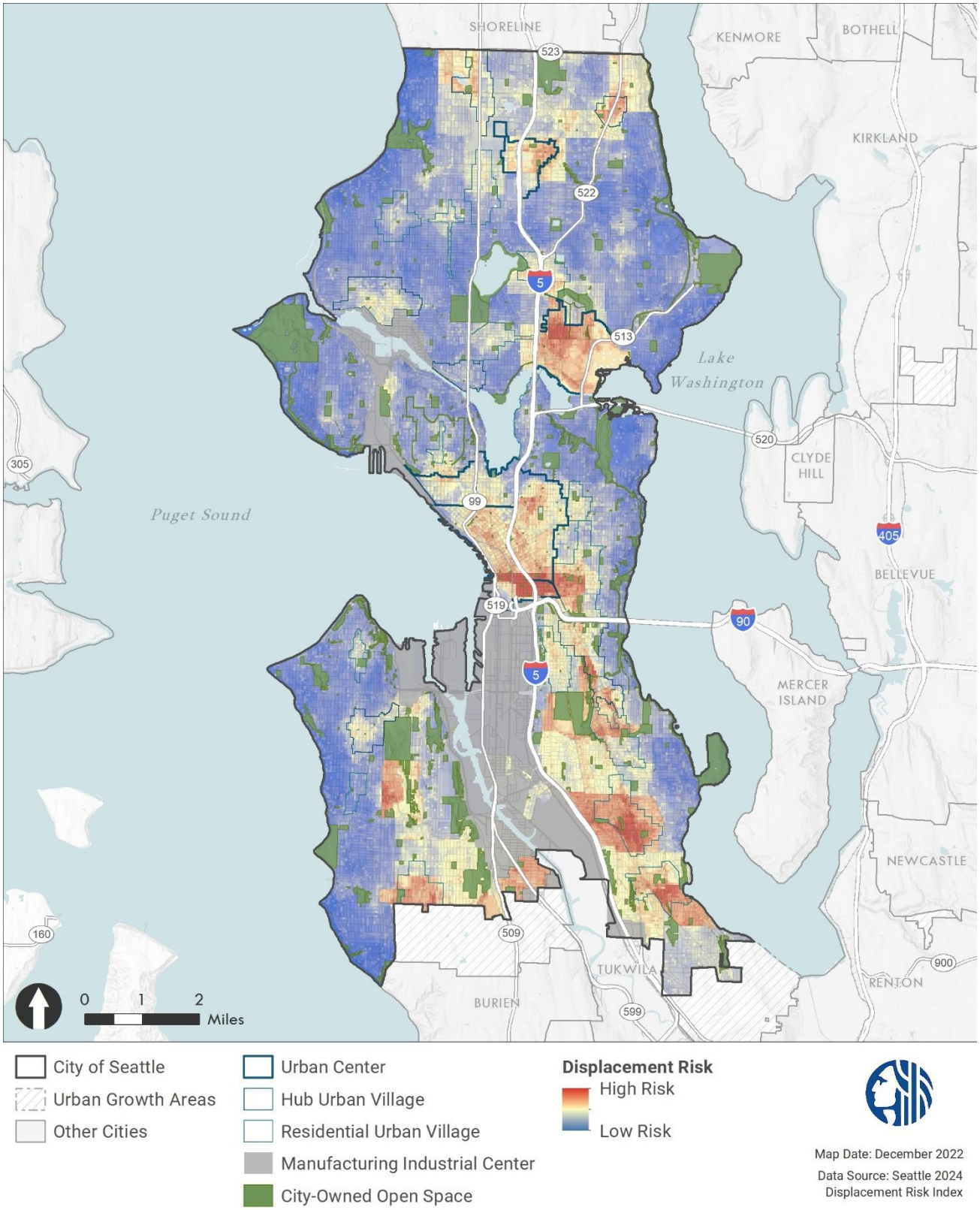
Source: City of Seattle, 2023.

The neighborhoods in Exhibit 3.8-30 are Community Reporting Areas (CRAs), groupings of census tracts the City uses to track population trends over time. Identifying demographic change at this scale is valuable given the historical and ongoing importance of certain neighborhoods to the development and preservation of some of Seattle's non-white cultural communities. Many of these communities originated during various phases of population growth, starting in the 19th century, as people migrated and immigrated to Seattle and established businesses and cultural organizations that drew others to those areas. During the 20th century, racially restrictive real estate covenants and redlining combined to further consolidate these communities. While this reduced access to housing and contributed to gaps in generational wealth along lines of race, it also spurred the creation of neighborhoods, networks, and institutions that specifically met the needs of some of Seattle's communities of color. Examples of culturally significant neighborhoods in Seattle include, among others, the Central District as a hub of Seattle's Black community; Chinatown–International District as a cultural hub for several Asian and Asian-American communities; much of Rainier Valley, which has concentrations of businesses and institutions owned by and serving immigrant and refugee communities; and South Park, which has become Seattle's largest Hispanic/Latinx community in recent decades. Some communities arise around communities with other shared identity, including the LGBTQ+ community in Capitol Hill, where change over time may be harder to measure with quantitative data sources. Finally, Native and Coast Salish people may view the natural environment overall, as well as specific locations and the Seattle region broadly, as places of cultural and historical importance.

Displacement Risk Index

Not all households are equally vulnerable to displacement pressure, and the factors that contribute to displacement risk are not equitably distributed throughout the city. Therefore, the City in 2016 developed in 2022 updated a Displacement Risk Index (shown in **Exhibit 3.8-31**) to identify where displacement of people of color, low-income people, renters, and other vulnerable populations may be more likely. The Displacement Risk Index provides a longer-term view of displacement risk based on neighborhood characteristics like the presence of vulnerable populations, rent and market factors, and infrastructure and amenities that tend to increase real estate demand. Neighborhoods with the highest displacement risk in Seattle include the Chinatown–International District, Central District, Rainier Valley, Rainier Beach, South Park, High Point, and the University District.

Exhibit 3.8-31. Seattle Displacement Risk Index, 2022

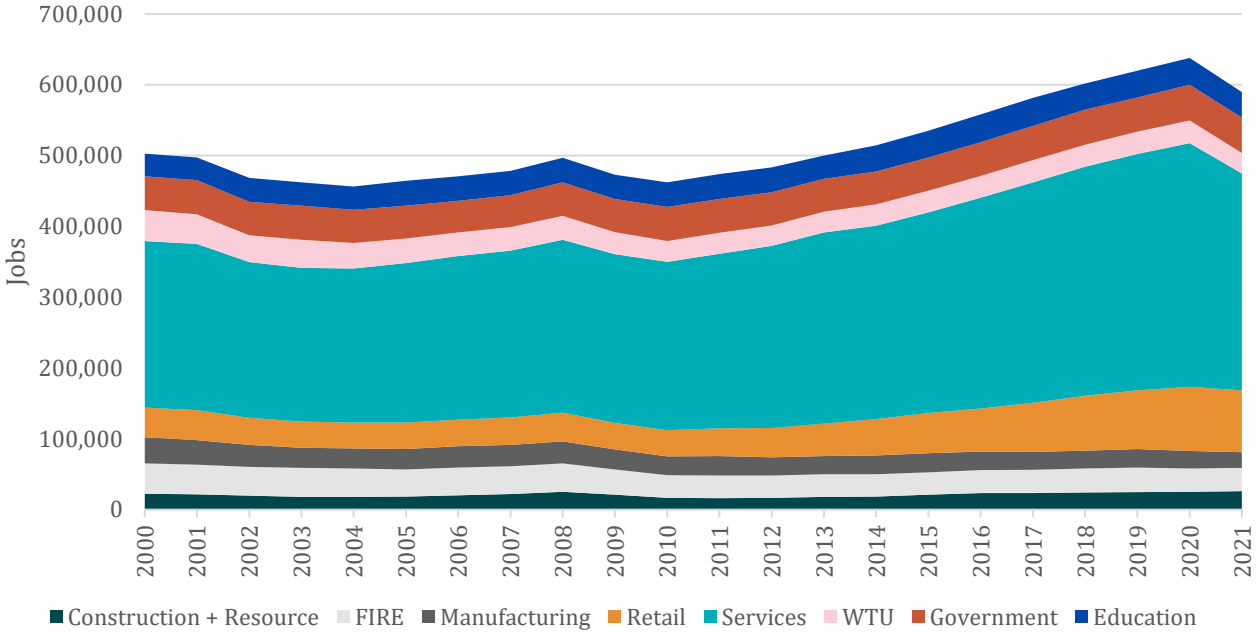


Sources: City of Seattle, 2022; BERK, 2023.

Employment

Between 2010 and 2020 Seattle experienced a rapid period of job growth, as shown in **Exhibit 3.8-32**. Much of that net growth was among services and retail sector jobs. As of March 2021, Seattle had 589,793 jobs, following a steep decline from the pre-pandemic peak in March 2020.

Exhibit 3.8-32. Seattle Employment by Sector, 2000-2021

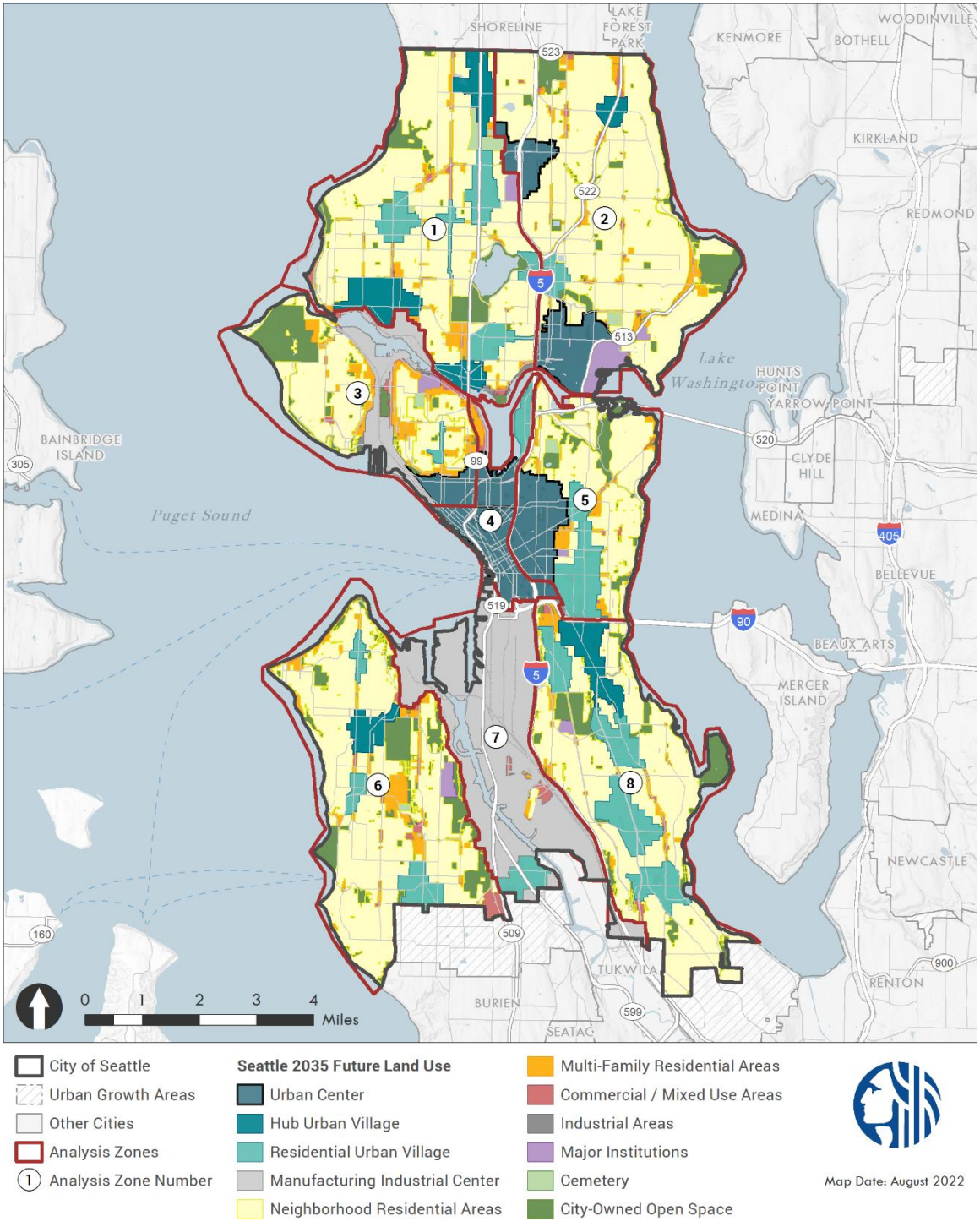


Sources: PSRC Covered Employment Estimates, 2022; BERK, 2023.

Analysis Areas

This section describes the unique population, employment, and housing characteristics of each analysis area. A map of the analysis areas is shown in **Exhibit 3.8-33**. This is followed by demographic and housing related statistics for each area in **Exhibit 3.8-34**, **Exhibit 3.8-35, Exhibit 3.8-36**, **Exhibit 3.8-37**, and **Exhibit 3.8-38.** The descriptions of each analysis area that follow refer to statistics in these exhibits as well as the displacement risk map in **Exhibit 3.8-31**.

Exhibit 3.8-33. EIS Analysis Areas



Note: See **Exhibit 2.1-1** in **Chapter 2** for a cross-walk of existing place types (existing and Alternative 1) versus proposed place type names under Alternatives 2-5.
Sources: City of Seattle, 2022; BERK, 2022.

Exhibit 3.8-34. Demographics and Selected Household Characteristics by EIS Analysis Area

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Citywide
Total population	153,131	146,658	69,681	63,803	106,416	95,061	9,726	92,539	737,015
% People of color	28.8%	40.5%	31.4%	50.8%	38.4%	34.3%	52.4%	67.6%	40.5%
American Indian or Alaska Native, Non-Hispanic	0.4%	0.4%	0.4%	0.6%	0.4%	0.5%	1.2%	0.4%	0.4%
Asian, Non-Hispanic	10.1%	18.9%	13.0%	29.9%	13.7%	9.3%	14.3%	30.9%	16.9%
Black or African American, Non-Hispanic	2.9%	4.8%	2.6%	6.4%	7.8%	6.6%	8.5%	19.0%	6.8%
Hispanic of Any Race	7.0%	7.9%	7.5%	7.4%	8.2%	9.2%	19.6%	9.5%	8.2%
Native Hawaiian or Pacific Islander, Non-Hispanic	0.2%	0.2%	0.2%	0.2%	0.2%	0.4%	0.7%	0.4%	0.3%
Other, Non-Hispanic	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Two or More Races, Non-Hispanic	7.7%	7.6%	7.1%	5.7%	7.4%	7.7%	7.5%	6.8%	7.3%
White, Non-Hispanic	71.2%	59.5%	68.6%	49.2%	61.6%	65.7%	47.6%	32.4%	59.5%
Total population under 18 years	15.5%	15.4%	14.4%	4.9%	9.7%	18.3%	14.2%	19.8%	14.5%
Total households	74,815	54,901	34,227	36,389	55,466	42,679	2,076	36,808	337,361
% owner households	48%	50%	45%	19%	34%	60%	45%	58%	45%
% renter households	52%	50%	55%	81%	66%	40%	55%	42%	55%
Average household size	2.10	2.36	1.88	1.52	1.81	2.25	2.38	2.61	2.08

Source: City of Seattle analysis of U.S. Census 2020; American Community Survey 5-Year Estimates (2017-2021): S1101 Households and Families; and American Community Survey 5-Year Estimates (2017-2021): B25012 Tenure by Families and Presence of Own Children.

Exhibit 3.8-35. Demographics of Neighborhood Residential (NR) Zones by EIS Analysis Area

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Citywide
Population in NR zones	76,063	75,728	27,918	1,110	26,729	54,283	1,196	49,769	312,796
% Total population in NR zones	50%	52%	40%	2%	25%	57%	12%	54%	42%
People of color as % of NR population	24%	31%	24%	27%	28%	30%	47%	63%	33%
People of color as % of population *outside* NR zones	33%	51%	37%	51%	42%	40%	53%	73%	46%

Notes: Neighborhood Residential zones are determined by the City of Seattle and zoned primarily for detached homes.
Source: City of Seattle analysis of U.S. Census 2020; American Community Survey 5-Year Estimates (2017-2021): S1101 Households and Families; and American Community Survey 5-Year Estimates (2017-2021); BERK, 2023.

Exhibit 3.8-36. Average Rent and Rental Affordability by EIS Analysis Area

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Citywide
Average rent, 1-bedroom apartment	$1,912	$1,635	$1,854	$2,301	$1,911	$1,737	$715	$1,791	$1,940
Affordability of 1-bedroom apartment (% AMI)	76.0%	65.0%	73.0%	91.0%	76.0%	69.0%	28.0%	71.0%	77.0%

Sources: CoStar, 2023; City of Seattle, 2023; BERK, 2023.

Exhibit 3.8-37. Housing Units by Type by EIS Analysis Area

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Citywide
Total housing units	79,576	64,581	36,514	52,062	70,170	46,500	2,287	39,704	391,394
Total detached homes	32,371	29,712	11,207	451	12,445	24,905	1,212	22,183	134,486
% detached homes	41%	46%	31%	1%	18%	54%	53%	56%	34%
Total multifamily homes	47,205	34,869	25,307	51,611	57,725	21,595	1,075	17,521	256,908
% multifamily homes	59%	54%	69%	99%	82%	46%	47%	44%	66%

Sources: King County Department of Assessments, compiled by City of Seattle, July 2022.

Exhibit 3.8-38. Displaced TRAO-Eligible Households by EIS Analysis Area

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Citywide
Total renter households	38,577	27,317	18,795	29,450	36,785	17,197	1,139	15,606	184,866
Total TRAO* displacements, 2015-22	203	325	106	70	255	86	31	124	1,200
TRAO displacement rate (annual per 10,000 renter households)	8	17	8	3	10	7	39	11	9

Sources: Seattle Department of Construction & Inspections, 2023; BERK, 2023.

Area 1: Northwest Seattle

Area 1 is in northwest Seattle, including the urban villages of Ballard, Fremont, Wallingford, Greenwood, Bitter Lake, and Aurora–Licton Springs. This area is relatively affluent and less diverse than other parts of Seattle, except the north end of the area, around Bitter Lake and Aurora–Licton Springs, which have higher displacement risk.

Population: Area 1 has a population of 153,131, with half (50%) living in Neighborhood Residential zones. Nearly three-quarters of the population of Area 1 (71%) identifies as White, Non-Hispanic, substantially higher than this proportion citywide (59%). The percentage of Area 1 residents identifying as BIPOC is 29%, much lower than the citywide 41%. This area has a smaller share of residents who identify as Black or Asian, compared to citywide. Fifteen percent of the population of this area is under 18 years old, just above the city average of 14%.

Housing: Area 1 has 79,576 housing units, of which 41% are detached homes and 59% are multifamily. Slightly less than half (48%) of households in Area 1 own their homes, and the average household size is 2.1 people, comparable to the citywide average.

Rental housing costs in Area 1 are the highest in the city outside downtown. The average rent for a 1-bedroom apartment in Area 1 is $1,914, which is affordable for a household whose income is 76% of AMI (see **Exhibit 3.8-20**). Ownership housing costs are slightly higher than the citywide average. A 3-person household needs an income 224% of AMI to afford a median priced detached home, compared to 216% citywide.

Mixed-use and multifamily housing production between 2009 and 2022 was most robust in low displacement risk areas (such as Fremont, Ballard, and Greenwood) and at the junction of Holman Road and Greenwood Avenue. Less new development has occurred in areas with higher displacement risk.

Based on Seattle's TRAO data, at least 203 low-income renter households in Area 1 were displaced between 2015 and 2022, an average annual rate of approximately 8 per 10,000 renter households, close to the average citywide.

Employment: Area 1 is primarily residential but has several urban villages and small sections of industrial activity at its southern border along the Ship Canal. Most jobs are located in and adjacent to that industrial concentration (which continues south across the canal into Area 3), along retail corridors (15th Ave NW, Aurora Ave NW, Greenwood Ave NW, and Holman Road NW), or in services like schools. North Seattle College sits on the eastern border of Area 1, next to the Northgate Urban Center in Area 2.

Area 2: Northeast Seattle

Area 2 comprises northeast Seattle, including the University of Washington (UW) main campus, Seattle Children's Hospital, the University District and Northgate Urban Centers, the Lake City and Roosevelt Urban Villages. The UW area to the south and Northgate and Lake City areas to the north both have moderate to high rates of displacement risk, while the middle section of

Area 2, which includes neighborhoods like Maple Leaf, View Ridge, and Laurelhurst, is affluent, more residential, and scores lower on vulnerability to displacement.

Population: One in five Seattle residents live in Area 2. More than half (52%) of its population of 146,658 resides in Neighborhood Residential zones. Approximately 60% of the population of Area 2 identifies as White, Non-Hispanic, and 40% identify as BIPOC, similar to citywide. The population distribution by race is also similar to citywide demographics. Fifteen percent of the population of this area is under 18 years old, just above the city average of 14%.

Housing: Area 2 has 64,581 housing units, of which 46% are detached homes and 54% are multifamily. Area 2 has a homeownership rate of about 50% and an average household size of 2.36 people.

Rental housing costs in Area 2 are somewhat lower than the Seattle average. The average rent for a 1-bedroom apartment in Area 1 is $1,635, which is affordable for a household whose income is 65% of AMI. Ownership housing costs are slightly higher compared to the citywide average. A 3-person household needs an income 224% of AMI to afford a median priced detached home, compared to 216% citywide.

Based on Seattle's TRAO data, at least 325 low-income renter households in Area 2 were displaced between 2015 and 2022, an average annual rate of approximately 17 per 10,000 renter households, nearly double the citywide average of 9.

Employment: Employment centers in Area 2 include the UW main campus and University District, Seattle Children's Hospital, and the urban center surrounding Northgate Mall, as well as the commercial center in the Lake City Urban Village. Most other land in Area 2, however, is large residential areas predominated by detached housing and few services.

130th/145th Station Area

These anticipated stations are a locus of current and anticipated development in Area 2. Currently primarily residential, this sub-area will increasingly serve as a connector between Lake City to the east and Bitter Lake and Aurora–Licton Springs to the west when the light rail stations open in 2024-2025. The residential areas within the half-mile buffer around NE 130th St Station are assessed to have low to moderate displacement risk according to Seattle's Displacement Risk Index (see **Exhibit 3.8-31**). Pockets of the broader Station Area have higher displacement risk: within the Lake City urban village, along 15th Ave NE south of NE 130th St, and on the west side of Aurora (SR 99) north of NE 130th St.

Area 3: Queen Anne/Magnolia

Area 3 covers western (but not West) Seattle south of the ship canal but north of downtown. This area includes Magnolia to the west and Queen Anne to the east, split by the Interbay industrial and manufacturing area. The Queen Anne section includes the Upper Queen Anne Urban Village and Uptown (Lower Queen Anne) Urban Center.

Population: Area 3 has a population of 69,681 (approximately 1 in 10 Seattle residents), with slightly less than half (40%) living in Neighborhood Residential zones. Approximately 69% of the population of Area 3 identifies as White, Non-Hispanic, and 31% identify as BIPOC, making it less diverse than the city as a whole. This area has a relatively smaller share of residents who identify as Black or Asian, compared to citywide. The population of this area under 18 years old is similar to the citywide rate at 14%.

Housing: Areas 3 has 36,514 housing units, of which 31% are detached homes and 69% are multifamily. Area 3 has a homeownership rate of about 45% and average household size of 1.88 people, lower than the citywide average of 2.08.

Rental housing costs in Area 3 are slightly lower than the Seattle average. Citywide the average rent for a 1-bedroom apartment is $1,940, versus $1,854 in Area 3, which is affordable for a household whose income is 73% of AMI. Ownership housing costs are substantially higher compared to the citywide average. A 3-person household needs an income 316% of AMI to afford a median priced detached home, compared to 216% citywide.

Based on TRAO data, at least 106 low-income renter households in Area 3 were displaced between 2015 and 2022, an average annual rate of approximately 8 per 10,000 renter households.

Employment: Employment centers in Area 3 include the Ballard–Interbay–North End Manufacturing and Industrial Center; the Uptown Urban Center northwest of Seattle Center; and Seattle Pacific University along the south edge of the ship canal. However, west of Interbay, which bisects Area 3, most of Magnolia is residential and lacks substantial services.

Area 4: Downtown/Lake Union

Area 4 comprises central and downtown Seattle, including the Westlake neighborhood and the Eastlake Urban Village that flank Lake Union and the South Lake Union and Downtown Urban Centers. It also includes the Chinatown International District.

Population: Area 4 has a population of 63,803 (about 9% of the city total), residing primarily in multifamily apartment buildings in the densest part of Seattle. Just 2% live in Neighborhood Residential zones due to the small amount of that zone in Area 4. Compared with other areas, Area 4 has relatively fewer people who identify as White, Non-Hispanic(approximately half of the population of Area 4). Thirty percent identify as Asian alone, nearly double the Seattle average. Many of these Asian residents live in the Chinatown-International District. Approximately half of Area 4 residents identify is BIPOC, significantly higher than the citywide (41%). Few families live in Area 4: only 5% of the population of this area is under 18 years old, around a third of the percentage for Seattle overall (14%).

Housing: Area 4 has 52,062 housing units, of which just one percent are detached homes and 99% are multifamily. Nearly 10% of those apartments are vacant, the highest vacancy rate of any EIS Area. Area 4 also has the highest percentage of renters (4 out of 5 households rent), and the smallest average household size (1.5 people) in the city.

Rental housing costs in Area 4 are the highest in Seattle. The average rent for a 1-bedroom apartment in Area 4 is $2,301, which is affordable only to households with incomes of at least 91% of AMI. Nearly all ownership housing supply is in condominiums in larger multifamily buildings, and the housing cost for this kind of unit is higher than any other area of the city.

Based on TRAO data, at least 70 low-income households in Area 4 were displaced between 2015 and 2022, for an average annual rate of approximately 3 per 10,000 households, markedly lower than elsewhere in the city.

Employment: Area 4 has a high concentration of commercial activity. In addition to corporate and professional offices throughout downtown, Area 4 houses the Seattle's civic campus (City of Seattle, King County, and other government facilities and offices); Amazon's headquarters in South Lake Union; dining, nightlife, and cultural institutions; hotels and tourist facilities; and downtown and waterfront retail, including the Pike Place Market. While this area has higher job volume and capacity than elsewhere in Seattle, it has been hit especially hard by the COVID-19 pandemic.

Area 5: Capitol Hill/Central District

Area 5 is central and eastern Seattle, including the First Hill/Capitol Hill Urban Center and the Madison–Miller and 23rd & Union–Jackson Urban Villages. This area is more densely populated than most and includes the historic centers of Seattle's Black (Central District) and LGBTQ+ (Capitol Hill) communities.

Population: Area 5 has a population of 106,416 (approximately 14% of Seattle residents), with about 1 in 4 living in Neighborhood Residential zones. About 62% of the population of Area 5 identifies as White, Non-Hispanic and 38% identify as BIPOC, making Area 5 slightly less diverse than citywide. About 8% of residents identify as Black, Non-Hispanic, just slightly higher than the percentage citywide (7%). Only 10% of Area 5 residents are under 18 years old, compared to 10% citywide.

Housing: Area 5 has 70,170 housing units, of which 18% are detached homes and 82% are multifamily, the highest share of multifamily housing outside downtown. Correspondingly, Area 5 has a lower homeownership rate (about 1 in 3 households) than other EIS Areas. The average household has 1.8 people.

Rental housing costs in Area 5 are roughly equal to the Seattle average. The average rent for a 1-bedroom apartment in Area 5 is $1,911, which is affordable for a household whose income is 76% of AMI. Ownership housing costs are substantially higher compared to the citywide average. A 3-person household needs an income 311% of AMI to afford a median priced detached home, compared to 216% citywide.

Based on TRAO data, at least 255 low-income renter households in Area 5 were displaced between 2015 and 2022, an average annual rate of approximately 10 per 10,000 renter households.

Employment: Area 5 is home to much of the city's healthcare institutions (including Swedish, Virginia Mason, and Harborview hospitals) on First Hill, part of an urban center that extends

north through Capitol Hill. The 23rd & Union–Jackson Urban Village, which spans much of the historically Black Central District of Seattle, has a few locations with neighborhood serving commercial uses. Neighborhood-serving businesses also exist in parts of Capitol Hill and Madison Valley. Other neighborhoods in Area 5 are predominantly high-cost residential areas with limited services, like Montlake, Leschi, Broadmoor, Madrona, and Portage Bay.

Area 6: West Seattle

Area 6 comprises southwest Seattle, including West Seattle's Admiral, West Seattle Junction, and Morgan Junction Urban Villages and the Westwood–Highland Park Urban Village.

Population: Area 6 has a population of 95,061, of which 57% lives in Neighborhood Residential zones, more than any other EIS Area. More than two-thirds of the population identifies as White, Non-Hispanic, and 38% identify as BIPOC, compared to 41% BIPOC citywide. About 18% of Area 6 residents are under 18 years old, compared to 14% citywide.

Housing: Area 6 has 46,500 housing units, of which 54% are detached homes and 46% are multifamily. At roughly 60%, Area 6 has the highest homeownership rate of any EIS Area. The average household size is 2.25 people, slightly above the citywide average.

Rental housing costs in Area 6 are slightly below the city average. The average rent for a 1-bedroom apartment in Area 6 is $1,737, which is affordable for households whose income is a 69% of AMI. Ownership housing costs are somewhat lower compared to the citywide average. A three-person household needs an income of 181% of AMI to afford a median priced detached home, compared to 216% citywide.

Based on TRAO data, at least 86 low-income renter households in Area 6 were displaced between 2015 and 2022, an average annual rate of approximately 7 per 10,000 renter households.

Employment: Area 6 has limited commercial development overall. The southern portion has access to services at Westwood Village, near Highland Park, and in White Center in unincorporated King County. Many residential areas in West Seattle down to Fauntleroy and Arroyo Heights have limited services. Area 6 is also home to South Seattle Community College.

Area 7: Duwamish

Located in south Seattle between Area 6 to the west and Area 8 to the east, Area 7 comprises primarily industrial-zoned land along the Duwamish river, including Port of Seattle land, the Seattle Intermodal facility (railyard), Boeing Field, the Georgetown neighborhood, and the South Park Urban Village. This area is sparsely populated, with far less residential land than other EIS areas apart from Georgetown and South Park. Given its smaller residential population, statistics about this area are suggestive and less reliable, as small changes in the limited sample could have large effects.

Population: Area 7 has a population of 9,726 (just 1.3% of the City's population), of which about 12% reside in Neighborhood Residential zones. Less than half of the population of Area 7 identifies as White, Non-Hispanic and 52% identify as BIPOC, compared to 41% citywide. Nearly 20% of residents in Area 7 identify as Hispanic or Latino, over double the rate citywide (8%). About 14% of Area 7 residents are under 18 years old, equivalent to the citywide share.

Housing: Area 7 has only 2,287 housing units, of which just over half (53%) are detached homes primarily in South Park. The homeownership rate is 45%, and the average household size is 2.38 people, larger than the Seattle average of 2.08.

Rental housing costs in Area 7 are the lowest in the city. The average rent for a 1-bedroom apartment in Area 7 is $715, which is affordable for household whose income is 28% of AMI, though this data reflects a limited sample, with no newly developed units and only one building that was substantially rehabilitated between 2013 and 2022. Ownership housing costs are substantially lower compared to the citywide average. A three-person household needs an income of 130% of AMI to afford a median priced detached home, compared to 216% citywide.

Based on TRAO data, at least 31 low-income renter households in Area 7 were displaced between 2015 and 2022, an average annual rate of approximately 39 per 10,000 renter households, more than four times the citywide average.

Employment: Area 7 is primarily industrial, with small commercial clusters in the Georgetown and South Park neighborhoods. Boeing Field / King County International Airport is located in Area 7.

Area 8: Southeast Seattle

Area 8 covers southeast Seattle, including the North Beacon Hill, Mt. Baker, Columbia City, Othello, and Rainier Beach Urban Villages. This area includes some of the most racially diverse neighborhoods in Seattle and is home to mixed-income planned housing developments like Holly Park.

Population: Area 8 has a population of 92,539, similar to Area 6, with 54% living in Neighborhood Residential zones. More than two-thirds of the population identifies as BIPOC. Asian (31%) and Black (19%) identifying residents are overrepresented compared to their shares citywide (17% and 7%, respectively). Almost 20% of Area 8 residents are under 18 years old, the highest rate of any EIS Area.

Housing: Area 8 has 39,704 housing units, of which 56% are detached homes and 44% are multifamily. The homeownership rate is 58%, second only to Area 6. The average household size is 2.61 people, the highest of any EIS Area by a substantial margin.

Rental housing costs in Area 8 are slightly lower than the city average and on par with Area 6 and Area 3 on a per-square-foot basis. The average rent for a 1-bedroom apartment is $1,791, which is affordable for a household whose income is 71% of AMI. Ownership housing costs are somewhat lower compared to the citywide average. A three-person household needs an income 172% of AMI to afford a median priced detached home, compared to 216% citywide.

Based on TRAO data, at least 124 low-income renter households in Area 8 were displaced between 2015 and 2022, an average annual rate of approximately 11 per 10,000 renter households.

Employment: Area 8 has mixed-use and commercial development primarily along the main arterials of Rainier Ave S, Beacon Ave S, and Martin Luther King Jr. Way S. However, large residential areas away from these corridors, including nearly the entire Rainier Beach neighborhood to the south, have limited or no services. Area 8 is also home to the Veterans' Affairs Puget Sound Health Care campus.

3.8.2 Impacts

Impacts Common to All Alternatives

Housing Supply

Seattle's housing supply would continue to increase under all five alternatives. What distinguishes the alternatives is the total amount of housing growth each would accommodate, the distribution of housing growth in different place types across the city, and the types of new housing likely to unfold in each place type given their zoning. Different kinds of housing can best support different kinds of households due to the size and affordability of units. **Exhibit 3.8-39** summarizes the amount and type of housing likely to be developed under each alternative. These projections are based on the amount of housing growth expected in each place type (detailed in **Chapter 2**) and assumptions about the kinds of housing most likely to be developed in each place type. These assumptions are based on recent housing production trends in zones similar to each proposed place type.

All action alternatives are expected to increase total housing supply more than No Action. In Alternative 2 (Focused), a greater share of new housing would be in stacked housing such as apartment buildings. Alternative 3 (Broad) would produce the greatest diversity of housing types, particularly detached and attached homes.

Exhibit 3.8-39. Projected Net New Housing Units by Housing Type

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Stacked Housing					
Condominiums	2,261	2,977	3,730	3,127	3,626
Apartments	73,109	93,815	76,652	88,662	110,079
Attached and Detached Housing					
>2,000 sq. ft.	1,389	698	1,111	1,111	1,111
>1,200 – 2,000 sq. ft.	648	533	4,260	1,578	1,128
≤1,200 sq. ft.	2,593	1,977	14,247	5,522	4,056
Total Net New Housing	**80,000**	**100,000**	**100,000**	**100,000**	**120,000**

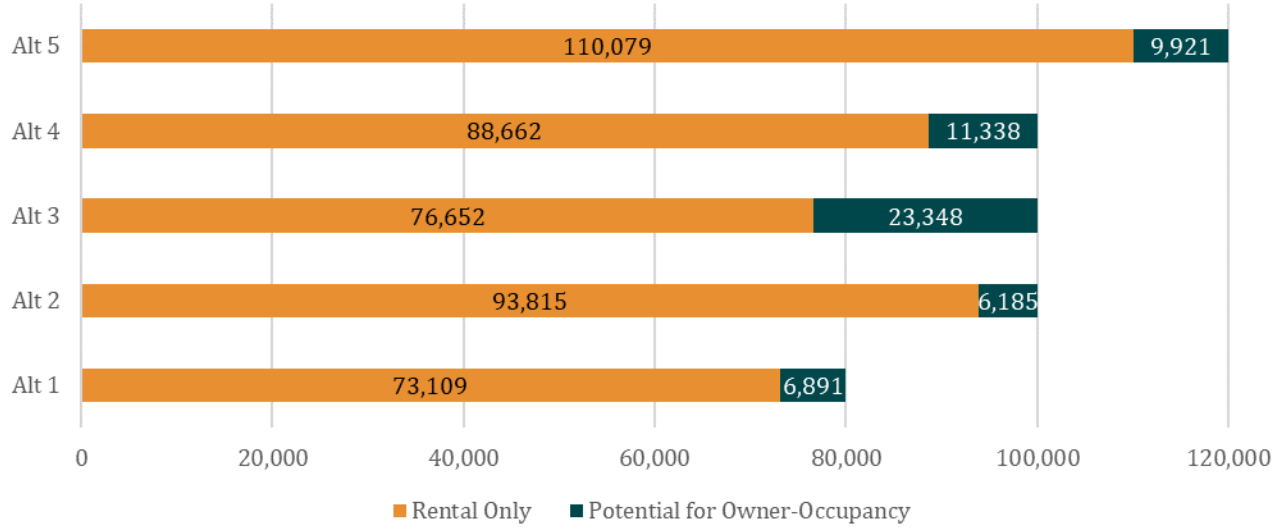
Note: Attached and detached housing refers primarily to unit types expected to be built in urban neighborhood areas. These include detached homes, attached, or detached accessory dwelling units, townhomes, or other low- to moderate-density formats. All of these units could be sold separately or as condominiums to support homeownership opportunities.

All five alternatives are expected to add substantially more renter-occupied housing than owner-occupied housing to the city's housing supply. This is consistent with recent housing production trends where most housing growth is in new apartment buildings. However, the alternatives vary substantially in the amount and potential tenure of projected new housing, as shown in **Exhibit 3.8-40**. These projections are based on the types of new housing expected to be produced in each alternative. They assume all attached and detached housing can be sold separately as either a condominium or on its own lot. For stacked housing, they assume that 60% would be built as condos in urban neighborhood areas, and 3% would be built as condos in all other place types.[47] However, any individual condominium or house on its own lot could be either owner- or renter-occupied.

Despite its higher overall housing growth estimate, Alternative 2 would produce fewer units that could be owner-occupied compared to Alternative 1 (No Action) due to its emphasis on zones that allow multifamily housing, which tend to be rental. Alternative 3 would produce the most units that could be owner-occupied due to its emphasis on growth in small-scale detached and attached housing typically offered for sale. Over time, changes in consumer preference, housing costs, or laws governing condominium construction could result in changes in the percentage of units that are owner-occupied.

[47] Analysis by City of Seattle indicates that about 3% of all multifamily housing constructed in recent years were condominiums. However, trends indicate a much higher percentage of new attached and detached homes in Neighborhood Residential zones are being sold separately as condos. Therefore, in alternatives where stacked housing types are allowed in Neighborhood Residential zones, a higher percentage of those new units are expected to be available as condominiums.

Exhibit 3.8-40. Projected Net New Housing Units by Tenure



Sources: City of Seattle, 2023; BERK, 2023.

Affordability of New Market Housing Supply

As discussed earlier, the balance of housing supply with the demand for housing in Seattle is a major contributing factor to market housing costs. Rising demand for new housing creates competition for a limited supply of homes. This causes upward pressure on rents and sales prices. In all alternatives, demand for housing in Seattle is likely to remain very high. However, the alternatives vary in the total amount of net new housing that would result. In general, the action alternatives would be expected to reduce competition for housing compared to No Action due to the increased housing growth that they accommodate. Alternative 5 would result in the largest increase in housing supply and therefore have the greatest impact on reducing overall market housing cost pressures for both new and older units.

New housing tends to be more expensive than older housing, as shown in **Exhibit 3.8-20** and **Exhibit 3.8-22**. However, this trend is due in part to the fact that new housing built in Neighborhood Residential zones has tended to be much larger than existing homes. As shown in **Exhibit 3.8-20**, **Exhibit 3.8-21**, and **Exhibit 3.8-23**, the affordability of new housing varies substantially by housing type and size. As of 2022, purchasing a median-priced detached home built between 2013 and 2022 requires nearly 300% of AMI, and even a median-priced detached home built before 1994 is affordable only to households with an income of at least 182% of AMI. By contrast, new apartments (built 2013-2022) were typically affordable to households with incomes of 80-100% of AMI. Among for-sale housing, new townhouses are typically affordable to households with incomes of 166% of AMI, smaller non-stacked condos less than 1,200 sq ft are affordable at 138% of AMI, and stacked condos are affordable at 117% of AMI. These affordability levels could change in the future, depending on the amount and type of housing created in Seattle, as well as other factors. Additionally, changes to density limits in Neighborhood Residential zones could result in smaller units that are comparatively lower cost.

Production of New Affordable Units through MHA & MFTE

Seattle has two programs that support the production of new income-restricted affordable housing through developer contributions or incentives alongside housing growth: Mandatory Housing Affordability (MHA) and the Multifamily Tax Exemption (MFTE). Under all alternatives, Seattle is expected to gain additional income-restricted units through these programs. However, the alternatives differ in the likely number of affordable units produced. This section briefly describes each program and then compares projected outcomes.

Mandatory Housing Affordability

MHA supports the development of new income-restricted affordable housing in Seattle. To provide affordable housing and mitigate the impacts of development, new commercial, residential, and live–work projects in designated zones must contribute to affordable housing by including affordable units within new development (performance option) or paying into a City fund that supports the creation and preservation of affordable housing (payment option). Specific requirements vary both geographically and by the scale of zoning change that implemented MHA, which in most cases is reflected as a suffix in the zone name.

Development in many areas of Seattle is already subject to MHA requirements. All action alternatives include proposals to rezone areas of the city, which would modify existing MHA requirements or trigger new MHA requirements in those areas. Additionally, the higher total housing growth estimates of the action alternatives mean more overall housing development would be subject to MHA requirements. **Exhibit 3.8-41** compares the projected number of net new income-restricted units expected under each alternative from the application of MHA on residential development. These projections assume that the City will not extend MHA requirements in any Neighborhood Residential (NR) zone.[48] They show that Alternatives 2, 4, and 5 would substantially increase the number of new income-restricted units produced, compared to No Action, while Alternative 3 would have a smaller impact.

Exhibit 3.8-41. Projected New Income-restricted Affordable Units through MHA-Residential (Excluding NR Zones)

	Alternative 1: No Action	Alternative 2: Focused	Alternative 3: Broad	Alternative 4: Corridor	Alternative 5: Combined
Performance Units	1,131	1,614	1,131	1,400	1,787
Payment Units	9,891	13,544	9,891	13,142	15,505
Total	**11,022**	**15,158**	**11,022**	**14,542**	**17,293**

Note: These projections assume that the city will not apply MHA requirements in Neighborhood Residential zones. Assumption was 75% payment for stacked flats and 100% payment for attached and detached housing based roughly on recent development.

[48] NR zones currently are one of the only areas of Seattle where MHA requirements do not apply to residential development.

Source: City of Seattle, 2023.

The City is considering whether to extend MHA requirements to include development in some or all NR zones. **Exhibit 3.8-42** shows the likely impacts of this change on the production of income-restricted units if we assume that MHA requirements in NR zones resemble the existing MHA requirements in other zones. It shows more income-restricted units produced for the action alternatives, compared to a scenario where MHA requirements do not apply in Urban Neighborhood Residential zones.

Exhibit 3.8-42. Projected New Income-restricted Affordable Units through MHA-Residential (Including NR Zones where updated)

	Alternative 1: No Action	Alternative 2: Focused	Alternative 3: Broad	Alternative 4: Corridor	Alternative 5: Combined
Performance Units	1,131	1,614	1,163	1,400	1,800
Payment Units	9,891	13,544	13,066	13,142	16,758
Total	**11,022**	**15,158**	**14,229**	**14,542**	**18,558**

Note: These projections assume that the City will apply MHA requirements in NR zones.
Source: City of Seattle, 2023.

Multifamily Tax Exemption

MFTE is a developer incentive that provides a tax exemption on eligible multifamily housing in exchange for setting aside a portion of units as income- and rent-restricted affordable housing. This exemption lasts 12 years, at which point the property owner can renew the tax exemption and affordability requirements or rent those units at market rates. Therefore, new affordable units are added to Seattle's housing supply each year as developers opt-in to the program, while other affordable units come offline when property tax exemptions expire. **Exhibit 3.8-43** shows projections of net new affordable housing units produced through MFTE under each alternative. These projections are based on current trends in use of the program, and the expected new housing production by zone under each alternative. Alternatives 1 and 3 are not expected to increase net MFTE units overall as the number of new affordable units produced with MFTE would equal the number expiring and returning to market rates. Alternatives 2, 4, and 5 expect modest growth in the total supply of MFTE units.

Exhibit 3.8-43. Projected Net Gain of Affordable Housing Units through MFTE

	Alternative 1: No Action	Alternative 2: Focused	Alternative 3: Broad	Alternative 4: Corridor	Alternative 5: Combined
Total	**0**	**600**	**0**	**450**	**525**

Source: City of Seattle, 2023.

Loss of Housing Stock through Demolition

Between 2009 and 2022, more than 600 housing units were lost due to demolition each year in Seattle. Demolition of older housing is expected to continue under all alternatives as lots with older homes are redeveloped with newer and higher-density housing. However, the number of units demolished is expected to vary widely by alternative, from 5,030 units in Alternative 1 to 9,148 units in Alternative 3, as shown in **Exhibit 3.8-44**. This table also shows the ratio of net new units per demolished unit. Here Alternatives 1 and 2 have the highest ratio, while Alternative 3 has the lowest. The reason for this variation is discussed in detail below.

Exhibit 3.8-44. Projected Housing Units Demolished by EIS Analysis Area and Alternative

Area	Alternative 1: No Action	Alternative 2: Focused	Alternative 3: Broad	Alternative 4: Corridor	Alternative 5: Combined
Area 1	871	1,192	1,662	1,330	1,758
Area 2	1,103	1,391	2,636	2,202	2,274
Area 3	389	534	484	473	565
Area 4	810	810	810	810	810
Area 5	685	929	735	745	915
Area 6	565	767	1,404	1,070	1,374
Area 7	80	85	48	87	140
Area 8	527	637	1,369	918	1,284
Total units demolished	5,030	6,345	9,148	7,635	9,120
Total net new units	80,000	100,000	100,000	100,000	120,000
Ratio of net new units to units demolished	**15.9**	**15.8**	**10.9**	**13.1**	**13.2**

Source: City of Seattle, 2023. BERK, 2023.

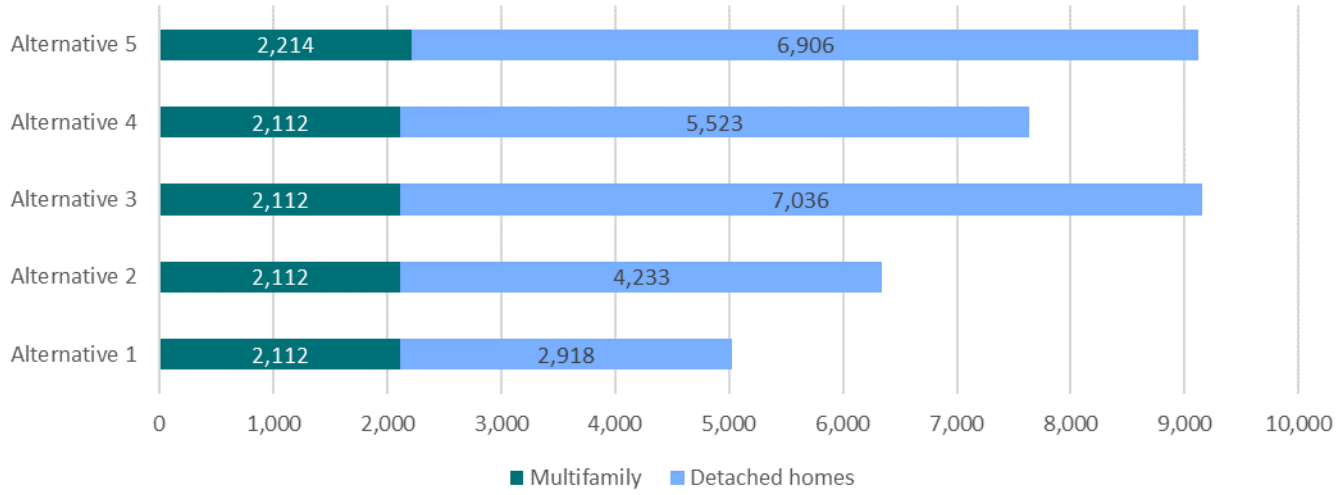
Two factors play the largest role in determining projected demolitions. The first is the total amount of housing growth. Alternatives with more projected growth typically have higher rates of demolition, given that more lots would redevelop to accommodate the additional growth. This explains why Alternative 1, which would have the least housing production, is projected to have the fewest demolitions.

The second factor is the amount of housing growth by place type. Alternatives 1 and 2 focus more growth in regional centers, urban centers, and, for Alternative 2, neighborhood centers and therefore are expected to see much of the net new housing produced as higher-density apartment and condominium buildings. New housing built at relatively higher densities require fewer parcels to redevelop to accommodate a given amount of growth, and more net new units are produced for every home demolished. On the other hand, Alternatives 3, 4, and 5 all anticipate more low- and moderate-density housing produced outside centers. Given its lower

density, new development in these areas would produce fewer net new units for every older unit demolished. For example, an existing detached home demolished and replaced with a new detached home and two ADUs produces two net new units for every one demolished unit. But if that same home is replaced instead with a six-plex, five net new units occur for one demolished unit.

The type of housing demolished would also vary. **Exhibit 3.8-45** shows the projected number of detached homes and multifamily housing units that would be demolished by alternative. Almost no variation exists in the number of multifamily units demolished across alternatives, with the exception that Alternative 5 is expected to result in slightly more demolitions. This is because the alternatives vary primarily in the amount of growth expected in new place types located where detached homes currently predominate. As a consequence, most demolitions are expected to be older detached homes, and the total number of detached homes expected to be demolished varies substantially across alternatives.[49]

Exhibit 3.8-45. Projected Housing Units Demolished by Housing Type and Alternative



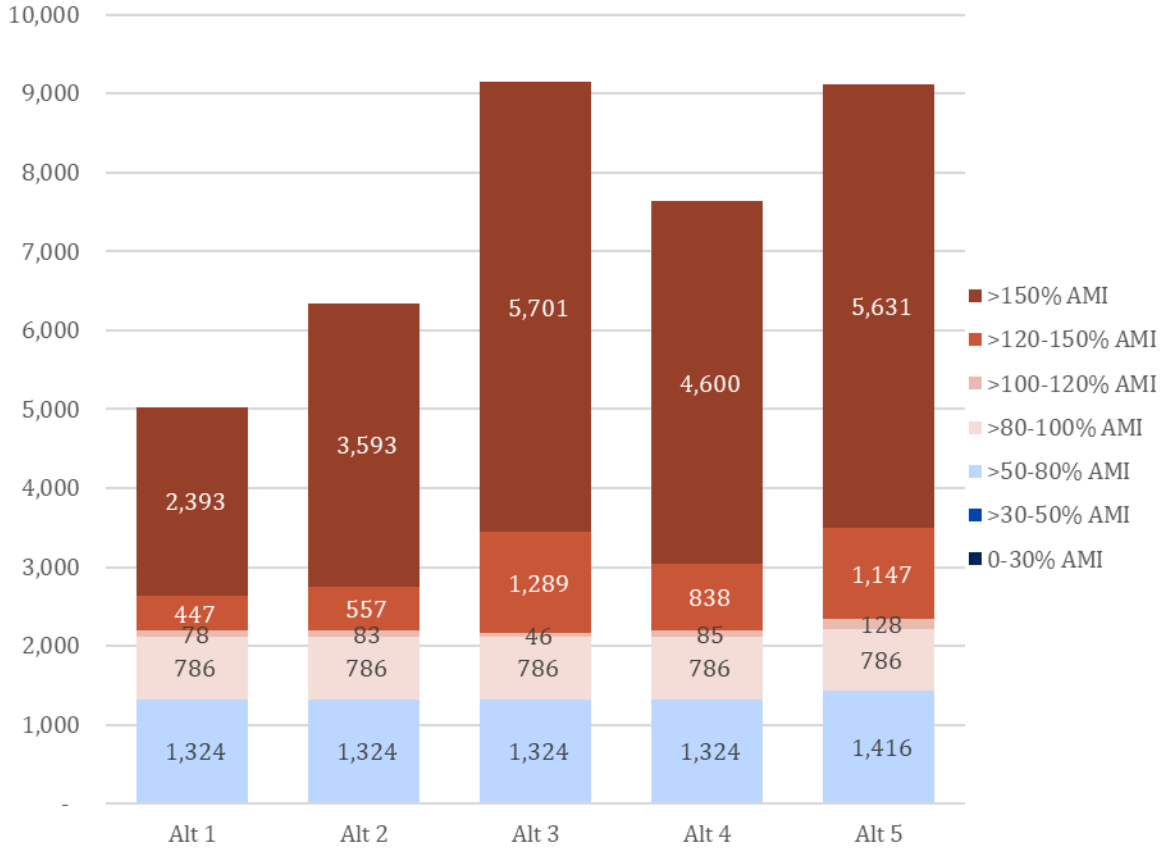
Sources: City of Seattle, 2023; BERK, 2023.

Exhibit 3.8-46 presents projections of housing lost due to demolition by affordability level. For detached homes, these projections are based on analysis of median sales price for older detached homes by analysis area (see **Exhibit 3.8-22**). For units in multifamily buildings, these projections are based on the affordability of apartment rents in older structures (see **Exhibit 3.8-20**). This analysis shows that all alternatives are expected to result in the demolition of a

[49] To develop these projections, the City of Seattle used King County Assessor data to identify parcels most likely to redevelop in the future based on characteristics such as the year built, density of development relative to what is allowed under current zoning, and the ratio of improvement value to land value. Next, the City classified the type of housing currently on redevelopable parcels as single family (detached) or multifamily. Then, for each place type it calculated the percentage of units on redevelopable parcels that are single family or multifamily. Finally, these percentages were applied to the estimate of total demolished housing units by place type to calculate single family and multifamily units demolished. For all growth outside the place types defined in Alternative 1, this analysis assumes all demolished units are detached homes.

similar number of units affordable at 120% AMI or below. The alternatives vary primarily in the number of detached homes demolished, which tend to be affordable only to households with incomes above 120 or 150% AMI, as shown in **Exhibit 3.8-45**.

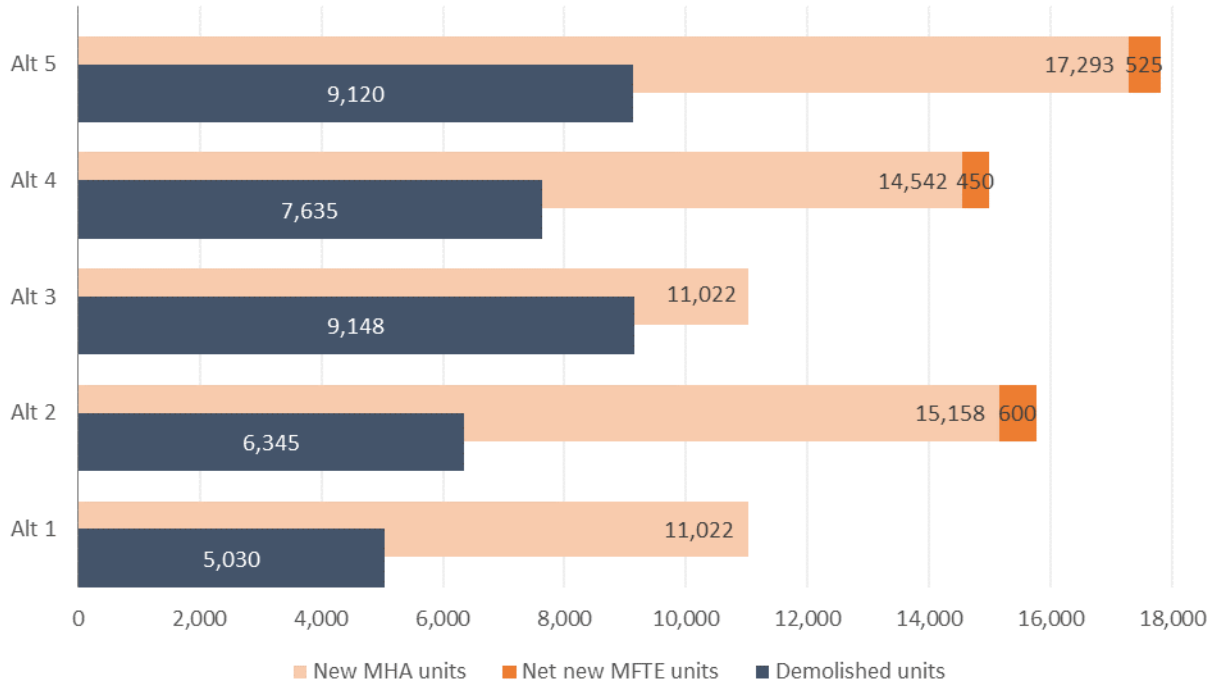
Exhibit 3.8-46. Projected Housing Units Lost to Demolition by Affordability Level



Note: No units from affordable at 30-50% AMI are projected to be demolished in any alternative. A very small number of 0-30% AMI units (2-12) could be demolished. These counts are not shown in the chart.
Sources: City of Seattle, 2023; BERK, 2023.

Exhibit 3.8-47 compares the projected number of demolished units to the projected number of new income-restricted affordable units produced through MHA and MFTE combined. In Alternatives 1, 2, 4, and 5 the number of new affordable units substantially exceeds the number of units demolished. In Alternative 3, new affordable units only slightly exceed demolitions, in part because of the assumption that MHA would not apply in NR zones. Alternatives 2 and 5 are expected to create the most new affordable units per unit demolished.

Exhibit 3.8-47. Comparison of Demolished Units to New Affordable Housing from MHA and MFTE



Note: This chart does not show total new housing supply. Alternative 5 would provide 120,000 net new units, Alternatives 2-4 would provide 100,000 net new units, and Alternative 1 would provide 80,000 net new units. Additionally, these projections assume that the City will not apply MHA requirements in any NR zone. Applying MHA would result in additional production of new income-restricted affordable housing.
Sources: City of Seattle, 2023; BERK, 2023.

Displacement

This section evaluates the potential for displacement of Seattle households under each alternative. The first part estimates physical displacement associated with demolished housing units. This is followed by a discussion of how economic and cultural displacement pressures may vary by alternative.

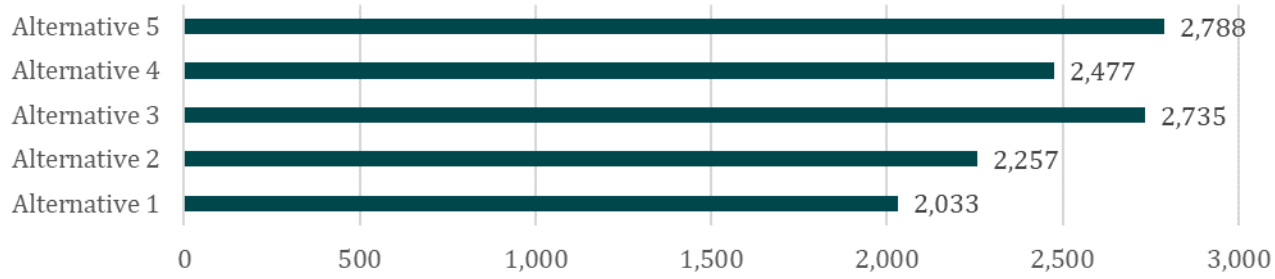
Physical Displacement

Not all demolitions result in the physical displacement of a household. For example, a homeowner may choose to sell their home to a developer or demolish it themselves in order to build a larger home. Renter households, however, are more likely to be physically displaced if the owner of their building decides to demolish the building they occupy. In some circumstances a renter household whose unit is demolished may not be considered physically displaced (e.g., they voluntarily ended their lease and the building owner subsequently decided to demolish the building). Similarly, in some circumstances a renter household might be physically displaced from their unit but relocate within the same neighborhood. This renter would be physically displaced from their unit but not from their neighborhood. Conversely, a renter household might be physically displaced under circumstances apart from demolition,

like eviction or the expiration of rent restrictions. Overall, estimating the number of renter households residing in units projected to be demolished is one way to conservatively estimate how many households could be physically displaced in each alternative.

Using Census data about the household characteristics of detached and multifamily housing occupants in each analysis area, projections of demolished units by housing type (**Exhibit 3.8-45**), and vacancy rates by housing type, it is possible to estimate how many renter households could be physically displaced in each alternative. The results of this analysis are shown in **Exhibit 3.8-48**. The number of renter households varies less than the total number of units demolished (see **Exhibit 3.8-45**) because the occupants of detached homes are more likely to be homeowners, and much of the variation in demolition by alternative was due to the number of detached homes demolished. Nonetheless, Alternative 5 would be expected to result in the greatest potential for renter households displaced due to demolitions, while Alternative 1 would be expected to see the fewest.

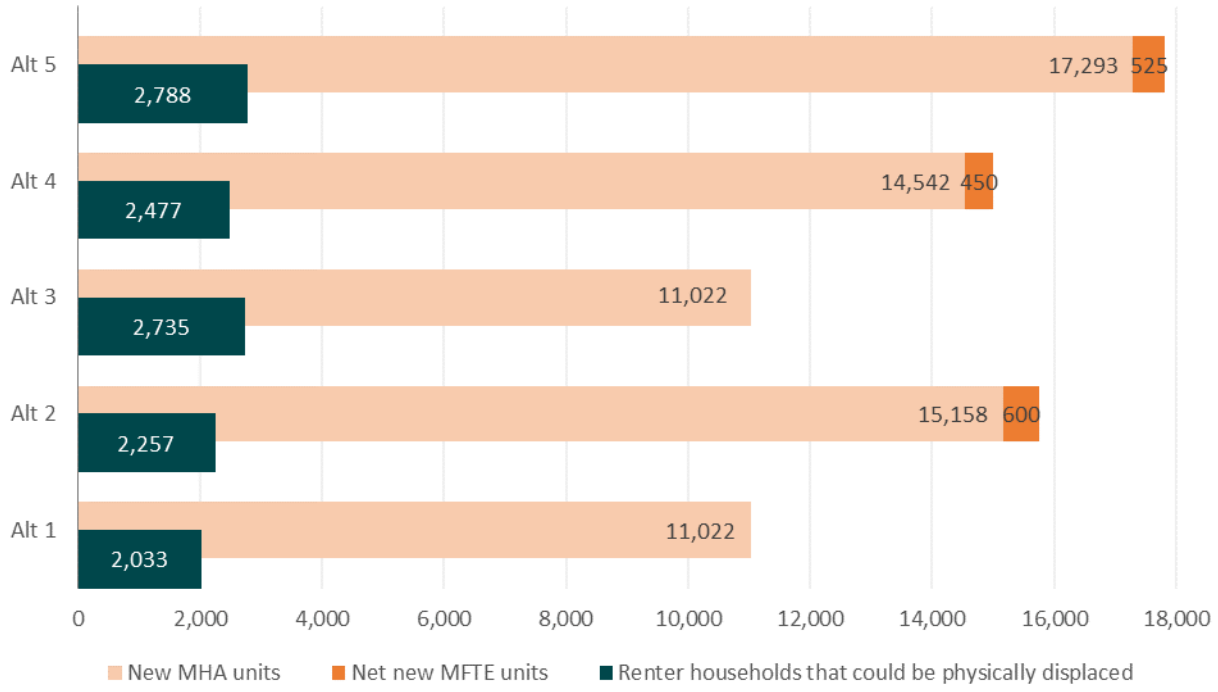
Exhibit 3.8-48. Renter Households Physically Displaced by Alternative



Sources: City of Seattle, 2023; BERK, 2023.

Exhibit 3.8-49 compares the projected number of renter households that could be physically displaced through demolition to the number of new income-restricted affordable units expected to be generated by MHA or MFTE. Across all alternatives, this conservative estimate of physically displaced households is much lower than the amount of new affordable housing that would be built during the planning period.

Exhibit 3.8-49. Renter Households Physically Displaced Compared to New Income-Restricted Affordable Units from MHA or MFTE

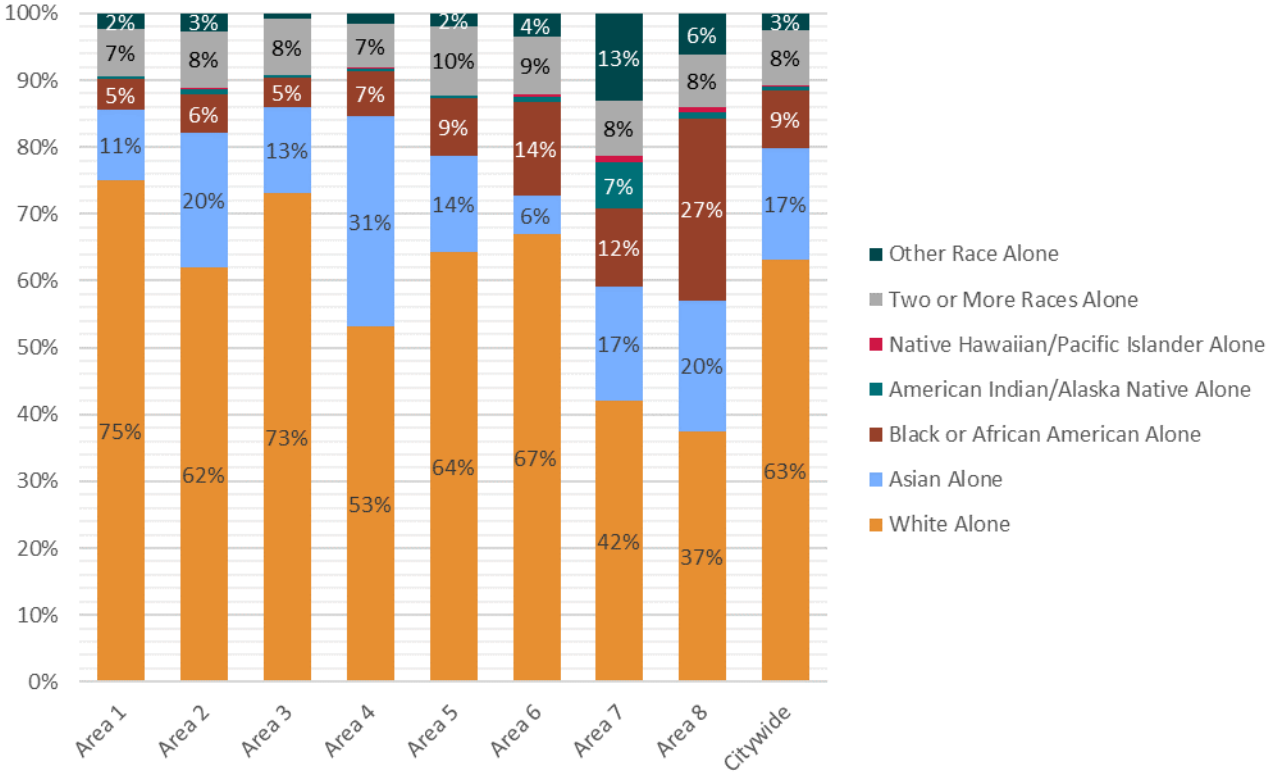


Note: These projections assume that the City will not apply MHA requirements in any Neighborhood Residential zone. Applying MHA would result in additional new income-restricted affordable housing production.
Sources: City of Seattle, 2023; BERK, 2023.

While it is impossible to predict exactly which kinds of renter households are most likely to be displaced in each alternative, information about the characteristics of today's renter households is available. **Exhibit 3.8-50** shows the breakdown of renter households by the race of householder[50] and analysis area. **Exhibit 3.8-51** breaks down renter households by ethnicity. Citywide, about 40% of all renter households are BIPOC, and these households are more likely to be vulnerable to displacement than White, Non-Hispanic households.[51] Areas with a higher proportion of BIPOC householders may see these households displaced at a disproportionately high rate compared to households with White householders.

[50] The Census term householder refers to "the person (or one of the people) in whose name the housing unit is owned or rented (maintained) or, if there is no such person, any adult member, excluding roomers, boarders, or paid employees." Source: https://www.census.gov/programs-surveys/cps/technical-documentation/subject-definitions.html#householder
[51] Source: American Community Survey 5-Year Estimates (2017-2021): S2502—Demographic Characteristics for Occupied Housing Units.

Exhibit 3.8-50. Race of Householder for Renter Households, by EIS Analysis Area



Note: Percentage values less than 2% are not displayed for readability.
Source: American Community Survey 5-Year Estimates (2017-2021): S2502—Demographic Characteristics for Occupied Housing Units; City of Seattle, 2023.

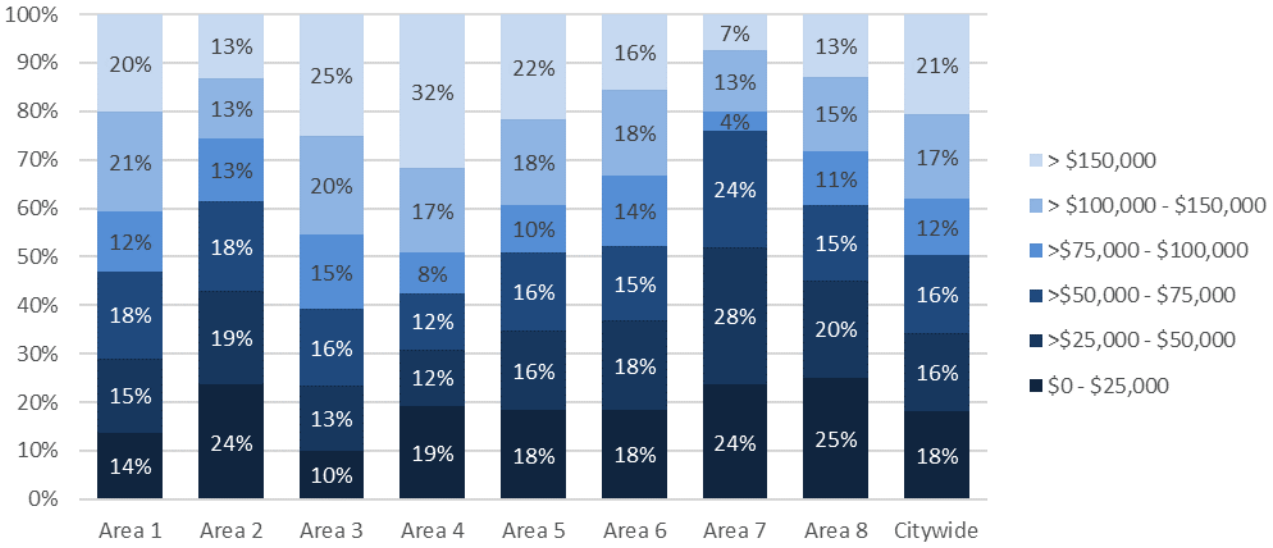
Exhibit 3.8-51. Ethnicity of Householder for Renter Households by EIS Analysis Area

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Citywide
Hispanic or Latino	7.3%	7.9%	7.6%	6.8%	7.4%	8.5%	27.7%	10.4%	7.9%
Not Hispanic of Latino	92.7%	92.1%	92.4%	93.2%	92.6%	91.5%	72.3%	89.6%	92.1%

Source: American Community Survey 5-Year Estimates (2017-2021): S2502—Demographic Characteristics for Occupied Housing Units; City of Seattle, 2023.

The impact of physical displacement on a renter household would vary based on household income. Compared to higher-income households, lower-income households who are displaced would be much less likely to find adequate housing they can afford within the same neighborhood. **Exhibit 3.8-52** shows household income for renter households across all EIS Analysis Areas and citywide. Just over a third of renter households citywide have incomes at or below $50,000. Some of these households live in income-restricted housing units unlikely to be demolished. Others live in older market-rate housing that may be at risk of demolition.

Exhibit 3.8-52. Household Income for Renter Households by EIS Analysis Area



Source: American Community Survey 5-Year Estimates (2017-2021): B25118—Tenure by Household Income in the past 12 months (in 2021 inflation-adjusted dollars); City of Seattle, 2023.

As discussed in the Affected Environment section above, records from Seattle's TRAO program indicate that about 89 households with incomes 50% of AMI or less are displaced each year due to demolition. This is about 13.5 for every 10,000 renter households at this income level (or 0.1%). While this percentage doesn't account for all physical displacement,[52] it does provide a sense of scale of impact to compare to other trends like economic displacement.

Economic Displacement

Under all alternatives, economic displacement is expected to continue having a much greater impact on Seattle residents than physical displacement, consistent with recent historic trends. This is because demand for housing in Seattle is expected to remain strong, and high demand for housing leads to competition that pushes up market-rate housing prices. However, alternatives that provide more additional housing supply are expected to reduce competition for exiting units and therefore reduce the upward pressure on market-rate housing costs, compared to Alternative 1 (No Action). Alternative 5 (Combined) is expected to have the greatest impact on reducing economic displacement pressure because it anticipates the largest increase in housing supply.

The kinds of households economically displaced would also vary by alternative, given that housing produced under each alternative is expected to vary by location, type, and tenure (ownership or rental). For example, Alternative 3 (Broad) is expected to produce considerably more new ownership units than other alternatives. This may provide more options for moderate-income households seeking homeownership and who may otherwise move outside

[52] See discussion under Physical Displacement in **Section 3.8.1 Affected Environment** above.

Seattle to find affordable options. Alternatives 2 (Focused), 4 (Corridors), and 5 (Combined) all provide much more rental housing than No Action and therefore could be expected to see less economic displacement among renter households. As noted earlier, Alternative 5 would result in the largest increase in overall housing supply and therefore have the greatest potential to reduce market pressures at the root of economic displacement.

Cultural Displacement

Cultural displacement will remain a challenge in Seattle under all alternatives. However, impacts on cultural displacement under each alternative could vary in two main ways. First, alternatives that reduce economic displacement pressures may also reduce cultural displacement pressures. This is because economic displacement often precipitates cultural displacement due to the impacts to social networks that result when members of a cultural community cannot weather rising housing costs. For communities of color, immigrants, and refugees, social cohesion often plays a bigger role in location decisions than for other populations. When community members are pushed out due to economic pressures, other residents, businesses, and institutions may also choose to relocate as well.

The alternatives may also vary in the likelihood of demolition or displacement of cultural assets such as businesses or institutions that serve specific racial or ethnic communities. Since cultural anchors, gathering spaces, arts organizations, small businesses, and religious institutions are not ubiquitous throughout the region, the presence of these cultural assets in certain neighborhoods or areas can have particular importance for racial or ethnic minority households in their location decisions. The zoning changes and patterns of growth proposed under some alternative could affect the likelihood that cultural assets are demolished in favor or redevelopment or replaced by new businesses that cater to the tastes of new residents who do not share the same cultural background. For example, Alternatives 2, 4, and 5 focus more growth in neighborhood centers or corridors that may currently include older commercial buildings where cultural community-serving businesses and institutions are located.

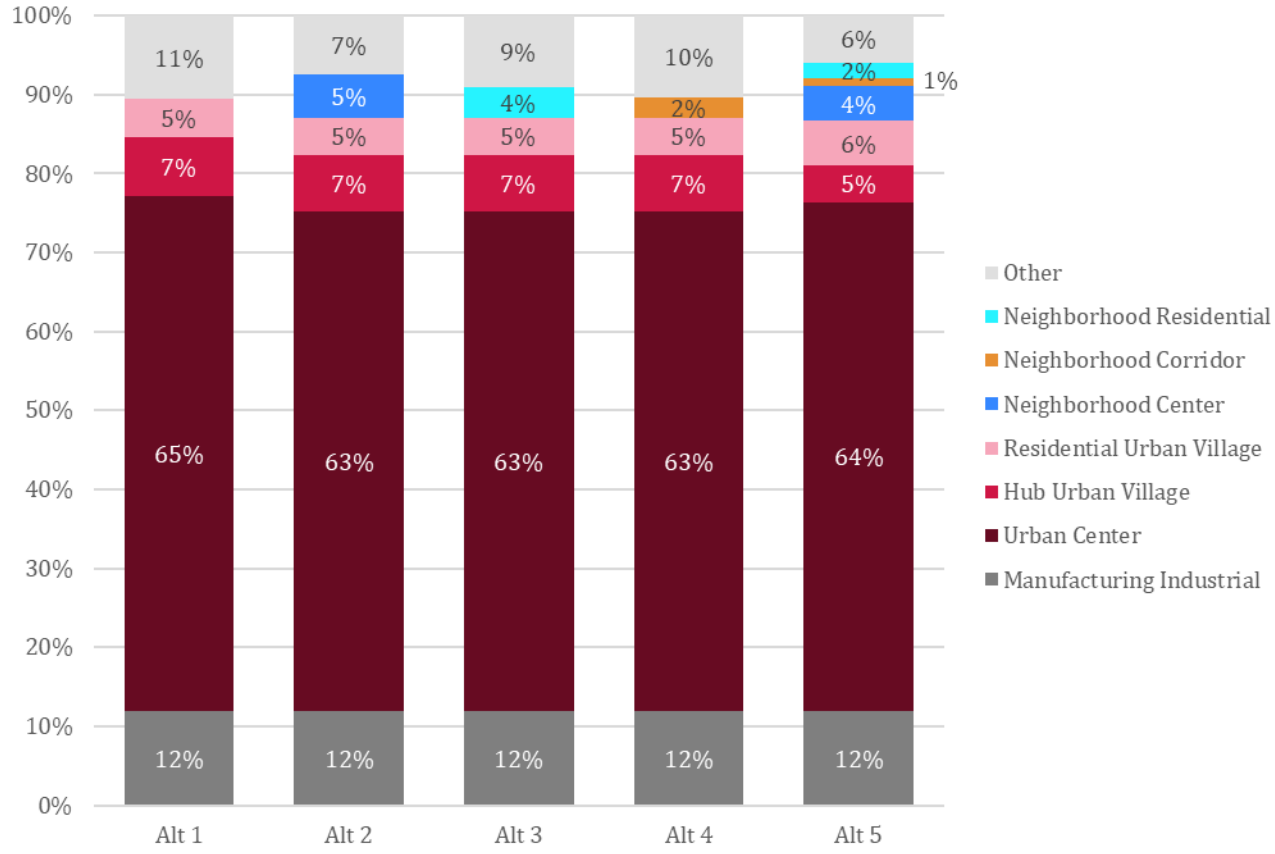
Businesses and institutions serving different communities are also subject to economic displacement pressure regardless of whether their building is demolished. Given the complexity in how people define and access their cultural community, it is difficult to predict the relative impacts of different alternatives on cultural displacement.

Employment

Seattle's total employment is expected to increase by 158,000 jobs in all alternatives. However, the alternatives differ in the pattern of new growth across the city. **Exhibit 3.8-53** compares the share of citywide employment growth expected by place type in each alternative. In all alternatives, most employment growth is expected to occur in urban centers such as Downtown, South Lake Union, University District, and Northgate. All alternatives assume 12% of growth will be in manufacturing industrial areas. The greatest variation across alternatives is in the distribution of growth in the remaining place types. For instance, job growth in

neighborhood centers and corridors has the potential to provide more neighborhood-serving businesses and services in areas of the city that currently have few options. Alternative 2 would focus about 5% of job growth in new neighborhood centers. Alternative 5 would distribute about 5% of jobs across neighborhood centers and corridors combined. Alternatives 1, 3, and 4 offer relatively less job growth in these areas.

Exhibit 3.8-53. Employment Growth by Place Type



Note: "Other" refers to areas outside designated place types.
Source: City of Seattle, 2023.

Equity & Climate Vulnerability Considerations

Seattle's housing affordability crisis disproportionately impacts communities of color and lower-income residents.

Beyond producing cost burden, economic displacement, and housing insecurity, Seattle's rising housing costs limit the amount of money available for other expenses and can curtail a person's ability to access resources necessary for economic success such as education or equity to start a business. High housing costs can also force people to live further from jobs, schools, or social support such as friends and family. This can impact social connection and the community

resiliency these connections support. It also has health implications due to increased car dependency and reduced opportunity for active transportation.

See also **Section 3.6 Land Use Patterns & Urban Form** and **Section 3.10 Transportation**.

Households moving away from Seattle due to displacement or the search for housing they can afford also has climate implications. When households are more dependent on driving and forced to travel further to reach jobs, schools, and local services, they produce more greenhouse gas emissions. Increased demand for housing options on the periphery of the Seattle region also creates pressure to convert more natural areas for residential development.

Alternatives that increase housing supply compared to No Action have greater potential to limit escalating housing costs that cause displacement and provide more opportunities for households to live closer to jobs, schools, social supports, and other amenities in Seattle. However, the types of housing produced also have potential implications for equity. A dearth of moderately priced ownership housing options prevents pathways to homeownership and wealth generation for both low- and moderate-income households. Achieving homeownership often requires moving outside Seattle to find more affordable ownership housing options. However, as discussed already, relocating outside Seattle can have negative impacts not only for the households that moved but also for the climate.

Impacts of Alternative 1: No Action

If the City takes no action, current trends are expected to continue. Housing costs would most likely continue to rise faster than AMI. This would result in the highest economic displacement pressure of all alternatives. This pressure would have disproportionate impact on communities of color, particularly Black and Indigenous residents who are most likely to be vulnerable given their lower median household income (see **Exhibit 3.8-9**). While this alternative is expected to result in the fewest demolished housing units and lowest potential for physical displacement of renter households, it would also yield the lowest production of new affordable housing through MHA and MFTE and the smallest increase in overall housing supply.

Employment growth would continue to be focused in urban centers and urban villages, with more limited change in other areas. As a result, areas with limited neighborhood-serving retail and commercial development would see little change, and their residents would continue to have very limited options for local services within walking or biking distance.

130th/145th Station Area

Both housing and employment growth would be much lower in the station area compared to the other alternatives. This would limit the number of households and businesses that can benefit from nearby access to the light rail stations. It would also limit the variety of housing choices available.

Equity & Climate Vulnerability Considerations

Housing Affordability

Housing affordability challenges under Alternative 1 would be similar to the existing trends described under Citywide Affected Environment and Impacts Common to All Alternatives. Although there would continue to be new housing built over the next 20 years, the rate of new housing production would likely continue to fall far short of demand, contributing to rising housing costs and disproportionately inequitable outcomes for low-income and BIPOC community members.

Impacts of Alternative 2: Focused

In this alternative, Seattle would grow by 20,000 additional housing units compared to Alternative 1 (No Action). This additional growth would occur in new neighborhood centers, which would increase the number and variety of housing options in existing Neighborhood Residential zones. About 94% of the new housing is expected to be exclusive available for rent and only 6% could support homeownership. This alternative provides the fewest new ownership housing options among all the alternatives, including No Action.

Much of this new growth would be focused in neighborhoods that the City determined have relatively lower risk of displacement (see **Exhibit 3.8-31** above), including parts of EIS Analysis Areas 1, 2, 3, 5, and 6. This could limit the negative impacts of physical displacement while allowing more households to live in areas of higher opportunity. Compared to the other action alternatives, Alternative 2 would result in the fewest units demolished and fewest physically displaced renter households. Alternative 2 would produce more new income-restricted units through MHA and MFTE than any alternative other than Alternative 5.

Alternative 2 will also allow for shops and services in new neighborhood centers. This would result in more Seattle residents living within a short walk or bike ride of these local amenities.

130th/145th Station Area

Alternative 2 would support transit-oriented development in these station areas at higher levels of density than allowed under current zoning. It is expected to more than double the number of new housing units compared to No Action and increase overall housing supply more than any alternative other than Alternative 5. This would allow many more households to live near light rail transit.

Equity & Climate Vulnerability Considerations

Housing Affordability

Except for Alternative 5, Alternative 2 would provide the greatest benefit for low-income renter households. This is due to the emphasis on increased rental housing production and its potential impact on moderating rental housing cost escalation as well as increased affordable housing production through MHA. However, Alternative 2 would provide the least benefit for moderate-income households seeking to access the homeownership market and associated wealth generation opportunities. In some cases, households will choose to move out of Seattle to find ownership housing they can afford. This kind of economic displacement has financial, social, health, and climate implications, as discussed under Impacts Common to All Alternatives.

Impacts of Alternative 3: Broad

Like Alternative 2, in Alternative 3 Seattle would grow by 20,000 more housing units than Alternative 1 (No Action). This additional growth would unfold across all Neighborhood Residential zones. Much of this new housing would be duplexes, triplexes, fourplexes, and stacked flats. Nearly a quarter of all new units produced could be available for homeownership, a much higher share than all other alternatives. This would result in a greater diversity of housing options in areas of Seattle where detached homes currently predominate.

Alternative 3 is expected to result in the most demolitions among all alternatives and the greatest potential for physical displacement of renter households. However, many demolished units would be older detached homes that tend to be relatively less affordable than other housing types. Alternative 3 also produces the fewest new income-restricted units through MHA and MFTE among all action alternatives.[53]

Alternative 3 would increase options for corner shops and flexibility for at-home businesses in Neighborhood Residential zones. This would result in some additional businesses and services in areas where they are currently scarce.

130th/145th Station Areas

The station area plan would not be implemented under Alternative 3; the area would grow based on the applicable citywide place types.

[53] This projection assumes that MHA does not apply in Neighborhood Residential zones. If the City applied MHA in Neighborhood Residential zones, the number of units would be substantially higher (13,043 rather than 9,489 net new affordable units) but still less than expected in all other action alternatives.

Equity & Climate Vulnerability Considerations

Housing Affordability

Except for No Action, Alternative 3 would provide the least benefit for low-income renter households. That is because rental housing supply and new affordable housing through MHA would only see modest increases compared to No Action. However, Alternative 3 would provide the greatest benefit for moderate income-households seeking to access the homeownership market and associated wealth generation opportunities. This is due to the emphasis on increased supply and diversity of housing types offered for sale. This could result in less economic displacement pressure for moderate-income households that wish to remain in the city.

Impacts of Alternative 4: Corridor

Like Alternatives 2 and 3, in Alternative 4 Seattle would grow by 20,000 more housing units than Alternative 1 (No Action). This additional growth would be focused in corridors where transit and amenities are located. About 89% of overall new housing production would be exclusively rental, with the large majority in apartment buildings in regional centers, urban centers, and corridors. However, compared to No Action, this alternative would also increase the supply of ownership housing types.

Alternative 4 is expected to result in more housing units demolished than No Action or Alternative 2 (Focused). However, many demolished units would be older detached homes .that are relatively higher cost than other housing types. Alternative 4 would also produce much more new income-restricted affordable housing units than units demolished.

Compared to No Action and other alternatives, Alternative 4 would focus more employment growth in corridors near residential areas, with the potential to increase neighborhood-serving businesses and services where they don't exist today.

130th/145th Station Areas

The station area plan would not be implemented under Alternative 4; the area would grow based on the applicable citywide place types.

Equity & Climate Vulnerability Considerations

Housing Affordability

Compared to No Action, Alternative 4 would provide benefits for both low-income renter households as well as moderate-income households that seek to access the homeownership market and associated wealth generation opportunities. This is due to an expected increase in rental housing supply, affordable housing production through MHA, and supply of for-sale housing types.

Impacts of Alternative 5: Combined

In this alternative, Seattle would grow by 40,000 additional housing units compared to Alternative 1 (No Action). This is the largest increase in housing supply among any alternative and would result in the greatest expansion of housing diversity of any alternative. Like all alternatives, most new housing is expected to be rental, but Alternative 5 would also produce more new ownership housing than all alternatives except Alternatives 3 and 4. Like Alternative 4, much of this new ownership housing would be in small-scale developments in Neighborhood Residential zones.

Alternative 5 is expected to result in more demolished housing units than all other alternatives except Alternative 3. However, those demolished units would tend be older detached homes that are relatively higher cost than other housing types. Alternative 5 would produce the most new income-restricted affordable housing units through MHA and MFTE. This alternative is also expected to have the biggest impact on reducing economic displacement by providing the largest increase in the supply of housing.

Compared to No Action, Alternative 5 would distribute employment growth across more areas of the city, including in new neighborhood centers and corridors where neighborhood-serving businesses and services are currently scarce.

130th/145th Station Area

This alternative would create a new urban center around the NE 130th St station area. This change would support transit-oriented development and the most housing and job growth compared to the other alternatives.

Equity & Climate Vulnerability Considerations

Housing Affordability

Alternative 5 would provide the greatest benefit for low-income renter households among all alternatives due to its impact on increasing rental housing supply and new affordable housing through MHA and MFTE. Compared to No Action, it would also provide benefits for moderate income-households seeking to access the homeownership market and associated wealth generation opportunities. This is due to the increased supply and diversity of housing types that can be sold to homeowners. However, both Alternative 3 and 4 are expected to produce more ownership housing.

3.8.3 Mitigation Measures

Incorporated Plan Features

All action alternatives would increase the supply of housing in Seattle, most significantly Alternative 5 (Combined), which would reduce competition for housing and slow housing cost increases over time. The action alternatives also focus relatively more future housing production in areas with low displacement risk to reduce development pressure in areas with high displacement risk where rapid market-driven housing production can have localized impacts on households and communities vulnerable to displacement.

Under the action alternatives, the City could also update Comprehensive Plan policies to further address current and future risk of displacement. For example, the Housing Element would add new policies around addressing displacement.

Regulations & Commitments

Seattle's municipal code contains regulations for housing and tenant protections. Below is a summary of these regulations and of existing policies and programs that would mitigate impacts associated with the alternatives. See also **Appendix C** for other state and county measures that reduce impacts such as displacement.

Mandatory Housing Affordability (MHA)

Commercial and multifamily residential development in Seattle is generally subject to MHA, which requires a contribution to affordable housing as a condition of permit issuance. Developers have a choice between reserving a portion of units at affordable prices for low-income households or making a payment to the City's affordable housing fund. Most development in all alternatives would occur in zones that currently have MHA. This would result in production of affordable units on-site (through the performance option) and in investments in production and preservation of affordable housing (through the payment option).

Multifamily Tax Exemption (MFTE)

Since its adoption in 1998, the MFTE program has produced affordable units by incentivizing builders to reserve 20 or 25% of the dwelling units in new multifamily structures at affordable rents or sales prices for low- and moderate-income households. In exchange for on-site affordable housing, the City provides a partial property tax exemption for up to 12 years, with an option to extend the affordability commitment for a continued tax exemption. MFTE is available in all zones that allow multifamily development. The affordability level of rental dwelling units reserved for income-eligible households varies according to unit size as follows:

- 40% of AMI for congregate residence sleeping rooms

- 40-50% of AMI for small efficiency dwelling units (SEDUs)
- 60% of AMI for studio units
- 70% of AMI for one-bedroom units
- 85% of AMI for two-bedroom units
- 90% of AMI for three-bedroom and larger units

Ownership units provided through MFTE must be affordable at 100% or 120% of AMI depending on unit size.

All alternatives are expected to see a substantial portion of future housing growth in zones where MFTE is available.

Affordable Housing Funding Programs

In addition to MHA and MFTE, which produce units with rent and sales price restrictions through development, several other sources of funding produce and preserve affordable housing and stabilize low-income households in Seattle. The primary funding source is the Federal low-income housing tax credit (LIHTC) program. Locally, the City has a Housing Levy, a voter-approved property tax passed most recently in 2016. Later in 2023, voters will consider a proposed $970 million Housing Levy renewal. Funds from these and other sources sustain several housing programs operated by the Office of Housing, including:

- The **Rental Housing Program** funds production and preservation of rental housing that serves low-income Seattle residents for a minimum of 50 years.
- The **Homeownership Program** funds the development of new for-sale housing stock sold to low-income, first-time homebuyers at affordable prices for a minimum of 50 years.
- The **Home Repair Program** funds critical health and safety repairs that help low-income homeowners preserve their asset and remain in their homes.
- The **Weatherization Program** funds energy conservation and indoor air quality improvements that support health, enhance living conditions, and lower utility bills for low-income homeowners and renters.

Tenant Protections

Seattle has adopted a suite of tenant protections in recent years. In 2016, the City Council passed legislation banning discrimination against prospective tenants who use alternative forms of income to pay rent, like social security, child support, or unemployment benefits. This expanded existing protections for tenants paying for rent with Federal Section 8 housing vouchers. Renters in Seattle also have protection under the Just Cause Eviction Ordinance, which requires landlords to have one of 16 “Just Cause reasons” if they want to terminate a tenancy. Other tenant protections help to ensure safe and healthy rental housing, uphold Fair Housing law, and prohibit rent increases in units with housing and building maintenance code violations.

Relocation Assistance

Seattle has two forms of relocation assistance for tenants who are forced to move. The Tenant Relocation Assistance Ordinance (TRAO) provides relocation assistance to low-income households who are considered displaced due to their housing being torn down, substantially renovated, undergoing a change of use, or removing certain rent and income restrictions. In these cases, property owners and developers must obtain a Tenant Relocation License, and income-eligible renters receive relocation assistance of $4,486, paid equally by the property owner the City.

More recently, in 2022 the City Council established Economic Displacement Relocation Assistance (EDRA), which provides financial support to income-eligible tenants if their landlord increases housing costs by 10% or more during a 12-month period. This provides assistance to low-income households displaced not through physical alteration of their housing but housing cost increases.

Equitable Development Initiative (EDI)

EDI was created in 2016 to address displacement resulting from inequitable growth in Seattle. Since then, EDI has awarded funding to dozens of community-driven anti-displacement projects in neighborhoods at high risk of displacement. Funding supports property ownership among Seattle's diverse cultural communities through site acquisition, capital projects, and capacity building.

Other Potential Mitigation Measures

Although not required to address identified impacts, the City could pursue the following kinds of actions to address possible population, employment, and housing conditions.

- **Implement MHA requirements in Neighborhood Residential zones.** The City could apply MHA requirements through changes in NR zones. This would increase affordable housing production in Alternatives 3 and 5, which contemplate allowing a greater amount and variety of housing in NR zones.
- **Increase funding for programs combating displacement.** To address the potential for residential, commercial, and cultural displacement under any alternative, the City could pursue various actions that support the stability and retention of existing households, and the preservation and creation of new, cultural institutions and businesses. Examples of potential anti-displacement actions include:
  - Increasing funding for Seattle's Equitable Development Initiative (EDI) to expand the ability of community organizations to acquire and development property in neighborhoods at high risk of displacement.
  - Supporting low-income homeowners to add housing on their property to stay in place and build wealth. Homeowners who have low or fixed incomes may struggle with the rising costs of property ownership, including taxes and maintenance costs, and may also

face challenges to adding housing to their property that could generate income or meet their household needs despite current or future zoning capacity that allows additional density. The City could fund programmatic efforts to help homeowners overcome awareness, financing, design, permitting, or other barriers.

- Strengthen the Office of Economic Development's (OED) small business support programs. OED has provided a range of support services for small businesses, including access to capital, storefront repair, a stabilization fund pilot, and a tenant improvement fund pilot. Resources for these or similar programmatic efforts could mitigate potential commercial displacement pressure.
- Establish and fund a program that supports tenant or community ownership of rental housing when it becomes available for purchase.

- **Strengthen relocation assistance programs.** As described above, TRAO and ERDA provide relocation assistance to low-income households displaced due to removal or alteration of their housing or increasing housing costs. The City could pursue policy or funding changes that would increase the number of households receiving assistance or the amount of assistance received.
- **Density bonuses:** The City could allow project that set aside a significant portion of their units as income-restricted affordable housing to receive extra height or floor area.

3.8.4 Significant Unavoidable Adverse Impacts

Over time, additional growth and development will occur in Seattle, and much of this growth will occur through redevelopment. The alternatives vary based on the amount, types, and geographic pattern of existing housing and businesses that may be demolished to make way for new growth. While this can contribute to the risk of physical displacement, that risk is not significantly higher in the action alternatives. Moreover, the benefits in terms of reduced economic displacement pressure and increased production of affordable units offered by the action alternatives outweigh any increased risk of physical displacement. Therefore, no significant unavoidable adverse impacts to population, employment, or housing are expected under any alternative.

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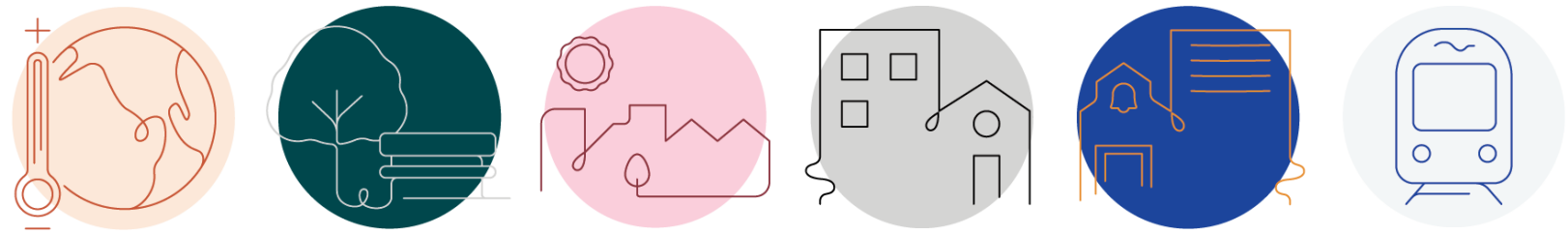
3.9 Cultural Resources



Source: Sunita Martini via City of Seattle, 2023.

This section describes the current conditions (affected environment), analyzes the alternatives' potential impacts on cultural resources (which includes historic-period architectural resources and precontact and historic-period archaeological resources), details the current cultural resources policy and regulatory frameworks, and suggests possible mitigation measures. Finally, it summarizes any significant unavoidable adverse impacts.

What are Cultural Resources?

Cultural resources are:

- **Architectural resources** (buildings, structures, sites, landscapes, objects, and districts) that are of the historic period, which is generally 25 years old or older (under the Seattle Landmarks program) or 40 years old or older (National Register of Historic Places)
- **Archaeological resources**, including precontact Native American artifacts, features, and sites; Traditional Cultural Properties; and historic-period artifacts, features, and sites.

Adverse effects or impacts to cultural resources are defined by the Advisory Council on Historic Preservation as impacts that alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register of Historic Places (NRHP) in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5). Adverse impacts may include reasonably foreseeable impacts caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Below are some examples of adverse impacts on cultural resources:

- Physical destruction or damage to all or part of the resource;
- Moving the resource from its historic location;
- Change of the character of the property's use or of physical features within the resource's setting that contribute to its historic significance; or
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the resource's significant historic features.

Impacts of the alternatives on cultural resources are considered significant if they result in:

- Substantial changes to or alteration of features or characteristics, or loss (removal or demolition) of a cultural resource that that prevent their eligibility for inclusion as a designated Seattle Landmark (SL), or inclusion in the NRHP, National Historic Landmark (NHL) program, or the Washington Heritage Register (WHR).
- More than a moderate adverse impact (potential loss of or alterations to the physical evidence or tangible evidence of cultural history) to Culturally Important Resources (CIR), which for the purposes of this EIS are important to certain cultural groups or communities, whether or not they are listed or eligible for the SL, NRHP, or WHR.

Resources that have been officially determined not eligible for these registers or considered CIR will not be adversely impacted by the proposed alternatives.

3.9.1 Affected Environment

This section describes the precontact, ethnographic, and historic contexts of the areas within the city as background by which to address the potential for impacts to cultural resources.

Indigenous Settlement Context

Based upon current scientific understandings of the archaeological record, the earliest human occupations in the Pacific Northwest were characterized by highly mobile bands of broad-spectrum foragers. The widespread Clovis culture, the first well-defined cultural complex in North America, has been dated to between 12,800 and 13,200 calibrated years before present (cal. B.P.) (Ames and Maschner 1999:65–66; Kirk and Daugherty 2007:13). Recent research suggests that large stemmed projectile points (i.e., Western Stemmed complex) may have been produced by populations pre-dating Clovis (e.g., Jenkins et al. 2012). Such points have been identified at the Cooper's Ferry site in western Idaho, which has been dated to between 16,560 and 15,280 cal. B.P. (Davis et al. 2019). These early Paleoindian cultures consisted of small, nomadic bands that specialized in hunting a variety of small- to large-sized game animals, including megafauna that went extinct across North America at the end of the Pleistocene (e.g., wooly mammoth [*Mammuthus primigenius*], mastodon [*Mammut americanum*], ancient bison [*Bison antiquus*]) (Kirk and Daugherty 2007:13).

Following the Clovis period, early and middle Archaic populations across western Washington produced large, willow leaf-shaped ("Olcott" phase) projectile points, in addition to lanceolate points and scrapers (Ames and Maschner 1999; Kopperl et al. 2016; Nelson 1990:483). Similar projectile points have been found in sites from the Fraser River Valley in British Columbia down to the margins of the Columbia River, indicating the wide dispersal of related groups across the broader Northwest Coast during this period. Sites containing Olcott material are most commonly documented well inland from the coast along rivers, suggesting that these populations were likely still subsisting largely upon terrestrial plant and animal resources and had not yet developed the extensive reliance upon riverine and coastal food resources observed among later Coast Salish peoples (Kopperl et al. 2016; Nelson 1990:483).

Between approximately 6400 and 2500 cal. B.P., there was a gradual shift across the Northwest Coast to an increasingly heavy reliance on marine and riverine resources for subsistence. This shift coincided with a general trend toward increasing sedentism as more sites were settled along river courses, estuaries, and productive marine environments (Ames and Maschner 1999:93–94; Nelson 1990:483). During this period, settlements began to be occupied on a seasonal basis. Larger, denser artifact concentrations have been identified within sites dating from 6400 to 2400 cal. B.P., and deep shell middens have been dated to as early as 5,200 years ago (Larson and Lewarch 1995; Mierendorf 1986:57; Wessen 1988). It was during this time that coastal and neighboring inland communities developed their complex suites of lithic, bone, and antler tool technologies suited for marine mammal hunting, riverine fishing, and the

further exploitation of terrestrial plant and animal resources (Ames and Maschner 1993:93–95; Blukis Onat et al. 1980:29–30; Kopperl et al. 2016:117–118).

Along with steady population growth and increasingly intensive resource utilization across the broader Northwest Coast, Late Pacific (2400–200 cal. B.P.) precontact archaeological sites in the region demonstrate the emergence of status differentiation and complex social hierarchies (Ames and Maschner 1999:95–96). Increased reliance on stored foods and controlled access to resources, including salmon and shellfish, also developed during this period. By this time, the general ethnographic (prior to Euroamerican influence) pattern observed along the Northwest Coast had become well-developed, although these societies saw swift and dramatic changes with the arrival of Euroamerican explorers, traders, and settlers beginning in the late 1700s (Ames and Maschner 1999:95–96, 112).

The EIS study area is within the traditional territory of the Lushootseed-speaking Duwamish people. The settlements of this ethnographically documented Coast Salish group were principally located along the Duwamish, Black, and Cedar Rivers, as well as along the coasts of Puget Sound and Lake Washington in the vicinity of present-day Seattle (Duwamish Tribal Services 2018; Ruby and Brown 1992:72). The Duwamish were part of the broader Southern Coast Salish culture, which was generally adapted toward the intensive utilization of marine and riverine resources (Suttles and Lane 1990). A principal division among the Duwamish existed between the Sxwaldja Ébc ("saltwater dwellers") who lived in settlements on Puget Sound and the Xatcua Ébc ("lake dwellers") who lived along the shores of Lake Washington. The latter, as well as Duwamish groups living along the interior rivers of the region, were considered to be poorer and lower-status than the coastal communities (Hilbert et al. 2001:45; Ruby and Brown 1992:72–73; Suttles and Lane 1990:485–486; Swanton 1952:26). The three main peoples with winter settlements within the Seattle area were the dx^{w}dəw?abš ("People of the Inside"), who lived primarily along the Duwamish River; the Hachooabsh ("Lake People"), who lived along the shores of Lake Washington; and the Shilshoolabsh ("People of Tucked Away Inside"), who lived primarily around Salmon Bay in what is today the Ballard neighborhood. The anglicized version of the first of these groups, Duwamish, was eventually applied as a general name covering all of the distinct populations living in the greater Seattle area (Duwamish Tribal Services 2018; Hilbert et al. 2001:45–50; Thrush 2007:23).

While Seattle represents the ancestral lands of the Duwamish, Hachooabsh, and Shilshoolabsh, Coast Salish groups living throughout Puget Sound, including the Snoqualmie, Suquamish, Muckleshoot, Stillaguamish, and Tulalip, routinely visited the area. These groups utilized Elliott Bay and the surrounding environment for hunting, gathering, and fishing purposes, as well as to trade with resident communities (Haeberlin and Gunther 1930; Spier 1936; Swanton 1952).

Like other Southern Coast Salish peoples, the Duwamish relied heavily upon salmon and other fish for subsistence and utilized a diverse suite of technologies to harvest them in different settings. They made use of trolling, seine, and gill net technologies to harvest fish in Puget Sound, while weirs, nets, gaff hooks, harpoons, and spears were all employed in rivers (Suttles and Lane 1990:488–489). Terrestrial mammals, especially black-tailed deer and elk were also

hunted by the Duwamish and neighboring Tribes using the bow and arrow, and they gathered a great variety of plant foods, including edible roots, bulbs, and berries (Duwamish Tribal Services 2018; Gunther 1945; Suttles and Lane 1990:489).

The Duwamish lived a semi-sedentary lifestyle, spending part of the year in permanent winter settlements and the warmer months in temporary encampments from which they fished, hunted, and gathered plant resources. Smaller bands would travel across their territory to hunt and forage for plant resources during the summer months, returning to their permanent settlements for the ceremonially rich winter season and to intensively fish in the spring and autumn (Duwamish Tribal Services 2018; Suttles and Lane 1990).

In 1855, members of the Duwamish and neighboring Puget Sound Tribes signed the Treaty of Point Elliott, which directed the removal of Tribal members to reservations. The Duwamish were ordered to relocate to the Port Madison Reservation, along with the Suquamish (Lane 1975:3–4). Created by ships dumping their ballast at the Seattle waterfront before loading their cargoes, Ballast Island (45KI1189) became an important gathering place for Tribal members from across Washington, British Columbia, and Alaska, as well as a permanent residence for Duwamish peoples forced from their homes elsewhere by the 1880s. Following the 1865 passage of an ordinance banning Tribal members from residing within the city limits, Ballast Island was a location in Seattle that the Duwamish and visiting Native peoples were grudgingly permitted to inhabit because it was not considered to be a part of the city proper. Following repeated attempts by the city government to expel the Tribal occupants of the island in the 1890s, waterfront developments eventually encroached on Ballast Island in 1898 and Tribal peoples residing there were forced to leave (Curti et al. 2020; Duwamish Tribal Services 2018; Elder 2014). The site is today recognized as a traditional cultural property (TCP) for numerous Tribes of the Puget Sound region and is listed in the NRHP and WHR (Curti et al. 2020). Many Duwamish had also remained along the Black River in defiance of federal government orders but were likewise removed from their ancestral lands by the early 1900s (Lewarch et al. 1996:3–13).

The Duwamish Indian Tribe petitioned for federal recognition in 1979. In 2001, the federal government rejected the petition, reversing the decision of the previous administration to recognize its Tribal status. The Duwamish Indian community continues to pursue recognition, build their community, and maintain their cultural traditions (Duwamish Tribal Services 2018; Thrush 2007:196–197).

At least 11 Indigenous winter settlements were located within the Seattle area when non-Indigenous explorers and settlers first began arriving in Puget Sound. Several of these settlements were located around the mouth of the Duwamish River and the expansive tidal marshes that once stretched across the area now occupied by downtown Seattle, as well as along the lower reaches of the Duwamish River. The settlement of tú?ul?altx^{w} ("where herring live" or "herring house"), was situated to the west of the mouth of the Duwamish River under the West Seattle bluff. An unknown Euroamerican settler burned the town down in 1893, and its name was eventually given to Terminal 107 Park (Hilbert et al. 2001:46; Thrush 2007:234).

The winter settlement of yəlíqʷad ("basketry cap") was named for the distinctive woven hats worn by peoples such as the Yakama, perhaps because its residents participated in trade networks that spanned the Cascades. This settlement was located along the west bank of the Duwamish River west of Kellogg Island (Dailey 2020; Hilbert et al. 2001:119; Thrush 2007:236–237). A third settlement, dxʷqʷíčəd ("Place of the Fish Spear"), was located atop a large flat next to the Duwamish River at what is presently the north end of Boeing Field (Hilbert et al. 2001:47; Thrush 2007:240). To the north, in the vicinity of the Old Rainier Brewery along U.S. Interstate 5 (I-5), the settlement of tutúłaqs ("Little-Bit-Straight Point") included three longhouses as well as a small stockade and lookout used to guard settlements up the Duwamish River (Hilbert et al. 2001:61; Thrush 2007:235).

Three winter settlements were located in the area of present-day downtown Seattle between the SoDo and Belltown neighborhoods. The large settlement of sdᶻídᶻəlʔali (□) ("Little Crossing-Over Place") was situated on both sides of a promontory overlooking a tidal marsh in the vicinity of present King Street Station and included up to eight longhouses (Hilbert et al. 2001:46; Thrush 2007:229). The smaller settlement of ḍəlx̌áqabixʷ ("Grounds of the Leader's Camp") was located between Cherry and Seneca Streets and First and Second Avenues, while the settlement of babáqʷab ("prairies") was located in the vicinity of the present-day Belltown neighborhood (Hilbert et al. 2001:60–64; Thrush 2007:228–229).

The settlement of šilšul ("Tucked Away Inside") included two large longhouses measuring 60 by 120 feet and a larger potlatch house along the north shore of Salmon Bay. It was inhabited by the Shilshoolabsh, or Shilshole, people, who continued living there until it was destroyed during the construction of the Hiram M. Chittenden Locks in the 1910s (Hilbert et al. 2001:45–46; Thrush 2007:222-223). An archaeologically well-documented settlement at West Point, paḍácał□u ("Brush Spread on the Water") was used in the nineteenth century by Duwamish peoples displaced from elsewhere in the area (Thrush 2007:226). Situated along the north shore of Elliott Bay before the lowering of Lake Washington in 1916, the settlement of sluwíł ("Little Canoe Channel") included up to five longhouses and an extensive fishing weir at the mouth of Ravenna Creek (Hilbert et al. 2001:78; Thrush 2007:251). The settlement of dxʷx̌úbəd ("Silenced Place"), at the mouth of Thornton Creek along the west shore of Lake Washington, included at least one longhouse (Thrush 2007:254).

Non-Indigenous Settlement Context

Early Non-Indigenous Settlement

Non-Indigenous peoples began visiting the Puget Sound Region in 1792 when George Vancouver and his crew explored the area. Within the next 100 years, Native populations plummeted due to repeated outbreaks of introduced diseases such as smallpox, influenza, and typhoid fever (Boyd 1990; Suttles and Lane 1990). The Treaty of Washington in 1852 conveyed the territory to the United States, and the Donation Land Claim Act drew settlers into land occupied by the

Duwamish and their neighbors. In 1855, members of the Duwamish and neighboring Puget Sound tribes signed the Treaty of Point Elliott, which provided for the removal of Tribal members to reservations, including the Port Madison Reservation (Suquamish/Fort Kitsap), Lummi, Swinomish, and Tulalip. Some Duwamish people continued to live in and around Seattle, maintaining friendly relations, working for, and trading with incoming settlers. Many others, meanwhile, relocated to the Port Madison Reservation, but due to undesirable conditions were compelled to leave. Many then attempted to return to their ancestral lands, and a few were able to claim or purchase land (Ruby and Brown 1992; Thrush 2007).

As non-Indigenous settlement increased, Tribal lands and fishing rights continued to be eroded through the late 1800s and 1900s. Non-Indigenous settlers purchased lands that were used by Natives as fishing areas and prevented access, and, as the commercial fishing industry grew, the State applied fishing regulations and fees not only to the industry but to the Tribes. These and other such actions culminated in the late 1900s, in a series of lawsuits and court cases that upheld certain treaty rights (Dougherty 2020; Marino 1990; Ruby and Brown 1992). The federally recognized Muckleshoot, Snoqualmie, Suquamish, and Tulalip Tribes are the descendant Tribes that represent the various tribes and bands with territorial interests in Seattle, that were signers of the Point Elliott Treaty. The Duwamish Tribe is not currently federally recognized but continues to fight for this distinction.

It was in 1851 that the first non-Indigenous settlers arrived in the Seattle area. In the Duwamish area (Area 7), a party that included Luther Collins, Jacob Maple, Samuel Maple, and Henry Van Asselt filed claims along the Duwamish River on lands that now make up Georgetown. Farming became the main industry in this area (Wilma 2001a).

Soon after, in what is now downtown Seattle (Area 4), the Denny Party arrived. They included Arthur A. Denny and his brother David T., John N. Low, Carson D. Boren, William N. Bell, Charles C. Terry and his brother Lee, and their families. These early settlers moved to the east shore of Elliott Bay in 1852, to take advantage of the deep-water harbor, and filed donation land claims. They encouraged additional settlement by adjusting their land claims to accommodate new arrivals, such as sawmill owner, Henry L. Yesler, and filed the first plat for the town of Seattle (Denny 1888:7–13, 16–17; Fiset 2001a; U.S. Surveyor General [USSG] 1856, 1863).

Some of these earliest non-Indigenous settlers in what is now the southern end of the Queen Anne/Magnolia area (Area 3), included members of the Denny party, David T. Denny and his wife, Louisa Boren Denny, who filed a donation land claim for just over 320 acres. Their neighbor to the north, Thomas Mercer, filed for a land claim on 160 acres (General Land Office [GLO] 1866a, 1866b). Dr. Henry Smith, with his wife, mother, and sister, and Erasmus M. Smithers settled in what is now the Interbay area of the Queen Anne/Magnolia area, establishing small farms, while David Standler settled on land to the north along Salmon Bay, and John Ross and William A. Strickler (alternately spelled Sticken) settled to the northeast near the north end of Lake Union, all filing land claims (GLO 1866c, 1871a, 1871b, 1872, 1877; Wilma 2001b; USSG 1871).

The earliest land claims in the NW Seattle area (Area 1) were Edmund Carr, who filed a donation land claim for 137 acres at the southwestern end of what is now the Ballard neighborhood and Ira W. Utter, who filed a land claim for 156.60 acres at the north shore of Salmon Bay (GLO 1871c, 1871d). In the Capitol Hill/Central District (Area 5), John H. Nagel (also spelled Nagle) filed a land claim for 161 acres south of present-day Volunteer Park, while Henry L. Yesler's 185.74-acre claim with his wife Sarah B. Yesler was in what is now the Central District, centered on the present-day Garfield Playfield (GLO 1866d, 1871e).

Two land claims in the northern end of the SE Seattle area (Area 8), were filed by John C. Holgate and Edward Hanford and his wife, Abigail Jane (Holgate) Hanford. Each was for 320 acres in what is now the Beacon Hill neighborhood (GLO 1867, 1871f; Lange 2000a).

More settlers followed in the 1850s, made claims, and supported themselves by farming and logging, or by establishing small retail or commercial enterprises (Wilma 2001a). Most of these earliest farms in the Seattle area were small family operations that raised some fruit, vegetables (potatoes), and a few chickens or livestock; these farms were used primarily to sustain the family, not for resale. In the Duwamish, some farmers grew hops and hired local Indigenous peoples to work the harvest (Gregory 2009; Wilma 2001c). Logging, which began with local men working with oxen and small timber mills, became the primary industry of this period (Caldbick 2014; Denny 1888:16–22; Fiset 2001a). Over time, larger mills were constructed in the area and the industry offered steady employment for incoming settlers, and much of the Seattle neighborhoods were logged off (Sanborn Map Co. 1884, 1888, 1893).

Also in 1852, King County was established, with Seattle as the county seat, and the following year, Congress split the Washington Territory out of Oregon Territory (Crowley 2006).

Other non-Indigenous settlers arrived from the east and opened small shops in the nascent city, providing services to other settlers. At least two of these non-Indigenous settlers were African Americans. One was Manuel Lopez, who came to Seattle in 1852 and established a barber shop, and another was William Grose (or Groce or Gross) who arrived in 1859 and opened a restaurant (Long 2006; Raftery 2021). For more information about Grose, see the Capitol Hill/Central District (Area 5).

Around 1855, the U.S. Navy anchored the sloop *Decatur* just offshore in Puget Sound to defend the settlers who feared attacks from Native peoples. The settlers also built blockhouses and hosted militias in response to skirmishes with frustrated Natives, dissatisfied with the reservations. After the Battle of Seattle in 1856, the government established the Muckleshoot Reservation southeast of Seattle on the White River in 1857 (Crowley and Wilma 2006; Williams 2015; Muckleshoot Indian Tribe 2023). In 1861, Seattle won the right to build the Territorial University. The school would develop into the University of Washington (UW) (Crowley 2006; Williams 2015). In 1865, the Board of Trustees of the Town of Seattle passed an ordinance banning Native Americans from living in Seattle, and although the law was not readopted when Seattle was reincorporated in 1869, discrimination against Native Americans continued. By that time, the population of settlers in Seattle had risen to 302, and many of them were working to grow the town into something more substantial. While most of the early

industry and commercial activity had grown along the eastern shore of Elliott Bay, sparse residential and family farms were beginning to pop up in the areas surrounding Seattle's central core (Bagley 1929; Ott 2014).

Development of Seattle

In the 1870s, the discovery of large deposits of coal near present-day Newcastle and Renton created a need for transportation to Seattle docks on Elliott Bay. Initially, the coal was transported on barges across Lake Washington, then unloaded to wagons and transported overland to Lake Union, where it would be loaded back onto barges and shipped southwest across the lake. Then the coal was once again unloaded onto wagons for the final leg of the route to Elliott Bay. In an attempt to simplify this onerous shipping system, a narrow-gauge rail line was constructed in 1872 between Lake Union's south shore and the coal dock on Elliott Bay. Five short years later, the line was abandoned as the Seattle and Walla Walla Railroad (S&WW) was constructed by the enterprising locals in Seattle from Elliott Bay south to the coal fields near Renton and then north to those near present-day Newcastle (Link 2004:3; MacIntosh and Crowley 1999).

The S&WW was incorporated as a response to Northern Pacific Railroad's choice for its western terminus. In the early 1870s, Northern Pacific Railroad representatives toured the Puget Sound area looking at locations for their transcontinental line west coast terminus. Seattle, Tacoma, and other towns made substantial offers to the railroad company in hopes of enticing them to choose their town. In 1873, the railroad selected Commencement Bay near Tacoma. Angered, Seattle's leaders and residents responded by forming the S&WW. When complete, the S&WW line carried vast quantities of coal from the mining region in southern King County to Seattle for export. In 1880, successful railroad magnate, Henry Villard, purchased the S&WW and renamed it the Columbia & Puget Sound Railroad (C&PS). In 1884, the Northern Pacific Railroad built a spur line to Seattle, and the following year, in 1885, the Seattle, Lake Shore & Eastern (SLS&E) built a rail line from Smith Cove to Newcastle and Issaquah, spurring additional growth (Chesley 2009; MacIntosh and Wilma 1999; Lange 2000b; Williams 2013).

Seattle's economy boomed with shipping, railroads, timber extraction and milling, coal mining and shipping, commercial and industrial manufacturing such as iron works, and service industry support. At this time, Seattle's economy was closely tied to other Pacific ports, especially those in California. At various times, a substantial percentage of lumber shipped from Seattle went to San Francisco to aid in its reconstruction from catastrophic fires and, later, the 1906 earthquake that was accompanied by a fire that destroyed some 25,000 buildings. The close connection between these ports can be seen in the creation of Ballast Island, an artificial landform on the Seattle waterfront, which was largely made up of rock mined from outcrops in San Francisco and dumped in Elliott Harbor to make space for the Seattle products shipped in return sailings. Ballast Island is a traditional cultural property (TCP) that is important to the area's Tribes (Curti, et al. 2020). This rise in production created jobs and encouraged population growth (Fiset 2001a).

In response to Seattle's growth, the pace of construction in the surrounding neighborhoods began accelerating in the late 1880s and early 1890s. Over time, additional sawmills were constructed, and existing mills were enlarged throughout the area with the addition of planing mills, molding cutters, and other specialty manufacture. The industry offered steady employment for incoming settlers and much of the Seattle neighborhoods were logged off (Sanborn Map Co. 1884, 1888, 1893). Mills and other commercial ventures were built on the available lands, manufacturing companies expanded, and support services such as restaurants, hotels, breweries, laundries, creameries, soap works, and other similar enterprises were established throughout the neighborhoods. In addition, houses were constructed to accommodate increasing numbers of employees, both management and labor, and business owners (Fiset 2001a; Sanborn Map Co. 1884, 1888, 1893).

At first many people in Seattle welcomed the city's Chinese residents for their labor. The Chinese had built many of Seattle's streets and railroads, operated shops and businesses, worked in mills, logging camps, mining, and the fishing industry, and were domestic workers. By the 1880s, they faced increased discrimination and abuse, as other laborers perceived greater competition for jobs. Following the passage of the Federal Chinese Exclusion Act in 1882, hostilities continued to rise against the area's remaining Chinese inhabitants. Many Chinese living in Seattle lost jobs and many left town fearing violence. Then, in 1886 an angry crowd of Seattle residents swarmed into Chinatown, forced more than 300 of the city's Chinese population to leave the city via ship, and destroyed many Chinese homes. The governor declared martial law and imposed a curfew, which was enforced by patrolling military troops. Later, crowds forced an additional 110 Chinese to leave town and many more left on their own. By the time Martial law was rescinded, fewer than 30 Chinese residents remained (Dougherty 2013; Riddle 2014). The Chinese Exclusion Act was extended for 10 years in 1892, made permanent in 1902, and was finally repealed in 1943 (National Archives and Records Administration [NARA] 2023).

Cable cars and electric streetcars crisscrossed Seattle's neighborhoods, ferries transported passengers across Lake Union, and systems of staircases, first constructed of wood and later of concrete, were built for ease of travel over the area's hilly topography (Fiset 2001a; Thompson and Marr 2013). According to Sanborn maps, in 1884 the population of Seattle was 7,000 persons; this number more than doubled by 1888 to 16,000 (Sanborn Map Co. 1884, 1888).

Like many cities in the United States, Seattle was devastated by fire. The Great Seattle Fire occurred in 1889 and leveled the city's 18-block waterfront and 40 blocks of the city center. The fire destroyed wood-frame buildings and structures, and those constructed of brick and stone, including wharves, piers, depots, mills, warehouses, businesses, offices, banks, stores, hotels, apartment buildings, and some residences. Rebuilding began almost immediately. The City widened some streets and raised others, implemented a new building code, banned wood buildings in the fire zone, and established a city water works (Caldbick 2020a, 2020b). Many of Seattle's sawmills that had been destroyed in the fire relocated to the north side of Salmon Bay, to what is now Ballard (Wilma 2001b).

After the fire, in 1892, the Great Northern Railway Company's president, James J. Hill, constructed his line to Seattle that crossed Salmon Bay and Interbay to Seattle, and built docks, a grain terminal, grain elevator and warehouse at Smith Cove to facilitate maritime commerce with the Far East. Other private docks and warehouses were also built in the area (McClary 2013). In 1895, the UW relocated from the downtown area to the Brooklyn neighborhood in NE Seattle (Crowley 2006). For more information about the UW, see NE Seattle (Area 2).

The discovery of gold in 1896 in the Klondike region of the Yukon Territory, in western Canada, impacted Seattle's development with long-lasting economic benefits. Seattle was uniquely positioned as the jumping-off point for thousands of miners headed to the gold fields, and as a supplier to those miners with the provisions they needed for the trek. The Klondike gold rush triggered a great need for Seattle's shipbuilders, merchants, steamships, and railroads, and in return, millions of dollars flooded into Seattle's economy and were used by individuals to open shops and stores, create transportation services, and construct buildings, and by the municipality to fund infrastructure improvements such as roads, sewer and water systems, and ports. The Klondike gold rush cemented Seattle's reputation as a successful port city and hub for shipbuilding, transportation, and business (Tate 2004).

Around the turn of the twentieth century, construction in Seattle's neighborhoods included educational buildings, religious facilities, and multi-unit apartment buildings in support of the rapidly expanding population (Baist 1905; Fiset 2001a). Additionally, religious organizations, commercial enterprises, and industrial operations began upgrading their wood-frame buildings with more substantial masonry versions in the wake of the fire (Link 2004:6). Industry boomed as well, spreading north and south of Seattle to more accommodating topography and expansive rail and waterway transportation systems (Langloe 1946). Private wharves, piers, warehouses, and mills were built south of the city, many were linked to the Northern Pacific lines to handle freight shipped into and out of Seattle. It was around 1900 that Seattle's Chinese population finally recovered, and Chinatown began to prosper once again (Dougherty 2013; Sanborn Map Co. 1905, 1928; Wilma 2001a).

After the turn of the twentieth century, the City of Seattle embraced the progressive era with a series of planned projects, including annexing a series of suburban towns, hiring the famed Olmsted Brothers landscape architects to create plans for parks, scenic boulevards, and playgrounds, built utilities and schools in the outlying neighborhoods, and began paving roads. (Crowley 2006). Although Seattle established a park commission in 1890 and had purchased parks over the years, the commission was unable to create a citywide parks plan. In 1903, Seattle hired the Olmsted Brothers Landscape Architects firm to develop plans for Seattle parks. That same year, John Charles Olmsted, his assistant Percy Jones, and park commissioners toured and surveyed the city for a month. When Olmsted submitted his report to the City Council, it laid out a citywide system of parks interconnected by parkways and boulevards and included playgrounds and meadows. The report stressed the importance of purchasing land across the city that had access to water and wooded areas, and that contains important views of mountains, water, and forests. The report recommended certain properties to purchase and included design recommendations for the city's existing parks. The plan was approved by the

City Council in November 1903. Olmsted continued to advise the city over the years on its development of the parks system, and also worked with the UW board of regents on improvements for the campus (Beckner and Perrin 2016; Williams 1999). In 2016, *Seattle's Olmsted Parks and Boulevards (1903–68)* was listed in the NRHP under a Multiple Property Documentation form (Beckner and Perrin 2016).

By 1904, Seattle's increasingly diverse population swelled to over 150,000. The city was ethnically diverse, with established Chinese, Japanese, Italian, and Jewish communities just outside the downtown area. Between 1905 and 1910, Seattle annexed many of the small towns and neighborhoods north and south of the city center, nearly tripling the size of the city. Many of these communities had petitioned for annexation due to their inability to keep up with infrastructure and safety concerns. Progressive city leaders funded projects for public benefit including paving roads, constructing utilities, and building schools. They established the Pike Place Public Market in 1907 and in 1908 again hired the Olmsted Brothers for a report on the newly annexed areas of the city (Beckner and Perrin 2016; City of Seattle 2023a; Crowley 2006; Sanborn Map Co. 1905; Williams 1999; Wilma 2001a).

In 1909, Seattle hosted a world's fair on the campus of the UW in the Brooklyn neighborhood. The 250-acre fairgrounds was designed by the Olmsted Brothers. The fair's planners requested the Olmsted Brothers firm develop landscaping plans for the fair's 250-acre grounds on the UW campus. Seattle residents celebrated the city's accomplishments with nearly four million visitors at the Alaska-Yukon-Pacific Exposition (Beckner and Perrin 2016; Williams 1999).

The onset of the 1910s saw big changes for the now booming Seattle. Between 1912 and 1917, the U.S. Army Corps of Engineers (USACE) constructed a canal between Puget Sound and Lake Washington following Ross Creek, which had been widened ca. 1885 for use as a log canal (Chrzastowski 1983:6). The Hiram M. Chittenden/Ballard Locks was completed in 1917, opening a major shipping route that connected Lake Washington, Lake Union, and Salmon Bay Waterway to Puget Sound. The project was funded by King County and the federal government. Simultaneous to the construction of the Canal, the City of Seattle completed bridge construction, street grading, and built the Third Avenue West Tunnel to provide a route for utilities to pass under the new Canal (Fiset 2001a; Walton Potter 1977:12).

Other large projects during that time included the flattening of Denny Hill and streets north of downtown Seattle, known as regrades, which allowed for easier transportation routes in and out of the city (Link 2004:8). Much of the earth removed in the regrades was used to fill in wetlands and tidal flats. In 1912, the Great Northern docks at Smith Cove were sold to the newly created Port of Seattle for construction of a deep-sea terminal. The Port's comprehensive plan also included the construction of Fisherman's Terminal on Salmon Bay, the Bell Street Pier, wharves and warehouses on the East Waterway pier and a second pier on the East Waterway, a public wharf and warehouse at the end of Bell Street, a grain elevator at Hanford Street, and a new ferry service on Lake Washington (Oldham 2020).

Additionally, man-made alterations along the Duwamish River beginning in 1913—rerouting, straightening, and channelizing the river, and draining, dredging, and filling tidelands—and

extensive logging, created land for agriculture and industry. These actions destroyed the Duwamish Tribe's traditional uses of the river to fish, gather and hunt. The dredged material was used to construct Harbor Island, which split the mouth of the river into two channels. The Port of Seattle would later plan extensive terminals on Harbor Island (Oldham 2020; Updegrave 2016; Wilma 2001c). This industrial growth created additional employment opportunities and more residences and apartment buildings were constructed in Seattle's neighborhoods to house the influx of needed workers. Seattle's population rose to 456,000 by 1928 (Crowley 2006; Sanborn Map Co. 1905, 1928).

In 1923, Seattle City Council passed the city's first zoning ordinance. Prior to its passage, the city had relied on the irregular issuance and amendment of Building Ordinances, that were largely building codes. These building ordinances defined building terminology, specified construction materials and methods by building class, described the role of the building inspector and Fire Marshall, laid out permitting procedures, and spelled out mandatory requirements for each class of building (fireproof, mill, masonry, and frame buildings), and type of building (residential, business, commercial, manufacturing, and industrial) (Seattle Building Code Commission 1909:1–10, 11–94). Conforming to these building ordinances, developers constructed a mix of single- and multi-family residences alongside boarding and lodging houses, and small commercial strips outside of the downtown core in neighborhoods across the city (Eliason 2018).

In January 1920, the city council passed Ordinance 40407, which established the City Zoning Commission and defined its role. The first members of the commission consisted of the City Engineer, Superintendent of Buildings, a Park Trustee, and six members appointed by the Mayor. The commission's first job was to divide the city into zones or districts and write ordinances that would "specify the uses to which property in each district may be devoted" (Seattle City Council 1920:2; Seattle Zoning Commission 1920a).

Through 1920, the commission heard testimony on neighborhood concerns and gathered information about zoning. Residents requested the commission address issues caused by meat packing plants and stockyards adjacent to residential neighborhoods, and tackle parking issues. The commission collected zoning data from cities around the country, including Portland, St. Louis, Cincinnati, Memphis, New York, Washington D.C., and others (Seattle Zoning Commission 1920a, 1920b, 1920c). In January the following year, the commission hired Harland Bartholomew a "zoning expert" and city planning engineer from St. Louis, Missouri, and a public meeting was held in February to introduce Bartholomew and discuss city zoning (Seattle Zoning Commission 1921a).

Bartholomew suggested that Seattle be divided into five districts by use and recommended that the commission consider building height, building area per parcel, and density of occupancy within each of the districts (Seattle Zoning Commission 1921a). Working with the Building Code Commission, the zoning commission developed a proposed zoning report, presented the report to the City Council, and held public meetings to share each neighborhood's proposed zoning (Seattle Zoning Commission 1921b). Throughout 1922, the commission received

petitions from numerous university, hospital, ecclesiastic, and industry representatives, improvement clubs, property owners, neighborhood groups, and business owners requesting changes to zoning that affected them; some of these were approved by the commission and some were denied (Seattle Zoning Commission 1922a, 1922b).

In January 1923, the zoning commission approved the draft zoning ordinance and presented it to the City Council. During the months that followed, the commission continued to review petitions for changes and make amendments to the draft, which they forwarded to the City Council (Seattle Zoning Commission 1923). In June 1923, the Council signed the zoning ordinance (Ordinance 45382), presented it to the mayor who approved it that same month (Seattle City Council 1923).

The ordinance divided the city into six different "use districts," which included the First Residence, Second Residence, Business, Commercial, Manufacturing, and Industrial Districts. Permitted in the First Residence Districts were single family dwellings, schools, churches, parks, playgrounds, art galleries, libraries, private conservatories, educational housing, and railroad stations. In the Second Residence Districts, zoning allowed for all First Residence uses plus dwellings, flats, apartments, boarding and lodging houses, hotels, clubs or fraternal organizations, and medical and philanthropic institutions. Within the Business Districts, both First and Second Residence uses were permitted plus stores, offices, banks, restaurants, service stations, police or fire stations, printing office, telephone/telegraph office, theaters, dance halls, skating rinks, retail trades or shops, automobile salesrooms and garages, hand laundries, and the like. In Commercial Districts, the zoning ordinance permitted all of the First and Second Residence, and Business uses, and allowed for any trade or industry except for 75 specific manufacturing industries that were enumerated in the ordinance. In the Manufacturing Districts, the ordinance allowed all of the First Residence, Second Residence, Business, and Commercial uses except for a list of 16 industries. Most of the excepted industries were listed as "objectionable" due to "the emission of dangerous, unwholesome, foul, nauseous or offensive gases, odors or fumes" (Seattle City Council 1923). Finally, in the Industrial Districts, all lawful uses were permitted under the zoning ordinance. Between its passage in 1923 and its repeal and replacement in 1957, the zoning ordinance was amended over 600 times (Seattle City Clerk 2023).

In many new neighborhood subdivisions, discriminatory racial restrictions were entered into the deeds. These restrictions that prohibited the use, sale, or lease of a property to persons of color and other such discriminatory classifications became common after a 1926 U.S. Supreme Court case, *Corrigan et al. v. Buckley*, ruled that such covenants were not prohibited by law. In 1948, in *Shelley v. Kraemer*, the court reversed its earlier opinion and found that such racial deed restrictions violated the Equal Protection Clause of the Fourteenth Amendment. However, it remained legal to discriminate on the basis of race or ethnicity in the rental or sale of housing until 1968, when Congress passed the Housing Rights Act. Although now illegal, such racially restrictive language remains in many deeds in many of Seattle's neighborhoods (LII 2021, 2023; University of Washington [UW] 2020a). For more specific information about racially restrictive covenants in Seattle's neighborhoods, see each of the analysis areas below.

Like most of the United States, the Great Depression hit Seattle hard, as the area's industries faltered, jobs were lost, and subsequently, the population fell. The arrival of World War II and the corresponding growth in war-supporting industries slowed the decline. In 1942, all the Japanese residents on the West Coast—including over 7,000 Japanese Americans in Seattle—were forcibly removed and incarcerated for the duration of World War II by President Roosevelt's executive order 9066. After the war, many never returned to the area, many lost their businesses and homes, and over time, many of their former farmlands were developed (Studio TJP 2021).

During this time, the city's earliest residential neighborhoods were in flux due to pressure of commercial and industrial interests. Additionally, the 1949 earthquake, which damaged numerous buildings, hastened the shift away from mixed residential and commercial neighborhoods towards those with a mix of commercial and industrial, as city officials sought to protect people from falling debris of unreinforced masonry buildings. The gradual rebuilding began in the late 1950s, in part stimulated by the rezoning of some of Seattle's neighborhoods to general manufacturing (Fiset 2001a; Link 2004:14; Thompson and Marr 2013).

In June 1957, the 1923 zoning ordinance was repealed and replaced with Comprehensive Zoning Ordinance 86300 (Seattle City Council 1957). One of the biggest zoning changes implemented under this ordinance included the classification of eight residential zones (R zones), which allowed for a mix of housing types and population densities plus some essential public services' facilities. These comprised three categories of single-family residence zones to "promote and protect various densities and uniformity of development within each" zone; two classes of duplex residence zones; and two classes of multiple family residence zones (Seattle City Council 1957). The ordinance also included three categories of shopping and business zones (B zones); two classes of commercial zones (C zones); and three categories of manufacturing zones (M, IG, and IH zones) (Seattle City Council 1957). The City Council amended Ordinance 86300 over 22,000 times before 1980 (Seattle City Clerk 2023).

As in many parts of the country, in 1957, the city implemented an Urban Renewal Program (Ordinance 86767) that altered the character of some of Seattle's neighborhoods. Defining areas as "blighted" due to what was perceived as deteriorated housing or unsanitary living conditions, the Planning Commission sought to use eminent domain to clear and redevelop areas of the city (City of Seattle 2023b). These projects were financed by federal funds authorized under the Washington State's Urban Renewal Law that passed in 1957. Even though the city found that these actions would unequally displace more persons of color, the plan moved forward, touting the benefits of eradicating blight and revitalizing communities. The city found nearly 1,400 acres of the city met the various classifications of blight and would need some form of urban renewal as treatment. By mid-1968, over 1,000 structures had been demolished due to "code noncompliance" (City of Seattle 2023c). Public hearings found residents in support of and in opposition to the program, and by 1974, the Federal Urban Renewal program was ended. In 1984, the City reported that the program failed to meet many objectives and in 2021, the City Council apologized, condemned the displacement of persons of

color caused by the program, and directed city departments to make amends for the injustices caused by the program (City of Seattle 2023b).

Years in the planning, work on I-5 through Washington began in 1959. The freeway aligned north–south along the east side of Eastlake Avenue E, cutting many neighborhoods in half, disrupting traffic patterns and routes, and introducing visual and auditory impacts. Much of I-5 through Seattle was completed in 1967, but the entire I-5 project was completed in 1969 (Dougherty 2010).

While not targeted by the Urban Renewal program, some of Seattle's neighborhoods such as Queen Anne pushed back against zoning changes in the 1960s–1970s, as they sought to protect their neighborhood character and historic buildings. In 1968 and 1970, voters approved a series of capital improvement bonds initiatives put forward by the Forward Thrust Committee, that included funding for a multipurpose stadium (Kingdome), historic preservation, arterial highways, neighborhood improvements, and parks and recreation, among others. In 1971, the Washington legislature created the Washington Heritage Register, and in 1973, the city passed a Landmarks Preservation Ordinance, establishing the Seattle Landmark designation (Williams and Miller 2015). In 1973, the City passed an ordinance that established the International Special Review District (ISRD) and ISRD Board, to "promote, preserve, and perpetuate the cultural, economic, historical, and otherwise beneficial qualities of the area" (Seattle Department of Neighborhoods 2023). The Seattle Chinatown-International Historic District, which is located within the ISRD, was listed in the NRHP in 1986 (Kreisman 1986).

In the 1970s, Seattle saw a drop in the city's population after a series of layoffs at the Boeing plant. Due to an influx of successful companies like Microsoft, Starbucks, and Costco, and research institutions at the UW, neighborhoods began to see rising populations and a corresponding growth in construction of new housing units, including mixed-use buildings along arterials but mostly single-family dwellings along residential streets (Williams and Miller 2015). In 1980, the City Council approved Ordinance 109560, which compiled and codified City ordinances that were passed on or prior to November 19, 1979, into the Official Code of The City of Seattle (Seattle City Clerk 2023). In 1984, Seattle's City Council passed an ordinance (111571) to pay reparations to five Japanese American city employees who were "terminated, laid off, or dismissed" due to President Roosevelt's executive order 9066 during World War II (Long 2001).

By the late 1990s, the rise in high-technology and knowledge sectors brought an influx of diverse, talented workers from around the world. The city by 2010 had just over 600,000 residents and by 2020, Seattle's population had soared to 735,015 (U.S. Census Bureau 2022).

Although Seattle began as a sparsely populated region whose settlers supported nearby lumber mills, by the turn of the twentieth century, it had become the Pacific Northwest's powerhouse city with considerable commercial, transportation, industrial, and maritime industries. Seattle's Chinatown-International District is a racially diverse cultural center for Chinese Americans, Japanese Americans, and Filipino Americans, as well as others. Today the city is home to modern hi-tech, retail, commercial, and multi-family infill construction in villages. While some

single-family homes and small commercial ventures make way for denser urban infill, most of the city's acres are still in low density residential use.

Development in Seattle Neighborhoods

Area 1: NW Seattle

Around 1870, David Denny purchased 160 acres in the area now known as the Licton Springs neighborhood and built a summer home there. The area was, and continues to be, an important cultural location for the Duwamish, Muckleshoot, Snoqualmie, Suquamish, Tulalip, and other Puget Sound region Tribes, and was known as líq'təd. The area contained forests, bogs, marshes, and mineral springs. The spring water contained minerals that colored the mud a coppery red. The Tribes used the red-colored mud in ceremonies and for other traditional purposes and harvested the native plants throughout the area (Remle and Howard 2019; Simpson 2021).

After the area along the shore north of Lake Union was logged around 1881, non-Indigenous people began settling there. In 1882, William Ashworth built a small cabin for his family on land he purchased from Corliss P. Stone at the northern end of Lake Union, in the area of present-day Wallingford. Also in the early 1880s, John and Mary Jane Ross moved north across the Outlet, which is what non-Indigenous settlers called the small stream that drained Lake Union into Salmon Bay, to the area now known as Ross/Fremont, where a few other settlers lived, including William and Mary Crawford. The settlers farmed and built a school for their children (Krafft 2010a; Veith 2005).

In 1883, the Lake Washington Improvement Company hired the Wa Chong Company to excavate canals connecting Salmon Bay and the Puget Sound with Lake Washington (see below Downtown/Lake Union [Area 4], for more information about the Wa Chong Company). The Wa Chong Company completed the canals in 1886, allowing for passage of shallow-draft boats and log booms through the Fremont and Montlake Cuts. That same year, David T. Denny and Judge John P. Hoyt platted the Denny & Hoyt's Addition, which encompassed land on both sides of the Outlet (Krafft 2010a; Riddle 2014; Veith 2005).

By the late 1880s, much of the present-day neighborhoods of Northlake, Edgewater, Fremont, and Wallingford had been logged over, and the Seattle Lake Shore and Eastern Railroad (SLS&E) connected the area with Seattle. By 1890, real estate investors had platted a number of subdivisions and sold lots for residential development, lumber and shingle milling companies set up operations, the Seattle Electric Railway and Power Company had established an electric trolley service, and a fleet of steamers plied the waters of Lake Union transporting passengers and supplies (Krafft 2010a).

The present-day neighborhood of Ballard developed on the Utter lands in the early 1880s, after real estate investors from Seattle purchased the property. By 1887, the West Coast Improvement Company combined a series of neighboring tracts with the Utter property and

platted the unit as Gilman Park. Most of the parcels were designated residential and commercial, but larger plots along the waterfront were allocated for industrial uses, which attracted shingle and lumber mills (Walton Potter 1976).

After the Great Fire of 1889 leveled much of downtown Seattle, investors and entrepreneurs established additional industrial, commercial, and retail operations in the burgeoning community of Fremont, including an iron works, a tannery and machine works, a hotel, hardware store, grocery, dairy, cigar stores, cafes, fraternal organizations, and a meat market. A number of residences and churches were also built during this prosperous time (Krafft 2010a).

It was in the late 1880s that a real estate developer platted 600 acres around Green Lake, built an amusement park on the northwestern shore of the lake, and worked to extend a railway line to the lake. At around the same time, a developer named Guy Phinney platted the Woodlands Estate subdivision in what became the Woodland Park neighborhood, built the Woodlands Hotel, and installed his own streetcar line to connect with Fremont (Studio TJP 2021; Veith 2005).

As growth continued and the area thrived, Ballard incorporated in 1890, while Seattle annexed Fremont, Green Lake, and much of North Seattle in 1891. Soon after annexation, Seattle established an elementary school in Fremont. In 1899, Seattle purchased and annexed the Phinney property. Shortly after the turn of the twentieth century, Fremont's street railways expanded north to Greenwood and later to Green Lake, Ballard, and east to Meridian and Wallingford, spurring residential growth with accompanying small commercial and retail centers (Krafft 2010a; Veith 2005; Walton Potter 1976).

In Ballard, by 1904 there were 15 shingle mills, iron foundries, shipyards for the fishing fleet, drop forge works, wood pipe works, and boiler works, and its population was around 10,000. Much of the residential stock constructed in Ballard during this time was worker housing around the industrial areas. That same year, Ballard received a Carnegie Library, which was listed in the NRHP in 1979 (Morrison Beals 1979; Walton Potter 1976).

In 1905, farther to the north, Theodore N. Haller purchased the land John Welch homesteaded, in what became known as the Haller Lake neighborhood. Haller then platted tracts around the lake for sale. The area, along with the neighboring community of Bitter Lake, slowly developed with a sparse population of small farms and summer cabins (Fiset 2001b).

In 1906, the Seattle Gas Light Company opened its gas manufacturing plant, originally called Lake Station, on the headland that protrudes south into Lake Union. Over the years, the plant delivered gas to Seattle, Renton, Kent, and Tukwila through 1,071 miles of pipes; the plant closed in 1956. In 1962, the site was purchased by the City of Seattle, and between 1969 and 1978, Gas Works Park, designed by Richard Haag, was developed. The park was listed in the NRHP in 2012. Also in 1906, the Seattle–Everett Interurban line was installed through Fremont, and reached Haller Lake by 1910, which contributed to another surge in population and residential housing growth. Likely hoping to see their faltering water and sewer systems upgraded, Ballard's citizens approved annexation to Seattle in 1907. In 1910, a Carnegie

Library was constructed in Green Lake, which was listed in the NRHP in 1981 (Krafft 2010a; Tusa Fels and Edstrom O'Hara 2012; Vandermeer 1981a; Walton Potter 1976).

In the early 1910s, as planning was underway for the construction of the Chittenden Locks and Lake Washington Ship Canal to connect Lake Washington with Puget Sound, Seattle engineers also planned for a new bridge to cross the channel at Fremont Avenue. Completed in 1917, the Fremont Bridge, a double-leaf trunnion bascule bridge, was listed in the NRHP in 1982. The Hiram M. Chittenden Locks and Related Features of the Lake Washington Ship Canal, also completed in 1917, were listed in the NRHP in 1978 (Soderberg 1980; Walton Potter 1977).

Although discrimination limited job opportunities for people of color, in the mid- to late 1910s, the Ballard shingle mills employed some African Americans, who were recruited by James A. Roston. A former Army officer, Roston helped other Black and sometimes Filipino Seattle residents find employment in mills, as cooks for the Admiral Lines, and in other industries (Mumford 1985:30–32).

In 1919, the Lakeside Boys School opened in Haller Lake, and two years later, the area's residents established a community club. Clare E. Huntoon, who purchased 200 acres of land in the Haller Lake area, never platted her land. After her death, developers acquired the land and built commercial, educational, and cultural properties, such as the Playland amusement park at Bitter Lake (built in 1930 and demolished in 1961), Ingraham High School (built in 1959 and designated an SL in 2016), and the Jewish cemetery, Bikur Cholim Cemetery (built in 1890) on N 115th Street. The Bikur Cholim is King County's oldest Sephardic cemetery (Bikur Cholim Machzikay Hadath [BCMH] 2023; Fiset 2001b; Sundberg 2010; The Johnson Partnership [TJP] 2016).

Some first-generation Japanese immigrants—Issei—settled on farms around Green Lake. Many farmed fruit, berries, flowers, and vegetables, which they sold to wholesalers or transported for sale at Pike Place Market. Other Japanese residents operated small commercial or retail enterprises. By the mid-1930s, there were about 300 Issei living in the area. In 1942, all the Japanese residents on the West Coast were forcibly removed and incarcerated for the duration of World War II by President Roosevelt's executive order 9066. After the war, many never returned to the area, and over time, their former farmlands were developed (Studio TJP 2021).

Throughout the 1920s and up until the onset of the Great Depression, residential development in the NW Seattle area remained strong. Most residential buildings (single family homes, duplexes, and apartments) were constructed near commercial districts and expanded outward from there, usually following streetcar lines. In the NW Seattle area, racially restrictive covenants were found in a number of residential developments. One example of such covenants was found in the Overland Park subdivision. Built by the Peoples Realty Company, the covenants covered about 990 properties. The covenant restricted the renting, leasing, or selling of the lots or buildings to African Americans or Asian Americans (UW 2020).

In 1921, a Carnegie Library was built in Fremont; the property was listed in the NRHP in 1981 (Vandermeer 1981b). Like many areas of Seattle, the depression slowed real estate development through the end of World War II, when returning soldiers caused a residential and

commercial construction boom, and a transformation to an automobile driven urban form in NW Seattle (Krafft 2010a).

The 1950s saw many changes in industrial and economic activity. In 1954, the city annexed the northern end of NW Seattle out to N 145th Street, which brought improvements in infrastructure and new residential development. During this time, many lumber mills declined and closed, and industrial development shifted south of Seattle in King County, which caused commercial and waterfront areas to deteriorate in NW Seattle. In preparation for the construction of Interstate 5, WSDOT purchased and demolished numerous buildings along the proposed two-block wide route through NW and NE Seattle. (Dorpat 2001a; Fiset 2001b; Tobin and Sodt 2002; Veith 2005; Wilma 2001d).

In the 1960s, the City purchased the Licton Springs property for a city park and filled in the bathing area. Improvements in the 1970s and 1980s included the creation of a pond, construction of a comfort station, and installation of stone or concrete ring around the iron oxide spring. The area continues to be a significant Tribal sacred place for gathering, healing, and ceremony, and was designated a SL in 2019 (Remle and Howard 2019; Simpson 2021).

After many years of decline, the 1970s and 1980s brought an influx of art, social services, and community development to Fremont and Ballard, causing a resurgence of the area. During this time of change, the Seattle School District's desegregation program bussed African American students to Lincoln High School. In response to desegregation, some parents pulled their students out of integrated public schools, and Lincoln closed in 1981 due to declining enrollment. After sitting unused for nearly 40 years, the school reopened in 2019. It currently serves approximately 1,700 students. In 1976, Seattle purchased the 11-acre site of the House of the Good Shepherd and transferred the deed to Historic Seattle. The property now includes the Meridian Playground, and the building is used as a multi-purpose community center. The Good Shepherd property was listed in the NRHP in 1977 and designated a Seattle Landmark in 1981. Throughout the 1980s, new residential and mixed-use development increased in the area (Alexander and Layman 1977; Krafft 2010a; Office of Urban Conservation 1981; Seattle Public Schools 2023; Veith 2005).

Area 2: NE Seattle

Development of the NE Seattle area closely followed the development in the NW Seattle area. In 1867, Christian and Harriet Brownfield, the earliest known non-Indigenous settlers in the NE Seattle area, filed a land claim for 174 acres, receiving their land patent in 1873. Northeast of the Brownfields claim, in the present-day Laurelhurst neighborhood, William H. Surber, Henry Nathan Jr., John Hildebrand, James and Alex Elder, Terresa Feltofer, and many others filed claims. The Brownfields and their neighbors farmed and improved their land (Rochester 2001a; Tobin and Sodt 2002). Farther to the north, in what is now the Lake City area, agricultural and residential development remained slow, with lumber mills and logging operations along the shoreline (Wilma 2001d).

Two events would open the area for settlement and development. By 1887, the SLS&E reached Union Bay and Laurelhurst, creating easier access to the area. And, in 1888, Henry Yesler purchased some of William Surber's land, established a sawmill near what is now Union Bay Boglands, and logged the surrounding area. With railroad access and cleared land, small farms and orchards developed. In 1889, William W. and Louise Beck platted tracts in the present-day Ravenna neighborhood, and James A. Moore platted tracts in what is now the Latona neighborhood. In 1891, the City of Seattle annexed the Brooklyn neighborhood (Tobin and Sodt 2002).

The biggest boon to the NE Seattle area was the relocation of the UW campus from downtown to Brooklyn in 1895. With a student enrollment of over 600 students by 1900, the UW drove development in the area. Between 1900 and 1910, all the tracts north of campus were platted and subdivided (Tobin and Sodt 2002). A number of buildings and structures on the UW campus are listed in the WHR, including Denny Hall, Parrington Hall, Bagley Hall, and Lewis Hall, all of which were listed in 1971, while the UW Faculty Center was listed in the NRHP in 2009 (DAHP 2023)

In 1900, the Seattle Golf and Country Club purchased 40 acres in Laurelhurst and luxury real estate development soon followed, with the largest waterfront lots set aside for public-use maritime facilities, such as boat launches, to attract buyers (Rochester 2001a). In 1902, the University Heights School was completed, and a wing was added in 1907. The school was listed in the NRHP in 2010 (Lengyel 2010).

In 1906, after receiving approval and funding from the Washington state legislature on their proposal for Seattle to host a world's fair in 1909, the Board of Trustees for the Alaska–Yukon–Pacific Exposition reached out to the Olmsted Brothers. They requested the firm develop landscaping plans for the fair's 250-acre grounds on the UW campus (Beckner and Perrin 2016; Williams 1999). At the exposition the buildings represented industries, states and countries, including Washington, Oregon, Alaska, Hawaii, and New York, the Philippines, Japan, and Europe, among many others, and were arranged around a central fountain and landscaped area with views to Mount Rainier. Contemporaneous fair maps show two locations featuring the Philippines: the Philippine Building and the "Igorrote" (Igorot) Village (Cordova, et al. 2009). Located in the fair's so-called entertainment area, the village, which featured members of the Bontoc Igorot, from Northern Luzon's Cordillera mountain provinces, contained traditional huts and fenced enclosures (Cordova, et al. 2009). Also located in the entertainment section of the fair, were both a Japanese Village and a Chinese Village. The manager of the Chinese Village was a Seattle merchant, Ah King. The village pavilion showcased Chinese shops, a temple, restaurant, and a performance stage (Ho and Bronson 2023). After the fair ended, UW used many of the former buildings and structures for classrooms and other campus uses. Over time most were removed. Today only Drumheller Fountain (originally Geyser Basin), Rainier Vista, remnants of the Olmsted landscape, the curving W and E Stevens Way NE (originally Pacific Avenue), Architecture Hall (originally the Fine Arts Building), and Cunningham Hall/Alene Moris Women's Center (the Woman's Building), which was relocated to George Washington Lane NE in 2009 (Andrews 1998; Frykman 1962; Sanborn Map Company 1909; UW 2023).

By 1910, most of the residential area around the UW had been platted and the area had a thriving commercial district, influenced by the Alaska–Yukon–Pacific Exposition. Many who came to Seattle for the fair stayed to purchase homes and establish businesses. In 1910, the Brooklyn area was annexed by the City of Seattle (Dorpat 2001a;Rochester 2001a; Tobin and Sodt 2002).

In 1920, in an industrial area on the Sand Point peninsula, King County, through purchase and condemnation, obtained slightly more than 400 acres to establish an airfield. In 1926, the U.S. Navy accepted the deed and began building the Naval Air Station Seattle. The station was decommissioned in 1970, and the base is now used as a Naval air reserve station, Magnuson Park, and a National Oceanic and Atmospheric Administration (NOAA) site. Naval Air Station Seattle was listed in the NRHP in 2010 (Howard et al. 2009).

In the 1920s and 1930s, in the NE Seattle area, racially restrictive covenants were found in a number of residential developments. One example of such covenants was found in the Maple Leaf Addition to Green Lake Circle subdivision. Built by A. F. Nichols Company, the covenants covered about 720 properties. The covenant restricted the renting, leasing, or selling of the tracts or buildings to anyone "other than one of the white race" (UW 2020).

The 1950s saw shifts in development. At the northern end of the NE Seattle area, in 1950, the Northgate Mall opened. The property was the first shopping mall in the United States. The construction of the mall hastened declines in the area's small neighborhood commercial corridors. Also, in preparation for the construction of I-5, WSDOT purchased and demolished numerous buildings along the proposed two-block wide route through NE and NW Seattle. In 1953, Seattle Children's Orthopedic Hospital opened its new campus in the Laurelhurst neighborhood. In 1954, the area that includes Haller Lake neighborhood and the Lake City community were annexed by the City of Seattle (Andrews 1999; Dorpat 2001a; Fiset 2001b; Tobin and Sodt 2002; Veith 2005; Wilma 2001d).

The post-World War II period saw a boom in the student population at UW, with returning service members taking advantage of the G.I. Bill to enroll in college. During this time, the UW expanded its campus to the south and southwest. But it was the construction of I-5 that caused a massive shift in the area. The freeway divided the University District from its historic western neighbors, the Latona and Wallingford neighborhoods (Dorpat 2001a; Tobin and Sodt 2002).

By the 1960s, Children's Orthopedic Hospital had expanded as a teaching hospital. The UW Medical School pediatrics program was located in the hospital. In 1970, the hospital opened the Odessa Brown Children's Clinic in the Central District (Andrews 1999).

After years of decline, the 1970s and 1980s brought an influx of art, social services, and community development to NE Seattle. The post-war baby boom, urban flight, desegregation, and the Boeing Bust moved residents out of the city into the suburbs, where development had slowed. As development picked up, smaller, older buildings were demolished and replaced. During this time, UW continued to have high enrollment and increased its student body in the 1970s (Dorpat 2001a; Meisner and Krafft 2015; Tobin and Sodt 2002).

In 1997, the Children's Orthopedic Hospital became Children's Hospital and Regional Medical Center, was allied with a number of regional hospitals and clinics, and had expanded clinics in Bellevue, Federal Way, and Olympia (Andrews 1999).

Area 3: Queen Anne/Magnolia

Residential development on lower Queen Anne Hill began in the 1870s and boomed in the 1880s, as the early non-Indigenous settlers subdivided and sold off portions of their land holdings. Infrastructure such as private water systems and electrical power service were available in Queen Anne in the 1880s, as well as some public transportation, such as cable cars, a ferry on Lake Union, and horse-drawn trolleys. The southern portion of Queen Anne was annexed by the City in 1883 (Lentz and Sheridan 2005).

While the Queen Anne neighborhood grew rapidly due to its proximity to central Seattle, growth in Magnolia was due to the construction of the West Point Lighthouse and later, Fort Lawton. Built in 1881, the lighthouse was originally a manned station, with two lighthouse keepers' houses built just east of the lighthouse structure. The lighthouse was remote and accessible only by water until 1883 when a horse trail was built connecting it to a wagon road. In 1985, the lighthouse was automated, and in 2002, the Federal government declared it surplus. The City obtained the deed to the property, restored the structure, and incorporated the property into Discovery Park. The West Point Lighthouse was listed in the NRHP in 1977 and is a resource within the Maritime Washington National Heritage Area (MW NHA) (Anderson 2023; Williamson 1977).

Fort Lawton was established in 1898 at the westernmost tip of Magnolia Bluff. Originally, it was part of a 700-acre land donation by local landowners. As one of a series of coastal military forts, Fort Lawton was an infantry headquarters and a strategic defense for the Puget Sound Naval Shipyard at Bremerton and the Port of Seattle. Around 1901, African American soldiers were garrisoned at Fort Lawton and helped to fight fires in national parks and forests, although some locals complained to the War Department about the presence of these troops. Army Sergeant Frank Jenkins, with his wife Rufina Clemente Jenkins, were stationed at Fort Lawton in 1909. They were the first Filipino family to homestead in Seattle. Over time, the Fort was used for National Guard training, troop processing and embarkation to the Pacific and Far East combat zones during World War II, and a German prisoner of war camp. In 1972, ownership of 391 acres of land around the fort was transferred to the City and became Discovery Park, which is now home to a visitor's center, playground, hiking trails, beach access, the West Point Lighthouse (1881), and the Daybreak Star Indian Cultural Center (1977). In 2007, additional portions of the Fort property were turned over to the City. The Fort was listed in the NRHP and designated a Seattle Landmark (Boyle and Sokol Fürész 2007; Cordova 2009; Kavanaugh 1978; Mumford 1985; Williamson 1977).

Between the 1890s and early twentieth century, the Queen Anne neighborhood blossomed. Residential infill construction followed extensive logging on the south side and the top of Queen Anne Hill. Other improvements during this time included the construction of the West Queen

Anne Elementary School (listed in the NRHP in 1975), installation of a municipal sewer system, a municipal water service, the construction of the Great Northern Railway's terminal at Smith's Cove, and the addition of streetcar and trolley lines. In 1907, Charles R. Collins built the Chelsea Family Hotel on the hill across from Kinnear Park. Listed in the NRHP in 1978, the Chelsea Family Hotel is a significant example of an early twentieth century apartment house (Walton Potter 1975a; Sutermeister 1978).

Most residential growth in Magnolia occurred after 1900. In those early years, some scattered residential and commercial developments appeared in the vicinity of the Fort, butut in 1905, the neighborhood began to see additional development after a streetcar line was constructed to the area. Residences, small farms, dairies, and orchards grew up along the line. Two years later, the Magnolia area was annexed to the City (Boyle and Sheridan 2015).

The completion of the Port of Seattle in 1911 and the Chittenden/Ballard Locks and Lake Washington Ship Canal in 1917 cemented the industrial, manufacturing, and maritime use of the area in and around Interbay, Lake Union, and Salmon Bay (Boyle and Sheridan 2015; Lentz and Sheridan 2005).

By the 1920s and 1930s, the Magnolia/Queen Anne area began to see further commercial development with additional small commercial districts built at the southern end of Magnolia and residences constructed on its ridges to the east and south. In 1927, the Magnolia School was built (Boyle and Sheridan 2015). In the Queen Anne/Magnolia area, racially restrictive covenants were found in a number of residential developments. One example of such covenants was found in the 832 property deeds of the Carleton Park subdivision, which was a residential development built by Charles F. Clise in 1928. The covenant restricted the renting, leasing, or selling of the tracts or buildings to anyone of the Asian American or African American "lineage" (UW 2020).

In 1940, the build-up to World War II increased jobs and the need for housing in Magnolia, and changes in public transportation brought a bus system to the neighborhoods transitioning away from street cars. The U.S. Navy takeover of much of Interbay brought the biggest changes to the Queen Anne/Magnolia area. The Navy filled in the tidal flats and constructed a supply depot, warehouses, barracks, and other buildings in Interbay, creating jobs and housing units, as the port sent thousands of troops to the war in the Pacific theater (Boyle and Sheridan 2015; Williams and Miller 2015). Like most parts of the city, at the end of the war, both Magnolia and Queen Anne neighborhoods saw a corresponding housing boom, with Magnolia seeing new neighborhoods develop around Fort Lawton (Boyle and Sheridan 2015; Wilma 2001b).

The Century 21 Exposition, the World's Fair of 1962, brought almost ten million attendees, and left an indelible mark on the Queen Anne neighborhood. A number of innovative, significant buildings and structures were designed for the Expo, including the Science Pavilion, Monorail, Space Needle, and the Century 21 Coliseum. The Science Pavilion was designed by Minoru Yamasaki and is today the Pacific Science Center, which was designated an SL in 2010 (Peterson 2010). The Monorail was designed by Germany's Alweg Company and was designated an SL in 2003 (Boyle 2003). The Space Needle was designed by John Graham, Jr., Victor Steinbrueck, and John Ridley and designated an SL in 1999 (Boyle 1998). The Century 21

Coliseum (designed by Paul Thiry) transitioned to a civic and multi-purpose convention and sports center and has remained an important architectural resource for Seattle. The building, now known as Climate Pledge Arena, was renovated in 1995 and listed in the NRHP in 2017 (Lazzaretto et al. 2017; Stein 2000).

Prior to the mid-1960s, Seattle's neighborhoods, commercial, and industrial enterprises discharged raw effluent into Puget Sound. In 1966, the City built the West Point Treatment Plant just east-northeast of the West Point Lighthouse. Secondary treatment tanks were installed in 1995. The plant was a necessary upgrade in infrastructure and now treats approximately 90 million gallons of wastewater per day from Seattle, Shoreline, north Lake Washington, north King County, and south Snohomish County (King County 2023; Long 2018; Wilma 2000).

In the 1970s, additional neighborhood amenities were built in the Queen Anne neighborhood. In 1972, the Queen Anne Recreation Center playfield was redeveloped, and in 1978, the City built the Queen Anne Pool. The pool was designed by Benjamin McAdoo Jr., the first African American to own an architecture firm in Seattle and the first to operate a long-term architectural practice in the state (Williams and Miller 2015).

Area 4: Downtown/Lake Union

The Denny Party, who arrived in 1852, were the first non-Indigenous settlers who landed in the area that would become Pioneer Square. The party included Arthur A. Denny and his brother David T., John N. Low, Carson D. Boren, William N. Bell, Charles C. Terry and his brother Lee, and their families. Later that year, Henry L. Yesler and David S. Maynard joined them. Yesler set up his steam-powered sawmill at the foot of what is now Yesler Way (Crowley and McRoberts 1999; Denny 1888:7–13, 16–17; Fiset 2001a).

In the hopes that the Northern Pacific Railway (NP) would choose to terminate its transcontinental line in Seattle, the inhabitants set about clearing trees, filling tidal marshes, constructing wood-frame residential and commercial buildings, blockhouses, and a wharf at the harbor. In 1861, Seattle lost the campaign to become Washington Territory's new capitol but won the right to build the Territorial University in Seattle. In the early 1860s, Bell, after returning from a sojourn in California, platted his claim into town lots. Shortly after Seattle was incorporated in 1869, the 1870 Census counted around 1,000 residents. In 1874, to the disappointment of the town, NP chose Tacoma over Seattle for its terminus (Bagley 1916; Crowley 2006; Williams 2015).

In 1868, Chun Ching Hock, who was likely Seattle's first Chinese immigrant, and his business partner, Chun Wa, opened the Wa Chong Company near the Yesler Mill. The company operated a general merchandise store and contracted Chinese laborers for jobs in Seattle and for the railroads. By the mid-1870s, around 250 Chinese settlers lived in the "Chinese quarter" or Chinatown (Kreisman 1986; Riddle 2014).

By 1878, Seattle's population had grown to about 3,000 inhabitants (Williams 2015). By the 1880s, development had spread east to the south end of Lake Union, where entrepreneurs established industries there such as sawmills, brick manufacturing, shipbuilding, tanneries, and iron works (Tusa Fels and Edstrom O'Hara 2012).

During the 1880s, two of Seattle's main industries were logging and the transportation of coal. Around Lake Union, a number of sawmills opened along its shores to process the timber harvested around the lake and a number of piers for offloading of coal (Link 2004). By 1884, the horse-drawn cars of Frank Osgood's Seattle Street Railway were operating in the downtown area. Osgood extended his line to the southern shore of Lake Union and built a wharf there for steamships ferrying passengers and supplies (Veith 2005). That same year, David Denny donated land for the first public park within the city. Although originally a cemetery, in 1884, the remains were disinterred and reinterred in Lakeview Cemetery (formerly the Washelli Cemetery), and the land became a park (Beckner and Perrin 2016; Corley 1969a).

In the 1880s, many Chinese worked in downtown Seattle. Although they faced discrimination and abuse from many in Seattle, Chinese laborers built streets and railroads, operated downtown businesses, worked in mills and the fishing industry, and were domestic workers. Following the passage of the Federal Chinese Exclusion Act in 1882, anti-Chinese sentiment continued to rise against the area's remaining Chinese inhabitants as other laborers perceived greater competition for jobs. Four years after the law passed, an angry crowd of Seattle residents swarmed into Chinatown and forced many Chinese to leave the city. Those who stayed and those who arrived later, relocated to a regraded area east of the railroad tracks, creating a new Chinatown. The Chinese established shops, businesses, social organizations, schools, hotels, and apartments there. The Chinese Exclusion Act was finally repealed in 1943. The Chinatown-International District was listed in the NRHP in 1986 (Kreisman 1986; NARA 2023; Riddle 2014).

The Japanese community also worked in Seattle's downtown. Kyuhachi Nishii was the first known Japanese resident in Seattle. After arriving in town from Oregon in 1888, he opened the Star Restaurant with his business partner, Azuma. Many other Japanese settlers worked in sawmills, canneries, shops, and on the railroads, while others took jobs as domestic help. The Japanese quarter known as Nihonmachi ("Japanese town") grew just north of Chinatown (Link 2007; Takami 1998).

The SLS&E was incorporated by a group of 13 investors comprising Thomas Burke, Daniel Gilman, James R. McDonald, T. T. Minor, John Leary, Henry L. Yesler, David T. Denny, George Kinnear, G. Morris Haller, Griffith Davies, William Cochrane, James W. Currie, and Frank Osgood. Construction began in 1887 at the depot near the waterfront with a line that ran northwest along Elliott Bay to Interbay, then north to Ballard, east to Lake Union, Ross and Fremont, Wallingford, Brooklyn (now the University District), to Union Bay, then on to Yesler, and finally to Bothell by November that same year. By 1888, the eastern branch line reached into Snohomish County and finally to the coal mines of Gilman (now Issaquah), and the

northern branch extended to Arlington. In 1901, the SLS&E was acquired by the NP and became its Seattle Division (Veith 2005).

Like many cities in the late nineteenth century, Seattle was susceptible to fire. Seattle's commercial core was nearly leveled by the "Great Seattle Fire" in 1889, which destroyed 64 acres of commercial, industrial, and residential buildings and the city's wharves, piers, depots, mills, and warehouses. The fire initiated a rebuilding effort that resulted in new stone and brick buildings, the widening and regrading of streets, and a phase of infrastructure improvements such as a public water system and cable car lines across the city to the suburbs (Caldbick 2020a, 2020b; Crowley 2006; Schultze et al. 2017). By 1891, a birds-eye image of Seattle, prepared by Augustus Koch, showed development spreading from the waterfront east to the banks of Lake Washington, which were still mostly forested but beginning to fill with scattered development in the clearings (Koch 1891). By 1893, the Great Northern Railway's transcontinental line terminated in Seattle, creating more opportunities for growth and development (Crowley 2006).

In 1895, the UW campus relocated from downtown to the Brooklyn neighborhood. The city also undertook a series of regrades, beginning in 1898, to flatten Denny Hill and others north of downtown. The regrades created easy access to the Belltown, Queen Anne, and Lake Union neighborhoods (Sheridan 2007). Much of the dirt removed in the regrades was used to fill in wetlands and tidal flats, as well as the depression known as the Belltown Ravine (Link 2004:8; Thomas Street History Services [TSHS] 2006; Tobin and Sodt 2002; Williams 2015).

After the turn of the twentieth century, the City of Seattle embraced the progressive era with a series of planned projects, including annexing a series of suburban towns, hiring the famed Olmsted Brothers landscape architects to create plans for parks, scenic boulevards, and playgrounds, built utilities and schools in the outlying neighborhoods, and began paving roads. (Crowley 2006). As a part of this progressive mindset, the City Council gave James J. Hill reclaimed tidal flats for construction of the Great Northern depot. City engineer Reginald H. Thomson objected to Hill's plans and insisted on a tunnel under the business district to reduce congestion. After the tunnel was complete in 1904, Great Northern built the King Street Station, which was finished in 1906 and was listed in the NRHP in 1969 (Corley 1969b; McClary 2002; TSHS 2006). It was city engineer Thomson who designed the east–west alignment for piers built in the 1900s along the waterfront (TSHS 2006).

Additionally, the City founded the Pike Place Public Market in 1907 (City Ordinance 16636). Located on Seattle's waterfront, the market was developed in response to widespread price gouging by wholesalers who raised the costs to consumers while minimizing payments to farmers. The market was an instant success. Shortly after the market opened, neighboring businessman Frank Goodwin constructed a large two-story building to house market stalls out of the weather. By 1909, the market was attracting over 60 farmers a day to sell their products, and each month the market drew 300,000 visitors and stimulated additional commercial development in the downtown area (City of Seattle 2022; PikePlaceMarket.org 2021).

Developed as a unique public-private partnership, the Pike Place Public Market was listed in the NRHP in 2010 (Krafft 2010b).

Just prior to this booming time, the Philippines came under colonial control of the United States following the Spanish-American War of 1898. After a three-year battle, the devastating Philippine-American War ended in 1902, and many Filipinos migrated to the United States, with some coming to Seattle. Many Filipinos, who could not become citizens or own property at the time, worked installing telegraph and telephone lines and attended college (Chinn 2011; Cordova 2009; Hedden 2013).

In 1909, when the city hosted the world's fair, the Alaska–Yukon–Pacific Exposition, Seattle surpassed expectations and impressed visitors as a major port city. In preparation for the influx of visitors to the Expo, the Seattle Park Board updated the 1890s-era Pioneer Square Park with a Chief Seattle fountain, a pergola, and a comfort station. The Pioneer Square-Skid Road National Historic District and the Pioneer Building, Pergola, and Totem Pole were listed in the NRHP in 2007 and 1977, respectively (Crowley 2006; Link 2007; Pitts 1977).

The city's commercial core shifted north of pioneer Square by 1910, as industries moved south (Crowley 2006). As rents increased for Chinese Americans, they moved farther east. One such move was the Wa Chong Company, which moved operations into the East Kong Yick Building in 1910 and would remain in business there until 1953. The building reopened in 2008 as the Wing Luke Museum of the Asian Pacific American Experience (Riddle 2014).

The construction of the Chittenden Locks and Lake Washington Ship Canal in 1917 triggered an expansion of Lake Union's boat yards. Some of the boat yards repaired ocean sailing ships, as they could now enter the canal to access Lake Union, while other shipbuilders built a fleet of wooden boats for World War I. The fleet never joined the war effort (Becker 2007).

Beginning in the 1920s, automobile-related enterprises, warehouses, light manufacturing plants, and construction-related businesses were constructed in South Lake Union (Krafft and Meisner 2014). The regrades of the Downtown/Lake Union area continued into the 1920s and 1930s, including the area of Denny Park. The project lowered the park grade by over 60 feet, and it was landscaped with walkways on the diagonal and cardinal directions, and planted with lawn, shrubs, flowers, and trees. Denny Park was listed in the NRHP in 1969 (Corley 1969a).

While most of the Chinese, Filipino, and Japanese immigrants to Seattle lived in the Chinatown area and Nihonmachi, by the 1920s and 1930s, some had moved farther out from the downtown area into the Central District onto larger properties where they grew fruits and vegetables to sell at Pike Place Market (Riddle 2014; Tobin 2004a). During the Great Depression, commercial construction in the downtown area slowed and commercial enterprises in the Pioneer Square area declined, but some industries rebounded during World War II in support of the war effort (Crowley and McRoberts 1999).

In 1940, construction began on the Naval Reserve Armory at the south end of Lake Union. The building and others at the site were completed in mid-1942 and was used to train thousands of U.S. Navy sailors, range finders, ammunition handlers, welders, electrician's mates, and others.

The site was decommissioned after the war and some of the buildings removed. In 1991, the property was redeveloped as Lake Union Park and maritime heritage center. The Naval Reserve Armory was listed in the NRHP in 2009 (Sokol Fürész and Boyle 2009)

During World War II, the residents of Japanese ancestry who lived in the Nihonmachi, were forcibly removed and incarcerated for the duration of the war. After the war ended, many Japanese residents never returned to the area, and many lost their businesses and homes (Kreisman 1978; Studio TJP 2021; Tobin 2004a).

Also in the 1940s, in the Downtown/Lake Union area, racially restrictive covenants were found in some residential developments. One example of such covenants was found in the Haggardts Addition subdivision. Built by Oren H. and Agnes M. Haggardt in 1946, the covenants covered about eight properties. The covenant restricted the renting, leasing, or selling of the tracts or buildings to anyone "other than one of the white or Caucasian race" except as domestic servants (UW 2020).

The post-war years allowed for some commercial and industrial growth in Seattle and led to a series of construction projects in the downtown area. The automobile-related businesses in South Lake Union expanded, and in 1947, the city passed a new zoning ordinance that rezoned most of the Cascade neighborhood and South Lake Union area for light industrial, manufacturing, and commercial use only (Krafft and Meisner 2014). The Alaska Way Viaduct project was designed to move traffic off Seattle city streets and bypass the downtown area, thus alleviating congestion. The first section opened in 1953, with the final section opening the following year (Veith 2005). Also, during this time period, work began on I-5 through Washington in 1959. The freeway bisected many neighborhoods, disrupted traffic patterns and routes, and introduced visual and auditory impacts downtown. The I-5 project was completed in 1969 (Dougherty 2010). During the 1950s, as the Cascade and South Lake Union neighborhoods shifted increasingly to commercial development, numerous residential buildings were demolished, and the neighborhoods were greatly affected by the construction of I-5 (Becker 2007).

In 1969, Pike Place Market was set to be demolished and replaced by multi-story buildings and a parking garage as an Urban Renewal project. Citizens were outraged and put forth an initiative in 1971 to create a Pike Place Market historic district and a historical commission to protect it. The initiative passed, and today the Market is celebrated as an iconic Seattle and tourist destination (City of Seattle 2022; PikePlaceMarket.org 2021).

In 1974, the 12th Avenue Bridge (1912) that links the International District to Beacon Hill was renamed in honor of Dr. Jose P. Rizal. Dr. Rizal was a nineteenth century Filipino patriot, artist, historian, and writer who was executed by the Spanish for his anti-colonial efforts on behalf of all Filipinos. After a campaign begun in 1960 by Filipino American civil rights activists Tinidad Rojo and Vic Bacho, the bridge was renamed, and in 1981, the Dr. Jose P. Rizal Park in Beacon Hill was constructed in his honor (Hedden 2013).

In 1989, voters approved a land use plan, Citizens' Alternative Plan (CAP) (Initiative 31), which established height and density limits for new construction in the downtown area. In 2006, the City altered those regulations by rezoning the downtown area to allow for greater height and density limits (City of Seattle 2023d; Wilma and Crowley 2001). In the 1990s, the downtown area underwent a period of redevelopment with revitalized stores and theaters, and increased residential and cultural development, including the building of a museum and a symphony hall (Crowley and McRoberts 1999). By the end of the twentieth century, the downtown area was booming.

Area 5: Capitol Hill/Central District

In 1869, Harvey Pike platted Union City on the isthmus between Lake Washington and Lake Union (at the northern end of present-day Montlake), reserving a 20-foot-wide strip of land for a future connecting canal between the lakes. Two years later, Pike transferred the property to the Lake Washington Canal Company, which built a tram rail for portage between the lakes. In 1875, Charles Coppin dug a well in the First Hill area that had been logged by Henry Yesler. The well became a source of drinking water for the development that followed. Also in 1875, the first plat was filed in the Central Area for the Edes & Knight's Addition (Dorpat 2001b; Veith 2005, 2009).

One of the earliest African Americans to settle in Seattle was William Grose. Before moving to Seattle, Grose enlisted in the Navy, worked as a gold miner in California, aided the western branch of the Underground Railroad, and served as a community leader. While the date of his arrival in Seattle is unclear, Grose cooked in a number of downtown restaurants before opening his own restaurant in 1876, on Yesler Way near the wharf. In 1882, Grose purchased 12 acres of land from Henry Yesler in what is now the Madison Valley area of the Central District. The following year, he built a hotel and restaurant on Yesler Wharf that catered to working men, which also housed Grose and his family. After the Great Fire in 1889 destroyed his hotel, the Grose family moved to the Central District property. The Grose house still stands at 1733 24th Avenue (Long 2006; Mumford 1985; Raftery 2021; Veith 2009).

In the 1880s, likely triggered by Grose's land purchase and construction of his home, other African Americans moved into the Central District. This influx later spurred residential development that included the construction of apartment buildings for African Americans. One such apartment building was the one built by Zechariah and Irene Francis Woodson in 1908 (Mumford 1985). Between 1919 and 1923, African American businesspeople were operating a number of commercial enterprises in the Central Area (Mumford 1985; Raftery 2021; Veith 2009).

By the mid-1880s, Seattle's leaders, such as Colonel Granville and Henrietta Haller, Morgan and Emily Carkeek, and a number of the Dennys, moved to First Hill to escape the boomtown that they had helped to create. In First Hill, along 14th Avenue, they built expansive mansions (Dorpat 2001b). The Millionaire's Row Historic District was listed in the NRHP in 2020

(Kurlander 2020). Some row houses and duplexes were also built in the area during this time period (Dorpat 2001b).

Easily accessible transportation sparked growth in commercial, residential, and institutional development in the Central District. The first of three cable car lines was installed in 1888 to First Hill, with the others completed by 1891. A commercial strip grew along Madison Street, and residential tracts expanded east of Broadway into the Cherry Hill and Squire Park neighborhoods. In 1890, King County built its courthouse at the southern end of First Hill, and by 1891, the City built three schools, Rainier, Randell/Madrona, and T. T. Minor (Dorpat 2001b).

The first Jewish services for the Chevra Bikur Cholim temple were held in 1889, in the downtown Seattle area, before moving into a building in the Central District. The temple incorporated in 1891. In 1898, the congregation built a new temple at 13th Avenue and Washington Street. By 1909, the Jewish population outgrew the temple. In 1915, the Chevra Bikur Cholim Synagogue No. 3 was completed. In the early 1960s, the congregation moved to Seward Park, merged with Congregation Machzikay Hadath in 1971, and sold Synagogue No. 3 to the City of Seattle, which repurposed the building as the Langston Hughes Performing Arts Center, in honor of the renowned poet, social activist, and leader of the Harlem Renaissance. The Langston Hughes Cultural Arts Center was designated an SL in 1982 (BCMH 2023; Michelson 2023).

The Capitol Hill/Central District contains a number of parks that were discussed in the Olmsted Brothers' reports to the City of Seattle. One of these was Volunteer Park, which is often referred to as the "centerpiece" of the Olmsted Brothers' plan for Seattle (Walton Potter 1975b). Originally purchased by the City in 1876, the land that became Volunteer Park was used as a cemetery. In 1887, the remains were disinterred and moved to an adjacent parcel to the north, and the land became Lake View Park. By 1901, the park was renamed Volunteer Park and had a greenhouse, nursery, caretaker's cottage, walking paths, lawn, picnic areas, some play equipment, and a recently constructed in-ground reservoir. In their 1903 report to the City, the Olmsted Brothers, anticipating development around the park, recommended an observation tower from which to view distant important sights and a full design plan by the firm. Their plan for Volunteer Park included a second reservoir, bandstand, music pavilion and pergola, and a conservatory, expansive lawns, undulating walkways, and various plantings. Construction began that same year (Beckner and Perrin 2016; Walton Potter 1975b). Volunteer Park was listed in the NRHP in 1975 (Walton Potter 1975b). In 1932, the Seattle Art Museum was constructed in Volunteer Park at the former location of the pavilion. The Art Moderne building was completed and opened in 1933. In 1994, the museum was renamed the Seattle Asian Art Museum, and in 2016, listed in the NRHP (Boyle 2016; Seattle Art Museum [SAM] 2023).

In the 1920s and 1930s, in the Capitol Hill/Central District area, racially restrictive covenants were found in a number of residential developments. One example of such racially restrictive covenants was found in 958 property deeds of the Capitol Hill subdivision, which was one of the largest subdivisions in the Capitol Hill/Central District (Area 5). Developed by the Capitol

Hill Community Club in 1927 or 1928, this covenant was included in the deeds, restricting the sale, conveyance, lease, rent, or gift by the property owner or their "heirs and assigns," to anyone of African American heritage (UW 2020).

While most early Japanese immigrants originally settled in what is now known as the International District, in the 1920s and 1930s, many Japanese Americans moved out of the city into the Central District and Beacon Hill, as they found fewer racially restrictive covenants and more affordable housing. One of the most culturally important buildings in the community is the Japanese Language School at 1414 S Weller Street in the Atlantic neighborhood, just east of the Chinatown-International District. The school was established in 1902 and moved into its new building in 1913. The Japanese Language School (Nihon Go Gakko) was listed in the NRHP in 1982 (Dubrow 2002; Tobin 2004a).

In 1931, Harborview Hospital was built on the site of the former King County Courthouse, and a medical zone has been built up around it over time (Dorpat 2001b).

In 1959, work began on I-5 through Washington. The freeway bisected many neighborhoods, disrupted traffic patterns and routes, and introduced visual and auditory impacts downtown. The I-5 project was completed in 1969 (Dougherty 2010). During the 1950s, as the Cascade and South Lake Union neighborhoods shifted increasingly to commercial development, numerous residential buildings were demolished, and the neighborhoods were greatly affected by the construction of I-5 (Becker 2007).

In 1974, the 12th Avenue Bridge (1912) that links the International District to Beacon Hill was renamed in honor of Dr. Jose P. Rizal. Dr. Rizal was a nineteenth century Filipino patriot, artist, historian, and writer who was executed by the Spanish for his anti-colonial efforts on behalf of all Filipinos. After a campaign begun in 1960 by Filipino American civil rights activists Tinidad Rojo and Vic Bacho, the bridge was renamed, and in 1981, the Dr. Jose P. Rizal Park was constructed in his honor (Hedden 2013).

Area 6: West Seattle

Shortly after the Denny Party arrived at Alki Point in 1851, most of them moved to the east shore of Elliott Bay to escape the grueling spring storms. Only one settler, Charles C. Terry, remained, and he platted the town of Alki in 1853, and opened a general store, sawmill, and post office. Three years later, Terry traded his land to David S. Maynard for land downtown, and left Alki behind. In 1868, Maynard sold the land to Hans M. Hanson, when he found it could not support farming (Corley 1969c; Sherrard 2016; Tate 2001).

By the late 1870s, a number of industries were established along what is now Harbor Avenue at Elliott Bay, including a salmon cannery, sawmill, and shipbuilders. Industrial workers lived in the mill town of Freeport (now Delridge), which provided housing and other services (City of Seattle 2023e; Tate 2001).

During the 1880s and 1890s, the West Seattle area began to see residential and commercial development. In 1885, the West Seattle Land & Improvement Company (WSL&IC) purchased

most of the land in the Admiral district, replatted it, and in 1888, the company developed a residential area they called "West Seattle" (City of Seattle 2023e; Tate 2001). The WSL&IC made transportation and other improvements to the area. They operated a ferry that carried passengers and supplies to and from Seattle and ran a cable car line up the hill into town. In 1898, the cable car ceased operation. In response, the City of West Seattle established a municipal streetcar system, which was operational by 1905. The City operated the streetcars for about a year, then sold the system to the Seattle Electric Company. They expanded the system to the south into a sparsely populated area of the peninsula, sparking a real estate boom (City of Seattle 2023e; Tate 2001).

Around 1895, the U.S. Army Corps of Engineers started to dredge the Duwamish River, which spurred additional industrial development in the area. The dredged material was dumped near the mouth of the river, creating Harbor Island. By this time, a business district was thriving near the ferry dock and the industrial area along the northeast shore (City of Seattle 2023e; Tate 2001; Wilma 2001c). Also, around this time, the NP constructed a trestle bridge to carry the rail line across the Duwamish River and connect to the WSL&IC ferry (Tate 2001).

In 1902, the residents of West Seattle incorporated as the City of West Seattle after the WSL&IC failed to continue making improvements. The city shared the peninsula with the unincorporated residential communities of Fauntleroy, Gatewood, Highland Park, Arbor Heights, Spring Hill, Youngstown, and Alki, which was a burgeoning summer recreation spot. Wealthy residents from Seattle began purchasing lots and building vacation homes in the area. One such buyer was William Bernard. In 1903, Bernard and his wife Gladys built their home, Fir Lodge at Alki Point, where they entertained frequently. After a few years, the Bernards sold the building, which was used over the years as a public event space, rental home, clubhouse, private residence, and finally as a restaurant by the 1950s. The Fir Lodge was listed in the NRHP in 2020 (Johnson 2020; Tate 2001).

By 1906, Alki had transformed into a summer playground and resort with residential tracts for sale along the beach and west of the point. The area boasted a small neighborhood filled with summer homes overlooking Puget Sound, a natatorium, an amusement park, bandstand, outdoor dining, swimming, boating, and other seasonal attractions. A steamship delivered passengers from Seattle to Alki Point, and a streetcar line extended into the area. Such amenities triggered additional residential and hotel development in the surrounding neighborhoods. In 1907, the City of West Seattle annexed Alki, Youngstown, and Spring Hill, and within a month, the City of Seattle annexed most of the West Seattle peninsula (City of Seattle 2023e; Sherrard 2016; Tate 2001). The area commonly known as Alki Beach Park, encompassing Alki Point and Duwamish Head, was listed in the WHR in 1969 (Corley 1969c).

Beginning in 1908, residents in the Alki area, including Ferdinand Schmitz, donated land to the City for a park, as great swaths of area forests were logged over for development. Originally named Forest Park, the 53-acre Schmitz Preserve Park contains old growth timber and nearly 2 miles of trails. In the Olmsted Brothers' 1908 report for Seattle's parks and boulevards, they

recommended construction of a picnic shelter, pergola, trails, scenic water feature, and waterfall in the park (Beckner and Perrin 2016; Friends of Seattle's Olmsted Parks 2023a).

In 1911, the U.S. Lighthouse Service purchased Alki Point from Hans Hanson's son Edward (or Edmund). Although a lighthouse at the point was initially requested in 1895, Congress appropriated the funds in 1913, and the U.S. Lighthouse Service built the Alki Point Lighthouse comprising a concrete fog signal building and octagonal lighthouse. The lighthouse was originally a manned station, with two lighthouse keepers' houses built just east of the lighthouse structure. In 1984, the lighthouse was automated, and in 2002, the federal government declared it surplus. The lighthouse continues to function as a navigation aid at the present time and is managed by the U.S. Coast Guard (Anderson 2023).

Infrastructure improvements were needed after the ferry was discontinued in 1921. Within a span of a few years, the City Council approved funding for two bridges across the Duwamish River. One was completed in 1924 and the other in 1930. In 1984, a high bridge was built, replacing the two earlier bridges (Tate 2001).

In the 1920s and 1930s, like many neighborhoods in Seattle, racially restrictive covenants were found in a number of residential developments in the West Seattle area. One example of such racially restrictive covenants was found in 28 property deeds of the Williams Alki Addition subdivision. Developed by Franklin and Mary Williams between 1926 and 1929, this covenant was included in the deeds, restricting the sale or rental of the property to Asian Americans, Filipino Americans, and African Americans (UW 2020).

In 1934, the last of three Natatoriums on Alki Beach was constructed by a private developer, north of the lighthouse on the shore. The Alki Natatorium was an indoor swimming pool housed within a glass-roofed building. Initially closed in 1939 after a tragic accident, the property was taken over by the City of Seattle and reopened in 1942. The property closed and was demolished in 1953, as renovation costs were deemed too high. The site was filled and landscaped (Corley 1969c; Sherrard 2016).

Area 7: Duwamish

The first non-Indigenous settlers in the Duwamish area were Luther Collins, Jacob Maple, Samuel Maple, and Henry Van Asselt, who filed land claims in the early 1850s. In 1871, developer Julius Horton purchased some of the Collins claim, and platted Georgetown (Wilma 2001a).

The Duwamish area soon became the industrial powerhouse of Seattle. In 1874, enterprising locals in Seattle built the S&WW from its start at Steele's Landing in Georgetown to the coal fields near Renton and then north to those near present-day Newcastle (Link 2004:3; MacIntosh and Crowley 1999; Smith 1983; Wilma 2001a).

In 1883, Andrew Hemrich and John Kopp founded Bay View Brewery overlooking Elliott Bay. The brewery was renamed Seattle Brewing and Malting Company Brewery Bay View Branch in 1893, Bay View Milling Company in 1919, Century Brewing Association in 1933, and finally in 1936, Rainier Brewery. Over the years, the Bay View Brewery expanded numerous times, was

one of the area's largest employers and the historic property was listed in the NRHP in 2012 (Howard and Chase 2012).

Around 1895, the U.S. Army Corps of Engineers started to dredge the Duwamish River, which spurred additional industrial development in the area. The dredged material was dumped near the mouth of the river, creating Harbor Island (Tate 2001; Wilma 2001c).

By the turn of the twentieth century, agriculture was the main industry in the Duwamish area and in 1904, Georgetown was incorporated (Smith 1983; Wilma 2001a). In 1907, the Georgetown Steam Plant began operation as a "standby" electrical plant, only switching on during peak demands for power. In 1951, Seattle City Light purchased the property, and it was last operated in 1972. The Georgetown Steam Plant was listed in the NRHP in 1984 (Caldbick 2016). In 1910, Seattle annexed Georgetown (Wilma 2001a).

In the Olmsted Brothers' 1908 report for Seattle's parks and boulevards, they recommended a playfield in the South Park neighborhood. By 1910, just over 5 acres of land was purchased, and two years later, the City began construction of the ballfield (Beckner and Perrin 2016; Friends of Seattle's Olmsted Parks 2023b).

In order to create more land along the Duwamish River for agriculture and industry, beginning in 1913 the area was logged; the river was rerouted, straightened, and channelized; and the tidelands were drained, dredged, and filled. The renamed Duwamish Waterway supported large industrial complexes, such as shipbuilders, foundries, clay and coal plant, terracotta factory, an antimony smelting and refining plant, iron works, flour mill, meat packer and slaughterhouse, creosoting works, lumber mills, warehouses, and Boeing Company Plant 1, which was constructed in 1916 to build aircraft for the military (Oldham 2020; Updegrave 2016; Wilma 2001c).

Founded by William E. Boeing, the Boeing Company struggled financially after World War I. Boeing began manufacturing furniture, power boats, and sea sleds. The company organized a subsidiary company to deliver mail and began making fast, powerful aircraft for mail delivery. 1928, King County established Boeing Field after Boeing threatened to leave the Seattle area (Crowley 2003).

In 1932, another industrial complex, the Ford Motor Company Assembly Plant, was built in the Duwamish area. The plant, designed by Albert Kahn, promised to employ 2,000 workers in automobile production. However, due to the economic impacts of the Great Depression, the plant shut down after six months and was operated as a Ford sales and service facility until 1941. Ford sold the plant to the U.S. military, who expanded the property to be used as an U.S. Army Depot. The property was leased to and then purchased by Boeing for a missile production center and finally sold back to the federal government for military use. The Ford Motor Company Assembly Plant was listed in the NRHP in 2013 (Lamprecht and Hetzel 2013).

This industrial growth created additional employment opportunities, and additional residences and apartment buildings were constructed in the surrounding residential neighborhoods to house the influx of workers (Oldham 2020; Updegrave 2016).

Like most of the United States, the Great Depression hit Seattle hard, as the area's industries faltered, jobs were lost, and subsequently, the population fell. The arrival of World War II and the corresponding growth in war supporting industries slowed the decline. Also, during World War II, the U.S. Government created the Bracero Program to create a pathway for Mexicans to migrate to the U.S. to fill a labor shortage in the agriculture and war industries. Boeing was one of those industries that thrived during the war. By 1944, the company expanded to employ tens of thousands of workers, who made thousands of aircraft in support of the war effort. Many of these workers were from Mexico. They were originally brought to work in the central and eastern Washington's agricultural regions through the Bracero Program; some then migrated to western Washington to obtain jobs in the higher-wage war industries, such as Boeing. Many of these workers and their families settled in the South Park neighborhood. Boeing's support continued through the Cold War and Korean War, then in the 1960s began manufacturing domestic airliners. During the Boeing Bust beginning in 1969, Boeing laid off a total of 86,000 workers. The Bust caused a regional economic decline, but by 1972, Boeing was back on track manufacturing for the military and airlines across the globe (Gamboa 2019; Kershner 2015; Sanchez 2011).

Area 8: SE Seattle

The neighborhood of Beacon Hill had its beginnings on Henry Van Asselt's land claim, which early non-Indigenous settlers called Maple Hill. These settlers harvested timber and farmed, and many platted their lands between 1869 and 1878. One of the first African Americans to purchase land in the Beacon Hill area was businessman George Riley, who, backed by a group of Portland investors, bought land in 1869. These lands were platted in 1875 as Riley's Additions to South Seattle. The northern side of Beacon Hill was annexed to Seattle in 1883 (Tobin 2004a; Wilma 2001e).

The first non-Indigenous settler in the area that would become Rainier Beach was Joseph Dunlap and his family. Like many other early settlers, he built a cabin, farmed, logged, and sold land to other settlers, and in 1904, Dunlap donated land for a school (Tobin 2004b).

By 1889, the north end of SE Seattle was dotted with small farms. Residential growth was stimulated when streetcars reached newly platted neighborhoods. The installation of a streetcar line between downtown and north Beacon Hill in the early 1890s led to residential construction in the area. Along the Rainier Valley, residential development boomed when J. K. Edmiston built the Rainier Avenue Electric Railway in 1891. By 1896, the line covered 12 miles and was renamed the Seattle, Renton and Southern Railway. The line opened up the area for additional settlement, and farmers used it to deliver crops into the Seattle markets. Hillman Investment Company bought some of Dunlap's land and platted the Atlantic City Addition in Rainier Beach in 1905. (Crowley 1999; Tobin 2004a; Wilma 2001e, 2001f).

In 1898, the City bought 235 acres from the state on the north side of Beacon Hill and, in 1911, built two water reservoirs there. This property became Jefferson Park in 1915 (Tobin 2004a;

Wilma 2001e). In 1907, the City of Seattle annexed the Rainier Valley communities and the south side of Beacon Hill (Tobin 2004a, 2004b).

In 1904, Seattle Public Schools built the Beacon Hill School, and in 1912, the school was expanded to handle a growing student population. In 1909, Seattle Public Schools built the Colman Elementary School and later expanded it in 1940. Beacon Hill and Rainier Valley saw moderate development until about 1920 and into the 1930s, when a number of Italian and Japanese immigrants built homes on large lots and put in expansive gardens. Some of these landowners sold their produce at markets downtown, while others opened local community shops and restaurants (Handy et al. 2019; Tobin 2004a, 2004b).

In the Olmsted Brothers 1903 report for Seattle's parks and boulevards, Olmsted recommended the development of the Mt. Baker ravine into Mount Baker Park with a connecting parkway linking the park with present-day Jefferson Park, and construction of a boathouse and pier (Beckner and Perrin 2016; Friends of Seattle's Olmsted Parks 2023c).

In the 1920s and 1930s, in the SE Seattle area, racially restrictive covenants were found in a number of residential developments. One example of such racially restrictive covenants was found in 622 property deeds of the Ladd's 2nd Addition and Jefferson Park Addition #2 subdivisions. Developed by George Spencer between 1927 and 1930, the covenant restricted occupancy of the properties by anyone "other than one of the white or Caucasian race" except as domestic servants (UW 2020).

In 1931, the U.S. Public Health Service built the U.S. Marine Hospital on the north end of Beacon Hill. This monumental building anchors the north end of the SE Seattle area and was listed in the NRHP in 1978 (Kreisman 1978). As Boeing expanded during the lead up to World War II, wartime housing in the nearby Beacon Hill boomed, and the Seattle Housing Authority built projects such as the Rainier Vista and Holly Park developments. During World War II, the residents of Japanese ancestry who lived in the area, were forcibly removed and incarcerated for the duration of the war. After the war ended, many Japanese residents never returned to the area, and many lost their businesses and homes, and their former farmlands were developed (Kreisman 1978; Studio TJP 2021; Tobin 2004a).

Also, during World War II, the U.S. Government created the Bracero Program to create a pathway for Mexicans to migrate to the U.S. to fill a labor shortage in the agriculture and war industries. While originally brought to work in the central and eastern Washington's agricultural regions through the Bracero Program, some of these workers migrated to western Washington to obtain jobs in the higher-wage war industries, such as Boeing. Some of these workers and their families settled in the SE Seattle area (Gamboa 2019; Kershner 2015; Sanchez 2011).

After World War II, development in the SE Seattle area began again with a new Veterans Hospital (built in 1951) in Beacon Hill, new schools in many communities, and an influx of single-family homes and multi-family residential apartments across the communities. Around the same time, African Americans, Filipino Americans, Mexican Americans, Chinese Americans,

and Southeast Asians began moving into the Beacon Hill area, creating a diverse community. In the South Beacon Hill neighborhood, Chinese American architect Jimmie S. Eng, who emigrated from China in the mid-1920s, designed and built a home for his family in 1966. The home was listed in the NRHP in 2019 (Chinn 2022; Cook 2019; Tobin 2004a).

The area's population that had stagnated during the Great Depression began to climb after World War II. By the 1960s, the post-war baby boom, urban flight, desegregation, and the Boeing Bust moved residents out of the city into the suburbs, which prompted the city to build new schools in the suburbs, including in Beacon Hill. The area's students were moved to new schools, and by 1971, the old Beacon Hill School building was vacant (Handy et al. 2019; Wilma 2001e). On October 11, 1972, frustrated by discrimination and lack of solutions to the challenges they faced, a coalition of the area's community leaders, including Roberto Maestas from the Chicano community, Larry Gossett from the African American community, Bernie Whitebear from the Native American community, and Bob Santos from the Asian American community, occupied the vacant school with over 100 supporters. It took until May 1973 for the City to sign a lease with the group, who then established El Centro de la Raza, a social service, civil rights organization, and community resource center. In 1999, El Centro purchased the building, which was listed in the NRHP in 2019 (Handy et al. 2019; Wilma 2001e, 2001f).

In the early 1960s, the Chevra Bikur Cholim congregation moved to Seward Park. After merging with Congregation Machzikay Hadath in 1971, they sold Synagogue No. 3 in the Central District to the City of Seattle. The following year, in 1972, Congregation Bikur Cholim—Machzikay Hadath completed Synagogue No. 4 in Seward Park (BCMH 2023; Michelson 2023).

In 1965, the Filipino Community Center opened on what is now Martin Luther King Jr. Way South, in Hillman City neighborhood (Chinn 2011).

The Colman Elementary School closed in 1973, as enrollment had plummeted. The school was used for a short time as a temporary, alternative school facility, before closing permanently in 1985. That year, a group of African American activists occupied the building, hoping to convince the City to allow them to create the Northwest African American Museum on the lower floor, with 36 lower-income apartments on the upper floor. The move was successful, and in 2008 the project was completed. The Colman School was designated a Seattle Landmark and listed in the WHR in 2005 (Johnson Partnership 2005a, 2005b).

In 1974, the 12th Avenue Bridge (1912) that links the International District to Beacon Hill was renamed in honor of Dr. Jose P. Rizal. Dr. Rizal was a 19th century Filipino patriot, artist, historian, and writer who was executed by the Spanish for his anti-colonial efforts on behalf of all Filipinos. After a campaign by Filipino American civil rights activists, the bridge was renamed, and the Dr. Jose P. Rizal Park was constructed in his honor (Hedden 2013).

Current Conditions

Data & Methods

To establish the presence and location of known historic and cultural resources in the study areas, for the purposes of this report, a GIS Specialist gathered building data from the King County Assessor's website, reviewed DAHP's online database, WISAARD, and Seattle City Landmarks online database for:

- Historic-period aged parcels;
- cultural resource survey reports;
- archaeological site records;
- HPIs;
- TCPs; and
- NHL-listed, WHBR-listed, NRHP- and WHR-listed and eligible resources; and
- SLs.

Acronym Definitions

BSO—Buildings, Structures, Objects

DAHP—Washington Department of Archaeology and Historic Preservation

GLO—General Land Office

HPI—Historic Property Inventory forms

NHL—National Historic Landmark (the Nation's highest level of significance)

NRHP—National Register of Historic Places

SL—Seattle Landmarks

TCP—Traditional Cultural Properties

WHBR—Washington Heritage Barn Register

WHR—Washington Heritage Register

WISAARD—Washington Information System for Architectural and Archaeological Records database

Cultural Data Sources

City of Seattle Landmarks List

- Established by City's Landmark Preservation Ordinance in 1973.
- Landmarks Preservation Board reviews and approves nominations, negotiates a Controls and Incentives Agreement with the property owner, and issues designations. The City Council issues a designating ordinance. The Board also reviews proposed alterations to Landmarks and issues Certificates of Approval.
- Affords the highest protection for designated historic properties.
- Landmarks List database contains a property's Landmark nomination form, designation reports, and the designating ordinance imposing controls upon the property.
- Landmarks List contains over 400 designated improvements (buildings and structures), objects, and sites.
- Landmarks Map shows location of each Landmark and each Landmark District.
- To be considered for designation, resources must meet certain designation standards. The resource must be at least 25 years old; must have significant character, interest, or value as part of the development, heritage or cultural characteristics of the city, state, or nation under one or more of the six criteria for designation; and must have sufficient integrity to convey its significance.
- For more information, go to https://www.seattle.gov/neighborhoods/historic-preservation/city-landmarks.

City of Seattle Landmark Districts

- Established by the City's Landmark Preservation Ordinance.
- There are eight historic Landmark Districts, each is regulated by a District Board or the Landmarks Preservation Board, per the District's Ordinance.
- Landmark Districts website links to each District's page with a short history, boundary map, link to the District Ordinance, guidelines, forms, FAQs, and Board meeting schedules, agendas, and minutes, and other information.
- For more information, go to https://www.seattle.gov/neighborhoods/historic-preservation/historic-districts.

King County Assessor's website

- Data includes GIS locational data (parcel number and address), year built, and year renovated for each building/structure on each parcel. Parcels that contain a building that is 40 years old or older are indicated on the "Historic-Aged Parcels and NRHP-Eligible Properties" maps.
- This data is updated regularly with information from renovation and demolition permits.
- For more information, go to https://kingcounty.gov/services/gis/Maps/parcel-viewer.aspx.

Washington Department of Archaeology and Historic Preservation (DAHP) WISAARD database

- The state's repository for public cultural resource data (NRHP-, WHR-, and NHL-listed and NRHP-eligible (for listing) historic properties/districts, cultural resource survey reports, historic property inventory (HPI) forms, and archaeological predictive model) and non-public archaeological data (archaeological site forms, most TCPs, and archaeological inventory reports).
- Data is updated as surveys and inventories are performed, and new information is entered.
- Some HPI forms were created by data transfer for a series of Assessors Data Projects for a few counties in the state. The resources were not formally surveyed and recorded, have neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data.
- For more information, go to https://wisaard.dahp.wa.gov/.

Black Historic Sites Survey

- Sponsored by the National Park Service (NPS), DAHP, and the City of Tacoma.
- Initiated by the 1985 work of Esther Mumford, *Black Heritage Survey of Washington State*.
- Work continues on identifying and documenting Black Historic Sites by a team comprising Guided Methods with project lead, Monette Hearn, and Studio TJP.
- The study identifies Black creators, including architects, designers, engineers, artists, builders, etc. whose work contributes to the history of Washington.
- Survey includes public outreach and extensive research and documentation, HPI forms, biographies, and the identification of up to 50 significant sites.

- Additional goals include the nomination of two sites to the NRHP and the identification of other important Black History sites across the state.
- For more information, go to https://www.blackhistoricsiteswa.com/.

Latino Heritage Survey Sites

- Sponsored by NPS, the Washington Trust for Historic Preservation (WTHP), and DAHP in 2015 and 2018.
- Study by Artifacts Consulting in the greater Seattle area and the Yakima Valley.
  - The study included oral interviews with community members, 37 HPIs, two NRHP nominations, and a report Latino Heritage of Greater Seattle: Intensive Level Survey Documentation and Illustrated Historic Context Statement (2019), with the historic context, "King County Latino Heritage: WWII–1980s" written by Dr. Erasmo Gamboa.
  - 20 sites were identified in Seattle.
- For more information, go to https://dahp.wa.gov/sites/default/files/Seattle_Latino_ContextStudy_2019.pdf.

To plot the location of architectural resources for this EIS, a GIS Specialist created maps showing the locations of parcels that meet the following criteria:

- Include SL designated historic properties and districts;
- Include NRHP-listed or NRHP-eligible historic properties or are included in NRHP-listed historic districts; and
- Include built resources 40-years-old or older (old enough to require evaluation for listing in the NRHP, WHR, WHBR and NHL).

The Seattle Historic Resources Survey Database was not utilized in the creation of the architectural resources maps. This database was compiled from survey and inventory projects that began in the late 1970s–1980s, were revived again in 2000, and although funding was discontinued in 2011, some survey work continued for a few years after that. The approximately 8,000 resources entered in the database have varying levels of documentation. Some have been surveyed and inventoried, and contain background research, description of the resource, brief discussion of the resource's integrity, and evaluation of its significance. Some database entries have little to no information about the resources, contain no discussions of integrity or significance, and make no evaluation recommendations. None of the resources in the database have formal evaluations for eligibility to the SL, NRHP, or WHR. Very few of the resources have been updated since their initial documentation—some of which were written over 30 years ago. Additionally, due to the lack of updating, it is unknown if resources have sustained alterations over time that may have led to loss of original character-defining features including style, design, form, materials, site/landscaping. It is also unknown how many of the resources are still standing or how many were demolished. Thus, the database does not contain data useful for analysis for this EIS and these resources were not added to the maps in this report. However, the database remains a useful tool when performing property research.

To prepare historic contexts for the project areas, which can be used to assist researchers in analyzing the significance of cultural resources, the consultants reviewed published and online sources, gathering information on the environmental, archaeological, and historical context of the project vicinity. As part of the Seattle Historic Resources Survey projects, a number of historic contexts were developed about many of Seattle's neighborhoods. They were written between 1997 and 2015 and were utilized for this EIS. The consultants reached out to a number of cultural community experts to gather information on culturally important resources within their community. Research staff also examined historic-period maps and aerial photographs, including GLO plats, which are nineteenth-century maps available online through the Bureau of Land Management (BLM) website. They can be used to locate potential historical features including former structures, trails, and transportation routes. Although these features may no longer be extant, these maps indicate where historic-period cultural resources, including archaeological materials, may be encountered. Other historic maps (e.g., U.S. Geological Survey [USGS] maps, Sanborn Fire Insurance maps, County atlases) were reviewed through online resources.

Based on environmental characteristics, ethnographic data, and the distribution of previously recorded cultural resources, HRA formulated initial expectations about the sensitivity of the analysis areas for containing cultural resources. DAHP's statewide predictive model layer was also reviewed for probability estimates of the presence of precontact cultural resources.

Citywide

Cultural resources identified in the full study area (including architectural resources such as districts, sites, buildings, landscapes, structures, or objects, and archaeological resources such as precontact Native American artifacts, features, and sites; Traditional Cultural Properties; and historic-period artifacts, features, and sites) that are 40 years old or older, and listed or eligible for listing in the NHL program, NRHP, WHR, WHBR, or in the SL program, whose age threshold for inclusion is 25 years old or older.

Architectural Resources

Within the Citywide study area, there are 7 NHL properties and several properties that are listed in the SL, NRHP, and WHR. There are 8 Seattle Landmark Districts, 24 NRHP-listed historic districts, and 1 WHR-listed historic district in the full study area. Citywide there are 474 properties that are designated Seattle Landmarks, 200 NRHP-listed historic properties, and 48 WHR-listed properties. Additionally, there are 31 Black Historic Sites, 28 Potential Black Commemorative Sites, and 20 Hispanic Historic Sites (Culturally Important Resources) within the citywide study area (**Exhibit 3.9-1** and **Exhibit 3.9-2**) (Sources: the Washington State Black Historic Sites Survey and the 2018 Latino Heritage Survey). There are no historic agricultural barns listed in the WHBR within the study area.

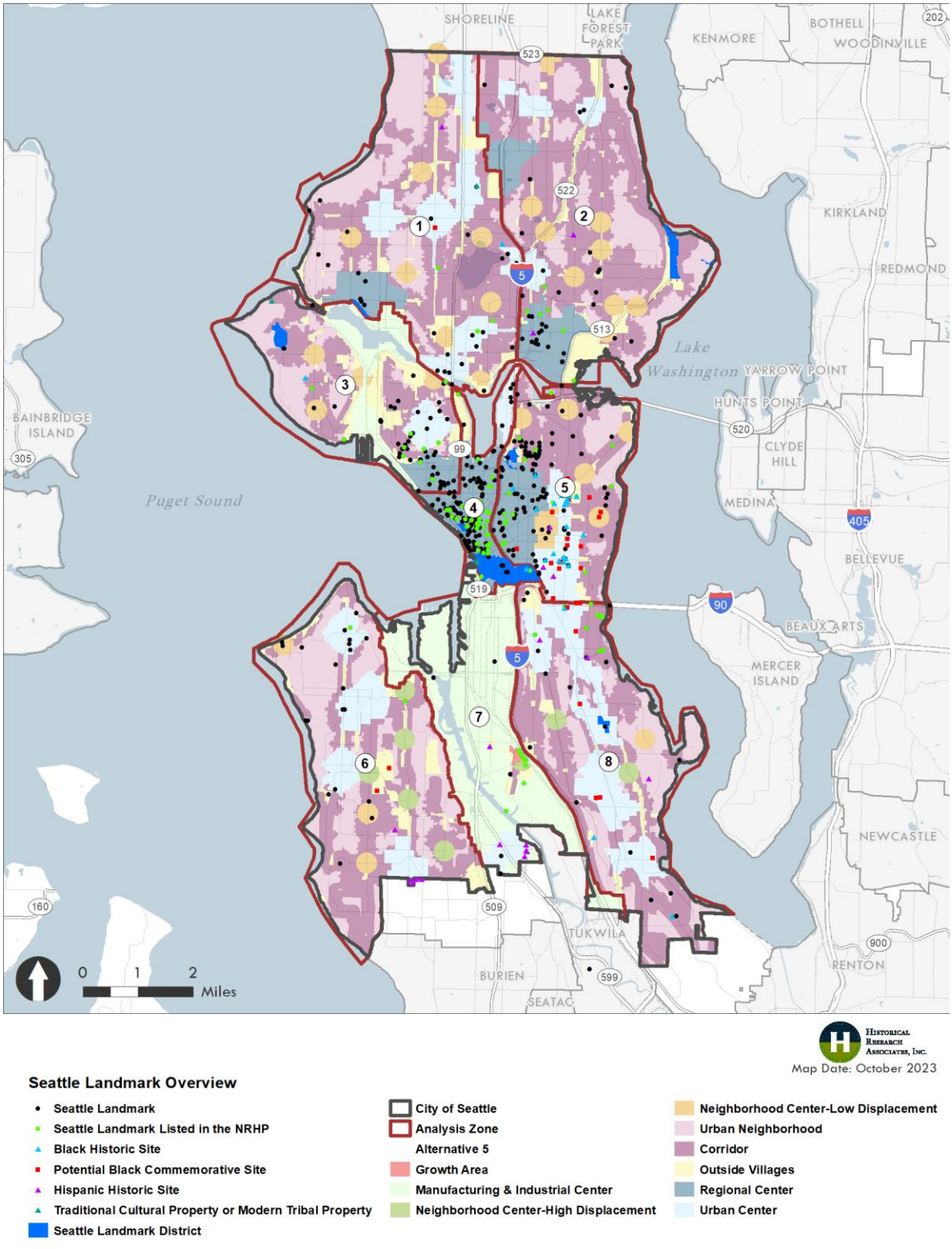
Current King County Tax Assessor's data provides one indication of how many historic-period, built-environment resources are located within the study area. For the purposes of this EIS, the

historic period refers to buildings that are 40 years old or older. According to the King County Tax Assessor, there are 135,367 historic-period buildings within the full study area, of which 124,037 are residential buildings (single-family dwellings, townhouses, duplexes, triplexes, fourplexes, apartment buildings, and condominiums), and the remaining 11,330 are commercial, industrial, and governmental buildings (**Exhibit 3.9-3**).

In contrast, DAHP's WISAARD database provides another indication. WISAARD records show 104,492 built resources within the full study area that were 50 years old or older in 2011. Of these, 1,208 were determined NRHP-eligible by DAHP or a federal agency (**Exhibit 3.9-3**). In 2011, WISAARD was updated for an Assessors Data Project for King County to provide a snapshot of buildings that were constructed in 1961 or earlier. These buildings were issued historic property identification numbers and HPI forms. The HPI forms created by the Assessors Data Project were not formally surveyed and recorded, have neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

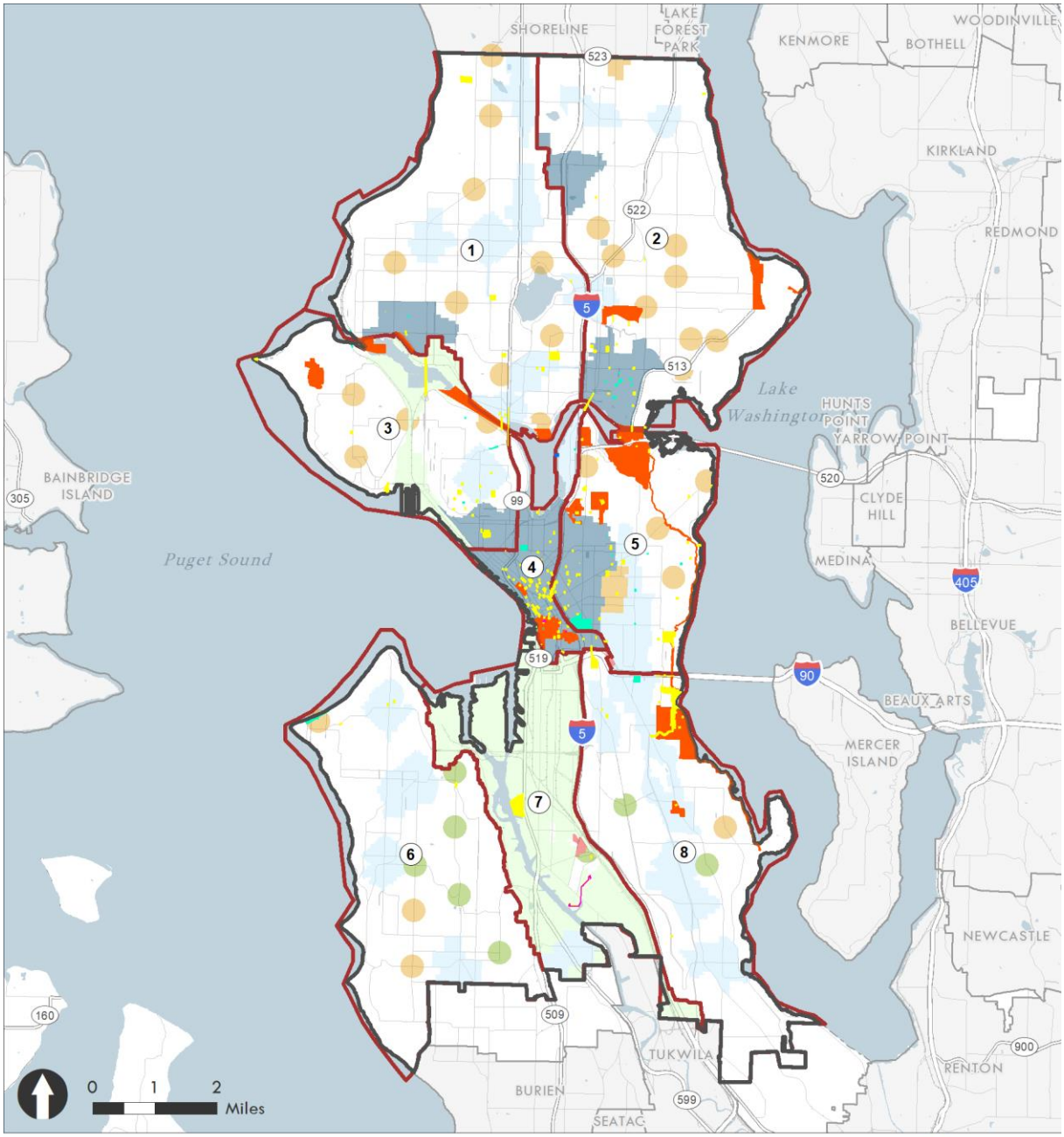
The discrepancy between the Assessor's and DAHP's records are likely due in part to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

Exhibit 3.9-1. Designated Seattle Landmarks, Seattle Historic Districts, and Culturally Important Resources—Citywide



Source: HRA, 2023.

Exhibit 3.9-2. NRHP- and WHR-Listed Architectural Districts and Properties—Citywide



Historical Research Associates, Inc.
Map Date: October 2023

Architectural Resource Overview

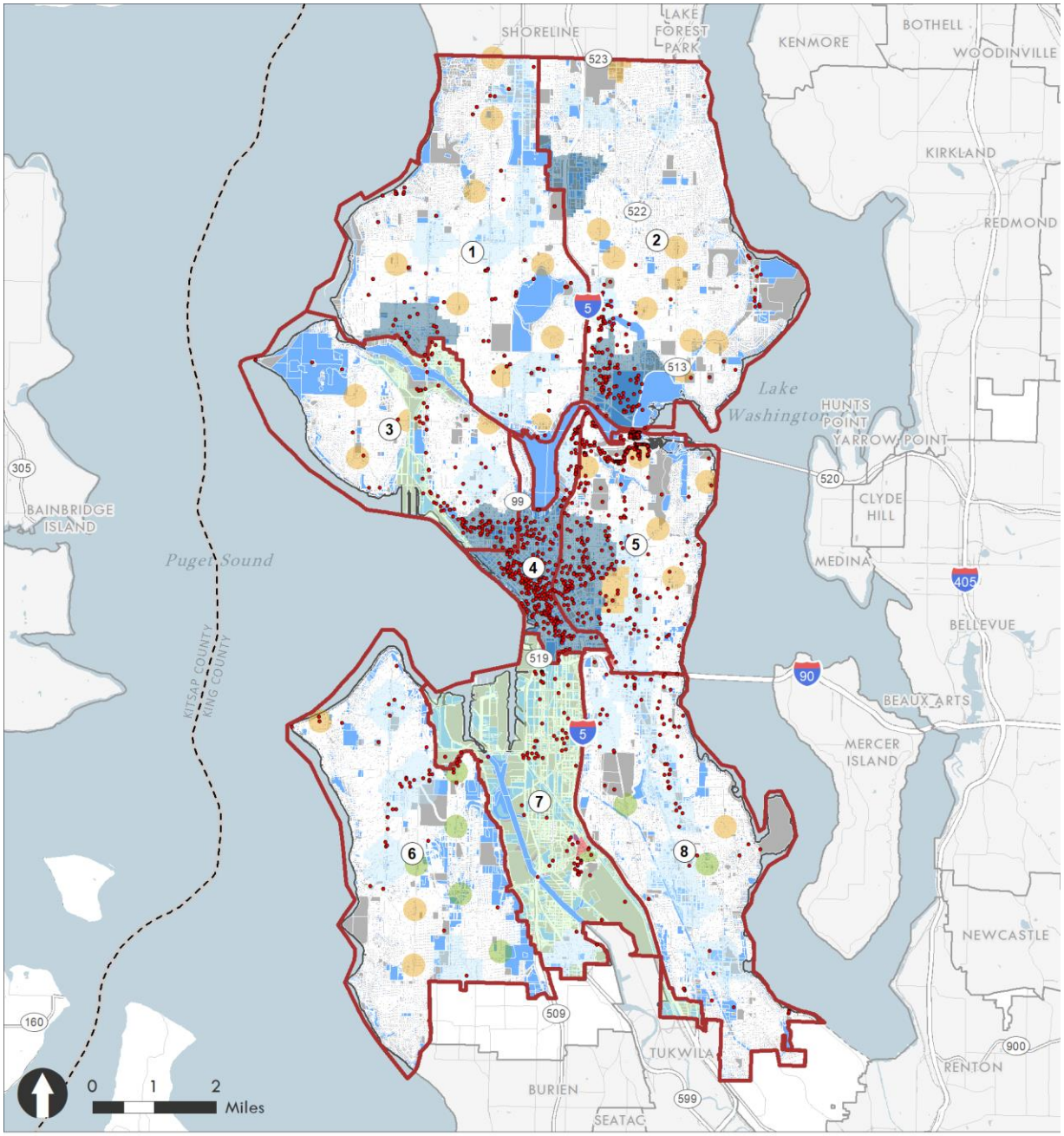
- City of Seattle
- Analysis Zone
- National Register and Washington Heritage Register Property
- Washington Heritage Register Property
- National Register and Washington Heritage Register District
- Washington Heritage Register District
- National Historical Landmark

Alternative 5

- Growth Area
- Manufacturing & Industrial Center
- Neighborhood Center-High Displacement
- Neighborhood Center-Low Displacement
- Regional Center
- Urban Center

Source: HRA, 2023.

Exhibit 3.9-3. Historic-Aged Parcels and NRHP-Eligible Properties—Citywide



Historical Research Associates, Inc.
Map Date: October 2023

Register-Eligible Properties and Parcels

- Register-Eligible Property
- Historic-Aged Parcel
- Non-Historic-Aged Parcel
- Analysis Zone
- Alternative 5
- Growth Area
- Manufacturing & Industrial Center
- Neighborhood Center-High Displacement
- Neighborhood Center-Low Displacement
- Regional Center
- Urban Center

Source: HRA, 2023.

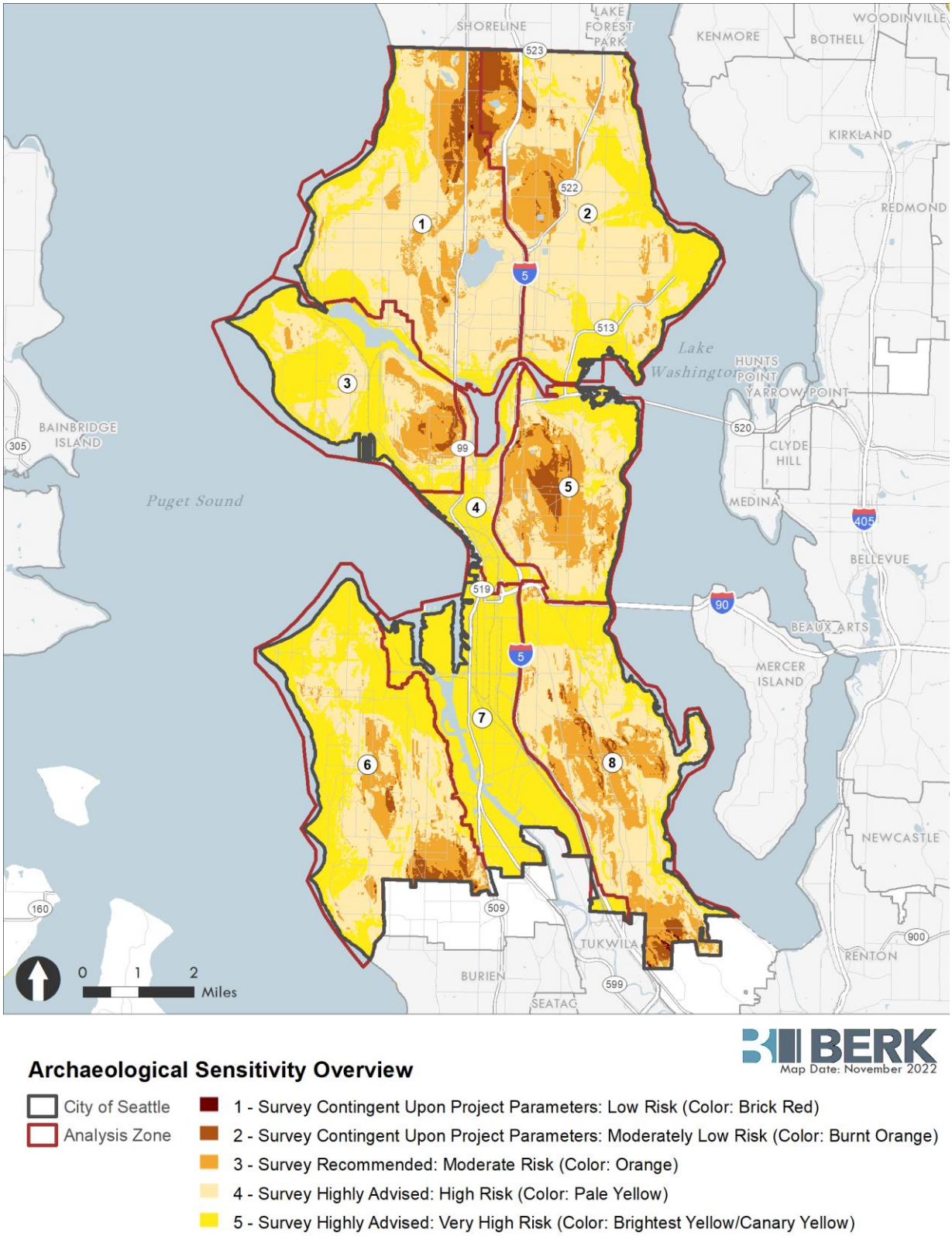
Archaeological Resources

Within the full study area, there are 135 previously documented archaeological sites. A total of 294 previous studies have been conducted within the full study area since 1995 that included archaeological investigations. One precontact site and two historic-period sites are listed in the NRHP and WHR. One of those historic-period sites is also a TCP. Two precontact sites and three historic-period sites have been determined eligible for inclusion in the NRHP. Two precontact sites and thirty-three historic-period sites have been determined not eligible for inclusion in the NRHP. The remaining thirteen precontact sites, seventy-five historic-period sites, and six multicomponent sites have not been formally evaluated. No TCPs were identified in WISAARD, however one, Ballast Island (45KI1189), is known to be within the full study area (Curti, et al. 2020; Elder and Cascella 2014; HRA 2018).

Per Washington state law (RCW 42.56.300), the locations of these sites are exempt from public disclosure in order to prevent their looting or depredation.

A majority of the area within each of the project subareas is considered of High or Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model, while areas of Moderately Low to Moderate Risk are typically located in hilly settings farther from permanent water sources (**Exhibit 3.9-4**).

Exhibit 3.9-4. Map Showing Archaeological Sensitivity from DAHP Model—Citywide



Source: HRA, 2023.

Maritime Washington National Heritage Area

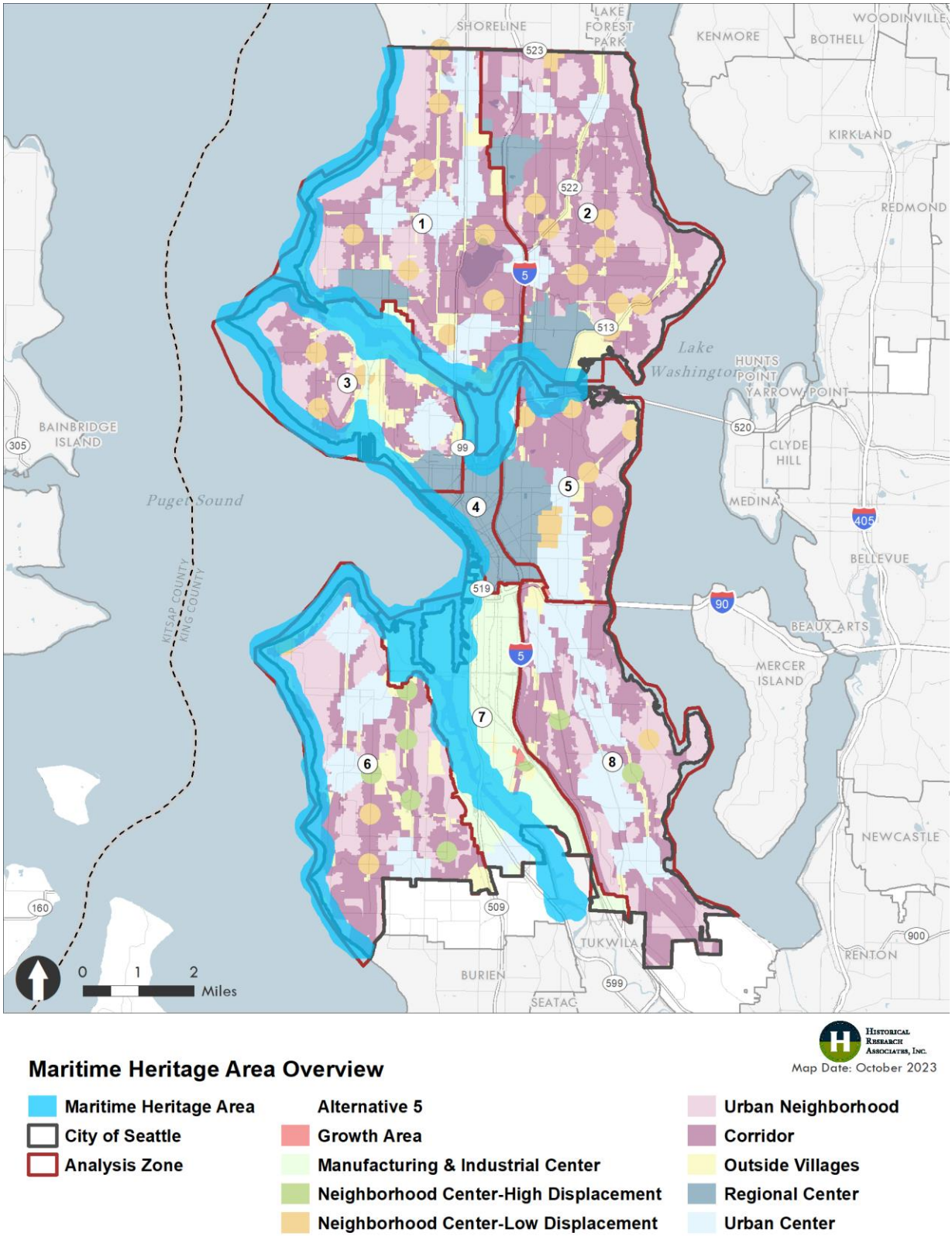
Congress designated the Maritime Washington National Heritage Area (MW NHA) in 2019 as a place recognized for its nationally important natural, cultural, historic, and recreational resources, which combine to form a nationally important landscape. The MW NHA stretches along 3,000 miles of saltwater shoreline from Grays Harbor County to the Canadian border. The MW NHA encompasses 18 federally recognized Tribes, 13 counties, 32 incorporated cities, and 33 port districts in Washington state. The MW NHA is a non-regulatory program coordinated by the Washington Trust for Historic Preservation (WTHP), Washington's statewide nonprofit historic preservation organization. The program will be guided by the Washington Trust Board of Directors, a Maritime Washington Advisory Board, and a Maritime Washington Tribal Working Group, with technical assistance and funding from the National Park Service (NPS). The MW NHA is a cooperative organization with regional representation that is supportive of tourism and economic development, and functions to build partnerships to support communities in maintaining and sharing their unique resources and telling the stories of those places (Maritime Washington 2022).

After receiving designation, the WTHP, with partners and community stakeholders developed a management plan that was submitted to the U.S. Department of the Interior and accepted in 2022. The plan includes the strategies, policies, and plans for the MW NHA program, guided by five key strategic goals:

- Goal One: Build a network of cross-sector partners dedicated to advancing, honoring, and stewarding Washington's maritime stories and resources.
- Goal Two: Provide support and resources for organizations, communities, and Tribes working to preserve, enhance, and share maritime heritage.
- Goal Three: Share diverse stories and increase visibility of Washington's maritime heritage, past and present.
- Goal Four: Encourage sustainable experiences of maritime heritage for residents and visitors alike.
- Goal Five: Preserve our region's unique maritime identity, resources, and lifeways.

The plan is an implementation framework that will guide the MW NHA's actions over the next five to fifteen years, and which includes directional guidance, interpretive plan framework, key sites from resources inventories, branding and marketing plan, business plan, and an implementation plan with short- and long-range actions and performance goals for the MW NHA (Maritime Washington 2022). **Exhibit 3.9-5** shows the portion of the MW NHA that occurs within the study area of this EIS. For more Information, go to the WTHP website, https://preservewa.org/programs/mariti--national-heritage-area/.

Exhibit 3.9-5. Maritime Washington Heritage Area that Occurs Within the Study Area



Source: HRA, 2023.

Analysis Areas

Area 1: NW Seattle

There are 1 Seattle Landmark District and 3 NRHP-listed historic districts found in the NW Seattle analysis area (**Exhibit 3.9-6**). There are 32 designated Seattle Landmarks in the NW Seattle area. Of these, 10 are education-related buildings, 6 are residential buildings, 5 are commercial buildings, 3 are former libraries, 3 are fire stations, 2 are bridges, 2 are parks, and 1 is a pool building. These resources are significant under a variety of the six standards for designation (**Exhibit 3.9-7**).

Exhibit 3.9-6. Area 1: NW Seattle—SL-designated and NRHP-listed Districts

Property name, type	Register/List Date/Significance	Period of Significance
Ballard Avenue Historic District	SL / 1976 / Criterion A for Contributions to the Development of Seattle, Criterion B for Commercial Development in Ballard, and Criterion C for Architecture	1890–1940s
Ballard Avenue Historic District	NRHP / 1976 / Criterion A for Industry, Commerce, Transportation, Politics/Government, and Criterion C for Architecture	1890–1930
Chittenden Locks and Lake Washington Ship Canal, historic district	NRHP / 1978 / Criterion A for Commerce, Politics/Government, and Criterion C for Architecture, Engineering, and Landscape Architecture	1906–1917
Gas Works Park, historic district	NRHP / 2013 / Criterion A for Industry, and Criterion C for Landscape Architecture	1973–1978

Sources: DAHP, 2023.

There are 14 NRHP-listed resources and 2 WHR-listed resources found in the NW Seattle analysis area. Of these, 2 are former schools, 2 are fire stations, 2 are residential buildings, 1 is a garden, 1 is a commercial building, 1 is a religious institution, 1 is a ship, and 3 are bridges, which were listed in the NRHP under the *Historic Bridges and Tunnels in Washington State MPD,* and, finally, 3 are Carnegie libraries, which were listed in the NRHP under the *Carnegie Libraries of Washington TR* (**Exhibit 3.9-8**).

Current King County Tax Assessor records show that within the NW Seattle area, there are 34,045 historic-period buildings. Of these, 31,588 are residential, including 30,325 residential buildings (single family dwellings, townhouses, duplexes, triplexes, and fourplexes), 1,104 apartment buildings, and 159 condominiums. The remaining 2,457 buildings are commercial, industrial, and governmental (**Exhibit 3.9-9**).

In contrast, DAHP records show 25,709 individual historic-period architectural resources have been entered on HPI forms within the NW Seattle area. Of these, only 59 were determined NRHP-eligible by DAHP or a federal agency and are plotted on the map (**Exhibit 3.9-9**). Many of the 25,709 HPI forms were created by data transfer for an Assessors Data Project for King

County. The resources in these HPIs were not formally surveyed and recorded, have neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

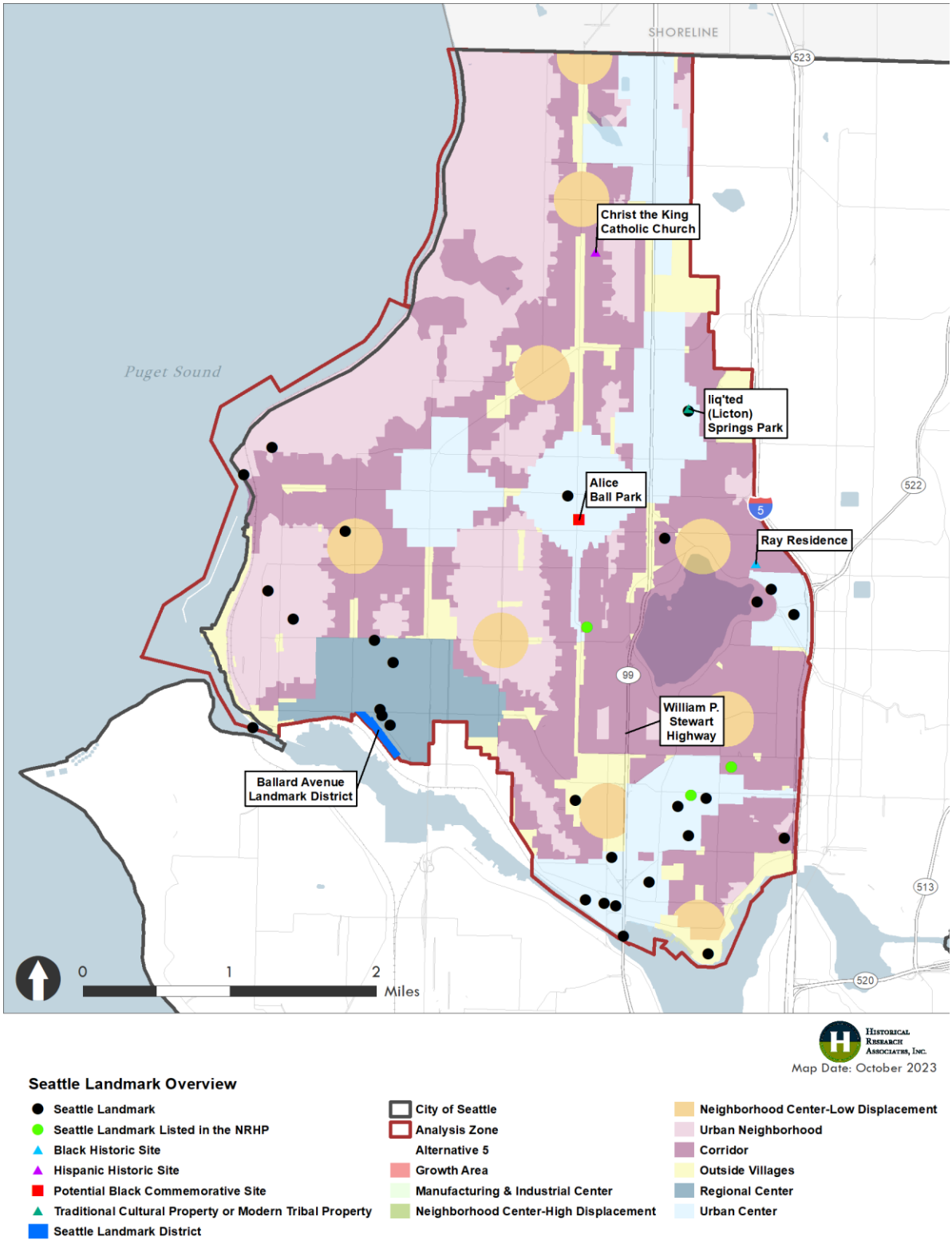
The discrepancy between the Assessor's and DAHP's records are likely in part due to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

DAHP records show 40 cultural resources studies that included archaeological resources investigations that have been conducted within Analysis Zone 1 since 1995. One precontact site, six historic-period sites, and one multicomponent site have been recorded within Analysis Zone 1, none of which have been formally evaluated for listing in the NRHP. Most of the area within Analysis Zone 1 is considered of High or Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model. Areas of Moderately Low to Moderate Risk are located in upland settings to the west and southwest of Green Lake, as well as across the northeastern portion of Analysis Zone 1 (**Exhibit 3.9-10**).

Culturally Important Resources

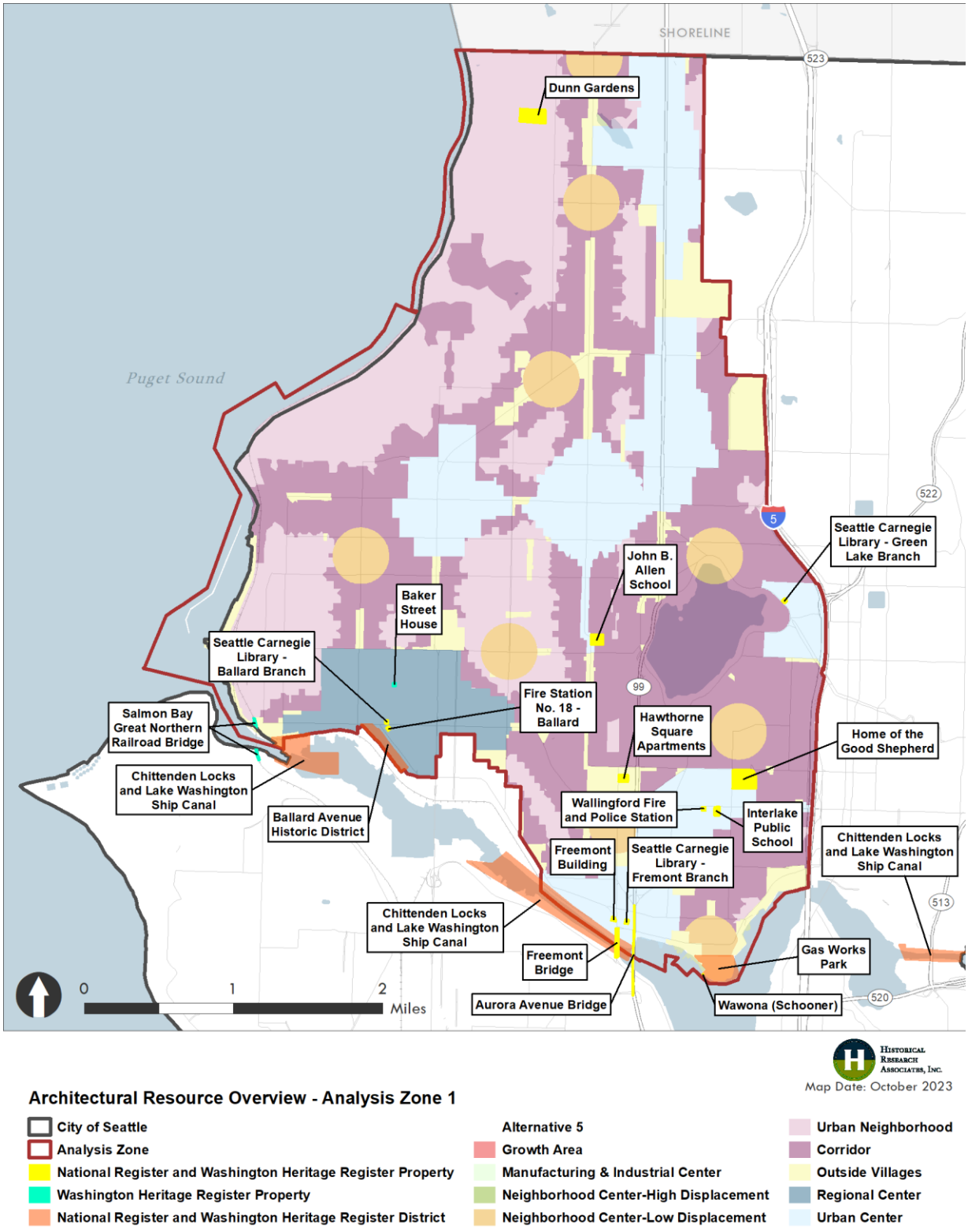
There are 1 Black Historic Site (the Ray Residence), 2 Potential Black Commemorative Sites (Alice Ball Park, and the William P. Stewart Highway), and 1 Hispanic Historic Site (Christ the King Catholic Church) within Analysis Zone 1. Traditionally utilized as a clay source for the creation of red paint, a rust-red springs known as *líqtəd* ("Red Paint") is an important Tribal cultural resource located within present-day Licton Springs Park in Analysis Zone 1 (**Exhibit 3.9-7**) (Sources: the Washington State Black Historic Sites Survey and the 2018 Latino Heritage Survey; Thrush 2007:250–252).

Exhibit 3.9-7. Area 1: NW Seattle—Designated Seattle Landmarks, Seattle Historic Districts, and Culturally Important Resources



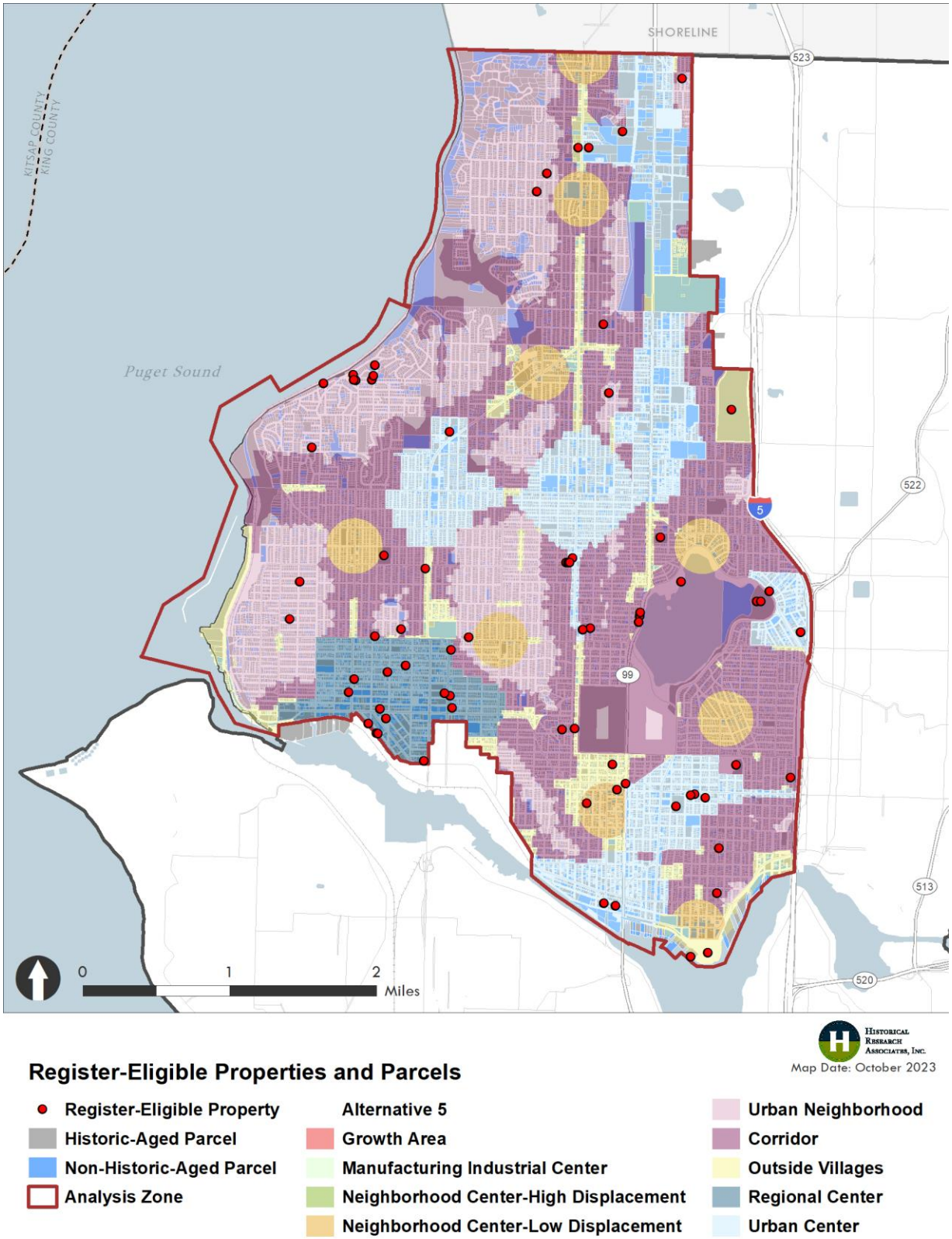
Source: HRA, 2023.

Exhibit 3.9-8. Area 1: NW Seattle—NRHP- and WHR-Listed Architectural Districts and Properties



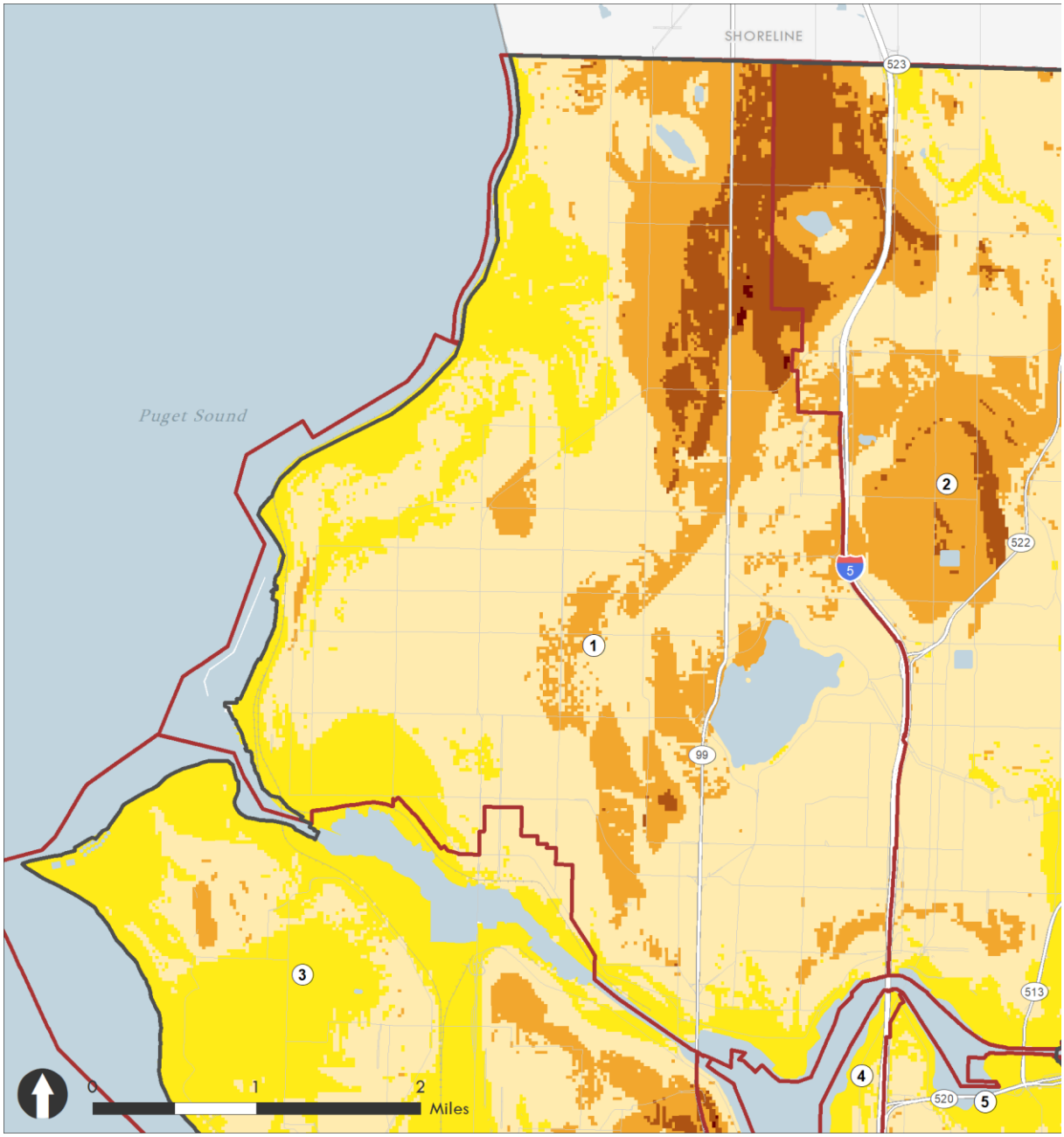
Source: HRA, 2023.

Exhibit 3.9-9. Area 1: NW Seattle—Historic-Aged Parcels and NRHP-Eligible Properties



Source: HRA, 2023.

Exhibit 3.9-10. Area 1: NW Seattle—Map Showing Archaeological Sensitivity from DAHP Model



Source: HRA, 2023.

Area 2: NE Seattle

There are 1 Seattle Landmark District and 3 NRHP-listed historic districts found in the NE Seattle analysis area (**Exhibit 3.9-11**. There are 39 designated Seattle Landmarks in the NE Seattle area. Of these, 13 are education-related buildings, 11 are residential buildings, 3 are religious institutions, 3 are former libraries, 2 are commercial buildings, 2 are fire stations, 2 are bridges, 1 is a hangar, 1 is a street clock, and 1 is a science and technology conference center. These resources are significant under a variety of the six standards for designation (**Exhibit 3.9-12**).

Exhibit 3.9-11. Area 2: NE Seattle—SL-designated and NRHP-listed Districts

Property name, type	Register/List Date/Significance	Period of Significance
Ravenna-Cowen North Historic District	NRHP / 2018 / Criterion A for Community Planning and Development, and Criterion C for Architecture	1906–1969
Chittenden Locks and Lake Washington Ship Canal, historic district	NRHP / 1978 / Criterion A for Commerce, Politics/Government, and Criterion C for Architecture, Engineering, and Landscape Architecture	1906–1917
Sand Point Naval Air Station Landmark District, historic district	SL / 2011 / Criterion A for Military, Criterion C for Political, Criterion for Architecture, and Criterion F as a Distinctive Visual City Feature.	1926–1953
Naval Air Station (NAS) Seattle, historic district	NRHP / 2010 / Criterion A for Military, and Criterion C for Architecture	1929–1945

Sources: DAHP, 2023.

There are 18 NRHP-listed resources and 9 WHR-listed resources within the NE Seattle analysis area. Of the 26 individually listed resources, 10 are collegiate buildings, 4 are residences, 2 are religious buildings, 2 are commercial buildings, 1 is a school, 1 is a site, 1 is an object, and 4 are bridges, which were listed in the NRHP under the *Historic Bridges and Tunnels in Washington State MPD,* and, finally, 1 is a Carnegie library, which was listed in the NRHP under the *Carnegie Libraries of Washington TR* (**Exhibit 3.9-13**).

Current King County Tax Assessor records show that within the NE Seattle area, there are 28,352 historic-period buildings. Of these, 26,690 are residential, including 26,057 residential buildings (single family dwellings, townhouses, duplexes, triplexes, and fourplexes), 554 apartment buildings, and 79 condominiums. The remaining 1,662 buildings are commercial, industrial, and governmental (**Exhibit 3.9-14**).

In contrast, DAHP records show 21,298 individual historic-period architectural resources have been entered on HPI forms within the NE Seattle area. Of these, only 140 were determined NRHP-eligible by DAHP or a federal agency and are plotted on the map (**Exhibit 3.9-14**). Many of the 21,298 HPI forms were created by data transfer for an Assessors Data Project for King County . The resources in these HPIs were not formally surveyed and recorded, have neither

eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

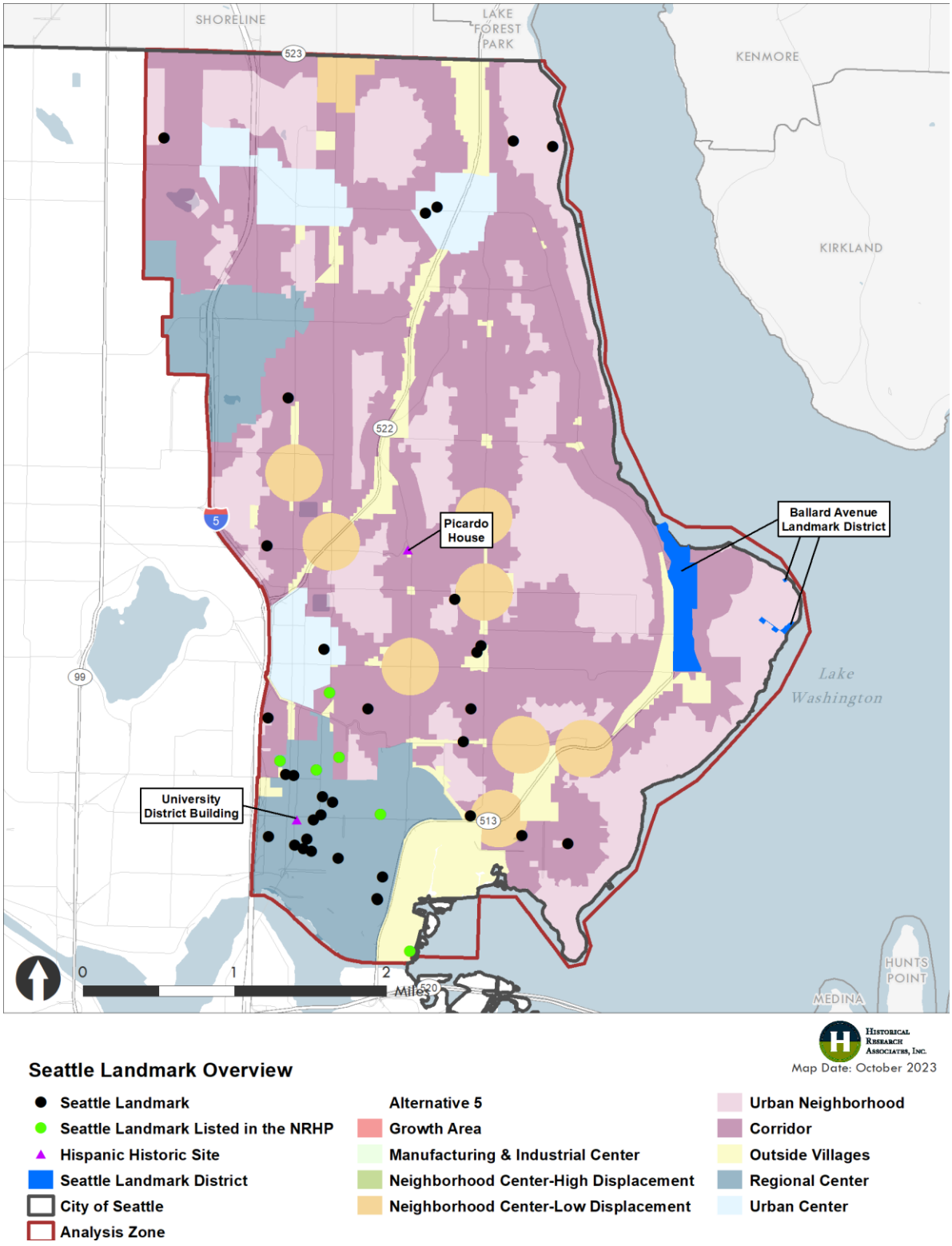
The discrepancy between the Assessor's and DAHP's records are likely in part due to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

DAHP records show 42 cultural resources studies that included archaeological resources investigations that have been conducted within Analysis Zone 2 since 1995. Two precontact sites and nine historic-period sites have been recorded within Analysis Zone 2. Both precontact sites and one of the historic-period sites were determined not eligible for listing in the NRHP. The remaining historic-period sites have not been formally evaluated for listing in the NRHP. Most of the area within Analysis Zone 2 is considered of High or Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model, with areas of Very High Risk predominating along the shorelines and drainages. Areas of Moderately Low to Moderate Risk are located in scattered upland settings throughout the Analysis Zone 2, particularly within its northwestern portion (**Exhibit 3.9-15**).

Culturally Important Resources

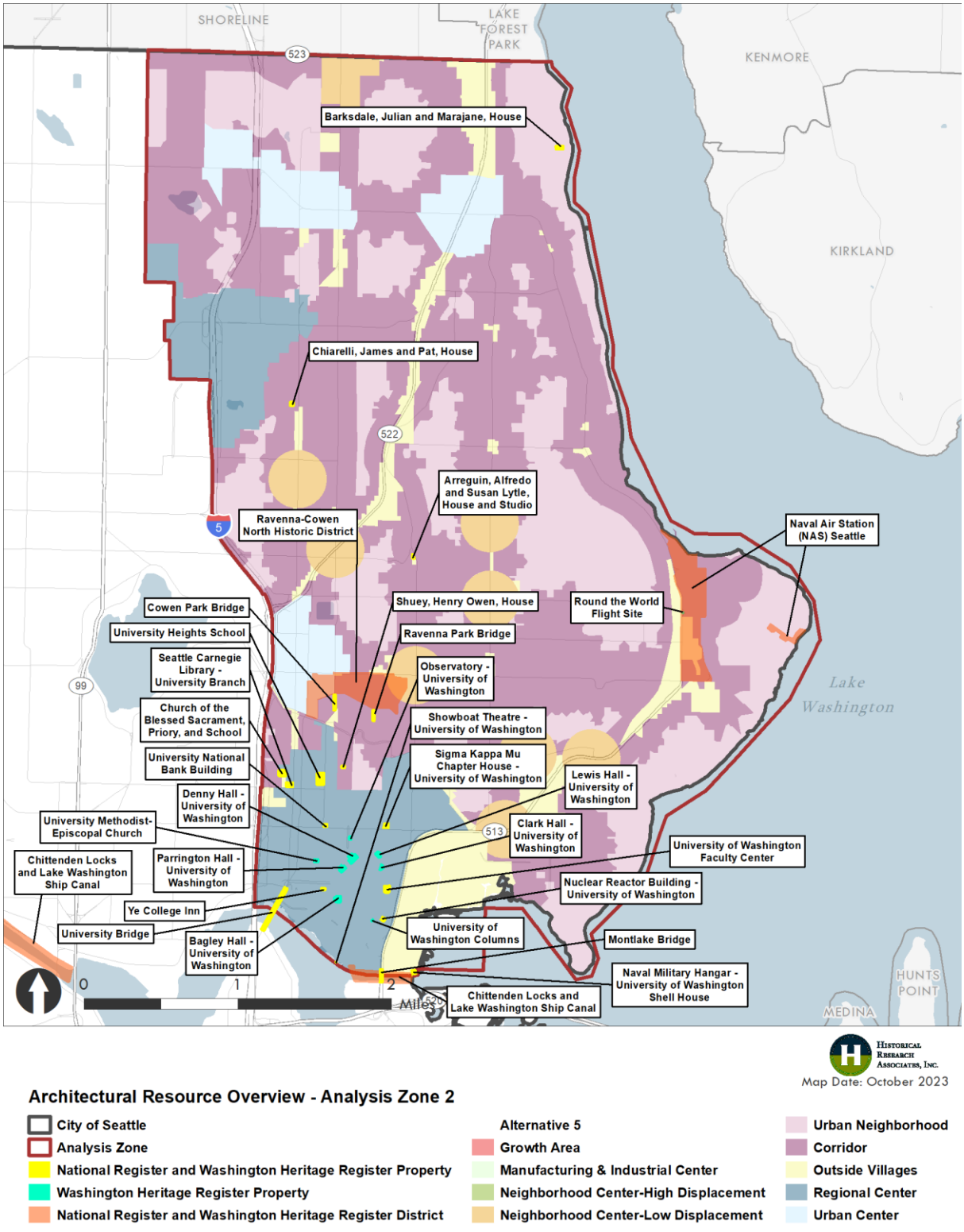
There are 2 Hispanic Historic Sites (the Picardo House and the University District Building) within Analysis Zone 2 (**Exhibit 3.9-12**) (Source: the 2018 Latino Heritage Survey).

Exhibit 3.9-12. Area 2: NE Seattle—Designated Seattle Landmarks, Seattle Historic Districts, and Culturally Important Resources



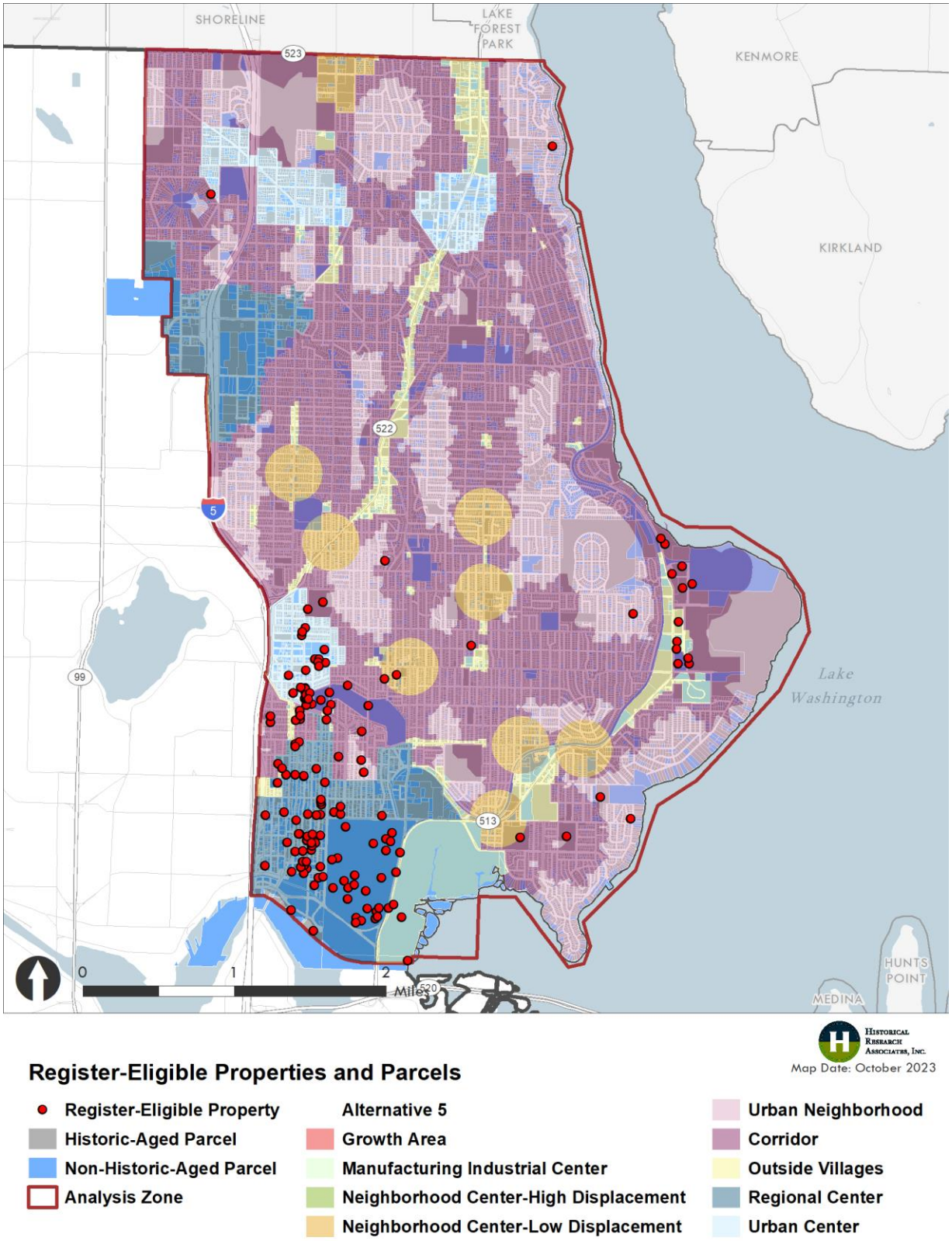
Source: HRA, 2023.

Exhibit 3.9-13. Area 2: NE Seattle—NRHP- and WHR-Listed Architectural Districts and Properties



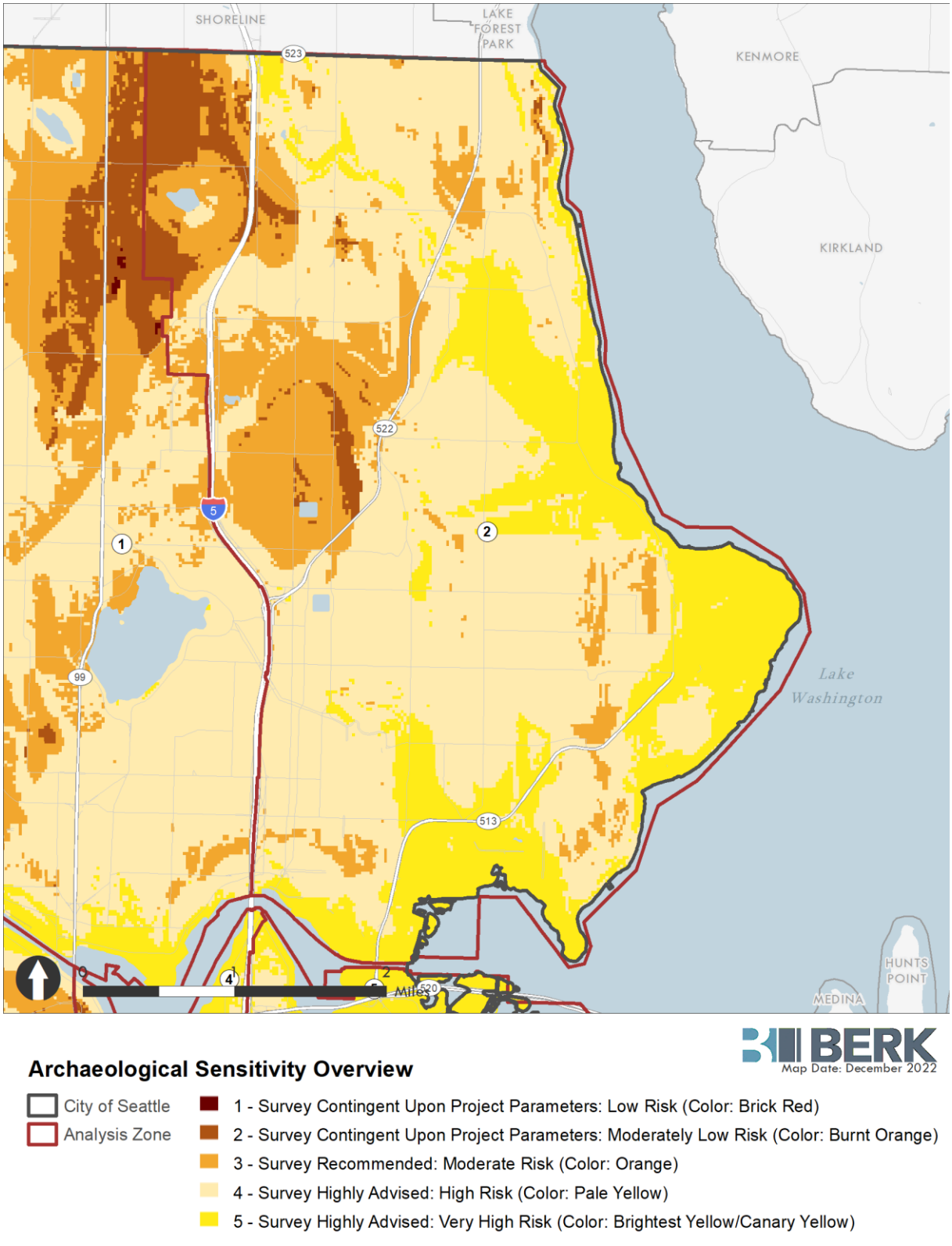
Source: HRA, 2023.

Exhibit 3.9-14. Area 2: NE Seattle—Historic-Aged Parcels and NRHP-Eligible Resources



Source: HRA, 2023.

Exhibit 3.9-15. Area 2: NE Seattle—Map Showing Archaeological Sensitivity from DAHP Model



Source: HRA, 2023.

130th/145th Station Area

There are 3 designated Seattle Landmarks in the 130th/145th Station Area. The first is Ingraham High School, which was designated in 2017. Built in 1958, the school is significant under Standard D, for its Mid-Century Modern style school architecture. The second is Lake City School, which was designated in 2009. The school was built in 1931 and is significant under Standard C for its association with the heritage of the community, Standard D for its Georgian style architecture, and under Standard F as a prominent feature of the neighborhood. Finally, the third Seattle Landmark within the 130th/145th Station Area is Lake City Library. Built in 1965, the library is significant under Standard D, for its Mid-Century Modern style architecture, and under Standard E as an outstanding work of the architect, John Morse (**Exhibit 3.9-16**)**.** There are no NRHP- or WHR-listed historic districts or individually listed resources found in the 130th/145th Station Area.

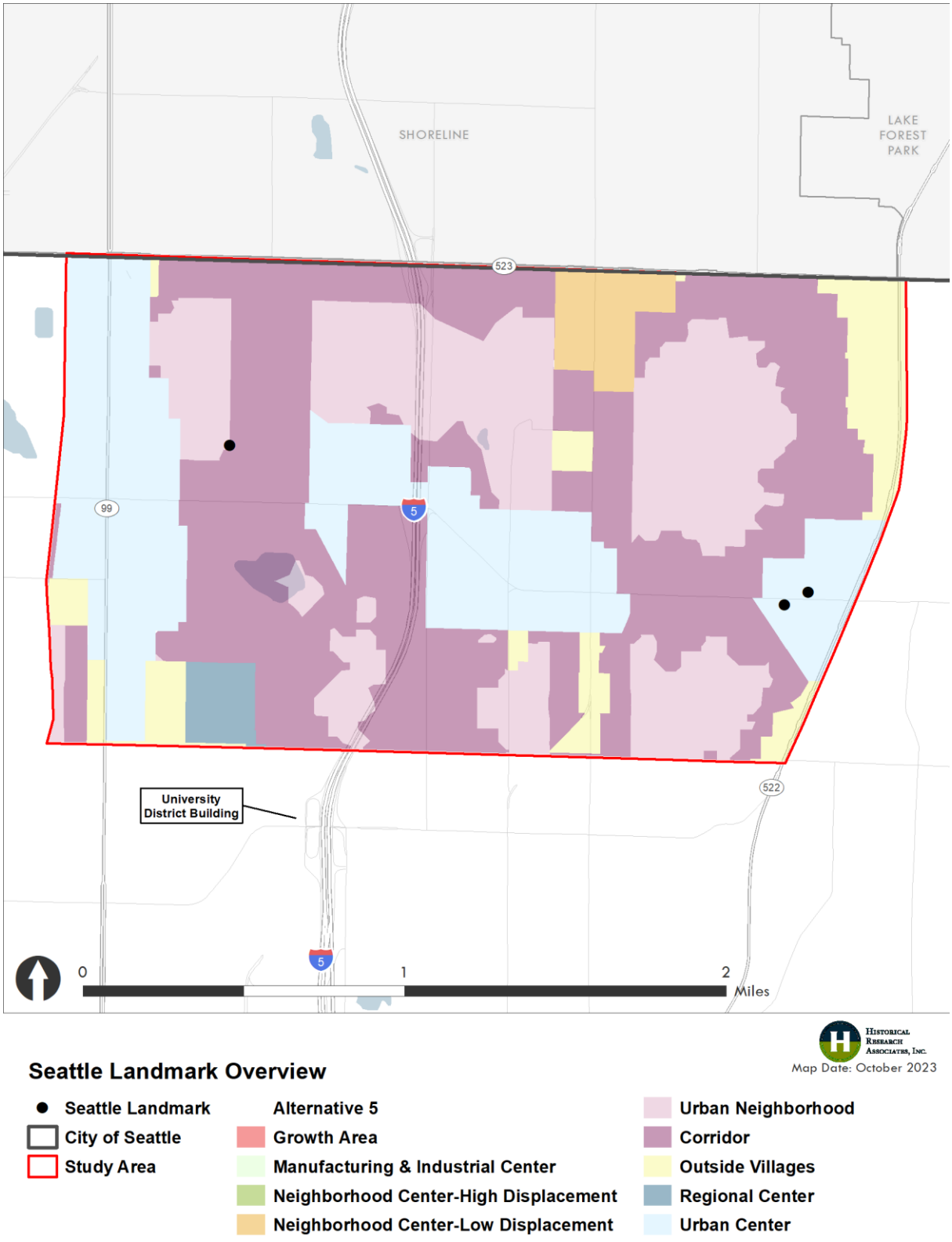
Current King County Tax Assessor records show that within the 130th/145th Station Areas, there are 5,260 historic-period buildings. Of these, 4,933 are residential, including 4,826 residential buildings (single family dwellings, townhouses, duplexes, triplexes, and fourplexes), 90 apartment buildings, and 17 condominiums. The remaining 327 buildings are commercial, industrial, and governmental (**Exhibit 3.9-17**).

In contrast, DAHP records show 3,789 individual historic-period architectural resources have been entered on HPI forms within the 130th/145th Station Areas. Of these, only 2 were determined NRHP-eligible by DAHP or a federal agency and are plotted on the map (**Exhibit 3.9-17**). Many of the 3,789 HPI forms were created by data transfer for an Assessors Data Project for King County. The resources in these HPIs were not formally surveyed and recorded, have neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

The discrepancy between the Assessor's and DAHP's records are likely in part due to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

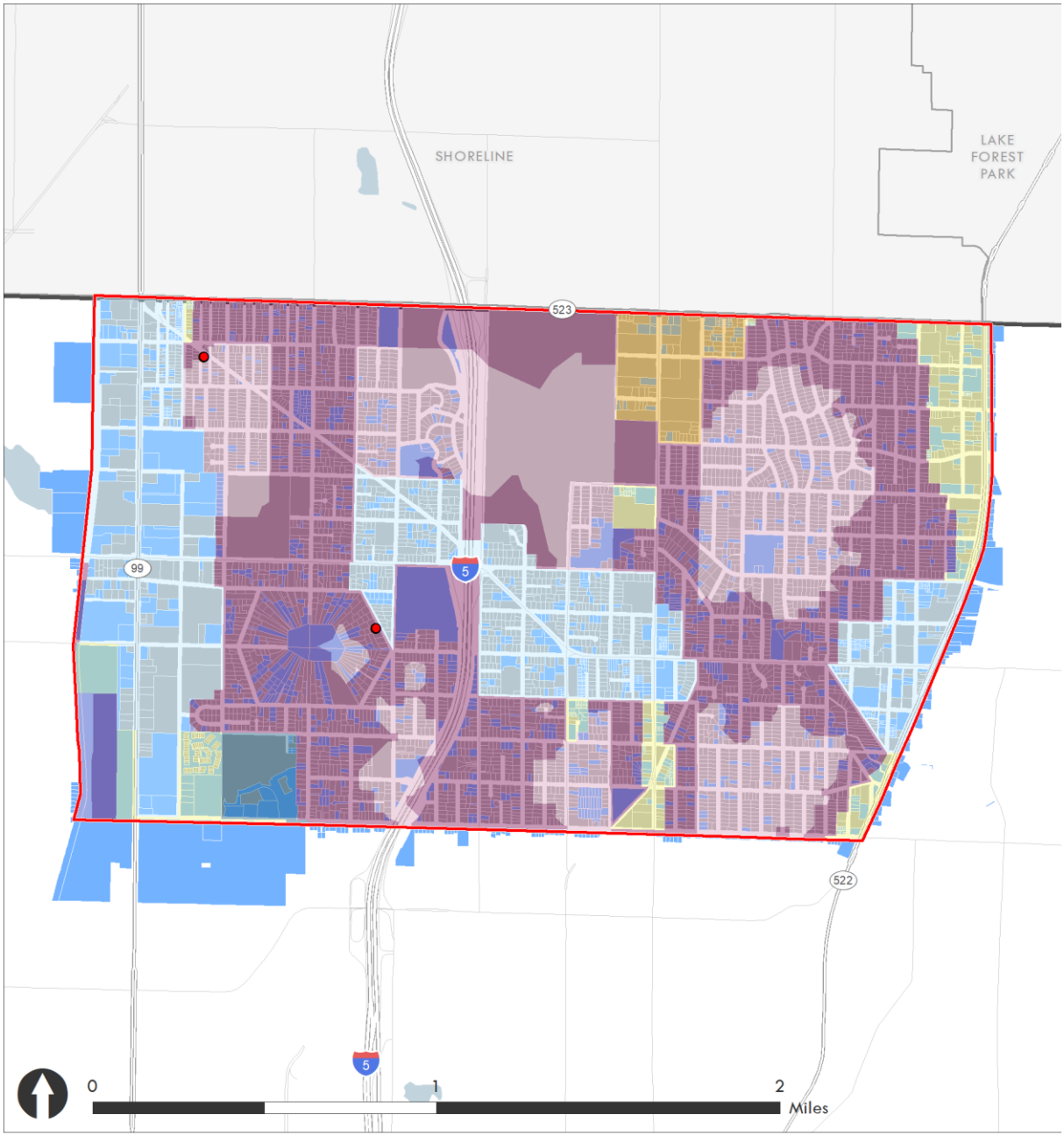
DAHP records show seven cultural resources studies that included archaeological resources investigations have been conducted within the 130th/145th Station Area since 1995. One historic-period site has been recorded within the 130th/145th Station Area. The site has not been formally evaluated for listing in the NRHP. Most of the eastern half of the 130th/145th Station Area is considered High to Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model. Areas of Moderately Low to Moderate Risk are primarily located in hilly upland settings across the western half of the 130th/145th Station Area (**Exhibit 3.9-18**).

Exhibit 3.9-16. Area 2: NE Seattle—Designated Seattle Landmarks



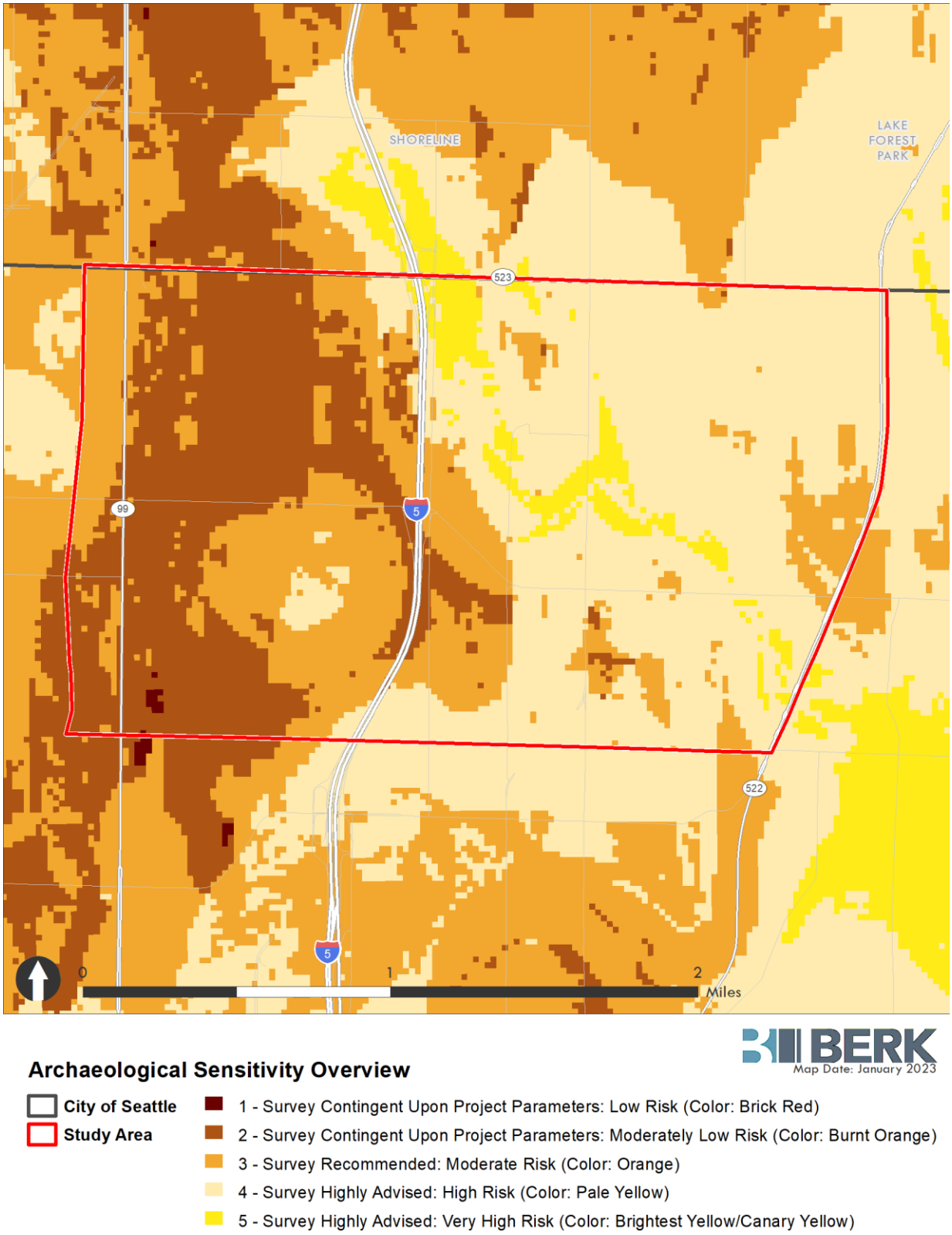
Source: HRA, 2023.

Exhibit 3.9-17. Area 2: NE Seattle—Historic-Aged Parcels and NRHP-Eligible Resources



Source: HRA, 2023.

Exhibit 3.9-18. Area 2: NE Seattle—Map Showing Archaeological Sensitivity from DAHP Model



Source: HRA, 2023.

Area 3: Queen Anne/Magnolia

There are 1 Seattle Landmark District and 3 NRHP-listed historic districts found in the Queen Anne/Magnolia analysis area. These resources are listed in the table below (**Exhibit 3.9-19**).

There are 59 designated Seattle Landmarks in the Queen Anne/Magnolia area. Of these, 25 are residential buildings, 5 are transportation-related, 4 are education-related buildings, 4 are commercial buildings, 3 are religious institutions, 2 are electrical power-related resources, 2 are former libraries, 2 are telephone-related buildings, 2 resources are Seattle World's fair-related, 2 are parks/gardens, 2 are bridges, 1 is a fire station, 1 is sports arena, 1 is a mural, 1 is a bell, 1 is a retaining wall, and 1 is a space needle. These resources are significant under a variety of the six standards for designation (**Exhibit 3.9-20**).

Exhibit 3.9-19. Area 3: Queen Anne/Magnolia—SL-designated and NRHP-listed Districts

Property name, type	Register/List Date/Significance	Period of Significance
Fort Lawton Landmark District, historic district	SL / 1988 / Criterion A for Development of the City, Criterion C for Military, Criterion D for Architecture and Landscape	1898–1945
Fort Lawton, historic district	NRHP / 1978, updated in 2008 / Criterion A for Military, and Criterion C for Architecture	1899–1945
Chittenden Locks and Lake Washington Ship Canal, historic district	NRHP / 1978 / Criterion A for Commerce, Politics/Government, and Criterion C for Architecture, Engineering, and Landscape Architecture	1906–1917

Sources: DAHP, 2023.

There are 19 NRHP-listed resources and 4 WHR-listed resources within the Queen Anne/Magnolia area. Of the 23 individually listed resources, 6 are residential, 3 are commercial buildings, two are schools, 1 is a light station, 1 is an object, 1 is a Post Office, 1 is a library, 1 is a coliseum, 1 is a collegiate building, and 5 are bridges, which were listed in the NRHP under the *Historic Bridges and Tunnels in Washington State MPD,* and, finally, 1 is a Carnegie library, which was listed in the NRHP under the *Carnegie Libraries of Washington TR* (**Exhibit 3.9-21**).

Current King County Tax Assessor records show that within the Queen Anne/Magnolia area, there are 12,546 historic-period buildings. Of these, 11,083 are residential, including 10,285 residential buildings (single family dwellings, townhouses, duplexes, triplexes, and fourplexes), 622 apartment buildings, and 176 condominiums. The remaining 1,463 buildings are commercial, industrial, and governmental (**Exhibit 3.9-22**).

In contrast, DAHP records show 9,588 individual historic-period architectural resources have been entered on HPI forms within the Queen Anne/Magnolia area. Of these, only 120 were determined NRHP-eligible by DAHP or a federal agency and are plotted on the map (**Exhibit 3.9-22**). Most of the 9,588 HPI forms were created by data transfer for an Assessors Data Project for King County. The resources in these HPIs were not formally surveyed and recorded, have

neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

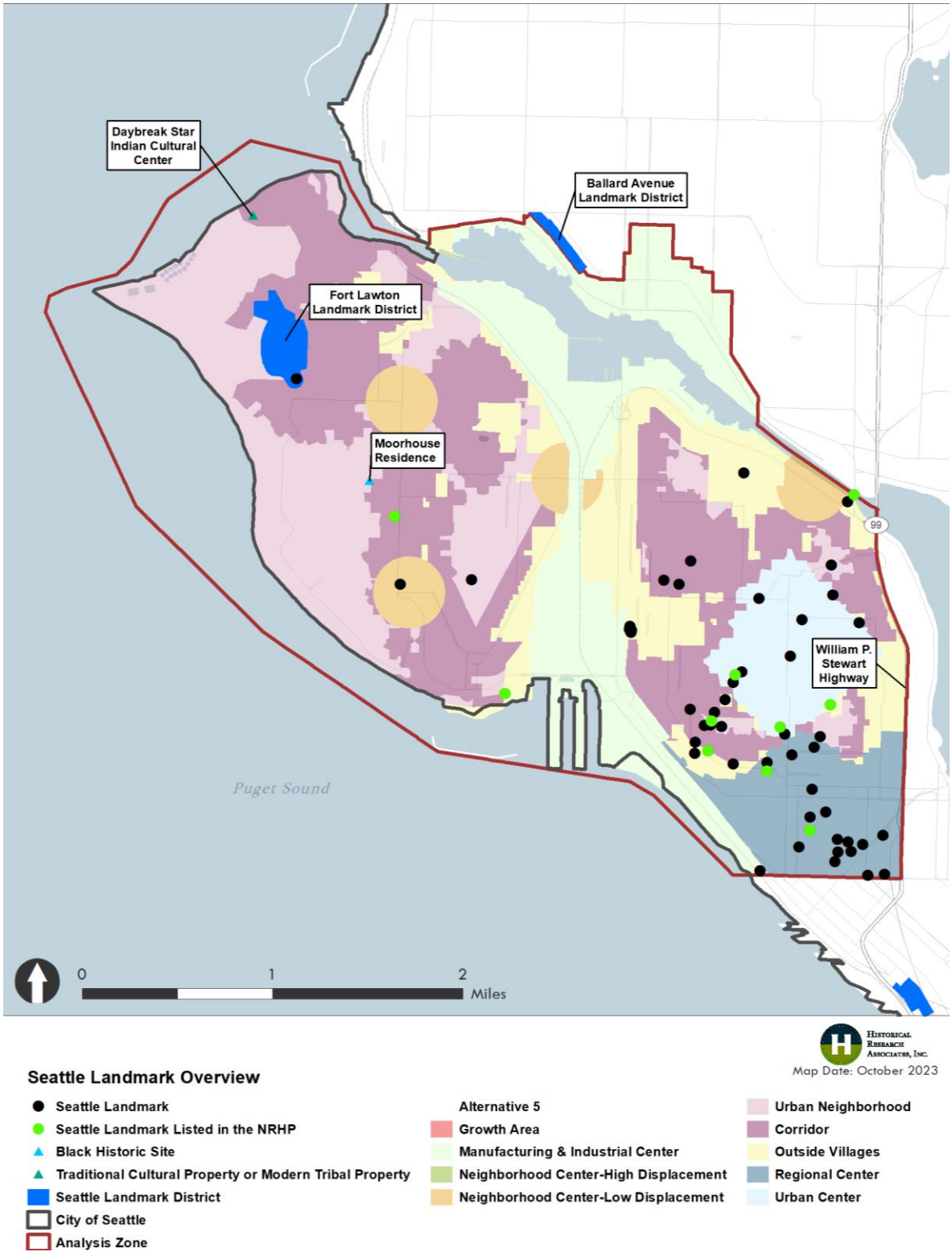
The discrepancy between the Assessor's and DAHP's records are likely in part due to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

DAHP records show 43 cultural resources studies that included archaeological resources investigations that have been conducted within Analysis Zone 3 since 1995. Three precontact sites, ten historic-period sites, and one multicomponent site have been recorded within Analysis Zone 3. One of the precontact sites was determined eligible for listing in the NRHP, three of the historic-period sites were determined not eligible for listing in the NRHP, and the remaining ten sites have not been formally evaluated for listing in the NRHP. Most of the area within Analysis Zone 3 is considered of High or Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model. Areas of Moderately Low to Moderate Risk are located in a small upland portion of the Magnolia neighborhood and across much of the hilly Queen Anne neighborhood (**Exhibit 3.9-23**).

Culturally Important Resources

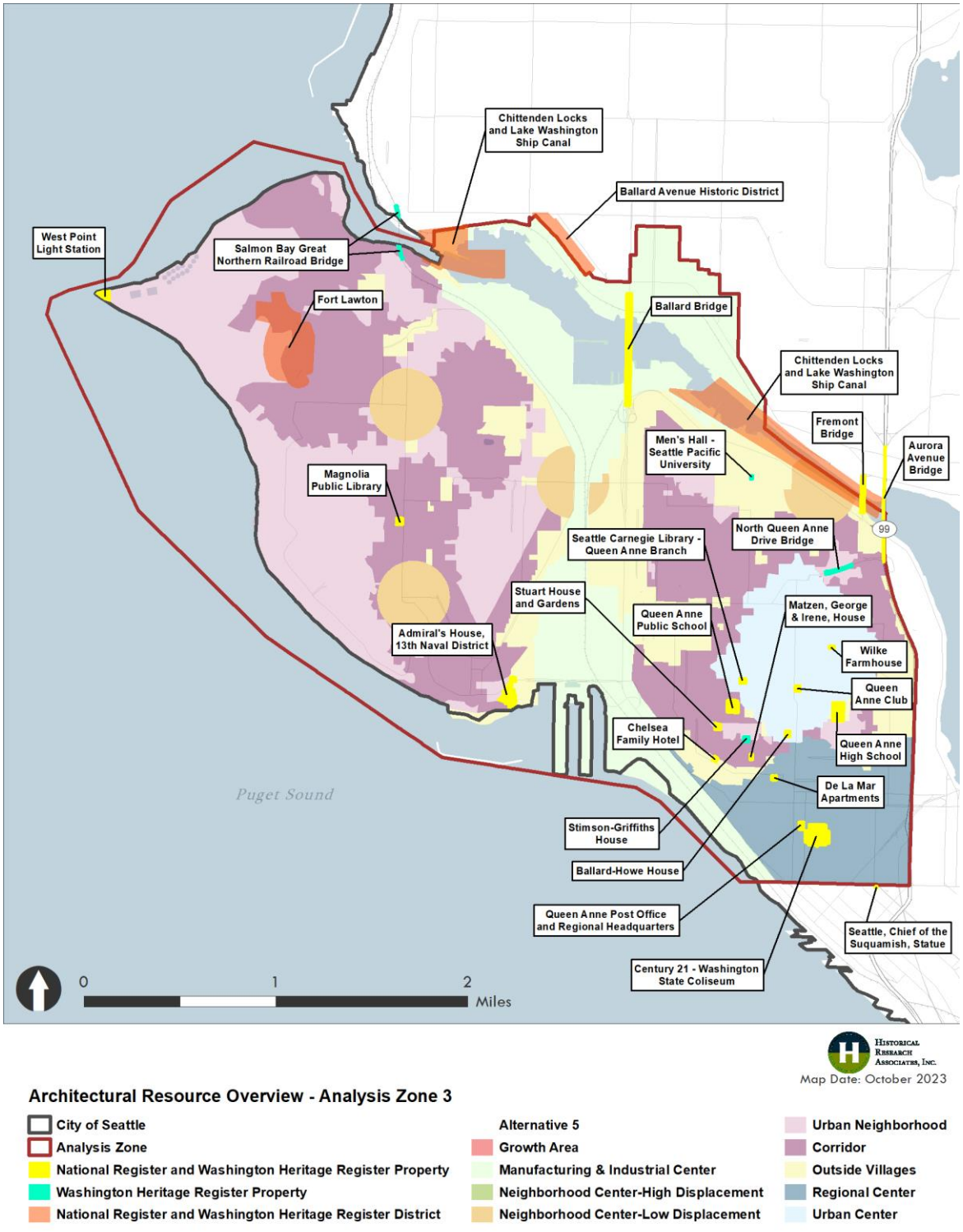
There are 1 Black Historic Site (Moorhouse Residence) and 1 Potential Black Commemorative Site (William P. Stewart Highway), within Analysis Zone 3 (**Exhibit 3.9-20**) (Source: the Washington State Black Historic Sites Survey).

Exhibit 3.9-20. Area 3: Queen Anne/Magnolia—Designated Seattle Landmarks, Seattle Historic Districts, and Culturally Important Resources



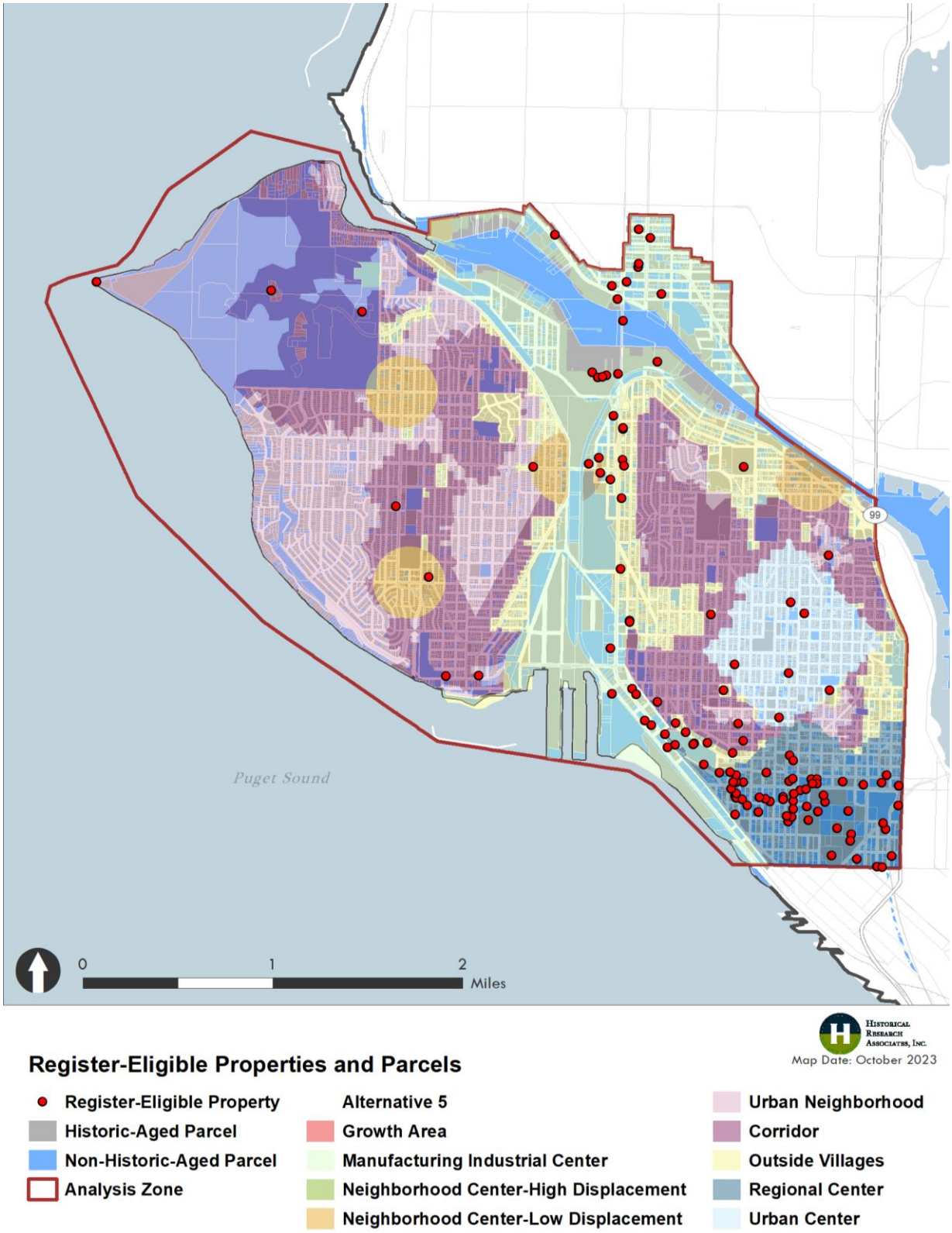
Source: HRA, 2023.

Exhibit 3.9-21. Area 3: Queen Anne/Magnolia—NRHP- and WHR-Listed Architectural Districts and Properties



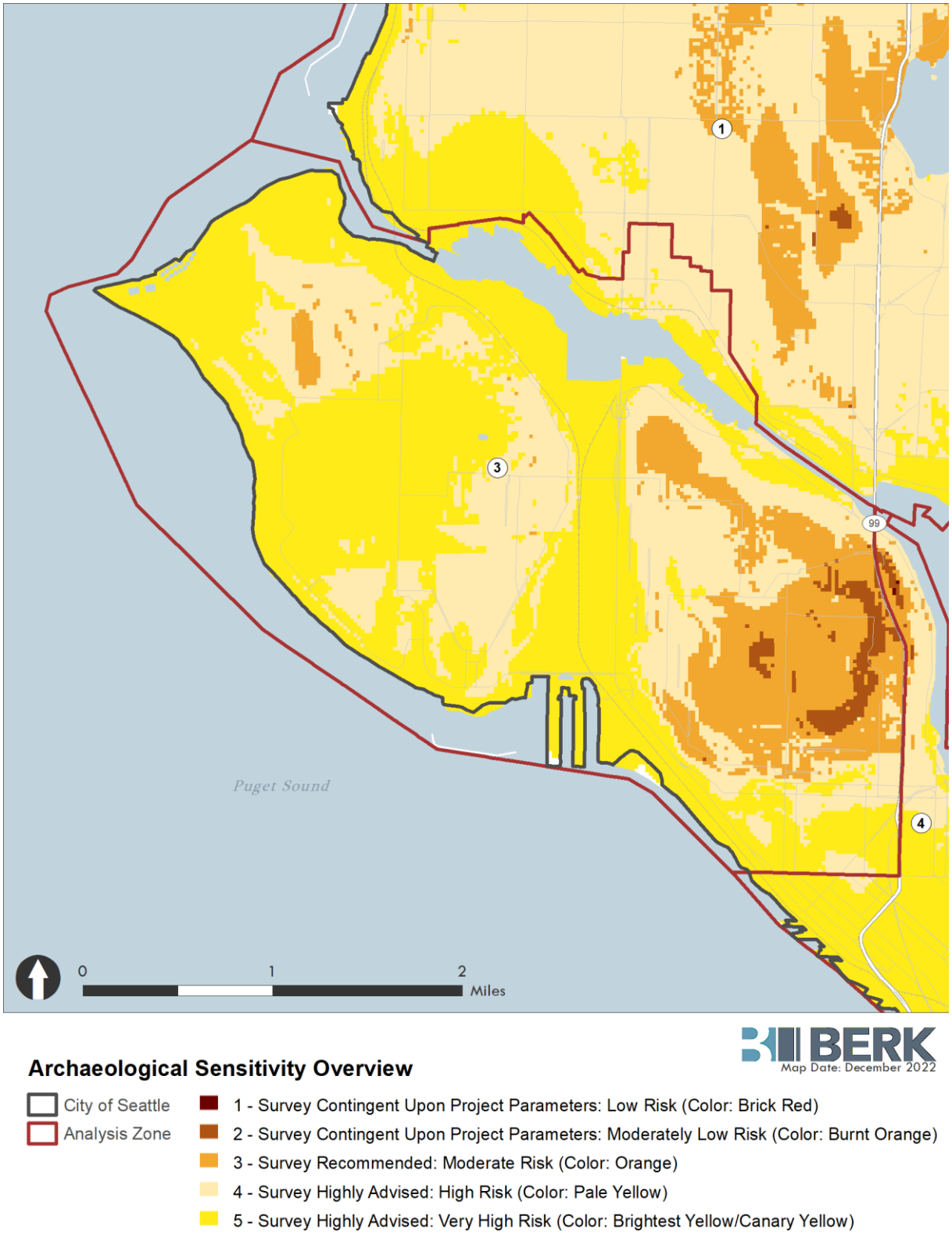
Source: HRA, 2023.

Exhibit 3.9-22. Area 3: Queen Anne/Magnolia—Historic-Aged Parcels and NRHP-Eligible Resources



Source: HRA, 2023.

Exhibit 3.9-23. Area 3: Queen Anne/Magnolia—Map Showing Archaeological Sensitivity from DAHP Model



Source: HRA, 2023.

Area 4: Downtown/Lake Union

There are a very large number of historic properties and districts in the Downtown/Lake Union Area. Found in the Downtown/Lake Union analysis area are 3 Seattle Landmark Districts, 3 NRHP-listed historic districts, 1 WHR-listed historic district, and notably, there are 6 National Historic Landmarks, which are also listed in the NRHP. These resources (districts and NHLs) are listed in the table below (**Exhibit 3.9-24**).

There are 155 designated Seattle Landmarks in the Downtown/Lake Union area. Of these, 15 are residential buildings, 15 are transportation-related, 2 are education-related buildings, 77 are commercial buildings, 12 are hotels, 8 are maritime-related, 6 are fraternal organization/club buildings, 5 are street clocks, 3 are religious institutions, 2 are power-related resources, 3 are theater buildings, 2 are fire station buildings, 2 are memorial sculptures, 1 is a Naval armory, and 1 is a YMCA. These resources are significant under a variety of the six standards for designation (**Exhibit 3.9-25**).

Exhibit 3.9-24. Area 4: Downtown/Lake Union—SL-designated and NHL-listed Districts, and NHL-listed Properties

Property name, type	Register/List Date/Significance	Period of Significance
Pioneer Square Preservation District, district	SL / 1970 / Criterion A for the Development of Seattle, Criterion C for the Economic Heritage of Seattle, Puget Sound, and Washington, Criterion D for Architecture	1889–1931
Pioneer Square-Skid Road Historic District, (Including Boundary Increases), district	NRHP / 2008 / Criterion A for Community Planning and Development, Industry, Commerce, Transportation, Politics/Government, and Social History, and Criterion C for Architecture, Landscape Architecture, and Engineering	1889–1931
Pike Place Market Historical District, district	SL / 1971 / Criterion A for Development of Seattle, Criterion C for Cultural and Economic Heritage, Criterion D for Architecture, and Criterion F as a Distinctive Neighborhood Feature	1907–1971
Pike Place Public Market Historic District, district	NRHP / 2011 / Criterion A for Agriculture, Commerce, Politics/Government, and Ethnic Heritage, and Criterion C for Architecture	1907–1971
International Special Review District (ISRD), district	SL / 1973 / Criterion A for Development of Seattle, Criterion C for Economic Heritage of the Community and Culture, and Criterion D for Architecture	1910
Seattle Chinatown Historic District, district	NRHP / 1986 / Criterion A for Commerce, Social/Humanitarian, and Ethnic History	1907–1936
Tenas Chuck Houseboat Moorage Historic District, district	WHR / 2000 / Criterion A for Early Settlement and Community, and Criterion C for Land Use and Architecture/Engineering	1910–1965
Pioneer Building, Pergola, and Totem Pole—Seattle, district	NHL / 1977 / Criterion 1 for Social History, and Criterion 4 for Architecture	1875–1899, 1900–1924

Property name, type	Register/List Date/Significance	Period of Significance
Schooner *Adventuress,* structure	NHL / 1989 / NHL Criterion 1 for Maritime History, and Criterion 4 for Naval Architecture	1914
Virginia V, structure	NHL / 1992 / Criterion 1 for Maritime Transportation, and Criterion 4 for Architecture	1922–1944
Relief (Lightship), structure	NHL / 1989 / Criterion 1 for Maritime Transportation, and Criterion 4 for Naval Architecture, Lightship	1905–1960
Duwamish, structure	NHL / 1989 / Criterion 1 for Maritime Business, Shipping and Transportation, and Criterion 4 for Naval Architecture	1909–1949
Panama Hotel, building	NHL / 2006 / Criterion 1 for Ethnic Heritage: Asian, and Criterion 4 for Architecture	1910–1942

Sources: DAHP, 2023.

There are 80 NRHP-listed resources and 20 WHR-listed resources within the Downtown/Lake Union area (for more information see the WISAARD map with the "Register Public" layer turned on, at https://wisaard.dahp.wa.gov/Map). As adding these resources to the table would create a table that spans a number of pages, they will be only briefly mentioned here. Of the 80 NRHP-listed resources, 30 are commercial buildings, 13 are hotels, 8 are ships/boats, 5 are apartment buildings, 5 are federal government-related buildings, 3 are transportation-related, 3 are churches, 3 are club facilities, 2 are theaters, 2 are art objects, 1 is a stables, 1 is a park, 1 is a YWCA, and 3 are bridges, which were listed in the NRHP under the *Historic Bridges and Tunnels in Washington State MPD*. Of the 20 WHR-listed resources, 15 are historic sites, 2 are ships, 1 is a school, 1 is a commercial block, and 1 is a park **(Exhibit 3.9-26**).

Current King County Tax Assessor records show that within the Downtown/Lake Union area, there are 1,711 historic-period buildings. Of these, 599 are residential, including 246 residential buildings (single family dwellings, townhouses, duplexes, triplexes, and fourplexes), 260 apartment buildings, and 93 condominiums. The remaining 1,112 buildings are commercial, industrial, and governmental (**Exhibit 3.9-27**).

In contrast, DAHP records show 1,853 individual historic-period architectural resources have been entered on HPI forms within the Downtown/Lake Union area. Of these, only 278 were determined NRHP-eligible by DAHP or a federal agency and are plotted on the map (**Exhibit 3.9-27**). Many of the 1,853 HPI forms were created by data transfer for an Assessors Data Project for King County. The resources in these HPIs were not formally surveyed and recorded, have neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

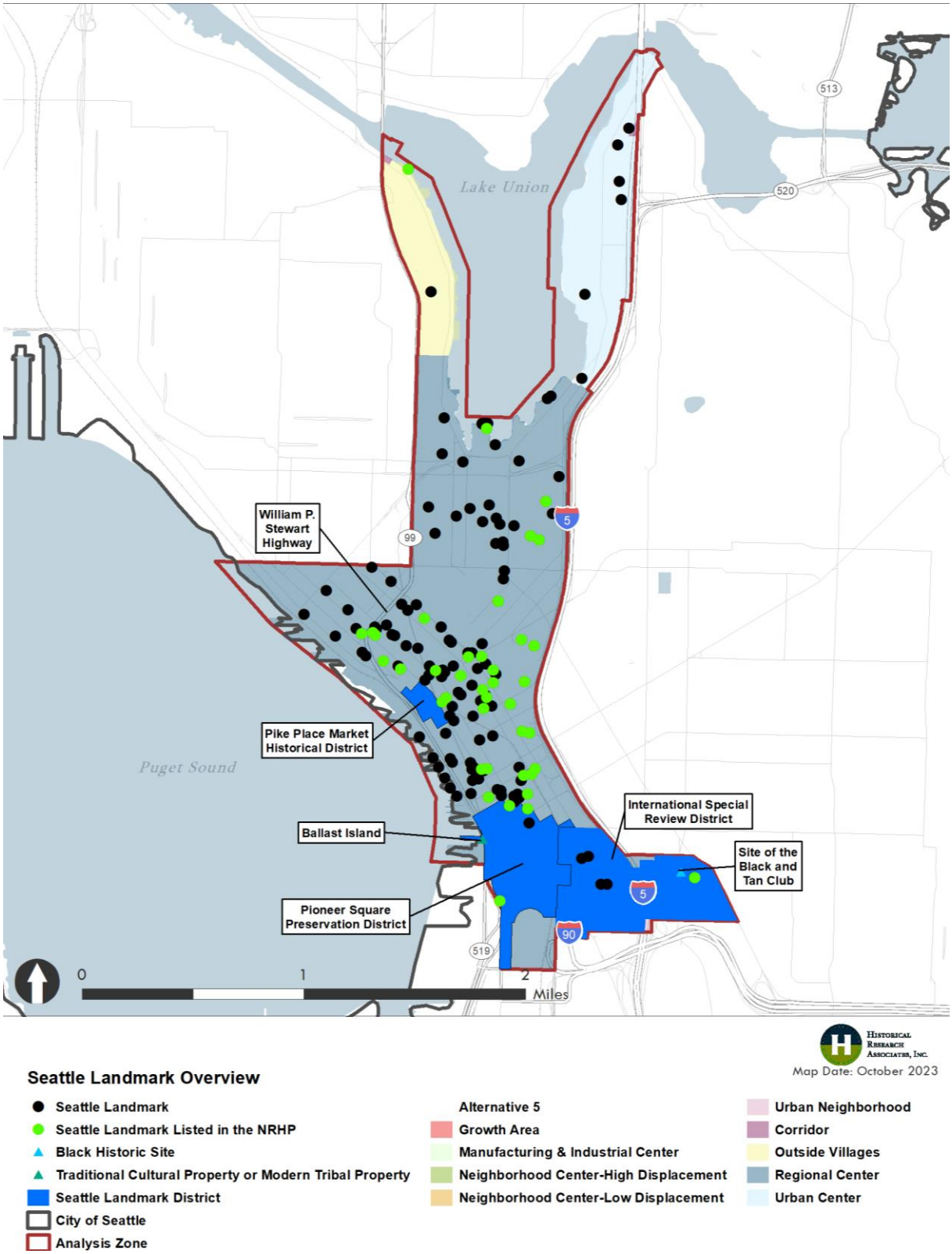
The discrepancy between the Assessor's and DAHP's records are likely in part due to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

DAHP records show 81 cultural resources studies that included archaeological resources investigations that have been conducted within Analysis Zone 4 since 1995. Thirty-four historic-period sites and two multicomponent sites have been recorded within Analysis Zone 4. two of the historic-period sites are listed in the NRHP, two historic-period sites were determined eligible for listing in the NRHP, ten historic-period sites were determined not eligible for listing in the NRHP, and the remaining twenty-one sites have not been formally evaluated for listing in the NRHP. One of the NRHP-listed historic-period sites, Ballast Island, is a TCP (45KI1189) (Curti, et al. 2020). Nearly all of Analysis Zone 4 is considered of High or Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model. Small areas of Moderate Risk are located along I-5 east of the South Lake Union neighborhood (**Exhibit 3.9-28**).

Culturally Important Resources

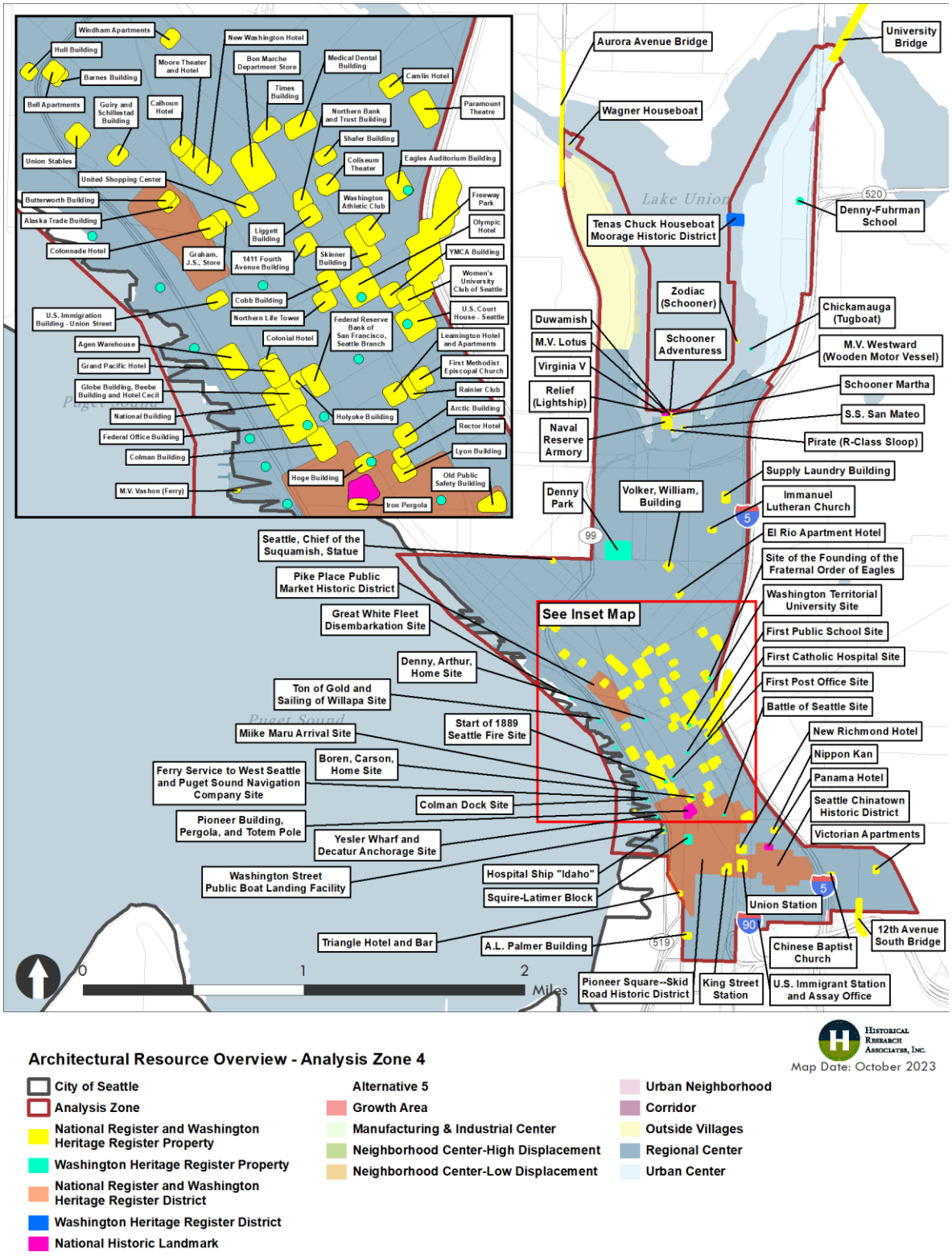
There are 1 Black Historic Site (the site of the Black and Tan Club) and 1 Potential Black Commemorative Site (the William P. Stewart Highway), in Analysis Zone 4 (**Exhibit 3.9-25**) (Source: the Washington State Black Historic Sites Survey).

Exhibit 3.9-25. Area 4: Downtown/Lake Union—Designated Seattle Landmarks, Seattle Historic Districts, and Culturally Important Resources



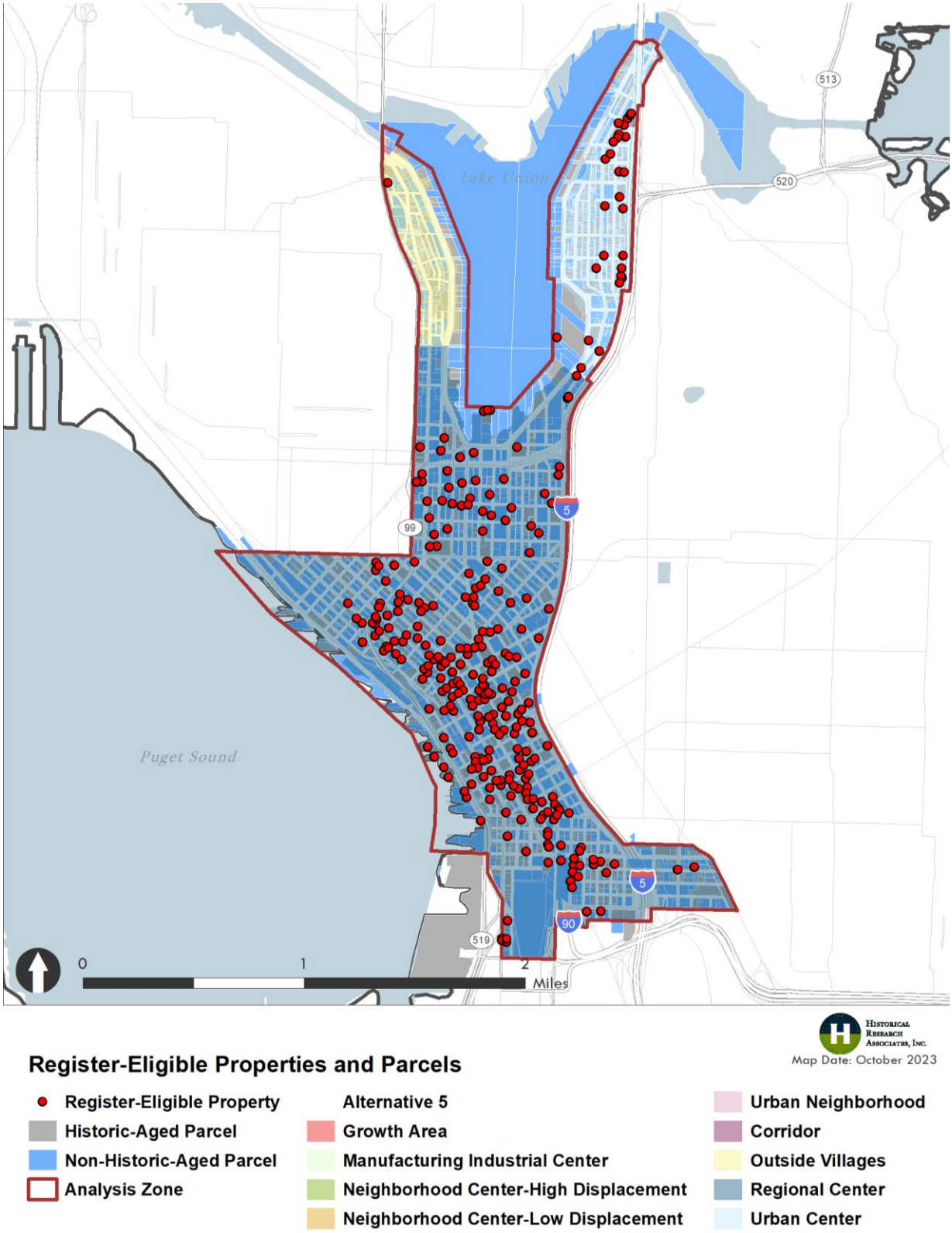
Source: HRA, 2023.

Exhibit 3.9-26. Area 4: Downtown/Lake Union—NHL-, NRHP- and WHR-Listed Architectural Properties and Districts



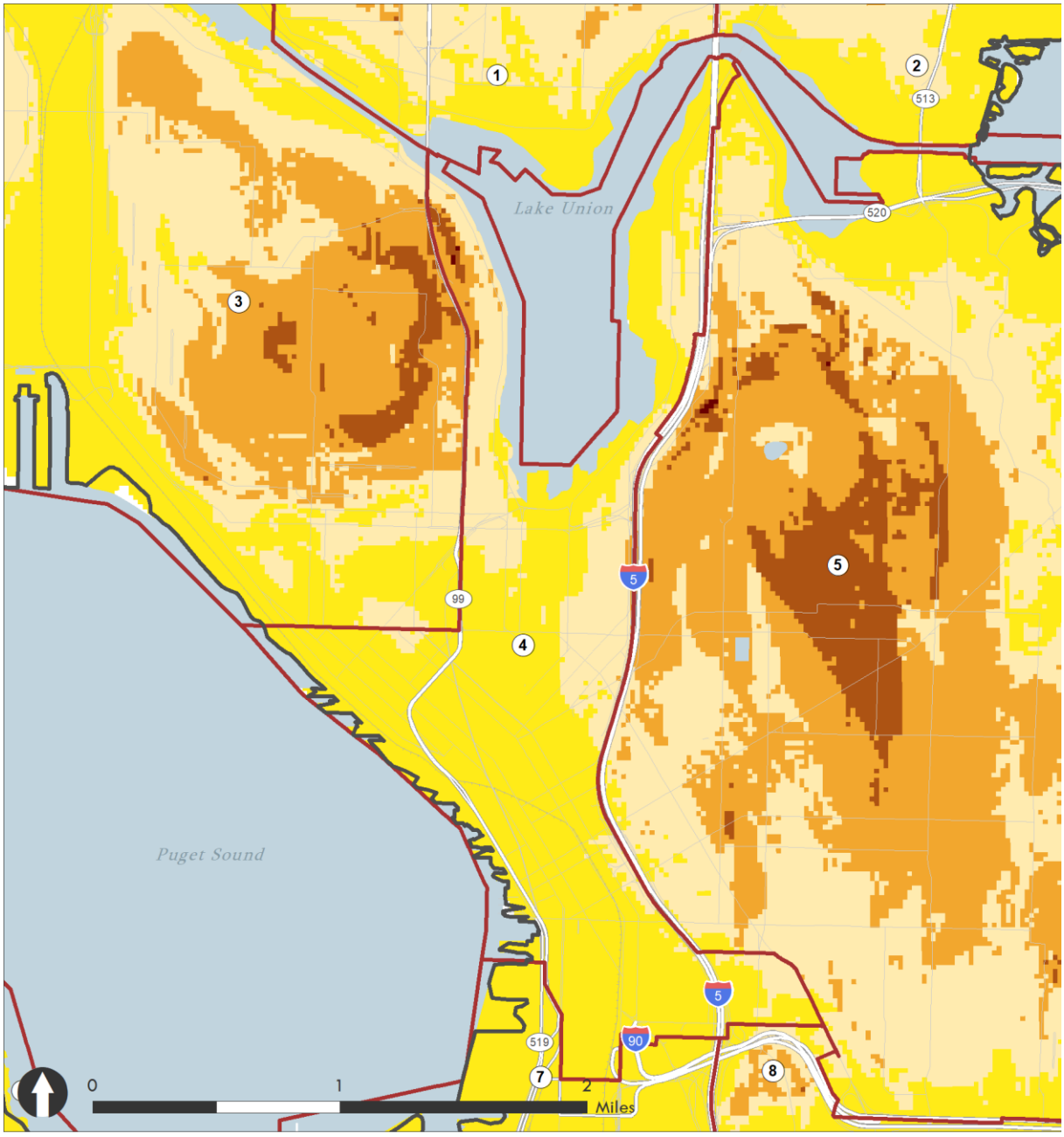
Source: HRA, 2023.

Exhibit 3.9-27. Area 4: Downtown/Lake Union—Historic-Aged Parcels and NRHP-Eligible Resources



Source: HRA, 2023.

Exhibit 3.9-28. Area 4: Downtown/Lake Union—Map Showing Archaeological Sensitivity from DAHP Model



BERK
Map Date: December 2022

Archaeological Sensitivity Overview

- City of Seattle
- Analysis Zone
- 1 - Survey Contingent Upon Project Parameters: Low Risk (Color: Brick Red)
- 2 - Survey Contingent Upon Project Parameters: Moderately Low Risk (Color: Burnt Orange)
- 3 - Survey Recommended: Moderate Risk (Color: Orange)
- 4 - Survey Highly Advised: High Risk (Color: Pale Yellow)
- 5 - Survey Highly Advised: Very High Risk (Color: Brightest Yellow/Canary Yellow)

Source: HRA, 2023.

Area 5: Capitol Hill/Central District

There are 1 Seattle Landmark district, 7 NRHP-listed historic districts, and 1 WHR-listed historic district located in the Capitol Hill/Central District analysis area. These resources are listed in the table below (**Exhibit 3.9-29**).

There are a large number of historic properties in the Capitol Hill/Central District. Adding these resources to the table would create a table that spans a number of pages, so they will be only briefly mentioned here. There are 117 designated Seattle Landmarks in the Capitol Hill/Central District area. Of these, 33 are residential buildings, 17 are religious institutions, 16 are Volunteer Park resources, 14 are apartment buildings, 9 are education-related buildings, 7 are clubs/community-related resources, 4 are fire stations, 3 are transportation-related buildings, 2 are medical buildings, 2 are hotels, 1 is a manufacturing building, 1 is a library, 1 is a garden, 1 is a bottling plant, 1 is a substation, 1 is a steam plant, 1 is a reservoir, 1 is a bike path, 1 is a bridge, and 1 is a stairway. These resources are significant under a variety of the six standards for designation (**Exhibit 3.9-30**).

Exhibit 3.9-29. Area 5: Capitol Hill/Central District—SL-designated, NRHP-, and WHR-listed Districts

Property name, type	Register/List Date/Significance	Period of Significance
Volunteer Park—Seattle, district	NRHP / 1976 / Criterion A for Community Planning, and Criterion C for Architecture, Landscape Architecture, and Engineering	1903–1912
Harvard-Belmont Landmark District, district	SL / 1980 / Criterion D for Architecture and Landscape Architecture	Ca. 1900–1940
Harvard-Belmont District, district	NRHP / 1982 / Criterion A for Education and Social History, and Criterion C for Architecture and Landscape Architecture	Ca. 1900–1930
Chittenden Locks and Lake Washington Ship Canal, district	NRHP / 1978 / Criterion A for Commerce, Politics/Government, and Criterion C for Architecture, Engineering, and Landscape Architecture	1906–1917
Roanoke Park Historic District, district	NRHP / 2009 / Criterion A for Commerce, Law, and Politics/Government, and Criterion C for Architecture	1899–1939
Lake Washington Boulevard, district	NRHP / 2017 / Criterion A for Community Planning and Development, Recreation and Culture, and Transportation, and Criterion C for Landscape Architecture	1904–1963
Montlake Historic District, district	NRHP / 2015 / Criterion C for Architecture	1904–1959
Millionaire's Row Historic District, district	NRHP / 2021 / Criterion A for Community Planning and Development, and Criterion C for Architecture	1902–1967
Row Houses on 23rd Avenue—Seattle, district	WHR / 1970 / Criterion A for Social History and Community Planning and Development, and Criterion C for Architecture	1893–1970

Sources: DAHP, 2023.

There are 46 individually listed resources within the area that are listed in the NRHP and 7 WHR-listed properties (for more information see the WISAARD map with the "Register Public" layer turned on). Of these 18 are residential buildings, 5 are religious facilities, 3 are apartment buildings, 3 are fire stations, 5 are club facilities, 3 are schools, 2 are parks, 1 is an assay office, 1 is a commercial building, 1 is a hotel, 1 is an art museum, and 3 are bridges, which were listed in the NRHP under the *Historic Bridges and Tunnels in Washington State MPD* (**Exhibit 3.9-31**).

Current King County Tax Assessor records show that within the Capitol Hill/Central District area, there are 14,100 historic-period buildings. Of these, 12,355 are residential, including 11,158 residential buildings (single family dwellings, townhouses, duplexes, triplexes, and fourplexes), 984 apartment buildings, and 213 condominiums. The remaining 1,745 buildings are commercial, industrial, and governmental (**Exhibit 3.9-32**).

In contrast, DAHP records show 11,887 individual historic-period architectural resources have been entered on HPI forms within the Capitol Hill/Central District area. Of these, only 399 were determined NRHP-eligible by DAHP or a federal agency and are plotted on the map (**Exhibit 3.9-32**). Many of the 11,887 HPI forms were created by data transfer for an Assessors Data Project for King County. The resources in these HPIs were not formally surveyed and recorded, have neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

The discrepancy between the Assessor's and DAHP's records are likely in part due to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

DAHP records show 38 cultural resources studies that included archaeological resources investigations that have been conducted within Analysis Zone 5 since 1995. Three precontact sites and eleven historic-period sites have been recorded within Analysis Zone 5. One of the historic-period sites was determined eligible for listing in the NRHP, eight historic-period sites were determined not eligible for listing in the NRHP, and the remaining five sites have not been formally evaluated for listing in the NRHP. The shorelines, adjacent low-elevation areas, and much of the southwestern (i.e., the First Hill, Yesler Terrace, and Atlantic neighborhoods) and northwestern (i.e., Arboretum and Washington Park neighborhoods) portions of Analysis Zone 5 are considered of High or Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model. The remainder of Analysis Zone 5, including most of the Capitol Hill neighborhood and other upland areas, are considered of Moderately Low to Moderate Risk (**Exhibit 3.9-33**).

Culturally Important Resources

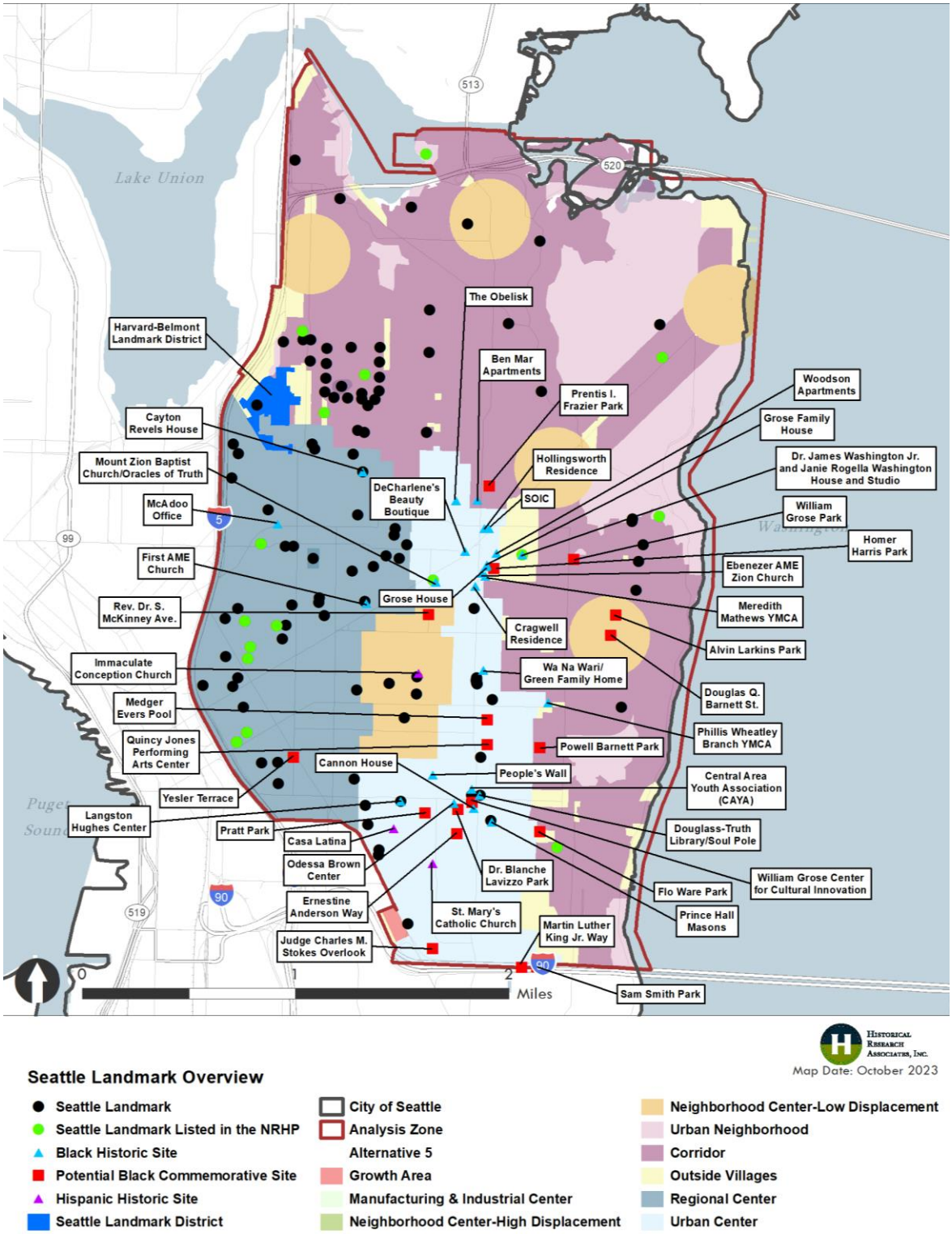
There are 25 Black Historic Sites in Analysis Zone 5, including the Ben Mar Apartments, Cannon House, Cayton Revels House (which is a designated SL), Central Area Youth Association (CAYA), Cragwell Residence, DeCharlene's Beauty Boutique, Douglass-Truth Library/Soul Pole (which is a designated SL), the Ebenezer AME Zion Church, First AME Church (which is a designated SL),

Grose House, Grose Family House, Hollingsworth Residence, Langston Hughes Center (which is a designated SL), Meredith Mathews YMCA, McAdoo Office, Mount Zion Baptist Church/Oracles of Truth (which is a designated SL), Odessa Brown Center, People's Wall, Prince Hall Masons (which is a designated SL), SOIC, The Obelisk, Wa Na Wari/Green Family Home, Dr. James Washington Jr. and Janie Rogella Washington House and Studio (which is a designated SL and listed in the NRHP), Phillis Wheatley Branch YWCA , and the Woodson Apartments (**Exhibit 3.9-30**) (Source: the Washington State Black Historic Sites Survey).

Additionally, there are 16 Potential Black Commemorative Sites, including Alvin Larkins Park, Flo Ware Park, Dr. Blanche Lavizzo Park, Homer Harris Park, Powell Barnett Park, Judge Charles M. Stokes Overlook, Pratt Park, Prentis I. Frazier Park, William Grose Park, Medgar Evers Pool, Ernestine Anderson Way, Rev. Dr. S. McKinney Avenue, Douglas Q. Barnett Street, Quincy Jones Performing Arts Center, Yesler Terrace, Sam Smith Park, Martin Luther King Jr. Way, and the William Grose Center for Cultural Innovation (**Exhibit 3.9-30**) (Source: the Washington State Black Historic Sites Survey).

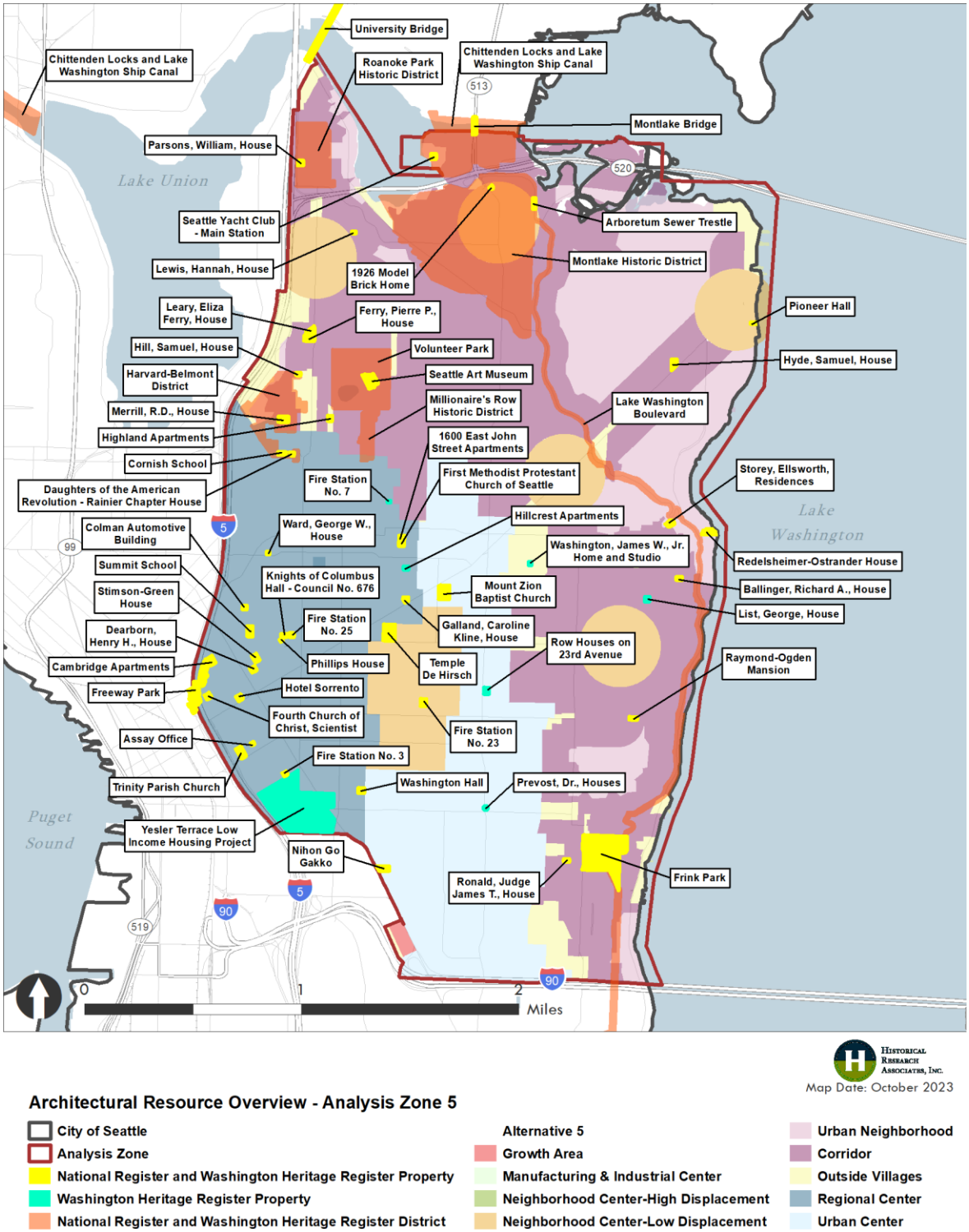
There are 3 Hispanic Historic Sites in Analysis Zone 5, including the Immaculate Conception Church, Casa Latina, and St. Mary's Catholic Church (**Exhibit 3.9-30**) (Source: the 2018 Latino Heritage Survey).

Exhibit 3.9-30. Area 5: Capitol Hill/Central District—Designated Seattle Landmarks, Seattle Historic Districts, and Culturally Important Resources



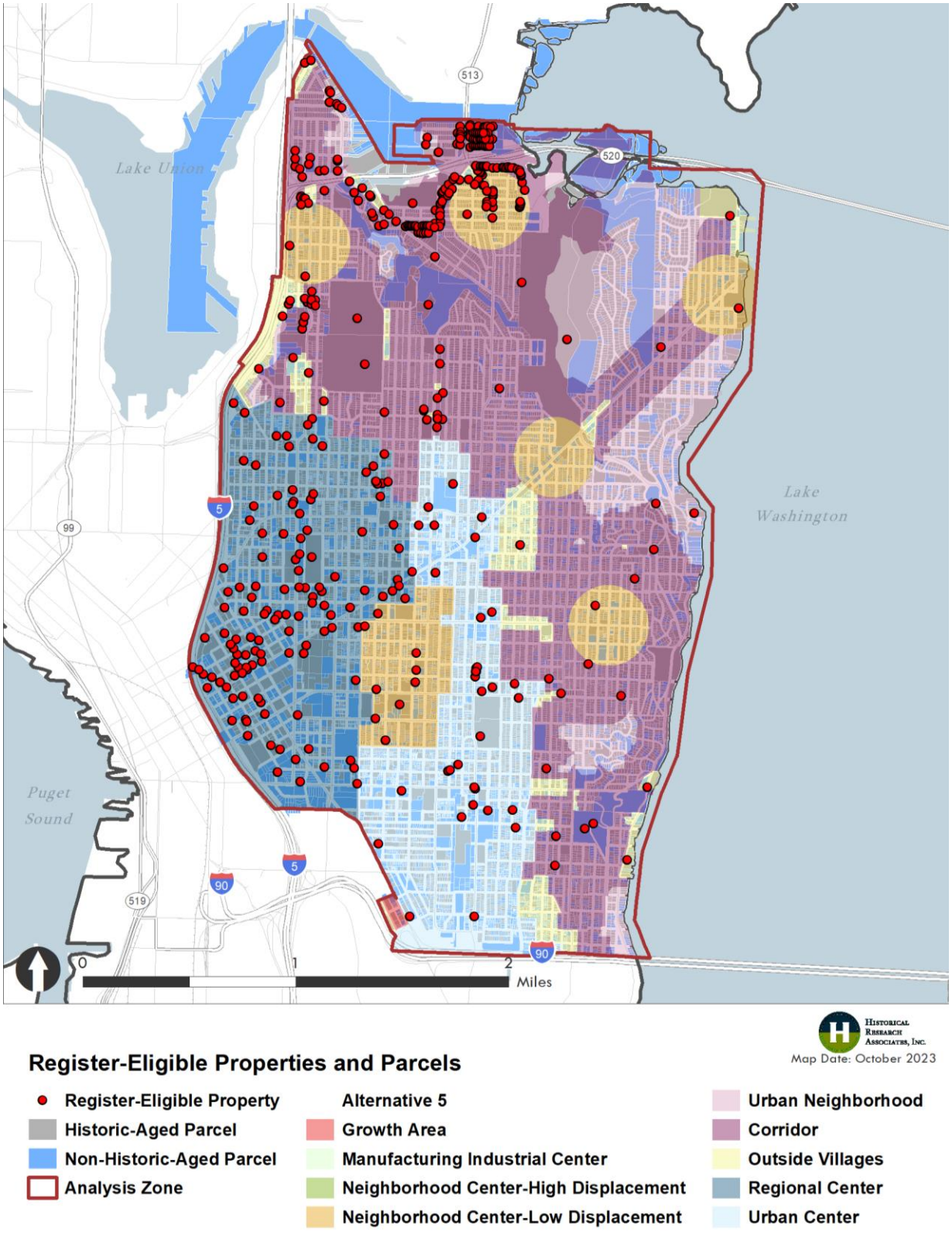
Source: HRA, 2023.

Exhibit 3.9-31. Area 5: Capitol Hill/Central District—NRHP- and WHR-Listed Architectural Properties and Districts



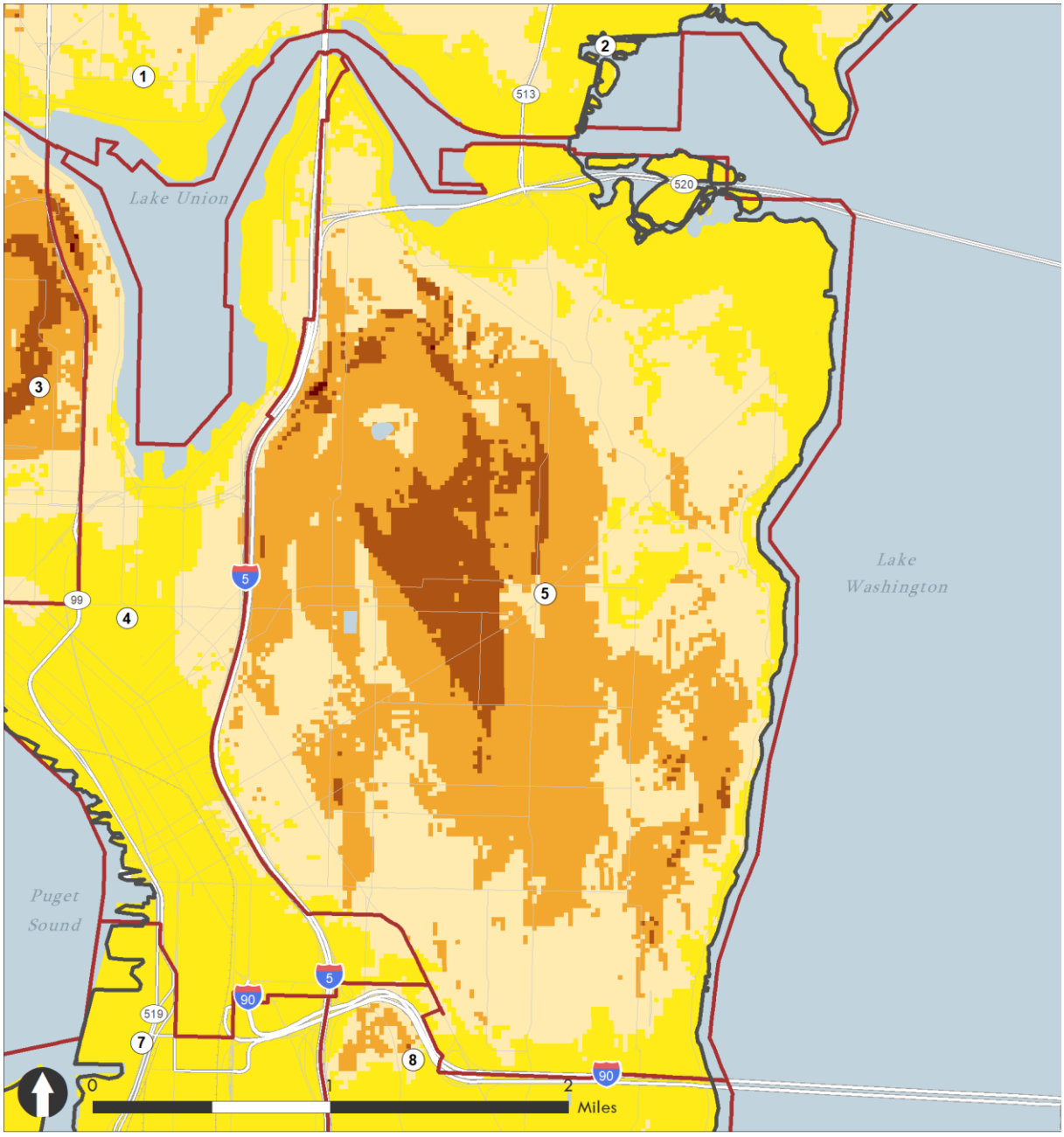
Source: HRA, 2023.

Exhibit 3.9-32. Area 5: Capitol Hill/Central District—Historic-Aged Parcels and NRHP-Eligible Resources



Source: HRA, 2023.

Exhibit 3.9-33. Area 5: Capitol Hill/Central District—Map Showing Archaeological Sensitivity from DAHP Model



BERK
Map Date: December 2022

Archaeological Sensitivity Overview

- City of Seattle
- Analysis Zone
- 1 - Survey Contingent Upon Project Parameters: Low Risk (Color: Brick Red)
- 2 - Survey Contingent Upon Project Parameters: Moderately Low Risk (Color: Burnt Orange)
- 3 - Survey Recommended: Moderate Risk (Color: Orange)
- 4 - Survey Highly Advised: High Risk (Color: Pale Yellow)
- 5 - Survey Highly Advised: Very High Risk (Color: Brightest Yellow/Canary Yellow)

Source: HRA, 2023.

Area 6: West Seattle

Within the West Seattle analysis area, there are a large number of designated Seattle Landmarks. There are no SL-designated or NRHP- or WHR-listed historic districts in the area. As there only a few NRHP- and WHR-listed properties, these resources are listed in the table below (**Exhibit 3.9-34**).

There are 24 designated Seattle Landmarks in the West Seattle area. Of these, 6 are residential buildings, 5 are education-related buildings, 5 are commercial buildings, 2 are parks, 2 are religious institutions, 1 is a library, 1 is a theater, 1 is a fire station, and 1 is a bridge. These resources are significant under a variety of the six standards for designation (**Exhibit 3.9-35**).

Exhibit 3.9-34. Area 6: West Seattle—NRHP- and WHR-listed Properties

Property name, type	Register/List Date/Significance	Period of Significance
Seattle Carnegie Library—West Seattle Branch, building	NRHP / 1982 / Criterion A for Education and Social History, and Criterion C for Architecture	1910
Schmitz Park Bridge, structure	NRHP / 1982 / Criterion C for Engineering	1936
Frank B. Cooper Elementary School, building	NRHP / 2003 / Criterion A for Education and Ethnic Heritage—African American, Criterion B for its association with Thelma Fisher Dewitty, and for Criterion C for Architecture	1917–1953
Fir Lodge, building	NRHP / 2020 / Criterion A for Community Planning and Development, and Criterion C for Architecture	1903–1970
Alki Point and Duwamish Head, site	WHR / 1970 / Criterion A for Education, Conservation, Science, and Urban Planning	1851–present

Sources: DAHP, 2023.

As noted in the table above, within the West Seattle analysis area there are 4 NRHP-listed resources and 1 WHR-listed resource. Of these, 1 is a bridge, which was listed in the NRHP under the *Historic Bridges and Tunnels in Washington State MPD,* and 1 is a Carnegie library, which was listed in the NRHP under the *Carnegie Libraries of Washington TR* (**Exhibit 3.9-36**).

Current King County Tax Assessor records show that within the West Seattle area, there are 22,764 historic-period buildings. Of these, 21,843 are residential, including 21,373 residential buildings (single family dwellings, townhouses, duplexes, triplexes, and fourplexes), 396 apartment buildings, and 74 condominiums. The remaining 921 buildings are commercial, industrial, and governmental (**Exhibit 3.9-37**).

In contrast, DAHP records show 16,777 individual historic-period architectural resources have been entered on HPI forms within the West Seattle area. Of these, only 48 were determined NRHP-eligible by DAHP or a federal agency and are plotted on the map (**Exhibit 3.9-37**). Many of the 16,777 HPI forms were created by data transfer for an Assessors Data Project for King

County. The resources in these HPIs were not formally surveyed and recorded, have neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

The discrepancy between the Assessor's and DAHP's records are likely in part due to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

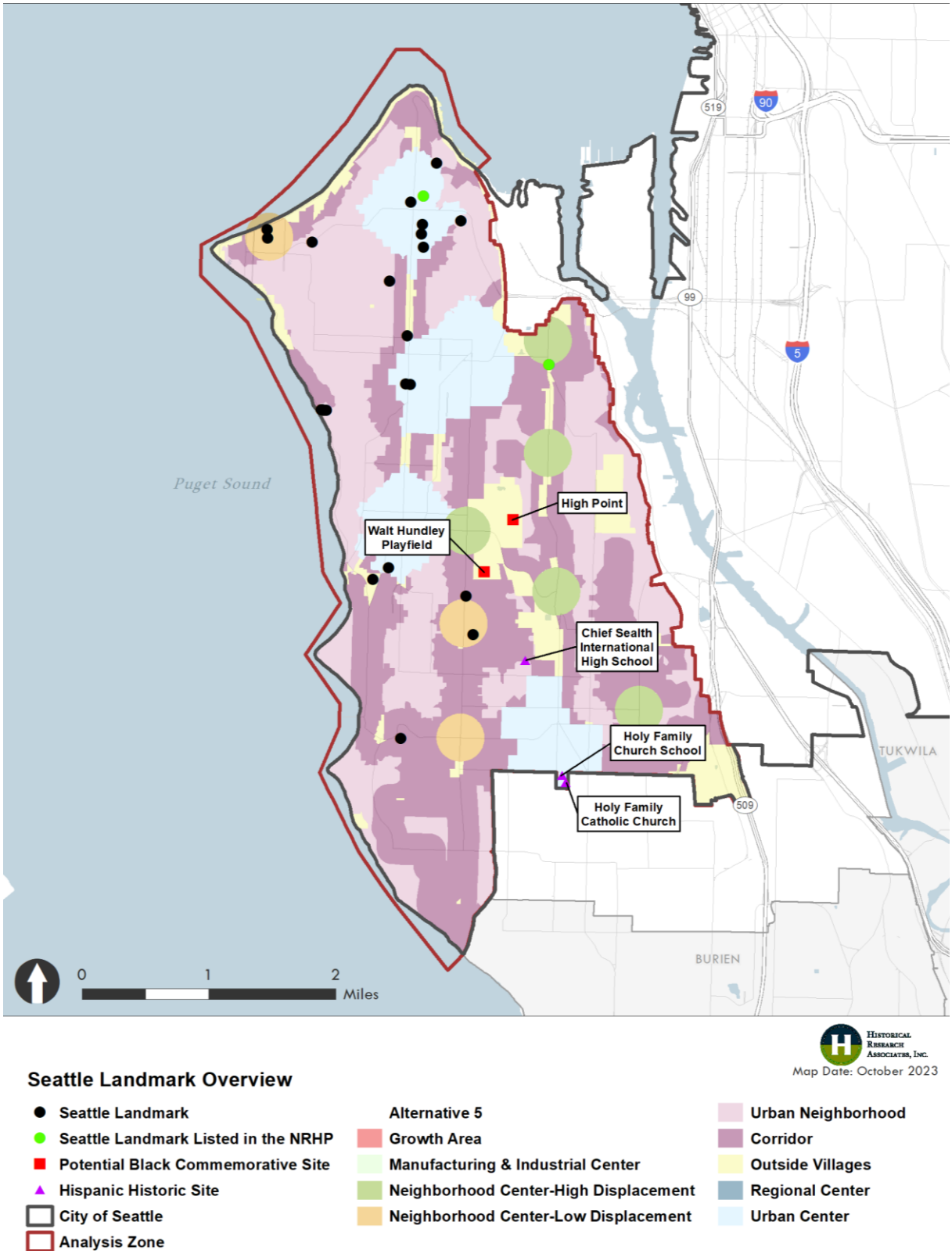
DAHP records show 33 cultural resources studies that included archaeological resources investigations that have been conducted within Analysis Zone 6 since 1995. Two precontact sites, six historic-period sites, and one multicomponent site have been recorded within Analysis Zone 6. One of the historic-period sites was determined not eligible for listing in the NRHP and the remaining eight sites have not been formally evaluated for listing in the NRHP. Most of Analysis Zone 6 is considered of High or Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model. Areas of Moderately Low to Moderate Risk are primarily located in upland settings in the central and southern portions of Analysis Zone 6 (**Exhibit 3.9-38**).

Culturally Important Resources

There are 2 Potential Black Commemorative Sites in Analysis Zone 6, including Walt Hundley Playfield and High Point neighborhood (**Exhibit 3.9-35**) (Source: the Washington State Black Historic Sites Survey).

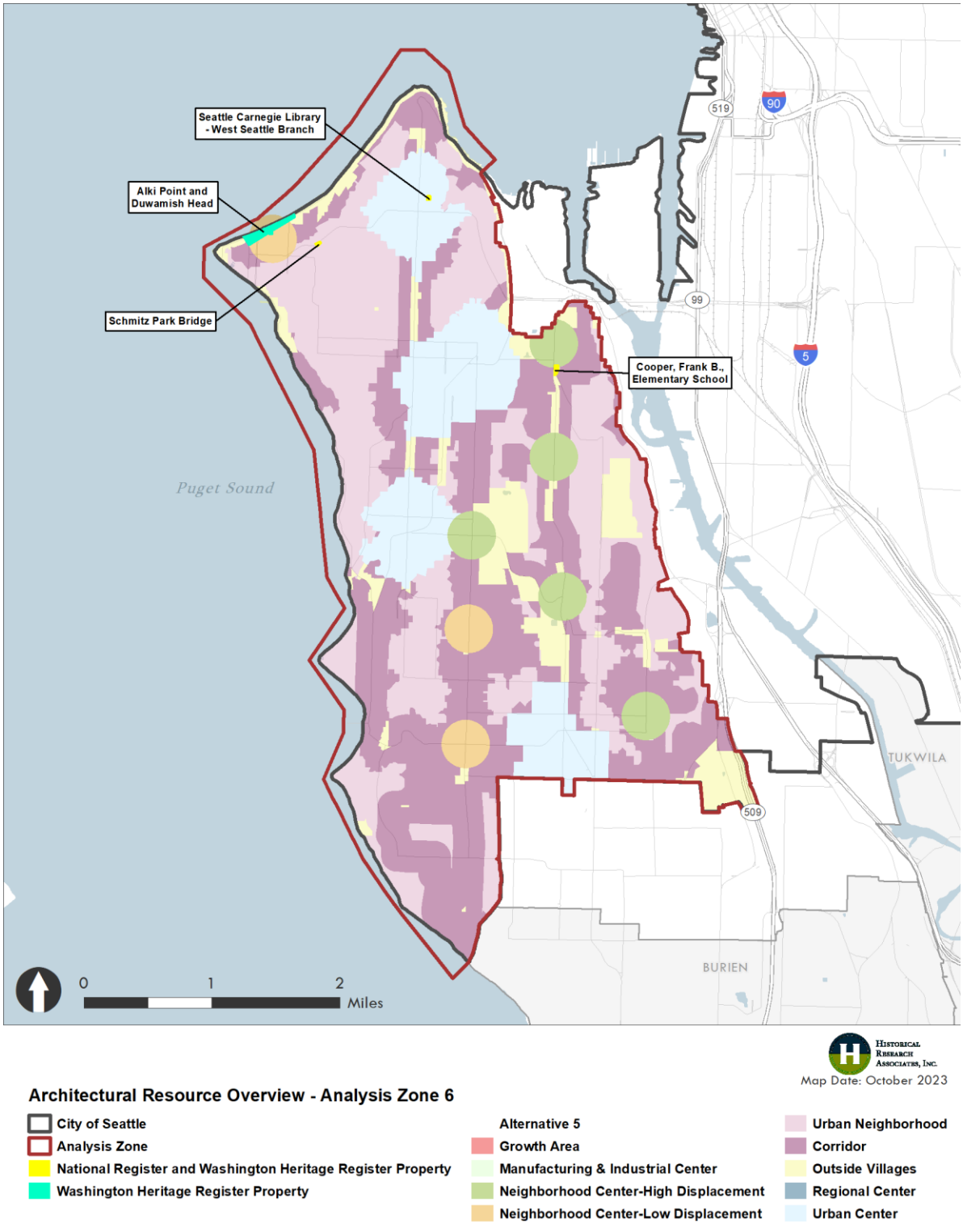
There are 3 Hispanic Historic Sites in Analysis Zone 6, including Chief Sealth International High School, Holy Family Church School, and the Holy Family Catholic Church (**Exhibit 3.9-35**) (Source: the 2018 Latino Heritage Survey).

Exhibit 3.9-35. Area 6: West Seattle—Designated Seattle Landmarks, Seattle Historic Districts, and Culturally Important Resources



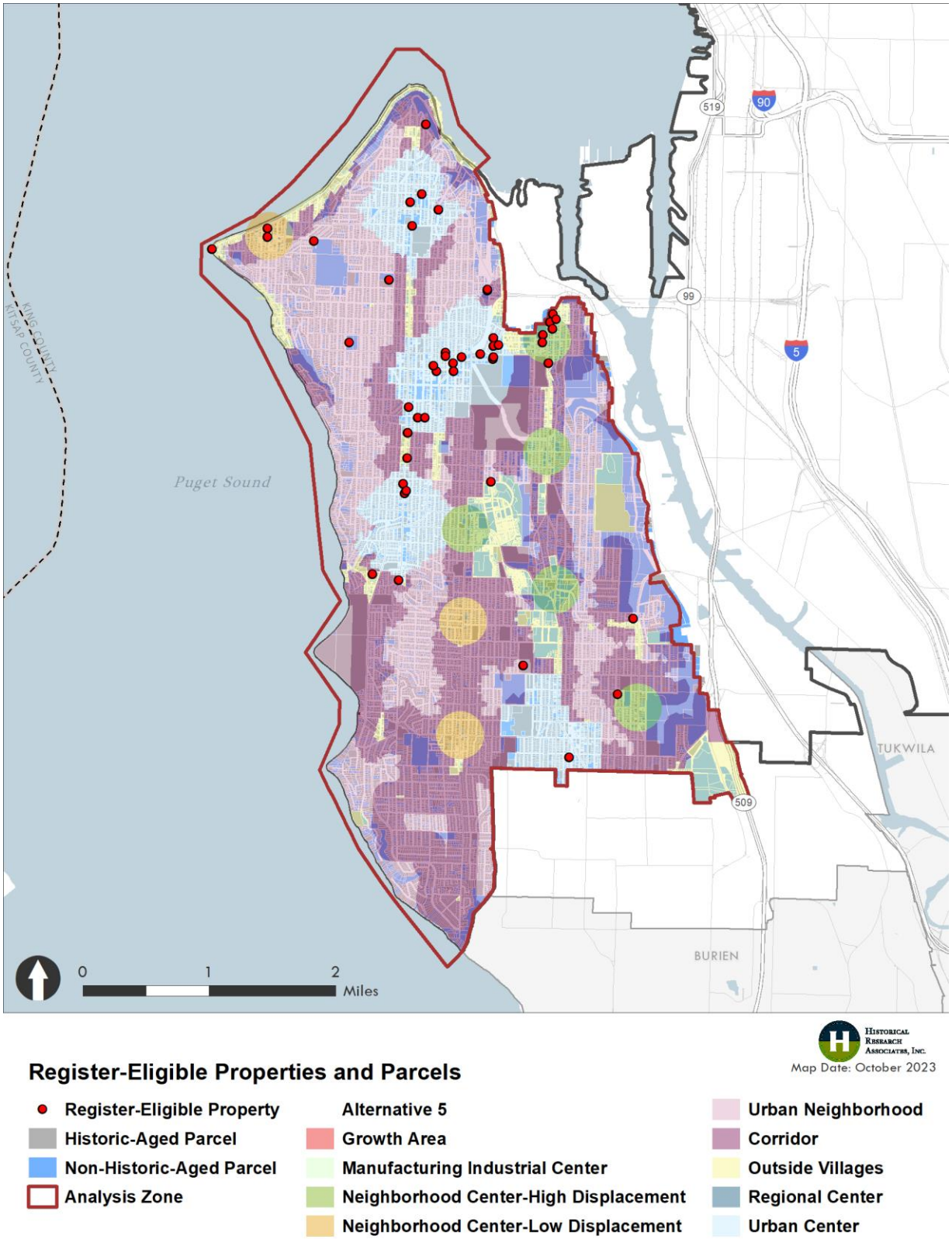
Source: HRA, 2023.

Exhibit 3.9-36. Area 6: West Seattle—NRHP- and WHR-Listed Architectural Properties and Districts



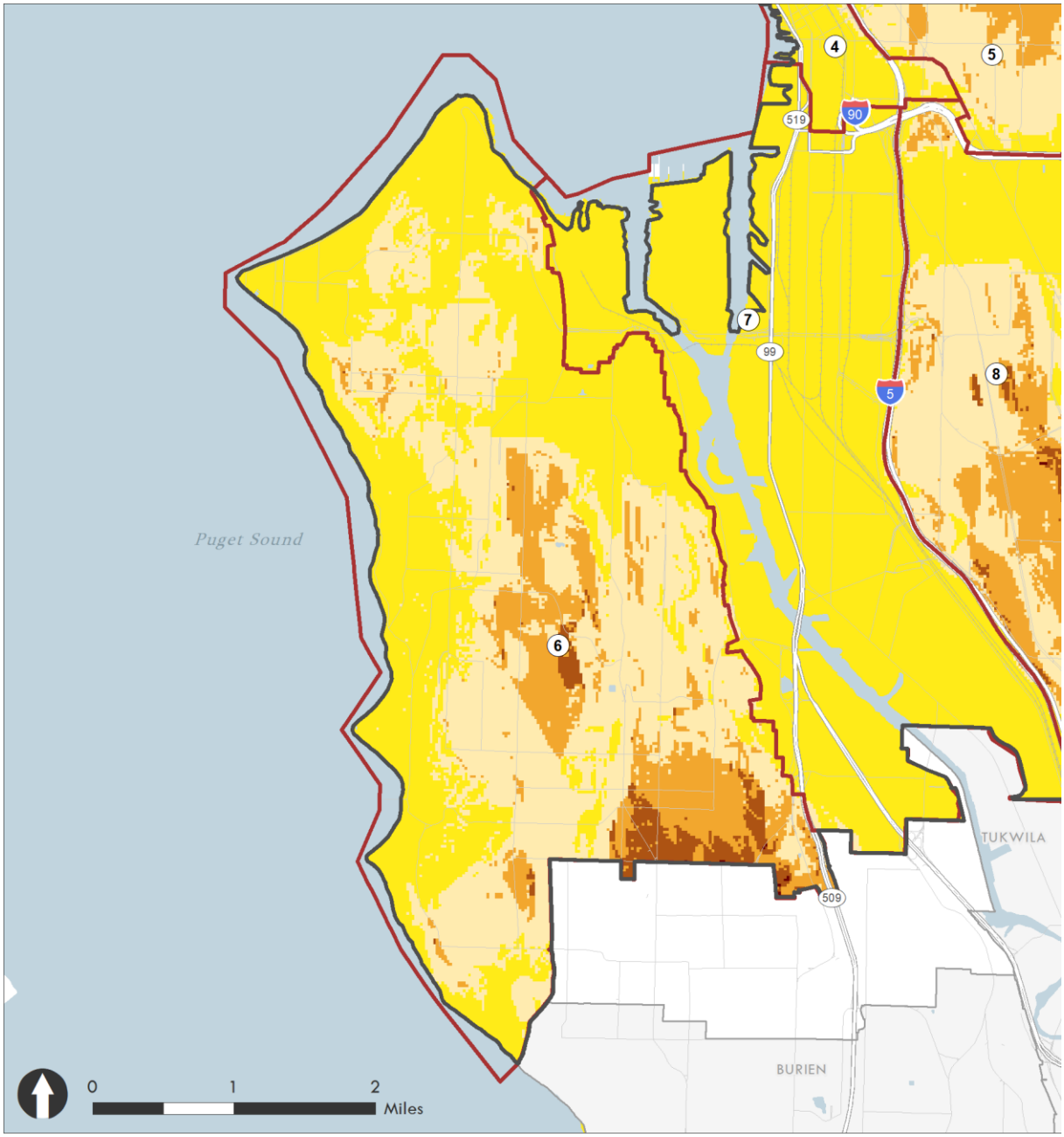
Source: HRA, 2023.

Exhibit 3.9-37. Area 6: West Seattle—Historic-Aged Parcels and NRHP-Eligible Resources



Source: HRA, 2023.

Exhibit 3.9-38. Area 6: West Seattle—Map Showing Archaeological Sensitivity from DAHP Model



Source: HRA, 2023.

Area 7: Duwamish

Within the Duwamish analysis area, there are a large number of designated Seattle Landmarks, but there are no Seattle Landmark districts. As there are only a few National Historic Landmark, NRHP- and WHR-listed properties, these resources are listed in the table below (**Exhibit 3.9-39**).

There are 14 designated Seattle Landmarks in the Duwamish area. Of these, 6 are related to the Rainier Cold Storage & Ice/Seattle Brewing & Malting Company, 2 are fire stations, 2 are related to the Georgetown Steam Plant, 1 is a gas station, 1 is an educational facility, 1 is a residential building, and 1 is a railroad bridge. These resources are significant under a variety of the six standards for designation (**Exhibit 3.9-40**).

Exhibit 3.9-39. Area 7: Duwamish—NHL-listed Properties, and NRHP- and WHR-listed Districts and Properties

Property name, type	Register/List Date/Significance	Period of Significance
Seattle Electric Company Georgetown Steam Plant, building	NHL / 1984 / Criterion C for Engineering	1906–1908, 1917
Pioneer Square--Skid Road Historic District (Including Boundary Increases), district	NRHP / 2008 / Criterion A for Community Planning and Development, Industry, Commerce, Transportation, Politics/Government, and Social History, and Criterion C for Architecture, Landscape Architecture, and Engineering	1889–1931
Triangle Hotel and Bar, building	NRHP / 1976 / Criterion A for Commerce, and Criterion C for Architecture	1909–1910
Old Georgetown City Hall, building	NRHP / 1983 / Criterion A for Politics/Government	1909
A.L. Palmer Building, building	NRHP / 2008 / Criterion A for Commerce and Industry, Criterion B for its association with Alfred L. Palmer, and Criterion C for Architecture	1910
Bay View Brewery, building	NRHP / 2013 / Criterion A for Industry and Commerce, Criterion B for its association with Andrew Hemrich and Emil Sick, and Criterion C for Architecture	1886–1962
Ford Motor Company Assembly Plant, building	NRHP / 2013 / Criterion A for Industry, and Criterion C for Architecture	1932
U.S.S. Nebraska Launching (Skinner and Eddy Shipyard), site	WHR / 1974 / Criterion A for Industry, Transportation, Maritime History, and Military (Naval History)	1904, 1916–1920
First Service Station Site—Seattle, site	WHR / 1970 / Criterion A for Commerce, Industry, and Transportation	1907
Maple Donation Claim, site	WHR / 1970 / Criterion A for Local History (Settlement)	1851
Gorst Field, site	WHR / 1970 / Criterion A for Industry, Commerce, and Transportation, and Criterion C for Engineering	Ca. 1920

Sources: DAHP, 2023.

As noted in the table above, there are 1 National Historic Landmark, which is also listed in the NRHP, 1 NRHP-listed historic district, 5 individually NRHP-listed resources, and 4 WHR-listed resources found in the Duwamish analysis area (**Exhibit 3.9-41**).

Current King County Tax Assessor records show that within the Duwamish area, there are 2,115 historic-period buildings. Of these, 1,052 are residential, including 994 residential buildings (single family dwellings, townhouses, duplexes, triplexes, and fourplexes), 55 apartment buildings, and 3 condominiums. The remaining 1,063 buildings are commercial, industrial, and governmental (**Exhibit 3.9-42**).

In contrast, DAHP records show 2,217 individual historic-period architectural resources have been entered on HPI forms within the Duwamish area. Of these, only 84 were determined NRHP-eligible by DAHP or a federal agency and are plotted on the map (**Exhibit 3.9-42**). Many of these HPI forms were created by data transfer for an Assessors Data Project for King County. The resources in these HPIs were not formally surveyed and recorded, have neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

The discrepancy between the Assessor's and DAHP's records are likely in part due to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

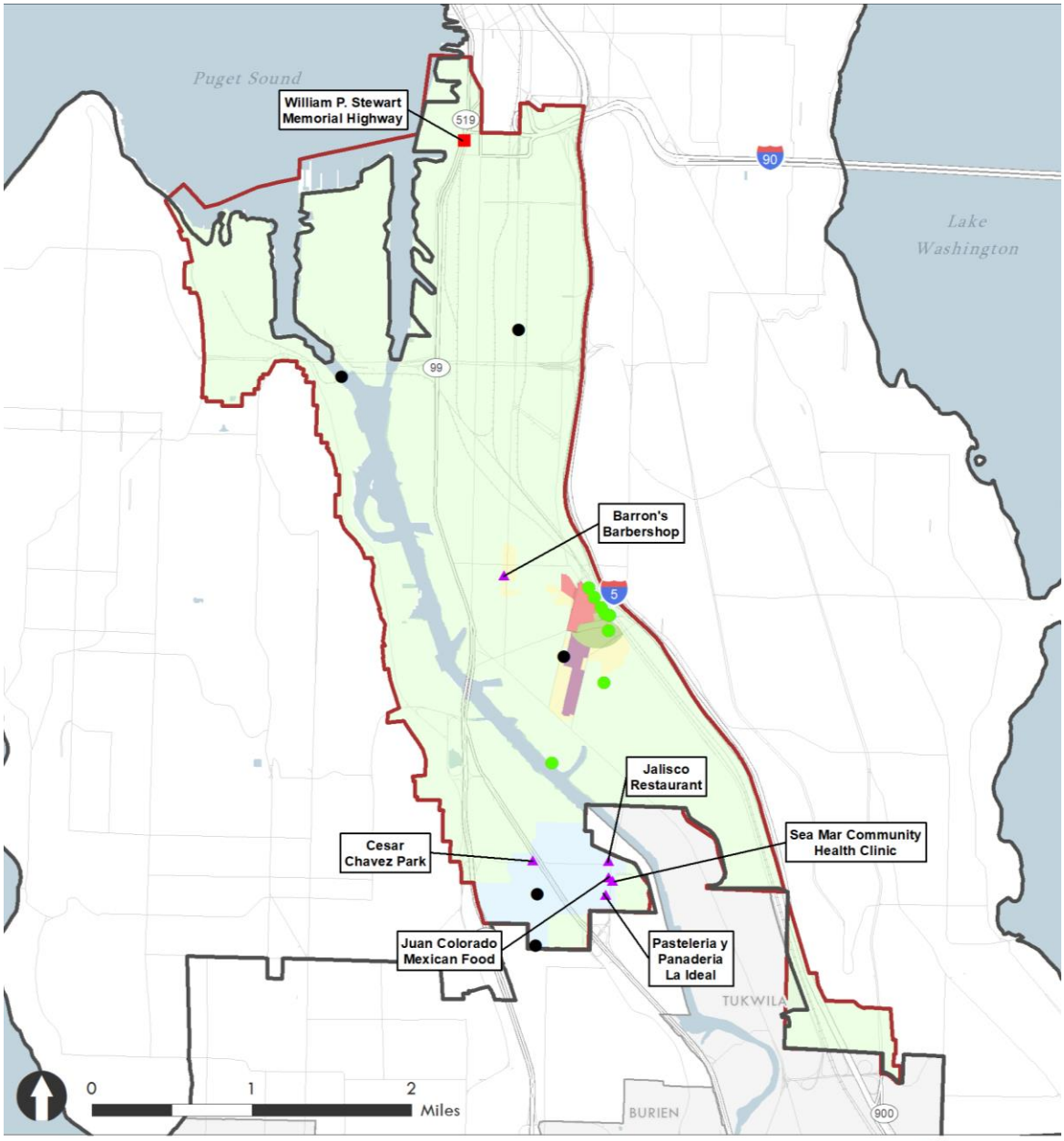
DAHP records show 70 cultural resources studies that included archaeological resources investigations that have been conducted within Analysis Zone 7 since 1995. Seven precontact sites, twenty-nine historic-period sites, and one multicomponent site have been recorded within Analysis Zone 7. One of the precontact sites is listed in the NRHP, one of the precontact sites was determined eligible for listing in the NRHP, nine of the historic-period sites were determined not eligible for listing in the NRHP, and the remaining twenty-six sites have not been formally evaluated for listing in the NRHP. All of Analysis Zone 7 is considered of Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model (**Exhibit 3.9-43**).

Culturally Important Resources

There is 1 Potential Black Commemorative Site in Analysis Zone 7: the William P. Stewart Highway (**Exhibit 3.9-40**) (Source: the Washington State Black Historic Sites Survey).

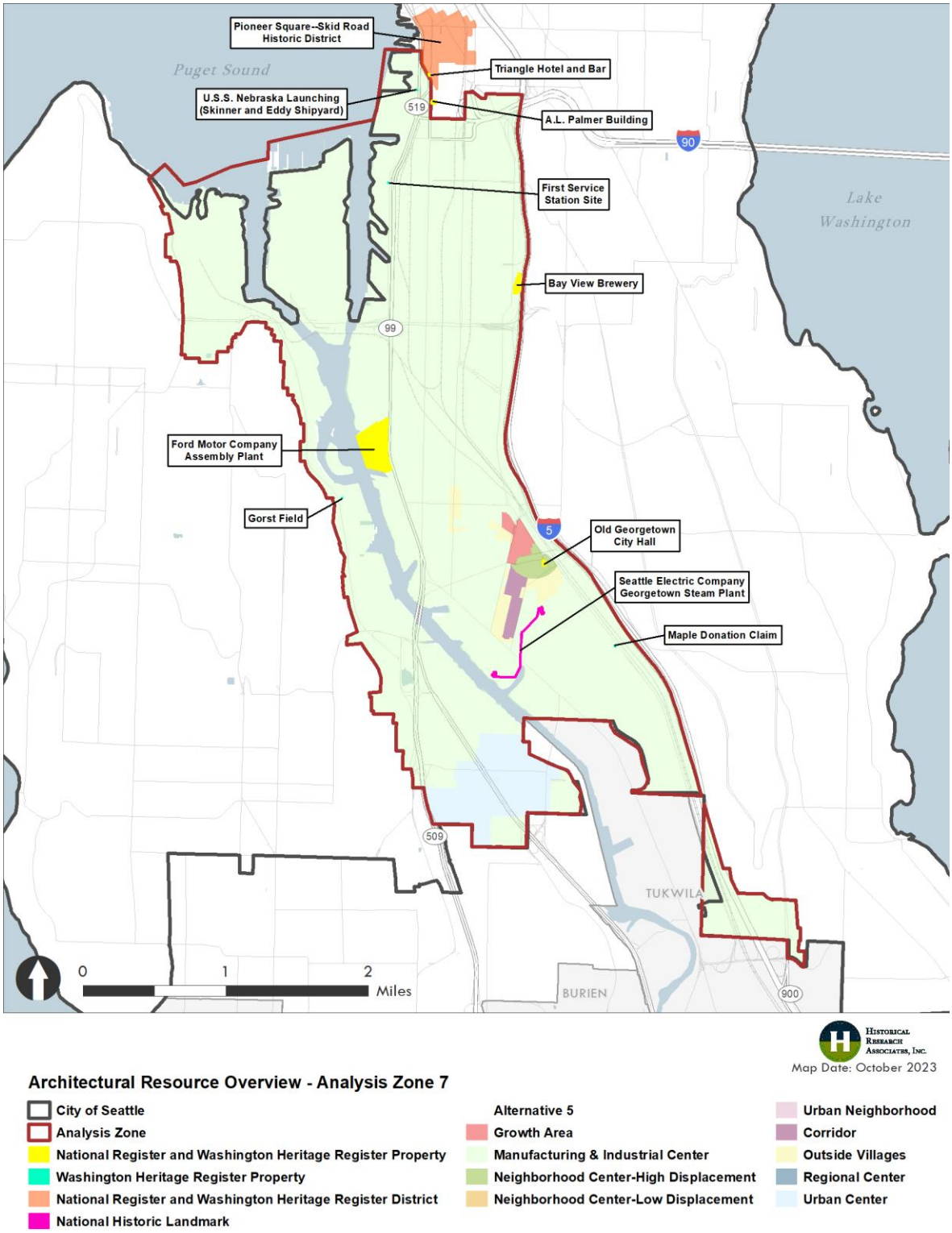
There are 6 Hispanic Historic Sites in Analysis Zone 7, including Barron's Barbershop, Cesar Chavez Park, Jalisco Restaurant, Sea Mar Community Health Clinic, Juan Colorado Mexican Food, and Pasteleria y Panaderia La Ideal (**Exhibit 3.9-40**) (Source: the 2018 Latino Heritage Survey).

Exhibit 3.9-40. Area 7: Duwamish—Designated Seattle Landmarks, Seattle Historic Districts, and Culturally Important Resources



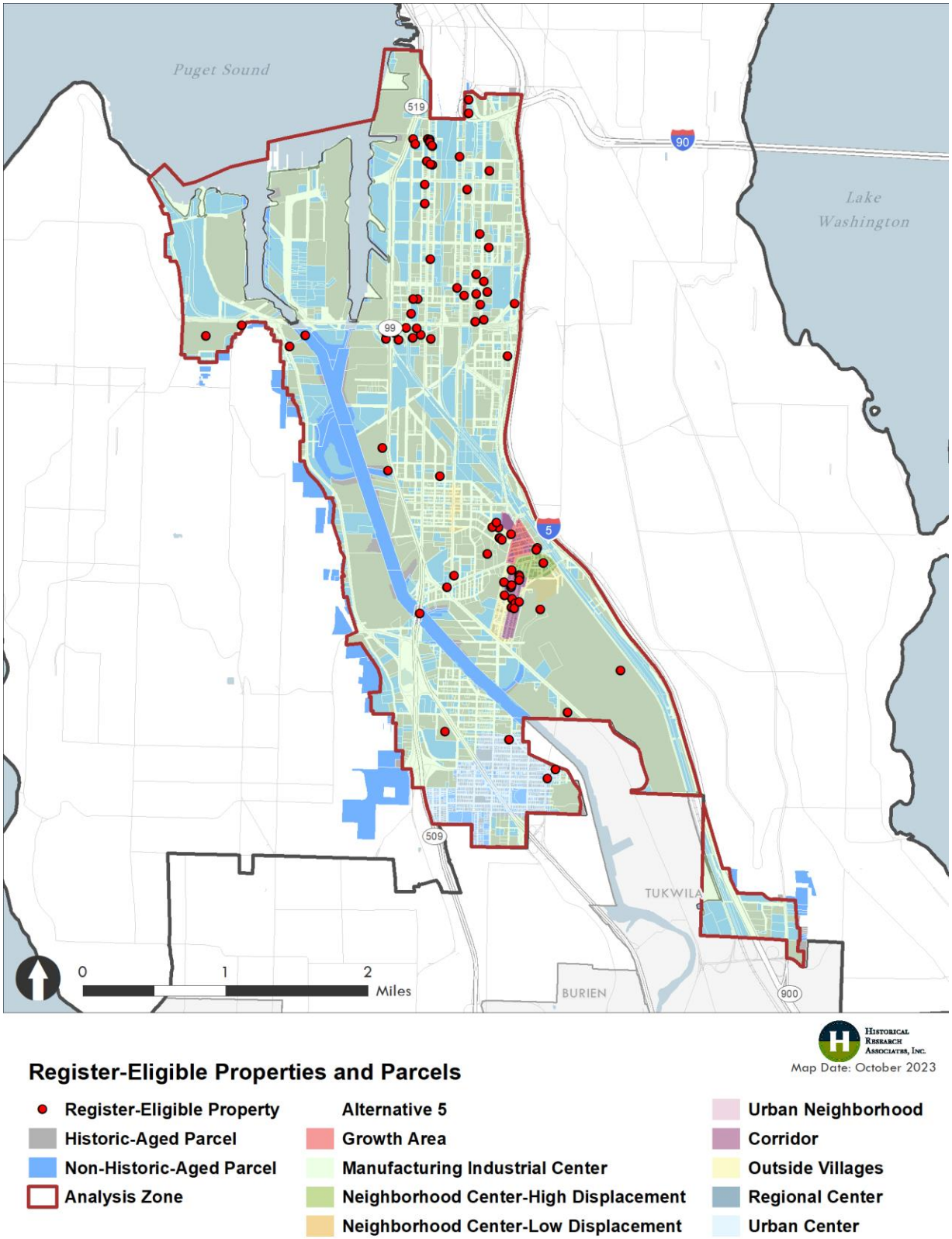
Source: HRA, 2023.

Exhibit 3.9-41. Area 7: Duwamish—NHL-, NRHP- and WHR-Listed Architectural Properties and Districts



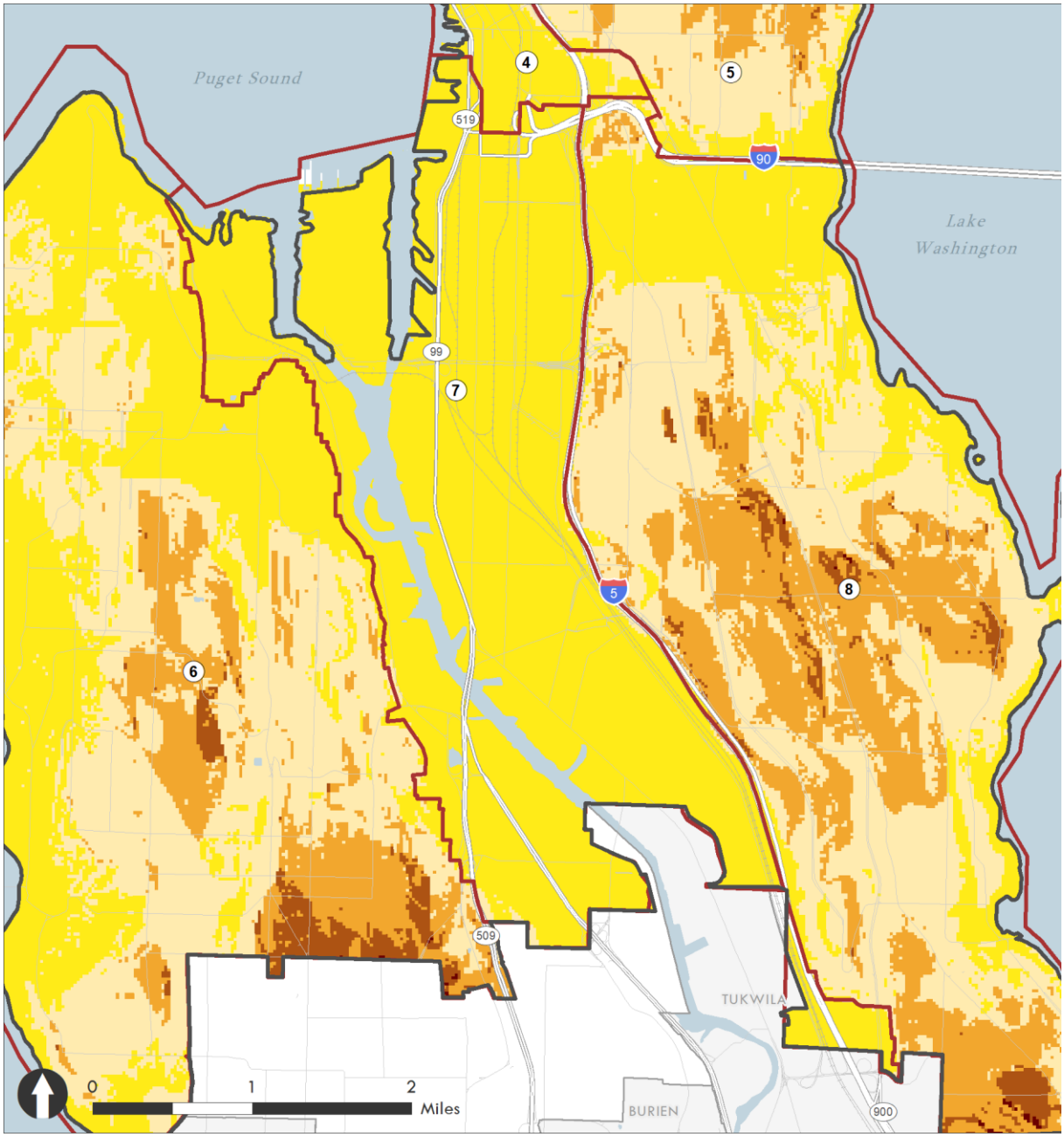
Source: HRA, 2023.

Exhibit 3.9-42. Area 7: Duwamish—Historic-Aged Parcels and NRHP-Eligible Resources



Source: HRA, 2023.

Exhibit 3.9-43. Area 7: Duwamish—Map Showing Archaeological Sensitivity from DAHP Model



BERK
Map Date: December 2022

Archaeological Sensitivity Overview

- City of Seattle
- Analysis Zone
- 1 - Survey Contingent Upon Project Parameters: Low Risk (Color: Brick Red)
- 2 - Survey Contingent Upon Project Parameters: Moderately Low Risk (Color: Burnt Orange)
- 3 - Survey Recommended: Moderate Risk (Color: Orange)
- 4 - Survey Highly Advised: High Risk (Color: Pale Yellow)
- 5 - Survey Highly Advised: Very High Risk (Color: Brightest Yellow/Canary Yellow)

Source: HRA, 2023.

Area 8: SE Seattle

There are 1 Seattle Landmark district and 4 NRHP-listed historic districts located in the SE Seattle analysis area. These resources are listed in the table below (**Exhibit 3.9-44**).

There are a large number of Seattle Landmarks in the SE Seattle area. Adding these resources to the table would create a table that spans a number of pages, so they will be only briefly mentioned here. There are 34 designated Seattle Landmarks in the SE Seattle area. Of these, 17 are residential buildings, 6 are education-related buildings, 2 are religious institutions, 2 are fire stations, 1 is a hospital, 1 is a boulevard, 1 is a street clock, 1 is a bridge, 1 is a garden, 1 is a clubhouse, and 1 is an inn. These resources are significant under a variety of the six standards for designation and **Exhibit 3.9-45**).

Exhibit 3.9-44. Area 8: SE Seattle—SL-designated and NRHP-listed Districts

Property name, type	Register/List Date/Significance	Period of Significance
Columbia City Landmark District, district	SL / 1978 / Criterion A for Development of Seattle, Criterion C for Cultural and Economic Heritage of the Community, and Criterion D for Architecture	1893–1936
Columbia City Historic District, district	NRHP / 2005 / Criterion A for Community Planning and Development, Commerce, Transportation, and Social History, and Criterion C for Architecture	1891–1937
Ellsworth Storey Cottages Historic District, district	NRHP / 1976 / Criterion C for Architecture and Landscape Architecture	1912–1916
Lake Washington Boulevard, district	NRHP / 2017 / Criterion A for Community Planning and Development, Recreation and Culture, and Transportation, and Criterion C for Landscape Architecture	1904–1963
Mount Baker Park Historic District, district	NRHP / 2018/ Criterion A for Community Planning and Development, and Social History, and Criterion C for Architecture and Landscape Architecture	1907–1968

Sources: DAHP, 2023.

There are 14 NRHP-listed and 1 WHR-listed resources found in the SE Seattle analysis area. Of the 15 individually listed resources, 6 are residences, 2 are schools, 2 are sites, 1 is a clubhouse, 1 is a hospital, 1 is a tunnel and 1 is a bridge, which were listed in the NRHP under the *Historic Bridges and Tunnels in Washington State MPD,* and, finally, 1 is a Carnegie library, which was listed in the NRHP under the *Carnegie Libraries of Washington TR* (**Exhibit 3.9-46**).

Current King County Tax Assessor records show that within the SE Seattle area, there are 19,734 historic-period buildings. Of these, 18,827 are residential, including 18,481 residential buildings (single family dwellings, townhouses, duplexes, triplexes, and fourplexes), 319 apartment buildings, and 27 condominiums. The remaining 907 buildings are commercial, industrial, and governmental (**Exhibit 3.9-47**).

In contrast, DAHP records show 15,163 individual historic-period architectural resources have been entered on HPI forms within the SE Seattle area. Of these, only 80 were determined NRHP-eligible by DAHP or a federal agency and are plotted on the map (**Exhibit 3.9-47**). Many of the15,163 HPI forms were created by data transfer for an Assessors Data Project for King County. The resources in these HPIs were not formally surveyed and recorded, have neither eligibility recommendations nor determinations of eligibility, and the forms contain no survey data of any kind.

The discrepancy between the Assessor's and DAHP's records are likely due in part to demolitions that alter County Tax Assessor's records but do not change the records in DAHP's WISAARD database, and/or a lack of up-to-date survey and recordation of historic-period resources on HPI forms in WISAARD.

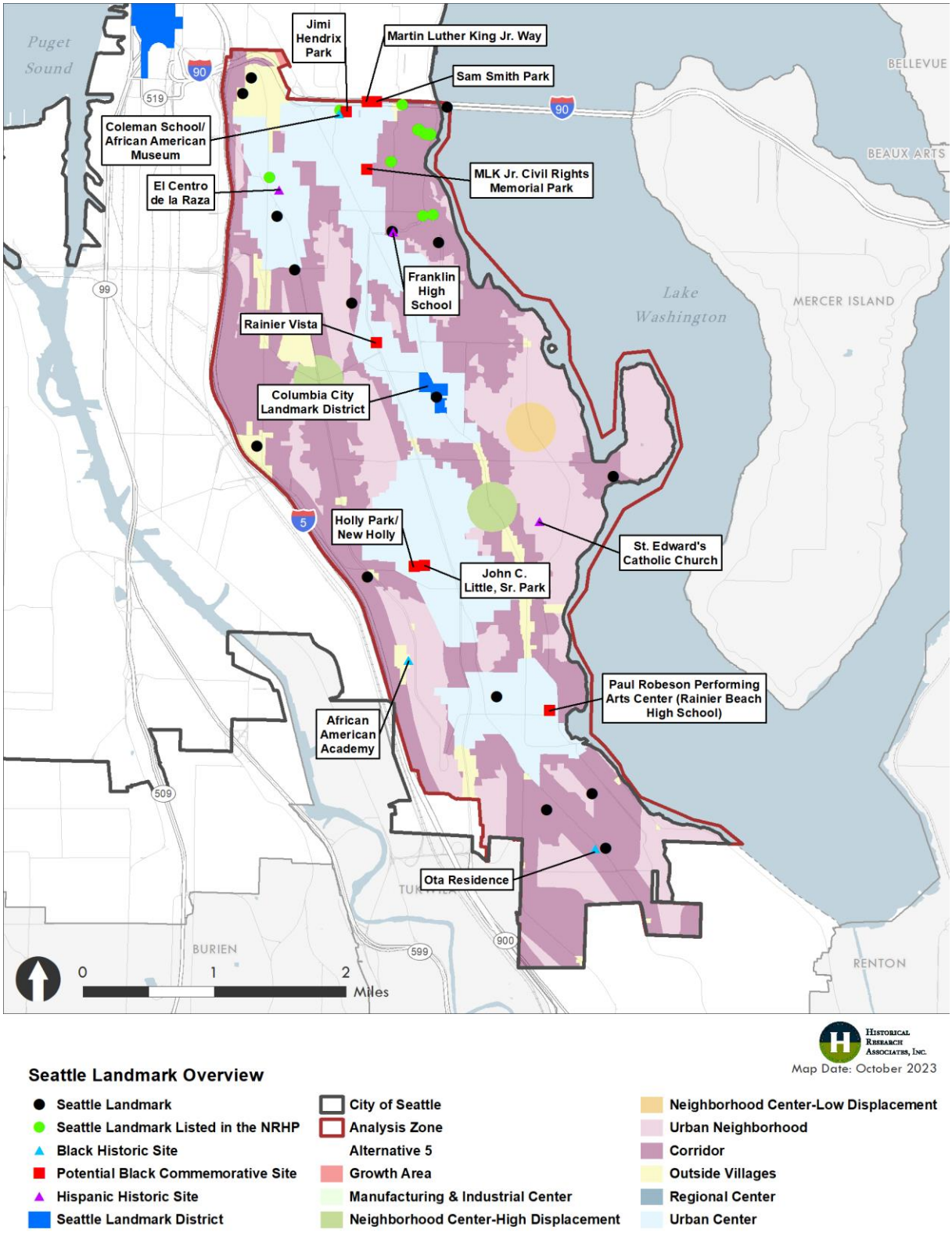
DAHP records show 16 cultural resources studies that included archaeological resources investigations that have been conducted within Analysis Zone 8 since 1995. Seven historic-period sites have been recorded within Analysis Zone 8. One of the sites was determined not eligible for listing in the NRHP and the remaining six sites have not been formally evaluated for listing in the NRHP. Much of Analysis Zone 8 is considered of High to Very High Risk to contain precontact archaeological resources by DAHP's precontact archaeological site probability model. Areas of Moderately Low to Moderate Risk are located in upland settings across the central portion and south end of Analysis Zone 8 (**Exhibit 3.9-48**).

Culturally Important Resources

There are 3 Black Historic Sites in Analysis Zone 8, including the African American Academy, Coleman School/African American Museum (which is a designated Seattle Landmark), and the Ota Residence. There are 8 Potential Black Commemorative Sites in Analysis Zone 8, including John C. Little, Sr. Park, Jimi Hendrix Park, MLK Jr. Civil Rights Memorial Park, Paul Robeson Performing Arts Center (Rainier Beach High School), Rainier Vista, Holly Park/New Holly, Sam Smith Park, and Martin Luther King Jr. Way (**Exhibit 3.9-45**) (Source: the Washington State Black Historic Sites Survey).

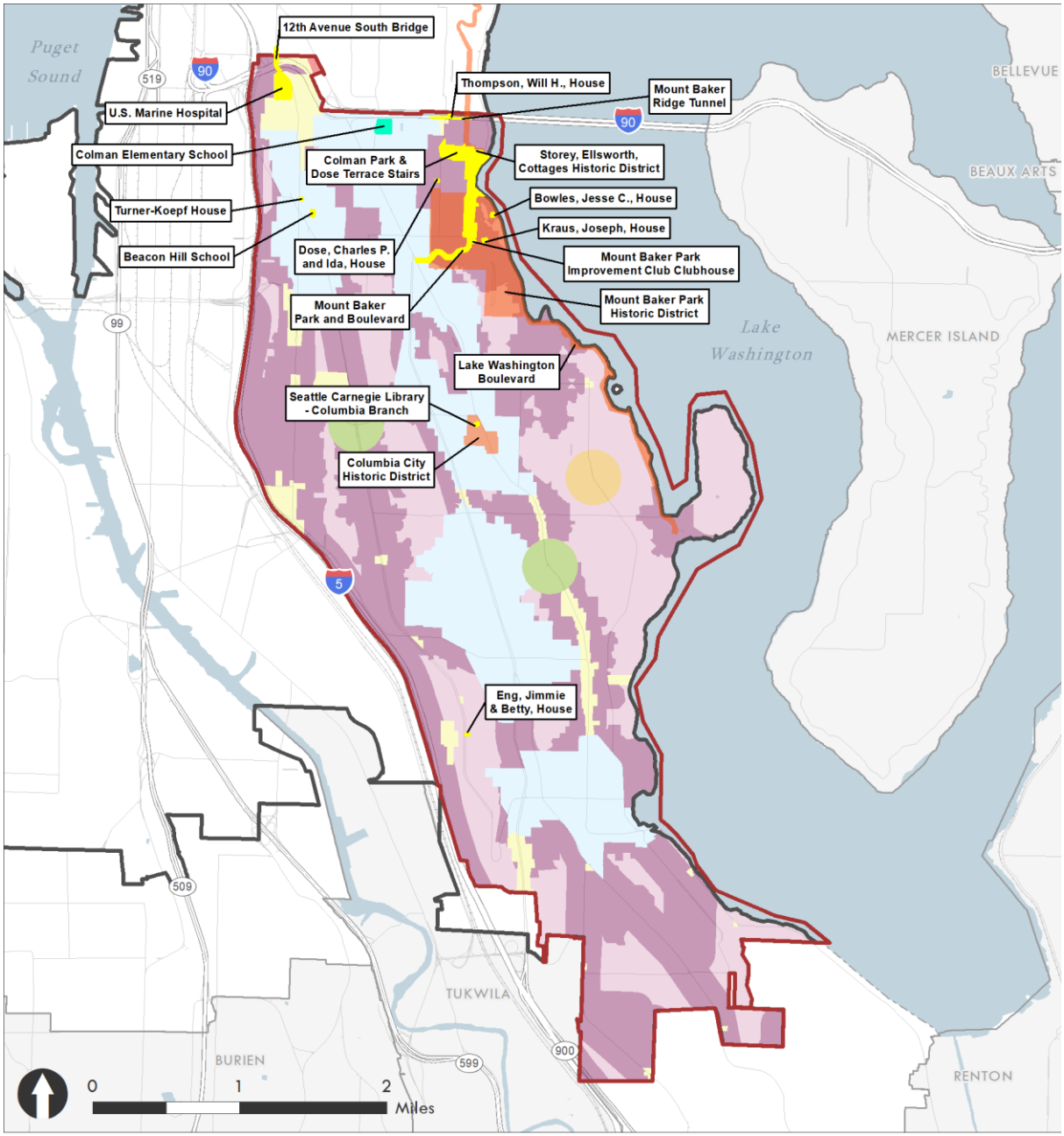
There are 3 Hispanic Historic Sites in Analysis Zone 8, including El Centro de la Raza, Franklin High School, and St. Edward's Catholic Church **Exhibit 3.9-45**) (Source: the 2018 Latino Heritage Survey).

Exhibit 3.9-45. Area 8: SE Seattle—Designated Seattle Landmarks, Seattle Historic Districts, and Culturally Important Resources



Source: HRA, 2023.

Exhibit 3.9-46. Area 8: SE Seattle—NRHP- and WHR-Listed Architectural Properties and Districts



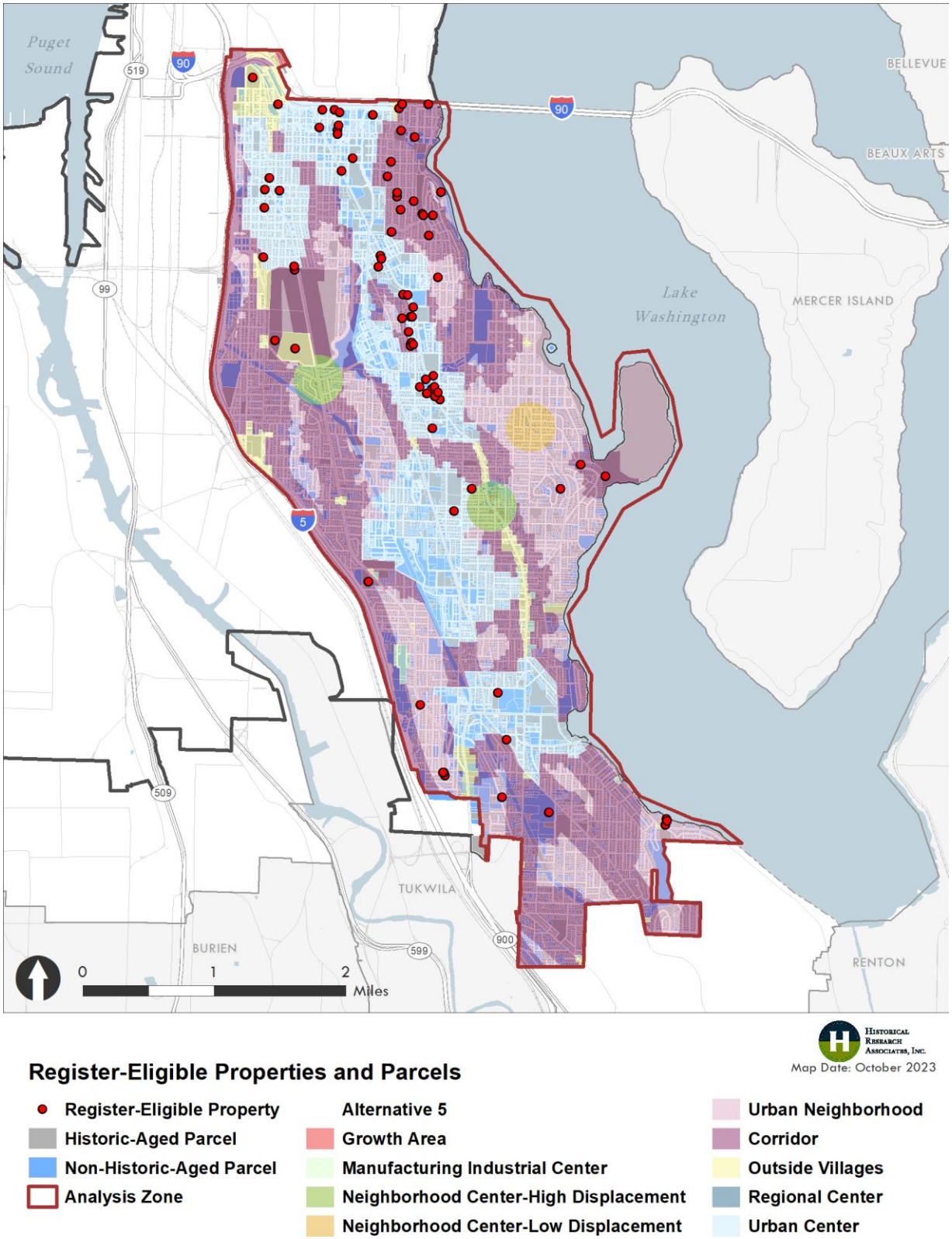
Historical Research Associates, Inc.
Map Date: October 2023

Architectural Resource Overview - Analysis Zone 8

- City of Seattle
- Analysis Zone
- National Register and Washington Heritage Register Property
- Washington Heritage Register Property
- National Register and Washington Heritage Register District
- Alternative 5
- Growth Area
- Manufacturing & Industrial Center
- Neighborhood Center-High Displacement
- Neighborhood Center-Low Displacement
- Urban Neighborhood
- Corridor
- Outside Villages
- Regional Center
- Urban Center

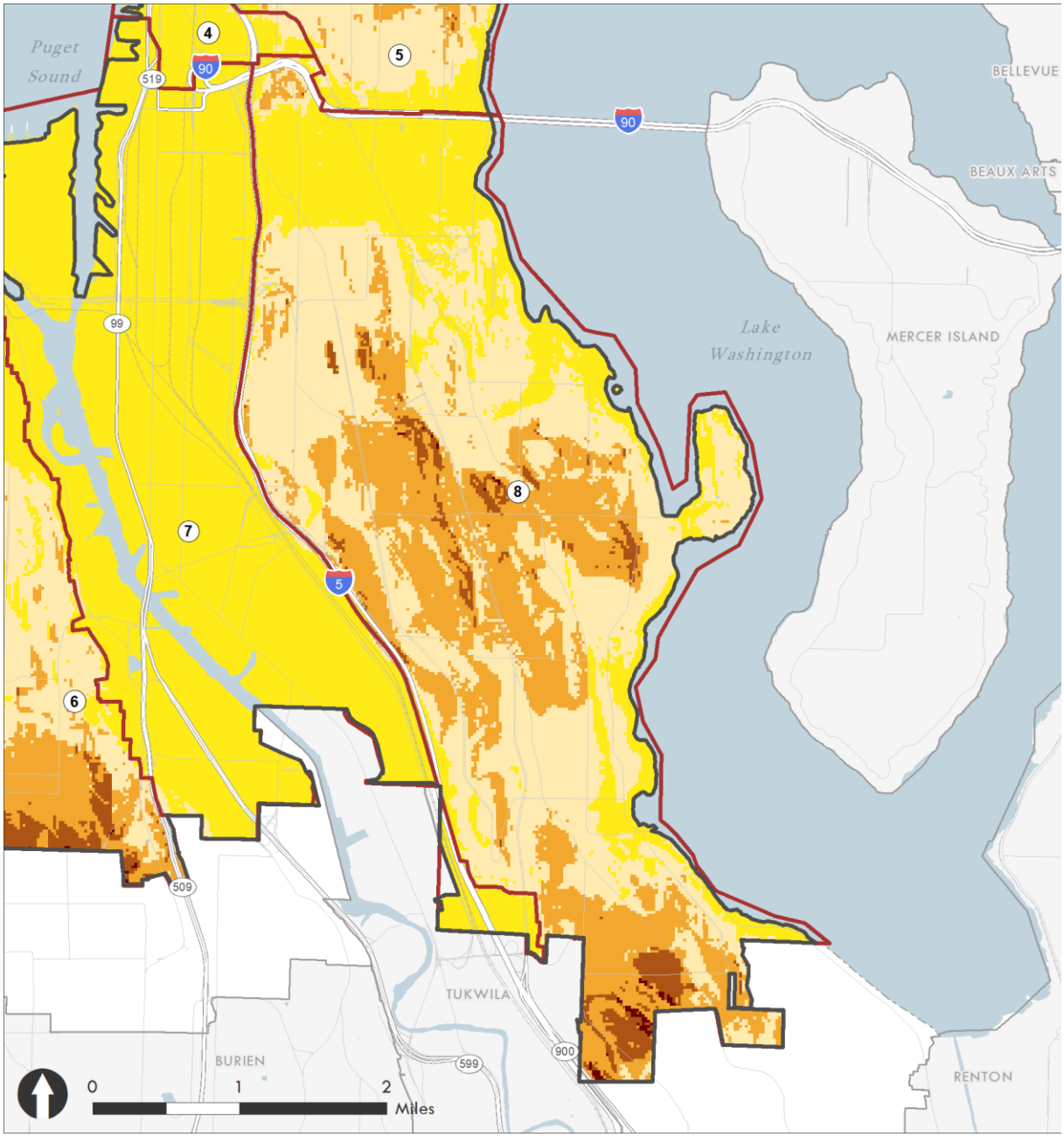
Source: HRA, 2023.

Exhibit 3.9-47. Area 8: SE Seattle—Historic-Aged Parcels and NRHP-Eligible Resources



Source: HRA, 2023.

Exhibit 3.9-48. Area 8: SE Seattle—Map Showing Archaeological Sensitivity from DAHP Model



BERK
Map Date: December 2022

Archaeological Sensitivity Overview

- City of Seattle
- Analysis Zone
- 1 - Survey Contingent Upon Project Parameters: Low Risk (Color: Brick Red)
- 2 - Survey Contingent Upon Project Parameters: Moderately Low Risk (Color: Burnt Orange)
- 3 - Survey Recommended: Moderate Risk (Color: Orange)
- 4 - Survey Highly Advised: High Risk (Color: Pale Yellow)
- 5 - Survey Highly Advised: Very High Risk (Color: Brightest Yellow/Canary Yellow)

Source: HRA, 2023.

3.9.2 Impacts

This section considers the impacts of the alternatives on cultural resources within the study area.

Impacts of the alternatives on cultural resources are considered significant if they result in:

- Substantial adverse changes to, alteration, or loss of a resource that impacts its eligibility for inclusion as an SL, or in the NRHP, NHL program, or the WHR.
- Adverse impacts (potential loss of or alterations to the physical evidence or tangible evidence of cultural history) to Culturally Important Resources (CIR), which for the purposes of this EIS are important to certain cultural groups or communities, whether or not they are listed or eligible for the SL, NRHP, or WHR.

Resources that have been officially determined not eligible for these registers or considered CIR will not be adversely impacted by the proposed alternatives.

Impacts Common to All Alternatives

Full Study Area

All the alternatives have the potential to affect districts, sites, landscapes, or buildings, structures, objects (BSOs) that have been designated as an SL or listed in the NRHP and WHR, and those resources that have been determined eligible for listing in the NRHP. Additionally, the alternatives could potentially affect the numerous BSOs and unidentified archaeological sites that have yet to be surveyed and assessed for potential eligibility for listing in the registers.

Impacts to cultural resources in the study areas from the No Action Alternative and four action alternatives were identified by assessing potential for both above- and below-ground changes. Such impacts generally include physical alteration, damage, or destruction of all or part of a resource; alteration of the characteristics of the surrounding environment that contribute to the property's significance; the introduction of visual or audible elements that are out of character with the property; and in the case of designated SLs, obstruction of protected public views of historic landmarks designated by the Landmarks Preservation Board. In other words, impacts are actions that would alter, directly or indirectly, any of the characteristics of a historic property in such a way that would diminish its integrity of location, design, setting, materials, workmanship, feeling, and association, and would affect its eligibility to qualify for inclusion in the NRHP or other historic registers have the potential to impact cultural resources.

Some of the action alternatives include proposed land-use changes such as allowing a wider range of housing options in residential zones and expanding housing choices; incentivizing development and densification of housing with stacked flats and multi-story, multi-family buildings; and some areas of mixed-use residential construction in selected locations (see **Exhibit 3.9-3**). Historic-period BSOs located in the study area could be subject to demolition

for new construction, incompatible alterations/additions, and inappropriate renovation of existing buildings for reuse under all alternatives. Such demolition and construction projects could require substantial below-ground work, thus negatively and irreversibly impacting below-ground archaeological and cultural resources. DAHP's archaeological predictive model, used to establish probabilities for precontact cultural resources, depicts much of the land within the study area as within a High or Very High Risk area, primarily because of proximity of Puget Sound, Salmon Bay, Lake Union, Elliott Bay, and the Duwamish River, and the use-history throughout the precontact and historic periods.

Additionally, Washington SEPA allows some projects to be exempt from SEPA review. SEPA exemptions vary by location, zone, and use. While SEPA review considers impacts from alterations to an SL (project must be reviewed and a Certificate of Approval issued by the Department of Neighborhoods [DON]/SL District Board) and impacts for projects that are adjacent to SLs (or across the street), some exempted projects are not subject to the same review and could impact cultural resources (Seattle Department of Construction and Inspections [SDCI] 2022; Seattle Department of Neighborhoods 2015).

Since development may occur in any location in the study area under any alternative, it is possible that cultural resources could be impacted under each alternative. Changes to zoning that allow a wider range of residential and/or commercial growth could spur redevelopment in those locations. This could occur, for example, where the focused growth within neighborhood centers would allow for a wide range of housing types and commercial space or within Neighborhood Residential zones where the broad expansion of housing options would allow for and possibly incentivize increased density on larger lots throughout the study area. Even where there are no formally designated historic properties, there are numerous properties with historic-period buildings, many of which have never been formally surveyed and evaluated for eligibility but could potentially qualify for designation as an SL or listing in the NRHP. Many are located in an area with a High or Very High Risk of archaeological resources.

Area 1: NW Seattle

All alternatives have the potential to affect the known and unknown cultural resources in the NW Seattle area. The NW Seattle area contains 3 NRHP-listed historic districts, 14 individually listed resources, 2 WHR-listed resources, 32 SL-designated resources, and 34,045 historic-period buildings and structures, 59 of which have been determined eligible for listing in the NRHP. Survey has identified 1 Black historic site, 2 potential Black commemorative sites, and 1 Hispanic historic site within the NW Seattle area. Due to the area's concentration of historic-period BSOs—many of which have yet to be surveyed and evaluated for eligibility—it is plausible that many could potentially be determined eligible for listing in the NRHP and local registers, and additional CIRs. In the NW Seattle area, 8 known archaeological sites have been previously recorded; however, due to the area's mix of Moderate to Very High Risk for archaeological and cultural resources, many more as yet unknown sites could be present.

Area 2: NE Seattle

All alternatives have the potential to affect the known and unknown cultural resources in the NE Seattle area. The NE Seattle area contains 3 NRHP-listed historic districts, 18 individually listed resources, 9 WHR-listed resources, 39 SL-designated resources, and 28,352 historic-period buildings and structures, 140 of which have been determined eligible for listing in the NRHP. Survey has identified 2 Hispanic historic sites within the NE Seattle area. Due to the area's concentration of historic-period BSOs—many of which have yet to be surveyed and evaluated for eligibility—it is plausible that many could be determined eligible for listing in the NRHP and local registers, and additional CIRs. In the NE Seattle area, 10 archaeological sites have been previously recorded; however, due to the area's mix of Moderate to Very High Risk for archaeological and cultural resources, many more as yet unknown sites could be present.

130th/145th Station Area

All alternatives have the potential to affect the known and unknown cultural resources in the 130th/145th Station Area. While there are no NRHP- or WHR-listed historic districts or individually listed resources found within the 130th/145th Station Area, there are 3 SL-designated resources. Within the station area there are 5,260 historic-period buildings and structures, 2 of which have been determined eligible for listing in the NRHP. Due to the area's concentration of historic-period BSOs—most of which have yet to be surveyed and evaluated for eligibility—it is plausible that many could be determined eligible for listing in the NRHP and local registers. In the 130th/145th station area, 1 archaeological site has been previously recorded. However, due to the area's Moderate to Very High Risk for archaeological and cultural resources, many more as yet unknown sites could be present.

Area 3: Queen Anne/Magnolia

All alternatives have the potential to affect the known and unknown cultural resources in the Queen Anne/Magnolia area. The Queen Anne/Magnolia area contains 3 NRHP-listed historic districts, 19 individually listed resources, 4 WHR-listed resources, 59 SL-designated resources, and 12,546 historic-period buildings and structures, 120 of which have been determined eligible for listing in the NRHP. Survey has identified 1 Black Historic Site and 1 Potential Black Commemorative Site within the Queen Anne/Magnolia area. Due to the area's concentration of historic-period BSOs—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers, and additional CIRs. In the Queen Anne/Magnolia area 14 archaeological sites have been previously recorded; however, due to the area's Very High Risk for archaeological and cultural resources, many more as yet unknown sites could be present.

Area 4: Downtown/Lake Union

All alternatives have the potential to affect the known and unknown cultural resources in the Downtown/Lake Union area. Found within the Downtown/Lake Union area are 6 NHLs, 3

NRHP-listed historic districts, 80 individually listed resources, 1 WHR-listed historic district, 20 individually listed WHR resources, 155 SL-designated resources, and 1,711 historic-period buildings and structures, 278 of which have been determined eligible for listing in the NRHP. Survey has identified 1 Black Historic Site and 1 Potential Black Commemorative Site within the Downtown/Lake Union area. Due to the area's concentration of historic-period BSOs—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers, and additional CIRs. In the Downtown/Lake Union area 1 historic archaeological site was listed in the NRHP and WHR and 35 historic-period sites have been previously recorded. Of these, 2 have been determined eligible for the NRHP. Due to the area's Very High Risk for archaeological and cultural resources, many more as yet unknown sites could be present.

Area 5: Capitol Hill/Central District

All alternatives have the potential to affect the known and unknown cultural resources in the Capitol Hill/Central District area. The Capitol Hill/Central District area contains 7 NRHP-listed historic districts, 46 individually listed resources, 7 WHR-listed resources, 117 SL-designated resources, and 14,100 historic-period buildings and structures, 399 of which have been determined eligible for listing in the NRHP. Survey has identified 25 Black Historic Sites, 16 Potential Black Commemorative Sites, and 3 Hispanic Historic Sites within the Capitol Hill/Central District area. Due to the area's concentration of historic-period BSOs—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers, and additional CIRs. In the Capitol Hill/Central District area, 14 archaeological sites have been previously recorded, with 1 determined eligible for listing in the NRHP. However, due to the area's Moderate to Very High Risk for archaeological and cultural resources, many more as yet unknown sites could be present.

Area 6: West Seattle

All alternatives have the potential to affect the known and unknown cultural resources in the West Seattle area. The West Seattle area contains 4 individually NRHP-listed resources, 1 WHR-listed resource, 24 SL-designated resources, and 22,764 historic-period buildings and structures, 48 of which have been determined eligible for listing in the NRHP. Survey has identified 2 Potential Black Commemorative Sites and 3 Hispanic Historic Sites in the West Seattle Area. Due to the area's concentration of historic-period BSOs—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers, and additional CIRs. In the West Seattle area, 8 archaeological sites have been previously recorded, with none yet determined eligible for listing in the NRHP. However, due to the area's High to Very High Risk for archaeological and cultural resources, many more as yet unknown sites could be present.

Area 7: Duwamish

All alternatives have the potential to affect the known and unknown cultural resources in the Duwamish area. Found within the Duwamish area is 1 NHL, 1 NRHP-listed historic district, 5 individually listed resources, 4 WHR-listed resources, 14 SL-designated resources, and 2,115 historic-period buildings and structures, 84 of which have been determined eligible for listing in the NRHP. Survey has identified 1 Potential Black Commemorative Site and 6 Hispanic Historic Sites in the Duwamish area. Due to the area's concentration of historic-period BSOs—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers, and additional CIRs. In the Duwamish area, 38 archaeological sites have been previously recorded, with 1 precontact site listed in the NRHP and 1 precontact site determined eligible for listing in the NRHP. However, due to the area's Very High Risk for archaeological and cultural resources, many more as yet unknown sites could be present.

Area 8: SE Seattle

All alternatives have the potential to affect the known and unknown cultural resources in the SE Seattle area. Found within the SE Seattle area are 4 NRHP-listed historic districts, 14 individually listed resources, 1 WHR-listed resource, 34 SL-designated resources, and 19,734 historic-period buildings and structures, 80 of which have been determined eligible for listing in the NRHP. Survey has identified 3 Black Historic Sites, 8 Potential Black Commemorative Sites, and 3 Hispanic Historic Sites in SE Seattle area. Due to the area's concentration of historic-period BSOs—many of which have yet to be surveyed—it is plausible that many could be determined eligible for listing in the NRHP and local registers, and additional CIRs. In the SE Seattle area, 7 archaeological sites have been previously recorded, with none determined eligible for listing in the NRHP. However, due to the area's Moderate to Very High Risk for archaeological and cultural resources, many more as yet unknown sites could be present.

Equity & Climate Vulnerability Considerations

In 2015, Seattle established the City of Seattle Equity and Environment Initiative (EEI) to address the connection between race and social justice and the environment. The Community Partners Steering Committee (CPSC), working with City staff, defined EEI populations as people of color, immigrants, refugees, people with low incomes, and people with limited-English proficiency (CPSC 2016:1–8). Studies by the National Trust for Historic Preservation (NTHP) have noted that while rezoning and redevelopment can address some of the particular issues in neighborhoods with high EEI populations of historically marginalized communities, such as poor air and water quality, soil contamination, noise pollution, climate change, and unsafe, disconnected, and inaccessible neighborhoods, some of the land use strategies could lead to adverse impacts such as the loss of historic and culturally important resources (CIRs) that have yet to be identified and documented within these communities (Canaan et al. 2021:54–55; NTHP 2021:10; Rypkema 2004).

Under all alternatives, should redevelopment occur within high EEI population neighborhoods in the study areas, benefits could be realized such as reinvestment in aging buildings, increased levels of homeownership/business ownership in newly rehabilitated buildings, and renovation/adaptive re-use of vacant and abandoned properties. However, there could also be adverse impacts from these benefits such as rising rents and property taxes, loss of "power" and "ownership" by long-term residents, and rising potential for conflicting priorities between new and long-term residents (Ryberg 2010:265–266; Rypkema 2004). These adverse impacts disproportionately affect EEI populations.

Analysis indicates that all alternatives have the potential to affect historic and cultural resources through development/redevelopment in historically marginalized neighborhoods in the study areas. Specifically, impacts to historic-period architectural resources could occur under all alternatives as a result of alteration, demolition, damage, or destruction to historic buildings associated with increased economic activity. Reinvestment may raise the cost of living, displacing long-term residents and weakening cultural cohesion. In addition, development under all alternatives could increase the probability of inadvertent discovery of archaeological and cultural resources because of foundation, circulation, and landscaping work.

Additionally, Indigenous populations may lose access to both known and potentially unrecorded cultural or spiritual sites due to redevelopment on their traditional lands in the study areas. As the locations of such resources are considered restricted information, specifics will not be discussed here without permission from the appropriate Tribes.

The Seattle area has experienced intensified weather events including heat, rain, snow, and flooding. These trends will doubtless continue due to Seattle's proximity to waterways. Impacts associated with intensified weather events (sea level rise, flooding, extreme storms, erosion, etc.) can potentially damage historic and cultural resources—both previously identified and as yet unknown (Calhoun 2023; CIG 2009:6–20; de Leon 2022; Seattle City Light 2015).

Impacts of Alternative 1: No Action

Alternative 1 No Action, maintains the status quo, with no changes to current Comprehensive Plan policies, development standards, or zoning, and with most housing and jobs remaining within existing regional centers (previously urban centers) and urban centers (previously urban villages) with no change to land use patterns. Under this alternative, new housing will continue to be primarily rental apartments concentrated in existing mixed-use areas. Most of the land outside of the regional centers and urban centers will remain limited to detached houses.

Development projects due to market pressures under Alternative 1 No Action would continue to affect cultural resources, with such impacts as alteration, demolition, damage, or destruction. Alternative 1 No Action includes no additional protections or improvements in planning for consideration of impacts to cultural resources.

130th/145th Station Area

In the 130th/145th Station Area, NR zoning would continue to allow three-story, single-purpose residential development around the future light rail station at 130th Street and some four- to eight-story, multifamily development near the 145th Street BRT station. The blocks around 130th Street would see an additional 194 housing units and 646 units would be developed at 145th Street.

Development projects due to market pressures under Alternative 1 No Action would continue to affect cultural resources, with such impacts as alteration, demolition, damage, or destruction. Alternative 1 No Action includes no additional protections or improvements in planning for consideration of impacts to cultural resources.

Impacts of Alternative 2: Focused

Alternative 2 identifies specific locations for areas of focused growth (known as neighborhood centers) creating more housing around shops and services. Within neighborhood centers (previously neighborhood anchors), this alternative would allow a variety of housing options including duplexes, triplexes, fourplexes, sixplexes/three-story stacked flats, townhouses/rowhouses, and up to seven-story apartment buildings. Similar to urban centers (previously urban villages), which also allow for a wide range of housing types and commercial space, neighborhood centers would have a smaller geographic size and lower intensity of allowed development than urban centers. This alternative would result in a greater range of housing options with amenities and services in many neighborhoods with more constraints on growth than Alternatives 3, 4, and 5. Regional centers (previously urban centers) and urban centers (previously urban villages), would gain up to 80,000 housing units, while neighborhood centers could gain up to 20,000 housing units with a mix of residential and mixed-use development. All neighborhood centers already contain areas zoned for commercial or mixed-use development; however, the City expects additional jobs and commercial space in these areas might increase more quickly due to the local demand for new housing.

Alternative 2 focuses housing growth around existing retail/commercial spaces. Typically, the neighborhood centers will be located in places where similar commercial, neighborhood commercial, and low-rise multi-family zoning is applied today but with expanded use allowances and development standards. These new neighborhood centers could incentivize development to increase floor area and height limits allowing construction of dense multi-story buildings. Most residential growth under Alternative 2 would be in regional centers and neighborhood centers (low displacement risk), with most growth located in areas 4 (Downtown/Lake Union), 1 (NW Seattle), and 2 (NE Seattle). As described in the Affected Environment and mapped in **Exhibit 3.9-1,** some new neighborhood centers contain or abut listed historic properties or recorded archaeological resources, or contain mapped resources sensitivity areas (e.g., High to Very High Risk of archaeological and cultural sensitivity), such as within the Loyal Heights and Upper Fremont (NW Seattle), Wedgwood and Sand Point Way (NE Seattle), Magnolia and Nickerson (Queen Anne/Magnolia), Montlake, Madrona, and Squire Park

(Capitol Hill/Central District), Alki, North Delridge/Youngstown, and Gatewood (W Seattle), and Georgetown (Duwamish) neighborhood centers.

Impacts to cultural resources could occur under Alternative 2 as a result of alteration, demolition, damage, or destruction. In addition, development under Alternative 2 could increase the probability of inadvertent discovery of below-ground archaeological and cultural resources as compared to Alternative 1 No Action because of substantial foundation work needed for multi-story buildings. Alternative 2 includes no additional protections or planning improvements to account for impacts to cultural resources. Additionally, some allowed adaptive reuse projects could impact historic-period architectural resources by allowing for inappropriate alterations, changes, additions, and loss of character-defining features and historic building materials that could diminish the building's ability to qualify as a designated SL or for listing in the NRHP.

130th/145th Station Area

In the 130th/145th Station Area, Alternative 2 would designate three neighborhood centers near 130th Street and Roosevelt Way, 125th Street and 15th Avenue, and 145th Street and 15th Avenue, clustering denser, taller buildings and growth near transit. These neighborhood centers would include a mix of low-rise residential, mid-rise residential, and neighborhood commercial (NC3), which includes commercial, office, multi-story mixed use, and residential building types, with no size limits for most commercial uses. Development would be more mixed-use near the 145th Station Area (with NC3) compared to Alternative 1. Building heights would be allowed up to 75 feet. The area would see 2,208 new housing units and 979 new jobs. Development projects under Alternative 2 could affect cultural resources, with such impacts as alteration, demolition, damage, or destruction.

Impacts of Alternative 3: Broad

Alternative 3 allows a wider range of low-scale housing options, such as detached and attached homes (duplexes, triplexes and fourplexes), as well as three-story stacked flats such as sixplexes on larger lots in all NR zones across the city. A three-story height limit will continue to apply to market-rate development in these areas; however, the City will also study potential height, floor area, or density incentives for affordable housing projects. Existing regional centers (previously urban centers) and urban centers (previously urban villages)would gain up to 80,000 housing units, while the urban neighborhood areas would see up to 20,000 additional housing units in new housing types. Additionally, the distribution of jobs and commercial space may shift toward existing urban neighborhood areas to reflect local demand. The City will also consider allowing more flexibility for commercial space in these areas, such as corner stores, or easing the way for at-home businesses.

Alternative 3 includes some areas of zoning change such as increased or altered boundaries of urban centers, which could incentivize development to increase floor area and height limits allowing construction of dense multi-story buildings. Most residential growth under Alternative

3 would be in regional centers and neighborhood centers (low displacement risk), with most growth located in areas 2 (NE Seattle), 4 (Downtown/Lake Union), and 1 (NW Seattle). As described in the Affected Environment and mapped in **Exhibit 3.9-1,** growth will occur in the areas that contain or abut listed historic properties or recorded archaeological resources, or contain mapped resources sensitivity areas (e.g., High to Very High Risk of archaeological and cultural sensitivity) in NR zones across the city. Insufficient formal survey and inventory has been undertaken in many of the NR zones across the city, leaving broad swaths of historic-period single-family and small-scale multi-family residential buildings as-yet unidentified or evaluated, and thus vulnerable to impacts from development.

As described in the Affected Environment and mapped in **Exhibit 3.9-1,** there are designated SLs, NRHP- and WHR-listed properties and mapped resources sensitivity areas (e.g., High to Very High Risk of archaeological and cultural sensitivity) across the city within the NR zones (previously NR zones), such as Dunn Gardens (NRHP-listed) (NW Seattle), James and Pat Chiarelli House (designated SL and NRHP-listed) and the Julian and Marajane Barksdale House (NRHP-listed) (NE Seattle), Fort Lawton Landmark District (designated SL) (Queen Anne/Magnolia), Harvard-Belmont Historic District (designated SL and NRHP-listed) and Frink Park (NRHP-listed) (Capitol Hill/Central District), Schmitz Park Bridge (designated SL and NRHP-listed) (W Seattle), and Joseph Kraus House (designated SL and NRHP-listed) (SE Seattle).

Impacts to cultural resources could occur under Alternative 3 as a result of alteration, demolition, damage, or destruction. In addition, development under Alternative 3 could increase the probability of inadvertent discovery of below ground archaeological and cultural resources as compared to Alternative 1 No Action because of substantial foundation work needed for multi-story buildings. Alternative 3 includes no additional protections or planning improvements to account for impacts to cultural resources. Additionally, some allowed adaptive reuse projects could impact historic-period architectural resources by allowing for inappropriate alterations, changes, additions, and loss of character-defining features and historic building materials that could diminish the building's ability to qualify as a designated SL or for listing in the NRHP.

130th/145th Station Area

In the 130th/145th Station Area, Alternative 3 would develop based on the citywide framework. Current regional centers and urban centers would remain in the study area with more flexibility in urban neighborhood areas for "missing middle" housing and small areas of commercial/residential. As with other alternatives, development projects under Alternative 3 could affect cultural resources, with such impacts as alteration, demolition, damage, or destruction. Alternative 3 includes no additional protections or improvements in planning for consideration of impacts to cultural resources.

Impacts of Alternative 4: Corridor

Alternative 4 will allow a wider range of housing options than other action alternatives but only in corridors**,** which can focus growth near transit, shops, large parks, and services. Under this alternative, corridors include about half the areas currently zoned NR. Within corridors, this alternative would allow a variety of housing options including detached homes, duplexes, triplexes, fourplexes, sixplexes/3-story stacked flats, townhouses/rowhouses, and up to 5-story apartments. The proposed corridors also include some areas currently zoned for multifamily and commercial development that could allow increases in building height. Existing regional centers (previously urban centers) and urban centers (previously urban villages)would gain up to 80,000 housing units, while the corridors would see up to 20,000 additional housing units in new housing types. Additionally, the distribution of jobs and commercial space may shift toward transit corridors to correspond with the location of housing growth.

Alternative 4 focuses residential growth along corridors in close proximity to transit stations, commercial and retail spaces, parks, and services, and includes some areas of zoning change such as increased or altered boundaries for urban centers, which could incentivize development to increase floor area and height limits, allowing construction of dense multi-story buildings. Most residential growth under Alternative 4 would be in urban centers and corridors, with most growth located in areas 2 (NE Seattle), 4 (Downtown/Lake Union), and 1 (NW Seattle). As described in the Affected Environment and mapped in **Exhibit 3.9-1,** growth will occur in the areas that contain or abut listed historic properties or recorded archaeological resources, or contain mapped resources sensitivity areas (e.g., High to Very High Risk of archaeological and cultural sensitivity), possibly impacting such cultural resources as the John B. Allen School (designated SL and NRHP-listed) and the Christ the King Catholic Church (CIR) (NW Seattle), the Bryant Elementary School (designated SL) and the Henry Owen Shuey House (designated SL and NRHP-listed) (NE Seattle), Magnolia Public Library (designated SL and NRHP-listed) and the (former) Seventh Church of Christ (designated SL) (Magnolia/Queen Anne), Samuel Hyde House (designated SL and NRHP-listed), Volunteer Park (designated SL and NRHP-listed), Millionaire's Row Historic District (NRHP-listed), Moore Mansion and Bordeaux House (designated SLs) (Capitol Hill/Central District), Fauntleroy Community Church and YMCA (designated SL) (W Seattle), Hat 'n Boots (designated SL) (Duwamish), and Van Asselt School and Old Fire Station #33 (designated SLs), Ota Residence (CIR), and the Jimmie and Betty Eng House (NRHP-listed) (SE Seattle).

Impacts to cultural resources could occur under Alternative 4 as a result of alteration, demolition, damage, or destruction. In addition, development under Alternative 4 could increase the probability of inadvertent discovery of below ground archaeological and cultural resources as compared to Alternative 1 No Action because of substantial foundation work needed for multi-story buildings. Alternative 4 includes no additional protections or planning improvements to account for impacts to cultural resources. Additionally, some allowed adaptive reuse projects could impact historic-period architectural resources by allowing for inappropriate alterations, changes, additions, and loss of character-defining features and historic building materials that could diminish the building's ability to qualify as a designated SL or for listing in the NRHP.

130th/145th Station Area

The station areas would develop based on the citywide framework. As with other alternatives, development projects under Alternative 4 could affect cultural resources, with such impacts as alteration, demolition, damage, or destruction. As described in the Affected Environment and mapped in **Exhibit 3.9-1,** growth will occur in the corridors that contain or abut listed historic properties or recorded archaeological resources, or contain mapped resources sensitivity areas (e.g., High to Very High Risk of archaeological and cultural sensitivity), possibly impacting such cultural resources as Ingraham High School (designated SL). Alternative 4 includes no additional protections or improvements in planning for consideration of impacts to cultural resources.

Impacts of Alternative 5: Combined

Alternative 5 will allow the largest increase in supply and diversity of housing throughout the city. It combines the strategies in Alternatives 2, 3, and 4, and expands the boundaries of the city's existing regional centers (previously urban centers) and urban centers (previously urban villages), such as Admiral, Greenwood–Phinney Ridge, Morgan Junction, and Upper Queen Anne. Alternative 5 would change the place type designations of Ballard from an urban center (previously urban village) to a regional center (previously urban center), giving the area a greater share of residential and job growth. Additionally, under Alternative 5, the NE 130th Street Station Area would be redesignated as an urban center resulting in a larger share of residential and job growth. Regional centers (previously urban centers) and urban centers (previously urban villages) including Northgate, Crown Hill, Othello, Rainier Beach, South Park, and Westwood–Highland Park, would be studied for potential growth. Existing regional centers and urban centers would gain up to 80,000 housing units, while other areas would see up to 40,000 additional housing units in new housing types. Additionally, the distribution of jobs and commercial space would be a combination of the other alternatives and may shift toward transit corridors to correspond with the location of housing growth.

Alternative 5 applies the proposed land-use concepts of all alternatives, which could incentivize development to increase floor area and height limits, allowing for the construction of dense, multi-story buildings. Most residential growth under Alternative 5 would be in regional centers, residential urban centers, and neighborhood centers (low displacement risk), with most growth located in areas 2 (NE Seattle), 1 (NW Seattle), 4 (Downtown/Lake Union), and 5 (Capitol Hill/Central District). As described in the Affected Environment and mapped in **Exhibit 3.9-1,** growth under Alternative 5 will occur in the areas that contain or abut listed historic properties or recorded archaeological resources, or contain mapped resources sensitivity areas (e.g., High to Very High Risk of archaeological and cultural sensitivity), such as within the neighborhood centers (previously neighborhood anchors) of Upper Fremont (NW Seattle), Ravenna (NE Seattle), Squire Park (Capitol Hill/Central District), Alki and Gatewood (W Seattle), and Georgetown (Duwamish), and within the neighborhoods of Loyal Heights, Phinney, and Wallingford (NW Seattle), Haller Lake, Ravenna, and Sandpoint (NE Seattle), Ft. Lawton,

Magnolia, and Queen Anne (Magnolia/Queen Anne), Capitol Hill, Montlake, Washington Park, Madrona, Central District, and Leschi (Capitol Hill/Central District), Delridge, Lincoln Park, and Fauntleroy Park (W Seattle), Georgetown (Duwamish), and Mount Baker, Beacon Hill, Columbia, South Beacon Hill, Seward Park, and Rainier Beach (SE Seattle). Impacts to cultural resources could occur under Alternative 5 as a result of alteration, demolition, damage, or destruction. In addition, development under Alternative 5 could increase the probability of inadvertent discovery of below ground archaeological and cultural resources as compared to Alternative 1 No Action because of substantial foundation work needed for multi-story buildings. Additionally, some allowed adaptive reuse projects could impact historic-period architectural resources by allowing for inappropriate alterations, changes, additions, and loss of character-defining features and historic building materials that could diminish the building's ability to qualify as a designated SL or for listing in the NRHP.

130th/145th Station Area

In the 130th/145th Station Area, Alternative 5 would create an expansive urban center (previously urban village) at the Sound Transit light rail station along both sides of I-5, with zoning including low-rise residential, mid-rise multifamily, and neighborhood commercial (NC2 and NC3), linking Pinehurst's existing commercial area to an expanded residential/mixed-use area near the station. Development would be denser than Alternative 2, with more mixed-use, retail, and commercial buildings, and a wider variety of housing types. Building heights in the urban center would be allowed up to 95 feet, while in the nodes and corridors, building heights could be up to 80 feet. The urban center at NE 130th Street would see the highest residential growth of up to 1,644 housing units, while the neighborhood center at 145th Street and 15th Avenue would receive up to 1,059 housing units. The Station Area would see up to 1,004 new jobs. As with other alternatives, development projects under Alternative 5 could affect cultural resources, with such impacts as alteration, demolition, damage, or destruction. As described in the Affected Environment and mapped in **Exhibit 3.9-1,** growth will occur in the areas that contain or abut listed historic properties or recorded archaeological resources, or contain mapped resources sensitivity areas (e.g., Moderately Low to High Risk of archaeological and cultural sensitivity), possibly impacting such cultural resources as Ingraham High School, Lake City School, or Lake City Library (designated SLs). Alternative 5 includes no additional protections or improvements in planning for consideration of impacts to cultural resources.

3.9.3 Mitigation Measures

Incorporated Plan Features

The action alternatives are designed to incorporate some land-use concepts that may help to mitigate adverse impacts to cultural resources, such as updates to land-use policies to anticipate future innovations and trends that may incentivize adaptive reuse of historic-period architectural resources.

Regulations & Commitments

Projects implemented under the Comprehensive Plan and development regulations evaluated in this EIS may be required to comply with a number of federal, state, and local regulations, including the National Historic Preservation Act of 1966, as amended; Archaeological Resources Protection Act of 1979; National American Graves Protection and Repatriation Act; National Environmental Protection Act of 1969, as amended; Washington Executive Order 21-02 (formerly 05-05); or the Washington State Environmental Protection Act. Additionally, the City of Seattle, the state of Washington, and the United States government all maintain lists of historic properties.

For projects that may adversely impact or affect historic properties listed in or eligible for listing in the NRHP, additional public coordination and consultation with DAHP, area Tribes, and other consulting parties may be required. Such coordination could include mitigation.

Federal

Federal regulations that guide cultural resource management activities include the following:

- National Historic Preservation Act (NHPA) of 1966, as amended, commonly referred to as Section 106, has implementing regulations (36 CFR Part 800), that require federal agencies (or others who have received federal grants or funds, or a federal permit or license) to take into account the effects of their undertakings on historic properties, by identifying historic properties, assessing adverse effects, and resolving those adverse effects.
  - The NHPA authorized the NRHP as the program to coordinate and support the Act. To be considered a historic property, a resource must be determined eligible for listing in the NRHP by meeting at least one of the four established Criteria of Evaluation and retaining sufficient integrity to express significance.
  - The NHL program functions to honor historic properties that are nationally and exceptionally significant in American history and culture. Properties must meet one of six NHL Criteria and possess a high degree of integrity.
- Archaeological Resources Protection Act (ARPA) of 1979 protects archaeological resources.
- National American Graves Protection and Repatriation Act (NAGPRA) creates protections for Native American burial sites, remains, and cultural objects.

- The National Environmental Protection Act (NEPA) of 1969, as amended, requires federal agencies to assess whether a major federal action has the potential to significantly affect the human environment prior to making decisions. This is done through the preparation of an Environmental Assessment (EA) or an EIS.

State

Washington state regulations that guide cultural resource management activities include the following:

- Washington Executive 21-02 (formerly 05-05) requires that impacts to cultural resources must be considered as part of any state-funded project or investment and must include consultation with DAHP and with Tribal governments.
- Washington State Environmental Protection Act (SEPA) has a process to identify and analyze environmental impacts to cultural resources associated with governmental decisions such as issuing permits, constructing public facilities, or adopting regulations, policies, and plans. This is accomplished through the SEPA Checklist.
- Washington State Archaeological Sites and Resources Protection Act (RCW 27.53) requires a permit to excavate or remove any archaeological resource located on public or Tribal lands.
- Registration of Historic Archaeological Resources on State-Owned Aquatic Lands (25-46 WAC) establishes to establish registration procedures for previously unreported historic archaeological resources discovered on, in, or under state-owned aquatic lands as provided for in Chapter 27.53 RCW.
- The WHR is an official state listing of significant sites and properties and is administered by DAHP. The list is honorary and the effects of listing in the WHR are parallel to the NRHP. Properties listed in the NRHP are automatically listed in the WHR.
- The WHBR honors the barns of the State that are historically significant. Administered by DAHP, the heritage barn designation allows the property owners access to matching grant funds (RCW 27.34.400).

Local

The City of Seattle also maintains city ordinances and city-run programs that guide cultural resource management activities within city boundaries. These include:

- City of Seattle's Historic Preservation Program, through the SL program, protects designated landmark sites, buildings, structures, objects, and districts city wide. Protections of designated landmarks are provided by design review of proposed alterations and the issuance of a Certificate of Approval (SMC 25.12). Owners of properties that have received Seattle Landmark designation may take advantage of City incentives including a Special Tax Valuation, Zoning Code Relief, Building Code Relief, and special incentives for downtown landmarks, such as the transfer of development rights (TDR).

- Seattle's Municipal Code (SMC) 25.05 Environmental Policies and Procedures, subsection 25.05.675.H provides Historic Preservation policies for the protection of historic buildings, special historic districts, and sites of archaeological significance that are found within Seattle, but that are not yet designated Seattle Landmarks.
  - The policy describes special historic districts that were established to protect their unique historical and cultural significance. These districts are subject to development controls and project review by special district review boards.
  - The policy also includes a limited list of mitigation measures. Additionally, under SMC 25.05.675.P.2.b.i, the policy provides protection for Public View of historic landmarks designated by the Landmarks Preservation Board that, that, because of their prominence of location or contrasts of siting, age, or scale, are visual features of their neighborhood or the city, and contribute to the distinctive quality or identity of their neighborhood or the city.

Potential Mitigation Measures

Some examples of avoidance or mitigation for impacts for architectural resources, might include:

- Modifying demolition review process so that historic review occurs even if SEPA thresholds are increased.
- Reusing buildings instead of demolition;
- Preparing DAHP Level I (Historic American Building Survey/Historic American Engineering Record [HABS/HAER]) Documentation;
- Preparing DAHP Level II Documentation for submission to local archives and libraries;
- Prioritizing historic properties when the City funds seismic retrofits for Unreinforced Masonry (URM) buildings;
- Developing cultural landscape contexts, including within historically marginalized communities;
- Preparing histories of the area prioritizing Indigenous perspectives; the City could work with Tribes and others to develop context statements;
- Funding the collection of oral histories from within the historically marginalized communities and creating a repository for them;
- Funding City-initiated, community-led thematic historic context survey and inventory projects that focus on marginalized or underrepresented immigrant communities and preparing thematic context statements relating to those resources;
- Including development incentives for the preservation of architectural resources including adaptive reuse projects. These may include exemptions from the floor area ration calculation, or flexibility for allowable uses within the structure; such adaptive reuse projects should follow the *Secretary of the Interior Standards for Rehabilitation,* or the City should develop new rehabilitation guidelines for adaptive reuse;

Mitigation for adverse impacts to archaeological or cultural resources, could include:

- Prior to commencing site-specific subsurface investigations of soils, notifying the local Indigenous Tribes so an archaeologist can observe the work;
- Funding survey and inventory of archaeological sites.
- Updating tree removal requirements for archaeological sites.
- Employing standard archaeological techniques such as archaeological testing, excavation and data recovery/collection of artifacts, documentation, analysis, sharing evidence with the local Indigenous Tribes, and archiving, possibly in a repository for future research;
- Funding public education and outreach, including interpretive signage and/or a museum exhibit;
- Funding interpretive signage and educational programs for BIPOC communities' historic neighborhoods; or
- Funding development of digital and other media content, including film, to share holistic stories of the impacted resource(s).

The development of a preservation action plan for Seattle's lands affected by rising sea levels and erosion could help to protect the city's resources located near the waterfront and in riverine or low-lying areas. The plan could include vulnerability/risk assessment tools/mapping (that communities could use to assess climate vulnerability/risks to their significant historic and cultural resources), performance indicator tools (to see how historic structures would perform during intense storms), and resilience guidance (a "roadmap" to advise how to create/increase resilience of particular building types) (O'Donnell 2022). Another helpful tool for Seattle's historic property owners could be the development of a publicly accessible website for resilience treatments and strategies for building components/materials and landscapes (O'Donnell 2022; UTSA 2022).

Additionally, the City could consider broadening the historic and cultural resources consideration section of the Seattle All-Hazards Mitigation Plan (HMP) to utilize the aforementioned preservation action plan. Mitigation Goal 4 of the HMP states, "Protect the natural environment and cultural and historic resources," with the stated action for cultural resources as "promote mitigation of historic buildings and key cultural assets" (OEM 2016:6-2, 6-8). By determining which areas of the city are likely to be vulnerable to extreme storms and sea-level rise, survey and inventory of historic and cultural resources should be performed within those areas, and a mitigation plan developed following Federal Emergency Management Agency (FEMA) guidance in *Integrating Historic Property and Cultural Resource Considerations Into Hazard Mitigation Planning* (FEMA 2005).

3.9.4 Significant Unavoidable Adverse Impacts

All the alternatives have the potential for significant adverse impacts to cultural resources in the analysis areas. Such impacts can include physical alteration, damage, or destruction of all or part of a resource; alteration of the characteristics of the surrounding environment that

contribute to the property's significance; and the introduction of visual or audible elements that are out of character with the property. Such impacts could alter the characteristics of a historic property in such a way as to diminish its integrity, thus affecting its eligibility to qualify for inclusion in the SL or NRHP.

Advanced planning to eliminate, minimize, or avoid impacts to cultural resources would improve outcomes under all the alternatives. If elimination, minimization, or avoidance is impracticable, mitigation should be implemented by coordinating with the area's Tribes, the lead agency, and all other stakeholders and consulting parties in accordance with DAHP Mitigation Options and Documentation Standards, and the City of Seattle's Historic Preservation policies. The ultimate outcome of such mitigation is to moderate or substantially lessen the adverse impacts to cultural resources before they are lost or significantly altered. With the implementation of advanced planning or mitigation, significant adverse impacts to cultural resources can be avoided or minimized.

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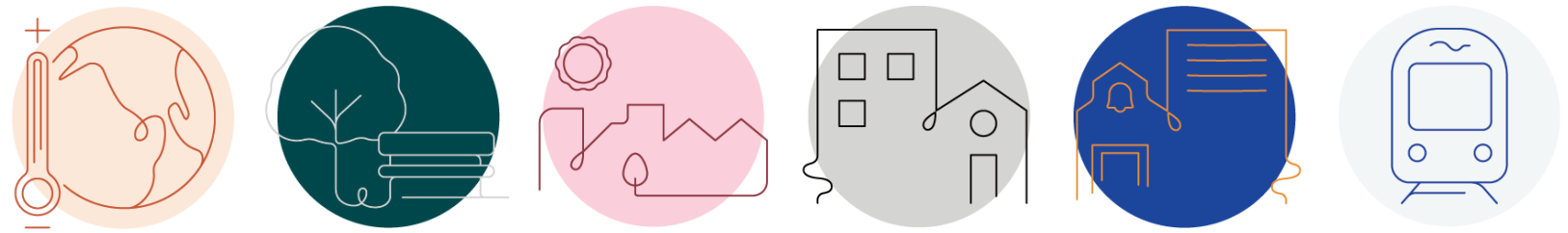
3.10 Transportation



Source: City of Seattle, 2023.

The transportation section provides a multimodal analysis of transportation in Seattle to evaluate the potential impacts of the proposed land use alternatives. This section discusses the current transportation conditions in addition to future conditions under the alternatives. Further detail on each alternative can be found in **Chapter 2**.

Transportation impacts are identified under each alternative, as appropriate. Although not individually modeled, the potential impacts of Alternative 4 are expected to fall between the other action alternatives due to the overall magnitude of growth and pattern of density. The citywide growth total for Alternative 4 is equivalent to Alternative 2 and Alternative 3, while Alternative 5 has higher growth. The pattern of growth assumed in Alternative 4 falls between the more concentrated growth of Alternative 2 and more dispersed growth of Alternative 3.

Thresholds of significance utilized in this impact analysis are defined in **Section 3.10.2 Impacts**. Additionally, potential strategies to mitigate adverse impacts are discussed.

3.10.1 Affected Environment

This section presents existing transportation conditions throughout the City of Seattle for all modes as well as the current performance of the transportation network and methodologies used to quantitatively evaluate the current system. Evaluations address people walking and biking, transit, autos, freight, and safety. The geographies used for analysis depend on the metric. Some evaluation metrics are performed for each of the eight EIS analysis subareas shown in **Exhibit 3.10-1**: Northwest Seattle, Northeast Seattle, Queen Anne/Magnolia, Downtown/Lake Union, Capitol Hill/Central District, West Seattle, Duwamish, and Southeast Seattle. These analysis subareas are used to describe how transportation conditions vary throughout the city.

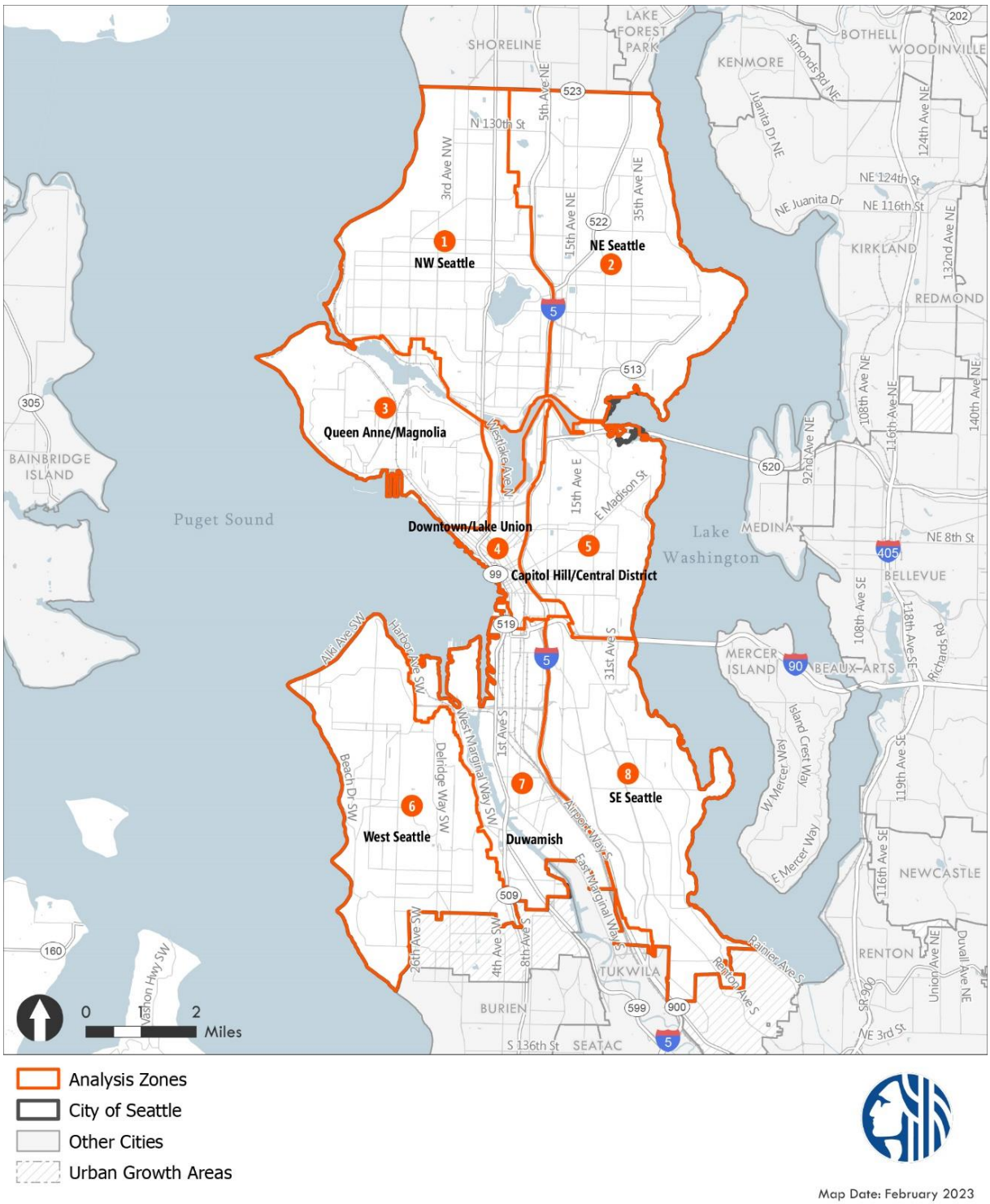
Data & Methods

This section describes the methodology used to evaluate impacts across scenarios. The following metrics are included as part of the evaluation:

- Mode share by subarea
- Person trips by mode
- Sidewalk network completion
- Access to All Ages and Abilities bicycle network
- Transit capacity analysis
- Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), and average trip speed
- Corridor travel time
- Volume-to-Capacity across screenlines
- Intersection LOS in the NE 130th/NE 145th Street Subarea
- State facility capacity analysis

Each metric is used to quantitatively evaluate and contextualize impacts. The following sections describe the data sources and procedures for calculating each analysis metric.

Exhibit 3.10-1. EIS Analysis Subareas



Sources: City of Seattle, 2022.

Data Collection Period

This EIS considers two time periods for analysis: 2019 as the baseline of existing conditions and 2044 as a horizon year at which the outcomes of the alternatives are compared. Beginning in March 2020, the COVID-19 pandemic disrupted longstanding commute patterns and broader travel trends. In the same month, the closure of the West Seattle Bridge fundamentally changed local travel patterns through a large portion of the city until the bridge's reopening in September 2022. For these reasons, 2019 was selected as a more representative year for baseline travel conditions. Selecting 2019 as the base year also provides a more conservative assumption (i.e., a baseline with more traffic congestion) with respect to identifying potential impacts of the alternatives because growth is assumed to be additive to existing conditions.

Puget Sound Regional Council (PSRC) Travel Model

Puget Sound Regional Council (PSRC) built a travel demand model for the Puget Sound Region called SoundCast designed to evaluate future travel behavior and inform land use planning. The model covers the four-county region for which PSRC is the metropolitan planning organization: King, Kitsap, Snohomish, and Pierce counties. Therefore, the model provides an inherently cumulative evaluation of travel behavior that accounts for not only Seattle, but also the transportation networks and land uses in neighboring jurisdictions. SoundCast is an activity-based model which estimates travel behavior across the region based on characteristics of individual persons and their households. The model produces detailed trip diaries for each simulated person in the region throughout an average weekday tracking the departure time, starting location, ending location, travel mode, and any other people sharing that trip.

This model was used to evaluate trip patterns under each of the analyzed alternatives. Alternative 4 was not modeled due to its similarities to other alternatives; see discussion of Alternative 4 under **Section 3.10.2 Impacts**. SoundCast incorporates household and employment forecasts for each future year alternative within the EIS. PSRC regional assumptions are maintained for areas outside of Seattle city boundaries. Transportation facilities that will be in place by the horizon year 2044 are also incorporated into the future year model network. The model and user guide are available at psrc.org.

As noted above, travel patterns have substantively changed over the past several years, particularly related to commute trips as an increasing number of people work from home at least part of the time. The PSRC model is rooted in the travel patterns observed through its periodic regional household travel surveys and therefore reflects the more traditional commute patterns that occurred before the COVID-19 pandemic. While there is considerable uncertainty about how travel patterns will evolve in the coming years, the PSRC travel model is the best available tool to evaluate the future year alternatives. The model is best used to 3.10-4identify relative differences among alternatives rather than provide a specific prediction of the exact location and magnitude of impacts, particularly given this is a programmatic EIS.

Single Occupancy Vehicle (SOV) Mode Share by Subarea

Using PSRC household travel survey data for 2017 and 2019, existing single occupancy vehicle (SOV) mode share has been compiled based on the eight analysis subareas defined in the *Seattle 2035* Comprehensive Plan. **Exhibit 3.10-1** shows the eight EIS analysis subareas: (1) Northwest Seattle, (2) Northeast Seattle, (3) Queen Anne/Magnolia, (4) Downtown/Lake Union, (5) Capitol Hill/Central District, (6) West Seattle, (7) Duwamish, and (8) Southeast Seattle. For future conditions, the PSRC regional travel demand model is used to estimate the change in SOV mode share relative to these observed values.

As part of the One Seattle Comprehensive Plan update, the City is proposing to replace the existing LOS standards, based on SOV mode share, with new multimodal LOS standards for locally owned arterials, locally and regionally operated transit routes, and active transportation facilities.

SOV mode share targets as defined in the *Seattle 2035* Comprehensive Plan are summarized in **Exhibit 3.10-2**.

Exhibit 3.10-2. Single Occupancy Vehicle (SOV) Mode Share Target by Subarea

Subarea	2035 Target
(1) Northwest Seattle	37%
(2) Northeast Seattle	35%
(3) Queen Anne/Magnolia	38%
(4) Downtown/Lake Union	18%
(5) Capitol Hill/Central District	28%
(6) West Seattle	35%
(7) Duwamish	51%
(8) Southeast Seattle	38%

Source: *Seattle 2035* Comprehensive Plan, Transportation Appendix, 2020.

Person Trips by Mode

Person trips by mode will be estimated at the citywide level as well as by EIS analysis subarea. This metric will be calculated for both the existing and future year evaluation using the PSRC regional travel demand model.

Sidewalk Network Completion

Using ArcGIS Pro, the pedestrian network is evaluated based on the percentage of sidewalk complete. The analysis uses sidewalk data from SDOT's ArcOnline Assets App. The percentage of sidewalk complete is calculated as the total sidewalk length divided by twice the length of centerline miles (i.e., defining 100% completion as sidewalks on both sides of every roadway). These statistics are then aggregated at the census tract level to display the levels of sidewalk network completion throughout the city.

Access to All Ages and Abilities Bicycle Network

ArcGIS Pro was used to estimate the number of people and jobs within ¼ mile of an All Ages & Abilities bicycle facility, which includes off-street trails, cycle tracks (protected bike lanes), and neighborhood greenways. The analysis uses bicycle facility data from the SDOT ArcOnline Assets App.

Transit Capacity Analysis

Transit boarding data has been summarized by route to evaluate the extent to which crowding occurs on each route. The average maximum load on each route is compared to the transit agency crowding threshold to determine the number of trips over the crowding threshold. The analysis evaluates each route's inbound and outbound direction and considers the PM peak period. For future conditions, the PSRC regional travel demand model, SoundCast, is used to forecast the change in ridership on the following routes: Link light rail, RapidRide bus, and those routes that were identified as exceeding the crowding threshold under existing conditions.

VMT / VHT / Average Trip Speed

The PSRC regional travel demand model provides estimates of daily vehicle miles traveled (VMT) and vehicle hours traveled (VHT) for both existing and future conditions. These metrics are reported both in total and relative to the total service population (number of residents and workers within the city) for each alternative. The methodology for VMT and VHT includes all trips with at least one end in Seattle and made by cars and trucks. Bus travel is not included as the number of bus trips is assumed to be the same across all future year alternatives. In addition, the ratio of VMT to VHT is reported; this metric represents the average speed of trips made by Seattle residents and workers.

Travel time

Travel time along major city arterials is used as a performance measure because it addresses the fundamental concern of most travelers—the time it takes to move within and through the city. These travel times speak to mobility for autos, freight, and transit that all share space along these corridors. To assess existing conditions, PM peak hour travel times were analyzed using September through November 2019 data from SDOT's Iteris travel time data platform. The PM peak period represents the overall peak of traffic volumes during the day though some types of travel activity may peak at other times (for example, freight travel tends to peak during the morning and midday hours).

As noted in the **Data & Methods** section, using 2019 as the base year represents a period when traffic congestion was at its peak. Travel times decreased substantially during the pandemic as typical travel patterns were disrupted, remote work became more common, and traffic congestion decreased. Over the past several years, travel times have continued to increase

toward pre-pandemic levels as traffic volumes have rebounded but travel times are still generally below those experienced in 2019.

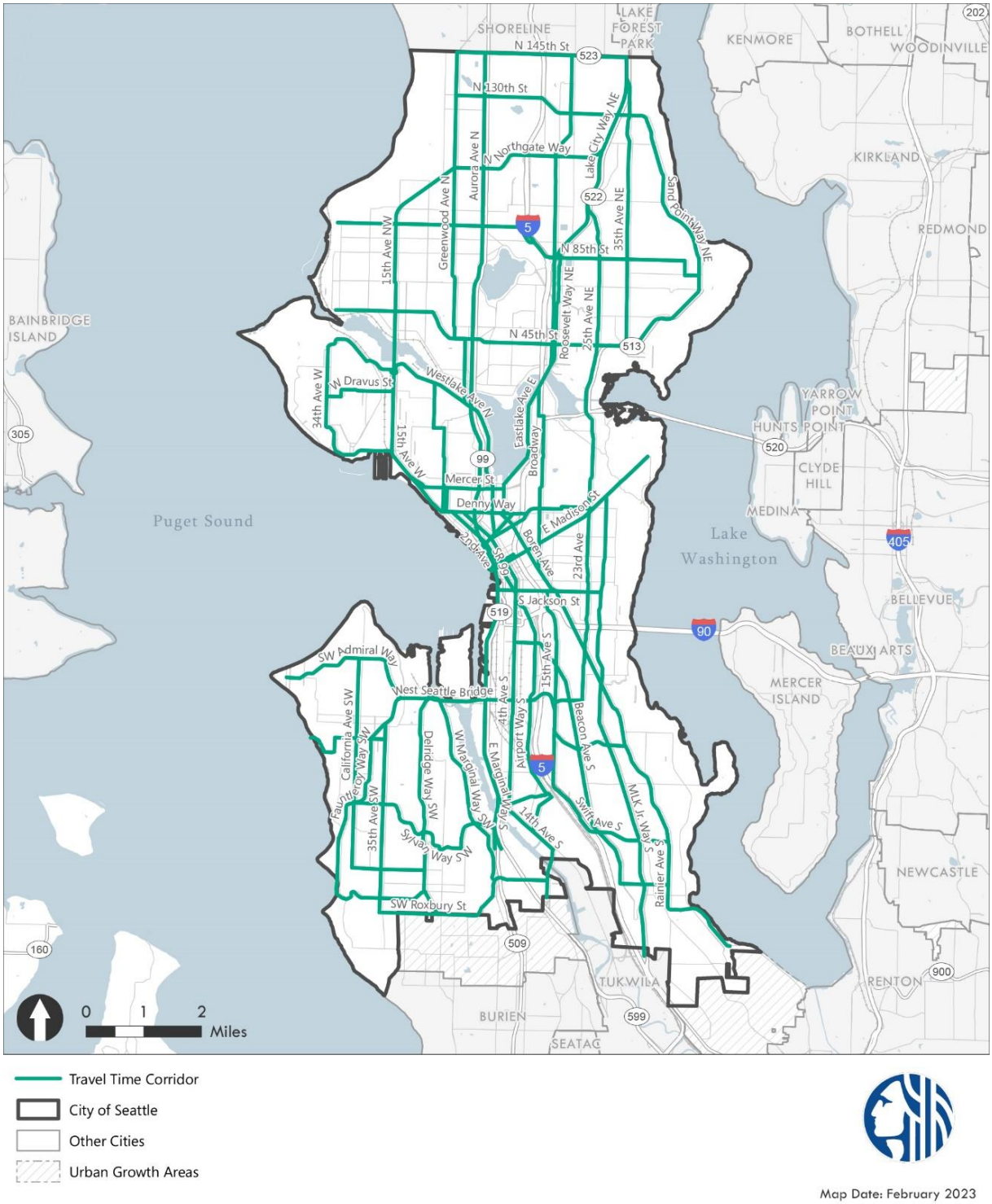
The concept of level of service (LOS) is used to describe traffic operations by assigning a letter grade of A through F, where A represents free-flow conditions, B represents free-flow conditions with some restrictions in lane changes, C is near free-flow conditions with a heavier flow, D is an unstable flow with minor queuing, E represents unstable flow with potentially extended queuing, and F represents highly congested conditions. This study uses concepts from the 7th Edition of the Highway Capacity Manual (HCM) to define thresholds for each LOS grade, as shown in **Exhibit 3.10-3.** The thresholds represent the ratio between observed travel time and free-flow travel time (i.e., at the speed limit). For example, a vehicle traveling at half the free-flow speed will have a travel time twice that of the free-flow travel time, which equates to the breakpoint between LOS C and LOS D. Because most city arterials include frequent signalized intersections or other traffic control, corridors in Seattle's urban environment tend to have travel times well below the overall speed limit of a corridor. The LOS values for the travel time study corridors in **Exhibit 3.10-4** utilize the thresholds described in **Exhibit 3.10-3**.

Exhibit 3.10-3. LOS Thresholds for Travel Speeds and Travel Time

	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Threshold for Ratio of PM Peak Hour Travel Time to Travel Time at Free-Flow Speed	<1.25	<1.5	<2.0	<2.5	<3.0	≥3.0

Source: Highway Capacity Manual, 7th Edition, 2022.

Exhibit 3.10-4. Travel Time Corridors



Source: Fehr & Peers, 2023.

Screenlines

Seattle defines "screenlines" as one way to evaluate traffic conditions for autos, freight, and transit. A screenline is an imaginary line across which the number of passing vehicles is counted. Each designated screenline has a threshold in the form of a volume-to-capacity (V/C) ratio which is defined as the number of vehicles crossing the screenline compared to the capacity of the roadways crossing the screenline. This EIS evaluates 42 screenlines during the PM peak hour. **Exhibit 3.10-5** and **Exhibit 3.10-6** summarize the location of each screenline, as well as its threshold as designated in the *Seattle 2035* Comprehensive Plan. As shown in the map, there are screenlines along the north and south city limits to allow analysis of how the alternatives would affect traffic levels in neighboring jurisdictions. See the State Facilities sections for analysis of the SR 520 and I-90 facilities which indicate how the alternatives would affect traffic levels in communities across Lake Washington.

Thirty of the screenlines have performance thresholds defined while the remaining twelve (beginning with the letter A) provide supplemental information about performance in Seattle's regional centers but do not have specific performance thresholds defined.

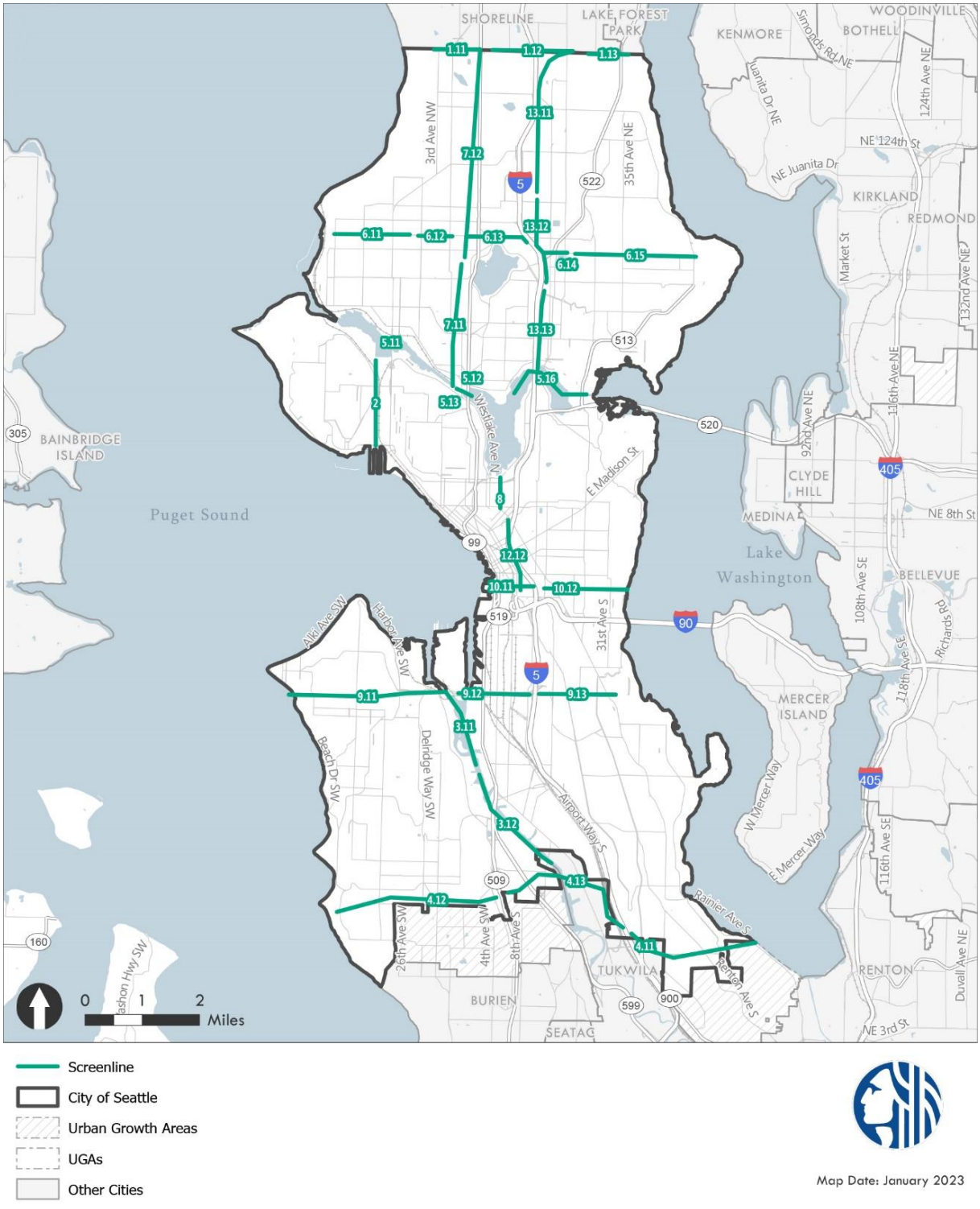
Exhibit 3.10-5. Screenline Locations and Volume-to-Capacity Thresholds

Screenline #	Screenline Location	Extents	V/C Threshold
1.11	North City Limit	3rd Ave NW to Aurora Ave N	1.20
1.12	North City Limit	Meridian Ave N to 15th Ave NE	1.20
1.13	North City Limit	30th Ave NE to Lake City Way NE	1.20
2.00	Magnolia	Magnolia Bridge to W Emerson Place	1.00
3.11	Duwamish River	West Seattle Bridge & Spokane St	1.20
3.12	Duwamish River	1st Ave S & 16th Ave S	1.20
4.11	South City Limit	Martin Luther King Jr. Way to Rainier Ave S	1.00
4.12	South City Limit	Marine Dr SW to Meyers Way S	1.00
4.13	South City Limit	SR 99 to Airport Way S	1.00
5.11	Ship Canal	Ballard Bridge	1.20
5.12	Ship Canal	Fremont Bridge	1.20
5.13	Ship Canal	Aurora Ave Bridge	1.20
5.16	Ship Canal	University & Montlake Bridges	1.20
6.11	South of NW 80th St	Seaview Ave NW to 15th Ave NW	1.00
6.12	South of N(W) 80th St	8th Ave NW to Greenwood Ave N	1.00
6.13	South of N(E) 80th St	Linden Ave N to 1st Ave NE	1.00
6.14	South of NE 80th St	5th Ave NE to 15th Ave NE	1.00
6.15	South of NE 80th St	20th Ave NE to Sand Point Way NE	1.00

Screenline #	Screenline Location	Extents	V/C Threshold
7.11	West of Aurora Ave	Fremont Pl N to N 65th St	1.00
7.12	West of Aurora Ave	N 80th St to N 145th St	1.00
8.00	South of Lake Union	Valley St to Denny Way	1.20
9.11	South of Spokane St	Beach Dr SW to W Marginal Way SW	1.00
9.12	South of Spokane St	E Marginal Way S to Airport Way S	1.00
9.13	South of Spokane St	15th Ave S to Rainier Ave S	1.00
10.11	South of S Jackson St	Alaskan Way S to 4th Ave S	1.00
10.12	South of S Jackson St	12th Ave S to Lakeside Ave S	1.00
12.12	East of CBD	S Jackson St to Howell St	1.20
13.11	East of I-5	NE Northgate Way to NE 145th St	1.00
13.12	East of I-5	NE 65th St to NE 80th St	1.00
13.3	East of I-5	NE Pacific St to NE Ravenna Blvd	1.00
A1	North of Seneca St	1st Ave to 6th Ave	N/A
A2	North of Blanchard	Elliott Ave to Westlake Ave	N/A
A3	East of 9th Ave	Lenora St to Pike St	N/A
A4	South of Mercer St	Elliott Ave W to Aurora Ave N	N/A
A5	East of 5th Ave N	Denny Way to Valley St	N/A
A6	North of Pine St	Melrose Ave E to 15th Ave E	N/A
A7	North of James St– E Cherry St	Boren Ave to 14th Ave	N/A
A8	West of Broadway	Yesler Way to E Roy St	N/A
A9	South of NE 45th St	7th Ave NE to Montlake Blvd NE	N/A
A10	East of 15th Ave NE	NE 45th St to NE 52nd St	N/A
A11	South of Northgate Way (N/NE 110th St)	N Northgate Way to Roosevelt Way NE	N/A
A12	East of 1st Ave NE	NE 100th St to NE Northgate Way	N/A

Source: *Seattle 2035* Comprehensive Plan, Transportation Appendix, 2020.

Exhibit 3.10-6. Screenline Map



Source: *Seattle 2035* Comprehensive Plan, Transportation Appendix, 2020.

Intersection Level of Service (LOS) Analysis—130th /145th Street Subarea

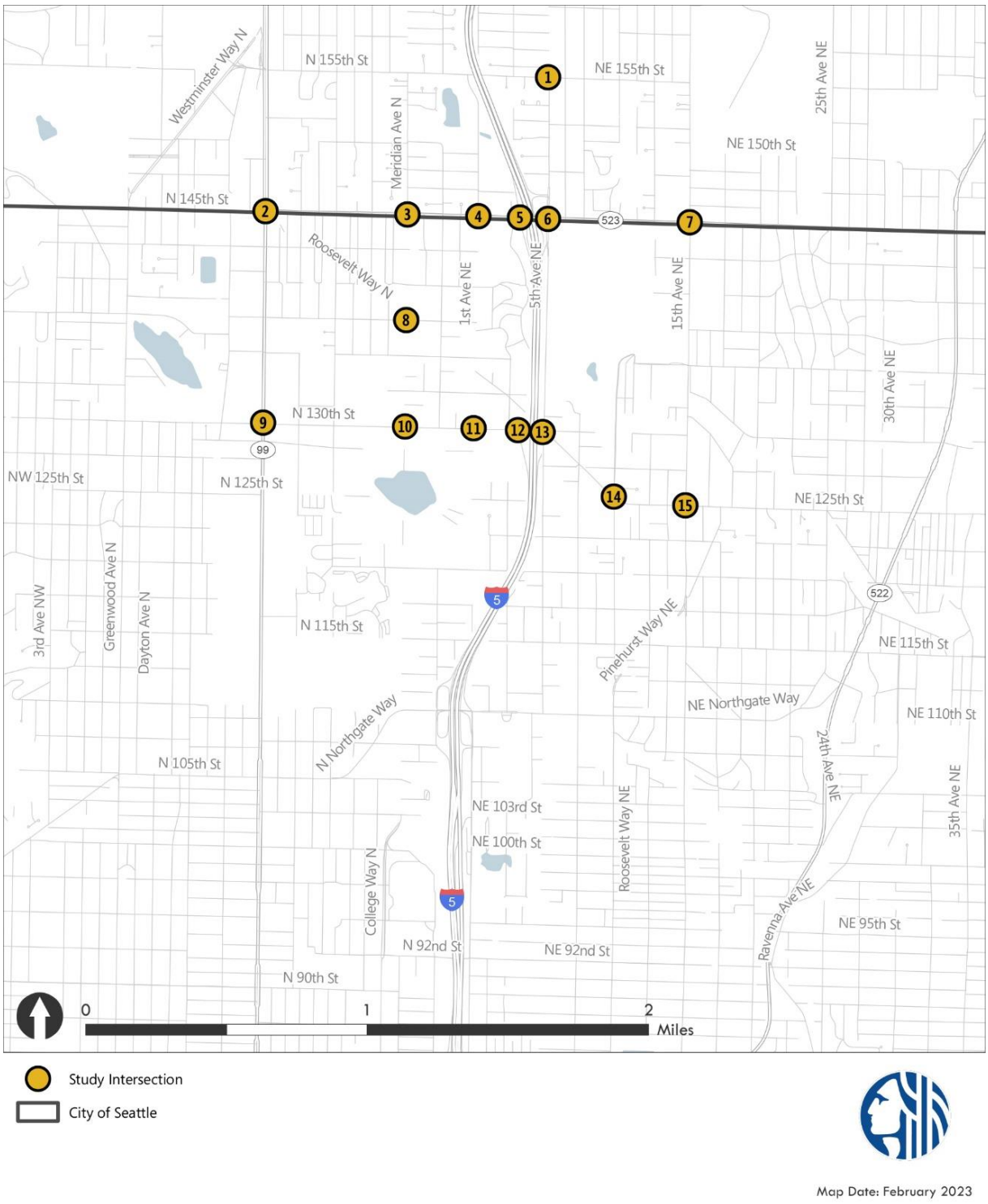
In addition to reviewing conditions and impacts citywide, this EIS also provides a focused review of the 130th and 145th Street Station Area Plan and options for the City to streamline future environmental review in that area. Therefore, this subarea is reviewed in great detail, including intersection level of service (LOS) within the 130th/145th Street subarea surrounding the planned Link light rail stations. Study intersections were selected to cover the roughly quarter-mile to half-mile area around the stations and focus on arterial intersections that are most likely to see traffic volume changes due to growth in the area. This includes seven intersections within or along the city limit with Shoreline to capture potential effects to that neighboring jurisdiction. Average delay experienced at each intersection is estimated based on the volumes, lane configuration, and traffic control at each study intersection. **Exhibit 3.10-7** lists the 15 study intersections within the 130th/145th Street study area (mapped in **Exhibit 3.10-8**).

Exhibit 3.10-7. 130th/145th Street Subarea Study Intersections

Intersection ID	Intersection	Traffic Control
1	NE 155th St / 5th Ave NE	Signal
2	N 145th St / Aurora Ave N	Signal
3	N 145th St / Meridian Ave N	Signal
4	N 145th St / 1st Ave NE	Signal
5	NE 145th St / I-5 On & Off Ramps	Signal
6	NE 145th St / 5th Ave NE	Signal
7	NE 145th St / 15th Ave NE	Signal
8	N 137th St / Meridian Ave N / Roosevelt Way N	All-way Stop Control
9	N 130th St / Aurora Ave N	Signal
10	N 130th St / Meridian Ave N	Signal
11	N 130th St / 1st Ave NE	Signal
12	NE 130th St / I-5 On Ramp	Free / Yield
13	NE 130th St / Roosevelt Way NE / 5th Ave NE	Signal
14	Roosevelt Way NE / NE 125th St / 10th Ave NE	Signal
15	NE 125th St / 15th Ave NE	Signal

Source: Fehr & Peers, 2023.

Exhibit 3.10-8. 130th/145th Subarea Study Intersections Map



Sources: Fehr & Peers, 2023.

Intersection LOS is measured using a scale that ranges from LOS A (which represents minimal delay) to LOS F (which represents high delay and substantial congestion) as defined by the Highway Capacity Manual (Transportation Research Board, 2022). **Exhibit 3.10-9** displays the range of delays corresponding to each LOS grade. For signalized intersections and all-way stop intersections, the average delay is calculated as the average of all vehicles passing through a given intersection (i.e., on all approaches of the intersection). For side-street stop sign controlled intersections, the average delay and LOS are reported for the worst minor street movement. All study intersections are analyzed for the PM peak hour using Synchro software. For this EIS analysis, signalized intersections operating at LOS E or F and unsignalized intersections operating at LOS F are considered to be operating below acceptable levels.

Exhibit 3.10-9. Level of Service (LOS) and Delay Thresholds

LOS	Signalized Intersections Delay per Vehicle (seconds)	Unsignalized Intersections Delay per Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 to 20	> 10 to 15
C	> 20 to 35	> 15 to 25
D	> 35 to 55	> 25 to 35
E	> 55 to 80	> 35 to 50
F	> 80	> 50

Source: Transportation Research Board, 2022.

PM peak hour turning movement volumes were compiled for each study intersection. Most counts were collected during the 2016 to 2019 timeframe to reflect the pre-pandemic period with the exception of several counts collected in late 2022. Future year volumes were forecasted by applying the growth predicted by the PSRC regional travel demand model for each alternative to the observed counts.

State Facilities

State facilities (roadways owned by WSDOT) are also evaluated using the volume-to-capacity and LOS concepts. For this EIS analysis, capacities are defined using a set of tables developed by the Florida Department of Transportation (FDOT) based on Highway Capacity Manual methodologies. Capacities for this analysis are based on the characteristics of the roadway including number of lanes, presence of auxiliary lanes, and presence of ramp metering. Pre-pandemic (2019) annual average weekday traffic volumes were compiled from WSDOT's Traffic Count Database System. The results are summarized using Level of Service (LOS) designations A-F. WSDOT sets the standard for most of its facilities in Seattle at LOS D; the exception is the segment of SR 99 between SR 509 and I-5 which has a standard of "E mitigated" meaning congestion should be mitigated when PM peak hour LOS falls below LOS E. Future year volumes were forecasted by applying the growth predicted by the PSRC regional travel demand model for each alternative to the observed counts.

Current Policy & Regulatory Frameworks

Relevant policies related to transportation in Seattle are summarized below. The City of Seattle has a 10-year strategic plan outlined in Move Seattle (2015) and is currently developing a citywide multimodal transportation plan as described at right. Seattle also has master plans specifically addressing pedestrians, bicycles, transit, and freight. More detailed information is available in the specified documents described in this section.

Seattle Transportation Plan

As described here, the City has adopted citywide modal plans for pedestrian, bicycle, transit, and freight travel. SDOT is currently engaging in a process to create a unified, multimodal Seattle Transportation Plan (STP) that will integrate the City's modal network visions into a single, holistic transportation plan.

A separate EIS was completed for the STP. The same No Action Alternative network assumptions are used in both the Comprehensive Plan and STP EISs. The Comprehensive Plan EIS assumes the No Action network is in place for all alternatives and tests varying land use alternatives. The STP EIS assumes Comprehensive Plan Alternative 5 land use growth and tests different network alternatives.

VISION 2050

VISION 2050, adopted in 2020, is the region's plan for how it will prepare for growth and meet goals including a healthy environment, thriving communities, and a strong economy. It also includes the region's multicounty planning policies which are adopted under the state's Growth Management Act. These policies guide Seattle's approach to growth as it develops its local comprehensive plan. The PSRC also released its 2022-2050 Regional Transportation Plan (RTP) which is a multimodal plan for the four-county region (King, Snohomish, Kitsap, and Pierce counties) to coordinate an integrated planning approach among the various jurisdictions in the region. The RTP includes an assessment of current and future transportation conditions and identifies regional projects to be implemented over the planning horizon.

Pedestrian Master Plan

The Pedestrian Master Plan (PMP) envisions Seattle as the most walkable and accessible city in the nation.[54] To achieve that vision, the following goals are identified:

- Reduce the number and severity of crashes involving pedestrians;
- Develop a connected pedestrian environment that sustains healthy communities and supports a vibrant economy;
- Make Seattle a more walkable city for all through public engagement, service delivery, accessibility, and capital investments that promote equity; and
- Get more people moving to improve health and increase mobility.

[54] Seattle Department of Transportation. 2017. "Pedestrian Master Plan." https://www.seattle.gov/documents/Departments/SDOT/About/DocumentLibrary/SeattlePedestrianMasterPlan.pdf

The plan documents existing pedestrian facilities and defines a Priority Investment Network to guide future funding. SDOT publishes implementation plan reports every one to two years to update the public on its progress toward implementing PMP projects and meeting the identified performance measures.

Bicycle Master Plan

The Seattle Bicycle Master Plan (BMP) provides guidance on future investments in bicycle facilities in Seattle, with a vision for bicycling as a safe and convenient mode for people of all ages and abilities on a daily basis.[55] The plan identifies the following goals:

- Increase the amount and mode share of bicycle riding in Seattle for all trip purposes;
- Improve safety for bicycle riders in Seattle;
- Create a high-quality bicycle network that connects to places people want to go and provides a time-competitive travel option;
- Improve bicycle riding for all through equity in public engagement, program delivery, and capital investments; and
- Build vibrant communities by creating a welcoming environment for bicycle riding.

The document describes the existing network and over 400 miles of planned future network for the city. Strategies for end-of-trip facilities, programs, maintenance, project prioritization, and funding are included. SDOT publishes reports every one to two years to update the public on its progress toward implementing BMP projects and meeting the identified performance measures.

Transit Master Plan

The Transit Master Plan (TMP) is a 20-year plan that outlines the needs to meet Seattle's transit demand through 2030.[56] It prioritizes capital investment to create frequent transit services that meet the most pressing needs of residents and workers. It outlines the high priority transit corridors and the preferred modes along each corridor. This document specifies capital projects to improve speed and reliability. Goals include:

- Meet sustainability, growth management and economic development goals;
- Make it easier and more desirable to take transit;
- Respond to needs of transit-reliant populations;
- Create great places where modes connect; and
- Advance implementation within constraints.

The elements of the document include policies and programs, transit corridors and service, access and connections to transit, and funding and performance monitoring.

[55] Seattle Department of Transportation. 2014. "Bicycle Master Plan." https://www.seattle.gov/documents/Departments/SDOT/About/DocumentLibrary/BicycleMasterPlan/SBMP_21March_FINAL_full%20doc.pdf
[56] Seattle Department of Transportation. 2016. "Transit Master Plan." https://www.seattle.gov/documents/Departments/SDOT/TransitProgram/TMPSupplmtALL2-16FINAL.pdf

Freight Master Plan

The Freight Master Plan (FMP) was adopted by the City in 2016.[57] Its purpose is to ensure efficient and predictable goods movement in the region to promote economic activity and international trade. This planning document is especially important for the two designated manufacturing and industrial centers, the Ballard-Interbay-Northend Manufacturing Industrial Center (BINMIC) and Greater Duwamish MIC, and the Port of Seattle. The FMP analyzes the current freight facilities and their ability to accommodate future freight growth and overlays the truck street system with other modal systems with the goal of facilitating better understanding of the potential for modal conflicts. The plan identifies six main goals with a total of 92 actions that address economy, safety, mobility, state of good repair, equity, and the environment in an effort to create a comprehensive freight network. The six overarching goals are as follows:

- Provide a freight network that supports a thriving and diverse economy for Seattle and the region;
- Improve the safety and the predictable movement of goods and people;
- Reliably connect manufacturing/industrial centers and business districts within the Seattle, regional, and international freight networks;
- Maintain and improve the freight transportation network to ensure safe and efficient operations;
- Benefit residents and businesses of Seattle through equity in freight investments and improve the health of communities impacted by goods movement; and
- Improve freight operations in Seattle and the region by making goods movement more efficient and reducing its environmental footprint.

The plan also includes a list of freight supportive projects with a focus on corridors connecting the City's two MICs to the freeway system and corridors connecting the MICs to one another.

Vision Zero

Seattle has implemented a Vision Zero program, with the goal of zero serious injuries and fatalities on Seattle streets by 2030. Relevant plans include a 2015 Vision Zero Action Plan, 2017 Vision Zero Progress Report, and 2019 Vision Zero Update Report. The Vision Zero plans include equity and climate goals of eliminating racial disparities and reducing the number of personal trips that produce emissions.[58] The City of Seattle is moving forward with the program through the implementation of a wide range of projects and distribution of resources.

[57] Seattle Department of Transportation. 2016. "Freight Master Plan." https://www.seattle.gov/documents/Departments/SDOT/About/DocumentLibrary/FMP_Report_2016E.pdf
[58] Seattle Department of Transportation. "Vision Zero." https://www.seattle.gov/transportation/projects-and-programs/safety-first/vision-zero

New Mobility Playbook

The New Mobility Playbook was published in 2017 to address the rapid changes to the transportation context, including ride-hailing, bike share, scooter share, and car share services.[59] The New Mobility Playbook outlines policies and strategies to guide the City's response to new mobility options while maintaining its commitment to safety, equity, affordability, and sustainability. The document discusses the potential benefits and risks of new mobility and defines five principles intended to drive the City's response to emerging technologies and mobility options:

- Put people and safety first;
- Design for customer dignity and happiness;
- Advance race and social justice;
- Forge a clean mobility future; and
- Keep an even playing field.

The New Mobility Playbook will guide the City's response to changes in transportation such that the implementation of new mobility options align with overall goals and plans.

Move Seattle

In 2015, voters approved a nine-year $930 million levy which replaced a prior levy that expired in 2015. The levy funds are used to implement projects including safety improvements, new facilities, as well as maintenance of existing infrastructure. Move Seattle is a strategic document published in 2015 that guides SDOT's work over the 2016-2024 period with an updated workplan published in 2018.[60] The plan identifies projects within the following categories:

- Safe Routes
  - Vision Zero
  - Pedestrians and Bicyclists
  - Neighborhood Projects
- Maintenance and Repair
  - Arterial Roadway Maintenance
  - Bridges and Structures Maintenance
  - Urban Forest and Drainage
- Congestion Relief
  - Corridor Mobility
  - Light Rail Partnership
  - Pedestrian and Bicycle Improvements
  - Freight Mobility Improvements

[59] Seattle Department of Transportation. 2017. "New Mobility Playbook." https://www.seattle.gov/documents/Departments/SDOT/NewMobilityProgram/NewMobility_Playbook_9.2017.pdf
[60] Seattle Department of Transportation. 2018. "Levy to Move Seattle Workplan Report." https://www.seattle.gov/documents/Departments/SDOT/About/Funding/2018_1129_MoveSeattle_WorkPlan_FINAL.pdf

SDOT provides annual reports summarizing accomplishments and delivery plans for the coming year as well as a Levy Performance Dashboard so the public can monitor the City's progress in implementing Move Seattle projects.[61]

Transportation Capital Improvement Program

For the 2022 to 2027 period, the Proposed Capital Improvement Program (CIP) plans to invest $1.6 billion on developing, maintaining, and operating Seattle's transportation system. Funded projects include street paving and resurfacing; building new sidewalks and curb ramps; school safety improvements; implementation of the modal plans described above; investments to facilitate freight mobility; traffic cameras and signals; bridge projects such as bridge replacement, maintenance, and seismic retrofitting; and support for the Waterfront Program.[62]

Complete Streets

Seattle's Complete Streets ordinance, passed in 2007, directs SDOT to design streets that balance the needs of all roadway users, including pedestrians, bicyclists, transit riders, and people of all abilities, while promoting safe operations for all users, including freight.[63] Design decisions are based on data, such as the adjacent land uses and anticipated future transportation needs. There is no set design template for complete streets as every situation requires a unique balance of design features within the available right-of-way. However, SDOT has developed a Right-of-Way Improvements Manual, called Seattle Streets Illustrated, which helps property owners, developers, engineers, and architects who are involved in the design, permitting, and construction of local streets.[64] Streets Illustrated sets standards for a variety of elements of the public right-of-way including sidewalks, landscaping, bicycle lanes, transit stop amenities, and vehicle lane widths.

Intelligent Transportation Systems (ITS) Strategic Plan

For the 2010-2020 period, the Intelligent Transportation Systems (ITS) Strategic Plan provides a 10-year approach for implementing ITS across Seattle.[65] ITS employs electronic and communication technologies on the streets, as well as automated traffic systems, to enhance mobility for all modes by increasing the efficiency and safety of the transportation infrastructure. The goal of the strategic plan is to ensure the existing ITS infrastructure is

[61] Seattle Department of Transportation. 2022. "Reporting Dashboard: Levy to Move Seattle."
https://public.tableau.com/app/profile/city.of.seattle.transportation/viz/Levy_Dashboard_16141242942520/SafeRoutes
[62] Seattle Department of Transportation. 2022. "2022-2027 Proposed Capital Improvement Program."
https://www.seattle.gov/documents/Departments/FinanceDepartment/2227proposedcip/SDOT.pdf
[63] Seattle City Council. 2007. "Ordinance 122386."
http://clerk.ci.seattle.wa.us/search/results?d=CBOR&s1=115861.cbn.&Sect6=HITOFF&l=20&p=1&u=/%7Epublic/cbor2.htm&r=1&f=G
[64] Seattle Department of Transportation. 2022. "Seattle Right-of-Way Improvements Manual: Seattle Streets Illustrated."
https://streetsillustrated.seattle.gov/
[65] Seattle Department of Transportation. 2010. "ITS Strategic Plan."
https://www.seattle.gov/documents/Departments/SDOT/TechnologyProgram/ITSStrategicPlan20102020.pdf

maintained and preserved, maximize the value of the existing infrastructure, and expand ITS to provide additional geographic coverage and services to travelers.

Neighborhood and Subarea Transportation Planning

The City routinely works with specific communities to plan for needs at the neighborhood level, which can include discussing how to reduce modal conflicts, determine priorities within a local context, and develop design concepts and associated cost estimates. Recent neighborhood transportation planning efforts include:

- One Center City
- Georgetown Mobility Study
- Judkins Park Station Access Study
- Beacon Hill Station Access and Mobility Study
- North Downtown Mobility Study
- Imagine Greater Downtown
- Ballard-Interbay Regional Transportation System

Neighborhood and subarea transportation efforts are undertaken as needed to plan at a finer-grained level and provide cohesive plans for particular geographic focus areas.

Current Conditions

This section describes current transportation conditions for all modes in Seattle: active transportation (people walking, biking, and rolling), transit, autos, and freight. The transportation network is described at various geographies: citywide, neighborhoods and districts, and for the 130th/145th Street subarea in particular. While not exhaustive given the programmatic nature of this EIS, some metrics are evaluated at a more detailed level, for example, subareas of the city or specific key facilities.

SOV Mode Share by Subarea

PM peak single occupancy vehicle (SOV) mode shares by subarea are summarized in **Exhibit 3.10-10**. This data is from the PSRC household travel survey which is a sampling of households to understand typical travel behavior. Because the PSRC household travel survey data sample size is limited at the subarea level, the margin of error ranges from 11 to 28%. The City of Seattle's overall SOV mode share during the PM peak is estimated to be 36%; the margin of error at the city level is approximately 7%. Given the margin of error in this survey, it is difficult to characterize the extent to which mode share is on track to meet the 2035 target.

Exhibit 3.10-10. PM Peak SOV Mode Share by Subarea, 2017-2019

Subarea	2035 SOV Target	2017-2019 Share of Single Occupancy Vehicles
(1) Northwest Seattle	37%	42% (+/- 14%)
(2) Northeast Seattle	35%	35% (+/- 16%)
(3) Queen Anne/Magnolia	38%	42% (+/-25%)
(4) Downtown/Lake Union	18%	24% (+/-11%)
(5) Capitol Hill/Central District	28%	37% (+/-20%)
(6) West Seattle	35%	41% (+/-26%)
(7) Duwamish	51%	72% (+/-28%)
(8) Southeast Seattle	38%	36% (+/-17%)
Citywide	N/A	36% (+/-7%)

Note: Margins of error are based on a 90% confidence interval.
Source: Puget Sound Regional Council Household Survey, 2017-2019.

Person Trips by Mode

Exhibit 3.10-11 summarizes the current estimates of daily person trips in Seattle. Of the roughly 4.1 million daily person trips currently generated in Seattle, SOV trips are estimated to make up 40%. HOV trips are estimated to account for 28%. More than two-thirds of daily trips are made by private vehicle. Transit accounts for 11% of trips, walking for 19%, and biking for 2%.

Exhibit 3.10-11. Daily Person Trips by Mode—Existing Conditions

Mode	Person Trips	Mode Share
SOV	1,624,000	40%
HOV	1,169,000	28%
Transit	465,000	11%
Walk	776,000	19%
Bike	71,000	2%
Total	**4,105,000**	**100%**

Source: Fehr & Peers, 2023.

Active Transportation

The active transportation network is composed of a variety of facility types, some of which serve specific modes while others are shared-use among multiple modes. These include sidewalks, crosswalks, curb ramps, staircases, pedestrian/bicycle bridges, pathways, shared-use trails, protected bike lanes, striped bike lanes, and neighborhood greenways. Detail regarding each active transportation mode has been expanded in the following sections below.

Pedestrian Network

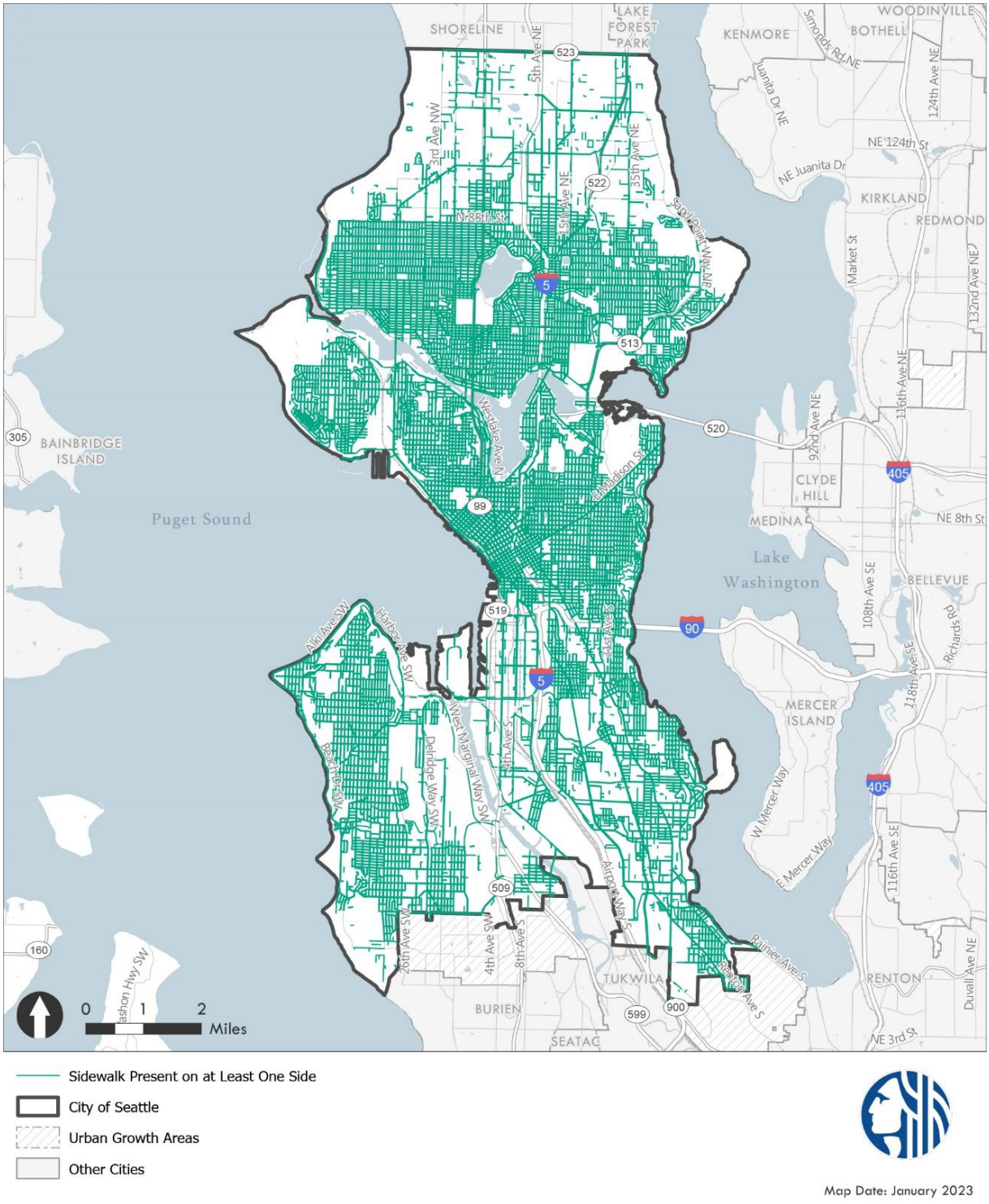
The Seattle pedestrian network is composed of sidewalks, crosswalks, staircases, pedestrian bridges, curb ramps, and trails. Seattle has over 2,000 miles of sidewalks. A map of the sidewalk facilities can be found in **Exhibit 3.10-12**. To view additional datasets related to pedestrian infrastructure, visit the Seattle Accessible Route Planner website. To evaluate the level of sidewalk network connectivity, GIS data was used to calculate the proportion of the sidewalk network that is complete, assuming a fully complete network would have a sidewalk on both sides of each roadway. The information has been summarized at the census tract level to evaluate trends in sidewalk network completion throughout the city. The results are shown in **Exhibit 3.10-13**. For the purposes of the EIS, sidewalk network completion percentages are categorized as follows:

- Low Completion: less than 50% complete
- Medium Completion: between 50% and 75% complete
- High Completion: greater than 75% complete

As shown in **Exhibit 3.10-12** and **Exhibit 3.10-13**, Seattle's pedestrian network is most complete in and around its regional centers and urban centers, including Downtown, South Lake Union, Capitol Hill, Uptown, University District, Northgate, Lake City, Fremont, Ballard, and North Rainier. These areas tend to have uninterrupted sidewalks with frequent pedestrian infrastructure including curb ramps, crosswalks, staircases, and pedestrian bridges.

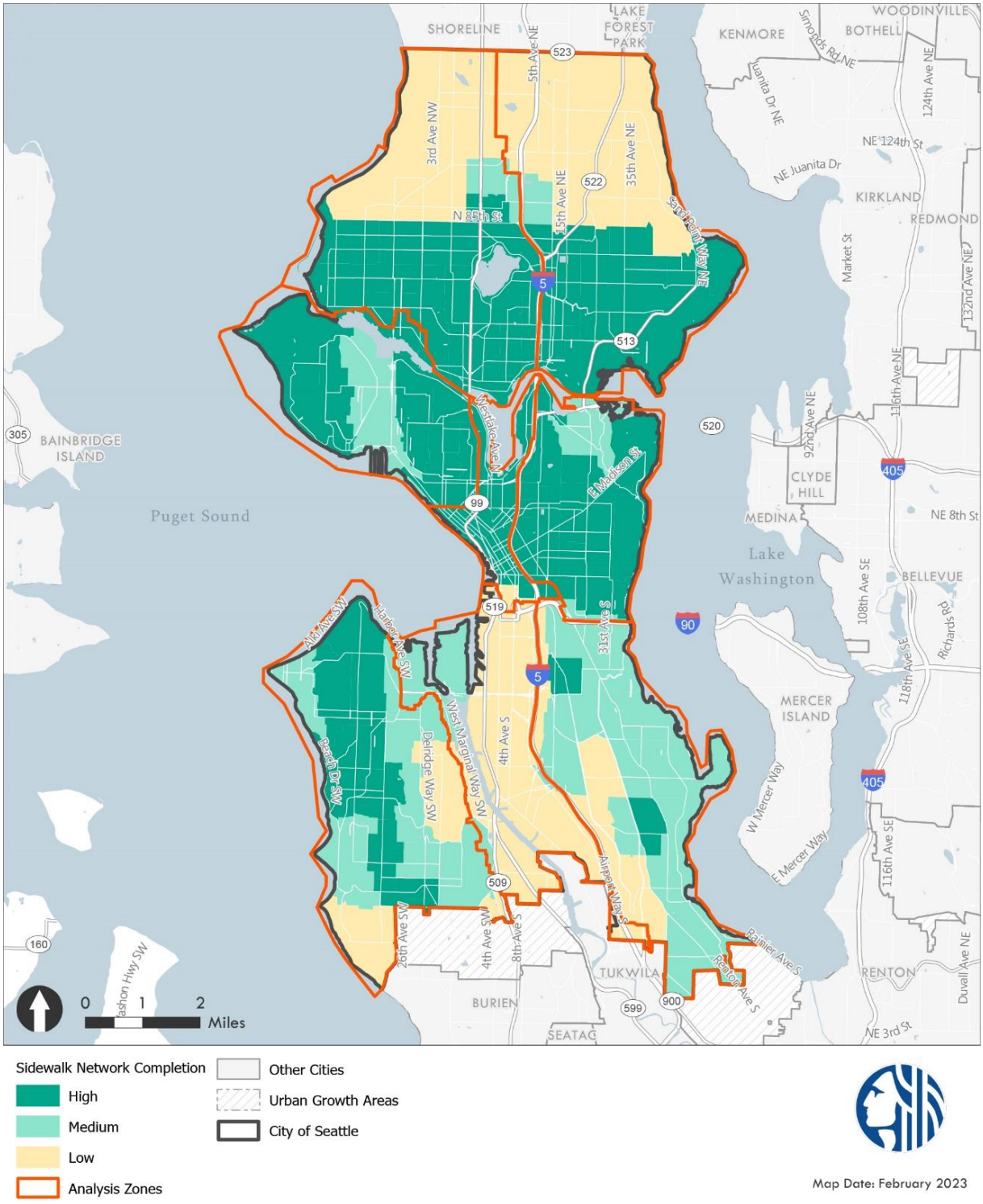
Some areas of the city lack connected networks. Those areas are primarily north of NE/NW 85th Street, Arbor Heights and the Delridge neighborhood in West Seattle, in industrial areas in the Duwamish and Ballard-Interbay MICs, and South Beacon Hill.

Exhibit 3.10-12. Existing Pedestrian Facilities, 2022



Source: Seattle Department of Transportation, 2022.

Exhibit 3.10-13. Existing Sidewalk Connectivity, 2022



Source: Fehr & Peers analysis of Seattle Department of Transportation data, 2023.

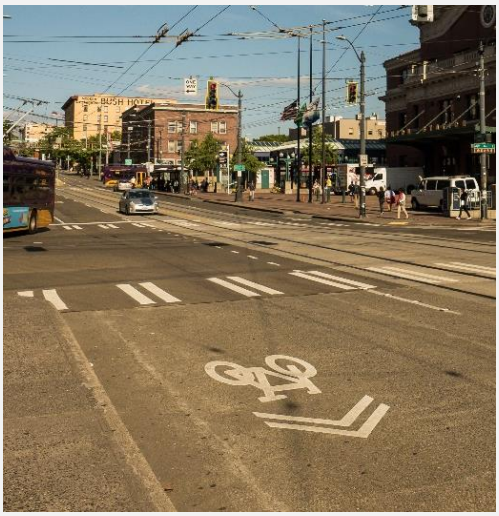
The Pedestrian Master Plan (PMP) designated a Priority Investment Network (PIN) to identify locations that are most in need of pedestrian improvements and therefore are the highest priority for investment. The PIN prioritization criteria include the following metrics: location within ¼ mile of a K-12 Seattle Public School, location along a Frequent Transit Network arterial, and proximity to Frequent Transit Network stops, and health and equity factors guided by the City's Race and Social Justice goals, and safety factors. The maps of the PIN network for each subarea can be found in **Appendix H.1**.

Bicycle Network

Seattle aims to provide a connected network of bicycle facilities that serve all ages and abilities by providing a comfortable separation from motor vehicles as well as a focus on intersection safety along those routes. **Exhibit 3.10-14** provides descriptions and images of various types of bicycle facilities. SDOT defines Seattle's All Ages & Abilities network to include off-street trails, cycle tracks, and neighborhood greenways.

Exhibit 3.10-14. Bicycle Facility Type

Facility Type	Description	Example
Bike Lane	A conventional bike lane is a striped lane on a roadway that is designed for exclusive use by people riding bicycles.	
Protected Bike Lane/Cycle Track	Protected bike lanes are separated by vertical elements that provide further protection from motor vehicle traffic. Common vertical elements include vertical curbs, a painted buffer with planter boxes, and parked cars.	

Facility Type	Description	Example
Neighborhood Greenway	Neighborhood Greenways are low-volume and low-speed streets that are designated and designed to give people walking and biking travel priority. They incorporate signage, pavement markings, and traffic calming tools to improve the comfort and connectivity of the bicycle roadway network.	
Off-street Paths & Trails	Off-street paths and trails are shared use, paved facilities for the exclusive use of those who walk, bike, or roll. They are wide enough for two-way travel.	
Sharrow	Sharrows are pavement markings used to indicate a shared lane use for bicycles and vehicles.	

Source: Fehr & Peers, 2023.

Exhibit 3.10-15 displays the citywide bicycle network. The City of Seattle maintains data layers showing many forms of bicycle facilities. To explore the detailed data, the City's interactive GIS database can be accessed here: SDOT Bike Map.

Bicycle facilities are spread throughout the city and tend to be most prevalent in regional centers such as the center city area. The areas farthest from downtown, in addition to the Duwamish area, have the lowest access to these facilities. Trails are generally along the water (Lake Washington, Lake Union, Ship Canal, Puget Sound), while neighborhood greenways are predominantly in residential areas.

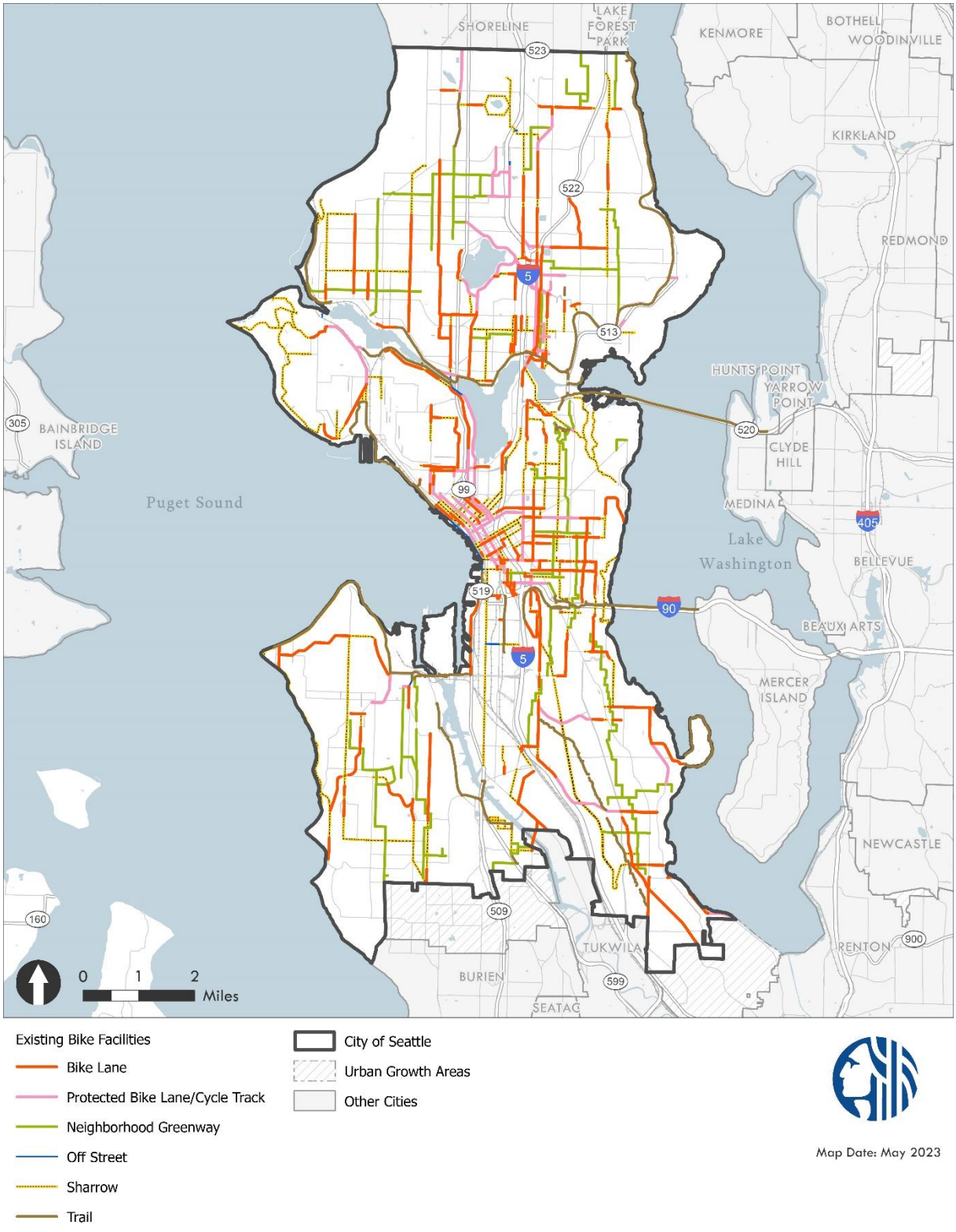
To gauge the current level of access to the All Ages & Abilities bicycle network, **Exhibit 3.10-16** displays the areas of the city within a quarter mile of any All Ages & Abilities facility. Of the approximately 503,000 households in Seattle, 75% (377,000) are within a quarter mile of a designated All Ages & Abilities facility. Approximately 86% of employees are within a quarter mile of an All Ages & Abilities facility. Although most households and employment locations are within a quarter mile of an All Ages & Abilities facility, not all facilities are connected to one another, creating gaps in the network.

As part of the City of Seattle's Bicycle Master Plan (BMP), the City regularly produces implementation plans that evaluate the current progress towards overarching goals. This includes data on the 12 bike counters that SDOT maintains throughout Seattle. Four of the counters are also able to capture pedestrian counts.[66] From 2014 to 2019, bike ridership increased by 26%—the locations with the highest ridership were the Fremont Bridge and SW Spokane Street. After several years of increasing ridership, the City of Seattle experienced a decrease in bike ridership at those locations between 2019 and 2020, in line with the COVID-19 pandemic. With the 2020 numbers included, the bicycle ridership rate increased 4% from 2014 to 2020.[67]

[66] Seattle Department of Transportation. "Bike Counters." https://www.seattle.gov/transportation/projects-and-programs/programs/bike-program/bike-counters

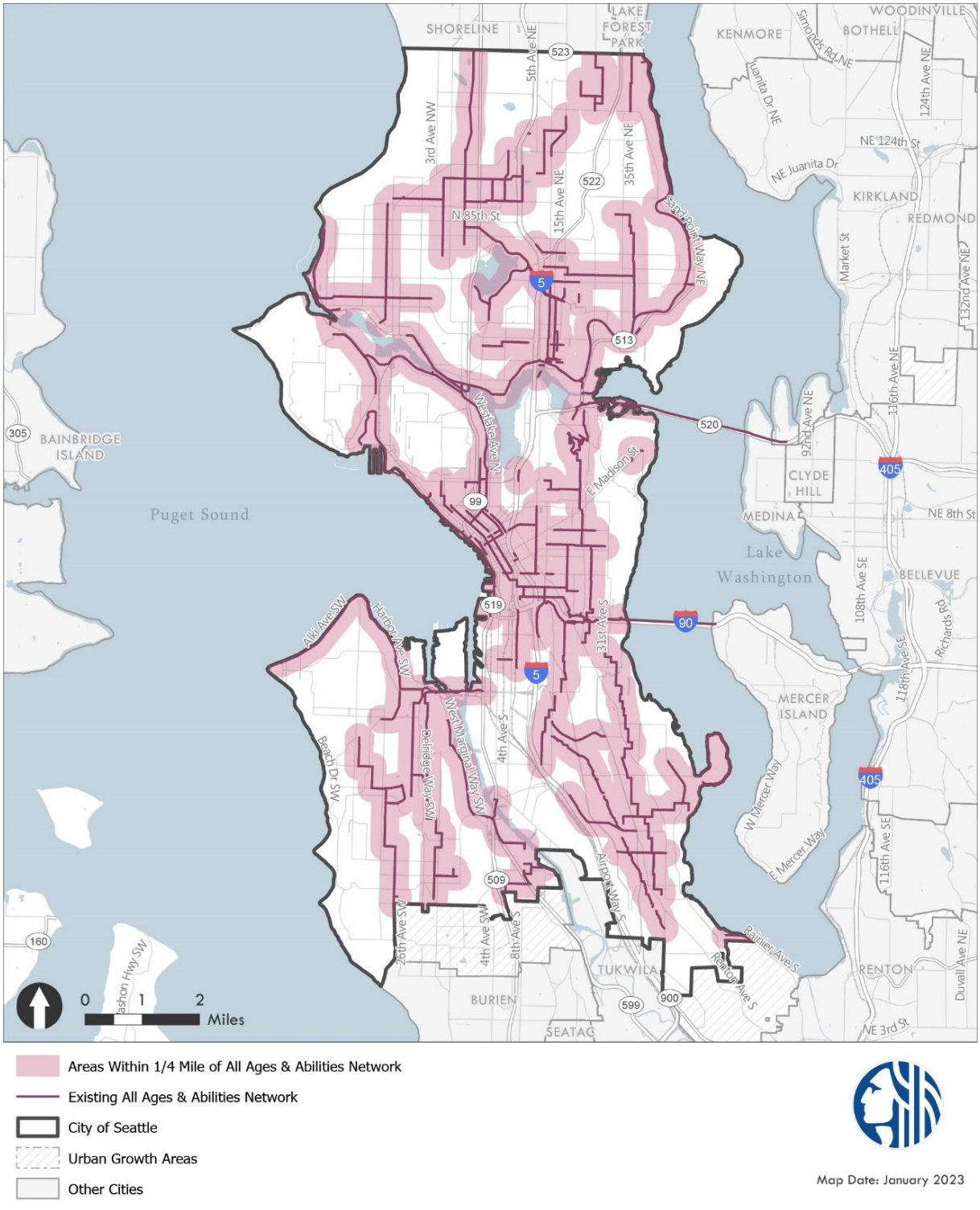
[67] Seattle Department of Transportation. 2021. "Seattle Bicycle Master Plan: 2021-2024 Implementation Plan." https://www.seattle.gov/documents/Departments/SDOT/BikeProgram/BMP_Imp_Plan_2021_FINAL.pdf

Exhibit 3.10-15. Existing Bicycle Facilities, 2022



Sources: Seattle Department of Transportation, 2022.

Exhibit 3.10-16. Existing All Ages & Abilities Network, 2022



Sources: Fehr & Peers analysis of Seattle Department of Transportation, 2022.

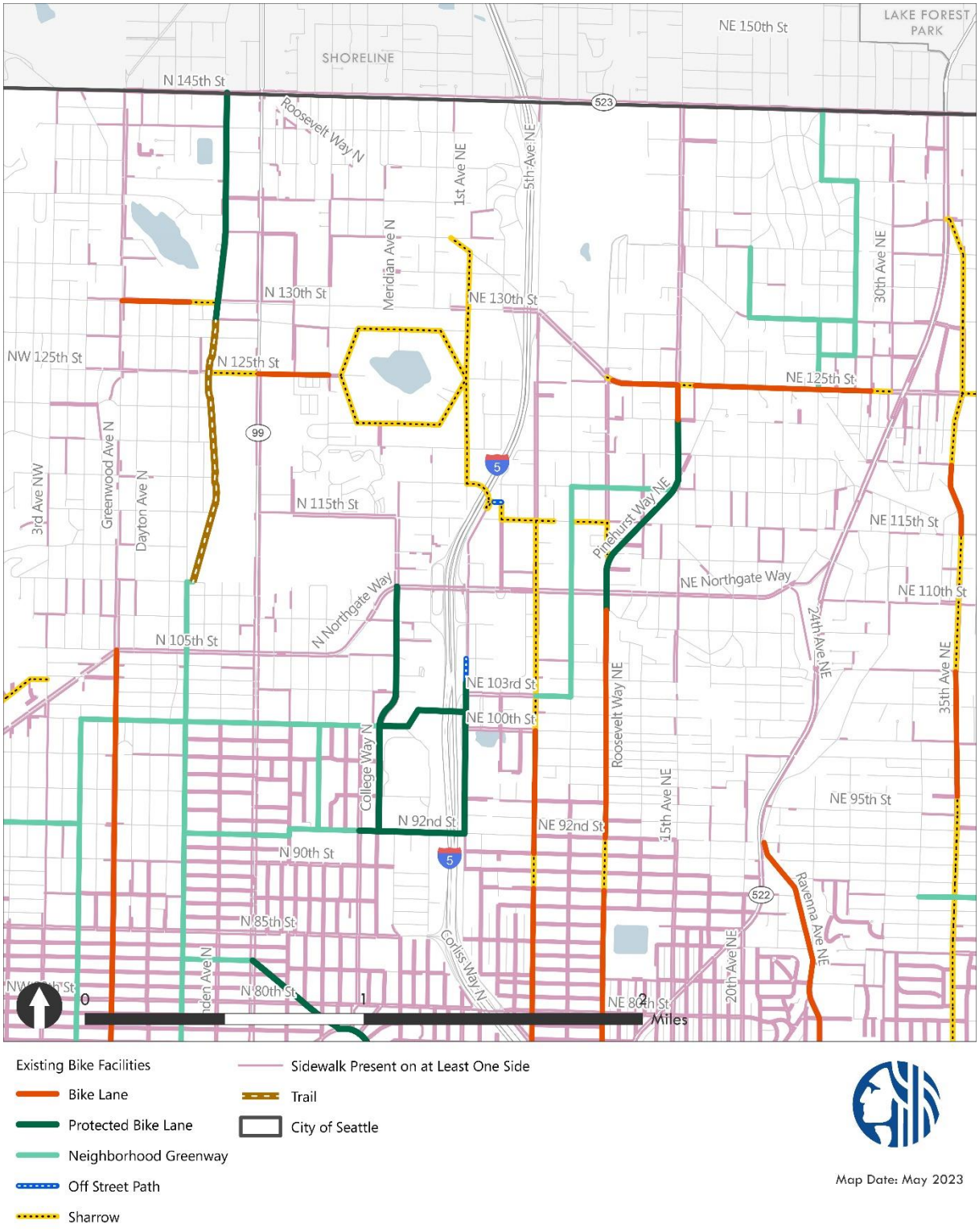
NE 130th / NE 145th Street Subarea

Exhibit 3.10-17 displays a map of the bicycle and pedestrian facilities within the subarea. In the NE 130th / NE 145th Street subarea, the pedestrian network has frequent gaps. Arterials such as NE 130th Street and Roosevelt Way NE have good sidewalk connectivity, but many north/south streets surrounding the area lack continuous sidewalks and ADA-compliant curb ramps. There are two planned sidewalk projects scheduled to be implemented in 2024: the first on 5th Avenue NE between NE 125th Street and NE 130th Street and the second on N 128th Street between Meridian Avenue N and Ashworth Avenue N.[68]

Within the 130th/145th subarea, there are bike lanes on NE 125th Street connecting to a protected bike lane on 15th Avenue NE and Pinehurst Way NE as well as several neighborhood greenways east of I-5. The All Ages & Abilities network is more limited on the west side of I-5. Additional protected and striped lanes are planned within the subarea.[69]

[68] Seattle Department of Transportation. "Sidewalk Development Program." https://www.seattle.gov/transportation/projects-and-programs/programs/pedestrian-program/sidewalk-development-program
[69] Seattle Department of Transportation. "SDOT Bike Map." https://seattlecitygis.maps.arcgis.com/apps/webappviewer/index.html?id=a24b25c3142c49e194190d6a888d97e3

Exhibit 3.10-17. NE 130th / NE 145th Street Subarea



Sources: Seattle Department of Transportation, 2022.

Transit

Seattle's public transit services are provided by King County Metro, Sound Transit, Community Transit, Kitsap Transit, and the City of Seattle. **Exhibit 3.10-18** displays Seattle's transit facilities.

Sound Transit's Link light rail serves the greater Seattle area with about 25 miles of rail coverage and 11.5 million annual riders in 2021. The 1 Line runs from Northgate Station through the center city and south to Seattle-Tacoma International Airport and Angle Lake. The park-and-ride located at Northgate Station serves as a central hub for riders in the northern parts of the city.

Sound Transit plans to expand the Link light rail network in the next several years. The 1 Line will be extended northward to Lynnwood and southward to Federal Way, with a targeted opening of 2024 or 2025. This will include the NE 130th Street Station and Shoreline South/148th Station just north of the Seattle city limit. The 2 Line, slated to open in 2024, will run from Redmond to Northgate via Downtown Bellevue and Seattle. Additional expansions will incorporate the entire Everett to Tacoma corridor. Within Seattle, the Link network will be expanded to include lines to West Seattle and Ballard with expected completion dates of 2032 and 2037-2039[70], respectively.

Transit Ridership

In 2019, the mode share of workers who arrived at Seattle's center city core between 6 AM and 9 AM by public transit was 46 percent (Commute Seattle 2019). The share of workers who drove alone to the city center was 26 percent. The COVID-19 pandemic has affected commuting behaviors since early 2020. Depending on the nature of the industry, many employers shifted to a full or partial remote format. Accordingly, this shaped the demand for travel during peak periods as well as the level of comfort people have sharing a space with other commuters. King County Metro reported a drop in ridership from over 123 million annual riders in 2019 to approximately 58 million riders in 2020. While transit ridership has begun to rebound since 2020, commuting patterns continue to evolve as remote and hybrid work has become more common in many workplaces.

King County Metro (KCM) operates fixed route bus service, on-demand transit, night service shuttles, and a limited number of ferry and rideshare programs. This includes three RapidRide routes connecting the center city to West Seattle (the C Line), Ballard (the D Line) and Shoreline along the Aurora Avenue corridor (the E Line). Seattle is also served by Community Transit bus routes that provide service north into Snohomish County and Kitsap Transit ferries to Kingston and Bremerton.

In addition to bus and light rail modes of public transit, the City of Seattle hosts a monorail as well as two streetcar lines: South Lake Union and First Hill.[71] At present, the two routes are not connected. However, there are plans in place to join the routes and provide north-south

[70] The Sound Transit Board completed a realignment process to adjust project timelines to reflect financial constraints. Depending on the ability to close the funding gap, service may open to Smith Cove in 2037 and Ballard in 2039. https://www.soundtransit.org/system-expansion/west-seattle-ballard-link-extensions/timeline-milestones

[71] Seattle Department of Transportation. "Seattle Streetcar." https://www.seattle.gov/transportation/getting-around/transit/streetcar#streetcar-reports

connectivity through the Center City Connector route. The Seattle Monorail is owned by the City of Seattle and is operated by Seattle Monorail Services (SMS). The Seattle Monorail serves a singular route between two stations: Seattle Center and Westlake Center. Both the Seattle Monorail and the Seattle streetcars accept ORCA card payment for the cost of fares.

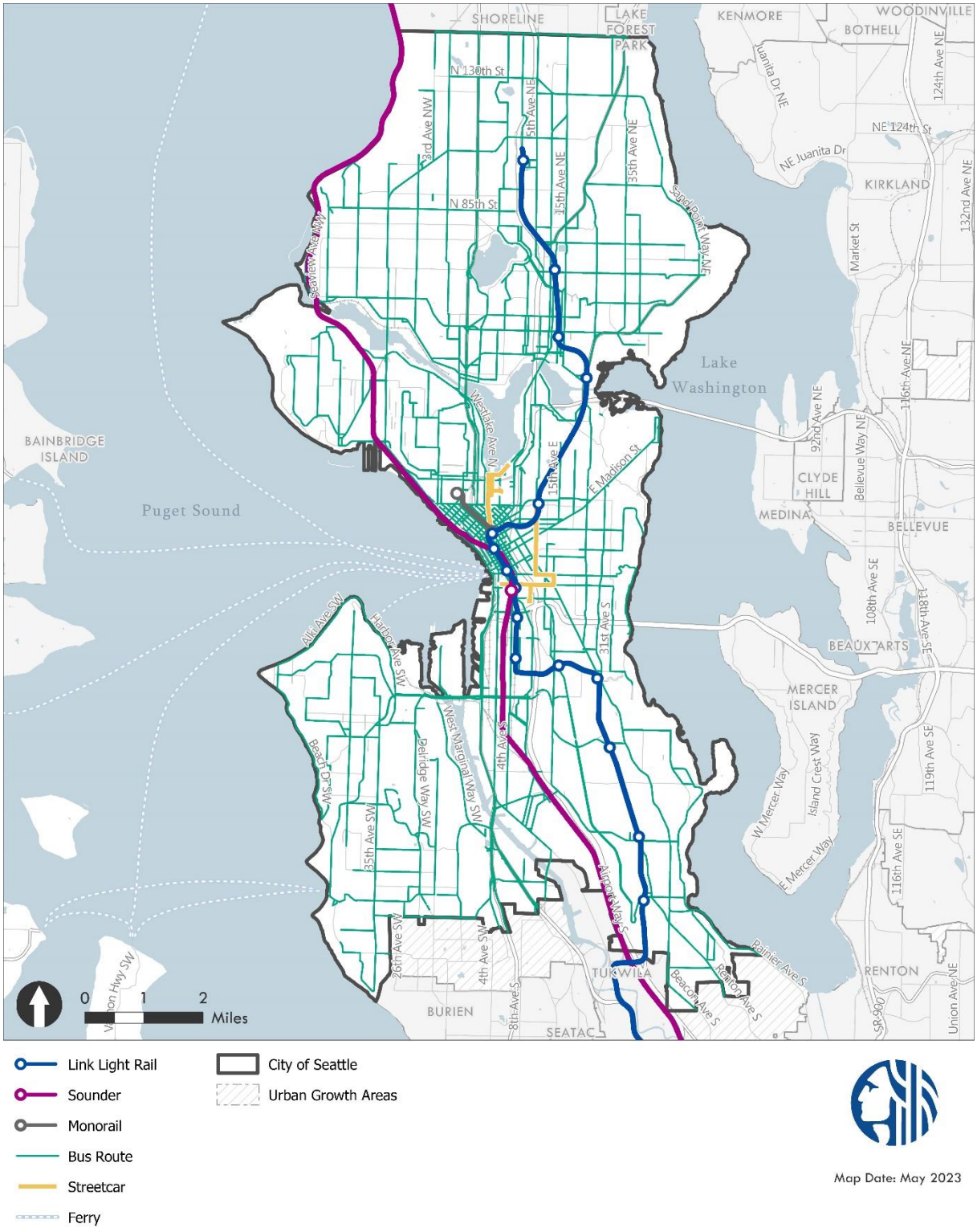
The Washington State Ferries (WSF) system serves many residents of the City of Seattle. The ferry system includes the following four routes, with Seattle service[72]:

- Seattle (Colman Dock) / Bainbridge Island
- Seattle (Colman Dock) / Bremerton
- Seattle (Fauntleroy Terminal) / Southworth
- Seattle (Fauntleroy Terminal) / Vashon

ORCA cards are accepted as a form of payment for all ferries, however there are some limitations for usage.[73]

[72] Washington State Department of Transportation. "Schedule By Route." https://wsdot.com/ferries/schedule/default.aspx
[73] Washington State Department of Transportation. "Wave2Go." https://wave2go.wsdot.com/webstore/landingPage?cg=21&c=76

Exhibit 3.10-18. City of Seattle Transit Service



Sources: Seattle Department of Transportation, 2023.

On fixed route buses, KCM uses two separate measures of passenger loads: number of passengers compared to space on the bus; and the amount of time the bus has a standing load. For each trip, KCM further determines a passenger load threshold for overcrowding, based on the characteristics of the bus type scheduled for that trip. This threshold is determined by the number of seats on the bus and the number of standing people that can fit on the bus (assuming each standing person is given at least four square-feet of space). KCM considers these routes for further investment to alleviate overcrowding—this can be achieved by assigning a larger vehicle to the trip, adjusting the spacing of trips, or adding trips.

Based on Fall 2019 data, out of 57 bus routes operating in the City of Seattle, four routes had one trip that exceeded the crowding threshold during the PM peak period. These include:

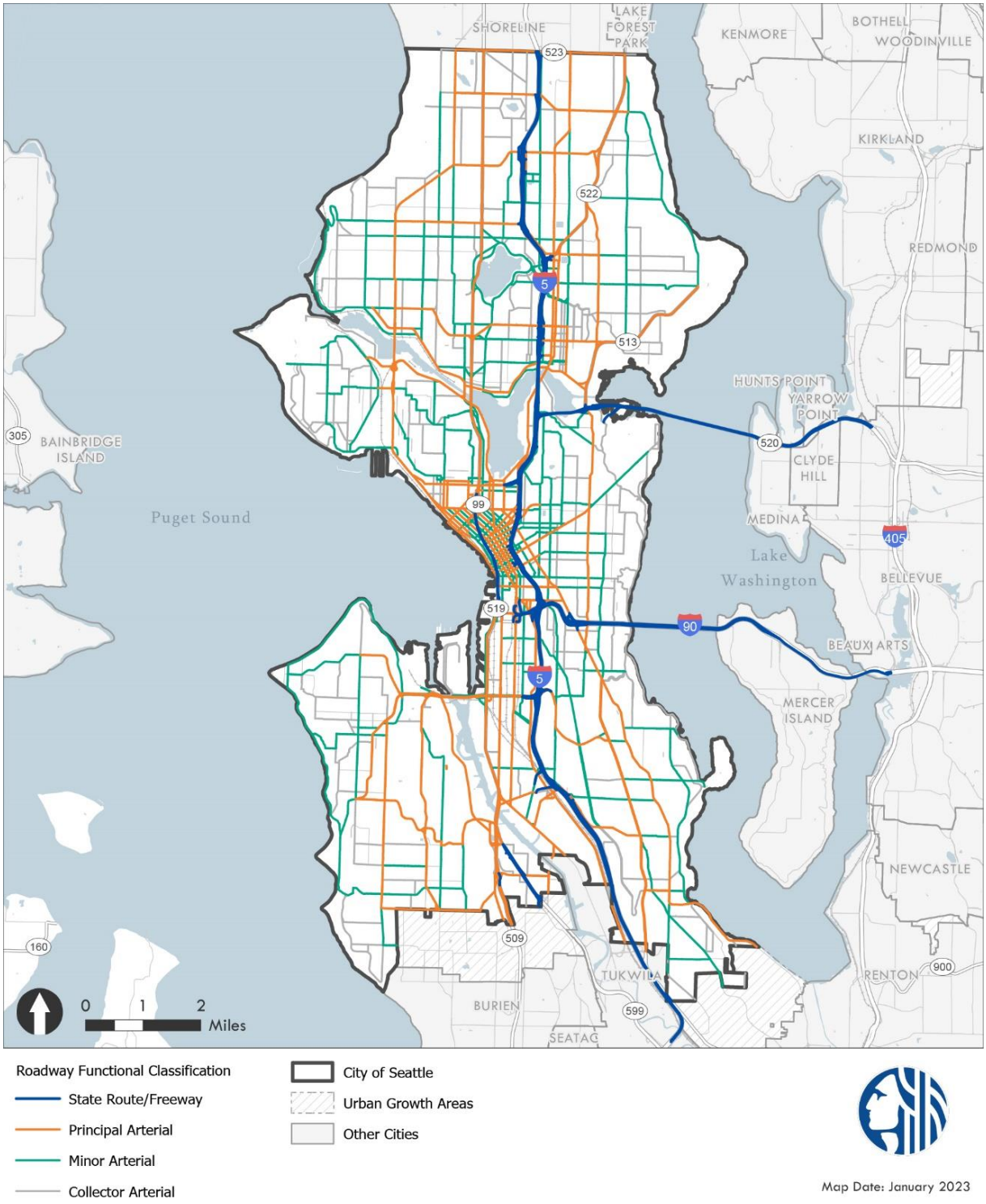
- Route 40: Northgate to Downtown Seattle via Loyal Heights, Crown Hill, Ballard, Fremont and South Lake Union.
- Route 62: Sand Point to Downtown Seattle via View Ridge, Ravenna, Green Lake, Wallingford, Fremont and South Lake Union.
- Route 63: Northgate to Downtown Seattle via Maple Leaf, Ravenna and the University District (note this route stopped operating after the 2021 opening of the 1 Line to Northgate).
- Route 64: Lake City to Downtown Seattle via Wedgwood, Ravenna, University District and South Lake Union.

Appendix H.2 displays the inbound and outbound crowding summaries by bus route.

Roadway Users

The City of Seattle is served by a dense roadway system of principal, minor, and collector arterials, as shown in **Exhibit 3.10-19**. City arterials generally follow a grid pattern. Much of Seattle's transportation network is constrained by the waterways within and around the city. The Ship Canal divides north Seattle from the rest of the city, with six crossing points: the Ballard Bridge, the Fremont Bridge, State Route (SR) 99, Interstate 5 (I-5), the University Bridge, and the Montlake Bridge. Likewise, West Seattle is separated from the rest of the city by the Duwamish Waterway, and is accessed via the West Seattle Bridge, Spokane Street Bridge, the First Avenue S Bridge, and the South Park Bridge.

Exhibit 3.10-19. Arterial Classification, 2022



Sources: Seattle Department of Transportation, 2022.

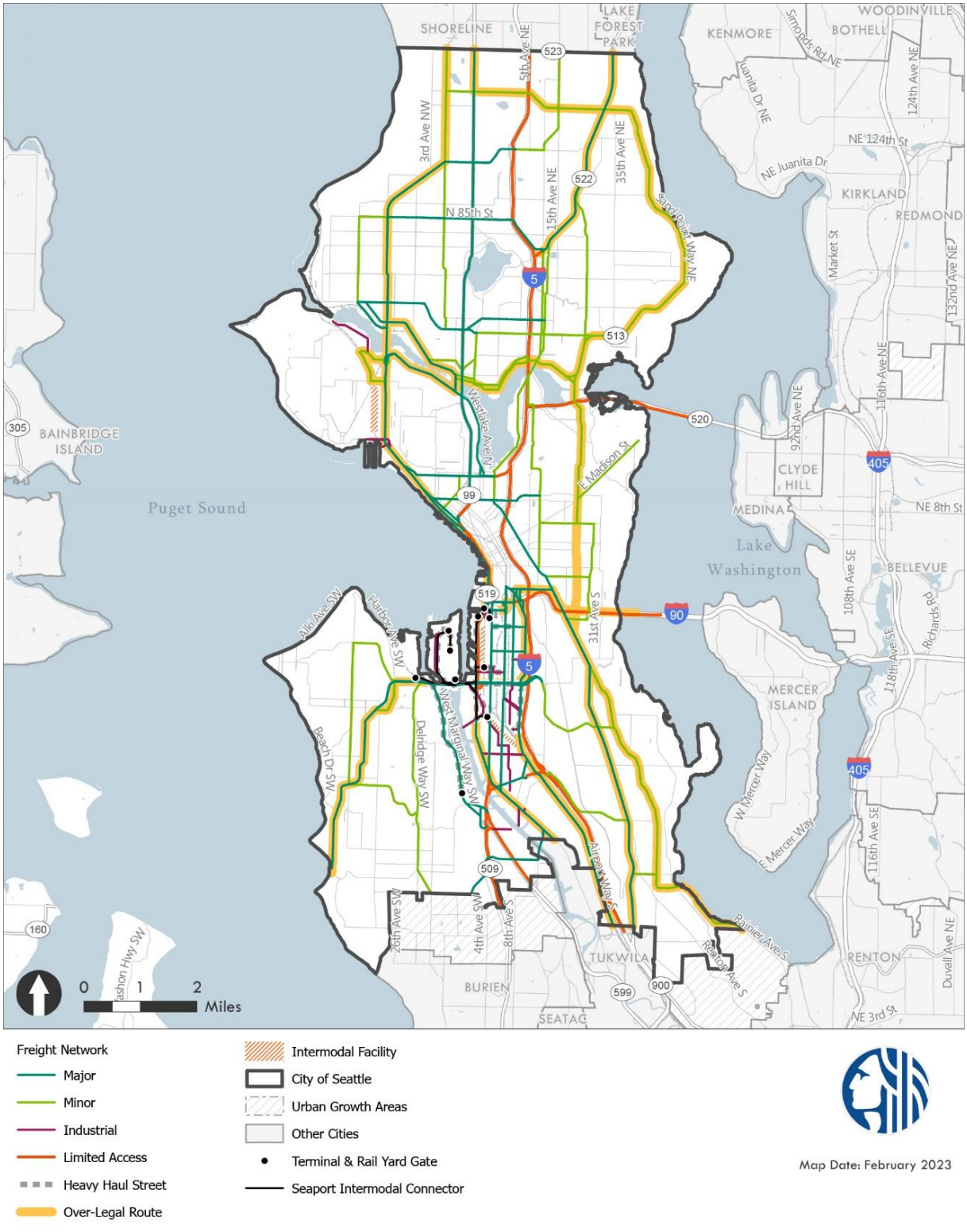
Freight

Seattle is a key port city along the West Coast and has two industrial zones that need ample transportation access to function: Ballard-Interbay-Northend and Duwamish Manufacturing and Industrial Centers (MICs). Seattle has designated a major truck street network throughout the city that carries a substantial amount of freight traffic. As shown in **Exhibit 3.10-20**, the freight network is comprised of state routes, interstates, and major arterials linking key freight destinations as well as intermodal facilities where freight is transferred among rail, truck, and ship. The map also shows terminal and rail yard gate locations, the heavy haul network, and over-legal routes.

Rail is also a critical mode for freight movement within the MICs. There are two Class 1 railroads in Seattle: BNSF and the Union Pacific Railroad (UP). The BNSF mainline extends north-south through Seattle and operates in a doubled-tracked tunnel through downtown, serving Balmer Yard in the BINMIC and SIG in the Duwamish MIC. The UP mainline only operates south of downtown Seattle and parallels the BNSF network, serving the Seattle ARGO Terminal. The MICs also include a variety of local rail spurs that provide direct rail service to businesses as well as on-dock rail at Port of Seattle terminals.

The BNSF and UP railroads cross roadways in many locations throughout the MICs. While at-grade crossings are more limited in the BINMIC, they are prevalent throughout the Duwamish MIC. When a train is passing through these locations, the crossing is closed to vehicle traffic resulting in delays to those on the roadway network, particularly truck freight in heavily industrial areas. Delays depend on the frequency and duration of the at-grade crossing closure and have been identified by the freight community as a key challenge for truck freight mobility.

Exhibit 3.10-20. Freight Network



Sources: Seattle Department of Transportation, 2022.

VMT / VHT / Average Trip Speed

Several metrics are used to evaluate the use of the road network: vehicle miles traveled (VMT), vehicle hours traveled (VHT), and average trip speed. VMT and VHT are calculated on a per capita basis to normalize each metric against the number of people living and working in Seattle.

Based on the base year PSRC travel demand model, Seattle is currently estimated to generate 22.2 million VMT each day. This equates to roughly 17.2 VMT per Seattle resident and worker. Total VHT is estimated to be 741,900 each day which equates to an average of 34 minutes of vehicle travel per person. The average speed of all trips generated is approximately 30mph. This includes travel on the highway system and local roadway network.

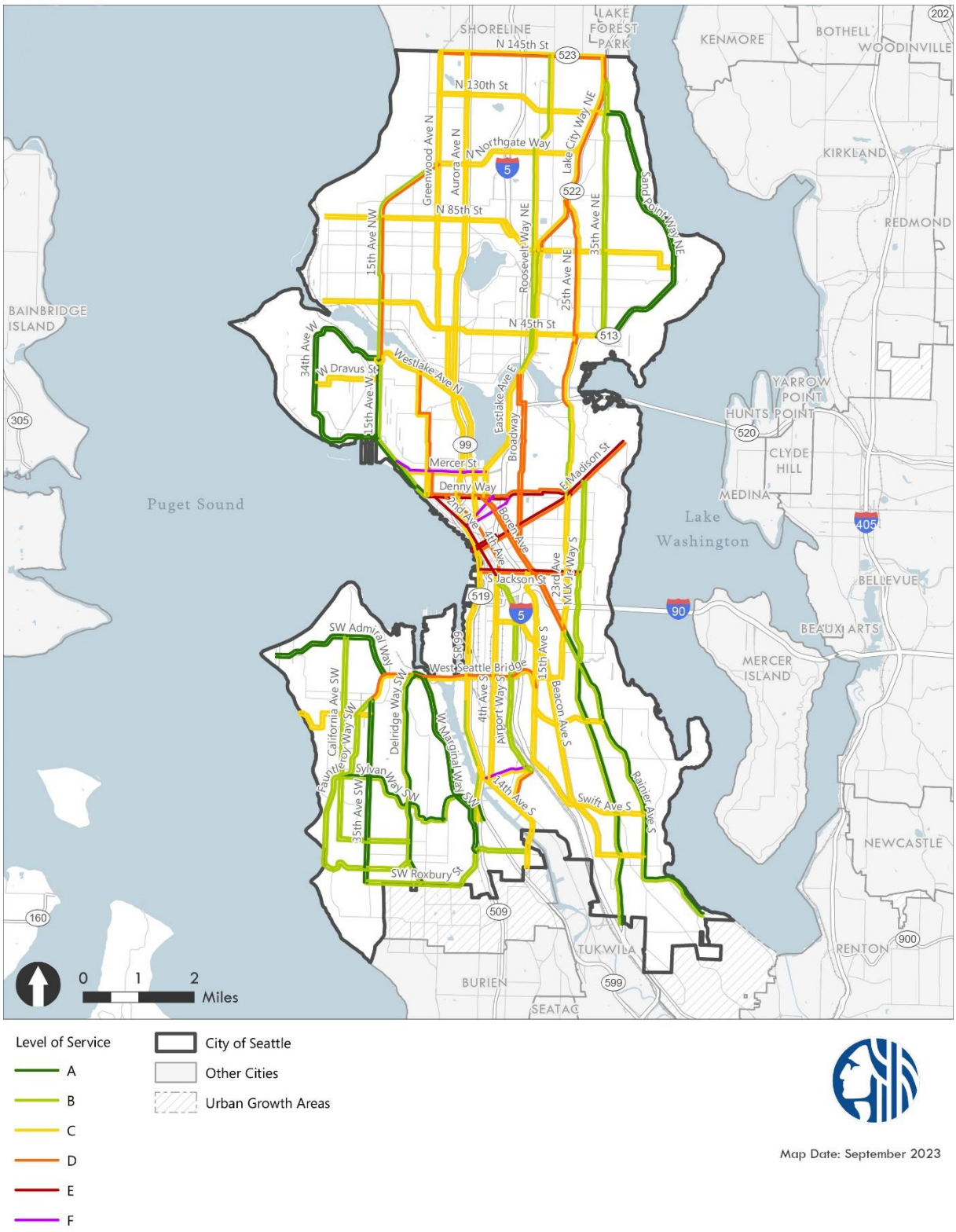
Telework & VMT

As a result of the COVID-19 pandemic, some workplaces have deviated from the typical in-person environment. As a result, commuting patterns have changed with increased telework opportunities. An analysis based on a recent household travel survey in the Sacramento region found that while workers who only telework generate substantially less VMT than workers who do not telework at all, workers who telework on some but not all days do not generate statistically less VMT than workers who do not telework at all.

Travel Time

PM peak hour corridor travel time results are summarized in **Exhibit 3.10-21** and **Exhibit 3.10-22**. As shown when mapped geographically, corridors closest to the center city tend to operate at LOS D through F with travel time generally improving in outlying neighborhoods. Corridors that cross waterways are also pinchpoints in the network and therefore tend to have lower LOS.

Exhibit 3.10-21. PM Peak Hour Corridor Travel Time, 2019



Sources: Fehr & Peers analysis of SDOT Iteris data, 2023.

Exhibit 3.10-22 PM Peak Hour Travel Time Corridor Level of Service

			Minutes / Level of Service	
Roadway	Extents		N/E	S/W
N 145th St	Greenwood Ave N	Lake City Way NE	10 / D	9.5 / C
N 130th St	Greenwood Ave N	35th Ave NE	11.5 / C	12 / C
N Northgate Way	Greenwood Ave N	Lake City Way NE	10.5 / C	10.5 / C
N 85th St	32nd Ave NW	Sand Point Way NE	24.5 / C	24.5 / C
N 45th St	32nd Ave NW	Union Bay Pl NE	23.5 / C	23.5 / C
15th Ave NW	W Emerson St	N 105th St	16 / D	10.5 / B
Greenwood Ave N	Nickerson St	N 145th St	26 / C	24 / C
Aurora Ave N	N 38th St	N 145th St	18.5 / C	15 / C
Roosevelt Way NE	Fuhrman Ave E	N 145th St	22 / C	20.5 / B
Lake City Way NE	NE 75th St	N 145th St	13.5 / D	10 / C
25th Ave NE	E Roanoke St	Lake City Way NE	14 / C	21 / D
35th Ave NE	Union Bay Pl NE	Lake City Way NE	16.5 / B	17 / B
Sand Point Way NE	Union Bay Pl NE	35th Ave NE	12.5 / A	12 / A
34th Ave W	15th Ave W	15th Ave W	11.5 / A	12 / A
W Dravus St	34th Ave W	15th Ave W	5 / C	4.5 / C
15th Ave W	Queen Anne Ave N	W Emerson St	9 / B	7.5 / A
Queen Anne Ave N	Denny Way	Nickerson St	12.5 / D	11.5 / C
SR 99	S Nevada St	N 38th St	13.5 / C	15 / C
Westlake Ave N	Stewart St	W Emerson St	16 / C	17 / C
Eastlake Ave E	Denny Way	Fuhrman Ave E	11.5 / C	10.5 / C
Broadway	Boren Ave	Eastlake Ave E	17.5 / D	17 / D
23rd Ave	E Madison St	E Roanoke St	6.5 / C	5 / B
Mercer St	Elliott Ave W	Fairview Ave N	7.5 / C	14 / F
Denny Way	Queen Anne Ave N	E Madison St	17 / E	16 / D
2nd Ave	4th Ave S	Denny Way	- / -	11.5 / E
4th Ave	S Jackson St	Denny Way	9 / D	- / -
Stewart St	1st Ave	Denny Way	- / -	6 / F
Olive Way	4th Ave	Denny Way	7 / F	- / -
E Madison St	Alaskan Way S	McGilvra Blvd E	20 / D	20 / E
Boren Ave	23rd Ave S	Denny Way	16 / D	14.5 / D
S Jackson St	Alaskan Way S	MLK Jr. Way S	8.5 / D	10.5 / E
23rd Ave	15th Ave S	E Madison St	14 / C	15.5 / C

Roadway	Extents		Minutes / Level of Service N/E	S/W
MLK Jr. Way S	Rainier Ave S	E Madison St	10 / B	11 / B
4th Ave S	E Marginal Way S	S Jackson St	12 / C	11.5 / C
Airport Way S	S Albro Pl	4th Ave S	10 / B	10 / B
15th Ave S	S Jackson St	Rainier Ave S	14.5 / C	16 / C
E Marginal Way S	S Holden St	S Nevada St	4.5 / C	4.5 / B
Swift Ave S	Rainier Ave S	S Columbian Way	13 / C	13 / C
Beacon Ave S	Rainier Ave S	4th Ave S	21.5 / C	24 / C
MLK Jr. Way S	S Boeing Access Rd	Rainier Ave S	14.5 / A	15.5 / B
Rainier Ave S	Cornell Ave S	23rd Ave S	17.5 / A	20 / B
S Michigan St	E Marginal Way S	Airport Way S	3.5 / C	4.5 / F
Ellis Ave S	E Marginal Way S	Airport Way S	3 / D	3.5 / C
14th Ave S	S Director St	1st Ave S	7 / C	7 / C
California Ave SW	Delridge Way SW	SW Admiral Way	17 / B	17 / B
Fauntleroy Way SW	Delridge Way SW	35th Ave SW	15 / B	17 / B
35th Ave SW	SW Roxbury St	Fauntleroy Way SW	8.5 / A	9 / A
Delridge Way SW	SW Roxbury St	W Marginal Way SW	11 / A	13 / B
W Marginal Way SW	S Cloverdale St	Delridge Way SW	7.5 / A	8 / A
SW Admiral Way	63rd Ave SW	SW Manning St	6.5 / A	7 / A
West Seattle Bridge	35th Ave SW	15th Ave S	7.5 / C	10 / D
SW Alaska St	Beach Dr SW	35th Ave SW	7 / C	7.5 / C
Sylvan Way SW	California Ave SW	S Holden St	12 / B	10.5 / A
SW Roxbury St	35th Ave SW	14th Ave S	11 / B	10 / B

Source: Fehr & Peers analysis of SDOT Iteris data, 2023.

Screenlines

Exhibit 3.10-23 summarizes each screenline's LOS threshold and V/C ratio based on pre-pandemic observed counts. Almost all screenlines are below 90% capacity. Only three locations are estimated to exceed 90% capacity in one travel direction during the evening peak hour. These locations are all bridges crossing the Lake Washington Ship Canal—the Ballard Bridge, Fremont Bridge, and the Aurora Avenue Bridge which are currently operating at or near capacity. However, no screenlines currently exceed the established thresholds.

Exhibit 3.10-23. PM Peak Hour Screenline Volume-to-Capacity Ratios—Existing Conditions

Screenline	Screenline Location	Extents	V/C Threshold	Northbound/ Eastbound V/C Ratio	Southbound/ Westbound V/C Ratio
1.11	North City Limit	3rd Ave NW to Aurora Ave N	1.20	0.68	0.52
1.12	North City Limit	Meridian Ave N to 15th Ave NE	1.20	0.47	0.30
1.13	North City Limit	30th Ave NE to Lake City Way NE	1.20	0.84	0.47
2.00	Magnolia	Magnolia Bridge to W Emerson Place	1.00	0.56	0.61
3.11	Duwamish River	West Seattle Bridge & Spokane St	1.20	0.64	0.81
3.12	Duwamish River	1st Ave S & 16th Ave S	1.20	0.56	0.87
4.11	South City Limit	Martin Luther King Jr. Way to Rainier Ave S	1.00	0.57	0.75
4.12	South City Limit	Marine Dr SW to Meyers Way S	1.00	0.37	0.42
4.13	South City Limit	SR 99 to Airport Way S	1.00	0.44	0.45
5.11	Ship Canal	Ballard Bridge	1.20	1.01	0.71
5.12	Ship Canal	Fremont Bridge	1.20	1.00	0.79
5.13	Ship Canal	Aurora Ave Bridge	1.20	0.96	0.58
5.16	Ship Canal	University & Montlake Bridges	1.20	0.74	0.79
6.11	South of NW 80th St	Seaview Ave NW to 15th Ave NW	1.00	0.37	0.46
6.12	South of N W 80th St	8th Ave NW to Greenwood Ave N	1.00	0.57	0.49
6.13	South of NE 80th St	Linden Ave N to 1st Ave NE	1.00	0.54	0.49
6.14	South of NE 80th St	5th Ave NE to 15th Ave NE	1.00	0.71	0.56
6.15	South of NE 80th St	20th Ave NE to Sand Point Way NE	1.00	0.47	0.34
7.11	West of Aurora Ave	Fremont Pl N to N 65th St	1.00	0.53	0.65
7.12	West of Aurora Ave	N 80th St to N 145th St	1.00	0.41	0.41
8.00	South of Lake Union	Valley St to Denny Way	1.20	0.49	0.35
9.11	South of Spokane St	Beach Dr SW to W Marginal Way SW	1.00	0.45	0.71
9.12	South of Spokane St	E Marginal Way S to Airport Way S	1.00	0.51	0.54
9.13	South of Spokane St	15th Ave S to Rainier Ave S	1.00	0.56	0.57
10.11	South of S Jackson St	Alaskan Way S to 4th Ave S	1.00	0.61	0.64
10.12	South of S Jackson St	12th Ave S to Lakeside Ave S	1.00	0.52	0.64
12.12	East of CBD	S Jackson St to Howell St	1.20	0.36	0.36

Screenline	Screenline Location	Extents	V/C Threshold	Northbound/ Eastbound V/C Ratio	Southbound/ Westbound V/C Ratio
13.11	East of I-5	NE Northgate Way to NE 145th St	1.00	0.67	0.51
13.12	East of I-5	NE 65th St to NE 80th St	1.00	0.52	0.54
13.3	East of I-5	NE Pacific St to NE Ravenna Blvd	1.00	0.59	0.52
A1	North of Seneca St	1st Ave to 6th Ave	N/A	0.47	0.50
A2	North of Blanchard	Elliott Ave to Westlake Ave	N/A	0.43	0.31
A3	East of 9th Ave	Lenora St to Pike St	N/A	0.46	0.83
A4	South of Mercer St	Elliott Ave W to Aurora Ave N	N/A	0.53	0.46
A5	East of 5th Ave N	Denny Way to Valley St	N/A	0.40	0.40
A6	North of Pine St	Melrose Ave E to 15th Ave E	N/A	0.39	0.32
A7	North of James St– E Cherry St	Boren Ave to 14th Ave	N/A	0.46	0.32
A8	West of Broadway	Yesler Way to E Roy St	N/A	0.47	0.38
A9	South of NE 45th St	7th Ave NE to Montlake Blvd NE	N/A	0.56	0.53
A10	East of 15th Ave NE	NE 45th St to NE 52nd St	N/A	0.51	0.48
A11	South of Northgate Way (N/NE 110th St)	N Northgate Way to Roosevelt Way NE	N/A	0.44	0.46
A12	East of 1st Ave NE	NE 100th St to NE Northgate Way	N/A	0.43	0.48

Sources: Fehr & Peers, 2023.

Intersection LOS—NE 130th / NE145th Street Subarea

Exhibit 3.10-24 summarizes the existing LOS and delay for each of the 15 intersections within the 130th/145th Subarea. Among the 15 intersections, only one intersection (N 145th Street and Meridian Avenue N) operates at LOS E or worse. All other intersections operate at LOS D or better.

Exhibit 3.10-24. 130th/145th Street Subarea PM Peak Hour Level of Service—Existing Conditions

Intersection ID	Intersection	Level of Service / Delay (seconds)
1	NE 155th St / 5th Ave NE	B / 11
2	N 145th St / Aurora Ave N	D / 47
3	**N 145th St / Meridian Ave N**	**E / 58**
4	N 145th St / 1st Ave NE	C / 21
5	NE 145th St / I-5 On & Off Ramps	D / 35
6	NE 145th St / 5th NE	D / 42
7	NE 145th St / 15th Ave NE	D / 48
8	N 137th St / Meridian Ave N / Roosevelt Way N	A / 7
9	N 130th St / Aurora Ave N	D / 51
10	N 130th St / Meridian Ave N	A / 9
11	N 130th St / 1st Ave NE	D / 52
12	NE 130th St / I-5 On Ramp	A / 2
13	NE 130th St / Roosevelt Way NE / 5th Ave NE	C / 32
14	Roosevelt Way NE / NE 125th St / 10th Ave NE	B / 17
15	NE 125th St / 15th Ave NE	D / 41

Source: Fehr & Peers, 2023.

State Facilities

State facilities are evaluated to monitor performance and facilitate coordination between the city and state per the Growth Management Act. I-5 runs north-south throughout the city, serving both local and regional travelers. SR 99 also runs north-south through the city and tends to serve more locally focused trips. To the east, there are two bridges across Lake Washington: SR 520 and Interstate 90 (I-90). These four state facilities are all designated as Highways of Statewide Significance (HSS) by WSDOT, a designation that assists with funding allocation. Other HSS facilities within the city include SR 509 connecting the Duwamish area south to Sea-Tac Airport; SR 519 connecting Colman Dock to I-90; and SR 522 connecting North Seattle to communities to the northeast.

Exhibit 3.10-25 summarizes the average annual daily traffic (AADT) on each HSS that passes through the city. For I-5 and SR 99, multiple study locations were selected. The AADT were

compared to the maximum service volume correlating to WSDOT's LOS standard (e.g., the maximum number of vehicles that can be served while maintaining a LOS D).

WSDOT sets the standard for most of the HSS facilities in Seattle at LOS D; the exception is the segment of SR 99 between SR 509 and I-5 which has a standard of "E mitigated" meaning congestion should be mitigated when PM peak hour LOS falls below LOS E. Because the volumes are compared to the maximum service volume for WSDOT's LOS standard, a ratio above 1.0 indicates the state facility is not meeting its LOS standard.

Based on these findings, the segments of I-5 over the Ship Canal Bridge and north of the West Seattle Bridge are exceeding the LOS D standard. SR 99 over the Aurora Avenue Bridge and SR 522 south of NE 145th Street are also exceeding their LOS D standards.

Exhibit 3.10-25. PM Peak Hour State Facilities Level of Service—Existing Conditions

Facility	Extents	WSDOT LOS Standard	Average Annual Daily Traffic (AADT)	Existing Volume to LOS Service Volume Ratio
I-5	North of NE Northgate Way	D	215,000	0.96
I-5	**Ship Canal Bridge**	**D**	**203,000**	**1.21**
I-5	**North of West Seattle Bridge**	**D**	**253,000**	**1.24**
I-5	North of Boeing Access Rd Ramp	D	200,000	0.93
I-90	Mt Baker Tunnel	D	148,000	0.90
SR 99	North of N Northgate Way	D	31,000	0.96
SR 99	**Aurora Ave Bridge**	**D**	**71,000**	**1.19**
SR 99	Tunnel	D	39,000	0.58
SR 99	North of West Seattle Bridge	D	67,000	0.72
SR 99	South of S Cloverdale St	E (mitigated)	32,000	0.42
SR 509	1st Ave S Bridge	D	60,000	0.97
SR 519	S Atlantic St West of I-90 Ramps	D	29,000	0.90
SR 520	Lake Washington Bridge	D	74,000	0.60
SR 522	**South of NE 145th St**	**D**	**34,000**	**1.01**

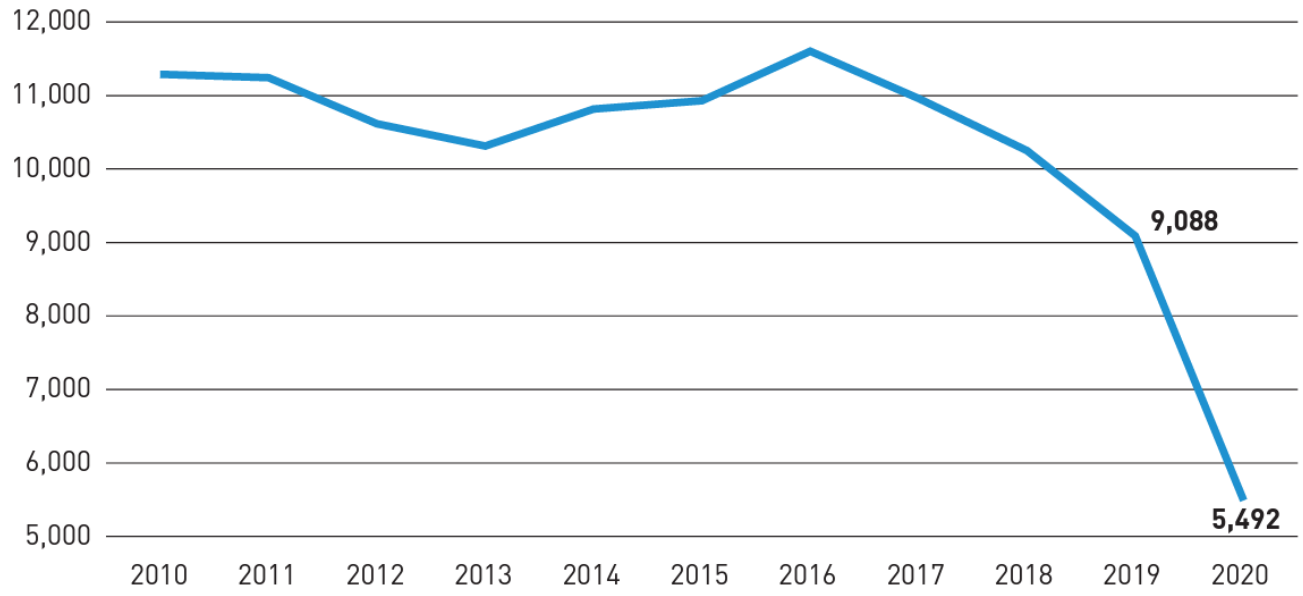
Source: WSDOT Transportation Data and GIS Office, 2019.

Safety

SDOT releases annual traffic reports that summarize citywide traffic information, including collision data. The most recently released data comes from the 2021 traffic report, providing data through 2020. Due to the onset of the COVID-19 pandemic in 2020, the data covers a volatile period in terms of travel behavior. Accordingly, this section discusses both 2020 and 2019 data.

The total number of police reported collisions on Seattle streets had been decreasing since a peak in 2016 of about 11,500 collisions. In 2019, there were 9,088 reported collisions and 5,492 collisions in 2020.[74] This decrease in collisions between 2019 and 2020 can be attributed to the reduction in overall trips as a result of the COVID-19 pandemic. However, despite the lower total number of collisions in 2020, the collision rate reported in 2020 increased—in other words, there were more collisions per trip made. This is shown in **Exhibit 3.10-26** and **Exhibit 3.10-27**. In 2020, the collision rate is reported as 74.2 per million AADT trips and the 2019 collision rate is reported as 60.5 per million AADT trips.[75] Traffic-related fatalities in 2019 and 2020 were similar at 26 in 2019 and 25 in 2020, mostly among pedestrians both years.[76]

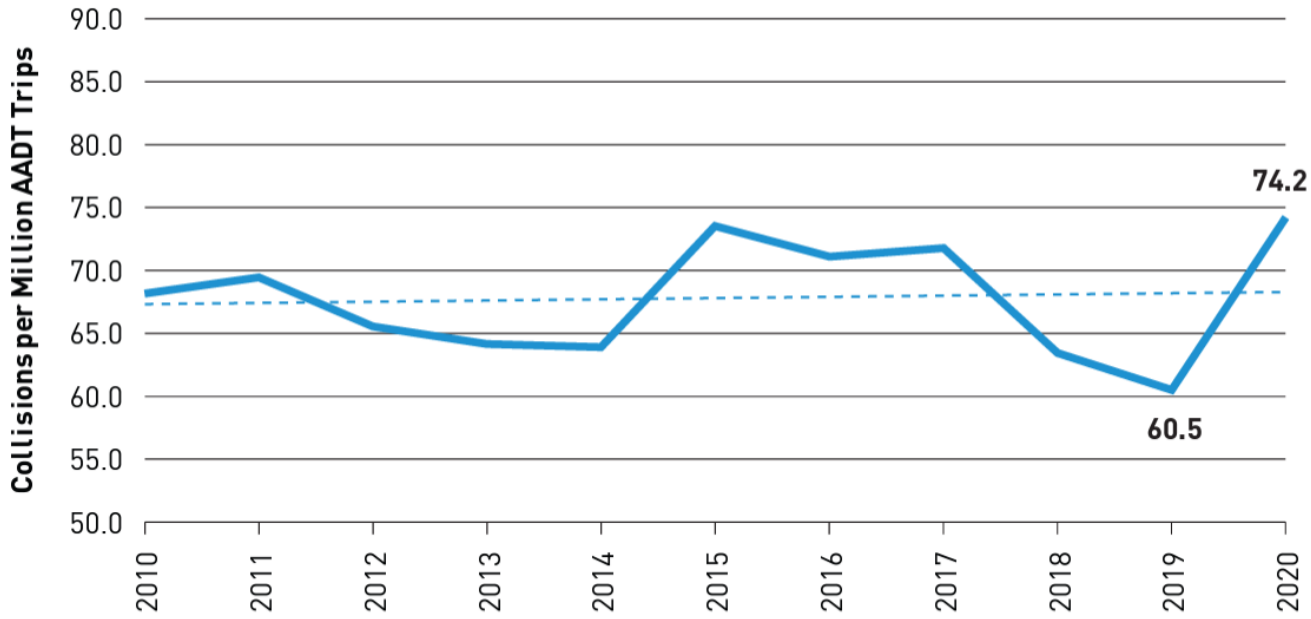
Exhibit 3.10-26. Police Reported Collisions on Seattle Streets, 2010-2020



Source: SDOT, 2021 Traffic Report, 2022.

[74] Seattle Department of Transportation. 2022. "2021 Traffic Report." https://www.seattle.gov/documents/Departments/SDOT/About/DocumentLibrary/Reports/2021_Traffic_Report_ADA_21522.pdf (Page 22)
[75] Seattle Department of Transportation. 2022. "2021 Traffic Report." https://www.seattle.gov/documents/Departments/SDOT/About/DocumentLibrary/Reports/2021_Traffic_Report_ADA_21522.pdf (Page 23)
[76] Seattle Department of Transportation. 2022. "2021 Traffic Report." https://www.seattle.gov/documents/Departments/SDOT/About/DocumentLibrary/Reports/2021_Traffic_Report_ADA_21522.pdfhttps://www.seattle.gov/documents/Departments/SDOT/About/DocumentLibrary/Reports/2021_Traffic_Report_ADA_21522.pdf (Page 24)

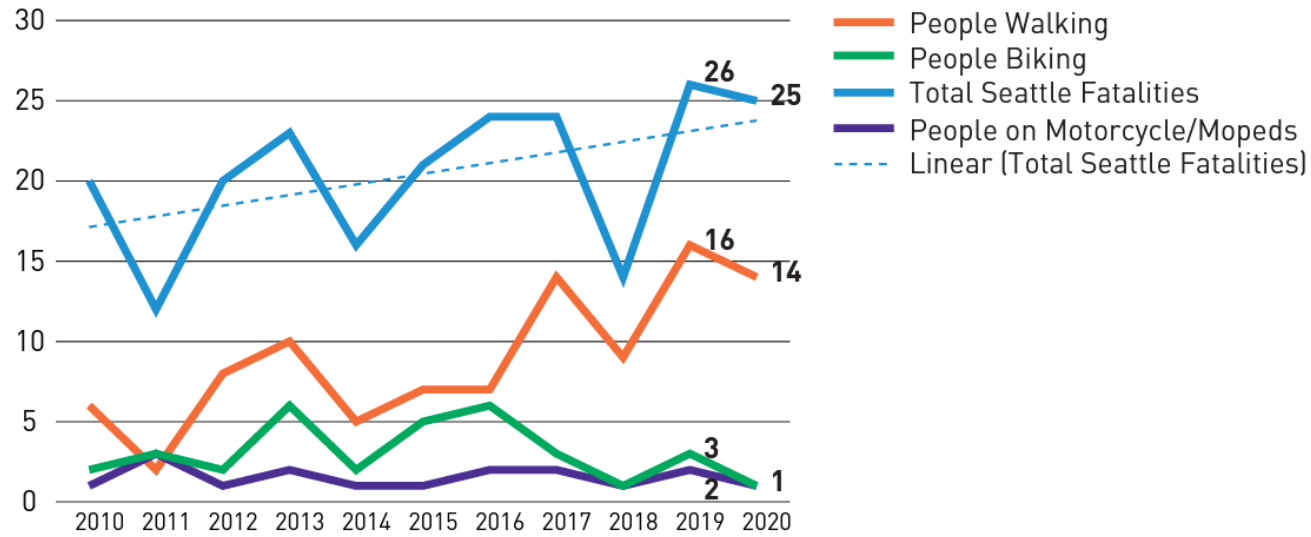
Exhibit 3.10-27. Citywide Collision Rate, 2010-2020



Source: SDOT, 2021 Traffic Report, 2022.

The report also summarizes trends among each mode, as shown in **Exhibit 3.10-28**. Over the past decade, fatalities on Seattle's streets have been increasing, particularly among people walking as they are among the most vulnerable in collisions with vehicles.

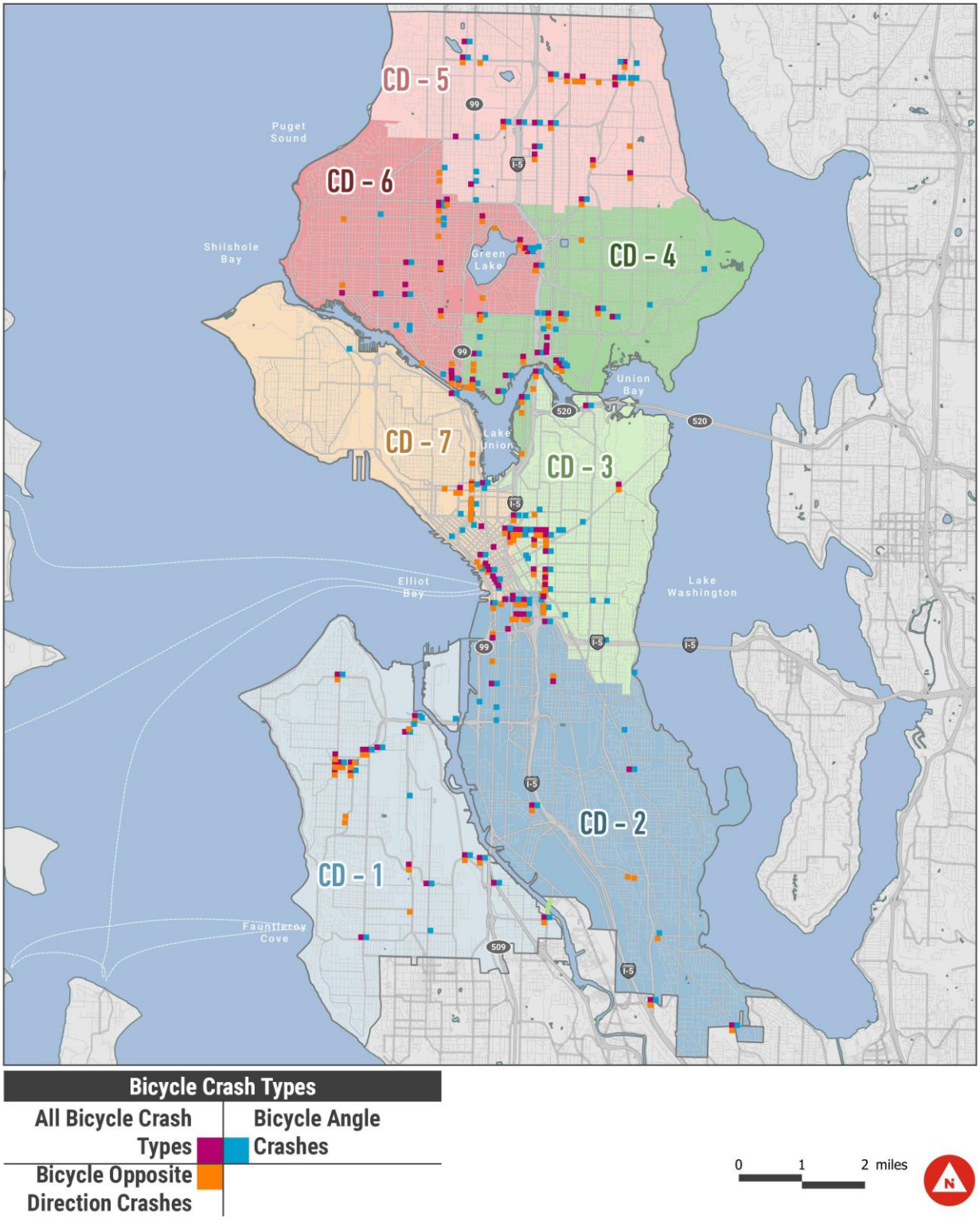
Exhibit 3.10-28. Traffic Fatalities on Seattle Streets, 2010-2020



Source: SDOT, 2021 Traffic Report, 2022.

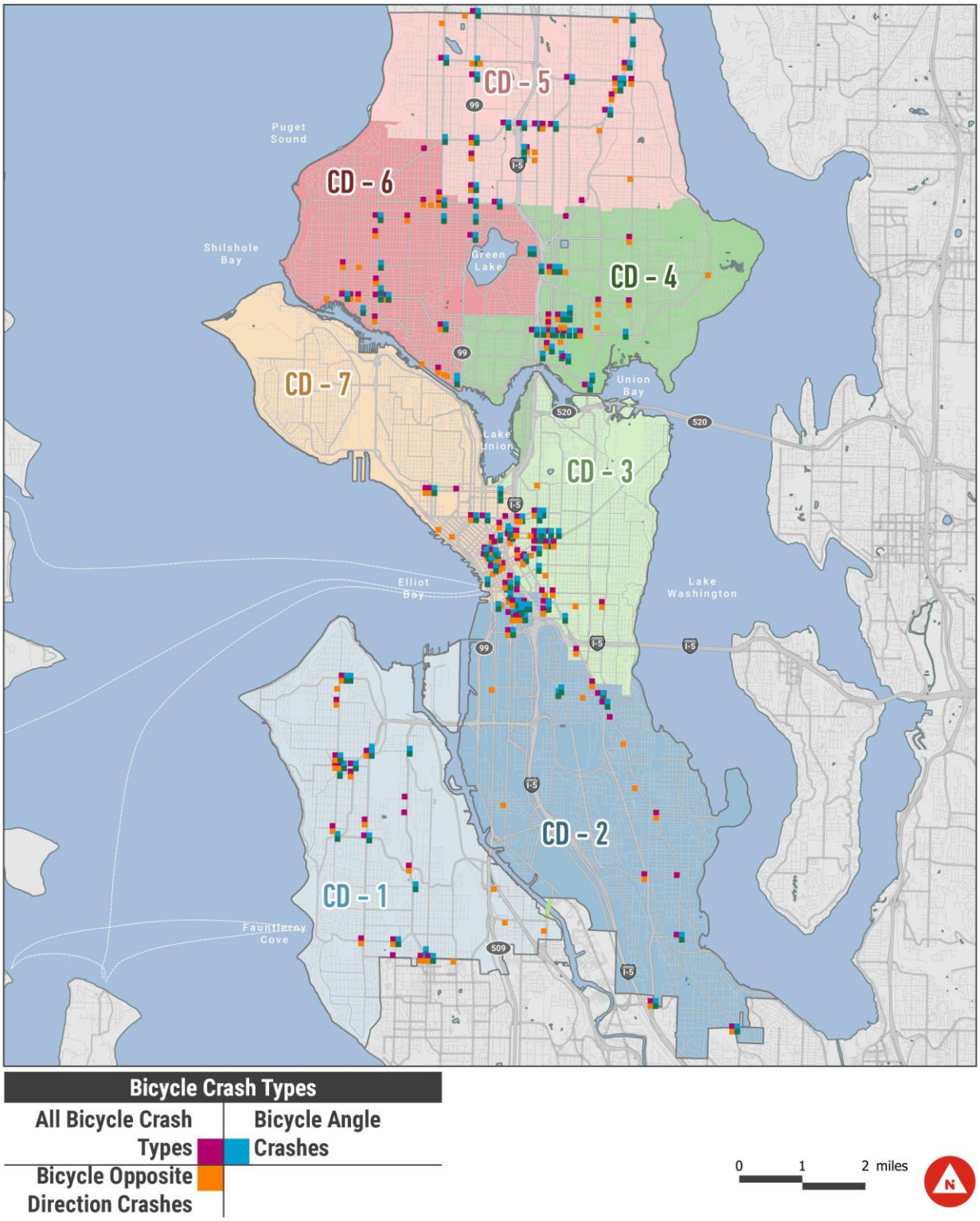
In 2020, SDOT released Phase 2 of the City of Seattle's Bicycle and Pedestrian Safety Analysis, providing statistical foundations for analyzing bicyclist and pedestrian collision data between 2010 and 2017. The analysis involved mapping the locations and types of bicycle and pedestrian collisions to determine priority locations for each council district. **Exhibit 3.10-29** and **Exhibit 3.10-30** display maps of collision locations by type in each council district. As part of the Vision Zero goal in place in the City of Seattle, SDOT is taking both proactive and reactive measure to eliminate serious injuries and fatalities from Seattle's streets.

Exhibit 3.10-29. Top 20 Priority Bicycle Locations Per Council District



Source: SDOT, City of Seattle Bicycle and Pedestrian Safety Analysis Phase 2, 2020.

Exhibit 3.10-30. Top 20 Priority Pedestrian Locations Per Council District



Source: SDOT, City of Seattle Bicycle and Pedestrian Safety Analysis Phase 2, 2020.

3.10.2 Impacts

This section discusses the potential impacts of each of the future year alternatives. Each of the action alternatives (Alternatives 2 through 5) are measured against the expected conditions of No Action Alternative (Alternative 1). While there is uncertainty inherent in any analysis of future travel behavior, this EIS uses the best available tool, the PSRC travel model, as a consistent basis to evaluate the future year alternatives. In particular, the model is best used to identify relative differences among alternatives rather than provide a specific prediction of the exact location and magnitude of impacts, particularly given this is a programmatic EIS assessing areawide changes rather than specific development proposals which are unknown at this time.

Analysis Methodology & Planning Scenarios Evaluated

Five alternatives are evaluated under future year 2044 conditions for each of the key metrics. The same transportation network is assumed under each alternative. That network includes all existing facilities plus those considered to be reasonably foreseeable by the 2044 horizon year. The 2044 transportation network used in this EIS is consistent with the assumptions used for the Seattle Transportation Plan (STP) EIS No Action Alternative. More details describing each alternative can be found in **Chapter 2**.

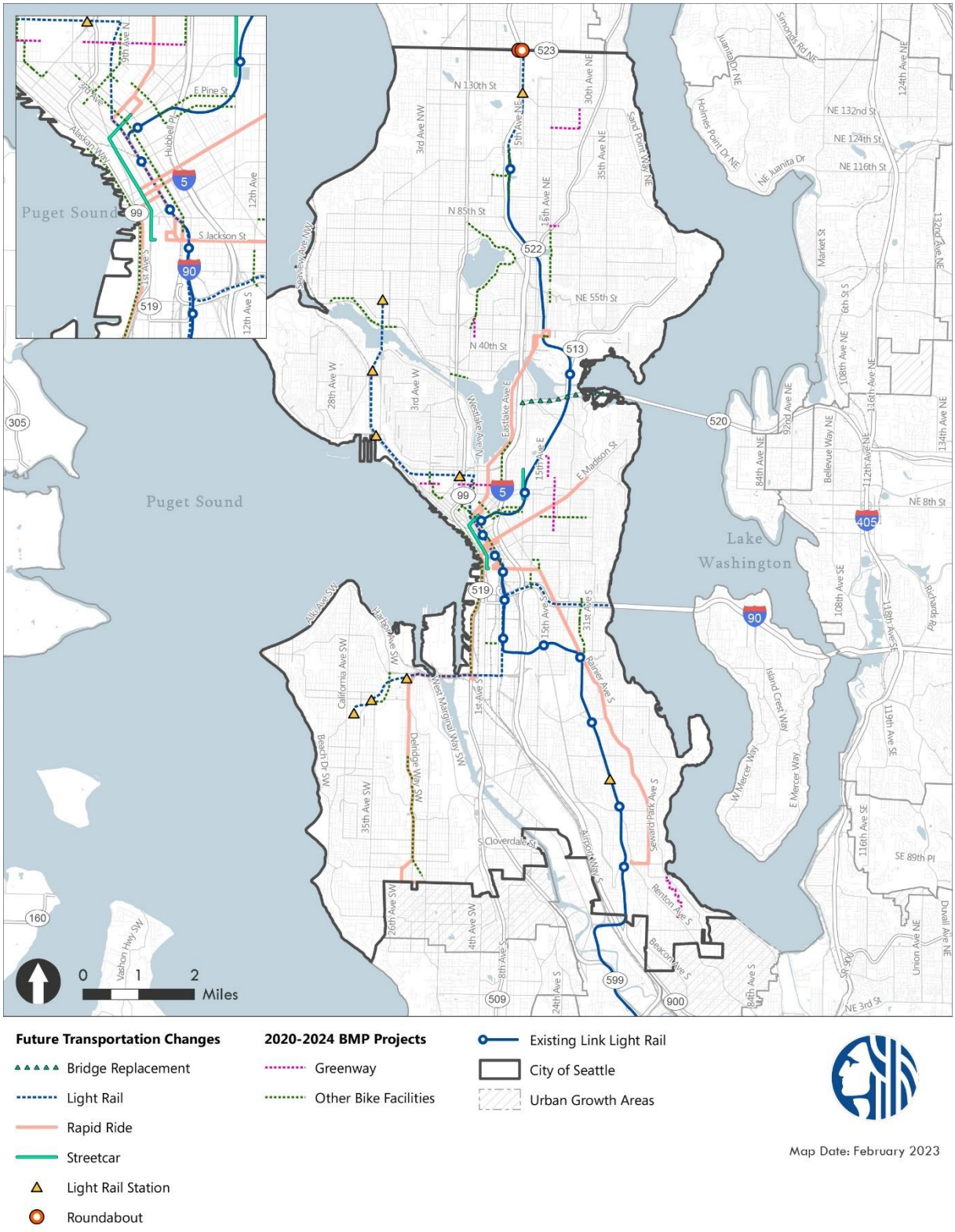
Travel Demand Forecasting

As described in the **Data & Methods** section, the PSRC's regional travel demand model, SoundCast, was used to develop travel forecasts for each of the future year alternatives. The model covers the four-county region of King, Kitsap, Snohomish, and Pierce counties. SoundCast is an activity-based model which estimates travel behavior across the region based on characteristics of individual persons and their households. The model produces detailed trip diaries for each simulated person in the region throughout an average weekday tracking the departure time, starting location, ending location, travel mode, and any other people sharing that trip.

SoundCast accounts for the household and employment forecasts for each future year alternative within the City of Seattle and is consistent with regional assumptions from PSRC for the areas outside city limits. The model also incorporates planned transportation facilities into the model network, such as the Link light rail extensions to Ballard and West Seattle. The projects assumed to be in place by 2044 are shown in **Exhibit 3.10-31**.

The purpose of this EIS is to compare impacts among the future year alternatives. Relative to prior travel demand model frameworks developed by PSRC, SoundCast projects substantially higher transit usage in the future. While future travel behavior cannot be definitively known, these travel behavior assumptions underly the modeling for all future year alternatives, providing a consistent basis for comparison across the alternatives. A sensitivity test is included at the end of the document to explore how effects may differ with a lower transit mode share and higher vehicle mode share.

Exhibit 3.10-31. Planned Transportation Improvements, 2044



Source: City of Seattle, 2023.

Although not individually modeled, the potential impacts of Alternative 4 are expected to fall between the other action alternatives due to the overall magnitude of growth and pattern of density. The citywide growth total for Alternative 4 is equivalent to Alternative 2 and Alternative 3, while Alternative 5 has higher growth. The pattern of growth assumed in Alternative 4 falls between the more concentrated growth of Alternative 2 and more dispersed growth of Alternative 3. Therefore, the potential impacts under Alternative 4 are expected to fall within the results for Alternatives 2, 3, and 5.

Thresholds of Significance

This section outlines the thresholds used to determine the impacts of No Action Alternative, as well as the four action alternatives. The expected conditions under the No Action Alternative are used as the baseline against which each of the action alternatives (Alternatives 2 through 5) are measured. In addition to the quantitative thresholds defined below, potential impacts to active transportation and safety are addressed qualitatively.

A significant transportation impact under the No Action Alternative is identified if:

- A subarea would have a percentage of SOV travel exceeding the target stated in the Seattle 2035 Comprehensive Plan.
- A study route would operate over the transit agency crowding threshold.
- VMT per capita exceeds the existing level.
- A corridor would have a travel time LOS grade of F.
- A screenline would exceed the V/C threshold stated in the *Seattle 2035* Comprehensive Plan by at least 0.01.
- A signalized intersection would operate at LOS E or F and an unsignalized intersection would operate at LOS F.
- A state facility does not meet the standard set by WSDOT.

A significant transportation impact under the four action alternatives is identified if:

- A subarea that does not exceed its SOV mode share target under the No Action Alternative would exceed its SOV mode share target or a subarea that exceeds its SOV mode share target under the No Action Alternative would have an increase in SOV mode share of at least 1% compared to the No Action Alternative.
- A study route that would operate at or under the transit agency crowding threshold under the No Action Alternative would operate over the transit agency crowding threshold or a study route identified as operating over the transit agency crowding threshold under the No Action Alternative would have an increase in passenger load of at least 5% compared to the No Action Alternative.
- VMT per capita would exceed the VMT per capita under the No Action Alternative.

- A corridor that would have a travel time LOS grade of A-E under the No Action Alternative would operate at LOS F or a corridor that would have a travel time LOS grade F under the No Action Alternative would have an increase in travel time of at least 5%.
- A screenline that would not exceed the V/C threshold under the No Action Alternative would exceed the V/C threshold or a screenline that would exceed the V/C threshold under the No Action Alternative would increase the V/C ratio by at least 0.01.
- The action alternative would cause an intersection that operated acceptably under No Action Alternative to operate unacceptably, or the action alternative would add at least a 5 second delay from the No Action Alternative at an intersection that operated unacceptably under the No Action Alternative.
- A state facility that would meet WSDOT's standards under the No Action Alternative would exceed WSDOT's standards or a state facility that does not meet WSDOT's standards under the No Action Alternative would increase the volume-to-LOS service volume ratio by at least 0.01 compared to the No Action Alternative.

Impacts Common to All Alternatives

The following section describes impacts common to all alternatives.

Active Transportation

SDOT is continually planning and implementing improvements to active transportation facilities through the Pedestrian Master Plan (PMP), Bicycle Master Plan (BMP), Vision Zero safety programs, and subarea planning efforts. The modal plans are currently being integrated into a citywide transportation plan that will bring together the individual plans into a single document.

As described in the Affected Environment section, the PMP identifies a Priority Investment Network (PIN) which designates street segments that should be prioritized for investment. However, the ability to implement investments is constrained by the high cost of infrastructure. SDOT publishes a BMP Implementation Plan every two years detailing the infrastructure projects that will be constructed over the following four years. It is assumed that the City will continue to implement both its PMP and BMP network under whichever alternative is pursued, though the pace of improvements will vary over time depending on funding availability. Sound Transit's light rail extensions to Ballard and West Seattle are planned to be complete by 2044, providing frequent, high-capacity service to more neighborhoods in Seattle. The Link extensions would construct stations in ten new locations and reconstruct or expand upon existing facilities at several other station areas. These projects will include investments to the pedestrian and bicycle connections to the station areas.

The City's emphasis on prioritizing neighborhoods with historical underinvestment will continue to guide future decisions on where improvements are focused; the discussion of equity considerations in the preceding section indicates neighborhoods where priority populations and improvement needs intersect. Among many other factors, the planning process

for active transportation network improvements will also consider changes in land use patterns for continued prioritization and phasing of infrastructure projects. Those areas of focus may vary to some degree depending on which alternative is selected.

A GIS analysis was completed to quantify how each action alternative would perform in terms of concentrating growth in areas with the highest access to active transportation facilities. Population data under each alternative was compiled by high, medium, and low sidewalk connectivity census tracts, as was presented in **Exhibit 3.10-13**.

Exhibit 3.10-32 summarizes the percent of Seattle's population within each category under each alternative. This analysis shows that under all future alternatives, including the No Action Alternative, the percentage of people living within high connectivity census tracts would increase compared to existing conditions. Alternative 1 and Alternative 2 would have the greatest concentration of population within high sidewalk connectivity areas. Alternatives 3 and 5 would also result in an increase, but not as high as for the other alternatives.

Exhibit 3.10-32. Population within Low, Medium, and High Sidewalk Connectivity Census Tracts

	Low (≤ 0.5)	Medium (>0.5; ≤ 0.75)	High (>0.75)
Existing	19.5%	17%	64%
Alternative 1 No Action	17%	16%	68%
Alternative 2	17%	16%	68%
Alternative 3	18%	16%	66%
Alternative 5	18%	16%	66%

Source: Fehr & Peers, 2023.

Exhibit 3.10-33 summarizes the percent of jobs in Seattle within each category of census tract under each alternative. These results are much more consistent across alternatives as the concentrations of employment growth are not assumed to vary as much as housing growth. All future year alternatives would result in 75% of employment within high connectivity census tracts, 9% within medium connectivity census tracts, and 16% within low connectivity census tracts.

Exhibit 3.10-33. Employment within Low, Medium, and High Sidewalk Connectivity Census Tracts

	Low (≤ 0.5)	Medium (>0.5; ≤ 0.75)	High (>0.75)
Existing	16%	9%	76%
Alternative 1 No Action	16%	9%	75%
Alternative 2	16%	9%	75%
Alternative 3	16%	9%	75%
Alternative 5	16%	9%	75%

Source: Fehr & Peers, 2023.

A summary of population and employment within a quarter mile of the All Ages and Abilities bicycle network is shown in **Exhibit 3.10-34**. The existing All Ages and Abilities network can be found in **Exhibit 3.10-16** with future year changes displayed in **Exhibit 3.10-31**.

All future year alternatives, including the No Action Alternative, show an increase in the percentage of population and employment within a quarter-mile of the All Ages and Abilities bike network as compared to existing conditions. Of the four modeled future year alternatives, Alternative 1 has the greatest percentage of population and employment growth within a quarter-mile of the All Ages and Abilities bike network; however, the share is just slightly above the three action alternatives.

Exhibit 3.10-34. Population and Employment within ¼ Mile of the All Ages and Abilities Bike Network

	Population	Employment
Existing	68%	84%
Alternative 1 No Action	76%	88%
Alternative 2	75%	87%
Alternative 3	75%	87%
Alternative 5	75%	87%

Source: Fehr & Peers, 2023.

The number of people walking and biking will continue to increase compared to existing conditions even under currently adopted policies. Therefore, under No Action Alternative, there would be more demand for active transportation facilities throughout the city, including areas that lack sidewalks, curb ramps, pedestrian crossings, and dedicated bicycle facilities. Capacity constraints on pedestrian and bicycle facilities are rare and are typically only a concern at bottlenecks such as pathways across bridges or areas of extremely high pedestrian activity. However, there are many locations throughout the city that would benefit from improvements to make walking and biking safer and more comfortable.

The action alternatives considered in this EIS are not expected to preclude any planned pedestrian and bicycle improvements and would likely result in improved infrastructure as new development projects would be subject to city standards for frontage improvements. As shown by the GIS analysis, the relative shares of growth within areas of high pedestrian and bicycle infrastructure access have slight differences across the alternatives. Compared to the No Action Alternative, there are slightly higher percentages of population within low pedestrian connectivity areas under Alternative 3 and Alternative 5. Additionally, all action alternatives have a slightly lower percentage of population and employment within ¼ mile of the All Ages and Abilities bike network compared to the No Action Alternative.

Because the action alternatives would result in higher levels of growth than the No Action Alternative, there would be more people walking and biking in areas with existing network

gaps, affecting the comfort, convenience, and willingness of those vulnerable users to travel by active transportation modes and potentially making it more difficult to reach the City's mode share targets. However, from a regional perspective, accommodating more growth within Seattle may provide access to better active transportation amenities as more suburban locations may have less pedestrian and bicycle infrastructure than Seattle. Therefore, at this programmatic level of evaluation and considering both the local and regional effects of accommodating more growth in Seattle, the impact to pedestrian and bicycle travel is not considered to rise to a level of significance.

Freight Mobility & Access

Because this is a programmatic EIS for all of Seattle, it studies citywide land use and zoning changes, rather than a project-specific proposal. Whichever alternative is implemented would result in a wide range of individual projects implemented over a long timeframe and across the city. Because the specific locations and sizes of development are unknown, it is not possible to specify how freight may be impacted by changes to loading zones or access needs at particular locations. These are potentially significant impacts that would need to be analyzed and mitigated at the project level.

The relative differences in traffic congestion described in the Roadway Users sections under each alternative are relevant to freight mobility. While these results provide an indication of relative delays expected among the alternatives, these effects may be more challenging for freight as traffic congestion is more difficult for large trucks to navigate and trucks typically travel at slower speeds than general purpose traffic.

The alternatives under consideration are not expected to materially affect rail operations. The railroads running through the city are privately operated and regularly adjust their operations to respond to changing needs.

Safety

Seattle's Vision Zero policy aims to eliminate traffic-related fatalities and serious injuries by 2030. This goal, and the policies and strategies supporting it, will be pursued regardless of which land use alternative is selected. Some strategies can be applied citywide, for example reducing speed limits and implementing leading pedestrian intervals (LPIs) that give people walking additional time before vehicles proceed. Other strategies are more location-specific depending on the context and could include traffic calming treatments, new traffic signals, separation of facilities for vulnerable users, and other physical changes to transportation facility design. As is current practice, SDOT will continue to monitor traffic safety and act to address areas of high need particularly for the most vulnerable users. As safety improvements continue to be implemented over the next two decades, it is expected that the safety program will result in safer conditions at many locations, potentially leading to decreased likelihood of traffic fatalities and serious injuries at those locations.

Relative to the No Action Alternative, the action alternatives would result in between 1% and 3.1% more vehicle miles traveled due to higher levels of growth assumed. In terms of relative exposure among the action alternatives, Alternative 5 is expected to be on the high end of that range while Alternatives 2 and 3 would be on the lower end. Alternative 4 would be within that range and likely closer to Alternatives 2 and 3 because of the similarity in total assumed growth. Increased VMT could potentially result in an increased number of collisions. Likewise, the increase in people walking and biking could increase exposure to the most vulnerable travelers. While the increasing number of travelers inherently increases the potential exposure to collisions, there is no evidence that the collision rate (i.e., the likelihood of a collision at a particular location) would increase. From a regional perspective, accommodating more growth within Seattle may provide safety benefits as more suburban locations may have less pedestrian and bicycle infrastructure than Seattle. Other factors may improve safety, for example the expected decrease in vehicle speeds may limit the severity of crashes and the action alternatives may result in more safety project implementation due to additional frontage improvements and a larger tax base.

Site-specific issues cannot be addressed at this level of analysis. However, regardless of the alternative selected, individual development applications would be reviewed through the City's permitting process, at which time the City may identify required safety features for the specific site. Due to the increase in people traveling by all modes relative to the No Action Alternative, a potential safety impact is identified under all action alternatives. However, at this programmatic level of evaluation and given the potentially counteracting factors influencing safety among the alternatives, the impact of the action alternatives relative to the No Action Alternative is not considered to rise to a level of significance.

Ferry Service

All of the alternatives could result in additional development near Washington State Ferries (WSF) and King County ferry terminals which could result in minor adverse impacts to staging, load, drop-off, and other activities. These impacts would be minor due to existing facilities for staging of cars, opportunities for project specific mitigation, and limitations on development in shoreline environment. Impacts might be larger, but still minor, for those alternatives that focus growth near transit services such as Alternative 4 and 5.

Equity & Climate Vulnerability Considerations

The City of Seattle has undertaken many recent efforts to understand and analyze race and social justice, as it relates to access to opportunities, equity, and climate vulnerability. The Seattle Racial and Social Equity Index combines data on race, ethnicity, and related demographics with data on socioeconomic and health disadvantages to identify neighborhoods with large proportions of

priority populations.[77] In many cases, locations with large proportions of priority populations are correlated to locations that lack comfortable transportation facilities, including sidewalks and access to bicycle facilities. A similar pattern is shown in the City's Access to Opportunity Index which includes access to frequent bus service and light rail/streetcar among other criteria.

In many neighborhoods there is a strong connection between demographic variables identified in the Racial and Social Equity Index and sidewalk connectivity. The Racial and Social Equity Composite Index shows that South Seattle, including Columbia City, Beacon Hill, and Rainier Valley have the highest or second highest equity priority. A similar geographic pattern is reflected in the sidewalk connectivity map, which shows low or medium connectivity in these communities. Similarly, the Delridge neighborhood shows the highest equity priority and ranks as low to medium connectivity for network completion. On the opposite end of Seattle, North Seattle near Shoreline has the highest or second highest equity priority composites, while these areas are also identified as low sidewalk connectivity. Comparatively, neighborhoods in areas that have the lowest or second lowest composite scores, including Ballard, Fremont, Laurelhurst, Magnolia, Capitol Hill, and West Seattle, have high sidewalk connectivity. Providing additional housing growth in areas with more complete infrastructure could advance equity by expanding the opportunity for more people to live in those areas. From that perspective, all of the action alternatives could advance equity by providing more housing opportunities throughout the city with Alternative 5 providing the most opportunity through its higher housing target.

There are similar correlations when comparing the Racial and Social Equity Composite Index to access to the All Ages and Abilities bicycle network. However, due to recent investment by the City of Seattle, many areas with the highest equity priority are located within one-quarter mile of the All Ages and Abilities network, including South Seattle and Delridge. While access is provided to many neighborhoods, as previously noted, gaps in the network are often a barrier to bicycle connectivity.

An important consideration for climate vulnerability and health disparities is the distribution of effects from emissions, generated by personal and freight vehicles. Underserved communities often face the highest effects of vehicle emissions; for example, freight traffic emissions or poor air quality due to close proximity heavily congested roadways and freeways. Total VMT generated by each alternative was estimated using the SoundCast model. The action alternatives are expected to result in higher VMT than the No Action Alternative due to the increased growth levels. The increase for Alternatives 2 and 3 is expected to be approximately 1% higher than the No Action Alternative and for Alternative 5 is expected to be approximately 3% higher. Alternative 4 would fall within that range and likely most similar to Alternatives 2 and 3. Therefore, it is possible that the action alternatives—Alternative 5 in particular—could result in additional vehicle emissions near underserved communities along high vehicle emissions roadways. See **Section 3.1 Earth & Water Quality** and **Section 3.2 Air Quality &**

[77] City of Seattle. "City of Seattle Racial and Social Equity Index Viewer." https://population-and-demographics-seattlecitygis.hub.arcgis.com/apps/SeattleCityGIS::racial-and-social-equity-index-viewer/explore

GHG Emissions for a comprehensive evaluation of the potential effects of increased VMT on water and air quality.

From a regional perspective, accommodating more growth within dense urban areas like Seattle provides better climate outcomes than if that growth were accommodated elsewhere. People living in urban areas tend to generate lower VMT than those in suburban or rural locations. One key factor is the modal choices available; people living in cities tend to walk, bike, and take transit more often as those modes are more readily available and convenient within dense areas. In addition, trips that are made by car tend to be shorter because residents are generally in closer proximity to their destinations (e.g., school, shopping, or commute trips). Therefore, at a regional scale, concentrating more growth within Seattle is expected to lead to travel behaviors with lower impacts to climate vulnerability than if that growth occurred in outlying areas. Because all of the action alternatives would accommodate more growth than the No Action Alternative, they are expected to result in better climate outcomes with Alternative 5 providing the most benefit as it would accommodate the highest level of housing growth within Seattle.

Impacts of Alternative 1: No Action

This section summarizes the analysis results and potential impacts of Alternative 1, No Action. Alternative 1 serves as the baseline for identifying impact of the action alternatives. It represents the operation of the transportation system if no zoning changes were made. However, growth would continue to occur under Alternative 1 consistent with current adopted zoning as described in **Chapter 2**.

Mode Share

The mode share expected to occur under Alternative 1 is summarized by subarea in **Exhibit 3.10-35**. The model predicts that SOV mode shares will decrease by 2044, with changes ranging from approximately five to thirteen percent depending on the subarea. The largest decreases are expected in the Downtown/Lake Union and Capitol Hill/Central District subareas. Most subareas are expected to meet their SOV mode share targets under the 2044 Alternative 1 scenario. The exception is Duwamish where shifts to non-SOV modes are more difficult to achieve given the travel needs of the manufacturing and industrial land uses in that area. Therefore, a mode share impact is expected in one subarea under Alternative 1.

Exhibit 3.10-35. PM Peak Hour SOV Mode Share—Alternative 1 No Action

Subarea	SOV Target	Existing SOV Share	Alternative 1 No Action SOV Share
(1) Northwest Seattle	37%	42%	34%
(2) Northeast Seattle	35%	35%	26%
(3) Queen Anne/Magnolia	38%	42%	34%

Subarea	SOV Target	Existing SOV Share	Alternative 1 No Action SOV Share
(4) Downtown/Lake Union	18%	24%	11%
(5) Capitol Hill/Central District	28%	37%	27%
(6) West Seattle	35%	41%	35%
(7) Duwamish	51%	72%	67%
(8) Southeast Seattle	38%	36%	31%

Note: Existing (2017-2019) mode share data from the PSRC household travel survey have substantial margins of error. See **Exhibit 3.10-10** for margins of error by subarea.
Source: Fehr & Peers, 2023.

Exhibit 3.10-36 compares the number of person trips expected by mode over the course of a day under existing conditions and 2044 Alternative 1. At the citywide level, the number of person trips is expected to increase by approximately 42% by 2044. However, the increase in trips by mode varies substantially. Growth in transit trips is expected to be highest among all modes with daily trips more than doubling; this would bring the transit mode share from the current 11% to 19% in 2044. While trips made by SOV and HOV would increase, the rate of growth would be much lower at 10% and 23%, respectively, decreasing the overall mode shares by 2044. In other words, while a substantial new number of trips are expected as population and employment increases in Seattle, travel behavior is expected to shift such that people choose to ride transit, walk, or bike in larger shares than currently occurs.

Exhibit 3.10-36. Daily Person Trips by Mode—Alternative 1 No Action

	Existing		Alternative 1 No Action	
Mode	Person Trips	Mode Share	Person Trips	Mode Share
SOV	1,624,000	40%	1,783,000	31%
HOV	1,169,000	28%	1,440,000	25%
Transit	465,000	11%	1,138,000	19%
Walk	776,000	19%	1,378,000	24%
Bike	71,000	2%	99,000	2%
Total	**4,105,000**	**100%**	**5,838,000**	**100%**

Source: Fehr & Peers, 2023.

The shift in mode shares predicted by the SoundCast model reflects trends observed over the decade preceding the pandemic. According to SDOT's 2021 Traffic Report, average daily traffic volumes remained essentially flat over the 2009-2019 period despite a 24% increase in the City's population and a 23% increase in regional employment.[78] During that time, average

[78] Seattle Department of Transportation. 2022. "2021 Traffic Report." https://www.seattle.gov/documents/Departments/SDOT/About/DocumentLibrary/Reports/2021_Traffic_Report_ADA_21522.pdf

regional transit ridership grew at roughly the same rate as population and employment. The limited vehicle traffic growth projected by 2044 also reflects the constraints of the roadway system as many roadways already operate with considerable congestion during peak periods.

Transit

Passenger loads on key transit connections were forecasted for the PM peak hour. **Exhibit 3.10-37** summarizes the projected load factors on the busiest segment of each route in the peak direction of travel. Therefore, the conditions indicated here are conservatively high as all other segments on each route would operate with lower passenger volumes.

The table includes the Link light rail lines that will run through Seattle by 2044 as well as planned RapidRide routes. These include routes serving the same corridors as Routes 40 and 62 which were both found to reach the crowding threshold under existing conditions. Route 40 is now represented as RapidRide Fremont and Route 62 is now represented as RapidRide 65th.

Based on the transit ridership levels projected by the SoundCast model, eight of the sixteen studied routes (shown in bold in **Exhibit 3.10-37**) would exceed the crowding threshold on their busiest segments in the peak direction during the peak hour, constituting an impact under Alternative 1.

Exhibit 3.10-37. PM Peak Hour Maximum Passenger Load Factors—Alternative 1 No Action

Transit Route	Maximum Passenger Load Factor in Peak Direction
Link light rail—1 Line	**1.08**
Link light rail—2 Line	**1.29**
Link light rail—3 Line	**1.29**
RapidRide C Line—Westwood Village to Alaska Junction	0.71
RapidRide E Line—Downtown to Aurora Village	**1.89**
RapidRide G Line—Downtown to Madison Valley	0.35
RapidRide H Line—Alki to Burien	0.77
RapidRide J Line—Downtown to University District	**1.97**
RapidRide R Line—Downtown to Rainier Valley	**1.07**
RapidRide 23rd	0.47
RapidRide 65th (replaces Route 62)	0.82
RapidRide Beacon	0.50
RapidRide Denny	**2.83**
RapidRide Fremont (replaces Route 40)	**1.49**
RapidRide Green Lake	0.47
RapidRide Market	0.76

Source: Fehr & Peers, 2023.

Roadway Users

Under Alternative 1, growth would continue to occur resulting in increased vehicle volumes—both passenger vehicles and trucks. However, traffic volume growth rates during the PM peak hour are expected to be low. This is consistent with traffic growth patterns over the decade preceding the pandemic, as described earlier in this section. As growth throughout the city continues, the transportation system will likely experience "peak spreading." Peak spreading refers to travelers shifting the times they travel to avoid the heaviest traffic congestion. The result is that while the peak hour may retain similar characteristics, the length of the congested period may grow.

VMT / VHT / Average Trip Speed

Exhibit 3.10-38 summarizes several citywide metrics for Alternative 1 relative to the existing condition. Total daily VMT generated by Seattle is expected to increase 10% between current conditions and 2044. However, the increase in the number of residents and workers assumed within the city would be higher at 38%; therefore, the VMT per capita would decrease from approximately 17.2 miles per day to 13.7 miles per day, a 20% decrease. This decrease is reflecting a change in travel behavior in terms of mode choice as well as average trip lengths decreasing as people do not have to travel as far, for instance between their home and work locations.

Similarly, VHT is projected to increase in total compared to existing conditions but would slightly decrease on a per capita basis. By 2044, the average resident/worker is expected to spend approximately half an hour traveling by private car or truck; this metric does not include bus travel. The ratio of VMT to VHT represents the average speed of trips made by Seattle residents and workers, including on the highway system and local streets. That metric is projected to decrease from 30mph under existing conditions to 28mph in 2044, reflecting higher levels of congestion.

Exhibit 3.10-38. Daily VMT, VHT, and Average Trip Speed—Alternative 1 No Action

	Existing		Alternative 1 No Action	
Metric	Total	Per Capita	Total	Per Capita
VMT	22,203,300	17.2	24,357,100	13.7
VHT	741,900	0.6	865,800	0.5
Average Trip Speed	29.9	—	28.1	—

Source: Fehr & Peers, 2023.

Because the VMT per capita would not exceed the existing levels, no impact to VMT per capita is identified under Alternative 1.

Travel Time

Exhibit 3.10-39 summarizes existing PM peak hour corridor travel times as well as those forecasted to occur under 2044 Alternative 1.[79] **Exhibit 3.10-40** shows the LOS values along associated corridors on the map. Corridor travel times are expected to increase by up to 2.5 minutes compared to existing conditions. The largest increases are expected on Boren Avenue, 23rd Avenue, and Martin Luther King, Jr Way South. Under existing conditions, 81 study corridors would operate at LOS A-C, 15 would operate at LOS D, 4 would operate at LOS E, and 4 would operate at LOS F. By 2044, LOS levels would shift to have 77 corridors operating at LOS A-C, 15 at LOS D, 8 operating at LOS E, and 4 operating at LOS F. Therefore, travel time impacts are expected under Alternative 1on four corridors (shown in bold in **Exhibit 3.10-39**):

- Mercer Street between Elliott Avenue W and Fairview Avenue N
- Stewart Street between 1st Avenue and Denny Way
- Olive Way between 4th Avenue and Denny Way
- S Michigan Street between E Marginal Way S and Airport Way S

[79] For corridors with peak directional patterns, the AM peak hour would typically reflect similar conditions in the opposite direction from those shown for the PM peak hour.

Exhibit 3.10-39. PM Peak Hour Travel Time Corridor Level of Service—Alternative 1 No Action

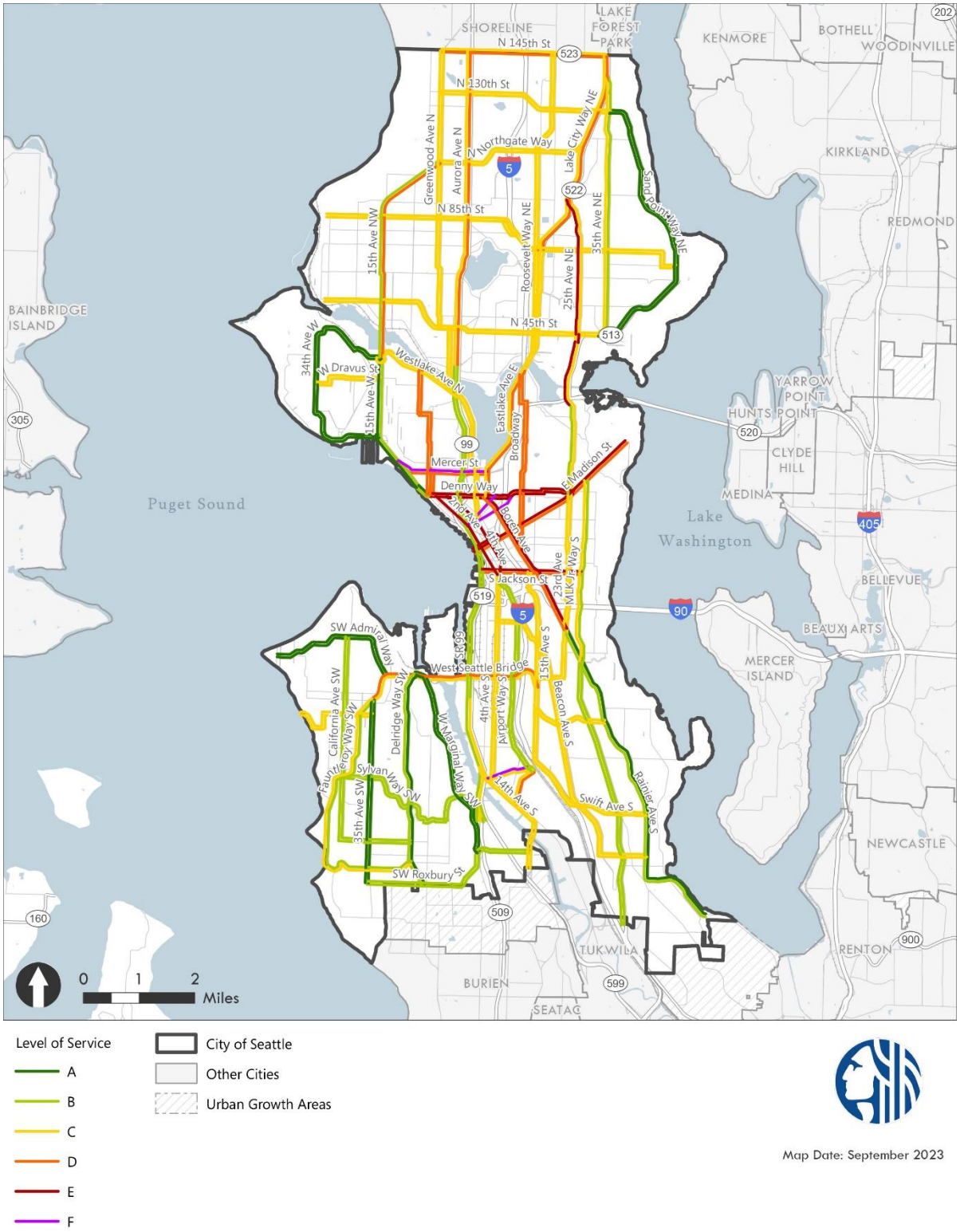
		Existing Conditions Minutes / Level of Service		Alternative 1 No Action Minutes / Level of Service	
Roadway	Extents	N/E	S/W	N/E	S/W
N 145th St	Greenwood Ave N to Lake City Way NE	10 / D	9.5 / C	10.5 / D	9.5 / C
N 130th St	Greenwood Ave N to 35th Ave NE	11.5 / C	12 / C	11.5 / C	12 / C
N Northgate Way	Greenwood Ave N to Lake City Way NE	10.5 / C	10.5 / C	10.5 / C	11 / C
N 85th St	32nd Ave NW to Sand Point Way NE	24.5 / C	24.5 / C	25 / C	24.5 / C
N 45th St	32nd Ave NW to Union Bay Pl NE	23.5 / C	23.5 / C	24.5 / C	23.5 / C
15th Ave NW	W Emerson St to N 105th St	16 / D	10.5 / B	17 / D	11.5 / B
Greenwood Ave N	Nickerson St to N 145th St	26 / C	24 / C	27 / C	25 / C
Aurora Ave N	N 38th St to N 145th St	18.5 / C	15 / C	19 / D	16.5 / C
Roosevelt Way NE	Fuhrman Ave E to N 145th St	22 / C	20.5 / B	23 / C	21.5 / C
Lake City Way NE	NE 75th St to N 145th St	13.5 / D	10 / C	14 / D	11 / C
25th Ave NE	E Roanoke St to Lake City Way NE	14 / C	21 / D	15 / C	22.5 / E
35th Ave NE	Union Bay Pl NE to Lake City Way NE	16.5 / B	17 / B	16.5 / B	17.5 / C
Sand Point Way NE	Union Bay Pl NE to 35th Ave NE	12.5 / A	12 / A	12.5 / A	12 / A
34th Ave W	15th Ave W to15th Ave W	11.5 / A	12 / A	11.5 / A	12 / A
W Dravus St	34th Ave W to15th Ave W	5 / C	4.5 / C	5 / C	4.5 / C
15th Ave W	Queen Anne Ave N to W Emerson St	9 / B	7.5 / A	8.5 / B	8 / A
Queen Anne Ave N	Denny Way to Nickerson St	12.5 / D	11.5 / C	12.5 / D	12 / D
SR 99	S Nevada St to N 38th St	13.5 / C	15 / C	11.5 / B	12.5 / B
Westlake Ave N	Stewart St to W Emerson St	16 / C	17 / C	16 / C	18 / C
Eastlake Ave E	Denny Way to Fuhrman Ave E	11.5 / C	10.5 / C	12 / D	11.5 / C
Broadway	Boren Ave to Eastlake Ave E	17.5 / D	17 / D	18 / D	18.5 / D

Roadway	Extents	Existing Conditions Minutes / Level of Service		Alternative 1 No Action Minutes / Level of Service	
		N/E	S/W	N/E	S/W
23rd Ave	E Madison St to E Roanoke St	6.5 / C	5 / B	6 / C	5 / B
Mercer St	**Elliott Ave W to Fairview Ave N**	7.5 / C	14 / F	8 / D	**14 / F**
Denny Way	Queen Anne Ave N to E Madison St	17 / E	16 / D	17.5 / E	16.5 / E
2nd Ave	4th Ave S to Denny Way	- / -	11.5 / E	- / -	12 / E
4th Ave	S Jackson St to Denny Way	9 / D	- / -	10 / E	- / -
Stewart St	**1st Ave to Denny Way**	- / -	6 / F	- / -	**6.5 / F**
Olive Way	**4th Ave to Denny Way**	7 / F	- / -	**7 / F**	- / -
E Madison St	Alaskan Way S to McGilvra Blvd E	20 / D	20 / E	20 / D	20 / E
Boren Ave	23rd Ave S to Denny Way	16 / D	14.5 / D	18 / E	15.5 / D
S Jackson St	Alaskan Way S to MLK Jr. Way S	8.5 / D	10.5 / E	8.5 / D	11 / E
23rd Ave	15th Ave S to E Madison St	14 / C	15.5 / C	16.5 / C	17.5 / C
MLK Jr. Way S	Rainier Ave S to E Madison St	10 / B	11 / B	11.5 / B	12 / C
4th Ave S	E Marginal Way S to S Jackson St	12 / C	11.5 / C	13.5 / C	11.5 / C
Airport Way S	S Albro Pl to 4th Ave S	10 / B	10 / B	10.5 / B	10 / B
15th Ave S	S Jackson St to Rainier Ave S	14.5 / C	16 / C	15 / C	16.5 / C
E Marginal Way S	S Holden St to S Nevada St	4.5 / C	4.5 / B	5.5 / C	5 / B
Swift Ave S	Rainier Ave S to S Columbian Way	13 / C	13 / C	14 / C	14 / C
Beacon Ave S	Rainier Ave S to 4th Ave S	21.5 / C	24 / C	22 / C	24.5 / C
MLK Jr. Way S	S Boeing Access Rd to Rainier Ave S	14.5 / A	15.5 / B	16.5 / B	16.5 / B
Rainier Ave S	Cornell Ave S to 23rd Ave S	17.5 / A	20 / B	18.5 / A	20.5 / B
S Michigan St	**E Marginal Way S to Airport Way S**	3.5 / C	4.5 / F	3.5 / C	**4.5 / F**
Ellis Ave S	E Marginal Way S to Airport Way S	3 / D	3.5 / C	3 / D	3.5 / C

Roadway	Extents	Existing Conditions Minutes / Level of Service		Alternative 1 No Action Minutes / Level of Service	
		N/E	S/W	N/E	S/W
14th Ave S	S Director St to 1st Ave S	7 / C	7 / C	7.5 / C	7 / C
California Ave SW	Delridge Way SW to SW Admiral Way	17 / B	17 / B	17 / B	17.5 / B
Fauntleroy Way SW	Delridge Way SW to 35th Ave SW	15 / B	17 / B	15.5 / B	18 / C
35th Ave SW	SW Roxbury St to Fauntleroy Way SW	8.5 / A	9 / A	8.5 / A	9 / A
Delridge Way SW	SW Roxbury St to W Marginal Way SW	11 / A	13 / B	11.5 / A	13.5 / B
W Marginal Way SW	S Cloverdale St to Delridge Way SW	7.5 / A	8 / A	7.5 / A	8.5 / A
SW Admiral Way	63rd Ave SW to SW Manning St	6.5 / A	7 / A	6.5 / A	7 / A
West Seattle Bridge	35th Ave SW to 15th Ave S	7.5 / C	10 / D	8.5 / C	10 / D
SW Alaska St	Beach Dr SW to 35th Ave SW	7 / C	7.5 / C	7 / C	7.5 / C
Sylvan Way SW	California Ave SW to S Holden St	12 / B	10.5 / A	12 / B	11 / B
SW Roxbury St	35th Ave SW to 14th Ave S	11 / B	10 / B	11.5 / B	10.5 / B

Source: Fehr & Peers, 2023.

Exhibit 3.10-40. Alternative 1 No Action Travel Time Corridor LOS



Source: Fehr & Peers, 2023.

Screenlines

Exhibit 3.10-41 summarizes PM peak hour screenline V/C ratios for existing conditions and 2044 Alternative 1. On average, the future volume forecasts are approximately ten percent higher than the existing volumes across all locations. Under Alternative 1, there are six screenlines with V/C ratios higher than 0.90 (indicating volumes are approaching capacity) including several at or just over capacity, compared with three in the existing conditions. The screenlines are:

- Ship Canal—Ballard Bridge
- Ship Canal—Fremont Bridge
- Ship Canal—Aurora Avenue N
- Duwamish River—1st Avenue S and 16th Avenue S
- Ship Canal—University and Montlake Bridges
- East of 9th Street

However, no screenlines exceed the established thresholds and therefore no impacts to screenlines are expected under Alternative 1.

Exhibit 3.10-41. PM Peak Hour Screenline Volume-to-Capacity Ratio—Alternative 1 No Action

Screenline	Location	Extents	V/C Threshold	Existing Conditions		Alternative 1 No Action	
				N/E	S/W	N/E	S/W
1.11	North City Limit	3rd Ave NW to Aurora Ave N	1.20	0.68	0.52	0.75	0.65
1.12	North City Limit	Meridian Ave N to 15th Ave NE	1.20	0.47	0.30	0.48	0.39
1.13	North City Limit	30th Ave NE to Lake City Way NE	1.20	0.84	0.47	0.85	0.62
2.00	Magnolia	Magnolia Bridge to W Emerson Place	1.00	0.56	0.61	0.58	0.61
3.11	Duwamish River	West Seattle Bridge & Spokane St	1.20	0.64	0.81	0.72	0.81
3.12	Duwamish River	1st Ave S & 16th Ave S	1.20	0.56	0.87	0.69	0.91
4.11	South City Limit	Martin Luther King Jr. Way to Rainier Avenue S	1.00	0.57	0.75	0.83	0.87
4.12	South City Limit	Marine Dr SW to Meyers Way S	1.00	0.37	0.42	0.44	0.49
4.13	South City Limit	SR 99 to Airport Way S	1.00	0.44	0.45	0.63	0.47
5.11	Ship Canal	Ballard Bridge	1.20	1.01	0.71	1.01	0.90
5.12	Ship Canal	Fremont Bridge	1.20	1.00	0.79	1.00	1.03
5.13	Ship Canal	Aurora Ave Bridge	1.20	0.96	0.58	0.96	0.70
5.16	Ship Canal	University & Montlake Bridges	1.20	0.74	0.79	0.74	0.94
6.11	South of NW 80th St	Seaview Ave NW to 15th Ave NW	1.00	0.37	0.46	0.40	0.52
6.12	South of N W 80th St	8th Ave NW to Greenwood Ave N	1.00	0.57	0.49	0.60	0.62
6.13	South of NE 80th St	Linden Ave N to 1st Ave NE	1.00	0.54	0.49	0.51	0.59
6.14	South of NE 80th St	5th Ave NE to 15th Ave NE	1.00	0.71	0.56	0.65	0.69
6.15	South of NE 80th St	20th Ave NE to Sand Point Way NE	1.00	0.47	0.34	0.41	0.39
7.11	West of Aurora Ave	Fremont Pl N to N 65th St	1.00	0.53	0.65	0.64	0.63
7.12	West of Aurora Ave	N 80th St to N 145th St	1.00	0.41	0.41	0.44	0.45
8.00	South of Lake Union	Valley St to Denny Way	1.20	0.49	0.35	0.50	0.35
9.11	South of Spokane St	Beach Dr SW to W Marginal Way SW	1.00	0.45	0.71	0.51	0.82

Screenline	Location	Extents	V/C Threshold	Existing Conditions		Alternative 1 No Action	
				N/E	S/W	N/E	S/W
9.12	South of Spokane St	E Marginal Way S to Airport Way S	1.00	0.51	0.54	0.65	0.52
9.13	South of Spokane St	15th Ave S to Rainier Ave S	1.00	0.56	0.57	0.69	0.60
10.11	South of S Jackson St	Alaskan Way S to 4th Ave S	1.00	0.61	0.64	0.81	0.82
10.12	South of S Jackson St	12th Ave S to Lakeside Ave S	1.00	0.52	0.64	0.74	0.74
12.12	East of CBD	S Jackson St to Howell St	1.20	0.36	0.36	0.37	0.44
13.11	East of I-5	NE Northgate Way to NE 145th St	1.00	0.67	0.51	0.70	0.53
13.12	East of I-5	NE 65th St to NE 80th St	1.00	0.52	0.54	0.54	0.50
13.3	East of I-5	NE Pacific St to NE Ravenna Blvd	1.00	0.59	0.52	0.61	0.56
A1	North of Seneca St	1st Ave to 6th Ave	N/A	0.47	0.50	0.63	0.65
A2	North of Blanchard	Elliott Ave to Westlake Ave	N/A	0.43	0.31	0.45	0.37
A3	East of 9th Ave	Lenora St to Pike St	N/A	0.46	0.83	0.46	0.94
A4	South of Mercer St	Elliott Ave W to Aurora Ave N	N/A	0.53	0.46	0.55	0.59
A5	East of 5th Ave N	Denny Way to Valley St	N/A	0.40	0.40	0.41	0.37
A6	North of Pine St	Melrose Ave E to 15th Ave E	N/A	0.39	0.32	0.41	0.42
A7	North of James St– E Cherry St	Boren Ave to 14th Ave	N/A	0.46	0.32	0.56	0.39
A8	West of Broadway	Yesler Way to E Roy St	N/A	0.47	0.38	0.55	0.46
A9	South of NE 45th St	7th Ave NE to Montlake Blvd NE	N/A	0.56	0.53	0.54	0.60
A10	East of 15th Ave NE	NE 45th St to NE 52nd St	N/A	0.51	0.48	0.58	0.53
A11	South of Northgate Way (N/NE 110th St)	N Northgate Way to Roosevelt Way NE	N/A	0.44	0.46	0.46	0.54
A12	East of 1st Ave NE	NE 100th St to NE Northgate Way	N/A	0.43	0.48	0.44	0.51

Source: Fehr & Peers, 2023.

Intersection LOS—NE 130th / NE 145th Street Subarea

Exhibit 3.10-42 summarizes the LOS and vehicle delay for each study intersection for Alternative 1. The subarea is expected to experience increased congestion in 2044 compared to current conditions. This can be attributed to the expected growth in population and employment locally and throughout the region. Separate from the model forecasts, the trips from a related project along Aurora Avenue N were added to the intersection forecasts because the growth from the traffic model did not account for all of the anticipated growth from this proposed project. A 145,000 square foot discount warehouse was assumed to generate 610 PM peak hour trips. These were distributed throughout the study area based on a trip distribution pattern from the model for this area. The City of Shoreline also has plans to improve N 145th Street (the city limit between Seattle and Shoreline), which include installing roundabouts at the two ramp intersections with I-5. The analysis is consistent with all planned design changes along N 145th Street.

Under Alternative 1, six intersections are expected to no longer meet the LOS D threshold, constituting a significant impact. These include:

- N 145th Street / Aurora Avenue N
- NE 145th Street / 5th Avenue NE
- NE 145th Street / 15th Avenue NE
- N 130th Street / Aurora Avenue N
- N 130th Street / 1st Avenue NE
- NE 125th Street / 15th Avenue NE

Exhibit 3.10-42. 130th/145th Street Subarea PM Peak Hour Level of Service—Alternative 1 No Action

ID	Intersection	Existing Conditions—Level of Service / Delay (seconds)	Alternative 1 No Action—Level of Service / Delay (seconds)
1	NE 155th St / 5th Ave NE	B / 11	B / 19
2	**N 145th St / Aurora Ave N**	D / 47	**E / 68**
3	N 145th St / Meridian Ave N	E / 58	B / 18
4	N 145th St / 1st Ave NE	C / 21	B / 20
5	NE 145th St / I-5 On & Off Ramps	D / 35	A / 9
6	**NE 145th St / 5th Ave NE**	D / 42	**E / 69**
7	**NE 145th St / 15th Ave NE**	D / 48	**E / 66**
8	N 137th St / Meridian Ave N / Roosevelt Way N	A / 7	A / 7
9	**N 130th St / Aurora Ave N**	D / 51	**E / 79**
10	N 130th St / Meridian Ave N	A / 9	B / 13
11	**N 130th St / 1st Ave NE**	D / 52	**E / 71**
12	NE 130th St / I-5 On Ramp	A / 2	A / 2

ID	Intersection	Existing Conditions—Level of Service / Delay (seconds)	Alternative 1 No Action—Level of Service / Delay (seconds)
13	NE 130th St / Roosevelt Way NE / 5th Ave NE	C / 32	D / 38
14	Roosevelt Way NE / NE 125th St / 10th Ave NE	B / 17	B / 17
15	**NE 125th St / 15th Ave NE**	D / 41	**E / 60**

Note: Intersections that exceed the LOS threshold are shown in bold.
Source: Fehr & Peers, 2023.

State Facilities

Exhibit 3.10-43 includes volume to maximum service volume ratios for state facilities under existing conditions as well as Alternative 1. Nearly all state facilities are expected to have increased volumes by 2044. Under Alternative 1, volumes at seven state facility study locations are expected to exceed the levels required to maintain the WSDOT LOS standard, constituting an impact under Alternative 1. These include:

- I-5 north of NE Northgate Way
- I-5 at the Ship Canal Bridge
- I-5 north of the West Seattle Bridge
- SR 99 north of N Northgate Way
- SR 99 at the Aurora Avenue Bridge
- SR 509 at the 1st Avenue S Bridge
- SR 522 south of NE 145th Street

I-5 north of Boeing Access Rd Ramp and the I-90 Mt Baker Tunnel are both expected to approach the LOS D service volumes, but not surpass the threshold. Because multiple state facilities within the city are expected to exceed WSDOT's LOS D standard, a significant impact to state facilities is expected under Alternative 1.

Exhibit 3.10-43. PM Peak Hour State Facilities Level of Service—Alternative 1 No Action

Facility	Extents	WSDOT LOS Standard	Existing Conditions—Volume to Maximum Service Volume Ratio	Alternative 1 No Action—Volume to Maximum Service Volume Ratio
I-5	**North of NE Northgate Way**	D	0.96	**1.03**
I-5	**Ship Canal Bridge**	D	1.21	**1.32**
I-5	**North of West Seattle Bridge**	D	1.24	**1.32**
I-5	North of Boeing Access Rd Ramp	D	0.93	0.98
I-90	Mt Baker Tunnel	D	0.90	0.97
SR 99	**North of N Northgate Way**	D	0.96	**1.08**

Facility	Extents	WSDOT LOS Standard	Existing Conditions—Volume to Maximum Service Volume Ratio	Alternative 1 No Action—Volume to Maximum Service Volume Ratio
SR 99	**Aurora Ave Bridge**	D	1.19	**1.30**
SR 99	Tunnel	D	0.58	0.65
SR 99	North of West Seattle Bridge	D	0.72	0.76
SR 99	South of S Cloverdale St	E (mitigated)	0.42	0.41
SR 509	**1st Ave S Bridge**	D	0.97	**1.25**
SR 519	S Atlantic St West of I-90 Ramps	D	0.90	0.83
SR 520	Lake Washington Bridge	D	0.60	0.86
SR 522	**South of NE 145th St**	D	1.01	**1.15**

Note: Facilities that exceed the LOS threshold are shown in bold.
Source: Fehr & Peers, 2023.

Impacts of Alternative 2: Focused

Mode Share

Exhibit 3.10-44 summarizes the SOV mode share expected under Alternative 2. The SoundCast model predicts that Alternative 2 SOV mode shares will be essentially the same as Alternative 1 across all eight subareas. Seven of the subareas would still meet their SOV target and although the Duwamish subarea would exceed its target, the difference in mode share relative to Alternative 1 is expected to be less than the 1% impact threshold. Therefore, no mode share impact is expected under Alternative 2.

Exhibit 3.10-44. PM Peak Hour SOV Mode Share—Alternative 2

Subarea	SOV Target	Alternative 1 No Action SOV Share	Alternative 2 SOV Share
(1) Northwest Seattle	37%	34%	34%
(2) Northeast Seattle	35%	26%	26%
(3) Queen Anne/Magnolia	38%	34%	34%
(4) Downtown/Lake Union	18%	11%	11%
(5) Capitol Hill/Central District	28%	27%	27%
(6) West Seattle	35%	35%	35%
(7) Duwamish	51%	67%	67%
(8) Southeast Seattle	38%	31%	31%

Note: Existing (2017-2019) mode share data from the PSRC household travel survey have substantial margins of error. See **Exhibit 3.10-10** for margins of error by subarea.
Source: Fehr & Peers, 2023.

Exhibit 3.10-45 compares the number of daily person trips expected by mode under 2044 Alternative 1 and Alternative 2. Citywide, Alternative 2 is expected to result in approximately 156,000 additional person trips compared to Alternative 1, an increase of 4%. That increase is spread fairly evenly across modes. In other words, while Alternative 2 would result in slightly more trips, the underlying travel behavior and mode shares expected by 2044 is consistent between the alternatives.

Exhibit 3.10-45. Daily Person Trips by Mode—Alternative 2

Mode	Alternative 1 No Action	Alternative 2
SOV	1,783,000	1,847,000
HOV	1,440,000	1,471,000
Transit	1,138,000	1,160,000
Walk	1,378,000	1,414,000
Bike	99,000	102,000
Total	**5,838,000**	**5,994,000**

Source: Fehr & Peers, 2023.

Transit

Passenger loads on key transit connections were forecasted for the PM peak hour. **Exhibit 3.10-46** summarizes the projected load factors on the busiest segment of each route in the peak direction of travel. Passenger loads are expected to increase on most, but not all, routes. Study routes that would have a transit capacity impact under Alternative 2 are shown in bold in **Exhibit 3.10-46**. The impacted routes include:

- RapidRide E Line—Downtown to Aurora Village
- RapidRide J Line—Downtown to University District
- RapidRide R Line—Downtown to Rainier Valley
- RapidRide Fremont

Exhibit 3.10-46. PM Peak Hour Average Passenger Load Factors—Alternative 2

	Maximum Passenger Load Factor in Peak Direction	
Transit Route	Alternative 1 No Action	Alternative 2
Link light rail—1 Line	1.08	1.04
Link light rail—2 Line	1.29	1.31
Link light rail—3 Line	1.29	1.21
RapidRide C Line—Westwood Village to Alaska Junction	0.71	0.78
RapidRide E Line—Downtown to Aurora Village	1.89	**2.22**

Transit Route	Maximum Passenger Load Factor in Peak Direction	
	Alternative 1 No Action	Alternative 2
RapidRide G Line—Downtown to Madison Valley	0.35	0.40
RapidRide H Line—Alki to Burien	0.77	0.93
RapidRide J Line—Downtown to University District	1.97	**2.64**
RapidRide R Line—Downtown to Rainier Valley	1.07	**1.27**
RapidRide 23rd	0.47	0.50
RapidRide 65th (replaces Route 62)	0.82	0.93
RapidRide Beacon	0.50	0.53
RapidRide Denny	2.83	2.58
RapidRide Fremont (replaces Route 40)	1.49	**1.65**
RapidRide Green Lake	0.47	0.42
RapidRide Market	0.76	0.85

Note: Impacted routes are shown in bold.
Source: Fehr & Peers, 2023.

Roadway Users

This section summarizes roadway conditions expected under Alternative 2.

VMT / VHT / Average Trip Speed

Exhibit 3.10-47 summarizes VMT, VHT, and average trip speed for Alternative 2 relative to Alternative 1. Total daily VMT generated under Alternative 2 is expected to increase by 1.4% compared to Alternative 1. However, the VMT per capita would decrease slightly from approximately 13.7 miles per day to 13.5 miles per day. This incremental difference may reflect slight changes in travel behavior in terms of mode choice and average trip lengths.

Similarly, VHT is projected to increase in total compared to Alternative 1 but would remain flat on a per capita basis at approximately a half hour of daily travel by private car or truck. The average trip speed would also decrease very slightly representing a small increase to levels of congestion on the highway system and local street network.

Exhibit 3.10-47. Daily VMT, VHT, and Average Trip Speed—Alternative 2

Metric	Alternative 1 No Action		Alternative 2	
	Total	Per Capita	Total	Per Capita
VMT	24,357,100	13.7	24,698,900	13.5
VHT	865,800	0.5	882,300	0.5
Average Trip Speed	28.1	—	28.0	—

Source: Fehr & Peers, 2023.

Because the VMT per capita under Alternative 2 would not exceed the level under Alternative 1, no impact to VMT per capita is identified under Alternative 2.

Travel Time

Exhibit 3.10-48 summarizes PM peak hour corridor travel times under Alternative 2 compared to Alternative 1.[80] **Exhibit 3.10-49** displays the LOS values along associated corridors on the map. All corridor travel times are expected to be within 0.5 minutes of Alternative 1 with some corridors seeing slight increases while others seeing slight decreases. Under Alternative 1, 77 corridors are expected to operate at LOS A-C, 15 at LOS D, 8 operating at LOS E, and 4 operating at LOS F. Under Alternative 2, 76 corridors are expected to operate at LOS A-C, 16 at LOS D, 8 operating at LOS E, and 4 operating at LOS F.

Alternative 1 and Alternative 2 are expected to result in the same four corridors operating at LOS F, one of which would have an increase in excess of the 5% threshold of significance. Therefore, a travel time impact is expected under Alternative 2 on one corridor (shown in bold in **Exhibit 3.10-48**):

- Olive Way between 4th Avenue and Denny Way

[80] For corridors with peak directional patterns, the AM peak hour would typically reflect similar conditions in the opposite direction from those shown for the PM peak hour.

Exhibit 3.10-48. PM Peak Hour Travel Time Corridor Level of Service—Alternative 2

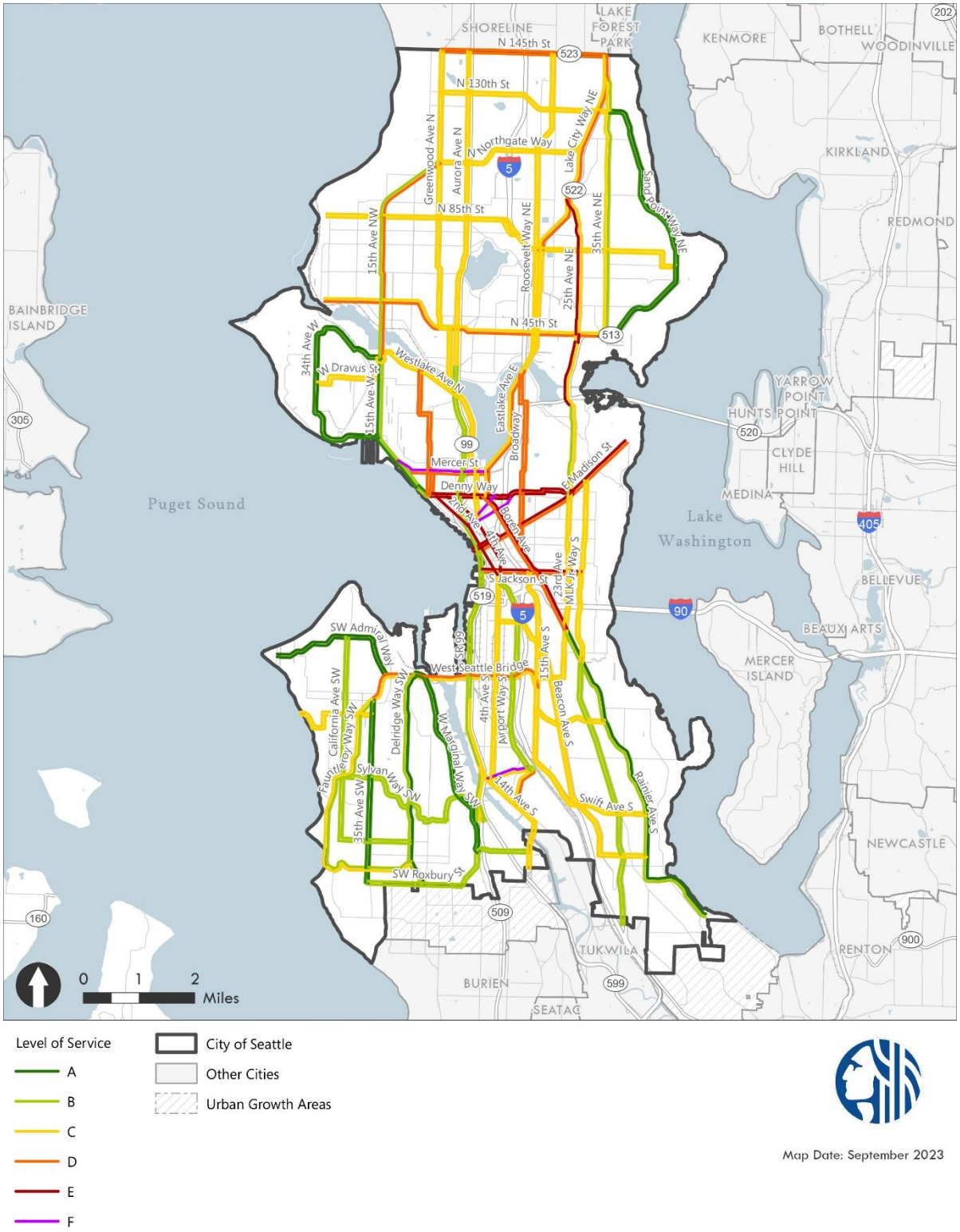
		Alternative 1 No Action Minutes / Level of Service		Alternative 2 Minutes / Level of Service	
Roadway	Extents	N/E	S/W	N/E	S/W
N 145th St	Greenwood Ave N to Lake City Way NE	10.5 / D	9.5 / C	10.5 / D	10 / D
N 130th St	Greenwood Ave N to 35th Ave NE	11.5 / C	12 / C	11.5 / C	12.5 / C
N Northgate Way	Greenwood Ave N to Lake City Way NE	10.5 / C	11 / C	10.5 / C	11 / C
N 85th St	32nd Ave NW to Sand Point Way NE	25 / C	24.5 / C	25 / C	25 / C
N 45th St	32nd Ave NW to Union Bay Pl NE	24.5 / C	23.5 / C	25 / D	24 / C
15th Ave NW	W Emerson St to N 105th St	17 / D	11.5 / B	17 / D	11.5 / B
Greenwood Ave N	Nickerson St to N 145th St	27 / C	25 / C	26.5 / C	25.5 / C
Aurora Ave N	N 38th St to N 145th St	19 / D	16.5 / C	18.5 / C	17 / C
Roosevelt Way NE	Fuhrman Ave E to N 145th St	23 / C	21.5 / C	22.5 / C	22 / C
Lake City Way NE	NE 75th St to N 145th St	14 / D	11 / C	13.5 / D	11 / C
25th Ave NE	E Roanoke St to Lake City Way NE	15 / C	22.5 / E	15 / C	23 / E
35th Ave NE	Union Bay Pl NE to Lake City Way NE	16.5 / B	17.5 / C	16 / B	18 / C
Sand Point Way NE	Union Bay Pl NE to 35th Ave NE	12.5 / A	12 / A	12 / A	12 / A
34th Ave W	15th Ave W to15th Ave W	11.5 / A	12 / A	11.5 / A	12 / A
W Dravus St	34th Ave W to15th Ave W	5 / C	4.5 / C	5 / C	4.5 / C
15th Ave W	Queen Anne Ave N to W Emerson St	8.5 / B	8 / A	8.5 / B	8 / A
Queen Anne Ave N	Denny Way to Nickerson St	12.5 / D	12 / D	12.5 / D	12 / D
SR 99	S Nevada St to N 38th St	11.5 / B	12.5 / B	11.5 / B	12.5 / B
Westlake Ave N	Stewart St to W Emerson St	16 / C	18 / C	16 / C	18.5 / C
Eastlake Ave E	Denny Way to Fuhrman Ave E	12 / D	11.5 / C	12 / D	11.5 / C
Broadway	Boren Ave to Eastlake Ave E	18 / D	18.5 / D	18.5 / D	18.5 / D

Roadway	Extents	Alternative 1 No Action Minutes / Level of Service		Alternative 2 Minutes / Level of Service	
		N/E	S/W	N/E	S/W
23rd Ave	E Madison St to E Roanoke St	6 / C	5 / B	6 / C	5.5 / B
Mercer St	Elliott Ave W to Fairview Ave N	8 / D	14 / F	8 / D	14 / F
Denny Way	Queen Anne Ave N to E Madison St	17.5 / E	16.5 / E	17.5 / E	16.5 / E
2nd Ave	4th Ave S to Denny Way	- / -	12 / E	- / -	12 / E
4th Ave	S Jackson St to Denny Way	10 / E	- / -	10 / E	- / -
Stewart St	1st Ave to Denny Way	- / -	6.5 / F	- / -	6.5 / F
Olive Way	**4th Ave to Denny Way**	7 / F	- / -	**7.5 / F**	- / -
E Madison St	Alaskan Way S to McGilvra Blvd E	20 / D	20 / E	20.5 / D	20.5 / E
Boren Ave	23rd Ave S to Denny Way	18 / E	15.5 / D	18.5 / E	15.5 / D
S Jackson St	Alaskan Way S to MLK Jr. Way S	8.5 / D	11 / E	8.5 / D	11 / E
23rd Ave	15th Ave S to E Madison St	16.5 / C	17.5 / C	16.5 / C	17.5 / C
MLK Jr. Way S	Rainier Ave S to E Madison St	11.5 / B	12 / C	12 / C	12 / C
4th Ave S	E Marginal Way S to S Jackson St	13.5 / C	11.5 / C	13.5 / C	11.5 / C
Airport Way S	S Albro Pl to 4th Ave S	10.5 / B	10 / B	11 / B	10 / B
15th Ave S	S Jackson St to Rainier Ave S	15 / C	16.5 / C	15.5 / C	16.5 / C
E Marginal Way S	S Holden St to S Nevada St	5.5 / C	5 / B	5.5 / C	5 / B
Swift Ave S	Rainier Ave S to S Columbian Way	14 / C	14 / C	14.5 / C	14 / C
Beacon Ave S	Rainier Ave S to 4th Ave S	22 / C	24.5 / C	22 / C	25 / C
MLK Jr. Way S	S Boeing Access Rd to Rainier Ave S	16.5 / B	16.5 / B	16.5 / B	16 / B
Rainier Ave S	Cornell Ave S to 23rd Ave S	18.5 / A	20.5 / B	18.5 / A	20.5 / B
S Michigan St	E Marginal Way S to Airport Way S	3.5 / C	4.5 / F	3.5 / C	4.5 / F
Ellis Ave S	E Marginal Way S to Airport Way S	3 / D	3.5 / C	3 / D	3.5 / C

Roadway	Extents	Alternative 1 No Action Minutes / Level of Service		Alternative 2 Minutes / Level of Service	
		N/E	S/W	N/E	S/W
14th Ave S	S Director St to 1st Ave S	7.5 / C	7 / C	7.5 / C	7 / C
California Ave SW	Delridge Way SW to SW Admiral Way	17 / B	17.5 / B	17.5 / B	17.5 / B
Fauntleroy Way SW	Delridge Way SW to 35th Ave SW	15.5 / B	18 / C	15.5 / B	18 / C
35th Ave SW	SW Roxbury St to Fauntleroy Way SW	8.5 / A	9 / A	8.5 / A	9.5 / A
Delridge Way SW	SW Roxbury St to W Marginal Way SW	11.5 / A	13.5 / B	11.5 / A	13.5 / B
W Marginal Way SW	S Cloverdale St to Delridge Way SW	7.5 / A	8.5 / A	8 / A	8.5 / A
SW Admiral Way	63rd Ave SW to SW Manning St	6.5 / A	7 / A	6.5 / A	7 / A
West Seattle Bridge	35th Ave SW to 15th Ave S	8.5 / C	10 / D	8.5 / C	10.5 / D
SW Alaska St	Beach Dr SW to 35th Ave SW	7 / C	7.5 / C	7 / C	7.5 / C
Sylvan Way SW	California Ave SW to S Holden St	12 / B	11 / B	12 / B	11 / B
SW Roxbury St	35th Ave SW to 14th Ave S	11.5 / B	10.5 / B	11.5 / B	11 / B

Note: Impacted corridors are shown in bold.
Source: Fehr & Peers, 2023.

Exhibit 3.10-49. Alternative 2 PM Peak Hour Travel Time Corridor LOS



Source: Fehr & Peers, 2023.

Screenlines

Exhibit 3.10-50 summarizes PM peak hour screenline V/C ratios for 2044 Alternative 1 and 2044 Alternative 2. The volume forecasts in Alternative 2 are approximately five percent higher than the Alternative 1 forecasts across all locations. There are six screenlines with V/C ratios higher than 0.90, which is the same as compared with Alternative 1. The screenlines are:

- Ship Canal—Ballard Bridge
- Ship Canal—Fremont Bridge
- Ship Canal—Aurora Ave N
- Duwamish River—1st Ave S and 16th Ave S
- Ship Canal—University and Montlake Bridges
- East of 9th Avenue

While Alternative 2 would cause V/C ratios to increase across many screenlines, none of the screenlines are expected to exceed the established thresholds. Therefore, no significant impacts to screenlines are expected under Alternative 2.

Exhibit 3.10-50. PM Peak Hour Screenline Volume-to-Capacity Ratio—Alternative 2

Screenline	Location	Extents	V/C Threshold	Alternative 1 No Action		Alternative 2	
				N/E	S/W	N/E	S/W
1.11	North City Limit	3rd Ave NW to Aurora Ave N	1.20	0.75	0.65	0.73	0.70
1.12	North City Limit	Meridian Ave N to 15th Ave NE	1.20	0.48	0.39	0.46	0.43
1.13	North City Limit	30th Ave NE to Lake City Way NE	1.20	0.85	0.62	0.83	0.65
2.00	Magnolia	Magnolia Bridge to W Emerson Place	1.00	0.58	0.61	0.62	0.65
3.11	Duwamish River	West Seattle Bridge & Spokane St	1.20	0.72	0.81	0.74	0.86
3.12	Duwamish River	1st Ave S & 16th Ave S	1.20	0.69	0.91	0.69	0.93
4.11	South City Limit	Martin Luther King Jr. Way to Rainier Ave S	1.00	0.83	0.87	0.86	0.89
4.12	South City Limit	Marine Dr SW to Meyers Way S	1.00	0.44	0.49	0.46	0.49
4.13	South City Limit	SR 99 to Airport Way S	1.00	0.63	0.47	0.64	0.48
5.11	Ship Canal	Ballard Bridge	1.20	1.01	0.90	1.06	0.93
5.12	Ship Canal	Fremont Bridge	1.20	1.00	1.03	1.09	1.12
5.13	Ship Canal	Aurora Ave Bridge	1.20	0.96	0.70	0.99	0.73
5.16	Ship Canal	University & Montlake Bridges	1.20	0.74	0.94	0.81	1.00
6.11	South of NW 80th St	Seaview Ave NW to 15th Ave NW	1.00	0.40	0.52	0.40	0.54
6.12	South of N W 80th St	8th Ave NW to Greenwood Ave N	1.00	0.60	0.62	0.61	0.64
6.13	South of NE 80th St	Linden Ave N to 1st Ave NE	1.00	0.51	0.59	0.52	0.62
6.14	South of NE 80th St	5th Ave NE to 15th Ave NE	1.00	0.65	0.69	0.69	0.74
6.15	South of NE 80th St	20th Ave NE to Sand Point Way NE	1.00	0.41	0.39	0.42	0.43
7.11	West of Aurora Ave	Fremont Pl N to N 65th St	1.00	0.64	0.63	0.67	0.66
7.12	West of Aurora Ave	N 80th St to N 145th St	1.00	0.44	0.45	0.45	0.47
8.00	South of Lake Union	Valley St to Denny Way	1.20	0.50	0.35	0.52	0.39

Screenline	Location	Extents	V/C Threshold	Alternative 1 No Action		Alternative 2	
				N/E	S/W	N/E	S/W
9.11	South of Spokane St	Beach Dr SW to W Marginal Way SW	1.00	0.51	0.82	0.53	0.85
9.12	South of Spokane St	E Marginal Way S to Airport Way S	1.00	0.65	0.52	0.66	0.53
9.13	South of Spokane St	15th Ave S to Rainier Ave S	1.00	0.69	0.60	0.71	0.63
10.11	South of S Jackson St	Alaskan Way S to 4th Ave S	1.00	0.81	0.82	0.85	0.86
10.12	South of S Jackson St	12th Ave S to Lakeside Ave S	1.00	0.74	0.74	0.79	0.76
12.12	East of CBD	S Jackson St to Howell St	1.20	0.37	0.44	0.38	0.45
13.11	East of I-5	NE Northgate Way to NE 145th St	1.00	0.70	0.53	0.72	0.54
13.12	East of I-5	NE 65th St to NE 80th St	1.00	0.54	0.50	0.58	0.53
13.3	East of I-5	NE Pacific St to NE Ravenna Blvd	1.00	0.61	0.56	0.67	0.60
A1	North of Seneca St	1st Ave to 6th Ave	N/A	0.63	0.65	0.67	0.67
A2	North of Blanchard	Elliott Ave to Westlake Ave	N/A	0.45	0.37	0.47	0.39
A3	East of 9th Ave	Lenora St to Pike St	N/A	0.46	0.94	0.46	0.95
A4	South of Mercer St	Elliott Ave W to Aurora Ave N	N/A	0.55	0.59	0.58	0.63
A5	East of 5th Ave N	Denny Way to Valley St	N/A	0.41	0.37	0.43	0.42
A6	North of Pine St	Melrose Ave E to 15th Ave E	N/A	0.41	0.42	0.43	0.44
A7	North of James St– E Cherry St	Boren Ave to 14th Ave	N/A	0.56	0.39	0.58	0.41
A8	West of Broadway	Yesler Way to E Roy St	N/A	0.55	0.46	0.58	0.47
A9	South of NE 45th St	7th Ave NE to Montlake Blvd NE	N/A	0.54	0.60	0.57	0.64
A10	East of 15th Ave NE	NE 45th St to NE 52nd St	N/A	0.58	0.53	0.62	0.56
A11	South of Northgate Way (N/NE 110th St)	N Northgate Way to Roosevelt Way NE	N/A	0.46	0.54	0.46	0.57
A12	East of 1st Ave NE	NE 100th St to NE Northgate Way	N/A	0.44	0.51	0.44	0.50

Source: Fehr & Peers, 2023.

Intersection LOS—NE 130th / NE 145th Street Subarea

Exhibit 3.10-51 summarizes the LOS and vehicle delay for each study intersection analyzed based on Alternative 2 conditions. Under Alternative 2, six intersections do not meet the LOS D standard. These intersections, highlighted in bold, are the same impacted intersections as those identified under Alternative 1. Five of the six intersections operate with LOS F conditions.

Under Alternative 2, six intersections are expected to fall below the LOS D threshold; these intersections are the same as those identified under Alternative 1. However, operations are expected to degrade with five of the six intersections falling from LOS E to F. All six intersections would experience at least five additional seconds of delay (the impact threshold) and therefore are considered to have a significant impact under Alternative 2. These include:

- N 145th Street / Aurora Avenue N
- NE 145th Street / 5th Avenue NE
- NE 145th Street / 15th Avenue NE
- N 130th Street / Aurora Avenue N
- N 130th Street / 1st Avenue NE
- NE 125th Street / 15th Avenue NE

Exhibit 3.10-51. 130th/145th Street Subarea PM Peak Hour Level of Service—Alternative 2

ID	Intersection	Alternative 1 No Action—Level of Service / Delay (seconds)	Alternative 2—Level of Service / Delay (seconds)
1	NE 155th St / 5th Ave NE	B / 19	C / 21
2	**N 145th St / Aurora Ave N**	**E / 68**	**F / 83**
3	N 145th St / Meridian Ave N	B / 18	B / 20
4	N 145th St / 1st Ave NE	B / 20	C / 25
5	NE 145th St / I-5 On & Off Ramps	A / 9	A / 9
6	**NE 145th St / 5th Ave NE**	**E / 69**	**F / 85**
7	**NE 145th St / 15th Ave NE**	**E / 66**	**F / 80**
8	N 137th St / Meridian Ave N / Roosevelt Way N	A / 7	A / 8
9	**N 130th St / Aurora Ave N**	**E / 79**	**F / 88**
10	N 130th St / Meridian Ave N	B / 13	B / 14
11	**N 130th St / 1st Ave NE**	**E / 71**	**F / 92**
12	NE 130th St / I-5 On Ramp	A / 2	A / 2
13	NE 130th St / Roosevelt Way NE / 5th Ave NE	D / 38	D / 42
14	Roosevelt Way NE / NE 125th St / 10th Ave NE	B / 17	B / 19
15	**NE 125th St / 15th Ave NE**	**E / 60**	**E / 70**

Note: Impacted intersections are shown in bold.
Source: Fehr & Peers, 2023.

State Facilities

Exhibit 3.10-52 shows a comparison of volume to maximum service volume ratios for Alternative 1 and Alternative 2 at each of the identified state facility study locations. Volumes at all locations are expected to remain similar or increase slightly relative to Alternative 1. The same seven study locations projected to exceed the WSDOT LOS standard under Alternative 1 would do so under Alternative 2. At four of those locations, the ratio is projected to increase by at least 0.01, constituting a significant impact under Alternative 2:

- I-5 at the Ship Canal Bridge
- SR 99 north of N Northgate Way
- SR 99 at the Aurora Avenue Bridge
- SR 522 south of NE 145th Street

The following study locations are also expected to exceed the WSDOT LOS standard, but would have volumes roughly equivalent to Alternative 1, and therefore are not considered to be significant impacts under Alternative 2:

- I-5 north of NE Northgate Way
- I-5 north of the West Seattle Bridge
- SR 509 at the 1st Avenue S Bridge

Because Alternative 2 would cause volumes to increase on multiple state facilities already expected to exceed WSDOT's LOS D standard under Alternative 1, a significant impact to state facilities is expected under Alternative 2.

Exhibit 3.10-52. PM Peak Hour State Facilities Level of Service—Alternative 2

Facility	Extents	WSDOT LOS Standard	Alternative 1 No Action—Volume to Maximum Service Volume Ratio	Alternative 2—Volume to Maximum Service Volume Ratio
I-5	North of NE Northgate Way	D	1.03	1.03
I-5	**Ship Canal Bridge**	D	1.32	**1.35**
I-5	North of West Seattle Bridge	D	1.32	1.32
I-5	North of Boeing Access Rd Ramp	D	0.98	0.98
I-90	Mt Baker Tunnel	D	0.97	0.99
SR 99	**North of N Northgate Way**	D	1.08	**1.11**
SR 99	**Aurora Ave Bridge**	D	1.30	**1.35**
SR 99	Tunnel	D	0.65	0.66
SR 99	North of West Seattle Bridge	D	0.76	0.77
SR 99	South of S Cloverdale St	E (mitigated)	0.41	0.42
SR 509	1st Ave S Bridge	D	1.25	1.25

Facility	Extents	WSDOT LOS Standard	Alternative 1 No Action—Volume to Maximum Service Volume Ratio	Alternative 2—Volume to Maximum Service Volume Ratio
SR 519	S Atlantic St West of I-90 Ramps	D	0.83	0.83
SR 520	Lake Washington Bridge	D	0.86	0.88
SR 522	**South of NE 145th St**	D	1.15	**1.18**

Note: Impacted locations are shown in bold.
Source: Fehr & Peers, 2023.

Impacts of Alternative 3: Broad

Mode Share

Exhibit 3.10-53 summarizes the SOV mode share expected under Alternative 3. The SoundCast model predicts that Alternative 3 SOV mode shares will be very similar to Alternative 1. The only notable changes are expected in Northeast Seattle and Southeast Seattle where the SOV mode shares would increase slightly, however both subareas would still meet their SOV targets. Although the Duwamish subarea would exceed its target, the difference in mode share relative to Alternative 1 is expected to be less than the 1% impact threshold. Therefore, no mode share impact is expected under Alternative 3.

Exhibit 3.10-53. PM Peak Hour SOV Mode Share—Alternative 3

Subarea	SOV Target	Alternative 1 No Action SOV Share	Alternative 3 SOV Share
(1) Northwest Seattle	37%	34%	34%
(2) Northeast Seattle	35%	26%	27%
(3) Queen Anne/Magnolia	38%	34%	34%
(4) Downtown/Lake Union	18%	11%	11%
(5) Capitol Hill/Central District	28%	27%	27%
(6) West Seattle	35%	35%	35%
(7) Duwamish	51%	67%	67%
(8) Southeast Seattle	38%	31%	32%

Note: Existing (2017-2019) mode share data from the PSRC household travel survey have substantial margins of error. See **Exhibit 3.10-10** for margins of error by subarea.
Source: Fehr & Peers, 2023.

Exhibit 3.10-54 compares the number of daily person trips expected by mode under 2044 Alternative 1 and Alternative 3. Citywide, Alternative 3 is expected to result in approximately 138,000 additional person trips than Alternative 1, an increase of 3%. The increase among

modes varies more than was the case under Alternative 2. In particular, the number of trips by transit and biking is only expected to increase by approximately 1% while the number of trips by driving and walking would increase by 3 to 4%.

Exhibit 3.10-54. Daily Person Trips by Mode—Alternative 3

Mode	Alternative 1 No Action	Alternative 3
SOV	1,783,000	1,853,000
HOV	1,440,000	1,473,000
Transit	1,138,000	1,142,000
Walk	1,378,000	1,408,000
Bike	99,000	100,000
Total	**5,838,000**	**5,976,000**

Source: Fehr & Peers, 2023.

Transit

Exhibit 3.10-55 summarizes the projected load factors on the busiest segment of each route in the peak direction of travel. Passenger loads under Alternative 3 are generally lower than those forecasted under Alternative 2; however, the same study routes would be impacted. Study routes that would have a transit capacity impact under Alternative 3 are shown in bold in **Exhibit 3.10-55**. The impacted routes include:

- RapidRide E Line—Downtown to Aurora Village
- RapidRide J Line—Downtown to University District
- RapidRide R Line—Downtown to Rainier Valley
- RapidRide Fremont

Exhibit 3.10-55. PM Peak Hour Average Passenger Load Factors—Alternative 3

	Maximum Passenger Load Factor in Peak Direction	
Transit Route	Alternative 1 No Action	Alternative 3
Link light rail—1 Line	1.08	1.00
Link light rail—2 Line	1.29	1.25
Link light rail—3 Line	1.29	1.26
RapidRide C Line—Westwood Village to Alaska Junction	0.71	0.78
RapidRide E Line—Downtown to Aurora Village	1.89	**2.00**
RapidRide G Line—Downtown to Madison Valley	0.35	0.37
RapidRide H Line—Alki to Burien	0.77	0.87
RapidRide J Line—Downtown to University District	1.97	**2.14**

Transit Route	Maximum Passenger Load Factor in Peak Direction	
	Alternative 1 No Action	Alternative 3
RapidRide R Line—Downtown to Rainier Valley	1.07	**1.18**
RapidRide 23rd	0.47	0.45
RapidRide 65th (replaces Route 62)	0.82	0.87
RapidRide Beacon	0.50	0.51
RapidRide Denny	2.83	2.77
RapidRide Fremont (replaces Route 40)	1.49	**1.63**
RapidRide Green Lake	0.47	0.44
RapidRide Market	0.76	0.70

Note: Impacted routes are shown in bold.
Source: Fehr & Peers, 2023.

Roadway Users

This section summarizes roadway conditions expected under Alternative 3.

VMT / VHT / Average Trip Speed

Exhibit 3.10-56 summarizes VMT, VHT and average trip speed under Alternative 3 relative to Alternative 1. As with Alternative 2, total daily VMT generated under Alternative 3 is expected to increase compared to Alternative 1; however, the increase is minimal at 1%. The VMT per capita is expected to decrease slightly from approximately 13.7 miles per day to 13.5 miles per day. This incremental difference may reflect slight changes in travel behavior in terms of mode choice and average trip lengths.

Similarly, VHT is projected to increase in total compared to Alternative 1 but would remain flat on a per capita basis at approximately a half hour of daily travel by private car or truck. The average trip speed is expected to stay essentially flat relative to Alternative 1.

Exhibit 3.10-56. Daily VMT, VHT, and Average Trip Speed—Alternative 3

Metric	Alternative 1 No Action		Alternative 3	
	Total	Per Capita	Total	Per Capita
VMT	24,357,100	13.7	24,593,100	13.5
VHT	865,800	0.5	873,000	0.5
Average Trip Speed	28.1	—	28.2	—

Source: Fehr & Peers, 2023.

Because the VMT per capita under Alternative 3 would not exceed the level under Alternative 1, no impact to VMT per capita is identified under Alternative 3.

Travel Time

Exhibit 3.10-57 summarizes PM peak hour corridor travel times under Alternative 3 compared to Alternative 1.[81] **Exhibit 3.10-58** shows the LOS values along associated corridors on the map. All corridor travel times are expected to be within 0.5 minutes of Alternative 1 with most corridors seeing slight increases. Under Alternative 1, 77 corridors are expected to operate at LOS A-C, 15 at LOS D, 8 operating at LOS E, and 4 operating at LOS F. Under Alternative 3, 75 corridors are expected to operate at LOS A-C, 17 at LOS D, 8 operating at LOS E, and 4 operating at LOS F.

Alternative 1 and Alternative 3 are expected to result in the same four corridors operating at LOS F, one of which would have an increase in excess of the 5% threshold of significance. Therefore, a travel time impact is expected under Alternative 3 on one corridor (shown in bold in **Exhibit 3.10-57**):

- Olive Way between 4th Avenue and Denny Way

[81] For corridors with peak directional patterns, the AM peak hour would typically reflect similar conditions in the opposite direction from those shown for the PM peak hour.

Exhibit 3.10-57. PM Peak Hour Travel Time Corridor Level of Service—Alternative 3

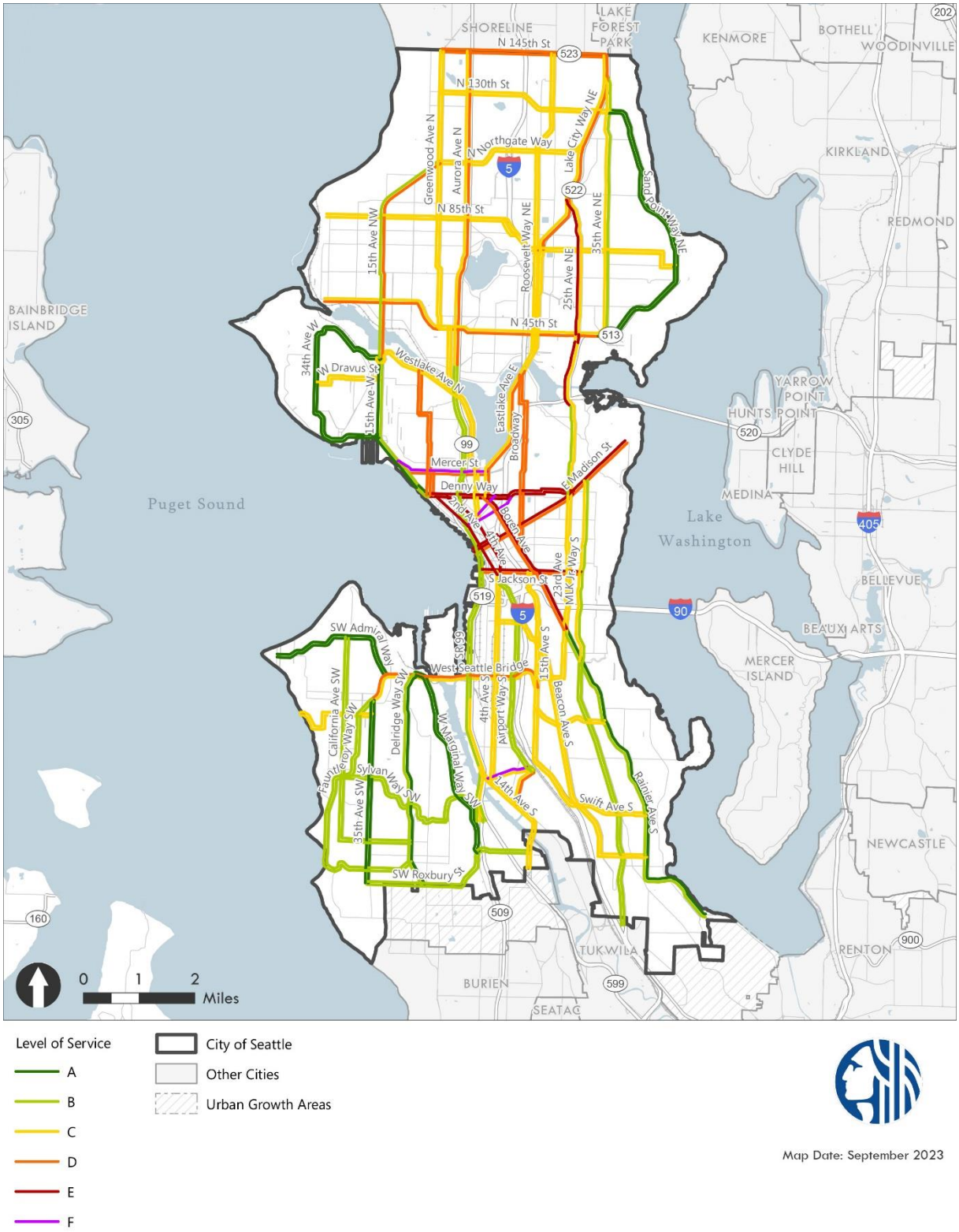
		Alternative 1 No Action Minutes / Level of Service		Alternative 3 Minutes / Level of Service	
Roadway	Extents	N/E	S/W	N/E	S/W
N 145th St	Greenwood Ave N to Lake City Way NE	10.5 / D	9.5 / C	10.5 / D	10 / D
N 130th St	Greenwood Ave N to 35th Ave NE	11.5 / C	12 / C	12 / C	12.5 / C
N Northgate Way	Greenwood Ave N to Lake City Way NE	10.5 / C	11 / C	11 / C	11 / C
N 85th St	32nd Ave NW to Sand Point Way NE	25 / C	24.5 / C	25 / C	25 / C
N 45th St	32nd Ave NW to Union Bay Pl NE	24.5 / C	23.5 / C	25 / D	24 / C
15th Ave NW	W Emerson St to N 105th St	17 / D	11.5 / B	17.5 / D	11.5 / B
Greenwood Ave N	Nickerson St to N 145th St	27 / C	25 / C	27.5 / C	25.5 / C
Aurora Ave N	N 38th St to N 145th St	19 / D	16.5 / C	19 / D	17 / C
Roosevelt Way NE	Fuhrman Ave E to N 145th St	23 / C	21.5 / C	23 / C	22 / C
Lake City Way NE	NE 75th St to N 145th St	14 / D	11 / C	14 / D	11 / C
25th Ave NE	E Roanoke St to Lake City Way NE	15 / C	22.5 / E	15 / C	23 / E
35th Ave NE	Union Bay Pl NE to Lake City Way NE	16.5 / B	17.5 / C	16.5 / B	18 / C
Sand Point Way NE	Union Bay Pl NE to 35th Ave NE	12.5 / A	12 / A	12.5 / A	12 / A
34th Ave W	15th Ave W to15th Ave W	11.5 / A	12 / A	11.5 / A	12 / A
W Dravus St	34th Ave W to15th Ave W	5 / C	4.5 / C	5.5 / C	4.5 / C
15th Ave W	Queen Anne Ave N to W Emerson St	8.5 / B	8 / A	9 / B	8 / A
Queen Anne Ave N	Denny Way to Nickerson St	12.5 / D	12 / D	12.5 / D	12 / D
SR 99	S Nevada St to N 38th St	11.5 / B	12.5 / B	11.5 / B	12.5 / B
Westlake Ave N	Stewart St to W Emerson St	16 / C	18 / C	16.5 / C	18 / C
Eastlake Ave E	Denny Way to Fuhrman Ave E	12 / D	11.5 / C	12 / D	11.5 / C
Broadway	Boren Ave to Eastlake Ave E	18 / D	18.5 / D	18.5 / D	18.5 / D

Roadway	Extents	Alternative 1 No Action Minutes / Level of Service		Alternative 3 Minutes / Level of Service	
		N/E	S/W	N/E	S/W
23rd Ave	E Madison St to E Roanoke St	6 / C	5 / B	6 / C	5 / B
Mercer St	Elliott Ave W to Fairview Ave N	8 / D	14 / F	8 / D	14 / F
Denny Way	Queen Anne Ave N to E Madison St	17.5 / E	16.5 / E	17.5 / E	16.5 / E
2nd Ave	4th Ave S to Denny Way	- / -	12 / E	- / -	12 / E
4th Ave	S Jackson St to Denny Way	10 / E	- / -	10 / E	- / -
Stewart St	1st Ave to Denny Way	- / -	6.5 / F	- / -	6.5 / F
Olive Way	**4th Ave to Denny Way**	7 / F	- / -	**7.5 / F**	- / -
E Madison St	Alaskan Way S to McGilvra Blvd E	20 / D	20 / E	20.5 / D	20 / E
Boren Ave	23rd Ave S to Denny Way	18 / E	15.5 / D	18 / E	15.5 / D
S Jackson St	Alaskan Way S to MLK Jr. Way S	8.5 / D	11 / E	9 / D	11 / E
23rd Ave	15th Ave S to E Madison St	16.5 / C	17.5 / C	16.5 / C	17.5 / C
MLK Jr. Way S	Rainier Ave S to E Madison St	11.5 / B	12 / C	11.5 / B	12 / C
4th Ave S	E Marginal Way S to S Jackson St	13.5 / C	11.5 / C	13.5 / C	11.5 / C
Airport Way S	S Albro Pl to 4th Ave S	10.5 / B	10 / B	10.5 / B	10 / B
15th Ave S	S Jackson St to Rainier Ave S	15 / C	16.5 / C	15.5 / C	17 / C
E Marginal Way S	S Holden St to S Nevada St	5.5 / C	5 / B	5 / C	5 / B
Swift Ave S	Rainier Ave S to S Columbian Way	14 / C	14 / C	14.5 / C	14.5 / C
Beacon Ave S	Rainier Ave S to 4th Ave S	22 / C	24.5 / C	22.5 / C	25 / C
MLK Jr. Way S	S Boeing Access Rd to Rainier Ave S	16.5 / B	16.5 / B	16.5 / B	16.5 / B
Rainier Ave S	Cornell Ave S to 23rd Ave S	18.5 / A	20.5 / B	18.5 / A	20.5 / B
S Michigan St	E Marginal Way S to Airport Way S	3.5 / C	4.5 / F	3.5 / C	4.5 / F
Ellis Ave S	E Marginal Way S to Airport Way S	3 / D	3.5 / C	3 / D	3.5 / C

Roadway	Extents	Alternative 1 No Action Minutes / Level of Service		Alternative 3 Minutes / Level of Service	
		N/E	S/W	N/E	S/W
14th Ave S	S Director St to 1st Ave S	7.5 / C	7 / C	7.5 / C	7 / C
California Ave SW	Delridge Way SW to SW Admiral Way	17 / B	17.5 / B	17.5 / B	17.5 / B
Fauntleroy Way SW	Delridge Way SW to 35th Ave SW	15.5 / B	18 / C	15.5 / B	17.5 / B
35th Ave SW	SW Roxbury St to Fauntleroy Way SW	8.5 / A	9 / A	8.5 / A	9 / A
Delridge Way SW	SW Roxbury St to W Marginal Way SW	11.5 / A	13.5 / B	11.5 / A	13.5 / B
W Marginal Way SW	S Cloverdale St to Delridge Way SW	7.5 / A	8.5 / A	8 / A	8.5 / A
SW Admiral Way	63rd Ave SW to SW Manning St	6.5 / A	7 / A	6.5 / A	7 / A
West Seattle Bridge	35th Ave SW to 15th Ave S	8.5 / C	10 / D	8.5 / C	10.5 / D
SW Alaska St	Beach Dr SW to 35th Ave SW	7 / C	7.5 / C	7 / C	7.5 / C
Sylvan Way SW	California Ave SW to S Holden St	12 / B	11 / B	12 / B	11 / B
SW Roxbury St	35th Ave SW to 14th Ave S	11.5 / B	10.5 / B	11.5 / B	11 / B

Note: Impacted corridors are shown in bold.
Source: Fehr & Peers, 2023.

Exhibit 3.10-58. Alternative 3 Travel Time Corridor LOS



Source: Fehr & Peers, 2023.

Screenlines

Exhibit 3.10-59 summarizes PM peak hour screenline V/C ratios for 2044 Alternative 1 and 2044 Alternative 3. The volume forecasts in Alternative 3 are approximately five percent higher than the Alternative 1 forecasts across all locations (similar to Alternative 2). Under Alternative 3, seven screenlines are expected to operate with V/C ratios higher than 0.90, compared with six in Alternative 1. The screenlines are:

- Ship Canal—Ballard Bridge
- Ship Canal—Fremont Bridge
- Ship Canal—Aurora Ave N
- Duwamish River—1st Ave S and 16th Ave S
- Ship Canal—University and Montlake Bridges
- East of 9th Avenue
- South City Limit—Martin Luther King Jr Wy to Rainier Ave S (Alternative 3 only)

While Alternative 3 would cause V/C ratios to increase across many screenlines, none are expected to exceed the established thresholds. Therefore, no significant impacts to screenlines are expected under Alternative 3.

Exhibit 3.10-59. Screenline Volume-to-Capacity Ratio—Alternative 3

Screenline	Location	Extents	V/C Threshold	Alternative 1 No Action		Alternative 3	
				N/E	S/W	N/E	S/W
1.11	North City Limit	3rd Ave NW to Aurora Ave N	1.20	0.75	0.65	0.74	0.71
1.12	North City Limit	Meridian Ave N to 15th Ave NE	1.20	0.48	0.39	0.45	0.42
1.13	North City Limit	30th Ave NE to Lake City Way NE	1.20	0.85	0.62	0.83	0.66
2.00	Magnolia	Magnolia Bridge to W Emerson Place	1.00	0.58	0.61	0.62	0.65
3.11	Duwamish River	West Seattle Bridge & Spokane St	1.20	0.72	0.81	0.74	0.85
3.12	Duwamish River	1st Ave S & 16th Ave S	1.20	0.69	0.91	0.70	0.93
4.11	South City Limit	Martin Luther King Jr. Way to Rainier Ave S	1.00	0.83	0.87	0.86	0.92
4.12	South City Limit	Marine Dr SW to Meyers Way S	1.00	0.44	0.49	0.46	0.50
4.13	South City Limit	SR 99 to Airport Way S	1.00	0.63	0.47	0.63	0.47
5.11	Ship Canal	Ballard Bridge	1.20	1.01	0.90	1.06	0.93
5.12	Ship Canal	Fremont Bridge	1.20	1.00	1.03	1.11	1.11
5.13	Ship Canal	Aurora Ave Bridge	1.20	0.96	0.70	0.99	0.72
5.16	Ship Canal	University & Montlake Bridges	1.20	0.74	0.94	0.79	0.99
6.11	South of NW 80th St	Seaview Ave NW to 15th Ave NW	1.00	0.40	0.52	0.43	0.56
6.12	South of N W 80th St	8th Ave NW to Greenwood Ave N	1.00	0.60	0.62	0.63	0.64
6.13	South of NE 80th St	Linden Ave N to 1st Ave NE	1.00	0.51	0.59	0.53	0.62
6.14	South of NE 80th St	5th Ave NE to 15th Ave NE	1.00	0.65	0.69	0.72	0.75
6.15	South of NE 80th St	20th Ave NE to Sand Point Way NE	1.00	0.41	0.39	0.45	0.42
7.11	West of Aurora Ave	Fremont Pl N to N 65th St	1.00	0.64	0.63	0.67	0.65
7.12	West of Aurora Ave	N 80th St to N 145th St	1.00	0.44	0.45	0.47	0.49
8.00	South of Lake Union	Valley St to Denny Way	1.20	0.50	0.35	0.52	0.37

Screenline	Location	Extents	V/C Threshold	Alternative 1 No Action		Alternative 3	
				N/E	S/W	N/E	S/W
9.11	South of Spokane St	Beach Dr SW to W Marginal Way SW	1.00	0.51	0.82	0.53	0.86
9.12	South of Spokane St	E Marginal Way S to Airport Way S	1.00	0.65	0.52	0.65	0.53
9.13	South of Spokane St	15th Ave S to Rainier Ave S	1.00	0.69	0.60	0.70	0.63
10.11	South of S Jackson St	Alaskan Way S to 4th Ave S	1.00	0.81	0.82	0.82	0.84
10.12	South of S Jackson St	12th Ave S to Lakeside Ave S	1.00	0.74	0.74	0.77	0.75
12.12	East of CBD	S Jackson St to Howell St	1.20	0.37	0.44	0.38	0.44
13.11	East of I-5	NE Northgate Way to NE 145th St	1.00	0.70	0.53	0.75	0.55
13.12	East of I-5	NE 65th St to NE 80th St	1.00	0.54	0.50	0.59	0.55
13.3	East of I-5	NE Pacific St to NE Ravenna Blvd	1.00	0.61	0.56	0.66	0.60
A1	North of Seneca St	1st Ave to 6th Ave	N/A	0.63	0.65	0.64	0.65
A2	North of Blanchard	Elliott Ave to Westlake Ave	N/A	0.45	0.37	0.45	0.38
A3	East of 9th Ave	Lenora St to Pike St	N/A	0.46	0.94	0.46	0.93
A4	South of Mercer St	Elliott Ave W to Aurora Ave N	N/A	0.55	0.59	0.57	0.62
A5	East of 5th Ave N	Denny Way to Valley St	N/A	0.41	0.37	0.42	0.40
A6	North of Pine St	Melrose Ave E to 15th Ave E	N/A	0.41	0.42	0.43	0.42
A7	North of James St– E Cherry St	Boren Ave to 14th Ave	N/A	0.56	0.39	0.57	0.40
A8	West of Broadway	Yesler Way to E Roy St	N/A	0.55	0.46	0.57	0.46
A9	South of NE 45th St	7th Ave NE to Montlake Blvd NE	N/A	0.54	0.60	0.57	0.63
A10	East of 15th Ave NE	NE 45th St to NE 52nd St	N/A	0.58	0.53	0.62	0.56
A11	South of Northgate Way (N/NE 110th St)	N Northgate Way to Roosevelt Way NE	N/A	0.46	0.54	0.49	0.57
A12	East of 1st Ave NE	NE 100th St to NE Northgate Way	N/A	0.44	0.51	0.46	0.53

Source: Fehr & Peers, 2023.

Intersection LOS—NE 130th / NE 145th Street Subarea

Under Alternative 3, Sound Transit would provide transit investments but the 130th / NE 145th Street Station Area Plan would not be implemented and the area would grow with citywide place types.

Exhibit 3.10-60 summarizes the LOS and vehicle delay for each study intersection under Alternative 3. The same six intersections that are identified as impacts under Alternative 1 and Alternative 2 would also be impacted under Alternative 3. Delays under Alternative 3 would be longer than under Alternative 2. These impacted intersections, all of which are expected to operate at LOS F, include:

- N 145th Street / Aurora Avenue N
- NE 145th Street / 5th Avenue NE
- NE 145th Street / 15th Avenue NE
- N 130th Street / Aurora Avenue N
- N 130th Street / 1st Avenue NE
- NE 125th Street / 15th Avenue NE

Exhibit 3.10-60. 130th/145th Street Subarea PM Peak Hour Level of Service—Alternative 3

ID	Intersection	Alternative 1 No Action—Level of Service / Delay (seconds)	Alternative 3—Level of Service / Delay (seconds)
1	NE 155th St / 5th Ave NE	B / 19	C / 21
2	**N 145th St / Aurora Ave N**	**E / 68**	**F / 86**
3	N 145th St / Meridian Ave N	B / 18	B / 20
4	N 145th St / 1st Ave NE	B / 20	C / 25
5	NE 145th St / I-5 On & Off Ramps	A / 9	A / 9
6	**NE 145th St / 5th Ave NE**	**E / 69**	**F / 92**
7	**NE 145th St / 15th Ave NE**	**E / 66**	**F / 81**
8	N 137th St / Meridian Ave N / Roosevelt Way N	A / 7	A / 8
9	**N 130th St / Aurora Ave N**	**E / 79**	**F / 96**
10	N 130th St / Meridian Ave N	B / 13	B / 19
11	**N 130th St / 1st Ave NE**	**E / 71**	**F / 107**
12	NE 130th St / I-5 On Ramp	A / 2	A / 2
13	NE 130th St / Roosevelt Way NE / 5th Ave NE	D / 38	D / 47
14	Roosevelt Way NE / NE 125th St / 10th Ave NE	B / 17	B / 19
15	**NE 125th St / 15th Ave NE**	**E / 60**	**F / 81**

Note: Impacted intersections are shown in bold.
Source: Fehr & Peers, 2023.

State Facilities

Exhibit 3.10-61 compares volume to maximum service volume ratios for Alternative 1 and Alternative 3 at each of the state facility study locations. Volumes at all locations are expected to remain similar or increase slightly relative to Alternative 1. The same seven study locations are projected to exceed the WSDOT LOS standard under Alternative 1 would do so under Alternative 3. At four of those locations, the ratio is projected to increase by at least 0.01, constituting a significant impact under Alternative 3:

- I-5 at the Ship Canal Bridge
- SR 99 north of N Northgate Way
- SR 99 at the Aurora Avenue Bridge
- SR 522 south of NE 145th Street

The following study locations are also expected to exceed the WSDOT LOS standard, but would have volumes roughly equivalent to Alternative 1, and therefore are not considered to be significant impacts under Alternative 3:

- I-5 north of NE Northgate Way
- I-5 north of the West Seattle Bridge
- SR 509 at the 1st Avenue S Bridge

Because Alternative 3 would cause volumes to increase on multiple state facilities already expected to exceed WSDOT's LOS D standard under Alternative 1, a significant impact to state facilities is expected under Alternative 3.

Exhibit 3.10-61. State Facilities Level of Service—Alternative 3

Facility	Extents	WSDOT LOS Standard	Alternative 1 No Action—Volume to Maximum Service Volume Ratio	Alternative 3—Volume to Maximum Service Volume Ratio
I-5	North of NE Northgate Way	D	1.03	1.03
I-5	**Ship Canal Bridge**	D	1.32	**1.35**
I-5	North of West Seattle Bridge	D	1.32	1.32
I-5	North of Boeing Access Rd Ramp	D	0.98	0.98
I-90	Mt Baker Tunnel	D	0.97	0.99
SR 99	**North of N Northgate Way**	D	1.08	**1.14**
SR 99	**Aurora Ave Bridge**	D	1.30	**1.35**
SR 99	Tunnel	D	0.65	0.68
SR 99	North of West Seattle Bridge	D	0.76	0.77
SR 99	South of S Cloverdale St	E (mitigated)	0.41	0.42
SR 509	1st Ave S Bridge	D	1.25	1.25

Facility	Extents	WSDOT LOS Standard	Alternative 1 No Action—Volume to Maximum Service Volume Ratio	Alternative 3—Volume to Maximum Service Volume Ratio
SR 519	S Atlantic St West of I-90 Ramps	D	0.83	0.83
SR 520	Lake Washington Bridge	D	0.86	0.87
SR 522	**South of NE 145th St**	D	1.15	**1.18**

Note: Impacted routes are shown in bold.
Source: Fehr & Peers, 2023.

Impacts of Alternative 5: Combined

Mode Share

Exhibit 3.10-62 summarizes the SOV mode share expected under Alternative 5. The SoundCast model predicts that Alternative 5 SOV mode shares will be essentially the same as Alternative 1. Although the Duwamish subarea would exceed its target, the difference in mode share relative to Alternative 1 is expected to be less than the 1% impact threshold. Therefore, no mode share impact is expected under Alternative 5.

Exhibit 3.10-62. PM Peak Hour SOV Mode Share—Alternative 5

Subarea	SOV Target	Alternative 1 No Action SOV Share	Alternative 5 SOV Share
(1) Northwest Seattle	37%	34%	34%
(2) Northeast Seattle	35%	26%	26%
(3) Queen Anne/Magnolia	38%	34%	34%
(4) Downtown/Lake Union	18%	11%	11%
(5) Capitol Hill/Central District	28%	27%	27%
(6) West Seattle	35%	35%	35%
(7) Duwamish	51%	67%	67%
(8) Southeast Seattle	38%	31%	31%

Note: Existing (2017-2019) mode share data from the PSRC household travel survey have substantial margins of error. See Exhibit 3.10-10 for margins of error by subarea.
Source: Fehr & Peers, 2023.

Exhibit 3.10-63 compares the number of daily person trips expected by mode under 2044 Alternative 1 and Alternative 5. Citywide, Alternative 5 is expected to result in approximately 343,000 additional person trips compared to Alternative 1, an increase of 8%. This is the highest growth among the action alternatives as Alternative 5 assumes the highest growth in residential and employment growth. The increase is spread fairly evenly across modes. In other

words, while Alternative 5 would result in more trips, the underlying travel behavior and mode shares expected are very similar between the alternatives.

Exhibit 3.10-63. Daily Person Trips by Mode—Alternative 5

Mode	Alternative 1 No Action	Alternative 5
SOV	1,783,000	1,908,000
HOV	1,440,000	1,537,000
Transit	1,138,000	1,178,000
Walk	1,378,000	1,453,000
Bike	99,000	105,000
Total	**5,838,000**	**6,181,000**

Source: Fehr & Peers, 2023.Transit

Transit

Exhibit 3.10-64 summarizes the projected load factors on the busiest segment of each route in the peak direction of travel with impacts shown in bold. As with Alternatives 2 and 3, the following study routes would be impacted under Alternative 5:

- RapidRide E Line—Downtown to Aurora Village
- RapidRide J Line—Downtown to University District
- RapidRide R Line—Downtown to Rainier Valley
- RapidRide Fremont

Exhibit 3.10-64. PM Peak Hour Average Passenger Load Factors—Alternative 5

	Maximum Passenger Load Factor in Peak Direction	
Transit Route	Alternative 1 No Action	Alternative 5
Link light rail—1 Line	1.08	1.06
Link light rail—2 Line	1.29	1.32
Link light rail—3 Line	1.29	1.21
RapidRide C Line—Westwood Village to Alaska Junction	0.71	0.90
RapidRide E Line—Downtown to Aurora Village	1.89	**2.01**
RapidRide G Line—Downtown to Madison Valley	0.35	0.39
RapidRide H Line—Alki to Burien	0.77	0.84
RapidRide J Line—Downtown to University District	1.97	**2.66**
RapidRide R Line—Downtown to Rainier Valley	1.07	**1.19**
RapidRide 23rd	0.47	0.48

Transit Route	Maximum Passenger Load Factor in Peak Direction	
	Alternative 1 No Action	Alternative 5
RapidRide 65th (replaces Route 62)	0.82	0.97
RapidRide Beacon	0.50	0.59
RapidRide Denny	2.83	2.53
RapidRide Fremont (replaces Route 40)	1.49	**1.66**
RapidRide Green Lake	0.47	0.41
RapidRide Market	0.76	0.78

Note: Impacted routes are shown in bold.
Source: Fehr & Peers, 2023.

Roadway Users

Alternative 5 assumes the most extensive changes to Seattle's land use patterns. Accordingly, Alternative 5 is projected to have the highest increase in vehicle volumes, compared to Alternative 1. Results are summarized in the following sections.

VMT / VHT / Average Trip Speed

Exhibit 3.10-65 summarizes VMT, VHT and average trip speed under Alternative 5 relative to Alternative 1. Among the action alternatives, Alternative 5 would result in the highest total VMT (3.1% over No Action) and VHT (4.6% over No Action) because it assumes a higher level of growth. Consequently, it also assumes the lowest average trip speed at just under 28 mph. However, despite the increase in VMT, the VMT per capita would be the lowest among the action alternatives at 13.4 VMT per Seattle resident and employee. The VHT per capita under Alternative 5 would essentially flat relative to the other 2044 alternatives.

Exhibit 3.10-65. Daily VMT, VHT, and Average Trip Speed—Alternative 5

Metric	Alternative 1 No Action		Alternative 5	
	Total	Per Capita	Total	Per Capita
VMT	24,357,100	13.7	25,122,100	13.4
VHT	865,800	0.5	905,700	0.5
Average Trip Speed	28.1	—	27.7	—

Source: Fehr & Peers, 2023.

Because the VMT per capita under Alternative 5 would not exceed the level under Alternative 1, no impact to VMT per capita is identified under Alternative 5.

Travel Time

Exhibit 3.10-66 summarizes PM peak hour corridor travel times under Alternative 5 compared to Alternative 1.[82] **Exhibit 3.10-67** displays the LOS values along associated corridors on the map. Because Alternative 5 includes higher citywide growth levels than the other action alternatives, it is expected to result in higher travel time increases as well. Corridor travel times are expected to increase by up to one minute compared to Alternative 1 and no corridors are expected to see decreases. Under Alternative 1, 77 corridors are expected to operate at LOS A-C, 15 at LOS D, 8 operating at LOS E, and 4 operating at LOS F. Under Alternative 5, 72 corridors are expected to operate at LOS A-C, 20 at LOS D, 8 operating at LOS E, and 4 operating at LOS F.

Alternative 1 and Alternative 5 are expected to result in the same four corridors operating at LOS F, one of which would have an increase in excess of the 5% threshold of significance. Therefore, a travel time impact is expected under Alternative 5 on one corridor (shown in bold in **Exhibit 3.10-66**):

- Olive Way between 4th Avenue and Denny Way

[82] For corridors with peak directional patterns, the AM peak hour would typically reflect similar conditions in the opposite direction from those shown for the PM peak hour.

Exhibit 3.10-66 PM Peak Hour Travel Time Corridor Level of Service—Alternative 5

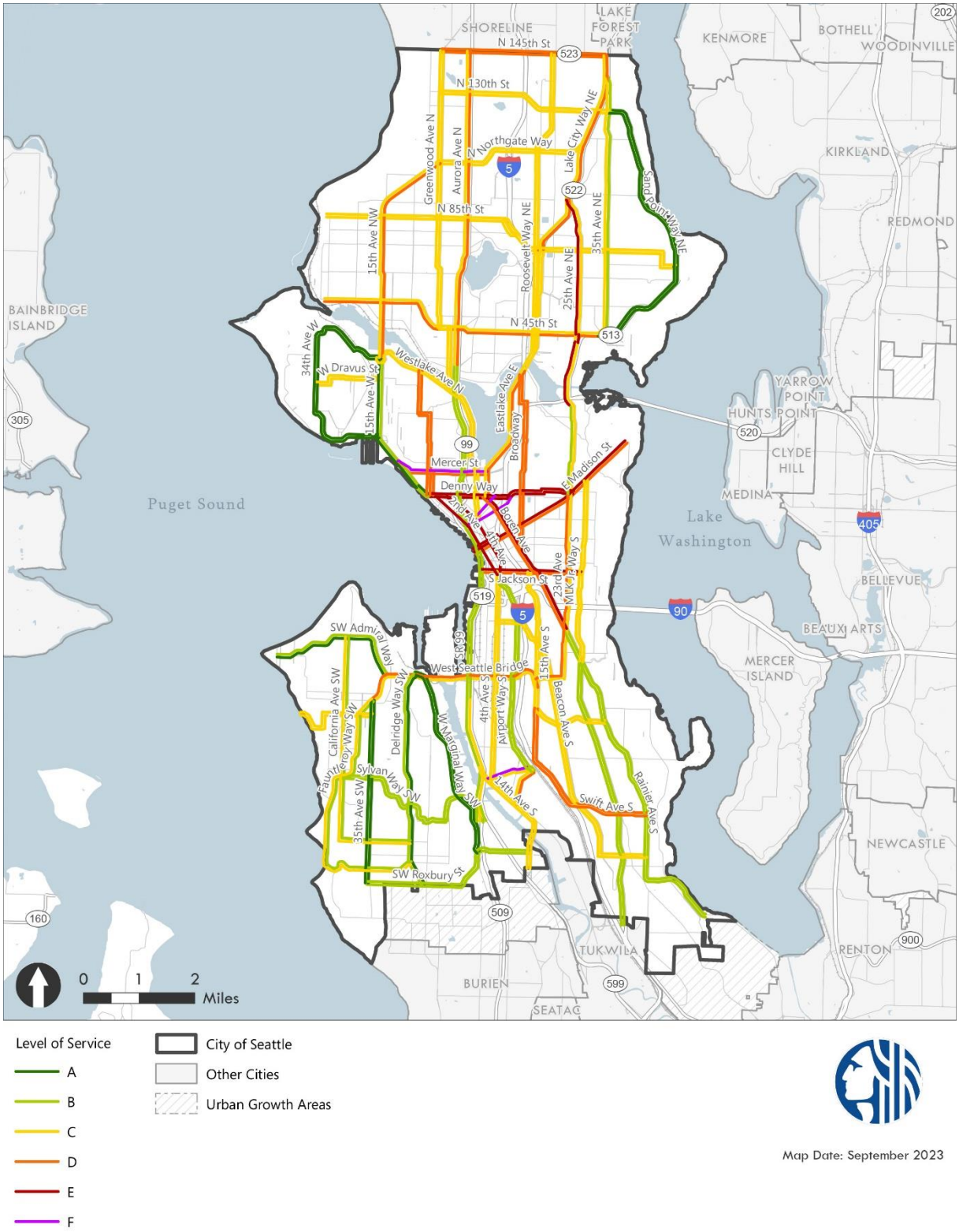
		Alternative 1 No Action Minutes / Level of Service		Alternative 5 Minutes / Level of Service	
Roadway	Extents	N/E	S/W	N/E	S/W
N 145th St	Greenwood Ave N to Lake City Way NE	10.5 / D	9.5 / C	10.5 / D	10 / D
N 130th St	Greenwood Ave N to 35th Ave NE	11.5 / C	12 / C	12 / C	12.5 / C
N Northgate Way	Greenwood Ave N to Lake City Way NE	10.5 / C	11 / C	11 / C	11 / C
N 85th St	32nd Ave NW to Sand Point Way NE	25 / C	24.5 / C	25 / C	25 / C
N 45th St	32nd Ave NW to Union Bay Pl NE	24.5 / C	23.5 / C	25 / D	24.5 / C
15th Ave NW	W Emerson St to N 105th St	17 / D	11.5 / B	17.5 / D	12 / C
Greenwood Ave N	Nickerson St to N 145th St	27 / C	25 / C	27.5 / C	26 / C
Aurora Ave N	N 38th St to N 145th St	19 / D	16.5 / C	19 / D	17 / C
Roosevelt Way NE	Fuhrman Ave E to N 145th St	23 / C	21.5 / C	23 / C	22.5 / C
Lake City Way NE	NE 75th St to N 145th St	14 / D	11 / C	14 / D	11 / C
25th Ave NE	E Roanoke St to Lake City Way NE	15 / C	22.5 / E	15.5 / C	23.5 / E
35th Ave NE	Union Bay Pl NE to Lake City Way NE	16.5 / B	17.5 / C	16.5 / B	18.5 / C
Sand Point Way NE	Union Bay Pl NE to 35th Ave NE	12.5 / A	12 / A	12.5 / A	12.5 / A
34th Ave W	15th Ave W to15th Ave W	11.5 / A	12 / A	11.5 / A	12 / A
W Dravus St	34th Ave W to15th Ave W	5 / C	4.5 / C	5 / C	4.5 / C
15th Ave W	Queen Anne Ave N to W Emerson St	8.5 / B	8 / A	9 / B	8 / A
Queen Anne Ave N	Denny Way to Nickerson St	12.5 / D	12 / D	12.5 / D	12.5 / D
SR 99	S Nevada St to N 38th St	11.5 / B	12.5 / B	12 / B	12.5 / B
Westlake Ave N	Stewart St to W Emerson St	16 / C	18 / C	16.5 / C	18.5 / C
Eastlake Ave E	Denny Way to Fuhrman Ave E	12 / D	11.5 / C	12 / D	11.5 / C
Broadway	Boren Ave to Eastlake Ave E	18 / D	18.5 / D	19 / D	19 / D

Roadway	Extents	Alternative 1 No Action Minutes / Level of Service		Alternative 5 Minutes / Level of Service	
		N/E	S/W	N/E	S/W
23rd Ave	E Madison St to E Roanoke St	6 / C	5 / B	6 / C	5.5 / B
Mercer St	Elliott Ave W to Fairview Ave N	8 / D	14 / F	8 / D	14 / F
Denny Way	Queen Anne Ave N to E Madison St	17.5 / E	16.5 / E	17.5 / E	16.5 / E
2nd Ave	4th Ave S to Denny Way	- / -	12 / E	- / -	12 / E
4th Ave	S Jackson St to Denny Way	10 / E	- / -	10 / E	- / -
Stewart St	1st Ave to Denny Way	- / -	6.5 / F	- / -	6.5 / F
Olive Way	**4th Ave to Denny Way**	7 / F	- / -	**7.5 / F**	- / -
E Madison St	Alaskan Way S to McGilvra Blvd E	20 / D	20 / E	21 / D	20.5 / E
Boren Ave	23rd Ave S to Denny Way	18 / E	15.5 / D	18.5 / E	16 / D
S Jackson St	Alaskan Way S to MLK Jr. Way S	8.5 / D	11 / E	9 / D	11 / E
23rd Ave	15th Ave S to E Madison St	16.5 / C	17.5 / C	17 / C	18 / D
MLK Jr. Way S	Rainier Ave S to E Madison St	11.5 / B	12 / C	12 / C	12 / C
4th Ave S	E Marginal Way S to S Jackson St	13.5 / C	11.5 / C	13.5 / C	11.5 / C
Airport Way S	S Albro Pl to 4th Ave S	10.5 / B	10 / B	10.5 / B	10 / B
15th Ave S	S Jackson St to Rainier Ave S	15 / C	16.5 / C	15.5 / C	17 / C
E Marginal Way S	S Holden St to S Nevada St	5.5 / C	5 / B	5.5 / C	5 / B
Swift Ave S	Rainier Ave S to S Columbian Way	14 / C	14 / C	15 / D	15 / D
Beacon Ave S	Rainier Ave S to 4th Ave S	22 / C	24.5 / C	22.5 / C	25.5 / C
MLK Jr. Way S	S Boeing Access Rd to Rainier Ave S	16.5 / B	16.5 / B	17 / B	16.5 / B
Rainier Ave S	Cornell Ave S to 23rd Ave S	18.5 / A	20.5 / B	19 / B	21 / B
S Michigan St	E Marginal Way S to Airport Way S	3.5 / C	4.5 / F	3.5 / C	4.5 / F
Ellis Ave S	E Marginal Way S to Airport Way S	3 / D	3.5 / C	3 / D	3.5 / C

Roadway	Extents	Alternative 1 No Action Minutes / Level of Service		Alternative 5 Minutes / Level of Service	
		N/E	S/W	N/E	S/W
14th Ave S	S Director St to 1st Ave S	7.5 / C	7 / C	7.5 / C	7 / C
California Ave SW	Delridge Way SW to SW Admiral Way	17 / B	17.5 / B	17.5 / B	18 / C
Fauntleroy Way SW	Delridge Way SW to 35th Ave SW	15.5 / B	18 / C	16 / B	18 / C
35th Ave SW	SW Roxbury St to Fauntleroy Way SW	8.5 / A	9 / A	9 / A	9.5 / A
Delridge Way SW	SW Roxbury St to W Marginal Way SW	11.5 / A	13.5 / B	11.5 / A	13.5 / B
W Marginal Way SW	S Cloverdale St to Delridge Way SW	7.5 / A	8.5 / A	8 / A	8.5 / A
SW Admiral Way	63rd Ave SW to SW Manning St	6.5 / A	7 / A	6.5 / A	7.5 / B
West Seattle Bridge	35th Ave SW to 15th Ave S	8.5 / C	10 / D	9 / C	11 / D
SW Alaska St	Beach Dr SW to 35th Ave SW	7 / C	7.5 / C	7 / C	7.5 / C
Sylvan Way SW	California Ave SW to S Holden St	12 / B	11 / B	12 / B	11.5 / B
SW Roxbury St	35th Ave SW to 14th Ave S	11.5 / B	10.5 / B	11.5 / B	11.5 / B

Note: Impacted corridors are shown in bold.
Source: Fehr & Peers, 2023.

Exhibit 3.10-67. Alternative 5 PM Peak Hour Travel Time Corridor LOS



Source: Fehr & Peers, 2023.

Screenlines

Exhibit 3.10-68 summarizes PM peak hour screenline V/C ratios for 2044 Alternative 1 and 2044 Alternative 5. The volume forecasts in Alternative 5 are approximately seven percent higher than the Alternative 1 forecasts across all locations. Among the action alternatives, overall volumes would be highest under Alternative 5. There are seven screenlines with V/C ratios higher than 0.90, compared with six in Alternative 1. The screenlines are:

- Ship Canal—Ballard Bridge
- Ship Canal—Fremont Bridge
- Ship Canal—Aurora Ave N
- Duwamish River—1st Ave S and 16th Ave S
- Ship Canal—University and Montlake Bridges
- East of 9th Avenue
- South City Limit—M L King Jr Wy to Rainier Ave S (Alternative 5 only)

While Alternative 5 would cause V/C ratios to increase across many screenlines, none are expected to exceed the established thresholds. Therefore, no significant impacts to screenlines are expected under Alternative 5.

Exhibit 3.10-68. PM Peak Hour Screenline Volume-to-Capacity Ratio—Alternative 5

Screenline	Location	Extents	V/C Threshold	Alternative 1 No Action		Alternative 5	
				N/E	S/W	N/E	S/W
1.11	North City Limit	3rd Ave NW to Aurora Ave N	1.20	0.75	0.65	0.75	0.72
1.12	North City Limit	Meridian Ave N to 15th Ave NE	1.20	0.48	0.39	0.46	0.47
1.13	North City Limit	30th Ave NE to Lake City Way NE	1.20	0.85	0.62	0.83	0.67
2.00	Magnolia	Magnolia Bridge to W Emerson Place	1.00	0.58	0.61	0.61	0.68
3.11	Duwamish River	West Seattle Bridge & Spokane St	1.20	0.72	0.81	0.74	0.88
3.12	Duwamish River	1st Ave S & 16th Ave S	1.20	0.69	0.91	0.71	0.96
4.11	South City Limit	Martin Luther King Jr. Way to Rainier Ave S	1.00	0.83	0.87	0.92	0.92
4.12	South City Limit	Marine Dr SW to Meyers Way S	1.00	0.44	0.49	0.49	0.51
4.13	South City Limit	SR 99 to Airport Way S	1.00	0.63	0.47	0.68	0.47
5.11	Ship Canal	Ballard Bridge	1.20	1.01	0.90	1.07	0.96
5.12	Ship Canal	Fremont Bridge	1.20	1.00	1.03	1.12	1.13
5.13	Ship Canal	Aurora Ave Bridge	1.20	0.96	0.70	1.01	0.74
5.16	Ship Canal	University & Montlake Bridges	1.20	0.74	0.94	0.82	1.03
6.11	South of NW 80th St	Seaview Ave NW to 15th Ave NW	1.00	0.40	0.52	0.42	0.54
6.12	South of N W 80th St	8th Ave NW to Greenwood Ave N	1.00	0.60	0.62	0.62	0.66
6.13	South of NE 80th St	Linden Ave N to 1st Ave NE	1.00	0.51	0.59	0.53	0.62
6.14	South of NE 80th St	5th Ave NE to 15th Ave NE	1.00	0.65	0.69	0.73	0.76
6.15	South of NE 80th St	20th Ave NE to Sand Point Way NE	1.00	0.41	0.39	0.47	0.45
7.11	West of Aurora Ave	Fremont Pl N to N 65th St	1.00	0.64	0.63	0.68	0.68
7.12	West of Aurora Ave	N 80th St to N 145th St	1.00	0.44	0.45	0.48	0.50
8.00	South of Lake Union	Valley St to Denny Way	1.20	0.50	0.35	0.53	0.39

Screenline	Location	Extents	V/C Threshold	Alternative 1 No Action		Alternative 5	
				N/E	S/W	N/E	S/W
9.11	South of Spokane St	Beach Dr SW to W Marginal Way SW	1.00	0.51	0.82	0.54	0.88
9.12	South of Spokane St	E Marginal Way S to Airport Way S	1.00	0.65	0.52	0.67	0.54
9.13	South of Spokane St	15th Ave S to Rainier Ave S	1.00	0.69	0.60	0.73	0.67
10.11	South of S Jackson St	Alaskan Way S to 4th Ave S	1.00	0.81	0.82	0.86	0.87
10.12	South of S Jackson St	12th Ave S to Lakeside Ave S	1.00	0.74	0.74	0.81	0.79
12.12	East of CBD	S Jackson St to Howell St	1.20	0.37	0.44	0.39	0.45
13.11	East of I-5	NE Northgate Way to NE 145th St	1.00	0.70	0.53	0.76	0.55
13.12	East of I-5	NE 65th St to NE 80th St	1.00	0.54	0.50	0.61	0.57
13.3	East of I-5	NE Pacific St to NE Ravenna Blvd	1.00	0.61	0.56	0.69	0.60
A1	North of Seneca St	1st Ave to 6th Ave	N/A	0.63	0.65	0.67	0.68
A2	North of Blanchard	Elliott Ave to Westlake Ave	N/A	0.45	0.37	0.48	0.39
A3	East of 9th Ave	Lenora St to Pike St	N/A	0.46	0.94	0.46	0.95
A4	South of Mercer St	Elliott Ave W to Aurora Ave N	N/A	0.55	0.59	0.59	0.62
A5	East of 5th Ave N	Denny Way to Valley St	N/A	0.41	0.37	0.42	0.41
A6	North of Pine St	Melrose Ave E to 15th Ave E	N/A	0.41	0.42	0.43	0.44
A7	North of James St– E Cherry St	Boren Ave to 14th Ave	N/A	0.56	0.39	0.58	0.41
A8	West of Broadway	Yesler Way to E Roy St	N/A	0.55	0.46	0.59	0.48
A9	South of NE 45th St	7th Ave NE to Montlake Blvd NE	N/A	0.54	0.60	0.59	0.64
A10	East of 15th Ave NE	NE 45th St to NE 52nd St	N/A	0.58	0.53	0.64	0.57
A11	South of Northgate Way (N/NE 110th St)	N Northgate Way to Roosevelt Way NE	N/A	0.46	0.54	0.49	0.58
A12	East of 1st Ave NE	NE 100th St to NE Northgate Way	N/A	0.44	0.51	0.47	0.52

Source: Fehr & Peers, 2023.

Intersection LOS—NE 130th / NE 145th Street Subarea

Exhibit 3.10-69 summarizes the LOS and vehicle delay for each study intersection under Alternative 5. Delays would generally be longest under Alternative 5. Under Alternative 5, impacted intersections would include the six intersections identified under the other alternatives as well as the intersection of NE 130th Street/Roosevelt Way NE/5th Avenue NE which would fall from LOS D to LOS E. Impacted intersections include:

- N 145th Street / Aurora Avenue N
- NE 145th Street / 5th Avenue NE
- NE 145th Street / 15th Avenue NE
- N 130th Street / Aurora Avenue N
- N 130th Street / 1st Avenue NE
- NE 130th Street/Roosevelt Way NE/5th Avenue NE
- NE 125th Street / 15th Avenue NE

Exhibit 3.10-69. 130th/145th Street Subarea PM Peak Hour Level of Service—Alternative 5

ID	Intersection	Alternative 1 No Action—Level of Service / Delay (seconds)	Alternative 5—Level of Service / Delay (seconds)
1	NE 155th St / 5th Ave NE	B / 19	B / 20
2	**N 145th St / Aurora Ave N**	**E / 68**	**F / 81**
3	N 145th St / Meridian Ave N	B / 18	C / 21
4	N 145th St / 1st Ave NE	B / 20	C / 27
5	NE 145th St / I-5 On & Off Ramps	A / 9	A / 9
6	**NE 145th St / 5th Ave NE**	**E / 69**	**F / 98**
7	**NE 145th St / 15th Ave NE**	**E / 66**	**F / 89**
8	N 137th St / Meridian Ave N / Roosevelt Way N	A / 7	A / 8
9	**N 130th St / Aurora Ave N**	**E / 79**	**F / 97**
10	N 130th St / Meridian Ave N	B / 13	C / 31
11	**N 130th St / 1st Ave NE**	**E / 71**	**F / 121**
12	NE 130th St / I-5 On Ramp	A / 2	A / 2
13	**NE 130th St / Roosevelt Way NE / 5th Ave NE**	D / 38	**E / 56**
14	Roosevelt Way NE / NE 125th St / 10th Ave NE	B / 17	C / 21
15	**NE 125th St / 15th Ave NE**	**E / 60**	**F / 83**

Note: Impacted intersections are shown in bold.
Source: Fehr & Peers, 2023.

State Facilities

Exhibit 3.10-70 shows a comparison of volume to maximum service volume ratios for Alternative 1 and Alternative 5 at each of the identified state facility study locations. Volumes at all locations are expected to remain similar or increase relative to Alternative 1 and to the other action alternatives as the assumed growth under Alternative 5 is highest among the alternatives. Again, the same seven study locations projected to exceed the WSDOT LOS standard under Alternative 1 would do so under Alternative 5. At six of those locations, the ratio is projected to increase by at least 0.01, constituting a significant impact under Alternative 5:

- I-5 at the Ship Canal Bridge
- I-5 north of the West Seattle Bridge
- SR 99 north of N Northgate Way
- SR 99 at the Aurora Avenue Bridge
- SR 509 at the 1st Avenue S Bridge
- SR 522 south of NE 145th Street

One study location is expected to exceed the WSDOT LOS standard, but would have volumes roughly equivalent to Alternative 1, and therefore is not considered to be a significant impact under Alternative 5:

- I-5 north of NE Northgate Way

Because Alternative 5 would cause volumes to increase on multiple state facilities already expected to exceed WSDOT's LOS D standard under Alternative 1, a significant impact to state facilities is expected under Alternative 5.

Exhibit 3.10-70. PM Peak Hour State Facilities Level of Service—Alternative 5

Facility	Extents	WSDOT LOS Standard	Alternative 1 No Action—Volume to Maximum Service Volume Ratio	Alternative 5—Volume to Maximum Service Volume Ratio
I-5	North of NE Northgate Way	D	1.03	1.03
I-5	**Ship Canal Bridge**	D	1.32	**1.35**
I-5	**North of West Seattle Bridge**	D	1.32	**1.33**
I-5	North of Boeing Access Rd Ramp	D	0.98	0.99
I-90	Mt Baker Tunnel	D	0.97	0.99
SR 99	**North of N Northgate Way**	D	1.08	**1.14**
SR 99	**Aurora Ave Bridge**	D	1.30	**1.37**
SR 99	Tunnel	D	0.65	0.68
SR 99	North of West Seattle Bridge	D	0.76	0.78
SR 99	South of S Cloverdale St	E (mitigated)	0.41	0.44
SR 509	**1st Ave S Bridge**	D	1.25	**1.29**

Facility	Extents	WSDOT LOS Standard	Alternative 1 No Action—Volume to Maximum Service Volume Ratio	Alternative 5—Volume to Maximum Service Volume Ratio
SR 519	S Atlantic St West of I-90 Ramps	D	0.83	0.86
SR 520	Lake Washington Bridge	D	0.86	0.88
SR 522	**South of NE 145th St**	D	1.15	**1.21**

Note: Impacted locations are shown in bold.
Source: Fehr & Peers, 2023.

Sensitivity Test

As noted earlier, the regionwide transit forecasts projected by PSRC's activity-based model are higher than the previous trip-based regional model. A sensitivity test was performed to understand how the impacts to certain transit and vehicle metrics might change if the transit forecasts were more closely aligned with the previous iteration of the regional model. This test assumes that transit trips would at most double from existing conditions to future conditions. For King County and regionwide, this would reduce transit trips in Alternative 5 (the highest growth action alternative) by 30% and if all those trips were to shift to vehicular modes, automobile trips would increase by 3 to 4%. For the sensitivity test, the transit trips were reduced by 30% for Alternatives 1 and 5 and the SOV and HOV trips were increased proportionally to maintain the same total number of trips. For metrics that do not have a direct relationship with the number of transit trips, the number of vehicle trips was increased by 5%.

Exhibit 3.10-71 summarizes the SOV mode share expected under the adjusted Alternative 1 and Alternative 5. The SoundCast model predicts that Alternative 5 SOV mode shares will be essentially the same as Alternative 1. Although the Duwamish subarea and West Seattle subarea would exceed their targets, the difference in mode share relative to adjusted Alternative 1 is expected to be less than the 1% impact threshold. Therefore, no SOV mode share impact is expected under the adjusted Alternative 5.

Exhibit 3.10-71. PM Peak Hour SOV Mode Share—Alternative 5 Sensitivity Test

Subarea	SOV Target	Alternative 1 No Action—Adjusted SOV Share	Alternative 5—Adjusted SOV Share
(1) Northwest Seattle	37%	35%	35%
(2) Northeast Seattle	35%	28%	28%
(3) Queen Anne/Magnolia	38%	35%	35%
(4) Downtown/Lake Union	18%	12%	12%
(5) Capitol Hill/Central District	28%	27%	28%
(6) West Seattle	35%	37%	36%
(7) Duwamish	51%	68%	68%

Subarea	SOV Target	Alternative 1 No Action—Adjusted SOV Share	Alternative 5—Adjusted SOV Share
(8) Southeast Seattle	38%	32%	32%

Source: Fehr & Peers, 2023.

Exhibit 3.10-72 shows the trips by mode for the City of Seattle for Alternative 1 and Alternative 5 assuming a 30% reduction in transit trips for each scenario.

Exhibit 3.10-72. Daily Person Trips by Mode—Alternative 5 Sensitivity Test

Mode	Alternative 1—SoundCast	Alternative 1—Adjusted	Alternative 5—SoundCast	Alternative 5—Adjusted
SOV	1,783,000	1,972,000	1,908,000	2,104,000
HOV	1,440,000	1,592,000	1,537,000	1,694,000
Transit	1,138,000	797,000	1,178,000	825,000
Walk	1,378,000	1,378,000	1,453,000	1,453,000
Bike	99,000	99,000	105,000	105,000
Total	**5,838,000**	**5,838,000**	**6,181,000**	**6,181,000**

Source: Fehr & Peers, 2023.

Assuming a 30% reduction in transit loading, **Exhibit 3.10-73** summarizes the projected load factors on the busiest segment of each route in the peak direction of travel. Under the SoundCast results, Alternative 1 had eight impacted routes; with a reduction in ridership, the number of impacted routes would be four. Notably, the light rail lines would not be projected to be over capacity. Compared to Alternative 1, the Alternative 5 adjusted results indicate three routes would be impacted, slightly fewer than is projected using the unadjusted SoundCast results.

Exhibit 3.10-73. PM Peak Hour Average Passenger Load Factors—Sensitivity Test

Transit Route	Maximum Passenger Load Factor in Peak Direction	
	Alternative 1 No Action—Adjusted	Alternative 5—Adjusted
Link light rail—1 Line	0.76	0.74
Link light rail—2 Line	0.90	0.93
Link light rail—3 Line	0.91	0.85
RapidRide C Line—Westwood Village to Alaska Junction	0.50	0.63
RapidRide E Line—Downtown to Aurora Village	**1.33**	**1.40**
RapidRide G Line—Downtown to Madison Valley	0.24	0.27

Transit Route	Maximum Passenger Load Factor in Peak Direction	
	Alternative 1 No Action—Adjusted	Alternative 5—Adjusted
RapidRide H Line—Alki to Burien	0.54	0.59
RapidRide J Line—Downtown to University District	**1.38**	**1.87**
RapidRide R Line—Downtown to Rainier Valley	0.75	0.83
RapidRide 23rd	0.33	0.34
RapidRide 65th (replaces Route 62)	0.57	0.68
RapidRide Beacon	0.35	0.41
RapidRide Denny	**1.98**	1.77
RapidRide Fremont (replaces Route 40)	**1.05**	**1.17**
RapidRide Green Lake	0.33	0.29
RapidRide Market	0.53	0.54

Source: Fehr & Peers, 2023.

Exhibit 3.10-74 summarizes VMT, VHT and average trip speed under the revised alternatives assuming a 5% increase in vehicle trips. Because the VMT per capita under Alternative 5 would not exceed the level under Alternative 1, no impact to VMT per capita is identified under Alternative 5.

Exhibit 3.10-74. Daily VMT, VHT, and Average Trip Speed—Alternative 5 Sensitivity Test

Metric	Alternative 1 No Action		Alternative 5	
	Total	Per Capita	Total	Per Capita
VMT	25,575,000	14.4	26,378,200	14.1
VHT	909,100	0.5	951100	0.5
Average Trip Speed	28.1	-	27.7	-

Source: Fehr & Peers, 2023.

Exhibit 3.10-75 summarizes PM peak hour screenline V/C ratios for adjusted Alternative 1 and Alternative 5, assuming a 5% increase in volumes. While the V/C ratios would increase, some to very near the thresholds, all screenlines would still be expected to fall within their threshold under both Alternative 1 and Alternative 5. In other words, the comparative impact conclusion would remain the same between the unadjusted and adjusted results.

Exhibit 3.10-75. PM Peak Hour Screenline Volume-to-Capacity Ratio—Alternative 5 Sensitivity Test

Screenline	Location	Extents	V/C Threshold	Alternative 1 No Action		Alternative 5	
				N/E	S/W	N/E	S/W
1.11	North City Limit	3rd Ave NW to Aurora Ave N	1.20	0.79	0.68	0.79	0.76
1.12	North City Limit	Meridian Ave N to 15th Ave NE	1.20	0.50	0.41	0.48	0.49
1.13	North City Limit	30th Ave NE to Lake City Way NE	1.20	0.89	0.65	0.87	0.70
2.00	Magnolia	Magnolia Bridge to W Emerson Place	1.00	0.61	0.64	0.64	0.71
3.11	Duwamish River	West Seattle Bridge & Spokane St	1.20	0.76	0.85	0.78	0.92
3.12	Duwamish River	1st Ave S & 16th Ave S	1.20	0.72	0.96	0.75	1.01
4.11	South City Limit	Martin Luther King Jr. Way to Rainier Ave S	1.00	0.87	0.91	0.97	0.97
4.12	South City Limit	Marine Dr SW to Meyers Way S	1.00	0.46	0.51	0.51	0.54
4.13	South City Limit	SR 99 to Airport Way S	1.00	0.66	0.49	0.71	0.49
5.11	Ship Canal	Ballard Bridge	1.20	1.06	0.95	1.12	1.01
5.12	Ship Canal	Fremont Bridge	1.20	1.05	1.08	1.18	1.19
5.13	Ship Canal	Aurora Bridge	1.20	1.01	0.74	1.06	0.78
5.16	Ship Canal	University & Montlake Bridges	1.20	0.78	0.99	0.86	1.08
6.11	South of NW 80th St	Seaview Ave NW to 15th Ave NW	1.00	0.42	0.55	0.44	0.57
6.12	South of N W 80th St	8th Ave NW to Greenwood Ave N	1.00	0.63	0.65	0.65	0.69
6.13	South of NE 80th St	Linden Ave N to 1st Ave NE	1.00	0.54	0.62	0.56	0.65
6.14	South of NE 80th St	5th Ave NE to 15th Ave NE	1.00	0.68	0.72	0.77	0.80
6.15	South of NE 80th St	20th Ave NE to Sand Point Way NE	1.00	0.43	0.41	0.49	0.47
7.11	West of Aurora Ave	Fremont Pl N to N 65th St	1.00	0.67	0.66	0.71	0.71
7.12	West of Aurora Ave	N 80th St to N 145th St	1.00	0.46	0.47	0.50	0.53
8.00	South of Lake Union	Valley St to Denny Way	1.20	0.53	0.37	0.56	0.41
9.11	South of Spokane St	Beach Dr SW to W Marginal Way SW	1.00	0.54	0.86	0.57	0.92

Screenline	Location	Extents	V/C Threshold	Alternative 1 No Action		Alternative 5	
				N/E	S/W	N/E	S/W
9.12	South of Spokane St	E Marginal Way S to Airport Way S	1.00	0.68	0.55	0.70	0.57
9.13	South of Spokane St	15th Ave S to Rainier Ave S	1.00	0.72	0.63	0.77	0.70
10.11	South of S Jackson St	Alaskan Way S to 4th Ave S	1.00	0.85	0.86	0.90	0.91
10.12	South of S Jackson St	12th Ave S to Lakeside Ave S	1.00	0.78	0.78	0.85	0.83
12.12	East of CBD	S Jackson St to Howell St	1.20	0.39	0.46	0.41	0.47
13.11	East of I-5	NE Northgate Way to NE 145th St	1.00	0.74	0.56	0.80	0.58
13.12	East of I-5	NE 65th St to NE 80th St	1.00	0.57	0.53	0.64	0.60
13.3	East of I-5	NE Pacific St to NE Ravenna Blvd	1.00	0.64	0.59	0.72	0.63
A1	North of Seneca St	1st Ave to 6th Ave	N/A	0.66	0.68	0.70	0.71
A2	North of Blanchard	Elliott Ave to Westlake Ave	N/A	0.47	0.39	0.50	0.41
A3	East of 9th Ave	Lenora St to Pike St	N/A	0.48	0.99	0.48	1.00
A4	South of Mercer St	Elliott Ave W to Aurora Ave N	N/A	0.58	0.62	0.62	0.65
A5	East of 5th Ave N	Denny Way to Valley St	N/A	0.43	0.39	0.44	0.43
A6	North of Pine St	Melrose Ave E to 15th Ave E	N/A	0.43	0.44	0.45	0.46
A7	North of James St– E Cherry St	Boren Ave to 14th Ave	N/A	0.59	0.41	0.61	0.43
A8	West of Broadway	Yesler Way to E Roy St	N/A	0.58	0.48	0.62	0.50
A9	South of NE 45th St	7th Ave NE to Montlake Blvd NE	N/A	0.57	0.63	0.62	0.67
A10	East of 15th Ave NE	NE 45th St to NE 52nd St	N/A	0.61	0.56	0.67	0.60
A11	South of Northgate Way (N/NE 110th)St)	N Northgate Way to Roosevelt Way NE	N/A	0.48	0.57	0.51	0.61
A12	East of 1st Ave NE	NE 100th St to NE Northgate Way	N/A	0.46	0.54	0.49	0.55

Source: Fehr & Peers, 2023.

Exhibit 3.10-76 shows a comparison of volume to maximum service volume ratios for adjusted Alternative 1 and Alternative 5 at each of the identified state facility study locations. Nine study locations are projected to exceed the WSDOT LOS standard under adjusted Alternative 1 and would also do so under adjusted Alternative 5. At all of these locations, the ratio is projected to increase by at least 0.01, constituting a significant impact under adjusted Alternative 5. This is three more impacts than were identified under the unadjusted Alternative 5.

Exhibit 3.10-76. PM Peak Hour State Facilities Level of Service—Alternative 5 Sensitivity Test

Facility	Extents	WSDOT LOS Standard	Alternative 1 No Action—Volume to Maximum Service Volume Ratio	Alternative 5—Volume to Maximum Service Volume Ratio
I-5	North of NE Northgate Way	D	1.08	**1.09**
I-5	**Ship Canal Bridge**	D	1.39	**1.42**
I-5	**North of West Seattle Bridge**	D	1.38	**1.39**
I-5	North of Boeing Access Rd Ramp	D	1.03	**1.04**
I-90	Mt Baker Tunnel	D	1.02	**1.04**
SR 99	**North of N Northgate Way**	D	1.13	**1.20**
SR 99	**Aurora Ave Bridge**	D	1.37	**1.44**
SR 99	Tunnel	D	0.68	0.71
SR 99	North of West Seattle Bridge	D	0.80	0.82
SR 99	South of S Cloverdale St	E (mitigated)	0.43	0.46
SR 509	**1st Ave S Bridge**	D	1.32	**1.35**
SR 519	S Atlantic St West of I-90 Ramps	D	0.88	0.91
SR 520	Lake Washington Bridge	D	0.90	0.93
SR 522	**South of NE 145th St**	D	1.20	**1.27**

Note: Impacted locations are shown in bold.
Source: Fehr & Peers, 2023.

Summary of Impacts

Exhibit 3.10-77 summarizes the potential impacts to Seattle's transportation system under each alternative. The purpose of an EIS is to disclose how potential actions by the City may impact the transportation system in comparison to what is expected to occur with currently adopted zoning codes and policies. Therefore, the impacts of each action alternative is assessed against the performance of the transportation system under the No Action Alternative. The impacts identified under the No Action Alternative are also expected to occur under the action alternatives even if those alternatives would not result in additional impacts. Although the focus of the EIS is not to mitigate conditions under the currently adopted zoning code (i.e., the

No Action Alternative), many of the mitigation measures proposed for the action alternatives would also lessen impacts under the No Action Alternative.

All action alternatives are expected to have significant impacts to transit passenger load, corridor travel time, intersection LOS in the NE 130th/NE 145th Street Subarea, and state facilities. Impacts of Alternatives 2 and 3 would be similar to one another while impacts of Alternative 5 are expected to be higher in magnitude due to the increased growth. Alternative 4 would fall within this range, likely closer in magnitude to Alternatives 2 and 3 than Alternative 5. **Exhibit 3.10-77** details the types and number of impacts expected under each alternative.

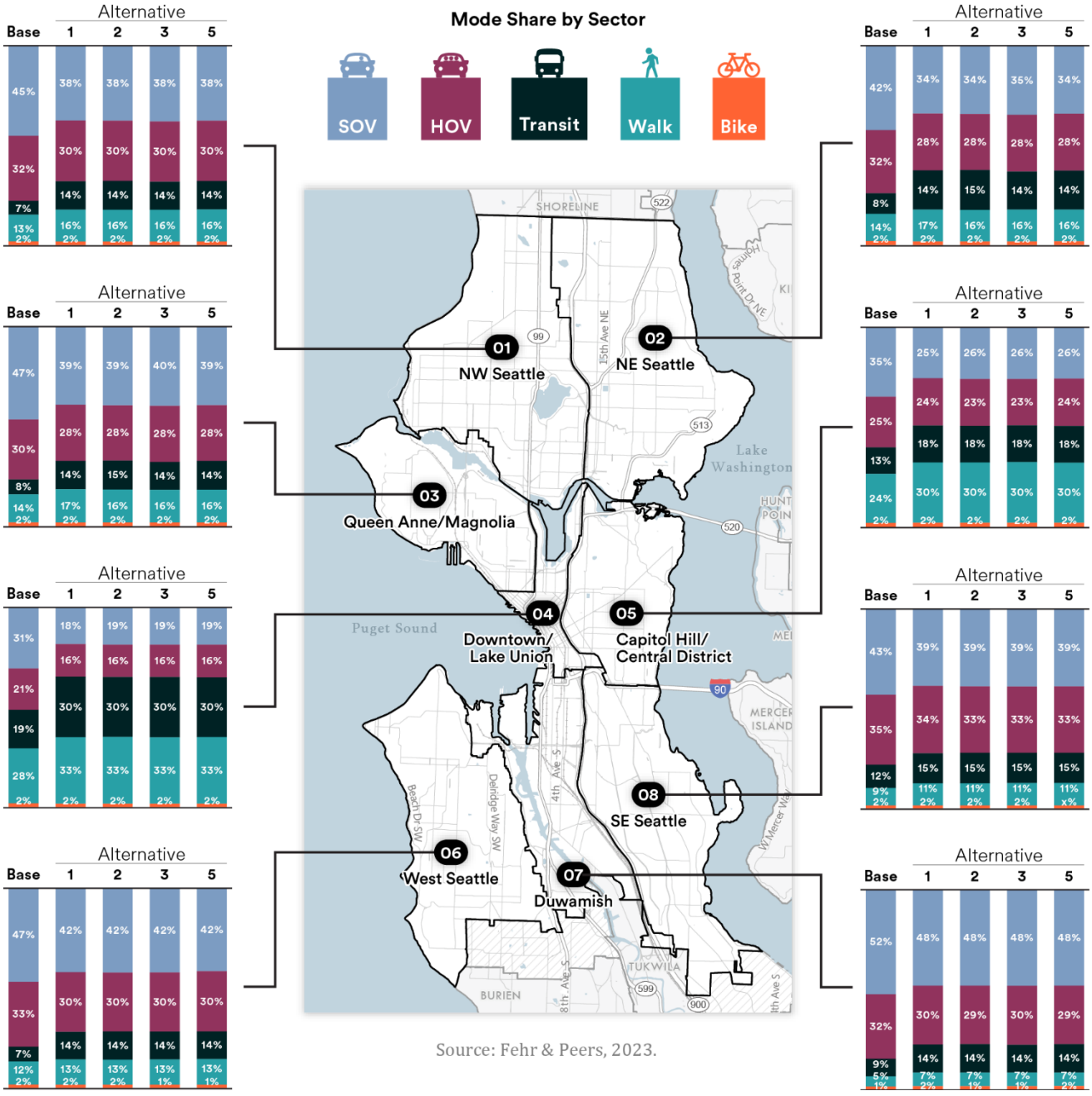
Exhibit 3.10-77. Overview of Significant Adverse Impacts: All Alternatives

Impact Type	Alt. 1—No Action	Alt. 2—Focused	Alt. 3—Broad	Alt. 5—Combined
SOV Mode Share	Duwamish subarea impacted	No additional impacts beyond No Action	No additional impacts beyond No Action	No additional impacts beyond D No Action
VMT per Capita	No	No	No	No
Active Transportation	No	No	No	No
Transit	8 routes: Light Rail 1, 2, and 3 Lines; RapidRide E, J, R, Denny & Fremont	8 routes under No Action + additional impacts to RapidRide E, J, R & Fremont	8 routes under No Action + additional impacts to RapidRide E, J, R & Fremont	8 routes under No Action + additional impacts to RapidRide E, J, R & Fremont
Roadway Users				
Corridor Travel Time	4 corridors: Mercer, Stewart, Olive & Michigan	4 corridors under No Action + additional impact to Olive	4 corridors under No Action + additional impact to Olive	4 corridors under No Action + additional impact to Olive
Screenline	No	No	No	No
130th/145th Subarea Intersection LOS	6 intersections: 145th/Aurora, 145th/5th, 145th/15th, 130th/Aurora, 130th/1st & 125th/15th	Additional impacts to the 6 intersections impacted under No Action	Additional impacts to the 6 intersections impacted under No Action	Additional impacts to the 6 intersections impacted under No Action + impact at 130th/Roosevelt/5th
State Facilities	7 segments along I-5, SR 99, SR 509 & SR 522	7 segments under No Action + additional impacts along I-5, SR 99, & SR 522	7 segments under No Action + additional impacts along I-5, SR 99, & SR 522	7 segments under No Action + additional impacts along I-5, SR 99, SR 509 & SR 522
Safety	No	No	No	No

Source: Fehr & Peers, 2023.

In addition to the table above, **Exhibit 3.10-78** and **Exhibit 3.10-79** summarizes some of the key metrics across the alternatives graphically.

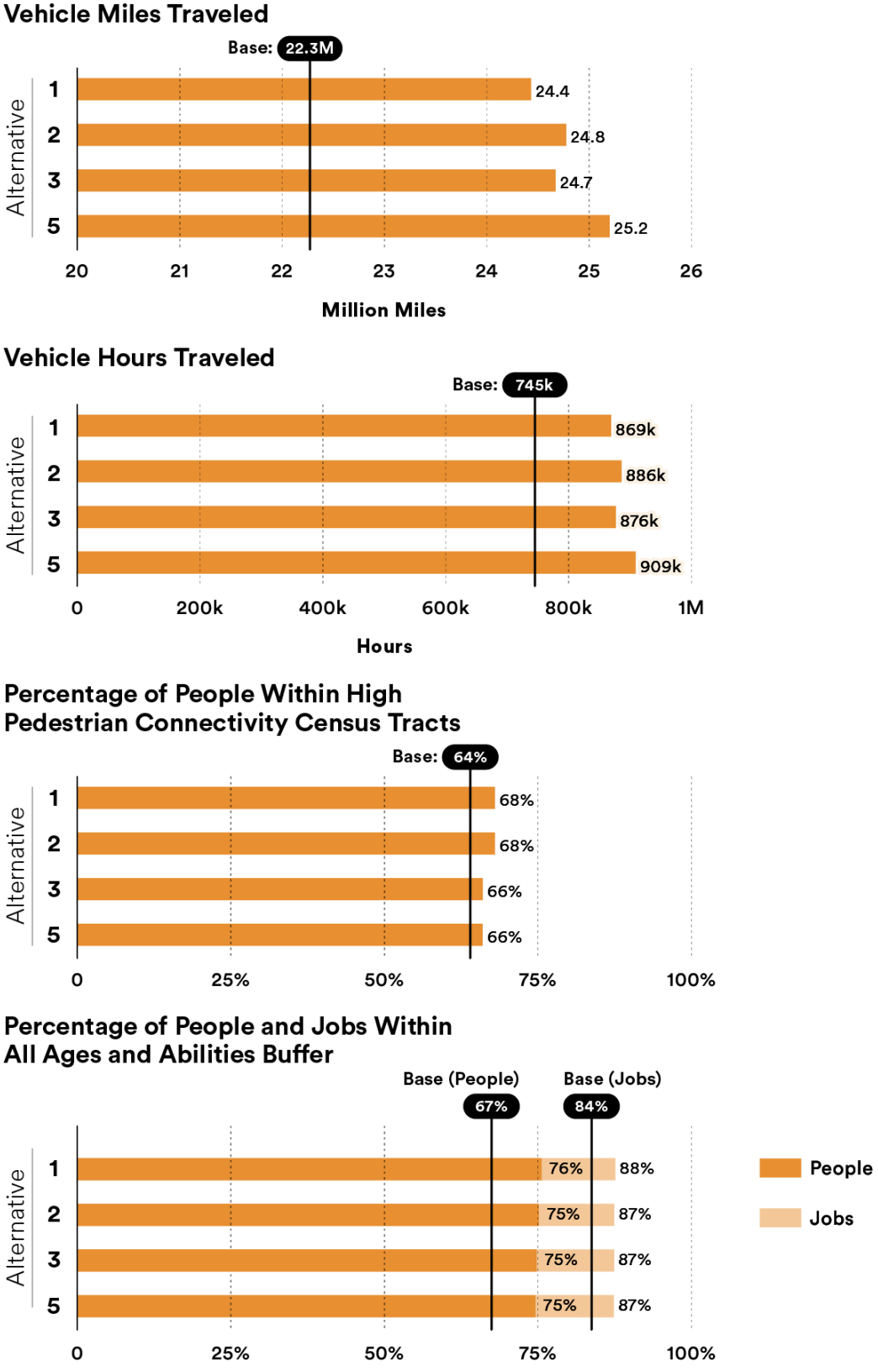
Exhibit 3.10-78. Transportation Metrics Across the Alternatives



Source: Fehr & Peers, 2023.

Source: Fehr& Peers, 2023.

Exhibit 3.10-79. Citywide Transportation Metrics



Source: Fehr & Peers, 2023.

3.10.3 Mitigation Measures

The impacts to the transportation system identified in the previous section include effects on transit passenger load, corridor travel time, intersection LOS in the NE 130th/NE 145th Street Subarea, state facilities, and parking. This section explores ways in which Seattle could potentially reduce the severity of those adverse impacts. These measures would be considered holistically within the framework of other goals and policies in the Comprehensive Plan. For example, while some transportation impacts identified through the preceding analysis stem from increased traffic congestion, the City has prioritized reducing vehicle demand rather than increasing roadway capacity.

Secondary Impacts

Some transportation mitigation projects could have secondary impacts. For example, converting a general-purpose travel lane or a parking lane to a transit lane, truck-only lane, or cycle track would reduce capacity for autos to travel. As required, the City would prepare additional analysis and take public and stakeholder input into consideration before implementing specific transportation improvement projects. Given the programmatic nature of this EIS, this Mitigation Measures section lists the types of projects that could be considered to mitigate potential impacts of the action alternatives.

The mitigation strategies described below are organized into main themes though many measures relate to and complement one another.

- Transportation Systems Management and Operations (TSMO)
- Transportation Demand Management (TDM)
- Pedestrian and Bicycle System Improvement
- Transit Strategies
- Parking Management Strategies
- Safety Strategies

Regulations & Commitments

Transportation Systems Management and Operations (TSMO)

Transportation systems management and operations (TSMO) maximizes efficiency of the existing multimodal transportation system by implementing low-cost, near-term improvements to improve overall system performance. TSMO solutions can improve safety and provide flexibility to address changing conditions. Strategies can also prioritize movement of specific modes, including freight, transit, and active transportation. Many of these strategies would require coordination with partner agencies, such as Port of Seattle, King County Metro, and Sound Transit.

Seattle already utilizes some TSMO strategies to reduce traffic congestion and improve vehicle flow, including providing drivers with updated travel information and managing the flow of traffic through intersections. SDOT has an ongoing effort to improve the operations of traffic signals, including some corridors with adaptive signal control, which coordinates signal timing

changes in response to real-time traffic volume data in order to reduce traffic congestion and improve vehicular flow. Additionally, Seattle's *Transit Master Plan*, *Freight Master Plan*, and *Seattle Industrial Areas Freight Access Project* identify speed and reliability improvements, such as transit and/or freight lanes that could improve mobility for those modes. Expanding existing programs or implementing new TSMO strategies, in coordination with regional partners, could help mitigate impacts to corridor travel time, screenlines, intersection LOS in the NE 130th/NE 145th Street Subarea, and state facilities by increasing efficiency of the existing system.

Potential strategies that Seattle might consider include:

- Intelligent transportation systems (ITS) applications such as dynamic message signs to alert travelers to incidents and provide travel information about route choices.
- Transit signal priority (TSP) to facilitate transit movements at intersections, reducing travel times for transit vehicles.
- Freight operations management to prioritize freight movements at specific locations and times.
- Reallocating travel lanes to serve specific uses such as transit and/or freight.
- Signal timing to improve vehicular flow along corridors.
- Wayfinding to improve route decisions and reduce illegal movements.
- Geometric or configuration improvements at intersections to facilitate key bus or truck turning movements.
- Improvements to pedestrian facilities such as crosswalk designs for increased safety, curb bulb-outs to reduce the distance to cross a street, curb ramps for accessibility, and signal timing improvements that increase pedestrian visibility at intersections.

Local and regional TSMO strategies could be combined to achieve greater reductions in impacts and maximize efficient operation of the transportation system. Seattle has historically funded some system improvements through voter-approved levies ($365M Bridging the Gap approved in 2006 and $930M Levy to Move Seattle approved in 2015). As the Levy to Move Seattle will expire at the end of 2024, Seattle may consider putting forward a new levy to sustain funding for continued improvements. Other improvements may require partnering with regional and state agencies.

Transportation Demand Management (TDM)

Transportation demand management (TDM) strategies can help reduce congestion and travel time impacts by reducing demand for automobile travel and supporting travel by other modes. Seattle currently promotes a variety of TDM strategies to encourage travel by carpooling, vanpooling, transit, walking, and biking, as well as reducing trips by teleworking. These include the Commute Trip Reduction (CTR) Program, Transportation Management Programs (TMPs), and the Commuter Benefits Ordinance which are described below along with additional measures Seattle could consider adding to its programmatic TDM efforts.

Commute Trip Reduction

The Washington State Commute Trip Reduction (CTR) Law, passed in 1991, requires large employers to implement employee commute programs to reduce drive alone peak-hour commute trips, with the goals of reducing traffic congestion and energy use and improving air quality. The CTR Law applies to employer worksites with at least 100 employees who begin work between 6 and 9 AM on weekdays. Employers who meet this threshold must develop commute trip reduction plans and work toward meeting their mode share targets through internal programs and monitoring. Affected employers must:

- Designate a transportation coordinator.
- Distribute information about non-drive alone commute options to employees.
- Survey employees every other year to measure vehicle miles traveled (VMT) and mode choice.
- Implement measures designed to achieve CTR goals adopted by the jurisdiction in which they are located.

The CTR program is currently undergoing a shift in the funding allocation and approach to better meet employer and jurisdictional needs and increase the effectiveness of the program. The changes to the CTR program present an opportunity for Seattle to reevaluate the City's TDM programs and implement new strategies to improve employer-focused TDM efforts and further reduce drive alone travel.

Transportation Management Programs

Seattle requires some large buildings to implement a Transportation Management Program (TMP) as part of the development review process. The TMP includes strategies the building managers must implement to encourage tenants to travel by transit, walking, biking, and/or carpooling. Parking management strategies are often included as well. A TMP typically includes measures such as:

- Travel options information displayed in a centrally located part of the building.
- Transit pass subsidies for tenants.
- Pedestrian and bicycle improvements and wayfinding signs directing tenants to nearby facilities.
- Bike parking and locker/shower facilities.
- Parking management strategies to minimize the number of vehicle trips made to and from the building.
- Preferred parking and subsidies for vanpool and carpool users.

Seattle also works with the building managers to set site-specific mode share targets and adjust the TDM approaches as needed to meet those goals.

Commuter Benefit Ordinance

In 2020, Seattle' Commuter Benefit Ordinance took effect, requiring businesses with 20 or more employees to offer their workers the option of making a pre-tax payroll deduction for transit or

vanpool expenses. This program offers a financial incentive to workers and businesses to use non-SOV travel options by lowering their tax obligation.

Additional TDM Measures

In addition to the ongoing programs and ordinances in place, Seattle could consider further expanding their TDM efforts. Research compiled by the California Air Pollution Control Officers Association (CAPCOA), surveys the spectrum of TDM strategies and provides data demonstrating which approaches can substantially reduce vehicle trips. Additional new or expanded TDM measures could include:

- Expand subsidized transit pass programs.
- Expand trip reduction programs to include new participants such as smaller businesses, residents, or community members.
- Improve bicycle and pedestrian facilities, including last-mile connections and end of trip facilities such as bicycle parking.
- Expand bike share/scooter share programs.

TDM program expansion, combined with other complementary strategies included in this section could help increase non-SOV mode share and reduce congestion to mitigate some impacts of the action alternatives.

Transportation Concurrency & Mitigation

SMC 23.52 subchapter 1 implements GMA policy that transportation improvements or strategies should be made concurrently with land development. SMC 23.52 subchapter 2 requires impact analysis and mitigation for projects meeting certain standards.

Pedestrian & Bicycle System Improvements

Improvements to the pedestrian and bicycle network can help provide last-mile connections and active transportation options that could increase the share of people walking and biking and mitigate impacts related to traffic congestion. A well-documented connection exists between improved, safer bicycle and pedestrian accessibility and reduced demand for vehicle travel (CAPCOA 2021).

Seattle has a Pedestrian Master Plan and Bicycle Master Plan as well as many subarea plans tailored to specific neighborhoods. All of these plans include recommendations to improve conditions for active transportation modes. Types of projects include concrete sidewalks, asphalt walkways, or painted walkways; signals to make crossing roadways easier and safer; treatments such as rectangular rapid flashing beacons (RRFBs) to alert drivers to people crossing the street; marked crosswalks; curb bulbs or extensions to shorten crossing distances and make people walking more visible to drivers; bicycle lanes (particularly protected and buffered bicycle lanes); and multi-use trails. SDOT is currently working to refine and integrate these prior plans into a single multimodal plan in the upcoming Seattle Transportation Plan.

Other pedestrian and bicycle improvements will be implemented as part of the City's partnership with Sound Transit to plan for the station areas around the West Seattle and Ballard Link Extensions. These station areas include neighborhoods in Alaska Junction, Avalon, Delridge, SODO, Chinatown-International District, Downtown, South Lake Union, Uptown, Smith Cove, Interbay, and Ballard. The City and Sound Transit are currently coordinating on transportation improvements around expanded and new light rail stations in these areas to support residents and workers in accessing transit. While specific projects have not yet been identified, it is assumed that Sound Transit will be constructing improvements in the immediate vicinity of each station as part of their project. Additional improvements could also be implemented through Sound Transit's System Access Fund which awards funds to jurisdictions to design and construct improvements that make it easier and more convenient for people to reach transit. This could include capital projects such as sidewalks, bike lanes, shared use paths, transit integration, and pick-up/drop-off facilities.

Seattle could also consider refining its development code to include requirements for pedestrian and bicycle infrastructure as part of frontage improvements. These investments in the multimodal transportation network would help provide alternate travel options and a more complete network, reducing reliance on SOV travel while increasing the share of people walking and biking thereby lessening traffic congestion impacts.

Transit Strategies

Potential impacts to transit passenger load were identified on four RapidRide routes under each of the action alternatives. However, it is unknown how future transit ridership levels will evolve with changing travel trends and land use changes, as demonstrated by the sensitivity test described in the previous section. King County Metro continually tracks ridership by route and trip using their automatic passenger counters allowing them to revise service to adapt to changing demands. The City could utilize an adaptive management approach to monitor crowding in partnership with King County Metro. Should it become apparent that some routes are exceeding King County Metro's crowding thresholds, the City of Seattle and King County Metro could identify potential measures, potentially including reallocating service hours within the city or pursuing funding for increased service levels. The purchase of increased Metro service has occurred in the past via a voter-approved funding measure.

Safety Strategies

Potential impacts to safety have been identified under all future year alternatives due to the likely increase of overall exposure associated with higher numbers of people traveling by all modes. Improvements to the active transportation network, as described in the previous section, could help mitigate some safety issues by providing dedicated facilities to separate people walking, biking, or rolling from vehicular traffic and adding design elements to increase their visibility to drivers in areas of higher conflict such as intersections.

SDOT has ongoing safety programs that are aimed at reducing the number of collisions. Many of the mitigation measures noted in the Pedestrian & Bicycle System Improvements section would also benefit safety of vulnerable users including: new sidewalks and walkways; signals to make crossing roadways safer; treatments such as rectangular rapid flashing beacons (RRFBs) to alert drivers to people crossing the street; marked crosswalks; curb bulbs or extensions to shorten crossing distances and make people walking more visible to drivers; protected and buffered bicycle lanes; and multi-use trails. SDOT may also pursue expanding strategies such as reducing speed limits, implementing leading pedestrian intervals, traffic calming treatments, new traffic signals, separation of facilities for vulnerable users, and other physical changes to transportation facility design.

These types of projects can reduce not only the number of collisions that occur but also the severity of those that do occur. Projects to address potential safety impacts could be implemented through City-led efforts or in partnership with new development through the development review and permitting process.

Coordination with Washington State Department of Transportation & Ferries

WSDOT and WSF frequently reviews large development projects near state facilities to identify potential impacts and suggest mitigation measures. The City could work with WSDOT and WSF to improve this coordination and to ensure that WSDOT and WSF continue to receive notices if SEPA thresholds are raised.

Other Potential Mitigation Measures

Intersection-Specific Improvements

Analysis of the action alternatives, relative to Alternative 1 No Action, identified seven impacted intersections. The impacted intersections are listed below:

- N 145th Street / Aurora Avenue N
- NE 145th Street / 5th Avenue NE
- NE 145th Street / 15th Avenue NE
- N 130th Street / Aurora Avenue N
- N 130th Street / 1st Avenue NE
- NE 130th Street / Roosevelt Way NE / 5th Avenue NE
- NE 125th Street / 15th Avenue NE

Each intersection was evaluated to identify potential mitigation measures that would address delay impacts such that intersection delays would not exceed the five second impact threshold relative to Alternative 1.

Some impacts could be addressed with more minimal interventions such as signal timing and phasing modifications while others would require physical changes to the intersections to

expand capacity, for example adding turn pockets or lanes. However, adding physical capacity to these intersections is likely not practical or desirable due to right-of-way constraints and potential secondary impacts to other modes. Instead, the City would likely pursue multimodal improvements aimed at making transit, walking, and biking more convenient and comfortable such that people have more options to choose from when traveling through the neighborhood. The STP, described in the following section, outlines the types of multimodal improvements that are being considered.

Seattle Transportation Plan

The City is currently developing the STP which considers how the level of investment in infrastructure for people walking, biking, and riding transit could improve transportation outcomes. The EIS for the STP considers three alternatives:

- **No Action**: This alternative represents the future of Seattle's transportation system where the city implements no additional multimodal or other transportation improvements beyond what is funded today. This alternative focuses on optimizing existing conditions in the transportation system with no new additional dedicated space for transit, pedestrians, or bikes. Roadway operations are optimized at key intersections, limited spot safety improvements are made throughout the network, and very limited slow zones are implemented on key pedestrian spaces. *Because this alternative reflects currently adopted plans, this is the network assumed for this Comprehensive Plan EIS.*
- **Moderate Pace:** This alternative envisions a future with moderate growth in funding for new multimodal infrastructure in Seattle's transportation system. This alternative takes a modest approach to expanding pedestrian, bicycle, and transit connections. Some space for general purpose vehicular traffic in this alternative would be reallocated to dedicated spaces for other modes including some improvements to the public and pedestrian realm. In this alternative, the city implements a modest set of the overarching policies of the STP. These include some restricted areas for general purpose traffic or "car-lite streets", a moderate number of mobility hubs and speed limits below 20 mph on higher-density residential streets.
- **Rapid Progress:** This alternative envisions a future with strong growth in funding for expanded and enhanced multimodal infrastructure in Seattle's transportation system. This option includes substantial improvements to the pedestrian, bicycle, and transit networks. It reallocates some general-purpose lanes to dedicated spaces for other modes to create a more balanced distribution of space for all mobility options. This alternative also includes a broad range of improvements to the public and pedestrian realm and additional dedicated space for goods movement through the city. In this alternative, the city fully implements overarching policies of the STP with car-free streets, electrification infrastructure, a wider range of mobility hubs, and deploys a road user charge to manage the level of miles driven in personal vehicles.

The proposed STP in February 2024 includes a proposed unconstrained project list derived from the range of potential projects in the Moderate Pace and Rapid Progress alternatives.

Many of the elements of the Moderate Pace and Rapid Progress alternatives listed above could serve as mitigating measures to some of the Comprehensive Plan impacts, namely, transit

passenger load, corridor travel time, intersection LOS in the NE 130th/NE 145th Street Subarea, and state facilities. By making non-SOV travel a safer and more convenient option for Seattle's residents, workers, and visitors, the STP could reduce vehicle demand. However, there could also be increased cumulative impacts to corridor travel time and intersection LOS because the Moderate Pace and Rapid Progress alternatives include reductions in roadway capacity, whether for car-free streets, car-lite streets, or reallocations of right-of-way to other modes. It is not possible to identify effects in specific locations as the roadway modifications are not yet known, but there would likely be areas of measurably increased traffic congestion in the vicinities of roadway capacity reductions.

3.10.4 Significant Unavoidable Adverse Impacts

This section identifies the significant and unavoidable adverse impacts to transportation expected to occur with implementation of the action alternatives. Those impacts have been identified relative to the performance of the transportation system if no new actions were taken, i.e., the No Action Alternative. Regardless of the alternative selected, travel demand is expected to increase, resulting in potentially significant adverse impacts to transit passenger load, corridor travel time, intersection LOS in the NE 130th/NE 145th Street Subarea, and state facilities.

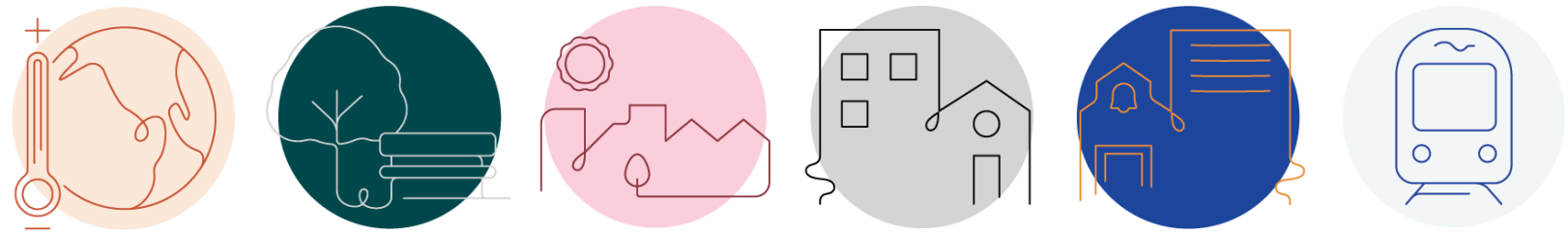
Significant impacts to transit were identified under all action alternatives with respect to passenger loads. The mitigation measures described in **Section 3.10.3 Mitigation Measures** could lessen the severity of the passenger load impacts. However, due to the increment of change projected, service levels may not be able to fully mitigate the projected impacts. Therefore, the action alternatives may still result in a significant unavoidable adverse impact to transit capacity.

The City will pursue targeted transportation capacity improvements focused on improved transit, bicycle, pedestrian, and freight connections. Additionally, the City will manage demand using policies, programs, and investments aimed at shifting travel to non-SOV modes. However, the magnitude and duration of traffic congestion during peak periods (as measured using corridor travel time) is expected to be exacerbated as growth continues to occur.

As noted in **Section 3.10.3 Mitigation Measures**, some of the impacts to subarea intersections would require physical capacity expansions which are unlikely to be implemented due to right-of-way constraints and potential secondary impacts to other modes. Therefore, the intersection impacts are not expected to be fully mitigated and the action alternatives may still result in a significant unavoidable adverse impact to intersection LOS.

Some combination of the travel demand management strategies discussed in **Section 3.10.3 Mitigation Measures** could be implemented to reduce the magnitude of SOV travel. These programmatic measures may lessen the severity of some of the potential impacts, particularly the travel time impacts which are fairly limited in scope. However, in the absence of state facility capacity expansion beyond that already planned and funded, the action alternatives may still result in significant unavoidable adverse impacts to state facilities.

3.11 Public Services



Jefferson Park. Source: City of Seattle, 2023.

This section addresses the potential impacts on public services associated with each alternative. Public services are defined as police, fire, emergency medical; parks and recreation; and schools. These services are provided citywide principally by the City of Seattle for police, fire, and parks, and by the Seattle Public Schools for education. Other providers of public safety include the Port of Seattle, King County Metro, and University of Washington. Other private institutions provide education services. Regarding parks, the focus is on Seattle Parks and Recreation Facilities managed with a level of service for the public. Other recreation facilities that are available to the community include public schools and universities, public street ends, Port recreation facilities, and other public lands like Seattle Center and Hiram M. Chittenden Locks.

Impacts of the alternatives are considered significant if they:

- Result in insufficient parks, open space, and trail capacity to serve expected population based on existing levels of service.
- Create inconsistencies with shoreline public access policies.
- Result in increases in public school enrollment that cannot be accommodated through regular school planning processes.
- Increase demand for police or fire and emergency that can't be accommodated through regular planning and staffing processes.
- Result in insufficient capacity to handle solid waste under current Seattle Public Facility plans.

3.11.1 Affected Environment

Police

Information about police services was collected from the Seattle Police Department (SPD) as well as other law enforcement agencies responsible for patrol in the City of Seattle. Data from SPD's 2019 Strategic Plan and the City's adopted 2021 Budget, and 2023-2028 Capital Improvements Plan published calls for service, response times, and crime reports annually inform this analysis. Independent researchers at Seattle University also collect data at the micro- community level through the annual Seattle Public Safety Survey which is available via SPD's Survey Results Dashboard. Coordination between the EIS authors and SPD's Director of Strategic Initiatives also informed this analysis.

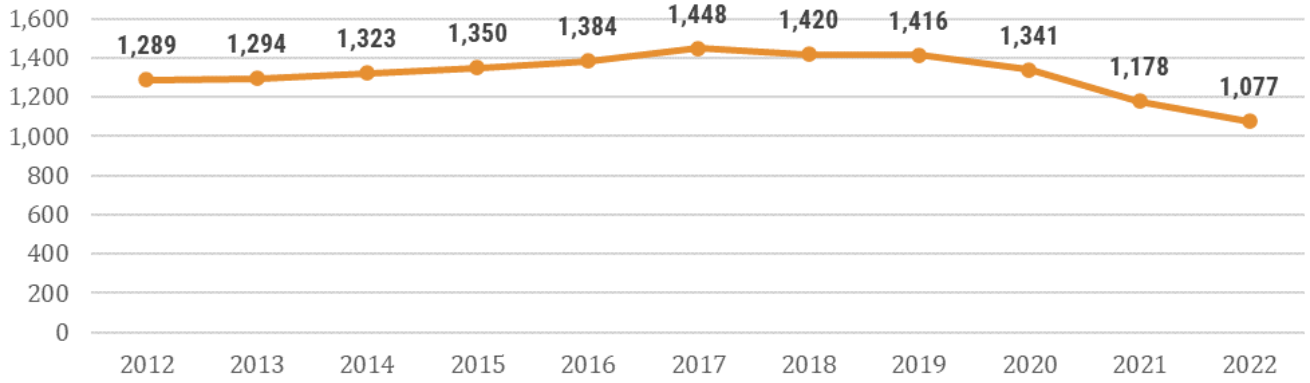
Citywide

Facilities & Staff

The Seattle Police Department (SPD) provides police protection services to the City of Seattle. Its primary duties include foot, car, and bike patrols, harbor patrols, 911 calls, investigations, traffic enforcement, parking enforcement, homeland security, and specialty units such as

Special Weapons and Tactics (SWAT), gang, bomb/arson, and canine units. SPD currently has 1,077 deployable sworn officers across all precincts and support facilities and between 341 and 405 additional non-officer employees (Washington Association of Sheriffs & Police Chiefs 2022, Socci, 2023). **Exhibit 3.11-1** highlights a recent downward trend in officer staffing.

Exhibit 3.11-1. Commissioned SPD Officers



Source: Washington Association of Sheriffs and Police Chiefs, 2023

The Department is divided into five precincts, each with a police station that serves as the base of operations for that precinct. Information about the precinct facilities is available in

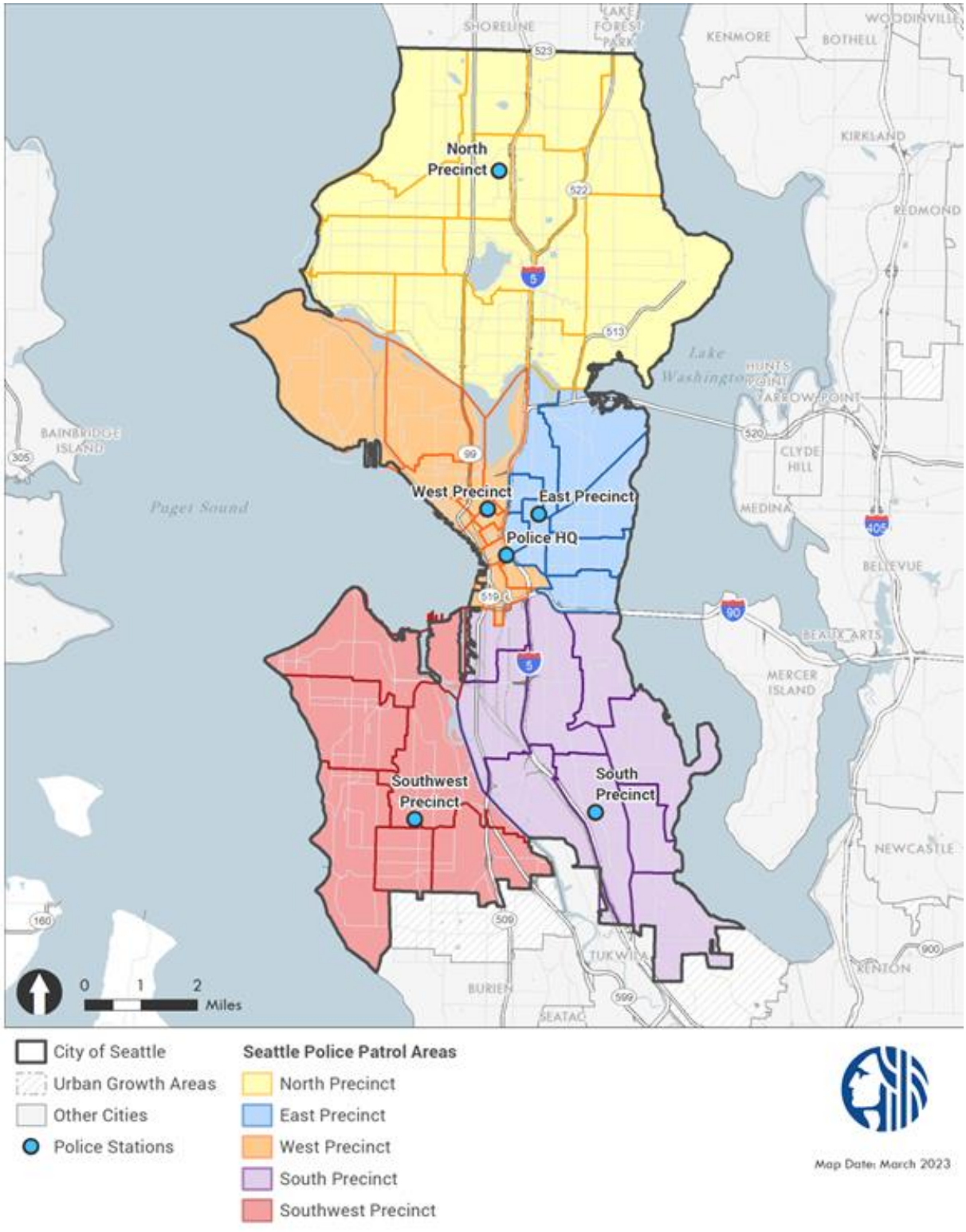
Exhibit 3.11-2 and the areas of service for each of the precincts are mapped in **Exhibit 3.11-3**.

Exhibit 3.11-2. Police Precinct Facilities

Precinct	Location	Primary Area Served	Sq Ft	Year Built
North	10049 College Way N	North of the Ship Canal to city limits	16,434	1984
West	810 Virginia St	Queen Anne, Magnolia, the Downtown care, and the area west of I-5	46,231	1999
East	1519 12th Ave	Eastlake and the area north of I-90 to the Ship Canal and east of I-5	61,580	1926
South	3001 S Myrtle St East	South of I-90 to city limits and west of the Duwamish	13,688	1983
Southwest	2300 Webster St	West Seattle and the Duwamish Industrial Area	28,531	2002

Source: City of Seattle, 2020

Exhibit 3.11-3. Police Precinct and Beat Boundaries



Sources: City of Seattle 2022; BERK, 2023.

These precincts serve different sectors of city and their alignment with Comprehensive Plan Analysis zones is generally as follows:

A. EIS Study Areas 1 and 2: North Precinct
B. EIS Study Areas 3 and 4: West Precinct
C. EIS Study Area 5: East Precinct
D. EIS Study Area 6: Southwest Precinct
E. EIS Study Areas 7 and 8: South Precinct

Maps illustrating the EIS Study Area boundaries and precincts are available in **Appendix I**.

Police Departments with Shared Jurisdiction

There are some areas and situations where the Seattle Police Department shares enforcement with other agencies.

Port of Seattle Police

The Port of Seattle Police (POSPD) are responsible for patrol and primary law enforcement of multiple different seaport locations as well as SeaTac International Airport which falls outside of the study area. Seaport properties such as the Downtown Seattle terminals, Shilshole Bay Marina, shipping facilities on the Duwamish River, and parts of Harbor Island are monitored by the Marine Patrol Unit and the POSPD Dive Team.

King County Sheriff's Office

Since Seattle is within King County, the King County Sheriff's Office has jurisdictional authority within the city limits as well, but the Seattle Police are considered the primary police agency. SPD works very closely with the King County Sheriff's Office.

Regional Transit Police

Both King County Metro and Sound Transit work closely with SPD but are primarily responsible for transit stops, tunnels, and other regional transit facilities.

Washington State Patrol

The Seattle Police Department shares jurisdictional authority with the Washington State Patrol within the study area's interstate highways.

Washington State Patrol is also the central repository for criminal history information in the State of Washington and runs the Crime Lab for the entire state of Washington.

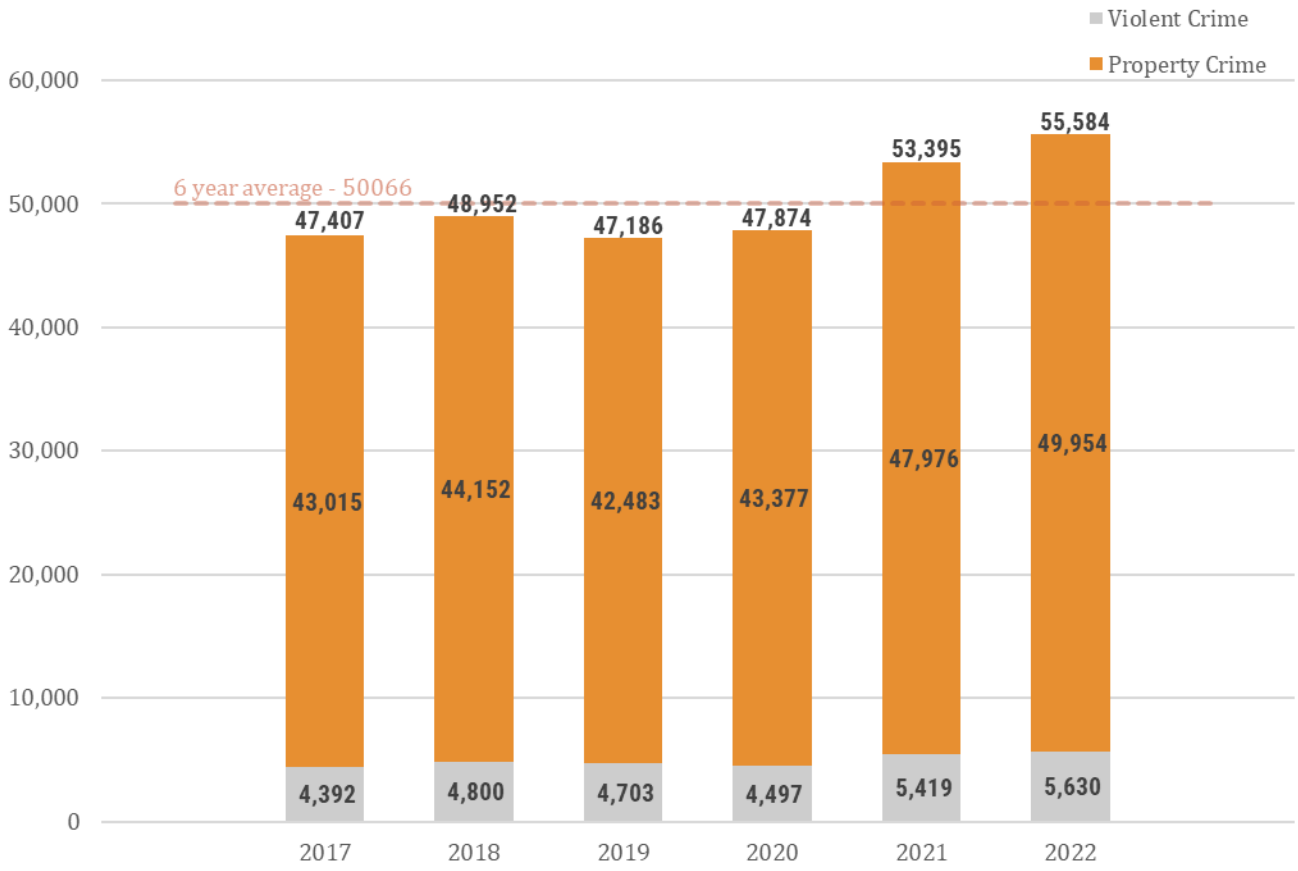
University of Washington Police

This police department has jurisdictional responsibility over the University of Washington Campus and serves as the primary law enforcement and investigative agency. All crime statistics within this jurisdiction are maintained by the University of Washington Police department.

Crime Rates & Service Calls

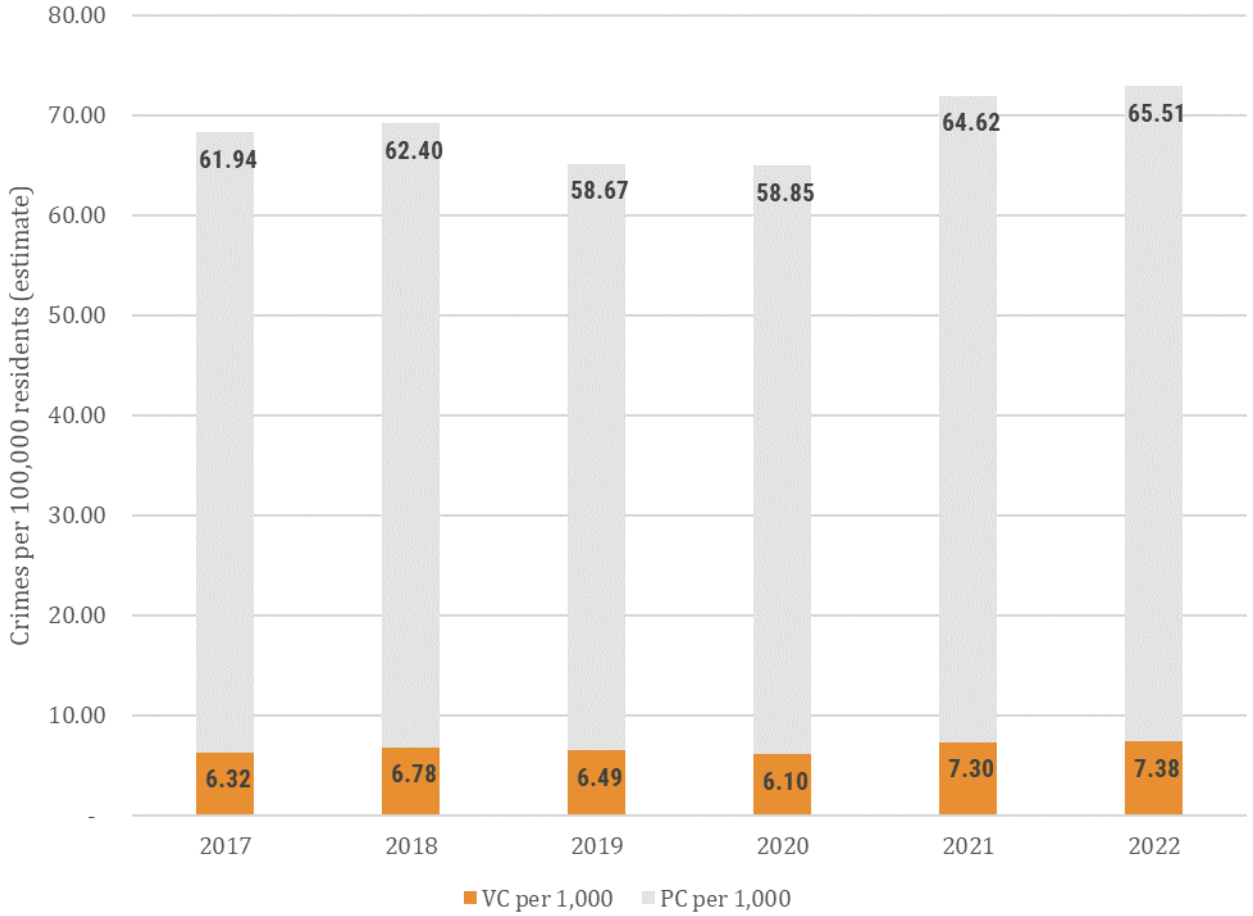
Since 2017, Seattle's crime rate has increased both in aggregate and per capita. In **Exhibit 3.11-4** and **Exhibit 3.11-5** violent crime includes homicide, rape, robbery, and aggravated assault whereas property crime includes burglary larceny and vehicle theft. There was a slight drop in the crime rate in 2019 that has since increased in 2021 and 2022.

Exhibit 3.11-4. Crime Reported, 2017-2022



Sources: Seattle Police Department Crime Dashboard, 2023; BERK, 2023.

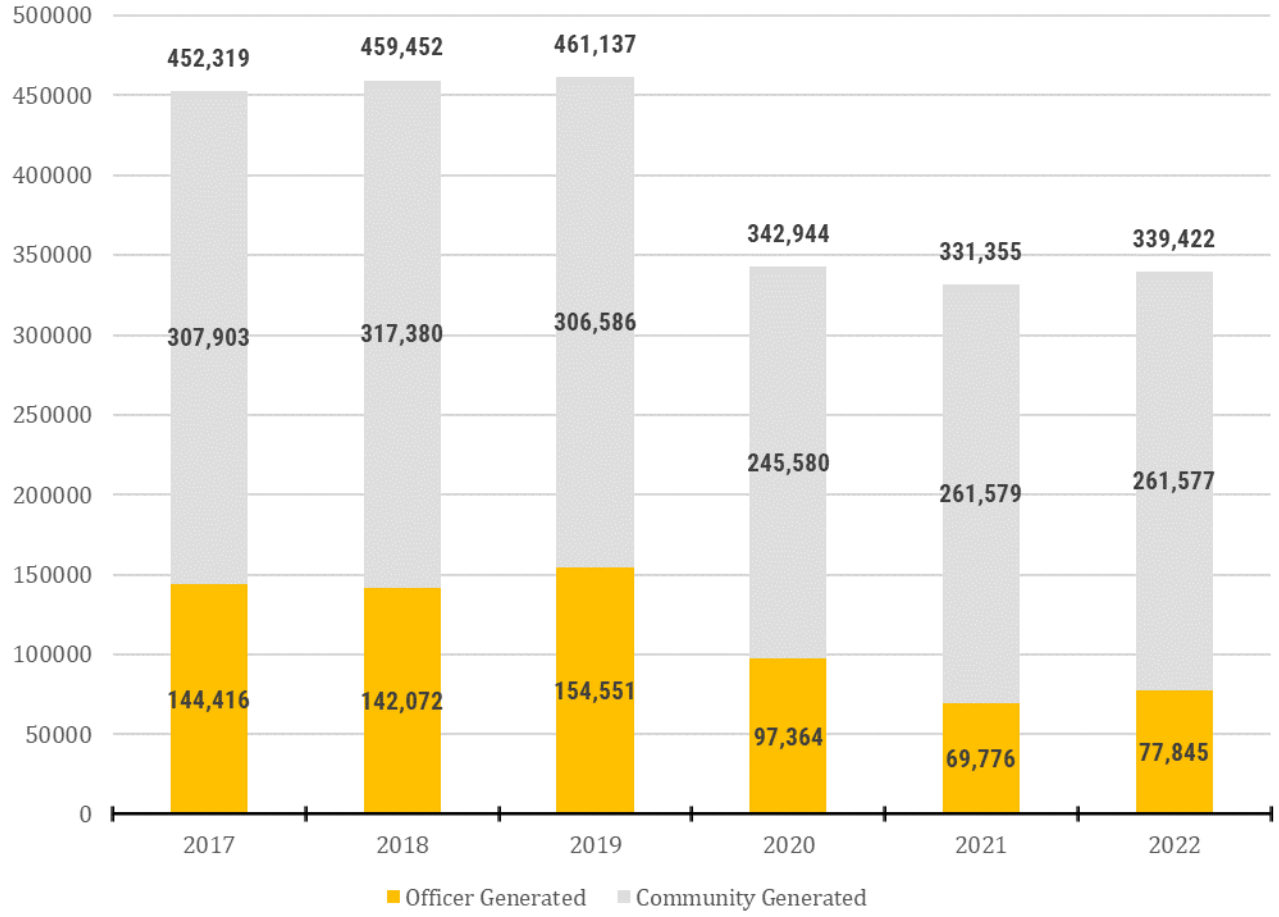
Exhibit 3.11-5. Reported Crime per 1,000 in Population, 2017-2022



Sources: OFM population statistics, 2017-2022; Seattle Police Department Crime Dashboard, 2023; BERK, 2023.

Data from the 2022 Crime Report and the Crime Dashboard show that while the crime rate has increased during this period indicating a positive correlation between population growth and crime rate, the calls for service have gone down significantly during the same period as seen in **Exhibit 3.11-6.**

Exhibit 3.11-6. SPD Citywide Dispatches by Type, 2017-2022

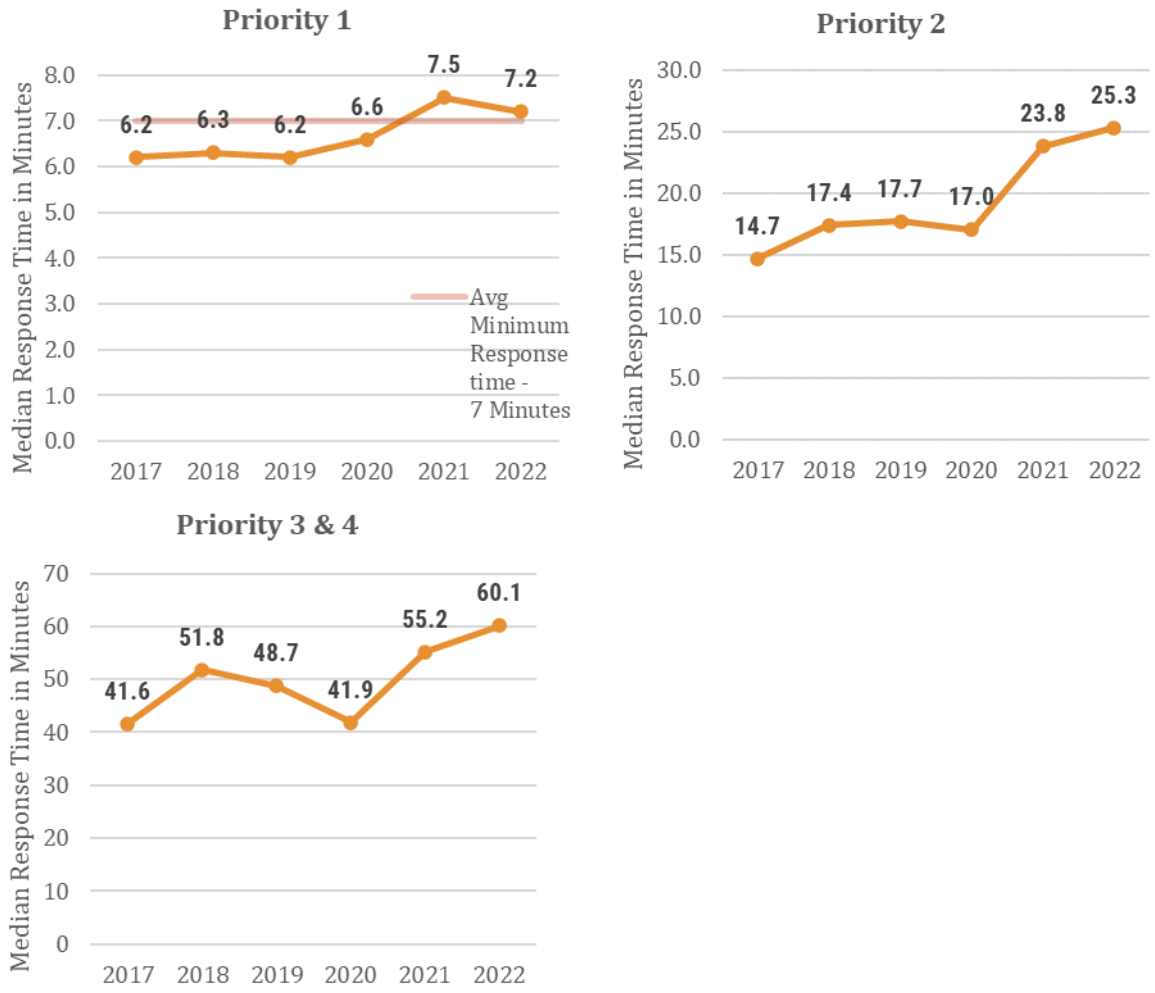


Note: Dispatches that were generated by unknown sources were not counted in this exhibit.
Sources: Seattle Police Computer Aided Dashboard, 2023; BERK, 2023.

Citywide Emergency Response Times

Dispatches are divided into priority 1-4 and the minimum response time level of service is determined by the priority of the call. The response time goal for priority one calls is 7 minutes. SPD has consistently been able to meet or narrowly miss this goal from 2017-2022 as seen in **Exhibit 3.11-7**.

Exhibit 3.11-7. SPD Dispatches and Response Times by Priority, 2017-2022



Source: City of Seattle, 2022; BERK, 2023.

Area Specific

Seattle Police Department is divided into five precincts and each precinct is divided into beats that are patrolled by officers.

Micro-Community Police Plans (MCPP) Priorities

The Seattle Public Safety Survey collects data at the micro-community level about perceptions of crime and public safety, police-community interactions, and knowledge and understanding of the MCPPs. The top five citywide public safety concerns identified in the 2021 survey (in order) were:

1. Police Capacity
2. Property Crime
3. Homelessness
4. Traffic Safety
5. Community and Public Safety Capacity

The top five public safety concerns in each Precinct are listed in **Exhibit 3.11-8**.

Exhibit 3.11-8. Top 5 Safety Concerns by Precinct in Ranked Order, 2021

Precinct	1st	2nd	3rd	4th	5th
East	Police Capacity	Property Crime	Homelessness	Traffic Safety	Community and Public Safety Capacity
North	Police Capacity	Homelessness	Property Crime	Traffic Safety	Community and Public Safety Capacity
South	Police Capacity	Property Crime	Homelessness	Drugs and Alcohol	Community and Public Safety Capacity
Southwest	Police Capacity	Property Crime	Homelessness	Traffic Safety	Community and Public Safety Capacity
West	Police Capacity	Property Crime	Homelessness	Drugs and Alcohol	Community and Public Safety Capacity

Source: Seattle Public Safety, 2021.

Safety concerns are summarized below:

- **East:** Survey respondents in the East Precinct identified the same top five public safety themes as the city. These themes were the same when analyzed at a MCPP level, just in different orders of priority. The Public Safety survey noted that overall, there is less concern

about crime (both day and night) compared to the city and has an overall less favorable view of SPD compared to Nationwide trends.

- **North:** The North Precinct shared similar public safety concerns as the city. However, survey respondents noted drugs and alcohol as a major public safety concern. There is an overall less concern of crime (both day and night) and have a less favorable view of SPD. Looking at MCPPs, Lawlessness was identified as a top theme in Lake City and Homelessness in Fremont, showing some discrepancies in looking at different subareas within the North Precinct.
- **South:** South Precinct Survey responded that Drugs and Alcohol was a higher concern compared to the city than traffic safety. Fear of Crime (both day and night), and perception of SPD, and the police nationwide, is less than the city's average overall. When looking at MCPPs, there were some differences in top public safety concerns. For example, property crime was a top safety concern in SODO.
- **South-West:** Top public safety concerns match city wide themes. The precinct has a higher level of fear of crime (both day and night) and a higher favorable view of SPD and the police nationwide. This is the highest favorable perception of SPD in all the precincts.
- **West:** Survey respondents had similar top public safety themes compared to the city but noted Drugs and Alcohol as a higher priority. The precinct has the highest fear of crime compared to the city and have a high favorable perception of SPD and police nationwide. Violent Crime is also noted as a top priority in the International District when looking at MCPPs.

Staffing & Facilities

SPD's staff is split between its five precincts, headquarters, support facilities, harbor patrol facility, and more. Approximately 514 of the 1,077 commissioned officers are considered precinct staff. See **Exhibit 3.11-9**. Other staff distributions are available in **Exhibit 3.11-9**.

Exhibit 3.11-9. SPD Precinct Staffing as of December 31, 2022

	East		North		South		Southwest		West		Citywide		Total	
	Sargent	Officer	Sargent	Officer	Sargent	Officer	Sargent	Officer	Sargent	Officer	Sargent	Officer	Sargent	Officer
911	11	66	19	116	10	74	8	52	13	107	5	23	66	438
Beats	—	—	—	—	—	—	—	—	1	6	—	—	1	6
Seattle Center	—	—	—	—	—	—	—	—	1	2	—	—	1	2
Total	**11**	**66**	**19**	**116**	**10**	**74**	**8**	**52**	**15**	**115**	**5**	**23**	**514**	

Note: includes phase 3 student officers, personnel who are unavailable due to vacation, training, limited duty, or short-term illness/injury, half time officers, and officers in Acting Sargent assignments. Excludes phase 1 and phase 2 students, detectives, and personnel on extended leave.
Source: SPD, Socci, 2023

By precinct, the available size and features of each station building is identified below:

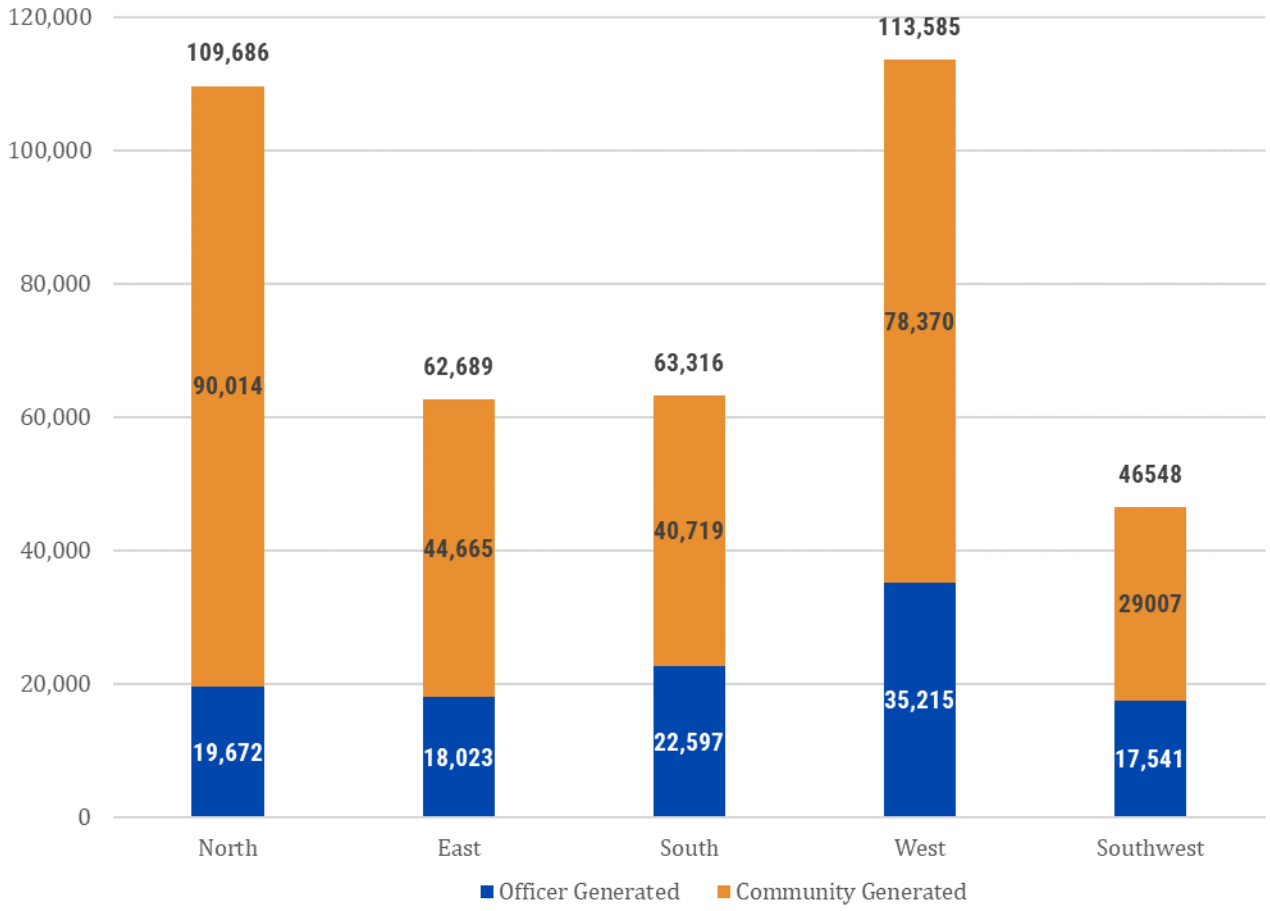
A. **North:** The North precinct was built in 1994 and is 16,560 square feet. Currently the department is leasing 5,000 square feet of nearby office space to house additional administrative staff members. It is the base for 135 sworn in officers and 119 additional staff and was designed to accommodate 154 staff. The North Precinct Police station upgrade was put on hold in 2016 to re-address department needs (Seattle, 2018).
B. **West:** The West precinct was built in 1999 and is 46,231 square feet. It is the base for 140 sworn in officers and 82 additional staff and is currently at capacity.[83]
C. **East:** the East precinct was remodeled completely in 1990 and is 31,356 square feet. It is the base for 77 commissioned officers and 107 additional staff and is at capacity.[84]
D. **Southwest:** The Southwest precinct was built in 2002 and is 28,531 square feet. It is the base for 60 sworn in officers and 58 additional staff and was designed to accommodate 131 staff.
E. **South:** The South precinct was built in 1983 and is 13,700 square feet. It is the base for 84 sworn in officers and 39 additional staff is currently at capacity. The existing facility will require seismic upgrades and renovations to bring the facility up to current standards. Further capacity and staff projection analysis is required.

Precinct Dispatching

Precincts dispatch to officers 911 calls throughout the city and expect officers to respond to possible crimes that they may see on their patrols. The North and West precincts were dispatched the most on average from 2017-2022. These data in **Exhibit 3.11-10** align with citywide data in **Exhibit 3.11-6** to show that most calls are community generated.

[83] Per SPD capacity assessment, design capacity of precinct not available.
[84] Per SPD capacity assessment, design capacity of precinct not available.

Exhibit 3.11-10. Six-year Average (2017-2022) of SPD Dispatches by Type



Source: Seattle Police Computer Aided Dispatch 2023

Fire/Emergency Medical Services

Information about fire and emergency medical services was collected from the Seattle Fire Department. SFD's published annual report includes information about the department, incident response trends and response standards, preventative measures taken (e.g., fire code implementation), public events/education, and other notable highlights. Other references include the City of Seattle geolocated call data on its Open Data Portal, SFD's 2012-2017 Strategic Plan, the City's proposed 2023-2024 Budget, and 2023-2028 Capital Improvement Plan. Coordination between EIS authors and SFD personnel knowledgeable about operations and spatial analysis informed this analysis.

Citywide

Level of Service (LOS)

SFD provides fire and rescue response, fire prevention and public education, fire investigation, and emergency medical services (EMS) throughout the city, including the study area. Emergency medical services include basic life support (BLS) and advanced life support (ALS). SFD also has specially trained technical teams that provide technical and heavy rescue, dive rescue, tunnel rescue, marine fire/EMS response, and hazardous materials response. SFD also provides mutual aid response to neighboring jurisdictions.

The 2022 Proposed Budget adds funding to enhance SFD operations in several areas including emergency responses, diversity recruitment, dispatch training, and IT system upgrades. In response to extensive research into community response models and on best practices gleaned from around the country, SFD will add a new specialized triage response program (Seattle City Budget Office 2021, 326).

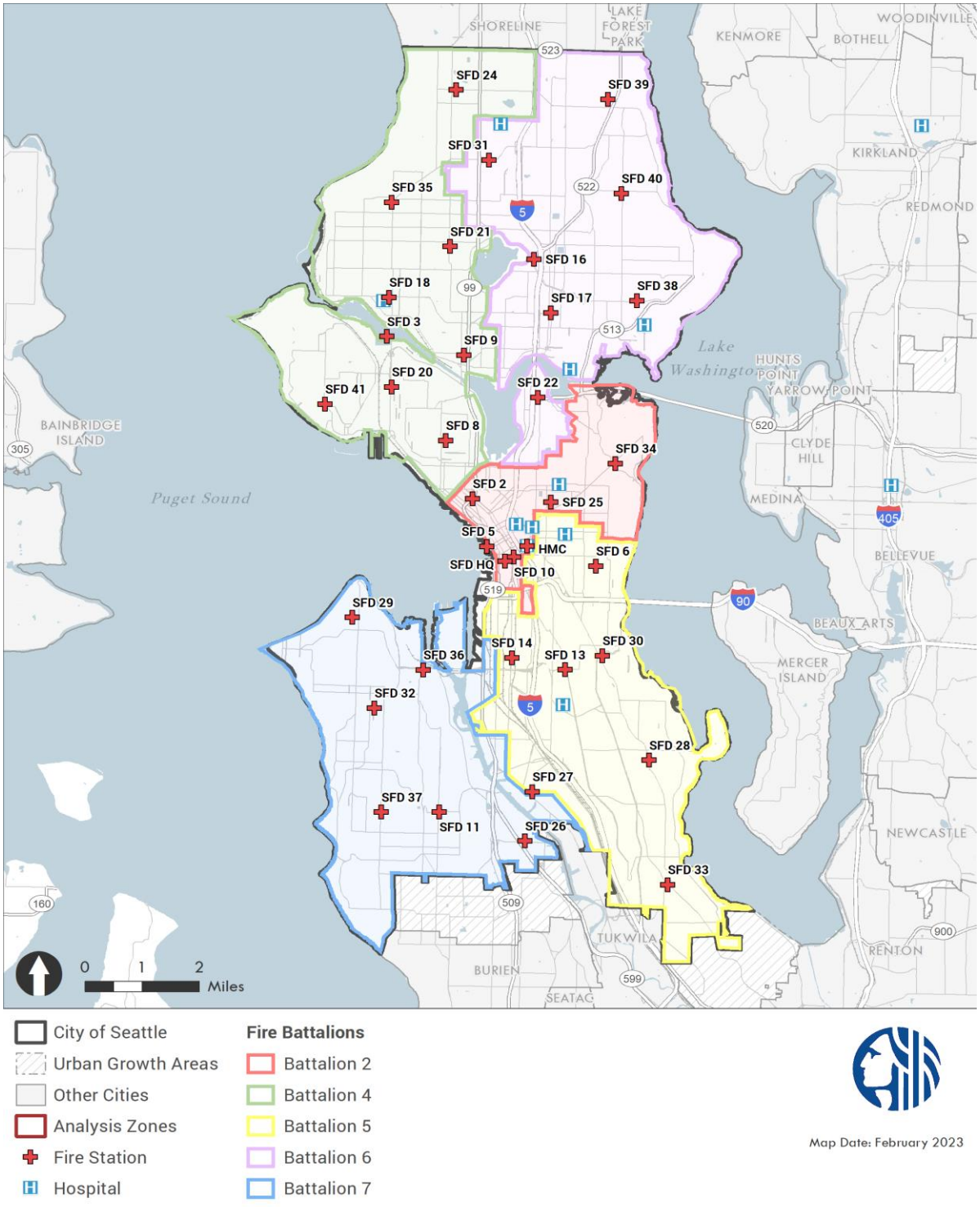
Facilities

SFD provides emergency response services through five battalions consisting of 33 fire stations (plus Battalion 3/Medic One at Harborview Medical Center) strategically placed around the city to maximize coverage and minimize response time. See **Exhibit 3.11-11**. Close up maps of EIS Study Areas and SFD facilities are provided in **Appendix I**.

All SFD stations are staffed 24 hours a day, seven days a week, by four separate shifts of firefighters. There are 216 members responding to emergencies every day across the city (220 with upstaffing for 2 daytime aid cars). In 2021, SFD had 963 uniformed personnel and 81 civilian personnel—uniform personnel include 897 firefighter/EMTs (including chiefs) and 66 firefighter/paramedics (Seattle Fire Department 2021).

These 220 uniformed fire department personnel on the clock 24 hours per day are responsible to provide services for an estimated 391,394 housing units (Seattle Fire 2023). The City also anticipates it will need to replace Station 3 and the Fire Marshal office, acquire, or develop a new facility for SFD Headquarters, replace or expand the commissary and fire garage, develop a fire station in South Lake Union, and develop a freshwater marine fire suppression facility (City of Seattle 2020).

Exhibit 3.11-11. Fire Battalions and Stations



Source: City of Seattle, BERK, 2023.

Exhibit 3.11-12. SFD Facility Locations and Equipment

Station	Battalion	Equipment	Engine	Ladder	Medic	Fire Boat	Aid
Headquarters	N/A	▪ DEP1 ▪ SAFT2					
Medic One / Harborview Medical Center	N/A	▪ Medic 1 ▪ Medic 10 ▪ Medic 44 ▪ Battalion 3			3		
Fire Station 2—Belltown	2	▪ Engine 2 ▪ Ladder 4 ▪ Aid 2 ▪ Aid 4 ▪ Hose 2	1	1			2
Fire Station 3—Fisherman's Terminal	4	▪ Fireboat Chief Seattle ▪ Fireboat 1*				2	
Fire Station 5—Waterfront	7	▪ Engine 5 ▪ Fireboat 2* ▪ Fireboat Leschi ▪ Rescue Boat 5*	1			2	
Fire Station 6—Central District	5	▪ Engine 6 ▪ Ladder 3	1	1			
Fire Station 8—Queen Anne	4	▪ Engine 8 ▪ Ladder 6	1	1			
Fire Station 9—Fremont	4	▪ Engine 9	1				
Fire Station 10—International District	2	▪ Engine 10 ▪ Ladder 1 ▪ Aid 5 ▪ Aid 10	1	1			2
Fire Station 11—Highland Park	7	▪ Engine 11	1				
Fire Station 13—Beacon Hill	5	▪ Engine 13 ▪ Battalion 5	1				
Fire Station 14—SoDo	5	▪ Aid 14 ▪ Rescue 1 (DECON1 & REHAB1) ▪ Ladder 7**		1			1
Fire Station 16—Green Lake	6	▪ Engine 16	1				
Fire Station 17—University District	6	▪ Engine 17 ▪ Ladder 9 ▪ Medic 17 ▪ Battalion 6	1	1	1		
Fire Station 18—Ballard	4	▪ Engine 18 ▪ Ladder 8 ▪ Medic 18 ▪ Battalion 4 ▪ Hose 18*	1	1	1		
Fire Station 20—West Queen Anne	4	▪ Engine 20	1				

Station	Battalion	Equipment	Engine	Ladder	Medic	Fire Boat	Aid
Fire Station 21—Greenwood	4	▪ Engine 21	1				
Fire Station 22—Roanoke	6	▪ Engine 22	1				
Fire Station 24—Bitter Lake	4	▪ Engine 24 ▪ Air 240	1				
Fire Station 25—Capitol Hill	2	▪ Engine 25 ▪ Ladder 10 ▪ Aid 25 ▪ Battalion 2	1	1			1
Fire Station—26—South Park	7	▪ Engine 26 ▪ Medic 26	1		1		
Fire Station 27—Georgetown	7	▪ Engine 27	1				
Fire Station 28—Rainier Valley	5	▪ Engine 28 ▪ Ladder 12 ▪ Medic 28	1	1	1		
Fire Station 29—Admiral District	7	▪ Engine 29	1				
Fire Station 30—Mount Baker	5	▪ Engine 30 ▪ Air 9	1				
Fire Station 31—Northgate (Interim)	6	▪ Engine 31 ▪ Ladder 5 ▪ Medic 31 ▪ Aid 31	1	1	1		1
Fire Station 32—West Seattle Junction	7	▪ Engine 32 ▪ Ladder 11 ▪ Medic 32 ▪ Battalion 7	1	1	1		
Fire Station 33—Rainier Beach	5	▪ Engine 33	1				
Fire Station 34—Madison Park	2	▪ Engine 34 ▪ Hose 34*	1				
Fire Station 35—Crown Hill	4	▪ Engine 35	1				
Fire Station 36—Delridge & Harbor Island	7	▪ Engine 36	1			1	
Fire Station 37—West Seattle & High Point	7	▪ Engine 37 ▪ Ladder 13	1	1			
Fire Station 38—Hawthorne Hills	6	▪ Engine 38	1				
Fire Station 39—Lake City	6	▪ Engine 39	1				
Fire Station 40—Wedgwood	6	▪ Engine 40	1				
Fire Station 41—Magnolia	4	▪ Engine 41	1				
Totals			**32**	**12**	**9*** **	**5**	**7**** **

* Not listed in 2022 annual report and identified on Seattle Fire Web Page
** Part of Rescue 1 Unit
*** Includes Health 1and added Medic Unit at Station 26
**** Two of seven are "Peak-Time Aid Units."
Source: Seattle Fire 2022 Annual Report, Seattle.gov/fire

Incident Response Trends

Between 2017 and 2021 total incident responses decreased from 96,822 to 93,233. As shown in **Exhibit 3.11-13**, the number of total responses remained relatively constant in 2017 and 2018, then decreased in 2019 and 2020. The COVID-19 pandemic drove a decrease in EMS calls in 2020—a trend SFD believes resulted from fewer people being outside their homes coupled with a fear of being exposed to the virus—and a rise in fire responses. However, both EMS and fire incident calls increased from 2020 to 2021. Total incident responses increased 16% from 2020-2021 and an additional 12.5% between 2021 and 2022.

Exhibit 3.11-13. Seattle Fire Department Emergency Response Incidents

Year	EMS Incidents: BLS and ALS	Fire and Specialty Incidents*	Other and Mutual Aid**	Total
2017	78,758 (81.3%)	16,548 (17.1%)	1,111 (1.1%)	96,822
2018	76,484 (80.7%)	17,080 (18.0%)	1,128 (1.2%)	94,780
2019	72,980 (79.6%)	18,088 (19.7%)	648 (0.7%)	91,716
2020	61,717 (76.8%)	18,094 (22.5%)	505 (0.6%)	80,316
2021	74,302 (79.7%)	24,616 (26.4%)	53 (0.1%)	93,233
2022	78,808 (74.0%)	27,587 (25.9%)	58 (.05%)	106,453

SFD Live and SFD 2019 & 2022 Annual Report
* "Special Incidents" responses were previously included in "Fire" in 2019 and 2020 but were separated in 2021
** For 2021 "other responses" transitioned to "mutual aid" responses.

Response Time

Maintaining or improving emergency response times is the core of Seattle Fire Department operations (Seattle Fire Department, 2012). SFD's response standards specify the minimum criteria needed to deliver fire suppression, special operations response, and emergency medical services (Seattle Fire Department 2020) effectively and efficiently. The Capital Facilities Appendix of Seattle 2035 establishes the following response time standards for the Department (City of Seattle 2020, 529-530):

A. Call Processing Time: 60 seconds for phone answered to first unit assigned for 90% of calls.
B. Fire Response Time: Arrival within 4 minutes for first-arriving engine at a fire for 90% of calls, and arrival within 8 minutes of the full first alarm assignment of 15 firefighters, for 90% of calls.
C. Basic Life Support: Arrival within 4 minutes of the first medical unit with two EMTs, for 90% of calls.
D. Advanced Life Support: Arrival within 8 minutes for 90% of call

Exhibit 3.11-14 shows the statistics the Department uses to measure response time performance. These statistics generally correspond with the Department's response time standards.

Between 2016 and 2020 the Department fell short of meeting its response time standards, with the exception of meeting its call processing time standard in 2018 and its full first alarm assignment standard from 2018-2022. Call processing has also decreased significantly in 2022 to 60%.

Exhibit 3.11-14. Response Statistics, 2017-2022

Year	Call Processing Time within 60 seconds	First Arriving Engine at Fire within 4 Minutes	Full Fire Alarm Assignment at Fire within 8 Minutes	Fire Arriving Unit for a BLS Incident within 4 Minutes	Fire Arriving Unit for an ALS Incident within 8 minutes
Adopted Standard	90%	90%	90%	90%	90%
2017	84%	77%	71%	79%	89%
2018	**92%**	76%	**93%**	79%	86%
2019	64%	75%	**94%**	76%	86%
2020	66%	78%	**92%**	73%	81%
2021	59%	75%	**91%**	73%	81%
2022	60%	76%	**95%**	75%	82%

Sources: Seattle Fire Department Annual Report, 2019, 2021, and 2022; BERK, 2023.

Area Specific

The 2023-2024 proposed operating budget includes a $2.2-million expenditure for 30 additional firefighting recruits, $303,102 for paramedic recruits in 2023, $606,203 for paramedic recruits in 2024. These additional recruit positions are on top of the 60 firefighting recruit positions and 5 paramedic recruit positions that are part of the base budget. The goal of these additional positions is to alleviate vacancies from attrition and retirement within the department.

These recruit positions are not reflected in the current FTE levels by Battalion in **Exhibit 3.11-15**. Other expenditures for fire prevention are increasing from 11.5 million in 2022 to a proposed 11.7 and 11.85 million in 2023 and 2024 respectively.

Exhibit 3.11-15. SFD Staffing and Expenditures Budget by Battalion

Battalion	FTE & Expenditures 2021	FTE & Expenditures 2022	FTE & Expenditures 2023 (proposed)	FTE & Expenditures 2024 (proposed)	Minimum Staff Per Shift (estimate)	Minimum staff for four shifts (estimate)
2	205.45 $28,015,684	205.45 $32,635,307	205.45 $32,309,457	205.45 $32,893,487	42	168
3	82.00 $15,476,222	82.00 $17,419,528	82.00 $17,360,397	82.00 $17,665,117	12	48
4	199.45 $29,591,593	199.45 $33,261,878	199.45 $34,272,162	199.45 $34,883,293	48	192
5	185.45 $28,465,652	185.45 $31,605,322	185.45 $32,044,188	185.45 $32,584,561	44	176
6	169.45 $26,641,698	169.45 $28,850,602	169.45 $29,158,278	169.45 $29,641,374	46	184
7	148.45 $26,619,359	148.45 $25,663,613	148.45 $25,625,945	148.45 $26,028,047	52	208

Source: Seattle Finance Department 2023-2024 proposed budget https://www.seattle.gov/city-budget-office/budget-archives/2023-2024-proposed-budget.

The Battalion staffing levels combined with information received from Seattle Fire about minimum staffing levels for each fire apparatus per shift are also available in **Exhibit 3.11-15**.

This data highlights potential opportunities for shifts in staff resources as well as current estimated staffing needs in each of the battalions. Battalion 6 and 7 are currently running at lower staff than their fire units can support. Battalion 7 Supports the Downtown Waterfront Station 5, South Park, Georgetown, as well as all five stations on the West Seattle peninsula. Battalion 6 supports the entire Northeast quadrant of the city ranging from the Roanoke Station in Eastlake up through Lake City and including the University of Washington and Greenlake.

Both of these Battalions' stations have at least one engine but as is consistent across the city there are far fewer fire units to support emergency medical staff and aid units which make up nearly 70% of dispatches to SFD (Haskell, McAuslan, 2023). These minimum staffing estimates are based on the types of units at each station and were provided by Seattle Fire. Engines & Ladders require four operators per run; Medic Units, Aid Units, and other special apparatuses require between two & four operators per run depending on the unit. Please note that two was used to form the basis of this estimate. (Haskell, McAuslan, 2023).

The subareas for analysis maps are found in **Chapter 2** and are the basis for the growth estimates for each different growth alternative. The subareas align partially with some battalions but do not overlap exactly. The subarea analysis highlights the current levels of service for households within them. **Section 3.12.2**, **Section 3.11.3**, and **Section 3.11.4** provide additional context for each subarea and the different proposed growth alternatives that will impact public services such as Fire, Police, and Parks.

Area 1

Northwest Seattle's seven fire stations service an estimated 79,576 housing units, both the highest number of stations and housing units in Seattle. Each station has an engine and additional units are mostly supported by Station 26 in Ballard that houses specialized apparatuses such as a ladder unit, a medic unit, one of Seattle's two hose and foam units. The Greenwood Station houses Seattle's mass casualty incident unit which has only been dispatched 87 times since data collection began in 2004. The Bitter Lake station houses one of Seattle's two air units. Area 1 also includes Station 31 at Northgate which is currently operating from an interim station until a new station is built. The new station is still currently in the design phase (City of Seattle 2022-2027 Adopted CIP). See **Exhibit 3.11-16** for stations, equipment, staffing, and ratios of fire units to dwelling units.

Exhibit 3.11-16. Stations and Fire Units in Area 1

Stations	Engines (4 Staff Per shift)	Ladders (4 Staff Per Shift)	Medic (2 Staff Per Shift)	Aid (2 Staff Per Shift)	Other Apparatus (~2 Staff Per Shift)
9, 16, 18, 21, 24, 31, 35	7	2	2	1	3
Required Minimum staff per shift	28	8	4	2	6
Housing units per fire unit	11,368	39,788	39,788	79,576	26,525

Sources: Seattle Fire Department Annual Report, 2022; Seattle 2035 Capital Facilities Appendix, 2020; BERK 2023.

Area 2

Northeast Seattle contains four fire stations with one engine per station as well as four other fire and EMS units. The University District Station houses the Battalion 6 vehicle as well as the one medic unit in this subarea. The most notable shortcoming of this subarea's fire station capacity is that it does not have a dedicated aid unit. There are 64,581 households in the service area so aid units and engines from elsewhere in the city respond to these emergencies. This shortcoming may increase response times and decrease service level standards. See **Exhibit 3.11-17** for stations, equipment, staffing, and ratios of fire units to dwelling units.

Exhibit 3.11-17. Stations and Fire Units in Area 2

Stations	Engines (4 Staff Per shift)	Ladders (4 Staff Per Shift)	Medic (2 Staff Per Shift)	Aid (2 Staff Per Shift)	Other Apparatus (~2 Staff Per Shift)
17, 38, 39, 40	4	2	1	0	1
Required Minimum staff per shift	16	8	2	0	2
Housing units per fire unit	16,145	32,290.5	64,581	—	64,581

Sources: Seattle Fire Department Annual Report, 2022; Seattle 2035 Capital Facilities Appendix, 2020; BERK, 2023.

130th/145th Station Area

The 130th and 145th Station Area is in Area 2, and between SFD Stations 24, 31 and 39. These stations' units include two engines, one ladder, and one air unit. Growth in the station areas could increase demand. Currently there are 2,376 housing units in the direct station area.

Exhibit 3.11-18. 130th/145th Station Area Fire Stations, Units and Minimum Required Staff

Stations	Engines (4 Staff Per shift)	Ladders (4 Staff Per Shift)	Medic (2 Staff Per Shift)	Aid (2 Staff Per Shift)	Other Apparatus (~2 Staff Per Shift)
24, 39	2	1	0	0	1
Required Minimum staff per shift	8	4	0	0	2
Fire units per 1000 housing units	.1	.03	.03	0	.05
Housing units per fire unit	1,188	2,376	—	—	2,376

Sources: Seattle Fire Department Annual Report, 2022; Seattle 2035 Capital Facilities Appendix, 2020; BERK, 2023.

Area 3

Area 3 includes Queen Anne, Magnolia, and part of Ballard's business district. The four stations within this subarea do not have any medic units or aid units and are therefore highly dependent on utilizing fire specific units and personnel for aid and medic calls or on stations elsewhere in the city. There are 36,514 housing units in this area. A large percentage of Area 3 is dedicated to non-housing uses such as commercial, industrial, and parks land. SFD staff has identified the topography of this subarea combined with the lack of more nimble fire and aid apparatuses as limiting factors on response times and levels of service (Haskell, McAuslan, 2023). Station 3 at Fisherman's Terminal houses Fire Boat Chief Seattle as well as Fireboat 1 that are dispatched to marine fires on the freshwater side of the Ballard's Hiram M. Chittenden Locks. See **Exhibit 3.11-19** for stations, equipment, and staffing.

Exhibit 3.11-19. Stations and Fire Units in Area 3

Stations	Engines (4 Staff Per shift)	Ladders (4 Staff Per Shift)	Medic (2 Staff Per Shift)	Aid (2 Staff Per Shift)	Other Apparatus (~2 Staff Per Shift)
3, 8, 20, 41	3	1	0	0	2
Required Minimum staff per shift	12	4	0	0	2
Housing units per fire unit	12,171	36,514	—	—	18,257

Sources: Seattle Fire Department Annual Report, 2022; Seattle 2035 Capital Facilities Appendix, 2020; BERK, 2023.

Area 4

Downtown Seattle has three fire stations as well as Seattle Fire Headquarters. Station 5 is home to two fire boats and a rescue boat that are dispatched to offshore emergencies within Puget

Sound. The stations also have the highest number of aid units with two full-time and two peak hour units. There are no medical units within this subarea but Medic One is located at Harborview Hospital and can easily be dispatched to Area 4. Seattle Fire Headquarters is also home to the Health One program. Health One is an integrated health response unit that can respond to physical or mental health crises and provides social services to those in distress. This unit is staffed by two firefighters and social workers and includes three truck units.

Most of the land area is dedicated to major institutions, commercial properties, and multifamily dwellings. The estimated 51,611 multifamily housing units that make up this area have much stricter fire codes than the estimated 451 single family homes and typically require more aid dispatches than fire dispatches. See **Exhibit 3.11-20** for stations, equipment, and staffing.

Exhibit 3.11-20. Stations and Fire Units in Area 4

Stations	Engines (4 Staff Per shift)	Ladders (4 Staff Per Shift)	Medic (2 Staff Per Shift)	Aid (2 Staff Per Shift)	Other Apparatus (~2 Staff Per Shift; 3 for Health One*)
2, 5, 10, Headquarters	3	2	0	4	6
Required Minimum staff per shift	12	8	0	8	15
Housing units per fire unit	17,354	26,031	—	13,015.5	8,677

*Health one is only staffed Monday-Friday during daytime hours rather than the traditional four shift schedule.
Sources: Seattle Fire Department Annual Report, 2022; Seattle 2035 Capital Facilities Appendix, 2020; BERK, 2023.

Area 5

The central east study area has four fire stations as well as Medic One based in the Harborview Medical Center on First Hill. This area is 64% residential by area with an estimated 12,445 single family units and 57,725 multifamily units. Medic One houses the Battalion 3 vehicle as well as three medic units. The area's aid unit as well as the Battalion 2 vehicle are based at Capitol Hill Station. There is also the SFD Communications Van based at Roanoke Station and the HOSE34 hose and foam unit at Madison Park Station. See **Exhibit 3.11-21** for stations, equipment, staffing, and ratios of fire units to dwelling units.

Exhibit 3.11-21. Stations and Fire Units in Area 5

Stations	Engines (4 Staff Per shift)	Ladders (4 Staff Per Shift)	Medic (2 Staff Per Shift)	Aid (2 Staff Per Shift)	Other Apparatus (~2 Staff Per Shift)
6, 22, 25, 34, MED ONE	4	2	3	1	3
Required Minimum staff per shift	16	8	6	2	6
Housing units per fire unit	17,543	35,085	23,390	70,170	23,390

Source: Seattle Fire Department Annual Report, 2022; Seattle 2035 Capital Facilities Appendix, 2020; BERK, 2023.

Area 6

The West Seattle study area contains four stations serving an estimated 21,595 multi-family housing units and 24,905 single-family units. This subarea is also the second largest by acreage and has no aid units. Like in other subareas and station areas, existing units have been operating outside of the intended use in order to meet SFD's level of service standard and response time standard. These stations have benefited from the additional units being relocated within and near the study area. One Ladder unit was placed at West Seattle Station and a medic unit was placed in Area 7 to serve the West Seattle Bridge Closure. Both movements were originally temporary but were later made permanent by Seattle City Council. See **Exhibit 3.11-22** for stations, equipment, staffing, and ratios of fire units to dwelling units.

Exhibit 3.11-22. Stations and Fire Units in Area 6

Stations	Engines (4 Staff Per shift)	Ladders (4 Staff Per Shift)	Medic (2 Staff Per Shift)	Aid (2 Staff Per Shift)	Other Apparatus (~2 Staff Per Shift)
11, 29, 32, 37	4	2	1	0	1
Required Minimum staff per shift	16	8	2	0	2
Housing units per fire unit	11,625	23,250	46,500	—	46,500

Source: Seattle Fire Department Annual Report, 2022; Seattle 2035 Capital Facilities Appendix, 2020; BERK, 2023.

Area 7

The Greater Duwamish MIC, Georgetown, and South areas are supported by four fire stations in South Park, SoDo, Delridge/Harbor Island, and Georgetown. See **Exhibit 3.11-23**. This is a predominantly industrial area with unique apparatuses to support industrial uses. Examples include SFDs Rescue One Technical Rescue Team which include DECON1 and REHAB1 apparatuses. An additional medic unit was moved to Station 26 in South Park in response to the West Seattle Bridge closure and now permanently supports the ~2,287 dwellings in the area.

Exhibit 3.11-23. Stations and Fire Units in Area 7

Stations	Engines (4 Staff Per shift)	Ladders (4 Staff Per Shift)	Medic (2 Staff Per Shift)	Aid (2 Staff Per Shift)	Other Apparatus (~2 Staff Per Shift)
14, 26, 27, 36	3	1	1	1	2
Required Minimum staff per shift	12	4	2	2	4
Housing units per fire unit*	762	2,287	2,287	2,287	1,143.5

Source: Seattle Fire Department Annual Report, 2022; Seattle 2035 Capital Facilities Appendix, 2020; BERK, 2023.
* Note: this is a predominantly industrial area and its units reflect the needs of industrial firefighting rather than residential firefighting needs—additional assessment of unit needs in **Exhibit 3.11-40**.

Area 8

The Southeast Seattle Subarea is serviced by four fire units and runs from I-90 to Rainier Beach East of I-5. These fire units service about 22,183 single family units and 17,521 multifamily units. This subarea takes up most of the land area within Fire Battalion 5 jurisdiction and none of the four stations have an aid car. The Mount Baker Station does house one of SFDs AIR units to provide supplemental breathing equipment for fire calls and Station 28 in the Rainier Valley houses Medic28 which provides life support dispatches.

Exhibit 3.11-24. Stations and Fire Units in Area 8

Stations	Engines (4 Staff Per shift)	Ladders (4 Staff Per Shift)	Medic (2 Staff Per Shift)	Aid (2 Staff Per Shift)	Other Apparatus (~2 Staff Per Shift)
13, 28, 30, 33	4	1	1	0	2
Required Minimum staff per shift	12	4	2	0	4
Housing units per fire unit	9,926	39,704	39,704	—	19,852

Source: Seattle Fire Department Annual Report, 2022; Seattle 2035 Capital Facilities Appendix, 2020; BERK, 2023.

Parks

Information about open space and recreation was collected from Seattle Parks and Recreation (SPR) and the Seattle Parks District. Plans and studies referenced include system wide plans particularly those that guide the location and use of parks, trails, and centers serving the broader public:

- Seattle Parks and Recreation Strategic Plan (2020),
- Seattle Parks and Recreation 2022-2024 Action Plan (2022),
- Parks and Open Space Plan (POS) (2017),
- Seattle Shoreline Master Program (2015),

Seattle Comprehensive Plan (2015). These plans set levels of service offered to Seattle community members today and in the long term. The City is in the process of updating its POS Plan by 2024 in parallel with the One Seattle Plan Update.

Planning Framework

This section summarizes the policies and strategies of the City's plans that guide the provision of facilities and access to parks and shorelines.

Parks & Recreation Strategic Plan (2020)

The strategic plan sets a direction for the 12 year period 2020-2032, recognizing the rapid resident and employment growth of the 2015-2020 period and lack of equity. The vision and key strategies are under five key elements:

- **Pathway to Equity:** Seattle Parks and Recreation envisions programs, policies, and funding that create equitable outcomes, as well as strategies and actions that show measurable results toward our vision of healthy people, a healthy environment, and strong communities.
  - Steps to equity include: (1) developing an equity and engagement plan to implement equity goals, (2 and 6) developing an equity scorecard and map for resource allocation and planning and department performance, (3) revamping Race and Social Justice Initiative Outcomes, (4) training Seattle Parks and Recreation staff on pathway to equity, (5) conducting robust and culturally responsive engagement.
- **Healthy People:** Healthy people are active and moving around, feel safe and welcomed in public spaces across the city, have access to affordable, fresh food, and practice healthy habits that prevent disease and enhance physical and mental well-being.
  - In summary, nine implementing strategies address: (1) access to parks and recreation to all ages, (2) universal design, (3) quality spaces and facilities, (4) information about health and activity, (5) accessible public space and/or high quality recreation programs within a 10-minute walk of all residents, (6) increasing connection to nature for underserved communities, (7) improving equity in design and placement of community centers, (8) provide multifunctional spaces, and (9) increasing resilience of urban food system and access to fresh food.
- **Healthy Environment:** Seattle becomes a national leader in mitigating climate change impacts, stewarding and protecting our urban forests and natural spaces, promoting environmental responsibility and environmental justice, and building resilient infrastructure.
  - Ten strategies include in summary: (1) managing water resources through conservation and landscaping, (2) reducing waste, (3) creating a carbon-neutral park system, (4) develop new target for urban forest goal, (5) preserve parkland and open space, (6) providing a year-round system to respond to extreme climate events (heat, smoke), (7) improving connectivity, (8) increase alternative energy and technologies, (9) program and events for natural environment appreciation, (10) acquire land responsibly focusing on urban centers and underserved areas.
- **Strong Communities:** A strong Seattle community affords universal access to housing, living-wage jobs, education, and safe spaces to congregate and forge social connections. Children have support for success in school and in life, adults have access to employment and economic opportunity, and all ages feel part of a connected, vibrant city.
  - Eleven strategies include: (1) extended academic enrichment opportunities, (2) support childcare and programming, (3) increase free programming and streamline registration, (4) level grant programs and build capacity in underserved areas, (5) improve safety at

parks, (6) address homelessness through parks-based job-training and respectful cleaning of unsanctioned encampments, (7) bringing people together at events, (8) increase communication and outreach about programs, (9) reexamine partnerships and strengthen volunteer programs, (10) enhance economic opportunities through apprenticeships and green economy employment, and (11) increase cleanliness and safety of public restrooms.

- **Organizational Excellence:** The City of Seattle is managed by a world-class local government with a high-quality, well-trained workforce that operates with a focus on excellence and professionalism, collaborates with community and partners, equitably delivers essential services, adapts to changing best practices, and embraces new technology and innovative ideas.
  - In summary, the ten strategies: (1) develop and implement an equity strategy, (2) seek national accreditation, (3) have an appropriately sized workforce, (4) invest in training, (5) update systems and technology, (6) have ongoing engagement of vulnerable populations, (7) advance innovation, (8) collaborate with public and private partners to address livability, affordability, homelessness, and the environment, (9) address preventative maintenance, and (10) have a new structure to advisory committees and maximize engagement opportunities.

Seattle Parks & Recreation 2022-2024 Action Plan

After a pivot to pandemic response in 2020, in 2021 Seattle Parks and Recreation sought to engage with communities and develop short-term budget and priorities and operational goals. This action planning work focused on addressing four parallel crises within the city and to Seattle Parks and Recreation services:

- Public Health and Well Being
- Racial Equity
- Economic Recovery
- Impacts of Climate Change

The actions and goals identified within the 2022-2024 Action Plan highlight how Seattle Parks and Recreation intends to move address each of the immediate crises above by making specific progress on the five key elements identified in the Park & Recreation Strategic Plan.

Parks Open Space (POS) Plan (2017)

The City of Seattle POS Plan (2017) includes five major goals:

- **Goal 1:** Provide a variety of outdoor and indoor spaces throughout the city for all people to play, learn, contemplate, and build community.
- **Goal 2:** Continue to provide opportunities for all people across Seattle to participate in a variety of recreational activities.
- **Goal 3:** Manage the city's park and recreation facilities to provide safe and welcoming places.

- **Goal 4:** Plan and maintain Seattle's parks and facilities to accommodate park users and visitors.
- **Goal 5:** Engage with community members on parks and recreation plans, and design and develop parks and facilities, based on the specific needs and cultures of the communities that the park is intended to serve.

Shoreline Master Program Public Access

The Comprehensive Plan includes shoreline access goals and policies that are considered part of the Shoreline Master Program. Selected goals and policies addressing shoreline access include a general goal to maximize physical and visual access, enhancing views, and promoting street ends.

> *LUG44 Maximize public access—both physical and visual—to Seattle's shorelines.*
>
> *LUG45 Preserve and enhance views of the shoreline and water from upland areas, where appropriate.*
>
> *LU238 Maintain standards and criteria for providing public access, except for lots developed for single-family residences, to achieve the following:*
>
> *1. linkages between shoreline public facilities via trails, paths, etc., that connect boating and other recreational facilities.*
>
> *2. visible signage at all publicly owned or controlled shorelines and all required public access on private property.*
>
> *3. development of bonuses or incentives for the development of public access on private property, if appropriate.*
>
> *4. provision of public access opportunities by public agencies such as the City, Port of Seattle, King County and the State at new shoreline facilities and encourage these agencies to provide similar opportunities in existing facilities.*
>
> *5. view and visual access from upland and waterfront lots.*
>
> *6. prioritize the operating requirements of water-dependent uses over preservation of views.*
>
> *7. protection and enhancement of views by limiting view blockage caused by off-premise signs and other signs.*
>
> *LU240 Shoreline street ends are a valuable resource for public use, access and shoreline restoration. Design public or private use or development of street ends to enhance, rather than reduce, public access and to restore the ecological conditions of the shoreline transportation in the shoreline.*

Level of Service (LOS)

The City of Seattle sets level of service (LOS) standards for open space and recreation across the City. The Seattle 2035 Comprehensive Plan states in policy P 1.2 "Provide a variety of parks and open space to serve the city's growing population consistent with the priorities and level-of-

service standards identified in the City's Park Development Plan" now called the Parks and Open Space Plan (Seattle Parks and Recreation 2017).

The 2017 Parks and Open Space Plan includes level-of-service standard of 8 acres per 1,000 residents (Seattle Parks and Recreation 2017). The assumption of 8 acres of park and recreation facilities per 1,000 residents is used throughout this impacts analysis to open space and recreation. See **Exhibit 3.11-25**. Seattle Parks and Recreation has initiated a process to update and adopt a new Parks and Open Space Plan by March 2024. This update considers changes to the level-of-service standard. The 2024 Parks and Open Space Plan Update proposes to change the Level of Service (LOS) from an acres per 1,000 people standard to providing parks and park facilities within a 10-minute walk.

Exhibit 3.11-25. Seattle's Projected Population to Acres of City-owned Parkland Comparison

Year	Seattle's Population	Acres of Parkland (2017)	Acres/1,000 residents
2016	686,800	6,414 acres	9.34 acres/1,000 residents
2023	731,012 (projected)*	6,414 acres**	8.77 acres/1,000 residents
2035	806,800 (projected)*	6,454 acres (minimum)	8.00 acres/1,000 residents

Notes: *Assumption is that Seattle's population will increase by approximately 6,316 individuals annually.
** This model assumes parkland levels stay at the current acreage for comparison purposes. As noted below land acquisition is often opportunity driven, however SPR anticipates the acquisition of additional parkland before 2023 based on its prior history of acquisition and ongoing negotiating on several properties. The 2024 Parks and Open Space Plan update shows 6,478 acres as of 2024.
Source: Seattle POS Plan, 2017.

The POS plan also identified a long-term acquisition strategy for natural areas, and parks in a 5-minute walk in urban centers and areas outside urban centers with a 10-minute walk. See **Exhibit 3.11-26**.

Exhibit 3.11-26. Long-Term Acquisition Strategy

Strategy	Locations	
5-minute Walkability—Within Urban Centers	Aurora-Licton Springs	North Beacon Hill
	Bitter Lake	Columbia City
	Northgate	Othello
	Ballard	Rainier Beach
	First Hill	South Park
	Fremont,	West Seattle Junction
	12th Avenue	Morgan Junction
	North Rainier	Westwood-Highland Park
Natural Area/Greenbelt Acquisition	200 + prioritized properties	
10-minute Walkability Outside Urban Centers Underserved	Georgetown neighborhood and Bitter Lake/Aurora area	

Source: Seattle POS Plan, 2017 and 2024.

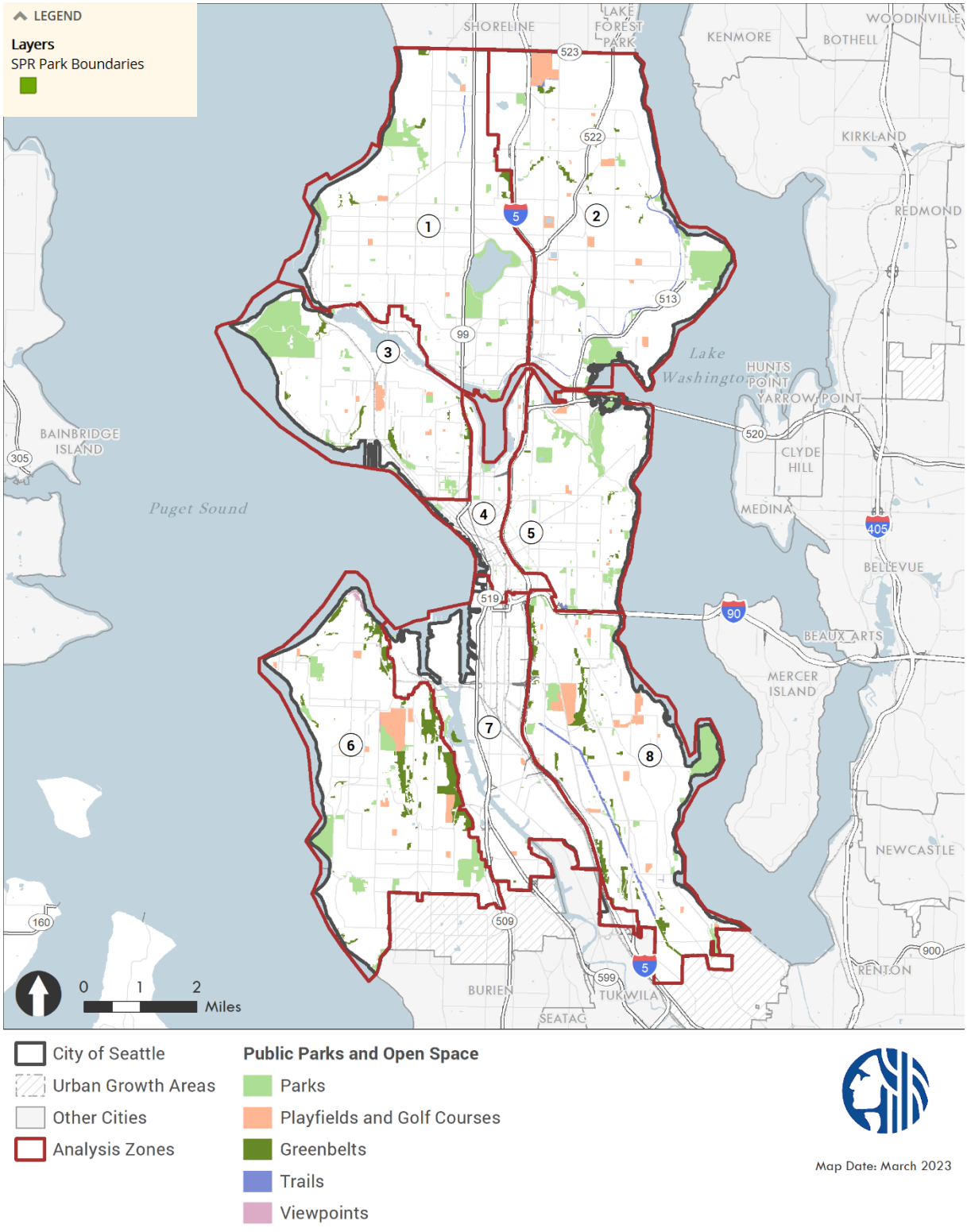
Current Conditions

Citywide

Seattle Parks and Recreation (SPR) manages a 6,478-acre park system with over 485 parks and natural areas. This system includes athletic fields, play areas, gardens, trails, facilities and community centers, swimming pools, education centers, golf course, and skateparks. The SPR system comprises about 12% of Seattle's land area.

The study area, the subareas, and the parks and recreation facilities available are identified in the map below (see **Exhibit 3.11-27**).

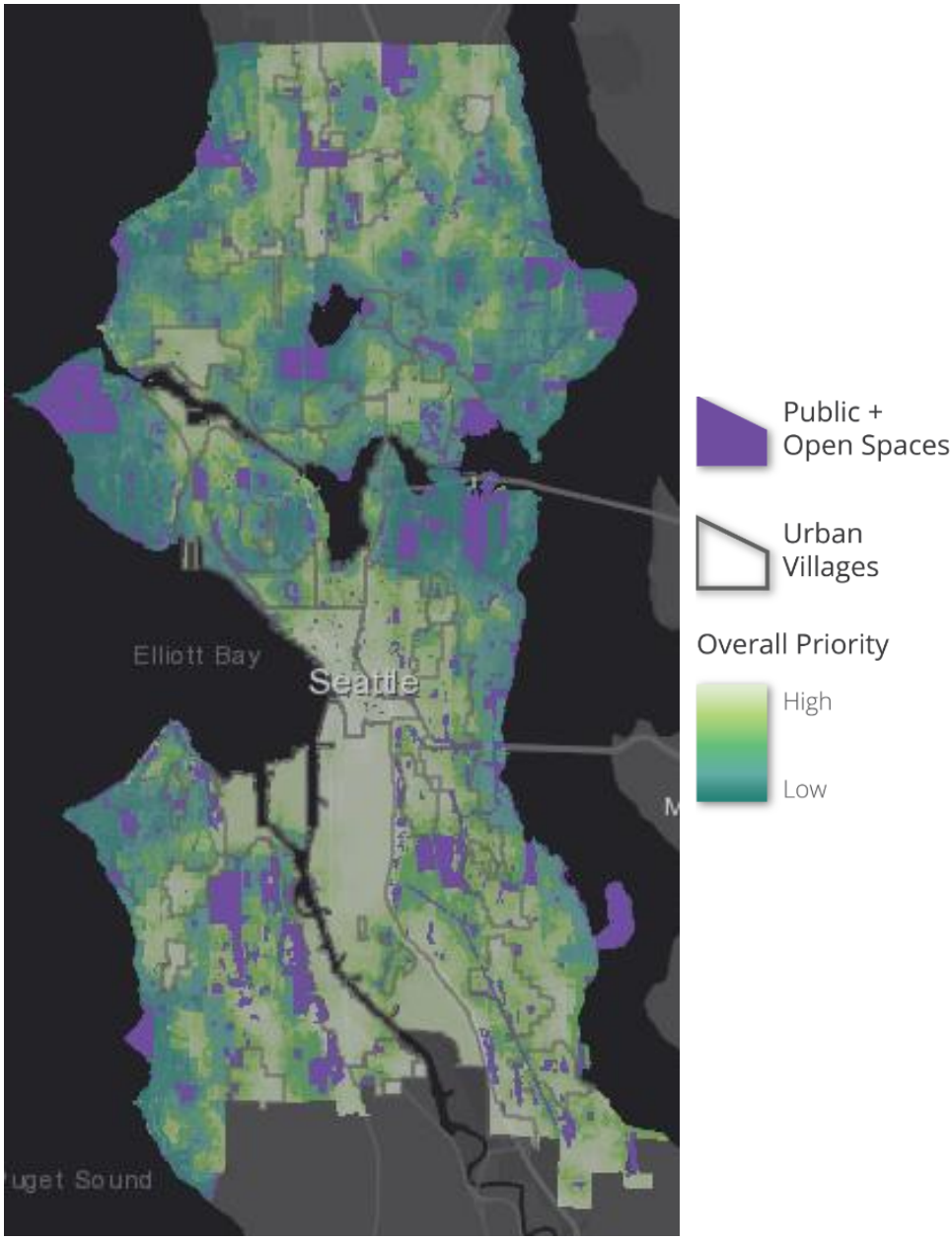
Exhibit 3.11-27. City and Study Area Parks and Recreation Facilities



Sources: Seattle POS Plan, 2017; BERK, 2023.

In 2020, OPCD developed an "Outside Citywide" map tool considering access to open spaces at city, county, state, and federal governments, special districts like schools and the Port, and other private space. Based on race and social equity, density and growth, and health outcomes, the City identified priority areas for public space provision. See **Exhibit 3.11-28**. Areas with poor access include many of those referenced in **Exhibit 3.11-26**. More notably, Ballard, Greenwood-Phinney Ridge, Aurora-Licton Springs, Lake City, Northgate, and Morgan Junction. The Greater Duwamish Manufacturing and Industrial Center (MIC) is also an area lacking parks and open space.

Exhibit 3.11-28. Outside Citywide Access—Public Space Priority Areas



Source: Seattle Parks and Recreation, 2020.

Analysis Areas

Maps of parkland by area are included in **Appendix I**. A summary of key park features by analysis area is provided below.

Area 1: NW Seattle

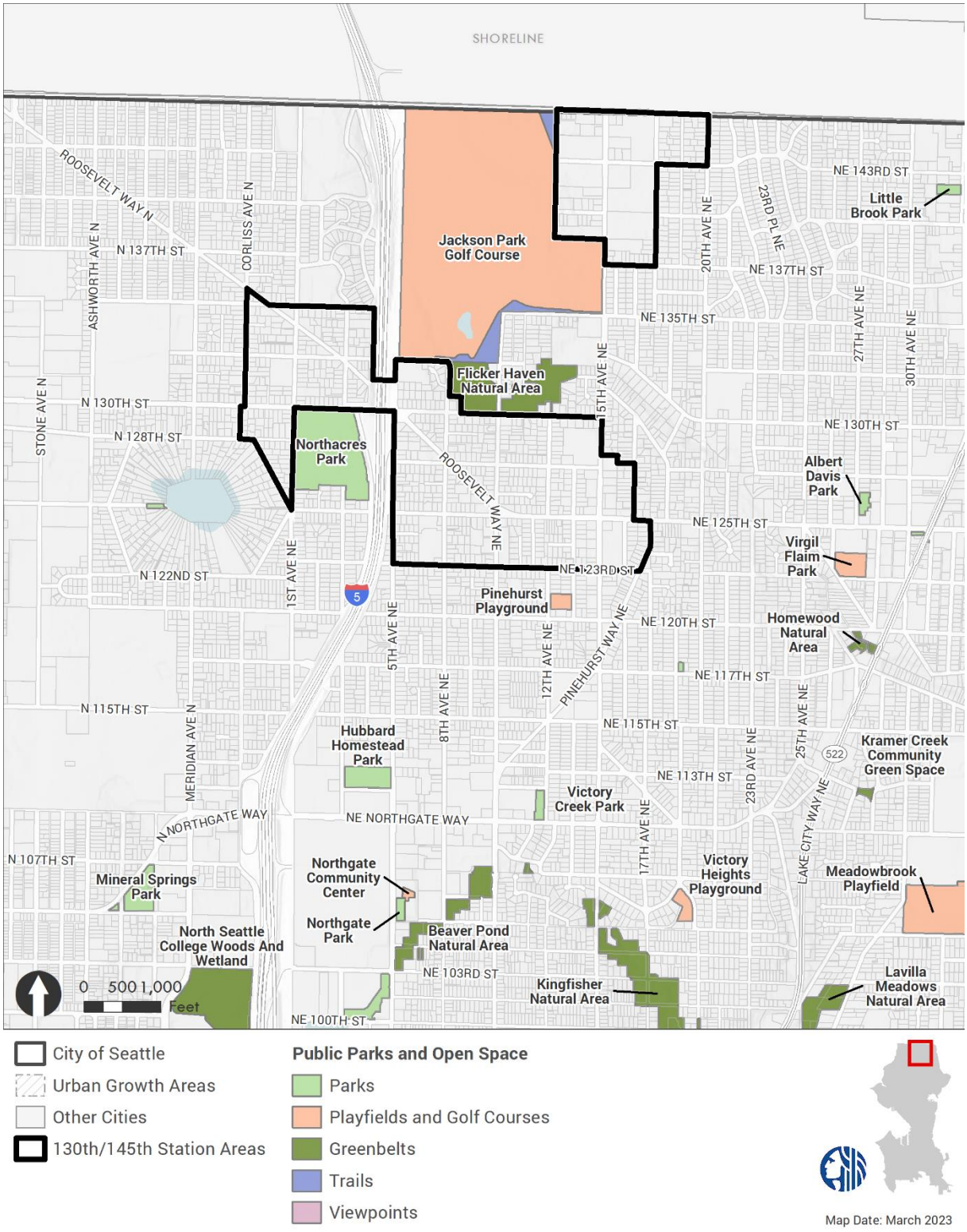
Major open spaces in Area 1 include: Carkeek and Golden Gardens along Puget Sound, as well as Greenlake and Woodland Park Zoo, Gas Works Parks as well as the Shilshole Bay Marina (Port of Seattle).

Area 2: NE Seattle

Major parks and open space in Area 2 include Jackson Park Golf Course, Warren G. Magnuson Park, the University of Washington east campus which includes a golf driving range, intramural fields and the Union Bay Natural Area, Ravenna Park, Maple Leaf Reservoir Park, Northeast Sports Complex—Nathan Hale High School (Seattle Public Schools), and others. Priority areas for public space include Northgate, Lake City, and NE 45th Street west of the University of Washington campus.

130th/145th Station Area. In the 130th/145th Station Area, the largest park and open space is Jackson Park Golf Course & Trail. Other parks in the area include Northacres Park, Licorice Fern Natural Area, Pinehurst Playground, Virgil Flaim Park, Albert Davis Park, Haller Lake Street End Park, Northwest Sports Complex (Ingraham High School—Seattle Public Schools) and others such as the North Seattle College Barton Woods wetland and campus landscape. The Evergreen Washelli Cemetery (private) is also located west of this area providing open space. Several P-Patches provide fresh food access and open space. See **Exhibit 3.11-29**.

Exhibit 3.11-29. 130th/145th Station Study Area Parks and Open Spaces



Source: City of Seattle 130th & 145th Street Station Area Background Report, 2021; BERK, 2023.

Area 3: Queen Anne/Magnolia

Area 3 includes Discovery Park, Interbay Golf Course and Athletic Field, West Seattle Playfield and Community Center, Myrtle Edwards Park, Magnolia Boulevard, Queen Anne Boulevard, Kinnear Park, David Rodgers Park, and Centennial Park (Port of Seattle). Priority areas for parks include the BINMIC area and some parts of the Uptown Urban Center.

Area 4: Downtown/Lake Union

Area 4 contains Lake Union Park, Denny Park, Cascade Playground, Olympic Sculpture Park, Victor Steinbrueck Park, Waterfront Park, City Hall Park, Hing Hay Park, Danny Woo Garden and Kobe Terrace, Occidental Square, various public plazas, Memorial Stadium (Seattle Public Schools) and Port of Seattle piers. Most of the Downtown Urban Center is an area of priority public space needs.

Area 5: Capitol Hill/Central District

Area 5 includes Washington Park and Arboretum, Interlaken Park, Volunteer Park, Cal Anderson Park, Garfield Playfield, Madrona Park, Leschi Park, Frink Park, Sam Smith Park, Judkins Park and Playfield, and Judge Charles M. Stokes Overlook, East Duwamish Greenbelt, among other small neighborhood parks. The west side of the First Hill/Capitol Hill Urban Center and part of the Madison-Miller and 23rd & Union-Jackson Urban Centers have areas less well served by parks; see **Exhibit 3.11-27**.

Area 6: West Seattle

Area 6 includes Lincoln Park, Alki Beach Park, Hamilton Viewpoint Park, Don Armeni Park, Schmitz Preserve Park, Alki Playground, West Seattle Golf Course, Camp Long, Me-Kwa-Mooks Park, Riverview Playfield, Westcrest Park, Roxhill Park, Southwest Athletic Complex (Seattle Chief Sealth International High School—Seattle Public Schools), Fauntleroy Park, Seola Park, and several natural areas and greenbelts along creeks and hillsides. The West Seattle Junction, Morgan Junction, and Westwood Highland Park are areas that could benefit from additional parks and open space.

Area 7: Duwamish

The Greater Duwamish MIC, Georgetown, and South Park areas in Area 7 have some shoreline access on Port of Seattle property and as well as parks, playfields and greenbelts such as Georgetown Playfield, Ruby Chow Park, Georgetown Urban Farm and Forest, South Park Playground, South Park Meadow, and Marra-Desimone Park. The South Park Urban Center and much of the MIC is considered a priority for public space.

Area 8: SE Seattle

Area 8 includes parks along the Lake Washington shoreline like Colman Park, Seward Park, Martha Washington Park, Pritchard Island Beach, as well as parks within the central residential area like Jefferson Park, Jefferson Golf Course, Maplewood Playfield, Chief Sealth Trail (Seattle City Light), Van Asselt Playground, Kubota Gardens, Lakeridge Park, Southeast Sports Complex (Rainier Beach High School—Seattle Public Schools) and other greenbelts. Priority locations for public access include areas abutting I-5 and Rainier Avenue South, as well as portions of the Mt. Baker/North Rainier, North Beacon Hill, Columbia City, Othello, and Rainier Beach Urban Centers.

Schools

The information about schools was collected from:

- Seattle Public Schools
- Seattle Preschool Program
- Washington Office of Superintendent of Public Instruction
- King County Assessor Parcel Records

Planning Framework

Seattle 2035

Seattle's Comprehensive Plan includes several goals related to education, including:

- ***Capital Investments & Schools:***

  CF 5.3 Partner with Seattle Public Schools to plan for expected growth in student population, explore opportunities to reduce the costs of developing new schools, encourage the siting of new school facilities in or near urban centers and villages, and make it easy for students and families to walk and bike to school.

  AC 4.4 Encourage the adaptive reuse of historic community structures, such as meeting halls, schools, and religious buildings, for uses that continue their role as neighborhood centers.

  AC 4.6 Encourage partnerships to use public and institutional spaces, such as parks, community centers, libraries, hospitals, schools, universities, and City-owned places, for arts, musicians, and culture.

  CW 4.6 Work with schools, higher education institutions, libraries, community centers, and arts and cultural agencies and organizations to link services into a seamless system that helps students stay in school, such as through collocation of services and joint use of facilities.

  CW 7.8 Encourage use of existing facilities and collocation of services, including joint use of schools and City and community facilities, to make services available in underserved areas and in Uran Center areas.

LU G3 Allow public facilities and small institutions to locate where they are generally compatible with the function, character, and scale of an area, even if some deviation from certain regulations is necessary.

- ***Access to Education, Recreation, & Cultural Access:***

  CW 4.1 Create equitable access to high-quality early-learning services, and support families so that their children are prepared for school.

  CW 4.9 Work with colleges, universities, other institutions of higher learning, and community-based organizations to promote lifelong learning opportunities and encourage the broadest possible access to libraries, community centers, schools, and other existing facilities throughout the city.

  CW 4.10 Work with schools, libraries, and other educational institutions, community-based organizations, businesses, labor unions, and other governments to develop strong educational and training programs that provide pathways to successful employment.

  AC G3 Improve access to arts and music education in all schools and outside the school setting so that students are prepared to be successful in school and life.

  P 1.9 Use cooperative agreements with Seattle Public Schools and other public agencies to provide access to open spaces they control.

  H 1.4 Remove barriers that prevent lower-income households from using rental assistance throughout Seattle, particularly in areas with frequent transit, schools, parks, and other amenities.

130th/145th Station Area Plan

The 130th/145th Station Area Plan includes several strategies related to education and schools:

Strategy 3.2 Consider partnerships to expand public access to private recreational facilities and gathering spaces associated with schools and faith communities.

Strategy 8.3 Connect key community destinations like parks, schools, and businesses with multimodal improvements to enhance neighborhood circulation.

Strategy 11.4 Share information with Seattle Public Schools about affordable housing developments to promote and market affordable housing to eligible families within the service area of local schools.

Current Conditions

Citywide

The Seattle School District serves the city as a whole with 103 schools, including:

- 63 Elementary Schools
- 10 K-8 Schools

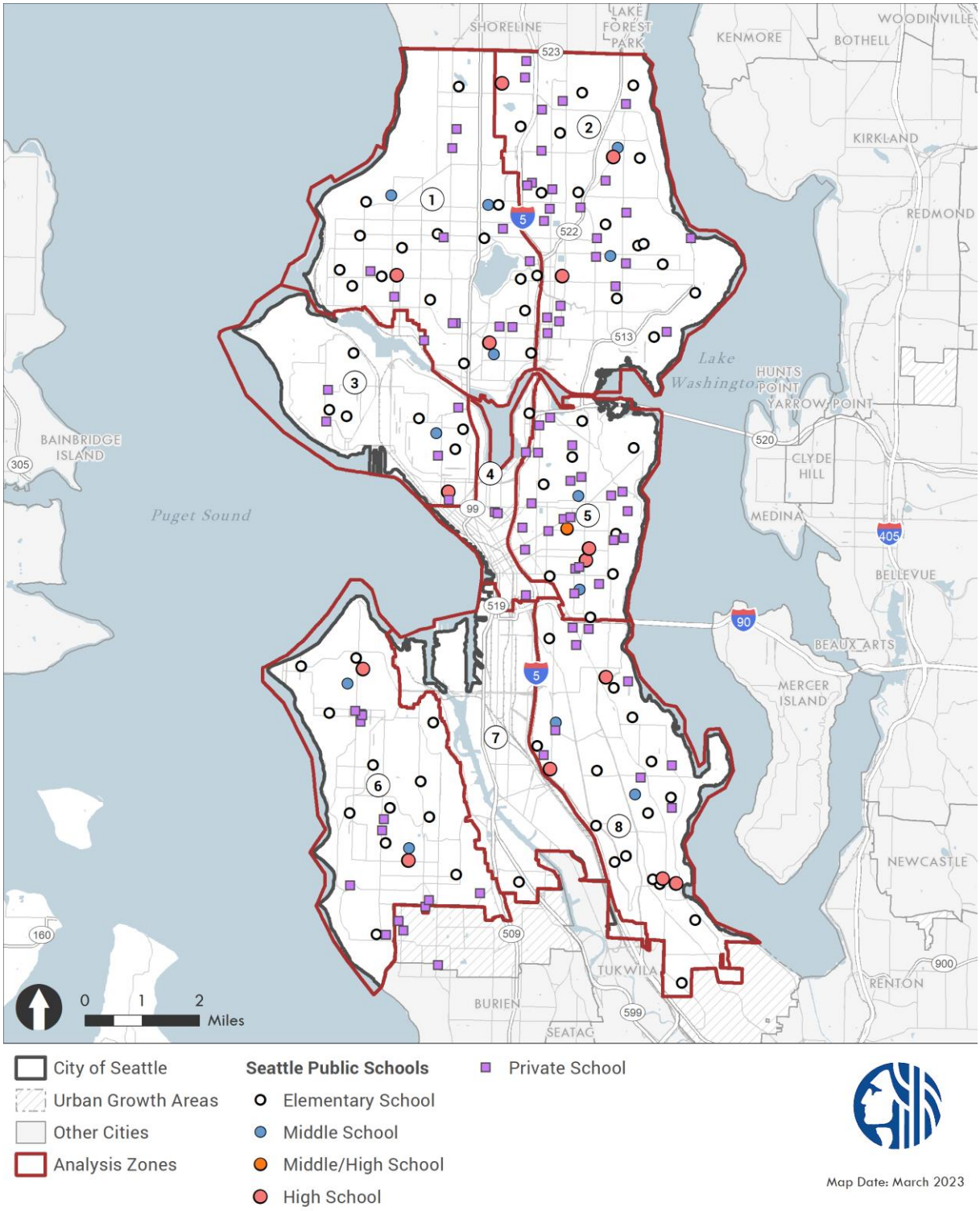
- 12 Middle Schools
- 18 High Schools (including Middle College, Interagency, South Lake, and Skills Center)

The Seattle School District employs 5,955 educators at school sites. There are currently about 23,691 elementary, 11,001 middle, and 15,364 high school students enrolled. The students are 46% white and 54% persons of color. The top languages spoken other than English include Spanish, Somali, Vietnamese, Chinese (Cantonese), Amharic, Oromo, Tigrinya, Chinese (Mandarin), Japanese, and Arabic (Seattle Public Schools 2022). The Seattle School District Administrative offices are in Area 7. Seattle Public Schools also hosts many pre-k programs in their facilities.

Private schools include secular and religious schools, found in every analysis area.

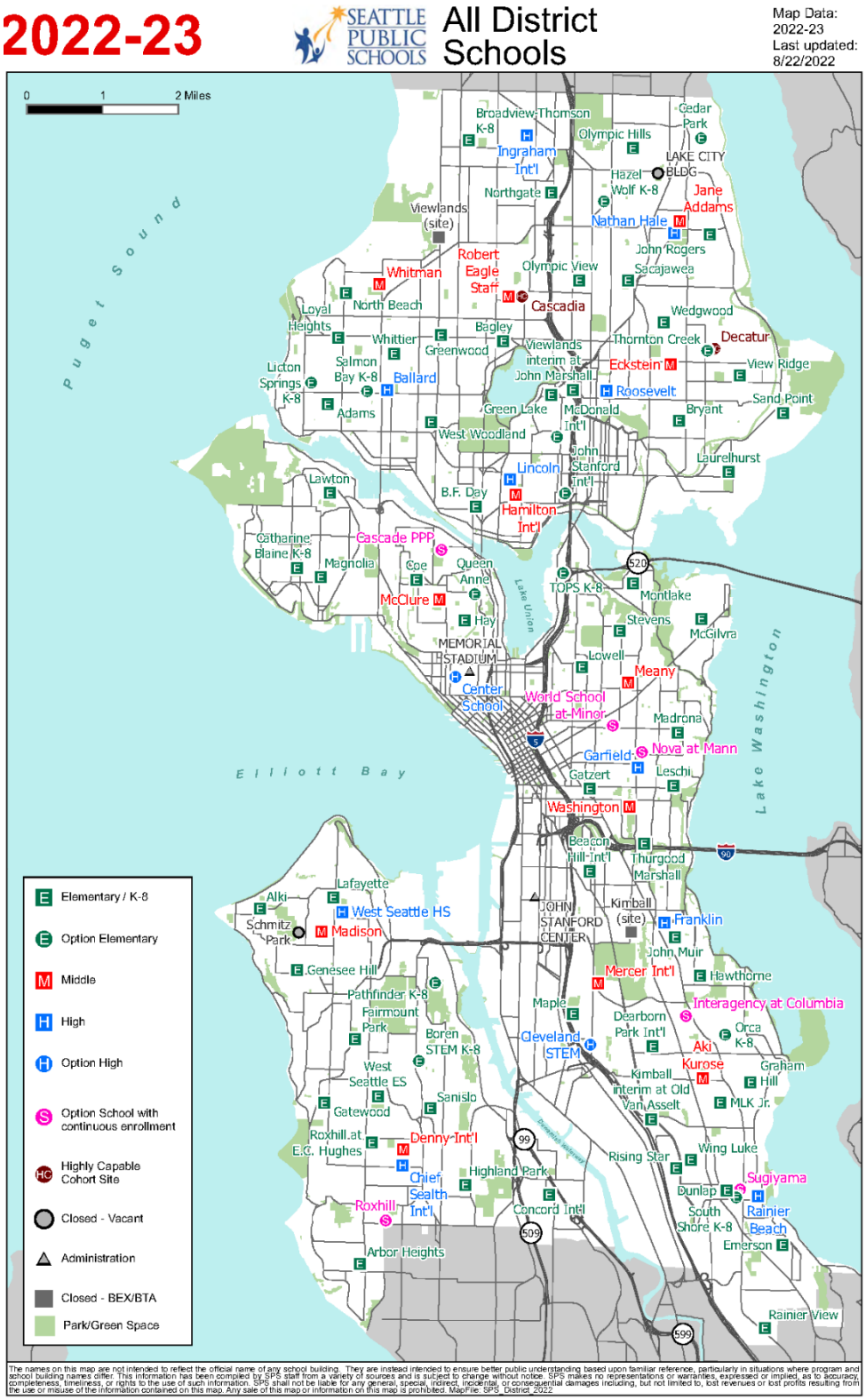
See **Exhibit 3.11-30** and **Exhibit 3.11-31**.

Exhibit 3.11-30. Public and Private Schools in City and Study Areas



Source: King County GIS, 2023; BERK, 2023.

Exhibit 3.11-31. Seattle Public Schools: All District Schools



Source: Seattle School District, 2022.

Capacity at each school and current enrollment is shown in **Exhibit 3.11-32**. Most schools' capacities are higher than current enrollment. In a few instances, capacity is less than enrollment which may require portables. Schools with capacities less than enrollment by more than 10 students include: Lincoln High School, Hazel Wolf K-8, Stevens Elementary School, and Graham Hill Elementary School.

Exhibit 3.11-32. Public Schools, Enrollment, and Capacity by Area

School Name	All Students (2022-23)	Operational Analysis Capacity (2022-2023)	Capital Projects for permanent capacity (2022-2025)
Area 1: NW Seattle			
Adams Elementary School	318	549	
B F Day Elementary School	355	423	
Ballard High School	1,555	1,805	
Broadview-Thomson K-8 School	519	661	
Cascadia Elementary	473	612	
Daniel Bagley Elementary School	322	503	
Green Lake Elementary School	324	387	
Greenwood Elementary School	322	345	
Hamilton International Middle School	927	978	
Licton Springs K-8	98	360	
Lincoln High School	1,632	1,600	X
Loyal Heights Elementary School	502	572	
North Beach Elementary School	340	387	
Robert Eagle Staff Middle School	677	1000	
Salmon Bay K-8 School	660	685	
Viewlands Elementary School	272	351	X
West Woodland Elementary School	398	643	
Whitman Middle School	681	1,033	
Whittier Elementary School	363	471	
Area 2: NE Seattle			
Bryant Elementary School	484	549	
Cedar Park Elementary School	204	283	
Eckstein Middle School	1,047	1,044	
Hazel Wolf K-8	725	658	
Ingraham High School	1,418	1796	
Jane Addams Middle School	885	1175	
John Rogers Elementary School	249	342	X
John Stanford International School	429	437	
Laurelhurst Elementary School	273	369	
McDonald International School	459	471	
Nathan Hale High School	1,081	1,225	
Northgate Elementary School	191	252	X
Olympic Hills Elementary School	453	525	
Olympic View Elementary School	361	458	

School Name	All Students (2022-23)	Operational Analysis Capacity (2022-2023)	Capital Projects for permanent capacity (2022-2025)
Roosevelt High School	1,502	1765	Funding for design only
Sacajawea Elementary School	195	274	X
Sand Point Elementary	160	276	
Stephen Decatur Elementary School	209	291	
Thornton Creek Elementary School	420	586	
View Ridge Elementary School	302	538	
Wedgwood Elementary School	354	478	
Area 3: Queen Anne/Magnolia			
Cascade Parent Partnership Program (North Queen Anne School)	349	unk	X
Catharine Blaine K-8 School	452	749	
Frantz Coe Elementary School	454	503	
John Hay Elementary School	270	477	
Lawton Elementary School	336	479	
Magnolia Elementary School	320	460	
McClure Middle School	428	630	
Queen Anne Elementary	205	500	
The Center School	230	300	
Area 5: Capitol Hill/Central District			
Bailey Gatzert Elementary School	311	336	
Edmonds S. Meany Middle School	512	850	
Garfield High School	1,577	1,619	
Leschi Elementary School	276	330	X
Lowell Elementary School	322	333	
Madrona K-5 School	226	390	
McGilvra Elementary School	223	278	
Montlake Elementary School	184	251	X
Nova High School	285	400	
Seattle World School	179	360	
Stevens Elementary School	176	283	
Tops K-8 School	478	446	
Washington Middle School	555	794	
Area 6: West Seattle			
Alki Elementary School	295	336	X
Arbor Heights Elementary School	487	635	
Chief Sealth International High School	1,178	1455	
David T. Denny International Middle School	816	949	
Fairmount Park Elementary School	413	516	
Gatewood Elementary School	372	464	
Genesee Hill Elementary	523	664	
Highland Park Elementary School	289	306	
Lafayette Elementary School	469	497	
Louisa Boren STEM K-8	468	576	

School Name	All Students (2022-23)	Operational Analysis Capacity (2022-2023)	Capital Projects for permanent capacity (2022-2025)
Madison Middle School	984	1190	X
Pathfinder K-8 School	465	460	
Roxhill Elementary School	243	336	
Sanislo Elementary School	175	264	
West Seattle Elementary School	347	432	X
West Seattle High School	1,301	1357	
Area 7: Duwamish			
Concord International School	291	333	
Area 8: SE Seattle			
Aki Kurose Middle School	773	900	Funding for design only
Alan T. Sugiyama High School	31	250	
Beacon Hill International School	344	407	
Cleveland High School STEM	846	965	
Dearborn Park International School	304	354	
Dunlap Elementary School	242	303	
Emerson Elementary School	307	396	
Franklin High School	1,174	1,398	
Graham Hill Elementary School	268	391	
Hawthorne Elementary School	364	351	
John Muir Elementary School	318	342	X
Kimball Elementary School	379	408	X
Maple Elementary School	434	468	
Martin Luther King Jr. Elementary School	239	336	
Mercer International Middle School	854	1296	X
Orca K-8 School	398	456	
Rainier Beach High School	791	1,088	X
Rainier View Elementary School	240	270	
Rising Star Elementary School	309	480	
South Shore PK-8 School	558	705	
Thurgood Marshall Elementary	464	543	
Wing Luke Elementary School	282	500	
Citywide			
Bridges Transition	128	n/a	
Interagency Detention School	18	n/a	
Interagency Open Doors	84	n/a	
Interagency Programs	194	n/a	
Middle College High School	96	n/a	
Private School Services	180	n/a	
Total	**50,222**	**61,302**	

Sources: Seattle Public Schools 2023; OSPI Student Information, 2023.

Seattle Preschool Program

The Seattle Preschool Program (SPP) is levy-funded and provides an evidence-based preschool program through the Seattle Department of Education and Early Learning (DEEL). It is conducted in partnership with a network of preschool providers throughout the city, including both community-based providers and Seattle Public Schools. About 87 program sites were in use in 2022, with 1,959 students enrolled. About 77% of the students are non-white, and 105 of the seats are for children with individual education plans. About 22 classrooms are for dual language learners. (Seattle Department of Education & Early Learning 2022)

Analysis Areas

Public and private schools are identified in each area below and on maps in **Appendix I**.

Area 1: NW Seattle

The following schools are in Northwest Seattle:

- 19 public schools with 14 elementary (K-5 and K-8) schools, 3 middle schools, and 2 high schools
- 12 private schools serving various grade levels with most religious (Catholic, Jewish) and some secular (language-based, Montessori, independent)

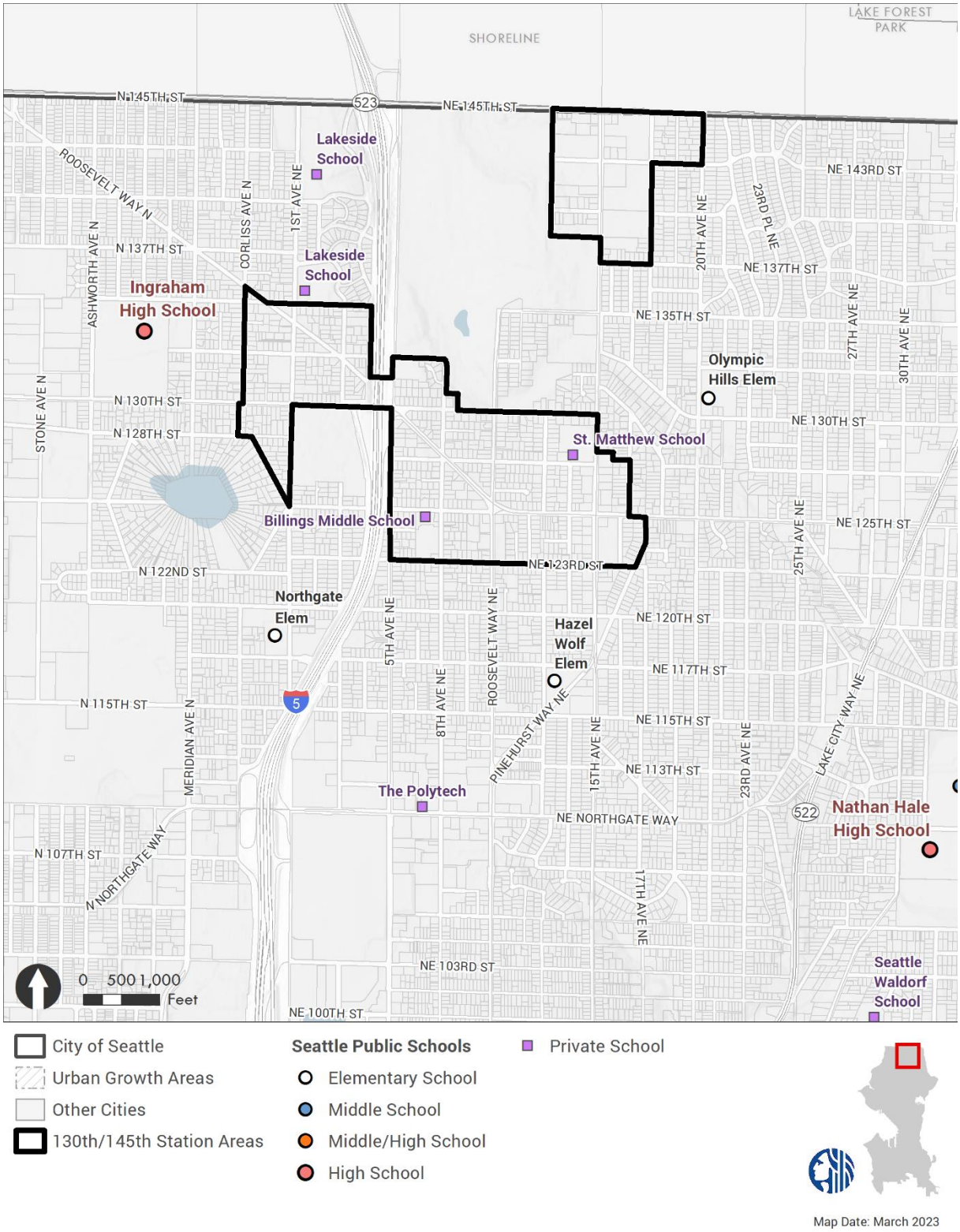
Area 2: NE Seattle

The following schools are located in Northeast Seattle:

- 21 public schools with 16 elementary (K-5 and K-8) schools, 2 middle schools, and 3 high schools
- 23 private schools serving various grade levels with most secular (language-based, Montessori, independent) and several religious (Catholic, Christian)

130th/145th Station Area. The station areas at 130th and 145th are served by several public schools (Hazel Wolf, James Baldwin, and Olympic Hills Elementary Schools; Jane Addams Middle School, and Nathan Hale High Schools). Nearby private schools include Lakeside School (middle and upper schools), Billings Middle School, and Saint Matthew School. See **Exhibit 3.11-33**.

Exhibit 3.11-33. Schools in Vicinity of 130th/145th Station Area



Source: King County GIS, 2023; BERK, 2023.

Area 3: Queen Anne/Magnolia

Area 3 includes the Magnolia and Interbay areas. The following schools are located in Area 3:

- 9 public schools with 6 elementary (K-5 and K-8), 1 middle school, 1 special high school (Center School) and 1 special program (Cascade Parent Partnership Program, K-8, individual academic programs)
- 6 private schools, religious (Catholic) and secular (language-based and independent)

Area 4: Downtown/Lake Union

Area 4 includes Downtown and South Lake Union. It has 4 independent private schools.

Area 5: Capitol Hill/Central District

Area 5 includes the Capitol Hill and Montlake areas. The following schools are located in Area 5:

- 13 public schools with 8 elementary (K-5 and K-8), 1 middle school, 1 high school and 1 middle/high school focused on languages (Seattle World School)
- 6 private schools, religious (Catholic) and secular (language-based and independent)

Area 6: West Seattle

The following schools are located in West Seattle:

- 16 public schools, with 12 elementary, 2 middle schools, 2 high schools
- 9 private schools, religious (Catholic, Christian) and secular (Montessori, independent)

Area 7: Duwamish

Area 7 includes one residential community, South Park. There is one elementary school, Concord Elementary, located in Area 7.

Area 8: SE Seattle

Southeast Seattle includes Beacon Hill, Rainier Valley, and other neighborhoods in Southeast Seattle. The following schools are located in Area 8:

- 22 public schools, with 16 elementary, 2 middle schools, 4 high schools
- 10 private schools, religious (Catholic, Christian, Jewish) and secular (gender-based, independent)

Solid Waste

Seattle Public Utilities has developed the 2022 Solid Waste Plan Update. The plan contains information needed for forecasting future solid waste needs as well as information on landfill contracts, hauling contracts, capital facilities, and staffing. Currently the City of Seattle offers three streams of solid waste to commercial, residential, and self-haul customers. These three streams are garbage, compost, and recycling. Garbage is processed through City operated transfer stations and sent to landfills for long term storage in the Columbia Ridge Regional Landfill and other facilities outside of Seattle. Recycling and compost streams are processed at materials reclamation facilities (MRFs) operated by specific haulers and are sent to one of many facilities depending on the solid waste collection contractor that collected the material, and the stream that was collected. Seattle Public Utilities promotes recycling and composting by offering these services at a discount when compared to garbage collection, and limits contamination of recycling and compost through tags on receptacles and robust sorting at processing facilities.

Citywide

Inventory of Current Facilities

Seattle's Public Utilities' Solid Waste Program encompasses all residents and business owners in Seattle. The program operates a number of capital facilities seen in **Exhibit 3.11-34**, **Exhibit 3.11-35**, and **Exhibit 3.11-36**. Facilities within the City of Seattle are used to sort commercial and residential garbage and recycling as well as hazardous materials. Other facilities outside of Seattle city limits are used for food and yard waste processing as well as landfilling.

Exhibit 3.11-34. Seattle Solid Waste Program, Public Facilities—Garbage Collection

City-Owned Permitted Facilities in Seattle: Operator	Facility	Type
Seattle Public Utilities	North Transfer Station	▪ City-contracted residential garbage and food and yard waste collection transfer ▪ City-contracted commercial garbage and food and yard collection transfer ▪ Self-haul garbage, yard and wood waste, recycling, and reuse
Seattle Public Utilities	South Transfer Station	▪ City-contracted residential garbage and food and yard waste collection transfer ▪ City-contracted commercial garbage and food and yard collection transfer ▪ Self-haul garbage, yard and wood waste, recycling, and reuse
Seattle Public Utilities	North Seattle Household Hazardous Waste Disposal Facility	▪ Self-haul facility for hazardous materials ▪ Batteries, motor oil, cleaning products, paint, light bulbs, and other hazardous materials
Seattle Public Facilities	South Seattle Household Hazardous Waste Disposal Facility	▪ Self-haul facility for hazardous materials ▪ Batteries, motor oil, cleaning products, paint, light bulbs, and other hazardous materials

Source: 2022 Solid Waste Plan Update, 2022.

Exhibit 3.11-35 Seattle Solid Waste Program, Private Facilities—Recycling Collection

Privately-Owned Permitted Facilities in Seattle: Operator	Facility	Type
Recology	MRF	▪ Recycling processing
Republic Services	Rabanco Recycling MRF	▪ Recycling processing ▪ Intermodal transfer of construction and demolition debris to long-haul disposal
Seadrunar	Seadrunar Recycling	▪ Recycling processing
Waste Connections	Northwest Container Service Intermodal Facility	▪ Intermodal transfer of construction and demolition debris to long-haul disposal
Waste Management Inc.	Eastmont Transfer Station	▪ Some garbage transfer. ▪ Some food and yard waste transfer ▪ Construction and demolition debris transfer
Waste Management Inc.	Alaska Reload Facility	▪ Contaminated soil transfer
Waste Management Inc.	Biomedical Waste Facility	▪ Biomedical treatment
Union Pacific Railroad (used by Waste Management Inc.)	Argo Rail Yard	▪ Intermodal transfer of construction and demolition debris and garbage to long-haul disposal

Source: 2022 Solid Waste Plan Update, 2022.

Exhibit 3.11-36 Seattle Solid Waste Program, Private Facilities—Compost Collection

Privately-Owned Permitted Facilities Outside of Seattle: Operator	Facility	Type
Cedar Grove	Cedar Grove Everett	▪ Food and yard waste composting
Cedar Grove	Cedar Grove Maple Valley	▪ Food and yard waste composting
Waste Connections	Finley Buttes Landfill	▪ Construction and demolition landfill disposal
Waste Management Inc.	Columbia Ridge Regional Landfill	▪ Landfill disposal
Republic Services	Roosevelt Landfill (Roosevelt, WA)	▪ Construction and demolition landfill disposal

Source: 2022 Solid Waste Plan Update, 2022.

Transfer Stations, MRFs, & Compost Processing Facilities

City-contracted collectors take the garbage and food and yard waste that they collect to City-owned transfer stations. They take residential recyclables to City-contracted MRFs, where materials are sorted, separated, and prepared for sale. The two Seattle Transfer stations also accept a small volume of recyclables only from self-haul customers. Occasionally, garbage and yard waste are transferred to contracted transfer facilities.

These facilities receive waste, consolidate it into loads, and send them to their next destination. Garbage is compressed and sealed into 40-foot intermodal containers and taken by truck to the Union Pacific Argo Rail Yard where the containers are taken to Columbia Ridge Landfill in Gilliam County, Oregon. As of the 2022 Seattle Solid Waste Plan Update's publication, the Columbia Ridge Landfill has an estimate 143 years of permitted capacity available and the contract with Waste Management Inc. provides alternative transportation options and disposal options if the rail lines become temporarily unavailable.

Compostable Materials are also loaded into these containers and taken to compost processing facilities owned by either Cedar Grove or Lenz Enterprises. Cedar Grove processes roughly 30% of Seattle's compostable material at both its Everett and Maple Valley facilities and Lenz Enterprises processes the remaining 70% at its Stanwood facility.

Self-haul recyclables that are accepted at the transfer stations are taken to the Rabanco MRF for processing and marketing recyclable material.

Scale operators, floor staff, equipment operators, maintenance laborers, and administrative employees work within the transfer stations to process commercial, residential, and self-haul solid waste.

Residential, Commercial, and Public Place Solid Waste Collection

Residential Customers do not select their waste hauler as Seattle Public Utilities residential and public place solid waste collection is determined by location and is the result of a decennial competitive bid process. These boundaries ensure a high level of service, competitive rates, and efficiency in collection throughout the city. A map of these boundaries can be found in **Exhibit 3.11-37**.

Commercial customers do not select their garbage collection but do have the ability to contract with third-party or private haulers for their recycling and composting. These haulers collect both SPU approved recyclables as well as additional materials depending on the needs of the customer.

The roughly 1,000 public place litter cans throughout Seattle are collected by contracted commercial collectors on a regular schedule and follow the same boundaries as commercial and residential solid waste. These receptacles are in commercial cores throughout the city.

Exhibit 3.11-37 Solid Waste Service Zones by Contractor—Residential and Commercial

Source: 2022 Solid Waste Plan Update, 2022.

Emergency Solid Waste Management

The City of Seattle provides guidelines for debris removal and processing after a debris-generating disaster in its Disaster Debris Management Plan, Emergency Operations Plan, and Continuity of Operations Plan. These plans ensure that debris generated is collected and disposed of in case of an emergency as well as ensuring that SPU will respond to emergencies and restore infrastructure and systems effected by emergencies.

Waste Generation Trends

Between the years 2000 and 2020, residential waste generation accounted for 38% of all non-construction and demolition waste generated in the City of Seattle per data in the 2022 Solid Waste Plan Update. About 10% of the total tonnage was generated by multi-family buildings and 28% were generated by single family households. Commercial waste generation accounted for 49% of the total waste generation during this time and 14% were attributed to self-haul customers at transfer stations. These values can be found in **Exhibit 3.11-38** and will be used in the impacts section to determine how solid waste generation will likely change over time.

Exhibit 3.11-38. Estimated Total Waste Generation by Non-C&D Customer Type, 2000–2020 (tons)

Year	Commercial	Single-Family Residential	Multi-Family Residential	Self-Haul	Total
2000	391,406	208,468	70,944	123,024	793,842
2001	377,927	211,982	68,611	124,453	782,974
2002	366,224	206,474	70,144	125,620	768,462
2003	339,844	205,748	72,149	123,597	741,337
2004	375,739	209,132	72,640	122,835	780,346
2005	385,093	208,675	72,325	124,364	790,456
2006	416,564	216,946	75,545	127,444	836,499
2007	418,979	220,128	77,108	132,545	848,759
2008	390,267	213,889	74,223	111,309	789,688
2009	335,992	215,015	70,524	97,893	719,424
2010	345,692	216,484	70,675	91,618	724,469
2011	351,214	212,861	70,145	81,776	715,996
2012	347,673	211,030	74,549	80,568	713,821
2013	356,480	206,603	76,960	84,341	724,385
2014	369,407	206,992	80,189	64,681	721,269
2015	370,037	204,397	78,278	67,993	720,705
2016	385,846	207,804	80,478	73,923	748,051
2017	398,422	213,709	77,150	111,098	800,380
2018	384,139	210,289	78,245	112,550	785,223
2019	355,453	207,538	80,241	114,234	757,466
2020	286,036	232,038	83,701	109,844	711,619
Average	**368,973**	**211,724**	**105,034**	**74,992**	**760,722**
Sum	**7,748,434**	**4,446,202**	**1,574,824**	**2,205,710**	**15,975,171**
% of Total	**48%**	**28%**	**10%**	**14%**	

Source: SPU 2020 Annual Waste Prevention & Recycling Report, 2021.

3.11.2 Impacts

Impacts Common to All Alternatives

Police

Growth in housing and jobs is expected to occur incrementally under all alternatives. For the purposes of the EIS analysis, increased density of population and jobs is anticipated to increase the potential demand for police services. However, many factors can influence crime rates. Literature and studies have identified population density and socioeconomic conditions (diminished economic opportunities, concentrations of poverty, high level of transiency, low levels of community participation) as factors as well as prevalent attitudes towards crime and crime reporting.

Property crimes are more prevalent than violent crimes and property crimes such as robbery and motor vehicle theft tend to occur at intersections rather than in whole neighborhoods. Victims of crimes are also more likely to be persons of color and younger; this has been observed in 2021 and 2022 Seattle Crime Reports for shootings.[85]

The estimated number of officers per 1,000 residents is 1.4 in 2022. Given that SPD staffing levels are as low as they have been since 1980 based on data collected by the Washington Association of Sheriffs and Police Chiefs (WASPC), this analysis uses a rate of 1.8 officers per 1,000 residents, which is the average rate between 2010 and 2022. See **Exhibit 3.11-39**. Though SPD is able to maintain adequate or near-adequate response times for priority 1 calls given the staffing deficiencies in recent years, an anticipated increase in property crimes (likely to be priority 2, 3, or 4 for SPD dispatch) may continue the upward trend of response times beyond acceptable standards.

Exhibit 3.11-39. Estimate of Officer FTEs per 1000 Residents

Alternative	Area 1	Area 2	Area 3	Area 4*	Area 5	Area 6	Area 7*	Area 8	Total
Current (est.)	219.0	177.7	100.5	143.3	193.1	128.0	6.3	109.3	1,077.0
Alternative 1	266.6	222.3	121.2	212.8	239.2	148.9	13.3	132.3	1356.6
Alternative 2	283.6	242.6	128.8	212.8	250.5	160.9	14.6	136.7	1430.5
Alternative 3	280.6	249.7	123.8	212.8	241.1	163.7	13.4	145.4	1430.5
Alternative 4	279.3	252.8	123.5	212.8	241.3	163.2	13.4	144.1	1430.5
Alternative 5	295.2	262.1	129.2	212.8	249.7	176.8	19.6	158.9	1504.3

Source: Washington Association of Sheriffs and Police Chiefs, 2023, BERK, 2023.
*Area 7 is predominantly industrial and will be regardless of alternative growth strategy
Note: the level of service calculation is based on Seattle Police Department's average level of service from 2010-2022 which is 1.8 officers per 1,000 residents.

[85] Centers for Disease Control and Prevention (CDC), 2020; Pew Research Center, 2020; Seattle Police Department, 2023; US Department of Justice, FBI, 2011; Weisburd, 2015.

Based on population and housing growth alone Alternative 1 would have the least demand and Alternative 5 the most demand for police staffing. Most demand would occur in areas with the greatest planned growth in Areas 1 and 2. Area 4 Downtown may need alternative ratios with a focus on office employment as well as residential uses. Area 7 may also need other personnel depending on needs with industrially focused land use.

Fire/Emergency Medical Services

Growth in worker and residential populations in the study area is expected to lead to an increased number of calls for aid, basic and advanced life support, and other emergency services. Growth is expected to occur incrementally under all alternatives, as individual development projects are constructed. The Seattle Fire Department would attempt to maintain response times consistent with or better than current performance levels as the population grows. These performance level benefits and reduced overall response times have a strong correlation with staffing at stations and apparatus availability (Haskell, McAuslan, 2023) Over time, additional staffing and equipment within each analysis area would be required in order to maintain or improve performance levels.

Station 31 is the first of many stations that will be needed to meet the demand of its station area. This station is currently under construction and will eventually have increased unit and staff capacity. As mentioned earlier under **Fire/Emergency Medical Services** in **Section 3.11.1**, the City also anticipates it will need to replace Station 3 and the Fire Marshal office, acquire, or develop a new facility for SFD Headquarters, replace or expand the commissary and fire garage, develop a fire station in South Lake Union, and develop a freshwater marine fire suppression facility (City of Seattle 2020).

Based on growth projections of housing units, and the minimum apparatus to maintain current ratios of fire units to housing units, the resulting fire units needed are presented, and rounded to the higher whole number in **Exhibit 3.11-40**.

Exhibit 3.11-40. Apparatus Need by Alternative and Area

Alt	Units	Current Housing Unit per Fire Units	Housing Unit per Fire Unit with Growth Alternative (current app. Inventory)	Area: Fire Units Needed Based on Study Area Growth Estimates and Existing Deficiencies (Rounded)								Total Additional Fire Units Needed (Rounded)	Projected Housing Units per Fire Unit if adopted
				1	2	3	4	5	6	7*	8		
1	Engine	12,231	14,731	1	1	1	1	1	0	0	1	7	12,087
	Ladder	32,616	39,283	0	0	1	0	0	0	1	1	3	31,426
	Medic	43,488	52,377	0	0	1	1	0	1	0	0	3	39,283
	Aid	55,913	67,342	1	0	1	0	1	1	0	1	4	42,854
	Other	19,570	23,570	1	1	0	0	0	1	1	0	4	19,641
2	Engine	12,231	15,356	1	1	1	1	1	1	1	1	8	12,285
	Ladder	32,616	40,950	0	0	1	0	0	0	1	1	3	32,760
	Medic	43,488	54,599	0	0	1	1	0	1	0	0	3	40,950
	Aid	55,913	70,199	1	1	0	0	1	1	0	1	5	40,950
	Other	19,570	24,570	1	1	0	0	0	1	1	0	4	20,475
3	Engine	12,231	15,356	1	1	1	1	1	1	1	1	8	12,285
	Ladder	32,616	40,950	0	0	1	0	0	0	1	1	3	32,760
	Medic	43,488	54,599	0	0	1	1	0	1	0	0	3	40,950
	Aid	55,913	70,199	1	1	0	1	0	1	0	1	5	40,950
	Other	19,570	24,570	1	1	0	0	0	1	1	0	4	20,475
4	Engine	12,231	15,356	1	1	1	1	1	1	1	1	8	12,285
	Ladder	32,616	40,950	0	0	1	0	0	0	1	1	3	32,760
	Medic	43,488	54,599	0	0	1	1	0	1	0	0	3	40,950
	Aid	55,913	70,199	1	1	0	1	0	1	0	1	5	40,950
	Other	19,570	24,570	1	1	0	0	0	1	1	0	4	20,475
5	Engine	12,231	15,981	2	1	1	1	1	1	1	1	9	12,473
	Ladder	32,616	42,616	0	0	1	0	1	0	1	1	4	31,962
	Medic	43,488	56,822	1	0	1	1	0	1	0	0	4	39,338
	Aid	55,913	73,056	1	1	1	0	1	1	0	1	6	39,338
	Other	19,570	25,570	1	1	0	0	0	1	1	0	4	21,308

*Areas 4 and 7 will only partially use housing data to support additional fire unit recommendations due to employment characteristics.
Sources: Seattle Fire Department Annual Report, 2022; BERK 2023.

Additional units would need to be added to meet the current levels of service average dwelling units served by each number of apparatus and type of apparatus. However, based on Seattle Fire Department's Live dispatch dashboard as well as the SFD 2022 annual report, citywide unit additions should reflect aid unit prioritization over other fire units. Across all alternatives, each

subarea or battalion should have at least a single aid unit stationed at a centrally located station to limit fire unit dispatches on aid calls.

Secondarily, the recommendations for Area 4 are consistent across all alternatives and reflect the growing need for an additional unit to fill the gap in service in the South Lake Union neighborhood. Overall, these recommendations are based on current service standards which can be greatly improved per **Exhibit 3.11-41**.

Alternative 5 having the highest growth has the greatest need for apparatus. More apparatus under any of the alternatives may require additional personnel and expanded stations. Any potential future fire facility, staffing, or equipment needs will be included as part of the City's annual Budget and Capital Improvement Program process.

Building Heights and Density

Existing ladder trucks at fire stations citywide are equipped to provide services to buildings of the heights proposed under all alternatives.

Additionally, new buildings of three or more units would be required to meet the Seattle Fire Code which requires sprinklers throughout. No impacts to fire services are anticipated due to increases in building height or density.

Hazardous Materials

Industrial uses often include hazardous materials or have the potential to produce hazardous waste. Hazardous materials are defined by the City of Seattle as "those that pose an unreasonable risk to the health and safety of operating or emergency personnel, the public, and the environment if not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal, or transportation" (City of Seattle 2018).

Additional industrial development under all of the alternatives could increase the amount or prevalence of hazardous materials in the study area. All new development would be required to meet the Seattle Fire Code which includes provisions for hazardous materials. Development proposals would be reviewed by the Seattle Department of Construction & Inspections as well as the SFD. Additional federal and state regulations also apply to development that includes hazardous materials or wastes—for example, WSDOT regulates off-site transportation of hazardous materials, and the Washington State Department of Ecology requires additional permits and inspections for such facilities as underground storage tanks (Seattle Industrial and Maritime Strategy EIS, 2022).

Construction

The Seattle Fire Department makes service calls related to inspection of construction projects and calls to respond to construction-related accidents. As such, increased construction activities associated with potential development under all alternatives could result in an

increase in demand for fire services. Existing Fire Department staffing and equipment are anticipated to be sufficient to handle the increased services needed for construction activities.

Transportation Network and Traffic Volumes

Use of the public right of ways is critical to SFD meeting their response goals as the Department is dependent upon the capability of the city's street network to handle traffic flows. Traffic volumes are anticipated to increase under all of the alternatives and no specific transportation projects or changes to emergency access routes are proposed under any of the alternatives, but changes to the street network over time has the potential to impact the mobility of fire response vehicles.

Any street improvements must be consistent with the Seattle Fire Code Section 503 and Appendix D, which address fire apparatus access roads. Additionally, SFD reviews proposed street improvements on a project-by-project basis to identify potential negative impacts on response times. It is anticipated that these mitigation measures would adequately address the potential impacts of future changes to the transportation network under any of the alternatives.

Outreach & Additional Programming

Seattle Fire Department's education programs and fire prevention services utilize education and code enforcement as tools to lower demand on SFD firefighting and EMT resources. Fire prevention services include the Fire Investigation Unit, community risk reduction program, building/construction inspections and permitting, mobile inspections and pre-planning for fire response, plan preview, special hazards, special events and temporary assembly support, and suppression systems testing. These prevention strategies and programs help to reduce the overall demand for SFD services and can help reduce response time and potential negative outcomes from emergencies.

SFD also provides a number of outreach programs, which are necessary to reduce fire risk and increase public awareness on fire safety. These programs restarted in 2022 after a multi-year hiatus caused by the COVID-19 Pandemic. These events can give communities and individuals the tools they need to reduce fire risk and produce better outcomes in the event of emergencies.

Additional information on both fire prevention and outreach events are detailed in both the SFD 2022 Annual Report and **Equity & Climate Vulnerability Considerations** section below.

Parks

Demand & Level of Service

The current parks level of service is 8.0 acres per 1,000 population (from Seattle 2035 and 2017 Parks and Open Space Plan). However, the city is considering options for updating the level of service as part of an update to the Parks and Open Space Plan. The goal of updating the level of services is to make it more consist with the City's goals and approach to acquisition.

Additional park acres would be needed under each alternative if the City maintains its 8.0 acres per 1,000 population level of service. Currently, Seattle Parks and Recreation manages 6,478 acres of parks in 2024; see **Exhibit 3.11-25**. The acreage needed would range from 1,312 to 1,968 acres between Alternative 1 and Alternative 5, with Alternatives 2 through 4 requiring an additional 1,640 acres. Within each analysis area, the acres required are highest under Alternative 5 except that Area 4 Downtown would have the same growth and acres needed under all alternatives. Under each alternative, expected population growth is lowest in Area 7 due to the focus on employment (except in South Park). See **Exhibit 3.11-41**.

Exhibit 3.11-41. Additional Acreage Needed to Meet Parks LOS by Alternative

Alternative	Total Net Acreage Needed
Alternative 1	1,312
Alternative 2	1,640
Alternative 3	1,640
Alternative 4	1,640
Alternative 5	1,968

Notes: Converts housing units to population using a persons per household of 2.05 regional housing target efforts. The 8 acres per 1,000 population is applied to net population growth.
Source: BERK, 2023.

The City currently has 6,478 acres of parkland. The city contains 53,651 acres and existing open space equates to approximately 12% of the city. If the city obtained the average amount of the alternatives this would raise the total open space to approximately 15% of the city. If no new acres are added to the City's inventory, the LOS rate per 1,000 would drop as shown in **Exhibit 3.11-42**. Under this scenario, the City could acquire new park land to meet the LOS or change the LOS itself.

Exhibit 3.11-42. Acres per 1,000 Population if Park Inventory Does Not Increase

	Actual 2022	Actual 2023	POS 2035	Alt 1 2044	Alt 2-4 2044	Alt 5 2044
Population	762,500	779,200	802,358	966,358	862,500	1,007,358
Rate: Acres per 1,000 population	8.50*	8.31	8.07	6.70	6.43	6.18

Note: Adds potential population of 2.05 persons per household within new housing units to an estimated 2024 base population of 802,358 accounting for housing under construction or permitted.
*The acres of parks increased between 2017 and 2024 from 6,414 to 6,478. The 2024 estimate is used in this table.
Sources: OFM, 2022; Seattle Parks and Recreation, 2017; BERK, 2024.

Shorelines Public Access

Greater population growth across the city could increase demand for shoreline public access. The alternatives would range in demand from the least under Alternative 1 to the most under Alternative 5. Shoreline Master Program requirements for shoreline public access for non-residential development could result in more public access as development occurs in shoreline jurisdiction.

130th/145th Station Area

All alternatives would result in an increased demand for parkland in the city, with most demand under Alternative 5 and the least demand under Alternative 1 in the 130th Street Station Area. In the 145th Street Area, demand for parkland would be slightly higher under Alternative 2 and Alternative 5 than the No Action Alternative (with demand highest under Alternative 2). See **Exhibit 3.11-43**.

Exhibit 3.11-43. Growth by Area and Alternative Demand for Park Acres: Station Area

	130th Street Population: Net	130th Street Park Demand (Acres)	145th Street Population: Net	145th Street Park Demand (Acres)
Alternative 1	399	3	1,324	11
Alternative 2	2,151	17	2,376	19
Alternative 5	3,371	27	2,171	17

Sources: Seattle Parks and Recreation, 2017; City of Seattle, 2022; BERK, 2023.

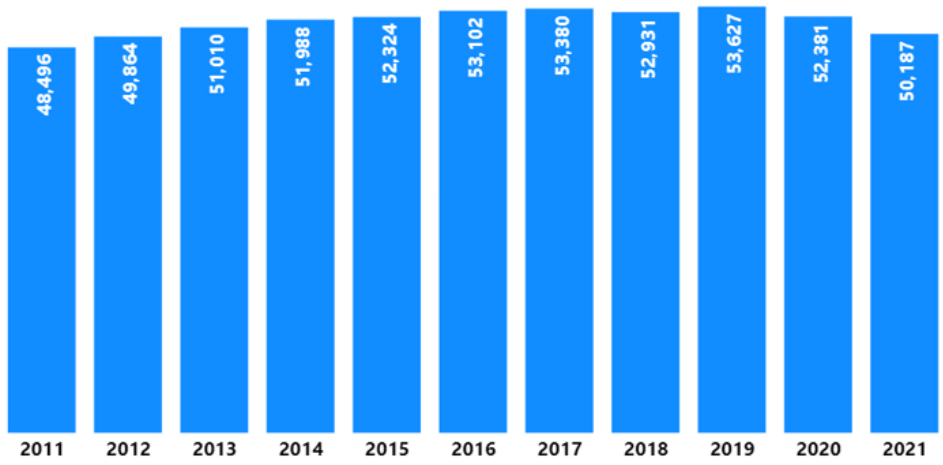
Schools

School enrollment is affected by a variety of factors including demographic trends, economic conditions, private school enrollment, and characteristics of housing stock such as size and cost.

Existing Trends

There are currently 50,056 students enrolled in Seattle Public Schools. This number represents about 80% of children enrolled in K-12 education. Over the last 10 years, enrollment in Seattle Public Schools increased from 49,900 students in 2012 to 53,600 students in 2019 and then decreased to x50,056 students by 2022. This change occurred during a period that Seattle added around 75,000 housing units. See **Exhibit 3.11-44**.

Exhibit 3.11-44. Seattle Public School Enrollment 2012-2022



Source: SPS, 2023.

Estimates at Current Student Ratio

It is not possible to develop an accurate twenty-year projection of school needs given the wide variety of factors that influence these numbers and the recent fluctuations in public school enrollment. As a high-end estimate of potential impacts, it may be helpful to estimate the number of new classrooms that would be needed if recent trends change and the percentage of the total population enrolled in Seattle Public Schools holds steady over the next twenty years. Based on current student enrollment and city population, about 6.56% of the total population are K-12 students in the Seattle Public School District. See **Exhibit 3.11-45**.

Exhibit 3.11-45. Student as Percentage of Total Population

	Number
Seattle School District Population (OFM 2022)	763,302
Enrollment Seattle School District OSPI 2022-2023	50,056
Students as a Percentage of Total Population	6.56%

Source: OSPI Student Information, 2023; OFM, 2022; BERK, 2023.

Applying this rate to expected population growth shows a range of 10,912-16,368 students generated by each alternative, the least under Alterative 1 and the most under Alternative 5. See **Exhibit 3.11-46**. Depending on the grade level and pace of housing and population growth, new classrooms or schools could be needed over time to accommodate growth. The total number of students is divided by 25 students per elementary school classroom to translate this number into potential elementary school classrooms—between 436 and 655 classrooms. This additional enrollment could be accommodated through a combination of accommodating students at schools that are currently under capacity, adding classrooms at existing school sites, and, potentially, adding new schools.

Exhibit 3.11-46. Housing, Population, and Potential Public School Students Assuming Current Student Percentage

Alternative	Net Change in Housing	Net Change In Population	Student Generation	Equivalent Elementary Classrooms
Alternative 1	80,000	164,000	10,912	436
Alternative 2	100,000	205,000	13,640	546
Alternative 3	100,000	205,000	13,640	546
Alternative 4	100,000	205,000	13,640	546
Alternative 5	120,000	246,000	16,368	655

Note: Applies 2.05 per household, 2017-2021 ACS; assumes 25 students per classroom.
Source: City of Seattle, 2023; SPS, 2021, SPS 2023, BERK, 2023.

Under this calculation, most population growth, and therefore students, would be added in areas 1 and 2 for all of the alternatives (see **Exhibit 3.11-47**). Student growth in Area 4 would be the same across all alternatives and would likely go to schools in areas 3 and 5 as there are no schools located in Downtown. Areas 6, 7, and 8 would have the second highest share of population and students in all the action alternatives.

Exhibit 3.11-47. Share of Students by Area: North, Central, and West/South Seattle Assuming Current Student Percentage

Alternative	Areas 1-2	Students (Net)	Area 4	Students (Net)	Areas 3 & 5	Students (Net)	Areas 6-8	Students (Net)	Total Students (Net)
Alternative 1	33%	3,621	24%	2,648	24%	2,629	18%	2,015	10,912
Alternative 2	37%	4,997	19%	2,648	24%	3,328	20%	2,667	13,640
Alternative 3	38%	5,152	19%	2,648	20%	2,793	22%	3,047	13,640
Alternative 4	38%	5,216	19%	2,648	20%	2,789	22%	2,987	13,640
Alternative 5	38%	6,146	16%	2,648	20%	3,310	26%	4,264	16,368

Source: BERK, 2023.

Within the analysis areas, most growth would be directed to centers and villages under all alternatives and schools in those areas would be most affected. However, in Alternatives 2 through 5, more areas currently designated urban neighborhood and proposed as urban neighborhood would see growth, which may be focused around neighborhood centers, corridors, or elsewhere distributed through distributed growth of missing middle housing types.

Overall Impact

While K-12 public school enrollment has declined over the last 5 years, future population growth has the potential to increase student enrollment in various areas throughout the city. Seattle Public Schools monitors changes in enrollment to track expected future needs and would adjust their enrollment projections accordingly for future planning cycle. SPS would respond to the exceedance of capacity as it has done in the past by adjusting school boundaries and/or geographic zones, adding or removing portables, adding/renovating buildings, reopening closed buildings or schools, and/or pursuing future capital programs.

130th/145th Station Areas

Under multiple alternatives, two station areas at 130th and 145th Street would be rezoned and allow greater density. There would be an increase in housing and population with most under Alternative 5 and least under Alternative 1. This increase could lead to an increase in the student population as well. Depending on alternative, the number of students could be greatest in 130th Street Station (Alternative 5) or at 145th Street (Alternative 2). See **Exhibit 3.11-48**.

Exhibit 3.11-48. Share of Students by Station Area Assuming Current Student Percentage

Alternative	130th Street Housing Units (Net)	Population (Net)	Students (Net)	145th Street Housing Units (Net)	Population (Net)	Students (Net)	Total Students 130th-14t5th
Alternative 1	194	399	27	646	1,324	87	113
Alternative 2	1,049	2,151	143	1,159	2,376	156	297
Alternative 5	1,644	3,371	224	1,059	2,171	142	363

Source: BERK, 2023.

Solid Waste

Growth in residential, commercial, and self-haul solid waste is expected to increase under all alternatives. For the purposes of the EIS analysis, increased density of population and jobs is anticipated to increase demand linearly. Estimates for this EIS are based on average annual tons of waste produced by sector and solid waste stream from 2020-2020. From 2000 to 2020 recycling and composting rates have increased per capita in Seattle while overall residential waste decreased every year from 2000-2019 with a slight increase in 2020 due to the COVID-19 Pandemic.

Exhibit 3.11-49. 2020 Waste Generation Rates/Capita/Year based on 2020 Rates

	Commercial	Single-Family Residential	Multi-Family Residential	Self-Haul
Recycling + Compost	61.6%	71.2%	36.6%	11%
	1.93 lbs./employee/day (estimated)	1.62 lbs./resident/day (estimated)	0.83 lbs./resident/day (estimated)	0.19 lbs./resident/day (estimated)
Garbage	38.4%	28.8%	63.4%	89%
	1.21 lbs./employee/day (estimated)	0.65 lbs./resident/day (estimated)	1.44 lbs./resident/day (estimated)	1.54 lbs./resident/day (estimated)
Total Waste Generation Rate per capita	3.14 lbs./employee*/day (estimated)	2.27 lbs./resident/day (estimated)	2.27 lbs./resident/day (estimated)	1.73 lbs./resident/day (estimated)
Total Waste Generation in 2020	572,072,000 lbs.	464,076,000 lbs.	167,402,000 lbs.	219,688,000 lbs.

Source: Seattle 2022 Solid Waste Plan Update (Ch. 3), 2022; BERK, 2023.
* "Employees" in this dataset refers to positions covered by the Washington Unemployment Insurance Act. The Act exempts the self-employed, proprietors and corporate officers, military personnel, and railroad workers, so those categories are not included in the dataset. Covered Employment accounts for approximately 85% to 90% of all employment.

Exhibit 3.11-49 shows the most recent per capita waste generation from 2020 extracted from the 2022 Solid Waste Plan Update. Based on population, jobs, and housing growth alone Alternative 1 would have the least waste generation and Alternative 5 the most. Most demand would occur in areas with the greatest planned residential growth such as Areas 1 and 2 while Area 4 would see an increase in both commercial and residential solid waste. Other areas and alternatives will also see growth in solid waste service demand proportionate to growth planned.

Exhibit 3.11-50 and **Exhibit 3.11-51** offer estimates of each solid waste stream by customer types for alternatives based on job growth estimates and housing units. The number of people per household is variable but is estimated at 2.05 people per household for these calculations. All alternatives estimate 158,000 additional jobs in Seattle between 2024 and 2044.

Exhibit 3.11-50. Estimated Tons of Solid Waste (Garbage, Recycling, Compost) Generated by Alternative—Residential

Scenario	Resident estimates	Tons of Waste Per year estimate	Tons of Diversion at goal rate: 70%
Current: 2020	762,148	315,739	221,017
Alternative 1	966,358	400,338	282,336
Alternative 2	1,007,358	417,323	292,126
Alternative 3	1,007,358	417,323	292,126
Alternative 4	1,007,358	417,323	292,126
Alternative 5	1,048,358	434,308	304,015

Sources: SPU, 2020 Annual Waste Prevention & Recycling Report; BERK, 2023.

Exhibit 3.11-51. Estimated Tons of Waste Generated for Commercial Customers

Year	Employee Estimates	Tons per year based on 2020 per employee estimate	Diversion at current recycling rate: 61.6%	Diversion at goal recycling rate: 70%
2020 (per 2020 employee estimate)	499,146 employees	286,036 tons	176,198.2 tons	200,225.2 tons
2044 estimates, all alternatives	746,447 employees	427,751 tons	263,494.9 tons	299,426 tons

Sources: SPU, 2020 Annual Waste Prevention & Recycling Report; BERK, 2023.

To meet the additional need for solid waste services, contracts with waste haulers are renegotiated every 10 years. Fees charged to residential and commercial customers from Seattle Public Utilities and from waste haulers directly support the necessary capital investments needed to ensure minimum levels of service.

Equity & Climate Vulnerability Considerations

Police

SPD has developed Micro Community Policing Plans (MCPP) to address the individual needs of each community. Based on the City's equity opportunity areas evaluation and engagement with the community in each area, these plans could be updated.

Police access to parts of the city could be affected by extreme precipitation, flooding, sea level rise, and landslides. Response times may be affected by climate-exacerbated natural hazards such as flooding. As police officers often work outdoors, officers may be affected by extreme heat. These considerations are expected to be similar across alternatives; alternatives with greater growth may require greater police services and may mean additional personnel and facilities that need to be adapted for climate resilience.

Fire/Emergency Medical Services

SFD leverages staff, facilities, and training resources to better address inequitable distributions of fire risk in homes, inequitable health outcomes, and the increased risk of wildfire smoke in our region.

While the Seattle Fire Department is the main firefighting entity within Seattle, most of its work is rooted in health services and fire prevention. To reduce fires in homes SFD works with communities throughout Seattle to distribute fire prevention flyers that have been translated in the top seven spoken languages in Seattle to ensure compliance with fire safety standards regardless of language.

Fire prevention outreach also helps alleviate racial and social inequities. There is a correlation between age of housing units and high prevalence of disadvantages related to Race and Socio-

economic status. Data gathered via Seattle's Market Rate Housing Needs and Supply Analysis (2021) as well as the Seattle Racial and Social Equity Index (2018) indicate that housing structures in the Southwest, Southeast, and East Central regions of the city are more likely to be older and to potentially benefit from fire prevention outreach. These areas are also more disadvantaged than elsewhere in the city per the Racial and Social Equity Index. Targeting fire prevention outreach in these areas is vital to alleviating fire safety inequity.

Aside from outreach and prevention, SFD also performs fire inspections on existing homes as well as required inspections on new development. Each growth alternative will result in an increase in the number of multi-family units and may require additional staff to adequately provide fire prevention services to the growing population. Alternative 5 would have more demand than Alternatives 2-4 and Alternative 1. See **Exhibit 3.11-40**.

Aid and medical response are also duties of SFD. Negative health outcomes as a result of certain environmental and climatic conditions are inequitably distributed in historically disadvantaged communities such as poor air quality or wildfire smoke leading to respiratory and cardiovascular diseases. Poor air quality may result in more serious chronic medical conditions that require emergency medical transport more often as well as Basic or Advanced life support for acute medical emergencies. Air quality hazards are exacerbated by climate change, vehicular traffic, and the increased wildfire smoke risk facing Washington State in recent years (Seattle & King County Public Health 2021). The potential for each alternative to locate growth near sources of pollution like major highways is addressed in **Section 3.2 Air Quality & GHG Emissions**.

Parks

Alternatives & Parks in Highest Equity Priority Areas

Parks are important for community health and well-being and a key amenity in growth areas. The City developed an overlay of public space priority areas considering race and social equity, density and growth, and health outcomes in **Exhibit 3.11-52**. Areas of centers/ urban centers are considered a priority for 5-minute walks to parks and areas outside of centers/ urban centers are considered a priority for 10-minute walk to parks.

Since the 2020 evaluation of "Outside Citywide" the City has updated its Racial and Social Equity Index in with ACS 5-Year data 2017-2021; see **Chapter 1**. Areas of the highest priority for plans/programs/investments based on Race and Social Equity are generally in the south end of the City including Delridge (Area 6), South Park (Area 7), and Southeast Seattle (Area 8), as well as locations generally north of NE 85th Street along NE 145th Street/SR 523 (Area 1) and along Lake City Way/SR 522 (Area 2), and central areas like Pioneer Square, International District, and Central District (Areas 4 and 5). The University District has a high share of students who likely have lower incomes. Area 3 does not have highest or second highest equity priority areas.

Urban centers considered to be park priority investment areas in **Exhibit 3.11-52** are not necessarily considered highest equity priority considering the Racial and Social Equity Index alone, including Ballard, West Seattle Junction, and Morgan Junction.

Exhibit 3.11-52. Racial and Social Equity Index: Highest Equity Priority

Analysis Area	General Areas of Concern	Areas Subject to Urban Centers Walkability Policy in POS Plan
1	Bitter Lake, N 105th Street	Bitter Lake
2	Northgate, and Lake City Way University District	Lake City, Northgate U District
3	None	None
4	Downtown, Pioneer Square, and International District	Downtown
5	Yesler Terrace and Atlantic neighborhoods	First Hill/Capitol Hill 23rd & Union Jackson
6	High Point, South Delridge, Roxhill, Highland Park	Westwood-Highland Park
7	Greater Duwamish and South Park	South Park

Source: BERK, 2023.

Alternative 5 has the most growth of the studied alternatives and generally would distribute the most growth and demand for parks under all areas except Area 4 Downtown where proposed growth is consistent across all alternatives and Area 5 (Central/East) where Alternative 2 has the most growth proposed. Where growth is focused, there could be more investment in parkland to serve the growth including in Race and Social Equity priority areas, particularly if the City requires provision of open space or contribution to city parks by new development. However, if growth outpaces investment in parks, there could be a degradation of acres per capita and greater demand on existing facilities.

Parks & Heat Islands

The areas considered to have greater heat islands due to impervious areas and less tree canopies are shown on **Exhibit 3.11-53**. Particularly warm areas morning and evening include Downtown, Greater Duwamish MIC, and Southeast Seattle, portions of which are considered to be Highest Equity Priority in part. Adding parkland and improving tree canopy in parkland and other public property like rights of way could also improve climate resilience and community health.

Exhibit 3.11-53. Heat Islands in Seattle

Notes: The morning index illustrates areas with the most concreate and building mass such as downtown Seattle are warm and likely retaining heat and emitting the previous day's heat through the nighttime. The afternoon map shows cooler temperatures; mid-day shadowing from buildings could cool temperatures in downtown. The evening temperatures are relatively high again with greater areas of concrete retaining heat into the evening.
Source: CAPA/NIHHIS. 2022. "Heat Watch Seattle & King County." OSF. August 2. osf.io/mz79p.

Schools

Seattle's Racial and Social Equity Index identifies Highest or Second Highest Equity Priority Areas around Rainier Valley, Beacon Hill, Delridge, High Point, Downtown, Central Area, University District, Greenwood, Bitter Lake/Haller Lake, and Lake City. More of the priority areas are in study areas 6, 7, and 8 in the southern portion of the city.

The City's responsibility in planning for schools is to coordinate with the School District in planning for growth and modernization. The City is also responsible for implementing zoning and development standards regulating new development on school property. The City also plays a role in ensuring access to schools with safe travel routes. Equitable access improvements would help all local students in priority areas for race and social equity. The latest 2021-2025 action plan includes priorities for communities of color, low-income communities, immigrant, and refugee communities, those with disabilities, homeless, LGBTQ communities, and girls.

Solid Waste

Seattle Public Utilities' Solid Waste Division has staff and contractors that are at high risk for the negative impacts of extreme weather events. Many of these workers are subject to extreme heat and extreme precipitation events that are made more severe and common by climate change. These hazards are mitigated through contracts with waste hauling entities to ensure the health and safety of staff that are at risk.

SPU has also joined with Seattle City Light to mitigate cost burden of utility services on low-income households through the Utility Discount Program. This program ensures that cost will not be a barrier for households to receive services provided by Seattle Public Utilities and Seattle City Light. This program's application process, as well as all outreach material created by Seattle Public Utilities, are translated into a number of languages to serve non-English speakers in Seattle and to lower the barrier to these vital public services.

The Clean City Division of SPU also provides necessary debris clearance in the event of climate emergencies and ensure equitable distribution of resources by utilizing Seattle's Racial Equity Toolkit in program planning and implementation. This toolkit and the division ensure that public litter receptacles, litter abatement routes, and encampment solid waste collection (purple bag program) are equitably distributed throughout the city and are not prioritized in highly resourced communities.

Impacts of Alternative 1: No Action

Police

Alternative 1 will concentrate growth on already existing urban centers. These urban centers could see an increase in demand for police services in these higher growth areas. Alternative 1 represents the lowest increase in demand for Seattle Police Department services but still a slight increase in number of officers.

Fire/Emergency Medical Services

Alternative 1 will concentrate growth on already existing urban centers in Downtown, University District, and Northgate areas and urban centers throughout the city. Current demand for additional aid units in urban centers will increase incrementally and will likely require additional unit to make up apparatus and staff deficits in Area 4. Concentrated growth in Area 4 with multifamily dwellings and less growth in areas will not increase the risk of fire but may increase the number of false alarms that still require dispatch by SFD. Current inspections staff should be adequate in meeting the construction inspections demand.

Parks

Alternative 1 studies the lowest overall growth of the Draft EIS alternatives and would thus result in the lowest amount of required new park acres. The No Action Alternative emphasizes growth in Downtown with the greatest demand for parkland there, followed by areas 1, 5, and 2. The least amount of growth would be in areas 6, 7, and 8 in southwest and southeast Seattle.

Schools

Alternative 1 has the lowest growth overall citywide and the lowest student generation. Most growth would be located in areas 1 and 2 and in the north portion of the city. Most schools have capacity for more students but if the net growth is on top of existing students more school capacity could be needed.

Solid Waste

Alternative 1 will concentrate growth in urban centers which will increase demand for Recology waste hauling service as they are the main hauler of residential customers in these areas. Of the new housing units estimated, roughly 67,000 are estimated to be multifamily customers and the remaining 13,000 are estimated to be single-family solid waste customers. Because multi-family customers have lower overall recycling rates, in order for the City to reach its 70% recycling goal SPU would need to increase its emphasis on education and outreach.

New infill and other residential development will also require additional waste hauling staff to meet the minimum levels of service of weekly garbage and compost collection and bi-weekly recycling collection for residential customers.

130th/145th Station Area

Police

The net population of the area is anticipated to be over 400 over the 20 year planning period. It is anticipated that growth would lead to incremental demand in Area 2.

Fire/Emergency Medical Services

The impacts of this station are not anticipated to increase with minimal zoning changes. However, this area is currently identified as potentially needing additional units at the Bitter Lake fire station to meet minimum service standards. This likely would not require a new station given that nearly all development is targeted at urban centers and the Northgate station is already well equipped with support units in case of multiple calls to the transit station area.

Parks

There would be relatively low additional demand for parkland in the 130th and 145th Street Station Areas under this scenario.

Schools

Alternative 1 produces a small residential growth number and similarly low number of students. The number of students would be spread to three elementary schools near to the stations and one middle school and one high school. It is unlikely to require changes to local school capacities or attendance boundaries.

Solid Waste

Alternative 1 produces a small residential growth number. The number of dwelling units would change the type of service but would not significantly impact levels of service.

Impacts of Alternative 2: Focused

Police

Alternative 2 would add 100,000 in new housing units and 205,000 in population. The 20,000 dwellings above Alternative 1 would largely be added in neighborhood centers, small mixed use nodes Alternative 2 could require a maximum of 1,430 police officers (FTEs) to meet potential additional demand, and most would serve the added growth in centers and newly designated nodes. Most growth though would be in the northern portion of the city in Areas 1 and 2.

Alternative 2 would add 158,000 employees like all other alternatives, with most in downtown neighborhoods. Unlike Alternative 1 a small share of jobs (~10%) would be located in neighborhoods to serve the greater residential growth. Thus, a slightly higher potential for calls for service in the neighborhoods beyond centers could occur, such as the neighborhood centers.

Fire/Emergency Medical Services

The addition of neighborhood centers in this alternative creates a higher need for fire units and additional staff in Areas 1 and 2. Based on the assessment, current LOS might be met with an additional station that includes at least one engine and one ladder unit. One of these two stations should also receive either an aid or medic car to provide BLS or ALS.

New growth would be developed in accordance with fire codes. Over the planning period to 2044, structures that are retained would continue to age and SFD fire prevention outreach would continue to be important.

City investments in climate resilience in areas with heat islands (see **Exhibit 3.11-53** in Parks evaluation) could reduce the potential for emergency aid calls during extreme heat. The

development added to centers and new neighborhood centers as well as the City's tree canopy goals and strategies on public and private lands could support improved climate resilience. There are added neighborhood centers in Areas 6 and 7; although there are relatively fewer neighborhood centers in Area 8 there are centers where growth could be focused.

See **Section 3.2 Air Quality & GHG Emissions** regarding equity and climate resilience and air quality such as buffers from high-volume roads and filtration of dwellings.

Parks

Growth under Alternative 2 would require 1,664 additional acres of parks across the city. More growth is planned in areas 1 and 2 and so those analysis areas would create the most demand for parks. Growth under Alternative 2 would also result in more demand for parkland in Area 5 than any of the other alternatives.

Schools

Alternative 2 would place the most growth in areas 1 and 2 like Alternative 1. With a higher level of housing and student growth there would be increases in areas 3 and 5-8 compared to Alternative 1. The same level of growth is planned in Centers and Villages, and more growth would be in neighborhood centers across the city, incrementally affecting nearby schools, and less in lands outside these areas of focus. Existing schools may need added classrooms, schools, or attendance boundary changes depending on the rate of growth.

Solid Waste

Alternative 2 would add an estimated 100,000 new housing units in neighborhood centers, small mixed-use nodes, as well as the Downtown Core. About 90% of these units are estimated to be multifamily solid waste customers while the remaining units would be single family customers. This alternative would also require an increase in education and outreach. It will increase demand for solid waste haulers and would put additional strain on other solid waste services such as illegal dumping and public place litter and recycling. However, the overall capacity of the solid waste system is anticipated to be adequate.

130th/145th Station Area

Police

Under Alternative 2, population would increase by over 2,100 and nearly double the demand for services in the subarea and contribute to more service needs in Area 2.

Fire/Emergency Medical Services

Fire services at the station area would require either a new station or additional units at Bitter Lake to support higher density housing, which results in additional aid calls as well as one additional firefighting unit as is customary at new stations. SFD has identified this area as a hole in service that falls just outside of the minimum response buffer of two different stations; providing additional units at one or both stations could better equip them to handle increased demand.

Parks

Under Alternative 2, growth would contribute to citywide demand for parks. There could be more residents using existing parks in the study area at nearly twice planned as under Alternative 1, and a greater need to improve existing parks to address the greater demand.

Schools

There would be a greater than doubling of expected students, though relatively low compared to Area 2 and citywide growth. There may need to be capacity changes to one or more existing schools or changes to attendance boundaries.

Solid Waste

Alternative 2 produces a larger number of residential units. The number of dwelling units would change the type of service but would not significantly impact levels of service. Multi-family dwellings require more garbage service relative to recycling and composting when compared to single family dwellings.

Impacts of Alternative 3: Broad

Police

Impacts of Alternative 3 on demand for officers would be similar to Alternative 2 with similar growth numbers and need for officers. Most growth would continue to be in centers, but the 20,000 additional residential dwellings would be distributed in a less dense fashion across the NR designation in middle housing types and calls for service may likewise be more diffuse.

Fire/Emergency Medical Services

This alternative will distribute more households throughout the city and will potentially increase needs in Area 1 and Area 2. However, because Area 1 has the highest number of units of any of the service areas, it would be a better use of resources to support aid units in Area 2, Area 4, and Area 8. Additionally, each area of this alternative aggregates to one additional firefighting specific unit depending on the density of the area. This may result in an additional station in South Lake Union to support an additional engine, or possibly increased usage of existing stations.

Investments in climate resilience to address health/emergency services would be likely focused where growth is concentrated in centers, as well as in rights of way and public and private lands (e.g., green infrastructure, tree canopy).

Parks

Alternative 3 distributes a similar amount of growth as Alternatives 2 and 4 but emphasizes growth in areas 1 and 2. Impacts would be similar to those described under Alternative 2.

Schools

Alternative 3 would place the most growth in areas 1 and 2 like Alternatives 1 and 2 and also place a similar amount of growth in centers and villages as these alternatives. The difference in growth is distributed across urban neighborhood areas in each alternative, and there could be incremental demand increases at all schools. Existing schools may need added classrooms, schools, or attendance boundary changes depending on the rate of growth.

Solid Waste

Impacts of this alternative would be similar to Alternative 2 in terms of amount of housing units estimated. However, the distribution of the units is broader across the city and would impact both solid-waste haulers more equally in terms of demand. The number of single-family customers would increase with the increase in in-fill development, but a large proportion of the growth (~68%) would still be in the number of multifamily customers. Education and outreach demand would increase at a slightly lower level than Alternative 2 but would still be required to meet diversion targets of 70% in residential solid waste. However, the overall capacity of the solid waste system is anticipated to be adequate.

130th/145th Station Area

Not applicable. Under Alternative 3, the station area plan would not be implemented and citywide place types would apply. See the cumulative evaluation under Alternative 3 in Area 2.

Impacts of Alternative 4: Corridor

Police

Impacts of Alternative 3 on demand for officers would be similar to Alternative 2 with similar growth numbers and need for officers. Most growth would continue to be in centers, but the 20,000 additional residential dwellings would be distributed in a less dense fashion across the NR designation in middle housing types and calls for service may likewise be more diffuse.

Fire/Emergency Medical Services

This alternative will distribute more households throughout the city and will potentially increase needs in Area 1 and Area 2. However, because Area 1 has the highest number of units of any of the service areas, it would be a better use of resources to support aid units in Area 2, Area 4, and Area 8. Additionally, each area of this alternative aggregates to one additional firefighting specific unit depending on the density of the area. This may result in an additional station in South Lake Union to support an additional engine, or possibly increased usage of existing stations.

Investments in climate resilience to address health/emergency services would be likely focused where growth is concentrated in centers, as well as in rights of way and public and private lands (e.g., green infrastructure, tree canopy).

Parks

Alternative 4 distributes a similar amount of growth as Alternatives 2 and 3 but emphasizes growth in areas 2, 6, and 8. Impacts would be similar to those described under Alternative 2 with more parkland needed in areas 2, 6, and 8.

Schools

Alternative 4 would place the most growth in areas 1 and 2 like Alternatives 1, 2, and 3, and also place a similar amount of growth in centers and villages as these alternatives. The difference in growth is distributed along corridors in urban neighborhood areas, and there could be incremental demand increases at serving schools. Given the size of attendance boundaries, there is likely not much difference in increased demand between Alternatives 3 and 4. Existing schools may need added classrooms, schools, or attendance boundary changes depending on the rate of growth.

Solid Waste

Impacts of this alternative would be similar to Alternative 2 in terms of amount of housing units estimated. However, the distribution of the units is broader across the city and would impact both solid-waste haulers more equally in terms of demand. The number of single-family customers would increase with the increase in in-fill development, but a large proportion of the growth (~68%) would still be in the number of multifamily customers. Education and outreach demand would increase at a slightly lower level than Alternative 2 but would still be required to meet diversion targets of 70% in residential solid waste. However, the overall capacity of the solid waste system is anticipated to be adequate.

130th/145th Station Area

Not applicable. Under Alternative 3, the station area plan would not be implemented and citywide place types would apply. See the cumulative evaluation under Alternative 3 in Area 2.

Impacts of Alternative 5: Combined

Police

Alternative 5 would have the greatest demand for additional police services by adding 40,000 more dwellings than Alternative 1 for total new growth of 120,000 or 246,000 new residents. The Alternative maximizes growth in all centers, nodes, corridors, and NR designations. It could require investment in police stations in all areas.

Fire/ Emergency Medical Services

This alternative presents the greatest number of additional dwelling units as well as the highest potential to overload existing fire stations. Growth is spread throughout the city and is maximized as this alternative more evenly distributes higher density housing and increased targeted growth.

Additional stations could be added to fill the holes in service near Area 1 or 2, I-5 corridor, or North Seattle, as well as in Area 5 near South Lake Union. Additionally extra units may be leveraged in Area 8 to support the larger geographic area whose growth may be achieved through smaller multifamily dwellings that are exempt from certain fire suppression measures.

The potential opportunities for investment in climate resilience particularly addressing extreme heat would be greatest (e.g. green infrastructure, tree canopy, etc.). More buildings could be designated for passive cooling and air filtration.

Parks

Demand for additional parkland would be highest under Alternative 5 with 40,000 more dwellings than Alternative 1 and 20,000 more than Alternatives 2 and 3. Alternative 5 matches or exceeds growth of the other alternatives in each area except in Area 5 where growth is slightly lower than Alternative 2.

Schools

Alternative 5 has the greatest population growth and the greatest demand for schools. All areas of the city would see more growth, though still focused in areas 1 and 2. All place types—centers, corridors, and residential districts would see growth and require increased educational services. More than other studied alternatives, existing schools may need added classrooms, schools, or attendance boundary changes depending on the rate of growth.

Solid Waste

This alternative presents the greatest number of additional dwelling units citywide. Growth is spread throughout the city and is maximized as this alternative more evenly distributes higher density housing and increased targeted growth. There would be additional need for outreach and engagement in multifamily residential developments, additional stress on public place litter and recycling and illegal dumping contractors, as well as increases in the number of routes needed to reach minimum levels of service for residential and commercial customers.

Even under the highest growth, the overall capacity of the solid waste system is anticipated to be adequate provided the solid waste plan is implemented. The plan is anticipated to be updated over time as the city grows over the 20-year period.

130th/145th Station Area

Police

Population would equal over 3,400 and more than double the current population, and lead to the highest level of demand in the station area and contribute to overall demand in Area 2.

Fire/Emergency Medical Services

This alternative presents that largest increase in unit needs for the transit stations areas. If an additional aid unit is provided at each of the nearby stations at Bitter Lake and Lake City, SFD can maintain and even improve the service levels of the station area without being forced to cross Interstate-5 which may present a challenge depending on the time of day.

Parks

Demand in the study area would contribute to the higher citywide demand for parks. Locally, Alternative 5 has the most residential growth in 130th Street Station Area. Growth and demand for parks in the 145th Street Station Area is second highest under Alternative 5. There could be increased usage at local parks and a need to increase capacity.

Schools

Under Alternative 5, impacts to schools immediately in the station areas would be similar to and slightly greater than Alternative 2 with a small difference in expected students.

Solid Waste

Under Alternative 5, impacts to solid waste would be similar to and slightly greater than Alternative 2 with a small increase in the number of dwelling units and waste volume.

3.11.3 Mitigation Measures

Incorporated Plan Features

The action alternatives would update the Parks and Recreation Element of the Comprehensive Plan which would result in refreshed policies. The POS Plan is being updated in parallel with the Comprehensive Plan, and it is anticipated that the plan will address levels of service and priorities for implementation.

The City is updating its Comprehensive Plan including its public services policies and coordinating with service providers regarding growth estimates.

Compact growth in centers under all alternatives and in other areas of focus like centers and corridors in Alternatives 2 and 4 could result in more efficient service delivery. More diffuse growth in urban neighborhood areas in Alternatives 3 and 5 could distribute the demand more incrementally and locate more housing near existing infrastructure like schools, parks, and fire stations.

Regulations & Commitments

Police

- SPD has Crime Prevention Coordinators (CPCs) who are experts in crime prevention techniques. SPD also advises on natural surveillance and other techniques to provide design of development and landscaping that allows for visibility and increase safety.
- SPD has developed Micro Community Policing Plans (MCPP) with community engagement and considering crime data to help direct police services to address the individual needs of each community.
- SPD has a Professional Standards Bureau to guide Seattle's Police Reform. Goals include:
  - Reduce Crime and Disorder: The Seattle Police Department strives to move beyond just responding to crime after it has occurred to proactively working toward reducing the opportunity for and disorder associated with criminal activity.
  - Service Excellence: Enforcing the law is only a portion of what the Seattle Police Department does each day. Providing service to individuals happens much more frequently than arrests. To this end the men and women of the Seattle Police Department are continuously looking for better and more effective ways to advance policing.
  - Honor and Professionalism: Public trust, Courtesy, and Respect remain a top priority for the Department. All SPD personnel understand that this is a shared responsibility and is critical in building strong relationships with the communities of Seattle.
  - Business Efficiency: SPD has a duty to administer the resources granted to it in a responsible and effective manner and is always looking toward implementing best business practices to provide effective and skillful police services.

- Data Driven Policies and Practices: Effective, modern policing is grounded in agile, data-driven strategies. SPD is committed to using multi-disciplinary solutions for improving the livability of the City.

Fire/Emergency Medical Services

- The Seattle Fire code specifies that any street improvements must be consistent with the Seattle Fire Code Section 503 and Appendix D, which address fire apparatus access roads and minimum standards for public right of way design to not inhibit response.
- Seattle Fire Code Section 9 also specifies that buildings of certain numbers of housing and commercial units that will be required to meet targeted growth require means of egress, sprinkler systems, and other fire protection measures. The code also specifies certain characteristics of each of these fire protection measures in new development and inspections on existing housing and commercial spaces.
- Response time commitments are available under **Response Time** in **Section 3.11.1** or as follows:
  - Call Processing Time: 60 seconds for phone answered to first unit assigned for 90% of calls.
  - Fire Response Time: Arrival within 4 minutes for the first-arriving engine at a fire for 90% of calls, and arrival within 8 minutes of the full first alarm assignment of 15 firefighters, for 90% of calls.
  - Basic Life Support: Arrival within 4 minutes of the first medical unit with two EMTs, for 90% of calls.
  - Advanced Life Support: Arrival within 8 minutes for 90% of call
- Seattle Fire has committed to limiting the number of dispatches/runs per unit to 2500 annually based on national standards and regulations (Haskell, McAuslan, 2023). This is to ensure that staff are not overburdened, units remain in good condition, and overburdened units can be identified.

Parks

- The Seattle Land Use Code (Seattle Municipal Code Title 23) contains development regulations, including standards governing the design and placement of exterior site and building illumination and recreation/open space. The LUC also provides for SPR review when subdivisions over a certain size are proposed.
- The Seattle Shoreline Master Program requires shoreline public access for development that creates a demand.

Schools

- Ongoing Seattle School District capital facilities management planning would be required to address increases in student population. The Seattle School District prepares capital plans and projects are funded by levies.

Solid Waste

- Seattle Solid Waste develops a Solid Waste Management Plan at consistent intervals to ensure that departmental policies align with their stated goals. The most recent draft update to this plan commits to a zero-waste vision in which Seattleites produce and use less to ensure reduced impacts to human health and the environment.
- Seattle Public Utilities produces strategic business plans every 5 years which include solid waste elements and ways in which SPU can support the Solid Waste Division through investments to reach its stated goals from the Solid Waste Management Plan.
- The City produces several resources on specific hazardous waste, single use plastics, food waste, and waste composition studies which create regulations and policies that limit environmental impacts from pollution, microplastics entering into the food system, and waste disposal. These studies have culminated in specific policies such as the single use plastic bag ban, prioritization of durables (metal or reusable tableware) in restaurants, and a number of pilot projects aimed at creating more opportunities to recycle and compost in all parts of the city.

Other Potential Mitigation Measures

Police

SPD could update its MCPP described under "Incorporated Plan Features" or create updated police service programs to engage the community in police services that equitably and justly meet community needs.

Fire/Emergency Medical Services

Additional fire/emergency medical services mitigation measures could include:

- SFD could explore options to decrease call times through new station placement strategies that limit East/West travel which has historically been challenging for fire units during busier times of day.
- SFD could explore smaller, more nimble fire units that are better equipped to navigate Seattle's complex topography to decrease response times while still ensuring SFD's excellent standard of service for emergency medical and fire response.
- SFD could convert peak aid units that are available at certain times to full time aid units.
- SFD could add aid units in underserved areas.
- **130th/145th Station Area:** If an additional aid unit is provided at each of the nearby stations at Bitter Lake and Lake City, SFD can maintain and even improve the service levels of the station area and avoiding crossing Interstate-5 at congested times of the day.

Parks

- The City could explore a population density or access-based level of service approach given the urban nature of the city as identified in the draft Parks and Open Space Plan March 2024.
- The City could add additional or improve existing park space including:
  - Expanding existing parks or adding capacity on existing parks (e.g., expanded play or sports facilities),
  - Creating linear parks and trails,
  - Increasing tree canopy coverage in rights-of-way or public parks and open space to reduce urban heat island effects,
  - Developing recreation facilities on building rooftops to provide sports courts, athletic fields, off-leash dog areas, etc. ,
  - Developing community gardens (permitted on some rooftops in individual zones) as a way to provide open space and urban agricultural use,
  - Increasing frequency of maintenance to offset an increase in park usage.
- The City could implement a parks impact fee to help pay for the development of new park land if needed in the future.
- The City could also explore transportation to and from parks and potentially increase connectivity between parks in areas of high equity opportunity.

Schools

- The City could implement a school impact fee to help pay for the development of new classrooms if they are needed in the future.
- The City could help identify interim uses for existing underutilized classrooms so that the school district can hold onto them in case they are needed in the future.
- The City could incentivize provision of public schools in centers in vertical formats, where new schools are needed. The City could also allow for greater heights at existing school locations where demand increases. Goals would be to protect recreation and tree canopy while allowing for more student classroom capacity.
- The City could update development standards and review processes for new schools in order to make it easier to add classrooms or build new schools if they are needed in the future.
- As part of development standards for new place types such as neighborhood centers and corridors, the City could enhance street crossing including walking routes to schools in areas with added housing.
- The City could identify specific objectives to assist Seattle Public Schools in acquiring and developing new schools if needed.

Solid Waste

Additional solid waste mitigation measures may be needed to help the City reach its goals of 70% diversion of waste to recycling and compost. These measures are as follows:

- Increasing budget for education and outreach services for multi-family residents
- Establishing more significant penalties for those who do not adhere to recycling and composting standards while increasing financial benefits for households and multi-family residents who opt for recycling and compost over landfill waste disposal.
- Require specific standards in solid waste hauling contracts to protect employees from adverse health impacts of their work during extreme weather events.

3.11.4 Significant Unavoidable Adverse Impacts

Police

There will be an increase in population and jobs and an increase in demand for police services. However, there are mitigation measures to invest in resources to address needs and provide adequate services.

Fire/Emergency Medical Services

It is anticipated that increased demand for fire/emergency medical services can be accommodated due the changes in staffing for fire prevention education, increased capacity at station facilities, and either redistributing or increasing the number of units at each station. Consequently, no significant unavoidable adverse impacts are to be expected.

Parks

All alternatives will exceed the existing level of service and increase demand for parks and recreation facilities. With mitigation (adding parks, making better use of existing parks, or updating the LOS) significant adverse impacts can be avoided.

Schools

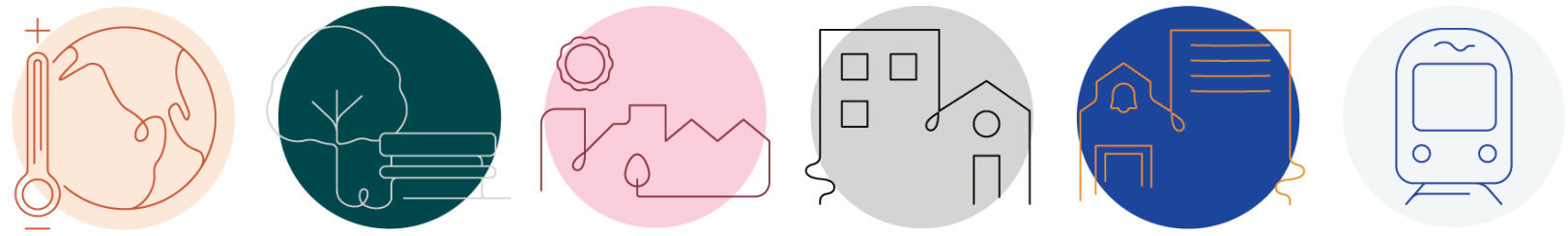
All studied alternatives would result in increases in students. This could require additional school capacity unanticipated in current district plans. However, it is anticipated that Seattle Public Schools could respond to any new growth that may occur through regular capital planning and coordination. Consequently, no significant unavoidable adverse impacts are anticipated.

Solid Waste

It is anticipated that Seattle Solid Waste will be able to accommodate expected increases in solid waste service through regular contract renegotiation and ongoing maintenance and upkeep of capital facilities. Consequently, no significant adverse impacts are anticipated.

Intentionally blank

3.12 Utilities



Seattle City Light. Source: City of Seattle, 2023.

This section evaluates the potential impacts to utilities that may result from the five alternatives. Utilities evaluated in this section include the public water system, the wastewater and drainage system, and the electrical system.

Thresholds of significance utilized in this impact analysis include:

- Impacts that would be inconsistent with plans for future utility improvements, development, or growth.
- Impacts that would require major unplanned capital improvements for the utility to serve new development.

3.12.1 Affected Environment

Citywide

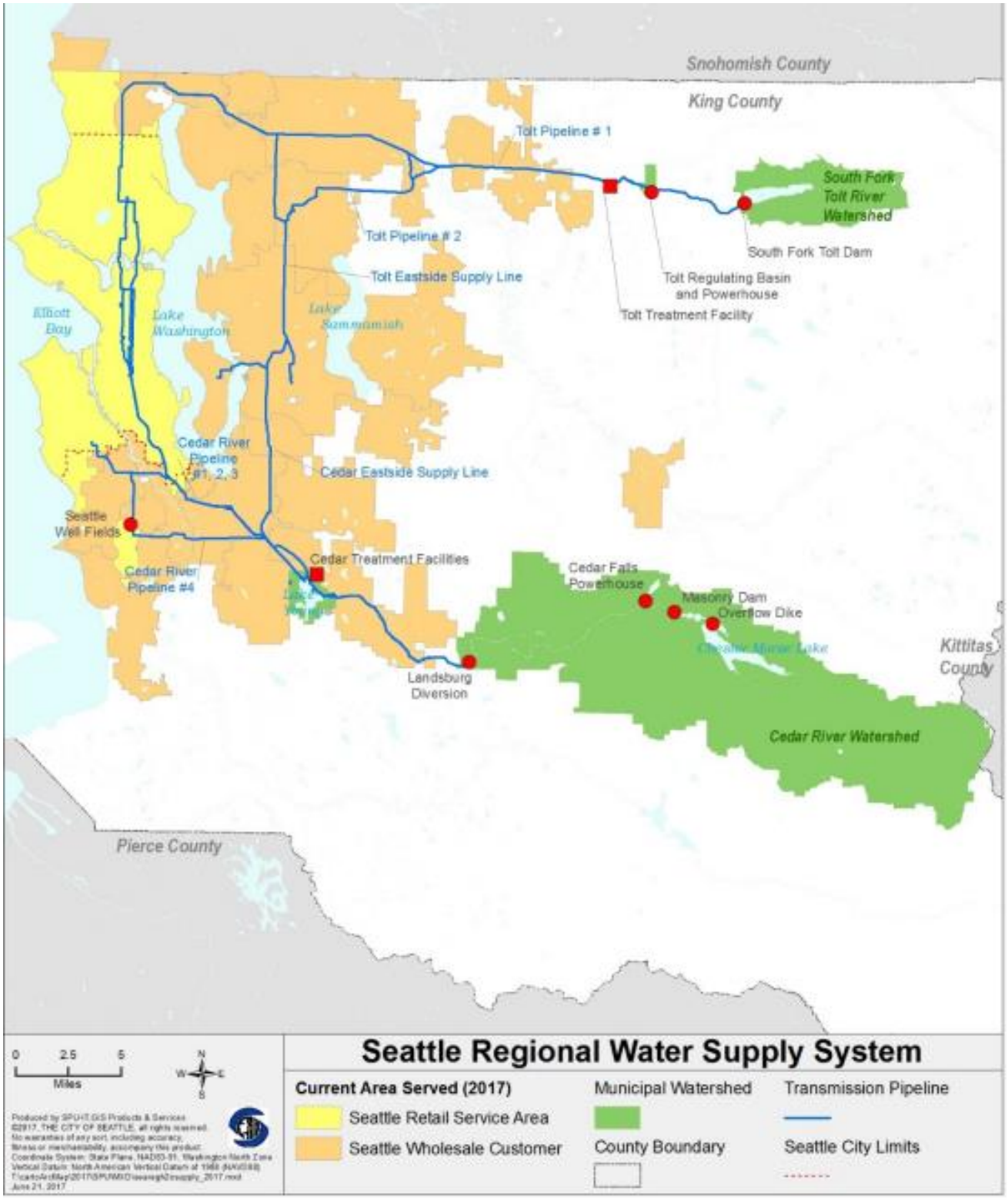
Water

Seattle Public Utilities (SPU) provides drinking water to approximately 1.5 million people living in Seattle and surrounding communities in western King County and portions of southern Snohomish County. The city's water supply comes primarily from surface water reservoirs on the Cedar River, which supplies 60 to 70%, and South Fork Tolt River, which supplies the remainder. SPU also manages a small wellfield that can be used to supplement the surface water sources if needed (SPU 2019a).

A roughly equal amount of water is provided to retail and wholesale customers through approximately 1,820 miles of transmission and distribution lines, as shown in **Exhibit 3.12-1**. SPU's water system has an estimated yield of 172 million gallons per day (mgd), although actual consumption has been much less and declining over time, with per capita consumption 44% less in 2019 than in 1990. Over the past five years, total consumption has averaged about 121 mgd (SPU 2019a).

SPU does not have any planned efforts to increase water supply prior to 2060. Despite an anticipated household growth rate of 18% in its retail service area and 29% in its full and partial wholesale customers between 2016 and 2040, SPU anticipates that total demand is forecast to remain relatively flat due to continued efforts to conserve water and changes to its wholesale water customers (SPU 2018). Current capital investments for SPU include those for maintenance of existing infrastructure including dams, watermain rehabilitation in the distribution system, seismic improvements, and ensuring the water system's resiliency under climate change.

Exhibit 3.12-1. Seattle Regional Water Supply System



Source: SPU, 2019a.

Wastewater & Drainage

SPU manages wastewater and drainage systems in Seattle, which include the combined sewer system, the sanitary sewer system, and the stormwater drainage system. The City contains three different types of areas: the combined sewer area (with only combined sewer systems), separated sewer areas (with sanitary sewer and stormwater drainage systems), and partially separated sewer areas (with sanitary sewer and stormwater drainage systems, where some rainwater still goes to the sanitary sewer), each covering about one-third of the city as shown in **Exhibit 3.12-2**. The King County Wastewater Treatment Division operates the West Point treatment plant—one of the County's three regional wastewater treatment plants—in addition to four combined sewer overflow (CSO) treatment facilities within the city of Seattle (King County 2022) and the wastewater trunkline system that serves Seattle. The majority of wastewater collected from within Seattle is treated at the West Point plant, which is supported by the Brightwater plant near Woodinville if needed (King County 2023a, King County 2023b).

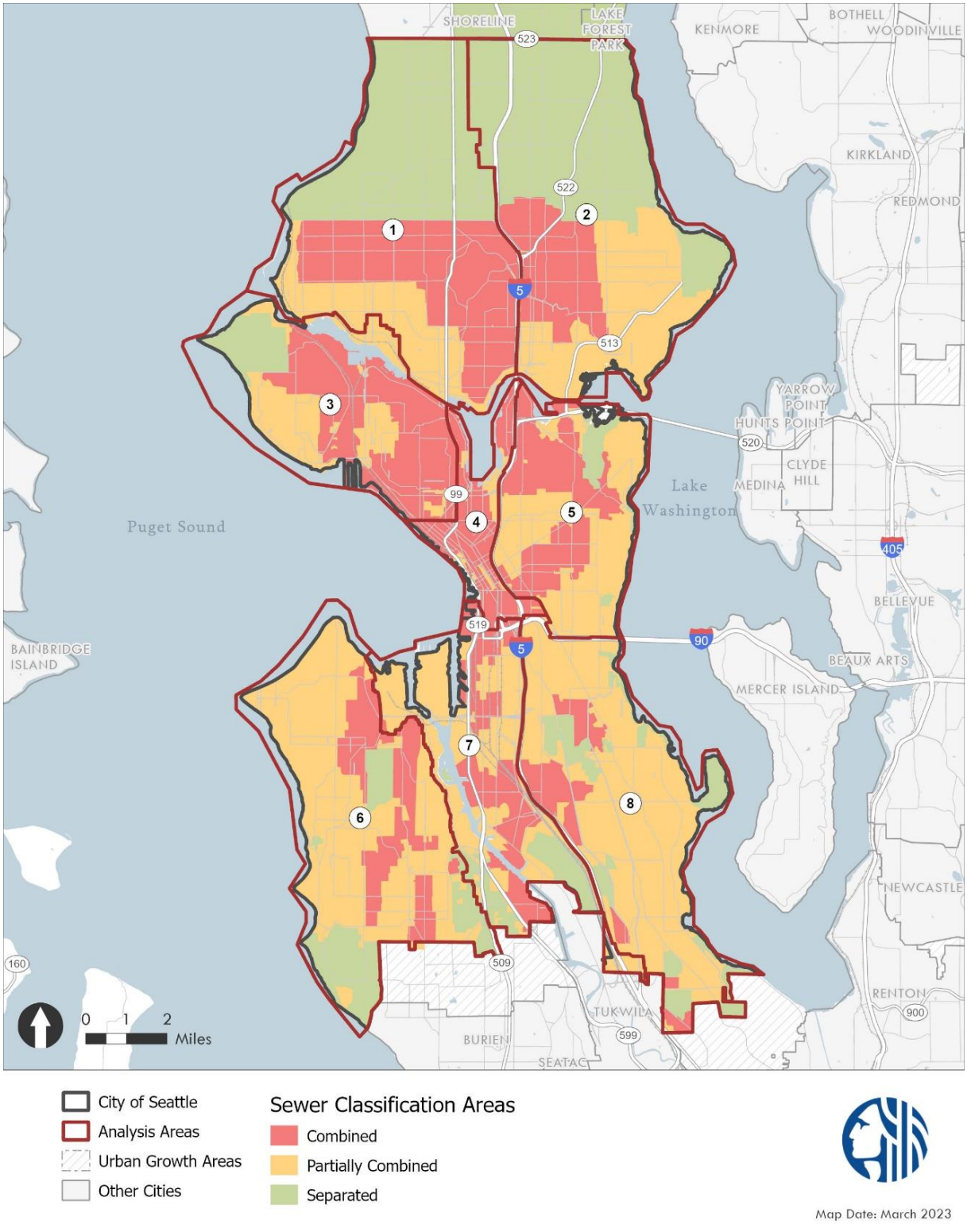
The combined sewer system is the oldest system conveying wastewater and drainage in Seattle, with infrastructure 100 years old or more in places (SPU 2023a). The combined sewer system collects wastewater from residents and businesses along with stormwater runoff from rooftops, yards, and streets into the same pipes, where it is then conveyed to the treatment plant. During periods of heavy rain, the system can overflow into waterbodies such as Lake Washington and Elliott Bay. While CSOs prevent wastewater treatment plants from being overwhelmed and prevent the wastewater system from backing up into roads and buildings, they contribute pollutants to receiving waterbodies. This degrades water quality, which impacts the aquatic life and habitat within these waterbodies and inhibits recreational opportunities.

In the separated sewer system wastewater from homes and businesses is collected through a separate set of pipes than stormwater. Wastewater is sent to the treatment plant while drainage collected from rooftops, yards, and streets is conveyed to waterbodies. Pollutants picked up by stormwater from rooftops and streets can impact water quality and the aquatic life in receiving waterbodies.

In the partially separated sewer system, stormwater runoff from the rooftops of older construction is collected along with wastewater from homes and businesses and conveyed through the wastewater system to the treatment plant. As in the separated system, stormwater runoff from yards, streets, and new development is conveyed to waterbodies.

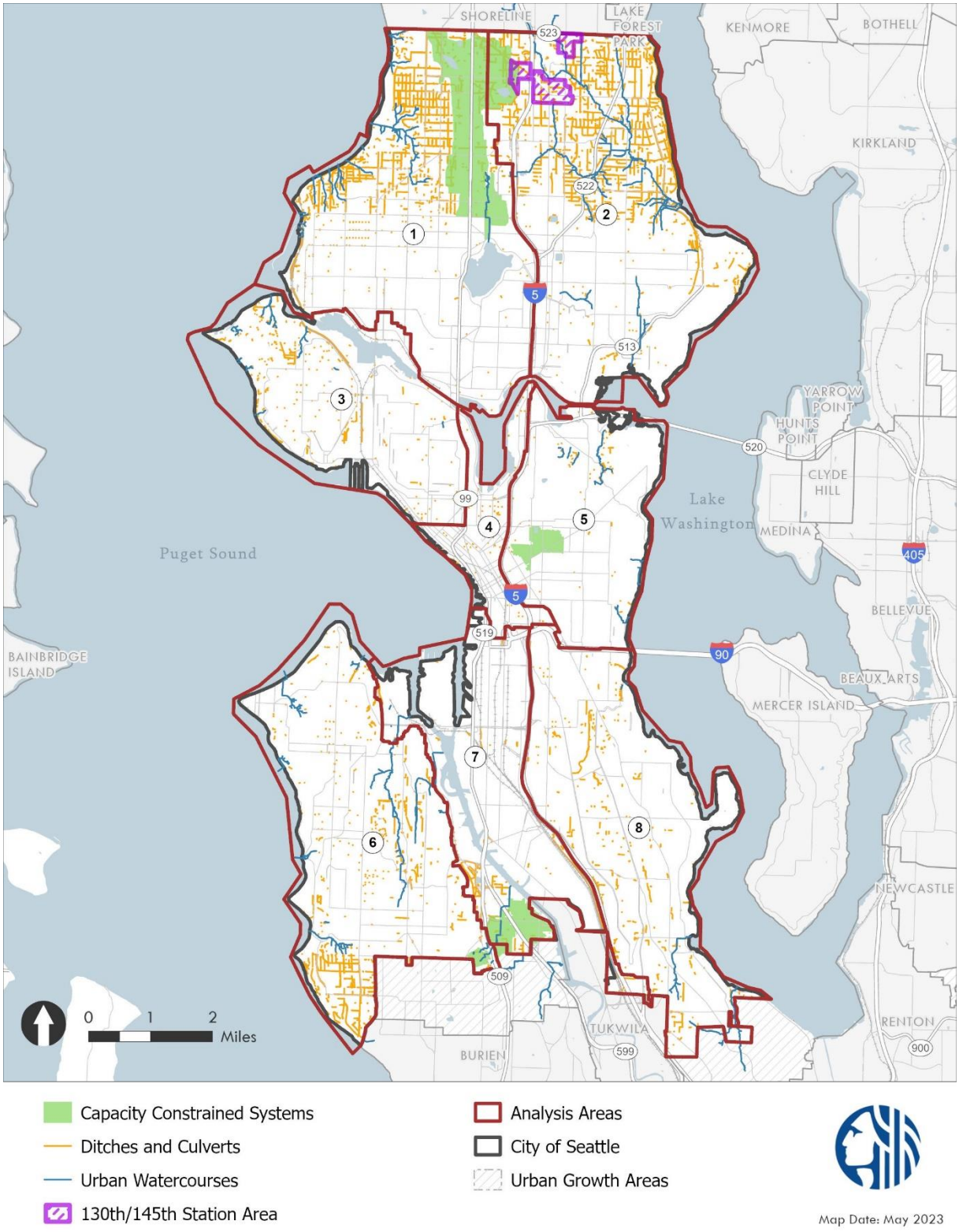
While the vast majority of SPU's drainage system is piped, Seattle has areas that are served by a predominantly 'informal' drainage system, particularly north of 85th Street and in the southwest corner of Seattle. These areas include blocks with no, or only limited drainage infrastructure and several miles of ditch and culvert systems. According to Seattle's Stormwater Code (Seattle Municipal Code [SMC] Title 22, Subtitle VIII) ditch and culvert systems are considered capacity constrained, meaning they have inadequate capacity for existing and anticipated stormwater loads. **Exhibit 3.12-3** shows the wastewater and drainage systems considered capacity constrained.

Exhibit 3.12-2. Drainage Areas by Type



Source: City of Seattle GIS, 2023; Parametrix, 2023.

Exhibit 3.12-3. Capacity Constrained Wastewater and Drainage Systems



Source: City of Seattle GIS, 2023; Parametrix, 2023.

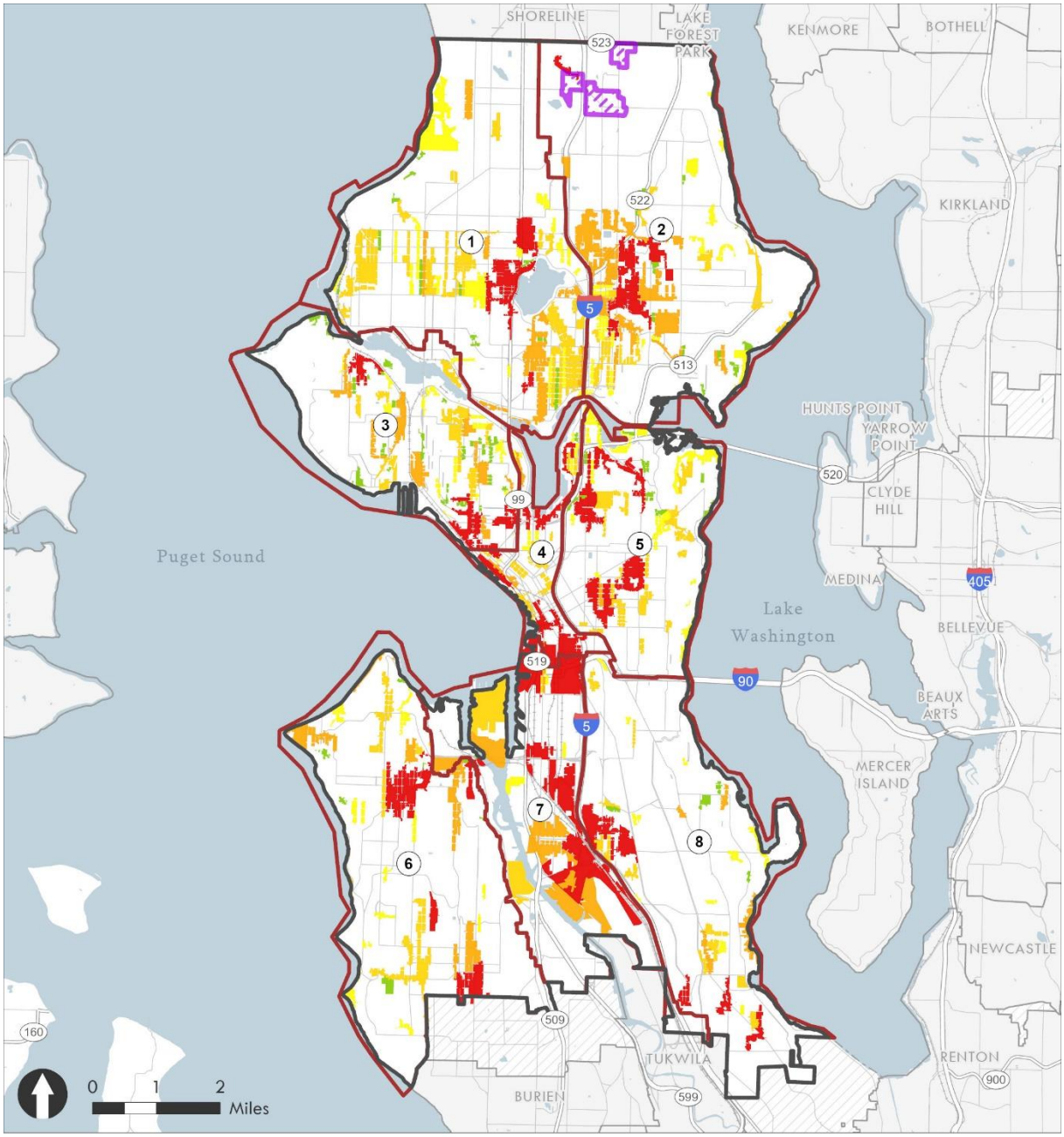
Development must meet certain requirements for flow control and possibly treatment depending on the characteristics of the project and the type of system to which it discharges or conveys runoff. Development within the combined sewer area is subject to flow control requirements, while projects within creek basins, discharging to wetlands, or conveying runoff through ditch and culvert systems are subject to both flow control and water quality treatment requirements.

In 2019 SPU published a Wastewater System Analysis (WWSA) that identifies areas at risk due to limited wastewater system capacity, which can cause sewer overflows through maintenance holes or backups into homes or businesses (SPU 2019b). In 2020, SPU completed a Drainage Systems Analysis (DSA) that identified areas at greatest risk from limited drainage system capacity, which could cause flooding in the right-of-way or onto private property (SPU 2020). These analyses simulated SPU's wastewater and drainage system performance under different design storms that represented differing amounts of rainfall in a 24-hour period and calculated risks based on the likelihood and consequences of flooding and sewer overflows, as well as areas of racial and socioeconomic disparity. The WWSA and DSA both used the best available growth and climate change projections at the time to assess how the identified risks might be impacted in the future.

The WWSA and DSA were developed to assess risks associated with system capacity citywide in order to prioritize SPU investments in sewer and drainage capacity improvements in the future through the Shape Our Water planning effort. They were not developed to inform development decisions. Both WWSA and DSA used modeling to simulate system performance at the citywide scale and risk areas identified have not necessarily been confirmed by real-world instances of flooding, sewer overflows, or sewer back-ups. The WWSA and DSA both used conservative assumptions to identify risks with the assumption that additional ground-truthing would be necessary before making decisions on specific capital improvements. This approach may have resulted in an overprediction of areas at risk due to sewer and drainage capacity. **Exhibit 3.12-4** shows areas with higher risk due to limited wastewater system capacity**. Exhibit 3.12-5** shows areas with higher risk due to limited drainage system capacity.

In addition, the WWSA and DSA modeled sewer and drainage system capacity under future conditions for the 2035 planning horizon and ran simulations to evaluate the potential changes in flooding, sewer overflows, and sewer back-ups caused by changes in impervious cover, stormwater code compliance, sea level rise, and more frequent and extreme rainfall events. The WWSA found that "Citywide, the percent of surcharged pipe length increased slightly from 30% under existing conditions to 33% under future conditions for the 5-yr, 24-hour storm. Simulated MH [maintenance hole] flooding increased to a lesser degree from 6% under existing conditions to 7% under future conditions (SPU 2019b)." The DSA found that "Redevelopment can result in additional impervious surface areas which can increase peak flows and affect conveyance capacity. Due to the City's stormwater code requirements, new or replaced impervious surface areas associated with development may require flow control which mitigate the increased flows and sometimes decrease existing flows (SPU 2020)."

Exhibit 3.12-4. Wastewater System Capacity Priority Areas



Wastewater System Capacity Priority Areas

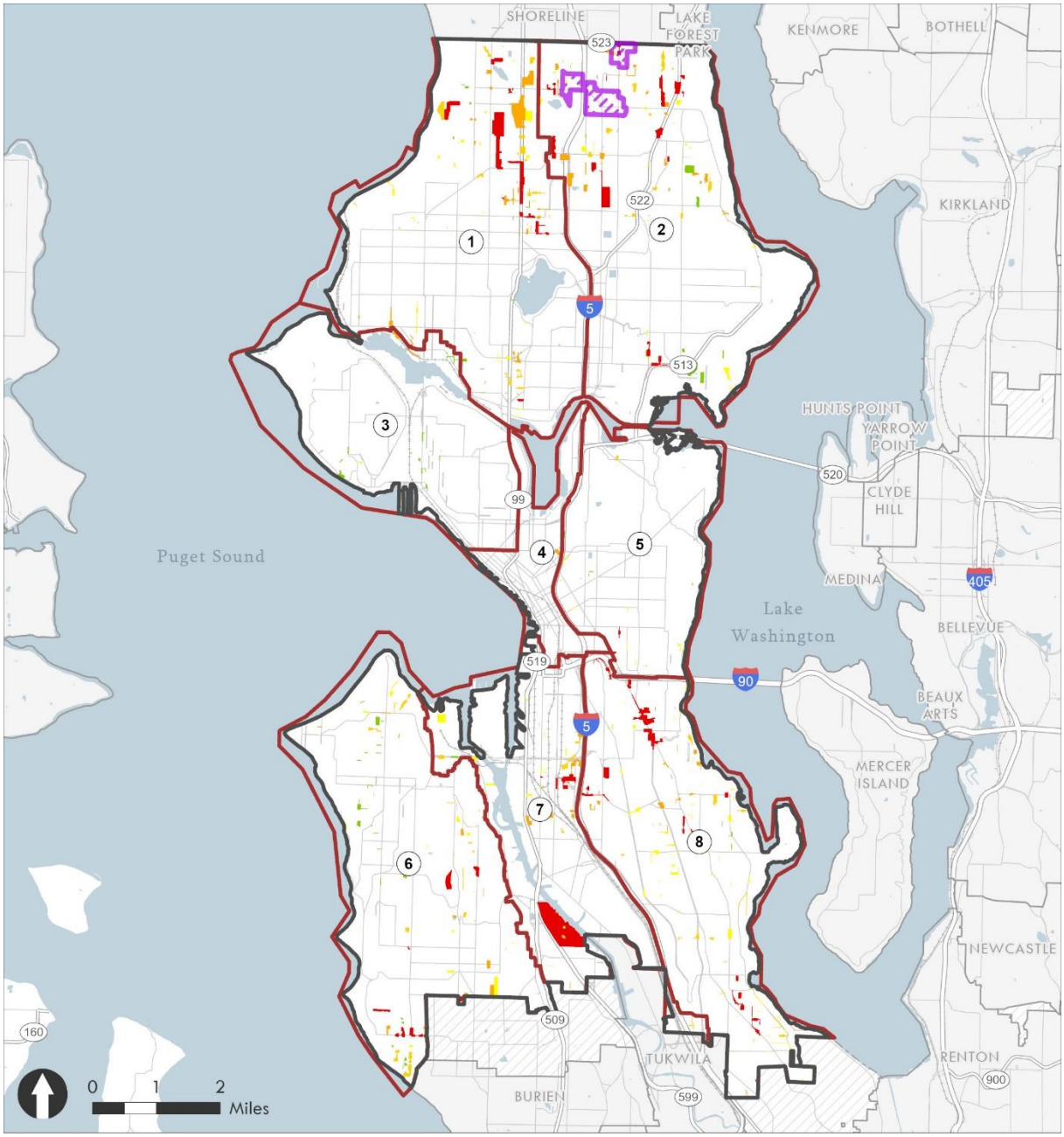
Relative risk categories

- Critical
- High
- Medium
- Medium-low
- Low
- 130th/145th Station Area
- City of Seattle
- Analysis Zones
- Urban Growth Areas

Map Date: June 2023

Source: SPU, 2019b; Parametrix, 2023.

Exhibit 3.12-5. Drainage System Capacity Priority Areas



Drainage System Capacity Priority Areas

Relative risk category

- critical
- high
- medium
- medium-low
- low

- 130th/145th Station Area
- City of Seattle
- Analysis Zones
- Urban Growth Areas

Map Date: June 2023

Source: SPU, 2020; Parametrix, 2023.

SPU's major capital investments currently include several projects to restore creeks, reduce flooding, improve sewer capacity, increase green stormwater infrastructure, and reduce CSOs. SPU's largest CSO control project is the Ship Canal Water Quality Project, which is being done in partnership with King County, and will prevent an average of 75 million gallons of polluted stormwater and sewage from entering waterways each year (SPU 2023b). SPU is also currently developing a plan for Seattle's water future, called Shape Our Water: A 50-year Plan for Seattle's Water Resilience.

Also in 2019, King County published the Treatment Plant Flows and Loadings Study, which evaluates the capacity of its wastewater treatment plants in terms of handling overall volume of wastewater and stormwater flow in addition to the amount of organic and solids load (King County 2019). In its evaluation, the County used population estimates and projections based on 2013 PSRC forecasts, adjusted for the higher growth rate the region experienced between 2010 and 2016. Based on the results, the West Point treatment plant is projected to be able to handle maximum month flow until 2050 but is already reaching capacity for maximum month loadings. In addition, the County will need to optimize treatment plant operations and ultimately invest in technical modifications to comply with the Puget Sound Nutrient General Permit, which became effective in January 2022. This may put further constraints on treatment plant capacity.

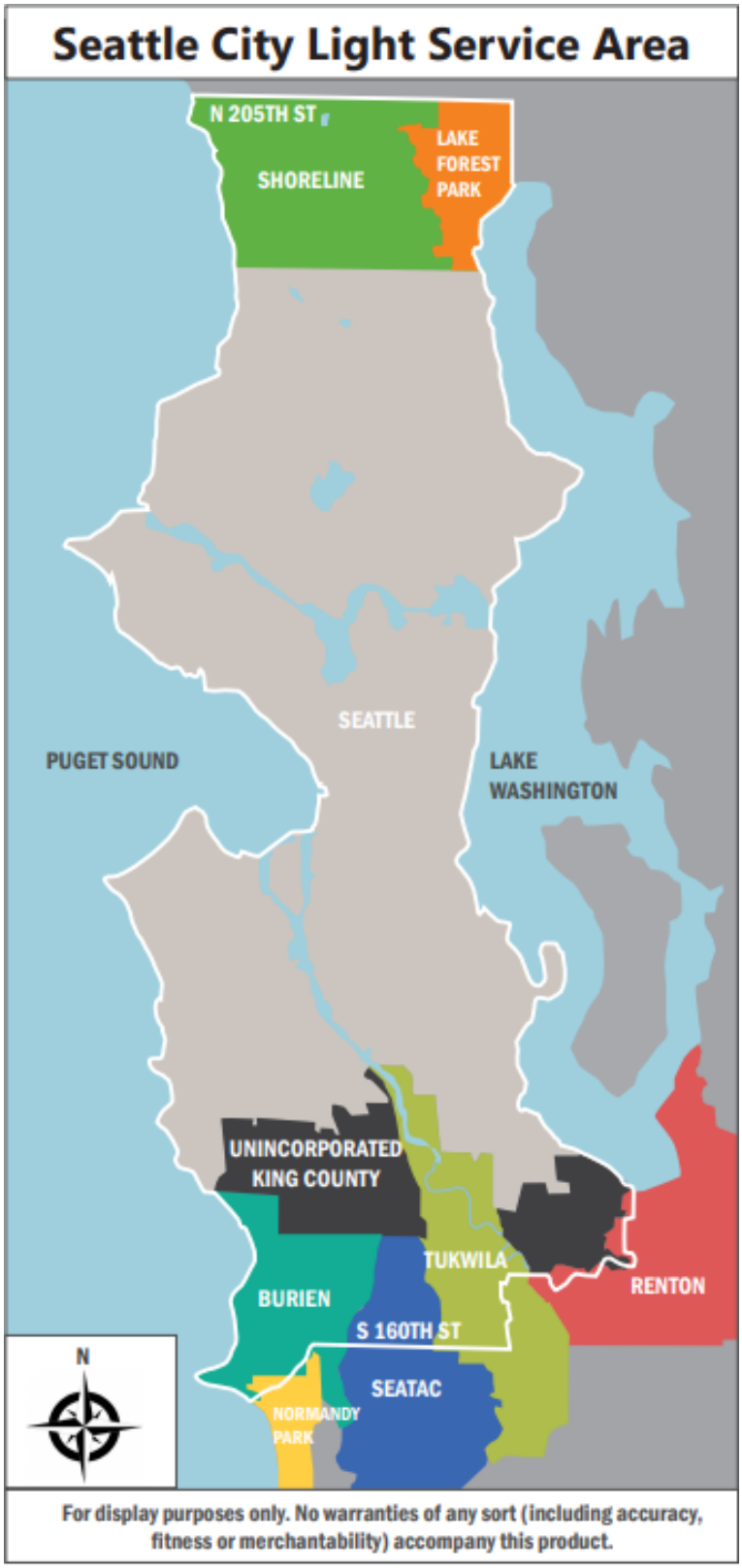
King County has capital projects underway at the West Point treatment plant to improve the reliability of power supply, replace and upgrade the raw sewage pump system, and construct seismic upgrades. King County has completed a number of CSO control projects in Seattle in recent years, and in addition to the Ship Canal Water Quality Project in Seattle, is working on a new CSO treatment facility in Georgetown and a 1.25-million-gallon storage facility for wastewater and stormwater in South Park. The County is also undergoing an effort to improve the capacity of the Thornton Creek sewer pipe, evaluating alternatives to reduce the infiltration and inflow of groundwater and stormwater into the pipe to reduce the risk of overflows and water quality impacts in the Thornton Creek basin.

Electricity

Seattle City Light (SCL) provides electrical power to homes and businesses in Seattle in addition to customers in communities north and south of the city. **Exhibit 3.12-6** shows the SCL service area. In 2020, SCL provided over 8.6 million megawatt-hours of power to over 425,000 residential customers and over 50,000 commercial and industrial customers (SCL 2021). A significant portion of SCL's power is generated by the utility's own hydroelectric facilities, namely the Ross, Gorge, and Diablo dams on the Skagit River north of Seattle and the Boundary Dam on the Pend Oreille River in northeast Washington. The rest of the power is purchased through other sources, including over a third of power needs from the Bonneville Power Administration (SCL 2021).

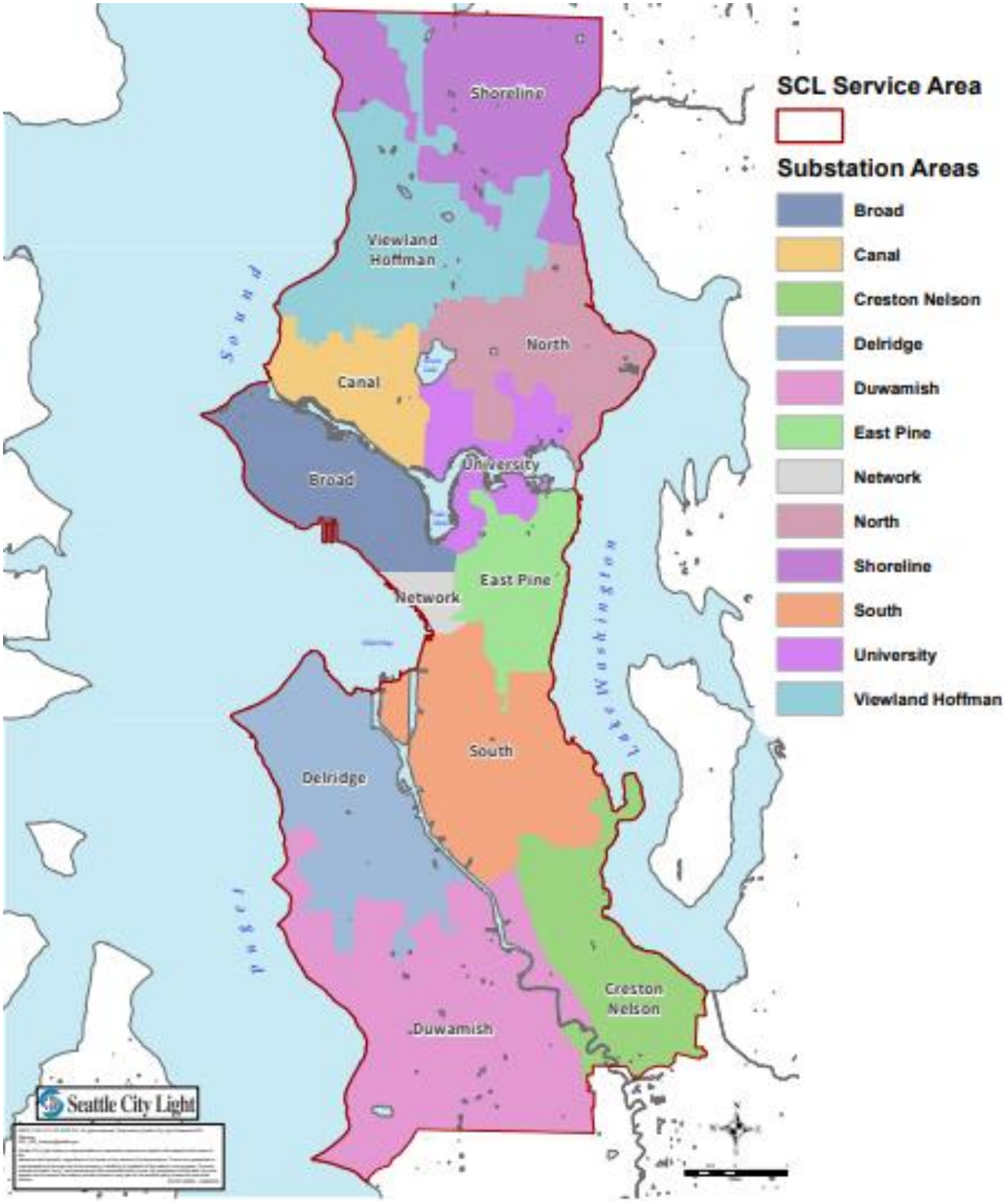
Within Seattle, SCL operates 12 substations—the newest being the Denny Substation built in 2018—that distribute power throughout the city, as shown in **Exhibit 3.12-7**. These substations lower the voltage of electricity from the high-voltage 115- and 230-kilovolt transmission lines before transferring it to the overhead and underground neighborhood distribution lines. In all, SCL manages over 2,300 miles of distribution circuit (SCL 2021). There is also a small but growing number of decentralized energy production sources, such as private solar panel arrays on residential or commercial buildings. These arrays can help supplement electrical power from SCL's system and, where large enough, can contribute electrical power back into the system.

Exhibit 3.12-6. Seattle City Light Service Area



Source: SCL, 2021.

Exhibit 3.12-7. Seattle City Light Substation Service Areas



Source: SCL, 2021.

SCL conducted an assessment in 2022 to examine the high-level impacts of electrification of buildings, transportation, and commercial and industrial applications within its service area in addition to population and commercial growth. The Seattle City Light Electrification Assessment (SCL 2022a) analyzed the impacts of electrification, such as the adoption of electric vehicles and building heating and cooling systems, under three different electrification scenarios: a Moderate Market Advancement scenario where electrification occurs based on past trajectories, a Rapid Market Advancement scenario consistent with the goals and policies of plans such as the Seattle Climate Action Plan, and the Full Adoption of Electrification Technologies scenario where all technologies would be fully electric by 2030, consistent with Seattle's Green New Deal. Each scenario included the addition of 65,000 housing units and over 69 million square feet of commercial development over the study period (SCL 2023a).

As shown in **Exhibit 3.12-8**, under all scenarios, the percent of energy use by residential and commercial uses drops relative to industrial and, particularly, transportation uses. This suggests that the adoption of electrification technologies poses a greater concern to system capacity than population growth. The study concluded that, throughout the year, SCL's electrical system has capacity available to accommodate electrification efforts—approximately 22 Terawatt hours (TWh)—although peak load demand could exceed the capacity of portions of the grid during certain times of the year as electrification efforts advance. For example, the study found that under the Full Adoption scenario winter and summer peak loads would exceed the existing system capacity in 2030 without mitigating strategies or technologies to reduce peak demand (SCL 2022a).

Exhibit 3.12-8. Comparison of Electrical Use Under Electrification Scenarios

End Use	Year 2020 Baseline TWh1 / % of Total	Year 2042 Moderate Market Advancement TWh / % of Total	Year 2042 Rapid Market Advancement TWh / % of Total	Year 2042 Full Adoption[2] TWh / % of Total
Commercial	4.52 / 49.5%	5.85 / 44.5%	6.10 / 37.6%	6.48 / 32.8%
Industrial	0.90 / 9.8%	1.38 / 10.5%	1.72 / 10.6%	2.98 / 15.1%
Residential	3.68 / 40.2%	4.89 / 37.2%	5.14 / 31.6%	5.65 / 28.6%
Transportation	0.04 / 0.5%	1.03 / 7.9%	3.28 / 20.2%	4.63 / 23.4%
Total TWh	**9.15 / 100%**	**13.16 / 100%**	**16.25 / 100%**	**19.74 / 100%**

Notes: 1) TWh = Terawatt hours; 2) In the Electrification Assessment report the Full Adoption scenario was analyzed between 2030 and 2042, assuming full electrification begins in 2030, and not compared against the 2020 baseline.
Source: SCL, 2022a.

In 2005, SCL became the first electric utility in the country to become carbon neutral and has maintained its carbon neutral status ever since. SCL continues to invest in energy conservation efforts. These include grid modernization technologies such as microgrids, automation, and demand response. SCL is also investing in public and private charging stations and working

with partner agencies to provide infrastructure and incentives for the electrification of public transit, commercial and government fleets, and personal modes of transportation (SCL 2023b).

Analysis Areas

The presence and nature of utility facilities is primarily consistent between the EIS planning areas, particularly for water and electricity. The primary differentiators for utilities between areas concerns wastewater and drainage systems, which are highlighted below.

Area 1: NW Seattle

Area 1 includes combined, separated, and partially separated wastewater and drainage systems. The northern portion of Area 1 contains a large proportion of streets with informal drainage systems and includes large areas served by ditch and culvert systems, including the capacity constrained Densmore drainage basin in which there are several under capacity drainage ditches and pipes. Short segments of capacity constrained drainage ditches are located in the Ballard and Fremont neighborhoods as well. There are some areas with medium to high risk due to wastewater system capacity with some areas identified as critical risk on the northeast side of Green Lake.

Area 1 is generally covered by the Viewland Hoffman and Canal SCL substation areas.

Area 2: NE Seattle

Area 2 includes combined, separated, and partially separated wastewater and drainage systems. The northern portion of Area 2 includes the greatest proportion of streets with informal drainage systems and areas served by ditch and culvert systems, particularly within the Thornton Creek watershed, in which there are a number of under capacity drainage ditches and pipes (see **Exhibit 3.1-7 Regulated Stream and Lake Watersheds** in **Section 3.1 Earth & Water Quality**). There are some areas with medium, high, and critical risk due to wastewater system capacity mostly within the southwest quadrant of Area 2.

Area 2 is generally covered by the Viewland Hoffman, North, and University SCL substation areas.

130th/145th Study Area

The 130th/145th Study Area is within the Thornton Creek watershed and partially within the Densmore drainage basin, which is considered capacity constrained. In addition, there are numerous streets within the study area with ditch and culvert systems, also considered capacity constrained. This area is indicated as very low risk due to wastewater system capacity.

The 130th/145th Study Area is covered by the Viewland Hoffman substation area.

Area 3: Queen Anne/Magnolia

Area 3 includes the Ballard Interbay Northend Manufacturing Industrial Center. It is primarily served by a combined wastewater and drainage system, with smaller areas served by partially separated and separated systems in the southern area of the Magnolia neighborhood and Discovery Park, respectively. Most streets are served by formal drainage systems, and there are very few drainage pipes listed as under capacity. There are some areas indicated as medium to high risk due to wastewater system capacity throughout the Area 3, with some areas indicated as critical risk within the Lower Queen Anne neighborhood.

Area 3 is covered by the Broad SCL substation area.

Area 4: Downtown/Lake Union

Area 4 includes the Downtown and South Lake Union neighborhoods that include some of the city's most densely populated areas. Wastewater and stormwater in Area 4 is conveyed almost wholly through the combined system, though there are small areas where stormwater is conveyed through the partially separated system. There are areas with medium to high risk due to wastewater system capacity throughout, with the Pioneer Square and International District neighborhoods indicated as critical risk.

Area 4 is generally covered by the Network, Broad, University SCL substation areas.

Area 5: Capitol Hill/Central District

Area 5 is served by both combined and partially separated wastewater and drainage systems, with the area including the Washington Park Arboretum served by a separated system. Nearly all streets are served by a formal drainage system, and there are very few drainage pipes listed as under capacity. The area is primarily indicated as very low risk due to wastewater system capacity except for the Madison Valley and areas in the northeast quadrant of the area, which are indicated as critical risk.

Area 5 is generally covered by the East Pine and University SCL substation areas.

Area 6: West Seattle

Area 6 in West Seattle is served primarily by a partially separated wastewater and drainage system, with smaller areas served by combined and separated systems. There is a small area within the southwestern portion of the area streets that is served by an informal drainage system, including ditch and culvert systems; this area contains drainage ditches listed as under capacity. There are short segments of under capacity drainage pipes located sparsely throughout the area. The area is primarily very low risk due to wastewater system capacity, with some medium and high risk areas, and critical risk areas in the West Seattle Junction and Delridge neighborhoods.

Area 6 is covered by the Delridge and Duwamish SCL substation areas.

Area 7: Duwamish

Area 7 includes the Duwamish Manufacturing Industrial Center. It is served both combined and partially separated wastewater and drainage systems, with smaller areas served by separated systems. It has a small proportion of streets served by a ditch and culvert system, particularly in the southwestern portion of the area. There are small concentrations of under capacity drainage pipes in the north-central and southern portions of the area. Approximately half of the area is indicated as medium, high, and critical risk due to wastewater system capacity.

Area 7 is covered by the South SCL substation area.

Area 8: SE Seattle

Area 8 is served primarily by a partially separated wastewater and drainage system, with smaller portions of the area served by combined or separated systems, including Seward Park. Most streets are served by formal drainage systems. There are under capacity drainage pipes concentrated along Rainier Avenue S in the northern end of the area, and generally in the southern end. The area is indicated primarily as very low risk due to wastewater system capacity, with a critical risk area indicated in the Beacon Hill neighborhood.

Area 8 is generally covered by the South and Creston Nelson SCL substation areas.

3.12.2 Impacts

Impacts Common to All Alternatives

Seattle would experience population and job growth under all the alternatives, which would result in an increase in demand for utility services. While the alternatives have different housing targets—job targets are the same under each alternative—the impacts to utilities as a result of the increased demand would be similar, as described below.

Water

None of the alternatives are anticipated to adversely impact water supply. As stated in **Section 3.12.1 Affected Environment**, SPU does not have any planned efforts to increase water supply during the 20-year planning horizon for the comprehensive plan. As reported in its Official Yield Estimate and Demand Forecast, SPU forecasts that future demand will remain relatively flat well below the available water supply beyond 2060 despite anticipated population and employment growth, due to continued efforts to conserve water and planned reductions in service to its wholesale water customers (SPU 2018, 2019a).

SPU currently has a forecasted surplus capacity between 35 and 40 MGD. Although all the alternatives project 80,000 to 120,000 more households by 2044 (approximately 40,000 to

80,000 more households than the estimates that factor into SPU's demand forecasts), the increase represents a modest increase to the nearly 620,000 households that SPU estimates serving regionally by 2040 (SPU 2018). The overall estimated yield of SPU's drinking water system is anticipated to support this higher growth rate through the planning period.

Individual housing and business developments would need to ensure adequate water supply for drinking water and fire suppression, which could require improvements or upgrades to the existing water distribution system and construction of new service connections where existing infrastructure is undersized. There could be variations in the extent to which water system infrastructure would need to be upgraded or added under each alternative depending on the age, extent, size, and condition of the existing infrastructure and the type of development being planned. For example, a greater degree of utility improvements may be required in urban neighborhood areas for multifamily development than in urban centers.

Wastewater & Drainage

All alternatives would result in greater demands on wastewater and drainage collection systems through a combination of population growth, water consumption, and the amount of impervious surface as a result of new development. The amount and location of increased demand, and any impacts as a result, would vary by alternative.

Development under all the alternatives would occur in areas with wastewater and, to a lesser extent, drainage capacity constraint risks as shown in **Exhibit 3.12-4** and **Exhibit 3.12-5**. All alternatives include shares of household and employment growth in regional centers and urban centers, some of which coincide with the high and critical risk areas for wastewater. This is due in part to the fact that SPU assigned a higher risk score to these areas because a sewer back-up or overflow would have a greater impact in denser areas. However, population growth alone is not likely to exacerbate capacity constraints. As stated in **Section 3.12.1 Affected Environment**, the WWSA found that the extent of surcharged wastewater pipe length would increase only slightly under future conditions, which considered effects from both climate change and population growth.

The drainage capacity constraint risk areas are generally not concentrated within regional or urban centers and, for the most part, are outside the areas targeted for the highest concentrations of growth. As with the WWSA, the DSA considered both population growth (through new development) and climate change. As stated in Affected Environment, while impervious surfaces from development can increase peak flows and affect conveyance capacity, these impacts could be mitigated by the City's stormwater code requirements for flow control.

As mentioned in Affected Environment, the West Point treatment plant is already approaching its capacity for maximum month loading (King County 2019). Treatment plant loading rates would continue to increase with population growth under all alternatives; however, the treatment plant may reach maximum month loading capacity under Alternatives 2 through 5 sooner than it would under Alternative 1 No Action, due to their higher growth targets.

None of the alternatives are anticipated to adversely impact wastewater or drainage conveyance systems significantly. King County and SPU have several projects underway to improve the operation and reliability of the wastewater and drainage collection and treatment systems for anticipated future conditions, including climate change. SPU has major capital projects underway to reduce flooding, sewer back-ups, and CSO events. Major King County capital projects include those to reduce CSO events and to improve the operations and reliability of the West Point treatment plant. Over time, these projects will increase the capacity of the wastewater and drainage systems and alleviate the risk of sewer back-ups and flooding in high and critical risk areas.

Individual development projects would need to comply with building and utility codes to connect to the city's sewer and drainage systems. In addition, development projects would need to comply with the Seattle Stormwater Code and Stormwater Manual, which include requirements for stormwater flow control and treatment, including onsite management such as green stormwater infrastructure where feasible depending on development and soil conditions. Complying with these requirements helps mitigate the impacts of development on the City's wastewater and drainage systems and in some cases can result in improvements to wastewater and stormwater management through upgrades to existing sewer and drainage infrastructure and construction of new facilities where existing infrastructure is undersized or nonexistent.

While there could be variations in the extent to which wastewater and drainage infrastructure would need to be upgraded or added under each alternative depending on the extent and location of additional population growth and development, the nature of the impact between alternatives would generally be the same.

Electricity

All alternatives would result in increased demands on the electrical system due to population and job growth but are not anticipated to have adverse impacts on the electrical system. SCL currently anticipates a modest baseline demand growth of 0.5% per year between 2022 and 2032, which factors in economic growth and electrification of transportation and buildings. A rapid electrification scenario would increase demand by 32% over the baseline during that same period (SCL 2022b). While Alternatives 2 through 5 target greater household increases than factored into SCL's Electrification Assessment, population growth is less of a consideration for load capacity than electrification of transportation and building systems. For either scenario, SCL will seek to increase energy supply through sustainable and resilient energy resources such as wind and solar while implementing customer demand management and energy efficiency programs (SCL 2022b).

As with the other utilities, development would need to connect to the city's power grid. This could require minor improvements or upgrades to existing electrical infrastructure and construction of new service connections where existing infrastructure is undersized or nonexistent. While there could be variations in the extent to which electrical infrastructure would need to be upgraded or added under each alternative, the nature of the impact between alternatives would be the same.

130th/145th Station Areas

The nature of impacts to water, wastewater, and electricity would be the same as described above in **Impacts Common to All Alternatives**. The 130th/145th Station area is within the Thornton Creek watershed and partially within the Densmore stormwater basin, which is capacity constrained, and includes many blocks with an informal drainage system, including some ditch and culvert systems. Increases in impervious surface due to new development could increase peak flows and potentially affect conveyance capacity. Development in this area would be subject to more stringent stormwater management requirements to avoid adversely affecting conveyance capacity and to protect water quality. These requirements could include flow control and treatment or the construction of formal stormwater drainage facilities if none are present.

Equity & Climate Vulnerability Considerations

Utility infrastructure is vulnerable to the impacts of climate change in a variety of ways.

Seattle's water supply comes from the Cedar and Tolt Rivers, which rely on winter snowpack and precipitation. Lower winter snowpacks due to drought and changes to precipitation patterns would reduce water recharge to these rivers. Even with these risks from climate change, the City is expected to have sufficient water to meet future demand; however, periods of prolonged drought could affect water supply during the dry summer and fall months.

The City's wastewater and drainage systems are vulnerable to sea level rise that could inundate conveyance pipes and facilities, particularly those facilities that lie within the 100-year floodplain. These facilities include CSO and drainage mainlines, pumps, and the West Point treatment plant. Impacts from sea level rise could be exacerbated by more frequent and extreme precipitation events could increase the potential for sewer back-ups, causing flooding and water quality impacts through CSO events.

Seattle's electrical power relies on hydroelectric sources, which rely on water supplies vulnerable to reduced winter snowpacks and drought. Warmer average temperatures and more frequent extreme heat days lead to greater average and peak demand and can overwhelm electrical supply and distribution systems. More frequent and extreme storm events can damage transmission lines and cause power outages.

The effects of climate change have disparate impacts on both populations and locations within Seattle, particularly for socially and economically vulnerable populations. These impacts can be worse for sensitive groups living in areas more susceptible to climate change, such as those areas more prone to flooding or those that experience greater heat island effects. The Seattle Climate Vulnerability Assessment identifies the International District, Duwamish Valley, South Park, Georgetown, SODO, and Rainier Valley as neighborhoods with sensitive populations that are vulnerable to flooding and extreme heat events (City of Seattle 2023). Except for the International District, these neighborhoods coincide with Areas 7 and 8. These areas experience a very small to modest share of new households under all alternatives, ranging between 1.9% to 3.0% for Area 7 and 7.9% to 11.6% for Area 8.

The City of Seattle and King County are working to address these vulnerabilities. In addition to capital improvements to protect and reinforce existing infrastructure, SPU, King County, and SCL have projects and programs in place to proactively adapt their respective facilities. These include constructing additional underground storage for combined wastewater flows, incentivizing water and power conservation to reduce demand, and promoting renewable energy and distributed power sources, such as residential solar panels, to bolster supply.

New construction contemplated by the plan alternatives has the possibility of improving climate resiliency by replacing or upgrading aging infrastructure. For example, while new development can result in a greater amount of impervious surface that could add greater stormwater flows to capacity constrained systems, it can also result in on-site stormwater management facilities, including green stormwater infrastructure, as well as upgrades to public wastewater and drainage infrastructure.

In addition, new construction is subject to current development codes, which results in greater energy and water efficiency than in older development and would result in overall less electrical and water demand per capita. However, as buildings and transportation become more electrified—also a strategy to address climate change—more overall demand will be put on SCL's electrical system.

Impacts of Alternative 1: No Action

Under Alternative 1 No Action growth would continue as planned under the 2035 Comprehensive Plan. Residential growth would be directed primarily to regional centers and urban centers. Employment would follow the same pattern, in addition to being directed to manufacturing and industrial centers. As the City has been planning for and directing growth to these areas, there would be no adverse impacts to utilities.

130th/145th Station Areas

Impacts to utilities would be the same as described above for the 130th/145th Station Areas under **Impacts Common to All Alternatives**. Development in this area would be subject to more stringent stormwater management requirements, which could include flow control and treatment, to avoid adversely affecting conveyance capacity and to protect water quality.

Equity & Climate Vulnerability Considerations

Alternative 1 directs approximately 8,500 households to Areas 7 and 8, primarily to existing urban centers in Area 8. These areas include neighborhoods that have vulnerable populations and are more susceptible to climate change impacts such as flooding and heat island effects. Growth in these areas may require a greater degree of investment in improved drainage and electrical utilities to overcome these vulnerabilities.

Impacts of Alternative 2: Focused

Under Alternative 2, growth would be directed to areas of focused growth, or neighborhood centers, in addition to the regional and regional centers as described under Alternative 1 No Action. Alternative 2 targets 100,000 new housing units, 20,000 households above Alternative 1 No Action. This alternative would result in more intense growth in areas that are currently less developed, such as in areas zoned as Neighborhood Residential.

Utility infrastructure within regional and regional centers would be expected to accommodate planned growth; however, focused and denser development within neighborhood center locations would likely require utility upgrades or expansion, particularly for stormwater management in Areas 1 and 2, which would accommodate the greatest amount of growth outside the Downtown Regional Center. Improvements could include on-site stormwater management, construction of green stormwater infrastructure, and new and upgraded drainage systems in association with development.

Areas 1 and 2 are characterized by single-family development and have extensive informal drainage systems, including ditch and culvert systems, particularly within the Piper and Thornton Creek watersheds (**Exhibit 3.12-3**). Development in Areas 1 and 2 could add stress to drainage systems that are already capacity constrained, including within the capacity constrained Densmore basin, beyond that of Alternative 1 No Action. These constraints could limit housing development where requirements for flow control or treatment prove too costly or are physically infeasible.

130th/145th Station Areas

The 130th/145th Station Area under Alternative 2 would consist of three neighborhood centers with more intense combination of residential and commercial development than under Alternative 1 No Action, including over 260 more jobs and over 2.6 times the number of housing units. This would lead to greater demand on utilities than under Alternative 1, along with a greater need for potential utility improvements within the area, particularly related to stormwater management in an area designated as capacity constrained.

Equity & Climate Vulnerability Considerations

Alternative 2 adds over 10,000 households in Areas 7 and 8, primarily in regional centers and a limited number of neighborhood centers. These areas include neighborhoods that have vulnerable populations and are more susceptible to climate change impacts such as flooding and heat island effects. Growth in these areas may require a greater degree of investment in improved drainage and electrical utilities to overcome these vulnerabilities.

Impacts of Alternative 3: Broad

Under Alternative 3, growth would be directed to new housing types throughout urban neighborhood areas, in addition to the regional and urban centers as described under Alternative 1 No Action. As with Alternative 2, Alternative 3 targets 100,000 new housing units, 20,000 households above Alternative 1 No Action. The addition of multifamily homes of various sizes—duplexes up to sixplexes—would likely require construction of new water and electrical service connections and potential upgrades to wastewater and drainage facilities to accommodate greater population and development density, particularly in areas characterized by large-lot single-family zones. These upgrades could be beneficial when replacing outdated or undersized facilities.

Under Alternative 3 a large proportion (nearly 38%) of growth would be within Areas 1 and 2, due to the extent of designated urban neighborhood land within those areas. As described above, development in these areas could add stress to drainage systems that are already capacity constrained, beyond that of Alternative 1 No Action and Alternative 2 Focused. These constraints could limit housing development where flow control or treatment prove too costly or are physically infeasible. This concern would apply to other areas of the city with informal drainage systems, such as in the southwest corner of Area 6.

Equity & Climate Vulnerability Considerations

Alternative 3 adds over 12,000 households in Areas 7 and 8, primarily in regional centers and urban neighborhoods in Area 8. These areas include neighborhoods that have vulnerable populations and are more susceptible to climate change impacts such as flooding and heat island effects. Growth in these areas may require a greater degree of investment in improved drainage and electrical utilities to overcome these vulnerabilities.

Impacts of Alternative 4: Corridor

Alternative 4 would allow for a variety of housing types along transportation corridors in addition to directing growth to regional and regional centers. As with Alternatives 2 and 3, it targets 100,000 new housing units, 20,000 households above Alternative 1 No Action. Under this scenario, Area 1 receives the greatest amount of growth outside the Downtown Regional Center.

As under Alternative 3 Broad, the addition of multifamily homes of various sizes—duplexes up to sixplexes—would likely require new water and electrical service connections and potential upgrades to wastewater and drainage facilities to accommodate greater population and development density. Benefits from new development related to utility improvements would be concentrated along corridors, but not as focused as under Alternative 2.

Alternative 4 has the largest share of population growth (over 38%) within Areas 1 and 2 as compared to the other alternatives. As described above, development in these areas could add stress to drainage systems that are already capacity constrained. The areal extent of potential

development within these areas would be greater than Alternatives 1 and 2 but less than under Alternative 3, as it would be focused along corridors. These constraints could hamper growth where requirements for flow control or treatment prove too costly or are physically infeasible. This concern would apply to other areas of the city with informal drainage systems, such as in the southwest corner of Area 6.

Equity & Climate Vulnerability Considerations

Alternative 4 adds nearly 12,000 households in Areas 7 and 8, primarily in regional centers and along corridors in Area 8. These areas include neighborhoods that have vulnerable populations and are more susceptible to climate change impacts such as flooding and heat island effects. Growth in these areas may require a greater degree of investment in improved drainage and electrical utilities to overcome these vulnerabilities.

Impacts of Alternative 5: Combined

Under Alternative 5, growth would be targeted within existing and expanded regional centers and urban centers, within neighborhood centers, and within expanded housing options along corridors and throughout urban neighborhoods. Alternative 5 targets 120,000 new housing units, 40,000 units above Alternative 1 No Action, which would lead to the greatest demand on utilities as compared to the other alternatives. Similar to the other alternatives, Areas 1 and 2 would accommodate the greatest amount of growth, over 37%.

The addition of 40,000 more housing units over the course of the planning period would likely exacerbate risks due to wastewater and drainage system capacity without improvements to those existing systems. However, as described for the other alternatives, development under this scenario would require improvements and upgrades to existing utilities and construction of new facilities to accommodate the increased density, which could offset the impact of increased growth.

The addition of 120,000 total housing units throughout the city may run into greater constraints than under the other alternatives if necessary utility improvements prove too costly or physically infeasible to support new development within capacity constrained drainage basins, areas served by informal drainage systems, or within creek basins. For example, as discussed above, development in the northern portions of Areas 1 and 2 could add stress to drainage systems that are already capacity constrained and would be subject to more stringent stormwater management requirements for flow control and treatment. These constraints may limit the overall number of households that could be developed in those areas.

130th/145th Station Areas

The 130th/145th Station Area under Alternative 5 would consist of an urban center on both sides of I-5 around the Sound Transit light rail station and a neighborhood center at NE 145th Street. This includes over 1,000 jobs and over 2,700 housing units and would result in a more

intense combination of residential and commercial development than under Alternatives 1 or 2 over a larger area. Demand on utilities would be greater than under Alternatives 1 and 2. While new development has the benefit of improving utility infrastructure, this development would occur within a capacity constrained stormwater basin, which may be a constraint on the extent of new development and resulting increase in impervious surface if stormwater cannot be managed on site or through improved conveyance infrastructure.

Equity & Climate Vulnerability Considerations

Alternative 5 adds approximately 17,500 households in Areas 7 and 8, primarily in regional center and urban neighborhood areas in Area 8. These areas include neighborhoods that have vulnerable populations and are more susceptible to climate change impacts such as flooding and heat island effects. Growth in these areas may require a greater degree of investment in improved drainage and electrical utilities to overcome these vulnerabilities.

3.12.3 Mitigation Measures

Incorporated Plan Features

None of the alternatives described in **Chapter 2** of this EIS include plan features that explicitly address utilities. However, the Comprehensive Plan includes a Utilities Element that lists policies and goals to ensure safe, reliable, and equitable service and growth throughout the city; protect water quality; and encourage energy efficiency and renewable resources. In addition, the City is adopting a climate element that would include greenhouse gas reduction measures and climate resilience measures.

Regulations & Commitments

Drinking Water

Federal

- Safe Drinking Water Act, 42 USC 300 et seq., Chapter 6A, administered by the U.S. Environmental Protection Agency

State

- Water Systems, WAC Title 246, Chapters 290-296, administered by the Washington State Department of Health

Local

- Utilities, SMC Title 21, Subtitle I – Water, administered by SPU

- Building and Construction Codes, SMC Title 22, includes plumbing and fire codes, administered by SDCI
- City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction

Wastewater & Combined Sewer

Federal

- National Environmental Policy Act United States Code (USC) 4321 et seq.
- Clean Water Act, 33 United States Code (USC) 1251 et seq., including Section 402 – National Pollutant Discharge Elimination System (NPDES)

State

- State Environmental Policy Act RCW Title 43.21C; WAC 197-11
- Washington State Department of Ecology, WAC Title 173, Chapters 200-270, which includes administration of the NPDES program, discharge and effluent standards, the waste discharge general permit program, construction of wastewater treatment plants, and construction and operation of combined sewer overflow reduction facilities
- NPDES Wastewater Discharge Permit program, administered by the Washington State Department of Ecology
- Wastewater Collection System Consent Decree, administered by the Washington State Department of Ecology and U.S. Environmental Protection Agency

Local

- Metropolitan Functions, King County Code (KCC) Title 28, sections of which pertain to the County's functions for establishing and operating the regional wastewater treatment system.
- Utilities, SMC Title 21, Subtitle II – Sewers, administered by SPU
- Building and Construction Codes, SMC Title 22, includes plumbing code, administered by SPU
- Side sewer permit program, administered by SPU
- City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction

Stormwater

Federal

- Clean Water Act, 33 USC 1251 et seq., including Section 402 – National Pollutant Discharge Elimination System
- Endangered Species Act, 16 USC 1531 et seq.

State

- National Pollutant Discharge Elimination System (NPDES) Western Washington Phase I Municipal Stormwater General Permit, administered by the Washington State Department of Ecology
- NPDES Industrial Stormwater General Permit, administered by the Washington State Department of Ecology
- Stormwater Management Manual for Western Washington, administered by the Washington State Department of Ecology
- Washington State Hydraulic Code, WAC Title 220, Chapter 660, administered by the Washington Department of Fish and Wildlife

Local

- Building and Construction Codes, SMC Title 22, Subtitle VIII – Stormwater Code, administered by SDCI and SPU
- Seattle Stormwater Manual
- City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction

Electrical

Federal

- National Electrical Code, as adopted by the National Fire Protection Association

State

- 2019 Washington State Clean Energy Transformation Act, amending portions of RCW Titles 19 (Business Regulations – Miscellaneous), 43 (State Government – Executive), 80 (Public Utilities), and 82 (Excise Taxes) to commit Washington to an electricity supply free of greenhouse gas emissions by 2045.
- Washington State Energy Code, WAC Title 51, Chapters 11C and 11R

Local

- Utilities, SMC Title 21, Subtitle IV – Lighting and Power, administered by SCL
- City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction

Other Potential Mitigation Measures

While each alternative has the potential to impact utilities through increased demand, none of these impacts are identified as significant adverse impacts. King County, SPU, and SCL regularly plan and adapt to changing growth patterns and are currently engaged in efforts to improve wastewater and drainage system capacity, reduce water consumption and electrical demand, and increase the resiliency of their utility systems against the impacts of climate change. City codes regulating construction and future utility investments will continue to ensure new development addresses any service or capacity constraints.

3.12.4 Significant Unavoidable Adverse Impacts

There would be no significant unavoidable adverse impacts to utilities under any of the alternatives.