



I-5 Lid Feasibility Study

Existing Conditions and Context Memorandum

August 2020



City of Seattle

Existing Conditions and Context Memorandum I-5 Lid Feasibility Study

Contract No. PCD19002

Task 3. Existing Conditions and Context Analysis

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Acknowledgements

We thank David Driskell, Lyle Bicknell and others from the Office of Planning and Community Development; Susan McLaughlin and others from Seattle Department of Transportation; Michael Shiosaki and others from Seattle Public Utilities; David Graves and others from Seattle Parks and Recreation; Alex Krieg and others from Sound Transit; and Elliott Krivenko, Jacqueline Gruber and Jennifer Casillas from the Downtown Seattle Association for providing valuable input for this memorandum. We also want to thank the I-5 Lid Feasibility Study Committee who have provided valuable input to this study through their continuous commitment and participation.

COVID-19 Context

Seattle will continue to grow and change in unforeseen ways, made less clear and further complicated by the COVID-19 pandemic. Employment opportunities and growth rates, existing displacement trends and lack of affordable housing, where people want to live and the transportation options they choose, and priorities for public funding will all be impacted by COVID-19. Yet, the pandemic highlights the need for strategies to increase community resiliency and capacity to thrive. The lid plays a critical role in city and regional planning to ensure, even in a global health and economic crisis, equitable opportunity and outcomes. While this feasibility study was largely conducted in a pre-COVID reality, it recognizes the significant near-term economic, social and health impacts of the pandemic. The long-term results of COVID-19 cannot be predicted in the timeframe of this study but are addressed throughout the report and will be influential in future next steps in exploring a lid of I-5 in downtown Seattle.

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Seattle Office of Planning and Community Development (OPCD)
Washington State Department of Transportation (WSDOT)

Consulted Agencies and Organizations

Central Area Collaborative
Downtown Emergency Service Center (DESC)
Downtown Seattle Association (DSA)
Equitable Development Initiative Advisory Board (EDI)
Freeway Park Association (FPA)
Horizon House Residents Council
Lid I-5 Steering Committee and Advisory Council
Olive Tower residents
Seattle Commission for People with disAbilities
Seattle Housing Authority (SHA)
Seattle Human Rights Commission
Seattle Immigrant and Refugee Commission
Seattle LGBTQ Commission
Seattle Office of Economic Development (SOED)
Seattle Public Schools (SPS)
Seattle Women's Commission
Washington State Convention Center (WSCC)

Technical Advisory Team

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Acronyms and Abbreviations

AMI	Area Median Income
APC	Automatic Passenger Counter
AWDT	Average Weekday Daily Traffic
CFR	Code of Federal Regulations
COVID	Coronavirus Disease
DMC	Downtown Mixed Commercial
DSA	Downtown Seattle Association
I-5	Interstate 5
LFS	I-5 Lid Feasibility Study
LGBTQIA+	Lesbian, Gay, Bisexual, Pansexual, Transgender, Genderqueer, Queer, Intersexed, Agender, Asexual, and Ally community
MHA	Mandatory Housing Affordability
NRHP	National Register of Historic Places
OPCD	Office of Planning and Community Development
PSRC	Puget Sound Regional Council
SAB	Structural Assessment Boundary for the LFS
SDOT	Seattle Department of Transportation
SPR	Seattle Parks and Recreation
SR	State Route
WSCC	Washington State Convention Center
WSDOT	Washington State Department of Transportation

S Executive Summary

S.1 Introduction

Determining the feasibility of spanning an interstate within a dense urban environment requires an understanding of the site and its relationship with its context at various scales. This memorandum documents the existing conditions and context assessment performed by the consultant team to understand and describe various policy, development, and community considerations that a potential lid or lids could have to create a framework for future decision-making. This memorandum complements the Technical Feasibility Memorandum of the Interstate 5 (I-5) Lid Feasibility Study (LFS), which documents the technical assessment to evaluate the concept of lidding (i.e., overbuild or cap) the freeway through downtown Seattle, Washington. The technical feasibility analysis was performed within a Structural Assessment Boundary, consisting of 0.8 mile of I-5 from Madison Street (south end) to Denny Way (north end) and its immediate perimeter (Figure 1-1) a section presenting significant grade separation between mainline I-5 freeway lanes and surface streets.

Figure 1-1. Study Site



Aerial view of the study site; north-facing view of I-5 from Madison Street overpass.

The goal of this memorandum is to understand and document how a lid might best fit into the existing context at all levels, and maximize benefits identified in City of Seattle plans, goals and policies. Reference documents for this context analysis include the Seattle 2035 Comprehensive

Plan, Imagine Greater Downtown partnership's vision plan, the Pedestrian, Transit and Bicycle Master Plans, Outside Citywide initiative, Parks & Open Space Plan, and the Seattle Climate Action Plan. This analysis also focused on work done in the Housing and Livability Agenda effort, and the Race and Social Justice Initiative. This existing conditions and context assessment provides preliminary information to inform the answers to the questions "What can a lid support?" and "How might different development program test cases perform?" to appraise the economic viability of the lid concept, with place-based considerations.

S.2 General Project Approach

- The approach to the existing conditions and context analysis was to look at the area surrounding the site in terms of geographic scales that matched policy-making jurisdictions. The intent was to make sure that the full policy and physical context of the lid was understood, and the value of the lid per the full context of policy intent could be considered.
- The regional scale includes consideration of the role of I-5 in Puget Sound and growth policies from the Puget Sound Regional Council. The citywide context looks at policies from the City of Seattle, and Greater Downtown looks at the relationship of the work done by City of Seattle and the Imagine Greater Downtown partnership's vision for the neighborhoods surrounding the proposed lid. The study area has been defined as a 15-minute watershed for consideration of a reasonable and accessible walking distance from the lid study site. The study site itself, defined as the Structural Assessment Boundary, was analyzed in terms of detailed urban conditions, including four areas within the site.
- The analysis of existing conditions and context was used as a foundation for developing the development program test cases, using the technical analysis to understand locations on the lid suitable for various structures for a technically supportable program. As part of the context analysis, four typologies were explored corresponding to the allowable structural load for lightweight structures, and low-rise, mid-rise, and high-rise structures. The physical context of the site and its surroundings was fundamental to developing the test case studies.

S.3 Key Study Assumptions

- The timeframe for the analysis is 2035, consistent with the horizon of planning projections in city and regional planning models and policies, for when the study was being done.
- The analysis assumed that the only structural modification to the existing lids at Freeway Park and the Washington State Convention Center would be at the edges for integration with a future lid, and that modifications to the historically designated areas of Freeway Park could be modified to some degree.
- The study assumes that buildings can be integrated with the lid structural framing up through mid-rise load levels, with high-rise structures only possible where foundations can be built on solid ground (terra firma).
- The study did not address traffic and utility impacts (temporary or permanent).

S.4 Considerations and Next Steps

- The existing conditions are a snapshot in time in terms of policies and priorities, and to a lesser extent, the land uses and physical context. While this feasibility study was largely conducted in a pre-COVID-19 pandemic reality, it recognizes the significant near-term economic, social and health impacts of the pandemic. The long-term results of the COVID-19 pandemic cannot be predicted in the timeframe of this study but will influence future next steps in exploring a lid of I-5 in downtown Seattle.
- The physical context for the lid is complex in terms of grade, parcel configuration, existing structural elements for I-5, and access. A detailed understanding of the existing conditions would require design at a much more specific level (> 30 percent design) than this study was able to provide.
- In order to develop concepts for developing the lid, a broader public engagement effort would be needed to inform priorities for uses and physical form.
- The evaluation of edge conditions would need to be considered at a finer level of detail with master planning, to refine structural approach, entries, and landscape.
- Transportation and mobility patterns would need close evaluation during a master planning effort.
- The on- and off- ramps should be evaluated in terms of neighborhood access and local traffic impacts, freeway function, and the ability to connect the lid to the adjacent neighborhood fabric.
- North-south pedestrian and bicycle connectivity would need further study, especially along the Washington State Convention Center, where infrastructure on a potential lid would meet street level and at critical intersections and access points to I-5.
- The amount and location of parking would be a factor in cost and design of a lid with development, but the need for parking at the expected time of construction is unknown.

S.5 Key Takeaways

- Lidding I-5 could provide multiple benefits that are in line with multiple City of Seattle policy goals by providing space for desired uses, relinking neighborhoods, improving walkability and cycling, and offering environmental benefits. Whether the lid is the most cost-effective way to achieve those benefits would need to be further studied.
- Because of the complexities of the site, creating a master plan for the lid that delivers the potential public benefits would require creative design solutions that would solve edge conditions, work within limited options for column placement, and improve connections for people walking and rolling.
- The on- and off- ramps would be a major factor in the ability to fully connect the lid to its surroundings.
- By using buildings to mitigate large grade changes (at least 10 to 14 feet), it is possible to have multiple “ground” floors, similar to the Fisher Pavilion at Seattle Center.
- A lid could improve the usability of Freeway Park by adding more active uses in the unbuilt locations and by making a stronger pedestrian route to Pine Street. However, connecting new lidded area to Freeway Park would need to be approved in terms of the historic designation of elements of Freeway Park and the box gardens.

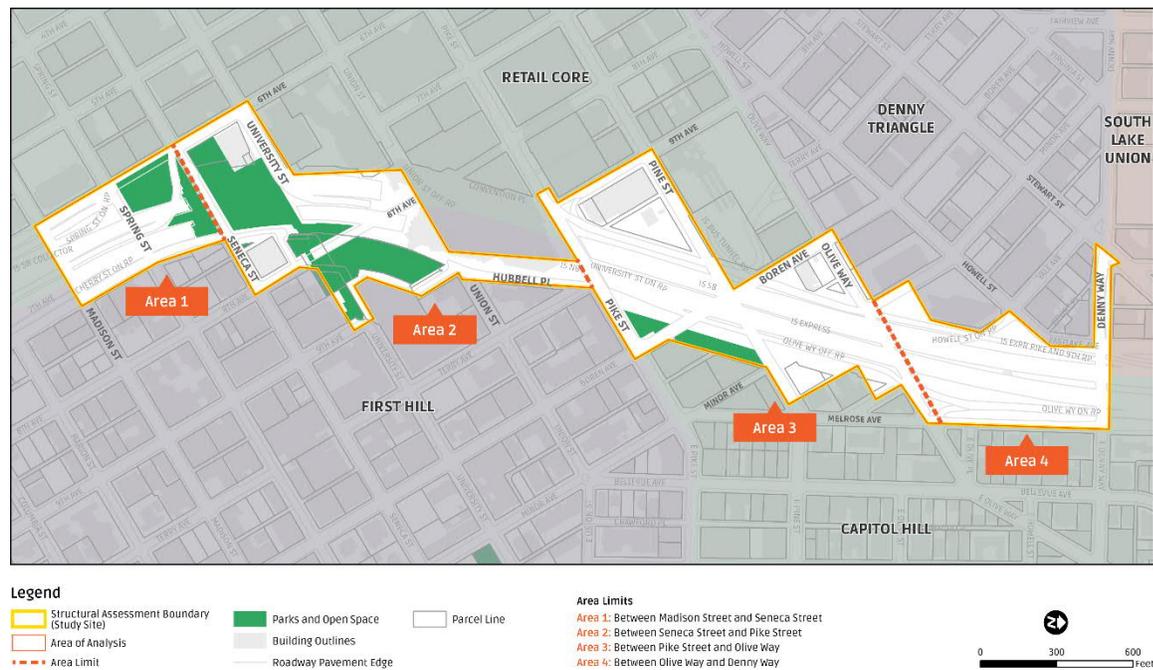
- Pike and Pine Streets are the most heavily used connections for pedestrians and bicycles. The area adjacent to the Pike-Pine corridor would be a priority for improved streetscape and for uses that activate the pedestrian realm.
- The Washington State Convention Center is under construction at the writing of this report, and its presence will change the nature of the surrounding streets.
- Providing parking in a way that is typical for current development will be challenging and expensive. If downtown parking becomes less of a factor in the future, it would make the lid design easier.

1. Introduction

The Interstate 5 (I-5) Lid Feasibility Study (LFS) identifies key considerations to inform future planning and decision-making regarding the concept to lid I-5 through downtown Seattle, Washington. The study was designed to understand the technical and financial feasibilities of lidding the freeway, and to look at opportunities for maximizing public benefits. The study site runs along a 0.8-mile sunken portion of I-5 from Madison Street (south end) to Denny Way (north end) (Figure 1-1). Lidding (or covering) I-5 through downtown Seattle is being explored as an opportunity to improve a publicly owned right-of-way by creating “land” for a variety of uses such as affordable housing, open space, transportation, civic facilities and commercial development. Existing lids in the area—the groundbreaking Freeway Park and the Washington State Convention Center (WSCC)—are precedents for this kind of solution by spanning I-5 to reconnect the street grid, improve pedestrian and bicycle mobility, expand open space, and create activity and opportunity while mitigating freeway noise and other environmental impacts. This existing conditions and context analysis provides a foundation for the potential public benefits of a lid, the development of the test cases and the economic analysis.

The City of Seattle commissioned the I-5 LFS in February 2019 as part of the “community benefit agreement” related to the expansion of the WSCC. The Seattle City Council approved the funds for the I-5 LFS as part of the benefit agreement to explore the feasibility of building a new lid or lids across I-5, expanding from the existing lids of Freeway Park and the WSCC. These funds were secured largely through the efforts of community members who have been exploring and advancing the proposal to lid (i.e. overbuild, deck or cap) I-5 through downtown Seattle, Washington. Seattle’s Office of Planning and Community Development served as project manager and convener, with active participation throughout the process from key departmental partners Seattle Department of Transportation, Seattle Parks and Recreation, Seattle Office of Housing and Seattle Department of Neighborhoods) as well as the asset owner, the Washington State Department of Transportation (WSDOT).

Figure 1-1. Study Site Areas of Analysis



For the purpose of the I-5 LFS, the study site (or Structural Assessment Boundary) was divided into four areas of analysis. From south to north, areas comprised the following: Area 1, between Madison and Seneca Streets; Area 2, between Seneca and Pike Streets; Area 3, between Pike Street and Olive Way; and Area 4, between Olive Way and Denny Way.

Determining the feasibility of spanning an interstate within a dense urban environment requires an understanding of the site and its relationship with its context at various scales. The goal of this memorandum is to understand and document how a lid might best fit into the existing context at all levels, and maximize benefits identified in City of Seattle’s policies, plans and goals. Reference documents for this context analysis include the Seattle 2035 Comprehensive Plan, Imagine Greater Downtown partnership’s vision plan, Pedestrian and Bicycle Master Plans, Transit Master Plan, Outside Citywide initiative, Parks & Open Space Plan, and the Seattle Climate Action Plan. This analysis also focused on work done in the Housing and Livability Agenda effort, and the Race and Social Justice Initiative. This existing conditions and context assessment provides preliminary information to inform the answers to the questions “What can a lid support?” and “How might different development program test cases perform?” to appraise the economic viability of the lid concept, with place-based considerations.

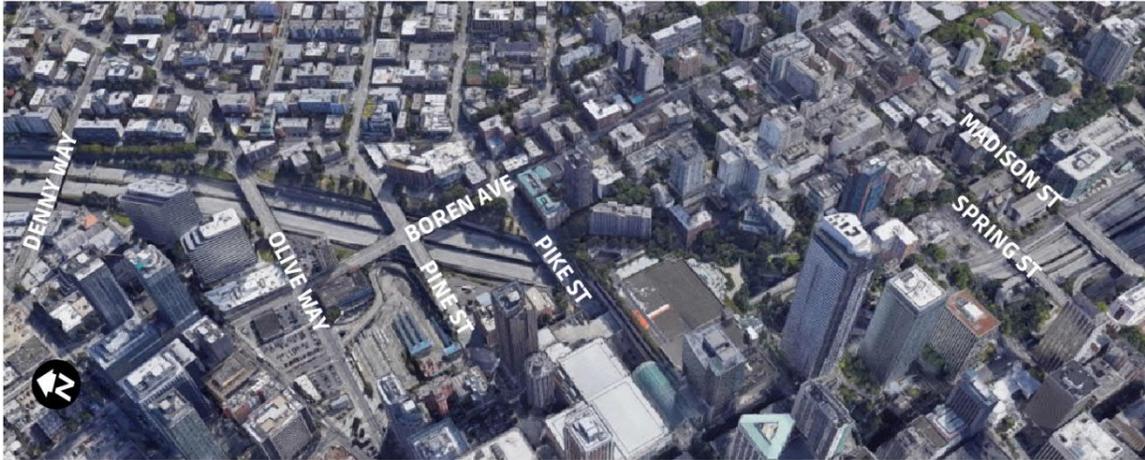
The I-5 Lid Feasibility Study has two overarching goals:
 Explore the range of feasibility—technically and financially; and
 create a framework to maximize benefits for all.

This memorandum considers the current state of the physical and policy context at multiple levels surrounding the site. It explores opportunities to create better neighborhoods and a better city by reconnecting the gap in Seattle’s downtown urban fabric. It looks forward to a more human-centric, and less auto-dominated urban environment. It considers the desirability of walking and cycling, the goals of affordable housing and racial justice, and a greener, more sustainable and resilient future.

2. Overview

Creating new “land” over portions of the study site in downtown Seattle requires consideration of the potential effects on the existing conditions and an understanding of the urban context surrounding the project area at multiple scales of analysis. The assessment examines the potential effects of the project on adjacent neighborhoods, transportation and utility infrastructure, and real estate market conditions. Onsite constraints were also considered, which included structural features and I-5 operations.

Figure 2-1. Aerial View of the Study Site



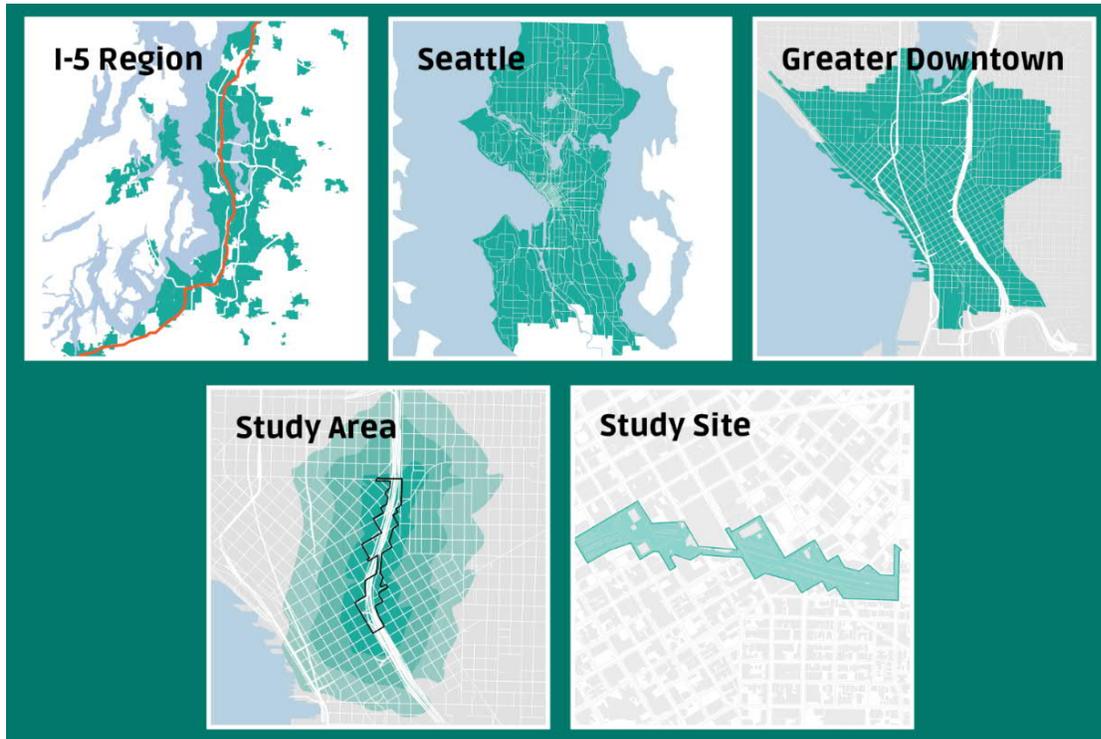
Aerial view of I-5 through the study site from Denny Way (north) to Madison Street (south). High-rise buildings characterize the urban form west of I-5, while low- to mid-rise buildings (with shorter urban blocks) are east of I-5 .

2.1 Geographic Scales of Analysis

The existing conditions and context analysis considers the site from the following scales (Figure 2-2):

- The regional context looks at the lid in its place in the Puget Sound region, where commuters travel to jobs, regional residents access amenities, goods are transported, and visitors from around the world travel to downtown Seattle.
- The citywide context is the level where the City of Seattle’s policies and goals apply for key issues, including housing, equity, race and social justice, sustainability, and mobility.
- The neighborhood context is considered through the lens of the Imagine Greater Downtown partnership’s vision, Seattle’s effort to plan for the ten neighborhoods in the center of the city (SDOT, 2019). The site and surrounding study area touch on most of these neighborhoods.
- The study area context looks at an area that is within reasonable walking distance from the segment of I-5 considered for a lid, within 5-, 10-, and 15-minute walksheds, taking slope into account.
- The context of the study site itself is considered, using the boundaries defined by the technical feasibility analysis’s Structural Assessment Boundary (SAB).

Figure 2-2. Scales of Analysis



2.2 Reference Time Frame

The analysis in this study uses 2018 for existing conditions and uses 2035 for the future, consistent with existing planning efforts to manage growth projections and the tentative time frame for planning and design toward the construction of a lid. The Seattle 2035 Comprehensive Plan is based on 2035 as a planning horizon, and Sound Transit's ST3 West Seattle and Ballard Link Extensions are expected to be in service by that date. The central Puget Sound region has established a 2040 vision for growth; this analysis also uses regional projections based on the assumptions as the best available information to inform a vision and tendencies for the Seattle of the future (Puget Sound Regional Council (PSRC), 2009). During the course of this study, PSRC released their VISION 2050: Regional Growth Strategy, which was considered in this memorandum along with the 2035 time frame.

The study uses a variety of policy documents for its basis, relying most heavily on the following from the City of Seattle:

- Seattle 2035 Comprehensive Plan
- Imagine Greater Downtown partnership's vision plan
- Outside Citywide's Access to Open Space Analysis
- Seattle 2035 Growth and Equity
- Pedestrian and Bicycle Master Plans
- Transit Master Plan
- 2017 Parks & Open Space Plan

- Seattle Climate Action Plan
- Citywide Implementation of Mandatory Housing Affordability

2.3 Public Value Opportunities of a Lid

The policy context and analysis suggest potential opportunities to create public value through a lid that supports development goals and considerations. This array of opportunities includes but is not limited to the following:

- Drive outcomes that reduce or eliminate existing inequities—addressing opportunities to reduce risk of displacement—increase low- and middle-income housing options, and provide public spaces that are welcoming and accessible to all.
- Reduce environmental impacts of I-5, including noise and air pollution.
- Provide opportunities for utility and green infrastructure for stormwater management, air pollution abatement, and other ecotechnologies for environmental stewardship.
- Reduce or eliminate safety conflicts between vehicles, bicyclists and pedestrians, especially at I-5 entry and exit points.
- Reconnect neighborhoods separated by I-5 through the creation of new development and public spaces.
- Support and improve the long-term safety and functionality of I-5 as the primary north-south connection through the city, region and state, serving passenger vehicles, transit, and freight.
- Re-establish and improve pedestrian and bike connectivity between adjacent neighborhoods.
- Support other City of Seattle and community objectives, that includes creating community-serving uses, civic amenities, and development that support arts and cultural spaces and commercial affordability downtown.

2.4 Guiding Principles

Based on the values expressed in City of Seattle policies—with input from partner agencies from the LFS Technical Advisory Team and Office of Planning and Community Development’s I-5 Lid Feasibility Study Committee—seven guiding principles were set out to inform decision-making for this project.

The guiding principles define opportunities to create public value and articulate the vision for the kind of community Seattle aspires to be by 2035. The guiding principles inform development program test cases and the economic analysis of each test case, aligning values articulated in the Seattle 2035 Comprehensive Plan and Imagine Greater Downtown partnership’s vision with the values embedded in decisions made as part of this study.

Equity

- Create processes, distribute resources, and make decisions to improve outcomes for vulnerable, underserved, and underrepresented populations.
- Examine biases and power dynamics and disrupt decision-making that upholds racial disparities and inequities.

Health

- Create safe environments that mitigate the negative impacts of I-5 on people's physical and mental well-being in order to achieve and sustain healthy communities.
- Reduce exposure to pollutants, noise, and stress conditions; promote active transportation; and create a built environment that fosters social cohesion and mental health.

Affordability

- Promote shared prosperity with access to affordable housing, small business opportunities and services.
- Encourage cultural and economic diversity, while minimizing the risk of displacement surrounding the lid.

Sustainability and Resilience

- Foster an urban environment that mitigates the ecological footprint of the freeway and built environment, to promote the health of ecosystems, make efficient use of resources, and increase quality of life.
- Increase the capacity of systems and communities within downtown Seattle to survive, adapt, and grow in the face of chronic stresses and acute shocks, including disaster risk reduction, to procure the long-term safety and security of people and assets.

Connectivity

- Reconnect neighborhoods and remedy the freeway impacts to improve access over, under and across I-5.
- Establish a cohesive network of multimodal connections that increase access to opportunity for people of all abilities by reducing existing barriers and car-dependence, and creating efficient, safe, high-quality travel experiences for all.

Complete Community

- Create places that meet the basic needs of all residents in a community to reduce social isolation, address inefficient land uses, and meet the needs of diverse households.
- Enhance neighborhoods with inviting places and destinations, creating spaces for communities to gather and enjoy.

Identity

- Explore the potential for the lid to create a space where people of all identities belong and thrive; recognizing, honoring, and reflecting the historical and current multicultural identities of Seattle's communities.

I-5 Lid Feasibility Study Guiding Principles

To keep the exploration of a lid aligned with the values and policy goals articulated in the Seattle 2035 Comprehensive Plan, Imagine Greater Downtown vision, and the City of Seattle's existing policy framework at the center of the study, guiding principles were created in partnership with the I-5 Lid Feasibility Study Committee. The guiding principles define opportunities and a vision for the kind of community Seattle aspires to be. Those principles and the values they represent include the following:

- Equity
- Health
- Affordability
- Sustainability and Resilience
- Connectivity
- Complete Community
- Identity

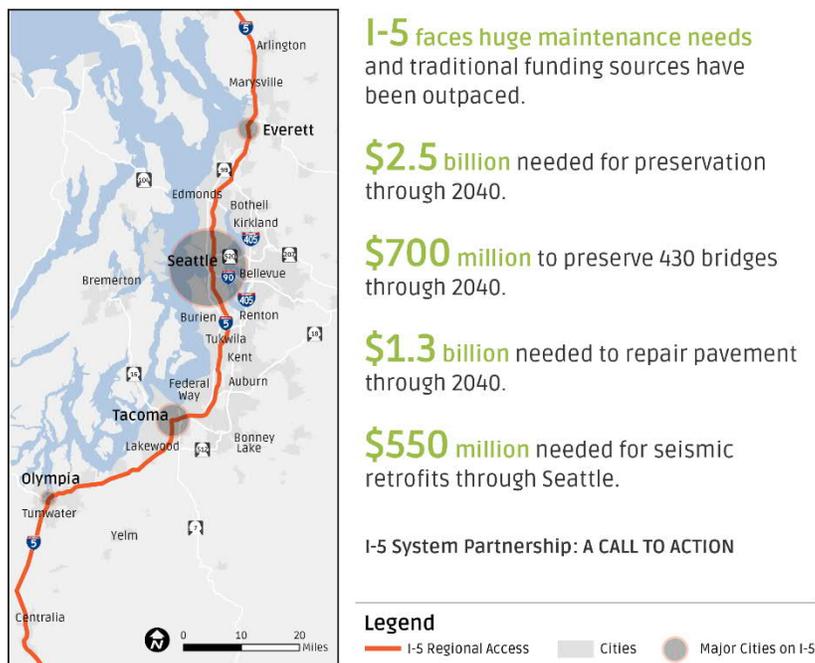
- Foster a strong sense of place-based identity by creating memorable spaces that support daily life, community, and culture.

2.5 Interstate 5

An understanding of I-5 is the starting point for considering a lid. I-5 is the backbone of Washington state's transportation system and one of its most important transportation assets. It powers the regional economy, linking statewide markets to major ports up and down the West Coast and connecting people to jobs, goods, and each other (Figure 2-3). All of the transportation systems connecting to I-5—local streets, highways, transit, freight and national defense infrastructure—rely heavily on I-5 as a functional highway spine.

I-5 is an economic lifeline, supporting \$550 billion in business income from freight-dependent industries. It supports Washington state's trade with the rest of the United States, Canada, and Asia and links marine and air-cargo port complexes with essential state warehouse districts, industrial lands, intermodal transportation hubs, and major population centers (Washington State Department of Transportation (WSDOT), City of Seattle, 2019).

Figure 2-3. Future of the I-5 System

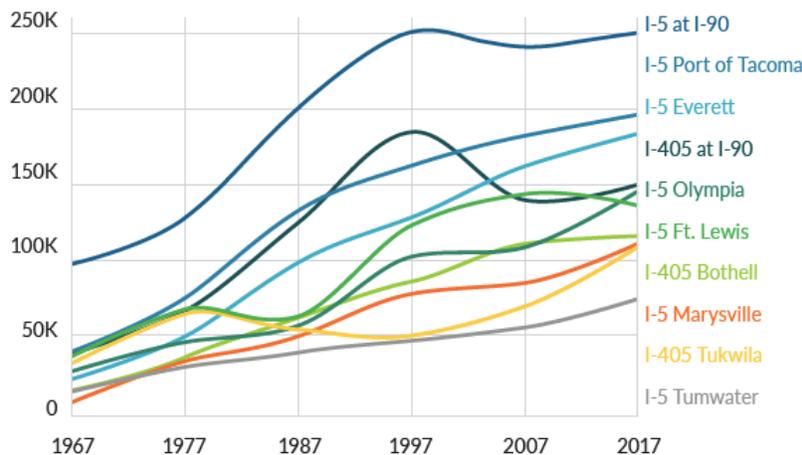


Source: (WSDOT, 2019).

2.5.1 Impacts and Challenges

Since I-5 was completed in 1969, average daily traffic on I-5 near downtown Seattle has doubled, from nearly 125,000 average daily vehicles to approximately 250,000 in 2017 (Figure 2-4) (Washington State Department of Transportation (WSDOT), City of Seattle, 2019). In 2018, I-5 carried 288,000 vehicles daily through downtown Seattle, and traffic volumes are expected to increase by 12 percent to 22 percent by 2035 (OPCD, 2019b). While I-5 offers access to the city, it also brings noise and pollution along its length, and frequent congestion along ramps and overpasses in I-5's downtown Seattle segment.

Figure 2-4. Estimated Annual Average Daily Traffic on I-5



Source: (WSDOT, 2019)

Traffic on I-5 was highest near downtown Seattle, with nearly 250,000 cars per day on I-5 at I-90.

Constructed in the 1960s, I-5 faces major challenges due to aging infrastructure, congestion, and dramatic regional population growth. These challenges already threaten mobility, public safety, and the region's economic vitality. Functionally, the corridor has problems: according to WSDOT's 2017 Corridor Capacity Report, the Seattle region now ranks 6th in the United States for hours spent in traffic on the metropolitan section of I-5. The number of hours spent in traffic has risen 29 percent just since 2014 (WSDOT and City of Seattle, 2019).

WSDOT has convened a group of stakeholders in an effort to create a future vision for I-5 that will preserve and redevelop the corridor, optimizing its performance to move people and goods. This effort, the I-5 System Partnership, is studying the 107-mile segment between Tumwater and Marysville (WSDOT, 2019). Re-inventing I-5 as a multimodal corridor may tie in with aspects of a potential lid, especially considering the future of the access and egress ramps and the opportunity to reconnect communities across the freeway.

2.6 The Value Proposition

The I-5 lid could transform daily life in Seattle and help future generations thrive. From an urban context and policy perspective, creating new "land" in the heart of downtown Seattle would open opportunities for equitable access to economic prosperity and jobs, parks, and open space to support physical and mental well-being, affordable housing, and healthy, resilient communities. A lid can be a catalyst to rebuild communities that have been displaced and disconnected by I-5 while supporting regional movement of people and goods.

Equity: The lid would provide affordable space to marginalized communities in an area with the highest access to opportunities.

Equity is a priority for the City of Seattle, and escalating rents are displacing the most vulnerable people and businesses from urban neighborhoods. The lid would create physical space, which could catalyze investment in communities that have been disenfranchised in order to improve outcomes for populations that have been hardest hit by historical disinvestment, displacement, and gentrification.

Health: The lid would create a healthier environment in the heart of the city.

A walkable urban core with reduced exposure to noise and pollution from I-5 would have positive health outcomes for people in downtown neighborhoods. A lid would contribute to a built environment that would reduce stressful conditions, promote active transportation, and foster social cohesion and mental health.

Affordability: The lid would accommodate affordable housing and affordable space for the uses that promote shared prosperity.

It is increasingly difficult for people to pay escalating rent and to keep small businesses and cultural spaces possible. The lid would create access to affordable housing, small business opportunities, and services, while encouraging cultural and economic diversity to create a vibrant street level.

Sustainability and Resilience: The lid would reduce ecological footprint of the freeway and improve seismic and community resilience.

A lid over I-5 would address the ecological footprint of the freeway and built environment, reduce the heat island effect downtown, promote healthy ecosystems, and increase the capacity of communities to survive, adapt, and grow in the face of chronic or acute stresses, including seismic and public health risk events.

Connectivity: The lid would improve and re-establish pedestrian and bicycle connections.

The lid would improve the pedestrian network and experience, addressing the existing limited access, unsafe, unpleasant, noisy and polluted conditions. The lid would also reconnect the original street grid severed by I-5 and open up shorter, more pleasant and accessible ways to walk and cycle between the First Hill/Capitol Hill and Denny Triangle/South Lake Union neighborhoods.

Complete Community: The lid is possibly the only way to provide space in a key location for needed amenities that include parks and open space, affordable housing, and commercial and civic spaces.

Land and space in the urban core are finite and in high demand. The lid could help respond to deficits in the surroundings for a desired large, flat open space in the heart of the city, as well as needed space to accommodate a variety of civic and public uses.

Identity: By covering the trenched freeway in its urban center, the City of Seattle could build on its Freeway Park legacy and its reputation in innovation and visionary thinking.

A lid is an opportunity to create a space that fosters a strong sense of place-based identity by creating memorable spaces that support daily life, community, and culture. Freeway Park was the country's first lid over an urban highway and is now considered a historically significant asset. Now, over 40 years later, Seattle's identity as the "Emerald City" could be strengthened by expanding the idea of reconnection and regreening, redefining the approach to adaptive infrastructure.

3. Existing Context

3.1 Regional Context

The growth that has been occurring in the Pacific Northwest is expected to continue. The Puget Sound Regional Council (PSRC) forecasts an additional 1.8 million residents and 1.2 million more jobs in the next 30 years (Puget Sound Regional Council, 2019).

Regional planning policies direct that growth should focus on cities as centers of jobs, housing, and activities. The regional growth strategy—spelled out in PSRC’s VISION 2050: Regional Growth Strategy—builds on existing infrastructure by prioritizing investments in areas that are accepting new development (e.g., Seattle’s central city neighborhoods). The regional growth strategy focuses on channeling significant growth into regional growth centers (also referred to as urban centers) throughout the region. I-5 divides several regional growth centers in the city, specifically downtown Seattle, First Hill/Capitol Hill, and South Lake Union. Within the growing Puget Sound region, Seattle will remain the central destination for the increased regional population accessing jobs, housing, culture, education, tourism and retail.

The Puget Sound region is focusing effort and resources on regional mobility. Sound Transit plans, builds, and operates transit service in central Puget Sound, serving King, Pierce and Snohomish Counties. Sound Transit’s services include Link light rail, Sounder trains, ST express buses, Tacoma Link light rail, and upcoming bus rapid transit. In 2017, Sound Transit services carried about 47 million passengers, including an average of 157,000 riders on weekdays (Sound Transit, 2018).

In November 2016, voters approved ST3, a \$53.8 billion package of transit improvements. When fully built out, ST3 will connect Seattle to Tacoma, Federal Way, Everett, and Issaquah. Within the city of Seattle, light rail will connect to West Seattle and Ballard. The complete network will include 116 miles of light rail and is expected to carry some 600,000 daily passengers (Sound Transit, n.d.). The nexus of this system will be in downtown Seattle at Jackson Hub (Chinatown-International District) and Westlake. Several planned light-rail extensions will be along portions of the I-5 corridor (from Northgate to Everett).

Revenues for transit construction are down sharply as a result of the COVID-19 pandemic, and the economic outlook both in the Sound Transit region and the nation is uncertain. Sound Transit is undergoing a realignment process to determine how voter-approved plans and timelines will be adjusted. This process will clarify the long-term financial impacts of the COVID-19 pandemic and the ensuing economic downturn on the future of the region’s light-rail system.

The Puget Sound region is forecast to reach a population of nearly 5 million people with nearly 3 million jobs by 2040, and the vision for growth emphasizes the important role of transit-rich centers and compact urban communities in accommodating future population and employment (PSRC, 2009).

Figure 3-1. Sound Transit (ST3) System Expansion



Source: Data sourced from Sound Transit (Sound Transit, 2017)
Sound Transit’s ST3 system expansion with new facilities highlighted, including East Link and the West Seattle and Ballard Link Extensions.

3.2 City of Seattle Context

Looking at the potential lid from the scale of the City of Seattle offers the perspective of citywide plans, programs, and initiatives. The Seattle 2035 Comprehensive Plan sets out an overall vision and more detailed goals for a number of policies, including housing, race and social justice, mobility, open space and sustainability.

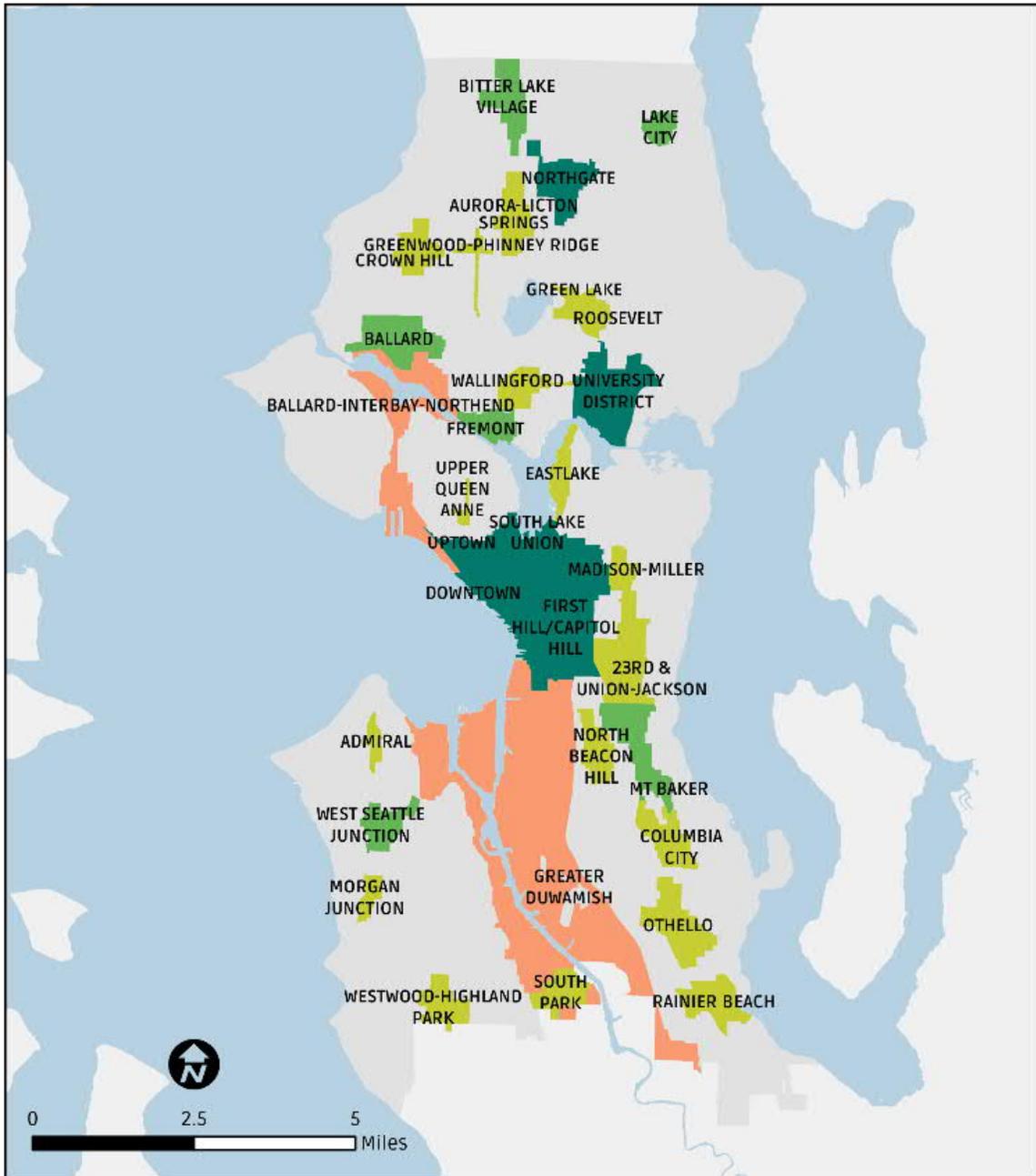
Seattle's strategy for absorbing its share of the projected regional growth is through an urban village strategy that directs growth to urban centers, urban villages, and manufacturing/industrial centers. The urban village strategy is a comprehensive approach toward a sustainable city, with urban villages described in the Seattle 2035 Comprehensive Plan as "complete and compact" neighborhoods. Increasing residential and employment opportunities in urban centers and villages makes transit and other public services convenient for more people. It also makes providing these key services more efficient. This can be a benefit to transit-dependent populations and to those who rely on other community services. At the same time, locating more residents, jobs, stores, and services near each other will reduce people's reliance on cars, limit traffic congestion, and decrease greenhouse gas emissions. (OPCD, 2019b).

Urban centers are the densest areas of the city with larger urban centers—such as downtown Seattle and Capitol Hill/First Hill—subdivided into urban villages, each with their own character and development pattern.

The City of Seattle's strategy for accommodating future growth and creating a sustainable and equitable city (OPCD, 2019c) builds on the foundation of its many diverse neighborhoods and aims to create a better city by providing the following:

- A variety of housing options
- Locations for employment growth
- Walkable communities with good transit access
- Services and the infrastructure needed to support growth
- Respect for the natural environment and enhancements to the city's cultural resources
- Growth that enables all residents to participate fully in the city's economy and civic life

Figure 3-2. Seattle’s Urban Centers, Villages & Manufacturing/Industrial Centers



Legend

- Urban Center
- Residential Urban Village
- Hub Urban Village
- Manufacturing/Industrial Center

Source: (City of Seattle, 2019)

3.2.1 Demographics

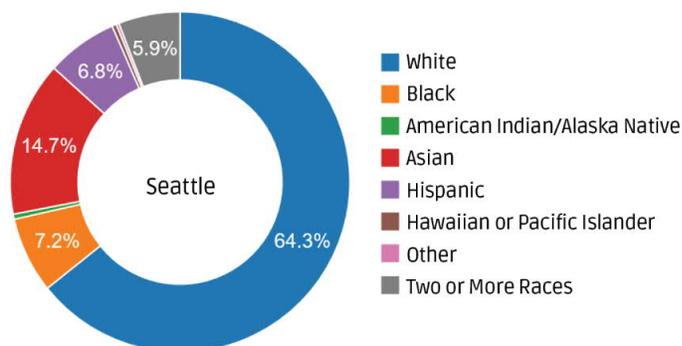
A potential lid in downtown Seattle would need to provide for the needs of Seattle's future residents. Although housing policies, market conditions, and acute disruptions will play a significant role in shaping this community in the years to come, understanding historical and current demographic trends can help inform the feasibility and recommendations for future phases of exploration for a lid, which could create equitable benefits and access to opportunity for future generations.

To understand the demographics of the study context, the I-5 LFS examined data for Seattle and the communities surrounding the study site within a 15-minute walkshed (i.e., the study area), from the American Community Survey 2017 5-year Estimates (American Community Survey (ACS), 2018) and the 2019 Downtown Demographics prepared by the Downtown Seattle Association (DSA) (DSA, 2020).¹

Population

- In 2019, approximately 747,000 residents lived in Seattle, with 88,000 people living downtown (DSA, 2020).
 - Since 2010, downtown population has increased 47 percent (Esri, 2019).²
- In 2017, 40,000 people lived within the 15-minute walkshed of the lid study site (ACS, 2018).
 - Within the 15-minute walkshed, the population was primarily young, single adults, with 25- to 34-year-olds comprising the largest age group in the study area (37.4 percent) (ACS, 2018).
 - People within the 15-minute walkshed reported race and ethnic identities similar to those reported citywide (Figure 3-3). Approximately 36 percent of people in both areas were people of color (ACS, 2018) .

Figure 3-3. Race and Ethnicity in Seattle



Source: Data sourced from American Community Survey 2017 5-Year Estimates (ACS, 2018)

¹ The year of statistical data and the definition of the downtown boundary varies by source. The Downtown Seattle Association's boundary of analysis has the broadest definition by including South of Downtown (SODO) on its south-end and establishing its eastern boundary at Broadway. The Imagine Greater Downtown initiative defines Greater Downtown with similar boundaries but does not consider SODO.

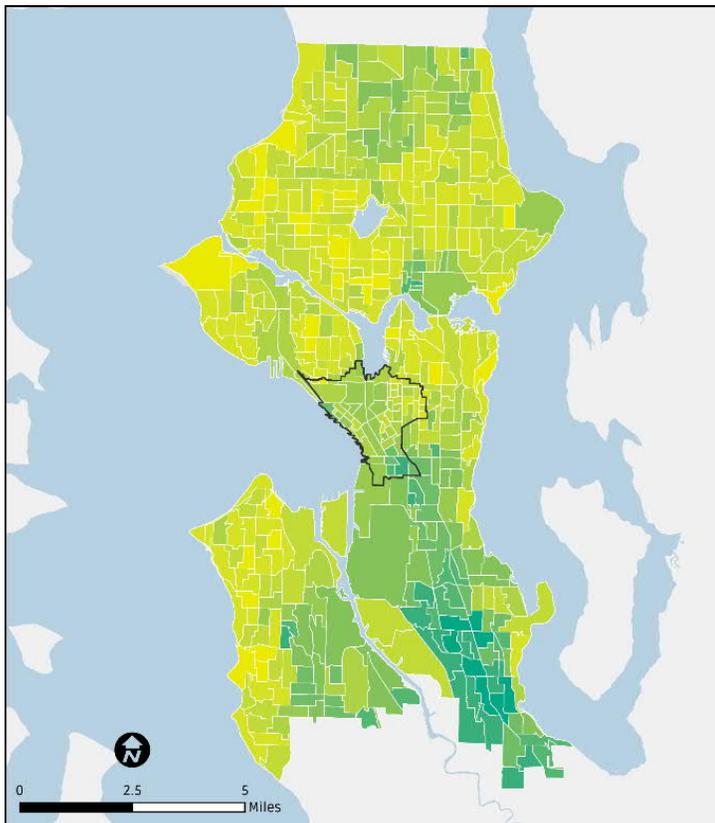
² Data sourced from Esri Community Analyst is based on 2010–2019 data, derived from the U.S. Census Bureau. Boundaries of analysis correspond to Downtown Seattle Association's downtown definition (DSA, 2020).

3.2.2 Race and Social Justice

Current demographics tell only a part of Seattle’s story (Figure 3-4). The exclusion of Native people from Seattle, redlining, racial restrictive covenants and exclusionary lending drew physical and economic boundaries to keep people of color out of certain neighborhoods with lasting impacts today (UW, 2004)(Figure 3-5). In the 1960s, the construction of I-5 through downtown created displacement that significantly changed the communities in and around the study area. While not in the scope of this study or existing conditions memorandum, understanding how history has shaped and fueled Seattle’s economic, health and other disparities is essential in further exploration of a lid.

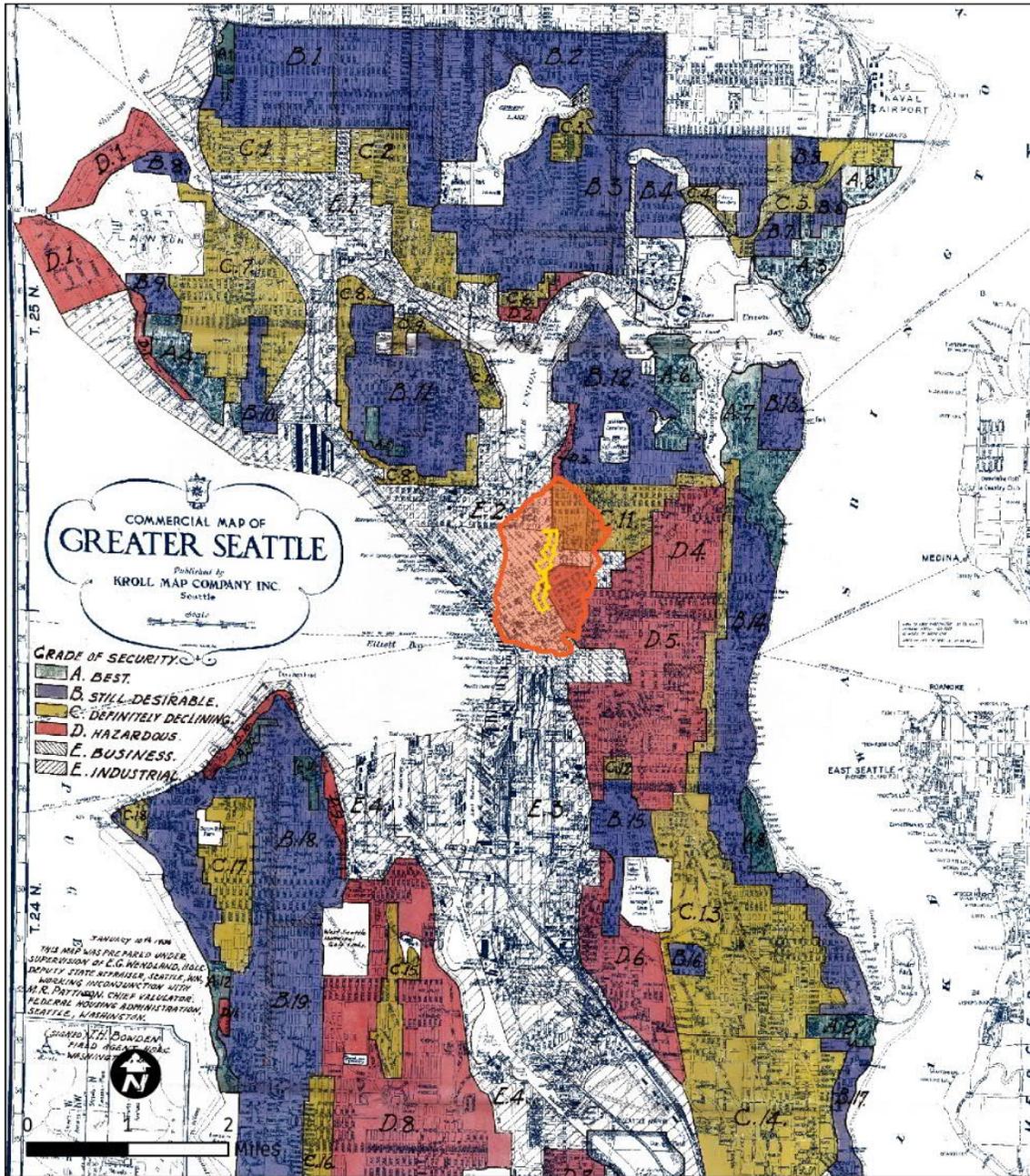
Seattle has committed to becoming a more equitable and just city. The Seattle Race and Social Justice Initiative is a citywide effort to end institutionalized racism and race-based disparities in City government. The Race and Social Justice Initiative focus efforts on nine Equity Areas: Education, Equitable Development, Criminal Justice, Health, Housing, Jobs, Environment, Service Equity, and Arts and Culture. In considering opportunities for creating space on a new lid, these Equity Areas can help inform future development scenarios (City of Seattle, 2019).

Figure 3-4. Seattle’s Population of Color by Census Block



Source: U.S. Census Bureau, 2017
 Seattle’s population of color is concentrated east of downtown in south Seattle, and the southeastern portion of west Seattle.

Figure 3-5. Historical Redlining Map of Central Seattle



Legend

- Structural Assessment Boundary (Study Site)
- 15-minute Walkshed

Source: 1936 Home Owners' Loan Corporation "Residential Security" map for Seattle. (Nelson, n.d.).

3.2.3 Housing

City policies aspire to safe, clean and affordable housing for all. Given the pressures of rising rents and housing prices, market forces are creating a heightened risk of displacement, which is creating a challenge for the City of Seattle's aspirational goals to be met. Rising housing costs most heavily affect communities of color and displace lower-income residents and marginalized populations.

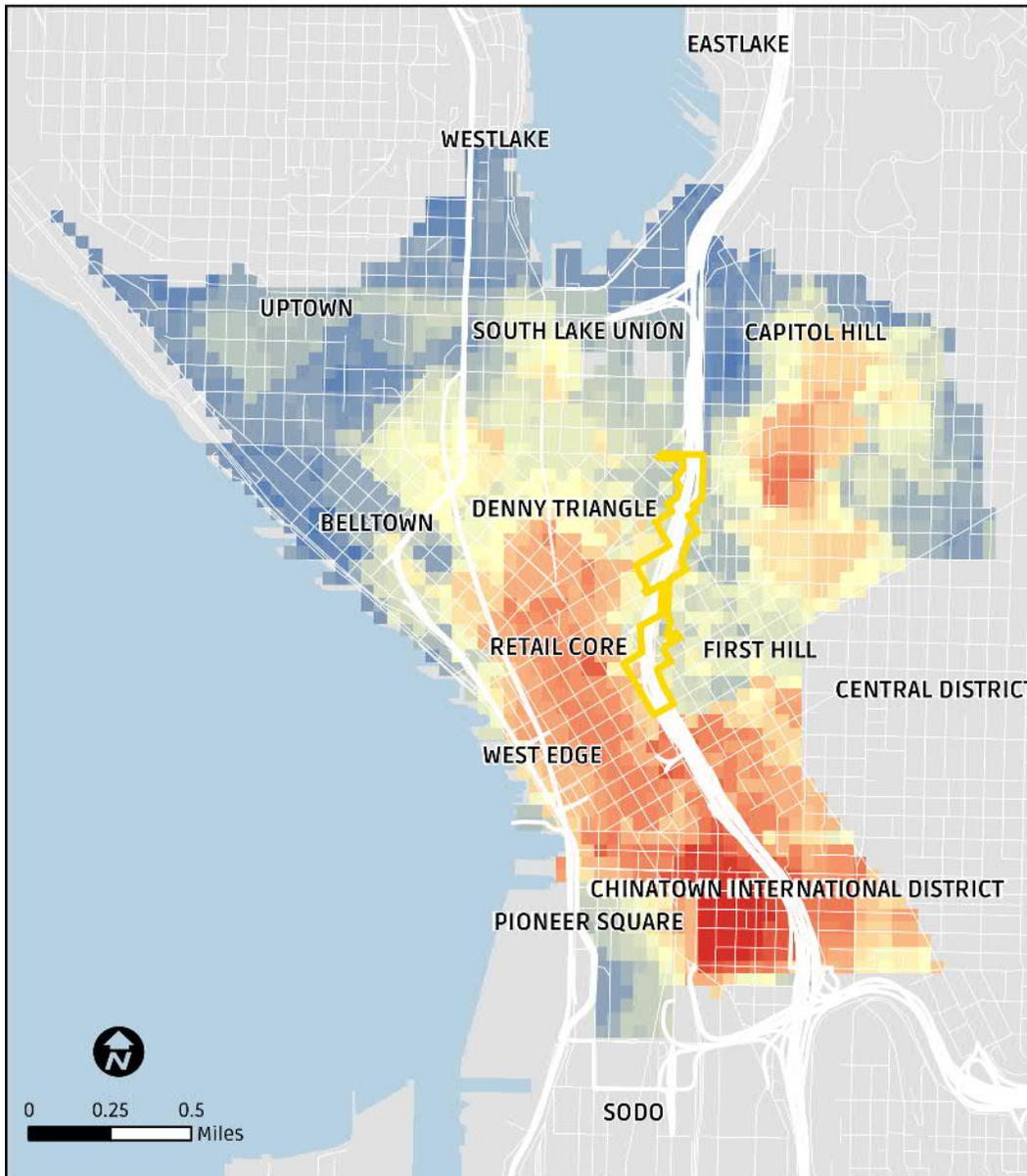
Seattle is experiencing its most rapid period of population growth since the Klondike Gold Rush and has been the fastest-growing big city in the United States since 2010. The Seattle 2035 Comprehensive Plan estimates that 70,000 additional housing units will be built in Seattle by 2035. The majority of this housing is planned for urban centers and villages, such as the neighborhoods surrounding the study site for the proposed lid. The intent of locating housing in the urban centers is to make best use of the infrastructure—transportation, utilities, community facilities—that supports residential life. Land in these urban centers is limited, and providing new housing often means removing the more affordable, older, existing housing.

The growth trends in downtown Seattle over the past decade have been accompanied by a heightened risk of displacement (OPCD, 2016) with increasing risk observed over the last decade (Figure 3-6). An assessment of the 11,731 low-income households within 1,000 feet of the study site revealed that 39 percent (4,613 households) were defined as low-income households because they earned 60 percent or less of the King County Area Median Income (AMI) of \$96,000 per average household (HUD, 2020). In the same area, 2,151 subsidized housing units were identified, which corresponded closely to the 5-minute walkshed of the study site with housing units extracted from City of Seattle Geographic Information System data on rent and income-restricted housing (City of Seattle, 2019d).

The increase in the displacement risk index in Greater Downtown neighborhoods was largely an effect of population growth and socioeconomic shifts in the region (with land use policies directing this growth downtown) and the lag in construction of new housing units to meet regional demand. Furthermore, areas where new housing was being constructed were often priced for middle3- or high-income households (Figure 3-7), often replacing housing stock once occupied by lower-income households (OPCD, 2016).

³ Middle-income households are defined as households earning between 60 percent and 120 percent of the Housing and Urban Development Area Median Income.

Figure 3-6. Displacement Risk Index in Greater Downtown (2016)



Legend

 Structural Assessment Boundary (Study Site)

Greater Downtown

 High Risk of Displacement

 Low Risk of Displacement

Source: (OPCD, 2016)

In 2016, displacement risk was higher throughout the center of downtown, the southern part of First Hill, and in Yesler Terrace, and it is highest in Chinatown-International District.

Of the 70,000 new units expected by 2035, 28,000 of those units should be affordable to people earning 80 percent or less of AMI. The private market, without government intervention, is not likely to produce those units (City of Seattle Office of Planning and Community Development (OPCD), 2015).

Concerns about affordability and displacement have led to a number of efforts by the City of Seattle. The Housing and Livability Agenda approved in 2015 put forth 65 recommendations for Seattle to accommodate more housing. In 2016, the City of Seattle released a report entitled *Seattle 2035: Growth and Equity, Analyzing Impacts on Displacement and Opportunity Related to Seattle’s Growth Strategy*. This report identified areas where residents, especially people of color, were at risk for displacement and those areas where the most opportunities were available to residents. The analysis showed that areas near the proposed lid study site had a high risk of displacement, but were near an abundance of social, physical, and economic opportunities.

Figure 3-7. Definitions of Housing Affordability in the City of Seattle

Affordability (Spending up to 30% of gross monthly income on housing costs)		
City of Seattle median household income: \$76,000 (single person household) \$108,000 (four person household)		
Low-income Household Earns <60% of Area Median Income (AMI)	Middle-income Household Earns 60–120% of Area Median Income (AMI)	High-income Household Earns > 120% of Area Median Income (AMI)
< \$46,500 (single person household)	\$46,501–\$93,000 (single person household)	> \$93,001 (single person household)
< \$66,400 (four person household)	\$66,400–\$132,850 (four person household)	> \$132,850 (four person household)

Adapted from (City of Seattle, 2019a); (Challenge Seattle, 2019).

3.2.4 Affordability for Local Retail and Cultural Uses

Not only residents are being displaced. Small, local businesses, non-profits and creative enterprises often rely on affordable rents to survive. Neighborhoods like Capitol Hill and Pike-Pine—known for LGBTQIA+ culture; arts, dance, music and theater; and small local businesses—are at risk of losing the institutions at the cultural heart of the community as older buildings are demolished and rents rise. The City of Seattle, through the Office of Arts & Culture, is looking at cultural displacement, particularly in communities of color. The economic and quality-of-life benefits of cultural uses in a neighborhood are substantial and should be considered in developing scenarios that could offer space for local businesses and community-based arts and cultural organizations.

3.2.5 Transportation and Multimodal Connections at the Citywide Scale

The study site’s location is strategic for transportation at multiple scales, with distinct challenges and opportunities from the regional to the study site scales.

From a citywide perspective, the City Seattle’s goal is to provide a robust transportation system that is safe, affordable and interconnected, where people can access reliable and easy-to-use travel options, and goods can continue to move through the city. Streets and sidewalks are

understood as infrastructure for mobility and as a network of public spaces that generate economic and social activity that add to the city's overall health, prosperity, and happiness.

The City of Seattle has developed a number of modal plans: Pedestrian Master Plan, Bicycle Master Plan, Transit Master Plan, and Freight Master Plan. These plans coordinate the various modes of transportation throughout the city.

Walkability and accessibility are priorities in the paradigm of the future. The Pedestrian Master Plan is based on the idea that walking and accessibility are at the core of a strong and healthy community. The Pedestrian Master Plan sets out the ambitious goal of making Seattle the most walkable and accessible city in the nation. Walkability includes the qualitative elements that support public life, elements that are missing in one of the city's densest and most valuable locations where I-5 splits downtown neighborhoods.

In a pedestrian-friendly city, the public realm is attractive—whether because of a street tree turning colors, an engaging retail façade, a convivial sidewalk café, or an inviting public open space. Walkable and accessible cities allow residents to meet people, experience places firsthand, and connect with their culture. (City of Seattle Department of Transportation (SDOT), 2014)

The Bicycle Master Plan, updated in 2014, envisions that riding a bicycle is a comfortable and integral part of daily life for people of all ages and abilities. The plan identifies projects and programs to be implemented through 2033, including approximately 100 miles of protected bike lanes and 250 miles of neighborhood greenways. The Bicycle Master Plan includes several facilities near the proposed lid that connect into regional systems:

- Seneca and Spring Street connections to the waterfront and a neighborhood greenway on University Street
- Pike Street as a protected bike-lane connection between Downtown Retail Core and Capitol Hill
- Hubbell Place as a north-south connection to Melrose Avenue East and the Melrose Connector Trail
- Marion Street as a neighborhood greenway.

The Transit Master Plan comprehensively considers facilities, services, programs, and system features through a 2030 timeframe. In coordination with the regional transit agencies—King County Metro and Sound Transit—the Transit Master Plan identifies major transit corridors, preferred transit modes, and a framework for investments. The plan recognizes the key importance of transit in Seattle's downtown neighborhoods, including the east-west connection across I-5.

Downtown is the heart of the region that captures 60% of the state's economic energy...Reliance on auto access to and through Downtown limits the person capacity of available right-of-way. Improved transit access to the Center City and Seattle's urban village neighborhoods is critical to support the City's economic growth. (City of Seattle Department of Transportation (SDOT), 2014)

3.2.6 Access to Parks and Open Space

Access to urban parks and open space is an important component of healthy cities and the social well-being of Seattle residents. Parks provide health and environmental benefits to communities and often serve as the common ground for interaction, recreation, and cultural events.

Seattle Parks and Recreation manages over 6,400 acres of parks and natural areas, with the mission of promoting healthy people, a healthy environment, and strong communities. The 2017 Parks and Open Space Plan has a minimum citywide guideline for open space of 3.3 acres per 1,000 residents, and an aspirational goal of 10 acres per 1,000 residents, acknowledging that the higher goal is not likely to be attainable in the denser areas of the city (City of Seattle, 2017a).

Overall, the total acreage of parks exceeds the acceptable goal and nearly meets the aspirational goal, with 9.34 acres of parkland per Seattle resident in 2016. The challenge in this period of growth is the ability to expand the amount of parkland as the population grows. With a projected 2035 population of 806,800, parkland acreage per 1,000 drops to 8.0 acres (City of Seattle, 2017a).

Figure 3-8. Park System and Population Growth



Source: Outside Citywide (OPCD, 2019)

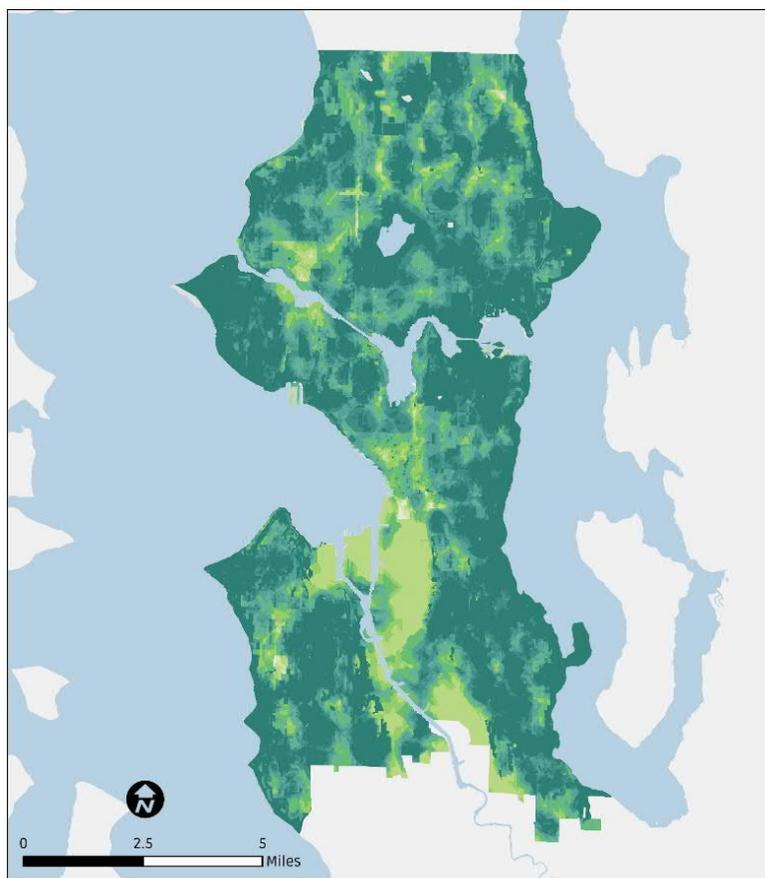
Parkland acreage and population decade from 1960 to 2030 projections, with parkland acreage remaining under 6,500 acres while population is projected to reach nearly 800,000 by 2030.

As noted in Outside Citywide, the interdepartmental study on Seattle's public realm, acquiring new land for parks and public space in Seattle is challenging and expensive, especially in the denser neighborhoods. In particular, Seattle lacks big opportunity sites that can support major recreation and gathering space. Even with the expected transformation of Seattle's waterfront, downtown lacks public space (described in later sections). With land values at hundreds of dollars per square foot in the downtown area, the City of Seattle has recognized the challenges, and current policy is to look for opportunities for public-private partnerships for the downtown rather than to expect further acquisition (City of Seattle Office of Planning and Community Development (OPCD), 2019).

In terms of uses of open space, local and statewide public opinion survey findings show that the most common reasons people use parks and open spaces is to make contact with nature and active recreation (City of Seattle, 2017a). Walking for fitness and enjoyment continues to be the most popular activity, and this finding mirrors the national recreation participation trends. Running and jogging are also popular outdoor activities in parks. Because of the high concentration of younger adults (age 25 to 34), interest in active recreation and recreation-level athletic leagues is high.

In terms of the kinds of open space to be provided, the City of Seattle aspires to offer a variety of outdoor and indoor spaces for playing, learning, contemplation, and community building. “Green streets” and urban trails would ideally connect open spaces and parks to each other, to urban centers and to regional open space systems. Creating both open space and green connections on and through a new lid would support these policy goals (City of Seattle, 2017a).

Figure 3-9. Public Space Access



Legend



Source: Outside Citywide (OPCD, 2019)

Public space access index, with higher scores representing better access to public spaces, shows a lack of public space access downtown and in some densely populated neighborhoods.

3.2.7 Economics

Seattle has been the fastest-growing big city in the United States since 2010. Downtown represents half of recent development in the city, with nearly half (44 percent) of all downtown apartment units, more than a quarter (28 percent) of downtown hotel rooms, and a fifth (21 percent) of downtown office space built in the last 10 years (DSA, 2019).

3.2.7.1 Jobs and Business

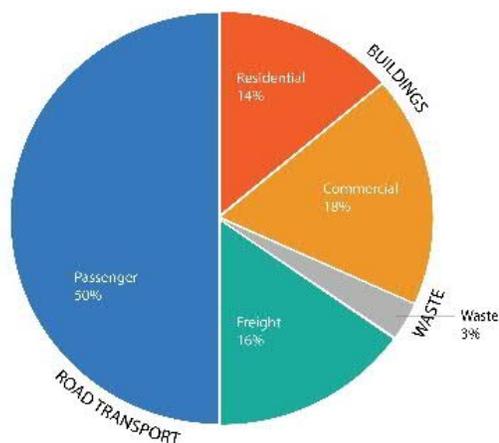
Since 2010, Seattle has added more than 17,000 jobs per year, or 3.34 percent employment compounded annual growth rate, reaching 602,000 jobs in 2018. While the growth of “tech” jobs in the professional and technical services industry are widely credited for Seattle’s economic growth, jobs in this industry sector represented only 14 percent of recent job growth. In fact, greater job growth exists in industries that support expanding neighborhood amenities like retail and food and beverage services, as well as hospitality. Service jobs, including retail trade and accommodation and food services jobs, comprised 39 percent of the city’s recent employment growth.

3.2.8 Sustainability

Seattle has long played a leadership role in sustainability, recognizing that cities can be the laboratories for solutions that address climate change. The City of Seattle has set out an ambitious goal in its Climate Master Plan of becoming carbon neutral by the year 2050. With much of the city’s greenhouse gas emissions coming from cars, sustainable strategies highlight improved conditions for walking, bicycling and using transit.

Since 1994, Seattle’s comprehensive planning has been based on the urban village strategy, which is grounded on the fundamental principal of concentrating density and co-locating housing, jobs, and transit. These sustainability strategies support the idea of utilizing the air space above I-5, adding needed land uses in the densest area of downtown now used only for motor vehicles.

Figure 3-10. Greenhouse Gas Emissions by Sector



Source: (City of Seattle Office of Sustainability and Environment (OSE), 2016)

In 2014, of Seattle’s total greenhouse gas emissions, road transport made up 66 percent (50 percent from passenger and 16 percent from freight), buildings made up 32 percent (18 percent from commercial and 14 percent from residential), and waste made up another 3 percent.

Increasing tree canopy cover—with its many environmental, social and economic benefits—is another aspect of sustainability with citywide support. The City of Seattle set a goal of 30 percent tree canopy cover by 2036, and a tree canopy of 28 percent, according to the 2016 Canopy Cover Study. However, rapid urban development has meant that canopy is actually being reduced. Seattle Audubon found that over the 10 years since 2009, canopy cover has declined by an estimated 1,200 acres (O'Neil-Dunne, J.; University of Vermont Spatial Analysis Laboratory, 2016), which is an area of canopy cover over twice the size of Discovery Park lost from Seattle's neighborhoods.

Tree cover varies by neighborhood, but single-family areas and city streets contain the most. It is notable that tree cover comprises only 10 percent of the downtown area, which is far below the overall city average (O'Neil-Dunne, J.; University of Vermont Spatial Analysis Laboratory, 2016). Without the shading and evapotranspiration provided by trees, the dense downtown neighborhoods have experienced increased heat island effect and higher levels of pollutants.

A lid will not be able to hold the largest tree species, but smaller trees located strategically where technically feasible would vastly improve the current impervious surface of the freeway.

Tree canopy in Seattle is a vital asset that provides multiple ecosystem services such as stormwater runoff reduction, improved air quality, decreased carbon footprint, enhanced quality of life, savings on energy bills, and habitat for wildlife. (O'Neil-Dunne, J.; University of Vermont Spatial Analysis Laboratory, 2016)

3.2.9 Seismic Risk

Earthquakes are an unavoidable natural hazard facing Seattle and the Pacific Northwest. The State Facilities Action Plan (PSRC, 2018), considers I-5 a lifeline route, conferring it priority in terms of retrofit relative to other infrastructure not located on lifeline routes. However, the plan notes that the I-5 corridor through Seattle is considered a "High Cost Corridor Segment," with alternate routes identified as lifelines into and out of the city. Seattle is on the Pacific Ring of Fire—one of the most seismically active regions in the world—and earthquakes are an imminent serious natural hazard the city faces.

Seismic risk is a key motive and consideration for the Community Connections and Leveraged Development analysis—a component of the partnership study from Partnering for the Future of I-5—with a focus on I-5 in downtown Seattle (Washington State Department of Transportation (WSDOT), City of Seattle, 2019). Lidding I-5 presents an opportunity to improve long-term seismic resilience to this segment of the corridor. Resiliency benefits will potentially result from seismic reinforcement and mitigation that will allow I-5, and specifically the identified structures through downtown Seattle enlisted in the I-5 LFS Technical Feasibility Memorandum, to withstand a 9.0 magnitude earthquake (Washington State Department of Transportation (WSDOT), City of Seattle, 2019).

The last earthquake Seattle experienced with the magnitude greater than 6.0 was the Nisqually Earthquake in 2001. Seattle will continue to experience earthquakes, and an earthquake on the Seattle Fault poses the greatest risk to the city because it runs east-west and quakes along the fault could be as large as magnitude 7.5. Seattle has prepared for the inevitable events through infrastructure planning and increasingly stringent codes. Still much of the city's infrastructure was

built decades ago, requiring seismic upgrades to bring the city's bridges, roadways and essential infrastructure up to standard (City of Seattle Office of Emergency Management (OEM), 2019).

3.2.10 Community Resilience

In an era where concerns about climate change are increasing, the idea of urban resilience has taken on new importance in planning for cities and neighborhoods. Cities are complex entities that are able to function better when the physical and social fabrics are well-connected, responding better to shocks (such as an earthquake or an economic crisis) and the ongoing, underlying stresses of a growing and increasingly unaffordable city.

Seattle is one of the designated "100 Resilient Cities" worldwide that the Rockefeller Foundation supported. Urban resilience is defined by the program as "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience" (The Rockefeller Foundation, n.d.).

Communities with strong social capital fare better in the face of disasters (Aldrich, 2017). Planning with a lens of social connectivity—including strong physical links, shared public spaces, and designs that foster positive daily interactions—creates healthier communities on a day-to-day basis. These principles apply to potential benefits of bridging the physical and psychological barriers I-5 created to address the damage of community severance between neighborhoods on either side of the highway. Severance from high-volume roadways affects not only pedestrian (and bike) travel and physical health, but also social networks. Research has shown that people have more and stronger social contacts within their immediate neighborhood when their neighborhood streets carried lower traffic volumes (Mindell & Karlsen, 2012).

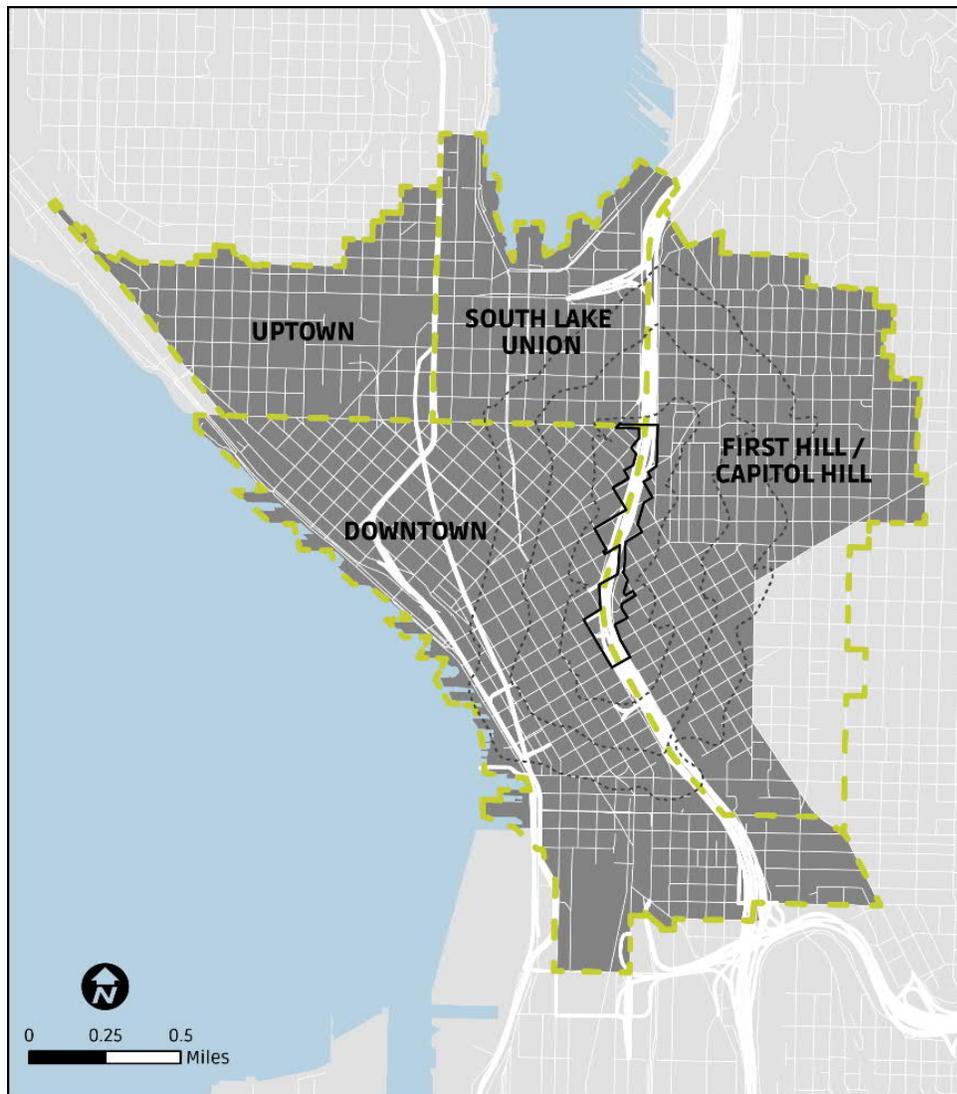
Urban resilience is about preparing ourselves, as individuals and as a community, for these shocks like an earthquake, but also slow-burns like rising rents and rising inequity.

--Katya Sienkiewicz, Seattle's Chief Resilience Officer.

3.3 Greater Downtown Context

The Seattle 2035 Comprehensive Plan is based on a strategy that identifies various categories of “urban villages” where anticipated growth will be focused. The densest category in the Seattle 2035 Comprehensive Plan is the urban center. Of the six designated urban centers, four are in Greater Downtown: Downtown, First Hill/Capitol Hill, Uptown and South Lake Union (City of Seattle Office of Planning and Community Development (OPCD), 2019c).

Figure 3-11. Greater Downtown Seattle



Legend

- Urban Centers
- Structural Assessment Boundary (Study Site)
- 5-, 10-, and 15-Minute Walksheds

Source: (City of Seattle, 2019)

Greater Downtown includes all of the Downtown, Uptown, and South Lake Union urban centers, and almost all the First Hill/Capitol Hill urban center.

These four urban centers are the subject of an initiative, Imagine Greater Downtown, which provides a vision for the area, including an emphasis on streetscape as both places for movement and places for public life (SDOT, 2019). Greater Downtown is subdivided into 10 urban neighborhoods, each with its own urban character. The potential lid over I-5 would be along a portion of the boundaries of First Hill, Pike-Pine, Capitol Hill, Denny Triangle and Downtown Retail Core.

In 2035, the heart of Seattle will be a place for us all, with diverse neighborhoods, active streets, and inviting public spaces.

--Imagine Greater Downtown (SDOT, 2019).

3.3.1.1 Greater Downtown Neighborhoods

Land use, urban character, and demographics were analyzed within 5-, 10-, and 15-minute walksheds of the study site. For the I-5 LFS, the 15-minute walkshed from the study site boundary is defined as the “study area”. This 15-minute walkshed from the study site touches on all neighborhoods of Greater Downtown except the westernmost neighborhoods of Uptown and Belltown. The study area expands into South Lake Union, Pioneer Square, and Chinatown-International District. Brief descriptions of each neighborhood follow. Each neighborhood has been shaped and influenced by historical and current policies and decisions; future decision-making should be informed by their unique histories.⁴

Capitol Hill

A mixed-use neighborhood with a large residential population, Capitol Hill retains a lower scale and is a hub of small businesses, restaurants, bars, art and music that is a source of pride. Capitol Hill was Seattle’s first designated Arts District and has been a long-standing home to LGBTQIA+ communities and culture. It is home to Volunteer Park, Cal Anderson Park, and the Seattle Asian Art Museum, and is connected by light rail to neighborhoods north and south, with the light-rail station opening in 2016. Capitol Hill typically has smaller lots and lower heights than the west side of I-5.

Pike-Pine

Historically, a streetcar ran along Pike and Pine Streets, running along these parallel commercial corridors from downtown to Madison Street. Pike and Pine Streets are now a mix of commercial and residential uses, and the City of Seattle has plans to make those streets a more walkable, identifiable corridor through the Pike Pine Renaissance project (City of Seattle Office of the Waterfront and Civic Projects, n.d.).

First Hill

With a dense mix of residential and institutional uses, First Hill is one of Seattle’s oldest residential neighborhoods. Zoning in the First Hill neighborhood allows high-rise development, and new residential towers, including Seattle’s first nonprofit-developed affordable housing high-rise, have been built near the study site. This rapidly growing neighborhood comprises dense residential uses and important institutional uses, including major hospitals and higher education and religious institutions. Harborview, Swedish and Virginia Mason hospitals are in the neighborhood, as well as the Frye Museum. Yesler Terrace was developed by the Seattle

⁴ More historical context can be found at HistoryLink.org (Flom & Caldbick, 2012)

Housing Authority (SHA) in the early 1940s as the city's first publicly subsidized housing community. In 2013, SHA began a vision to make new investments in this community that honor the neighborhood's history and cultural richness while creating new housing that is affordable to residents across a broad range of incomes (Seattle Housing Authority, n.d.). The First Hill streetcar connects the neighborhood to Capitol Hill and Pioneer Square.

Chinatown-International District

Seattle's Chinatown-International District is composed of Chinatown, Japantown and Little Saigon—three unique neighborhoods with rich cultures, traditions, and histories. The district is listed in the National Register of Historic Places and has been home to the most extensive Asian community in Washington state. It is both a residential and commercial community with many small BIPOC-owned businesses. Along with its many restaurants and businesses, the neighborhood has the Wing Luke Museum and Theater Off Jackson. Jackson Hub is a major concentration of transit, with light rail, commuter rail, buses, and a streetcar.

Pioneer Square

Pioneer Square is on the ancestral land of the Coast Salish people. It was settled in 1852 and rebuilt after the Great Fire of 1889 with the masonry buildings that are now characteristic of the neighborhood. The area includes small-scale residential buildings, restaurants and bars, retail and social service organizations. Pioneer Square's relationship with the waterfront is being redefined with the removal of the Alaskan Way Viaduct and the rebuilding of public spaces and Coleman Dock. Amtrak's national rail lines connect Seattle at the historic King Street Station. The First Hill streetcar terminates in Pioneer Square.

Downtown Retail Core

The Downtown Retail Core is a dense employment hub, a worldwide tourist and cultural destination, and a center for shopping and entertainment. The Downtown Retail Core is also rich in transit service, including light-rail stops at University Street and Westlake, multiple local and regional bus routes, and the Seattle Center Monorail. New stations will be added with the planned Sound Transit routes. Major attractions include the Seattle Art Museum, Benaroya Hall, the Seattle Aquarium, and Pike Place Market. The waterfront is undergoing major public space investments, including along the Pike-Pine corridor to make better pedestrian connections from the waterfront to the Downtown Retail Core and Capitol Hill. This is the densest area of Seattle and has unlimited height zoning in some areas. The land use mix includes more office buildings, and single buildings sometimes occupy a full block. Although there is a variety of uses, office uses and high-rise buildings stand out to the west of I-5.

Denny Triangle

This is a rapidly growing neighborhood with new residential and office high-rise buildings, including the Amazon campus. Denny Triangle was flattened by a series of regrades in the early 20th century. It is between South Lake Union and the Downtown Retail Core, with similar architectural style to both neighborhoods. A number of bus routes serve the neighborhood, and a streetcar runs from Westlake to South Lake Union. Cornish College of the Arts has been expanding its campus in Denny Triangle, and new restaurants are coming into the neighborhood with the new buildings. Seattle's first park, Denny Park, now has dog-walking facilities and play equipment.

South Lake Union

Once an industrial area with a working waterfront along Lake Union, in recent years the development has changed the neighborhood to a technology and biotech employment center, with many restaurants, retail and residential buildings. South Lake Union Park, the Museum of History and Industry, and the Wooden Boat Center offer recreational and educational opportunities near the water. There is streetcar connection to downtown, and two new stops are planned with new light rail.

Belltown

Adjacent to the Downtown Retail Core, Belltown has been developing with high-rise buildings that are bringing new residents and jobs. The neighborhood also has a concentration of social services and affordable housing. The lack of parks in the neighborhood is somewhat mitigated by larger open spaces at the edges: the north waterfront on the west and Denny Park and Seattle Center to the north. Belltown was one of the first neighborhoods to add streets as open space, with Growing Vine Street, and more recently, Bell Street Park. Bus service, including Rapid Ride, is frequent through Belltown.

Uptown

At the base of Queen Anne Hill, the Uptown neighborhood includes residential, commercial and retail uses. It is home to Seattle Center with the Space Needle and numerous cultural venues and festivals. A major renovation to Climate Change Arena will bring a new professional hockey team to the city. Uptown is a City of Seattle-designated Arts District. The neighborhood is served by bus and Rapid Ride routes, and Sound Transit's ST3 expansion will add new light-rail service.

3.3.2 Neighborhood Planning Efforts

Each of these neighborhoods—among many others throughout the city—has its own planning efforts. Future lid exploration phases will be well served to understand and identify synergies with these planning efforts. The following sections describe some of the most relevant to the proposed lid because they are adjacent to or intersect the study site.

Pike-Pine Renaissance

The Seattle Office of the Waterfront and Civic Projects and the DSA have moved forward a design for the Pike-Pine corridor as the primary east-west streets of the Downtown Retail Core and an essential link to Capitol Hill and the Waterfront. The project is intended to improve the pedestrian experience and accessibility, offer places to enjoy the city, and to encourage stewardship and activation on the part of adjacent property owners and businesses.

Melrose Promenade

Initially a community-led effort in 2010, the idea of Melrose Avenue as a “front porch” for Capitol Hill is becoming a reality with a \$3 million grant. The intent is to welcome a wide range of users to enjoy some of the best views in the city, while reconnecting the divide that I-5 created between Capitol Hill and downtown. Building on the community's vision, SDOT will be leading the build-out of this vision. The Melrose Promenade will support Seattle's bicycle network with protected bicycle facilities, neighborhood greenways, and community gathering space (Melrose Promenade, 2018).

First Hill Public Realm Action Plan

This 2015 study was a joint effort of the City of Seattle’s parks, planning, and transportation departments, focusing on strategies for public realm enhancements in a neighborhood with insufficient park space. It identified opportunities to expand the public realm network through right-of-way reallocation, private development partnerships, and strategic site selection for potential acquisition. One of the first initiatives was a temporary park using right-of-way in an awkward intersection of Union, University, and Boylston Streets. A permanent park has been built as part of an adjacent development. University Street is considered an important neighborhood greenway, connecting to Freeway Park. Plans for improving Terry Avenue as pedestrian-oriented public realm began design in 2019 (First Hill Improvement Association; City of Seattle Department of Neighborhoods (DON); City of Seattle Department of Transportation (SDOT); Framework , 2015)..

Efforts are already underway in the neighborhoods to address the disconnect over I-5. Decision-making for a lid will be able to build on the work being done for these plans.

3.3.3 Demographics in Greater Downtown

To understand the demographics for the Greater Downtown area, the I-5 LFS examined data from the American Community Survey 2017 5-year Estimates (American Community Survey (ACS), 2018) and the 2019 Downtown Demographics prepared by the DSA (DSA, 2020). The DSA definition of “downtown” includes the industrial South of Downtown (SODO) neighborhood but the I-5 LFS definition of Greater Downtown does not..

Population and Housing

- Approximately 88,000 people live downtown (DSA, 2020a).
- Since 2010, downtown population has increased 47 percent (Esri, 2019).
- Children were the fastest-growing demographic, with nearly 4,850 children living in downtown. School-aged children (ages 5–17) increased downtown by 133 percent since 2010 (DSA, 2020).
- While citywide population has increased by 22 percent,⁵ an estimated 15 percent of Seattle’s residents and half of Seattle’s employees lived and worked alongside many visitors on just 5 percent of the city’s land area (SDOT, 2019).
- In the same period, the percentage of Black residents fell to 6.8 percent, below 7 percent for the first time since the 1960s. By contrast, the Black population in King County outside of Seattle increased by almost 50 percent (Balk, 2020).⁶
- Downtown has a significantly higher percentage of renter-occupied households than Seattle as a whole. Renter-occupied households make up 82 percent of downtown’s 56,000 households. By comparison, 56 percent of the more than 338,000 households in Seattle are renter-occupied (Esri, 2019).

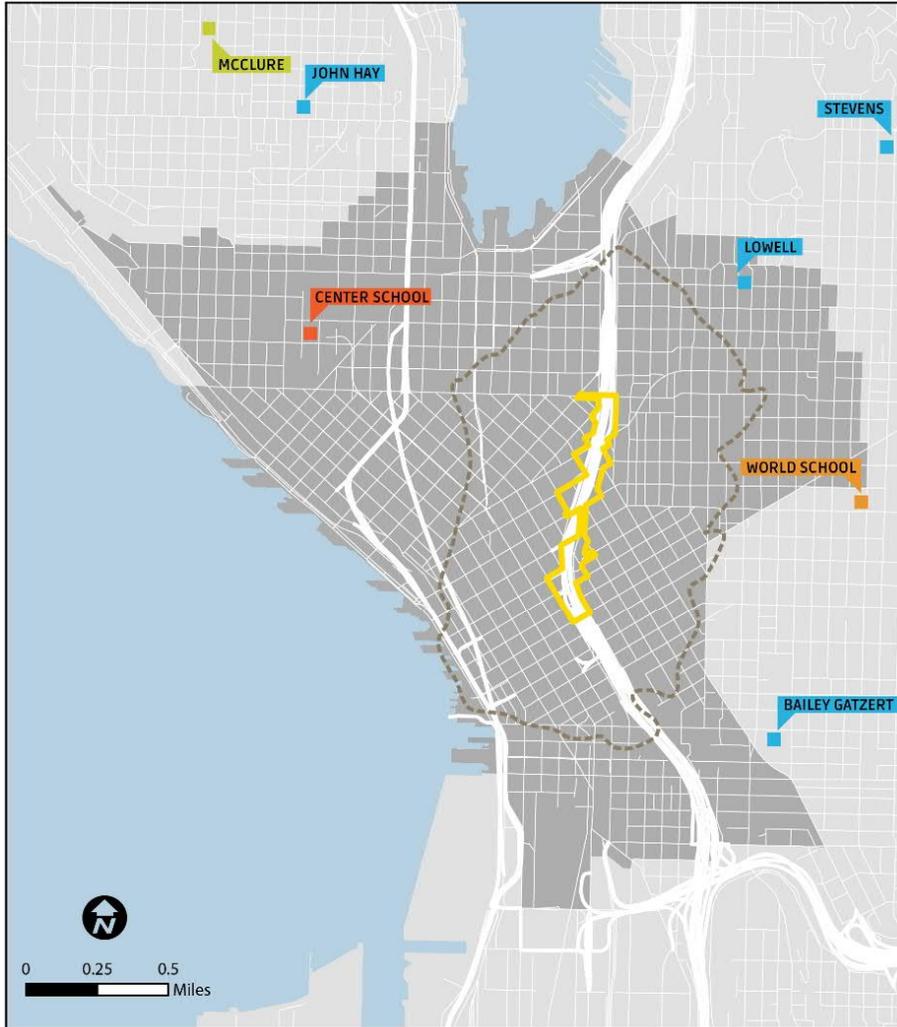
⁵ Based on 2010-2018 U.S. Census Bureau data

⁶ Source article is based on 2014–2018 U.S. Census Bureau data.

Income

- The median household income downtown was \$78,499 (Esri, 2019). Citywide, the median income for a household headed by a white person was \$105,100, more than double the \$42,500 median income for households headed by a Black person (Balk, 2020).

Figure 3-12. Public Schools in Greater Downtown



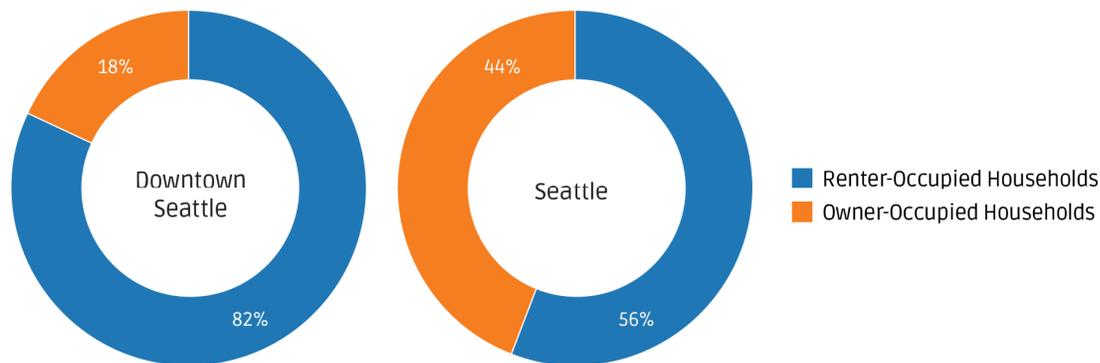
Legend

 Structural Assessment Boundary (Study Site)	 Elementary School	 Middle/High School
 15-minute Walkshed	 Middle School	 High School
 Greater Downtown		

Source: City of Seattle (City of Seattle, 2018e)

Elementary, middle, and high schools are primarily on the edges of Greater Downtown, with only the Center School and Lowell Elementary within the Greater Downtown boundary. None are within the 15-minute walkshed of the study site.

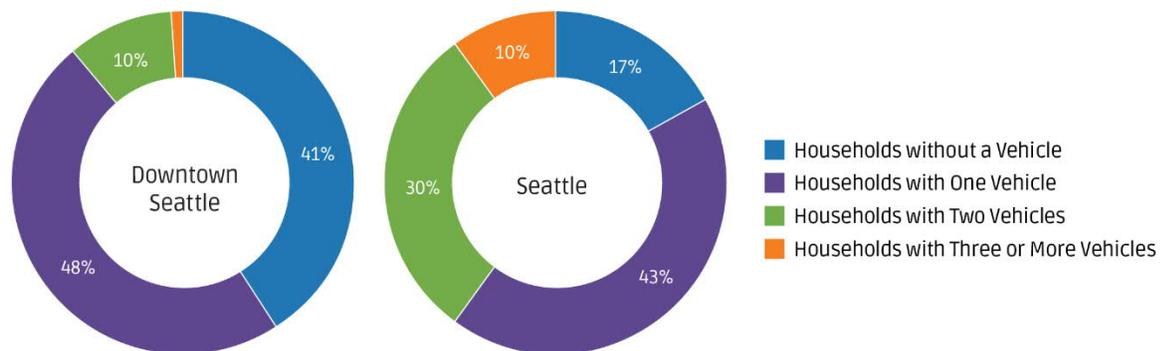
Figure 3-13. Housing Tenure



Source: Data sourced from Esri Community Analyst 2014-2018 Estimates (Esri, 2019)

- In 2019, the asking rent per unit downtown was \$2,230 compared to \$1,884 in Seattle. The percentage change between 2010 and 2019 in asking rent per unit downtown was 80 percent, which was higher than that for Seattle (62 percent), King County or the Puget Sound region (64 percent) in the same timeframe (DSA, 2020).
- Overall, downtown households reported having fewer vehicles than households citywide (Figure 3-14), notably with 41 percent of downtown households not owning a vehicle, compared to 17 percent of households citywide (Esri, 2019).

Figure 3-14. Vehicle Ownership



Source: Data sourced from Esri Community Analyst 2014-2018 Estimates (Esri, 2019)

3.3.4 Transportation and Multimodal Connections in Greater Downtown

The Greater Downtown neighborhoods are rich in transit, and options for mobility are increasing with a concerted effort to move away from single-occupancy vehicles and make walking, cycling, and transit the most attractive modes of travel. According to Commute Seattle's 2019 Center City Commute Mode Split Survey, walking, cycling, and transit have become the most popular modes of travel, capturing more than 70 percent of Downtown's estimated 247,000 daily commuters over single-occupancy vehicle travel (Commute Seattle, 2019). Downtown residents walk, bike, use transit, rideshare, or telecommute. Urban neighborhoods, which are much less dependent on cars, are key to reducing the city's carbon footprint (Commute Seattle, 2019).

Five Sound Transit Link light-rail stations are within the 15-minute walkshed of the study site. A dense network of King County Metro and Sound Transit bus routes with over 30 routes either stop within or pass through the study area. Expanding the light-rail network will significantly

increase connectivity in the Greater Downtown neighborhoods. In the planning for ST3, a new Midtown stop on 4th between Madison and Marion will be just two blocks from the lid site. Two new stops will be added in Denny Triangle/South Lake Union.

Current conditions with bridges across the freeway, create a gap in the quality of walkability in the transit-rich heart of the city.

Figure 3-15. Existing and Proposed Sound Transit (ST3) Stations in Greater Downtown



Legend

- Structural Assessment Boundary (Study Site)
- 15-minute Walkshed

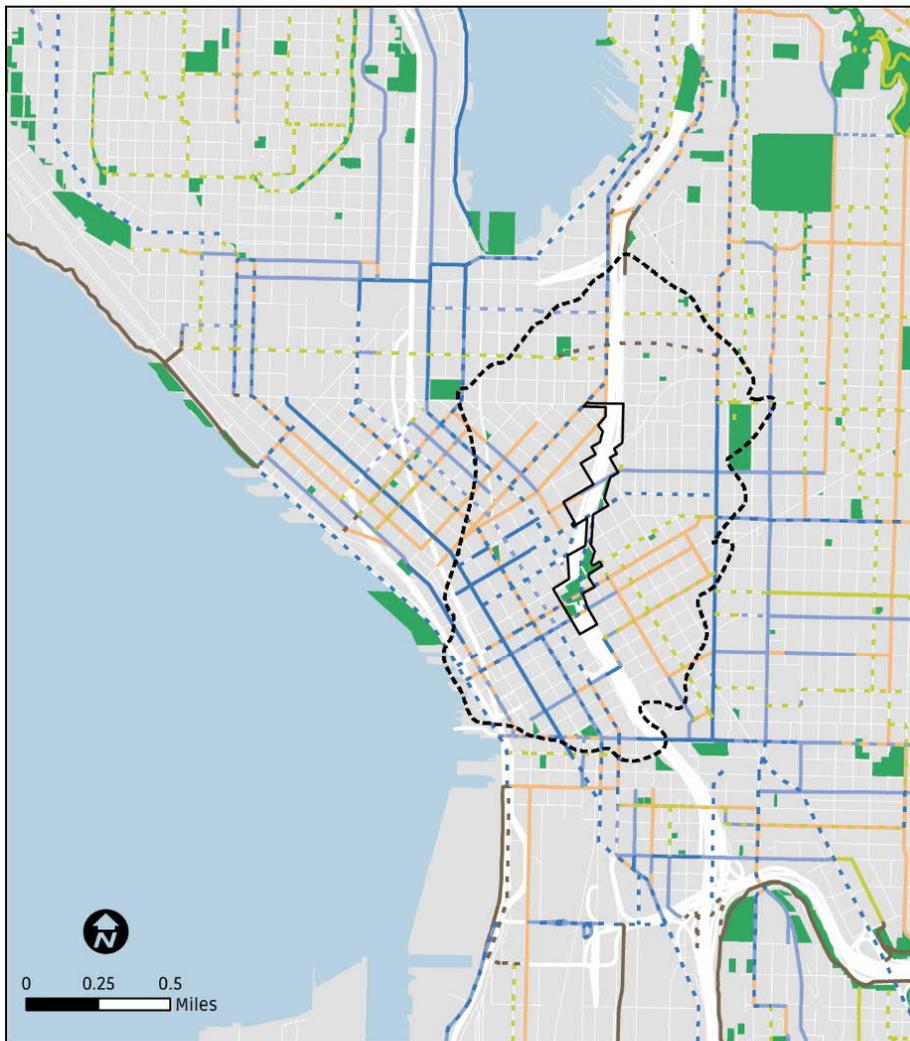
Link Light Rail

- Existing Station
- Proposed Station
- Existing Route
- Preferred Alternative Alignment

Source: Sound Transit, 2019

Planned new light-rail stations in Greater Downtown as part of ST3 would parallel the existing line between Stadium and Westlake Stations with new light-rail stations in South Lake Union, Lower Queen Anne and Interbay.

Figure 3-16. Bicycle Facilities and Multi-Use Paths in Greater Downtown



Legend

- Structural Assessment Boundary (Study Site)
- Parks and Open Space
- 15-minute Walkshed
- Bike Lane, Major Separation
- Bike Lane, Minor Separation
- Multi-Use Path
- Neighborhood Greenways
- Sharrow
- Planned Bike Lane, Major Separation
- Planned Bike Lane, Minor Separation
- Planned Multi-Use Path
- Planned Neighborhood Greenway

Source: (City of Seattle, 2018b)

Existing and planned bicycle facilities in Greater Downtown include various existing and planned protected and painted bike lanes, sharrows, multiuse paths and neighborhood greenways—the latter two primarily outside of the Downtown Retail Core.

SDOT has been focusing its to implement the Bicycle Master Plan by adding protected bike lanes on 2nd Avenue and Dearborn Street, and improving connections from Westlake/South Lake Union into the north end of Downtown via 9th and Bell Streets. Bicycle facility upgrades are planned on the Pike-Pine corridor between Downtown Retail Core and Capitol Hill. The Bicycle Master Plan, updated annually, will continue to focus on filling gaps in the Center City bicycle network.

3.3.5 Parks and Open Space in Greater Downtown

Greater Downtown has a shortage of parks and open spaces, despite the concentration of jobs and residents. Just 6 percent of total space in downtown is parks or open space, compared to 12 percent of space citywide (SDOT, 2019). Some of the greatest open space assets within Greater Downtown—the shorelines of Elliott Bay and Lake Union—are far from many locations and neighborhoods within its boundary.

Freeway Park⁷—one of Greater Downtown’s major open spaces built in 1976 as the first lid on this segment of I-5—is being reconsidered through the current “Finding Freeway Park” design study (Freeway Park Association, n.d.). Active edges support more successful parks, and the level of adjacent activity would be a factor in creating new park spaces wherever possible. The efforts in Freeway Park hold useful lessons for how a new lid might be developed, including active uses along the edges.

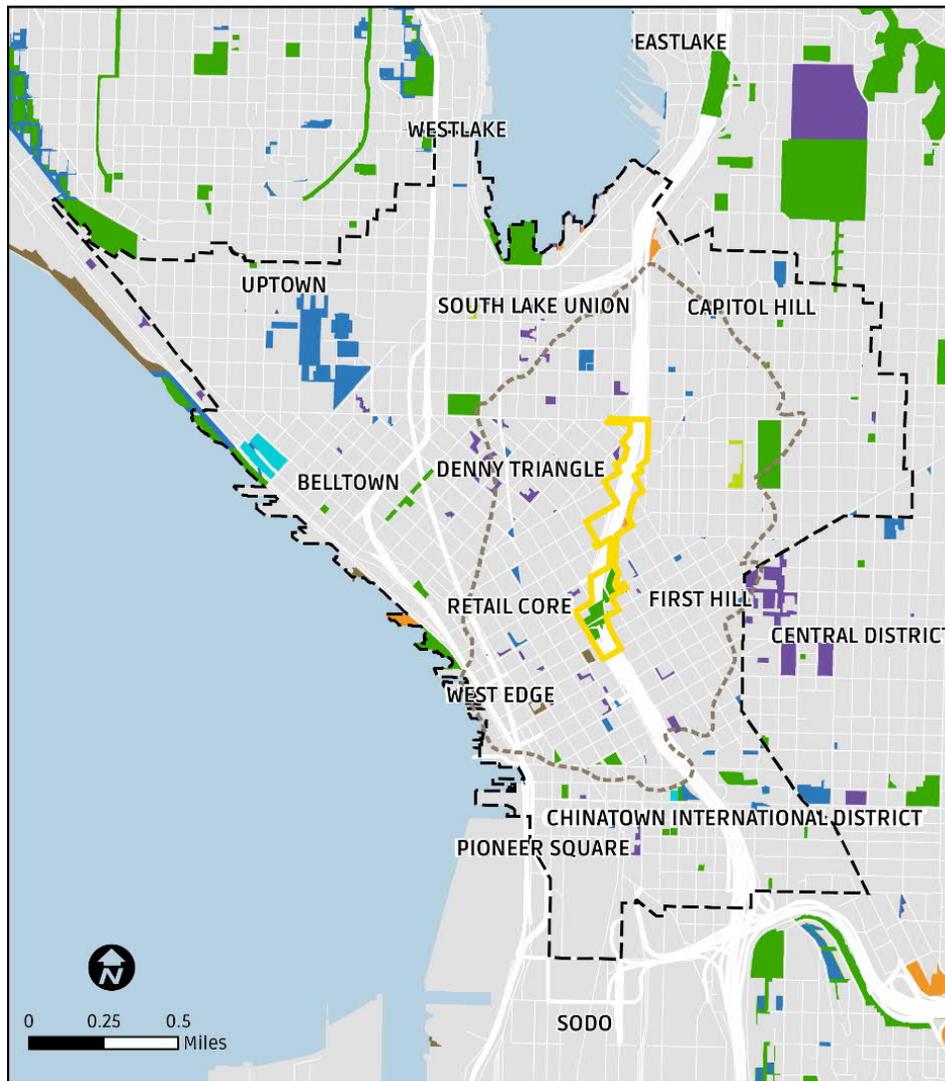
Efforts to activate parks in Greater Downtown over the past several years, especially Occidental and Westlake Parks, have increased park use. The DSA began an activation program in Westlake and Occidental Square parks in 2016, and found an increase in park usage and user satisfaction in both parks, with Occidental Park seeing a 30 percent increase in observed park visitors and Westlake with a 7 percent increase (DSA).

Despite the acknowledged need for additional park space in the Greater Downtown neighborhoods, the Parks Department has experienced challenges acquiring suitable land for larger parks and has a policy that they will not pursue additional acquisition because of scarcity and cost of land.

The lid is a unique opportunity to bring a large usable open space to Greater Downtown.

⁷ Freeway Park is now included in the National Register of Historic Places. Any project that has could affect Freeway Park’s character-defining features will need to follow the processes outlined in Title 36 Code of Federal Regulations Part 800 – Protection of Historic Properties.

Figure 3-17. Parks and Open Space in the Greater Downtown



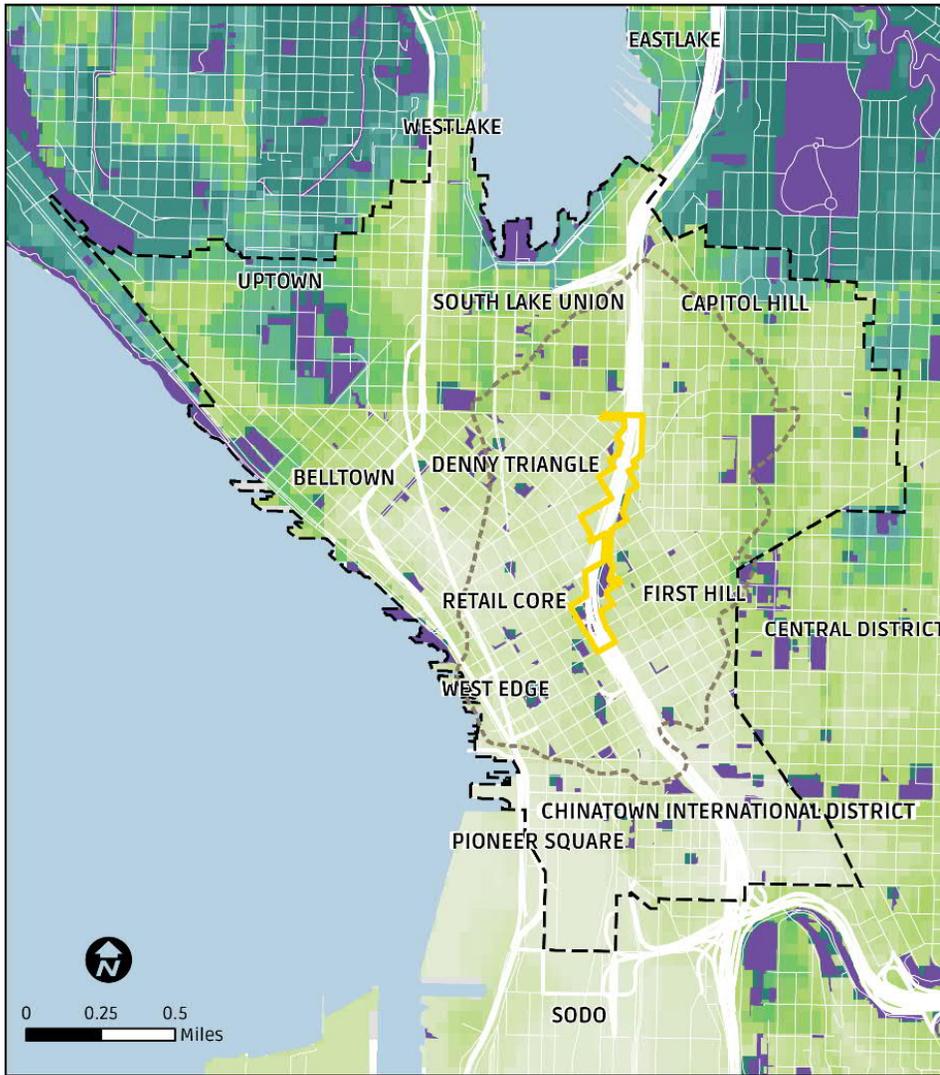
Legend

Structural Assessment Boundary (Study Site)	City of Seattle (Non SPR)	Non-Profit
15-minute Walkshed	Seattle Parks & Recreation	Private Open Space
Greater Downtown	King County & Washington State	Port of Seattle
	Public Schools & Institutions	

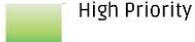
Source: (OPCD, 2019)

Public and private parks and public spaces around Greater Downtown include not only Seattle Parks and Recreation facilities, but also private open spaces (like Seattle University campus), nonprofit managed spaces (like the Olympic Sculpture Park) and other City of Seattle properties (like Seattle Center).

Figure 3-18. Public Space Equity Map for Greater Downtown



Legend

- | | | |
|---|--|--|
|  Structural Assessment Boundary (Study Site) |  Greater Downtown |  Public Space Priority Areas |
|  15-minute walkshed |  Public & Open Spaces |  High Priority |
| | |  Low Priority |

Source: (OPCD, 2019)

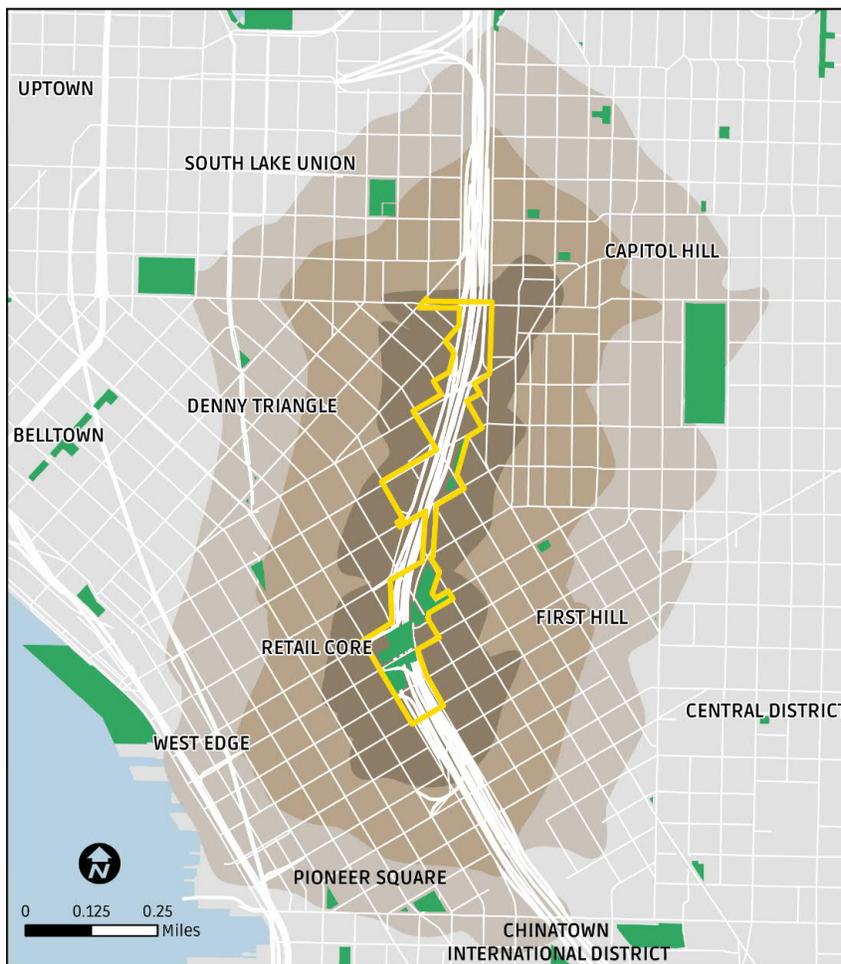
The City of Seattle’s Outside Citywide initiative recognizes that while Seattle has a robust and diverse public space network, there are opportunities to address inequitable distribution of open space, underutilized spaces, and a fragmented network that can be difficult to navigate (OPCD, 2019). The initiative identified the area surrounding the lid study site as an area of poor access and highest priority for investment in open space expansion and improvements to elevate access to public space, as well as health and social justice outcomes (Figure 3-18). Lidding I-5 would present significant opportunity to expand green and open spaces downtown, helping the City of Seattle to advance its park an open space goals articulated in these plans that aspire to a greener, better connected, healthier and more equitable Seattle.

3.4 Study Area Context

3.4.1 Adjacent Neighborhoods

The study area for the I-5 LFS is defined by a 15-minute walk from the study site. Unlike the previous geographic areas, it is distinct to the project, rather than reflective of city districts or regional jurisdictions. In order to collect data from the study area, census tracts were included if 30 percent or more of the tract was within the 15-minute walkshed area. The walkshed area takes into account the longer time walking uphill than downhill.

Figure 3-19. Adjacent Neighborhoods and Walksheds within Study Area



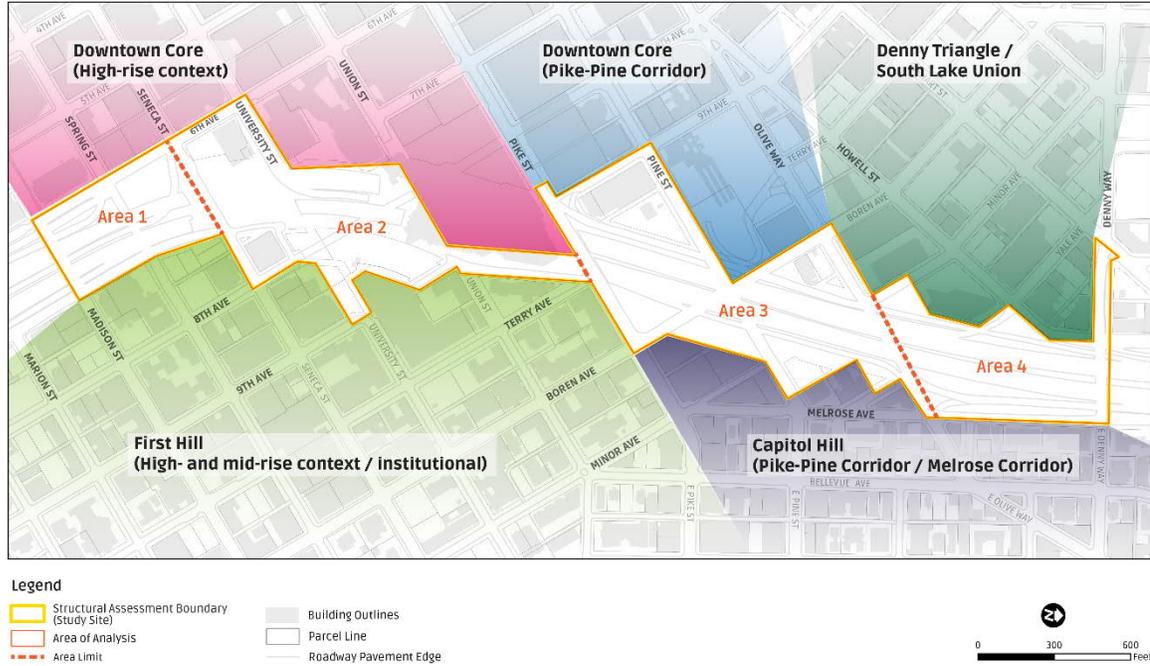
Legend

- Structural Assessment Boundary (Study Site)
- Parks and Open Space
- 5-minute Walkshed
- 10-minute Walkshed
- 15-minute Walkshed

Map of the study area location and context within 5-, 10-, and 15-minute walksheds. The study area includes much of downtown Seattle and Denny Triangle and First Hill, and parts of Capitol Hill, South Lake Union, Pioneer Square, and Chinatown-International District.

Since the construction of I-5 in the 1960s, neighborhood urban character to the east and west of the freeway show some distinctions. Each of these neighborhoods has a unique land use pattern. Connecting the neighborhoods by spanning I-5 with a lid could contribute to unite these areas.

Figure 3-20. Neighborhood Character of the I-5 Lid Study Area

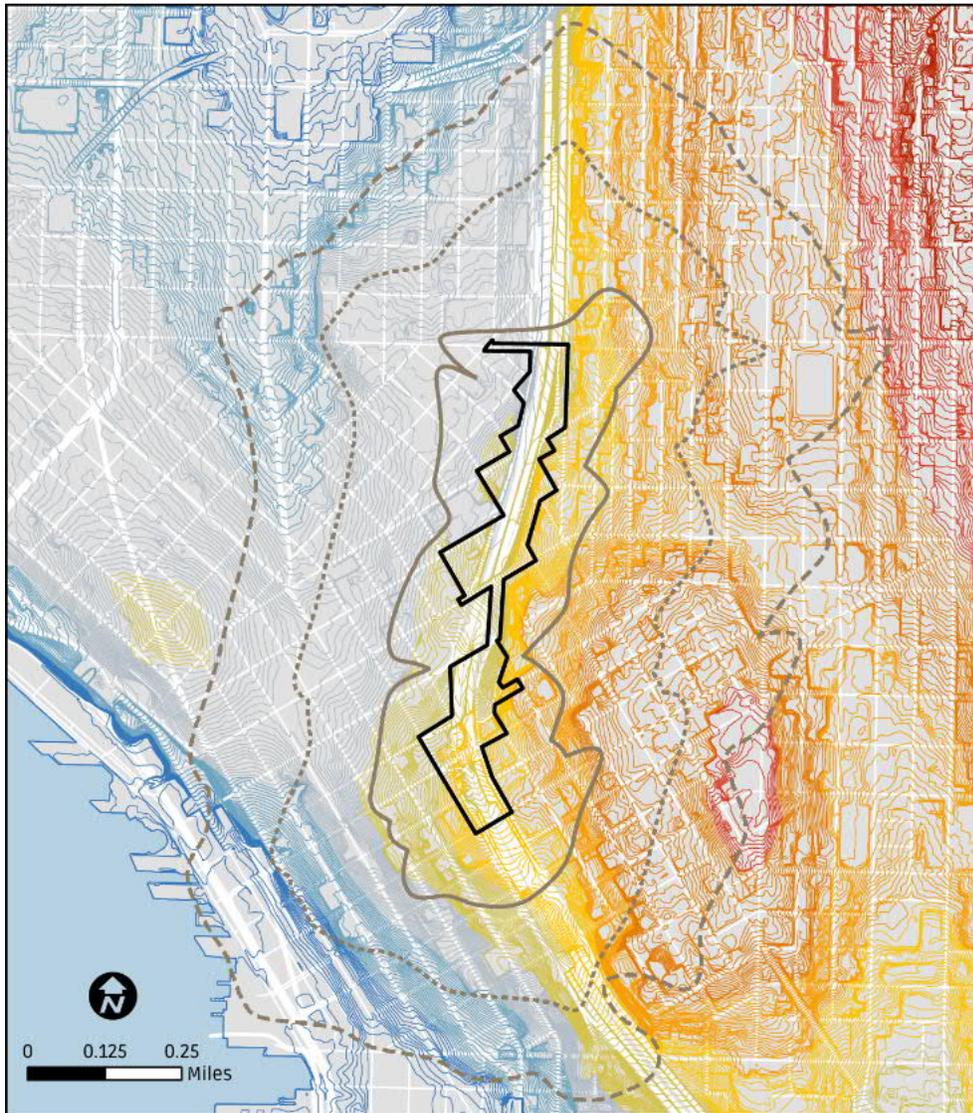


These four neighborhoods' unique urban characters were examined in order to inform the urban design considerations for the study site's test case development.

3.4.2 Topography

The location of the study area across a hillside creates a significant design challenge. The study site experiences grade variations in each direction (Figure 3-21).

Figure 3-21. Topography through the Study Site



Legend

- Structural Assessment Boundary (Study Site)
- 5-minute Walkshed
- 10-minute Walkshed
- 15-minute Walkshed

Elevation

- | | | |
|------------|------------|------------|
| 0 - 50' | 150 - 200' | 300 - 350' |
| 50 - 100' | 200 - 250' | 350 - 400' |
| 100 - 150' | 250 - 300' | > 400' |

Not a single section of the study site is flat, and generally slopes down to the west and fluctuates north and south on I-5. This condition creates unique challenges and greater complexity and impacts in terms of connectivity and access, as well as in terms of edge conditions for the pedestrian environment.

3.4.3 Downtown Seattle's Historical Context and Physical Form

Managing the steep topography has always been an issue in Seattle. The glaciers that once covered Puget Sound left a series of hills that have challenged the ability to move west to east. Earlier in the city's history, these topographic challenges were addressed by taking down hills such as Denny Hill (partly in study area), making Belltown one of the flatter areas of Greater Downtown.

Pike and Pine Streets were regraded from 1st Avenue to 5th Avenue in the early 1900s, (Peterson & Davenport, 1950) and are two of the least-steep grades connecting the Downtown Retail Core and Capitol Hill, which made them attractive routes for the streetcar. The retail uses along Pike and Pine Streets are a legacy of the streetcar that ran from 1st Avenue to 15th Avenue and Madison Street.

3.4.4 Downtown Seattle's Street Grid

The three played grids of Seattle's downtown streets originated in a difference of opinion among the city's founders on whether the grid should follow cardinal directions, or the angle of the waterfront. Streets are aligned north-south south of Yesler Way. The grid shifts to align with the harbor, at 32 degrees west of north, from Yesler Way to Stewart Street. North of Stewart Street, the grid shifts again; Belltown streets run at 49 degrees west of north. Denny Way, the north end of the study site, returns to the east-west direction.

The grid shift leads to some confusing areas, especially in the Denny Triangle area, with a "wedge" between Olive Way and Stewart Street. Even so, the grid before constructing I-5 was relatively connected as it moved away from the waterfront, as shown in Figure 3-22 from the 1923 zoning map for downtown. The introduction of I-5, shown in the current figure ground map, overlaid a powerful discontinuity on to the already-complicated grid, cutting off streets such as Yale Avenue, Minor Avenue, and Terry Avenue.

Figure 3-22. Historical Zoning Map of Downtown Seattle (1923)



Source: (Seattle Municipal Archives, 1923)
1923 historical zoning map of downtown Seattle with an intact street network

Figure 3-23. Historical Street Grid in Downtown Seattle after I-5 was Constructed



Source: Seattle Municipal Archives (Dorpat & Sherrard, 2014).
A ground map of downtown Seattle after I-5 was constructed shows a gap in the built environment along the highway.

In addition to the streets, the built fabric of the city was intact between downtown and the adjacent neighborhoods. The route of the freeway avoided properties in downtown and the historic homes and institutions on the crest of the hills. By the time the freeway was being planned in the 1950s, much of the land along the route of the freeway was used for surface parking. This is visible in the photo below, with the Rainier Club and First United Methodist Church visible as landmarks for orientation (Figure 3-24).

A significant benefit of the lid would be reconnecting the grid of streets disrupted by I-5

Figure 3-24. Historical Photo of Downtown Seattle in 1961 before I-5 was Constructed



Source: Seattle (Dorpat & Sherrard, 2014) Now and Then

3.4.5 Interstate 5 in the Study Area

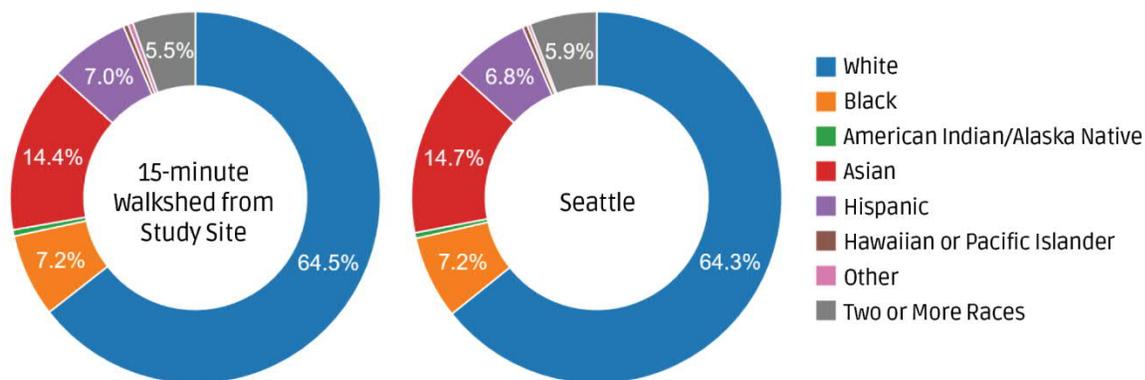
I-5 is a complicated piece of major infrastructure that includes through-travel lanes, high-occupancy vehicle lanes, and on- and off-ramps. It runs below the adjacent topography in the area of the proposed lid, rising over grade in the stretch to the south over Cherry and James Streets, and Jackson and King Streets in the Chinatown-International District neighborhood. A technical description of I-5 in the study area is as follows:

North of the I-5/I-90 interchange and south of the downtown Seattle study area, I-5 travels on an elevated viaduct over the International District and splits into collector-distributor lanes that serve exits to downtown Seattle. The thirteen-lane freeway runs the full block between 6th and 7th Avenues between downtown to the west and the First Hill neighborhood to the east. It passes to the east of Seattle's tallest building, the Columbia Center, before a set of reversible express lanes appear in the median near Madison Street. I-5 then passes under two lid structures built atop sections of the highway: Freeway Park, a landscaped city park between Seneca and Union Streets; and the Washington State Convention Center between Union and Pike Streets. At the north end of the downtown Seattle study area, I-5 continues north out of downtown Seattle, passing 20 to 30 feet under a retaining wall along Melrose Avenue at the edge of the Capitol Hill neighborhood. To the west are the South Lake Union and Cascade neighborhoods, accessed via ramps to Stewart Street and Mercer Street. (Washington State Department of Transportation (WSDOT), 2019)

3.4.6 Demographics of the Study Area

As of 2017 nearly 40,000 people lived within a 15-minute walkshed of the study site. Within the 15-minute walkshed, the population was primarily young, single adults with 25- to 34-year-olds comprising the largest age group in the study area (37.4 percent). The study area had fewer children with 3 percent compared to 16 percent for Seattle overall. People within the 15-minute walkshed report race and ethnic identities similar to those reported citywide, with approximately 36 percent in both areas being people of color (ACS, 2018). As described in Section 3.2, City of Seattle Context, current demographics tell only a part of area’s story. The exclusion of Native people from Seattle, redlining, racial restrictive covenants and exclusionary lending drew physical and economic boundaries to keep people of color out of certain neighborhoods with lasting impacts today (UW, 2004) (Figure 3-5).

Figure 3-25. Race and Ethnicity

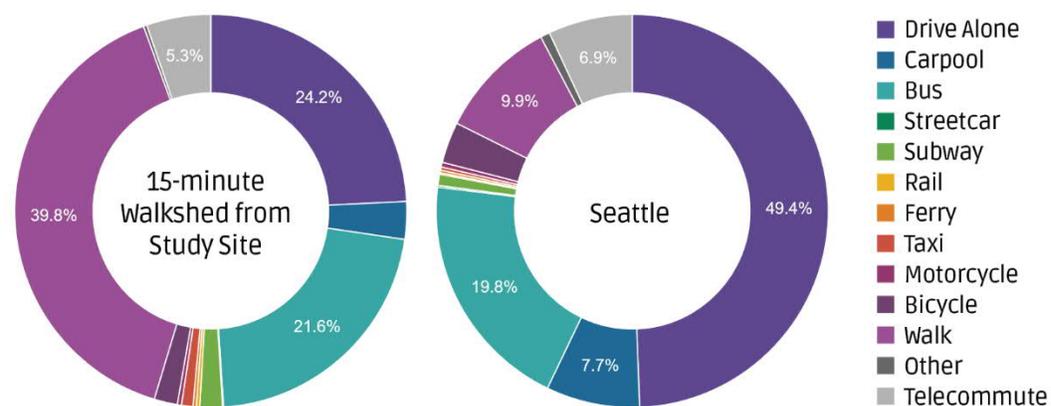


Source: Data sourced from American Community Survey 2017 5-Year Estimates (ACS, 2018)

Commuting Trends

- Walking was the main form of commute for nearly 40 percent of people within the 15-minute walkshed, compared to just under 10 percent citywide (ACS, 2018).
- Commute times were less than 20 minutes for 44 percent of people within the 15-minute walkshed, compared to 31 percent citywide (ACS, 2018).

Figure 3-26. Commute Mode of Eligible Labor Force

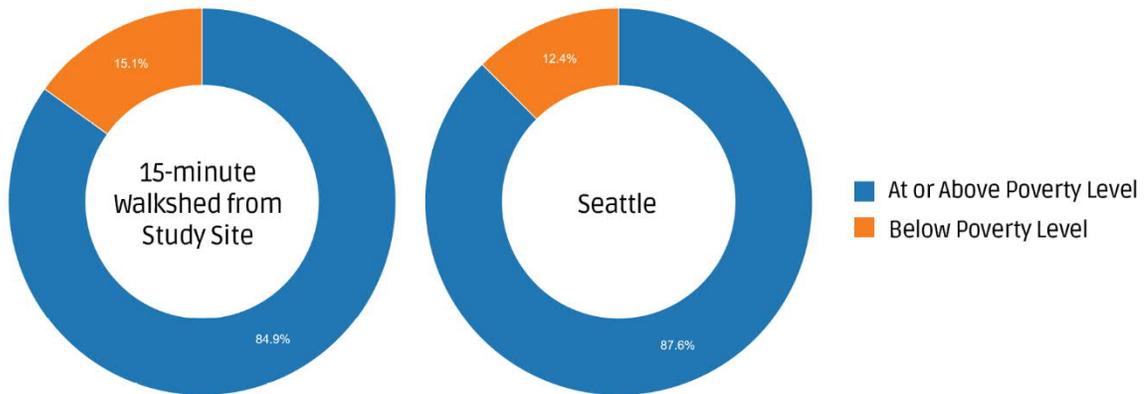


Source: Data sourced from American Community Survey 2017 5-Year Estimates (ACS, 2018)

Income Level

- The median household income in 2017 within the 15-minute walkshed was \$63,612 compared to \$85,063 citywide (ACS, 2018).
- Over 15 percent of people within the 15-minute walkshed were living below the poverty level, which was higher than the citywide 12 percent (Figure 3-27) (ACS, 2018).

Figure 3-27. Individual Poverty Status



Source: Data sourced from American Community Survey 2017 5-Year Estimates (ACS, 2018)

These demographic and economic trends in the downtown neighborhoods are resulting in new demand for the services and conveniences that typically exist in dense residential neighborhoods. The community's need for schools is increasing, as is a desire for parks, public space, and retail amenities.

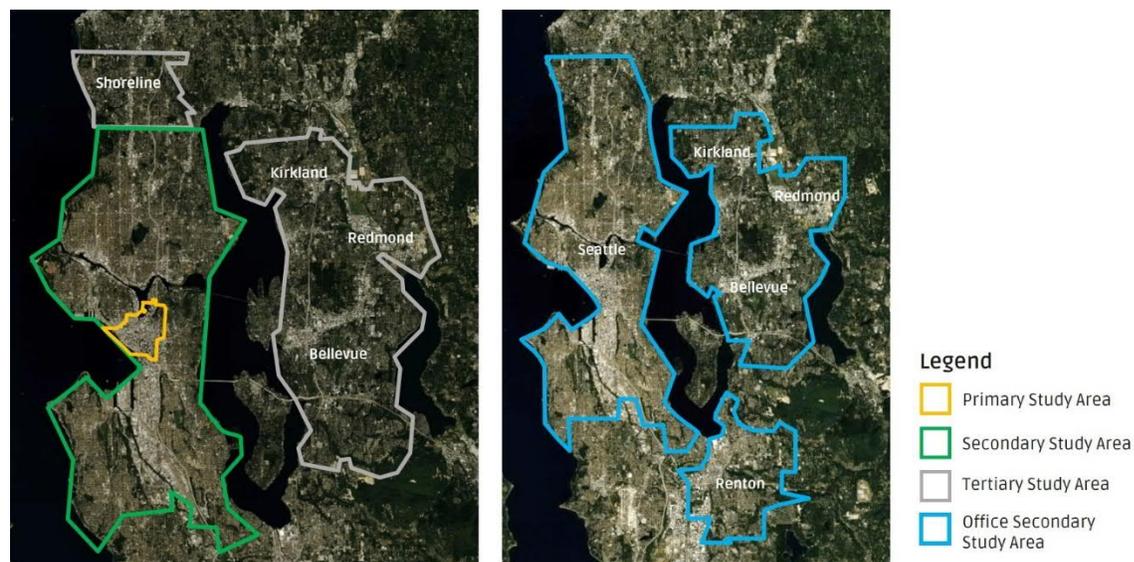
3.4.7 Real Estate Market Scan

As part of the I-5 LFS, a market scan was conducted to assess real estate supply and demand conditions, to forecast likely future demand in the study area, and to estimate the lid study site's potential to capture demand for new commercial and residential uses⁸. Market areas analyzed for residential, office, retail, and hospitality supply conditions included the downtown Seattle submarket, the City of Seattle, and neighboring cities of Shoreline, Kirkland, Redmond, Bellevue, and Renton (Figure 3-28).

The real estate market analysis was conducted in 2019 prior to the COVID-19 pandemic in 2020. At the time of the analysis, there was insufficient information to forecast the resulting direct and indirect impacts of the pandemic and likely recessionary period. For the purpose of this study, it is assumed that when lid construction begins in 2030, the Seattle economy will have gone through multiple economic cycles with varying degrees of economic expansion and contraction. The analysis of 2019 conditions provided a baseline grounded in a period of sustained economic growth but also considered the impact of previous economic cycles to inform future socioeconomic conditions, property value trends, and financing terms (i.e., interest rates, depreciation, etc.).

⁸ HR&A Advisors performed the Real Estate Market Scan in 2019.

Figure 3-28. Representative Real Estate Market Scan Study Areas



Real estate market scan study areas for market-rate residential (left) and secondary study area for office (right).

3.4.7.1 Study Site-Specific Development Strengths

The study site is adjacent to key retail, employment, and hospitality centers and is at the nexus of distinct neighborhoods: Downtown Retail Core, South Lake Union, Capitol Hill, and First Hill. This area will be affected by several ongoing, transformative projects, such as the WSCC addition, Yesler Terrace redevelopment, and Seattle Waterfront revitalization.

Findings from the real estate market scan suggest that the new urban space created by the lid could support up to 1,200 market-rate residential units, 1.8 million square feet of office, 200,000 square feet of retail, and 600 hotel rooms (Table 3-1).

Table 3-1. Real Estate Market Capture Ranges Estimated for the Study Site

Potential Development Program	Low-End Range of Market Capture	High-End Range of Market Capture
Residential (market-rate rental)	800 units	1,200 units
Office	1.2 million square feet	1.8 million square feet
Retail	130,000 square feet	200,000 square feet
Hospitality	400 hotel rooms	600 hotel rooms

Source: I-5 Lid Feasibility Study Real Estate Market Scan (HR&A Advisors)
 Estimates reflect market capture ranges for 2035. All numbers are not adjusted to account for the existing pipeline. Future pipeline and churn will also meet a share of demand. These estimates do not include affordable housing units.

3.4.8 Zoning and Land Use

In terms of both zoning and current land use, the I-5 corridor is an edge between neighborhoods and between the land uses found on the east versus the west side. The land use map shows the overall mix of land uses, but predominantly residential land uses on the east side and a dominance

of commercial uses to the west. The major presence of institutions is also visible in the zoning map of the First Hill neighborhood.

The Downtown Retail Core, on the west, has Seattle's highest zoning. High-rise buildings are allowed in the Downtown Office Core 1 (DOC-1) zone up to 450 feet, with no upper height limit with incentives. Functional and locational criteria for DOC-1 zoning states that "The density of office activity shall be greater in this area than any other part of downtown" (Seattle Municipal Code 23.34.102).

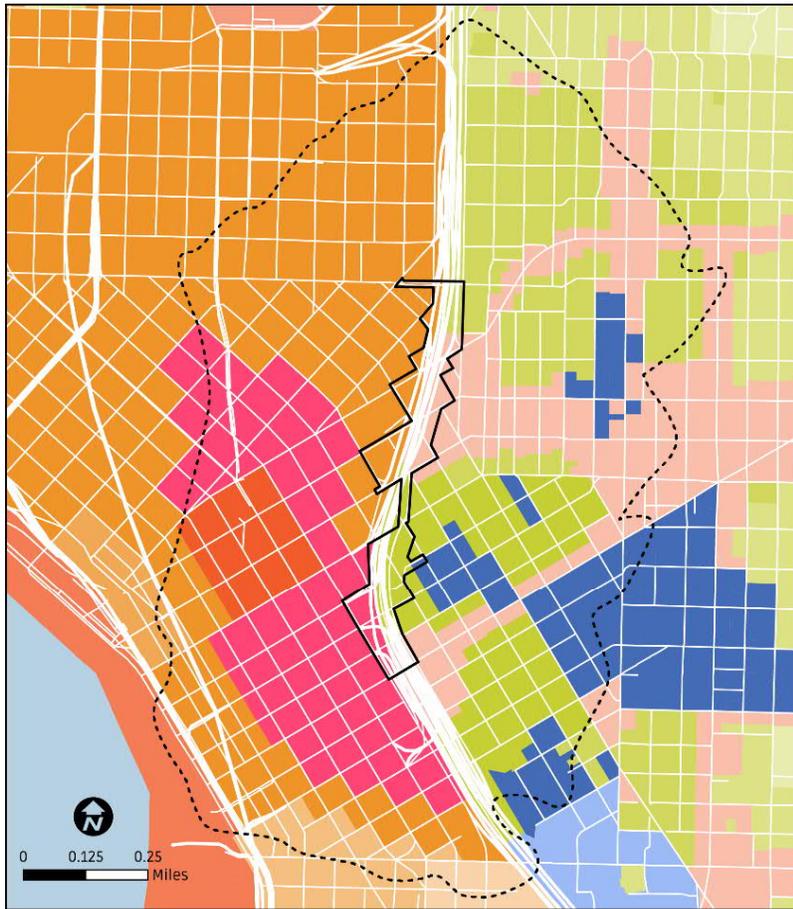
North of Union Street, the Downtown Mixed Commercial (DMC) zone allows high-rise buildings with a base height of 290 feet, and up to 440 feet with incentives. The DMC zone, per the zoning code, is characterized by lower-scale office, retail and commercial uses related to activity in the office core, retail core or other moderate-scale commercial cores in the Downtown Urban Center, and with use patterns that may include housing (Seattle Municipal Code 23.34.108.).

Existing land uses on the east side reflect this zoning with high-rises built since the 1970s. Older buildings are lower and add variety to the streetscape. Notable buildings include the Nakamura Courthouse (1940), Plymouth Congregational Church (1967), and the Women's University Club (1922). Several hotels are in the area east of the freeway, including Renaissance Seattle, Crown Plaza, and the Kimpton Hotel. The Central Branch of the Seattle Public Library (2004) is between 5th and 4th Avenues between Madison and Spring Streets.

Zoning on First Hill allows high-rise buildings with primarily High-Rise (HR) zoning. HR zoning is intended to provide a concentration of high-density housing in walkable neighborhoods near transit and employment. The height limit for HR zoning is 440 feet. Built in 2015, Cielo—a mixed-use high-rise building at 8th Avenue and Seneca Street—is an example of the kind of building allowed by the zoning and includes a connection to Freeway Park as an amenity.

First Hill has several institutions covered by the City of Seattle's Major Institutional Ordinance provisions. Virginia Mason Medical Center, Harborview Medical Center, Swedish Medical Center, and Seattle University are all subject to overlay zoning with unique rules and an adopted Major Institutional Master Plan created between the institution, the City of Seattle and the community.

Figure 3-29. Zoning and Land Use Designations in the study area



Legend

Structural Assessment Boundary (Study Area)	Downtown Office	Master Planned
15-Minute Walkshed	Downtown Retail Core	Downtown Mixed
High-Rise Residential	Downtown Harborfront	Pike Market Mixed
Mid-Rise Residential	Commercial	Pioneer Square Mixed
Low-Rise Residential	Neighborhood Commercial	International District Mixed
Residential	Major Institution Overlay	

Source: (City of Seattle, 2020)

Zoning and land use designations in and around the study site are split by I-5, with denser downtown, mixed and office zones west of I-5, and residential and major institutional zones east of I-5.

Recent zoning changes have been made in response to the affordable housing shortage. The City of Seattle’s Mandatory Housing Affordability (MHA) legislation requires that new development contribute to affordable housing either through including affordable housing in the development (performance option) or contributing to the Seattle Office of Housing fund to support the development of affordable housing off-site (payment option). MHA applies to 27 urban villages throughout Seattle, including the entire study site area (City of Seattle Office of Planning and Community Development (OPCD), 2017)).

Zoning and land uses differ on the east and west sides of the freeway. The character of new development can draw from the context of either side or favor open space as a means of connection.

3.4.9 Existing Uses

The study area includes a significant expanse of the Downtown Retail Core which is home to a wide range of commercial, office and retail uses, including flagship stores such as Nordstrom, and office headquarters such as Expeditors. The Seattle retail market has remained strong, despite the trends in online retail. Appropriate spaces are smaller, with a growing number of local businesses.

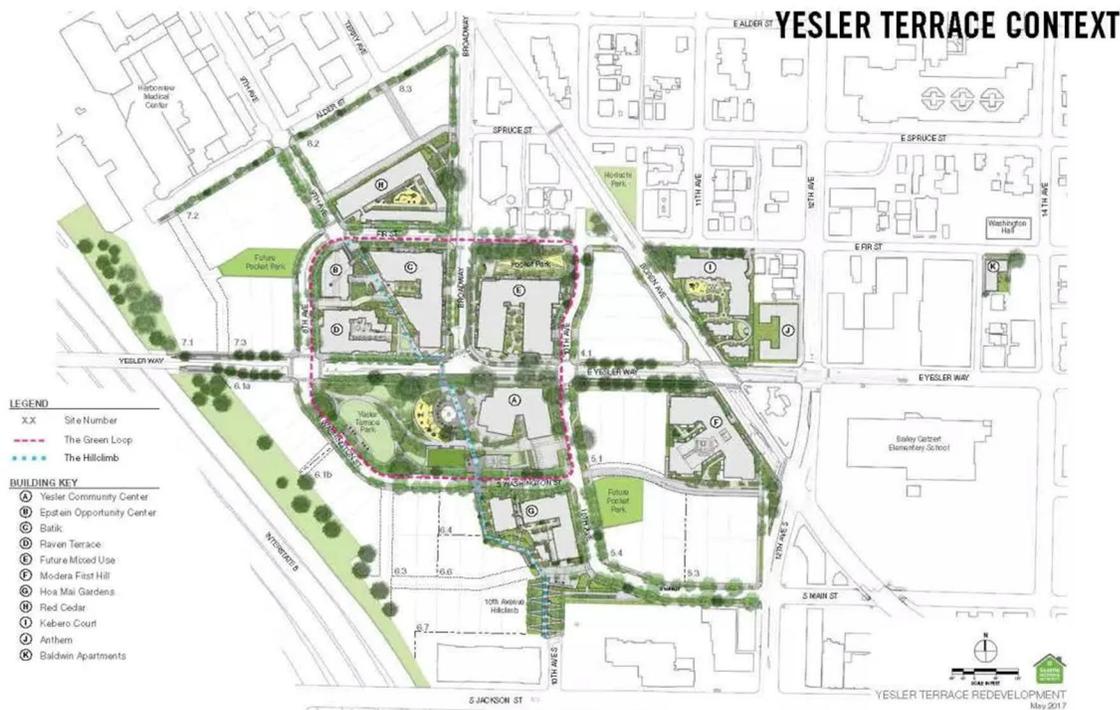
Housing in the study area is almost exclusively multi-family. Apartments have been on Capitol Hill for many years, so there is a mix of older units and units built recently. Residential demand is high, and buildable sites are becoming scarce.

Case Study: Yesler Terrace

Yesler Terrace is an interesting case study for a residential mixed-income approach to the lid, with housing for low-income residents provided by Seattle Housing Authority, and market-rate housing and offices by private developers. Yesler Terrace is centered on a community center and park, with recreational uses and art. Adjacent to I-5 at the south end of the study area, Yesler Terrace is connected to downtown by the steep grade of Yesler Way, and a monumental stair connects to Little Saigon. The Seattle Housing Authority and private developers have built a mid-rise wood frame over a concrete base; two high-rise towers on the west edge adjacent to WSDOT property are in the design stage.

The Yesler Terrace project is relevant to the I-5 lid in that it creates a new neighborhood centered on community assets and connections to the surrounding urban fabric. The new construction replaces the original 561 units one-for-one— a 30-acre affordable housing community built in 1940—and will add up to 1,100 additional affordable units. Cultural uses include a community center, the Epstein Opportunity Center and community rooms in the residential buildings. The buildings surround Yesler Terrace Park is approximately 1.7 acres (Seattle Housing Authority, n.d.)

Figure 3-30. Yesler Terrace Site Plan



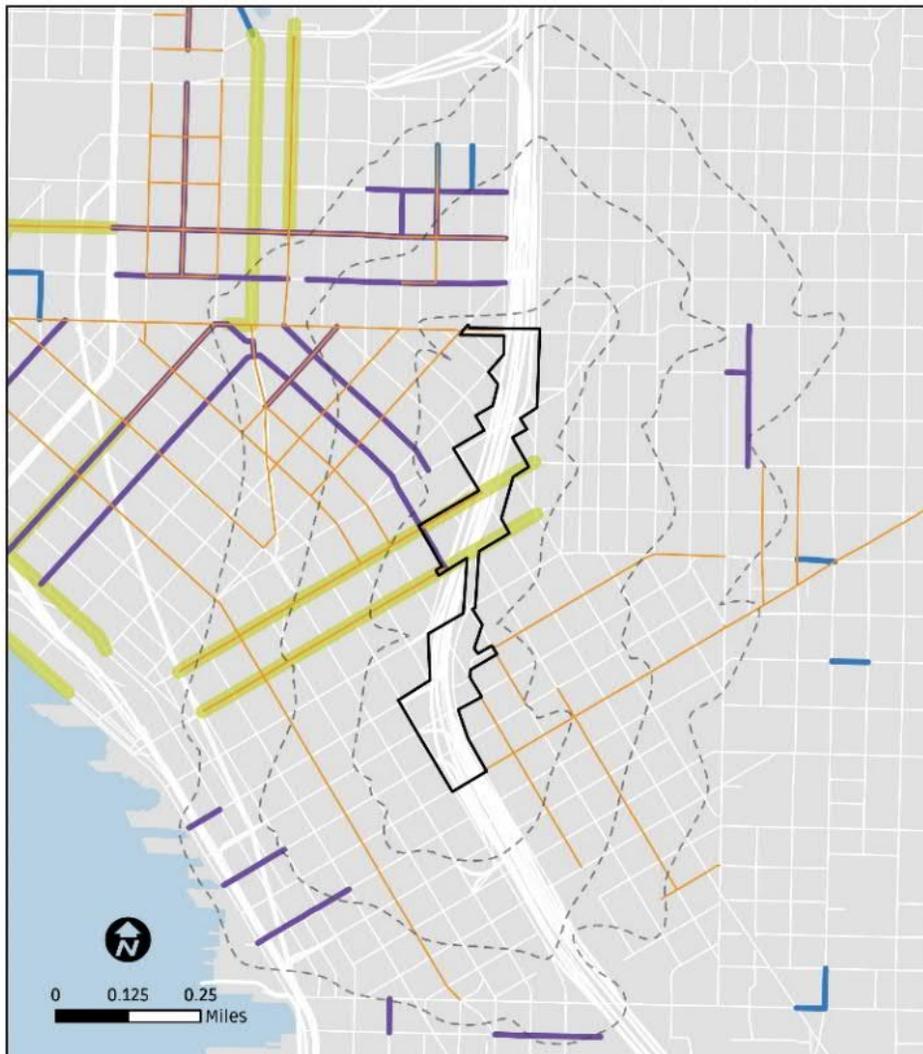
Source: (Seattle Design Commission, 2017)

The study area, despite its high density of residents and businesses, is markedly deficient in public open space. This deficiency will become more problematic as population growth outpaces the ability to create new open space. The analysis prepared by the University of Washington's Department of Urban Design and Planning, *Reconnecting the Emerald City*, revealed that within the study area, there are roughly 79 acres of open space, with 50 acres coming from parks and 19 coming from privately owned public spaces (UW, 2019). The larger parks in the study area include Lake Union Park (12 acres), Cal Anderson Park (11 acres), Freeway Park (5.2 acres) and Denny Park (4.6 acres).

Due to the cost of land in the downtown core and within the study area, meeting Seattle Parks and Recreation's (SPR) aspirational goal of 8 acres of open space per 1,000 residents is challenging. Though SPR continues to acquire lands throughout the system, it is assumed that the rate of new park land acquisition within the downtown area will not be prioritized because of high land costs. With limited existing park lands in the downtown area and the cost of acquiring property for park use, a potential I-5 lid could play an important role in increasing park space in downtown Seattle.

Parks and open spaces within the study area include both public parks managed by SPR as well as non-SPR facilities such as plazas, gardens and streetscapes. Freeway Park, central to the study area, provides approximately 5.2 acres of open space adjacent to the WSCC. Farther out in the study area are Denny Park in Denny Triangle, Cal Anderson Park on Capitol Hill, South Lake Union Park and the Elliott Bay waterfront. Additional open space in the neighborhood include pocket parks, p-patch community gardens, playgrounds, and off-leash dog areas.

Figure 3-31. Linear Public Space in and around the Study Area



Legend

	Structural Assessment Boundary		Street Design Concept Plan
	Green Stormwater Infrastructure in Right-of-Way		Urban Marked Trail
	Green Street		

Source: Outside Citywide, (OPCD, 2019)

Linear public spaces in and around the study area include urban marked trails, green streets, streets with conceptual design plans.

Outside Citywide also includes a category of open space that is linear, typically associated with right-of-way that has amenities or is planned to have amenities. Linear public spaces of note in the study area are the corridors with Street Concept Plans in the First Hill neighborhood: University Street, Terry Avenue, and 8th Avenue. Madison Street has a concept plan that will accommodate bus rapid transit. Pike and Pine Streets are being designed as part of the work being done to better connect downtown and the waterfront. The east edge of this project goes across I-5 to Melrose Avenue.

3.4.10 Institutions

A number of major institutions play an important role in the study area, concentrated primarily in the First Hill neighborhood. First Hill is home to Swedish Medical Center, Virginia Mason Medical Center, and Harborview Medical Center, a public hospital managed by the University of Washington. A variety of related medical uses are in the neighborhood, as well as businesses that serve employees, patients, and visitors.

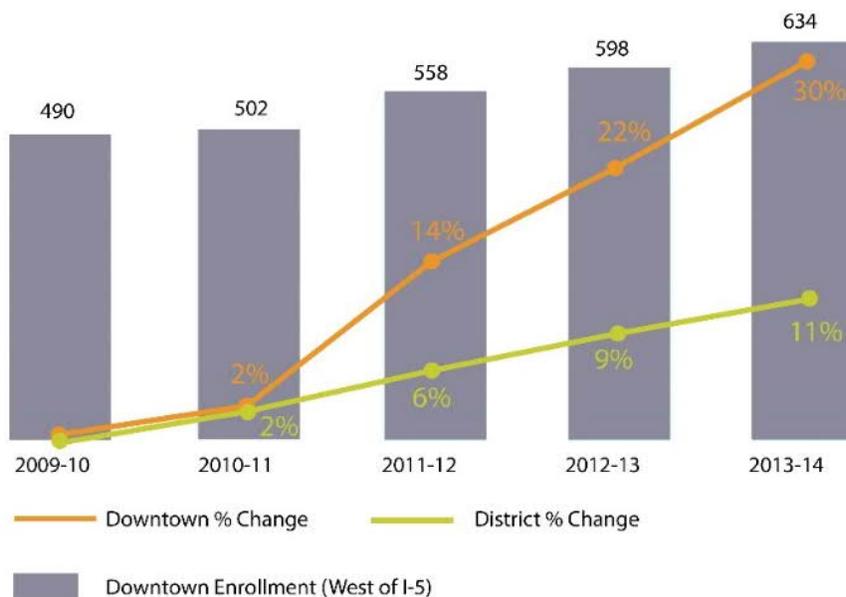
The staff and patients of these institutions benefit from the neighborhood's open spaces. The Pigott Memorial Corridor provides a direct link to Freeway Park at University Street and is well used by hospital staff as well as neighborhood residents.

3.4.11 Community Facilities

The study area includes a number of educational institutions. Seattle University and Seattle Central College are on the east side of the study area and are covered by Major Institution Master Plans. Cornish College of the Arts has facilities in its main campus in Denny Triangle and its Capitol Hill campus, with music, art, design, dance and theater. Private secondary schools in the study area include O'Dea High School, Seattle Academy, and the Northwest School.

Starting in the 2011-2012 school year, growth in grades K–12 school enrollment downtown has far surpassed growth in enrollment throughout the district. The study area has few public schools (Figure 3-12), and a growing population of school-age children. Lowell Elementary on Capitol Hill and Bailey Gatzert on Yesler Way serve the downtown neighborhoods. The Center School serves the study area, although outside the boundaries of the study area.

Figure 3-32. Change in Grades K-12 Enrollment



Source: (Trumm, 2016)

Between 2009 and 2014 downtown K-12 enrollment outpaced district enrollment changes across the entire city (30 percent compared to 11 percent)

The DSA conducted a focus group in 2012 on how to create a family friendly downtown and heard that a downtown school was a top priority. A public elementary school would be a significant improvement to the quality of life and a key factor in deciding to stay in the city. Two-thirds rated a downtown school as a top priority, and nearly all of the participants with children nearing school age were planning on moving out of downtown (City of Seattle, 2018).

The Seattle Public Schools district has been exploring options for building an elementary school downtown for several years and has considered options with a development partner. A recent program considered for co-development had a 30,000-square-foot footprint within a larger building. A challenge for the school district, particularly in denser neighborhoods, is to find land for open space and recreational fields for all grade levels. The district is willing to partner on green space with shared-use agreements. A lid over I-5 could provide space for a downtown school with adjacent shared open space.

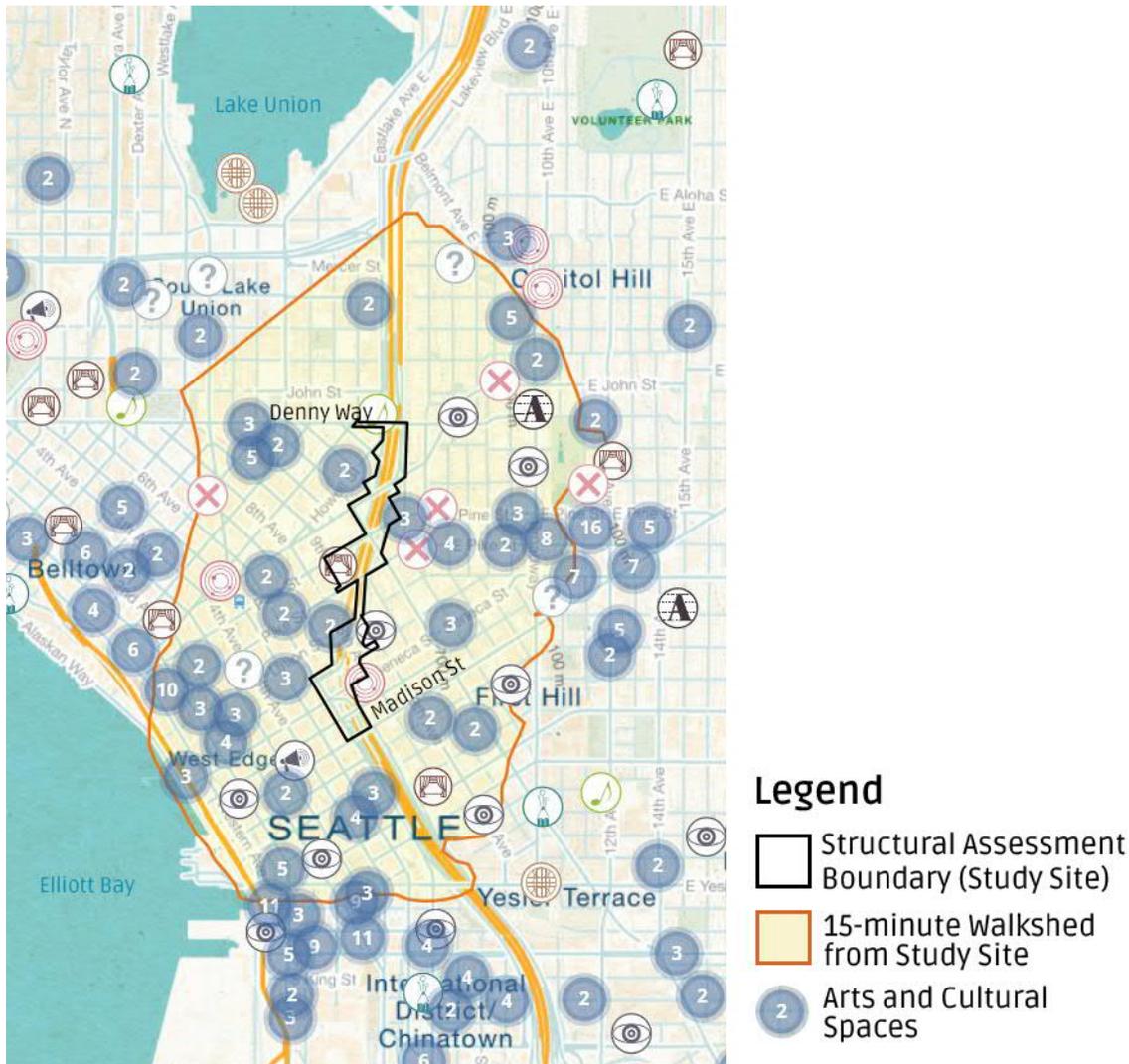
3.4.12 Arts and Cultural Context

The study area has many of the region's premier cultural venues and activities. The neighborhoods west of I-5 are typically larger, and have more established organizations, including the Seattle Art Museum and Benaroya Hall, the home of the Seattle Symphony. The downtown branch of the Seattle Public Library is the main branch of Seattle's library system, and is an architectural icon designed by Dutch architect Rem Koolhaas. Act Theatre, the Paramount Theater, the Showbox, and the Moore Theater are major performance venues in the Downtown Retail Core. The WSCC is connected to Freeway Park and will be expanding adjacent to the proposed lid. Restaurants, bars, and other attractions are located throughout the downtown.

In addition to arts and culture, the Downtown Retail Core is home to the centers of government, with Seattle's City Hall, Justice Center, and City of Seattle offices in Seattle Municipal Tower. Federal offices are in the Henry M. Jackson Federal Building on 2nd Avenue and the 300 5th Avenue Building.

People visit the study area from all over the city, the region, and the world to shop and enjoy cultural activities. The Pike Place Market is one of Washington's major tourist attractions and the new waterfront is expected to be an even larger draw for visitors and the new cruise ship facility will also bring people to downtown.

Figure 3-33. Arts and Cultural Spaces in Proximity to the Study Site



Representation of the 15-minute walkshed using the SpaceLab NW interactive map, an ongoing effort that catalogues cultural space in Seattle (SOAC, 2020). Numbers in the circles represent the number of arts and cultural spaces aggregated within the location marker.

East of I-5, First Hill’s cultural institutions include Town Hall, adjacent to Freeway Park, the Frye Museum, and St. James Cathedral. The Capitol Hill neighborhood is a designated Arts District and has a history of supporting independent artists. It has long been known to be the heart of the LGBTQIA+ community. Venues include SIFF Egyptian Theater, Broadway Performing Art Center, 12th Avenue Arts, Velocity Dance and the Century Ballroom.

3.4.13 Transportation and Multimodal Connections in the Study Area

While the construction of I-5 brought new regional mobility to the Northwest, it dramatically altered the local network of neighborhood streets and traffic patterns. Streets in the study area were disconnected: University and Union Streets; 7th and 9th Avenues; Terry, Minor and Yale Avenues. Others became heavily used routes to on-ramps, such as Madison Street on First Hill and Spring Street from the downtown. Where traffic exits the freeway, such as Seneca Street, streets and intersections take on a heavy burden of traffic. Other exit ramps, such as Olive Way, create complex intersection configurations, resulting in significant risk for pedestrians.

With the growth of housing on Capitol Hill and an influx of jobs and housing in Denny Triangle and South Lake Union, there is an increasingly strong travel desire line that cannot be negotiated by any mode. Minor and Yale Avenues do not connect across the freeway, and Denny Way reverts to an east-west geometry. North of Denny Way, no cross-freeway connections exist until eight blocks north at Lakeview Boulevard.

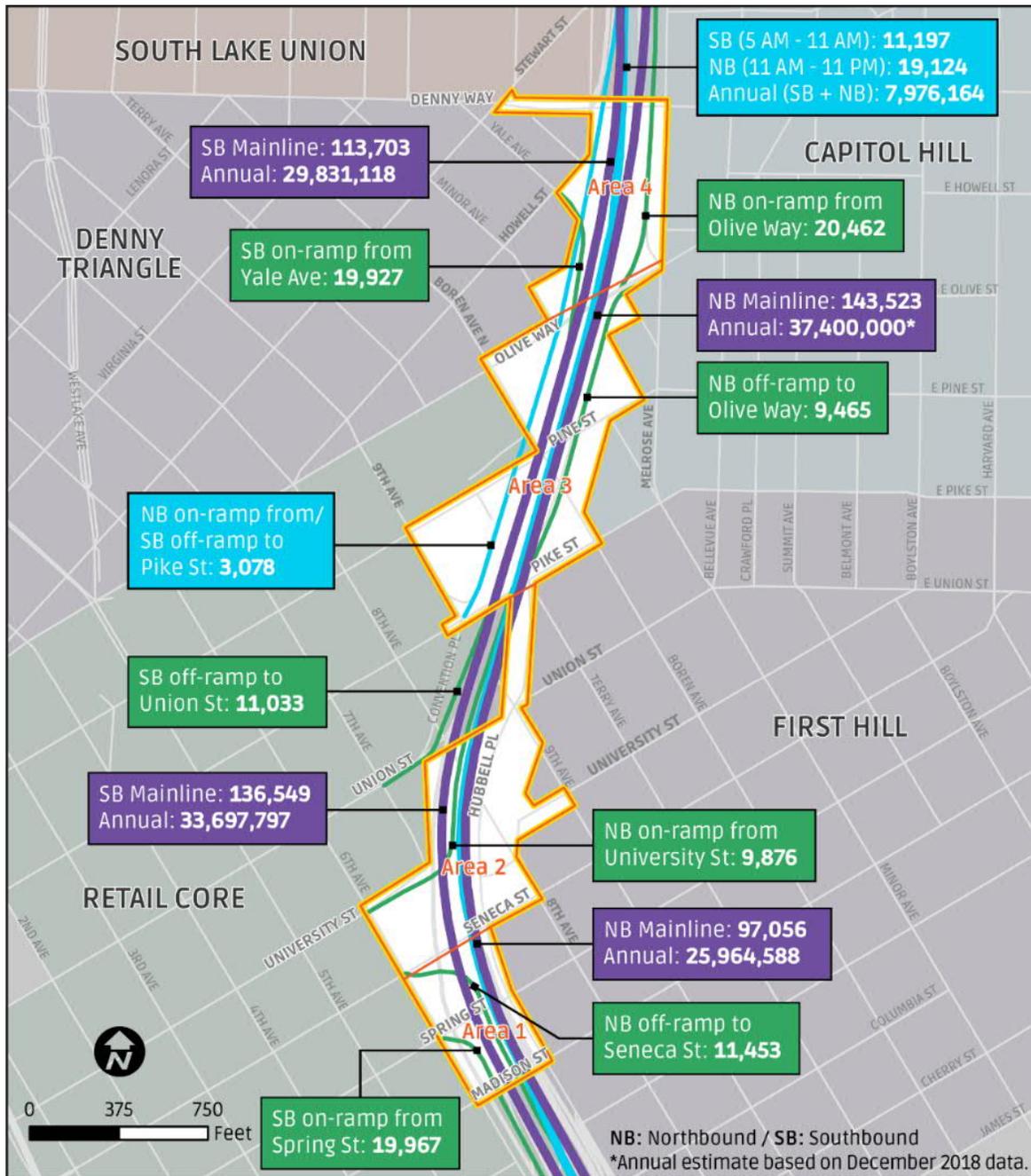
Traffic Operations

In terms of traffic operations on I-5, the study site is considered a “pinch point” of the 107-mile corridor. A series of ramps and mergers, together with high volumes, results in heavy congestion during peak periods.

The I-5 corridor carries 288,000 vehicles daily through its downtown segment, including mainline I-5 and express lanes in both directions (WSDOT, 2018) (Figure 3-34). Daily weekday traffic volumes in the central segment of I-5 through downtown are projected to increase 12 percent to 22 percent and are expected to be the most heavily used portions of I-5 in Seattle in 2035 (OPCD, 2019b).

The study site has eight on- and off-ramps that connect the I-5 corridor to and from the downtown street network. From south to north, these include the Spring Street on-ramp, Seneca Street off-ramp, University Street on-ramp, Union Street off-ramp, express-lane reversible on- and off- ramps at Pike Street, Olive Way on- and off-ramps, and Yale Avenue on-ramp.

Figure 3-34. Traffic Volumes on I-5 through the Study Site



Legend

- Structural Assessment Boundary (Study Site)
- Area of Analysis

Average Weekday Daily Traffic (AWDT) Volumes

- Mainline I-5
- I-5 Express Lane (Reversible)
- Ramp

Pedestrian and Bicycle Connections

Walking is Seattle's fastest-growing mode share (Ryan, 2019) and key to a healthy and sustainable city. However, outreach for the Pedestrian Master Plan found that nearly 60 percent of Seattle residents think that pedestrian safety is a problem (City of Seattle Department of Transportation (SDOT), 2017). Both the perception of safety and the quality of the walking environment are challenged by the presence of I-5 and its ingress and egress. In addition, the increased noise and air pollution in its vicinity degrade the pedestrian experience.

In the study area, protected bike lanes running east-west are planned for Pike, Pine, Seneca and Spring Streets. North-south bike facilities downtown run on 2nd and 4th Avenues. Broadway is a major north-south connection through Capitol Hill and First Hill. Bikers traveling north from downtown will be able to connect via Stewart Street and Eastlake Avenue. Just east of I-5, neighborhood greenways will take cyclists north via Melrose Avenue. Hubbell Place is part of the system east of I-5 with protected bike lanes. University Street, Seneca Street, and Melrose Avenue are designated as neighborhood greenway streets. These designations will be important in prioritizing bicycle routes related to a future lidding of I-5.

In previous considerations of a lid over I-5, there has been a desire to create a strong north-south route. In the long term, that route could be integrated into the lid and connected to the system of planned routes described in the City of Seattle's Bicycle Master Plan. There are challenges with the north-south route on the lid, including how the route would be integrated into Freeway Park, coming to grade at Pike Street or farther north, and how to negotiate the shifted grid. In this study, the travel desire line is acknowledged, and a widened pedestrian/bicycle route is included along the east edge of the WSCC leading to Pike Street. This study also recognizes that there are several possible solutions to the north-south connectivity that can be planned in future studies.

Transit

The study area has a strong network of King County Metro bus service, with frequent east-west service on Denny Way, and Pike, Pine, Madison, Seneca, and James Streets. Downtown has many bus lines running on 2nd, 3rd, 4th and 5th Avenues as well as light-rail stops and regional bus service. Light rail continues to Capitol Hill, and light-rail stations in the study area are a 0.3 to 0.2 mile walk from the site itself. The streetcar connects Capitol Hill, First Hill, Yesler Terrace, Chinatown-International District, and Pioneer Square.

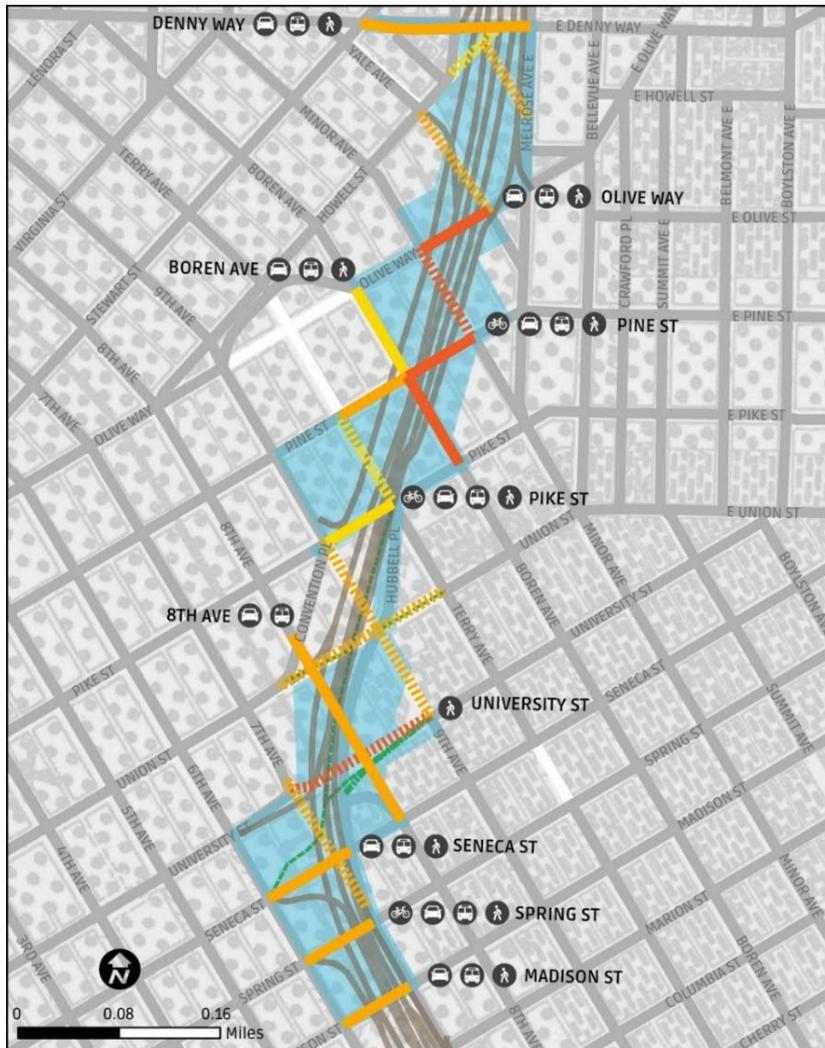
Street Grid

Nine vehicular bridges connect the surface street grid from east to west across I-5. Freeway Park and WSCC interrupt the street grid, so traffic volumes are higher on Madison Street and Boren Avenue with both over 23,000 average weekly daily traffic volumes (City of Seattle, 2018a). Denny Way, which is one of the only connections between Capitol Hill and Denny Triangle/South Lake Union, also has high volumes, with approximately 22,500 average weekly daily traffic volumes. Denny Way and Boren are the only designated Freight Major Access routes within the study site (SDOT, 2016). These overpasses are often congested during peak periods.

One of the key considerations in planning for a lid is the decision-making regarding on- and off-ramps. Working around existing on- and off-ramps would add complexity and cost, and would result in lid outcomes that are less than ideal. Removing ramps could increase the amount of land available for a lid and could reduce localized traffic congestion caused by motor vehicles

exiting and queuing to enter the freeway. Nonetheless, ramp closures would also reduce access to the neighborhoods to and from I-5. Closing off-ramps would also increase impacts to local traffic where ramps would remain. Although the frequency of highway interchanges in the study area is greater than what highway design standards recommend, eliminating even a single ramp would present significant challenges. Any future lid project would need to analyze and address the long-term needs and operations of I-5 and the adjacent downtown street network. That work was beyond the scope of this study, but the results of this analysis can help inform future work and problem solving.

Figure 3-35. Historical vs. Current Street Grids in the Study Site

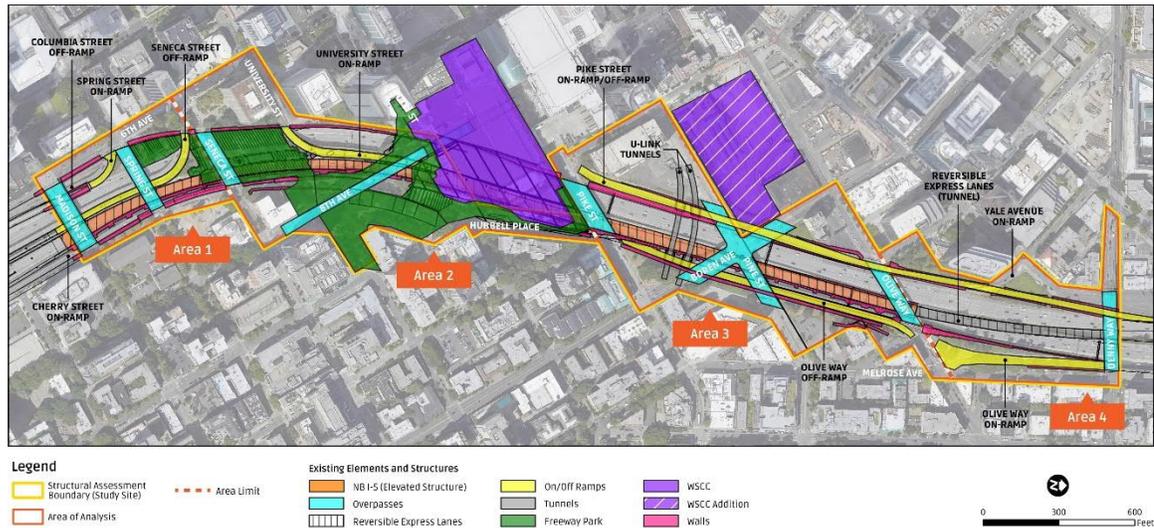


The street grid prior to the construction of I-5 was relatively connected as it moved away from the waterfront, as shown in the underlying image from the historical 1923 zoning map for downtown Seattle (Dorpat & Sherrard, 2014). The figure illustrates the missing street connections that pre-date the construction of I-5 in the 1960s.

3.4.14 Infrastructure and Utilities

I-5 though the study site features extensive walls that support city streets on each side of the right-of-way, elevated viaducts, overpasses, on- and off-ramps, and city streets and buildings (Figure 3-36). There are also many subsurface features (e.g., tunnels, utility mains, and laterals).

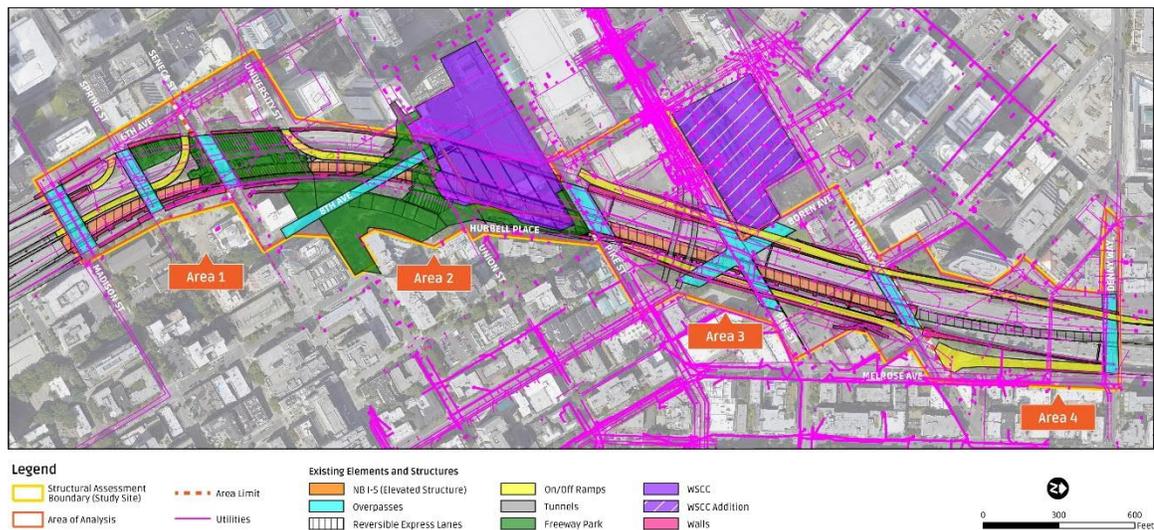
Figure 3-36. Noteworthy Existing Elements and Structures within the Study Site



There are 15 independent bridge structures and 33 different wall structures of cast-in-place (CIP) construction. The bridges are CIP box girders, slabs, or t-beams. The walls are either CIP cylinder walls or conventional CIP retaining walls.

Existing utility systems (Figure 3-37) (e.g., storm drain, sanitary sewer, water, gas, electrical, communications) are well developed and generally have adequate capacity to support current land uses and previously planned development.

Figure 3-37. Utilities within the Study Site



Some infrastructure—such as existing water, sewer, storm, power and communication systems—may not have adequate capacity to meet future demand for a new neighborhood on the study site. Most of these utilities are in city streets. Water lines do not cross I-5 in the area of the lid study site and generally stay on the city streets.

Water System

I-5 divides Seattle's water system, creating a break in the city's water-main network between the uphill neighborhoods along the east side of the highway—Capitol Hill, First Hill and Yesler Terrace—and the downhill neighborhoods to the west. I-5 separates the city water system into two different water pressure zones. The south pressure zone is to the west of I-5 (326 feet pressure head) and the Volunteer Park pressure zone is to the east of I-5 (530 feet pressure head). Most stormwater from the densely populated portions of Capitol Hill drains to the swale on Yale Avenue. One distribution main, installed in 1962 crosses I-5 within the study site along Olive Way. The only other water-main connection across I-5 in Greater Downtown runs under South Jackson Street, where I-5 is elevated over the surface street. Seattle Public Utilities restricts service connections on both water mains.

Approximately 30 percent of the runoff of the Capitol Hill basin would be treated or retained on the lid, reducing runoff and pollution to our waterways and reducing excess demand of our existing infrastructure/sewer system.

Sewer

The water system crosses I-5 just south of Denny Way. West of the study site, the stormwater enters a combined sewer area. Two sanitary sewer basins cross the project limits. A lid could act as green infrastructure with sustainable ways to support new development in addition to potentially reducing pressure on existing sewer systems (City of Seattle Development Services Office (DSO), n.d.).

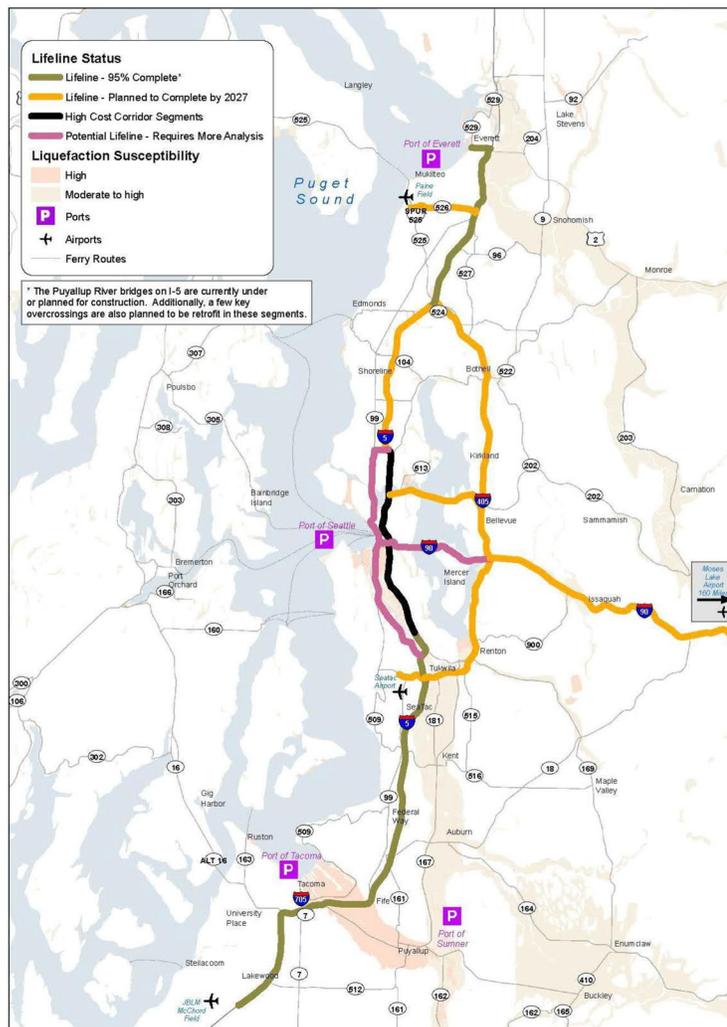
Sanitary service adjacent to the SAB area runs through partially separated mains along the east side of the highway and through largely combined mains on the west side of the highway. Areas to the east are divided into two sewer basins—one that covers northern sections of First Hill and one that includes parts of Capitol Hill. The First Hill sewer basin connects to a combined main that crosses I-5 near the 8th Avenue overpass to the King County Central Trunk, which carries the wastewater to the Westpoint Treatment Plant in Magnolia. The Capitol Hill sewer basin connects to separated sanitary and drainage mains that cross I-5 south of the Denny Way overpass, connecting to combined sewer west of I-5 that terminate the Elliott West Combined Sewage Outflow Control Facility and Denny Way Regulator Station (City of Seattle Development Services Office (DSO), n.d.). As of 2017 the amount of sewage and wastewater discharged by the facility into Elliott Bay exceeded permit performance standards set by the U.S. Environmental Protection Agency (King County Wastewater Treatment Division, 2018).

Sewage and other waste, often entirely untreated, pours into water bodies through outflows during storm events. Wastewater from the study area flows into Elliott Bay through combined sewage outflows, which act as a storm- and wastewater release valve to prevent treatment system overflow. A future I-5 lid could help divert regional wastewater from combined sewage outflows with reclamation systems. Sewage produced onsite or in the surrounding neighborhood can also be harnessed to produce heat and electricity.

3.4.15 Seismic Vulnerability

Earthquakes are an unavoidable natural hazard facing Seattle and the Pacific Northwest. I-5 is considered a lifeline route, according to the State Facilities Action Plan (PSRC, 2018), which confers it as a priority in terms of retrofit relative to other infrastructure not on lifeline routes. However, as noted in the State Facilities Action Plan (Figure 3-38), the stretch of the I-5 corridor through Seattle is considered a “High Cost Corridor Segment,” with alternate routes identified as lifelines into and out of the city. As such, the 15 independent bridge structures and 33 wall structures within the study site extents may be vulnerable in a major seismic event. These structures, which will have exceeded their 75-year design life as defined by American Association of State Highway Transportation Officials by the time the lid structure could be built, would need to be assessed in future studies. Similarly, the seismic performance of a lid structure supporting a wide range of loads (e.g., open space to buildings) in a high seismic region would need to be further assessed in future phases of analysis. In any scenario, damage to I-5 structures through the study site could impair emergency services and economic activity for months, if not years.

Figure 3-38. Regional Bridge Seismic Lifeline Routes, 2017



Source: (PSRC, 2018)

3.4.16 Environmental Quality

I-5 creates significant noise, air pollution, and visual impacts to thousands of people who live and work nearby and walk across it every day. A lid could significantly reduce the environmental burden to surrounding communities and ecosystem.

Air Quality and Emissions

Populations living near heavily traveled corridors like I-5 have higher levels of exposure to traffic-related air pollution in the air they breathe. Pollutants directly emitted from cars, trucks and other motor vehicles are found in higher concentrations near major roads, particularly within 500–600 feet downwind from the vicinity of heavily traveled corridors (EPA, 2014). Many of the pollutants found near roadways have been associated with adverse health effects and increased cancer risk. According to ongoing studies by the Puget Sound Clean Air Agency, diesel is the largest contributor to potential cancer risk throughout the Puget Sound region. Diesel risk contributed over 70 percent of the potential cancer risk at Seattle air pollutant monitoring sites (PSCAA, UW, 2010). U.S. Environmental Protection Agency research suggests that some transportation design features can reduce traffic-related air pollutants directly downwind of a roadway; therefore, a lid could reduce direct exposure to criteria pollutants within the study area (EPA, 2014).

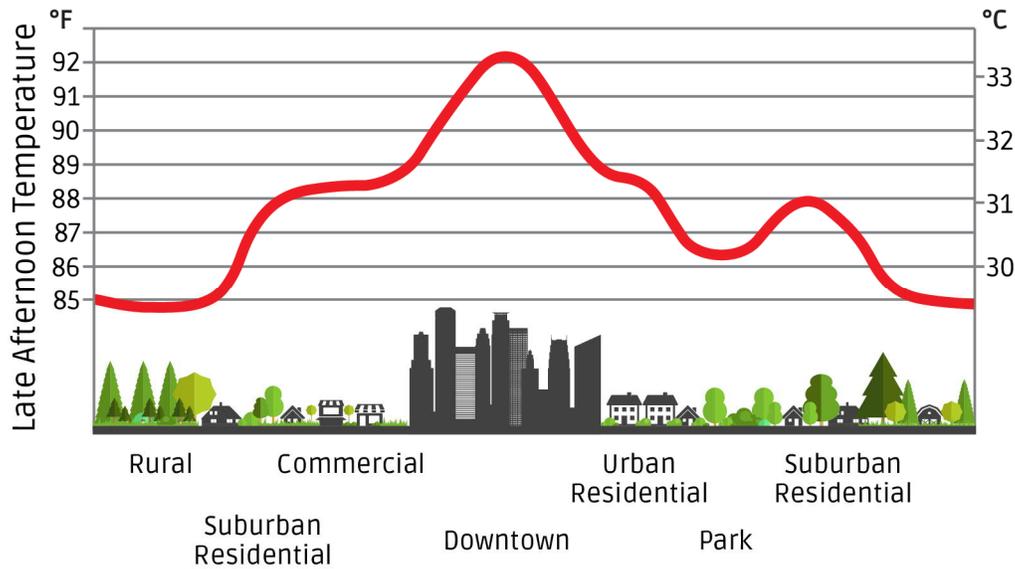
Noise

The study site is burdened with considerable freeway noise that negatively affects quality of life, enjoyment of outdoor spaces, and property values. Ambient noise over 66 decibels qualifies as an affected area, and a level where the State of Washington may offer mitigation with sound walls or berms (WSDOT, 2020c). An environmental impact statement for a project in the corridor showed that existing noise levels at 10 short-term monitoring sites ranged from 70 to 78 decibels, depending on the proximity to I-5 and side streets in the area (WSDOT, 2020e). A lid would act as a noise barrier in cases where it would interrupt the line of sight between a noise source (I-5) and a receiver (FHWA, 1974), and the noise reduction would depend on the material, size, and location.

Urban Heat Island Effect

A lid could enhance the microclimate in downtown Seattle, by modifying the cover over the 0.8 mile of road surfaces, pavements and buildings that elevate localized air temperatures by three to four degrees as compared to the air in neighboring, less developed regions or areas with increased vegetated cover (Figure 3-39). These temperature variations are associated with negative impacts on a community’s environment and quality of life. Urban heat islands can lead to increased emissions of air pollutants and greenhouse gases, compromised human health and comfort, as well as impaired water quality from heated stormwater runoff (EPA, 2019).

Figure 3-39. Urban Heat Island Effect Profile



Stormwater and Runoff

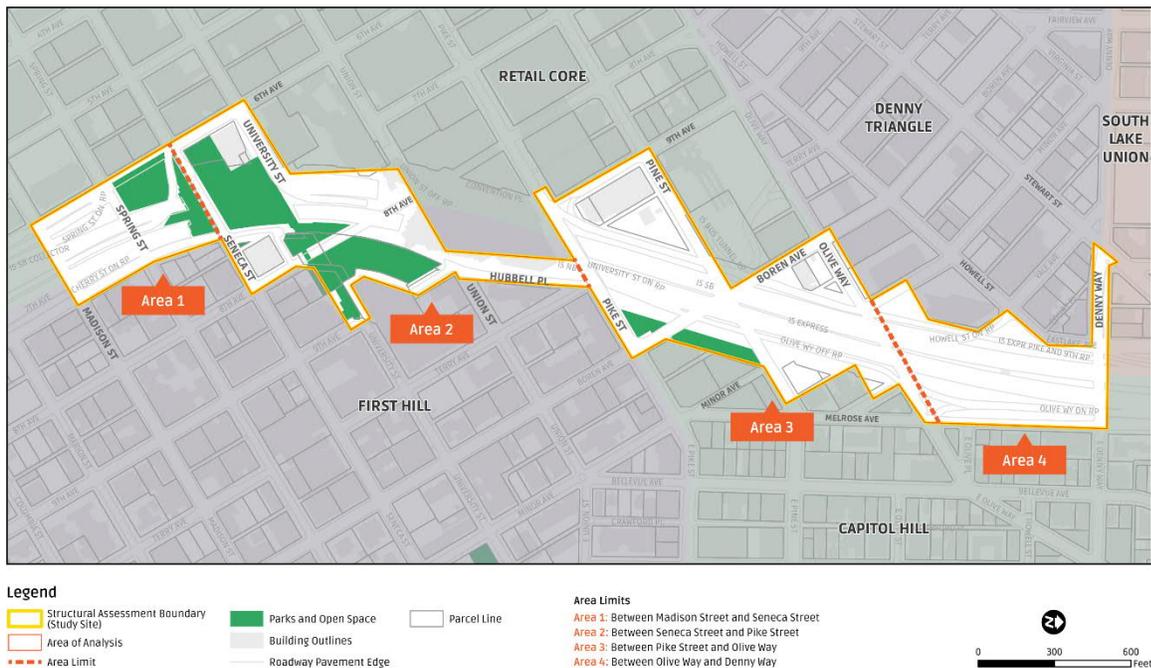
A potential lid over I-5 is an opportunity to manage stormwater from parts of the Capitol Hill basin and to reduce the strain on the swale on Yale Avenue, which captures most of the neighborhood’s stormwater. A lid could offer opportunities for green infrastructure and sustainable ways to support new development. Approximately 30 percent of the Capitol Hill basin runoff could be treated or retained on the lid, reducing runoff and pollution to the waterways and reducing excess demand of the existing infrastructure and sewer system. An I-5 lid project could also explore the opportunity to treat currently untreated runoff from I-5 itself.

3.5 The Study Site

3.5.1 Site Overview

The study site refers to the area within the SAB analyzed as part of the I-5 LFS to place a lid over I-5, from Madison Street on the south to Denny Way on the north. The study site has a wide variety of conditions from block to block from an urban standpoint and from a structural standpoint. The study has subdivided the overall study site into four areas (Figure 3-40). The following discussion looks at the fine-grained site conditions that are essential to understanding the specific conditions at a level that show important opportunities and constraints.

Figure 3-40. Study Site Analysis Areas

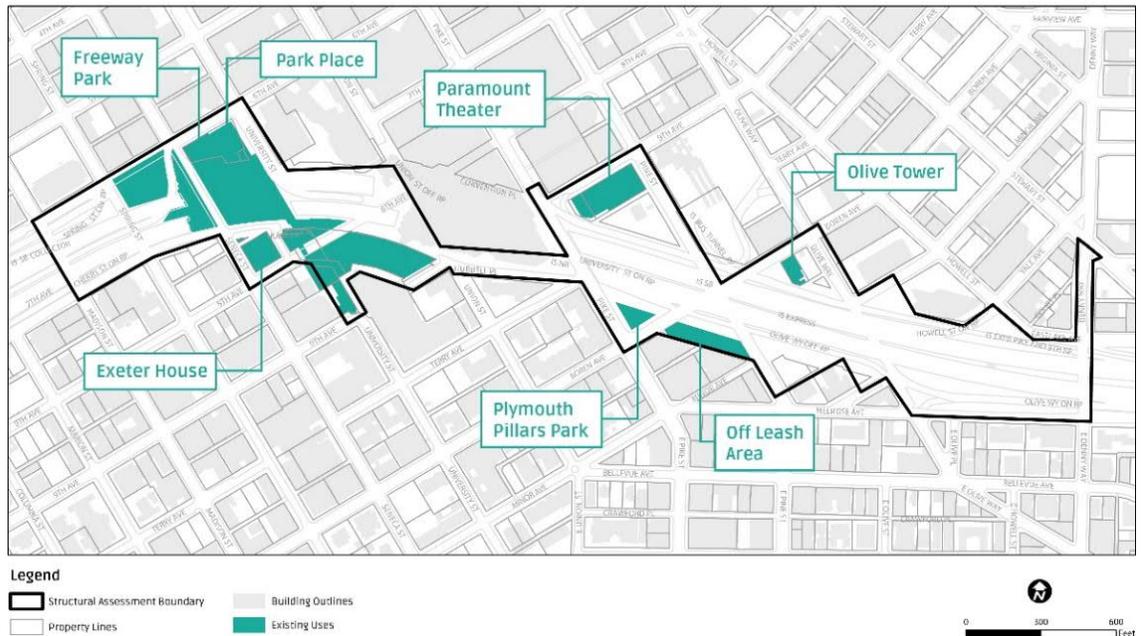


For the purpose of the engineering feasibility, the study site was considered the Structural Assessment Boundary, which was analyzed in four areas of lid development as shown in the present figure. Note: Private parcels, and existing buildings and lids were not considered to be affected or intervened for the purposes of the engineering feasibility analysis. Only edge integration with the existing lid of Freeway Park was assumed.

3.5.2 Existing Uses

Because I-5 comprises most of the site, the predominant use is for the movement of vehicles. However, adjacent properties within the area are being studied for a lid, and several uses above the highway, including Freeway Park and the WSCC. The following properties include buildings and park spaces within the study site boundaries.

Figure 3-41. Existing Uses on the Study Site



Existing uses include apartment and office buildings, cultural uses and parks on the edges of the Structural Assessment Boundary.

Park Place

The 21-story high-rise building, adjacent to Freeway Park, was built in 1972 and fully renovated in 2012 to become Seattle's first certified LEED-EB Platinum building. Park Place has 300,000 square feet of office space and boasts a Walkscore of 98 (Pacific Coast Architectural Database, n.d.).

Exeter House

Built in 1926 as an upscale hotel, Exeter House was senior housing until 2016. The 10-story building is now 144 market-rate apartments, with Section 8 housing vouchers accepted for qualifying households (Affordable Housing Online, n.d.).

Olive Tower

The 14-story Olive Tower, built in 1928, was one of Seattle's first apartment buildings. Bellwether Housing operates its 86 affordable apartments, which are restricted to a maximum of 50 percent of Average Media Income (AMI) (Sweger, 2017).

Paramount Theater

Built in 1928, the Paramount Theater remains one of the finest examples of Seattle's theater-building boom of the 1920s. The 2,800-seat theater has seen extraordinary performers from the vaudeville era to the present and is on the National Register of Historic Places. The nine stories over the theater were originally intended to include space for artists and musicians (Flom & Caldbick, 2012).

Plymouth Pillars Park

The primary features of this 0.6 acre park are its panoramic view of downtown and the columns moved from the historic Plymouth Congregational Church after it was damaged in Seattle's 1965 earthquake. The original church played a role in Seattle history as a leader in the suffragette movement, immigrants' rights, and as the location of the sole trip to Seattle by Martin Luther King Jr in 1961 (Atlas Obscura, n.d.).

The well-used 0.2 acre off-leash area across Boren Avenue has scenic views of downtown and is needed for the many dog-owning households in the vicinity.

Freeway Park

The idea of a lid for I-5 is as old as the highway itself. The construction of the downtown Seattle portion was completed in 1966, and the passage of "Forward Thrust" bonds two years later provided one of several sources of funds for Freeway Park. The park opened on July 4, 1976, as part of the City of Seattle's bicentennial celebrations.

Figure 3-42 shows the dramatic change that Freeway Park had on the urban context. In the earlier photo on the left, 8th Avenue was a lengthy bridge above I-5. Buildings were stranded in the tangle of surface streets and egress ramps and the expanse of concrete created an urban heat island. The lid transformed the disconnected condition by creating an impressive green space in the midst of the city (photo on right).

Figure 3-42. I-5 at Freeway Park - Before and After



Source: Seattle Municipal Archives, Google Earth, 2019

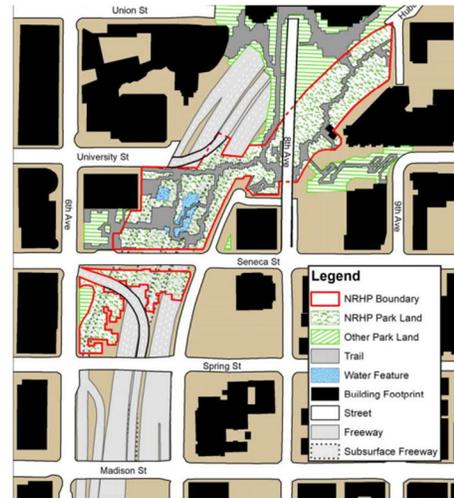
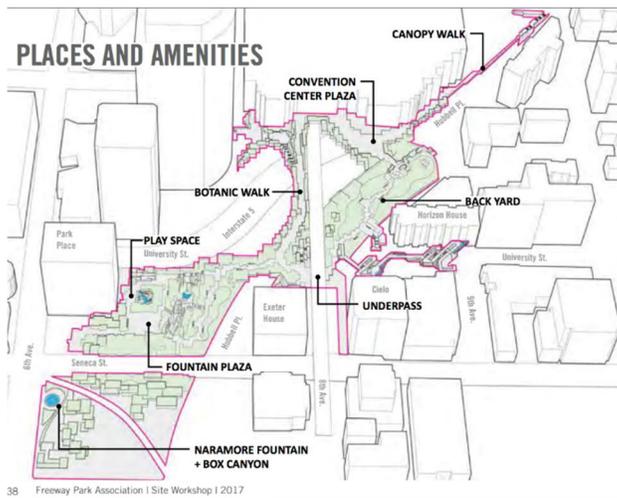
The Great Box Garden, at the south end of the park, is at grade along 6th Avenue, Seneca and Spring Streets. The signature board-formed concrete boxes are also visible to motorists on the highway below. The Naramore Fountain at 6th Avenue and Seneca Street, designed by renowned artist George Tsutakawa, was already in place for ten years before the construction of the park.

The Park Place building was developed some four years before the completion of Freeway Park, but was designed to be incorporated into the park. Park Place contributed to the park's construction and currently maintains an adjacent portion of the park.

Eighth Avenue runs above the park, with a wide pedestrian underpass near the connection of the Pigott Memorial Corridor. This corridor, completed in 1984, connects to First Hill with stairs, ramps and a water feature. The original park ends at 9th Avenue. The WSCC, opened in 1988, connects to and extends the original park. The WSCC portion is not protected by historic designation. The map from the Park National Register of Historic Places Nomination outlines in red the areas that are included in the historic nomination.

Figure 3-43. Freeway Park Map

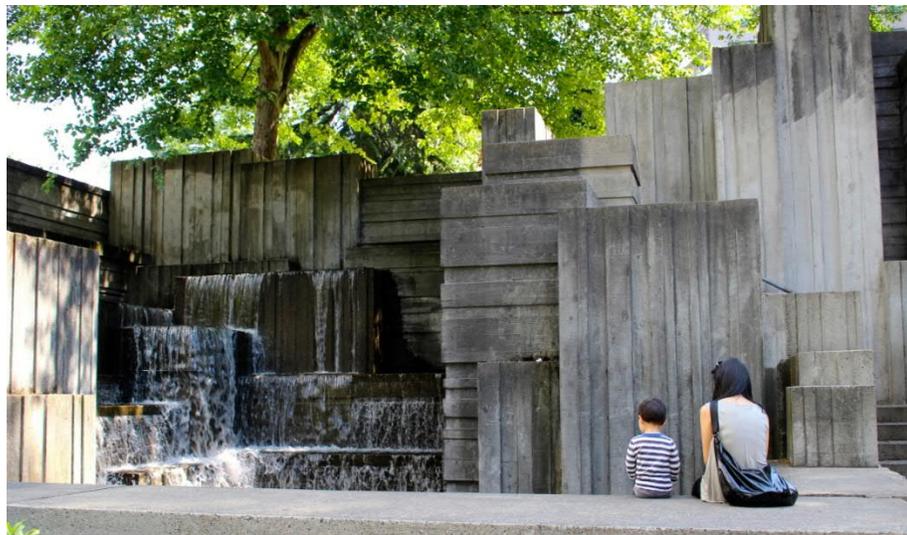
Figure 3-44. National Register of Historic Places Nomination Map



Source: (Freeway Park Association, Site Workshop, 2017)

(Freeway Park Association, 2019)

Figure 3-45. Freeway Park



Source: (Freeway Park Association, 2019)

As part of the Section 106 process initiated by the Federal Highway Administration in 2016 regarding the expansion of the WSCC, Freeway Park received \$10 million in funds for

improvements. The Freeway Park Association and the City of Seattle have conducted public outreach and created a general plan for restoring infrastructure and upgrading utilities, wayfinding, lighting, and furnishings.

An agreement signed in 2018 by the Federal Highway Administration, the Washington State Historic Preservation Officer, the WSCC public facilities district, the Stillaguamish Tribe, and the City of Seattle specified that the WSCC complete a nomination for Freeway Park for the National Register of Historic Places. Per the agreement, any project that could affect Freeway Park's character-defining features as described in the National Register of Historic Places nomination and receiving funding from WSCC, Washington State Capital Budget, or federal government assistance will need to follow the processes outlined in the Code of Federal Regulations (CFR), 36 CFR Part 800 – Protection of Historic Properties. Future improvement projects at Freeway Park will need to follow the Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties and Guidelines for the Treatment of Cultural Landscapes (The Cultural Landscape Foundation, 2018).

Washington State Convention Center Addition

The WSCC is building a major expansion of their existing facility, with edges along the boundaries of the study site along Pike Street and Boren Avenue. The original convention center connected to and expanded Freeway Park, and there is an interest in a new relationship between the expansion and a potential lid across I-5.

The street-level plan shows that Pike Street is activated with small retail spaces along the façade, and an entrance lobby at 9th Avenue and Pike Street. Boren is less active, with a parking entry at midblock. Attention has been given to the corners at Pike Street and at Olive Way (LMN Architects, 2018).

The presence of the expanded WSCC is expected to increase demand for hotels and other businesses in the vicinity. The WSCC has expressed interest in an outdoor amphitheater as part of a lid, should it be constructed.

Figure 3-46. Washington State Convention Center Site Plan and Rendering



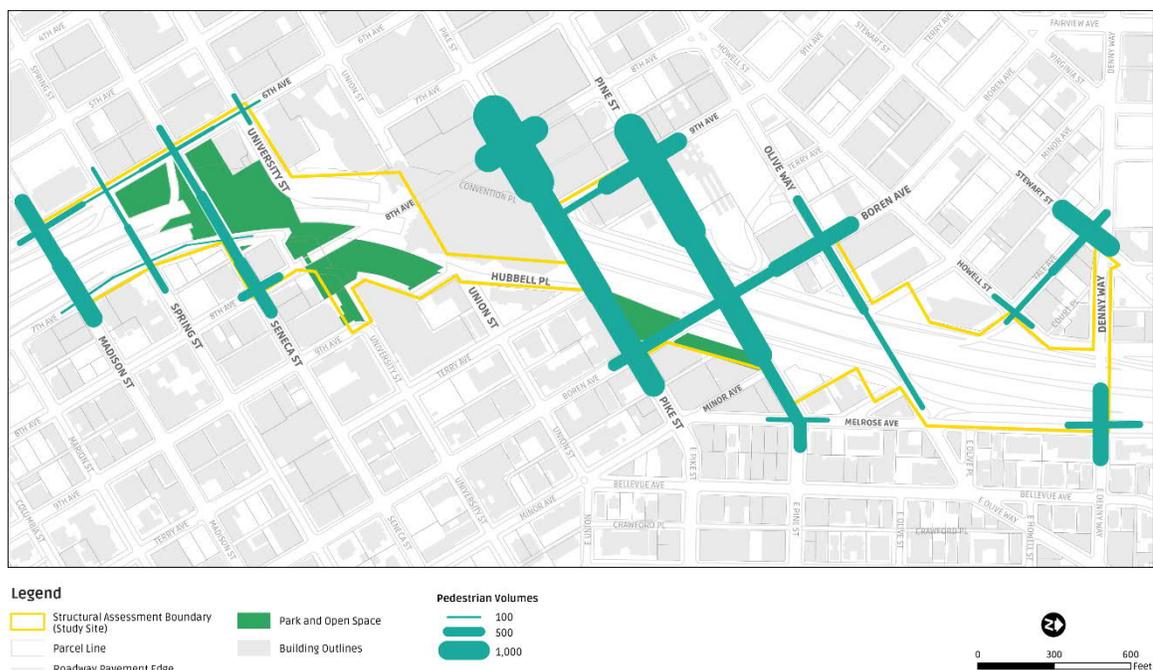
Source: (LMN Architects, 2018)

3.5.3 Transportation and Multimodal Connections

Pedestrian and Bicycle Connections

The vehicular bridges across I-5 also serve as pedestrian connections. There are some notable deficiencies, such as the lack of sidewalks on some portions of the north side of Denny Way and the west side of 7th Avenue. Generally, these conditions increase the risk, travel distances and time for pedestrians crossing east-west over I-5. Despite the discomfort of walking on the overpasses, pedestrian volume counts reveal considerable foot traffic on these bridges, with the highest volumes on Pike and Pine Streets (Figure 3-47). Pike and Pine Streets represent strong desire lines between the Downtown Retail Core and Pike-Pine/Capitol Hill and have the least topographic gain. Pedestrians use Olive Way, a 170-foot-long crossing, less frequently.

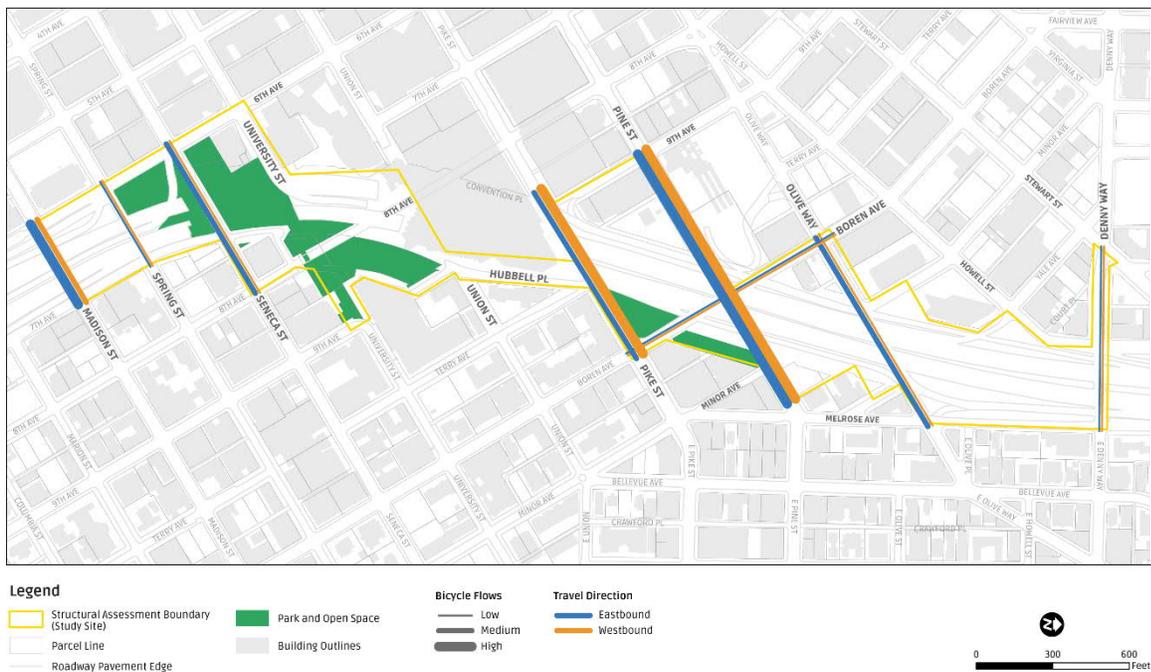
Figure 3-47. Pedestrian Volumes on I-5 Overpasses, 2018



Weekday PM peak period (4:00 to 6:00 p.m.) pedestrian volume assembled from 2015-2018 SDOT Intersection Turning Movement Counts and 2016-2018 SDOT NBPD Pedestrian and Bike Counts (City of Seattle, 2018f)(City of Seattle).

An analysis of origin-destination bicycle flows across I-5 overpasses reveals a similar travel pattern for bicycle traffic across the freeway (Figure 3-48). Pike and Pine Streets are the preferred bicycle routes across I-5, compared to other overpasses north of Pike Street. Madison Street again reveals a similar preference for cyclists as a route over I-5, south of Pike Street. Volume by direction of travel is likely influenced by roadway grade and elevation gain, given the study site’s topography.

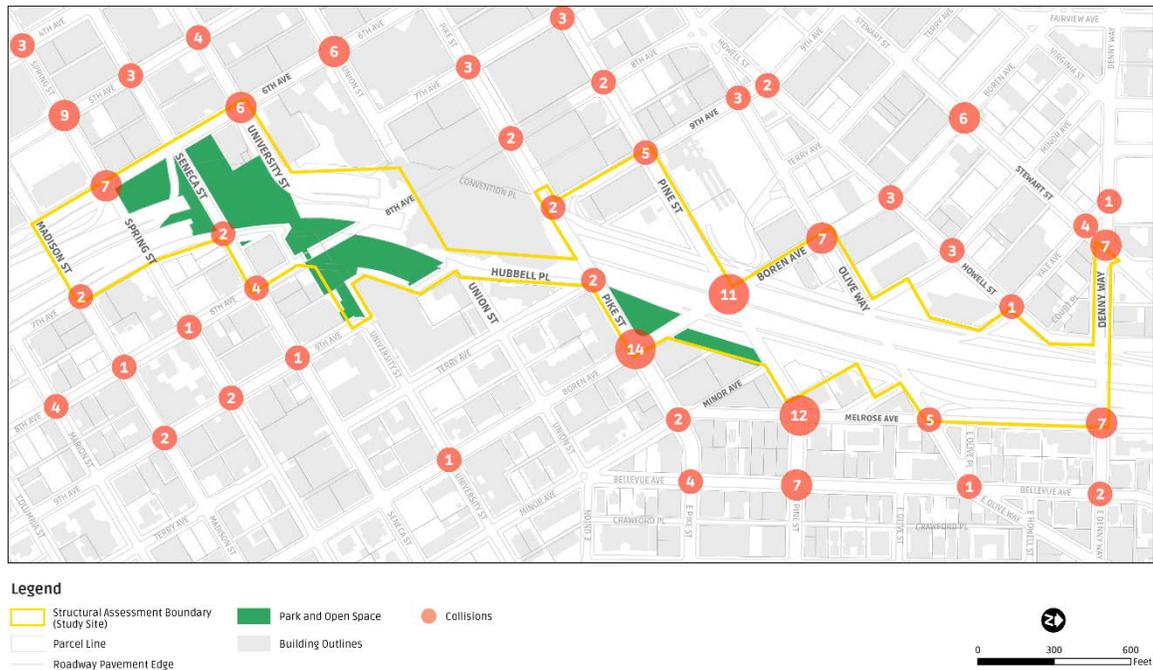
Figure 3-48. Bicycle Flows on I-5 Overpasses, 2018



Observed bicycle counts were not available for this study. To estimate the relative use of the overpasses by people biking, an analysis of origin-destination bicycle flows across I-5 for the 2-hour PM peak period (4:00 to 6:00 p.m.) was performed, using 2018 origin-destination data. Eastbound and westbound bicycle flows across the overpasses were backchecked and interpolated using historical bicycle counts available at three study site locations.

Multiple factors—including road design, site topography, lack of direct paths and adequate pedestrian and bicycle facilities—generate significant road safety issues near the study site (Figure 3-49). Notably, complex intersection configurations and the confluence of more than two roadways and/or freeway ramps result in significant risk for people walking and rolling. The intersection of Pike Street and Boren Avenue had the highest number of collisions in the immediate vicinity of study site, followed by 5th Avenue and Spring Street, 6th Avenue and Spring Street, Pine Street and Boren Avenue, and Melrose Avenue and Pine Street.

Figure 3-49. Pedestrian and Bicycle Collisions In and Near the Study Site



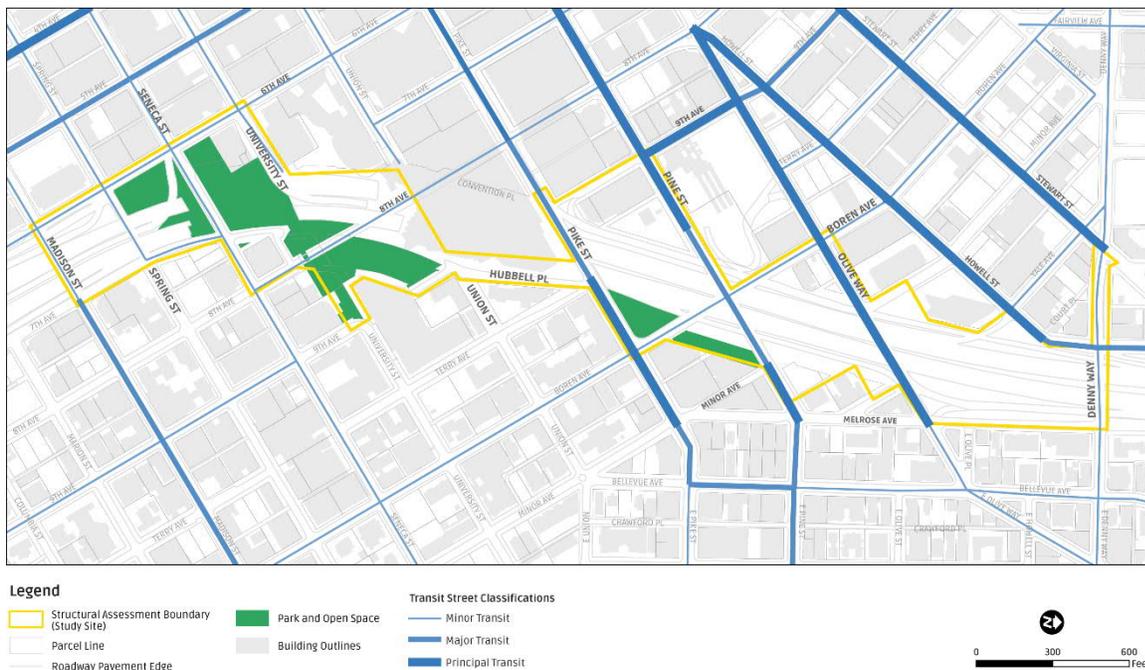
Source: 5-year pedestrian and bicycle collision data within two blocks of the study site, from January 2014 to January 2019. (City of Seattle, 2018c)

Although downtown neighborhoods have relatively high multimodal access and walkability, I-5 continues to present an east-west barrier for human-scale mobility through downtown.

Transit

The neighborhoods adjacent to the study site are transit rich and have great multimodal mobility options. Weekday daily peak transit loads (King County Metro, 2018) shows that Denny Way is the most heavily traveled transit street that touches the study site, followed by Pine Street. Smaller volumes run on Madison, Spring and Seneca Streets. No routes travel north-south along surface streets in or near the site, making travel between parts of First Hill and Capitol Hill and South Lake Union indirect and time-consuming. Figure 3-50 shows the City of Seattle’s transit street designations.

Figure 3-50. Transit Street Classifications



Source: (City of Seattle, 2018d)

Map of transit street classification in the vicinity of the study site with principal, major, and minor transit streets represented.

The planned expansion of the light-rail network, including three new stations at 5th Avenue and in the Denny Triangle/South Lake Union neighborhood, will significantly increase transit access to the study site and adjacent neighborhoods by 2035.

Street Network

Nine vehicular bridges connect the surface street grid from east to west across I-5. The street network carries a range of motor-vehicle traffic volumes, from over 25,000 average weekday daily traffic (AWDT) on Boren Avenue and over 23,000 on Madison Street to a few thousand cars per day on minor and collector arterials such as Hubbell Place and Spring Street (City of Seattle, 2018a).

The disconnect in the grid at Freeway Park concentrates traffic on Madison Street and Boren Avenue. Denny Way also has high volumes, with approximately 22,500 AWDT, because it is one of the few connections between Capitol Hill and Denny Triangle/South Lake Union (City of Seattle, 2018a).

Pike and Pine Streets—major routes for pedestrians, cyclists, and transit—have moderate motor-vehicle traffic volumes of approximately 12,000 and 9,000 AWDT, respectively (City of Seattle, 2018a).

Denny Way and Boren Avenue are the only designated Freight Major Access routes near the study site.

Figure 3-51. City of Seattle Street Classifications



Source: SDOT (SDOT, 2019b)

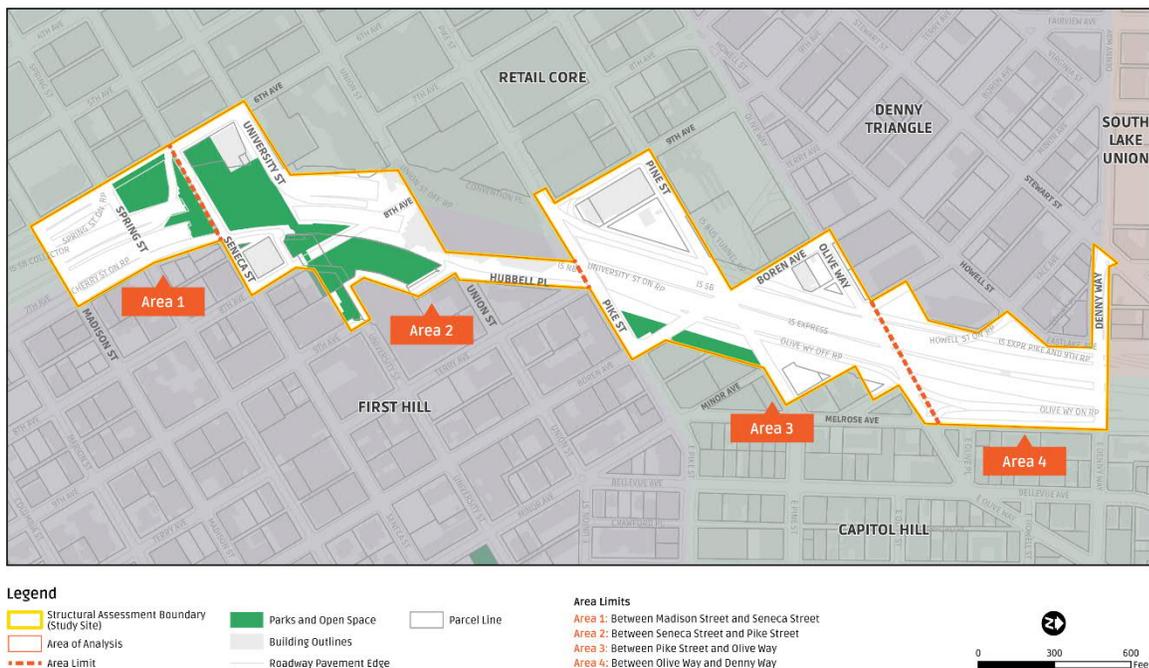
Map of street classifications in the vicinity of the Structural Assessment Boundary with principle arterials, collector arterials, and minor arterials shown.

3.6 Lid Study Site Areas of Analysis

For the purpose of the I-5 LFS, the study site (or Structural Assessment Boundary) was divided into four areas of analysis. From south to north, areas were comprised as follows:

- Area 1 is between Madison Street and Seneca Street.
- Area 2 is between Seneca Street and Pike Street.
- Area 3 is between Pike Street and Olive Way.
- Area 4 is between Olive Way and Denny Way.

Figure 3-52. Structural Assessment Boundary with Areas of Analysis



For the purpose of the engineering feasibility, the study site was considered the Structural Assessment Boundary, and it comprises four areas to analyze lid development.

Note: Private parcels and existing buildings and lids were not considered to be affected or intervened for the purposes of the engineering feasibility analysis. Only edge integration with the existing lid of Freeway Park was assumed.

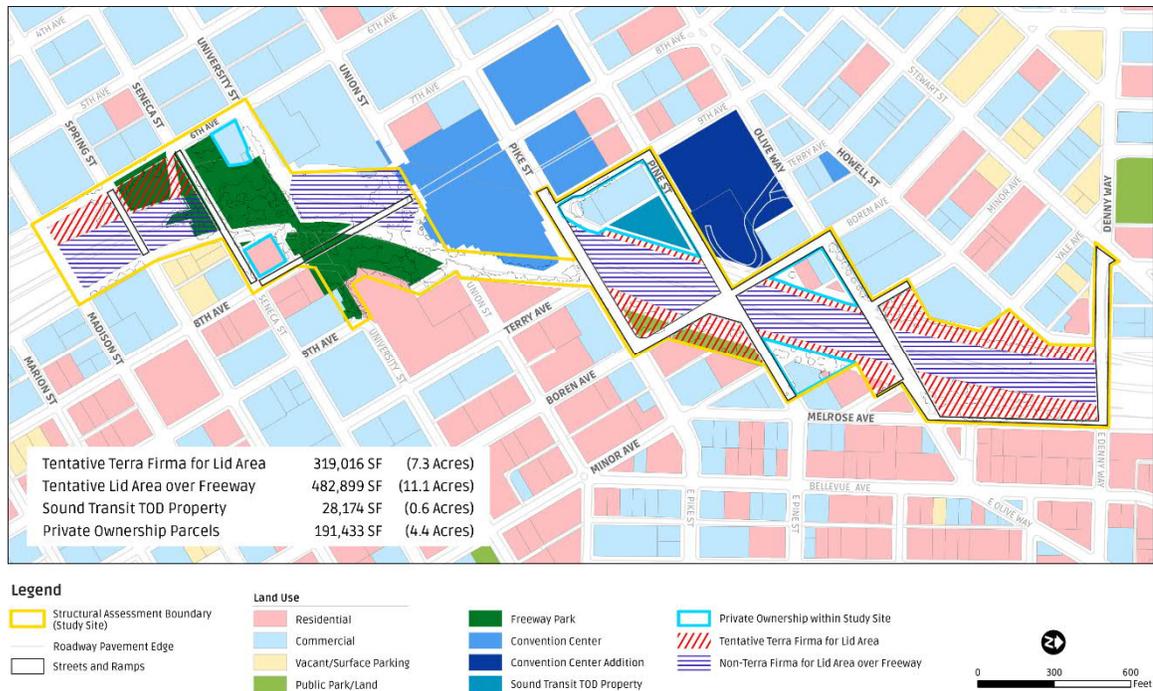
3.6.1 Site Overview

The I-5 LFS focuses on a study site that extends 0.8-mile from Madison Street at its south end to Denny Way at the north (Figure 3-52). Key features of the study site include the following:

- The study site is nine times the size of CenturyLink Field and about six times the size of Cal Anderson Park, which is comparable in scale to the Seattle Waterfront from Pioneer Square to Belltown.
- Mainline I-5 from east to west has a width ranging from 160 to 218 feet, with an average freeway width of 175 feet along the 0.8-mile stretch; a total of 11.5 lane-miles run through the site.

- The land within the study site is primarily WSDOT right-of-way (Figure 3-53).
 - Freeway Park, portions of the WSCC, and the Seattle Municipal Tower were constructed above WSDOT right-of-way.
 - Sound Transit owns property within the study site currently planned as a transit-oriented development site.
 - The City of Seattle manages the surface street network and Freeway Park.

Figure 3-53. Land Use and Land Ownership in the Study Site



Land within the study site is primarily WSDOT right-of-way. For the purpose of the I-5 LFS, privately owned parcels were not considered for the structural assessment of a lid. Structural systems rely on having foundations built on terra firma (i.e., dry land or ground). This figure shows sections within the study site—areas that would allow building a lid over terra firma (red hash) and that are not over terra firma (purple hash)—in WSDOT right-of-way.

3.6.2 Existing Conditions Considerations

The existing conditions analysis at the study site scale considers the particular conditions that create both constraints and opportunities for potential uses on a lid.

Size and Geometry

The size and shape of the lid areas of analysis range from the south end (Area 1), with standard downtown blocks oriented to the street grid to the large irregular shape of Area 4. The developable area in each area is also affected by whether ramps would be retained.

Ramps

All of the areas of analysis are affected by on- and off-ramps connecting to I-5. In some but not all cases, buildings could be constructed over the connection of ramps to the street grid. The difference in the buildable lid area in a concept that removes all ramps (Figure 3-54) and the concept that retains all ramps (Figure 3-55) is 5.9 acres (17.4 acres compared to 11.5 acres, respectively).

Figure 3-54. Maximum, Potential Lid Area Considered for a Robust Lid Project

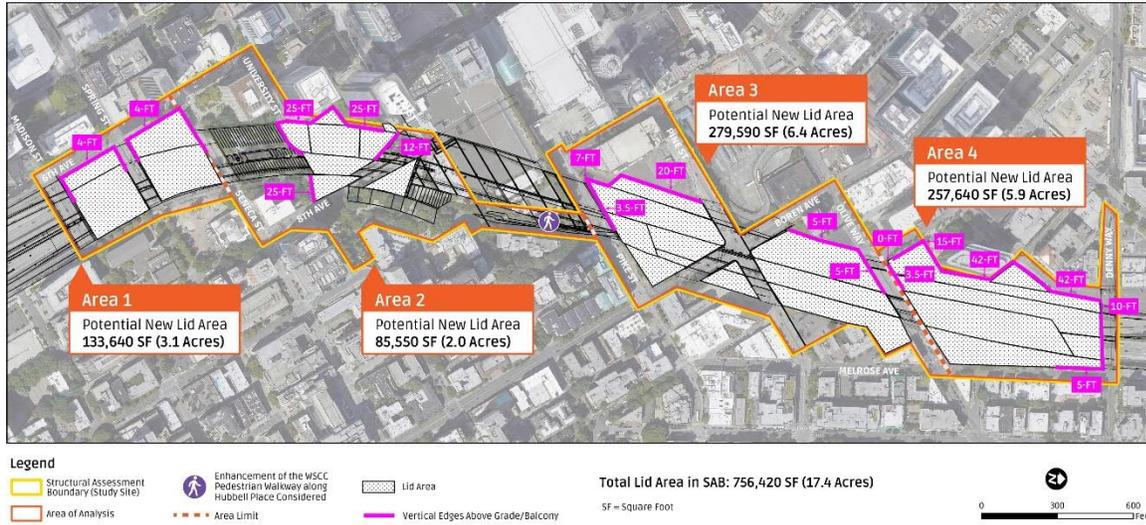
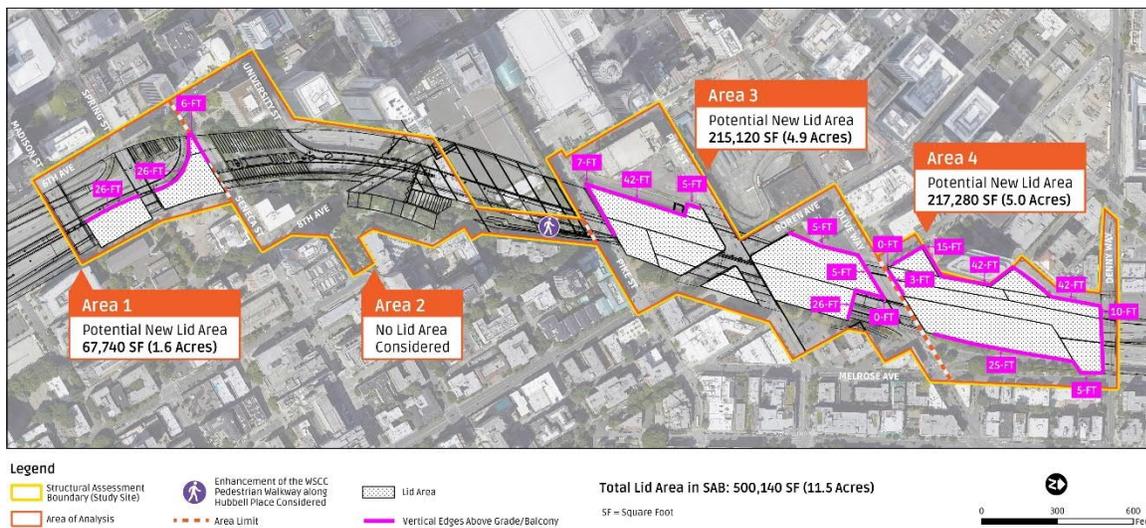


Figure 3-55. Minimum, Potential Lid Area Considered for the Leanest Lid Project



Structural Capacity

The structural engineering assessment defined the load capacity for each conceptual lid geometrical layout within the study site (Structural Assessment Boundary). Four categories of load were used:

- High-rise (up to 45 stories)
- Mid-rise (up to 20 stories)
- Low-rise (up to 7 stories)
- Landscaping and Pavilions (up to 3 stories)

In Figure 3-56 and Figure 3-57, red areas represent structural load levels able to support high-rise development, dark blue areas represent mid-rise load levels, light blue areas represent low-rise load levels, and green areas represent load levels capable of supporting landscaping and pavilions.

The load capacity potential of the conceptual geometric lid layouts is not even across the SAB or within each lid subsection. This is an important consideration in terms of the possible development program and capacity of each scenario considered, with significant urban design implications.

Figure 3-56. Highest Load Levels for Maximum, Potential, Developable Lid Area for a Robust Lid Project

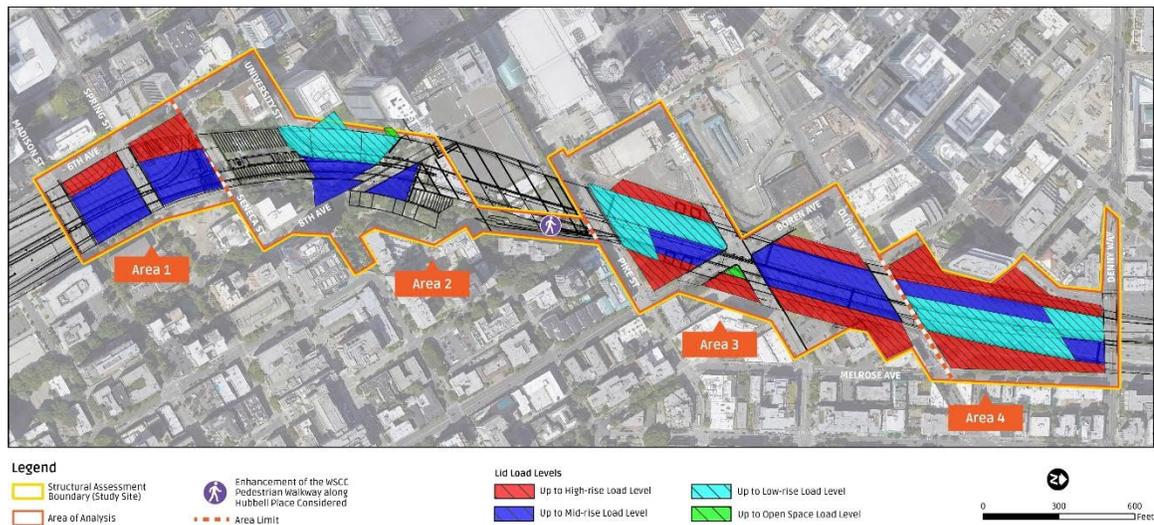
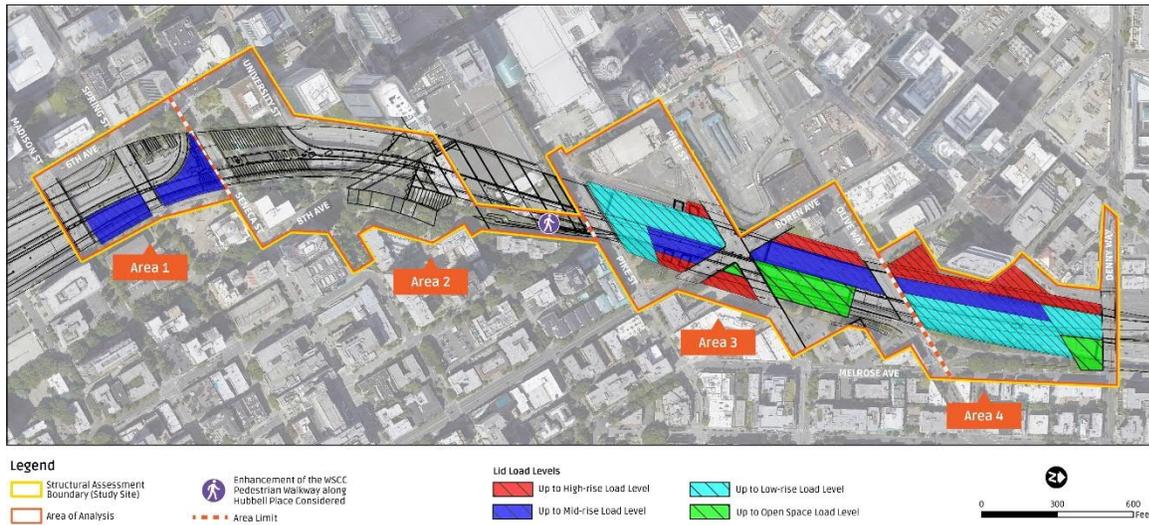


Figure 3-57. Highest Load Levels for Minimum, Potential, Developable Lid Area for the Leanest Lid Project



Topography and Edges

Understanding the site's topography is critical to understanding the potential to reconnect neighborhoods across I-5. The elevation drops from east to west across I-5 and runs from roughly 20 feet to over 40 feet. The edge conditions can be treated in a variety of ways, as shown in the icons in Figure 3-59. For low slopes, landscaped edges could be flush to the sidewalk with low terraced planters to take up grade, as shown in the image of the Freeway Park edge along Seneca (see Edge Treatments 1 and 2).

For larger grade differentials, buildings can mitigate grade with entries at upper and lower grade levels. Fisher Pavilion at Seattle Center is a good example of this strategy (Edge Treatment 4), with a roof terrace at the upper level and a gathering space with large operable doors opening to the adjacent lawn. Edge Treatment 5 occurs where a building is constructed over a freeway ramp, such as the Seattle Municipal Tower. This strategy would allow development where ramp removal may not be feasible.

Figure 3-58. Existing Edge Conditions along I-5



(Google, 2019a)
View from Convention Place of the Pike Street Bridge over I-5 north edge.

Figure 3-59. Edge Treatments Between Topography and Development

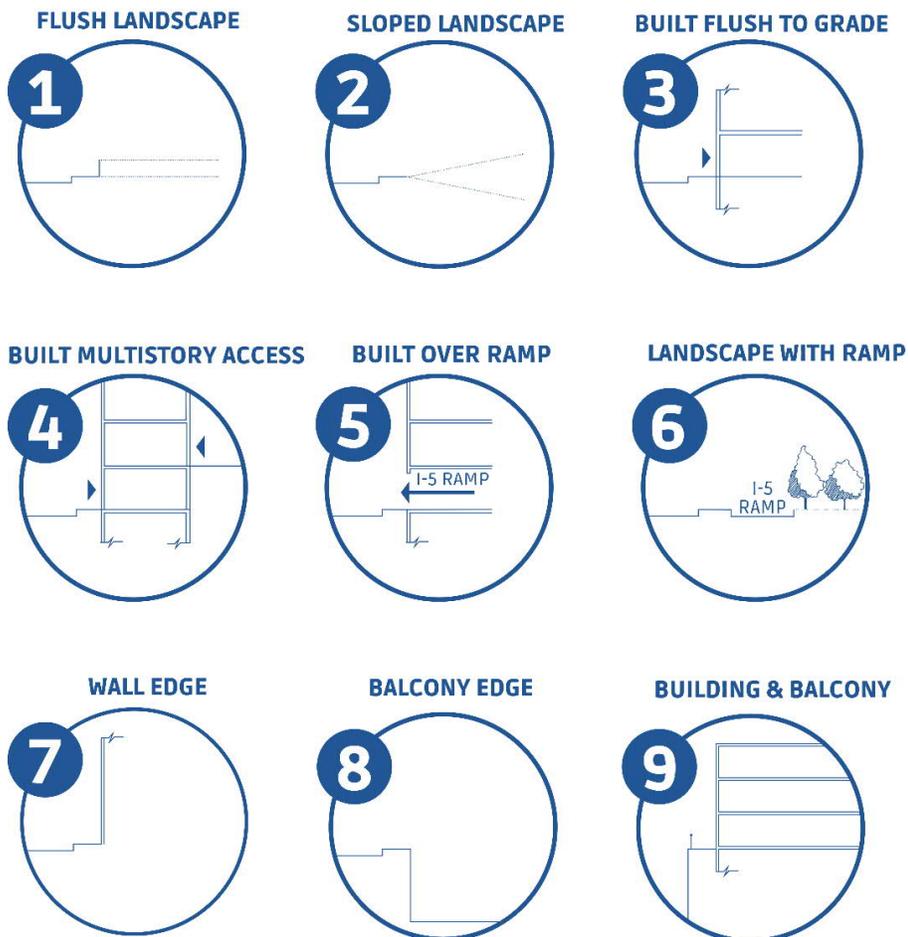


Figure 3-60. Examples of Potential Lid Edge Treatments



Source: (Google, 2019b)
Freeway Park's landscaped edges for low slope near Seneca Street. Example of Figure 3-59 edge treatment numbers one and two.



Source: (Mikkio, 2003)
Fisher Pavilion at the Seattle Center as grade mitigation. Example of Figure 3-59 edge treatment number four.



Source: (Google, 2019c)
Seattle Municipal Tower constructed over I-5 exit ramps. Example of Figure 3-59 edge treatment number five.

Connectivity

A successful lid design will provide opportunities to reconnect neighborhoods surrounding the study site by creating easy access to and across the lid. While the I-5 LFS will not lay out an urban design plan for the design of a lid, several opportunities are noted in terms of the quality of human-scale experience, the lack of facilities, and areas with road safety concerns. The I-5 LFS also notes opportunities to reconnect some routes that were severed by I-5, notably routes connecting to Yale Avenue and Minor Avenue that re-establish connections between the growing job and residential centers of Capitol Hill and Denny Triangle/South Lake Union.

Vertical circulation to allow for access to a lid structure and/or to buildings would be a major benefit to those who find moving up and down the hills across the study site difficult. This could take the form of stairs, escalators, or elevators that could be either in an exterior open space or

on the interior of new buildings. There are several good examples of each of these options locally and globally (Figure 3-61). In Seattle, outdoor escalators are found on the west side of the Wells Fargo Center; public escalators are in the Fourth and Madison Building and the nearby Seattle Public Library. Outdoor elevators are found on Marion Street at Post Alley, connecting the bridge to the ferries and street level.

Figure 3-61. Examples of Vertical Circulation Alternatives



Source: (Wikimedia Commons 1, n.d.)
Urban escalator in Barcelona



Source: (Google, 2019d)
Pedestrian bridge connection on the Seattle waterfront

Building Typologies for Vertical Development

In order to inform the exploration of a potential development program on a lid, building typologies for vertical development are necessary, which are associated with the structural load capacity categories defined for the engineering assessment of a lid. The images shown in Figure 3-62 are representative examples of a typology of buildings to consider, informed by local examples.

Figure 3-62. Building Typology Relative to Structural Capacity Categories

			
High-rise	Mid-rise	Low-rise	Pavillion
45 stories	20 stories	5-7 stories	Up to 3 stories
400 feet or 680 feet	200 feet	70 feet	30 feet

The eventual success of the lid from an urban design standpoint will be the quality of the “plinth,” defined as the area where interaction between the building and the street level/open space(s) occurs. While the design of the plinth levels for a lid is premature for this feasibility study, the footprints of the buildings on a lid should consider a well-designed, well-landscaped human-scale set of levels. Plinths can provide space for retail, cultural, and civic spaces and other amenities that are understood over time. An example of a landscaped plinth space is at Two Union Square, which holds the street edge with retail and creates landscaped space at the base of the tower.

Figure 3-63. Representative Example of a Building Plinth



Source: (Union Square Seattle, 2019)

3.6.3 Area 1

Area 1 has two blocks that are similar to typical downtown blocks in terms of size and geometry. The south block, between Madison and Spring Streets, has an on-ramp on the west side that will preclude development if it remains. The northern block, between Spring and Seneca Streets, has the Seneca Street off-ramp on the west side. This ramp could remain with development if it were enclosed within a building.

Area 1's context has a mix of uses on the west, including the historic Nakamura Courthouse and the Women's University Club, with taller buildings nearby such as the Crowne Plaza and Renaissance Seattle hotels. On the First Hill side to the east is the First Presbyterian Church (which has been discussed for redevelopment) and Town Hall. Two new residential high-rise buildings are being built along Spring Street, with an open space along Seneca. High-rise development could be appropriate to Area 1 given the surrounding development character.

With Freeway Park to the north, shading of the park would be a consideration for future decisionmakers.

The Box Gardens associated with Freeway Park in Area 1 are more a visual element than a usable green space. The Nakamura Fountain is between Seneca Street and the Seneca Street off-ramp. While Freeway Park is adjacent to the north, it lacks a large flexible open space. High-rise development could be appropriate to Area 1 given the surrounding development character. With Freeway Park to the north, shading of the park would be a consideration.

3.6.3.1 Size and Geometry

Area 1 would allow for 3.1 acres of lid with ramps removed and 1.6 acres with ramps remaining and would allow for a similar development pattern to standard downtown blocks within a regular grid.

3.6.3.2 Ramps

The I-5 southbound on-ramp south of Spring Street would preclude development on the southwest corner of the Madison Street to Spring Street block. To provide support for a building, the ramp would be modified or removed. The off-ramp near Seneca could remain, either by keeping the edge of the building south of the ramp or by having an opening for the ramp and building over the clearance required for the ramp.

3.6.3.3 Structural Capacity

Area 1 would be able to support high-rise development on the west and mid-rise development on the east. There is a narrow band of terra firma (i.e., ground or soil) on the west side on the west side; wider buildings would need to be cantilevered over a structure or be limited to mid-rise development.

3.6.3.4 Topography and Edges

The elevation drop of approximately 20 feet east to west could be taken up by multiple levels of a building or by landscape treatment.

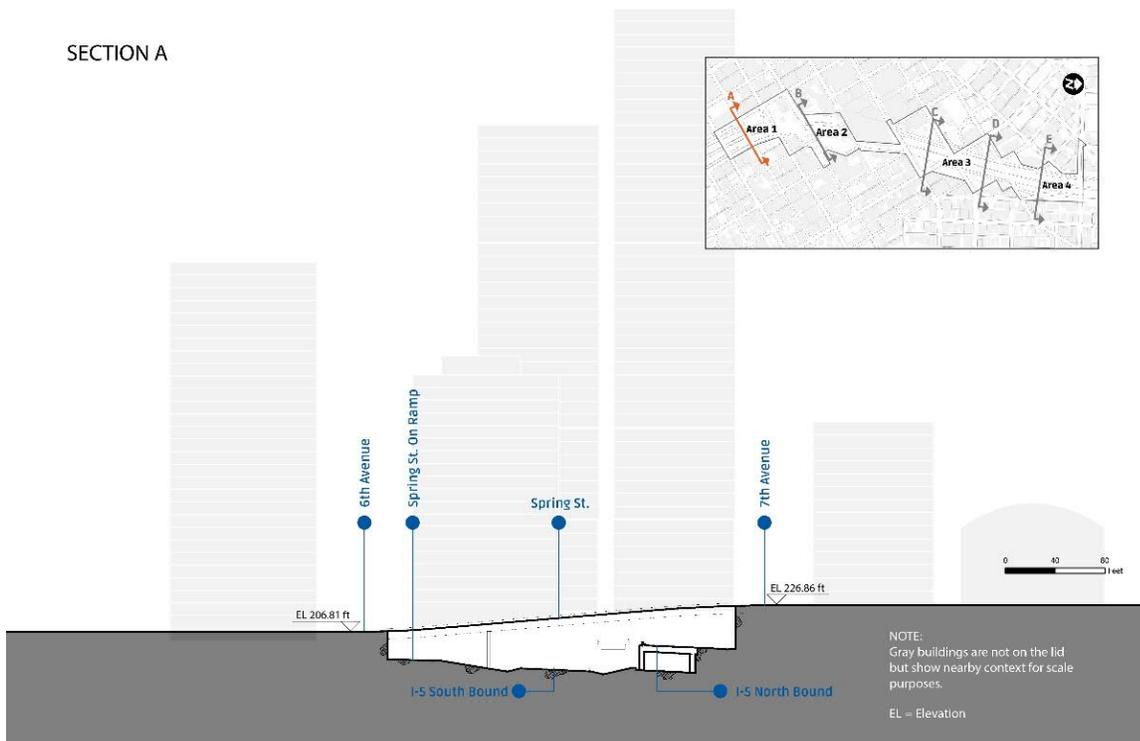
3.6.3.5 Connectivity

The existing street grid provides standard connectivity. New development could contribute to additional routes via an alley or landscaped areas. Adding a green edge along the sidewalk would improve the quality of the pedestrian environment along areas that are not lidded.

3.6.3.6 Other

Freeway Park's historic designation would require significant coordination because a lid development would tentatively alter its signature walls and box gardens at its edges.

Figure 3-64. Area 1 Cross-Section at Spring Street



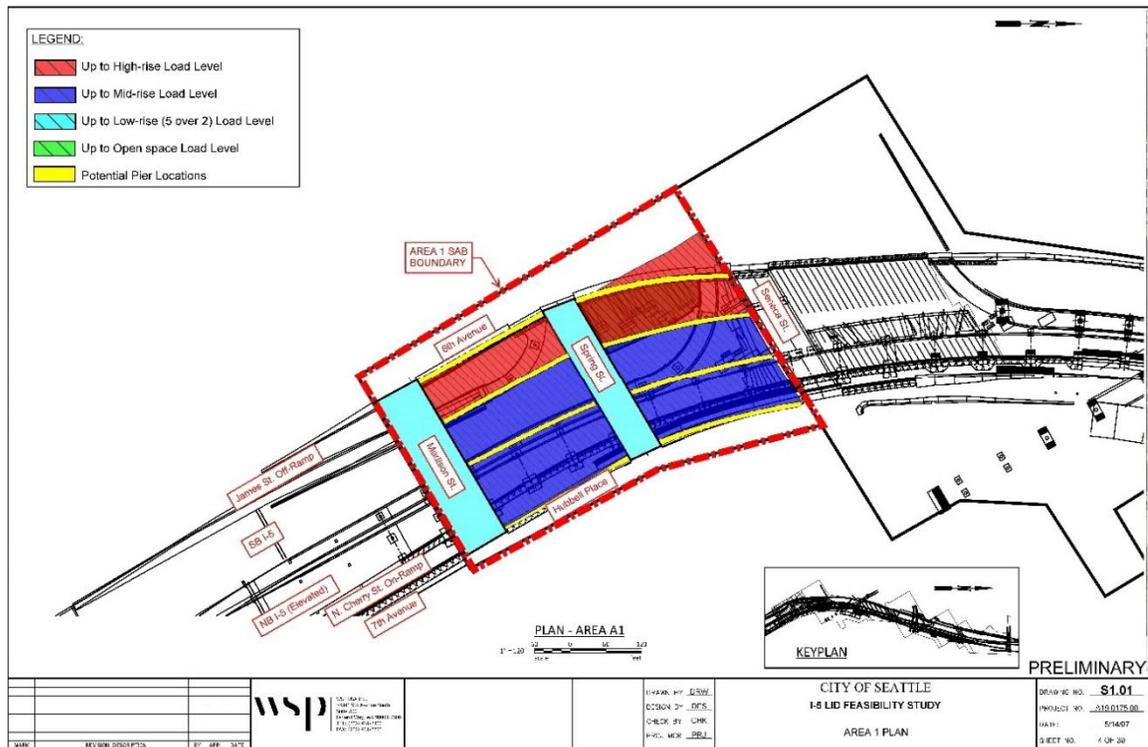
Existing cross-section of Area 1 at Spring Street

Figure 3-65. Area 1 Adjacent Uses



Adjacent uses, entries and view corridors to Area 1

Figure 3-66. Area 1 Load Level Plan



Area 1 load level plan with high-, mid-, and low-rise load levels shown

3.6.4 Area 2

Area 2 includes Freeway Park, the associated area adjacent to the WSCC and the pedestrian connection to Pine Street along Hubbell Place. The existing lid does not cover the freeway at two locations within Area 2, and these locations could be included in a new lid.

The western site is between the Union 1 and 2 buildings and Freeway Park. A building on this site could front on the area named as the Botanical Walk on the Finding Freeway Park map, adding activity to Freeway Park. The second site is a triangular shape that could be accessed from 8th Avenue as it slopes below the WSCC and would activate the area named as the Back Yard on the plan.

The University Street northbound on-ramp affects Area 2 on the west side, making access to the site via University Street challenging. University Street continues to run adjacent to the on-ramp, providing service access to the Union 1 and 2 buildings, and potentially to a new building on Area 2. A lid could be built avoiding University Street on-ramp.

Freeway Park has many unique assets, but the lack of adjacent activity in some areas of the park makes it less usable than it could be. Filling in the two existing openings with active uses could make the park increase its activity, especially on evenings and weekends.

Freeway Park is a historic site, and there will be landmark challenges with changes to the designated historic areas. Design would need to be sensitive to the edge conditions of the park in terms of structural integration, construction staging, and landscape design.

Additional lidding could better connect this portion of downtown and First Hill, including ACT Theater and Town Hall. New buildings with active pedestrian-level uses could benefit from the increase in park use. All alternatives for Area 2 should improve pedestrian connections along the edge of the WSCC and along Hubble Place that link to Pike Street.

Development could occur on one or both of the available sites, designed to improve the edges of Freeway Park with active uses. Mid-rise buildings would be compatible with adjacent buildings, but could be lower if desired for scale with the park.

3.6.4.1 Size & Geometry

There are approximately 2 acres of developable area that could fill gaps in the existing Freeway Park lid.

3.6.4.2 Ramps

The northbound University Street ramp on the west side could be retained. The configuration at University Street would need to be studied further in order to confirm the ability to bring service access into a new building.

3.6.4.3 Structural Capacity

Mid-rise development is the maximum that could be supported.

3.6.4.4 Topography and Edges

Buildings would meet existing Freeway Park grade with active uses. 8th Avenue would also be a point of connection, particularly for the site to the east, and would need to access the street as it slopes downward to the north below the WSCC.

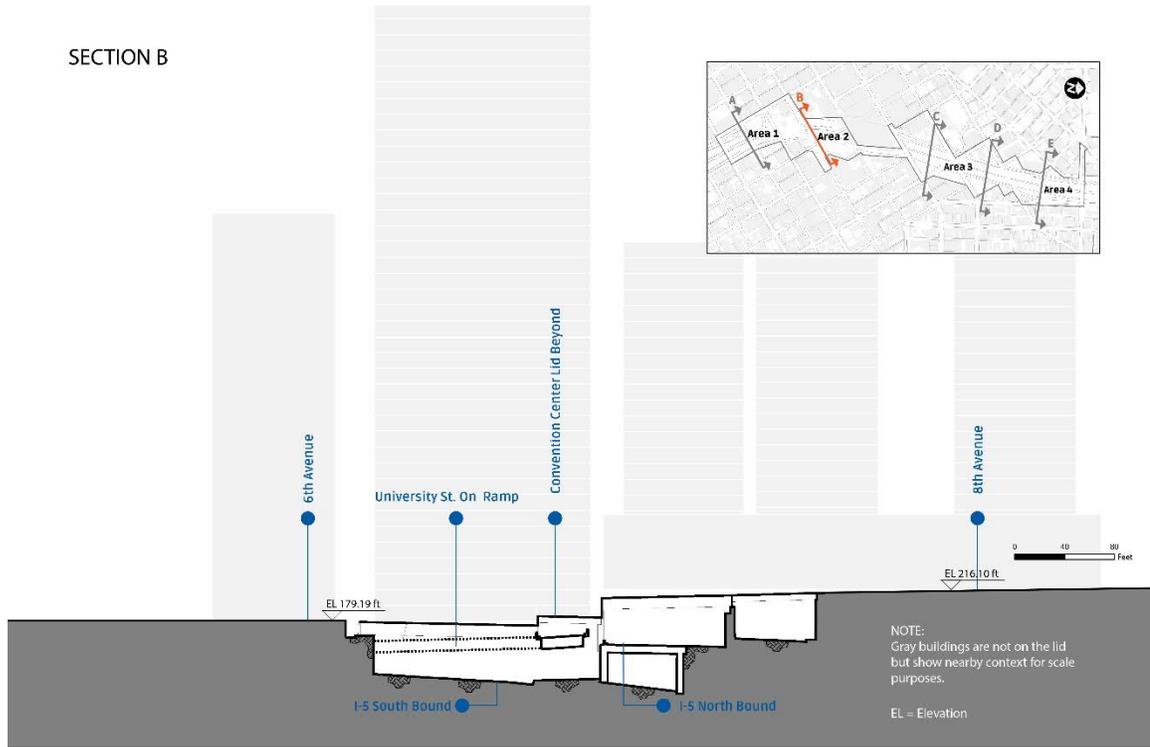
3.6.4.5 Context

Mid-rise development could be compatible with Union Square buildings. Street-level uses that could help activate the park are desirable. Shading impacts on Freeway Park should be considered.

3.6.4.6 Connectivity

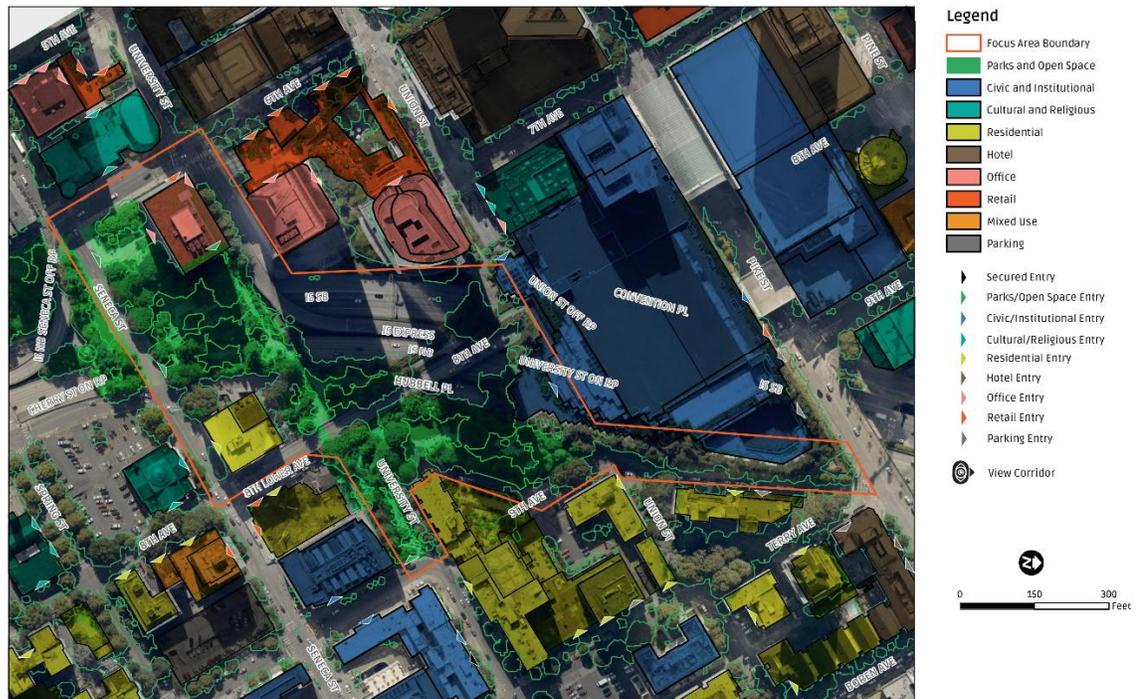
Adding additional lid space to Freeway Park would increase usability of the existing park both in terms of recreation and connectivity. All options to lid Area 2 would consider improvements to the connection along the WSCC leading to Pike Street along Hubble Place. Hubbell Place is part of the bicycle network, allowing cyclists to avoid riding through Freeway Park.

Figure 3-67. Area 2 Cross-Section at University Street



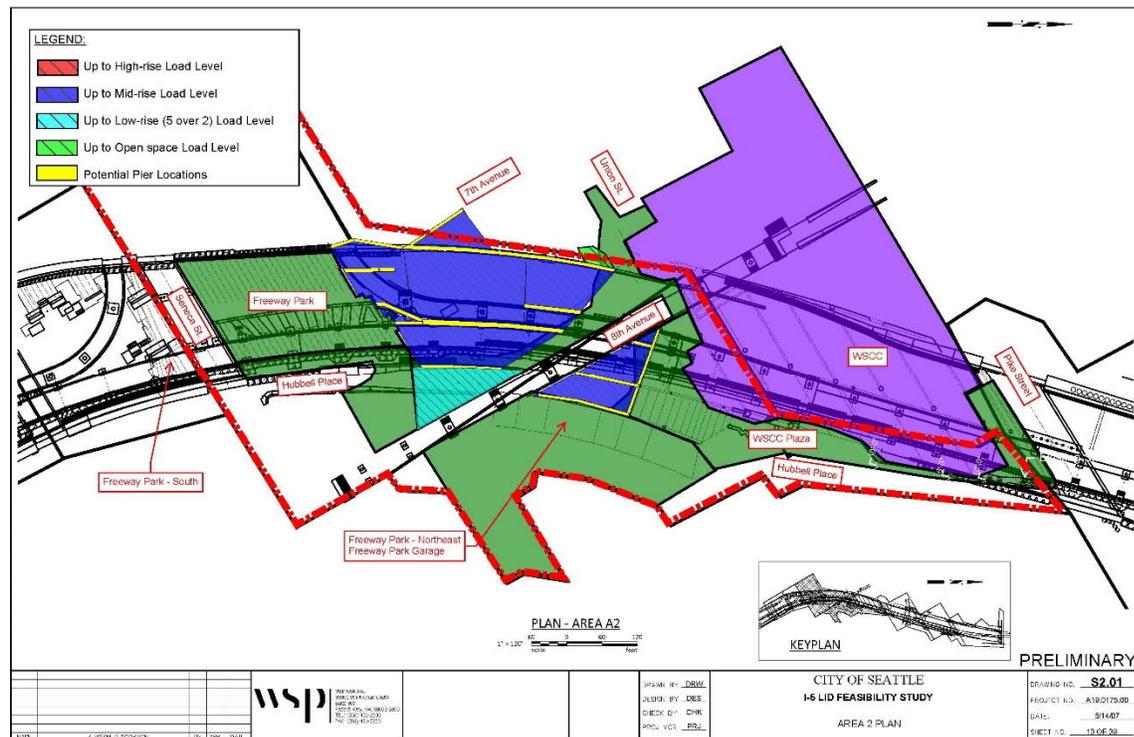
Existing cross-section of Area 2 at University Street

Figure 3-68. Area 2 Adjacent Uses



Adjacent uses, entries and view corridors to Area 2

Figure 3-69. Area 2 Load Level Plan



Area 2 load level plan with high-, mid-, and low-rise load levels shown

3.6.5 Area 3

Area 3 runs between Pike Street and Olive Way, with three segments separated by the intersection of Pine Street and Boren Avenue. Area 3 is the area with relatively high pedestrian traffic and where the walk between the Downtown Retail Core and Capitol Hill is most accessible and comfortable.

On the east side of Area 3, there are relatively small but notable open spaces: Plymouth Pillars Park and the off-leash dog park. Consideration to keep these parks in all proposed lid program explorations is recommended.

The east side includes a hotel and mixed-use buildings. On the west side of Area 3, Sound Transit owns a triangular-shaped parcel that adjoins the Paramount Theater will accommodate transit-oriented development. Plans for the WSCC expansion would represent an edge along Pine Street with active uses at street level.

The two potential lid areas in Area 3 are the strongest candidates for accommodating large park areas and reconnecting the urban fabric across I-5 because the location is already highly preferred by pedestrians and cyclists to cross I-5 between the Downtown Retail Core and Capitol Hill. Moreover, lidding Area 3 would complement the existing plans the City of Seattle has for the Pike-Pine Renaissance project to reconnect the waterfront and the Melrose Promenade. In addition, an opportunity exists to increase connectivity by creating new routes matching desire lines between Capitol Hill and South Lake Union, which would bridge the gap in the original street grid.

The two potential lid areas over the freeway at the center of the study site have lower structural capacity (low- to mid-rise development) than the areas at the edges. Ramps include express-lane ramps on the west side of Area 3, and the exit ramps to Olive Way on the east side. It is possible to build over these ramps so long as there is clearance near street level. A major open space would be appropriate on one or both of the blocks in Area 3 because of its location in an active area with high pedestrian and bicycle traffic. Pavilions could be used to activate an open space and mitigate topographic changes, and potentially to expand the existing small parks using a strategy similar to Fisher Pavilion at Seattle Center.

A higher level of development could also take advantage of the central location with high-rise buildings where possible and low-rise buildings holding the street edge and park edge with active uses.

3.6.5.1 Size and Geometry

Area 3 is approximately 6.4 acres in the lid concept with ramps remaining or 4.9 acres in the lid concept with ramp removal. Most of the area is in two large blocks that are aligned with the downtown grid but are skewed to the freeway direction and potential column lines of a potential lid. An additional triangular parcel is on the east corner of the intersection of Boren Avenue and Olive Way.

3.6.5.2 Ramps

An express-lane ramp parallels the west edge of Area 3, connecting to the street grid at 9th Avenue and Pike Street. This ramp could be retained with development above if space was left for vehicular ingress and egress. On the west side, the Olive Way off-ramp brings vehicles onto eastbound Olive Way. The connection of the off-ramp and Olive Way is a challenging pedestrian environment. The ramp could remain with development as long as design allows for space for motor-vehicle traffic.

3.6.5.3 Structural Capacity

Relatively narrow strips of terra firma are capable of supporting high-rise development along the eastern edge of Area 3. Between these opportunities for high-rise zones, most of the southern block of Area 3 would support only low-rise development. The interior of the northern block could support mid-rise development.

3.6.5.4 Topography and Edges

The site slopes from east to west with an approximate 33-foot change in elevation. This topography change could be addressed with a building on the east side or with landscape elements such as planted areas and constructed planters like those on Seneca Street along Freeway Park.

3.6.5.5 Connectivity

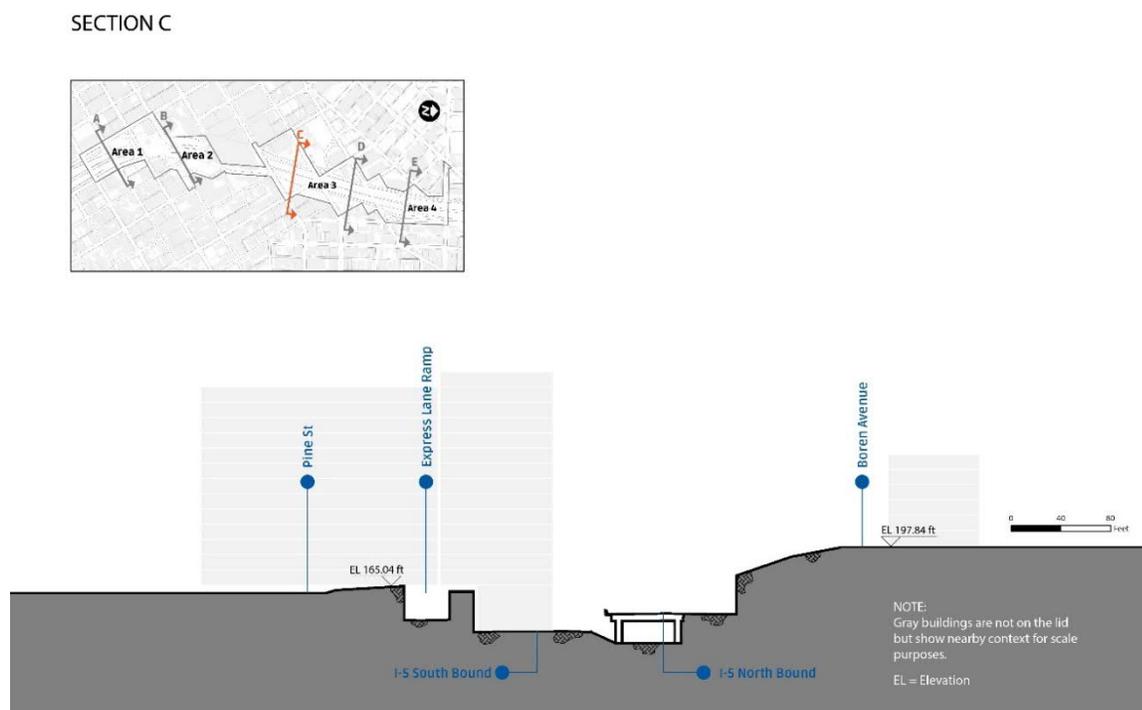
Pike Street is one of the most heavily used pedestrian routes between Capitol Hill and the Downtown Retail Core, with pedestrian volumes of up to 1,000 people during the weekday afternoon peak (4 p.m. to 6 p.m.). Steps from the main level of Freeway Park lead down to Pike

Street at Hubbell Place, but these steps do not land on an area where Pike Street can be safely crossed, inducing a pedestrian desire line. Boren Avenue presents a less comfortable pedestrian environment with a steeper slope and high motor-vehicle traffic volumes.

Pedestrian and bicycle connectivity improvements are underway on Pike and Pine Streets via the Pike-Pine Renaissance project.

The north-south human-scale connection through Freeway Park is not easily continued to the north through Area 3 because of the street grid orientation. There is an opportunity to continue north-south pedestrian and bicycle routes through new open space, but connections midblock at the street level are more problematic. At the key intersection of Pike Street and Hubbell Place, there could be an opportunity to address the pedestrian and bicycle desire line through a “skybridge” with an upper-level building-integrated pedestrian and/or bicycle connection to Freeway Park above Pike Street.

Figure 3-70. Area 3 Cross-Section Between Pike and Pine Streets



Existing cross-section of Area 3 between Pike and Pine Streets

Figure 3-71. Area 3 Cross-Section Between Pine Street and Olive Way

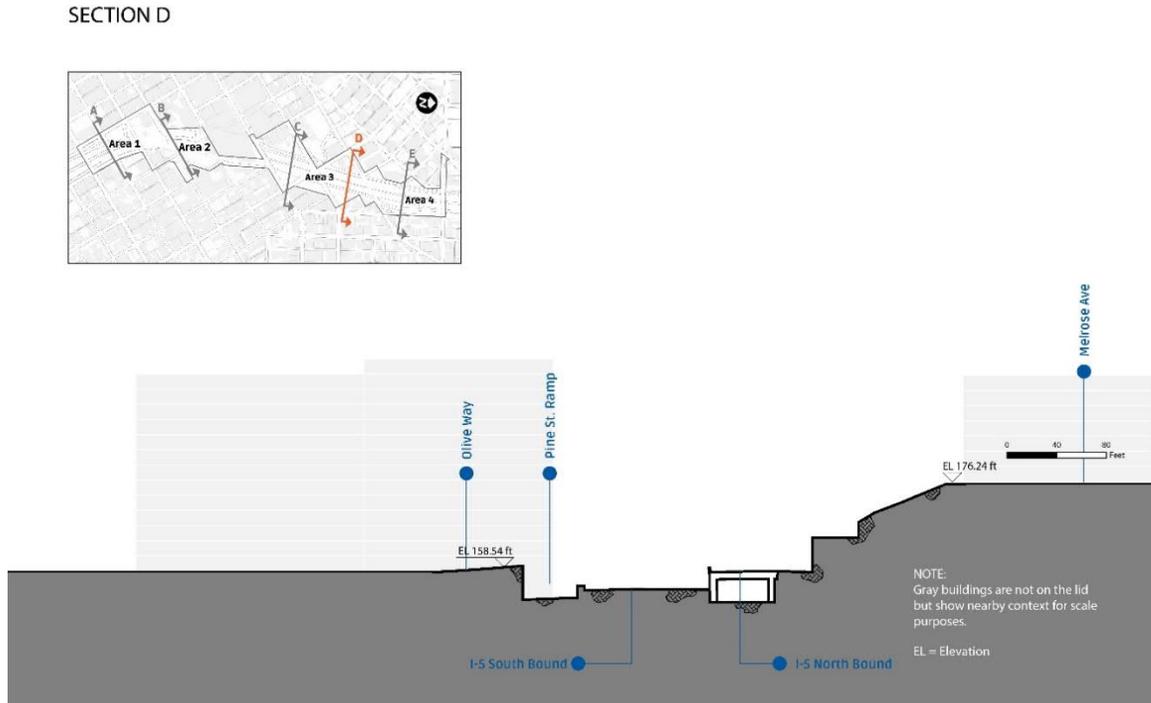
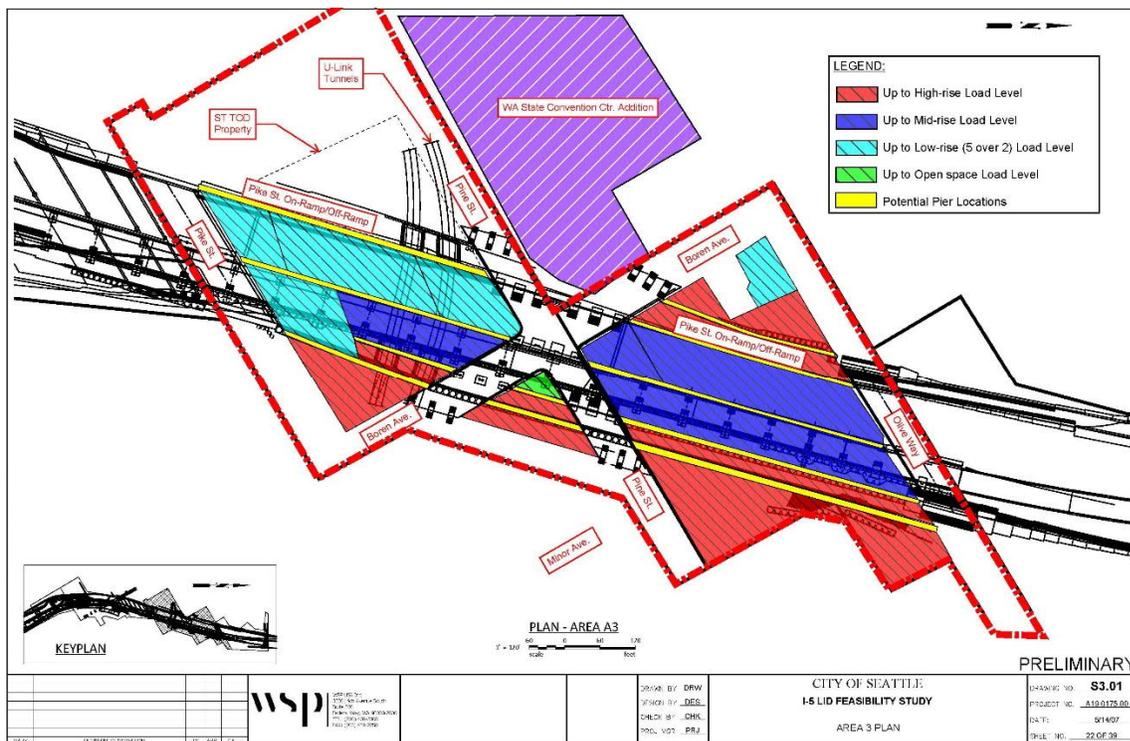


Figure 3-72. Area 3 Adjacent Uses



Figure 3-73. Area 3 Load Level Plan



Area 3 load level plan with high-, mid-, and low-rise load levels shown

3.6.6 Area 4

Area 4, between Olive Way and Denny Way, is large and irregularly shaped and has the largest topographic drop (approximately 44 feet) from east to west compared to the rest of the areas of analysis. Area 4 has the opportunity to reconnect pedestrian routes that were severed by freeway construction at Minor Avenue and Yale Avenue. Vertical assists would be necessary to increase connectivity between Denny Triangle/South Lake Union and Capitol Hill.

Melrose Avenue, along the east side of Area 4, is a narrow right-of-way lined on the east side by mid-rise housing. Those units experience higher levels of freeway noise, but also have exceptional views. The west side of Area 4 has a mix of uses that experience high motor-vehicle traffic and pedestrian safety risks as a result of the proximity to the freeway and existing ramps, further heightened by the grade south of Denny Way being lower than the Denny Way bridge structure to the east.

Area 4 could accommodate lower-scale development that could be compatible in scale with existing development along Melrose Avenue. Placing buildings along the edge of the site, where there is the most structural load capacity, would create an internal open space that could hold multiple bike and pedestrian connections, and publicly accessible vertical circulation to overcome the heightened grade challenges along the site.

A more intensive use of the site could include high-rise structures where possible to increase desirable uses by the community or to

accommodate revenue-generating uses for the project. Open spaces and circulation routes would ideally remain regardless of the type of density on a lid.

3.6.6.1 Size and Geometry

Area 4 is 6.4 acres in the lid concept with ramps remaining or 5.9 acres in the lid concept with ramp removal, excluding existing roadways. The area is bound by Melrose Avenue to the east, Denny Way to the north, and Olive Way to the south. The east edge of the area has a sawtooth configuration because of the shift in the street grid.

3.6.6.2 Ramps

The Olive Way off-ramp is along the east side of the site but could be lidded if a building opening is designed to allow for a ramp exit, similar to the Seattle Municipal Tower. An I-5 southbound on-ramp on the west side of Area 4 brings in motor vehicles along Yale Avenue. This ramp could also be accommodated with a building atop of it.

3.6.6.3 Structural Capacity

High-rise development is possible on relatively narrow strips of terra firma on both the east and west sides. Mid-rise development is possible along Denny Way and a strip on the west, with a sizable central area that would be able to accommodate only low-rise development.

3.6.6.4 Topography and Edges

The topographic drop of up to 44 feet east-west makes grade resolution on the west side challenging, especially where there is limited space to build along Eastlake and near the existing office building.

3.6.6.5 Connectivity

The original grid included connections between Capitol Hill and Denny Triangle along Yale and Minor Avenues. These links could be reconnected for pedestrians and cyclists through open space on a lid, including new vertical circulation—elevators and/or escalators—to assist with the grade change. North-south connection could also be accommodated through the site, linking Olive Way and Denny Way.

Figure 3-74. Area 4 Cross-Section Between Olive Way and Denny Way

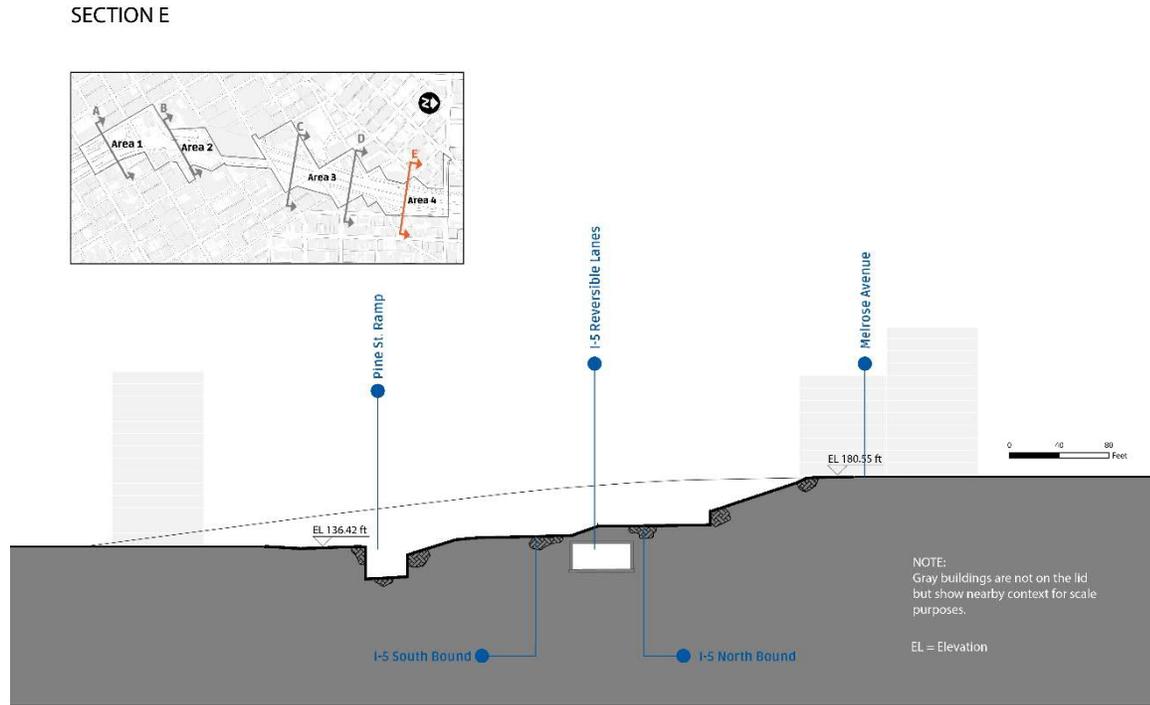
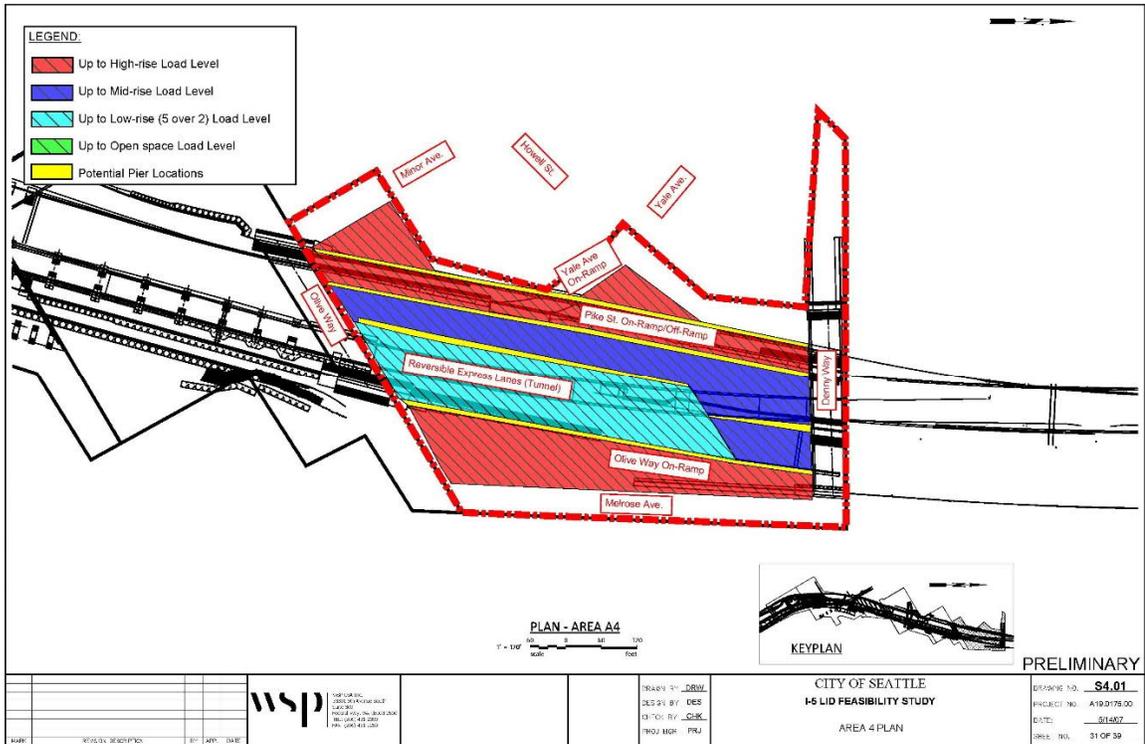


Figure 3-75. Area 4 Edge Conditions



Adjacent uses, entries and view corridors to Area 4

Figure 3-76. Area 4 Load Level Plan



Area 4 load level plan with high-, mid-, and low-rise load levels shown

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