SDOT
Seattle Department of Transportation

BURKE-GILMAN TRAIL MISSING LINK PROJECT

Cultural Resources Discipline Report

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Draft Environmental Impact Statement
May 2016

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ABBREVIATIONS

BGT	Burke-Gilman Trail
Cal B.P.	Calibrated Radiocarbon Years Before the Present
CEQ	Council on Environmental Quality
CSO	Combined Sewer Overflow
DAHP	Department of Archaeology and Historic Preservation
DPD	Department of Planning and Development
EPA	U.S. Environmental Protection Agency
EIS	Environmental Impact Statement
fbs	Feet Below the Surface
GLO	General Land Office
mbs	Meters Below the Surface
NARA	National Archives and Records Administration
NRHP	National Register of Historic Places
RCW	Revised Code of Washington
SDOT	Seattle Department of Transportation
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Officer
SLS&E RR	Seattle, Lake Shore, and Eastern Railroad
SMC	Seattle Municipal Code
SR	State Route
SWCA	SWCA Environmental Consultants
WAC	Washington Administrative Code
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WSDOT	Washington State Department of Transportation

EXECUTIVE SUMMARY

The City of Seattle proposes to complete the Burke-Gilman Trail (BGT) Missing Link between 11th Ave NW and NW 45th St and the Hiram M. Chittenden (Ballard) Locks at 30th Ave NW. The project would create a safe, direct, and defined multi-use trail for persons of all abilities and improve predictability for all motorized and nonmotorized users. The project would also provide connections to the proposed nonmotorized networks. The Draft Environmental Impact Statement (EIS) evaluates five alternatives: the No Build Alternative, the Shilshole South Alternative, the Shilshole North Alternative, the Ballard Avenue Alternative, and the Leary Alternative. In addition, the project proposes up to six Connector Segments.

This BGT Missing Link Cultural Resources Discipline Report includes a detailed project description, a general discussion of the regulatory context, methods used to prepare this document, and a description of the affected environment. The natural setting discusses the BGT Missing Link study area geology, geomorphology, and stratigraphy. The cultural setting includes a summary of the prehistory of the project area, important nearby ethnographic locations, and themes applicable to the history of the BGT Missing Link area, such as early settlement, land development, transportation, industry, community, infrastructure, and Ship Canal construction. The affected environment also includes a review of previously completed cultural resources investigations undertaken in the BGT Missing Link study area. The background information provides a foundation to formulate expectations for encountering cultural resources in the BGT Missing Link study area.

Expectations developed during research on the affected environment define portions of the study area where potential exists to encounter archaeological cultural resources during BGT Missing Link construction. Cultural materials encountered in previously drilled boreholes completed along the project alternatives suggest potential for encountering buried historical archaeological resources within fill is highest along the Shilshole North and South Alternatives and the Ballard Avenue Alternative, especially at the crossings of 11th Ave NW, 20th Ave NW, and 28th Ave NW. It is unlikely, however, that any identified historical archaeological resources encountered during BGT Missing Link construction would be considered significant. Borehole data and background research also indicate naturally deposited sediment with potential for encountering ethnohistoric or pre-contact–period archaeological resources below a minimum of 7 feet of fill east of 14th Ave NW and west of 26th Ave NW. It is likely that any cultural materials present within the naturally deposited sediment below the fill would be considered significant. The BGT Missing Link construction would not extend below the fill, so would have no effect on any potentially significant cultural materials that may be present within the naturally deposited sediment below the fill. Therefore, the project would likely have no impact on archaeological or ethnographic period archaeological cultural resources.

In addition to formulating archaeological expectations, the background presented in this Cultural Resources Discipline Report also pertains to the historical built environment of the BGT Missing Link study area. Information about the known historical buildings and structures adjacent to the BGT Missing Link project alternatives and Connector Segments was compiled into summary tables and maps. A field survey was completed to identify additional potentially significant built-environment resources along the project alternative alignments. The built environment field survey results were combined with those of previous historical architectural investigations to create a comprehensive inventory of the historic built environment of the BGT Missing Link study area. Sixty-one potentially significant historical cultural resources belonging to the built environment were identified in the BGT Missing Link study area. Of these resources, most are located along the Ballard Avenue, Shilshole North, and Shilshole South alternatives. Construction and operational impacts to most of these important resources would be minimal because trail work would not alter the buildings and structures. There could be impacts to contributing

features, including curbs and brick pavers, within the Ballard Avenue Historic District that could modify the streetscape and affect the integrity of the district. The only other effect on built-environment resources would be the potential impact on portions of the Seattle, Lake Shore, and Eastern Railroad (SLS&E RR) within all four Build Alternatives and the Connector Segments where street work would occur. The project could have impacts to this historical resource, but the effect could be minimized or mitigated.

The BGT Missing Link project would have no significant unavoidable impacts to cultural resources. Any negative effects to potentially significant historical cultural resources, such as the identified segment of the SLS&E RR, would be minimized or mitigated, as recommended.

CHAPTER 1: INTRODUCTION AND PROJECT HISTORY

1.1 Introduction

The Burke-Gilman Trail (BGT) is a regional trail that runs east from Golden Gardens Park in Seattle and connects to the Sammamish River Trail in Bothell, except for a missing segment through the Ballard neighborhood. Currently, the regional trail ends at 30th Ave NW by the Hiram M. Chittenden (Ballard) Locks on the west, and begins again at the intersection of 11th Ave NW and NW 45th St on the east. The Seattle Department of Transportation (SDOT) proposes to connect these two segments of the BGT with a marked, dedicated route that would serve all users of the multi-use trail. The proposed project to complete the regional facility is referred to as the Missing Link.

Completing this section of the BGT has been discussed since the late 1980s. Refer to Chapter 1 in the Draft Environmental Impact Statement (DEIS) for a detailed summary of the project history. The alternatives evaluated in the DEIS were developed from suggestions received in 2013 during scoping for the DEIS. Suggested routes were evaluated using the following screening criteria: directness of route, number and types of trail crossings (i.e., driveways and intersections), street and arterial classification, adjacent land uses, and right-of-way width.

1.2 No Build Alternative

Under the No Build Alternative, no new multi-use trail would be constructed to connect the existing segments of the regional Burke-Gilman Trail. Trail users would continue to use the existing surface streets and sidewalks to travel between the existing trail segments, a distance of approximately 1.2 miles. Currently, trail users tend to use the most direct route, which is along Shilshole Ave NW. Pedestrians may opt for a street with sidewalks such as Ballard Ave NW or NW Leary Way. The No Build Alternative serves as the baseline condition, against which the Build Alternatives are compared over time to their 2040 design year. Over that time period, population and employment growth is expected to continue in the Ballard neighborhood, leading to an increase in traffic congestion, parking demand, and the number of people walking and biking.

1.3 Build Alternatives

Four Build Alternatives are analyzed in the DEIS: the Shilshole South, Shilshole North, Ballard Avenue, and Leary Alternatives. The alternatives described below are conceptual routes designed to provide distinct alternatives for analysis in the DEIS. The route that is eventually selected as the preferred alternative could be any one of these routes, or a combination of portions of any of them.

1.3.1 Shilshole South Alternative

Under the Shilshole South Alternative, the multi-use trail would be primarily routed along the south side of Shilshole Ave NW (Figure 1-1). There would be changes to parking, lanes, and intersection configurations on both sides of the street along this alternative alignment. The trail would accommodate users on a newly paved surface for most of its length.

Figure 1-1. Project Alternatives.

Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the north side of the unimproved NW 54th St right-of-way until the intersection with Shilshole Ave NW, just east of 24th Ave NW. The trail would then proceed along the south side of Shilshole Ave NW, continuing onto the southern side of NW 45th St to the eastern project end at 11th Ave NW.

From the existing western trail end at the Ballard Locks, the trail would be north of the Ballard Terminal Railroad (BTR) tracks until just before 17th Ave NW, at which point the trail would cross to the south of the tracks. A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW for trail users crossing Shilshole Ave NW to access 17th Ave NW**.**

The trail width would vary throughout the corridor due to existing conditions and constraints, but would generally be between 8 and 12 feet wide. Based on the design concepts, the typical right-of-way on Shilshole Ave NW for this alternative would include a buffer zone adjacent to the railroad tracks and vehicle traffic lanes, a multi-use trail, two vehicle travel lanes, and preservation of parking areas where feasible.

1.3.2 **Shilshole North Alternative**

Under the Shilshole North Alternative, the multi-use trail would be primarily routed along the north side of Shilshole Ave NW (Figure 1-1). Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the south side of NW 54th St until it turns into NW Market St. The trail would continue along the south side of NW Market St, until it crosses 24th Ave NW and turns south on the east side of 24th Ave NW. The trail would then proceed east along the north side of Shilshole Ave NW to the intersection with NW 46th St. A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW for trail users crossing 17th Ave NW. It would continue along the north side of NW 46th St underneath the Ballard Bridge to 11th Ave NW. At this point, the trail would turn south along the east side of 11th Ave NW until it connects to the eastern end of the trail at NW 45th St.

There would be changes to parking, vehicle travel lanes, and intersection configurations on both sides of the street in this alternative. The typical right-of-way section on NW Market St would include a sidewalk, the multi-use trail, a buffer zone, two vehicle travel lanes, center turn lane, and parallel parking areas on both sides of the street. The typical right-of-way on Shilshole Ave NW for this alternative would include a buffer zone and informal parking adjacent to the railroad tracks, two vehicle travel lanes, parallel parking area, buffer area, multi-use trail, and sidewalk. The existing gravel shoulder on the south side of Shilshole Ave NW would be maintained. These elements would vary along the trail due to the existing road configuration and structures.

1.3.3 **Ballard Avenue Alternative**

Under the Ballard Avenue Alternative, the multi-use trail would be primarily routed along the south side of Ballard Ave NW (Figure 1-1). Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the north side of the unimproved NW 54th St right-of-way until 28th Ave NW. At this point the trail would turn north along the east side of 28th Ave NW until it reaches NW 56th St. The trail would then turn east along the south side of NW 56th St to the intersection with 22nd Ave NW. At 24th Ave NW and NW 56th St, a new pedestrian-activated signal would be installed to facilitate the trail crossing of 24th Ave NW. The trail would turn south along the west side of 22nd Ave NW, cross NW Market St, and proceed south to Ballard Ave NW. At this point the trail would turn southeast along the south side of Ballard Ave NW and continue east on the south side of NW Ballard Way to the intersection with 15th Ave NW. The trail would then turn south onto the one-way road on the west side of 15th Ave NW, which could potentially be converted to trail-only use (no motor vehicles). The trail would cross to

the south side of NW 46th St at a newly signalized intersection and proceed east across 11th Ave NW. It would then turn south along the east side of 11th Ave NW to the eastern trail end at NW 45th St.

There would be changes to parking and vehicle travel lane configurations on all streets traversed by this alternative. The typical right-of-way section on Ballard Ave NW would include pedestrian sidewalks on both sides of the street, buffer zone, two vehicle travel lanes, and a parallel parking area on the north side of the street. These elements would vary along the trail due to the existing road configurations and structures.

1.3.4 Leary Alternative

Under the Leary Alternative, the multi-use trail would be primarily routed along the south side of Leary Ave NW (Figure 1-1). Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the south side of NW 54th St until it turns into NW Market St. The trail would continue east along the south side of NW Market St, crossing 22nd Ave NW. At 22nd Ave NW, the trail would turn southeast on the south side of Leary Ave NW. The trail would continue east along the south side of Leary Ave NW, which becomes NW Leary Way, to 11th Ave NW. At this point, the trail would turn south along the east side of 11th Ave NW to the current trail end at NW 45th St.

There would be changes to parking, vehicle travel lanes, and intersection configurations on both sides of the street along this alternative. The typical right-of-way on Leary Ave NW would include buffer zones on both sides of the street, a multi-use trail, parking areas on both sides of the street, sidewalks on both sides of the street, two vehicle travel lanes, and one two-way center left turn lane. The typical right-of-way on NW Market St would include a sidewalk, the multi-use trail, a buffer zone, two vehicle travel lanes, center turn lane, and parking areas on both sides of the street. These elements would vary along the trail due to the existing road configuration and structures.

1.3.5 Connector Segments

As mentioned previously, there are a number of possibilities to configure the routes, and six segments have been identified as the most likely connectors (Figure 1-1). These segments may be used as connections between portions of the previously identified alternative routes and could be on either side of the road. The connector segments include the following:

- Ballard Avenue NW;
- NW Vernon Place;
- 20th Avenue NW;
- 17th Avenue NW;
- 15th Avenue NW; and
- 14th Avenue NW.

Should NW Vernon Pl be used as a connector segment, a signal at NW Vernon Pl and Shilshole Ave NW may also be warranted, depending on whether the trail would continue on the north or south side of Shilshole Ave NW.

1.4 Features Common to All Build Alternatives

1.4.1 Roadway Design Considerations

Roadway designs would vary for each alternative based on factors such as intersection geometry, vehicle volumes, and types of vehicles. This section describes roadway modifications, intersection treatments, driveway design, and parking lot changes that could be incorporated during the final design phase of the project to address safety, access, non-motorized users, and vehicle types. Similar concepts can be found throughout the city and in design documents such as the Urban Bikeway Design Guide (National Association of City Transportation Officials [NACTO], 2015) and Guide for Development of Bicycle Facilities (American Association of State Highway and Transportation Officials [AASHTO], 2012). These features are common to all Build Alternatives, but the location and other specifics would vary by alternative.

Roadway Design

Adding a trail to the existing street system would require roadway modifications for vehicles to co-exist with non-motorized users. These changes could include geometric changes to create perpendicular intersections, changes to roadway lane configurations, alterations of curb radii, and design details that provide sight lines between vehicles and non-motorized users.

Intersection Design

Intersections would be designed to more clearly identify crossings of the multi-use trail. These improvements could include the following:

- Curb extensions or curb bulbs;
- Pavement markings;
- Raised crosswalks;
- Driveway-style entrances at intersections;
- Signalized intersections;
- Rapid flashing beacons at road crossings of the trail;
- Medians used either to improve the street crossing for pedestrians or to restrict left turns across the trail;
- Barriers, fences, or buffers separating non-motorized trail users from moving vehicular traffic or the railroad; and
- Alternative pavement treatments.

Driveway Design

Driveways that cross or intersect with the multi-use trail would also be evaluated for possible design changes. Design changes could include many of the intersection elements described above, including curb bulbs, and pavement markings and treatments. Driveways and loading docks would be reconfigured so that parked vehicles or trucks would not block the trail. Some driveways may be eliminated, relocated, or consolidated where there are multiple driveways at a single property.

Access Modifications

Some private lots may be affected where vehicle parking currently extends into the public right-of-way, or due to changes to property access from the multi-use trail. For example, striping in parking lots may be modified to prevent vehicles from parking in the right-of-way and blocking the trail, which may reduce the number of parking spaces in some lots.

1.4.2 Construction Activities and Durations

Overall construction of any of the Build Alternatives would last 12 to 18 months. Duration would vary depending on the extent of utility relocations, storm drainage improvements, and existing roadway reconfigurations including bus stop relocations. Construction would likely occur in segments, and one segment would be completed before moving on to the next segment to minimize the construction duration at any given location.

Construction of any of the Build Alternatives would consist of the following general activities:

- Demolition, including removal of pavement, curbs, sidewalks, driveways, trees, signs, bus shelters, fencing, or other features located in the new trail area.
- Construction of new roadway elements, including pavement, curbs and gutters, sidewalks, driveways, trees, bus shelters, fencing, signs, and buffer elements. Buffer elements include such things as paving, landscaping, barriers, fencing, and signage.
- Utility relocations, ranging from moving fire hydrants, stormwater catch basins, and overhead utility and power poles to the installation of new drainage facilities.

1.4.3 Construction Staging

Construction staging and scheduling are typically determined by the contractor; however, the City would specify some mandatory restrictions for the contractor. Demolition would likely be limited to a certain length of the trail; as such, the contractor would not be allowed to demolish the work space along the entire length of the trail. Rather, the project would be constructed in multiple smaller segments.

The project would generally use areas within or near the project footprint for construction staging and storing materials and equipment, including vacant lots, parking lots, and unused rights-of-way. Temporary construction offices (such as trailers) could also use these areas. Alternatively, construction offices may be located in a rented office space. All staging areas would be restored to their pre-construction condition or better.

1.4.4 Construction Traffic and Haul Routes

Construction would generate traffic to transport materials and equipment to the work site and to remove demolition debris and excess soil. The contractor would require access to the site for heavy vehicles such as dump trucks and concrete trucks, light vehicles such as pickup trucks, and heavy equipment such as excavators and compactors. Trucks would transport construction material. The contractor would determine the best construction methods, as permitted by the City and in conformance with the project construction plans and specifications. The exact number of truck trips per day during construction cannot yet be determined because project design is not yet complete. However, preliminary estimates indicate that the highest number would be approximately 20 round-trip truck trips per work day during a paving operation, spread uniformly throughout the day. City streets that could be used as haul routes include Shilshole Ave NW, NW 46th St, NW Leary Way/Leary Ave NW, and 15th Ave NW.

CHAPTER 2: REGULATORY CONTEXT

2.1 State Laws and Regulations

The environmental review process for the BGT Missing Link Project is governed by the State Environmental Policy Act (SEPA). SDOT is the lead agency. SEPA [RCW 43.21C] implementing rules [WAC 197-11 and SMC 25.05] require identification of historic, archaeological, and cultural resources eligible for listing in local, state, or federal registers. State and local historical registers, such as the Washington Heritage Register, often incorporate federal National Register of Historic Places (NRHP) criteria into their own evaluation systems. Therefore, identification of historic properties and assessment of effects in a manner consistent with existing National Historic Preservation Act (NHPA) guidelines [36 CFR 63] are among the provisions of this Discipline Report.

2.1.1 National Register of Historic Places [36 CFR 800]

Significant properties qualify for listing in the NRHP if they are least 50 years old and meet at least one of the following four criteria of eligibility:

A. Association with events that have made significant contributions to the broad patterns of our history;

B. Association with the lives of persons significant in our past;

C. Embodiment of the distinctive characteristics of a type, period, or method of construction, or representation of the work of a master, or possession of high artistic value, or representation of a significant and distinguishable entity whose components may lack individual distinction; and/or

D. Has yielded or may be likely to yield important information about the past.

In addition, NRHP-eligible properties must also possess characteristics of integrity including location, design, setting, materials, workmanship, feeling and association.

The following state laws and regulations that address historic, cultural, and archaeological resources will also be followed.

2.1.2 The Archaeological Sites and Resources Act [RCW 27.53]

This Act prohibits knowingly excavating or disturbing prehistoric and historic archaeological sites on public or private land without a permit from the Washington State Department of Archaeology and Historic Preservation (DAHP).

2.1.3 Washington Heritage Register [RCW 7.34.200 and 25-12 WAC]

The Register is an official listing of historically significant sites and properties found throughout the state. The list is maintained by DAHP and includes districts, sites, buildings, structures, and objects that have been identified and documented as being significant in local or state history, architecture, archaeology, engineering or culture. Listing in the Washington Heritage Register is strictly an honorary designation and raises the public awareness about historic and cultural values.

2.1.4 The Indian Graves and Records Act [RCW 27.44]

This Act prohibits knowingly destroying American Indian graves and requires their inadvertent disturbance by construction or other activity to be followed by re-interment under supervision of the appropriate Indian tribe.

The Discipline Report will also follow guidance provided by the DAHP's Standards for Cultural Resources Reporting.

2.2 Local Laws and Regulations

The following local laws, rules, ordinances, and guidelines also address historic, cultural, and archaeological resources and apply to this project.

2.2.1 City of Seattle Landmarks Preservation Ordinance [SMC 25.12] and guidelines

The City of Seattle's Historic Landmark Preservation Ordinance [SMC 25.12] protects properties of historic and architectural significance. An object, site or improvement that is more than 25 years old may be designated for preservation as a landmark if it has significant character, interest, or value as part of the development, heritage, or cultural characteristics of the city, state, or nation; if it has integrity or the ability to convey its significance; and if it falls under one of six criteria [SMC 25.12.350]:

A. It is the location of, or is associated in a significant way with, a historic event with a significant effect upon the community, city, state or nation;

B. It is associated in a significant way with the life of a person important in the history of the city, state or nation;

C. It is associated in a significant way with a significant aspect of the cultural, political, or economic heritage of the community, city, state or nation;

D. It embodies the distinctive visible characteristics of an architectural style, or period, or of a method of construction;

E. It is an outstanding work of a designer or builder; or

F. Because of its prominence of spatial location, contrasts of siting, age or scale, it is an easily identifiable visual feature of its neighborhood or the city and contributes to the distinctive quality or identity of such neighborhood or the city.

Under the City of Seattle's SEPA regulations, properties that are likely to meet City Landmark criteria must be formally reviewed for designation before demolition. This determination and other review decisions concerning landmarks and districts are made by the Seattle Landmarks Preservation Board. Proposed changes to the external appearance of any building or structure in the district, or to the external appearance of any other district property that is visible from a public street, alley, or way will require a certificate of approval from the District Board. Changes to the sidewalk or street itself will also require approval.

2.2.2 The City of Seattle's Department of Planning and Development Director's Rule 2-28 (DPD Director's Rule 2-98) [SMC 25.05.675]

DPD Director's Rule 2-98 is a clarification of SEPA historic preservation policy for potentially significant archaeological sites and requirements for archaeological assessment. The Rule elaborates on SEPA and provides guidance for identification, protection, and treatment of archaeological sites on the City's shorelines. As noted in the Rule, many of Seattle's existing and former shoreline areas may be sites of potential archaeological significance due to settlement patterns of Native Americans and non-Native settlers. The Rule requires applicants for projects within 200 feet of the Government Meander Line to conduct research regarding the probable presence of archaeologically significant sites or resources and to identify potential mitigation depending on the results of that investigation.

CHAPTER 3: METHODOLOGY

3.1 Data Collection

Primary data used to identify and assess cultural resources prior to field investigations for the BGT Missing Link project can be grouped into one of three categories: 1) information on previously identified cultural, historic, and archaeological resources; 2) information needed to identify resources; and 3) project information required to assess environmental impacts on significant resources.

Information about previously identified resources, including the boundaries of national and local historic districts, was gathered from the NRHP, the Washington Heritage Register, the City of Seattle list of Landmarks and Historic Resources Survey Database, the King County Historic Preservation Program database, and the DAHP's Washington Information System for Architectural and Archaeological Records Data (WISAARD) database. Archaeological and historic resources identified along the Shilshole North and South Alternatives as part of previous BGT studies in 2008 and 2010 are included in this discipline report, but were not part of the reconnaissance survey.

A study area was defined as all parcels adjacent to the alignments, as described in Section 3.2 below. The reconnaissance level survey of the study area allowed for reconsideration of previously recorded built-environment resources and for identification of areas or individual resources that are likely eligible for local, state, or federal registers. Information from the King County Department of Assessments and archival sources were used to determine the age of built-environment resources. SWCA Environmental Consultants (SWCA) has provided an evaluation of NRHP eligibility for built-environment resources recorded more than 10 years ago and previously unevaluated resources. With a few noted exceptions, resources with NRHP eligibility evaluations that were less than 10 years old were not reevaluated by SWCA. The built-environment resources were evaluated using NRHP Criterion C for significance of design and/or construction.

Field numbers were assigned to all buildings over 50 years of age within the study area. Multiple buildings present at one address were assigned individual numbers internally, but assessor's dates refer to entire parcels rather than individual structures.

Historical maps and photographs and other documents were used to identify locations where ethnographic, ethnohistoric, and historical activity occurred within the study area. Existing geotechnical borehole logs were used to help characterize stratigraphy in order to identify areas where potentially significant archaeological resources could be identified during construction.

Project information that could be used to assess potential impacts on significant resources includes the following:

- The proposed construction methods to be used and the types of planned activities at each location, especially ground disturbance and construction vibration;
- Location and extent of any ground disturbance related to the project (e.g., utility relocates, landscaping);
- Rights of way or easements to be acquired;
- Locations of construction staging areas or similar activities outside the project site; and

- The type, extent (length of time and area), and intensity of temporary effects (such as reduced access).

3.2 Selection of Study Area

Selecting the BGT Missing Link cultural resources study area involved consideration of impacts to known and potentially significant archaeological and built-environment resources. The depth and extent of ground disturbance defined those areas where the project could potentially impact significant archaeological resources. Built-environment resources within and abutting the proposed alignments and connectors were included in the study area if they were constructed before 1996, listed in or eligible for local, state, or national registers, or likely to be eligible for these registers either individually or as part of a district. The study area selection also considered the areas of potential impacts from previous cultural resources assessments of the BGT Missing Link.

3.3 Identification of Impacts

The BGT Missing Link would have an impact on significant resources if it changes the characteristics that qualify a historic property for inclusion in the NRHP or the Seattle Landmarks register. The impact would be significant if it diminishes the integrity of these characteristics. If the project affects such resources, then it could also have an impact on the quality of the human environment.

Potential alterations to the site and setting of a historic resource were analyzed to determine the degree to which the alterations would affect the resource's historic significance. To determine the potential effects on historic resources, the following information was, to the extent available, obtained and analyzed:

- For construction impacts, the type, extent (length of time and area), and intensity of temporary effects caused by the project would be identified. Examples of construction effects could include reduced access and limited parking that could affect the viability of an historic resource as well as changes in environmental conditions such as dust, debris, or vibrations that could affect the physical condition of buildings or structures. The extent to which these effects alter the condition of the historic resources would be analyzed based on experience with previous activities and events that have caused similar effects as well as scientific measurement techniques. To ensure consistency, coordination with teams analyzing other types of environmental impacts would take place.

- For operational effects, the type and extent of permanent effects caused by the project would be identified. For example, changing the streetscape in front of historic buildings or structures could alter their setting, feeling and association and thus affect the integrity of these properties. Where alterations to buildings or structures are necessary, the degree to which the alterations affect the resource’s historic significance would be analyzed using the Secretary of the Interior’s Standards for Rehabilitation.

To determine the potential effects on archaeological resources, the construction locations and methods will be evaluated in context with known or potential archaeological resources. Existing information from historical shoreline mapping and prior subsurface explorations was used to evaluate whether project elements have the potential to impact significant archaeological resources. Potential impacts will be reevaluated as more information about proposed utility relocations, landscape planting, irrigation systems, and drainage become available.

3.4 Identification of Avoidance, Minimization, and Mitigation Measures

Identification of avoidance, minimization, and mitigation measures was guided by the following:

- Federal, state, and local preservation laws, regulations, guidance, and ordinances;
- Knowledge of past projects;
- An understanding of the historic significance of resources within the project;
- Knowledge of the environmental setting;
- Construction methods; and
- Best management practices within the archaeological and built environment fields of study.

3.5 Cumulative Impacts and Mitigation Measures Analysis

Cumulative impacts were analyzed using guidelines prepared by the Council on Environmental Quality (CEQ) and the Washington State Department of Transportation (WSDOT) (CEQ, 1997; WSDOT, 2008). Much of the information that forms the basis of this analysis was developed as part of this cultural resources assessment, including defining the study area, identifying historical and archaeological resources in the study area, providing a historical context for these resources, and identifying direct and indirect impacts that might contribute to a cumulative impact. In addition, the City assisted in preparation of a master list of present and reasonably foreseeable future projects for use in identifying and assessing cumulative impacts across all disciplines.

CHAPTER 4: AFFECTED ENVIRONMENT

4.1 Selected Study Area

The BGT Missing Link study area for cultural resources includes the four Build Alternatives, a No Build Alternative, and six Connector Segments that are described from the east project terminus at the intersection of 11th Ave NW and NW 45th St to the west terminus at 30th Ave NW and the Ballard Locks. The Build Alternatives follow parallel roadways, creating a study area that is two to three blocks wide from the east to west extents. The study area includes properties directly abutting these alternatives and connectors (Figure 4-1). The major streets and avenues within the study area include Shilshole Ave NW, Ballard Ave NW, NW Ballard Way, NW Leary Way, NW Market St, and NW 56th St. Several of these roadways provide access to and through Ballard.

4.2 Natural Setting

The BGT Missing Link study area is within the Puget Lowland, a geographic province that separates the Olympic from the Cascade Mountains (Alt and Hyndman, 1995; Easterbrook, 1993; Franklin and Dyrness, 1973). The present topography of the Puget Lowland is primarily the result of continental glaciation during the Pleistocene Epoch. The ice sheet began to retreat 16,850 calibrated radiocarbon years before the present (cal B.P.) (Booth et al., 2004; Porter and Swanson, 1998). The subsequent Holocene Epoch marked the beginning of modern landscape evolution in the region (Thorson, 1989). Changing environmental conditions, such as sea-level rise, climate variation, alluvial erosion, mass wasting, and tectonic activity, throughout the Holocene have affected the kinds and distribution of resources, as well as the suitability of particular landforms for occupation. These environmental changes also affected the archaeological record in terms of site visibility and preservation. Today, the topography of the region is characterized by rolling hills interrupted by troughs that were carved by the ice sheet and later occupied by large freshwater lakes and rivers (Galster and Laprade, 1991; Liesch et al., 1963; Troost and Stein, 1995; Yount et al., 1993).

4.2.1 **Geology**

The BGT Missing Link is along the north shore of Salmon Bay in a glacially exposed and eroded trough. After glaciers left the region at the end of the Pleistocene, Salmon Bay was a dry valley and the shoreline was southwest of its modern position throughout most of the Holocene. The geologic history of Salmon Bay informs on potential for cultural resources.

Salmon Bay, as part of the Puget Lowland, is filled with glacial till, outwash, and lacustrine sediment. Similar glacially derived sediments are up to 1,750 feet (533 meters) thick in Lake Washington near the University of Washington east of the study area (Jones, 1996). These glacial sediments were deposited directly by the glacial ice and by glacial meltwater. In addition to carrying and depositing outwash from the ice, glacial meltwater accumulated in the Puget Lowland troughs as glaciers receded from the area. When recession was at its height at the end of the Pleistocene, the individual meltwater lakes formed large bodies of deep fresh water, such as Glacial Lake Russell and Glacial Lake Bretz, as they coalesced around 16,630 cal B.P. (Thorson, 1989). The study area was underwater within these large glacial lakes while they persisted.

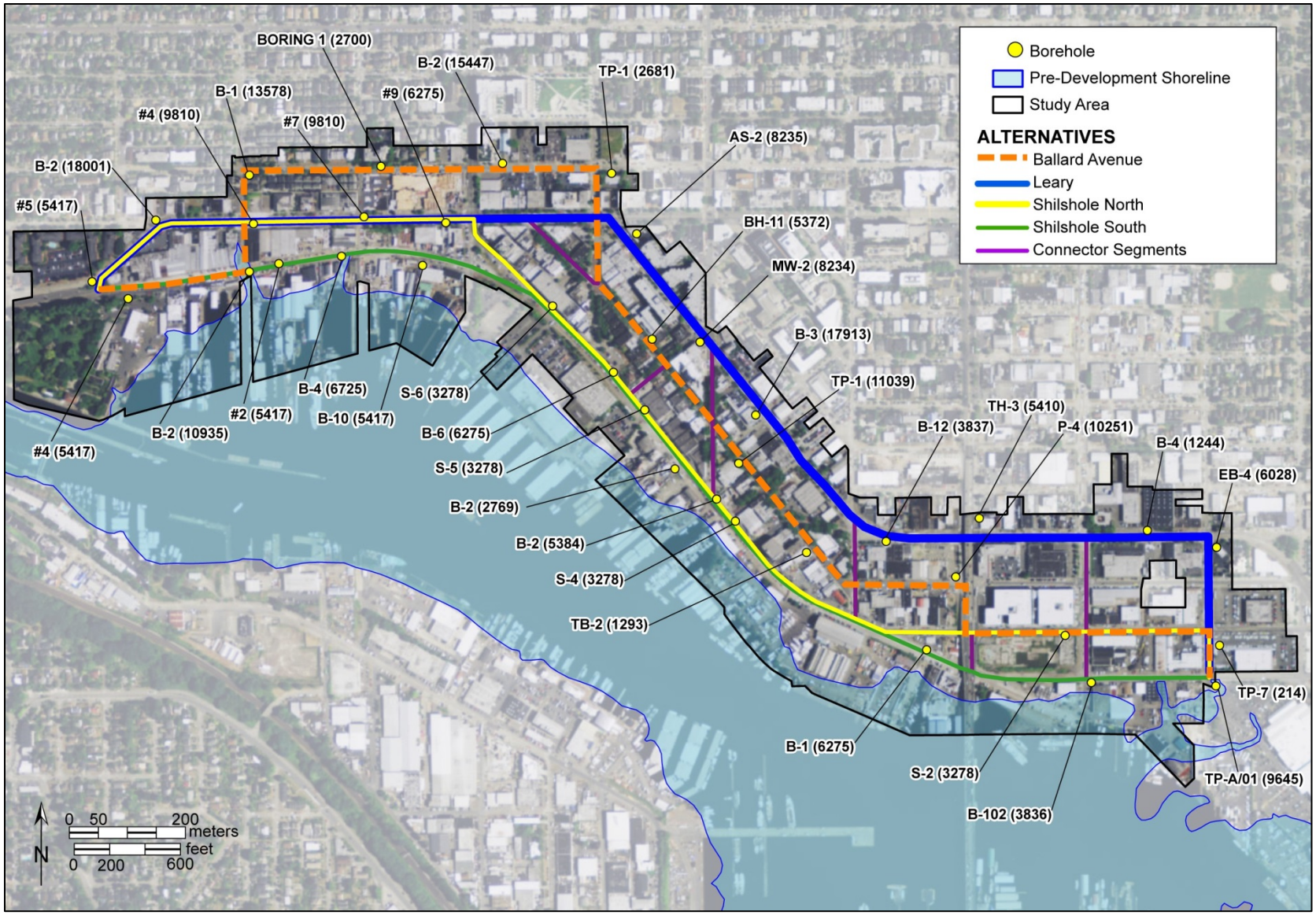

Figure 4-1. Project location showing alternative trail alignments, connector segments, the historical 1891 shoreline, and previously drilled borehole locations referred to in Figures 4-2 through 4-4.

Increased contribution of glacial meltwater into the oceans at the end of the Pleistocene caused sea level to rise around the world (Dethier et al., 1995). The ocean was higher than the modern shoreline for a short period immediately following deglaciation of the Pacific Northwest. Raised sea level allowed the remaining glacial ice to float and the large meltwater lakes drained into the Pacific Ocean via the Strait of Juan de Fuca. Marine water then inundated the glacial troughs around 14,900 cal B.P. (Porter and Swanson, 1998). Sea level in the Puget Lowland remained high until the land rebounded from the weight of the glacial ice. As a result of rebound, relative sea level in the Puget Lowland dropped below the modern shoreline during the early Holocene, exposing the study area (Dragovich et al., 1994). Rebound of the land was complete by 11,600 years cal B.P. World-wide sea level continued to rise throughout the remainder of the Holocene, so that the shoreline was within 16 feet (5 meters) of its modern elevation by about 5,000 years ago (Clague and James, 2002; Dethier et al., 1995; Thorson, 1989).

Understanding sea-level history is important when considering past use of the study area because the shoreline of Salmon Bay was lower during the Holocene. Salmon Bay supported a floodplain in which a stream flowed from Lake Union west to the sea as recently as 2,500 years ago (Downing, 1983). As such, cultural materials dating to the early and middle Holocene could be in the bottom of Salmon Bay, well below the modern shoreline. Relative sea level in Puget Sound continued to rise throughout the Holocene and the Salmon Bay area transitioned from a floodplain environment into a brackish tidal embayment after 2,500 years ago. Tectonic activity along the Seattle Fault Zone also affected sea level, deposition, and drainage patterns, causing subsidence north of Seattle and effectively raising sea level an additional 3 feet (1 meter) as a result of an earthquake approximately 1,100 years ago (Atwater and Moore, 1992; Johnson et al., 1999).

4.2.2 **Geomorphology**

The modern geomorphology of Salmon Bay is artificial. Widening and deepening of the trough between Lake Union and the Sound for construction of the Ballard Locks and Lake Washington Ship Canal between 1916 and 1934 changed the geomorphology of the relatively recently formed shoreline and added an influx of fresh water to Salmon Bay (Chrzastowski, 1983). Just prior to ship canal construction, the Salmon Bay shoreline roughly paralleled Shilshole Ave NW and wetlands were prevalent in the intertidal zone. At high tide, canoes and boats could navigate Salmon Bay and a 3-foot-deep (1-meter-deep) tidal channel flowed through wetlands in Salmon Bay at very low tides (Chrzastowski, 1983). Figure 4-1 depicts the shoreline of Salmon Bay in 1891 in relation to the study area. The Shilshole North and South Alternatives are at or adjacent to the 1891 shoreline.

Deposition of industrial fill was commonplace along the Salmon Bay shoreline in the 1890s and canal spoils were later placed along the shoreline during construction of the Ship Canal. As a result, the wetlands along the coast were filled and the Salmon Bay shoreline was extended south of its original position. Mean tide elevation in Salmon Bay rose from 6.6 feet (2 meters) above mean lower low water (MLLW) to the level of Lake Union at 21 feet (6.4 meters) above MLLW after completion of the Ship Canal (Chrzastowski, 1983). Lake Washington was subsequently lowered approximately 10 feet (3 meters) to the level of Lake Union (Galster and Laprade, 1991). Today, soils mapped in the project vicinity consist of Alderwood series soils that formed on uplands and terraces in glacial till (Snyder et al., 1973). The study area, however, does not include intact Alderwood soils because it has been fully developed and most of the area includes a considerable amount of fill.

4.2.3 **Stratigraphy**

The logs of 38 borings from 25 previously completed geotechnical investigations were reviewed in order to understand the stratigraphy of the project vicinity and the related potential for encountering archaeological resources (Aspect Consulting, 2002; Associated Earth Sciences, Inc., 2000; Converse

Consultants NW, 1994a, 1994b; Converse, Davis and Associates, Inc., 1975; Dames and Moore, 1968, 1971, 1980; Dodds GeoSciences, Inc., 2003; Fowler, 2000; Geotech Consultants, Inc., 1998, 2004; Huckabay, 1979; Mann, 1989; Metropolitan Engineers, 1968; Rice, 1989; Seattle Department of Engineering, 1995; Seattle Public Utilities Materials Laboratory, 1969, 1970, 1972, 2002; Shannon & Wilson, Inc., 1973, 1999; Terra Associates, Inc., 2003; Tobin, 1999). The boreholes show that between 1 and 17 feet (30 centimeters and 5.2 meters), mixed clayey, gravelly, silty, sandy fill is present across the surface of the study area. The fill is thickest along the Shilshole North and South Alternatives at the historical shoreline. The fill overlies silty and organic-rich Holocene-aged alluvium or weathered gravelly, silty, and sandy glacial till. Three cross-sections showing the vertical and historical distribution of the fill, Holocene, and Pleistocene strata allow for a comparison of the stratigraphy between project alternatives (Figures 4-2 through 4-4). Table 4-1 details the thickness of the fill along each alternative and the information by cross-street can be used to determine the thickness of fill along each Connector Segment. The NW Vernon Pl Connector Segment is closest to 20th Ave NW and the Ballard Ave NW Connector Segment is closest to 22nd Ave NW.

Although the geotechnical borelogs are not very detailed, a few of the geotechnicians did describe potential archaeological deposits within the fill. Table 4-2 details all of the cultural materials described on the available borelogs from borings drilled along the four Build Alternatives. Brick, metal, and wood debris are mentioned as present throughout the fill and similar deposits are expected along the Connector Segments. It appears that two dump sites exist, one near 11th Ave NW and NW 46th St and the other near 28th Ave NW and NW Market St. Wood and other debris was also found at the base of the fill. For example, historical debris was identified between 15 and 20 feet below the surface (fbs) (4.6 and 6 meters below the surface [mbs]) at 20th Ave NW and Shilshole Ave NW. Wood was found at the base of the fill along the Leary Alternative from 10 to 12 fbs (3 to 3.7 mbs) at 11th Ave NW, 7 to 9.5 fbs (2.1 to 2.9 mbs) at 14th Ave NW, and 11 to 12 fbs (3.4 to 3.7 mbs) at 20th Ave NW. The deeply buried wood and debris deposits that are concentrated at the base of the fill are more likely to be culturally significant than the bricks, wood, and metal debris found scattered throughout the upper fill because the lower deposits are on natural surfaces, are older, and in place. Most of the geotechnical borelogs did not contain enough detail to differentiate Holocene sediments from the overlying fill or underlying Pleistocene strata; however, a couple logs did detail organic-rich silty and sandy deposits in the middle of the sequence. Where present the Holocene-aged sand, silt, and peat beds are found between an average of 9.5 and 14 fbs (2.9 and 4.3 mbs). Holocene-aged deposits were most commonly encountered at the east and west ends of the project. Table 4-3 shows the provenance of the Holocene sediments that were described on the previously borelogs. These Holocene-aged sand, silt, and peat beds are alluvial intertidal sediments that were likely deposited between about 2,500 and 125 years ago. Holocene-aged deposits are also expected along the Connector Segments and the information by cross-street in Table 4-3 can be used to estimate the extent of naturally deposited sediment along each Connector Segment. The NW Vernon Place Connector Segment is closest to 20th Ave NW and the Ballard Ave NW Connector Segment is closest to 22nd Ave NW.

Pleistocene till deposits were logged below the fill and Holocene-aged sand, silt, and peat beds across the study area. Till pre-dates the arrival of humans to the region, so borelog notes concerning Pleistocene deposits were not reviewed in detail.

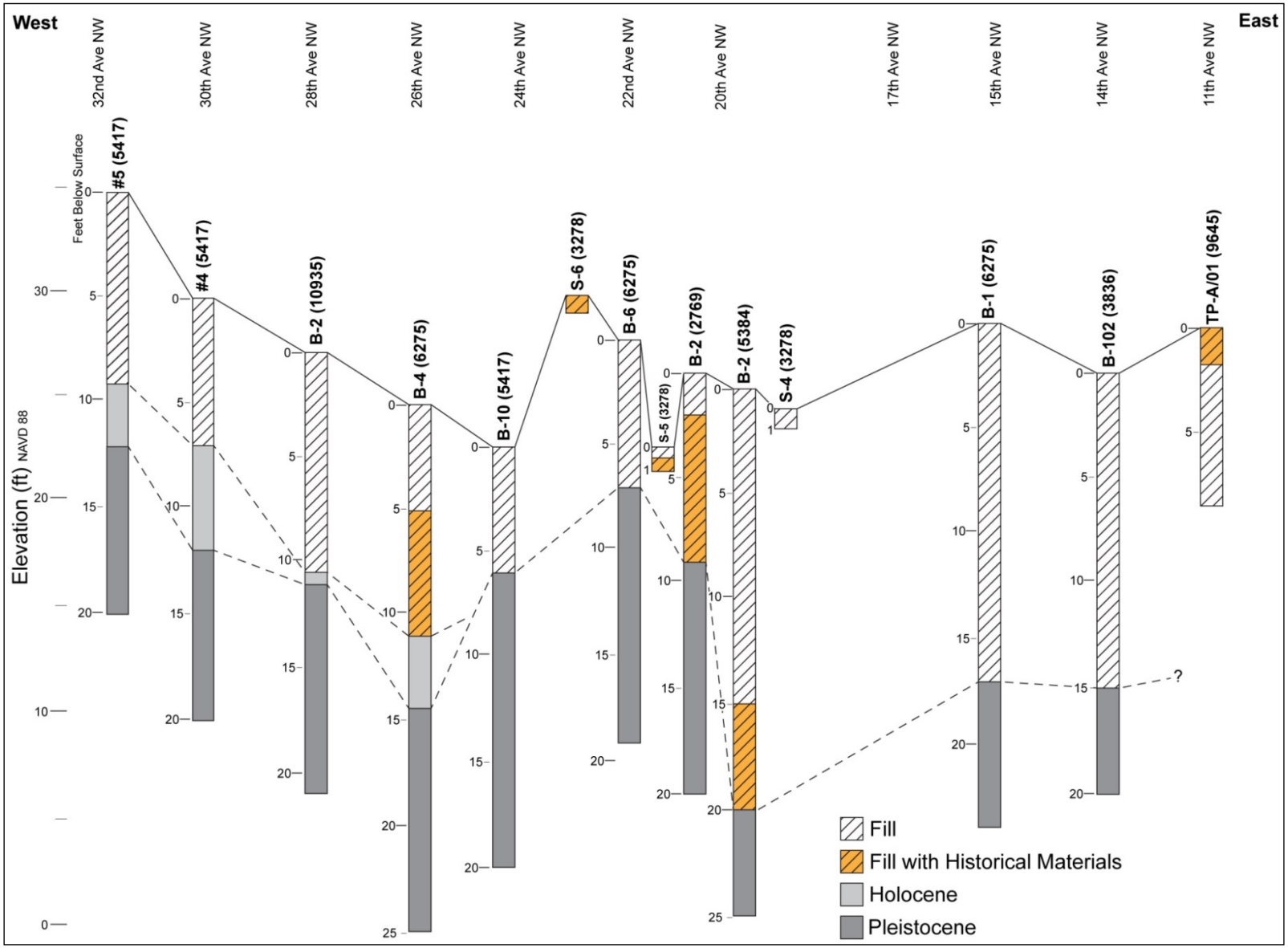

Figure 4-2. Stratigraphy cross-section along the Shilshole North and South Alternatives

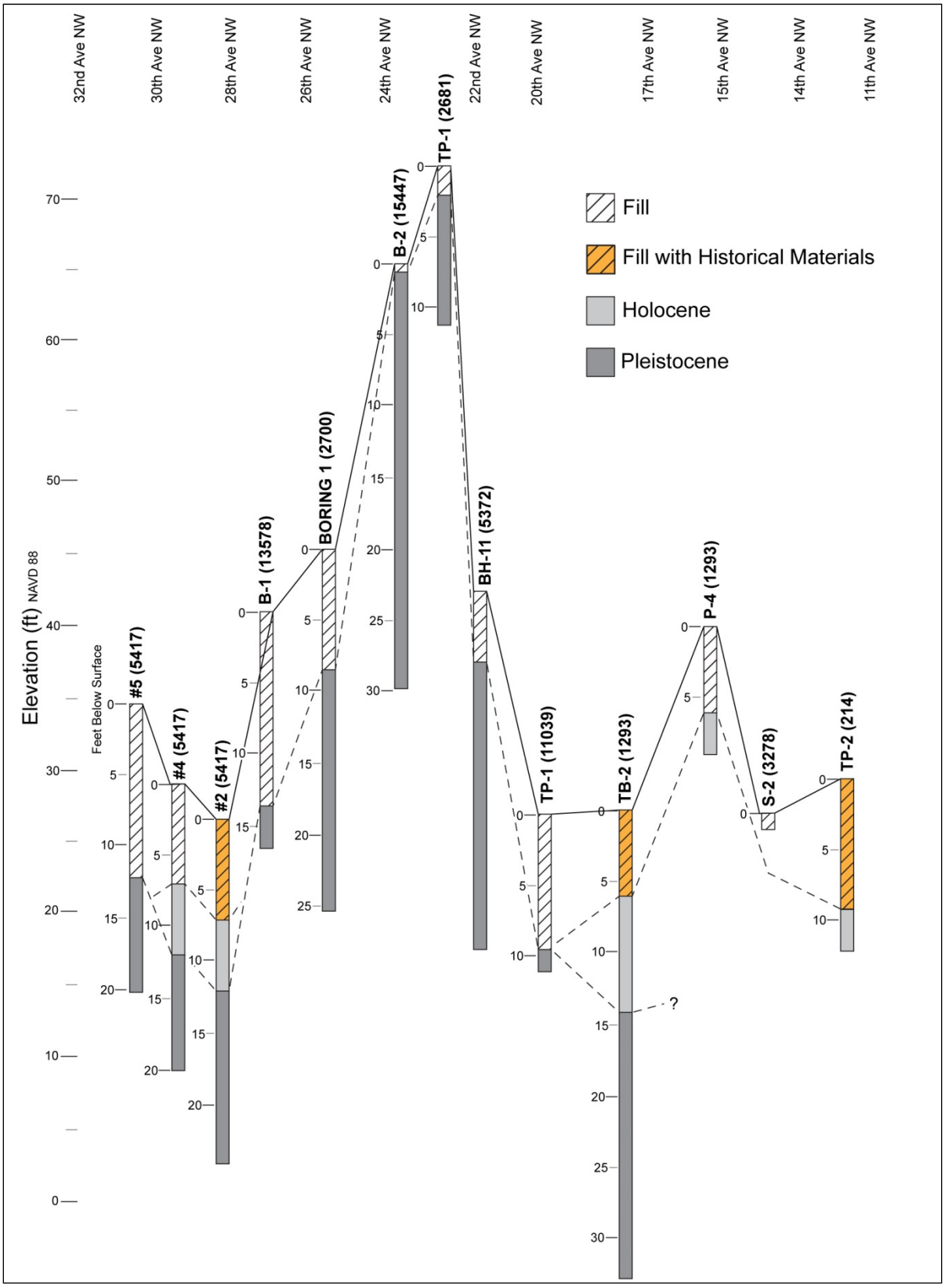

Figure 4-3. Stratigraphy cross-section along the Ballard Avenue Alternative

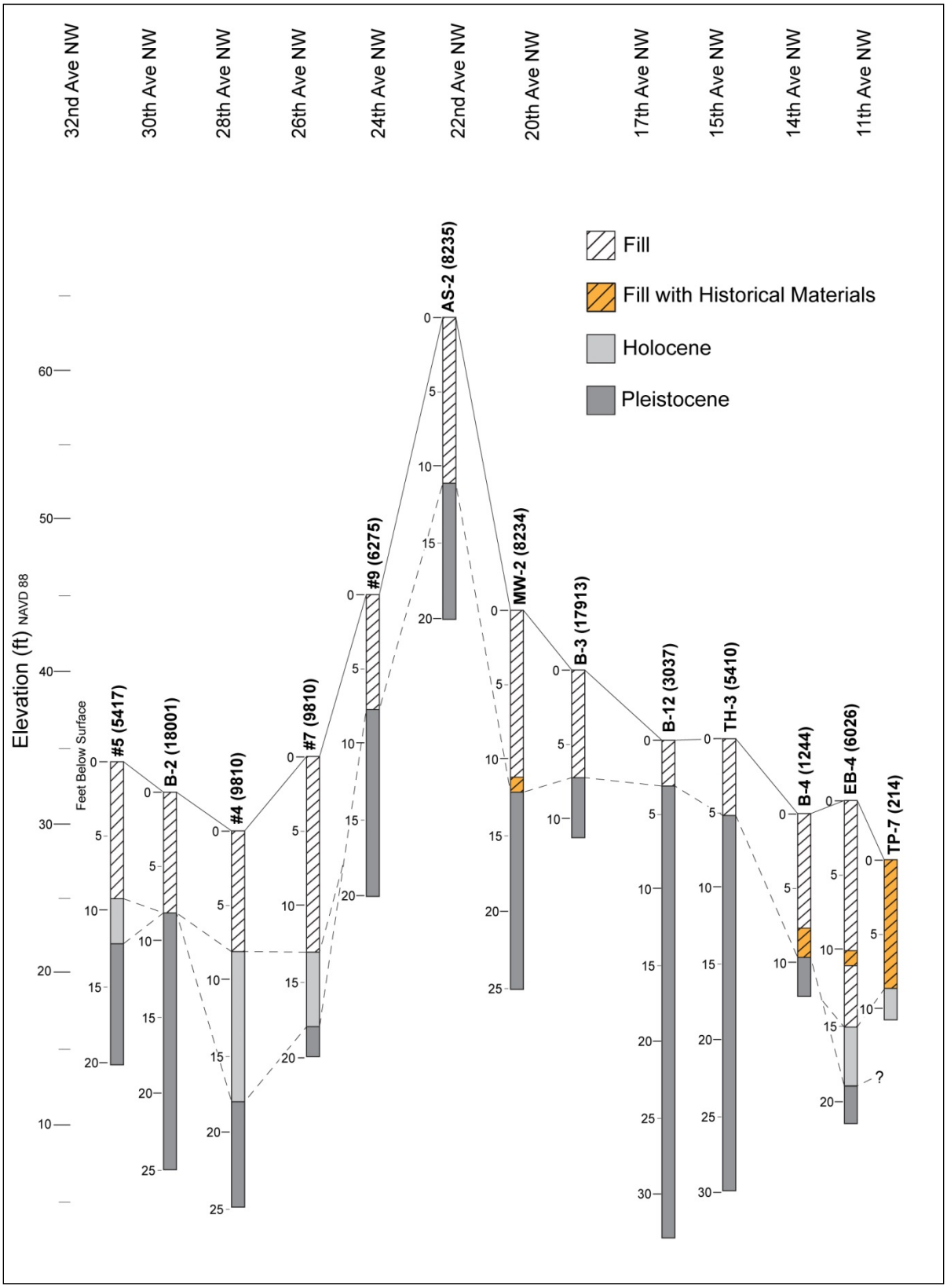

Figure 4-4. Stratigraphy cross-section along the Leary Alternative

Table 4-1. Estimated Fill Thickness in Feet (Meters) from East to West along Each Alternative

Alternative	*11th Ave NW*	*14th Ave NW*	*15th Ave NW*	*17th Ave NW*	*20th Ave NW*	*22nd Ave NW*	*24th Ave NW*	*26th Ave NW*	*28th Ave NW*	*30th Ave NW*
Shilshole North and South	8.5 (2.6)	15 (4.6)	17 (5.2)	15.5 (4.7)	14.5 (4.4)	7 (2.1)	7 (2.1)	11 (3.4)	10.5 (3.2)	N/A
Ballard Avenue	9 (2.7)	7.5 (2.3)	6 (1.8)	6 (1.8)	9.5 (2.9)	3.5 (1)	1 (0.3)	8 (2.4)	10.5 (3.2)	9.5 (2.9)
Leary	12 (3.7)	9.5 (2.9)	5 (1.5)	3 (0.9)	7 (2.1)	9.5 (2.9)	7.5 (2.3)	13 (4)	8 (2.4)	8.5 (2.6)

4.2.4 **Flora and Fauna**

Government land surveyors in the mid-1800s describe the lands within the study area as being level to gently rolling, and heavily timbered with old stands of large Douglas fir, cedar, and hemlock (United States Surveyor General, 1856). At the time of Euroamerican settlement, lands above Salmon Bay were described as heavy stands of spruce, fir, and cedar interspersed with alder, hemlock and maple with thick undergrowth of elderberry, red huckleberry, salal, Oregon grape, fern, hazelnut, and devil's club (Fiset, 2001; United States Coast and Geodetic Survey, 1896). Lowlands and meadows supported cattails, reeds, sedges, wapato, and camas and alder, cottonwood, and big leaf maples were found along waterways (Franklin and Dyrness, 1988). An early map of the inner bay shows large areas of brackish marsh, a habitat type that would have offered useful plants to Native Americans and homesteaders for food and basketry as well as habitat for wildlife, especially waterfowl like ducks and geese. Fisheries resources included Chinook, coho, and sockeye salmon and freshwater fish such as bull trout, suckers, Dolly Varden, sculpin, and numerous other fishes (Williams, 1975). Wildlife important to Native Americans and early settlers included deer, elk, bear, beaver, otter and raccoons. The bay and nearby Puget Sound shoreline provided early inhabitants with fish, clams, mussels, oysters, and other marine resources as well (Wandrey, 1975).

Table 4-2. Cultural Materials in the Historical Fill as Described on Geotechnical Borelogs

Alternative	*11th Ave NW*	*14th Ave NW*	*15th Ave NW*	*17th Ave NW*	*20th Ave NW*	*22nd Ave NW*	*24th Ave NW*	*26th Ave NW*	*28 Ave NW*	*30th Ave NW*
Shilshole North and South	Industrial debris 0–2.5 fbs	N/A	N/A	N/A	Peaty wood waste 2–9 fbs and historical debris 15–20 fbs	Metal, brick, and wood at 1 fbs	N/A	Brick fragment 5–11 fbs	RR ballast 0–1 fbs and burned wood and rust 0–10.5 fbs	N/A
Ballard Ave	Bricks and wood 0–9 fbs	N/A	N/A	Bricks and wood 0–6 fbs	N/A	N/A	N/A	N/A	Trash, brick, cans, and ash 0–7 fbs	Shell-rich fill 0–7 fbs
Leary	Battery cases and metal debris 3.5–8.5 fbs and wood 10–12 fbs	Wood and debris 7–9.5 fbs	N/A	N/A	Charred wood 11–12 fbs	N/A	N/A	N/A	N/A	N/A

Table 4-3. Depth and Thickness of Holocene Deposits as Described on Geotechnical Logs; fbs (mbs)

Alternative	*11th Ave NW*	*14th Ave NW*	*15th Ave NW*	*17th Ave NW*	*20th Ave NW*	*22nd Ave NW*	*24th Ave NW*	*26th Ave NW*	*28th Ave NW*	*30th Ave NW*
Shilshole North and South	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11-14.5 (3.4-4.4)	10.5-11 (3.2-3.4)	N/A
Ballard Avenue	9–12 (2.7–3.7)	N/A	N/A	6–14 (1.8–4.3)	N/A	N/A	N/A	N/A	7–12 (2.1–3.7)	7–12 (2.1–3.7)
Leary	8.5–10.5 (2.6–3.2)	15–19 (4.6–5.8)	N/A	N/A	N/A	N/A	N/A	13–18 (4–5.5)	8–18 (2.4–5.5)	9–12 (2.7–3.7)

4.3 Cultural Setting

Depositional environments in the Puget Lowland that are rich in natural resources, such as shorelines, have implications for human subsistence and settlement. Consequently, resource-rich environments influence the distribution of archaeological sites and other remains of historic human activity. Native American communities whose descendants are now part of the Duwamish, Muckleshoot, Snohomish, Snoqualmie, and Suquamish Tribes once used the varying environments in the project vicinity for settlement and subsistence. What we know of Native American lifeways based on physical remains and ethnography help to explain the cultural processes that link the past with the present. Understanding historic development of the area allows us to assess historic-period archaeological material and also to estimate and evaluate the potential extent of modern disturbance to archaeological deposits.

4.3.1 **Prehistory**

The earliest well-established cultural period in North America, designated the Paleoindian period, is based on a small number of isolated fluted projectile points (Avey, n.d.; Carlson, 1990; Meltzer and Dunnell, 1987). The closest was found near Lake Sammamish, about 11 miles east of the study area (Kopperl et al., 2010). Other evidence of possible early human occupation involving the pursuit of now-extinct fauna was found at the Manis mastodon site on the Olympic Peninsula (Gustafson and Manis, 1984; Kirk and Daugherty, 1978). Inferences about Paleoindian lifeways have been limited to presumptions of tool function based on the isolated stone tools and their rare association with large extinct mammals. The projectile point styles of the Paleoindian period did not persist past 10,000 years ago, when they were replaced by regional variants of lithic technology (Carlson and Dalla Bona, 1996). Although it is possible that cultural materials dating to the Paleoindian period are in the project vicinity, encountering Paleoindian artifacts during BGT Missing Link construction is unlikely.

Human occupation during the early and middle Holocene is better understood than the Paleoindian period because of several archaeological sites that represent the period from 8,000 to 5,000 years ago, locally termed “Olcott” (Butler, 1961; Fladmark, 1982; Kidd, 1964; Mattson, 1985). Typical Olcott artifacts are large stemmed or leaf-shaped points, scrapers, flake tools and blade cores formed of basalt and dacite

toolstone. Olcott sites, often located on upland terraces or lake shores, usually do not contain features, such as fire hearths or structural remains (Blukis Onat et al., 2000; Carlson, 1990; Morgan, 1999; Wessen and Welch, 1991). Age estimates of Olcott sites have been inferred based on their similarity to dated components of assemblages from archaeological sites in British Columbia, as well as using projectile point cross-dating, obsidian hydration analysis, and luminescence dating (Carlson and Dalla Bona, 1996; Chatters et al., 2011). Encountering Olcott artifacts during BGT Missing Link construction is also possible, but unlikely.

Archaeological evidence of Native Americans living around the Puget Sound between about 5,000 and 2,500 years ago is commonly found along modern shorelines. Population was rising during the middle Holocene, as subsistence gradually transitioned towards a marine resource base with seasonal economic strategies and a diminishing dependence on mammals (Ames and Maschner, 1999; Matson and Coupland, 1995). Past subsistence activities left behind observable markers in the archaeological record that tell us about the lifeways of past people. The seasonality of subsistence during the middle Holocene, for example, is evidenced by a variety of archaeological sites, site distributions, and artifact types, such as groundstone tools and toggling harpoons (Ames and Maschner, 1999; Matson and Coupland, 1995). Evidence of specialized subsistence is more common in middle Holocene coastal sites compared to archaeological sites of similar age from the interior valleys. It is possible that archaeological materials dating to the middle Holocene are in the project vicinity, and if present, they would likely be encountered along the pre-historic shoreline that is closest to the Shilshole North and South Alternatives.

Native American culture shows further differentiation based on subsistence strategy between 2,500 years ago and Euroamerican contact, during the late Holocene. Archaeological sites dating to the later Holocene are characterized by a marine-oriented culture on the Pacific Coast, a mixed marine and terrestrial economy on the Puget Sound, and an inland terrestrial mammal and riverine fishing culture (Ames and Maschner, 1999; Blukis Onat, 1987). Large semisedentary populations of Native Americans occupied cedar plank houses on protected tidal shorelines and at river confluences. Seasonal camps were used for hunting, fishing, or resource gathering during the spring, summer, and fall (Ames and Maschner, 1999). Archaeological evidence for these settlement and subsistence patterns can be seen in the greater diversity of hunting, fishing, plant processing, and woodworking tools made of local and imported materials. Wealth-status objects, status differentiation in burials, art objects, and ornaments are also represented (Ames and Maschner, 1999; Blukis Onat, 1987; Fladmark, 1982; Matson and Coupland, 1995). Similar to middle Holocene sites, archaeological materials dating to the late Holocene are possibly in the project vicinity. If present, late Holocene sites would likely be encountered just below the historical fill along the pre-historic shoreline that is closest to the Shilshole North and South Alternatives.

One of the most famous archaeological investigations in the region occurred approximately 2 miles (3 kilometers) west of the current project at the West Point Site Complex. Excavation at this site recovered archaeological midden deposits and artifacts, such as choppers, microblade tools, projectile points, fire modified rock, ground stone, shell beads, pendants, and gaming pieces that date to the middle and late Holocene (Larson and Lewarch, 1991, 1995). The West Point Site Complex began as a salmon fishery and was later used as a shellfish procurement locale. The sites in this complex were also used generally for camping because the complex was a socioeconomic and political center for different local groups. It is very likely that inhabitants of the West Point Complex visited the study area at various times throughout the year.

4.3.2 **Ethnohistory**

The BGT is in the ethnographic territory of the Duwamish, or Xacho-absh, a Lushootseed-speaking group who occupied the shorelines of Salmon Bay, Lake Union, Lake Washington, Lake Sammamish, Elliott Bay, and sections of the Duwamish, Black, and Cedar River watershed (Petite, 1954; Stevens, 1854;

United States Court of Claims, 1927; Ruby and Brown, 1992; Smith, 1940; Waterman, 1920). The Duwamish were linked by marital ties and shared use of some territory with the Suquamish to the west, Snohomish to the north, Snoqualmie to the east, and groups on the White and Green Rivers to the south collectively known today as Muckleshoot (Lane, 1987). A distinct group of Duwamish, the Shisholamish or people of the inlet, lived in the Salmon Bay area of Ballard (Waterman, 1922).

Native American place names have been recorded at important features in and around Salmon Bay, Elliott Bay, Lake Union, and Lake Washington, attesting to the presence of Native Americans in the region (Figure 4-5). Table 4-4 includes recorded place names in the immediate project vicinity and their relationship to the project alternatives. The trail project is within the boundary of *SUlSUl*, the place name for Salmon Bay, as well as the Shisholamish village that once stood on the north shoreline of the bay. The name means "shoving a thread through a bead," referring to the way the narrow estuary invades the shoreline (Hilbert et al., 2001; Waterman, 1920, 1922). The Shilshole North and South Alternatives and the Ballard Avenue Alternative are adjacent and within the boundaries of *SUlSUl*, while the Leary Alternative is one block north of the ethnographic place. The mouth of Salmon Bay that is adjacent to the west end of the project was named *SlSUlucid* or "mouth of *SUlSUl*" (Petite, 1954; Waterman, 2001). A small creek, called *betetdaq*, drained the glacial upland at the east end of the project, emptying into Salmon Bay above the Fremont Bridge (Smith, 1940; U.S. Surveyor General, 1856, 1863; Waterman, 2001). *Betetdaq* means "a kind of supernatural power" or, "a ritual" (Waterman, 2001). The creek called *Qw^{3}ula'stab*, meaning "a small bush with white flowers and black berries," was also named nearby (U.S. Surveyor General, 1856, 1863; Waterman, 2001).

Salmon Bay, Lake Union, and Union Bay were water bodies linked by streams that provided Native Americans with access to Lake Washington (Forsman and Larson, 1998; Smith, 1940; Thompson, 1988). Canoe passage from Salmon Bay to Lake Washington occurred up a small stream into Lake Union and via portage to Lake Washington and Lake Sammamish. The Puget Sound could be reached from an outlet at the southeast end of Lake Washington into the Cedar and Black Rivers and down the Duwamish River, as well. The connected waterways within and surrounding traditional Duwamish territory opened up a large area for resource gathering and trade with other groups.

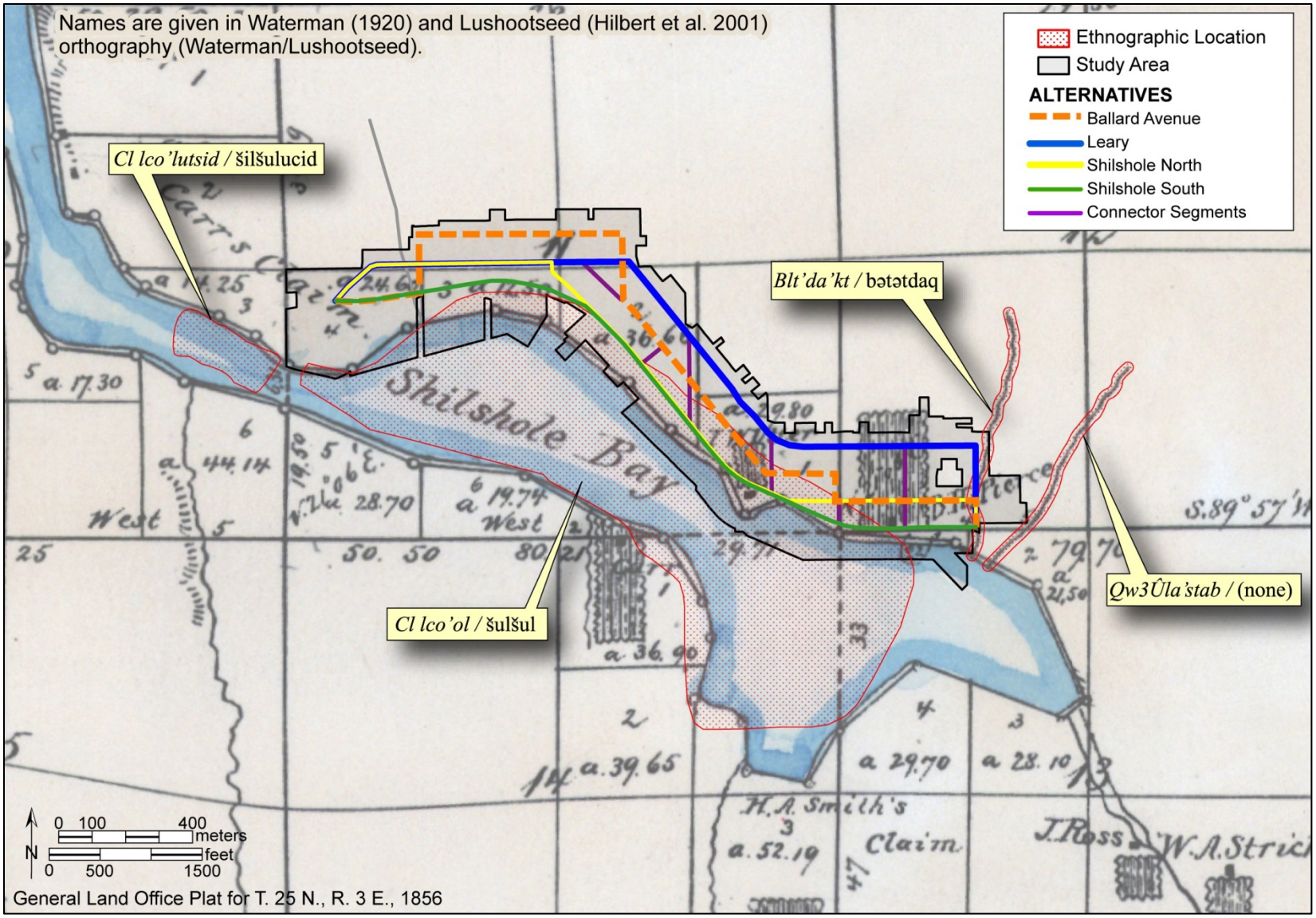

Figure 4-5. Ethnographic place names in the study area vicinity; map numbers correspond with Table 4-4

Table 4-4. Ethnographic Resources Recorded in the Study Area after Hilbert et al. (2001)

Name (Waterman 1920/ Lushootseed)	*Translation*	*Waterman (1922) Description*	*Relation to Shilshole North and South Alternatives*	*Relation to Ballard Avenue Alternative*	*Relation to Leary Alternative*
Cl lco'ol/ SulSul	Threading or inserting something	Shilshole/ Salmon Bay	Adjacent and encompasses	Adjacent and crosses	One block south
Blt'da'kt/ betetaq	A kind of supernatural power or a ritual	A very small creek	Crosses east end	Crosses east end	Crosses east end
Qw^{3}Ûla'stab/ (none)	A small bush with white flowers and black berries	A still smaller creek	Adjacent to east end	Adjacent to east end	Adjacent to east end
Cl lco'lutsid/ SilSulucid	Narrow opening that leads to SilSul	Mouth of Salmon Bay	Adjacent to west end	Adjacent to west end	Adjacent to west end

Permanent Duwamish settlements were located at Salmon Bay and Elliott Bay, among other locations, and the Duwamish had many smaller camps around Lake Washington where groups congregated to fish, harvest, and gather plant resources throughout the spring, summer, and autumn. Salmon caught in the narrow neck of Salmon Bay provided the local inhabitants with a dependable food source along with clams, crabs, and waterfowl (Wandrey, 1975; Waterman, 1922). Deer and other game were hunted in the surrounding glacial upland forests where berries, bulbs, and roots were also gathered. The Duwamish returned to their more permanent villages after making their seasonal rounds, carrying back and preserving smoked salmon, shellfish, game, and plant foods. During winter, family groups gathered in their permanent villages for spiritual song and dance (Haeberlin and Gunther, 1930; Smith, 1940). Archaeological deposits identified on the north shore of the Salmon Bay near the Burlington Northern Santa Fe Railroad Bridge have been interpreted as the possible location of the Shisholamish village (Thompson, 1988; Wandrey, 1975). These deposits include shell midden and human remains.

The traditional way of life was altered in the mid-1800s when the first Euroamerican settlers arrived in the Puget Lowland on the coattails of explorers and capitalists (Bass, 1937; Watt, 1931). An early settler's description of the village on the north shore of Salmon Bay maintains that a dozen Shisholamish families were present at the time of contact (Costello, 1974). These Duwamish provided the settlers and pioneers with labor, salmon, shellfish, baskets, and other resources until the 1855 Treaty of Point Elliott directed them to move to the Port Madison Indian Reservation at Suquamish (Thrush, 2007). Many Shisholamish left Salmon Bay in 1855, but others chose to remain in small milled lumber shacks rather than move to the reservation (Thompson, 1988). They continued to sell salmon and shellfish to local residents until they were forced to vacate their homes when the locks were constructed in 1914. The last Duwamish residents at Salmon Bay were Indian Charlie (Hwehchtid) and his wife Madeline (Chilohleet'saax). They lived in a small cedar plank cabin on the south shoreline of Salmon Bay until Madeline passed away

(Dorpat, 2003; Thompson, 1988; Wandrey, 1975; Webster and Stevens, 1903). Today, some people of Duwamish descent live among the Muckleshoot, Suquamish, Snoqualmie, and Tulalip tribal communities. As descendants of Seattle‘s native inhabitants, many of the Duwamish continue to seek independent tribal status (Ruby and Brown, 1992).

4.3.3 History

The historic development of Seattle and its surrounding area was influenced by access to both natural resources and a means to transport them. Land seekers initially chose property along navigable waterways, and communities grew where there were good harbors and nearby resources that could accommodate the growth of trade. Seattle's first settlers chose a site on Elliott Bay because of the deep and protected moorage it offered as well as accessible forest lands. For the first four decades of the town's existence, the waterfront was its most important link to the outside world. Over time, expansion of permanent settlement and the development of new industries also relied on more varied forms of transportation. Residents recognized the need to establish roads to connect them with other settlements and to encourage agricultural and industrial growth in the surrounding region. From their arrival, Seattle's founders also worked to bring transcontinental rail connections that would give the Northwest access to markets throughout the country. As the city grew, surrounding population centers were annexed and new transportation systems and other infrastructure developed to make Seattle a desirable commercial and residential center for the region.

Early Settlement

The Puget Sound area was originally part of Oregon Territory. As new migration flooded over the Oregon Trail in the 1840s and much of the best farmland south of the Columbia River was claimed, land seekers then turned their attention to the north. Non-Native settlement in the area that ultimately became Seattle first began along the Duwamish River, which flowed into Elliott Bay, and on a forested peninsula just to the north of the river's mouth. The earliest families planned to farm and staked their claims in the Duwamish Valley in September 1851, but they were quickly followed by other settlers who were more interested in commercial development. This group, known as the Denny party, chose land on a headland jutting into the bay, ultimately naming it Alki. Soon several of its members, including the Boren, Denny and Bell families, broke off from the rest and located claims along the eastern shore of Elliott Bay in February 1852. In addition to its more protected harbor, the site also offered extensive forest lands, stretching inland from the waterfront, which would provide better logging opportunities. With the addition of newcomers David S. "Doc" Maynard, who was interested in the commercial salmon trade, and then Henry Yesler, who built a steam sawmill, the nucleus of the original Seattle settlers was in place by the following year (Denny, 1979:15, 39; Eals, 1987:14, 17, 19; Newell, 1977:30–32, 37).

The new settlement was located in King County, which was originally established by the Oregon Territorial Legislature in December 1852 and included a huge expanse of land in central Puget Sound, extending from the Cascade Mountains to the Pacific. Within a few months, in March of 1853, Congress officially created Washington Territory out of the northern portion of Oregon and the first plat of Seattle was filed a few weeks later. Additional settlement had already begun in other parts of the county surrounding this new commercial center, and claimants could gain land in several ways. The cash entry system, which was initially established so that the federal government could bring money into the treasury, allowed individuals (and ultimately companies) with cash to purchase unclaimed lands with few restrictions. Policies had begun to change with the Preemption Act, first passed in 1841, and ultimately the Donation Land Act of 1850 and the Homestead Act of 1862, all of which were programs that established the principle of free or low-cost land and encouraged the transfer of these lands from the government into the hands of private individuals (Gates, 1963:315–317, 330, 338).

Through the Donation Land Claim Act, Congress had provided the early residents of Oregon Territory with very generous land grants, and these provisions were also extended to residents in the newly formed territory of Washington through 1855. In Washington, individuals could claim 160 acres and their wives an equal amount as long as they lived on and cultivated the land. The Homestead Act, which was applied nationwide, offered 160 acres to any settler who resided on and improved a tract of land for five consecutive years. A settler also had the option to purchase the land for $1.25 an acre after six months of residency. At the same time, the cash entry system remained in place, and in Washington, rampant speculation through large purchases continued (Shannon, 1945:56; Opie, 1987:55–56; Gates, 1963:315–321).

Shoreline property was in particular demand, and along a bay that extended inland to the north of the Seattle settlement, several early claimants filed for land. This inlet was originally shown as Shilshole Bay on the January 1856 General Land Office (GLO) survey map (Figure 4-6), but ultimately became known as Salmon Bay. Like many other parts of the new territory, the land was occupied by a mix of farmers and entrepreneurs who planned to stay in the area, but also speculators and drifters who took advantage of available opportunities and then moved on. Since claims could not be filed until a government survey was recorded, property often changed hands before official ownership was established. Among the early settlers who originally filed claims for land along the north side of the Salmon Bay waterway were Ira W. Utter, Osborn Hall, John Ross and Lemuel Holgate. Others, including John Carr, Burleigh Pierce and Francis McNatt, had likely taken up these lands even earlier, but gave up or possibly sold their interest to subsequent settlers and moved on (GLO Survey Plat, Jan.11, 1856; Washington Tract Book, National Archives and Records Administration [NARA], Seattle).

The largest landowner along Salmon Bay's northern waterfront was Ira W. Utter, who initially filed a Donation Claim for 156.6 acres in parts of Sections 11 and 12 of Township 25 North, Range 3 East. Utter, a native of New York, had arrived in Washington Territory in August 1853, and in July 1855 took up the land previously settled by an even earlier pioneer, Francis McNatt. McNatt, who had crossed the plains in 1852, had evidently resided at Salmon Bay for a few years before moving to South Park, where he then filed a Donation Claim (GLO Tract Books, NARA; Rhodes, 1992:129, 184).

Immediately to the east of Ira Utter on Salmon Bay was land officially claimed by Osborn Hall, who according to local history accounts was a friend of Utter's and came with him to Seattle via San Francisco. Hall filed a pre-emption claim in May of 1860, paying $1.25 an acre for nearly 169 acres. The 1860 census, however, shows Oliver Hall, who was originally from Maine, as the landowner adjacent to Utter, so it is not known whether the two are the same person or possibly related. The survey plat indicates that even before Hall's ownership, another settler, Burleigh Pierce, occupied and likely farmed the same land. Pierce, who came to the area with his brother in 1853 and served as a King County delegate to the territorial Democratic Convention in 1855, had apparently begun the application process for a Donation Claim on Salmon Bay, but never completed it (Donation Land Claims in Washington Territory, 1852–1855, Office of the Secretary of State, Washington State Archives, Digital Archives, http://digitalarchives.wa.gov; GLO Survey Plat 1856; GLO Tract Book, NARA; Bureau of the Census 1860; Rhodes, 1992:147; Reinartz, 1988:17–18).

Another claimant to the east of Utter who had filed a Donation Claim was John Ross, who emigrated from Ohio to the region in the fall of 1852 and made his entry in the following spring. Ross worked as a carpenter and millwright, but also farmed his land at the head of Salmon Bay with his wife, Mary. The couple had a number of children, and the first school for local families was established on their property (Reinartz, 1988:20; Rhodes, 1992:159; Washington Donation Land Claim O-528, NARA).

Figure 4-6. General Land Office survey map, 1856

To the west on both sides of the mouth of the bay, Lemuel Holgate also filed a Donation Claim. Holgate came west from Iowa with his mother, siblings and their extended family as early as 1853 and he made his entry in March of 1855. His brother-in-law Edmund Carr also took a claim across Salmon Bay to the south. Holgate did not remain on this property very long, as he later filed for a homestead along the western shores of Lake Washington and then moved to White River and Kent. Early survey maps show J. Carr, likely John Carr, a brother of Edmund Carr, as the occupant of some of the Salmon Bay property in 1856 (GLO Survey Plat 1856, NARA; Rhodes, 1992:53, 90; Washington Donation Claim O-403, NARA).

Life was disrupted during this period by a series of skirmishes between Native peoples and settlers that became known collectively as the Treaty Wars. Washington Territorial Governor Isaac Ingalls Stevens had negotiated with Puget Sound-area tribes during the winter of 1854–1855 to sign treaties that ceded large amounts of land in exchange for designated reservations. Discontent with the terms of the treaties and continuing incursions on reservation lands led to hostilities throughout the region. Settlers around Puget Sound fled to blockhouses built for protection and the naval sloop-of-war *Decatur* spent nine months along the coast to guard American interests. In late January 1856, the Seattle settlement briefly came under assault in an incident that later was referred to as the Battle of Seattle. Two settlers were killed, including Lemuel Holgate's brother Milton, and although the conflict was over quickly, new settlement was slower to revive (Bagley, 1916:110–112; Bancroft, 1890:108–123; Denny, 1979:68; Eckrom, 1989:90–95; Harmon, 1998:78–80; Meeker, 1905:352).

Some early settlers never returned to their property, while others tried to recoup their losses. Once the uprisings ended, Ira Utter was among the individuals who filed claims against the government for damages during the depredations. He listed his 16' by 20' cabin, his canoe, household items and crops as destroyed during the fighting. Utter rebuilt and added to his holdings over the next decade by filing cash-entry claims on five more parcels that bordered Salmon Bay. He was also said to have purchased the neighboring land that was owned by Osborn Hall, ultimately amassing more than 820 acres. An intellectual but reclusive figure, Utter was taken into custody by the county sheriff for insanity in 1870 and ultimately was sent back to his family home in New York, where he died a few years later (Reinartz, 1988:17–19; Rhodes, 1992:184).

Land Development

Seattle's population grew steadily after the period of Indian uprisings, and the large piece of property owned by Ira Utter on Salmon Bay soon became an ideal site for development. Much of the land was still heavily forested, and logging camps dotted the landscape as the old-growth timber was cut and hauled away to be processed and shipped to California and other destinations. Soon these cut-over lands as well as the fields along the bay that early settlers had cleared for cultivation and grazing were platted into residential and commercial lots. A farmer, D.W. Crooks, had first purchased much of Utter's land in 1871, but after his death by suicide in 1878, the property became the subject of litigation. In 1882 nearly 720 acres of the former Utter holdings were sold to Judge Thomas Burke, a prominent Seattle attorney, federal judge and extensive landholder. Burke and his wife platted the Farmdale Homestead in June of 1882, laying out 72 lots that were primarily ten acres in size. The plat imposed a grid pattern of streets with the lots along the southern portion following the meandering shoreline of Salmon Bay. A county road bisected the development, but access to the property from the south was difficult because of the waterway, and sales of the lots were initially slow (King County Recorder, Farmdale Homestead Plat; Reinartz, 1988).

The Burkes soon joined forces with a number of other prominent Seattle-area investors to form a new land development venture, the West Coast Improvement Company. In addition to early Seattle pioneers Arthur Denny, John Leary and Dexter Horton, another participant was Captain William Ballard. Ballard,

who had a background in civil engineering and surveying, had become a successful steamboat captain and eventually co-owner of the sternwheeler *Zephyr*, which was part of the growing "Mosquito Fleet" that provided transport to communities throughout Puget Sound. Ballard saw the potential for future development along Salmon Bay and opened a hay and feed store to supply the logging outfits and farmers in the area. In the course of business he had received 160 acres of logged-over land in payment for a debt owed to the store, and that property became part of the development planned by the West Coast Improvement Company (Reinartz, 1988:23, 24, 26; Wandrey, 1975:59, 65).

Daniel Gilman, who was Burke's partner in several other ventures, may also have been involved in the West Coast Improvement Company. Gilman was an attorney who had moved to Seattle from New York and used his financial contacts to help Burke and his associates raise funds for railroad and streetcar development. One biographer described him as "an inveterate optimist and a shoestring operator with a talent for keeping up appearances among moneyed people" (Nesbit 1961:96-97). Gilman had purchased several hundred acres of land between Smith Cove and Salmon Bay to the south of the Burke property in anticipation of future transportation improvements and stood to gain from any new development in the vicinity. When the West Coast Improvement Company was incorporated in August of 1887, the first plat filed was called Gilman Park, possibly in honor of Gilman's friendship with Burke or his enthusiastic support for local development (Nesbit 1961:256-257, 267; Reinartz 1988:21, 26).

The Gilman Park plat included 3000 small residential parcels as well as larger lots for industrial and commercial development along the Salmon Bay waterfront. A number of other supplemental plats followed this initial offering, ultimately incorporating property owned by Ballard, Burke, Leary and other early landholders. The company aggressively promoted lot sales, recruited businesses, and also built new infrastructure to make the site more appealing for development (King County Recorder, Map of Gilman Park; Reinartz, 1988:26–27).

Transportation

From the earliest days of settlement, access to the northern shores of Salmon Bay was the main stumbling block to rapid development. The partners in the West Coast Improvement Company recognized the need for expanded transportation systems to ensure successful land sales and began to invest in a variety of infrastructure improvements. In 1889 one of its first efforts was to build a wooden wagon bridge across Salmon Bay for easier access from the south. The company planked some major streets and pressured the county to improve its road system (Reinartz, 1988:26).

Several of the West Coast Improvement Company investors were also involved in street railway development.to the north end. The difficulty of crossing waterways and climbing Seattle's steep grades had slowed the evolution of public transportation in Seattle, but in 1884 construction had begun on the city's initial horse-drawn street railway. In 1888 several local businessmen, noting the success of the San Francisco system, built the first cable car line in the Northwest, which ran from the waterfront to Lake Washington. Electrified streetcars soon overtook this type of system, however, and the Seattle Electric and Power Company opened its first line, running from the central city to Lake Union, in March 1889, with plans to continue to Fremont and beyond. Competition quickly heated up, and Ballard, Burke, Gilman and other West Coast Improvement Company investors organized the West Street and North End Railway Company in January 1890 to bring passengers to their development. The route ran from downtown Seattle north along the waterfront to Smith Cove and then turned eastward to Ballard (Bagley, 1916: I-436–441; Blanchard, 1968:15–16, 21, 26).

The proliferation of street railways undercut their profitability and beginning in 1900 the Stone and Webster Company of Boston purchased and consolidated most of these lines, adding the West Street and North End Railway to their system in early 1901. By the next year Ballard also became the southern

terminus of the Everett and Interurban Railway line, which planned high-speed electric railway service northward to Everett. Construction began in late 1902 and by 1905 had reached 15 miles to the north, providing further impetus for new development in the areas it served (Bagley, 1916:I-440–441).

In addition to streetcar lines, several of the investors in West Coast Improvement were also heavily involved in railroad development. Seattle had been seeking transcontinental rail connections for a number of years since the Northern Pacific had initially chosen Tacoma as its West Coast terminus. In 1885 a homegrown rail line, the Seattle, Lakeshore and Eastern (SLS&E), was incorporated by Judge Burke, Daniel Gilman, and a number of other prominent local businessmen. The group planned a railroad route east across Snoqualmie Pass to the inland Northwest and also a northern connection to Canadian transcontinental lines. Gilman and Burke were able to raise enough interest among Eastern capitalists to finance the survey work for the SLS&E in late 1886 and to begin actual construction in 1887. The work moved quickly and by April 15, 1888, the company had laid rails from the downtown area to Salmon Bay, around Lake Union and Lake Washington and on to Issaquah, then known as Squak. The railroad soon began to have financial difficulties and, after efforts to proceed independently failed, its backers flirted with several major rail lines. The Northern Pacific finally stepped up in 1891, purchased a majority of the stock, and helped to complete the line to the international border (Armbruster, 1999:151, 100–101, 122–123, 136–137; Dorpat, 2006:12; Nesbit, 1961:129).

The SLS&E provided access to Salmon Bay from the south, and in addition to freight and passenger service, the railroad also developed small two-car suburban trains that ran from the downtown depot to the waterway beginning in February of 1889. Passengers initially disembarked and used the wagon bridge built by West Coast Improvement to reach Gilman Park, but local legend suggests that the conductor, knowing the role William Ballard played in the new development, called the stop Ballard Junction. (Armbruster, 1999:132–134; Reinartz, 1988:26, 33, 57–58).

Ballard received additional railroad service when the Great Northern Railroad, James J. Hill's independent transcontinental line, also chose to make Seattle a West Coast terminus. Hill named Thomas Burke, the former SLS&E backer, as his representative, and quickly secured land at Smith Cove for rail yards. As the line pushed west from Minnesota, crews hired by its local subsidiary, the Seattle and Montana, began to lay track along Puget Sound in the summer of 1890. The railroad crossed Salmon Bay on a trestle and extended along the Ballard waterfront before heading north. The tracks followed the Sound to Port Gardner and then turned east across what became known as Stevens Pass (Armbruster, 1999:167–168).

Maritime Businesses

Despite these additions to Seattle-area transportation systems, the maritime industry also continued to thrive, and the Salmon Bay waterfront became the home for a number of marine-related businesses. Boat construction, drydock, and repair were among the important Ballard industries, but local companies also provided moorage, fueling, and towing as well as various types of maritime equipment and supplies. The fishing industry also had its own set of businesses along Ballard's waterway. Initially, most of Seattle's major shipyards were located along the city's central waterfront, but particularly during the period of growth after the Great Fire of 1889, many of these types of businesses were established or rebuilt in outlying areas, including Ballard. The gold rush to the Klondike helped to stimulate demand for new supply ships and barges, and the introduction of gasoline-powered boat engines around 1894 also provided the Ballard yards with additional opportunities in small vessel construction. Both the lumber and fishing industries also created demand for new ship design and construction (Bagley 1916:II-621–622).

John J. Holland and Thomas W. Lake were among the first Ballard shipbuilders who established their yards along Salmon Bay around 1890. Holland, whose business was located near the foot of what later

became 24th Avenue NW, constructed two marine railways that allowed him to haul large steamboats and other vessels in and out of water. A well-known local steamer, the *Bailey Gatzert*, was one of the early ships launched from the Holland yard, and Holland also constructed a number of other sternwheel steamboats used around Puget Sound and in the Alaska trade. Nearby, Lake's shipyard also built several large steam freighters in the early 1890s as well as ferries. They were soon joined by additional yards on the south side of Salmon Bay. When the Klondike rush peaked in 1897 and 1898, several more shipwrights established facilities along Shilshole Avenue in Ballard, while new firms took over earlier companies. Murphy and Miller, Frank Borzone, Charles Hennigar, and Heckmann and Hanson were among the maritime ship builders operating in Ballard by 1900 (Bagley, 1916: II-621; Polk, 1890:851; Polk, 1892:1053; Polk, 1895:909; 1898:17, 1180; Polk, 1900:1250).

Milling Industry

To encourage additional growth, the West Coast Improvement Company had also offered incentives for other types of businesses to locate in its new development. The Seattle economy was beginning to diversify by the 1880s, but lumber manufacturing still dominated the region's resource-based industries. In late 1887, West Coast Improvement formed a partnership with lumberman J. F. Sinclair to build a sawmill and lumber yard, the Gilman Park Lumber Company, on one of the Salmon Bay tracts. In the following year, a group of Michigan lumbermen also purchased waterfront lots and began construction of another large sawmill. The plant was purchased by Charles Stimson, a member of another Great Lakes timber family, and he and his brothers formed the Stimson Mill Company. The Stimsons soon became the largest lumber producers in Seattle, known for their efficient mill operations. Seattle Cedar added to this expanding industrial base with its sawmill, which opened in Ballard in 1890 (Cox, 1974:239–240; Ficken, 1987:60; Polk, 1889; Reinartz, 1988:26–27).

The growth of the Salmon Bay industrial area was further spurred by Seattle's Great Fire of 1889. At least thirty blocks encompassing nearly 116 acres had burned, and in addition to much of its commercial and residential core, most of the city's major wharves and factories, including the Yesler sawmill, were also destroyed. The city began to rebuild immediately but the owners of some industrial plants, including Yesler himself, chose to move their facilities to less expensive locations on Lake Union or Salmon Bay (Beaton, 1914:10; Warren, 1989:18–28; Klingle, 2001:44).

The local demand for lumber was high during Seattle's rebuilding period, but it was shingle manufacturing that ultimately dominated Ballard's industrial development. Railroad access, and particularly the area's increasing number of transcontinental connections such as the Great Northern and Northern Pacific allowed local mills to market across the United States. High demand from Midwestern farmers initiated a "shingle craze," according to one timber industry historian, and by 1893, Ballard had become the world's largest producer. The 1894 commercial directory shows at least 8 shingle plants in Ballard, with a number of others likely having Seattle offices but mills along Salmon Bay. By 1904, one account suggests that Ballard boasted at least 20 mills and produced more than 3 million shingles per day (Ficken, 1987:60–61; Pheasant-Albright, 2007:57; Polk, 1894:976).

Other Industrial Development

Other industries joined the lumber and shingle manufacturers and boat builders along the Ballard waterfront. The Sanborn Fire Insurance maps of 1905 show a number of plants that likely provided parts, equipment and services for the milling and rail industries as well as other clients throughout the region. These businesses included two ironworks, several machine shops, a boiler works, a pipe manufacturer and an artificial stone producer. Warehouses and other storage facilities were also located in fairly close proximity to the industrial plants, rail lines, and ship yards that were accessed by the road that became

Shilshole Ave NW. The Ballard industrial district also included a candy factory and a food processing plant (Sanborn, 1905).

Community and Infrastructure

Just as Seattle's Great Fire of 1889 had contributed to Ballard's industrial growth, so, too, did it have a significant impact on Ballard's development as a community. The fire leveled much of the commercial center of Seattle and led to a massive rebuilding effort that ultimately shaped growth patterns within the city as well as in outlying areas. The opportunity to start again allowed Seattle to put in place a new infrastructure of water and sewage lines, replat and widen streets and reconfigure other transportation systems. Once rebuilding began, most new residential construction in the downtown area consisted of lodging for workers, while new single-family homes were built around the city, extending into the growing suburbs reached by the railroads and streetcars (Buerge, 1986:113, 115; Sale, 1976:53–54, 59; Warren, 1989:44–48).

Ballard, with its new transportation access and plentiful lots for sale, was one of the areas that experienced significant population growth during this period. By federal census count, nearly 1200 residents had already settled there, and many began to push for municipal status for their community. As a result, the town of Ballard was incorporated in January of 1890. This action also forestalled any takeover move by the City of Seattle, which in 1891 significantly expanded its boundaries by annexing almost all of the land that reached to the southern edge of Salmon Bay as well as to the north of Green Lake (Phelps, 1978:216–218; Reinartz, 1988:33).

Residential areas continued to grow as workers chose to move where there were jobs. Throughout the 1890s Ballard remained an independent municipality with a population second only in size to the City of Seattle within King County. Single men predominated and a number of boarding houses and hotels dotted the streets close to the waterfront areas. An increasing number of homes were built on residential lots originally platted by West Coast Improvement Company, but realty firms also began to advertise newly developed lands ringing the Ballard community. Despite this rapid urban growth, within a mile of Salmon Bay large forested areas and small farms still predominated into the early 1900s. Gradually Ballard's population became more diverse as newcomers flooded into the area. By 1910 more than half of Ballard's residents were foreign-born, with a particularly sizeable percentage of Scandinavian descent (Reinartz, 1988:40, 44–47; Wandrey, 1975:91, 94).

A small commercial district primarily centered on Ballard Ave, which paralleled the heart of the industrial area along Shilshole Ave NW and the Salmon Bay waterfront. Among the earliest enterprises were a feed store, pharmacy and multiple saloons. Dry goods dealers, grocers, butchers and bakeries also had storefronts in the area and several livery stables served the community. Many of the merchants initially maintained their own plank sidewalks and often muddy streets made winter travel difficult (Reinartz, 1988:35, 37, 38).

Once Ballard was incorporated, the city government began to establish more infrastructure and services. Most roads remained dirt, but planking was used to address the often muddy condition. A volunteer fire department provided protection and ordinances established building codes and other fire prevention measures. Kerosene and oil lamps for lighting were replaced with a publicly owned system after the town council passed an ordinance and bonds were issued to fund an electric light plant in 1894. The West Coast Improvement Company had originally provided water from a spring for the Gilman Park development, but as the population grew, this water supply was insufficient to meet demand. The city took over the improvement company's system and tried to develop new wells, but ultimately was forced to purchase water from the City of Seattle beginning in 1902. Most of this water was piped from the city's Lincoln Park reservoir (McWilliams, 1955:13–14; Reinartz, 1988:57–58, 60–61).

Ultimately water became the primary issue in the decision whether Ballard would seek annexation by the City of Seattle. The city's boundaries had increased with continued population growth, moving northward from Queen Ann to Lake Union and then Green Lake. Unlike most other communities, many citizens of Ballard were against annexation, but negotiations over water rates finally pushed town residents to vote for annexation in 1907. In addition to linkages to the city water and sewer system, other immediate results of annexation were name changes for most of Ballard's major streets with the exception of the central waterfront area along Salmon Bay for continuity and ease of identification (Beaton, 1914:32; Phelps, 1978:218, 230–231; Reinartz, 1988:61, 63–64; Warren, 1989:4).

Ship Canal

Another major change for the community was the development of the Lake Washington Ship Canal, a massive project to connect Lake Washington and Puget Sound with a canal that included a masonry lock and spillway dam in the section of Salmon Bay adjacent to Ballard. For decades, some of Seattle's leading citizens had pushed for construction of a navigable waterway to Lake Washington that would allow easier access for shipping of raw materials and the possibility of additional industrial development and protected moorage along the lakeshore. Among the proponents were Judge Burke and some of the other West Coast Improvement Company investors, who also saw the benefits for real estate development. Their initial efforts were stymied by a competing group led by former governor Eugene Semple, who by 1894 had begun construction of a canal that would link the south end of the city with Lake Washington and use the spoils to fill the tidelands and create more useable ground for development (Berner, 1991:17–18; Ficken, 1986:11–14).

The battle became very political and the Burke-led group continued to advocate for a north canal, turning to the federal government for funding of the effort. Burke, who was also the attorney for the Great Northern, used the railroad's influence to exert pressure on the City of Seattle and the Army Corps of Engineers to develop a canal that would utilize a route from Shilshole Bay through Salmon Bay. The railroad's resources ultimately decided the issue. Burke and his fellow developers then deeded much of the land to the government in 1900, and initial excavation to improve shipping access between the Sound and Salmon Bay began in the following year. Additional work on a channel between Salmon Bay and Lake Union was completed by 1903. At the same time Burke's group filed lawsuits against their rivals, stalling construction on the south canal for several years and more importantly straining their competitors' financial resources so that eventually Semple's company was forced out of business (Berner, 1991:131–132; Ficken, 1986:16–20).

Ultimately, Major Hiram M. Chittenden of the Army Corps of Engineers stepped in and conducted a study in 1907 that proposed a plan for completing the north-end canal. At this time, many of the Ballard mill owners objected to the twin locks that were in Chittenden's plans for the western end of Salmon Bay, claiming they would raise the water level and cause them great financial hardship to rebuild docks and other parts of their plants. Legal challenges slowed progress, but ultimately a large federal appropriation allowed the US Army Corps of Engineers to undertake the project as proposed by Chittenden. Groundbreaking began in November of 1911 and by its dedication in July of 1917, the 825-foot canal with locks 80 feet in width was completed. The project enabled large naval and commercial vessels to enter Lake Washington and dramatically increased the amount of protected moorage available. The construction also significantly altered the Salmon Bay shoreline, affecting the size and location of many of the docks and waterfront structures along Shilshole Ave NW, in particular. The canal had a major economic impact on Ballard and continues to be an important water transport corridor. In the 1970s a new fish ladder, public viewing area, parks and trails were added that have also contributed to its impact as a tourist attraction (Dorpat and McCoy, 1998:57–59; Ficken, 1986:17–19; McRae, 1988:87–94).

Modern Ballard

Ballard, like the rest of Seattle, experienced dramatic changes to its economic fortunes and built environment over the decades following the World War I era. The Depression led to losses in population and a sharp decline in the value of its manufacturing base that lasted for several decades. Then as hostilities in Europe moved the world toward war once again, shipbuilding and the production of war-related products, including lumber and steel, led to a revival of some of the industrial base. In the post–World War II era, the focus of the transportation industry changed, rail traffic declined significantly, and by 1971, the line through Ballard, which had become part of the Burlington Northern system, was abandoned. In 1978, one section of this right of way became the BGT and other segments were added over the following decades. Much of the commercial activity in Ballard by this time had moved to Market St, but the original town center along Ballard Ave was designated as a National Register Historic District in 1976.

4.3.4 Previous Cultural Resources Investigations

Over 15 cultural resources assessments have been previously completed in the vicinity of the BGT Missing Link. Table 4-5 includes a summary of selected reports with information that contributes to our understanding of the current project. Four of the previous reports were written for projects associated with the BGT. These investigations included municipal utility and transportation projects and private development. Most did not identify significant cultural resources; however, four potentially eligible historic buildings, one NRHP-eligible structure, and potentially eligible segments of railroad were recorded. Many of the previous investigations concluded with the recommendation for archaeological monitoring of construction due to the sensitive natural and cultural setting of the Salmon Bay shoreline.

Table 4-5. Selected Previous Cultural Resource Investigations within Approximately One Mile

Author	*Date*	*Project*	*Relation to Shilshole North and South Alternatives*	*Relation to Ballard Avenue Alternative*	*Relation to Leary Alternative*	*Results*[1]
Demuth et al.	2004	Seattle Monorail	Crosses	Crosses	Crosses	Mike's Chili Parlor, Brekke Co. Steel Fabricators, and Ballard Bridge
Lewarch et al.	2004	Seattle Monorail	Crosses	Crosses	Crosses	None
Roedel et al.	2004	BGT Extension	Adjacent to west end	Adjacent to west end	Adjacent to west end	None
Trudel and Larson	2005	BGT Extension	Adjacent to west end	Adjacent to west end	Adjacent to west end	None

Author	*Date*	*Project*	*Relation to Shilshole North and South Alternatives*	*Relation to Ballard Avenue Alternative*	*Relation to Leary Alternative*	*Results*[1]
Kiers and LeTourneau	2006	Ballard Siphon Replacement	Crosses and adjacent	One block south	Two blocks south	None
Blukis Onat	2007	Ballard Siphon Replacement	Crosses and adjacent	One block south	Two blocks south	None
Kaehler	2007	Ballard Blocks 2	Adjacent	Adjacent	Two blocks south	None
Kaehler and Gillespie	2008	BGT Extension	Within and adjacent	Within and adjacent	Within and adjacent	C.D. Stimson Lumber Company Office, Seattle Boiler Works Office, and Seattle, Lake Shore, and Eastern Railroad segment
Piper	2008	Ballard Hotel	Adjacent	One block south	Two blocks south	None
Thompson	2008	Nordic Heritage Museum	Adjacent	One block south	Adjacent	Seattle, Lake Shore, and Eastern Railroad segment
Major	2009	Salmon Bay Piling Removal	0.3 mile west	0.3 mile west	0.3 mile west	None
Perrin et al.	2010	BGT Extension - Shilshole Segment	Within	One block southwest	Two blocks southwest	None
Kanaby	2011	Barrier Fence at the Locks	Adjacent to west end	Adjacent to west end	Adjacent to west end	None

Author	*Date*	*Project*	*Relation to Shilshole North and South Alternatives*	*Relation to Ballard Avenue Alternative*	*Relation to Leary Alternative*	*Results*[1]
Dellert et al.	2013	CSO Outfall 150 Replacement	Within	Two blocks south	One block south	None
Dellert and Stevenson	2014	King County Metro's RapidRide D-Line	One block north	Adjacent and crosses	Adjacent and crosses	None

[1]Significant cultural material identified within the BGT Missing Link study area.

The four previous BGT projects were conducted from 2004 to 2010. Roedel et al. (2004) made an assessment of an extension of the BGT from the Ballard Locks to 60th St to the west of the current BGT Missing Link Project. Based on the potential for encountering significant cultural resources, recommendations were made for a combination of additional archaeological investigations and monitoring during construction. Trudel and Larson (2005) reported on the subsequent archaeological monitoring, identifying modern debris and isolated historical period artifacts. No pre-contact, ethnographic, or significant historical period archaeological resources were found.

Kaehler and Gillespie (2008) assessed the BGT extension from 11th Ave NW to the Ballard Locks within and adjacent to the current project. Twenty-eight historical buildings were identified and evaluated. Two buildings, the C.D. Stimson Lumber Company Office and the Seattle Boiler Works Office, were recommended eligible for listing in the NRHP. Both of these resources are adjacent to the Shilshole North and South Alternatives and the Ballard Avenue Alternative of the BGT Missing Link. A portion of a historic corridor of the former SLS&E RR was also recommended eligible for listing in the NRHP. No archaeological resources were identified during this study, but background research suggested there is high potential for encountering significant prehistoric, ethnographic period, or historical Native American archaeological resources below fill between 11th Ave NW and the Ballard Locks. Kaehler and Gillespie (2008) also indicated high probability for identification of historical Euroamerican archaeological resources at the east end of the project near NW 45th St and 14th Ave NW. Archaeological monitoring of ground-disturbing activities that would intersect the natural surface was recommended. An addendum to this report identified an additional 26 historical buildings bordering the proposed trail alignment along Shilshole Ave NW between 17th Ave and Vernon Pl, none of which were recommended eligible for listing in the NRHP (Perrin et al., 2010).

Two previous investigations that were conducted for the Seattle Monorail Project Green Line intersect the BGT. One segment proposed along 15th Ave NW crosses the east end of the current project. Lewarch et al. (2004) reported that significant, unknown archaeological resources may exist in the Salmon Bay area of Ballard. In addition, Demuth et al. (2004) reported the Green Line project would have impacts on three historic properties including Mike's Chili Parlor, the Brekke Co. Steel Fabricators, and Ballard Bridge. The Ballard Bridge crosses the Shilshole North and South Alternatives and the Ballard Avenue Alternative. Mike's Chili Parlor is adjacent to the Ballard Avenue Alternative and the Brekke Co. Steel Fabricators is between the two Shilshole and Ballard Avenue Alternatives.

No significant cultural resources were identified during two smaller investigations conducted for the Ballard Siphon Replacement Project near the intersection of Dock St and Shilshole Ave NW. Kiers and

LeTourneau (2006) recognized potential for encountering significant cultural materials based on archaeological sites, named ethnographic places, and historic buildings in the vicinity, but did not identify any new cultural resources. A subsequent report written after the study area was expanded recommended recording buildings older than 50 years in age, but no cultural resources were identified (Blukis Onat, 2007). Both reports recommended monitoring of project excavations.

Another report was completed for a proposed mixed-use building with an associated below-grade parking structure called the Ballard Blocks 2 Project (Kaehler, 2007). Archaeological resources were not recorded within the Ballard Blocks 2 project area, but background research conducted during the investigation suggested high probability exists for encountering prehistoric, ethnographic period, and historical Native American archaeological resources, as well as historical archaeological materials. Archaeological monitoring during construction was recommended and two historical buildings were evaluated. Both were recommended not eligible for listing in the NRHP.

Additional reports were also produced for the Ballard Hotel Project (Piper, 2008) and the Nordic Heritage Museum Project (Thompson 2008). No cultural resources were identified in the Ballard Hotel project, but archaeological monitoring of construction was recommended due to the sensitive natural and cultural setting. Thompson (2008) completed an assessment for the Nordic Heritage Museum Project and recorded five buildings, none of which were recommended for listing in the NRHP. A segment of the former SLS&E RR that is still in use along Shilshole Ave NW was recommended eligible for listing in the NRHP. Based on the setting of the project, Thompson (2008) also recommended sub-surface investigations prior to construction to verify that archaeological resources were not present.

One other letter report was written for removal of creosote-treated pilings within the ethnographic named place, *SiISulucid*, at the mouth of Salmon Bay (Major, 2009). Research showed the pilings were installed between 1960 and 1967, so they were not recorded as historical resources. No other cultural material was observed.

A cultural resources investigation was conducted for installation of a barrier fence around the historic Cavanaugh house located on the grounds of the Hiram M. Chittenden Locks. The project also involved the removal of historical plantings and trees that dated to the district's period of significance and included species selected by Carl English. Shovel probes were excavated along the proposed fence line and no cultural materials were observed. Kanaby (2011) recommended consideration of the potential direct and indirect effects of the barrier fence on the Cavanaugh House and 45DT114.

One desktop analysis was written for the Combined Sewer Overflow (CSO) Outfall 150 Replacement Project that included an inventory of twelve historic buildings, structures, or objects (Dellert et al., 2013). None of the resources were recommended eligible for listing in the NRHP. Finally, archaeological monitoring was recommended in four high probability areas during construction of King County Metro's RapidRide D-Line (Dellert and Stevenson, 2014). One of the four high probability areas was along 15th Ave NW near the Ballard Ave and Leary Alternatives of the BGT Missing Link Project. Unmonitored construction proceeded along 15th Ave NW and there were no subsequent opportunities for subsurface investigation after RapidRide construction, as the area was already developed and included utilities. Future archaeological monitoring of additional ground disturbance more than 18 inches (46 centimeters) below the surface in this vicinity was recommended.

4.3.5 **Previously Identified Archaeological Sites**

Table 4-6 summarizes the archaeological resources recorded in the vicinity of the BGT, as well as human remains and other cultural materials that have been noted, but not recorded, in the project vicinity.

Site 45KI1000, the Salmon Bay Midden, is a prehistoric shell midden with fire-modified rock eroding from a cut bank north of the ship canal near the Great Northern Railroad Bridge, just west of the Hiram M. Chittenden Locks (45DT114) and the current project (Major, 2010). The exposure is 131 feet (40 meters) long and about 26 feet (8 meters) wide, but appeared disturbed during preliminary assessment. Additional investigations beyond initial documentation of the exposure were not undertaken.

Table 4-6. Previously Recorded Archaeological Sites and Burke Museum Collections and Materials Noted in the Project Vicinity

Site No.	*Compiler/ Data*	*Age*	*Description*	*Relation to Shilshole North and South Alternatives*	*Relation to Ballard Avenue Alternative*	*Relation to Leary Alternative*
45KI1000	Major 2010	Pre-contact	Salmon bay midden	0.3 mile west	0.3 mile west	0.3 mile west
Burke Human Remains Site 1162	King County Database	Pre-contact	Human remains	One block north	Adjacent at 1416 NW 46th St	Two blocks south
Burke Archaeological Site 1117	King County Database	Pre-contact	Isolated projectile point	North	North	North
Burke Archaeological Site 1102	King County Database	Pre-contact	Shell midden and human remains	Adjacent to west end	Adjacent to west end	Adjacent to west end

Other potentially significant cultural resources in the project vicinity have been noted, but not formally recorded. The Burke Museum holds a collection obtained by A.G. Colley, who identified a shell midden and human remains along the north shoreline of Salmon Bay in 1923 (Burke Site 1102). The assemblage includes 56 artifacts, such as antler wedges, modified bone, groundstone tools and tool fragments, chipped stone tools, lithic debitage, wood stake fragments, iron anchor artifacts, modified stone, and a partial human skeleton (CRPP number 7465). The shell midden was 150 feet (46 meters) long and varied from three and 15 feet (0.9 and 4.6 meters) wide at about 30 inches (76 centimeters) below the surface. Private landowners in the project vicinity have also discovered isolated cultural materials. For example, a local resident reported finding human remains while digging in his basement on the north side of the Ship Canal in 1943 (Burke Site 1162/Parcel 2768303229) and a local resident found a serrated, leaf-shaped stone projectile point while gardening nearby in 1993 (Burke Site 1117). The human remains were found along the Ballard Avenue Alternative, just a block north of the Shilshole North and South Alternatives, and two blocks south of the Leary Alternative. The isolated projectile point was found north of the study area.

4.3.6 **Built-environment Resources**

There are three historic districts (Table 4-7), one NRHP-listed bridge, and 60 historic resources adjacent to the project alternatives and connectors. These resources are listed in Table 4-8 and identified in Figures 4-7 through 4-10. The Identification Number in the first column of Table 4-8 refers to the building numbers noted in the figures.

Table 4-7. Historic Districts in or Adjacent to the Study Area

Site No.	*Compiler/Data*	*Age*	*Description*	*Relation to Shilshole North and South Alternatives*	*Relation to Ballard Avenue Alternative*	*Relation to Leary Alternative*
45DT56	Potter, Elisabeth Walton, 1976	1890–1930	Ballard Avenue Historic District	½ block North	Within	Adjacent to ½ block south
45DT114	Potter, Elisabeth Walton, 1977	1906–1917	Hiram M. Chittenden Locks and Related Features of the Lake Washington Ship Canal	Adjacent to west end	Adjacent to west end	Adjacent to west end
N/A	City of Seattle, 1975	1890–1930	Ballard Avenue Landmark District	½ block north	Within	Adjacent to ½ block south

Historic Districts

Three historic districts are in the immediate vicinity of the four Build Alternatives. Two are NRHP-listed historic districts: Ballard Avenue Historic District (45DT56) and Hiram M. Chittenden Locks and Related Features of the Lake Washington Ship Canal (45DT114). The third is a local historic district, the Ballard Avenue Landmark District, which has the same boundaries as the Ballard Avenue NRHP district. Figure 4-11 illustrates the historic districts in relation to the study area.

The historic streetscape along Ballard Ave from NW Market St to NW Dock St makes up the NRHP-listed Ballard Ave Historic District (45DT56), which includes 74 properties that belong to the period of significance between 1890 and 1930 (Potter, 1976). Forty-two of these properties are adjacent to one or more of the alternatives or connectors. The Ballard Avenue Alternative extends through the middle of the Historic District and the contributing historic properties within this district will be discussed further in the following section on the built environment of the project. The boundaries of this NRHP historic district are the same as that of the Ballard Avenue Landmark District, a local historic district designated by the City of Seattle in 1975.

Table 4-8. NRHP Eligible Built-environment Resources Adjacent to Alternatives

ID No.	*Compiler/Date*	*Age*	*Historic/Common Name*	*Address*	*Status*[3]	*Adjacent Alternative or Connector Segment*
1	City of Seattle 2015[1]	1938	Jack Johnson Beer Parlor/ Lock Spot	3005 NW 54th St	Yes - Hold	Ballard Avenue, Leary, Shilshole North
6, 310	Thompson 2008b, Heideman 2015[2]	1885	Seattle Lake Shore and Eastern Railroad Grade/Ballard Terminal Railroad	NW 54th St between 26th and 28th Aves NW (ID No. 6); Shilshole Ave (ID No. 310)	Determined Eligible by SHPO (ID No. 6), Recommended Eligible (ID. No. 310)	Shilshole North, Shilshole South, Ballard Avenue, Leary
16	City of Seattle 2015[1], Heideman 2015[2]	No date provided	Kress/Dollar Plus + 2 others	2220 NW Market St	No - Altered	Leary
17	Peckham 1979b; Sheridan 2002a; City of Seattle 2015[1]	1927	Ballard Eagles Building/ Ballard Block	2200–2218 NW Market	Yes - Inventory	Leary
18	City of Seattle 2015[1]	1938	Tully's/Ballard Court Apartments	2060 NW Market St	Yes - Hold	Ballard Avenue, Leary
27	Potter 1976	1923	N/A	2301–2313 NW Market St and 5421 Ballard Ave NW	Secondary : Ballard Avenue Historic District (NRHP)	Leary, Ballard Avenue NW Connector
28	Potter 1976	1906	N/A	5443–5447 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
29	Potter 1976	1903	N/A	5439–5441 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
30	Potter 1976	1900	N/A	5435 Ballard Ave NW	Tertiary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector

ID No.	*Compiler/Date*	*Age*	*Historic/Common Name*	*Address*	*Status*[3]	*Adjacent Alternative or Connector Segment*
31	Potter 1976	1923	Hopkins Block	5429–5431 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
32	Potter 1976	1926	The Vik Apartments	5423–5427 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
33	Potter 1976	1913	N/A	5419 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
34	Potter 1976	ca.1890s	N/A	5411 Ballard Ave NW	Tertiary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
35	Potter 1976	ca.1890s	N/A	5411 Ballard Ave NW	Tertiary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
36	Potter 1976	1901	J.C. Penney	5403–5407 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
37	Potter 1976	1903	N/A	2215–2225 NW Market St	Secondary: Ballard Avenue Historic District (NRHP)	Leary, Ballard Avenue NW Connector
38	Potter 1976	1906	Lucky Vintage/Dandelion Botanical Company	5424 Ballard Avenue NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
39	Potter 1976 Heideman 2015[2]	1948	Eidem Upholstery	5420-5422 Ballard Avenue NW	Intrusion: Ballard Avenue Historic District (NRHP), Recommended Eligible	Ballard Avenue NW Connector

ID No.	*Compiler/Date*	*Age*	*Historic/Common Name*	*Address*	*Status*[3]	*Adjacent Alternative or Connector Segment*
40	Potter 1976	1908	Eagles Lodge/Ballard Printing and Publishing Co.	5410 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue, Ballard Avenue NW Connector
41	Potter 1976	No date provided	Site of City Hall/Marvin's Garden	5400 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
42	Potter 1976	1901	A.W. Preston Drug Store	5345 ½–5349 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
43	Potter 1976	1900	N/A	5337–5339 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
44	Potter 1976	1909	N/A	5335 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
45	Potter 1976	1904	N/A	5333 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
46	Potter 1976	1906	N/A	5325 ½–5329 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
47	Potter 1976	1901	G.B. Sanborn Building/ Al’s Second Hand Store	5323 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
48	Potter 1976	1927	N/A	5317–5319 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue

ID No.	*Compiler/Date*	*Age*	*Historic/Common Name*	*Address*	*Status*[3]	*Adjacent Alternative or Connector Segment*
49	Potter 1976	1914	Ballard Savings and Loan Association	5301 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue, NW Vernon Place Connector
50	Potter 1976	1900	N/A	5237–5239 Ballard Ave NW	Tertiary: Ballard Avenue Historic District (NRHP)	Ballard Avenue, NW Vernon Place Connector
51	Potter 1976	1898	N/A	5233 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
52	Potter 1976	1913	N/A	5231 Ballard Ave NW	Tertiary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
53	Potter 1976	1890	N/A	5227–5229 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
54	Potter 1976	1902	J.L. Andstrom Building	5221 Ballard Ave NW	Tertiary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
55	Potter 1976	1902	International Schooner Tavern	5213–5215 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
56	Potter 1976	1898	N/A	5209 Ballard Ave NW	Tertiary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
57	Potter 1976	1915	N/A	5205 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue

ID No.	*Compiler/Date*	*Age*	*Historic/Common Name*	*Address*	*Status*[3]	*Adjacent Alternative or Connector Segment*
58	Potter 1976	1915	N/A	5201 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue, 20th Avenue NW Connector
71	Potter 1976	1890	Junction Block/Pelican Printers, Inc.	5202–5210 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue, 20th Avenue NW Connector
72	DAHP 1994; Heideman 2015[2]	1911	Curtiss Building	5227 Leary Ave NW	Determined Not Eligible by SHPO; Recommended Eligible**	Leary, 20th Avenue NW Connector
73	Potter 1976	1893	Cors and Wegener Building/H.C. Davidson's Restaurant	5000–5004 20th Ave NW	Primary: Ballard Avenue Historic District (NRHP)	20th Avenue NW Connector
74	Potter 1976	1893	N/A	5006 20th Ave NW	Tertiary: Ballard Avenue Historic District (NRHP)	20th Avenue NW Connector
78	Potter 1976	1897	Paulette Financial Arrangements	5135 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue, 20th Avenue NW Connector
79	Potter 1976	1897	American Flag and Decorating Company	5129 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue, 20th Avenue NW Connector
81	Potter 1976	ca.1900	N/A	5109 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
82	Potter 1976	1900	N/A	5105 Ballard Ave. NW	Tertiary: Ballard Avenue Historic District (NRHP)	Ballard Avenue

ID No.	*Compiler/Date*	*Age*	*Historic/Common Name*	*Address*	*Status*[3]	*Adjacent Alternative or Connector Segment*
83	Potter 1976	1905	North Star Bar and Hotel	5101 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
84	Potter 1976	1909	N/A	4775 Ballard Ave NW	Primary: Ballard Avenue Historic District (NRHP)	Ballard Avenue
92	Peckham 1979e; Sheridan 2002c; Gillespie 2007t; City of Seattle 2015[1]	1912	Stimson Mill Office	2116 NW Vernon Pl	Determined Eligible by SHPO; Yes - Inventory	Shilshole North, NW Vernon Place Connector
101	DAHP 2009	1900	Peterson Hardware & Plumbing Company Building/5313 Ballard Building	5313 Ballard Ave NW	Determined Eligible by NPS	Ballard Avenue
102	DAHP 2009	1927	Obermaier Machine Works Building/Bastille Restaurant	5307 Ballard Ave NW	Determined Eligible by NPS	Ballard Avenue
113	Peckham 1979a; Soderberg 1980; Killen 1985;	1915–1919	15th Ave Bridge/Ballard Bridge	15th Ave NW over Salmon Bay	NRHP Listed	Shilshole North, Shilshole South, Ballard Avenue, 15th Ave Connector
172	Heideman 2015[2]	1939	N/A	5514 24th Ave NW	Recommended Eligible	Ballard Avenue
181	Heideman 2015[2]	1928	N/A	5415 22nd Ave NW	Recommended Eligible	Ballard Avenue, Leary
192	Heideman 2015[2]	1900	N/A	5341 Ballard Ave NW	Recommended Eligible	Ballard Avenue
194	Heideman 2015[2]	1904	N/A	5405 Leary Ave NW	Recommended Eligible	Leary
223	Heideman 2015[2]	1914	N/A	4763 Ballard Ave NW	Recommended Eligible	Ballard Avenue
224	Heideman 2015[2]	1900	N/A	4743 Ballard Ave NW	Recommended Eligible	Ballard Avenue

ID No.	*Compiler/Date*	*Age*	*Historic/Common Name*	*Address*	*Status*[3]	*Adjacent Alternative or Connector Segment*
251	Heideman 2015[2]	1900	N/A	1556 NW Ballard Way	Recommended Eligible	Ballard Avenue, 17th Ave Connector
261	Heideman 2015[2]	1948	N/A	1535 NW Leary Way	Recommended Eligible	Leary
307	Potter 1976	1920	N/A	5449 Ballard Ave NW	Secondary: Ballard Avenue Historic District (NRHP)	Ballard Avenue NW Connector
309	Potter 1976	1900	N/A	5107 Ballard Ave NW	Tertiary: Ballard Avenue Historic District (NRHP)	Ballard Avenue

[1]Seattle, 2015 – exact date recorded by city is unknown, so date represents year information was accessed online.
[2]Recommendation provided by Heideman 2015 (SWCA).
[3]See Section 4.1.5 for discussion of Status terms.

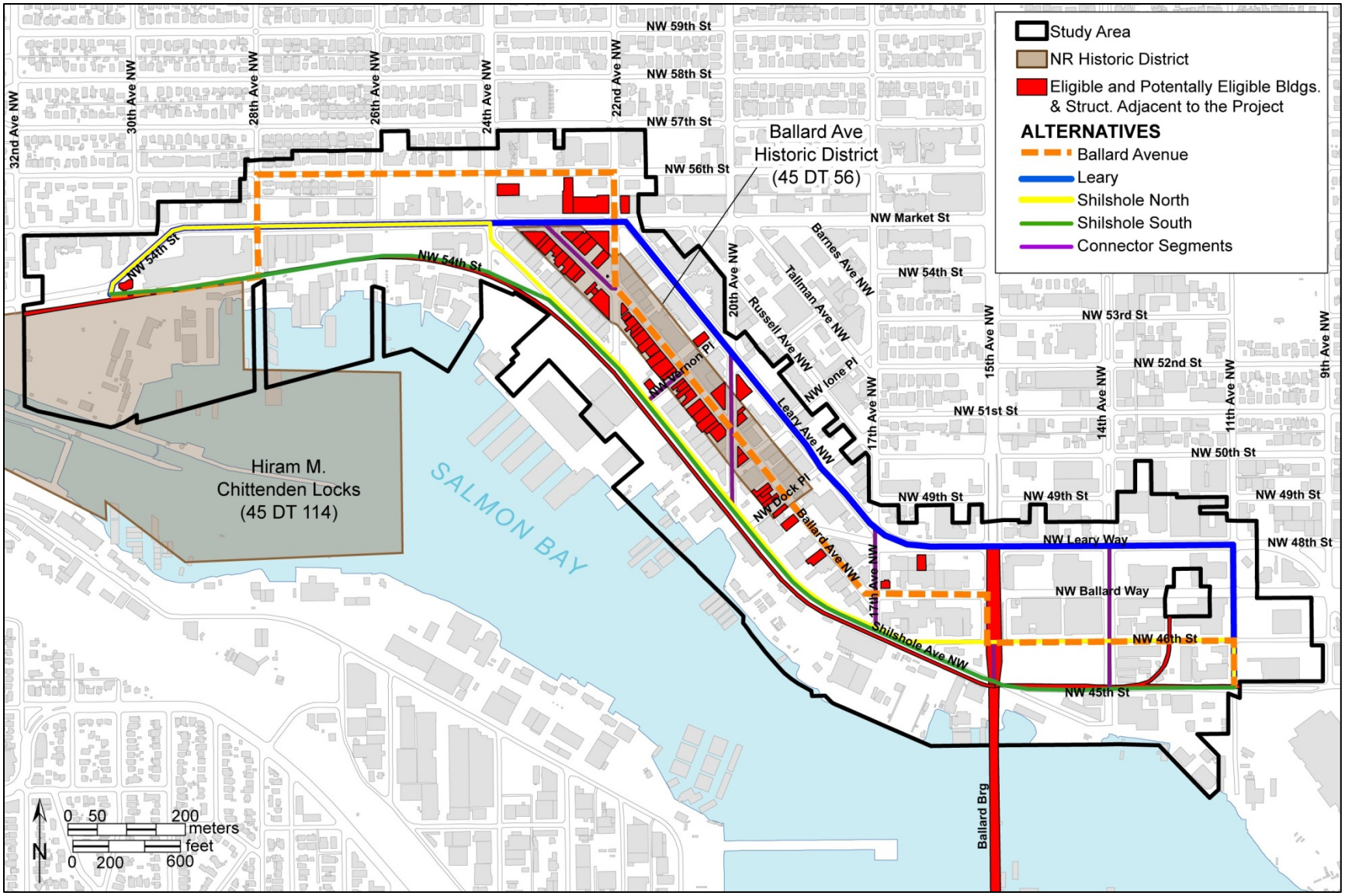

Figure 4-7. Overview of Study Area, showing project alternatives, historic district boundaries, and historic resources

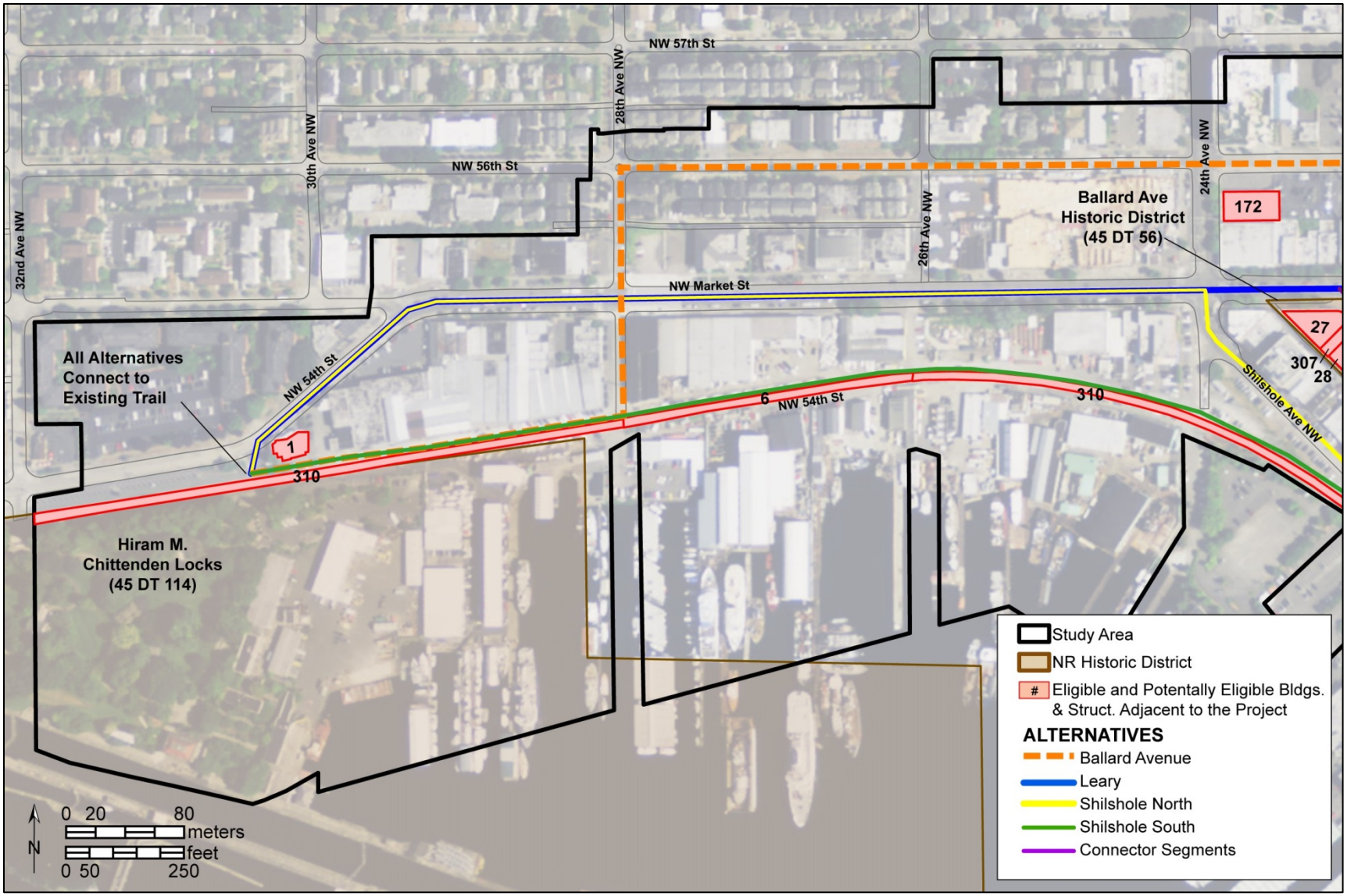

Figure 4-8. West end of study area showing detail of Figure 4-7. Building numbers key to Table 4-8

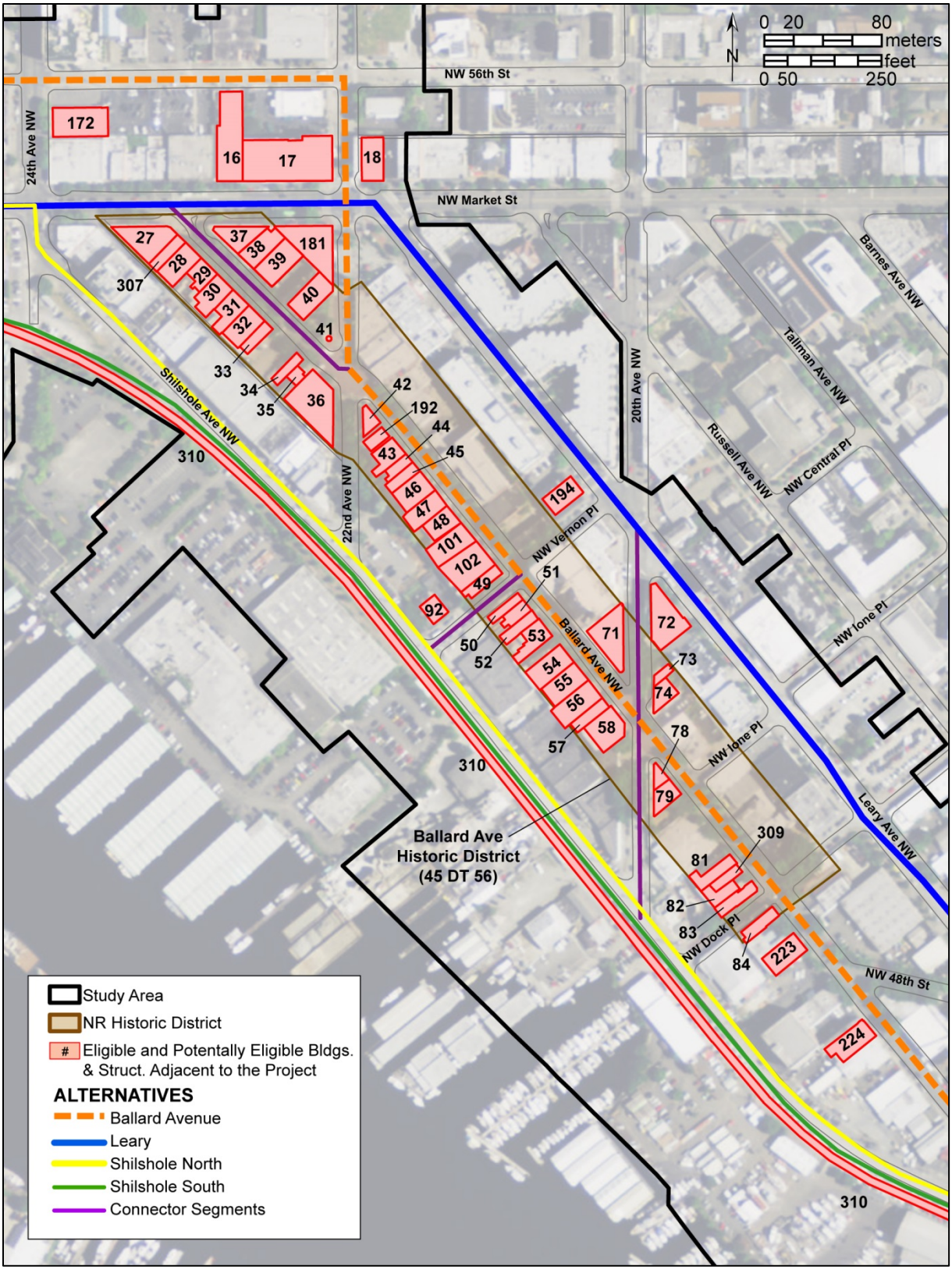

Figure 4-9. Central portion of study area showing detail of Figure 4-7. Building numbers key to Table 4-8

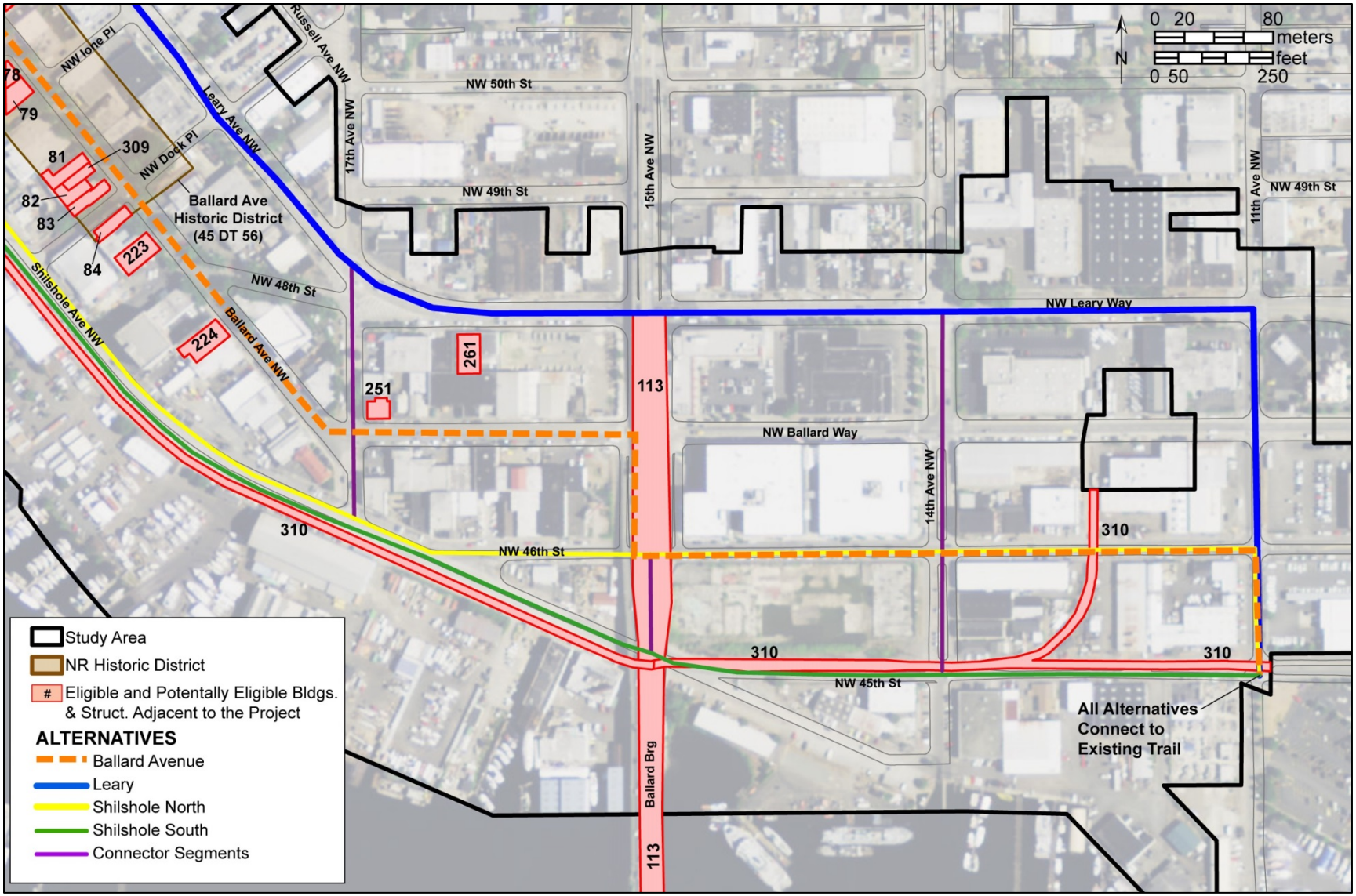

Figure 4-10. East end of study area showing detail of Figure 4-7. Building numbers key to Table 4-8

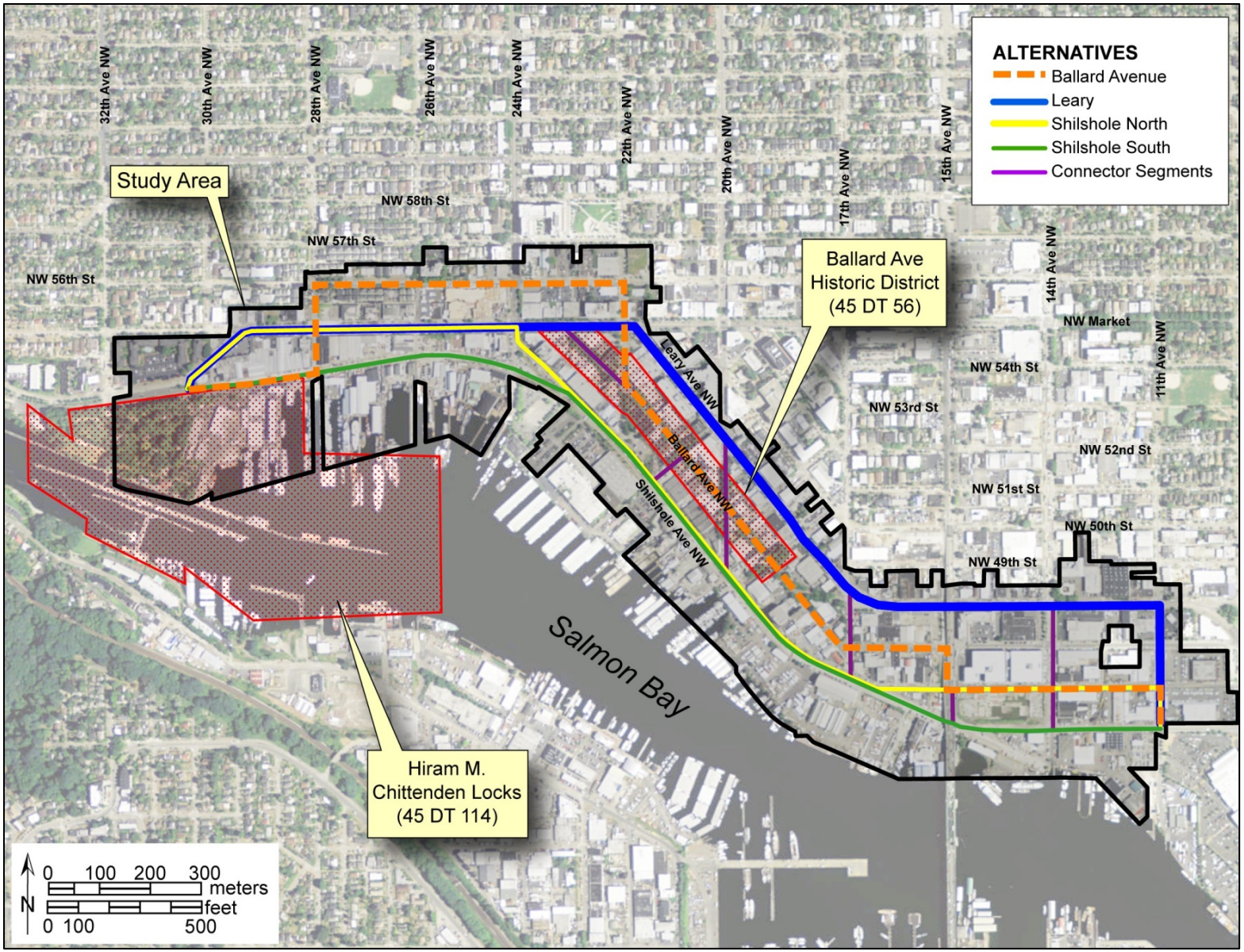

Figure 4-11. Historic districts in the vicinity of the project alternatives

Resources within the Ballard Avenue Historic District and Ballard Avenue Landmark District are identified as belonging to one of four categories: Primary, Secondary, or Tertiary Resources, or Intrusions. The NRHP nomination clearly defines Primary and Secondary buildings as contributing resources in the district, while intrusions were considered non-contributing in the 1976 nomination. Tertiary buildings, however, were not clearly defined in the nomination. The Ballard Landmark District Board, in their District Guidelines dated June 4, 2015, provided some clarification by further defining these categories.

- Primary resources are buildings that contribute to both the NRHP and local historic districts.
- Secondary resources have less architectural or historic significance than Primary resources, but still contribute to the district character and appearance because of scale, design, use of materials or location.
- Tertiary resources are not defined in the NRHP nomination as either contributing or non-contributing, but the Ballard Landmark District Board considers these to be contributing resources if distinctive features of these resources are repaired or replaced consistent with the Secretary of the Interior's Standards.
- Intrusions are resources located within the district boundaries that were not considered contributing in 1976, which in some cases was due to a post-1930 date of construction. Some of these resources may now be old enough to be considered for NRHP eligibility.

Eight miles of man-made channels and inland bodies of water between Puget Sound and Lake Washington have been recorded as the Ballard Locks and Related Features of the Lake Washington Ship Canal (45DT114) (Potter, 1977). These features include the fixed dam and double locks at Salmon Bay in Ballard, the Fremont Cut between the locks and Lake Union, and the Montlake Cut between Lake Union and Lake Washington, as well as 20 accessory structures that date to the period of significance between 1906 and 1917. District 45DT114 is just west of the current project.

Changes within the district, including any change in a public right-of-way within the Ballard Avenue Landmark District, require a Certificate of Approval (COA) before the City will issue any permits. This process involves filling out an application for COA, which includes a detailed description of the project work, scale drawings of existing conditions and proposed work, and photographs of existing features to be altered, among other information. This application will be reviewed by the Ballard Avenue Landmark District Board. Further information about this process can be found on the City of Seattle Department of Neighborhood's website (City of Seattle 2016).

Buildings and Structures

In addition to the buildings that were recorded as part of the historic districts, 54 buildings located on properties adjacent to the project alternatives have been previously recorded. Some of these resources were evaluated for NRHP eligibility, and these inventory forms are on file at DAHP. Several properties were also recorded and evaluated at the local level, with the following statuses: No – Altered, Yes – Hold, and Yes – Inventory. These classifications are described by the City as follows:

- No - Altered - These properties have physical features that are so altered there is a loss of integrity and physical fabric and no further study is warranted. Some of these properties do not represent a distinctive architectural style and so no further study is warranted.
- Yes - Hold - These properties have undergone initial survey work, but inventory forms have not been completed. Some fieldwork was performed, but additional information is needed before the

inventory of this property is complete. It is possible that the property may be eligible for further study at a later time.

- Yes – Inventory - These properties merit the completion of a full Inventory form and an assessment by the surveyor of the property's potential eligibility for local and/or National Register listing (City of Seattle, 2015).

A few of the recorded buildings have not been evaluated for historic register eligibility, and they are noted in the Status column. One resource, the Ballard Bridge, is individually listed in the NRHP.

A few previously recorded resources warrant further discussion:

- The Kress/Dollar Plus building at 2220 NW Market St (ID No. 16) is not considered historic by the City of Seattle; however, the building retains much of its historic character and potentially contributes to an expanded Ballard Avenue Historic District. As a result, it is considered a historic resource.
- The Curtiss Building at 5227 Leary Ave NW (ID No. 72) was determined not eligible for the NRHP by DAHP in 1994; however, the building retains much of its historic character and would be considered a contributing resource in a potential expansion of the Ballard Avenue Historic District (although no expansion is planned at this time). No inventory form exists in DAHP's WISAARD database for this building, and no contextual information is available that provides background for the DAHP determination. Without further information about the reasoning behind the DAHP determination, this building should be considered a historic resource.
- Brekke Company Steel Fabricators at 1526 NW 46th St was determined eligible by SHPO in 2003; however, the building has undergone numerous alterations since that time and no longer retains sufficient integrity to convey its historic character. Due to these alterations, this building is no longer considered a historic resource.
- The Seattle Lake Shore and Eastern Railroad Grade/Ballard Terminal Railroad is noted as two separate resources in the table (ID No. 6 and 310) due to a previously-recorded segment receiving a determination of eligibility by SHPO (ID No. 6). A separate segment of the same railroad (ID No. 310) received a recommendation of eligibility in 2015. For the purposes of this report, these two segments will be treated and discussed as a single resource.
- Eidem Upholstery (ID No. 39) was identified as an intrusion in the Ballard Avenue Historic District, as it was not yet 50 years old at the time of the district nomination. It is now considered eligible for the NRHP and would be considered a contributing resource in a district update.

Summary of Built-environment Resources by Alignment

As noted in the historic districts discussion, buildings classified in the 1976 NRHP nomination of the Ballard Avenue Historic District as "Tertiary" were not clearly identified as either contributing or non-contributing resources. The Ballard Avenue Landmark District also does not categorize these resources as either contributing or non-contributing, but indicates that they may fall into either category and should be examined individually. For the purposes of this discussion, Tertiary resources have been categorized as historic.

Shilshole South Alternative

This alternative does not pass through any historic districts, but is adjacent to the north edge of the Hiram M. Chittenden Locks and Related Features of the Lake Washington Ship Canal historic district. This alternative does not border any contributing features in that district, but is adjacent to two eligible or listed resources (see Table 4-8).

The NRHP-listed 15th Ave Bridge/Ballard Bridge (ID No. 113) crosses a segment of the Shilshole South Alternative at NW 46th St.

A large segment of the Shilshole South Alternative is adjacent to the NRHP-eligible Seattle Lake Shore and Eastern Railroad Grade/Ballard Terminal Railroad (Identification Numbers 6 and 310). Proposed plans for the Shilshole South Alternative indicate that this resource is located in very close proximity to the proposed trail and crosses it on Shilshole Ave between NW Dock Pl and 17th Ave NW.

Shilshole North Alternative

This alternative does not pass through any historic districts, but is adjacent to the north edge of the Hiram M. Chittenden Locks and Related Features of the Lake Washington Ship Canal historic district. This alternative does not border any contributing features of that district, but it is adjacent to four eligible or listed resources (see Table 4-8).

The NRHP-listed 15th Ave Bridge/Ballard Bridge (ID No. 113) crosses a segment of the Shilshole North Alternative at NW 46th St. The Stimson Mill Office (ID No. 92) is located adjacent to this alternative at the corner of NW Vernon Place and Shilshole Avenue NW. In addition, the Jack Johnson Beer Parlor/Lock Spot (ID No. 1), which was evaluated and recorded locally, is adjacent to the Shilshole North Alternative at 3005 NW 54th St.

Large segments of the Shilshole North Alternative are adjacent to the NRHP-eligible Seattle Lake Shore and Eastern Railroad Grade/Ballard Terminal Railroad (ID Nos. 6 and 310). Proposed plans for the Shilshole North Alternative indicate that this resource is located adjacent to, but does not cross, the proposed trail; however, a small segment of the railroad crosses the proposed trail route on NW 46th St, midway between 11th Ave NW and 14th Ave NW. The southeast end of the proposed route also crosses the railroad at the intersection of NW 45th St and 11th Ave NW.

Ballard Avenue Alternative

This alternative extends through the center of two historic districts (the NRHP-listed and local Ballard Ave historic districts) and is adjacent to the north edge of a third historic district (Hiram M. Chittenden Locks District). A total of 38 eligible or listed resources are adjacent to or cross this alternative (see Table 4-8).

The Ballard Avenue Alternative extends through the center of the Ballard Avenue Historic District from 22nd Ave NW to the southeast district boundary near NW Dock Pl. Twenty-six district resources are adjacent to this alternative.

The 15th Ave Bridge/Ballard Bridge (ID No. 113) crosses the Ballard Avenue Alternative at NW 46th St and is located immediately east of the alternative between NW Ballard Way and NW 46th St.

As with the Shilshole North and South Alternatives, plans for this alternative place the trail in close proximity to the Seattle Lake Shore and Eastern Railroad Grade/Ballard Terminal Railroad (ID Nos. 6

and 310). The west end of the alternative is located immediately north of the railroad, and the east end of the alternative crosses the railroad on NW 46th St between 11th Ave NW and 14th Ave NW. The far eastern end of the alternative also crosses the railroad at the intersection of NW 45th St and 11th Ave NW.

Leary Alternative

The Leary Alternative is adjacent to the north edge of the two Ballard Ave historic districts and the north edge of the Hiram M. Chittenden Locks District. A total of 11 eligible or listed resources are adjacent to this alternative. These resources include the north end of the 15th Avenue Bridge/Ballard Bridge (ID No. 113) and the Seattle Lake Shore and Eastern Railroad Grade/Ballard Terminal Railroad (ID Nos. 6 and 310), which this alternative crosses at the intersection of NW 45th St and 11th Ave NW (see Table 4-8).

Connector Segments

1. *14th Avenue NW Segment*

This segment is not in the vicinity of any historic districts, and no historic resources are adjacent to this alternative.

2. *15th Avenue NW Segment*

This segment is not adjacent to any historic districts, but is adjacent to the 15th Avenue Bridge/Ballard Bridge (ID No. 113) between Shilshole Ave NW and NW 46th St.

3. *17th Avenue NW Segment*

This segment is adjacent to one eligible building (ID No. 251), which is located at the northeast corner of the 17th Ave NW and NW Ballard Way intersection.

4. *20th Avenue NW Segment*

The 20th Avenue NW segment extends through the Ballard Avenue Historic District/Ballard Avenue Landmark District and is adjacent to six district resources and the Curtiss Building (ID No. 72) (see Table 4-8).

5. *NW Vernon Place Segment*

The northeast half of the NW Vernon Place segment extends into the Ballard Avenue Historic District/Ballard Avenue Landmark District. Three eligible or listed resources are adjacent to this connector (see Table 4-8).

6. *Ballard Avenue NW Segment*

This segment extends through the Ballard Avenue Historic District/Ballard Avenue Landmark District and is adjacent to 16 eligible or listed resources (see Table 4-8).

4.3.7 **Expectations**

Based on the natural and cultural setting, potential for encountering significant cultural resources exists in the study area. Potential for encountering significant pre-contact and ethnographic period archaeological materials is slightly higher than the potential for encountering historical period archaeological materials. There are, however, a number of known historical cultural resources belonging to the built environment in the study area.

The Salmon Bay shoreline was accessible throughout the Holocene, and local inhabitants almost certainly passed through, camped within, processed resources throughout, and even occupied portions of the study area in the past. These activities left behind variable traces in the archaeological record. For example, groups traveling through the project vicinity might have left behind isolated stone tools, such as the leaf-shaped point found just north of the study area in 1993 (Burke Site 1117). Longer-term camping, intense resource processing, or use as a village site would result in more substantial archaeological deposits, such as canoe haul outs and shell midden containing faunal remains, pit and hearth features, post-molds, cobble pavements, fire-modified rocks, stone, bone or antler tools, and possibly human remains. The number of named places that have been recorded in the project vicinity attests to the continued importance of Salmon Bay to the Duwamish throughout the late Holocene. Ethnographic period archaeological resources that may be present would be similar to prehistoric cultural materials with the addition of contact period artifacts. Natural processes related to earthquake-driven subsidence and sea-level rise likely resulted in burial of prehistoric and ethnographic period cultural resources deposited along the Salmon Bay shoreline. Previously drilled borings suggest Holocene-aged sand, silt, and peat beds are found between an average of 9.5 and 14 fbs (2.9 and 4.3 mbs) where present in the study area, and as shallow as 6 fbs (1.8 mbs). Holocene-aged deposits were most commonly encountered at the far east and west ends of the project.

Historical filling along the shoreline of Salmon Bay occurred concurrently with industrial development and construction of the Ballard Locks, further burying any prehistoric and ethnographic period cultural resources that may be present in the study area. Potential for encountering significant early historical archaeological deposits exists within this fill. The potential for encountering significant historical cultural materials is highest at the base of the fill along the buried shoreline. Historical maps showing homesteads and commercial development of the Salmon Bay shoreline signal that structural remains, such as foundation walls, floors, footings, or pilings, may be encountered within the fill in the study area. Potentially significant archaeological deposits related to the structural remains might include bottle or artifact concentrations, privies, stratified refuse areas, industrial deposits, or event-related deposits that collected after fires or demolition. The previously drilled borings indicate the fill varies from 1 to 17 feet (30 centimeters to 5.2 meters) deep across the study area, with the thickest fill along the old shoreline at the Shilshole North and South Alternatives and the thinnest fill along the Leary Alternative and Ballard Avenue Alternative between 22nd Ave NW and 26th Ave NW.

The information presented in this summary is synthesized in Table 4-9, which assigns a sensitivity rating to each alternative based on potential for encountering prehistoric, ethnographic, or historic period archaeological resources. The Shilshole North and South Alternatives and the Ballard Avenue Alternative appear to be slightly more sensitive than the Leary Alternative, and therefore, they carry higher risk of an archaeological find during construction. This risk is tempered by the fact that there is a significant amount of fill on top of the old shoreline, so any potentially significant cultural materials that may be present are likely deeply buried below the proposed depth of project disturbance.

Table 4-9. Sensitivity for Encountering Cultural Resources within the BGT Missing Link Alternatives

Alternative	*Prehistoric Archaeological*	*Ethnographic Archaeological*	*Historic Archaeological*	*Historic Built Environment*
Shilshole North	High	High	High	High
Shilshole South	High	High	High	High
Ballard Avenue	High	High	High	High
Leary	Moderate	Moderate	Moderate	Moderate

CHAPTER 5: POTENTIAL IMPACTS

The design details of the BGT Missing Link alternatives are summarized in Chapter 1 and methods used to determine impacts are discussed in Chapter 3. In general, effects to historic properties from the four Build Alternatives and Connector Segments are similar and are summarized below. Details by alternative follow the general discussion of impacts where alternative-specific effects were identified.

5.1 No Build Alternative

No construction is proposed for the No Build Alternative, and, as a result, there are no anticipated impacts.

5.2 Impacts Common to all Build Alternatives

5.2.1 Construction

Three major types of impacts on historic properties common to all Build Alternatives could occur due to construction of the BGT Missing Link project. The first type includes direct physical effects, primarily consisting of vibration, noise, dust or other temporary environmental conditions caused by construction activities. These effects could result in damage to built-environment resources or could affect the maintenance or economic viability of these buildings and structures.

The second type of impact consists of indirect effects due to traffic congestion, the presence of machinery and other apparatus, loss of parking, and limited access during construction. Prolonged periods of traffic disruption and construction could potentially result in the loss of the distinctive character and economic base of historic neighborhoods; however, traffic delays and parking loss from construction are expected to be minimal from construction (see Transportation Discipline Report [Parametrix, 2015a] and Parking Discipline Report [Parametrix, 2015b] for more information). Access may be limited but it will be maintained during construction (Parametrix, 2015a).

The third construction impact would be potential alterations to the National Register-eligible resource, the SLS&E RR, which could affect its significance. All four Build Alternatives cross the SLS&E RR at various locations. Removal or relocation of rails or irreversible treatments that cover the rails or other physical features of the railroad, such as sleepers or switches, would result in an impact to the SLS&E RR.

The four Build Alternatives have moderate to high probability for potentially significant archaeological resources within the naturally deposited sediments of the project area. Because there is a significant amount of fill on top of the old shoreline, the BGT Missing Link construction would not likely affect any potentially significant cultural materials that may be present because project excavations would not extend below the fill.

5.2.2 Operation

In terms of potential operational effects on built-environment resources, no buildings would likely be altered. The streetscape would change slightly with new curb and markings, but in most areas, these changes would not alter the overall character of the streetscape except within the limits of the historic district.

There would be no anticipated operational effects to pre-contact, ethnohistoric, or historical archaeological resources.

5.3 Shilshole South Alternative

5.3.1 Construction

The Shilshole South Alterative would cross from the north side of SLS&E RR to the south along Shilshole Ave NW between NW Dock Pl and 17th Ave NW. Removal or relocation of rails or irreversible treatments that cover the rails or other physical features of the railroad, such as switches or sleepers, could result in an impact to the railroad.

5.3.2 Operation

There are no operational impacts unique to the Shilshole South Alternative.

5.4 Shilshole North Alternative

5.4.1 Construction

The proposed Shilshole North Alternative would cross the SLS&E RR twice. Removal or relocation of rails or irreversible treatments that cover the rails or other physical features of the railroad, such as switches or sleepers, could result in an impact to SLS&E RR at the east end of the alternative at NW 46th St midway between 11th Ave NW and 14th Ave NW and at the intersection of NW 45th St and 11th Ave NW.

5.4.2 Operation

There are no operational impacts unique to the Shilshole North Alternative.

5.5 Ballard Avenue Alternative

5.5.1 Construction

The Ballard Avenue Alternative crosses the SLS&E RR at NW 46th St midway between 11th Ave NW and 14th Ave NW and at the intersection of NW 45th St and 11th Ave NW. Removal or relocation of rails or irreversible treatments that cover the rails or other physical features of the railroad, such as switches or sleepers, could result in an impact to SLS&E RR.

The brick pavers on streets in this alternative are noted in the Ballard Avenue Landmark District Guidelines (adopted June 4, 2015) as one of the "qualities" that contributes to the historic character of the district. This description includes historic brick pavers that have been covered with asphalt as well as streetcar lines that may exist beneath the current street surface. Granite curbs and hitching rings located along these roads are also called out in this document as important to the district.

The pavement itself is not listed as a contributing feature within the NRHP nomination for the Ballard Avenue Historic District, but the nomination does note in the Site and Physical Features section that "brick was the earliest pavement to abut the Seattle Electric Railway tracks which ran the length of

Ballard Avenue...," and that "granite curb stones, still in evidence here and there, are generally believed to have come to land as ships' ballast" (Potter, 1976).

Removal of granite curbs and brick underlying the asphalt road surface is anticipated throughout the Ballard Avenue Alternative due to changes in existing sidewalk width and construction of the trail and buffer. These changes constitute an adverse impact to the District. Potential dust and vibrations from construction vehicles and activities could result in the physical deterioration of the buildings and structures as well as the pavers and roadway. The weight of construction vehicles on the streets that contain brick pavers could have an additional impact.

5.5.2 Operation

There are no operational impacts unique to the Ballard Avenue Alternative.

5.6 Leary Alternative

5.6.1 Construction

The Leary Alternative crosses the SLS&E RR at the intersection of NW 45th St and 11th Ave NW. Removal or relocation of rails or irreversible treatments that cover other physical features of the railroad, such as switches or sleepers, as part of this crossing could result in an impact to SLS&E RR.

5.6.2 Operation

There are no operational impacts unique to the Leary Alternative.

5.7 Connector Segments

5.7.1 Construction

Removal or relocation of the pavers underlying the asphalt surface and granite curbs on the Ballard Avenue Connector could result in an impact to the Ballard Avenue Historic District.

5.7.2 Operation

There are no operational impacts unique to the Connector Segments.

CHAPTER 6: AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

The potential construction and operational impacts to archaeological and built-environment resources for the four alternatives and Connector Segments of the BGT Missing Link project are discussed in Chapter 5. Based on these impacts and currently available design details, this chapter discusses potential measures to avoid, minimize, or mitigate these effects. When feasible, avoidance would limit most potential effects, but recommended minimization and mitigation measures should be coordinated with DAHP, the Ballard Avenue Landmark District Board, and other affected parties.

6.1 Measures Common to All Build Alternatives

The primary impacts of the BGT Missing Link project on the built environment would involve effects to the rail lines and associated features of the SLS&E RR. Construction impacts along the four Build Alternatives and Connector Segments could be minimized if railroad rails are not removed or altered, and effects to other contributing features, such as switches and sleepers, are avoided. Use of surfaces that would not affect the rails or active use of the railroad would also minimize impacts. An example of minimization can be seen along the existing BGT east of the Missing Link project. There, the crossing of the tracks is approached at an angle for safety, and the area between the rails was paved with asphalt. With the implementation of these minimization measures, impacts would not be considered significant.

Construction mitigation measures for direct and indirect impacts on historic properties would be based on the type of construction activity and the extent of the potential adverse effect on the resources. Traffic delays, loss of parking, and access problems during construction would be minor. Potential impacts could be minimized by implementing measures as outlined in the Transportation Discipline Report (Parametrix, 2015a) and Parking Discipline Report (Parametrix, 2015b). Best management practices could be used to control noise, dust, and mud and ensure that damage to historic resources is avoided. Other efforts to minimize impacts during construction could include limiting disruptions of utility services and providing continued access to businesses and residences during construction as well as vibration monitoring of buildings.

The BGT Missing Link would have limited operational impact on built-environment resources and no expected impact on archaeological resources.

6.2 Measures Specific to Each Alternative

The construction and operation of the BGT Missing Link Ballard Avenue Alternative and the Ballard Avenue connector could have impacts on features that contribute to the historic significance of the Ballard Avenue Historic District. The design and appearance of the trail within the district should be compatible with its historic character and period of significance and obtain a Certificate of Approval demonstrating compatibility from the Office of Historic Preservation. Construction impacts to historic streetscapes could be minimized by reuse of the granite curbs for the expanded sidewalk design and by retention and, if necessary, resetting of the existing brick pavement that lies underneath the asphalt surfacing of the street. Any decisions about minimization or mitigation measures should be made in consultation with DAHP and the Ballard Avenue Landmark District Board.

No further measures other than those recommended for all of the alternatives in Section 6.1, Measures Common to All Build Alternatives, would be needed.

CHAPTER 7: CUMULATIVE IMPACTS

7.1 Introduction

Cumulative impacts are the effects that may result from the incremental impact of an action when added to other past, present, and reasonably foreseeable actions, regardless of who undertakes them. The purpose of a cumulative impacts analysis is to identify the potential for the project to contribute to the incremental impacts to a degree that, if unmitigated, these impacts could become significant. Potential cumulative impacts are analyzed so that decision-makers can consider how impacts from actions over time "add up" to affect a resource. Analysts identified potential past, present, or reasonably foreseeable future actions that could affect or be affected by the BGT project, either directly or indirectly.

The Ballard area has experienced significant development and re-development in the past several years, and this trend is anticipated to continue as long as favorable economic conditions persist. This development has resulted in numerous apartments and condominiums throughout the area and a relatively high level of construction activity. Listed below are descriptions of several large construction/development projects that are known or are reasonably expected to occur in the near future in the project vicinity.

7.2 Known or Anticipated Projects

7.2.1 West Ship Canal Water Quality Project

Seattle Public Utilities (SPU) is proposing a large project to reduce Combined Sewer Overflow (CSOs) that would occur in the vicinity of the proposed BGT Missing Link project. The project will be under construction over an approximate 6-year period, beginning in approximately 2018. Over the course of construction, active construction would occur in phases at different locations, but would be heavily involved in the Ballard area over much of the construction period.

7.2.2 C.D. Stimson Development

Developer C.D. Stimson Co. plans to build a 500,000-square-foot office complex consisting of five, five-story buildings at 5423 Shilshole Ave NW. The project will start with one 105,000-square-foot building, with the remaining added in the following years. Construction of the first building is anticipated to take two years beginning in 2016 or 2017.

7.2.3 Sound Transit 3 Draft Priority Projects List

Sound Transit has developed a draft priority projects list as part of their planning process to expand the regional mass transit system to meet anticipated population growth expected by 2040. Sound Transit is currently conducting further analysis and a final list will be included in a ballot measure that could go to voters as early as November 2016. The schedule for these potential projects is not yet known. The projects on the draft project list in the study area are:

C-02 Ballad to University District. This project would build light rail in a tunnel from Ballard's Market Street area to the vicinity of the U District light rail station now under construction.

Light Rail Downtown Seattle to Ballard (Market Street Vicinity). There are several alternative projects that would build light rail from downtown Seattle to Ballard's Market Street area.

7.2.4 SDOT Move Seattle Transportation Strategy

There are two projects in Move Seattle that overlap with the study area: the Ballard to Downtown Enhanced Transit Corridor and Market/45th Transit Improvement Project. Both these projects are proposed to be implemented by 2024.

Ballard to Downtown Enhanced Transit Corridor. In preparation for a potential inclusion of a Ballard light rail line in the future Sound Transit 3 ballot measure, the Ballard to Downtown Enhanced Transit Corridor project improves the corridor's existing transit operations and adds interim safety improvements for people who bike and walk crossing the Lake Washington Ship Canal.

Market/45th Transit Improvement Project. The Market / 45th transit project enhances transit speed and reliability on of one the city's primary east-west corridors and most chronically congested routes.

7.2.5 Seattle Bicycle Master Plan Projects

The Bicycle Master Plan proposes a number of bicycle improvements in and near the BGT Missing Link project study area. These projects include constructing neighborhood greenways on NW 50th St, 11th Ave NW, 28th Ave NW, and NW 64th St. Bicycle lanes with minor separation are proposed for NW Market St between 24th Ave NW and 32nd Ave NW, and on 14th Ave NW.

7.2.6 Other Private Development

The Ballard neighborhood has been experiencing growth in the last few years, and it is anticipated that this growth will continue (City of Seattle, 2014). The types of development expected are commercial buildings as well as residential medium-density and high-density housing, including multi-family complexes with commercial development on the ground floor.

7.3 Assessment of Cumulative Impacts

The four Build Alternatives would not contribute to a cumulative impact for archaeological resources. However, a few of the projects listed in Section 7.1, Cumulative Impacts Project List, are likely to impact the SLS&E RR at crossings due to removal or relocation of rails or irreversible treatments that cover the rails or other physical features of the railroad, such as switches or sleepers. The West Ship Canal Water Quality Project would upgrade the existing railroad tracks for use in moving construction materials and spoils, and the proposed C.D. Stimson Development at 5423 Shilshole Ave NW would require access points that crossed the tracks. If these projects propose removal or relocation of rails or irreversible treatments that cover the rails or physical features of the SLS&E RR, they could, along with the BGT Missing Link, contribute to a cumulative impact for built-environment resources.

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