Seattle Arena

Final
Environmental Impact Statement and Appendices A-D
(Appendices E, F and G Bound Separately)

Date Published: May 7, 2015

City of Seattle
Department of Planning and Development

The intent and purpose of this Final Environmental Impact Statement is to satisfy the procedural requirements of the State Environmental Policy Act (RCW 43.21c) and City Ordinance 114057. This document is not an authorization for an action, nor does it constitute a decision or a recommendation for an action; in its final form it will accompany the final decision on the proposal.

Introductory Memo

This document is a Final Environmental Impact Statement (FEIS), prepared under the direction of DPD. It fully incorporates the information contained in the DEIS, comments received on the DEIS during the public review period, responses to these comments, and additional information developed in response to comments.

The FEIS will be used by the City of Seattle and King County to inform various decisions and options, including: (1) whether the City and County will participate in development of ArenaCo's proposed Seattle Arena; (2) whether the City will issue land use approvals and the nature of impact mitigation that may be required; and (3) whether to approve a street vacation.

Key environmental issues and options identified in this FEIS are primarily potential impacts to traffic and transportation and, to a lesser extent, construction and operational impacts on the other elements of the environment including geology/soils, air quality, climate, water, conservation and renewable resources, scenic resources, land use, recreation, historic resources, public services and utilities. Summary information regarding the project's effects on these elements of the environment is provided beginning on page vii.

This FEIS also contains an Economic Impact Analysis (Appendix F) which is included as a result of an agreement between King County, the City of Seattle, and ArenaCo. The accuracy or adequacy of the Economic Impact Analysis or other non-environmental analysis included in this EIS may not be used to determine whether this EIS meets the requirements of SEPA. WAC 197-111-440 (8).

By agreement between the City of Seattle and King County, the City is serving as the SEPA lead agency for this proposal. The scope of this document has been determined in accordance with the scoping process required by the Seattle SEPA Ordinance (SMC 25.05.408). A public notice was issued on October 25, 2012, stating that the project would require an EIS and inviting public and agency comments on the scope of the DEIS.

On November 8, 2012, a public meeting was held in the Bertha Landes room at Seattle City Hall at 6:00 PM to provide opportunity for the public to discuss and identify probable significant environmental impacts that should be addressed in the EIS. On November 13, 2012, a meeting was held with public agencies and Tribes at Seattle Municipal Tower, Room 2240, at 10:00 AM to provide opportunity for the public agencies and Tribes to discuss and identify probable significant environmental impacts that should be addressed in the EIS. On November 14, 2012, a public meeting was held in the Fidalgo Room at Seattle Center at 6:00 PM to provide opportunity for the public to discuss and identify probable significant environmental impacts that should be addressed in the EIS.

The scoping comment period ended on November 30, 2012. Written comments were received from 20 agencies, businesses, organizations, individuals and unions as of November 30, 2012. In addition, ten people made oral comments during the three scoping meetings. The majority

of the comments were directed at traffic and transportation impacts, land use compatibility with industrial uses, evaluation of alternative sites, and impacts on public services and utilities.

Based on scoping comments, DPD determined that the project had the potential to result in adverse impacts on the following elements of the environment: geology/soils, air quality, climate, water, conservation and renewable resources, scenic resources, land use, recreation, historic resources, traffic and transportation, and public services and utilities. There would also be potential impacts from construction (air quality, noise and transportation). It is not anticipated that there would be a significant adverse impact on other elements of the environment, and these elements are eliminated from detailed study.

On August 15, 2013, the City of Seattle Department of Planning and Development (DPD) issued a Draft Environmental Impact Statement (DEIS) for the Seattle Arena. The issuance of the DEIS was followed by a 45-day agency and public review period which ended on September 30, 2013. During the review period, DPD conducted two public hearings. The first was on September 10, 2013, in the Bertha Landes Room at Seattle City Hall; and the second was on September 19, 2013, in the Fidalgo Room at Seattle Center.

During the 45-day comment period, DPD received 22 written comments from government agencies, organizations, and individuals. In addition, four people provided oral comments at the September 10, 2013, comment hearing, and 32 people provided comments at the September 19, 2013, comment hearing. Of these comments, the largest number (21 comments) were of concern for the economic impacts to the Port of Seattle and 16 comments were about general impacts to industrial jobs in Seattle from the South Downtown (SoDo) location. Other issues frequently raised with the SoDo alternatives were pedestrian safety, vehicular congestion, traffic operations, freight mobility, and train traffic. All comments are included in Appendix G.

This FEIS contains:

- A summary of the EIS including a discussion of impacts and mitigation measures relevant to the alternatives (Section 1), and a summary of changes made to information contained in the DEIS
- A description of project alternatives (Section 2)
- A description of the affected environment, environmental impacts, mitigation measures and significant unavoidable adverse impacts (Section 3)
- A complete set of comments received on the DEIS during the agency and public review period along with responses to all written comments and to oral comments made during the two public hearings (Appendix G

Text changes or additions to Sections 1 through 6 are denoted by a vertical line in the left margin.

Appendix G contains the comment letters and applicable responses occurring in tandem. Each comment is identified with a number in the margin. Responses are coded with the number for the comment to which they refer.

Fact Sheet

Project Title

Seattle Arena

Proponent

WSA Properties III, LLC

Location

The proposal is located in the Stadium District south of the existing Safeco Field. The site address is 1700 First Avenue S., Seattle, Washington

Proposed Action

The Proposed Action is the future construction of an approximately 750,000 square foot, 20,000-seat spectator sports facility (Seattle Arena) to be located at 1700 First Avenue South, Seattle. The Project would include the demolition of eight existing structures of approximately 128,087 square feet, and grading would occur for construction. The Project includes a proposed street vacation of the portion of Occidental Avenue South between South Holgate and South Massachusetts Streets, and a realignment of S. Massachusetts Street between Occidental Avenue S and 1st Avenue S. Parking for the facility is proposed to be provided by use either of existing off-site parking or the construction of new off-site parking on a lot south of Holgate Street (referred to in this document as the "South Warehouse site"). The Proposed Action includes all regulatory, transactional and other decisions necessary to accomplish the project.

The principal on-site alternative is an 18,000-seat arena. This Final EIS also evaluates potential impacts at the KeyArena and Memorial Stadium locations in the vicinity of Seattle Center, however no proposal exists to locate an arena at either of those locations.

Lead Agency

City of Seattle Department of Planning and Development

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Master Use Permit No.: 3014195

Required Approvals

Preliminary investigation indicates that the following permits and/or approvals could be required for the proposal. Additional permits/approvals may be identified during the review process.

State of Washington

Labor & Industries

- Elevator Permits

Puget Sound Clean Air Agency

- Asbestos Survey
- Demolition Permit

King County

- Transaction Documents with City of Seattle and ArenaCo

City of Seattle

City Council

- Transaction Documents with King County and ArenaCo
- Street Vacation (vacation of portion of Occidental Avenue South)

Department of Planning and Development

- Draft and Final EIS Approval
- Master Use Permit
- Grading Permit/Shoring Permit
- Demolition Permit
- Building Permit
- Mechanical Permits
- Electrical Permits
- Structural Permit
- Certification of Occupancy
- Energy Code Approval
- Drainage Control Plan Review and Approval

Seattle Public Utilities

- Water connection
- Sewer connection

Seattle Fire Department

- Fire Code Inspections

Seattle-King County Department of Health

- Plumbing Permits

Date of Issue of the Draft EIS

August 15, 2013

Date of Issue of the Final EIS

May 7, 2015

Approximate Date of Final Actions

Final actions will include DPD's issuance of a Master Use Permit (MUP), Seattle City Council approval of the street vacation, and City and King County approval of transaction documents. These actions will follow the issuance of the Final EIS and are expected to occur in 2015 and 2016.

Document Availability and Cost

Copies of this FEIS have been distributed to agencies and organizations noted in Chapter 6, Distribution List of this document.

Copies of this document are also available for review at the City of Seattle Department of Planning and Development Public Resource Center, located in Suite 2000 of Seattle Municipal Tower in Downtown Seattle (700 Fifth Avenue) and at the following branch of the Seattle Public Library:

- Central Library (1000 – 4th Avenue)

A limited number of complimentary copies of this FEIS may be obtained from the Department of Planning and Development Public Resource Center while the supply lasts. Additional copies may be purchased for the cost of reproduction.

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Location of Background Data

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Elements of the Environment

The following is a list of elements of the environment set forth in Chapter 25.05.444 of the Seattle Municipal Code. During the scoping process, the Department of Planning and Development evaluated the project's potential for adverse impacts on each of these elements. Consideration was given to both construction and operational impacts. The items marked "reviewed" are discussed in Chapter 3 of this EIS. These items were identified as a result of the scoping process carried out in compliance with Section 25.05.408 of the Seattle Municipal Code and were determined by the Department to have potential significant adverse impacts. Items marked "not reviewed" do not have impacts, or have impacts that were deemed non-significant and are not discussed in the EIS.

I. Natural Environment

(a) Earth

(i)	**Geology and Soils**	**Reviewed**
(ii)	Topography	Not reviewed
(iii)	Unique physical features	Not reviewed
(iv)	**Erosion/enlargement**	**Reviewed**

(b) Air

(i)	**Air Quality**	**Reviewed**
(ii)	Odor	Not reviewed
(iii)	**Climate**	**Reviewed**

(c) Water

(i)	Surface Water Movement, Quantity, or Quality	Not reviewed
(ii)	**Runoff/absorption**	**Reviewed**
(iii)	Floods	Not reviewed
(iv)	**Groundwater**	**Reviewed**
(v)	**Public water supply**	**Reviewed**

(d) Plants and Animals

(i)	Habitat	Not reviewed
(ii)	Unique species	Not reviewed
(iii)	Fish or wildlife	Not reviewed

(e) Energy and Natural Resources

(i)	Amount required/ rate of use/ efficiency	Not reviewed
(ii)	Source/availability	Not reviewed

	(iii)	Nonrenewable resources	Not reviewed
	(iv)	**Conservation and renewable resources**	**Reviewed – see Air Quality**
	(v)	**Scenic resources**	**Reviewed**

II. Built Environment

(a) Environmental Health

(i)	Noise	Not reviewed for operation; **Construction Noise Reviewed**
(ii)	Risk of explosion	Not reviewed
(iii)	Releases or potential releases to the environment affecting public health, such as toxic or hazardous materials.	Not reviewed for operation; potential soil conditions reviewed as part of construction impacts

(b) Land and Shoreline Use

(i)	**Relationship to existing land use plans and to estimated population**	**Reviewed as Regulatory Framework**
(ii)	Housing	Not reviewed
(iii)	Light and glare	Not reviewed
(iv)	**Aesthetics**	**Reviewed as Scenic Resources**
(v)	**Recreation**	**Reviewed – See Parks in Public Services and Utilities**
(vi)	**Historic and cultural preservation**	**Reviewed**
(vii)	Agricultural crops	Not reviewed

(c) Transportation

(i)	**Transportation systems**	**Reviewed**
(ii)	**Vehicular traffic**	**Reviewed**
(iii)	**Waterborne, Rail**	**Reviewed**
(iv)	**Parking**	**Reviewed**
(v)	**Movement and circulation of people or goods**	**Reviewed**
(vi)	**Traffic hazards**	**Reviewed**

(d) Public Services and Utilities

(a)	**Fire**	**Reviewed**
(b)	**Police**	**Reviewed**

(c)	Schools	Not reviewed
(d)	**Parks or other recreational facilities**	**Reviewed**
(e)	Maintenance	Not reviewed
(f)	Communications	Not reviewed
(g)	**Water and Storm Water**	**Reviewed – see Water**
(h)	**Sewer and Solid Waste**	**Reviewed – see Water**
(i)	**Other government services or utilities.**	**Reviewed**

III. Economic Factors

(a)	**Employment, Public Investment and Taxation**	**Reviewed (Appendix F)**

Acronyms

ADA	Americans with Disabilities Act
AVO	average vehicle occupancy
BNSF	Burlington Northern Santa Fe
CBD	Central Business District
C&D	construction and demolition
CIP	Capital Improvement Program
CMP	construction management plan
CO	carbon monoxide
CO_2	carbon dioxide
CONCACF	Confederation of North, Central American and Caribbean Association Football
CMP	Construction Management Plan
CPTED	Crime Prevention Through Environmental Design
CSMP	Comprehensive Safety and Mobility Plan
CSO	combined sewer overflow
CTMP	Construction Transportation Management Plan
CTS	Comprehensive Transportation Strategy
cu yds	cubic yards
DAHP	Department of Archaeology and Historic Preservation
dB	decibels
dBA	A-weighted decibels
DEIS	Draft Environmental Impact Statement
DPD	Department of Planning and Development
DPM	diesel particulate matter
DRB	Design Review Board
EBI	Eliot Bay Interceptor
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FEIS	Final EIS
FRA	Federal Railroad Administration
GHG	greenhouse gas
GMA	Growth Management Act
gpm	gallons per minute
GRH	Guaranteed Ride Home
gsf	gross square feet
HCM	highway capacity manual
HOV	high occupancy vehicle
I-5	Interstate (Highway) 5
I-90	Interstate (Highway) 90

I&M	inspection and maintenance
ITS	intelligent transportation system
KCWTD	King County Wastewater Treatment Division
kVA	kilovolt amperes
kW	kilowatt
lbs/day	pounds per day
LEED	Leadership in Energy and Environmental Design
L_{eq}	equivalent sound level
L_{max}	maximum sound level
LOS	level of service
LTCP	Long Term Control Plan
MBH	million BTU/hour
MCER	maximum considered earthquake
MIC	Manufacturing and Industrial District
MLB	Major League Baseball
MLS	Major League Soccer
MOTTF	Maintenance of Traffic Task Force
mph	miles per hour
msl	mean sea level
MTCO2e	Metric tons CO2 equivalent
MUP	Master Use Permit
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NBA	National Basketball Association
NC3	Neighborhood Commercial 3
NFL	National Football League
NHL	National Hockey League
NHPA	National Historic Preservation Act
NOx	nitrogen oxide
OSE	Office of Sustainability and Environment
p/min/ft	pedestrians per minute per foot
PM_{10}	particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter
ppm	parts per million
PSCAA	Puget Sound Clean Air Agency
psi	pounds per square inch
PSRC	Puget Sound Regional Council
SDC	Seattle Design Commission
SDOT	Seattle Department of Transportation
SEPA	State Environmental Policy Act
sf	square feet

SFD	Seattle Fire Department
SIFF	Seattle International Film Festival
SIG	State Intermodal Gateway
SLU	South Lake Union
SMC	Seattle Municipal Code
SoDo	South Downtown
Sounders FC	Sounders Football Club
SOV	single occupancy vehicle
SPD	Seattle Police Department
SPU	Seattle Public Utilities
SR	State Route
SRI	solar reflectance index
ST	Sound Transit
SUAI	Significant unavoidable adverse impact
TCP	traffic control plan
tcy	total cubic yards
TDM	transportation demand management
TEAM	Techniques for Effective Alcohol Management
TEU	twenty-foot equivalent units
TMP	Transportation Management Plan
TOD	transit oriented development
U-link	University Link Light Rail
UP	Union Pacific
UW	University of Washington
v/c	volume to capacity
VMS	variable message signs
VOC	volatile organic compound
VPH	vehicles per hour
WAC	Washington Administrative Code
WAMU Theatre	Washington Mutual Theatre
WNBA	Women's National Basketball Association
WSDOT	Washington State Department of Transportation
WSF	Washington State Ferries

Table of Contents

Section 1 - Summary 1-1

1.1 Project 1-1
1.2 Site and Site Vicinity 1-1
1.3 Description of Alternatives 1-2
1.4 Summary of Changes Made to Information Contained in August 2013 Draft EIS 1-5
1.4.1 Project Description 1-5
1.4.2 Scenic Resources 1-5
1.4.3 Historic and Cultural Resources 1-5
1.4.4 Transportation – Section 3.8 and Appendix E 1-5
1.4.5 Appendix F – Economics Report 1-6
1.5 Summary of Potential Impacts and Major Conclusions 1-7
1.6 Significant Areas of Controversy and Uncertainty 1-7
1.7 Summary of Potential Mitigation Measures 1-7
1.8 Secondary and Cumulative Impacts 1-8
1.9 Significant Unavoidable Adverse Impacts 1-8

Section 2 - Description of Alternatives 2-1

2.1 Proposed Action 2-1
2.2 Site and Site Vicinity 2-2
2.3 City of Seattle Permitting 2-4
2.3.1 Zoning 2-4
2.3.2 Permitting Process 2-4
2.4 Project Activities 2-5
2.4.1 Construction 2-5
2.4.2 Operation 2-5
2.5 Alternatives 2-6
2.6 Alternatives Considered But Not Advanced 2-7
2.7 Benefits and Disadvantages of Delaying Project Implementation 2-10
2.8 2018 Operation Impacts 2-10

Section 3 - Environmental Analysis 3.1-1

3.1 Geology and Soils 3.1-1
3.1.1 Stadium District Alternatives - Alternatives 2 and 3 ..... 3.1-1
3.1.2 Seattle Center Area Alternatives - Alternatives 4 and 5 ..... 3.1-15

3.2 Air Quality 3.2-1
3.2.1 Introduction 3.2-1
3.2.2 Stadium District Alternatives - Alternatives 2 and 3 ..... 3.2-3
3.2.3 Seattle Center Area Alternatives - Alternatives 4 and 5 ..... 3.2-11
3.3 Water 3.3-1
3.3.1 Stadium District Alternatives - Alternatives 2 and 3 ..... 3.3-1
3.3.2 Alternative 4 - KeyArena 20,000-Seat Arena 3.3-10
3.3.3 Alternative 5 - Memorial Stadium 20,000-Seat Arena 3.3-16
3.4 Scenic Resources 3.4-1
3.4.1 Introduction 3.4-1
3.4.2 Stadium District Alternatives – Alternatives 2 and 3 ..... 3.4-2
3.4.3 Seattle Center Area Alternatives - Alternatives 4 and 5 ..... 3.4-7
3.5 Noise 3.5-1
3.5.1 Introduction 3.5-1
3.5.2 Stadium District Alternatives – Alternatives 2 and 3 ..... 3.5-2
3.5.3 Seattle Center Area Alternatives – Alternatives 4 and 5 ..... 3.5-7
3.6 Land Use 3.6-1
3.6.1 Stadium District Alternatives – Alternatives 2 and 3 ..... 3.6-1
3.6.2 Alternative 4 – KeyArena 20,000-Seat Arena 3.6-6
3.6.3 Alternative 5 – Memorial Stadium 20,000-Seat Arena 3.6-10
3.6.4 Significant Unavoidable Adverse Impacts 3.6-12
3.7 Historic and Cultural Resources 3.7-1
3.7.1 Introduction 3.7-1
3.7.2 Stadium District Alternatives – Alternatives 2 and 3 ..... 3.7-2
3.7.3 Alternative 4 – KeyArena 20,000-Seat Arena 3.7-5
3.7.4 Alternative 5 – Memorial Stadium 20,000-Seat Arena 3.7-7
3.8 Transportation 3.8-1
3.8.1 Introduction 3.8-1
3.8.2 Stadium District Alternatives - Alternatives 2 and 3 ..... 3.8-10
3.8.3 Seattle Center Area Alternatives – Alternatives 4 and 5 ..... 3.8-130
3.8.4 Mitigation Measures 3.8-204
3.8.5 Secondary and Cumulative Impacts 3.8-218
3.8.6 Significant Unavoidable Adverse Impacts 3.8-220
3.9 Public Services and Utilities 3.9-1
3.9.1 Stadium District Alternatives – Alternatives 2 and 3 ..... 3.9-1
3.9.2 Alternative 4 – KeyArena 20,000-Seat Arena 3.9-15
3.9.3 Alternative 5 – Memorial Stadium 20,000-Seat Arena 3.9-21
3.10 Regulatory Framework 3.10-1
3.10.1 Stadium District Alternatives - Alternatives 2 and 3 ..... 3.10-1
3.10.2 Alternative 4 – KeyArena 20,000-Seat Arena 3.10-4
3.10.3 Alternative 5 – Memorial Stadium 20,000-Seat Arena 3.10-8
3.11 Economics 3.11-1
3.11.1 Introduction 3.11-1
3.11.2 Summary of Economic Effects 3.11-1

Section 4 - References 4-1

Section 5 - Glossary 5-1

Section 6 - Final EIS Distribution List 6-1

6.1 State Agencies 6-1
6.2 Regional Agencies 6-1
6.3 Local Agencies 6-1
6.4 Libraries 6-1
6.5 Newspapers 6-1

List of Tables

Table 1-1 Summary of Potential Impacts and Major Conclusions 1-9
Table 1-2 Summary of Potential Mitigation Measures 1-47
Table 1-3 Summary of Secondary and Cumulative Impacts 1-56
Table 1-4 Summary of Significant Unavoidable Adverse Impacts 1-60
Table 3.2-1 Estimated Greenhouse Gas (GHG) Emissions 3.2-7
Table 3.3-1 Estimated and Proposed Annual Stormwater Flows - Alternatives 2 and 3 ..... 3.3-6
Table 3.3-2 Estimated Annual Existing and Proposed Wastewater Flows - Alternatives 2 and 3 ..... 3.3-7
Table 3.3-3 Estimated Existing and Proposed Total Annual Flow to Combined Sewer - Alternatives 2 and 3 ..... 3.3-8
Table 3.3-4 Estimated Existing and Future Annual Stormwater Flows - Alternative 4 – KeyArena Site 3.3-13
Table 3.3-5 Estimated Annual Existing and Future Wastewater Flows - Alternative 4 – KeyArena Site 3.3-14
Table 3.3-6 Estimated Annual Existing and Future Stormwater Flows - Alternative 5 – Memorial Stadium Site 3.3-19
Table 3.3-7 Estimated Annual Existing and Future Wastewater Flows - Alternative 5 – Memorial Stadium Site 3.3-20
Table 3.4-1 Public Viewpoints Where Alternatives 2 and 3 May Be Visible 3.4-4
Table 3.4-2 Public Viewpoints Where Alternatives 4 and 5 May Be Visible 3.4-7
Table 3.4-3 Summary of Potential View Effects of the Space Needle 3.4-9
Table 3.5-1 City of Seattle Exterior Sound Level Limits 3.5-2
Table 3.5-2 Construction Equipment Sound Ranges 3.5-4
Table 3.6-1 Selected Area Demographics 3.6-3
Table 3.6-2 Summary of Proposed Changes 3.6-4
Table 3.6-3 Uptown Area Demographics 3.6-8
Table 3.6-4 Potential Key Arena Displacements 3.6-9
Table 3.6-5 Summary of Potential Changes at KeyArena 3.6-9
Table 3.7-1 Structures Over 25 Years Old on the Alternatives 2 and 3 Site 3.7-2

Table 3.7-2 Structures Over 25 Years Old at the KeyArena Site 3.7-5
Table 3.8-1 Arena Event Attendance Ranges 3.8-6
Table 3.8-2 Stadium District - Event Cases for Analysis 3.8-7
Table 3.8-3 Seattle Center Area Alternatives - Event Cases for Analysis 3.8-9
Table 3.8-4 Stadium District Existing Street System Summary 3.8-12
Table 3.8-5 Stadium District: Key Study Area Planned Transportation Projects 3.8-16
Table 3.8-6 2018 Alternative 2 Arena Site Vicinity Traffic Volumes 3.8-56
Table 3.8-7 2030 Alternative 2 Arena Site Vicinity Traffic Volumes 3.8-57
Table 3.8-8 Existing Weekday PM Peak Hour Travel Times Non-Event and With-Event Conditions 3.8-61
Table 3.8-9 Stadium District Existing Ramp Terminal Weekday PM Peak Hour LOS Summary 3.8-66
Table 3.8-10 Stadium District 2018 No Action Weekday PM Peak Hour Corridor Travel Times 3.8-70
Table 3.8-11 Stadium District 2030 No Action Weekday PM Peak Hour Corridor Travel Times 3.8-71
Table 3.8-12 2018 Alternative 2 Weekday PM Peak Hour Intersections at LOS E or LOS F 3.8-77
Table 3.8-13 2030 Alternative 2 Weekday PM Peak Hour Intersections at LOS E or LOS F 3.8-78
Table 3.8-14 2018 Alternative 2 Weekday PM Peak Hour Corridor Travel Times 3.8-79
Table 3.8-15 2030 Alternative 2 Weekday PM Peak Hour Corridor Travel Times 3.8-80
Table 3.8-16 2018 Alternative 2 Increase in Traffic on Freeway Corridors 3.8-81
Table 3.8-17 Stadium District Existing Weekday PM Peak Hour Intersection Operations at Key Freight Intersections 3.8-90
Table 3.8-18 Existing Weekday PM Peak Hour Travel Times Non-Event & With-Event Conditions on Key Freight Corridors 3.8-91
Table 3.8-19 S. Holgate Street and S. Lander Street Rail Crossing Summary – Existing PM Peak Hour 3.8-92
Table 3.8-20 Anticipated Future Changes to Daily Rail Activity 3.8-94
Table 3.8-21 Stadium District Weekday AM Peak Hour No Action Intersection Operations at Key Freight Intersections 3.8-95
Table 3.8-22 Stadium District 2018 No Action Weekday PM Peak Hour Freight Corridor Travel Times 3.8-96
Table 3.8-23 Stadium District 2030 No Action Weekday PM Peak Hour Freight Corridor Travel Times 3.8-97
Table 3.8-24 No Action S. Holgate Street and S. Lander Street Rail Crossing Impact Summary 3.8-98
Table 3.8-25 Stadium District Alternative 2 Weekday PM Peak Hour Intersection Operations at Key Freight Intersections 3.8-100
Table 3.8-26 Occidental Avenue S. Street Vacation Comparative Analysis 3.8-117
Table 3.8-27 Parking Garage Transportation Elements 3.8-129
Table 3.8-28 Seattle Center Area Existing Street System Summary 3.8-133
Table 3.8-29 Seattle Center: Key Study Area Planned Transportation Projects 3.8-136
Table 3.8-30 2018 Alternative 4 Weekday PM Peak Hour Traffic Volumes Comparison 3.8-162

Table 3.8-31 2030 Weekday PM Peak Hour Alternative 4 Traffic Volumes Comparison 3.8-163
Table 3.8-32 2018 Alternative 5 Weekday PM Peak Hour Traffic Volumes Comparison 3.8-164
Table 3.8-33 2030 Alternative 5 Weekday PM Peak Hour Traffic Volumes Comparison 3.8-164
Table 3.8-34 Seattle Center Existing Corridor Travel Times 3.8-167
Table 3.8-35 Seattle Center Area Existing Weekday PM Peak Hour Ramp Termini Intersection Operations – Existing Conditions, PM Peak Hour 3.8-168
Table 3.8-36 Seattle Center Area 2018 Weekday PM Peak Hour No Action Corridor Travel Times 3.8-171
Table 3.8-37 Seattle Center Area 2030 No Action Weekday PM Peak Hour Corridor Travel Times 3.8-172
Table 3.8-38 Seattle Center Area No Action Weekday PM Peak Hour Ramp Terminal Intersection Operations 3.8-173
Table 3.8-39 2018 Alternative 4 Weekday PM Peak Hour Intersections at LOS E or LOS F 3.8-176
Table 3.8-40 2030 Alternative 4 Weekday PM Peak Hour Intersections at LOS E or LOS F 3.8-177
Table 3.8-41 2018 Alternative 4 Weekday PM Peak Hour Corridor Travel Times 3.8-178
Table 3.8-42 2030 Alternative 4 Weekday PM Peak Corridor Travel Times 3.8-179
Table 3.8-43 2018 Alternative 4 Weekday PM Peak Hour Increase in Traffic on Freeway Corridors 3.8-180
Table 3.8-44 Alternative 4 Weekday PM Peak Hour Ramp Terminal Intersection Operations 3.8-180
Table 3.8-45 2018 Alternative 5 Weekday PM Peak Hour Intersections at LOS E or LOS F 3.8-183
Table 3.8-46 2030 Alternative 5 Weekday PM Peak Hour Intersections at LOS E or LOS F 3.8-184
Table 3.8-47 2018 Alternative 5 Weekday PM Peak Hour Corridor Travel Times 3.8-185
Table 3.8-48 2030 Alternative 5 PM Peak Hour Corridor Travel Times 3.8-185
Table 3.8-49 2018 Alternative 5 Weekday PM Peak Hour Increase in Traffic on Freeway Corridors 3.8-186
Table 3.8-50 2030 Alternative 4 Weekday PM Peak Hour Traffic Volumes Comparison 3.8-193
Table 3.8-51 2030 Alternative 4 Weekday PM Peak Hour Corridor Travel Times 3.8-194
Table 3.8-52 2030 Alternative 5 Weekday PM Peak Hour Traffic Volumes Comparison 3.8-195
Table 3.8-53 2030 Alternative 5 Weekday PM Peak Hour Travel Times 3.8-195
Table 3.8-54 Weeknight Transportation Management Program Goals 3.8-211
Table 3.8-55 General Traffic Control Plan Levels 3.8-217
Table 3.9-1 Citywide Seattle Fire Department Personnel and Apparatus (2010 - 2012) 3.9-2
Table 3.9-2 Monthly Average Crime West Precinct King Sector Beat 3 2008-2014 2008-2012 (Alternatives 2 and 3) 3.9-5

Table 3.9-3 Crime Totals per Year West Precinct David Sector Beat 12008-2014 (Alternatives 4 and 5) 3.9-16

List of Figures

Figure 1-1 Site Location Alternative 2 and Alternative 3 1-3
Figure 1-2 Site Location Alternative 4 and Alternative 5 1-4
Figure 2-1 Stadium District Proposed Arena Site Plan 2-1
Figure 2-2 South Warehouse Site Parking Location 2-2
Figure 2-3 Site Vicinity, Proposed Action – Alternatives 2 and 3 2-3
Figure 2-4 Anticipated Event Calendar 2-6
Figure 2-5 Site Vicinity Alternative 4 2-8
Figure 2-6 Site Vicinity Alternative 5 2-9
Figure 3.1-1 Regional Topography 3.1-1
Figure 3.1-2 Stadium District Site Topography 3.1-2
Figure 3.1-3 Historic Shoreline of Elliott Bay 3.1-3
Figure 3.1-4 Beacon Hill and First Hill from Tideflats, ca. 1904 ..... 3.1-3
Figure 3.1-5 Elliott Bay in 1901 Before Tidelands Were Filled 3.1-4
Figure 3.1-6 Seattle Tideflats from Beacon Hill, ca. 1895-1898 ..... 3.1-4
Figure 3.1-7 Site and Exploration Plan 3.1-6
Figure 3.1-8 Conceptual Geologic Cross-Section 3.1-7
Figure 3.1-9 Potential Seismic Source Zones in the Pacific Northwest 3.1-8
Figure 3.1-10 Mapped Seattle Fault Line 3.1-9
Figure 3.1-11 Tsunami Inundation Zone 3.1-10
Figure 3.1-12 North Downtown Topography 3.1-16
Figure 3.3-1 Utilities in the Vicinity of Alternative 2 and Alternative 3 ..... 3.3-2
Figure 3.3-2 Utilities in the Vicinity of Alternative 4 ..... 3.3-12
Figure 3.3-3 Utilities in the Vicinity of Alternative 5 ..... 3.3-17
Figure 3.4-1 Scenic Viewpoints and Scenic Routes Near Alternatives 2 and 3 ..... 3.4-3
Figure 3.6-1 South Downtown Neighborhoods 3.6-2
Figure 3.6-2 Uptown Urban Center 3.6-7
Figure 3.8-1 Transportation / Parking Analysis Study Areas 3.8-2
Figure 3.8-2 Regional Transportation Project Timeline 3.8-4
Figure 3.8-3 Stadium District Study Intersections 3.8-11
Figure 3.8-4 Stadium District Street System 3.8-14
Figure 3.8-5 Stadium District Intersection Subject to Traffic Control Plans 3.8-15
Figure 3.8-6 Stadium District Transit Facilities and Corridors 3.8-22
Figure 3.8-7 Stadium District Key Pedestrian Routes 3.8-34
Figure 3.8-8 Stadium District Pedestrian Facilities 3.8-37
Figure 3.8-9 Stadium District Bicycle Facilities 3.8-44
Figure 3.8-10 Stadium District Existing Intersection LOS Comparison 3.8-60
Figure 3.8-11 S. Holgate Street Existing Rail Crossing Locations 3.8-63
Figure 3.8-12 I-5 and I-90 Existing Travel Times Non-Event and With Event 3.8-65
Figure 3.8-13 Stadium District 2018 No Action Intersection LOS Comparison 3.8-67
Figure 3.8-14 Stadium District 2030 No Action Intersection LOS Comparison 3.8-68
Figure 3.8-15 Stadium District 2018 Alternative 2 Intersection LOS Comparison 3.8-75

Figure 3.8-16 Stadium District 2030 Alternative 2 Intersection LOS Comparison ... 3.8-75
Figure 3.8-17 Stadium District Rail and Freight Facilities ... 3.8-87
Figure 3.8-18 Primary Study Area On-and Off-Street Parking Supply ... 3.8-105
Figure 3.8-19 Occidental Avenue S. Street Vacation 2030 Weekday PM Peak LOS & Volumes ... 3.8-123
Figure 3.8-20 Occidental Avenue S. Street Vacation 2030 Weekday AM Peak LOS & Volumes ... 3.8-124
Figure 3.8-21 Occidental Avenue S. Street Vacation 2030 Weekday Midday Peak LOS & Volumes ... 3.8-125
Figure 3.8-22 Stadium District Proposed Arena Site Plan ... 3.8-127
Figure 3.8-23 Seattle Center Study Intersections ... 3.8-132
Figure 3.8-24 Seattle Center Street System ... 3.8-135
Figure 3.8-25 Seattle Center Transit Facilities and Corridors ... 3.8-140
Figure 3.8-26 Seattle Center Pedestrian Facilities ... 3.8-151
Figure 3.8-27 Seattle Center Bicycle Facilities ... 3.8-154
Figure 3.8-28 Existing Seattle Center Intersection LOS Comparison ... 3.8-167
Figure 3.8-29 Seattle Center Area 2018 No Action LOS Comparison ... 3.8-169
Figure 3.8-30 Seattle Center Area 2030 No Action LOS Comparison ... 3.8-170
Figure 3.8-31 Seattle Center Area 2018 Alternative 4 Intersection LOS Comparison ... 3.8-175
Figure 3.8-32 Seattle Center Area 2030 Alternative 4 Intersection LOS Comparison ... 3.8-175
Figure 3.8-33 Seattle Center 2018 Alternative 5 Intersection LOS Comparison ... 3.8-182
Figure 3.8-34 Seattle Center 2030 Alternative 5 Intersection LOS Comparison ... 3.8-182
Figure 3.8-35 Seattle Center Area Freight Facilities ... 3.8-190
Figure 3.9-1 Seattle Police Department West Precinct Sectors and Beats ... 3.9-4
Figure 3.9-2 Monthly Average Crime West Precinct Beat King 3: 2008-2012 ... 3.9-6
Figure 3.9-3 Monthly Average Crime West Precinct David Sector Beat 1: 2008-2012 ... 3.9-16
Figure 3.9-4 Parks in the Vicinity of Alternative 4 and Alternative 5 ... 3.9-18
Figure 3.10-1 Stadium Transition Area Overlay District and Area Zoning ... 3.10-2
Figure 3.10-2 Uptown Urban Center ... 3.10-5

Appendices

Appendix A – Screening of Alternative Locations
Appendix B – Draft Preliminary Geotechnical Report
Appendix C – Greenhouse Gas Emission Worksheets
Appendix D – Historical Building Surveys
Appendix E – Transportation Resource Report
Appendix F – Economics Impacts Analysis
Appendix G – Comments and Responses on the Draft EIS

Section 1 - Summary

1.1 Project

WSA Properties III, LLC (ArenaCo) has applied to the City of Seattle for the future construction of an approximately 750,000 sf, 20,000-seat spectator sports facility (Seattle Arena). ArenaCo's objective is to build and operate a 20,000-seat Seattle Arena for NBA and NHL home teams on a site located at 1700 – 1st Avenue S., Seattle, Washington.

The ArenaCo Project would include the demolition of eight existing structures of approximately 128,087 sf, and grading would occur for construction. The Project includes a proposed street vacation of the portion of Occidental Avenue S. between S. Holgate and S. Massachusetts Streets, and a realignment of S. Massachusetts Street between Occidental Avenue S and 1st Avenue S. Parking for the facility is proposed to be provided by use of either existing off-site parking or the construction of new off-site parking on a lot south of Holgate Street (referred to in this document as the "South Warehouse site"). The Proposed Action includes all regulatory, transactional and other decisions necessary to accomplish the Project.

The City and County's objective is to determine whether to participate in ArenaCo's private proposal to build and operate the Seattle Arena for NBA and NHL home teams. While the City and County could decide to pursue participation in a project to build and operate such an arena at a location different than the ArenaCo site, including the Memorial Stadium or KeyArena sites considered in this Environmental Impact Statement (EIS), no proposal for the City and County to participate in such a project currently exists other than ArenaCo's proposal to build and operate the Arena on its South Downtown (SoDo) property.

1.2 Site and Site Vicinity

The site of the Proposed Project (Alternative 2) and Alternative 3, is located within South Downtown (SoDo) in the Stadium Transition Area, south of Safeco Field and CenturyLink Field. SoDo includes the areas of Pioneer Square, the International District, the Stadium Transition Area (Overlay District) and the North Duwamish neighborhood.

Warehouses, small businesses, and parking now occupy the site. The site is surrounded by similar uses. Newer development has occurred in parcels to the west of 1st Avenue S. Newer uses include midrise office and mixed commercial uses with street-front retail and restaurants. To the north of the site is the Safeco Field parking garage. Recently, land uses in the immediate vicinity are trending away from warehouse to office, light manufacturing with storefront retail, and other small businesses associated with Safeco Field, and CenturyLink Field and Exhibition Center.

BNSF Railroad and Amtrak facilities are located to the east of the existing stadiums and the site of the Proposed Project (Alternative 2) and Alternative 3. Facilities include passenger and freight rail lines as well as several structures that support those activities. BNSF's loading yard is located one block to the west. Port of Seattle container shipping facilities are located west of the loading yard.

See Figure 1-1 Site Location, Alternatives 2 and 3.

1.3 Description of Alternatives

The FEIS includes an evaluation of the following alternatives:

- **Alternative 1 –** No Action Alternative
- **Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena**: 20,000-seat spectator sports arena to be located at 1700 – 1st Avenue S., Seattle, Washington
- **Alternative 3 – Stadium District 18,000-Seat Arena**: 18,000-seat spectator sports arena to be located at 1700 – 1st Avenue S., Seattle, Washington
- **Alternative 4 – KeyArena 20,000-Seat Arena**: demolish the KeyArena at Seattle Center and replace it with a 20,000-seat spectator sports arena
- **Alternative 5 – Memorial Stadium 20,000-Seat Arena**: demolish the Seattle School District's Memorial Stadium and replace it with a 20,000-seat spectator sports arena

See Figure 1-2 for the site locations of Alternatives 4 and 5.

Remodeling the existing KeyArena was considered and eliminated from further consideration as the existing floorplate could not be enlarged enough to allow the placement of a regulation size ice rink of 200 feet by 85 feet with an adequate number of seats for NHL league games.



Source: Google Earth Pro

0 1000 2000

Scale in Feet

Figure 1-1

Site Location
Alternative 2 and Alternative 3

Job No. 33763922



Source: Google Earth Pro

0 1000 2000

Scale in Feet

Figure 1-2

Site Location
Alternative 4 and Alternative 5

Job No. 33763922

URS

1.4 Summary of Changes Made to Information Contained in August 2013 Draft EIS

1.4.1 Project Description

The description of the Proposed Alternative (Alternative 2) has been updated to include the proposed location of parking (by use of either existing off-site parking or by the construction of new off-site parking on the South Warehouse site), and that S Massachusetts Street will be realigned between Occidental Avenue S and 1st Avenue S with the vacation of a section of Occidental Avenue S.

1.4.2 Scenic Resources

Information has been added to the description of the No Action Alternative at Alternative 2 and 3 to describe the adjacent marine landscape that exists in the background of westerly views. See Section 3.4.2.2.

1.4.3 Historic and Cultural Resources

The age of existing buildings have been updated to reflect the 2-year period since publication of the Draft EIS. Text has been added to Section 3.7.4 Alternative 5 – Memorial Stadium 20,000-Seat Arena to state that the Memorial Stadium and Memorial Wall have not been designated as Seattle landmarks.

1.4.4 Transportation – Section 3.8 and Appendix E

Section 3.8 and Appendix E has been updated to include the following:

- The triple event scenario (events at the new SoDo Arena, concurrent with events at Safeco and CenturyLink Fields) has been updated to increase attendance at Safeco from the 40,500 used for the DEIS to 47,500 attendees. The 47,500 attendance level represents a maximum attendance scenario for baseball games at Safeco Field. Together with a 20,000-person event at the Arena and a 5,000-person event at CenturyLink, the total attendance used for the triple event scenario has been increased to 72,500.
- Parking demand for a 20,000-seat Arena has been increased from 6,667 to 6,833.
- Impacts on public transportation from a one-hour post-event departure has been added (in addition to the information on a two-hour post-event departure).
- Information has been added on sidewalk widths for likely pedestrian pathways to and from the SoDo Arena site.
- Additional information has been included on potential post-event pedestrian queuing at Holgate Street and the storage needed while pedestrians wait for train traffic to clear the intersection.
- To mitigate for potential pedestrian impacts, closure of S. Holgate Street to pedestrians coupled with either a pedestrian bridge from the Arena to approximately 3rd Avenue S.

or shuttles running to and from King Street Station and pedestrian improvements south along 1st Avenue S. and east along S. Lander Street from 1st to 4th Avenue S. has been added as a measure to improve pedestrian access.

- Section 2.3.6.1 of Appendix E includes an evaluation of options for Holgate Street closures.
- Future PM traffic volumes for traffic diverted from S. Holgate Street and S. Lander Street rail crossings to S. Atlantic Street to reflect increased rail crossing closures from increased mainline and non-revenue train activity. Traffic volumes were proportionally diverted consistent with proportional increases to rail crossing closure times.
- Traffic volumes along Occidental Avenue S. were reviewed to identify approximate numbers of vehicles that use Occidental Avenue as alternative travel route to 1st Avenue S.
- Level of Service (LOS) estimates for the 2018 No Action scenario have been updated.
- Corridor travel times for 2018 and 2030 No Action and Action Alternatives have been updated.
- Anticipated rail activity levels have been increased and new data has been collected on rail activity (frequency and length of time of gate closures).
- The applicant has proposed to provide parking at either existing off-site parking lots or by constructing new parking at the South Warehouse Site south of Holgate Street. The analysis of traffic operations has been revised to reflect the location of proposed parking.
- The parking analysis includes an analysis of the impacts of a Safeco and CenturyLink Field parking restriction in the event shared parking agreements are not secured with these facilities.
- Additional information has been provided on the impacts of vacating Occidental Avenue S. including impacts on traffic operations, traffic volumes, local access, freight movements, parking supply, and traffic diversion.

1.4.5 Appendix F – Economics Report

In 2015, the transportation analysis in the FEIS was updated to integrate additional variables and to modify initial assumptions. The revisions included changes to transit mode split percentages, parallel route reallocations due to possible reduced capacity from forecasted increases in train activity and related street blockages, and updated parking assumptions. These modifications changed the calculated operation at intersections throughout the study area and, as a result, Pro Forma Advisors' Port transportation activity cost impacts changed. The updated transportation analysis results have increased both the previous estimated annual additional costs resulting from port truck delays and the estimated annual costs associated with

non-port truck delays. This updated analysis has been added as a separate document placed in front of the 2013 Economic Impact Analysis included as Appendix F to this FEIS.

1.5 Summary of Potential Impacts and Major Conclusions

A summary comparing potential environmental impacts of each alternative discussed in Section 3 is shown in Table 1-1. See Section 3 for more details.

1.6 Significant Areas of Controversy and Uncertainty

The Proposed Project (Alternative 2) is the subject of general public controversy, related primarily to two issues: whether the City should issue development permits for the project in light of potential, adverse environmental or economic impacts that may occur, and whether the City and King County should participate financially in development of the project, as proposed by the applicant.

Two primary subjects of uncertainty have been identified, both related to the nature and magnitude of potential traffic and transportation impacts. Because the availability of funding for transit service varies over time, it is somewhat uncertain as to what extent transit service will be available to serve the SoDo area over time. The second subject is the uncertainty over future tolling of the SR 99 replacement tunnel and the effect the tolling would have on causing traffic to divert onto local streets or I-5.

In March 2014, the Alaskan Way Viaduct Replacement Program Advisory Committee on Tolling and Traffic Management issued their advisory recommendations for tolling the SR 99 tunnel.[1] The Committee's recommendation is for a toll rate structure similar to $1 for 24 hours per day with a $1.25 toll during the 6 to 9 AM and 3 to 6 PM peak periods. The Committee acknowledged that more work on the exact toll rate structure is still needed and that with a $1.00 toll, diversion to city streets and I-5 is about 38 percent. The Committee recommended that further investigation be done of ways to minimize diversion during midday. This could result in lowering the midday toll rates and extending the PM peak hour for toll collections. Traffic forecasts summarized in the March 2014 tolling study were reviewed relative to the traffic forecasts presented in the DEIS for the SoDo area. A comparison of these volumes showed that the traffic forecasts in the August 2013 Arena DEIS were generally higher in the SoDo area as compared to the forecasts presented from the tolling study. Traffic forecasts presented in this FEIS are consistent with the August 2013 DEIS and thus provide a conservative estimate of future vehicular traffic in the area.

1.7 Summary of Potential Mitigation Measures

A summary of potential mitigation measures discussed in Section 3 is shown in Table 1-2. See the mitigation sections included for each element of the environment in Section 3 for more details.

[1] Alaskan Way Viaduct Replacement Program Advisory Committee on Tolling and Traffic Management, Advisory recommendations for tolling the SR 99 tunnel, March 2014.

1.8 Secondary and Cumulative Impacts

Secondary impacts are caused by the Proposed Project or Action Alternatives and are reasonably foreseeable, but are later in time or farther removed in distance than direct impacts. Examples are changes in land use and economic vitality (including induced new development, growth and population), water quality, and natural resources. Cumulative impacts are impacts that result from the incremental consequences of a project when added to other past or reasonable foreseeable future actions. The cumulative effects may be undetectable when viewed individually, but added to other effects, eventually lead to a measurable environmental change. Examples are changes to land use, the loss of wetland areas, and the elimination of wildlife habitats caused by a combination of new developments in areas that were formerly open space.

Table 1-3 summarizes the secondary and cumulative impacts anticipated to be caused by each of the alternatives.

1.9 Significant Unavoidable Adverse Impacts

Significant unavoidable adverse impacts are those adverse impacts that would remain even after applying mitigation measures, or for which no mitigation measures would be effective.

Table 1-4 summarizes the significant unavoidable adverse impacts anticipated to be caused by each of the alternatives.

Table 1-1
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
Geology	Construction	No impacts	The site is susceptible to liquefaction and likely erosion; deep foundation support required. Foundation-related excavations could result in sediment mixing with stormwater, creating turbid water. Ground vibrations would likely occur during excavation or demolition.	Same as Alternative 2	Less impacts than Alternative 2	Less impacts than Alternative 2
	Operation	No impacts	No impacts	No impacts	No impacts	No impacts
Air Quality	Construction	No impacts	Potential temporary impacts from fugitive dust and emission throughout the construction activities	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
	Operation	No impacts	Increase in emissions from vehicles during events	Similar to Alternative 2 with less vehicle emissions	Same as Alternative 2	Same as Alternative 2
Water	Construction	No impacts	Groundwater would be encountered and could affect construction methodology	Same as Alternative 2	No impacts	No impacts
	Operation	No impacts	Existing water use and wastewater production would increase. To accommodate the loss of the 16-inch Occidental feeder in the proposed vacation area, the remaining 16-inch feeder in 1st Avenue S. would need to be upsized and reconstructed to be seismically resistant. The existing 16-inch Occidental feeder, severed by the street vacation at S. Massachusetts	Same as Alternative 2 with a small percentage of less water use and discharge due to 2,000 fewer seats	Water use and discharge are anticipated to be higher than existing KeyArena due to increased seating A net reduction in stormwater runoff volume compared to existing conditions is anticipated to occur.	Water use and discharge are anticipated to be higher than existing Memorial Stadium due to increased seating A net reduction in stormwater runoff volume compared to existing conditions is anticipated to occur.

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			Street, would need to be extended west to connect with the upgraded 24-inch seismically resistant feeder in 1st Avenue S. Valving would need to be provided such that the single, seismically upgraded 24-inch feeder north of S. Holgate Street could receive two alternate supplies from the reservoir; from either the east (via S. Holgate Street) or from the south (via 1st Avenue S.). There would be a net reduction in stormwater runoff volume compared to existing conditions.			

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
Scenic Resources	Construction	No impacts	Short-term aesthetic impacts	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
	Operation	No impacts. Westerly views toward the SoDo Arena site include the adjacent marine industrial landscape in the background. The industrial landscape includes the views of the Port's 27 container cranes (as of February 2015), most of which are 100 feet in height and painted either orange or white, colors that contrast with the background. In addition, the Port's container facilities include a daily changing landscape of stacks of containers being loaded or unloaded, and container trucks or trains delivering or picking up the containers.	Of nine potential public viewpoints, the project would be visible from five. No Puget Sound or territorial views from public viewpoints would be affected. The Arena would be visible at points along both interstates and 12th Avenue S., but at a smaller height and scale as than the existing Stadiums. Alternative 2 would be smaller than the two existing Stadiums, but larger than many of the older industrial buildings located to the south. Depending on the distance from the site, the presence of the new Arena would change the existing foreground, middle ground or background views from private properties. Existing views from downtown toward the south and from residences east of the site of Alternatives 2 and 3 looking toward the Puget Sound would also change.	Same as Alternative 2	Of ten potential public viewpoints, an arena at the site of the KeyArena would be visible from seven including distant views from Seacrest-Harbor Vista Park and views from within Seattle Center. Views of the Space Needle would only be affected by an arena at the site of Alternative 4 if viewed from within the Seattle Center grounds. Alternative 4 would add to the skyline views from adjacent scenic routes. Depending on the location on the surrounding street and the viewing direction, vehicular drivers, bicyclists, and pedestrians would have intermittent views of the arena amidst structures visible at Seattle Center.	Of ten potential public viewpoints, an arena at the site of Memorial Stadium would be visible from six, including distant views from Seacrest-Harbor Vista Park and views from within Seattle Center. Views of the Space Needle from Bhy Kracke Park would be affected in addition to potential effects to views of the Space Needle from locations within Seattle Center. Changes in views from scenic routes and private property would be similar to those described for Alternative 4.
Noise	Construction	No impacts	Short-term, temporary noise impacts due to pile driving and general construction equipment	Same as Alternative 2	Potentially less pile driving but closer to sensitive receptors than Alternative 2	Potentially less pile driving but closer to sensitive receptors than Alternative 2

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
Land Use	Construction	No impacts	No impacts	No impacts	2-year displacement to KeyArena tenants	Displacement of existing users of Memorial Stadium
	Operation	No impacts	Alternatives 2 or 3 would change the land use of the project site from warehouses, vacant lots used for parking, and mixed commercial uses to a spectator sports facility and pedestrian-oriented retail and other small businesses similar to those associated with Safeco Field, CenturyLink Field, and CenturyLink Event Center. The applicant has also proposed to provide parking through either use of existing off-site parking or construction of new parking south of Holgate Street. If new parking is constructed on the South Warehouse Site, it would displace existing warehouse uses and change the use from warehouse to parking. Alternative 2 would include a street vacation of Occidental Avenue S. between S. Holgate and S. Massachusetts Streets. Land use impacts of the street closure are minimal since the uses related to that street would be demolished in construction of the Proposed Project. Same as Alternative 2		Operation of a new arena on the site of existing KeyArena may permanently displace some existing users. The existing Skatepark would need to be relocated. The use of the site as an arena would be compatible with surrounding land uses.	Operation of a new arena on the site of the existing Memorial Stadium would permanently displace existing users. The use of the site as an arena would be compatible with surrounding land uses.
Historic and Cultural Preservation	Construction	No impacts	A historical building assessment has been performed for the three buildings that are over 50 years old, and none have been found to appear to meet any of the six landmark criteria. Archaeological materials may be found; mitigation would protect materials encountered.	Same as Alternative 2	In March 2013, a historic landmark study was conducted for the KeyArena site and greater Seattle Center area. In the area of potential redevelopment for a new arena, three buildings (KeyArena, NASA building and the Seattle Center Pavilion) appear to meet at least one of the six criteria for landmark designation. The KeyArena may qualify for landmark status; which may be a historic impact if demolished. If any are declared a historic landmark, controls would be imposed	The Memorial Stadium and Memorial Wall may qualify for landmark status; which may be a historic impact if demolished. If either are declared a historic landmark, controls would be imposed by the Landmarks Board. No archaeological impacts anticipated.

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
					by the Landmarks Board. No archaeological impacts anticipated.	
	Operation	No impacts	No impacts	No impacts	No impacts	No impacts
Transportation Construction	Construction – Street System	No impacts	Construction impacts related to the street system would mostly occur on 1st and Occidental Avenues S and S Massachusetts and Holgate Streets adjacent to the site. If applicable, street closures and other disruptions to the street system would be minimized and scheduled during the off-peak periods to minimize impacts to the system.	Same as Alternative 2	Construction impacts related to the street system would mostly occur on Mercer Street, Denny Way, and 1st Avenue N adjacent to the site. Street closures and other disruptions to the street system would be minimized and scheduled during the off-peak periods to minimize impacts to the system.	Same as Alternative 4
	Construction – Public Transportation	No impacts	Construction of Alternative 2 could result in some increase in ridership as a result of construction workers traveling to and from the site. It is anticipated that public transportation impacts related to construction would be less than a 20,000-person event at the Seattle Arena, however would occur on a daily basis during the 2-year construction period and occur during AM and PM peak hours. In addition, construction related activities could impact nearby transit routes and stops as well as	Same as Alternative 2.	Construction of Alternative 4 could result in some increase in ridership as a result of construction workers traveling to and from the site. It is anticipated that public transportation impacts related to construction would be less than a 20,000-person event at a new arena, however would occur on a daily basis during the 2-year construction period and would occur during AM and PM peak hours.	Same as Alternative 4

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			pedestrian accessibility to these stops. A construction management plan could be prepared and impacts to transit stops could be coordinated with the transit agency in advance and appropriate relocation and signage provided.			
	Construction - Pedestrians	No impacts	Alternative 2 construction would result in intermittent sidewalk closures along the frontage of the site (i.e., 1st Avenue S and S Massachusetts and S Holgate Streets). A construction management plan would be developed and alternate pedestrian circulation would be provided adjacent to the construction site through the use of temporary walkways, detours and signs.	Same as Alternative 2	Alternative 4 construction would result in intermittent sidewalk and pedestrian facility closures along the frontage of the site. A construction management plan would be developed and alternate pedestrian circulation would be provided adjacent to the construction site through the use of temporary walkways, detours and signs.	Alternative 5 construction would result in intermittent sidewalk and pedestrian facility closures along the frontage of the site. A construction management plan would be developed and alternate pedestrian circulation would be provided adjacent to the construction site through the use of temporary walkways, detours and signs.
	Construction - Bicycles	No impacts	Construction of Alternative 2 may result in intermittent bicycle facility closures and re-routing along 1st Avenue S. A construction management plan would be developed to mitigate impacts, and would include alternate bicycle circulation adjacent to the construction site through the use of temporary facilities, detours, and signs.	Same as Alternative 2	Construction of Alternative 4 may result in intermittent bicycle facility closures and re-routing along Mercer Street and 1st Avenue N as well as within the Seattle Center. A construction management plan could be developed to mitigate impacts. Protocol could be included in the plan related to alternate bicycle circulation adjacent to the construction site through the use of temporary facilities,	Similar to Alternative 4, construction of Alternative 5 may result in intermittent bicycle facility closures and re-routing along 5th Avenue N as well as within Seattle Center. A construction management plan could be developed to mitigate impacts. Protocol could be included in the plan related to alternate bicycle circulation adjacent to the construction site through the use of temporary facilities,

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
					detours, and signs.	detours, and signs.
	Construction – Traffic Volumes	No impacts	Alternative 2 would result in an increase in traffic volumes due to workers traveling to and from the site, delivery of material, and truck hauling. While the volume of construction traffic would be less than that expected for a 20,000 person event at the Seattle Arena, the construction traffic would occur on a daily basis for the 2 year duration of construction activities and occur during AM and PM peak hours.	Alternative 3 would result in an increase in traffic volumes due to workers traveling to and from the site, delivery of material, and truck hauling. While the volume of construction traffic would be less than that expected for a 18,000 person event at the Seattle Arena, the construction traffic would occur on a daily basis for the 2 year duration of construction activities and occur during AM and PM peak hours.	Alternative 4 would result in an increase in traffic volumes due to workers traveling to and from the site, delivery of material, and truck hauling. While the volume of construction traffic would be less than that expected for a 20,000-person event at a new arena, the construction traffic would occur on a daily basis for the 2 year duration of construction activities and occur during AM and PM peak hours.	Same as Alternative 4
	Construction – Traffic Operations	No impacts	As described for traffic volumes, construction impacts related to traffic operations would occur as a result of increased traffic levels. To minimize impacts to operations, a construction management plan would be developed and could include scheduling the most intensive construction activities such that they are spread out over time and prohibiting material deliveries from leaving or entering the area during AM and PM peak hours when feasible.	Same as Alternative 2	As described for traffic volumes, construction impacts related to traffic operations would occur as a result of increased traffic levels. To minimize impacts to operations, a construction management plan would be developed and could include scheduling the most intensive construction activities such that they are spread out over time and prohibiting material deliveries from leaving or entering the area during AM and PM peak hours when feasible.	Same as Alternative 4
	Construction – Freight and Goods	No impacts	Major truck routes surrounding the site could be intermittently impacted by construction. A Construction	Same as Alternative 2	Major truck routes surrounding the site could be intermittently impacted by construction. A construction	Same as Alternative 4

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			Traffic Control Plan would be developed to minimize any street closures or other impacts as a result of the Seattle Arena construction. This management plan would include use of manual flaggers and signs to help vehicle circulation. In addition, key stakeholders would be notified of any major roadway closures.		management plan would be developed to minimize any street closures or other impacts as a result of construction of an arena. This management plan would include use of manual flaggers and signs to help vehicle circulation. In addition, key stakeholders would be notified of any major roadway closures.	
	Construction - Parking	No impacts	Parking impacts related to construction would be minimized by providing off-street parking, securing parking in near-by garages, as well as encouraging use of alternative modes. It is anticipated that parking impacts relate to construction would be less than the 20,000-seat Seattle Arena but would occur on a daily basis during the 2-year construction period. In addition, construction activities could result in the need to close on-street parking adjacent to the site. These closures would be coordinated with SDOT and appropriate notice and signs would be provided.	Same as Alternative 2	Parking impacts related to construction would be minimized by providing off-street parking, securing parking in near-by garages, as well as encouraging use of alternative modes. It is anticipated that parking impacts relate to construction would be less than a 20,000-seat arena but would occur on a daily basis during the 2-year construction period. In addition, construction activities could result in the need to close on-street parking adjacent to the site. These closures would be coordinated with SDOT and appropriate notice and signs would be provided.	Same as Alternative 4
	Construction - Safety	No impacts	Alternative 2 construction would increase vehicular traffic within the study area, which could result in	Same as Alternative 2	Alternative 4 construction would increase vehicular traffic within the study area, which could result in	Same as Alternative 4

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			increased conflicts between vehicular, pedestrian, and bicycle traffic. It is anticipated that safety impacts related to construction would be less than the 20,000-seat Seattle Arena.		increased conflicts between vehicular, pedestrian, and bicycle traffic. It is anticipated that safety impacts related to construction would be less than for a 20,000-seat arena	
Transportation Operations	Operation – Street System	Many of the major street system projects impacting vehicular movements would be completed by 2018. Projects slated to be completed beyond 2018 are primarily related to the non-motorized and transit system and would likely encourage a decrease in dependence on the auto mode, during both typical commuter periods, as well as for events in the Stadium District.	The impacts to the operation of the street system are the same for Alternatives 2 and 3. Traffic currently using Occidental Avenue S. (proposed to be vacated) as an alternate north-south route would shift to the parallel 1st Avenue S. corridor and/or S. Massachusetts Street Other street system changes would occur along the project frontage with the reconstruction of curb faces and the removal of all existing driveways on 1st Avenue S. and S. Holgate Street along the project frontage. A private connection between S. Holgate Street and the Safeco Field parking garage would be located on the east edge of the new Arena. This connection is only proposed to function during events that would use the garage and there is potential for continued local access to the Safeco Field parking garage through an easement.		Planned offsite improvements in the study area for 2018 and 2030 conditions are consistent with the No Action Alternative. No additional changes offsite or within the Seattle Center street system have been identified as a result of Alternative 4.	Same as Alternative 4
	Operation – Public Transportation	***Stadium District Projects***: • 2018 - Waterfront Seattle project, providing a pair of bus stops for the SR 99/Alaskan Way route closer to the Stadium District at Alaskan Way and King Street. The bus stop locations have not been determined. • U-Link extension and new station south of SeaTac Airport on the Central Link	Approximately 12 percent (2,320) of event attendees were estimated to use transit to travel to and from events in 2018 and 14 percent (2,720) in 2030 ***Bus Transit:*** Approximately 3 percent of event attendees would use bus service to the Proposed Project (Alternative 2), adding approximately 640 bus passengers traveling to and	This alternative would result in a small reduction in the number of event attendees using transit to travel to the Stadium District. The impact would be similar to Alternative 2.	The Alternative 4 transportation analysis assumed a 20,000-seat arena on the site of the existing KeyArena with a 5,000-seat event at Memorial Stadium. Alternative 5 assumed a 20,000-seat arena on the site of the existing Memorial Stadium with a 12,000-seat event at the existing Key Arena. Because the total number of attendees would be less, Alternative 4 would	Use of transit by event attendees for Alternative 5 was assumed to be consistent with the Stadium District Alternatives. ***Bus Transit***: Approximately 2 percent of event attendees would use bus service to a new arena, adding approximately 390 bus passengers traveling to and from the Seattle Center area in 2018 and 340 passengers

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element		Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			alignment, which would add light rail capacity. • 2015 - First Hill Streetcar would provide a station near 1st Avenue and Jackson Street north of the Stadium District. Proposition 1 passed in Fall 2014 and provides funding to maintain current transit service on existing routes in the City of Seattle. The analysis was not revised to reflect Proposition 1 as the added transit capacity is not anticipated to change the analysis results. ***Bus Ridership***: The number of bus riders is anticipated to increase by approximately two percent annually from 2013 to 2018. Bus transit passenger loads would increase by approximately 4,310 inbound and 2,910 outbound passengers for 2030 No Action Case S3 compared to existing conditions. The total passenger load for No Action Cases S1, S2 and S3 could be accommodated with the assumed bus service levels These scenarios, including the 2030 No Action non-event, could be	from the Stadium District. Alternative 2 Cases S1, S2, and S3 could be accommodated with the assumed bus service levels. By 2030, it is assumed that a portion of bus riders would shift to light rail that serves similar destinations. It is estimated that approximately 2 percent of event attendees would use bus transit, resulting in approximately 400 passengers. Alternative 2 Cases S1, S2, and S3 could be accommodated with the assumed bus service levels, but bus riders may shift to light rail service connecting to similar destinations given the faster speeds and higher reliability. ***Light Rail:*** Approximately 4 percent of event attendees would use existing and planned light rail service to the Proposed Project (Alternative 2), adding approximately 800 light rail passengers traveling to and from the Stadium District on Central and North Link. The 2018 Alternative 2 Case S1, S2, and S3 could be accommodated with assumed light rail service levels. By 2030,		result in a small reduction in the number of event attendees using transit to travel to the Seattle Center area compared to Alternative 5.	in 2030. For 2018, it was estimated that the additional ridership could be accommodated with assumed bus service levels. By 2030, passenger demand would be accommodated for all zones except routes operating inbound from southeast Seattle and Renton. ***Light Rail***: Light rail was not considered a viable transportation mode to Seattle Center. It is noted that the southern terminus of the Monorail connects to the transit tunnel and could be used as a connection to light rail. ***Streetcar:*** In 2018, approximately 1 percent of event attendees would use streetcar to a new arena. This would add approximately 230 streetcar passengers traveling to and from Seattle Center on the South Lake Union streetcar for Alternative 5 Case M2. By 2030, approximately 2 percent of event attendees would use streetcar to a new arena. This would add approximately 440 streetcar passengers traveling to and

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element		Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			accommodated with assumed bus service levels. ***Light Rail***: ST estimates light rail ridership will increase approximately 350 percent, or 19.5 percent annually from the year 2013 to 2018. By 2030, light rail transit passenger loads would increase by approximately 26,380 inbound and 9,670 outbound passengers for 2030 No Action Case S3 compared to existing conditions. The total passenger load for No Action Cases S1, S2 and S3 could be accommodated with assumed light rail service levels. ***Streetcar***: Streetcar passenger loads would increase by approximately 750 inbound and 635 outbound passengers by 2030 in No Action Case S3 compared to existing conditions. The total passenger load for No Action Cases S1, S2 and S3 could be accommodated with assumed streetcar service levels. ***Ferries***: The number of walk-on passengers is anticipated to increase by approximately	approximately 8 percent of event attendees would use light rail service to the Proposed Project (Alternative 2), adding approximately 1,460 passengers on Central, North and East Link. Non-event riders boarding trains in downtown to connect to Sounder commuter rail at King Street station could experience near capacity trains and choose to walk or ride a connecting bus as an alternative to light rail during events. ***Streetcar:*** Approximately one percent of event attendees would use streetcar transit to the Proposed Project (Alternative 2), adding approximately 160 streetcar passengers traveling to and from the Stadium District. These riders could be accommodated with assumed streetcar service levels. By 2030, it is estimated that the level of streetcar users would remain the same, with approximately one percent of event attendees using streetcar transit to the Proposed Project (Alternative 2). This would add approximately 140			from Seattle Center on the South Lake Union Streetcar for Alternative 5 Case M2. Both 2018 and 2030 estimated passenger levels could be accommodated with assumed streetcar service levels for Alternative 5 Cases M1 and M2. ***Monorail***: In 2018, approximately 5 percent of event attendees would use monorail transit to a new arena. This would add approximately 980 monorail passengers traveling to and from Seattle Center, and could be accommodated with assumed monorail service levels for Alternative 5 Cases M1 and M2. By 2030, approximately 6 percent of event attendees would use monorail transit to a new arena. This would add approximately 1,220 monorail passengers traveling to and from Seattle Center. Alternative 5 Cases M1 and M2 could be accommodated with assumed monorail service levels. ***Washington State Ferry Service:*** Approximately 720 event attendees would use

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		three percent annually from 2013 to 2018. By 2030, WSF passenger loads would increase by approximately 1,775 inbound and 1,905 outbound passengers. The projected total passenger loads could be accommodated with assumed WSF service levels for the No Action Cases S1, S2 and S3. ***Seattle Center Projects***: The Alaskan Way Viaduct Replacement project is scheduled to be complete and would reconnect John Street, Thomas Street, and Harrison Street, which were previously bisected by SR 99. This improvement was not assumed to change ridership, but would provide alternative pedestrian connections from the South Lake Union Streetcar and bus transit routes to the Seattle Center. ***Bus Ridership***: The number of bus riders is anticipated to increase by approximately two percent annually from 2013 to 2018. Bus transit passenger loads would increase by approximately 450 inbound and 430 outbound passengers for	streetcar passengers traveling to and from the Stadium District as compared to the No Action, and could be accommodated with assumed service levels. ***Washington State Ferry Service:*** Approximately 4 percent of event attendees would use ferry service to the Proposed Project (Alternative 2) (approximately 90 percent of these event attendees would be walk-ons). This would add approximately 720 ferry passengers traveling to and from the Stadium District. These riders could be accommodated with assumed WSF service levels. By 2030, it is estimated that the level of ferry service users would remain the same, with approximately 4 percent of event attendees using ferry service to the Proposed Project (Alternative 2) (approximately 90 percent of these event attendees would be walk-ons). This would add approximately 720 ferry passengers traveling to and from the Stadium District, which could be accommodated with assumed WSF service levels.			WSF service for part of their trip to events at Seattle Center. Event attendees would connect between Colman Dock and Seattle Center using bus, monorail, streetcar, and / or other services such as a taxi, walking, or bicycling. From 5:00 to 7:00 PM bus routes through downtown would experience an increase in passenger demand as some ferry riders use bus service to travel to an event at Seattle Center.

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element		Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			2030 No Action Case K2/M2 compared to existing conditions. The total passenger load for No Action Cases M1/K1 and K2/M2 could be accommodated with assumed bus service levels. ***Streetcar***: Streetcar passenger loads would increase by approximately 450 inbound and 430 outbound passengers by 2030 in No Action Case K2/M2 compared to existing conditions. The total passenger load for No Action Cases K1/M1 and K2/M2 could be accommodated with assumed streetcar service levels. ***Monorail***: Monorail passenger loads would increase by approximately 1,180 inbound and 1,160 outbound passengers by 2030 in No Action Case K2/M2 compared to existing conditions. The total passenger load for No Action Cases K1/M1 and K2/M2 could be accommodated with assumed monorail service levels. ***Ferries***: The number of walk-on passengers is anticipated to increase by approximately	***Sounder Commuter Rail and King County Passenger Ferry Transit:*** Sounder commuter rail and King County passenger ferry service were not assumed to be used by event attendees because there is no post-event outbound service in the evening.			

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		three percent annually from 2013 to 2018. Approximately 370 inbound passengers and 500 outbound passengers would use WSF service for part of their trip to events at Seattle Center for No Action Case K2/M2. The projected total passenger loads could be accommodated with assumed WSF service levels for the No Action Cases K1/M1 and K2/M2.				
	Operation – Pedestrians	***Stadium District*** Connectivity between Stadium Station, SoDo Station, and International District routes to and from the 1st Avenue S./S. Holgate Street area would be consistent with existing conditions. Planned improvements impacting pedestrian routes in the area include multiuse paths as part of the Alaskan Way Viaduct, the First Hill Streetcar, and the railing crossing improvements along S. Holgate Street. Overall, pedestrian connectivity along the five key travel routes would remain good with improvements along 1st Avenue S., Railroad Way, and Alaskan Way creating a more	Sidewalks along the site frontage would be widened as part of Alternative 2 development. 1st and 4th Avenues S.: The calculation of pedestrian flow rates suggests that during the peak 15 minutes associated with a capacity event egress sidewalk, capacities may be exceeded. This could be mitigated via sidewalk widening, rerouting more pedestrians to Occidental Avenue immediately north of the site, or providing more onsite attractions and amenities to reduce peaking characteristics of post-event egress. • Given the location of the doors to the Arena (northwest and southwest	With 10 percent less seats, this would result in a 10 percent reduction in the overall pedestrian demand as compared to the Alternative 2. Given the lesser demand, overall transportation impacts for Alternative 3 would be similar to those described for Alternative 2.	Consistent with the Stadium District, pedestrian levels associated with an event at an arena would be highest during the post-event egress. Currently, average attendance for the KeyArena is approximately 12,000 people. Alternative 4 would result in a net increase of 8,000 pedestrians for a total of 20,000 pedestrians associated with an arena event. The existing and planned pedestrian network is well-connected and facilities will accommodate increased pedestrian demand levels. This type of pedestrian demand or higher is already accommodated at the Seattle Center with the several festivals held there each year. Increases in pedestrian as	Pedestrian impacts associated with Alternative 5 are anticipated to be consistent with those described for Alternative 4.

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		pedestrian-friendly environment. With No Action, there would continue to be a poor connection across S. Atlantic Street when coming to and from the northeast, missing and narrow sidewalks along 3rd and 4th Avenues S., and south of S. Atlantic Street. Planned industrial projects north and south of Seattle would result in additional at-grade train crossings on S. Holgate Street with no improvements to pedestrian facilities or provision of pedestrian crossing controls. There is an existing pedestrian access issue along S. Holgate Street related to the lack of storage and pedestrian control at the train crossings. An analysis of No Action Cases S1, S2, and S3 shows This analysis indicates that the sidewalks along 1st and 4th Avenues S. are adequate to accommodate pedestrian demand. Pedestrian queuing analysis at the S. Holgate Street train crossing shows that with higher event demands related to No Action Case S3,	corners of the building) and the 24-foot wide sidewalk or 16-foot wide pedestrian zone proposed along the frontage, flows along 1st Avenue S. between S. Massachusetts and S. Holgate Streets would be slightly restricted. • Flow rates on 1st Avenue S. between S. Atlantic and S. Massachusetts Streets would exceed acceptable levels on the east side for all Alternative 2 scenarios and on the west side under Cases S2 and S3 multi-event scenarios, but this segment would be acceptable under Case S1 or an Arena-only event. • Pedestrian flows along 4th Avenue S. between S. Atlantic and S. Walker Streets would generally experience free flow except on the west side of 4th Avenue S between S. Atlantic and S. Holgate Streets where the addition of the Arena would result in some crowding due to a constrained sidewalk section. There is capacity on the east side, so pedestrians wanting to avoid crowds could use these facilities.		well as vehicle demands on events would increase the potential for conflicts between these two modes. Pedestrian impacts in 2018 and 2030 are anticipated to be similar.	

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		queues would be greater than could be accommodated between the railroad tracks and 1st Avenue S. ***Seattle Center*** The pedestrian environment in the Seattle Center study area is significantly different than that described in the Stadium District. There is a well-connected gridded sidewalk network with multiple paths for pedestrians to take to and from the Seattle Center area. With the multitude of pedestrian paths in the study area capacity. The SR 99 North Portal and Mercer Corridor projects will result in enhanced pedestrian connectivity and infrastructure including sidewalk connections across SR 99. Under No Action, changes in non-motorized demands are likely to occur as a result of ongoing redevelopment associated with neighborhoods surrounding the Seattle Center; however no significant change in Seattle Center pedestrian activity is anticipated.	S. Holgate Street: Alternative 2 would result in substantially more pedestrians along S. Holgate Street than characterized for the No Action conditions during both event ingress and egress. Conflicts between pedestrians and trains would increase with Alternative 2. The introduction of an Arena at this location would substantially increase and concentrate demands over currently observed levels. With increases in event-related pedestrian volumes associated with Alternative 2 and planned increases in train activity, pedestrian access issues would result in the future along S. Holgate Street. Accommodating the large storage needs for pedestrians, particularly during post-event egress, would be difficult. • Pedestrian queues and storage needs would be substantially more than characterized for the No Action conditions. • Pedestrian queues attributable to waiting for passing trains would range from approximately 900 to 8,000 pedestrians,			

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			depending on the duration of the blockage. • Sidewalk storage to accommodate queues based on current blockage levels of around 10 minutes would be over 500 square-feet. • Blockages up to 45 minutes (representing increased activity) would result in the need for approximately 2,120 square-feet of storage to accommodate just an Arena event.			
	Operation – Bicycle	***Stadium District*** Bicycle improvements planned and funded in the SoDo study area include two multi-use paths being constructed as part of the Alaskan Way Viaduct Replacement Project to be completed by 2018. Bicycle use is anticipated to continue to grow in Seattle as transportation congestion and cost of parking increases but are not identified as a significant portion of the traffic stream during the pre- and post-event hours in the Stadium District study area. There are no additional funded improvements for 2030 at this time; however, the City has adopted the	Alternative 2 is not anticipated to impact bicycle facilities within the study area. Bicycle volumes within the study area are generally low in the vicinity of the Stadium District site, and minimal increase is anticipated with the development. Development of the Seattle Arena would result in increased vehicular demands on event days within the study area, which would increase the potential conflicts between bicyclists and vehicles. Bicycle impacts in 2018 and 2030 are anticipated to be similar.	With 10 percent less seats, this would result in a 10 percent reduction in the overall vehicular demand as compared to Alternative 2. Given the lesser demand, bicycle impacts with development of Alternative 3 may be slightly less than with Alternative 2.	Alternative 4 is not anticipated to impact bicycle facilities within the study area. Bicycle volumes within the study area vary from one corridor to the next; however, Alternative 4 is anticipated to result in minimal increase in bicycle activity. Development of a new arena would result in increased vehicular demands on event days within the study area, which would increase the potential conflicts between bicyclists and vehicles. Bicycle impacts in 2018 and 2030 are anticipated to be similar.	Same as Alternative 4

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		Bicycle Master Plan outlining the 6-year bicycle priorities for the City. In general, as traffic volumes increase in the study area due to future 2018 and 2030 growth, there is a potential for increased conflict between vehicles and bicyclists. ***Seattle Center*** Ongoing projects associated with the Alaskan Way Viaduct North Portal, as well as the Mercer East and West projects will result in enhanced bicycle connectivity and infrastructure. The Mercer Corridor improvements are scheduled to be completed by 2015. Bicycle improvements are also included on Roy and Valley Streets. The completion of these improvements will create a viable bicycle linkage between the Seattle Center and the South Lake Union Neighborhood as well as the South Lake Union Park and related trail connections. In addition, the completion of the North Portal will result in sidewalk connections across SR 99 at Republican, Harrison and Thomas Streets, effectively linking Seattle				

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		Center and the neighborhood surrounding the Bill and Melinda Gates Foundation with the South Lake Union area. In general, as traffic volumes increase in the study area due to future 2018 and 2030 growth, there is a potential for increased conflict between vehicles and bicyclists.				
	Operation – Traffic Volumes ***Stadium District***	***Stadium District*** <u>*Case S1 – No Event*</u> 1st Avenue S. north of S. Massachusetts Street: 3,340 vehicles in 2018; 4,110 vehicles by 2030 Edgar Martinez Drive S. west of Westbound I 90 Off Ramps: 2,815 vehicles in 2018; 3,995 vehicles by 2030 S. Holgate Street east of Occidental Avenue S.: 830 vehicles in 2018; 320 vehicles by 2030 4th Avenue S. north of S. Holgate Street: 3,455 vehicles in 2018; 4,650 vehicles by 2030	***Stadium District*** <u>*Case S1 – Arena Event Only*</u> 1st Avenue S. north of S. Massachusetts Street: 3,760 vehicles in 2018; 4,525 vehicles by 2030 Edgar Martinez Drive S. west of Westbound I 90 Off Ramps: 3,375 vehicles in 2018; 4,550 vehicles by 2030 S. Holgate Street east of Occidental Avenue S: 805 vehicles in 2018; 295 vehicles by 2030 4th Avenue S. north of S. Holgate Street: 3,675 vehicles in 2018; 4,865 vehicles by 2030	***Stadium District*** <u>*Case S1 – Arena Event Only*</u> 1st Avenue S. north of S. Massachusetts Street: 3,720 vehicles in 2018; 4,485 vehicles by 2030 Edgar Martinez Drive S. west of Westbound I 90 Off Ramps: 3,320 vehicles in 2018; 4,495 vehicles by 2030 S. Holgate Street east of Occidental Avenue S: 805 vehicles in 2018; 295 vehicles by 2030 4th Avenue S. north of S. Holgate Street: 3,655 vehicles in 2018; 4,845 vehicles by 2030		
	Operation – Traffic Volumes ***Seattle Center***	***Seattle Center Area*** Mercer Street east of Terry Avenue N: 5,765 (Case K1) -			***Seattle Center Area*** *(Case K1 – Arena Event Only)* Mercer Street east of Terry	***Seattle Center Area*** *(Case M1 – Arena Event Only)* Mercer Street east of Terry

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
	Area	5,975 (Case K1/M1) vehicles in 2018; 5,785-5,990 vehicles by 2030 Denny Way west of Stewart Street: 2,575-2,600 vehicles in both 2018 and 2030 Western Avenue northwest of Denny Way: 3,270 vehicles in 2018; 3,530 vehicles by 2030 Mercer Street east of 3rd Avenue N: 2,910-2,995 vehicles in 2018; 2,885-2,970 vehicles by 2030 Queen Anne Avenue N south of Mercer Street: 1,300-1,345 vehicles in 2018; 1,395-1,435 vehicles by 2030 1st Avenue N south of Mercer Street: 1,075-1,080 vehicles in 2018; 1,055 -1,060 vehicles by 2030 5th Avenue N south of Mercer Street: 1,890-2,025 vehicles in 2018; 2,175-2,305 vehicles by 2030			Avenue N: 6,645 vehicles in 2018; 6,630 vehicles by 2030 Denny Way west of Stewart Street: 2,590 vehicles in both 2018 and 2030 Western Avenue northwest of Denny Way: 3,285 vehicles in 2018; 3,550 vehicles by 2030 Mercer Street east of 3rd Avenue N: 3,405 vehicles in 2018; 3,360 vehicles by 2030 Queen Anne Avenue N south of Mercer Street: 1,555 vehicles in 2018; 1,645 vehicles by 2030 1st Avenue N south of Mercer Street: 1,085 vehicles in 2018; 1,065 vehicles by 2030. 5th Avenue N south of Mercer Street: 2,280 vehicles in 2018; 2,550 vehicles by 2030	Avenue N: 6,585 vehicles in 2018; 6,495 vehicles by 2030 Denny Way west of Stewart Street: 2,590 vehicles in 2018; 2,585 in 2030 Western Avenue northwest of Denny Way: 3,280 vehicles in 2018; 3,545 vehicles by 2030 Mercer Street east of 3rd Avenue N: 3,275 vehicles in 2018; 3,185 vehicles by 2030 Queen Anne Avenue N south of Mercer Street: 1,460 vehicles in 2018; 1,525 vehicles by 2030 1st Avenue N south of Mercer Street: 1,010 vehicles in 2018; 990 vehicles by 2030 5th Avenue N south of Mercer Street: 2,335 vehicles in 2018; 2,575 vehicles by 2030
	Operation – Traffic Operations ***Stadium District***	***Stadium District*** Increased traffic volumes and changes in travel patterns result in a greater number of intersections operating at Level of Service (LOS) E/F under both 2018 and 2030	***Stadium District*** The addition of Arena event trips results in a greater number of worsened LOS E/F values under 2018 and 2030. With a single event day a total of 16 study intersections	***Stadium District*** Alternative 3 includes the development of an 18,000-person capacity arena on the same site evaluated for Alternative 2. The difference between an event with		

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		conditions. The occurrence of Mariners and CenturyLink Field Events Center events also result in worsened operations throughout the study area. Eleven additional intersections operate at LOS E/F under 2018 conditions with one or both events and approximately 5 more intersections under 2030 conditions. Of the intersections shown to operate at LOS E or LOS F under 2018 No Action conditions, four are located within the vicinity of the Proposed Project (Alternative 2) or Alternative 3site. Under 2030 No Action conditions (non-event, single event, or dual event), up to six intersection would operate at LOS E or LOS F within the vicinity of the Proposed Project (Alternative 2) or Alternative 3 site.	would operate at LOS E/F under 2018 conditions with an Arena event while a Mariners only event is forecast to have 15 intersections at LOS E/F. Under 2030 conditions with an Arena-only event a total of 21 intersections are forecast to operate at LOS E/F. With Case S2 (Arena and Mariners), in 2018, six additional intersections would operate at LOS E/F for a total of 22 intersection. By 2030, four additional intersections would operate at LOS E/F for a total of 26 intersections. With Case S3, four additional intersections would degrade from LOS E to LOS F in 2018 conditions compared to the No Action and four additional intersections under 2030 conditions.	20,000 and 18,000 attendees equates to approximately 200 vph during the weekday PM peak hour. Given the distribution of traffic to the area, this difference in overall activity would not likely be discernible by the average motorist and would be within the daily fluctuations in the background traffic. Traffic operations measures reported for Alternative 2 are expected to be slightly worse than would occur under Alternative 3 but identified impacts are anticipated to be similar.		
	Operation – Traffic Operations ***Seattle Center Area***	***Seattle Center Area*** • Increased traffic volumes and changes in travel patterns result in a greater number of intersections			***Seattle Center Area*** • Throughout the wider study area, the addition of arena event trips would result in one additional	***Seattle Center Area*** • Throughout the wider study area, the addition of arena event trips would result in two additional

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		operating at LOS E/F under both 2018 and 2030 conditions. • The greater attendance level of an event under Case K1 and K2/M2 results in one additional intersection operating at LOS E under 2018 conditions as compared to Case M1 and two additional operating at LOS F for 2030 conditions. Of the intersections shown to operate at LOS E or LOS F under 2018 No Action conditions, three are located within the vicinity of the Seattle Center area. Under 2030 No Action conditions, up to four intersections would operate at LOS E or LOS F within the vicinity of the Seattle Center area.			intersection operating at a calculated LOS E/F under 2018 Case K1 and two additional intersections under Case K2. • Under 2030 conditions two additional intersections would operate at LOS E/F under Alternative 4 Case K1 and three additional intersections would operate at LOS E/F under the multiple event case (Alternative 4 Case K2).	intersections operating at a calculated LOS E/F under 2018 Case M1 and three additional intersections under Case M2. • Under 2030 conditions three additional intersections would operate at LOS F for Alternative 5 Case M1 and four additional intersections would operate at LOS E/F under Alternative 5 Case M2.
	Operation – Freight and Goods ***Stadium District***	***Stadium District*** Travel times for freight corridors under 2018 conditions increase from existing conditions, increasing from approximately one	***Stadium District*** Freight corridor travel times increase with the addition of Arena event traffic. Changes in 2018 range from no notable change to 5 minutes	***Stadium District*** In general, impacts to freight and goods anticipated under Alternative 3 would be slightly less than reported for Alternative 2. Overall traffic		

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		minute to six minutes, depending on route and travel direction. Travel times further increase with the addition of event traffic, in some cases nearly tripling. Freight corridor travel times along southbound 4th Avenue S. under 2018 conditions are forecasted to exceed 10 minutes with Case S1 traffic, exceed 10 minutes northbound on 4th Avenue S. and northbound on 1st Avenue S., exceed 15 minutes for southbound 4th Avenue S., exceed 15 minutes for northbound 1st Avenue S. and southbound 4th Avenue S. for Case S3. Eastbound freight corridor travel times along S. Atlantic Street increase approximately 1 minute while westbound increase by 1 minute for Case S1, 6 minutes for Case S2 and 9 minutes for Case S3. Eastbound freight corridor travel times along S. Atlantic Street are expected to increase but less so than other routes. This direction of travel is opposite the inbound event flows, minimizing the increase in travel times. S. Atlantic Street is also subject to TCPs at Occidental Avenue	under Case S1, to 1.25 minutes to 8 minutes under Case S3. Under 2030 the range of increases is similar to 2018 conditions. In general, the direction of travel for each freight corridor travel time route that serves vehicles arriving for the Arena event (i.e. northbound 1st Avenue S.) experiences the greatest travel time increase while the opposing direction experiences a lesser increase (i.e. southbound vs. northbound 1st Avenue S.). Travel times for freight corridor routes with only an Arena event are generally less than the No Action Case S2 (Mariners only) conditions. Travel times for specific routes and directions are calculated to see large increases with multiple concurrent events (i.e. northbound 1st Avenue S., eastbound S. Atlantic Street).	volumes for Alternative 3 are approximately one percent less during the weekday PM peak hour under both 2018 and 2030 conditions.		

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		S. and the Mariners Safeco Field parking garage. Event traffic control could increase S. Atlantic Street travel times beyond what is reported. Under 2030 conditions freight corridor travel times are generally similar to but worse than 2018 conditions. Increases range from approximately 2 minutes to 11 minutes when compared to existing conditions. Travel time changes result from small changes in forecast volumes at some study intersections and additional diversion from congested freeways as forecast in the Alaskan Way Viaduct Replacement study and increase rail crossing closures at S. Holgate Street and S. Lander Street. Similar to 2018 conditions, eastbound freight corridor travel times along S. Atlantic Street are expected to increase at a lower percentage than other routes since the direction of travel is opposite the inbound event flows.				

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
	Operation – Freight and Goods ***Seattle Center Area***	***Seattle Center Area*** The travel time analysis conducted for the W. Mercer Street corridor showed 2030 travel times of 18.5 minutes in the westbound direction and 8.5 in the eastbound direction. This represents no noticeable change in the eastbound direction and increase of approximately 9.5 minutes in the westbound direction as compared to the "existing" conditions. This change is likely due to several factors including development within the South Lake Union neighborhood, planned changes to the roadway including the two-way Mercer Street improvement projects and Alaskan Way North Portal improvements, changes in travel patterns, and varying growth in traffic volumes along the length of the corridor.			***Seattle Center Area*** The travel time estimated for the W. Mercer Street corridor showed 2030 travel times of 24.1 minutes in the eastbound direction and 25.2 in the westbound direction with Alternative 4.	***Seattle Center Area*** Same as Alternative 4
	Operation – Parking ***Stadium District***	***Stadium District*** ***Weekday Occupancy:*** Occupancies in the primary study area are higher than existing conditions as a result of anticipated development	***Stadium District*** It is anticipated with any of the event cases parking closer to the Arena and / or other event venues would be more highly utilized. As the areas near the venues	***Stadium District*** With 10 percent less seats, this would result in a 10 percent reduction in the overall parking demand as compared to Alternative 2. Given the lesser demand,		

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		primarily in the Pioneer Square and SoDo areas. • Parking utilization in the International District and Pioneer Square neighborhoods would continue to increase with the single and dual event conditions. • Overall primary study area occupancies are calculated to be 60 to 85 percent for the event cases and the utilization of parking would continue to be concentrated around the event venues themselves. • Parking occupancies for the CBD would be generally very low except for the Waterfront (65 to 80 percent), which is the most proximate area to the Stadium District. ***Weekend Occupancy*** Occupancies in the primary study area are similar to existing conditions with only slight increases as a result of the anticipated future development. • Compared to weekday the weekend No Action Case S2 and S3 occupancies are lower within both the	become full, it would likely become more difficult to find parking. The primary study area would be full for multi-event cases. (Case S2 and S3 There would be parking available within the CBD even with multiple events; however, in some cases this may be considered less desirable given the greater walking distance from the venue. ***Weekday Occupancy*** Arena parking demand could be fully accommodated within the primary study area under Case S1 (i.e., no other events at nearby venues). • Event parking would spill into the expanded study area under multi-event conditions (Case S2 and S3). • For the Arena plus Mariners and / or Exhibition Hall scenarios, parking occupancies within the primary study area would be approximately 90 percent as compared to the No Action event cases, which would have occupancies of approximately 65 to 85 percent.	overall transportation impacts for the Alternative 3 would be slightly less than those described for the Alternative 2.		

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		primary and expanded study areas as a result of lower non-event demands. The lower weekend non-event demands within the primary study area allows for more event-related parking to occur within this area. • Parking utilization in the International District and Pioneer Square neighborhoods would continue to increase with the single and dual event conditions. • Overall primary study area occupancies are calculated to be 65 to 85 percent for the event cases and the utilization of parking would continue to be concentrated around the event venues themselves. • Parking occupancies for the CBD would be lower than weekday conditions given the ability to accommodate more of the event parking demand within the primary study area.	***Weekend Occupancy*** • Similar to weekday conditions, weekend Arena parking demand could be fully accommodated within the primary study area under Case S1 (i.e., no other events at nearby venues). • Event parking would spill into the expanded study area under multi-event conditions (Case S2 and S3). • For Alternative 2 Case S3, parking occupancies within the primary study area would be approximately 90 percent as compared to the No Action Case S3, which would have occupancies of approximately 80 to 85 percent. • Given the lower overall weekend non-event parking demand within the expanded study, occupancies in this area lower than the weekday. The Proposed Project (Alternative 2) or Alternative 3 would result in an increase in events within the Stadium District regardless of the event case or day of week. The resulting			

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			parking demand associated with the Arena could displace some observed SoDo overnight truck parking in publicly available spaces to other areas (likely south of the Stadium District), which may be consider less convenient locations.			
	Operation – Parking ***Seattle Center Area***	***Seattle Center Area*** ***Weekday Occupancy*** • The No Action occupancy is higher than existing conditions due to the assumed increases in parking demand caused by anticipated development as well as demand associated with events at KeyArena and Memorial Stadium. • A comparison of case K1 and M1 shows that utilization is about 13 to 14 percent less in the neighborhoods nearest the sites with No Action Case M1 given the smaller event (i.e., 5,000 attendees) at Memorial Stadium as compared to KeyArena (i.e., 12,000 attendees). • For single and dual events, Case K1, M1, and M2/K2, all of the anticipated			***Seattle Center Area*** ***Weekday Occupancy*** • Alternative 4 Case K1, with the arena only, would result in an almost 30 percent increase in parking occupancy within the primary study area. • For a multi-event scenario, Alternative 4 Case K2, the primary study area would reach 55 percent occupancy. • Although the overall primary study area would be 55 percent, the Uptown neighborhoods closest to the venue would begin to fill up with occupancies of approximately 80 percent. SLU and Denny Triangle within the primary study area would have ample parking to accommodate arena parking.	***Seattle Center Area*** ***Weekday Occupancy*** • For a multi-event scenario, Alternative 5 Case M2, the primary study area would reach 60 percent occupancy, an increase of almost 15 percent in parking occupancy compared to No Action. • Although the overall primary study area would be 60 percent for Alternative 5 Case M2, the Uptown neighborhoods closest to the venue would be more highly utilized and would become full with an 89 percent occupancy. Finding parking would become more difficulty in these areas. SLU and Denny Triangle within the primary study area would have ample parking to accommodate arena

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		parking demand could be fully accommodated within the primary study area. • Overall primary study area occupancies are calculated to be approximately 39 to 47 percent for the No Action event cases, which would allow for some additional parking. It is likely that attendees of events at KeyArena or Memorial Stadium would desire to park close to the venues. Based on the review of existing conditions, on-street parking would likely be difficult to find close to the venues; however, off-street parking is more readily accessible and the Seattle Center has several large garages in close proximity of both venues. ***Weekend Occupancy*** • Weekend utilization is generally higher in the primary study area as compared to weekday. Given the higher baseline, the No Action event cases have occupancies up to approximately 85 percent in the Uptown neighborhood.			***Weekend Occupancy*** • The primary study area parking occupancy would reach a 55 percent occupancy with Alternative 4 Case K1 and 60 percent with Alternative 4 Case K2, an increase of almost 10 percent in parking occupancy compared to No Action on the weekend. • Although the overall primary study area would be 55 to 60 percent, the Uptown neighborhoods closest to the venue would be more highly utilized and for Alternative 4 Case K2 they would become full with occupancies of 85 to 90 percent. Finding parking would become more difficulty in these areas. SLU and Denny Triangle within the primary study area would have ample parking to accommodate arena parking.	parking. ***Weekend Occupancy*** • With the arena-only on weekends, the primary study area would reach 56 percent occupancy for Alternative 5 Case M1 and 65 percent for Alternative 5 Case M2, an increase of almost 15 percent in parking occupancy compared to No Action. • During the multi-event scenario on the weekend, the closest parking within the primary study area would reach 90 percent; however, SLU and Denny Triangle have ample parking to accommodate arena parking demand and it is anticipated parking supply would increase in the future with development.

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		• For single and dual events, Case K1, M1, and K2/M2, all of the anticipated parking demand could be fully accommodated within the primary study area. • The expanded study area occupancy would be approximately 43 to 51 percent for No Action event cases indicating approximately 49 to 57 percent of the spaces would be available for arena use. • The results indicate that there would be limited reliance on the expanded study area to accommodate parking even in multi-event cases. • Attendees of events at KeyArena or Memorial Stadium would likely desire to parking close to the venues. Based on the review of existing conditions, on-street parking would likely be difficult to find close to the venues; however, off-street parking is more readily accessible and the Seattle Center area has several large garages in close proximity of both venues.				

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
	Operation – Safety	As traffic volumes increase, the potential for traffic safety issues increases proportionately. The overall vehicular and non-motorized traffic in the area under 2018 and 2030 conditions are anticipated to be higher than occurs under existing conditions. There are changes in transportation infrastructure underway, and the effect of these changes on transportation safety is unknown. The projects are all designed to current standards of practice. In the immediate vicinity of the site, there are several at-grade rail crossings along S. Holgate Street that are uncontrolled for non-motorized traffic.	As traffic volumes increase, the potential for traffic safety issues increases proportionately. Alternative 2 would increase both vehicular and non-motorized traffic within the study area. Increased pedestrian activity at the several on-grade rail crossing locations as a result of travelling to and from the Seattle Arena could result in safety issues. The S. Holgate Street corridor has multiple at-grade rail crossings closely spaced in the immediate vicinity of the site and pedestrian gates may not be feasible or appropriate. The applicant will be required to improve pedestrian access between the Arena site and areas to the east by either providing a grade separated pedestrian bridge that would be oriented east-west over the train tracks connecting the Arena to the S. Holgate Street/4th Avenue S intersection, or by providing a shuttle service. See Table 1-2 Summary of Mitigation Measures.	Alternative 3 would have similar safety impacts as identified with Alternative 2; however, these impacts would be to a less extent since the traffic levels would be lower with the smaller venue.	Alternative 4 would increase both vehicular and non-motorized traffic within the study area, which could potentially increase conflicts between vehicular and non-motorized traffic resulting in the potential for increase safety issues.	Safety impacts associated with Alternative 5 would be similar to those described for Alternative 4.
	Operation – Occidental Street Vacation	No impact	***Traffic Volumes***: Hourly traffic volumes collected along 1st Avenue S. over a 7-	Same as Alternative 2	Not Applicable	Not Applicable

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			day period in December 2013 demonstrated that additional capacity appears available on 1st Avenue S., suggesting that the observed diversion may not be due to congestion on 1st Avenue S. The vacation of Occidental Avenue S. would result in this pattern being altered, with these vehicles turning west onto S. Massachusetts Street to access 1st Avenue S. instead of S. Holgate Street ***Pedestrians/Bicycles:*** Pedestrians and bicycles would be rerouted to 1st Avenue S. along the site frontage. Low non-event volumes would not result in a significant impact. ***Traffic Operations***: The vacation of Occidental Avenue S. would divert traffic to 1st Avenue and S. Massachusetts Street, however the 1st Avenue S. / S. Holgate intersection would continue to operate at LOS D. By 2030, the Arena and street vacation would degrade intersection operations along 1st Avenue S. as compared to a 810,000 sf commercial development that could be allowed under the current			

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			zoning: • 1st Avenue S. / S. Atlantic Street: LOS E to LOS F • 1st Avenue S. / S. Holgate Street: LOS D to LOS E Traffic volumes and operations east of the site, at 4th Avenue S. / S. Holgate Street would not materially change between the two build scenarios. As described in the traffic operations section, the more concentrated impacts associated with event traffic would occur less frequently than the everyday added congestion associated with site buildout under the current zoning. ***Local Access/Circulation:*** Under the non-event conditions, peak hour traffic volumes would be nominal and minimal impacts to circulation are identified. With the street vacation, the continuity of Occidental Avenue S. from S. Horton Street to S. Atlantic Street would be interrupted, disrupting a potential parallel route to 1st Avenue S. during periods of congestion.			

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			However, northbound and southbound through traffic volumes across S. Holgate Street are minor, and do not represent a substantial movement. Impacts to emergency vehicle access to the south could occur if the street was vacated without providing a parallel replacement link to S. Holgate Street. ***Freight and Goods***: A limited number of trucks currently utilize Occidental Avenue for deliveries. Those trucks serving existing uses along this section of Occidental Avenue area will be redirected to 1st Avenue S. The traffic count conducted for the weekday AM midday and PM peak hours showed a range of 0 to 10 trucks per hour. ***Parking:*** The elimination of this section of Occidental Avenue S. would result in the removal of on-street parking for this street segment. Based on the parking supply surveys and actual usage, approximately 60 spaces would be removed. ***Traffic Safety:*** Addition of pedestrians and bicycles to			

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
			1st Avenue for Occidental Avenue vacation could increase vehicle/pedestrian/bicycle conflicts.			
Public Services and Utilities	Construction	No impacts	Potential short-term, temporary impact to fire and police response time	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
	Operation – Fire	No impacts	No impacts	No impacts	No impacts	No impacts
	Operation – Police	No impacts	As with other sporting events, the SPD could need parking enforcement officers working overtime to staff the Proposed Arena before, during, and after major events since parking will be provided offsite in existing private lots and on the streets surrounding the Arena. A slight increase in offenses would be expected due to increased number of visitors to the area. Offenses that could increase include robbery, aggravated assault, theft, auto theft, misdemeanor theft, assaults, urinating in public, disturbance, and public drinking. Operation of the Proposed Action would not have any effect on existing mutual aid agreements.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
	Operation – Parks and Recreation	No impacts	No impacts	No impacts	Displacement of Seattle Center Skatepark	Displacement of Seattle School District athletic and band use, and adult soccer

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
						and football leagues
	Operation –Solid Waste	No impacts	Volumes are within the capacity of the existing solid waste collection and processing facilities and no adverse impacts from the collection of additional solid waste are anticipated.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
	Operation – Natural Gas, Electricity, Telecom.	No impacts to natural gas or telecommunications. As part of Seattle City Light's Denny Substation project, a new 230-kV transmission line would be constructed between the existing Massachusetts Substation in the SoDo area to the new Denny Substation in South Lake Union. The new 230-kV line would extend from the Denny Substation, through downtown Seattle to S Massachusetts Street, and then west along S. Massachusetts Street at the north end of the Seattle Arena site into the existing Massachusetts Substation located at Utah Avenue S. and S. Massachusetts Street. The estimated timing for construction of the transmission line to the Massachusetts Substation is 2018 – 2020. In addition to the existing	Electrical 26-kV lines would require relocation. The Arena team is working with Seattle City Light on options for both underground and overhead relocations of existing 115-kV transmission lines that are currently aligned over the north portion of the Arena site. The relocation alternatives include both existing and proposed transmission lines that would be installed as part of the No Action Alternative. An increase in use of utilities could be met by existing utility providers	Same as Alternative 2	An increase in use of utilities could be met by existing utility providers	Same as Alternative 4

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
		transmission lines, Seattle City Light is planning a second 115-kV circuit along S. Massachusetts as part of their Denny Substation project (2018-2020).				
Economics	Construction	No impacts	Same as Alternative 3 (Economic Analysis prepared for an 18,000-seat arena assuming a conservative estimate of average event attendance).	Construction of an 18,000-seat arena on any of the sites would generate one-time economic and fiscal benefits to the region. The economic activity from direct spending and re-spending is estimated at $480 million within Seattle, with an additional $53 million in King County outside of Seattle (total of $533 million within King County including Seattle). Arena construction would support approximately 3,200 jobs and $266 million in earnings within Seattle, with an additional 370 jobs and $23 million in King County outside of Seattle (total of 3,570 jobs and $289 million in King County including Seattle).	Same as Alternative 3	Same as Alternative 3
	Operation	No impacts	Same as Alternative 3	The gross regional economic activity associated with operating an 18,000-seat arena in the Stadium District area of Seattle would annually generate approximately $260 million in economic activity in Seattle with an additional $53 million	Same as Alternative 3	Same as Alternative 3

Table 1-1 (Continued)
Summary of Potential Impacts and Major Conclusions

Environmental Element	Construction and Operation Phases	Alternative 1 – No Action	Alternative 2 – Proposed Action – Stadium District 20,000 Seat Arena	Alternative 3 – Stadium District 18,000 Seat Arena	Alternative 4 – KeyArena 20,000 Seat Arena	Alternative 5 – Memorial Stadium 20,000 Seat Arena
				in King County ($313 million total in King County including Seattle). The total regional annual economic impact generated is approximately 2,045 jobs and $103 million in earnings in Seattle. The totals for King County including Seattle would be 2,473 jobs and $130 million in earnings. The fiscal benefits from taxes generated from the operations of the arena are projected at $7.9 million annually to the City of Seattle with an additional $0.6 million to King County. For Alternatives 2 and 3, increased traffic from Arena events would result in traffic delays to Port of Seattle and non-Port trucks. The estimated annual cost from these delays is $115,584 for the total of Port trucks, and $66,141 for the total of non-Port trucks.		

Table 1-2
Summary of Potential Mitigation Measures

Environmental Element	Construction and Operation Phases	Mitigation Measures
Geology	Construction	The following mitigation measures could potentially reduce or eliminate geologic impacts at the sites of all Action Alternatives: • Designing the new structures according to relevant and appropriate seismic design methods to mitigate liquefaction and ground settlement. Site soils would also be improved as necessary to reduce the risk of liquefaction and related seismic damage. • Designing the new structure to meet or exceed earthquake loading requirements in the latest issues of the relevant and appropriate building codes. • Implementing best management practices to mitigate adverse effects of sedimentation and erosion, and offsite migration of silt-rich soil and turbid water. • Implementing vibration monitoring if necessary to prevent offsite adverse effects. • Sampling and analyzing onsite soil and groundwater in order to determine the presence or absence of contamination. If contaminated soil and / or groundwater is encountered during the investigation and / or construction, and depending on the contaminant concentrations, the materials could potentially require special handling, treatment, transport, and /or disposal at offsite locations. The following measure could potentially reduce or eliminate geological impacts at the site of Alternatives 2 and 3: • Constructing the proposed structure on deep foundations that extend through the compressible soils to denser bearing material in order to mitigate foundation settlement. The following measure could potentially reduce or eliminate geological impacts at the sites of Alternative 4 or 5: • Conducting a detailed geotechnical investigation to understand the subsurface conditions in support of project design. As part of the study, identify measures to mitigate long-term foundation settlement and seismic hazards during the project design and construction.
	Operation	No mitigation measures are required.
Air Quality	Construction	Construction activities would comply with the PSCAA regulations that require reasonable precautions to minimize fugitive dust (PSCAA, 2013b). Construction equipment also would include emission-control devices to reduce CO, GHGs, and particulate emissions from gasoline and diesel engines. • Spraying water, when necessary, during demolition, grading, and construction activities to reduce emissions of particulate matter. • Covering dirt, gravel, and debris piles to reduce dust and wind-blown debris. • Covering open-bodied trucks to reduce particulate matter blowing off trucks or dropping on roads while transporting materials. Alternatively, wetting materials in trucks or providing adequate freeboard (space from the top of the material to the top of the truck) could be used to reduce dust and deposition of particulate matter. • Providing wheel washers at construction sites to remove particulate matter from vehicle wheel wells and undercarriages before they exit to decrease deposition of particulate matter on area roadways. • Sweeping public streets, when necessary, to remove particulate matter deposited on paved roads and subsequent wind-blown dust.

Table 1-2 (Continued)
Summary of Potential Mitigation Measures

Environmental Element	Construction and Operation Phases	Mitigation Measures
		• Turning off construction trucks and engine-powered equipment during long periods of non-use, instead of being left idling, to reduce exhaust emissions and odors. • Requiring emission-control devices on construction equipment and using relatively new, well-maintained equipment to reduce exhaust emissions of CO, GHGs, and particulate matter from engine exhaust. • The project would include a CTMP to reduce temporary traffic delays on area streets.
	Operation	No mitigation measures are required.
Water	Construction	The following measures could be used to mitigate impacts to water and water quality at the site of Alternatives 2 and 3: • If groundwater as a result of the installation of retaining walls becomes an issue, identify and implement engineering solutions, such as the installation of a perimeter drainage system. • In order to prevent schedule delays during construction as a result of the potential presence of contaminated groundwater, complete a groundwater quality investigation well in advance of the scheduled construction in order to determine the presence or absence of the contamination. If contamination is found to be present, identify and implement engineering solutions to remedy the situation before the construction commences. • Based on existing soil properties and the total depth of cover over the pipe, it may be necessary to monitor the ground over the top of the pipe for settlement, and any extremely heavy construction loads may need to be restricted from traveling over the interceptor sewer. • Ground vibrations would likely occur during construction and demolition. Conduct studies as necessary to determine how to prevent or mitigate the potential to cause damage to underground utilities. Implement vibration monitoring during construction to prevent any damage to the Elliot Bay Interceptor. • It is important to keep the route of the interceptor available for maintenance and repairs. Avoid construction activities within S. Massachusetts Street that would prevent maintenance personnel from gaining access either in an emergency or for routine maintenance operations. No mitigation measures have been identified to be required for impacts of the construction of an arena at the site of either Alternative 4 or 5.
	Operation	No mitigation measures are required.
Scenic Resources	Construction	No mitigation measures are required.
	Operation	No mitigation measures are required.
Noise	Construction	Construction mitigation measures could include: • Limiting noisier construction activities to between 7:00 AM and 10:00 PM would eliminate construction noise and vibration during sensitive nighttime hours. • Equipping engines of construction equipment with adequate mufflers, intake silencers, or engine enclosures would reduce engine noise. • Requiring contractors to use the quietest equipment available, maintain all equipment, and train their equipment operators would reduce noise levels and increase efficiency of operation. • Turning off construction equipment during prolonged periods of nonuse would eliminate noise from construction equipment during those time periods.

Table 1-2 (Continued)
Summary of Potential Mitigation Measures

Environmental Element	Construction and Operation Phases	Mitigation Measures
		• Locating stationary equipment and construction staging areas away from sensitive uses would reduce noise impacts because of greater distances to noise-sensitive receptors. The actual construction staging would be determined during the final design phases of the project. • Installing temporary noise barriers, shields, or curtains around stationary construction equipment would decrease noise levels at nearby sensitive receptors. • Routing construction trucks to avoid sensitive receptors. • Implementing vibration monitoring if necessary to prevent offsite adverse effects. • Notifying nearby land uses in advance when noise-generating construction activities are scheduled. A telephone hotline number could be published and maintained by the construction company to directly receive calls from the public on noise and vibration impacts and other construction issues.
Land Use	Construction	No mitigation measures are required for Alternatives 2, 3 and 5. For Alternative 4, if an arena were to replace the existing KeyArena, existing tenants would be displaced for up to 2 years during the construction period, and may be permanently displaced. Potential mitigation measures include: • Notice to existing tenants of the construction period as far in advance as possible. • Assistance in identifying alternative locations in which to hold games, concerts and other events. • Assistance in publicizing the relocation to the potential attendees. • Assistance in working with the ArenaCo event schedulers to determine whether the displaced tenants could come back to the new arena once construction is completed.
	Operation	No mitigation measures are required.
Historic and Cultural Resources	Construction	**Alternatives 2 and 3** Historic Resources: None of the buildings proposed for demolition appear to meet any of the six criteria for historic landmark status. If the landmark status nomination is denied, mitigation would not be required as impacts to historic resources would not occur. If the landmark status nomination is upheld by the Landmarks Preservation Board, the proponent would work with staff to develop a Controls and Incentives Agreement. In addition, any changes to historic features would follow the Certificate of Approval Process. Cultural Resources: An Unanticipated Discovery Plan would be prepared for the project that provides for notification and consultation among the State Historic Preservation Office Department of Archeology and Historic Preservation (DAHP), Tribes, and the City related to discoveries of unknown archaeological materials or human remains. **Alternative 4** Historic Resources: If a new arena were to be built at KeyArena, the existing building would have to be submitted through a landmarks status nomination. If the nomination were denied, a possible outcome would be the removal of KeyArena. If the landmark status nomination is upheld by the Landmarks Preservation Board, the proponent would be required to work with staff to develop a Controls and Incentives Agreement. The agreement may include measures such as preservation of the iconic roofline and façades. In addition, any changes to historic features would follow the Certificate of Approval Process or may be denied.

Table 1-2 (Continued)
Summary of Potential Mitigation Measures

Environmental Element	Construction and Operation Phases	Mitigation Measures
		Cultural Resources: If a new arena were to be built at KeyArena, an Unanticipated Discovery Plan would be prepared that provides for notification and consultation among the DAHP, Tribes, and the City related to discoveries of unknown archaeological materials or human remains. **Alternative 5** Historic Resources: If an arena were to be built at Memorial Stadium, the existing building and Memorial Wall would have to go through the landmarks status nomination process. If the nomination were denied, a possible outcome would be the removal of Memorial Stadium and relocation of the Memorial Wall. If the landmark status nomination is upheld by the Landmarks Preservation Board, the proponent would work with staff to develop a Controls and Incentives Agreement. The agreement may include measures such as preservation of the roofline or façades. In addition, any changes to historic features would follow the Certificate of Approval Process. Cultural Resources: If an arena were to be built at Memorial Stadium, an Unanticipated Discovery Plan would be prepared that provides for notification and consultation among the DAHP, Tribes, and the City related to discoveries of unknown archaeological materials or human remains.
	Operation	No mitigation measures are required.
Transportation	Construction	**All Build Alternatives – Construction Management Plan** A construction management plan would be required as a condition of permit approval. The plan would include the following: • **Central Construction Coordination Office**. During construction, the construction manager shall maintain coordination with the existing venues and the Port of Seattle to advise them of major phases of construction that may create constraints or disruption along roads and sidewalks in the immediate vicinity of the Arena. • **Construction Hours and Sensitive Receivers.** Identify demolition and construction activities within permissible construction hours. • **Construction Noise Management.** Include the requirement that all demolition and construction activities shall conform to the Noise Ordinance, except as approved through the variance process. Identify and list techniques and measures to minimize or prevent demolition and construction noise including: timing restrictions, noise reduction construction technologies, process modifications. • **Measures to Minimize Noise Impacts.** List measures to be implemented to reduce or to prevent noise impacts during demolition and construction activities during standard and non-standard working hours. • **Construction Milestones.** Include a description of the various phases of demolition and construction, including a description of noise and traffic generators, and anticipated construction hours for each phase. • **Construction Parking Management.** Identify areas for construction worker parking. As part of the agreement with the Arena, the general contractor would develop a construction worker parking program, so available public off-street and on-street parking is not adversely impacted by the influx of this large temporary population of workers. This would involve remote parking with a shuttle service, use of parking and loading areas in vacant buildings, or other means of providing construction worker parking without impacting existing on- and off-street public parking. • **Construction Traffic/Street and Sidewalk Closures.** As part of the Arena construction, the construction manager would be required to identify anticipated street closures, the timing for street closures, and the detour routes and

Table 1-2 (Continued)
Summary of Potential Mitigation Measures

Environmental Element	Construction and Operation Phases	Mitigation Measures
		signing plan to guide drivers, bicyclists and pedestrians around these restrictions. The CMP shall identify potential sidewalk, transit stop and bicycle lane closures or rerouting, and shall consider the need for construction truck traffic to avoid peak traffic periods (e.g., 6-9 AM, 3-6 PM). This proposal would be reviewed and coordinated with SDOT, the Port of Seattle, and others nearby venues through the Maintenance of Traffic Task Force (MOTTF). • **Off-site Construction Coordination.** The Transportation Coordinator would regularly attend and / or be informed by the Maintenance of Traffic Task Force (MOTTF) relating to utility and road projects that would potentially impact Arena and other event access in the immediate area as well as more regional transportation projects like the SR 520 and Mercer Corridor projects that shift traffic patterns and may impact access to the Arena. • **Priority Truck Routing and Loading**. Develop demolition, earthwork excavating, concrete and other truck routing plans and submit those plans for approval through SDOT for site-specific development. The arena general contractor would specify priority truck routes and loading areas as part of a coordinated Construction Traffic Control Plan. This plan could not only be reviewed by SDOT but also could be coordinated with other venue transportation managers and the Port of Seattle to ensure that there are minimal conflicts with existing and scheduled operations.
		The following elements shall be included in the CMP if applicable. • Schedule the most intensive construction activities such that they are spread out over time and prohibit material deliveries from leaving or entering the area during AM and PM peak hours when feasible. • Schedule street closures and other disruptions to the street system during off-peak periods, unless approved for other hours by SDOT to minimize impacts to the system. • Provide safe pedestrian and bicycle circulation adjacent to the construction site through the use of temporary facilities, detours, and signs. • If construction activities cause the need to close on-street parking adjacent to the site, coordinate such closures with SDOT and obtain appropriate street use permits.
	Operation	
	Physical Capacity and Safety Improvements	**Alternatives 2 and 3 – Required Mitigation or Mitigation Included in Project Proposal** • **S. Massachusetts Street Realignment.** As part of the Proposed Action, S. Massachusetts Street between Occidental and 1st Avenues S. would be realigned to the north to improve the direct alignment of the street with the section immediately east of Occidental Avenue S. This would enhance accessibility to the Safeco Field garage and service road. In addition, it would allow the pedestrian plaza at the north side of the Arena to be generous in size and limit the potential for pedestrian spillover onto S. Massachusetts Street, avoiding the potential for conflict with S. Massachusetts Street traffic. This realignment would also improve the alignment of this segment of S. Massachusetts Street with the segment west of 1st Avenue s. • **North-South On-Site Connection.** As part of the Proposed Action, a north-south connection parallel to the proposed vacated Occidental Avenue S. would link S. Holgate Street with the extension of S. Massachusetts Street, along the east side of the property. This link could serve as direct ingress and egress to the Safeco Field garage, as well as replace the connection to the south for emergency and service vehicles to the Safeco Field garage, surface parking, and service and emergency road. • **Signal System Upgrades.** ArenaCo would be required to make a pro-rata contribution to projects such as the ITS

Table 1-2 (Continued)
Summary of Potential Mitigation Measures

Environmental Element	Construction and Operation Phases	Mitigation Measures
		Next Generation project list. The results of the transportation analysis suggest that there is an underlying need for area-wide improvements focusing on achieving a higher efficiency from the existing signal system as well as providing additional east/west connectivity in light of the increase in future rail activity. • **Traffic Control Equipment Upgrades.** ArenaCo would work with SDOT to upgrade the traffic control equipment at signalized intersections in the Stadium District to increase its reliability through improving communications with the SDOT traffic control center and by utilizing current Adaptive Traffic Control technology. These improvements are more than simply optimizing traffic signals but give signals the flexibility to respond to unanticipated surges, interruptions, and / or shift in traffic flows due to collisions, road construction projects and / or variation in tenant access patterns. • **Lander Street Pro-rata Contributions.** ArenaCo would be required to make a pro-rata contribution to the future grade separation of Lander Street. This has been identified based on existing and future deficiencies noted in the analysis. Further pressure would be put on the east/west capacity of the system and increases potential for vehicle/rail safety conflicts due to increases in the north/south rail activity and resulting decrease in capacity of the at-grade street crossings. • **Pedestrian Improvements.** Implementation of the following pedestrian improvements would contribute to increased safety and / or improved connectivity between the Arena and pedestrian connections to transit and / or offsite parking areas. o The north-south crossing of S. Atlantic Street at Occidental Avenue S. would be improved by: ▪ Providing manual traffic control at the north-south crossing before, during, and after Arena events, and / or, ▪ Developing a more-permanent improvement such as adding a staircase to the south side of S. Atlantic Street connecting to 3rd Avenue S. o To improve the connectivity and safety of the east-west pedestrian connection between the Arena site and 4th Avenue S., ArenaCo would be required to develop or implement one of the following: ▪ Construction of a pedestrian bridge from the Arena along S. Holgate Street to the east spanning such that it clears the easternmost railroad tracks. This would reduce the need for surface management pedestrian traffic control measures before or after events. The pedestrian bridge should directly connect to the Arena with a pathway wide enough to assure free flow of pedestrians during ingress and egress conditions. ▪ Alternatively, the applicant may provide operating shuttles or jitneys that follow a fixed route on a fixed headway that link the Washington State Ferry terminal, Link Light Rail and Transit Stations to / from the Arena. The intent of these jitneys and / or shuttles would be to provide an incentive for walk-on ferry passengers, transit users and persons parking in more remote offsite parking spaces. A specific shuttle plan would be developed as part of the TMP. The shuttle option would be coupled with pedestrian lighting and sidewalk improvements along 1st Ave S. from S. Holgate Street to S. Lander Street, and along S. Lander Street between 1st Avenue S. and 4th Avenue S. • **At- Grade Way-Finding System.** In coordination with other Stadium District stakeholders, ArenaCo could be required to contribute to development of a way-finding system to guide pedestrians and cyclists to the various

Table 1-2 (Continued)
Summary of Potential Mitigation Measures

Environmental Element	Construction and Operation Phases	Mitigation Measures
		venues in the Stadium District. To the extent possible this system will link with and through the Pioneer Square, International District, and SoDo. **Alternatives 4 and 5 – Required Mitigation** • **Traffic Control Equipment Upgrades.** Similar to traffic control equipment upgrades required for Alternatives 2 and 3, signal optimization enhancement would be desirable in the Seattle Center area in the event Alternative 4 or 5 are constructed. These improvements are more than simply optimizing traffic signals but give signals the flexibility to respond to unanticipated surges, interruptions, and / or shift in traffic flows due to collisions, road construction projects and / or variation in tenant access patterns. **Potential Mitigation Measures – these measures have been identified for consideration by DPD and SDOT as part of permit review and conditioning:** • **Directional (Dynamic/Static) Event Signage**. Directional signage between the freeway and other limited access facilities could be revised to incorporate the Arena. For Alternatives 2 and 3, this would complement the existing signage that currently exists for CenturyLink Field and Safeco Field and for Alternatives 4 and 5, it would further integrate with the Seattle Center signage. • **Parking Guidance Signage.** The Arena could participate with the City of Seattle in implementing a parking guidance system that provides direction and information regarding parking availability to those drivers who do not pre-purchase parking. This system could notify drivers as to the location and number of spaces available in public and event garages in the Stadium District or Seattle Center area, reducing excess and erroneous circulation. This system will be similar to the downtown parking guidance system. • **SDOT Traffic Control Center Improvements.** The Arena could contribute to improvements to the SDOT Traffic Control Center. The Traffic Control Center will have the ability to provide video feeds of information from WSDOT and SDOT traffic cameras and allow for posting of current conditions relating to congestion, parking, and traffic incidents that could help drivers' decision-making as they travel to an event at the Arena, Safeco Field, and/or CenturyLink Field, for Alternatives 2 and 3, and the Seattle Center area attractions for Alternatives 4 and 5. **Potential Mitigation Measures Applicable Only to Alternatives 2 and 3** • **Pedestrian Scale Street Lighting.** Consider upgrading street lighting to enhance safety for pedestrians in several areas where there are preexisting low light levels. See Section 3.8 or Appendix E for potential locations. • **Bicycle Route Improvements.** The Arena could participate in marketing and upgrading the bike route system and prioritize bike lanes in the immediate vicinity of the site.
	Programmatic Measures / Transportation Management Plan	**TMP – a TMP would be required as a condition of permit approval. A summary of what the TMP could be required to include is listed below. The final elements of the TMP will be determined by DPD as part of permit approval. See Section 3.8 or Appendix E (Section 4.0) for a complete listing of the TMP elements:** • Event Management and Marketing: Event Transportation Coordinator; Event Access Guide; Event Scheduling Protocol and Management; and Port of Seattle Protocols. • Public Information and Marketing: Public Information Coordinator; Survey and Market Research; Static Electronic Media; Dynamic Electronic Media; Arena Call Center; Broadcast Advisory; Event Access Application; and Cross-Marketing with Area Businesses. • Traffic and Parking Demand Reduction: Transit, Premium Transit Service; Shuttles; Subsidized Transit Fares;

Table 1-2 (Continued)
Summary of Potential Mitigation Measures

Environmental Element	Construction and Operation Phases	Mitigation Measures
		Charter Bus/Meal/Ticket Packages; Adding Cars to Link Light Rail Trains; Adding Link Light Rail Trains on a Pocket Track. • Traffic and Parking Demand Reduction: Rail, Waterborne and Bicycle: Rail/Lodging/Ticket Packages; Facilitate Washington State Ferry Use; Facilitate Passenger Ferry Service; and Bicycle Racks. • Traffic and Parking Demand Reduction: Average Vehicle Occupancy (AVO): Priority Disabled, Taxi, and Limousine Loading; Higher Vehicle Occupancy Incentives. • Management of Vehicle and Parking Demand: Off-Street Parking: Participation in e-Park Program; Establish Parking Agreements; Parking for Event Staff; Off-Street Parking Reservations; and Pre-Sell Reserved Arena Parking. • Traffic Management Plan: Traffic Control Plan; Post-Opening Traffic Study; and Vehicle Wayfinding. • Implementation and Monitoring: Parking and Access Review Committee (PARC); Traffic Operations Group; and Periodic Program Review and Survey.
Public Services and Utilities	Construction	**All Build Alternatives** Fire: The project would require coordination with the SFD to develop a plan for emergency vehicle access to and from the Project Area during construction. Intelligent traffic signal controls at signalized intersections would be used as a partial mitigation measure for the effects on response times for fire and emergency medical services, particularly during construction. If intelligent traffic signals cannot adequately mitigate the effects on emergency response, additional staff, apparatus, and facilities may be necessary. Police: The project developer would be responsible for maintaining security at construction and staging areas during construction. **Alternatives 2 and 3** Electrical: Mitigation for the relocation of the overhead 26-kV overhead lines would include undergrounding of these facilities adjacent to the Project Site and relocating of the overhead lines located within the project site on Occidental Avenue S. **Alternative 4** Parks: Mitigation may need to be provided for the removal and relocation of the Seattle Center Skatepark if Alternative 4 were implemented. The city would likely convene the Skate Park Advisory Committee to provide guidance to any potential relocation of the skate similar to the process followed in 2007 to determine the parks last relocation. **Alternative 5** Parks: Advance notice of the closure of Memorial Stadium and construction schedules should be provided to adult soccer and football leagues currently using Memorial Stadium to assist in future scheduling of games.

Table 1-2 (Continued)
Summary of Potential Mitigation Measures

Environmental Element	Construction and Operation Phases	Mitigation Measures
	Operation	**All Build Alternatives** Fire: The project would require the establishment of an emergency evacuation plan. Emergency evacuation plans provide procedures in the event of an emergency: e.g., guests should follow evacuation plan instructions given via the public address announcer, seating hosts, uniformed security, police and medical personnel. If an emergency requires evacuation, exit directions will be given over the public address system and scoreboards. During emergencies, elevators and escalators are not to be used. All guests will be directed to exit using the stairs or ramps. Police: During events, high-volume traffic and pedestrian areas would require additional police support services to direct and control traffic and pedestrian movements.

HOV – high occupancy vehicle
PSCAA – Puget Sound Clean Air Agency
SDOT – Seattle Department of Transportation
SFD – Seattle Fire Department
WSDOT – Washington State Department of Transportation

Table 1-3
Summary of Secondary and Cumulative Impacts

Element of the Environment	Secondary or Cumulative Impact
Geology	Alternatives 2 and 3 would occur on a site that was the result of the cumulative disposal of fill during the early 1900s, which is currently susceptible to liquefaction during an earthquake. The construction of the foundation system for the Proposed Project or Alternative 3 would generally stabilize the site and limit future earthquake-related damage. Secondary effects related to the geology and soils would occur either farther from the project site footprint and / or later in time. Potential secondary effects for the Proposed Project or Alternative 3 include: The onsite silt-rich soil would be exposed to the weather during the proposed excavations and foundation construction. The exposed soils could be transported offsite. In addition, spillage from dump trucks and soil on truck tires could also result in similar consequences beyond the project site. **Potential secondary effects common to all Action Alternatives include:** Aggregate in the form of sand and gravel would be needed to mix with cement to create concrete and for use in onsite fills. The sand and gravel are sourced from gravel pits located within the Puget Sound area. The use of aggregate on the project would reduce the supplies of material that might be used elsewhere for other projects. However, the quantity required for the construction of an arena would be considered minimal Trucks would be transporting heavy equipment and / or construction materials to the project site and to remove excess soils and construction debris. The trucks could cause deterioration of nearby streets and roadways if the loads exceeded the strength of the roadway base material, leading to cracking or rutting of pavements. No secondary effects are anticipated during the operation of an arena at the Stadium District site, or at either of the Seattle Center area site, with respect to the geology and soils.
Air	Cumulative impacts on air quality would be related to short-term increases in construction activity. Long-term cumulative increases in traffic volumes and congestion would result from the combined arena event volumes under the Proposed Project, or Alternatives 3, 4 or 5, and from future growth in traffic resulting from other future projects in the area. At the Stadium District area under Alternatives 2 and 3, air pollutant emissions could increase from expansion of Port facilities, increased rail traffic, vehicular traffic diverted by tolling the new SR-99 Tunnel, and new residential development in the North Lot of CenturyLink Field. Near Seattle Center, air pollution emissions could increase from vehicular traffic diverted by tolling the new SR-99 Tunnel, and new residential and commercial development in the lower Queen Anne and South Lake Union areas. Secondary impacts on air quality could result from economic growth and changes in land uses induced by the development of a new arena. Any growth induced by a new arena would incrementally increase traffic volumes and associated traffic air pollutants. Although the location and specific amount of growth is unknown, incremental increases in traffic emissions likely would be small.
Water	For Alternatives 2 and 3, there would be cumulative impacts to water supply and discharge created by the development of a new Arena in conjunction with other development in the Stadium District area. Similar to Alternatives 2 and 3, for Alternatives 4 and 5 there would be cumulative impacts to water supply and discharge created by the development of a new arena in conjunction with other development in the Seattle Center area. New and larger buildings may cumulatively increase the need for additional water supply; however code-compliant plumbing fixtures are targeted toward reducing supply needs on a per-person basis. New code requirements for onsite detention of stormwater, utilization of "Green Stormwater Infrastructure" practices and "Green Area Factor," low-flow plumbing fixtures and water reuse design practices may reduce overall stormwater and sanitary sewer flows.

Table 1-3 (Continued)
Summary of Secondary and Cumulative Impacts

Element of the Environment	Secondary or Cumulative Impact
Scenic Resources	No secondary impacts would be expected. Cumulative impacts may result from future increased heights and densities of new development near these alternatives that could add to the obstruction of views of Puget Sound (Alternatives 2 or 3) or obstruct views of the Space Needle (Alternatives 4 or 5) from identified public parks. Adding a new building of the proposed size of the Arena would add to the skyline, extending the higher profile of buildings farther to the south than currently exists with the Safeco Field and CenturyLink Field (Alternatives 2 or 3) or in the Seattle Center area (Alternatives 4 or 5).
Noise	Secondary impacts on noise could result from economic growth and changes in land uses induced by the Proposed Project (Alternative 2) or Alternatives 3, 4 or 5. Cumulative impacts on noise would be related to short-term increases in construction activity near the sites.
Land Use	For Alternatives 2 and 3, there would be a cumulative impact of developing another large spectator sports facility adjacent to the two existing facilities, Safeco Field and CenturyLink Field and Event Center, in the area north of the industrial center. Land uses outside of the Stadium Transition Overlay District would likely change to serve the expanding needs and more commercial character of the Stadium District in contrast to the industrial-commercial and general industrial character of the Port of Seattle and the Greater Duwamish MIC. ArenaCo owns additional properties within and outside the Stadium Transition Area Overlay District. No development has been proposed for those properties, however development of the Proposed Project or Alternative 3 could induce the redevelopment of those properties for commercial uses designed to support the Arena or stadiums. New development would be subject to a site-specific evaluation under SEPA and Land Use Code development and use regulations. The Proposed Project could make the South Downtown area more attractive to non-industrial developers, which could indirectly result in changes to the use of some properties. Such changes could also encourage Port and Manufacturing Industrial Center-related development by providing support services (e.g., offices, office-related retail and eateries) to businesses and workers in the area (Port Terminals 46 and 30 are within a 15-minute (3/4 mile) walking radius of the proposed Seattle Arena site). Property values in the South Downtown area could rise and rents could increase for some businesses. Alternative 4 would not result in a secondary or cumulative land use impact since a new arena would be replacing a similar use (KeyArena) and not compounding uses. Alternative 5 could result in a secondary land use impact as the Seattle School District may need to construct a new stadium to accommodate school athletic activities, and that new stadium could potentially displace another existing use. During construction, there may be secondary impacts to nearby properties and businesses from loss of on-street parking, construction noise, and construction traffic.
Historic and Cultural Resources	Loss of historical landmarks would add to cumulative loss of historic structures; however any loss would be minimized through the Certificate of Approval Process and coordination with the Landmarks Preservation Board.
Transportation	**Secondary Impacts for Alternatives 2 and 3** There could be secondary and cumulative impacts to non-event transit users due to additional passengers using transit or park-and-ride lots to attend events at the Proposed Project (Alternative 2) or Alternative 3. Non-event transit users may find transit more crowded, fewer parking spaces at remote lots, and longer commute times during game days. The effective implementation of transportation demand reduction strategies through a Transportation Management Program would result in increases in demands on other transportation modes and systems, including pedestrians, transit, and bicycles. Short term parking restrictions may be implemented to support event related activities as a result of traffic control plans, or other efforts to balance traffic, transit, freight and goods movement, and parking demands. **Cumulative Impacts for Alternatives 2 and 3** There would be direct impacts to the movement of freight and goods caused by an increase in traffic volumes and congestion for the No Action Alternative by 2018 and 2030. These impacts would be increased on game days. Secondary and cumulative impacts to other motorists could occur by drivers choosing to

Table 1-3 (Continued)
Summary of Secondary and Cumulative Impacts

Element of the Environment	Secondary or Cumulative Impact
	reroute to avoid congestion at specific intersections. For freight, changes in Port of Seattle operations could change the amount of heavy trucks on some routes through the Stadium District, especially if service hours are extended later in the day and into the evening. This could add delay and congestion on arterial streets and intersections in the project vicinity, and add delay to some surface transit routes in SoDo. As light rail service in the region is expanded, transit service providers are anticipated to redeploy service to avoid duplication of transit service. It is unclear how transit service provided would redeploy service, but it is likely to impact event attendees traveling to stadium events. Major capital projects, such as Waterfront Seattle and the Southend Transit Pathways study, will change how transit connects through and to downtown Seattle. These projects will bring some bus transit stop locations closer to the Proposed Project (Alternative 2) or Alternative 3, resulting in a cumulative benefit to encourage event attendees to use transit for traveling to events. In general, the impacts identified for the Proposed Project (Alternative 2) or Alternative 3 without other concurrent events are similar in magnitude and slightly less than for a Mariners event. However, the addition of the Proposed Project (Alternative 2) or Alternative 3 would increase the number of days in the SoDo neighborhood where an event occurs and could add cumulatively to reduction of parking availability in the SoDo neighborhood. Short-term parking restrictions may be implemented to support event related activities as a result of traffic control plans, or other efforts to balance traffic, transit, freight and goods movement, and parking demands. **Secondary Impacts for Alternatives 4 and 5** A 1st Avenue streetcar currently being considered as part of the Center City Transit Study would provide another way for event attendees, especially those using ferry services, to connect to Seattle Center. This would reduce the number of people using bus, monorail, and South Lake Union Streetcar transit services. The effective implementation of transportation demand reduction strategies through a Transportation Management Program would result in increases in demands on other transportation modes and systems, including pedestrians, transit, and bicycles. **Cumulative Impacts for Alternatives 4 and 5** There would be direct impacts to the general vehicular traffic and to the movement of freight and goods caused by an increase in traffic volumes and congestion for the No Action Alternative by 2018 and 2030. These impacts would be increased on game days. Secondary and cumulative impacts to other motorists could occur by drivers choosing to reroute to avoid congestion at specific intersections.
Public Services and Utilities	**Secondary Impacts for all Build Alternatives** Fire: Construction of any of the four build alternatives could cause some minor delays in fire service response to the Project Area during construction. Such delays are typical for any major construction activity in and around downtown Seattle. As part of a Construction Management Plan, the project developer would work with the SFD to ensure that adequate access to the area is available during construction. **Cumulative Impacts for All Build Alternatives** Utilities: The construction of a new 750,000 square-foot spectator sports facility in Seattle at any of the potential locations would cumulatively add to the need for additional sources of natural gas, electricity, telecommunications, and solid waste pickup and handling. The needs for this type of facility would be similar to any large new facility and potential growth in Seattle is part of the forecasting in the load plans for each utility. **Cumulative Impacts for Alternatives 2 and 3** A major long-term construction project, the Alaska Way Viaduct replacement, is in the vicinity of the site of Alternatives 2 and 3. The project, events at nearby facilities, and the viaduct replacement project would modify the transportation network in and around downtown, but are not expected to result in significant adverse operational effects on the provision of public services. Depending on the route used, some public service providers would experience increased traffic-related delay. Others would experience less traffic-related delay. Police: Over the long term, the demand for police protection service in the vicinity of the Proposed Project or Alternative 3 could increase as a result of the cumulative effect of the proposal and other anticipated

Table 1-3 (Continued)
Summary of Secondary and Cumulative Impacts

Element of the Environment	Secondary or Cumulative Impact
	development projects in the Stadium District and larger SoDo area. Yet, as the city has grown and developed over the last 25 years, reported major crimes have shown a steady downward trend. The decline was continuous from 1988 to 2000. The lowest year for reported major crimes was 2012 when the major crime rate reported was 62 percent lower than the rate reported in 1988 (SPD - Major Crimes a 25-Year Review). **Cumulative Impacts for Alternatives 4 and 5** Two major long-term construction projects, the north portal of the Alaska Way Viaduct replacement and the Mercer Corridor Project, are in the vicinity of the Alternatives 4 and 5. In combination with construction of either Alternative 4 or 5 with events at nearby facilities, the viaduct replacement, and Mercer Corridor projects would modify the transportation network in and around downtown. Increased congestion may have operational effects on the provision of public services. Depending on the route used, some public service providers may experience increased traffic-related delay.
Economics	A new arena in Seattle would add cumulatively to the venues available for sports and concerts.

Table 1-4
Summary of Significant Unavoidable Adverse Impacts

Element of the Environment	Significant Unavoidable Adverse Impact
Geology	No significant unavoidable adverse impacts to geology are expected.
Air	No significant unavoidable adverse impacts to air quality are expected.
Water	No significant unavoidable adverse impacts to surface or groundwater are expected
Scenic Resources	No significant unavoidable adverse impacts to scenic resources are expected.
Noise	Even with the identified mitigation measures, short-term significant unavoidable adverse noise impacts due to pile driving could occur from the construction of Alternatives 2 or 3.
Land Use	No significant unavoidable adverse impacts to land use are expected.
Historic and Cultural Resources	No significant unavoidable adverse impacts to historic or cultural resources are expected.
Transportation	Significant unavoidable adverse impacts were found for the following sub-elements of transportation: **Traffic Volumes** • No Action Alternative - peak hour traffic volumes would increase substantially over current levels in both the SoDo and Seattle Center vicinities. • All Build Alternatives - The order of magnitude of change in traffic volumes associated with an arena for any event case falls within the range of current event experience. There would be an increase in traffic volumes during peak conditions on event days, which would occur more frequently with an arena. A number of measures have been identified to reduce the level of increase in traffic volumes, including demand reduction, and management of vehicles to orient them to the most appropriate route. **Traffic Operations** • No Action Alternative - Several additional intersections in both the Stadium District and Seattle Center area are forecast to operate at LOS E or LOS F under the No Action Alternative conditions. • Alternatives 2 and 3 - Several additional intersections in the Stadium District are forecast to operate at LOS E or LOS F and with additional traffic due to events at the Arena. On event days, delays would be expected to increase as a result of Arena event traffic. • Alternatives 4 and 5 – Several additional intersections in the Seattle Center area are forecast to operate at LOS E or LOS F and with additional traffic due to events at an arena at the site of KeyArena or Memorial Stadium. On event days, delays would be expected to increase as a result of arena event traffic. **Freight and Goods Movement** • No Action Alternative - Several additional intersections in both the Stadium District and Seattle Center area are forecast to operate at LOS E or LOS F under the No Action Alternative conditions. These conditions would impact freight activity to the extent identified in the impact analysis. • Alternatives 2 and 3 - On event days, delays would be expected to increase as a result of Arena event traffic. These conditions would impact freight activity to the extent identified in the impact analysis. • Alternatives 4 and 5 - On event days, delays would be expected to increase as a result of Arena event traffic. These conditions would impact freight activity to the extent identified in the impact analysis. **Parking** • Alternatives 2 and 3 - The increase in event days anticipated with the Arena (especially the increase in high attendance event days) would result in the increased frequency of parking impacts. This results in greater competition for parking with other area stakeholders, including commercial businesses in neighborhoods such as SoDo, Pioneer Square, and the International District. • Alternatives 4 and 5 – As described in the impact analysis, the increase in event days anticipated with the Arena would result in increased frequency of parking impacts resulting in competition for parking throughout the primary, and, on occasion, the extended study area surrounding Seattle Center. **Pedestrian Safety and Connections** • Alternatives 2 and 3 - Increased frequency of events together with the proximity of the Arena to the S. Holgate Street rail crossings would increase the potential for conflict between pedestrians and rail, east of the site. If a pedestrian overpass were constructed, this issue would be largely

Table 1-4 (Continued)
Summary of Significant Unavoidable Adverse Impacts

Element of the Environment	Significant Unavoidable Adverse Impact
	eliminated. With at-grade improvements together with increased manual control of pedestrians at crossings, the potential would be reduced but not eliminated. • Alternatives 4 and 5 - No identified significant unavoidable adverse impacts are expected
Public Services and Utilities	No significant unavoidable adverse impacts to public services and utilities are expected.

Section 2 - Description of Alternatives

2.1 Proposed Action

WSA Properties III, LLC (ArenaCo) has applied to the City for the future construction of an approximately 750,000 square feet (sf), 20,000-seat spectator sports facility (Seattle Arena). ArenaCo's objective is to build and operate a 20,000-seat Seattle Arena for NBA and NHL home teams on a site located at 1700 – 1st Avenue S. As described in Section 2.2.3 Permitting Process, the design of the Proposed Project is subject to review by the Downtown Design Review Board (Downtown DRB) and the project design has been evolving in response to DRB comments. The current design package is available on line through the DRB website at; http://www.seattle.gov/dpd/AppDocs/GroupMeetings/DRProposal3014195AgendaID4538.pdf or at DPD's Public Resource Center.

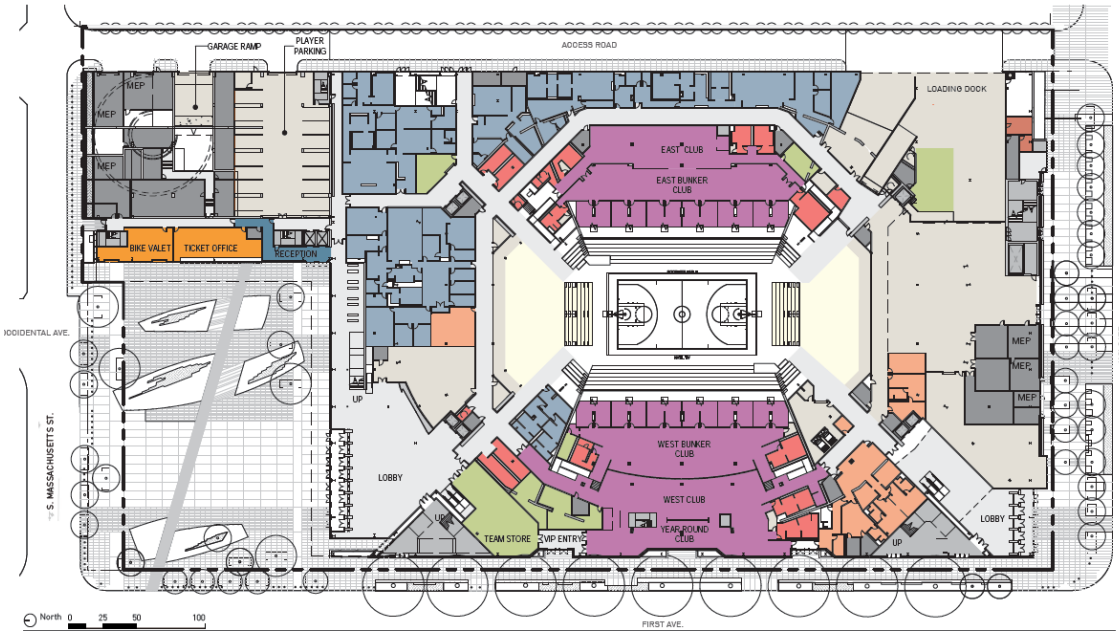


Figure 2-1
Stadium District Proposed Arena Site Plan

The Proposed Project (Alternative 2) would include the demolition of 8 existing structures of approximately 128,087 sf, and grading would occur for construction. The Proposed Project includes a proposed street vacation of the portion of Occidental Avenue S. between S. Holgate and S. Massachusetts Streets, and a realignment of S. Massachusetts Street between Occidental Avenue S and 1st Avenue S. Parking for the facility is proposed to be provided by use either of existing off-site parking or the construction of new off-site parking on a lot south of Holgate Street (referred to in this document as the "South Warehouse site") (See Figure 2-2).

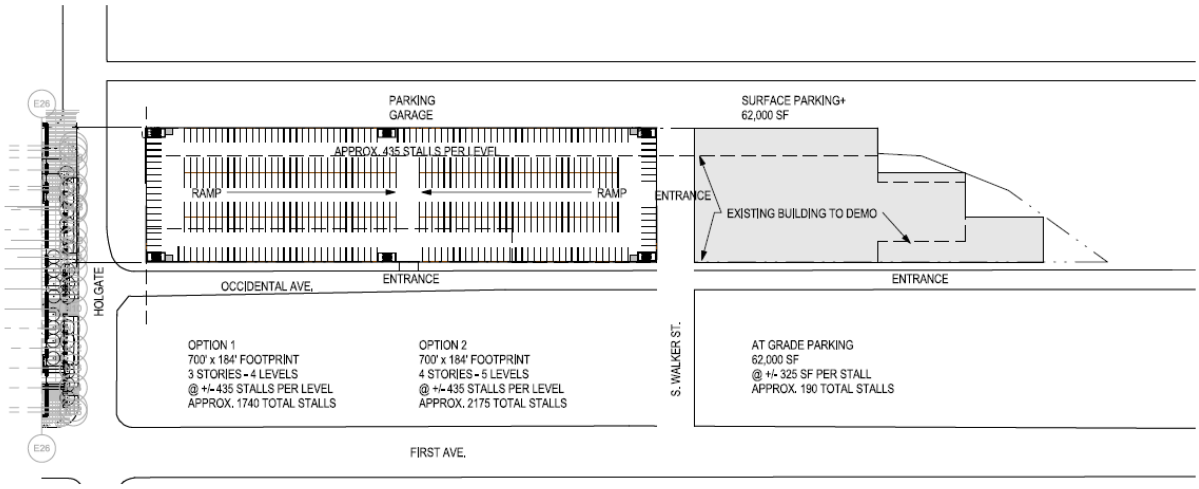


Figure 2-2
South Warehouse Site Parking Location

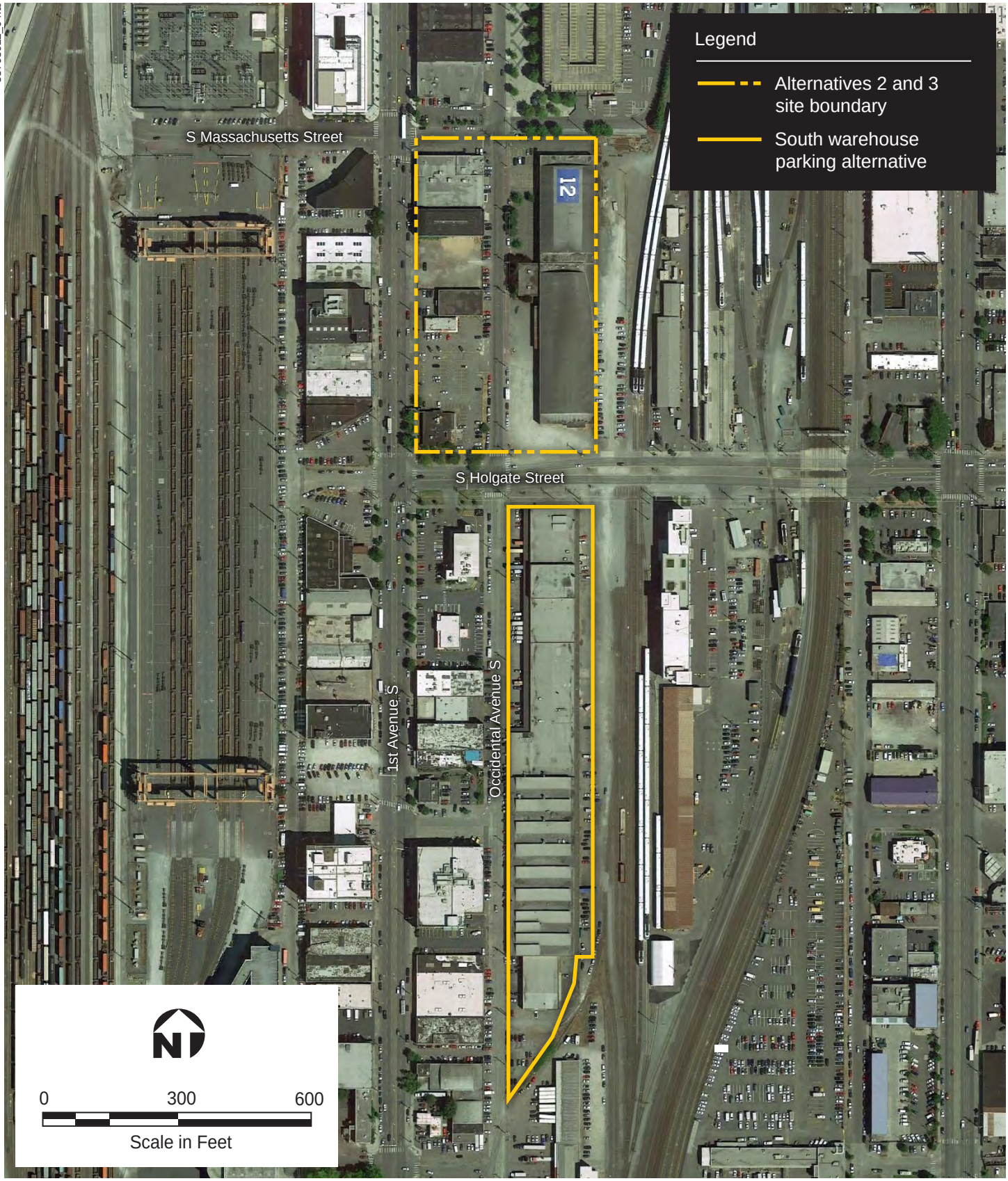
The proposed action includes all regulatory, transactional and other decisions necessary to accomplish the Project. The Project design includes a number of components intended to lessen environmental impacts including systems designed to reduce water and electrical use, stormwater runoff, and to encourage alternative forms of transportation (bicycle valet parking). This EIS also identifies potential mitigation measures that will be considered by decision-makers during permit decisions and permit conditioning.

The City and County's objective is to determine whether to participate in ArenaCo's private proposal to build and operate the Seattle Arena for NBA and NHL home teams. While the City and County could decide to pursue participation in a project to build and operate such an arena at a location different than the ArenaCo site, including the Memorial Stadium or Key Arena sites considered in this Environmental Impact Statement (EIS), no proposal for the City and County to participate in such a project currently exists other than ArenaCo's proposal to build and operate the Arena on its South Downtown (SoDo) property.

2.2 Site and Site Vicinity

The proposed site is located within SoDo in the Stadium Transition Area, south of Safeco Field and CenturyLink Field. SoDo includes the areas of Pioneer Square, the International District, the Stadium Transition Area (Overlay District) and the North Duwamish neighborhood.

See Figure 2-3 Site Vicinity – Alternatives 2 and 3.



Source: Google Earth Pro

Figure 2-3

Site Vicinity Alternatives 2 and 3

Job No. 33763922

Warehouses, small businesses, and parking now occupy the site of the Proposed Seattle Arena. The site is surrounded by similar uses. Newer development has occurred in parcels to the west of 1st Avenue S. Newer uses include midrise office and mixed commercial uses with street-front retail and restaurants. To the north of the site is the Safeco Field parking garage. Recently, land uses in the immediate vicinity are trending away from warehouse to office, light manufacturing with storefront retail, and other small businesses associated with Safeco Field, and CenturyLink Field and Exhibition Center.

BNSF Railroad and Amtrak facilities are located to the east of the existing stadiums and the Proposed Seattle Arena site. Facilities include passenger and freight rail lines as well as several structures that support those activities. BNSF's loading yard is located one block to the west. Port of Seattle container shipping facilities are located west of the loading yard.

2.3 City of Seattle Permitting

2.3.1 Zoning

The Proposed Project site is located within the Stadium Transition Area Overlay zoning district. The underlying zoning of the Proposed Seattle Arena site is Industrial-Commercial, 85 foot height limit (IC-85). Spectator sports facilities are permitted outright in the zone. Within the Stadium Transition Area Overlay District, maximum height limits of the underlying zone are not applicable to spectator sports facilities.

The eastern portion of the Proposed Seattle Arena site (the portion along the railroad right-of-way) extends into General Industrial 2 (IG2) U/85 zoned land.

The applicant has proposed to use either existing off-site parking or to build new off-site attendee parking on the South Warehouse Site south of Holgate Street. Per SMC 23.74.008, footnote 1: "Parking required for a spectator sports facility or exhibition hall is allowed and shall be permitted to be used for general parking purposes or shared with another such facility to meet its required parking."

The Proposed Project is going through design review, and consistency with Land Use Code development standards will be reviewed as part of the review of the Master Use Permit (MUP) application.

2.3.2 Permitting Process

Before the project can be approved for construction, the Department of Planning and Development (DPD) must complete the SEPA compliance process and decide if the project complies with development regulations. The project must also be reviewed by the Downtown Design Review Board (DRB), and a proposed street vacation must be approved by the Seattle City Council.

A pre-submittal conference with DPD occurred on October 11, 2012, and an application for Early Design Guidance (EDG) was filed with DPD on October 18, 2012. EDG is the first step in the

Design Review process. During EDG, the project's designers describe their analysis of the urban context and explore at least three concept design alternatives that fit within the height and density the Land Use code allows for the site. In its review, the Board decides which of the City's design guidelines are the most important for the developer to address in the project's design. There have been four EDG meetings with the Downtown DRB: November 27, 2012, December 11, 2012, January 22, 2013, and March 5, 2013. On April 30, 2013, the applicant filed a Master Use Permit (MUP) application with more detailed drawings that incorporate the early design guidance. There have been two meetings with the Design Review Board as part of the recommendation phase of review, the first on August 6, 2013 and the second on September 17, 2013. The project will continue through Design Review. The MUP cannot be issued until both the SEPA and Design Review processes are complete and the City Council has made a decision whether to approve the proposed street vacation of a portion of Occidental Avenue S.

The proposed street vacation of a portion of Occidental Avenue S. must be reviewed by the Seattle Design Commission before the vacation is considered by the City Council. The proposal has been reviewed at six Design Commission meetings since 2012. The Commission's final review and vote will occur after the Final EIS is published in May 2015. The City Council is anticipated to consider the street vacation in summer 2015.

2.4 Project Activities

2.4.1 Construction

Construction of the proposed Arena is anticipated to take approximately two years after permit issuance. Construction activities would begin with the demolition of 8 existing structures of approximately 128,087 sf, followed by site preparation and foundation construction. See each element of the environment in Section 3 for a description of construction impacts and proposed mitigation measures.

2.4.2 Operation

The following event schedule has been anticipated for the new Arena. Arena events in conjunction with other events are shown graphically on Figure 2-4:

- **NBA Basketball –** 41 home games between November and mid-April; up to 16 home playoff games in April and May, and pre-season games in October.
- **NHL Hockey –** Similar to NBA; with a new Arena, the NBA and NHL seasons would generally run concurrently with additional NHL games occurring in September.
- **WNBA Basketball –** 17 home games from mid-May to late September, including playoffs.
- **Other Arena Events –** There is also the potential for an increased number of events unrelated to the professional sports teams. Based on discussion with the proponent a

total of 60-65 additional events were assumed to occur, distributed throughout the year, with a slightly higher concentration in November and December.

2.5 Alternatives

SEPA requires an EIS to discuss reasonable alternatives to a proposed project. When a project is for a "private project" on a specific site, the EIS is required "to evaluate only the no-action alternative plus other reasonable alternatives for achieving the proposal's objective on the same site." SMC 25.05.440 (D) (4).

A "private project" is defined as "any proposal primarily initiated or sponsored by an individual or entity other than an agency." SMC 25.05.780. Because the proposed Arena was initiated by a private entity, ArenaCo, would be financed primarily by ArenaCo, and would be constructed and operated by ArenaCo, it is a private project for purposes of the alternatives analysis required by SEPA.

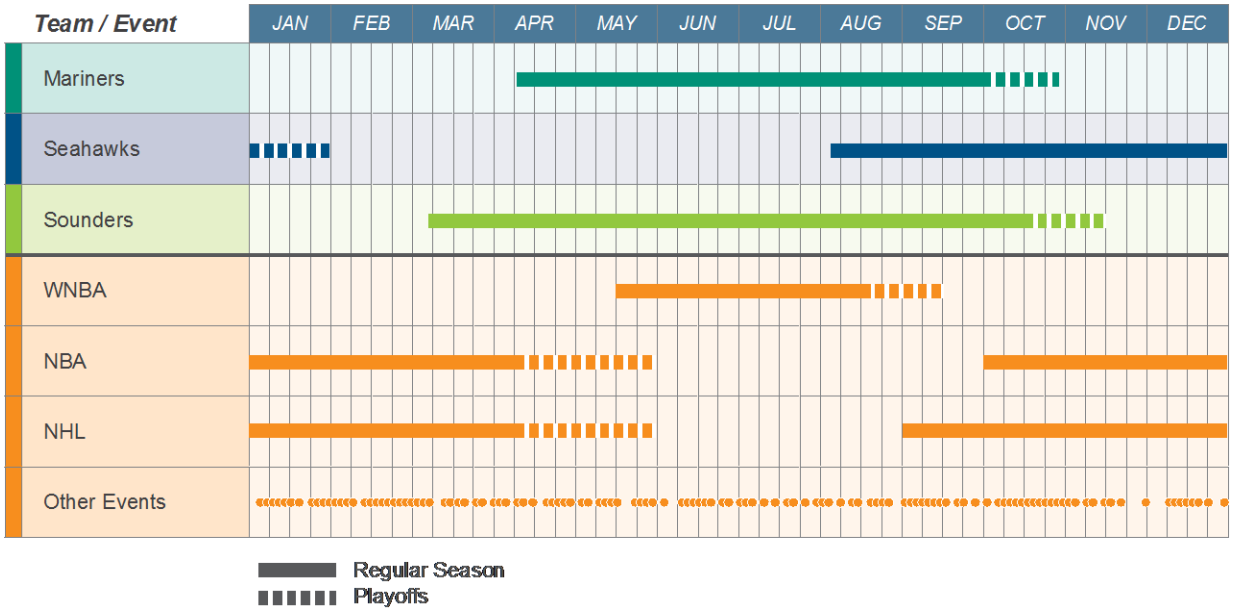


Figure 2-4
Anticipated Event Calendar

As stated above, the onsite alternatives must be reasonable alternatives that achieve the proposal's objective. ArenaCo's objective is to build and operate a spectator sports facility on property it owns in Seattle's SoDo neighborhood. The facility is to accommodate NBA and NHL home teams in Seattle. This EIS includes analysis of two onsite alternatives.

ArenaCo proposed that the City and County help fund the Arena and participate in development of the Arena in other ways. To help inform future City and County decisions whether to participate in the ArenaCo private project, the City and County decided to compare the potential environmental impacts of ArenaCo's Proposed Project in SoDo with the potential environmental impacts of building an arena at other locations. The additional locations are the KeyArena site at the Seattle Center and Memorial Stadium site adjacent to Seattle Center.

Analysis of those two locations is included in this EIS, in addition to the two onsite alternatives in SoDo and a "no action" alternative.

As noted above, while the City and County could decide to pursue participation in a project to build and operate such an arena at a location different than the ArenaCo site, including the Memorial Stadium or KeyArena sites considered in this EIS, no proposal for the City and County to participate in such a project currently exists other than ArenaCo's proposal to build and operate the Arena on its South Downtown (SoDo) property.

The EIS includes an evaluation of the following alternatives:

- **Alternative 1 – No Action Alternative**
- **Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena**: 20,000-seat spectator sports arena to be located at 1700 – 1st Avenue S.
- **Alternative 3 – Stadium District 18,000-Seat Arena**: 18,000-seat spectator sports arena to be located at 1700 – 1st Avenue South.
- **Alternative 4 – KeyArena 20,000-Seat Arena**: demolish the KeyArena at Seattle Center and replace it with a 20,000-seat spectator sports arena.
- **Alternative 5 – Memorial Stadium 20,000-Seat Arena**: demolish the Seattle School District's Memorial Stadium and replace it with a 20,000-seat spectator sports arena.

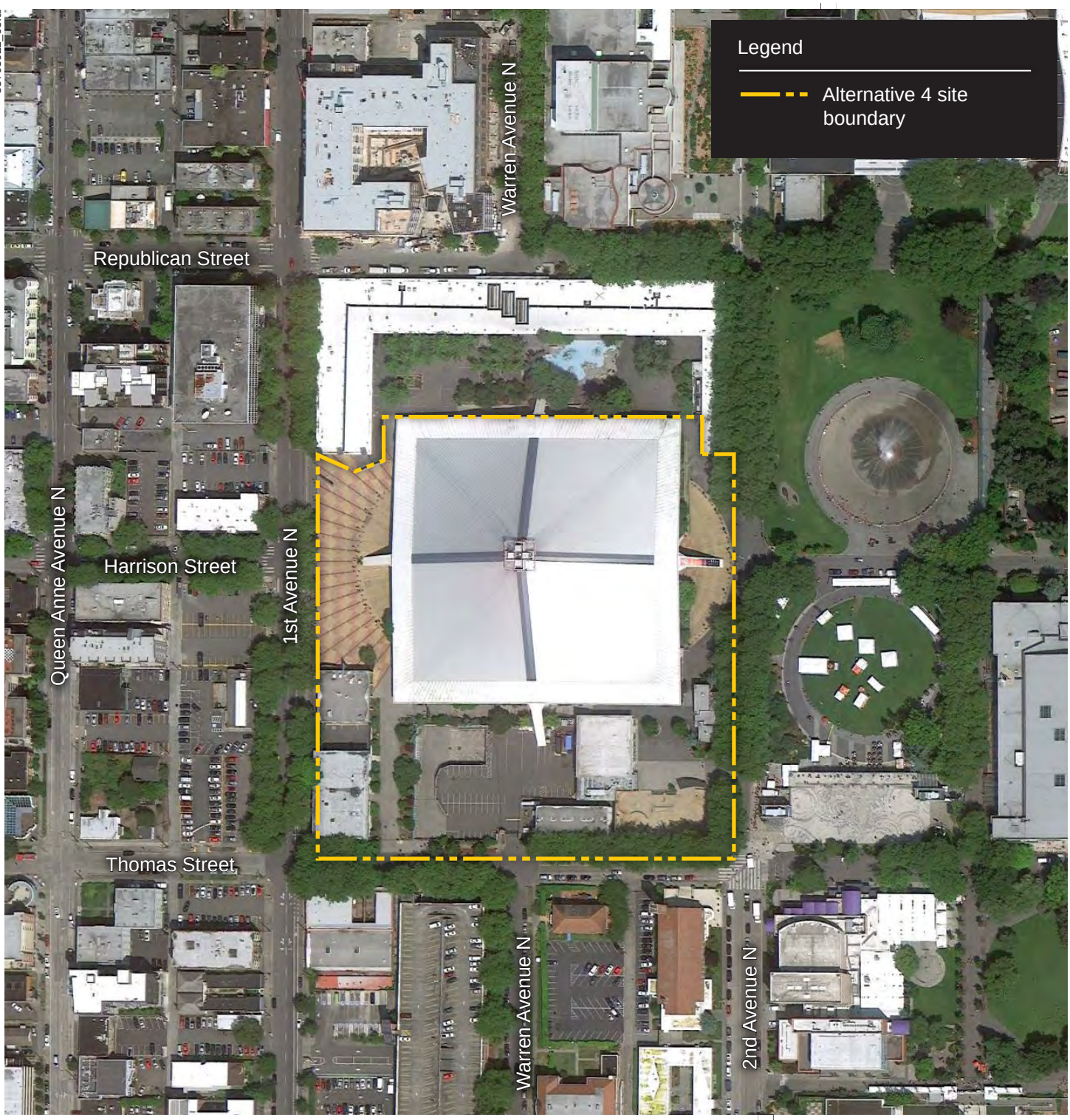
The locations of the action alternatives are shown on Figures 2-3, 2-5, and 2-6.

2.6 Alternatives Considered But Not Advanced

In addition to the five alternatives to be analyzed in the EIS, the City and County considered whether to evaluate other locations for an arena for comparative purposes, but due to various constraints such as minimum parcel size, zoning, and accessibility, none of those locations were deemed to be appropriate for further study. The other locations that were considered but not advanced for further analysis in this EIS are described in Appendix A.

The City and County also considered whether remodeling the KeyArena would be an option. Between 2004 and 2008, Seattle Center studied how the KeyArena could be remodeled to meet current NBA standards. There have been diverse opinions by various NBA ownership groups as to whether this study, "*NewArena Imagine the Future*" successfully met current NBA building standards. Because the existing basketball seating bowl was to be retained, the proposal did not meet NHL standards. While the KeyArena could work as an interim facility for basketball and hockey, remodeling the KeyArena would not meet the project purpose or objective of building and operating an arena for Seattle NBA and NHL home teams.

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Source: Google Earth Pro

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Scale in Feet

Figure 2-5

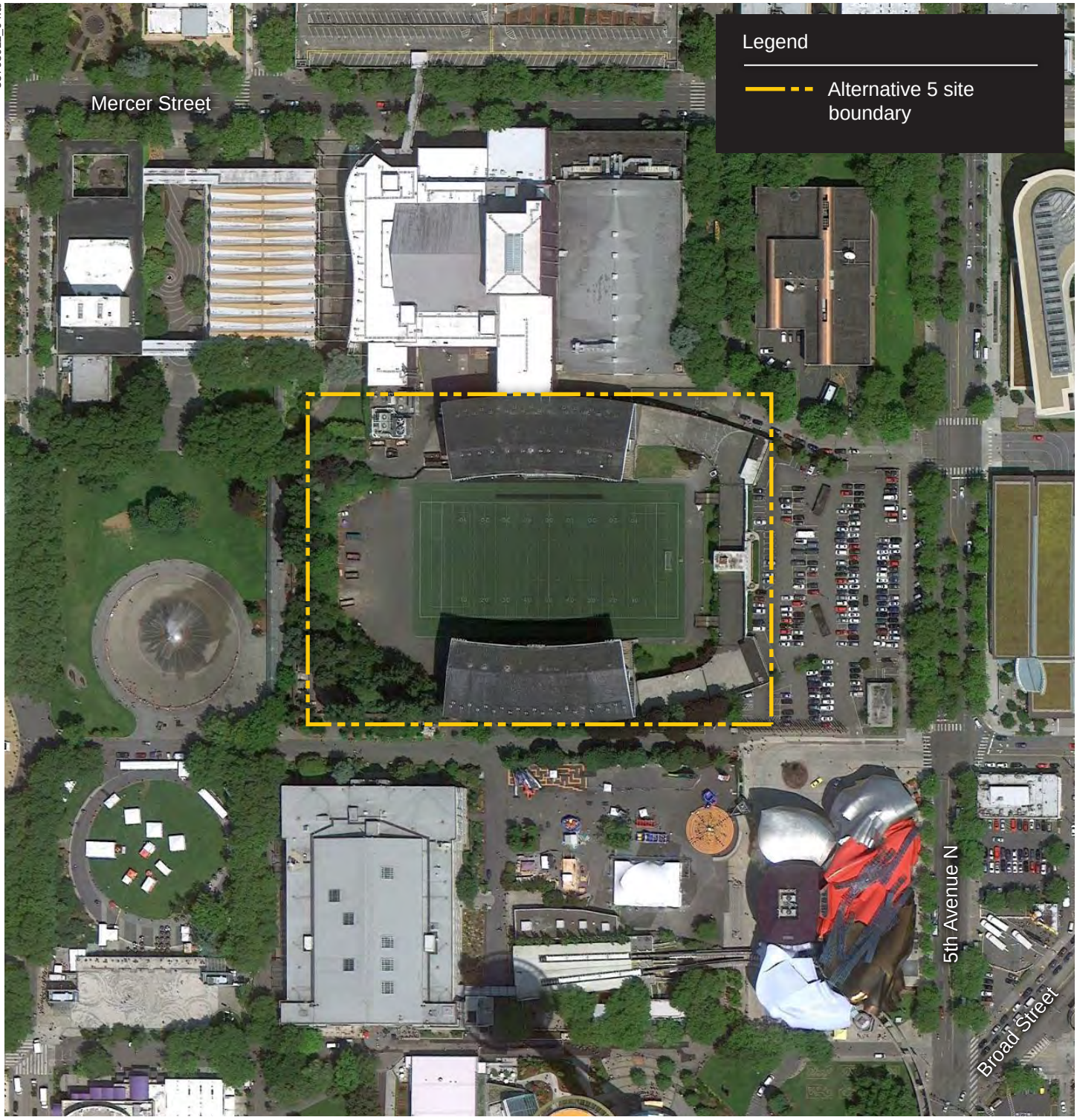
Site Vicinity Alternative 4

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Seattle Arena
Final EIS

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Source: Google Earth Pro

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Scale in Feet

Figure 2-6

Site Vicinity Alternative 5

Job No. 33763922

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2.7 Benefits and Disadvantages of Delaying Project Implementation

If ArenaCo chose to delay construction of the Arena, potential benefits would include:

- Delaying construction impacts and perhaps avoiding conflicts with other construction projects occurring in the SoDo Seattle area.
- Allowing more certainty regarding future traffic conditions resulting from planned improvements to surrounding roadways (SR 99 Bored Tunnel) and transit (Sound Transit Link light rail and additional Metro routes).

The disadvantage of delaying construction may be to delay or reduce the likelihood of the presence of an NBA and NHL team in Seattle, with the resulting loss of the jobs and economic stimulus that major sports facilities can provide.

2.8 2018 Operation Impacts

At the time of publication of the Draft EIS in August 2013, it was anticipated that the Seattle Arena would be completed by 2016 prior to completion of the Waterfront Seattle project and Link Light Rail (Northgate, East, and Lynnwood). The Draft EIS included an analysis of potential traffic impacts for 2016 – 2018, the period of time between the opening of the Arena and the completion of major construction projects. The year of opening for the Arena is now estimated to be 2018. This EIS includes a review of potential transportation impacts for 2018 when all of the major infrastructure improvements (Alaskan Way Viaduct, Waterfront Seattle, SR 520 Bridge Replacement, Mercer Corridor, and Link Light Rail (University) would be substantially complete. The discussion of interim operational impacts has been eliminated from this EIS and it is no longer relevant.

Section 3 - Environmental Analysis

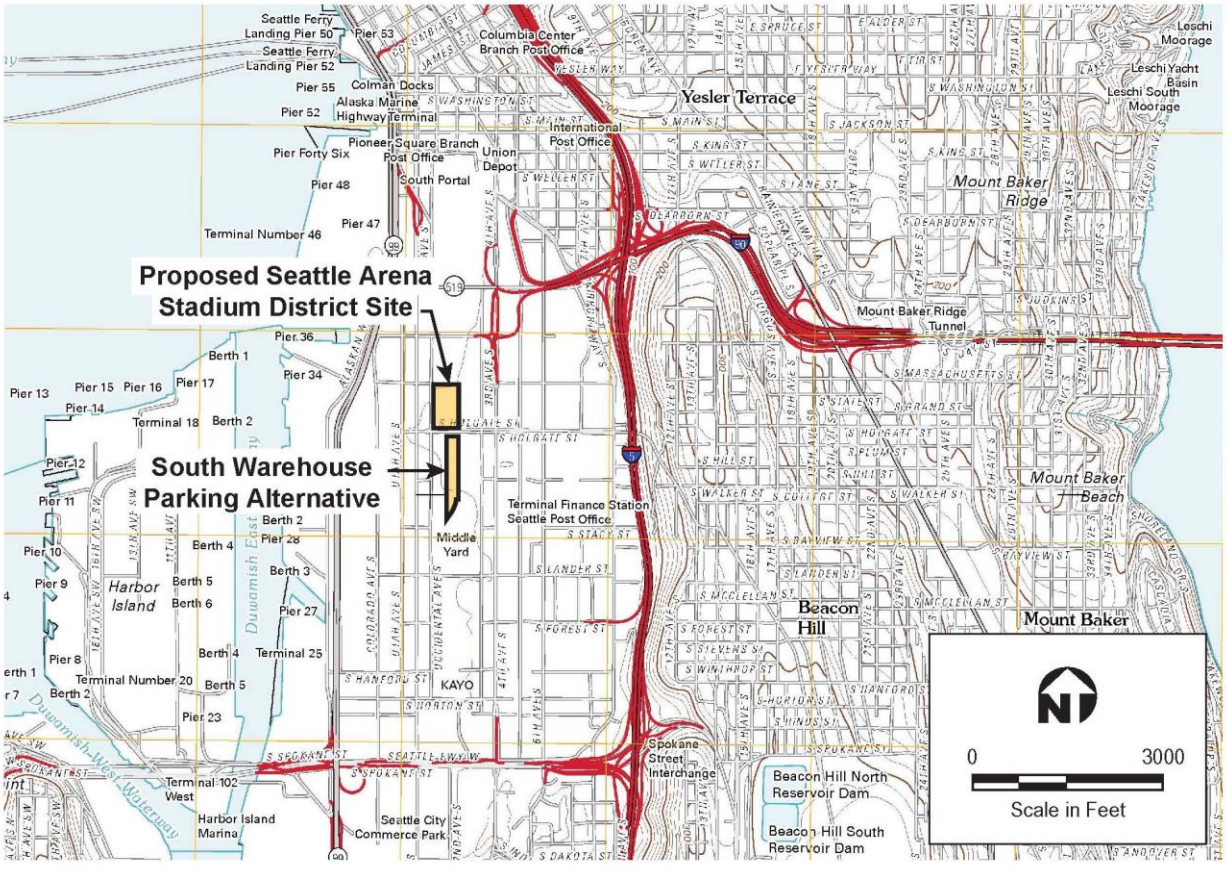
3.1 Geology and Soils

3.1.1 Stadium District Alternatives - Alternatives 2 and 3

3.1.1.1 Affected Environment

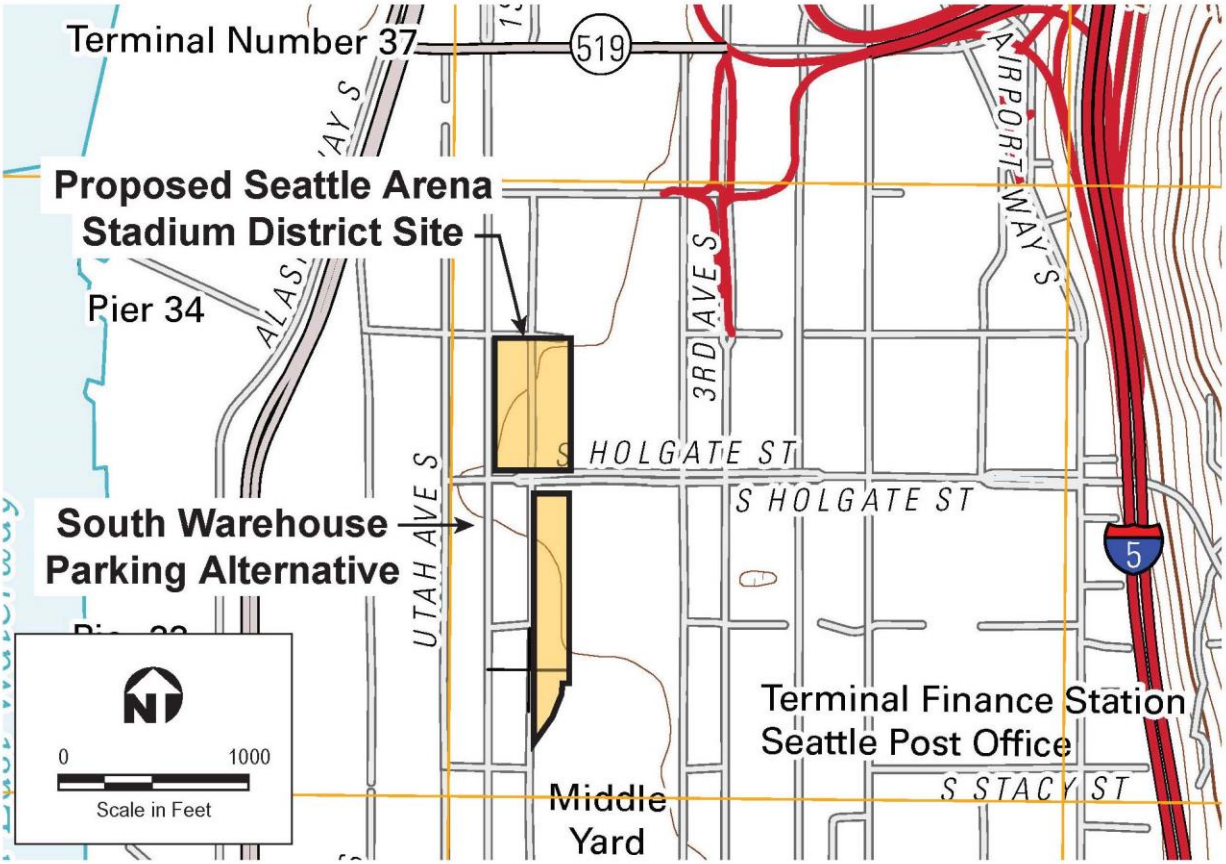
Topography

The site of the Proposed Project (Alternative 2) and Alternative 3 is located within the area of Seattle that was formerly tidelands until it was filled in the early 1900s. As shown on Figures 3.1-1 and 3.1-2, the topography of the general area and project site is flat-lying with a very gentle downward gradient of less than one percent to the west, in the direction of Elliott Bay.



Source: USGS 7.5-minute topographic quadrangle, Seattle South, Washington, 2011

Figure 3.1-1
Regional Topography



Source: USGS 7.5-minute topographic quadrangle, Seattle South, Washington, 2011

Figure 3.1-2

Stadium District Site Topography

Geology and Soils

The geology within the Puget Sound region is primarily the result of glaciation that occurred between about 2 million to 10,000 years ago, which is known as the Pleistocene Epoch. Upwards to several thousands of feet of ice were present at that time. The glaciation resulted in both the scouring of the landscape and the deposition of glacial materials, which includes silt, sand, and gravel with occasional cobbles and boulders. Within the general area of the project site, the depth to bedrock is on the order of hundreds of feet below the ground surface (Yount et al. 1985).

The project site is located within an area of extensive in-filling resulting from the re-grading of the downtown area of Seattle more than 100 years ago, during which time millions of cubic yards of hydraulic fill were transported to fill the former tidelands. In addition, dredged soil from the Duwamish River and Elliott Bay may have also been deposited within the area of the project site.

To illustrate the amount of fill placement, Figure 3.1-3 shows the historic shoreline and the former edge of the tidelands at the low water line with respect to the project site. The photographs presented on Figures 3.1-4 through 3.1-6 further show the conditions within the general project site area prior to the fill placement.



Source: Souvenier Guide of the Alaska-Yukon-Pacific Exposition, 1909

Figure 3.1-3
Historic Shoreline of Elliott Bay



Figure 3.1-4
Beacon Hill and First Hill from Tideflats, ca. 1904 (exact location unknown)

(Source: Ashahel Curtis ca. 1904; University of Washington Libraries, Special Collections Division)

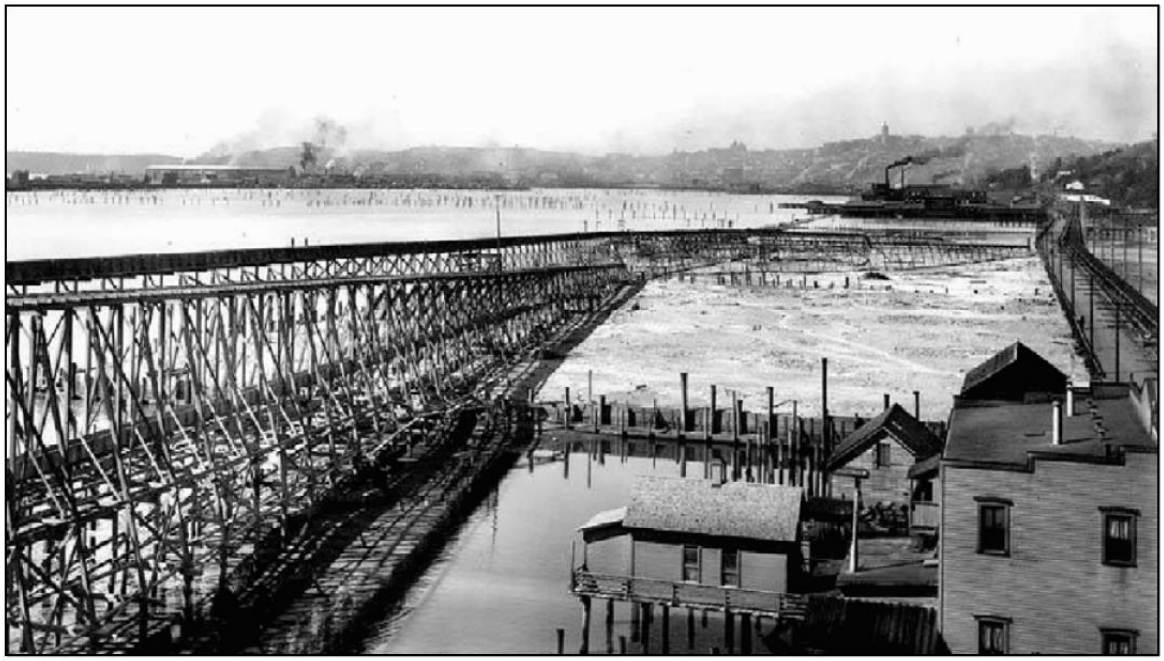


Figure 3.1-5

Elliott Bay in 1901 Before Tidelands Were Filled

(Source: Ashahel Curtis 1901; University of Washington Libraries, Special Collections Division)



Figure 3.1-6

Seattle Tideflats from Beacon Hill, ca. 1895-1898

(Source: Seattle Municipal Archives 130374)

The characteristics of geology within the area of and underlying the project site are based on historic and current (Hart Crowser 2013) subsurface explorations, geotechnical laboratory classification of soil samples, and field observations.

Historical boring logs were completed within the immediate vicinity of the project site and were reviewed by the Washington Department of Natural Resources Subsurface Geology Information System (WADNR 2013). In addition, two borings and two cone penetrometers were advanced on the project site. The borings were drilled to depths of about 155 and 157 feet below the ground surface, and the cone penetrometers were advanced to depths of about 117 and 135 feet below the ground surface.

Geophysical data in the form of downhole shear wave velocity measurements were also collected. Vibrating wire piezometers were installed in the two borings in order to measure the depth to groundwater.

The locations of both the nearby historical and onsite recent explorations are presented on Figure 3.1-7. As shown on Figure 3.1-8, which is a conceptual geologic cross section, the subsurface explorations completed on the project site encountered four general soil units.

Starting at the ground surface, the four units of soil composition located on or within the vicinity of the Stadium District site are:

Loose Fill: This unit typically consists of very loose to medium dense sand, silt, and gravel. Wood debris and abandoned timber piles may be encountered in this unit. The thickness varies but is generally 10 to 20 feet.

Loose to Medium Dense Sand and Silt: This unit is generally characterized as inter-bedded alluvial and estuarine deposits. Alluvial deposits typically consist of very loose to medium dense sand to silty sand. Estuarine deposits typically consist of very soft to stiff silt to very sandy silt but may locally include clay. Abandoned timber piles may be encountered in this unit as well. This unit extends to the glacial soils noted below.

Very Dense Sand and Gravel: This unit of glacial soil typically consists of dense to very dense sand and gravel and may include cobbles and boulders. The expected depth to this unit is about 100 to 140 feet below the existing ground surface. These soils are glacially over-consolidated and occasionally cemented and are very strong.

Hard Silt and Clay: This unit of glacial soil typically consists of glacially over-consolidated, hard silt and clay. This unit has a much lower permeability than the overlaying granular soils. The geologic unit was not encountered in all of the subsurface explorations so the unit may not be continuous across the site.

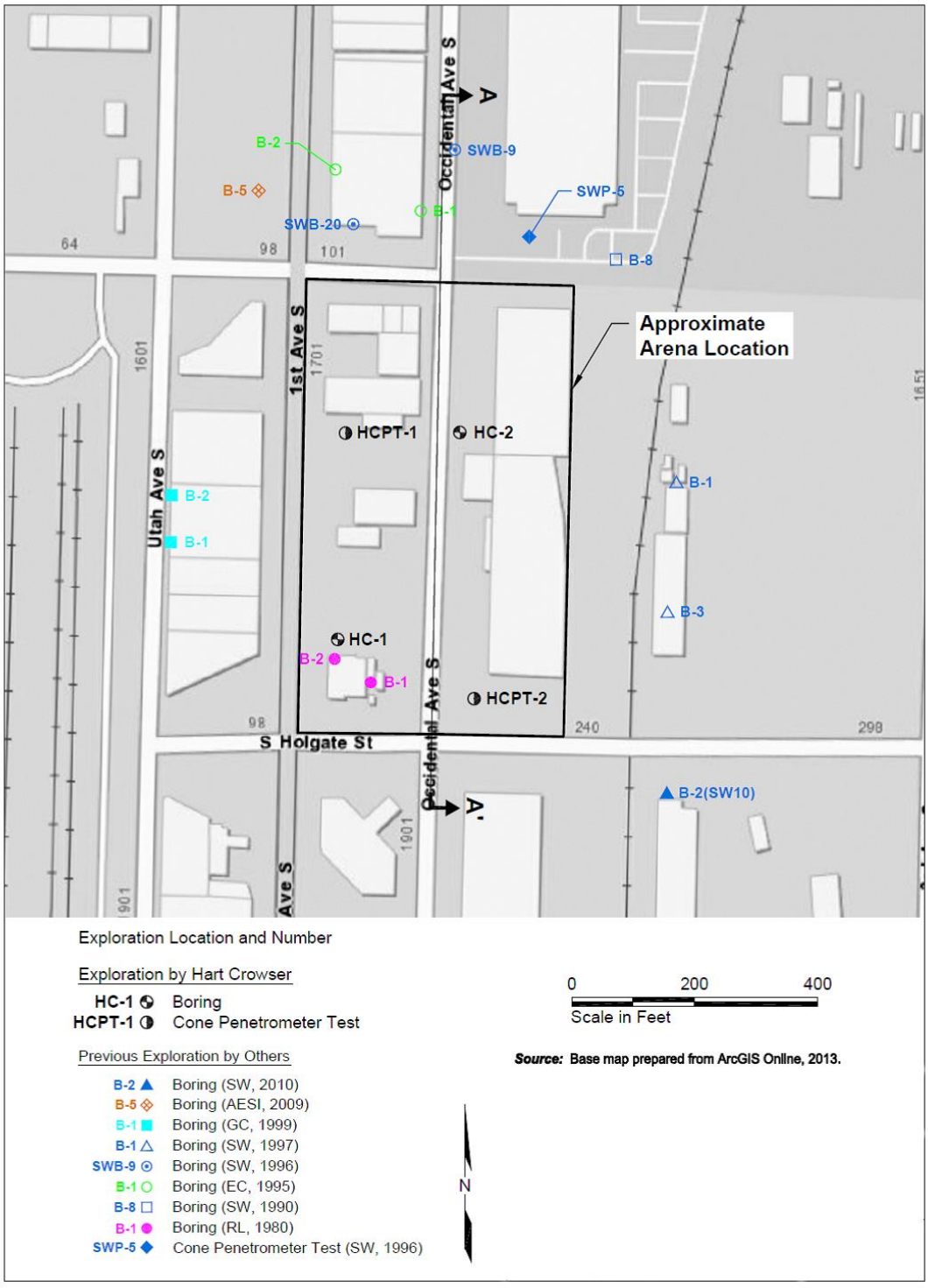


Figure 3.1-7

Site and Exploration Plan

(Source: Hart Crowser 2013)

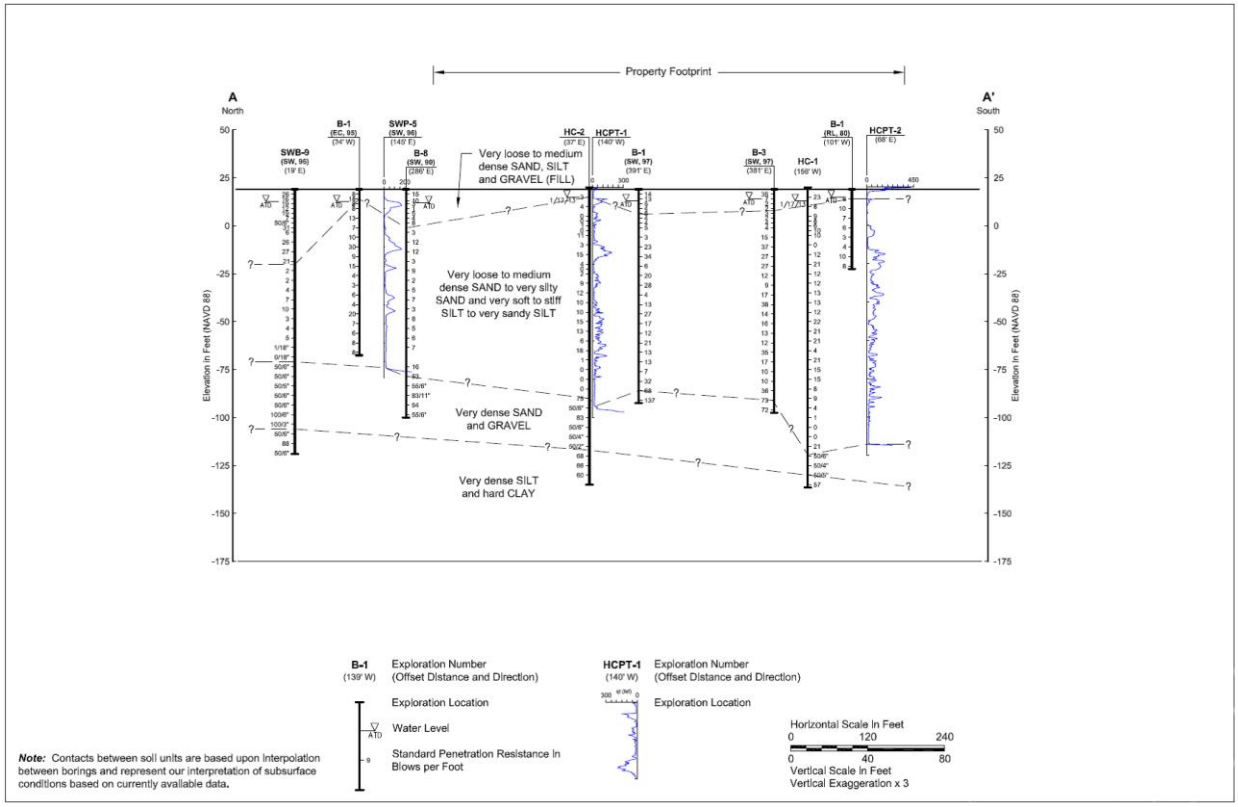


Figure 3.1-8
Conceptual Geologic Cross-Section

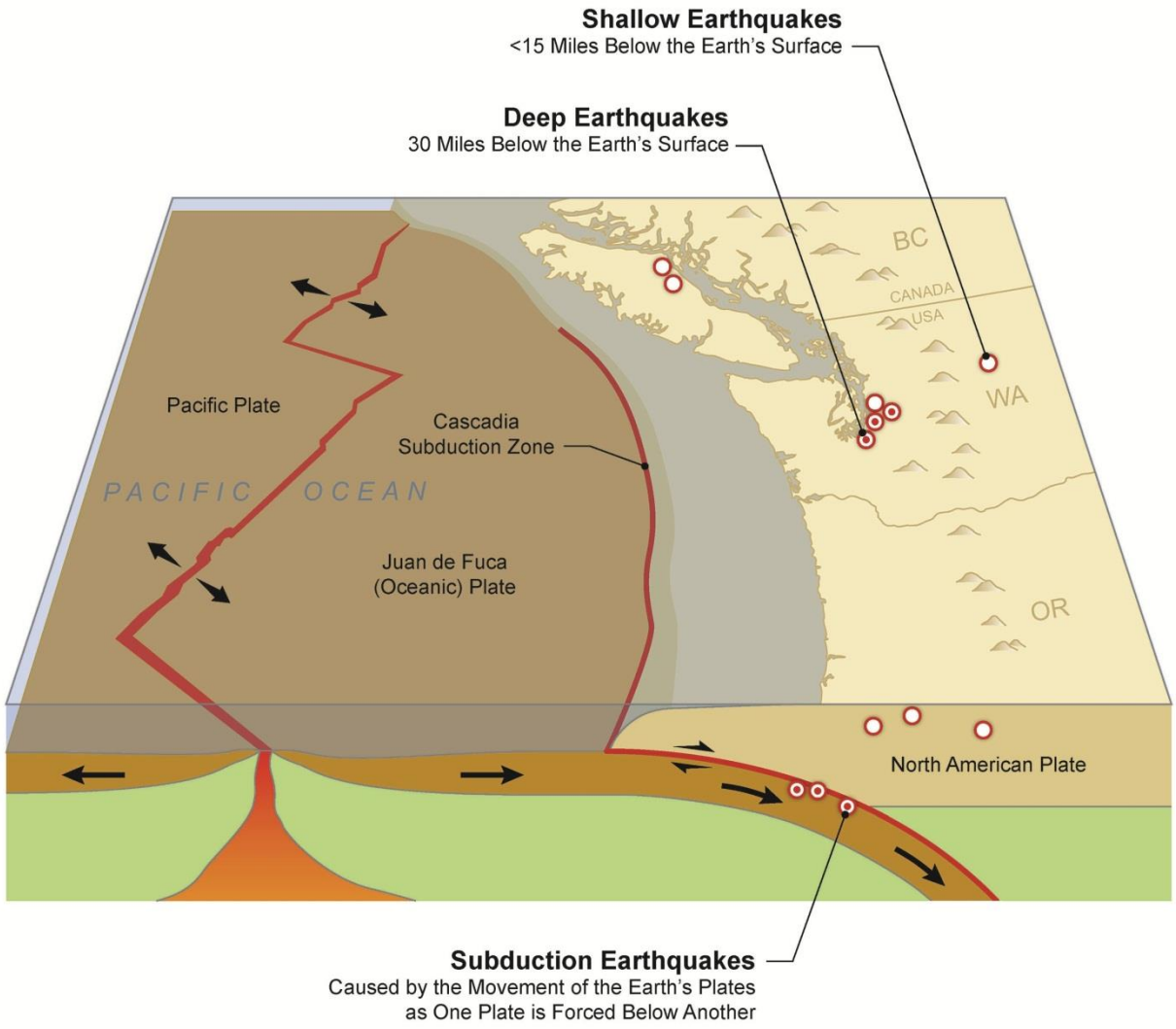
As noted earlier, vibrating wire piezometers were installed in the two exploratory borings. The groundwater levels were measured in January 2013 and found to be at about five to eight feet below the ground surface.

Details of the conditions observed at the subsurface exploration locations are shown on the boring logs. The results of geotechnical laboratory testing are included in Appendix B and should be referred to for specific information.

Geologic Hazards

The Pacific Northwest is seismically active. As shown on Figure 3.1-9, Seattle is located to the east of the Cascadia Subduction Zone, which is where the Juan de Fuca Plate is plunging below the North American Plate. Earthquakes occur as a result of relative plate movement.

The most recent significant earthquake within the Seattle area occurred in 2001. But even more significant earthquakes have occurred within the past 100 to more than 1,000 years. The earthquakes occur at varying depths below the ground surface and have been associated with physical changes to the ground surface in the form of fault rupture, liquefaction and lateral spreading, as well as tsunamis or tidal waves and seiches.



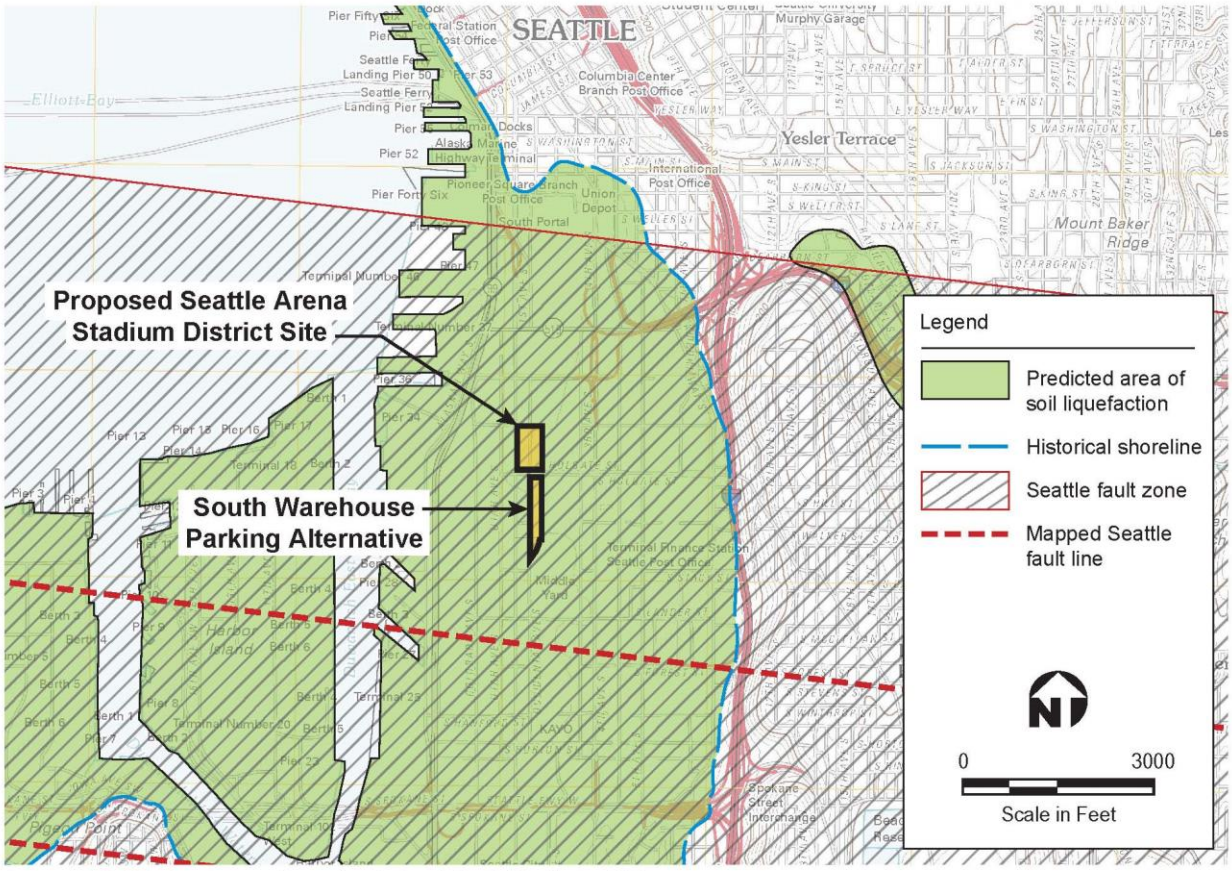
Source: Adapted from Troost (2003)

Figure 3.1-9

Potential Seismic Source Zones in the Pacific Northwest

Fault Rupture

As shown on Figure 3.1-10, the site of the Proposed Project (Alternative 2) and Alternative 3 is about one mile north of the mapped limits of the Seattle Fault (USGS 2012) but within the area noted as the Seattle Fault Zone (Troost 2005). Based on the review of existing information, the probability of fault rupture affecting the proposed building structure during its design life of 30 years was considered to be low due to the low recurrence interval of fault movement (on the order of hundreds to thousands of years), the width of the fault zone, and the relatively deep bedrock.



Source: USGS 7.5-minute topographic quadrangle, Seattle South, Washington, 2011

Figure 3.1-10
Mapped Seattle Fault Line

Liquefaction

Liquefaction is a condition where loose, granular, saturated soil behaves like quicksand when an earthquake occurs. As depicted on Figure 3.1-10 (showing subduction zone, plates, Seattle Fault Zone and predicted area of liquefaction), the site soils are susceptible to liquefaction. It is estimated that about one to two feet of liquefaction-induced ground settlement could occur following a Maximum Considered Earthquake (MCER) event (Hart Crowser 2013).

In addition, liquefaction theoretically could occur to a depth of about 80 feet (Hart Crowser 2013). However, observations and the analysis of damage in past earthquakes suggest that lateral deformation and instability effects of liquefaction generally decrease as the depth of a liquefiable layer increases. In addition, the engineering solutions to fully address deep liquefaction are not considered practical and cost-effective.

Lateral Spreading

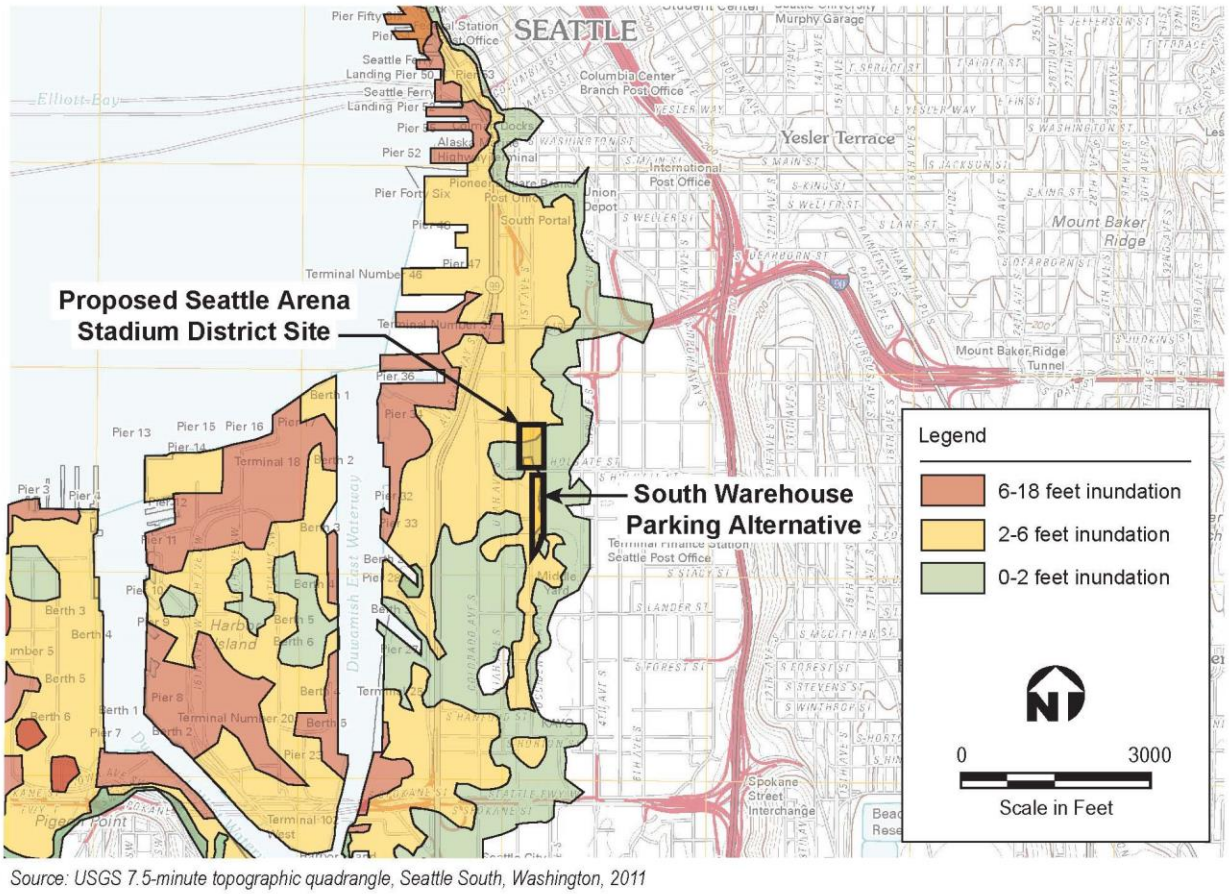
Lateral spreading is ground movement that occurs laterally as a result of liquefaction or reduced soil strength within or under a slope during an earthquake. Because the project site

and surrounding areas are generally flat, and the shoreline is protected and supported by retaining structures hundreds of feet from the site, it is thought that the lateral spreading hazard is low.

Tsunamis and Seiches

Tsunamis and seiches are water waves that are created by an earthquake. Tsunamis or tidal waves occur when large volumes of rock or soil are displaced on the ocean bottom during the earthquake. In comparison, seiches involve the oscillation of the water from shaking of the earth.

As shown on Figure 3.1-11, the site of the Proposed Project (Alternative 2) and Alternative 3 is mapped as being within a tsunami inundation zone and indicates that the project site has a potential inundation depth of up to about 6 feet. However, the risk of tsunami inundation is expected to be low given the relatively low frequency of large earthquakes along the Seattle Fault. Also, there would likely be adequate warning to evacuate the project site if a large tsunami from a distant source were predicted.



Source: USGS 7.5-minute topographic quadrangle, Seattle South, Washington, 2011

Figure 3.1-11
Tsunami Inundation Zone

Earthquakes may also cause seiches to occur in lakes, bays, and large rivers. However, the closest body of water to the project site is Elliott Bay, which is approximately one-half mile west of the project site. It is considered highly unlikely that an earthquake-induced seiche would cause flooding of the project area and site.

Erosion and Enlargement

Erosion is the process whereby the earth is worn away by the action of water, winds, waves, etc. In contrast, enlargement is the process whereby land mass is added or an area is in-filled, either as the result of erosion (such as at the mouth of a stream) or through human-related activities.

Based on field observations and observations made during a geotechnical engineering investigation (Hart Crowser 2013), the soil at the site of the Proposed Project (Alternative 2) and Alternative 3 is predominantly fine-grained and susceptible to erosion.

As described above under Geology and Soils, the site of the Proposed Project (Alternative 2) and Alternative 3 is located within an area of extensive in-filling resulting from the re-grading of the downtown area of Seattle more than 100 years ago during which time millions of cubic yards of hydraulic fill were transported to fill the former tidelands.

3.1.1.2 Impacts of the No Action Alternative at Alternative 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new Arena. There would be no direct effects to geology or soils.

3.1.1.3 Impacts of Alternatives 2 and 3

Key Foundation-Related Design Elements

The Proposed Project (Alternative 2) and Alternative 3 would include the following key foundation-related elements and options:

- Site preparation to include demolition and removal of the existing structures
- Shoring / support of excavation options to allow for the foundation-related excavations to a depth of up to 20 feet below the present ground surface. Options considered include:
    - Secant pile (overlapping drilled shafts) / slurry wall cutoff (overlapping rectangular panels) shoring to a depth of about 125 to 155 feet across the site
    - Soldier piles and lagging (H-piles installed in drilled holes filled with concrete and spaced along the site perimeter with wood lagging placed between the piles to retain the soil)

- Sheet piles (continuous, interlocking, steel sheets that are driven along the site perimeter to retain the soil)
- Ground freezing shoring (uses onsite refrigeration facilities and pipes to freeze a block of soil to allow excavation adjacent to the frozen soil)

- Foundation support options that are being considered include:
  - Deep foundations, such as pipe piles driven to a depth of about 125 to 155 feet below the ground surface, supporting a structural concrete slab
  - A structural slab supported by stone columns, driven to depth of about 40 to 60 feet below the ground surface, combined with ground improvement

Construction Impacts

The construction related to the Proposed Project (Alternative 2) or Alternative 3 would likely result in several direct effects with respect to the geology and soils. These effects would have potentially adverse environmental consequences if they are not appropriately identified, evaluated, and mitigated. Potential direct effects for the Proposed Project (Alternative 2) or Alternative 3 include the following (impacts related to groundwater are presented in Section 3.3 Water):

- The demolition of the structures would result in the generation of concrete and other building materials. This material would have to be processed for reuse or disposed of as construction debris. The quantities of construction debris are unknown but could potentially be reprocessed onsite or as part of other ongoing projects in the area. If the concrete and other building materials cannot be re-processed, it will be disposed in landfills, reducing the available volume at the landfills.
- The foundation-related excavations would include activities that could result in sediment mixing with stormwater, thereby creating turbid water. Potential sources of turbidity include exposed soils related to excavations and foundation system installation, spillage from dump trucks, and the tracking of mud from equipment-related tires onto the roadway.
- The potential exists for encountering contaminated soils and groundwater during the construction. If encountered, the soil and / or groundwater would, depending on the contaminant concentrations, potentially require special handling, treatment, transport, and / or disposal at offsite locations. An investigation would likely be conducted prior to initiating the construction efforts in order to confirm the presence or absence of contamination.
- Drilled shafts may be planned for both preparing the site for excavations and foundation support of the proposed development. During construction of the drilled shafts, loosely compacted soil and fill materials (e.g., glacial soil, building materials, piling from before in-filling in the 1900s) could be encountered. Glacially-derived cobbles and boulders are

also known to exist in the glacial deposits encountered at depth. These materials may result in difficulties and delays during the construction.

- Underground utilities are present beneath and adjacent to the project site. If the proposed excavations for foundation-related elements and for the relocation of utilities are not adequately supported, then lateral and vertical movements of the ground supporting the utilities could occur. These movements could result in damage to buried utilities and to structures or roadways located adjacent to the excavations, if the amount of movement is excessive. Design studies would be conducted to evaluate the potential for these movements.

- Ground vibrations would likely occur during construction as a result of the use of heavy equipment during the demolition of existing structures, ground improvement activities, compaction equipment operations, and truck traffic. These vibrations could be annoying to individuals working or living within the area, possibly cause settlement of loose soils near the source of vibration, and / or potentially cause damage to nearby structures or utilities.

- An earthquake could occur during the construction, which would result in damage to the site in the form of liquefaction, ground settlement and / or damage to partially completed structures and would cause schedule delays. However, based on the earthquake recurrence interval, such an event is not considered likely.

- The construction related to Alternatives 2 and 3 would likely result in several direct effects with respect to erosion. For example, the foundation-related excavations would include activities that could result in sediment mixing with stormwater, thereby creating turbid water. Potential sources of turbidity include exposed soils related to excavations and foundation system installation, spillage from dump trucks, and the tracking of mud from equipment-related tires onto the roadway.

Operation

During the operation of the Proposed Project (Alternative 2) or Alternative 3, no direct effects to the geology, soils, and erosion are anticipated. However, the potential exists for an earthquake to occur during the lifetime of the Proposed Project or Alternative 3, which has the potential to damage the structure and other site features, such as underground utilities.

3.1.1.4 Mitigation Measures

The following measures could reduce or eliminate geological impacts (mitigation measures related to groundwater are presented in Section 3.3 Water):

- A detailed geotechnical investigation was conducted to understand the subsurface conditions in support of project design. Measures to mitigate long-term foundation settlement and seismic hazards were identified and include the following:

- Constructing the proposed structure on deep foundations that extend through the compressible soils to denser bearing material in order to mitigate foundation settlement.
- Designing the new structures according to relevant and appropriate seismic design methods to mitigate liquefaction and ground settlement.
- Improving site soils as necessary to reduce the risk of liquefaction and related seismic damage.
- Designing the new structure to meet or exceed earthquake loading requirements in the latest issues of the relevant and appropriate building codes.

- Implementing best management practices to mitigate adverse effects of sedimentation and erosion, and offsite migration of silt-rich soil and turbid water.
- Implementing vibration monitoring if necessary to prevent offsite adverse effects.
- Sampling and analyzing onsite soil and groundwater to determine the presence or absence of contamination. If contaminated soil and / or groundwater are encountered during the investigation and / or construction, and depending on the contaminant concentrations, the materials could potentially require special handling, treatment, transport, and / or disposal at offsite locations.

3.1.1.5 Secondary and Cumulative Impacts

Alternatives 2 and 3 would occur on a site that was the result of the cumulative disposal of fill during the early 1900s, which is currently susceptible to liquefaction during an earthquake. The construction of the foundation system for the Proposed Project (Alternative 2) or Alternative 3 would generally stabilize the site and limit future earthquake-related damage.

Secondary effects related to the geology and soils would occur either farther from the project site footprint and / or later in time. Potential secondary effects for the Proposed Project (Alternative 2) or Alternative 3 include:

- Aggregate in the form of sand and gravel would be needed to mix with cement to create concrete and for use in onsite fills. The sand and gravel are sourced from gravel pits located within the Puget Sound area. The use of aggregate on the project would reduce the supplies of material that might be used elsewhere for other projects. However, the quantity required for the construction of the Proposed Project (Alternative 2) or Alternative 3 would be considered minimal.
- The onsite silt-rich soil would be exposed to the weather during the proposed excavations and foundation construction. The exposed soils could be transported offsite. In addition, spillage from dump trucks and soil on truck tires could also result in similar consequences beyond the project site.

- Trucks would be transporting heavy equipment and / or construction materials to the project site and to remove excess soils and construction debris. The trucks could cause deterioration of nearby streets and roadways if the loads exceeded the strength of the roadway base material, leading to cracking or rutting of pavements.

No secondary effects are anticipated during the operation of the Proposed Project (Alternative 2) or Alternative 3 with respect to the geology and soils.

3.1.1.6 Significant Unavoidable Adverse Impacts

Effects considered to be significant, unavoidable and adverse are those that might require new locations for the project or the use of a different method of supporting the new structure. This environmental assessment determined that no direct or indirect effects of the Proposed Project (Alternative 2) or Alternative 3 related to the geology and soils would be significant, unavoidable and adverse.

The most important issue related to the geology and soils for Alternatives 2 and 3 is the potential for seismic loading. The above-mentioned appropriate methods would be implemented to mitigate adverse consequences of seismic loading, including mitigation for liquefaction potential and densification of the soil through use of ground improvement methods, if determined to be necessary. Designers would follow relevant and appropriate design requirements for seismic loading during the design of all project-related structures.

3.1.2 Seattle Center Area Alternatives - Alternatives 4 and 5

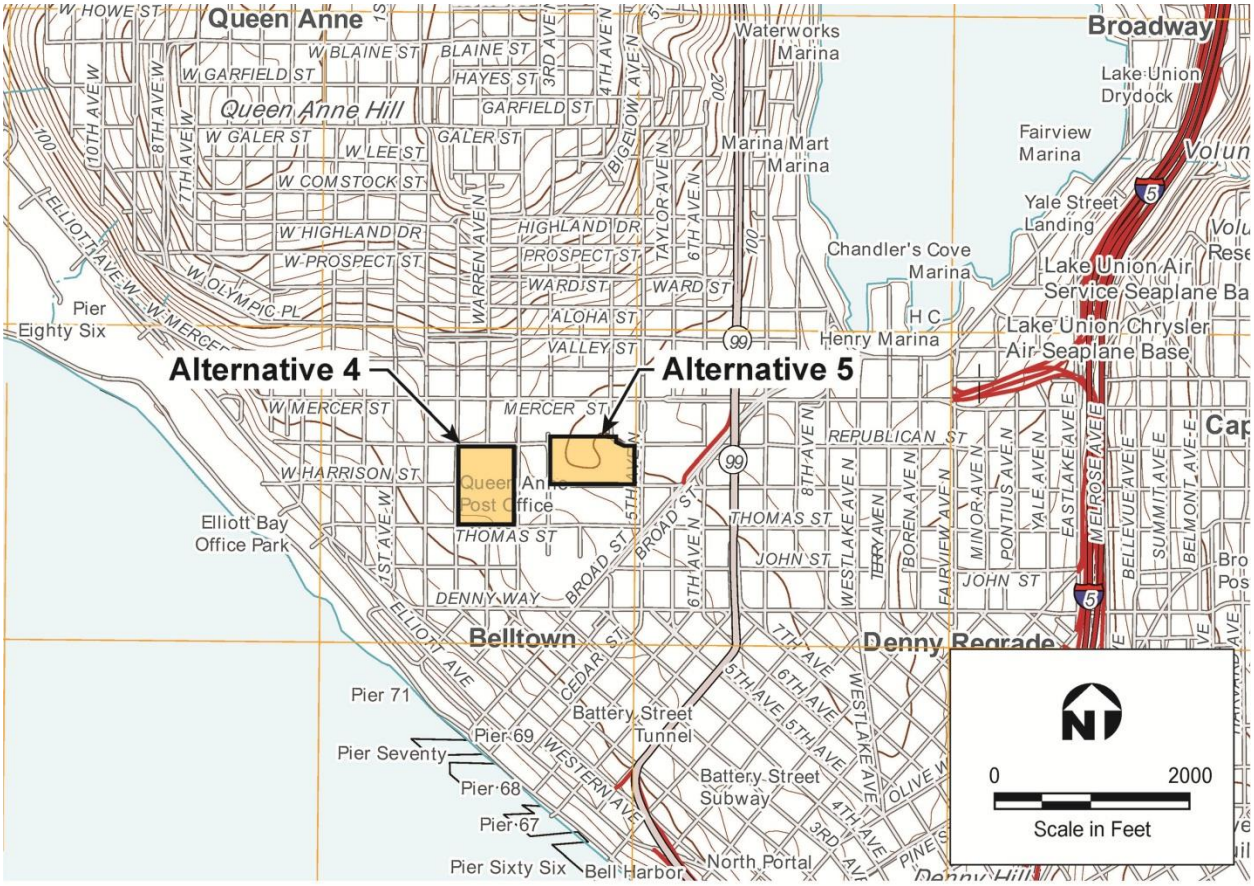
3.1.2.1 Affected Environment

Topography

The Seattle Center KeyArena site and the Seattle School District's Memorial Stadium are located north of the downtown Seattle core, within the area near the base of Queen Anne Hill. As shown on Figure 3.1-12 (Topography), the topography within the area surrounding the two sites is gently rolling, but is bound to the north by the relatively steep, south-facing slope that is associated with Queen Anne Hill.

Geology and Soils

Both the KeyArena site and the Memorial Stadium site are located within an area of re-grading that occurred more than 100 years ago; and served as a source of the soil used to fill the tidelands south of the downtown Seattle core. Earthworks were completed as part of the construction of the Memorial Stadium site in 1947 and then again during the expansion in about 1974. The KeyArena site was excavated when the facility was constructed in 1962, as part of the World's Fair.



Source: USGS 7.5-minute topographic quadrangles, Seattle North and Seattle South, Washington, 2011

Figure 3.1-12
North Downtown Topography

Geology

The characteristics of geology within the area of and underlying both the KeyArena site and the Memorial Stadium site is based on historical subsurface explorations within the nearby vicinity and existing literature. The geology at both sites is underlain by mostly glacial deposits of a mixture of silt, sand and gravel that generally increases in density with depth below the ground surface.

Groundwater at the location of the nearby Space Needle was encountered at depths ranging from about 55 to 80 feet below the ground surface (Dames & Moore 1961). However, groundwater was not encountered in several other borings that were completed as deep as about 100 feet below the ground surface of both the KeyArena site and the Memorial Stadium site.

Geologic Hazards

As noted earlier, Seattle is situated within a seismically active region. However, the geologic hazards associated with both the KeyArena and the Memorial Stadium sites are dramatically

different than the project site associated with the site of Alternatives 2 and 3. Due to the presence of relatively dense glacial materials beneath the general Seattle Center area, the only geologic hazard of potential significance is ground shaking. However, a detailed review of the tendency for amplification or attenuation is part of the design process that would be performed for the sites, and the structures would be designed to mitigate the hazard.

Erosion and Enlargement

The existing conditions at the Alternatives 4 and 5 sites are generally underlain by glacial deposits. There is also a significant percentage of fine-grained soil that is also susceptible to erosion.

3.1.2.2 Impacts of the No Action Alternative at Alternative 4 and 5 Sites

Under the No Action Alternative, there would be no demolition and construction at the sites of either Alternative 4 or 5 for a new arena. There would be no direct effects to geology or soils.

3.1.2.3 Impacts of Alternative 4 and 5

Key Foundation-Related Design Elements

The Alternatives 4 and 5 sites would not require the installation of deep foundation support as needed for the Proposed Project (Alternative 2) or Alternative 3. However, the following key foundation-related elements and options were considered for the impacts assessment:

- Site preparation to include demolition and removal of the existing structures.
- Shoring / support of excavation options to allow for the foundation-related excavations to an unknown depth below the present ground surface. However, the foundation design is only conceptual for Alternatives 4 and 5.

Construction Impacts

Similar to the construction effects for Alternatives 2 and 3, the construction related to Alternatives 4 and 5 would likely result in several direct effects with respect to erosion. For example, the foundation-related excavations would include activities that could result in sediment mixing with stormwater, thereby creating turbid water. Potential sources of turbidity include exposed soils related to excavations and foundation system installation, spillage from dump trucks, and the tracking of mud from equipment-related tires onto the roadway.

Construction-related impacts that are anticipated to be different for Alternatives 4 and 5 include the following:

- An earthquake could occur during the construction, but the damage would likely be significantly less than for the Proposed Project (Alternative 2) or Alternative 3 due to the soils not being susceptible to liquefaction.

- Deep foundation support will likely not be necessary for Alternatives 4 and 5. Therefore, the foundation installation should be less challenging than for the Proposed Project (Alternative 2) or Alternative 3.

Operation

During the operations of an arena at the KeyArena site, no direct effects to the geology and soils are anticipated. However, the potential exists for an earthquake to occur to the lifetime of the facility, which has the potential to damage the structure and other site features, such as underground utilities.

3.1.2.4 Mitigation Measures

The following measures could reduce or eliminate geological impacts: :

- Conducting a detailed geotechnical investigation to understand the subsurface conditions in support of project design. As part of the study, identify measures to mitigate long-term foundation settlement and seismic hazards during the project design and construction. The recommended mitigation measures would be similar to those recommended for Alternatives 2 and 3.

- All other recommended mitigation measures would also be similar to the Proposed Project (Alternative 2).

3.1.2.5 Secondary and Cumulative Impacts

Secondary effects related to the geology and soils would occur either farther from the project site footprint and / or later in time. Potential secondary effects for Alternatives 4 and 5 include:

- Aggregate in the form of sand and gravel would be needed to mix with cement to create concrete and for use in onsite fills. The sand and gravel are sourced from gravel pits located within the Puget Sound area. The use of aggregate on the project would reduce the supplies of material that might be used elsewhere for other projects. However, the quantity required for the construction of an arena at the site of either Alternative 4 or 5 would be considered minimal.

- Trucks would be transporting heavy equipment and / or construction materials to the project site and to remove excess soils and construction debris. The trucks could cause deterioration of nearby streets and roadways if the loads exceeded the strength of the roadway base material, leading to cracking or rutting of pavements.

No secondary effects are anticipated during the operation of an arena at the site of Alternative 4 or 5 with respect to the geology and soils. No secondary effects are anticipated during the operation of an arena at the site of either Alternative 4 or 5 with respect to the geology and soils.

3.1.2.6 Significant Unavoidable Adverse Impacts

No direct or indirect effects of Alternatives 4 and 5 related to the geology and soils are anticipated to be significant, unavoidable and adverse.

3.2 Air Quality

3.2.1 Introduction

3.2.1.1 Air Quality Trends

Air pollutants associated with development projects in the Puget Sound area primarily are related to vehicular emissions. The air pollutants potentially include particulate matter, air toxics, diesel exhaust, carbon monoxide (CO), ozone, and greenhouse gases (GHGs).

In urban areas of the Puget Sound, motor vehicles are the largest source of air emissions. Over the last two decades, many pollutant levels have declined, and air quality has generally improved. Elevated fine particle levels are the most important air quality challenge in Puget Sound. Ozone levels also remain a concern in the region. Air toxics have been present at levels that pose adverse health effects (PSCAA 2012).

Air quality in the project area is regulated by the U.S. Environmental Protection Agency (EPA), Washington State Department of Ecology (Ecology), and the Puget Sound Clean Air Agency (PSCAA). Under the Clean Air Act, the EPA has established the national ambient air quality standards (NAAQS). The NAAQS are designed to protect public health with an adequate margin of safety. The PSCAA is primarily responsible for monitoring and regulating air quality in the Seattle area.

The EPA has designated most regions as attainment, maintenance, or nonattainment areas in regard to air quality standards. Nonattainment areas are geographic regions where air pollutant concentrations for a specific pollutant have persistently exceeded the NAAQS, while attainment areas have had measured concentrations below standards. Maintenance areas are regions that were previously in nonattainment but have since attained compliance. The Seattle area is currently in attainment for all EPA-regulated air pollutants, and has maintenance plans in place for CO, ozone, and particulate matter (PSCAA 2012).

3.2.1.2 Air Pollutants

Particulate Matter

Particulate matter includes fine particles less than 2.5 micrometers in size (PM2.5) and particles less than 10 micrometers in size (PM10). Motor vehicle exhaust emissions are generally in the PM2.5 size range, while fugitive dust is generally in the PM10 size range. Fine particles (PM2.5) are more harmful than dust and PM10, because they can be inhaled deeply into the lungs. Fine particles have a greater impact than coarse particles at locations far from the emitting source, because they remain suspended in the atmosphere longer and travel farther.

Particulate emissions have decreased over the past 15 years, and the Puget Sound area is in attainment with federal air quality standards. PM2.5 is still one of the major air pollution concerns affecting the Puget Sound area, and PM2.5 levels do not meet the PSCAA's more-

stringent health goal (PSCAA 2012). PM10 is no longer a major concern in the Puget Sound area, and the PSCAA ceased all PM10 monitoring in 2006. Fine particulate matter levels in the Puget Sound area are often higher in the winter months because of stagnant air inversions and wood burning in fireplaces and wood stoves.

Air Toxics and Diesel Exhaust

Air toxics are broadly defined as over 400 pollutants potentially harmful to human health and the environment. Many air toxics are a component of either particulate matter or volatile organic compounds (VOCs) (a precursor to ozone). Although air toxics concentrations have declined since 2003 in the Puget Sound area, the health risks remain substantial. Recent studies show people living near ports and roadways have higher exposures and health risks (PSCAA 2013a).

In the Puget Sound area, diesel particulate matter (DPM) accounts for most of the potential cancer risk from all air toxics. This pollution comes from diesel-fueled trucks, cars, buses, construction equipment, rail, marine, and port activities.

Carbon Monoxide

CO is an odorless, colorless gas that reduces the oxygen-carrying capability of blood. The majority of CO comes from vehicle exhaust, and the highest levels typically occur in winter at busy traffic intersections. In spite of substantial increases in vehicle travel, automobile emissions of CO have been reduced in urban areas of Puget Sound as the result of federal emission standards for new vehicles and the Washington State vehicle inspection and maintenance (I&M) program.

CO levels are well below federal standards and are no longer considered a pollutant of concern in the Puget Sound area. This region was designated as “attainment” status in 1996 and has not exceeded the CO standard since 1990. Based on monitoring data, emissions inventory projections, and continued improvements in vehicle technology, it is highly unlikely that measured CO levels will exceed the EPA standard in the future (PSCAA 2013a). The maximum 8-hour CO concentration in 2010 in the Puget Sound area was 1.1 parts per million (ppm), which was well below the EPA standard of 9 ppm (PSCAA 2012).

Ozone

Ozone is a major component of smog. Harmful ozone near the earth's surface results from a reaction of sunlight with nitrogen oxides (NOx) and VOCs, which are known as ozone precursors. Ground-level ozone is primarily a product of regional vehicular traffic and industrial sources. Ozone is a summertime air pollution problem in the Puget Sound area, and the period of concern is May through September. The highest concentrations of ozone are measured in the communities downwind of these large urban areas. The Puget Sound area has not exceeded the EPA ozone standard since 1992, and was designated as attainment status for ozone in 1996 (PSCAA 2013a). Ozone remains a pollutant of concern in the Puget Sound area, because the EPA

might tighten the federal ozone standard. If the ozone standard were lowered, then it is likely that portions of the Puget Sound area would be determined to be in violation of the new standard.

Greenhouse Gases

The major GHGs are ozone, carbon dioxide (CO2), methane, nitrous oxide, and hydrofluorocarbons. The major source of GHGs in the Puget Sound region is transportation, which includes cars, trucks, buses, aircraft, construction equipment, recreational vehicles, boats and ferries. GHGs contribute to climate change in the Pacific Northwest. The PSCAA does not monitor greenhouse gas levels in the ambient air in the Seattle area.

The 2010 King County Strategic Plan established environmental sustainability as one of King County's eight goals. The plan outlines objectives to reduce climate pollution and prepare for the effects of climate change on the environment, human health and the economy and to minimize King County's operational environmental footprint. Washington State Law RCW 70.235.020 requires that by 2020 Washington State reduce overall greenhouse gas emissions to 1990 levels and that by 2050 emissions are further reduced to fifty percent below 1990 levels.

The King County Comprehensive Plan directed that the county collaborate with other local governments to reduce greenhouse gas emissions in the region to eighty percent below 2007 levels by 2050 and incorporate climate change considerations into county plans, programs and projects among other related policies and goals.

The City of Seattle Office of Sustainability and Environment (OSE) conducts a community inventory of GHG emissions every three years, and the most recent available inventory is from 2008. The community inventory measures the entire City's GHGs emissions. The OSE's community GHG inventory is the primary method of gauging progress toward Seattle's near-term and long-term goals of reducing climate pollution (City of Seattle 2008b).

Seattle GHG emissions are produced from 3 main sources: transportation (62 percent), buildings (21 percent), and industry (17 percent). Transportation GHG emissions are the largest source and remain Seattle's biggest challenge.

The City of Seattle's Climate Action Plan includes the goal of being carbon neutral. The Climate Action Plan includes a wide range of GHG-reduction strategies.

3.2.2 Stadium District Alternatives - Alternatives 2 and 3

3.2.2.1 Affected Environment

The Stadium District is located in the Puget Sound maintenance areas for CO, ozone, and PM10. Maintenance areas are regions that were previously in nonattainment of EPA air quality standards, but have since attained compliance with the NAAQS. Major sources of air pollutants in the area include the Duwamish industrial area, the Port of Seattle, rail yards, and vehicular

traffic on area roadways. The Seattle area is currently in attainment for all EPA-regulated air pollutants, and air quality at the Stadium District site is not expected to exceed the NAAQS.

The Seattle Duwamish PM10 maintenance area is comprised of the Duwamish industrial and commercial area immediately south of the downtown district and includes the Port of Seattle. Its northern boundary is Dearborn Street from Puget Sound on the west to I–5 on the east, which includes the Stadium District site. Emissions primarily come from industrial sources, with a minor amount of emissions from diesel exhaust and gasoline-fueled motor vehicles. Fugitive dust is a negligible source of particulate matter (Federal Register 2001).

Sensitive land uses include the commercial area along 1st Avenue S. Residences are not located in the immediate vicinity of the project site. The closest residential areas are located to the north in the Pioneer Square area.

The nearest air quality monitoring stations are located at Beacon Hill to the east and the Duwamish Valley to the south. The Seattle Beacon Hill monitoring site represents typical urban emissions, which are a mixture of mobile sources, industrial sources, and residential wood burning. The Seattle Duwamish monitoring site represents a mixture of mobile sources, port and marine sources, industrial sources, and residential wood burning. Air quality measurements at these two locations have not exceeded the EPA standard for PM2.5 or CO.

3.2.2.2 Impacts of the No Action Alternative at Alternative 2 and 3 Site

Construction

Construction emissions from a new arena would not occur under the No Action Alternative in the Stadium District. Other anticipated projects in the Stadium District area would temporarily generate air pollutants during construction, which would be most noticeable at nearby sensitive land uses such as residences, hospitals or institutions. Because construction emissions would be temporary in duration and small in quantity, comply with the PSCAA regulations, and include mitigation, construction emissions would be low under Alternative 1, No Action.

Operation

Long-term sources of air pollutants in the Stadium District area are primarily from vehicular traffic. Event traffic at a new arena would not occur under the No Action Alternative. Vehicular emissions of air pollutants in the Stadium District area would continue from background traffic. Background traffic would continue to grow, which would proportionately increase vehicular emissions. Any increase in vehicular emissions under No Action would likely be offset by emission reductions from future improvements in vehicle technology.

3.2.2.3 Impacts of Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

Construction

Demolition, site preparation, and construction activities would intermittently generate particulate matter, odors, and engine exhaust. Particulate matter (dust, PM2.5 and PM10) would be emitted from ground clearing, excavation, material piles, building construction, and trucks depositing mud on streets. Engine exhaust would include small amounts of CO, GHGs, and particulate matter from trucks and construction equipment. Diesel-powered construction equipment would emit small amounts of diesel exhaust and air toxics. Engine exhaust and paving activities could be sources of odors at times. Construction emissions would occur during the approximately two-year construction schedule, and any construction impacts would be considered short-term or temporary impacts.

Construction equipment, temporary detours, lane restrictions, and other construction activities would increase traffic congestion at times. Emissions from traffic would increase while vehicles experience greater delay. Any vehicular emissions from construction traffic would contribute a small amount compared with area automobile traffic, because construction traffic would be a small fraction of the total traffic in the area. Emissions from temporary traffic delays as a result of construction equipment could be reduced by the Construction Transportation Management Plan (CTMP) that will be prepared for the Proposed Project.

Potential construction impacts would be mostly localized to the vicinity of the construction activity. Residences are not located in the immediate vicinity of the Stadium District site, and the potential for site-specific construction impacts to sensitive land uses would be low.

To reduce fugitive dust, odors, and engine exhaust, construction activities would include mitigation measures such as spraying with water and emission-control devices on equipment. Construction activities would comply with the PSCAA regulations to minimize fugitive dust (PSCAA 2013b). With the mitigation and dust-control measures, the quantity of air emissions during construction would be relatively small compared to other local sources in the Stadium District area.

It is possible that a NBA or NHL team may be acquired prior to the completion of a new arena. If so, during construction of the Arena under Alternative 2 or 3, NBA or NHL games would be played at another location, most likely KeyArena. Vehicular emissions during NBA games would be similar to emissions at other larger events at KeyArena, but would occur for additional NBA games during the two-year construction period. Because traffic conditions for temporary use of KeyArena would be similar to large events already there, emissions in the Queen Anne neighborhood should not increase substantially. Any traffic mitigation to reduce traffic volumes and congestion during temporary use of KeyArena would provide corresponding reductions in vehicular air emissions.

Because construction emissions would be temporary and minimal, comply with the PSCAA regulations, and include mitigation, construction emissions would be low under the Proposed Project (Alternative 2).

Operation

Operation of the Arena building itself would not be a point source of air pollutants at the Stadium District site. Operational impacts under the Proposed Project would be attributable to vehicular traffic during events. Event traffic would primarily emit CO, precursors of ozone, particulate matter, and GHGs from vehicles. Highest event emissions would likely occur during a weekday peak hour with additional traffic arriving at the Arena. The Proposed Project would include traffic mitigation to reduce volumes and congestion, and to encourage transit use, which would reduce traffic emissions of air pollutants during events. See Section 3.8 Transportation.

The Proposed Project would affect local emissions of CO from traffic in the immediate vicinity, particularly at congested traffic signals in the Stadium District area. CO levels measured in Seattle have been well below the health-based EPA standards, and it is highly unlikely that measured CO levels would exceed the federal standard in the future (PSCAA 2013a). While Arena events would increase local emissions of CO at Stadium District intersections, CO levels are anticipated to be below the EPA air quality standards. Future CO levels in the Stadium District likely would decrease because of continued improvements in vehicle technology.

Event traffic under the Proposed Project also could affect regional emissions of the precursors of ozone (VOC and NOx). Ozone is a summertime air pollution problem in the Puget Sound area, and the period of concern is May through September (PSCAA 2013a). Because most events at the Arena would not occur during the peak-ozone period of May through September, the Proposed Project would not likely contribute to ozone concentrations that would exceed EPA air quality standards.

Diesel-powered vehicles are a source of fine particles, diesel exhaust, and air toxics (PM2.5). The relative proportion of diesel vehicles in event traffic under the Proposed Project would be relatively small.

Additional traffic volumes before and after events, under the Proposed Project are not anticipated to cause any exceedances of air quality standards at nearby monitoring sites. Measured concentrations of air pollutants have not recently exceeded EPA air quality standards at the closest monitoring stations at Beacon Hill and the Duwamish Valley. These monitoring stations have not measured any recent violations of air quality standards related to larger events at Safeco Field and CenturyLink Field. Because traffic volumes under the Proposed Project would be lower than the larger events at Safeco Field and CenturyLink Field, events under the Proposed Project similarly should not result in exceedances of air quality standards at the nearby Beacon Hill and the Duwamish Valley monitoring stations.

GHG emissions under the Proposed Project have been quantified with the King County GHG Emissions Worksheet (King County 2011). The King County GHG Emissions Worksheet estimates GHG emissions that would be created over the lifespan of a building project. GHG emissions include obtaining construction materials, fuel used during construction, energy consumed during the buildings operation, and transportation by building occupants. The King County GHG Emissions Worksheet is included as Appendix C to this FEIS. The estimated GHG emissions for the Proposed Project are summarized in Table 3.2-1 below. As noted in footnote 1, the calculated emissions include vehicular traffic emissions during Arena events.

Table 3.2-1
Estimated Greenhouse Gas (GHG) Emissions

Alternative	Building Size (Square Feet)	Lifespan Emissions[(1)] (MTCO2e)	Annual Emissions[(2)] (MTCO2e)	Percentage of Annual City-wide GHG Emissions
Proposed Project	750,000	691,481	23,049	0.3 %
City of Seattle[(3)] City-wide Emissions	--	--	6,770,000	--

Notes: (1) Lifespan Emissions include construction, electricity during operation, and vehicular traffic during Arena events. GHG emissions are estimated as MTCO2e (metric tons CO2 equivalent)
(2) Annual Emissions based on a 30-year lifespan of the proposed Arena.
(3) City-wide GHG emissions from all sources, based on 2008 community inventory (City of Seattle, 2008b).

The building size of the proposed Arena would be approximately 750,000 sf for a 20,000-seat spectator sports facility. The estimated GHG emissions would be 691,481 MTCO2e (metric tons CO2 equivalent) during the lifespan of the Proposed Project. Based on a lifespan of 30 years for the proposed Arena, the annual emissions would be 23,049 MTCO2e per year. The annual emissions under the Proposed Project would be 0.3 percent of the City-wide GHG emissions (Table 3.2-1).

The Proposed Project would be designed to reduce its GHG emissions. The Arena would be designed and operated to meet or exceed green building and sustainability practices, which would reduce its overall carbon footprint and would help the City of Seattle to achieve its goal of being carbon neutral. Design and operational features could include:

- Efficient lighting fixtures, in both interior and exterior
- Bicycle and pedestrian improvements, which would reduce the number of vehicles and their exhaust emissions
- Measures to encourage transit use and car pools during events
- Parking for bicycles
- Electric car infrastructure
- LEED (Leadership in Energy and Environmental Design) Silver or higher certification
- Solid waste reduction during events

- Water conservation and reuse fixtures
- Promoting solar use where possible, and using alternative energy sources
- Onsite stormwater management and treatment

Emissions from vehicles would increase during events at the Arena, which could be considered an adverse impact. Event traffic is not anticipated to cause any exceedances of EPA's health-based air quality standards.

3.2.2.4 Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

Construction

Air quality impacts and mitigation during construction would be similar to the Proposed Project (Alternative 2). Because construction emissions would be temporary and minimal in quantity, comply with the PSCAA regulations, and include mitigation, construction emissions would be low under Alternative 3.

Operation

Operation of the Arena building itself would not be a point source of air pollutants at the Stadium District site. Operational impacts would be attributable to vehicular traffic during events at the Arena. The types of vehicular emissions under Alternative 3 would be similar to those described under the Proposed Project, although the quantity of vehicular emissions would be lower because of fewer vehicles attending the 18,000-seat Arena. Additional traffic volumes during events at the Arena are not anticipated to cause any exceedances of the EPA health-based air quality standards.

The size of the Arena building under Alternative 3 would be approximately 750,000 square feet for an 18,000-seat spectator sports facility. The estimated GHG emissions for Alternative 3 are summarized in Table 3.2-1. The annual emissions would be 23,049 MTCO2e per year, which would be 0.3 percent of the City-wide GHG emissions (Table 3.2-1). The Arena under Alternative 3 would include similar design and operation features as the Proposed Project to reduce its overall carbon footprint.

Emissions from vehicles would increase during events at the Arena, which could be considered an adverse impact. Event traffic is not anticipated to result in any exceedances of EPA's health-based air quality standards. Alternative 3 would include traffic mitigation to reduce volumes and congestion, and to encourage transit use, which would reduce traffic emissions of air pollutants during events.

3.2.2.5 Mitigation Measures Applicable to both Alternatives 2 and 3

Construction

The project alternatives would include mitigation measures to reduce emissions of dust, odors, and engine exhaust during construction. Construction activities would comply with the PSCAA regulations that require reasonable precautions to minimize fugitive dust (PSCAA 2013b). Construction equipment also would include emission-control devices to reduce CO, GHGs, and particulate emissions from gasoline and diesel engines. Construction mitigation would be incorporated into construction plans and contractor specifications in the construction contracts. The project alternatives could include, among other measures, the following mitigation measures during construction:

- Spraying water, when necessary, during demolition, grading, and construction activities to reduce emissions of particulate matter.
- Covering dirt, gravel, and debris piles to reduce dust and wind-blown debris.
- Covering open-bodied trucks to reduce particulate matter blowing off trucks or dropping on roads while transporting materials. Alternatively, wetting materials in trucks or providing adequate freeboard (space from the top of the material to the top of the truck) could be used to reduce dust and deposition of particulate matter.
- Providing wheel washers at construction sites to remove particulate matter from vehicle wheel wells and undercarriages before they exit to decrease deposition of particulate matter on area roadways.
- Sweeping public streets, when necessary, to remove particulate matter deposited on paved roads and subsequent wind-blown dust.
- Turning off construction trucks and engine-powered equipment during long periods of non-use, instead of being left idling, to reduce exhaust emissions and odors.
- Requiring emission-control devices on construction equipment and using relatively new, well-maintained equipment to reduce exhaust emissions of CO, GHGs, and particulate matter from engine exhaust.

The construction contractors could participate in the PSCAA's Diesel Solution Program, to voluntarily reduce diesel exhaust. Reduction strategies under the Diesel Solutions Program include using cleaner fuels, retrofitting engines and exhaust systems, and replacing older equipment with newer, cleaner equipment. Reducing diesel exhaust from construction equipment would reduce emissions of fine particulate matter and air toxics during the construction period.

The project would include a CTMP to reduce temporary traffic delays on area streets (see Section 3.8 Transportation). The CTMP could include specific hours of construction, temporary

traffic detours, scheduling construction trucks, and flagging. Routing and scheduling construction equipment to reduce delays to traffic during peak travel times would reduce air impacts caused by traffic delays while waiting for construction trucks and other activities.

A telephone hotline number would be published and maintained by the construction company to directly receive calls from the public on air quality impacts and other construction issues.

Construction activities could encourage waste reduction and use of green building materials, which would reduce overall GHG emissions and be consistent with the City of Seattle's goal to achieve carbon neutrality. Construction waste from the project site could be recycled and reused. Reuse of construction, demolition, and land clearing wastes onsite if feasible would reduce the number of trucks required to transport the material. Reducing the number of construction trucks would reduce their exhaust emissions.

Operation

Any transportation mitigation measures included in the Proposed Project to reduce traffic volumes and congestion correspondingly could also apply to Alternative 3 and could reduce traffic emissions of air pollutants (see Section 3.8 Transportation). Such measures could include encouraging transit use and carpooling, bicycle parking and routes, access improvements, traffic signal optimization, intersection realignments, improved pedestrian facilities, and police control of traffic during events. The Proposed Project would include a Transportation Management Plan (TMP) to reduce the number of fans arriving by single-occupancy vehicles.

3.2.2.6 Secondary and Cumulative Impacts

Cumulative impacts on air quality would be related to short-term increases in construction activity and to long-term increases in traffic volumes and congestion. Cumulative construction impacts could occur from the Proposed Project (Alternative 2) or Alternative 3 and other development projects being constructed at the same time in the Stadium District. Because construction emissions under the Proposed Project or Alternative 3 and other development projects would be temporary in duration and comply with PSCAA requirements, short-term cumulative impacts during construction would be low.

Long-term cumulative increases in traffic volumes and congestion would result from the combined Arena event volumes under the Proposed Project or Alternative 3 and from future growth in traffic resulting from other future projects in the area. At the Stadium District area under Alternatives 2 and 3, air pollutant emissions could increase from expansion of Port facilities, increased rail traffic, vehicular traffic diverted by tolling the new SR-99 Tunnel, and new residential development in the North Lot of CenturyLink Field.

Secondary impacts on air quality could result from economic growth and changes in land uses induced by the Arena. Any growth induced by the Proposed Project or Alternative 3 would incrementally increase traffic volumes and associated traffic air pollutants. Although the

location and specific amount of growth is unknown, incremental increases in traffic emissions likely would be small.

3.2.2.7 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to air quality from the construction or operation of the Proposed Project or Alternative 3 are expected.

3.2.3 Seattle Center Area Alternatives - Alternatives 4 and 5

3.2.3.1 Affected Environment

The KeyArena site and the Memorial Stadium site are both located in the Puget Sound maintenance areas for CO and ozone, but are outside the maintenance area for particulate matter. Major sources of air pollutants include residential woodstoves and vehicular traffic on area roadways. Because the Seattle area is currently in attainment for all EPA-regulated air pollutants, air quality at both sites are not expected to exceed the NAAQS.

Sensitive land uses adjacent to the KeyArena site include the KEXP Radio studios, Seattle International Film Festival (SIFF) offices, the VERA Project (located in the Northwest Rooms), Seattle Repertory Theater, the International Fountain and Lawn, and the Center Skatepark. Sensitive land uses adjacent to the Memorial Stadium site include the Armory, International Fountain and Lawn, McCaw Hall, EMP Museum, and the Bill & Melinda Gates Foundation. High-density residential areas are several blocks to the west and north of both sites of Alternatives 4 and 5.

The nearest air quality monitoring stations are located at Queen Anne Hill to the north and at Olive and Boren to the east. Air quality measurements at these two locations have not exceeded the EPA standard for PM2.5.

3.2.3.2 Impacts of the No Action Alternative at Alternative 4 and 5 Sites

Construction

Construction emissions from a new arena would not occur under the No Action Alternative at either the KeyArena or Memorial Stadium sites. Other anticipated projects in the Queen Anne area would temporarily generate air pollutants during construction, which would be most noticeable at nearby sensitive land uses such as residences, hospitals or institutions. Because construction emissions would be temporary in duration and small in quantity, comply with the PSCAA regulations, and include mitigation, construction emissions would be low under Alternative 1, No Action.

Operation

Long-term sources of air pollutants in the Queen Anne area are primarily from vehicular traffic. Event traffic at a new arena would not occur under the No Action Alternative. Vehicular

emissions of air pollutants in the Queen Anne area would continue from background traffic. Background traffic would continue to grow, which would proportionately increase vehicular emissions. Any increase in vehicular emissions under No Action would likely be offset by emission reductions from future improvements in vehicle technology.

3.2.3.3 Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

Construction

Air quality impacts and mitigation during construction would be similar to the Proposed Project (Alternative 2). Localized construction emissions of dust, odors, and engine exhaust could be more noticeable at times under Alternative 4, because more sensitive land uses are near the KeyArena site. Because construction emissions would be temporary in duration and small in quantity, comply with the PSCAA regulations, and include mitigation, construction emissions would be low under Alternative 4, KeyArena.

During construction of an arena under Alternative 4, NBA or NHL games would need to be played at another location, most likely the Tacoma Dome, if teams are acquired prior to the construction of a new arena. Vehicular emissions during NBA games would be similar to emissions at other large events at the Tacoma Dome, but would be additive to events already programmed for the Tacoma Dome during the two-year construction period. Because traffic conditions for temporary use of the Tacoma Dome would be similar to large events already there, emissions in Tacoma's stadium district would not increase substantially. Any traffic mitigation to reduce in traffic volumes and congestion during temporary use of the Tacoma Dome would provide corresponding reductions in vehicular air emissions.

Operation

Operation of an arena building itself would not be a point source of air pollutants at the KeyArena site. Operational impacts would be attributable to vehicular traffic during events at the arena. The types of vehicular emissions under Alternative 4 would be similar to those described under the Proposed Project.

Traffic during events at an arena, at the site of Alternative 4, are not anticipated to cause any exceedances of air quality standards. Measured concentrations of air pollutants have not recently exceeded EPA air quality standards at the closest monitoring stations at Queen Anne Hill, and at Olive and Boren. These monitoring stations have not measured any recent exceedances of air quality standards related to similar events at the KeyArena. While traffic volumes would be slightly higher than the existing KeyArena, events under Alternative 4 should not cause exceedances of air quality standards in the vicinity of the closest monitoring stations at Queen Anne Hill and at Olive and Boren.

The size of an arena at the Alternative 4 site would be approximately 750,000 sf for a 20,000-seat spectator sports facility. The estimated GHG emissions for Alternative 4 are summarized in Table 3.2-1. The annual emissions would be 23,049 MTCO2e per year, which would be 0.3

percent of the City-wide GHG emissions (Table 3.2-1). An arena under Alternative 4 would include similar design and operation features as the Proposed Project to reduce its overall carbon footprint.

Emissions from vehicles would increase during events at such an arena, which could be considered an adverse impact. Event traffic is not anticipated to cause any exceedances of EPA's health-based air quality standards. Alternative 4 would include traffic mitigation to reduce volumes and congestion, and to encourage transit use, which would reduce traffic emissions of air pollutants during events.

3.2.3.4 Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Construction

Air quality impacts and mitigation during construction would be similar to the Proposed Project (Alternative 2). Localized construction emissions of dust, odors, and engine exhaust could be more noticeable at times under Alternative 5, because more sensitive land uses would be near the Memorial Stadium site. Because construction emissions would be temporary in duration and small in quantity, comply with the PSCAA regulations, and include mitigation, construction emissions would be low under Alternative 5, Memorial Stadium.

Operation

Operation of an arena building itself would not be a point source of air pollutants at the Memorial Stadium site. Operational impacts would be attributable to vehicular traffic during events at the arena. The types of vehicular emissions under Alternative 5 would be similar to those described under the Proposed Project. Similar to Alternative 4, traffic during events at the arena is not anticipated to cause exceedances of air quality standards in the vicinity of the closest monitoring stations at Queen Anne Hill and at Olive and Boren.

The size of an arena at the Alternative 5 site would be approximately 750,000 sf for a 20,000-seat spectator sports facility. The estimated GHG emissions for Alternative 5 are summarized in Table 3.2-1. The annual emissions would be 23,049 MTCO2e per year, which would be 0.3 percent of the City-wide GHG emissions (Table 3.2-1). An arena under Alternative 5 would include similar design and operation features as the Proposed Project to reduce its overall carbon footprint.

Emissions from vehicles would increase during events at the arena, which could be considered an adverse impact. Event traffic is not anticipated to cause any exceedances of EPA's health-based air quality standards. Alternative 5 would include traffic mitigation to reduce volumes and congestion, and to encourage transit use, which would reduce traffic emissions of air pollutants during events.

3.2.3.5 Mitigation Measures Applicable to both Alternatives 4 and 5

Construction

The potential construction mitigation measures would be the same as listed above for Alternatives 2 and 3 in Subsection 3.2.2.5.

Operation

Any transportation mitigation measures included for Alternatives 4 and 5 to reduce traffic volumes and congestion correspondingly would reduce traffic emissions of air pollutants (see Section 3.8 Transportation). Such measures could include encouraging transit use and carpooling, bicycle parking and routes, access improvements, traffic signal optimization, intersection realignments, improved pedestrian facilities, and police control of traffic during events. If an arena were constructed at the site of either Alternative 4 or 5, the construction project would include a TMP to reduce the number of fans arriving by single-occupancy vehicles.

3.2.3.6 Secondary and Cumulative Impacts

Secondary and cumulative impacts caused by either Alternative 4 or 5 would be similar to those described above in Subsection 3.2.2.6 for the Proposed Project and Alternative 3. Cumulative impacts on air quality would be related to short-term increases in construction activity and to long-term increases in traffic volumes and congestion. Cumulative construction impacts could occur from an arena and other development projects being constructed at the same time on or near Seattle Center. Because construction emissions under Alternatives 4 and 5 and other development projects would be temporary in duration and comply with PSCAA requirements, short-term cumulative impacts during construction would be low.

Long-term cumulative increases in traffic volumes and congestion would result from combined arena event volumes under Alternatives 4 and 5 and from future growth in traffic resulting from other future projects in the area. Near Seattle Center, air pollution emissions could increase from vehicular traffic diverted by tolling the new SR-99 Tunnel, and new residential and commercial development in the lower Queen Anne and South Lake Union areas.

Secondary impacts on air quality could result from economic growth and changes in land uses induced by the development of a new arena. Any growth induced by the Alternatives 4 or 5 would incrementally increase traffic volumes and associated traffic air pollutants. Although the location and specific amount of growth is unknown, incremental increases in traffic emissions likely would be small.

3.2.3.7 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to air quality from the construction or operation of Alternatives 4 or 5 are expected.

3.3 Water

3.3.1 Stadium District Alternatives - Alternatives 2 and 3

3.3.1.1 Affected Environment

Groundwater

As noted in Section 3.1, Geology and Soils, vibrating wire piezometers were installed in the two exploratory borings that were completed as part of a site-specific geotechnical engineering investigation (Hart Crowser 2013). The groundwater levels were measured in January 2013 and found to be at about five to eight feet below the ground surface.

The groundwater gradient beneath the subject site is anticipated to be relatively flat but gently towards Elliott Bay to the west. Due to the distance from Elliott Bay, the influence of tidal fluctuations is anticipated to be negligible.

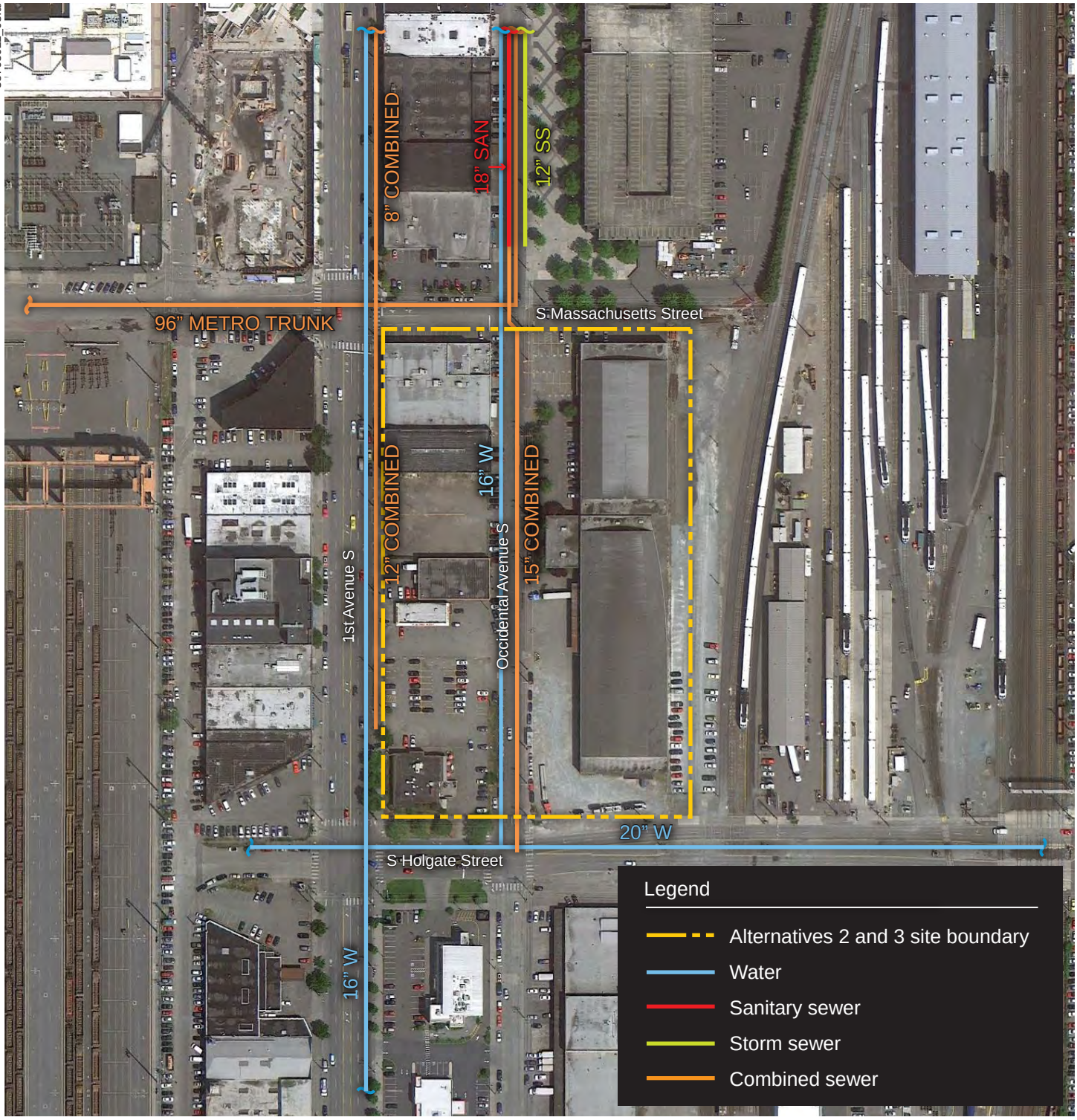
The Stadium District site of Alternatives 2 and 3 is located within an area of past and present industrial and commercial land uses. The past actions have resulted in reported releases of contaminants to the environment. Based on a preliminary review of relevant literature sources within the immediate vicinity of the project site, the potential exists for the presence of contaminated soil and groundwater. However, soil and groundwater quality-related sample collection and laboratory testing were not included in the scope of work during the completion of the subsurface explorations on the project site. The groundwater gradient likely generally follows the topography, which generally slopes towards the south.

Water System (SPU)

Water mains serving the Alternatives 2 and 3 site include an existing 20-inch water main on S. Holgate Street, an existing 16-inch water main on Occidental Avenue S. and an existing 16-inch water main on 1st Avenue S. No hydrant flow tests have been recently performed in the project area, but a flow test at the intersection of S. Massachusetts Street and Occidental Avenue S. conducted in 1998 produced a flow capacity of 12,761 gallons per minute (gpm) at 20 pounds per square inch (psi) residual pressure. Per a May 9, 2012, email correspondence with Melissa Hill of SPU, the static pressure at the Stadium District site is 135 psi. The total current water usage within the development area is unknown. See Figure 3.3-1.

Stormwater System (SPU)

For existing stormwater runoff, the Alternative 2 and 3 site surface cover consists primarily of impervious surfaces (asphalt paving, brick paving, gravel and building rooftops). A portion of the site has sparse tree cover and landscaping, but combined account for less than approximately three percent of total site cover. As a result, precipitation runs off of impervious surfaces and is conveyed primarily into the underground combined sewer system that runs from south to north in an existing 12-inch main on the east side of 1st Avenue S., and



Source: Google Earth Pro

0 200 400

Scale in Feet

Figure 3.3-1

Utilities in the Vicinity of Alternative 2 and Alternative 3

Job No. 33763922

in a 15-inch main near the center of Occidental Avenue S. In addition to the combined sewer mains serving the area, there is an existing 12-inch separated stormwater main on the east side of Occidental Avenue S. that begins just north of the S. Massachusetts Street intersection. This storm line travels north along Occidental Avenue S. and 1st Avenue S. to the 72-inch trunk sewer main on Royal Brougham Way. This is a First Flush system meaning that the first part of a rainstorm is diverted to the King County Elliot Bay Interceptor (EBI), and larger storms are then discharged to Puget Sound. This system also acts as the overflow route when the EBI goes into combined sewer overflow (CSO) mode (see description of the Kingdome CSO operation below) which provides for more combined sewer to stay in the system prior to discharge. The volumes in this portion of the system are greatly influenced by the way King County operates its system. See Figure 3.3-1.

Combined Sewer System (SPU and King County)

Existing wastewater generation from the Alternative 2 and 3 sites is produced by discharges from 6 occupied buildings, and flows to the combined sewer system that runs from south to north in an existing 12-inch main on the east side of 1st Avenue S. and in a 15-inch main near the center of Occidental Avenue S. Based on the Proposed Project and Alternative 3 configuration, an estimated annual existing sewer production volume of 500,000 gallons was calculated.

The 96-inch EBI is owned and maintained by the King County Water Wastewater Treatment Division (KCWTD) and runs adjacent to the project site for a short distance. This is a critical facility, and the structural integrity and function must be protected in place during construction, and access for maintenance and repair must be provided both during and after construction of the Arena has been completed. The interceptor approaches the project site from the west along S. Massachusetts Street. It is directly adjacent to the north limits of the project site between 1st Avenue S. and Occidental Avenue S., where it turns north and runs within Occidental Avenue S. on its way to the West Point Treatment Facility. At the intersection of S. Massachusetts Street and Occidental Ave S., KCWTD has a maintenance hole (W10-139) that would need to be protected during construction activities. See Figure 3.3-1.

3.3.1.2 Impacts of the No Action Alternative at Alternative 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new arena. There would be no direct effects to groundwater, water supply, stormwater systems, or sanitary sewer systems.

3.3.1.3 Impacts of Alternatives 2 and 3

Groundwater

As noted in Section 3.1, Geology and Soils, the Proposed Project (Alternative 2) and Alternative 3 would include a number of foundation-related construction elements that could result in groundwater-related direct effects:

- Groundwater flow may be altered by the presence of the retaining walls to support the foundation-related excavations. Areaways and basements adjacent to the new facilities could experience leakage or partial flooding if groundwater mounding occurs.

- Construction-related activities may result in the release of pollutants such as sediment, oil and grease that can increase turbidity and affect other water quality parameters. Also, the acidity of the groundwater can be altered if runoff comes into contact with curing concrete.

- Dewatering associated with excavations beneath the water table, which is about five to eight feet below the ground surface, would be needed with respect to the foundation construction. The dewatering could result in groundwater flow from adjacent areas being drawn toward the excavated areas. The groundwater may potentially be contaminated. Depending on the type(s) and concentrations of contaminants, there may be the need to collect and treat the water. This could lead to schedule delays.

- Dewatering associated with excavations can cause ground subsidence and damage adjacent utilities, in the absence of mitigation measures, due to the presence of fill soils. Vibration and/or settlement monitoring could be required to protect utilities and other structures. Damage to underground utilities has occurred in the vicinity as a result of dewatering activities.

- SPU's combined sewer system and storm systems have limited capacity for accommodating dewatering flows. It should not be assumed that contaminated groundwater can be dewatered to the sewer system. A King County Discharge Authorization, as well as SPU approval, is required prior to discharging contaminated groundwater to the sewer system.

- KCWTD has limited capacity in the EBI for accommodating dewatering flows. Construction techniques which minimize discharging flows to the combined sewer system should be considered.

Water System (SPU)

Prior to design development, the design engineer would obtain a water availability certificate from Seattle Public Utilities (SPU). This certificate would provide water service connection information and would recommend an existing water line to connect to. The certificate will also identify any water system improvements that are required under Seattle Municipal Code and SPU policy for development projects. It is anticipated that the Proposed Project (Alternative 2) or Alternative 3 would be able to connect to either the existing 20-inch water line on S. Holgate Street or the existing 16-inch water line on 1st Avenue S. Additional fire flow tests would be required by SPU during the design coordination process to verify current flow capacity. It is anticipated that the static pressure of 135 psi would be adequate for the Arena development.

The existing water use on the site would increase with the Arena development. While the total current water usage within the development area is unknown, the preliminary mechanical demands for cooling towers are estimated to be approximately 1,800,000 gallons per year. Water use based on the calculated wastewater discharge from the Arena development is 5,200,000 gallons for Alternative 2 (20,000-seat Arena) and 4,700,000 gallons for Alternative 3 (18,000-seat Arena). A discussion of wastewater generation is included below under "Sanitary Sewer System."

The existing 16-inch feeder main in Occidental Avenue S. is one of two alternate feeds to the Pioneer Square seismic backbone main from Beacon Hill Reservoir. If Occidental Avenue S., between S. Massachusetts Street and S. Holgate Street were to be vacated, the current ability to feed the 24-inch Pioneer Square seismic backbone main from either the Holgate Street feeder or the 1st Avenue S. feeder would be lost.

To accommodate the loss of the 16-inch Occidental feeder in the proposed vacation area, the remaining 16-inch feeder in 1st Avenue S. would need to be upsized and reconstructed to be seismically resistant. The existing 16-inch Occidental feeder, severed by the street vacation at S. Massachusetts Street, would need to be extended west to connect with the upgraded 24-inch seismically resistant feeder in 1st Avenue S. Valving at the supply junction of 1st Avenue S. and S. Massachusetts Street would need to be arranged so that either the 16-inch feeder in Occidental Ave S. or the 16-inch feeder in 1st Avenue S. (north of Massachusetts St.) could be supplied from the upgraded 24-inch feeder approaching Massachusetts from the south. Similarly, at 1st Avenue S. and S. Holgate Street, valving would need to be provided such that the single, seismically upgraded 24-inch feeder north of S. Holgate Street could receive two alternate supplies from the reservoir; from either the east (via S. Holgate Street) or from the south (via 1st Avenue S.).

An additional fire main loop around the Arena site to provide fire protection along the east side of the new facility would likely be constructed, depending on DPD and Fire Department review comments.

Stormwater System (SPU)

The likely offsite storm connection for the site of Alternatives 2 or 3 would be the 12-inch City of Seattle-separated storm line on Occidental Avenue S. that begins at a maintenance hole just north of the intersection with S. Massachusetts Street. Additional stormwater storage for the Proposed Project (Alternative 2) or Alternative 3 at this site would have a benefit to helping the whole stormwater system operate better. According to maps published by SPU, the project area is not in a capacity constrained system, and the project design team expects approval for this connection point. In the event that the 12-inch Seattle-separated storm line on Occidental Avenue S. is not deep enough to properly serve the site without pumping, it may be necessary to reconstruct the existing 12-inch and 24-inch storm lines to provide a deeper connection point. This concern will be passed on the site design team for evaluation during the design process.

Table 3.3-1 provides estimated annual existing and proposed stormwater flows for the Alternatives 2 and 3.

Table 3.3-1
Estimated and Proposed Annual Stormwater Flows - Alternatives 2 and 3

Condition	Stormwater (Gal)
Existing	5,900,000
Alternatives 2 and 3	4,950,000[1]

[1] Based on the Arena assuming a 35,000 SF green roof

Further reduction in runoff is anticipated. If the project connects to the 15-inch City of Seattle combined sewer system flowing north along Occidental Ave S. instead of the separated stormwater system, it would be part of the Kingdome sub-basin. Combined storm and sewer flows in this 915-acre sub-basin are managed by a regulator located near S. Royal Brougham Way and Alaskan Way S. During normal operation, the regulator diverts flow into the 96-inch EBI that ultimately flows to the West Point Treatment Plant in Magnolia.

In the event that the EBI is at capacity, the regulator diverts flow to the Kingdome CSO Outfall. This outfall is operated by the King County Wastewater Treatment Division and discharges into the Duwamish River. Between 1992 and 2011, the Kingdome CSO averaged 6.4 overflows per year.

King County's CSO Long Term Control Plan (LTCP) was adopted by the King County Council in 2012, and is required to be implemented by Washington Department of Ecology and a federal consent decree with the US Department of Justice and Environmental Protection Agency. As part of the LTCP, King County is required to build a $271 million (2010 dollars) 151 mgd CSO wet weather treatment plant between King Street and Hanford Street regulator stations and will modify the EBI to divert wastewater flows to the new plant. The project, called the King Street, Kingdome, Lander, and Hanford (HLKK) treatment plant, is currently scheduled to be completed by 2030 and could begin in 2021 or earlier. If the project schedule is moved earlier, it is important to coordinate construction staging and transportation to reduce impacts to the community, a community with construction fatigue from the current large infrastructure projects (seawall, viaduct replacement, etc.). More information is available at: http://www.kingcounty.gov/environment/wastewater/CSO/ProgramReview/Plan/9Projects.aspx

The Proposed Project (Alternative 2) and Alternative 3 would be designed to meet current City stormwater codes. As the stormwater from Alternatives 2 or 3 would ultimately flow to the combined sewer system, flow control facilities are required. Two additional City requirements apply to the development: 1) Implementing green infrastructure to the maximum extent feasible; and 2) Green Area factor. Specific best management that would address these requirements is in early design, but a net reduction in stormwater runoff volume compared to existing conditions would occur.

All design requirements for incorporation of onsite detention, utilization of "Green Stormwater Infrastructure" practices and "Green Area Factor" would be incorporated into the site design.

Code standards would also be used to prepare Temporary Erosion and Sedimentation Control plans, and all standards would be followed during construction activities to protect the existing stormwater and combined sewer systems and the project site environment.

Sanitary Sewer System (SPU and King County)

The proposed connection point for wastewater discharge from Alternatives 2 or 3 is the existing City of Seattle 15-inch combined sewer maintenance hole located in the intersection of S. Massachusetts Street and Occidental Avenue S.

For proposed wastewater generation, the Stadium District site is a zero lot-line development, and would occupy the full extents of existing parcels and a partial vacation of Occidental Avenue S. between S. Massachusetts Street and S. Holgate Street.

With a seating capacity of 20,000 or 18,000 and holding year-round events and permanent offices, the Arena would generate a significant amount of wastewater. A preliminary estimate of wastewater production based off of the mechanical engineers and civil engineers estimates was developed. Table 3.3-2 below provides estimated annual existing and proposed wastewater flows for the Arena:

Table 3.3-2
Estimated Annual Existing and Proposed Wastewater Flows - Alternatives 2 and 3

Condition	Wastewater (Gallons)
Existing	500,000
Alternative 2	5,200,000[1]
Alternative 3	4,700,000[1]

[1] Conservative estimate, no water reuse strategies implemented.

Because the site would be transformed from a low, full-time equivalent use area to a heavily used, year round Arena, wastewater production would increase substantially. Water reuse strategies (rainwater collection, smart detention, and onsite wastewater treatment) are being evaluated as part of the design process to reduce wastewater and stormwater discharges from the site.

Current plans call for the design of the development to take advantage of code compliant low flow plumbing fixtures and also to use water reuse design practices wherever practical. These efforts would minimize the effect of the additional flows to the existing system. Table 3.3-3 shows the anticipated annual flows to the combined system for the existing development and for the future development, assuming that the stormwater from the site is routed to the existing separated stormwater system as recommended:

Table 3.3-3
Estimated Existing and Proposed Total Annual Flow to Combined Sewer - Alternatives 2 and 3

Condition	Stormwater (Gallons)	Wastewater (Gallons)	Total to Combined Sewer (Gallons)
Existing	5,900,000	500,000	6,400,000
Alternative 2	N/A	5,200,000[1]	5,200,000[1]
Alternative 3	N/A	4,700,000[1]	4,700,000[1]

[1] Conservative estimate, no water reuse strategies implemented.

Existing combined sewer mains along Occidental Avenue S. within the project area would be removed or abandoned, and new stormwater and wastewater discharges from the Arena development would be routed to either separated or combined systems after all required detention, water quality, and water reuse treatments have been completed onsite.

Stormwater and wastewater systems would be piped independently to their point of connection with existing facilities, even if they are both routed to the combined system. This would allow future separation of the two systems without construction of new facilities within the Project Site. Given the calculated flows from the site, it is not anticipated that any new or replaced sewer mains would be required to support the development of either Alternative 2 or 3.

Because the northerly limits of the Stadium District site stop at the southern right-of-way line of S. Massachusetts Street, there is no proposed construction over the existing EBI sewer, with the possible exception of paving and installation of additional utilities to support the development.

Greater amounts of wastewater flows are anticipated to be produced by the developed site than the existing site, but without the inclusion of stormwater flows, these flows are within the capacities of the existing combined sewer system north of the project site in Occidental Avenue S. The final determination of existing system capacity and possible need for new or reconstructed sewer mains will be determined by capacity analysis and system modeling during the design phase of the project.

3.3.1.4 Mitigation Measures Applicable to Both Alternatives 2 and 3

Construction

The project design team will prepare an analysis of the existing soils properties and loading conditions for the 96-inch EBI sewer, and provide recommendations for monitoring and / or mitigation for any construction activities that could cause either lateral or vertical movement of the ground and their impact on the interceptor. This analysis and recommendation would be completed and submitted to the King County Wastewater Treatment Division for review and comments as part of the design review process prior to construction.

The following measures would be used to mitigate impacts to water and water quality:

- If groundwater as a result of the installation of retaining walls becomes an issue, the applicant would identify and implement engineering solutions, such as the installation of a perimeter drainage system.

- Before temporary or permanent discharge of groundwater to the SPU sewer system is allowed, the project applicant will need to evaluate alternatives such as on-site treatment before discharging to sewer or storm drain facilities, depending upon the type and concentration of contaminants in the groundwater.

- It is important to keep the route of the interceptor available for maintenance and repairs. Construction activities within S. Massachusetts Street that would prevent maintenance personnel from gaining access either in an emergency or for routine maintenance operations would be avoided or coordinated with SPU.

The following mitigation measures are recommended for consideration by DPD as part of permit decisions:

- In order to prevent schedule delays during construction as a result of the potential presence of contaminated groundwater, complete a groundwater quality investigation in advance of the scheduled construction in order to determine the presence or absence of the contamination. If contamination is found to be present, identify and implement engineering solutions to remedy the situation before the construction commences.

- Based on existing soil properties and the total depth of cover over the pipe, it may be necessary to monitor the ground over the top of the pipe for settlement, and any extremely heavy construction loads may need to be restricted from traveling over the interceptor sewer.

- Ground vibrations would likely occur during construction and demolition. Conduct studies as necessary to determine how to prevent or mitigate the potential to cause damage to underground utilities. Implement vibration monitoring during construction to prevent any damage to the Elliot Bay Interceptor. In addition to vibration monitoring, it may be necessary to establish baseline conditions for underground utilities, such as elevation data, leak surveys, and other means. Settlement monitoring and reporting may be required during dewatering and/or construction activities that generate high impacts or ground vibration.

Operation

- Groundwater: No impacts have been identified and no mitigation measures are anticipated to be needed. If contaminated soils and/or groundwater are encountered, special design consideration may be required in order to minimize hazards encountered later by SPU crews performing routine maintenance or repairs to water, stormwater, and sewer

systems. SPU may also be required to utilize specialized safety equipment and PPEs for maintenance

- Water System (SPU): Since the proposed vacation of Occidental Ave S will result in the decommissioning of SPU's existing 16 inch cast iron feeder main, there may be short term operational changes during construction in order to preserve fire flow and customer service, as well as longer term operational changes due to the relocation and possible upsizing of water feeder mains in the vicinity. New services for domestic and fire system connections would be provided as necessary to meet City code requirements.

- Stormwater System (SPU): No mitigation is anticipated to be needed.

- Sanitary Sewer System (SPU and King County): Flows are anticipated to be within the capacities of the existing combined sewer system north of the project site in Occidental Avenue S. No mitigation is anticipated to be needed.

3.3.1.5 Secondary and Cumulative Impacts

There would be cumulative impacts to water supply and discharge created by the development of a new Arena in conjunction with other development in the Stadium District area. New and larger buildings may cumulatively increase the need for additional water supply; however code-compliant plumbing fixtures are targeted toward reducing supply needs on a per-person basis. New code requirements for onsite detention of stormwater, utilization of "Green Stormwater Infrastructure" practices and "Green Area Factor," low-flow plumbing fixtures and water reuse design practices may reduce overall stormwater and sanitary sewer flows.

3.3.1.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to groundwater, water supply or discharge facilities are expected.

3.3.2 Alternative 4 - KeyArena 20,000-Seat Arena

3.3.2.1 Affected Environment

Groundwater

As noted in Section 3.1, Geology and Soils, at the location of the nearby Space Needle the groundwater was encountered at depths ranging from about 55 to 80 feet below the ground surface (Dames & Moore 1961). However, groundwater was not encountered in several other borings that were completed as deep as about 100 feet below the ground surface.

Water System (SPU)

Existing water mains serving the project area include a 12-inch water main on Thomas Street and a 12-inch water main on 1st Avenue N. No hydrant flow tests have been recently performed in the project area so the full fire capacity is unknown. Per the March 11, 2013,

email correspondence with Mark Jaeger of SPU, the static pressure at the KeyArena site is approximately 90 psi. See Figure 3.3-2.

Stormwater System (SPU)

For existing stormwater runoff, the KeyArena site is assumed to be approximately 6 acres of the overall 10.95 acre parcel, where surface cover consists primarily of impervious surfaces (asphalt paving, concrete walkways and stairs, gravel and building rooftops). The KeyArena site is assumed to not include the existing Northwest Rooms, which are on the northerly portion of the parcel. A portion of the assumed site area has sparse tree cover and landscaping, but combined account for less than approximately three percent of total site cover, similar to the Stadium District site for Alternatives 2 and 3. Stormwater is currently collected from the KeyArena site in a separate piped stormwater system. The collected stormwater from the north half of the site is routed to a 24-inch separated stormwater main running east on Harrison Street. The collected stormwater from the south half of the site is routed to the east to an existing stormwater detention vault before being discharged to the 24-inch separated stormwater main running east on Harrison Street. See Figure 3.3-2.

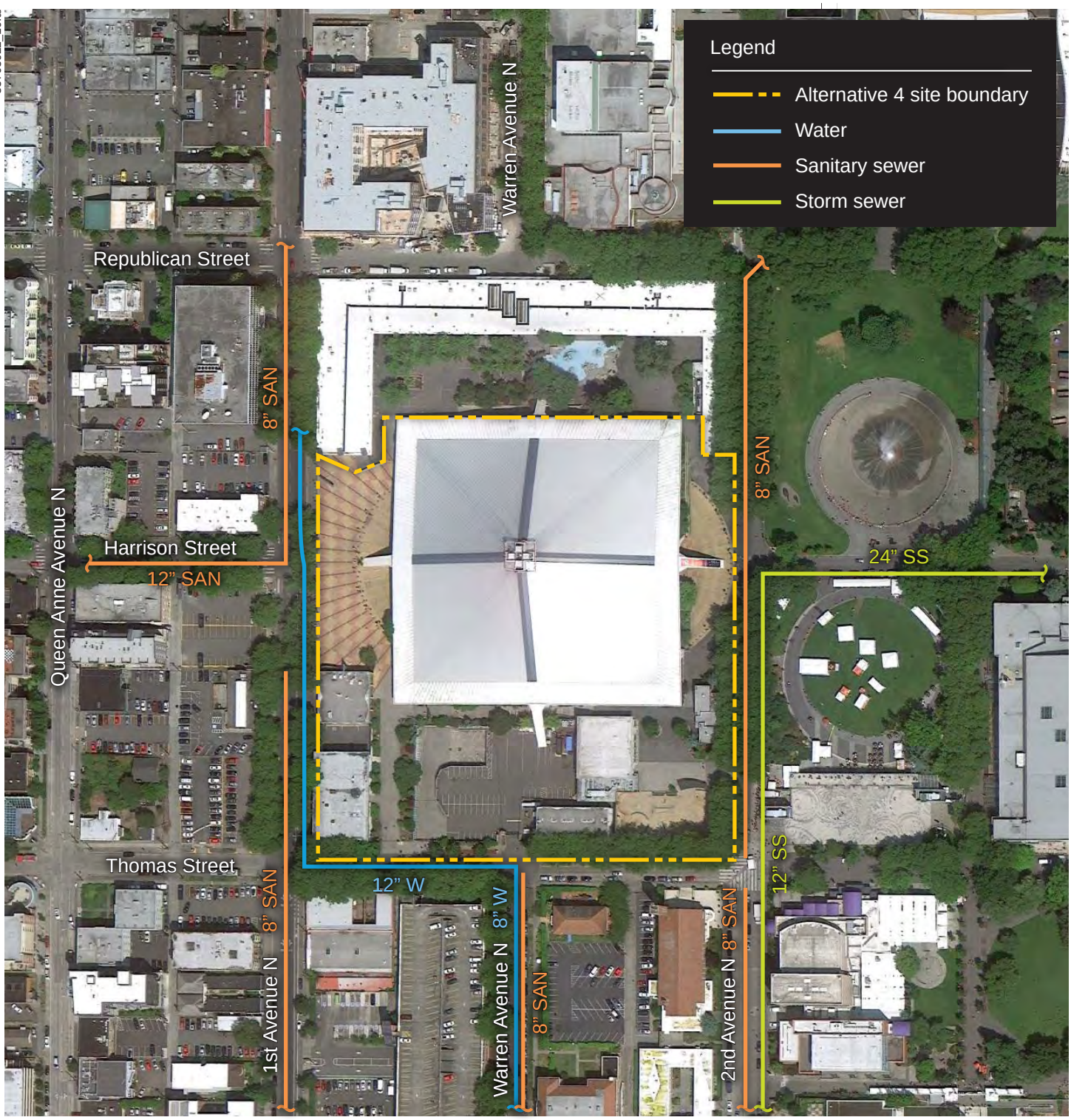
Sanitary Sewer System (SPU)

Wastewater generation from the existing KeyArena site is produced by discharges from seven occupied buildings. Based on an arena configuration similar to the Proposed Project (Alternative 2), an estimated annual sewer production volume was calculated, and is summarized in the table below as "wastewater."

Sanitary sewer "wastewater" is discharged to multiple side sewers with connection points to the existing combined public sewer system. Sewage is discharged from structures at the northwest corner of the KeyArena site to a 12-inch combined sewer at the intersection of 1st Avenue N. and Harrison Street, and also to an 8-inch combined sewer in 1st Avenue N. just south of Harrison Street. Another side sewer from the south end of the site connects to an 8-inch combined sewer main in Warren Avenue N., and two additional side sewers from the north and east sides of the site connect to the 8-inch combined sewer main in 2nd Avenue N. See Figure 3.3-2.

3.3.2.1 Impacts of the No Action Alternative at Alternative 4 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 4 for a new arena. There would be no direct effects to groundwater, water supply, stormwater systems, or sanitary sewer systems.



Source: Google Earth Pro

0 200 400

Scale in Feet

Figure 3.3-2

Utilities in the Vicinity of Alternative 4

Job No. 33763922

URS

Seattle Arena
Final EIS

3.3.2.2 Impacts of Alternative 4 - KeyArena 20,000-Seat Arena

Groundwater

As a result of the anticipated depth to groundwater, Alternative 4's structure or foundation would likely not intercept groundwater during construction.

Water System (SPU)

Prior to design development, the design engineer would obtain a water availability certificate from SPU. This certificate would provide water service connection information and would recommend an existing water line to connect to. It is anticipated that Alternative 4 would be able to connect to either the existing 12-inch water main on Thomas Street or the 12-inch water main on 1st Avenue N. Fire flow tests would be required by SPU during the design coordination process to verify adequate fire flow availability. It is anticipated that the static pressure of 90 psi and 12-inch water mains would be adequate for arena development needs.

The existing water usage on the KeyArena site would likely increase with construction of a new arena. The total 2012 water usage records for the existing KeyArena show usage of approximately 1,500 CCF (1,122,000 gallons, which seems low and may not include all associated meters). An arena development would be larger and have a higher occupancy capacity than the existing structure. Water use based on the calculated wastewater discharge from an arena development would be 5,200,000 gallons. A discussion of wastewater generation is included as "Sanitary Sewer System" below.

No major water facilities are planned to be removed or relocated as part of the development. An additional fire main loop around the KeyArena site to provide fire protection along the north and east sides of a new facility would likely be constructed, depending on DPD and Fire Department review comments.

Stormwater System (SPU)

The likely stormwater connection to the downstream system is assumed to be at or near the existing maintenance hole at the intersection of 2nd Avenue N. and Harrison Street on the 24-inch separated stormwater main. Table 3.3-4 provides estimated annual existing and calculated annual stormwater flows for an arena at the KeyArena site, which are assumed to be the same as for Alternative 2:

Table 3.3-4
Estimated Existing and Future Annual Stormwater Flows - Alternative 4 – KeyArena Site

Condition	Stormwater (Gallons)
Existing	5,900,000
Alternative 4	4,950,000[1]

[1] Based on the arena assuming a 35,000 SF green roof

As with the other alternatives, further reduction in runoff is anticipated.

Preliminary estimates show that stormwater runoff from the site would decrease with the construction of a new arena. An arena would be designed to meet current City stormwater codes.

As the arena would connect to the separated stormwater system, both water quality and flow control facilities would likely be required. Two additional City requirements apply to the development: 1) Implementing green infrastructure to the maximum extent feasible; and 2) Green Area factor. Specific best management practices that would address these requirements have not been identified as there is no design proposed for the KeyArena site, but a net reduction in stormwater runoff volume compared to existing conditions is anticipated to occur.

All design requirements for incorporation of onsite detention, utilization of "Green Stormwater Infrastructure" practices and "Green Area Factor" would be incorporated into the site design if an arena were to be constructed on the KeyArena site. Code standards would also be used to prepare Temporary Erosion and Sedimentation Control plans, and all standards would be followed during construction activities to protect the existing stormwater and combined sewer systems and the project site environment.

Sanitary Sewer System (SPU)

With a seating capacity of 20,000 and holding year-round events and permanent offices, an arena would generate a significant amount of wastewater. A preliminary estimate of wastewater production based off of the mechanical engineers and civil engineers estimates was developed. The existing KeyArena has a seating capacity of 17,000, and since the actual total discharge for the site is not currently known, the existing total is assumed to be a percentage of the potential future development based on total seating capacity. Table 3.3-5 provides estimated annual existing and future wastewater flows for an arena at the KeyArena site:

Table 3.3-5
Estimated Annual Existing and Future Wastewater Flows - Alternative 4 – KeyArena Site

Condition	Wastewater (Gallons)
Existing (17,000 seats)	4,420,000
Alternative 4 (20,000 seats)	5,200,000[1]

[1] Conservative estimate, no water reuse strategies implemented.

Water reuse strategies (rainwater collection, smart detention, and onsite wastewater treatment) are being evaluated as part of the design process to further reduce wastewater and stormwater discharges from the site.

Stormwater is already discharged to a separate system in the vicinity of the site, so all wastewater flows can be routed through multiple existing sidesewer connections, depending on the best layout for the new arena. Given the relatively large wastewater flows from the site, the existing public sewer system would need to be analyzed during the design process to

determine where and how many different connections would be required to prevent exceeding the downstream capacity of the existing sewer mains.

If a new arena were to be developed on the KeyArena site, it is anticipated that the design of a new development would take advantage of code compliant low-flow plumbing fixtures and also to use water reuse design practices wherever practical. These efforts would minimize the effect of the additional flows to the existing system.

It is anticipated that marginally more wastewater flows would be produced by the developed site than the existing site, but these flows would be anticipated to be within the capacities of the existing combined sewer system serving the site.

3.3.2.3 Mitigation Measures

- Groundwater: No impacts to groundwater at the KeyArena site are anticipated and no mitigation measures are anticipated to be needed.
- Water System (SPU): No mitigation is anticipated to be needed for the water system, as there are no identified significant impacts.
- Stormwater System (SPU): No mitigation is anticipated to be needed.
- Sanitary Sewer System (SPU and King County): Flows are anticipated to be within the capabilities of existing systems. No mitigation measures are anticipated to be needed.

3.3.2.4 Secondary and Cumulative Impacts

There would be cumulative impacts to water supply and discharge created by the development of a new arena in conjunction with other development in the Seattle Center area. New and larger buildings may cumulatively increase the need for additional water supply; however code-compliant plumbing fixtures are targeted toward reducing water supply needs on a per person basis. New code requirements for onsite detention of stormwater, utilization of "Green Stormwater Infrastructure" practices and "Green Area Factor" low flow plumbing fixtures and water reuse design practices may reduce overall stormwater and sanitary sewer flows.

3.3.2.5 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to groundwater, water supply or discharge facilities are expected.

3.3.3 Alternative 5 - Memorial Stadium 20,000-Seat Arena

3.3.3.1 Affected Environment

Groundwater

As noted in Section 3.1, Geology and Soils, at the location of the nearby Space Needle the groundwater was encountered at depths ranging from about 55 to 80 feet below the ground surface (Dames & Moore 1961). However, groundwater was not encountered in several other borings that were completed as deep as about 100 feet below the ground surface.

Water System (SPU)

Existing water mains serving the project area include a 20-inch water main on Mercer Street or the 8-inch water main on 5th Avenue N. A hydrant one block north of Memorial Stadium at 4th Avenue N. and Mercer Street was tested on November 7, 2008, and was found to have a capacity of 4,000 gpm at 20 psi residual pressure. Per the March 11, 2013, email correspondence with Mark Jaeger of SPU, the static pressure at the Memorial Stadium site is approximately 100 psi. The total 2012 water usage for the existing Memorial Stadium was approximately 3,600 CCF (2,692,800 gallons). See Figure 3.3-3.

Stormwater System (SPU)

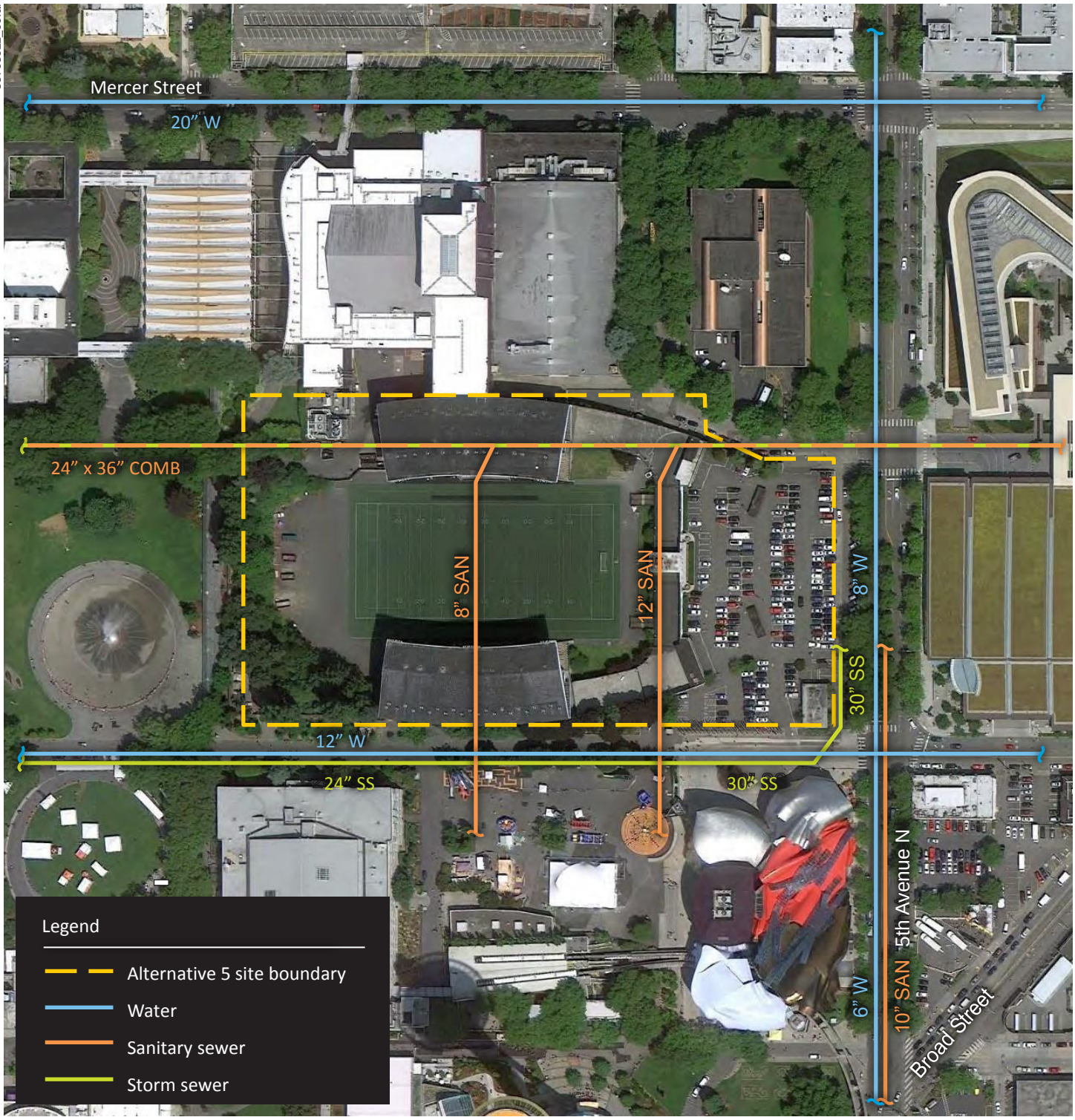
For existing stormwater runoff, the Memorial Stadium site is assumed to be all of the 6.3 acre parcel, where surface cover consists primarily of impervious surfaces (FieldTurf artificial playing surface, concrete walkways and stairs, gravel and building rooftops). A portion of the assumed site area has sparse tree cover and landscaping, but combined accounts for less than approximately three percent of total site cover, similar to the Stadium District and KeyArena sites. Stormwater is currently collected from the Memorial Stadium site in a separate piped stormwater system and routed to a 30-inch separated stormwater main running north on 5th Avenue N. See Figure 3.3-3.

Sanitary Sewer System (SPU)

Wastewater generation from the existing site is produced by discharges from stadium rest rooms and concession stands. Sanitary sewer "wastewater" is discharged to multiple side sewers with connection points to the existing 12-inch combined public sewer mains on Nob Hill Avenue N. and 4th Avenue N. (this main runs under the existing stadium site). The existing wastewater produced from the Stadium site is unknown, but an estimate based on the number of existing seats is roughly 3,120,000 gallons. See Figure 3.3-3.

3.3.3.2 Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. There would be no direct effects to groundwater, water supply, stormwater systems, or sanitary sewer systems.



Source: Google Earth Pro

0 200 400

Scale in Feet

Figure 3.3-3

Utilities in the Vicinity of Alternative 5

Job No. 33763922

3.3.3.3 Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Groundwater

As a result of the anticipated depth to groundwater, Alternative 5's structure or foundation would likely not intercept groundwater during construction.

Sanitary Sewer System (SPU)

Wastewater generation from the existing site is produced by discharges from stadium rest rooms and concession stands. Sanitary sewer "wastewater" is discharged to multiple side sewers with connection points to the existing 12-inch combined public sewer mains on Nob Hill Avenue N. and 4th Avenue N. (this main runs under the existing stadium site). The existing wastewater produced from the Stadium site is unknown, but an estimate based on the number of existing seats is roughly 3,120,000 gallons. See Figure 3.3-3.

3.3.3.4 Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. There would be no direct effects to groundwater, water supply, stormwater systems, or sanitary sewer systems.

3.3.3.5 Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Groundwater

As a result of the anticipated depth to groundwater, Alternative 5's structure or foundation would likely not intercept groundwater during construction.

Water System (SPU)

Prior to design development, the design engineer would obtain a water availability certificate from SPU. This certificate would provide water service connection information and would recommend an existing water line to connect to. It is anticipated that an arena on this site would be able to connect to either the existing 20-inch water main on Mercer Street or the 8-inch water main on 5th Avenue N. Additional fire flow tests may be required by SPU during the design coordination process to verify adequate fire flow availability. It is anticipated that the static pressure of 100 psi and the size of the existing supply mains in the area would be adequate for arena development.

The existing water usage on the site would likely increase with construction of a new arena. The total 2012 water usage for the existing Memorial Stadium was approximately 3,600 CCF (2,692,800 gallons), and a new arena development would have a higher occupancy capacity than the existing stadium (20,000 seats versus 12,000 seats). Water use based on the calculated wastewater discharge from the arena development is 5,200,000 gallons.

No major water facilities are planned to be removed or relocated as part of the development. An additional fire main loop around the Memorial Stadium site to provide fire protection along the east side of a new facility would likely be required to be constructed, depending on DPD and Fire Department review comments.

Stormwater System (SPU)

The likely stormwater connection to the downstream system is assumed to be at or near the existing connection with the 30-inch stormwater main on 5th Avenue N., just north of the intersection with Harrison Street. Table 3.3-6 provides estimated annual existing and future stormwater flows for an arena, which is assumed to be the same as for Alternatives 2 and 3:

Table 3.3-6
Estimated Annual Existing and Future Stormwater Flows - Alternative 5 – Memorial Stadium Site

Condition	Stormwater (Gallons)
Existing	5,900,000
Alternative 5	4,950,000[1]

[1] Based on the Arena assuming a 35,000 SF green roof

As with the other alternatives, further reduction in runoff would be anticipated. Preliminary estimates show that stormwater runoff from the site would decrease with the construction of a new arena. An arena at this site would be designed to meet current City stormwater codes.

As the arena would connect to the separated stormwater system, both water quality and flow control facilities would likely be required. Two additional City requirements apply to the development: 1) Implementing green infrastructure to the maximum extent feasible; and 2) Green Area factor. Specific best management practices that would address these requirements have not been identified as there is no design proposed for the Memorial Stadium site, but a net reduction in stormwater runoff volume compared to existing conditions is anticipated to occur.

All design requirements for incorporation of onsite detention, utilization of "Green Stormwater Infrastructure" practices and "Green Area Factor" would be incorporated into the site design. Code standards would also be used to prepare Temporary Erosion and Sedimentation Control plans, and all standards would be followed during construction activities to protect the existing stormwater and combined sewer systems and the project site environment.

Sanitary Sewer System (SPU)

Based on an arena configuration similar to the Proposed Project (Alternative 2), an estimated annual sewer production volume was calculated, and is summarized in the table below as "wastewater." For potential future wastewater generation, the Memorial Stadium site would be a zero lot-line development, and would occupy the full extent of 6.3-acre stadium parcel.

With a seating capacity of 20,000 and holding year-round events and permanent offices, an arena at the Memorial Stadium site would generate a substantial amount of wastewater. A

preliminary estimate of wastewater production based off of the mechanical engineers and civil engineers estimates was developed. The existing Memorial Stadium has a seating capacity of 12,000, and since the actual total discharge for the site is not currently known, the existing total is assumed to be a percentage of the potential future development based on total seating capacity. Table 3.3-7 provides estimated annual existing and future wastewater flows for an arena at the Memorial Stadium site:

Table 3.3-7
Estimated Annual Existing and Future Wastewater Flows - Alternative 5 – Memorial Stadium Site

Condition	Wastewater (Gallons)
Existing (12,000 seats)	3,120,000
Alternative 5 (20,000 seats)	5,200,000[1]

[1] Conservative estimate, no water reuse strategies implemented.

Water reuse strategies (rainwater collection, smart detention, and onsite wastewater treatment) would be evaluated as part of the design process to further reduce wastewater and stormwater discharges from the site.

Stormwater is already discharged to a separate system in the vicinity of the site, so all wastewater flows could be routed through multiple existing sidesewer connections, depending on the best layout for a new arena. Given the relatively large wastewater flows from the site, the existing public sewer system would need to be analyzed during the design process to determine where and how many different connections would be required to prevent exceeding the capacity of downstream sewer mains. In addition, the depth of the existing 12-inch sewer main on 4th Avenue N. would need to be evaluated as part of an arena design to determine whether the foundation elevation for the arena at the Memorial Stadium site would impact the existing sewer, thus requiring a relocation of these facilities or a revision to the depth of the arena structure.

It is anticipated that if an arena were to be located on the Memorial Stadium site, the design of the development would take advantage of code compliant low flow plumbing fixtures and also use water reuse design practices wherever practical. These efforts would minimize the effect of the additional flows to the existing system.

It is anticipated that substantially greater wastewater flows would be produced by the developed site than the existing site, but these flows would be within the capacities of the existing combined sewer system serving the site. The depth of the existing 12-inch sewer main on 4th Avenue N. in relationship to the potential Alternative 5 structure elevation for an arena may require either a relocation of the existing 12-inch sewer main, or a change in the depth of an arena structure to mitigate any potential conflicts.

3.3.3.6 Mitigation Measures

- Groundwater: No impacts to groundwater at the Memorial Stadium site are anticipated and no mitigation measures are anticipated to be needed.

- Water System (SPU): No mitigation is anticipated to be needed for the water system, as there are no identified significant impacts. New services for domestic and fire system connections would be provided as necessary to meet City code requirements.

- Stormwater System (SPU): No mitigation is anticipated to be needed.

- Sanitary Sewer System (SPU and King County): Flows are anticipated to be within the capabilities of existing systems. No mitigation measures are anticipated to be needed.

3.3.3.7 Secondary and Cumulative Impacts

Secondary and cumulative impacts from Alternative 5 would be the same as described above for Alternative 4.

3.3.3.8 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to groundwater, water supply or discharge facilities are expected.

3.4 Scenic Resources

3.4.1 Introduction

As described in Section 2, ArenaCo is proposing to construct an approximately 750,000 square feet – 20,000-seat spectator sports facility. The approximate dimensions of the facility would be 400 feet wide, 720 feet long (including exterior features such as the pedestrian plaza), and up to 125 feet tall. For the purpose of analyzing potential effects on visual resources, it has been assumed that the structure would be of the same size and dimensions for each of the Action Alternatives.

The City of Seattle's State Environmental Policy Act (SEPA) rules provide protection for certain defined public views and views toward historic landmarks. The section on Public View Protection indicates, "*The City has developed particular sites for the public's enjoyment of views of mountains, water and skyline and has many scenic routes and other public places where such views enhance one's experience*" (SMC 25.05.675). Protected views include Mount Rainier, the Cascade and Olympic mountain ranges, Puget Sound, Lake Washington, Lake Union, the Ship Canal, and the Downtown Skyline. The City does not protect views from private property.

3.4.1.1 Public Viewpoints

An inventory completed by the City of Seattle (City) in May 2002 represents a visual appraisal and inventory of amenities at 86 sites throughout Seattle (City of Seattle 2002). These sites are identified in Seattle's Environmental Policies governing the review and conditioning of physical development in the City (SMC 25.05.675P). These sites represent the extent to which the City historically has considered public views in the review and conditioning of development through the Master Use Permit and SEPA review process.

Of these, nine have a potential view of the site of the Proposed Project or other Build Alternatives:

- Bhy Kracke Park Viewpoint
- Gasworks Park Viewpoint
- Hamilton View Point Park Viewpoint
- Kerry Park Viewpoint
- Kobe Terrace Park Viewpoint
- Myrtle Edwards Park Viewpoint
- Dr. Jose Rizal Park Viewpoint
- Seacrest-Harbor Vista Park Viewpoint

- Admiral Viewpoint in Belvedere Park

Accordingly, each of the identified viewpoints was studied to determine whether the Proposed Project or other Build Alternative would affect the view from the park; see Sections 3.4.2.3 Impacts of Alternatives 2 and 3, and 3.4.3.3 Impacts of Alternatives 4 and 5 below for more information.

3.4.1.2 Views of the Space Needle

Seattle's SEPA Policy on Public View Protection, SMC 25.05.675 P.2.c states:

> *c. It is the City's policy to protect public views of the Space Needle from the following public places. A proposed project may be conditioned or denied to protect such views, whether or not the project meets the criteria of the Overview Policy set forth in SMC Section 25.05.665.*
>
> *i. Alki Beach Park (Duwamish Head)*
> *ii. Bhy Kracke Park*
> *iii. Gasworks Park*
> *iv. Hamilton View Point*
> *v. Kerry Park*
> *vi. Myrtle Edwards Park*
> *vii. Olympic Sculpture Park*
> *viii. Seacrest Park*
> *ix. Seattle Center*
> *x. Volunteer Park*

Accordingly, each of the identified locations was studied to determine whether the Proposed Project or other Build Alternatives would be visible from that park and whether it would affect the view from the park of the Space Needle; see Section 3.4.3.3 Impacts of Alternatives 4 and 5 below for more information.

Scenic Routes

The City's SEPA policies also address the protection of public views from City streets designated as scenic routes; see Sections 3.4.2 and 3.4.3 for more information.

3.4.2 Stadium District Alternatives – Alternatives 2 and 3

3.4.2.1 Affected Environment

Views from Public Viewpoints

Five viewpoints were identified as having a potential view of Alternatives 2 and 3. A summary of these viewpoints describing which alternative may be visible from that location, and the main viewing direction of the alternative's location is provided in Table 3.4-1 below. The location of the viewpoints is shown on Figure 3.4-1.



Source: USGS 7.5-minute topographic quadrangles, Seattle North, Seattle South, Duwamish Head, and Shilshole Bay, Washington, 2011

Figure 3.4-1

Scenic Viewpoints and Scenic Routes Near Alternatives

Job No. 33763922

Table 3.4-1
Public Viewpoints Where Alternatives 2 and 3 May Be Visible

Public Viewpoint	Alternative(s) Potentially Visible	Viewing Direction
Hamilton View Point Park Viewpoint	Alternatives 2 and 3	East-Southeast
Kobe Terrace Park Viewpoint	Alternatives 2 and 3	Southwest
Dr. Jose Rizal Park Viewpoint	Alternatives 2 and 3	West
Seacrest-Harbor Vista Park Viewpoint	Alternatives 2 and 3	East-Southeast
Admiral Viewpoint in Belvedere Park	Alternatives 2 and 3	Northeast

Views of the Space Needle

There are no SEPA-protected views toward, or of, the Space Needle in the vicinity of Alternatives 2 and 3.

Scenic Routes

Scenic routes in the vicinity of Alternatives 2 and 3 include 12th Avenue S., Interstate 5 (I-5), and Interstate 90 (I-90). The relationship of the scenic routes to these alternatives is described below.

12th Avenue S.

This scenic route provides views westward primarily at the 12th Avenue S. Bridge crossing S. Dearborn Street, with views of the Seattle Skyline, Puget Sound, the Olympic Mountains, West Seattle, and South Downtown.

Interstate 5

Southbound I-5 motorists have a limited number of views of Alternatives 2 and 3. Northbound motorists approaching downtown have a few opportunities to view the alternatives vicinity with the Downtown Skyline in the background. Safeco Field and CenturyLink Field are visual landmarks from the northbound I-5 locations where views are possible.

Interstate 90

Views toward the west from I-90 are of a perspective toward CenturyLink Field and the Dearborn Street vicinity.

3.4.2.2 Impacts of the No Action Alternative at Alternative 2 and 3 Site

As this alternative does not include construction of a new arena, impacts to scenic resources would not occur as a result of construction of a new Arena. Westerly views toward the SoDo Arena site include the adjacent marine industrial landscape in the background. The industrial landscape includes the views of the Port's 27 container cranes (as of February 2015), most of which are 100 feet in height and painted either orange or white, colors that contrast with the background. In addition the Port container facilities include a daily changing landscape of

stacks of containers being loaded or unloaded, and container trucks or trains delivering or picking up the containers.

3.4.2.3 Impacts of Alternatives 2 and 3

Construction

Short-term alterations from viewpoints may occur during construction. No impacts are anticipated with Alternatives 2 or 3.

Views from Public Viewpoints

Hamilton View Point Park Viewpoint

The viewpoint, located on the promontory of Admiral Hill, provides panoramic views of the Downtown Skyline and Cascade Mountains, secondary views of Puget Sound, and a protected view of the Space Needle across Elliott Bay. Tall trees on the slopes below partially obscure views of ferry traffic and maritime activity and may further obscure views of the City Skyline in the future. Due to the distance and lack of a clear view due to vegetation, Alternative 2 or 3 would likely be seen as additional elements in the background of downtown buildings.

Kobe Terrace Park Viewpoint

Kobe Terrace offers panoramic views of the Downtown Skyline (International District and Pioneer Square areas) and a framed view of Puget Sound. Safeco Field (approximately 225 to 250 feet high) and CenturyLink Field (approximately 251 feet high) are currently visible from this viewpoint. With either Alternative 2 or 3, the proposed Arena constructed to the south of Safeco Field would be visible as it would be up to 125 feet high; however views of Puget Sound would not be affected.

Dr. Jose Rizal Park Viewpoint

This park's viewpoint offers wide-angle views of the Olympic Mountains, Puget Sound, and the Downtown Skyline. Both Safeco Field and CenturyLink Field feature prominently in the view. With either Alternative 2 or 3, the proposed Arena constructed to the south of Safeco Field would be visible; however views of Puget Sound would not be affected.

Seacrest-Harbor Vista Park Viewpoint

The park provides panoramic views of Puget Sound, the Downtown Skyline, Mt. Rainier, and a protected view of the Space Needle. Due to the distance of the viewpoint to the site of Alternatives 2 or 3, the Arena would add to the Downtown Skyline but not be prominent in the view.

Admiral Viewpoint in Belvedere Park

This viewpoint offers panoramic views of the Downtown Skyline, Puget Sound, and the Cascade Mountains. With either Alternative 2 or 3, the proposed Arena constructed to the south of Safeco Field would be visible; however existing views of the Downtown Skyline and the Cascade Mountains would not be affected.

Views from Scenic Routes

The Proposed Project (Alternative 2) or Alternative 3 would be visible from the 12th Avenue S., I-5, and I-90 scenic routes. Views from users of these routes are glancing and intermittent. From these scenic routes, the existing Safeco Field and CenturyLink Field are visible, along with Port activities and industrial-type uses. The Arena would be visible at points along both interstates and 12th Avenue S., but at a smaller height and scale than the existing Stadiums.

Views from Private Property

With a height of approximately 125 feet and dimensions of approximately 720 by 400 feet, Alternatives 2 or 3 would be smaller than the two existing Stadiums, but larger than many of the older industrial buildings located to the south. Depending on the distance from the site, the presence of the new Arena would change the existing foreground, middle ground or background views from private properties. Existing views from downtown toward the south and from residences east of the site of Alternatives 2 and 3 looking toward the Puget Sound would also change.

3.4.2.4 Mitigation Measures

There would be changes to some views from public viewpoints and scenic routes. No mitigation is anticipated to be needed.

3.4.2.5 Secondary and Cumulative Impacts

No secondary impacts are expected.

Cumulative impacts may result from future increased heights and densities of new development near these alternatives that could add to the obstruction of views of Puget Sound from identified public parks. Adding a new building of the proposed size of the Arena would add to the skyline in this location, extending the higher profile of buildings farther to the south than currently exists with the Safeco Field and CenturyLink Field.

3.4.2.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to scenic resources are expected from the construction and operation of either the Proposed Project or Alternative 3.

3.4.3 Seattle Center Area Alternatives - Alternatives 4 and 5

3.4.3.1 Affected Environment

Views from Public Viewpoints

Six viewpoints were identified as having a potential view of Alternatives 4 and 5. A summary of these viewpoints describing which alternative may be visible from that location, and the main viewing direction of the alternative's location is provided in Table 3.4-2 below. The location of the viewpoints is shown on Figure 3.4-1.

Table 3.4-2
Public Viewpoints Where Alternatives 4 and 5 May Be Visible

Public Viewpoint	Alternative(s) Potentially Visible	Viewing Direction
Bhy Kracke Park Viewpoint*	Alternatives 4 and 5	South
Gasworks Park Viewpoint*	Alternatives 4 and 5	Southwest
Hamilton View Point Park Viewpoint*	Alternatives 4 and 5	East-northeast
Kerry Park Viewpoint*	Alternatives 4 and 5	Southeast
Myrtle Edwards Park Viewpoint*	Alternatives 4 and 5	East-northeast
Seacrest-Harbor Vista Park Viewpoint*	Alternatives 4 and 5	Northeast

* indicates viewpoint also has a SEPA-protected view of the Space Needle.

Views of the Space Needle

As described in Table 3.4-2 above, views from specified Seattle City Parks of the Space Needle are protected; an analysis of impacts is described in Section 3.4.3.3 Impacts of Alternatives 4 and 5 below.

Scenic Routes

The streets on the perimeter of these alternatives are designated as scenic routes for their territorial views of the City and surrounding mountains and water bodies; and views of structures within Seattle Center such as the Space Needle and the Pacific Science Center.

3.4.3.2 Impacts of the No Action Alternative at Alternatives 4 and 5 Sites

As this alternative does not include construction of a new arena, impacts to scenic resources would not occur.

3.4.3.3 Impacts of Alternatives 4 and 5

Construction

Short-term alterations from viewpoints may occur during construction. No impacts are anticipated with Alternatives 4 or 5.

Views from Public Viewpoints

Bhy Kracke Park Viewpoint

The park viewpoint features panoramic views of the Downtown Skyline, and secondary views of Lake Union, Puget Sound, and the Cascades. Some views are partially obscured by vegetation. With Alternative 4 at the KeyArena site, an arena would be approximately twice as high as the existing KeyArena (up to 125 feet high from the existing 70 feet above ground level from the KeyArena). The Land Use section (Section 3.6) suggests that the floor of a new arena could be placed at a level similar to the playing floor of the existing KeyArena, and this would lower the overall height of the structure.

At the Alternative 5 Memorial Stadium site, the arena would be up to 40 feet taller than the existing Memorial Stadium. Memorial Stadium is approximately 85-feet high. As the view from Bhy Kracke Park Viewpoint is partially obscured by vegetation, Alternative 5 would be partially visible from this location.

Gasworks Park Viewpoint

The park's viewpoints present panoramic views of Lake Union, the Downtown Skyline, the Lake Washington Ship Canal, and a protected view of the Space Needle. Views of Alternatives 4 and 5 would be obscured by Queen Anne Hill and existing development.

Hamilton View Point Park Viewpoint

The viewpoint, located on the promontory of Admiral Hill, provides panoramic views of the Downtown Skyline and Cascade Mountains, secondary views of Puget Sound, and a protected view of the Space Needle across Elliott Bay. With Alternative 4, the arena would be taller than the existing KeyArena, unless the playing floor of a new arena were placed at the same level as the existing floor of the KeyArena. If not lowered into the site, a new arena at the site of the KeyArena may feature more prominently in the skyline.

Development of an additional 40 feet in height (approximately) at the Memorial Stadium location for Alternative 5 would not affect views from Hamilton Park of the Downtown Skyline or Cascade Mountains due to the distance.

Kerry Park Viewpoint

This park offers panoramic views of the Downtown Skyline, Puget Sound, Mt. Rainier, the Cascade Mountains, and a protected view of the Space Needle. As the arena under Alternative 4 would be taller than the existing KeyArena (unless lowered into the site similar to the existing KeyArena), views from Kerry Park of the site would be changed by a higher roofline. The Memorial Stadium location is obscured by vegetation; Alternative 5 would not be visible from Kerry Park.

Myrtle Edwards Park Viewpoint

The park offers panoramic views of Puget Sound, Olympic Mountains, the Downtown Skyline, and Mt. Rainier, with a protected view of the Space Needle. An existing building obscures the view of the locations of Alternatives 4 and 5 from the park.

Seacrest-Harbor Vista Park Viewpoint

The park provides panoramic views of Puget Sound, the Downtown Skyline, and Mt. Rainier, and a protected view of the Space Needle. As an arena under Alternative 4 would be taller than the existing KeyArena, distant views of the site from this viewpoint would be altered by the higher roofline.

Development of an additional 40 feet in height (approximately) at the Memorial Stadium location for Alternative 5 would not affect views from Seacrest-Harbor Vista Park of the Downtown Skyline or Mt. Rainier due to the distance; adverse effects resulting from Alternative 5 are not anticipated.

Views of the Space Needle

Each of the following parks was analyzed to determine whether Alternatives 4 and/or 5 would be visible from the park, and whether an arena on either site would affect the view of the Space Needle (see Table 3.4-3). The location of the parks and the viewpoints is shown in Figure 3.4-1.

Table 3.4-3
Summary of Potential View Effects of the Space Needle

Seattle Park	Would Alternative(s) be Visible?	Would Alternative Affect the View of the Space Needle?
Alki Beach Park	Yes (Alternatives 4 and 5)	No
Bhy Kracke Park	Yes (Alternatives 4 and 5)	Yes (Alternative 5)
Gasworks Park	No	No
Hamilton View Point	Yes (Alternatives 4 and 5)	No
Kerry Park	Yes (Alternative 4) No (Alternative 5)	No
Myrtle Edwards Park	No	No
Olympic Sculpture Park	No	No
Seacrest Park	Yes (Alternatives 4 and 5)	No
Seattle Center	Yes (Alternatives 4 and 5)	Depends on location of viewer within Seattle Center
Volunteer Park	Yes (Alternatives 4 and 5)	No

A view of the Space Needle was determined to be “affected” if the alternative would be located in front of the Space Needle in the view from the park or within the identified view corridor.

If Alternative 5 were implemented, views of the Space Needle would be affected from Bhy Kracke Park, as an increase in height at the current Memorial Stadium of up to 40 feet may

obstruct a portion of the lower view of the Space Needle. The City requires mitigation measures if a proposed project would reduce the full view of the Space Needle, which is 605 feet tall, beyond at least three-quarters of the structure and the entire saucer (City of Seattle 2001a and 2001b). Generally, this means that mitigation measures would be required for any structure in excess of 151 feet that could block views. As the proposed Arena is up to 125 feet tall, it is below the threshold requiring mitigation.

Views from Scenic Routes

Alternatives 4 or 5 would add to the skyline views from adjacent scenic routes. Depending on the location on the surrounding street and the viewing direction, vehicular drivers, bicyclists, and pedestrians would have intermittent views of the arena amidst structures visible at Seattle Center.

Views from Private Property

With a height of approximately 125 feet and dimensions of approximately 720 by 400 feet, Alternatives 4 or 5 would be larger and taller than the existing KeyArena and Memorial Stadium unless a new arena on the site of the KeyArena were depressed into the site similar to the existing KeyArena. Depending on the distance from the site, the presence of a new arena at either the site of Alternative 4 or 5 would change the existing foreground, middle ground or background views from private properties. Views from downtown and nearby residences would change.

3.4.3.4 Mitigation Measures

There would be changes to some views from public viewpoints and scenic routes. No mitigation is anticipated to be needed.

3.4.3.5 Secondary and Cumulative Impacts

No secondary impacts are expected.

Cumulative impacts may result from future increased heights and densities of new development near Seattle Center that could further obstruct views of the Space Needle from designated parks. Similar to Alternative 2 and 3, adding a new building of the proposed size of the arena at either the site of the KeyArena or Memorial Stadium would alter the skyline of this portion of Seattle.

3.4.3.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to scenic resources are expected from the construction and operation of an arena at the site of either Alternatives 4 or 5.

3.5 Noise

3.5.1 Introduction

Noise impacts from a new arena are anticipated to be largely due to the construction, and not to the operation itself, as the activities would be contained within a building. Noise from crowds outside of a spectator sports facility, or from traffic going to or from a spectator sports facility are not typically included in a noise analysis of a facility. This impact assessment is focused on the construction of an arena at the Stadium District site, the KeyArena site and the Memorial Stadium site.

3.5.1.1 Noise Characteristics

Noise can be defined generally as unwanted sound. Prolonged exposure to very high sounds can cause hearing loss or impairment, although environmental noise in urban areas rarely approaches sound levels that could cause hearing damage. The primary effect of environmental noise is annoyance that interferes with sleep, thought, and conversation.

Noise is expressed on a logarithmic scale in units of decibels (dB). Noise is composed of many frequencies, and the various frequencies commonly are measured as A-weighted decibels (dBA), which approximate how an average person hears a sound. Under the logarithmic decibel scale, a doubling of the number of noise sources, such as the number of vehicles on a roadway, increases noise levels by 3 dBA. For example, a noise source emitting a noise level of 60 dBA added to another noise source of 60 dBA results in a combined noise level of 63 dBA, not 120 dBA.

The common descriptor for measuring and predicting environmental noise is the equivalent sound level (L_{eq}). The L_{eq} can be considered a measure of the average sound level for a specific period of time. The maximum sound level during that period of time is called the L_{max}. Unlike the L_{eq} that is an average over a period of time, L_{max} is a measurement of a single event of short duration during that time period. Both the L_{max} and L_{eq} are used in local noise ordinances to evaluate the noise limits at receiving properties.

Loudness, compared to physical sound measurement, refers to how people judge a sound and varies from person to person. A listener often judges an increase of 5 dBA to be readily noticeable and an increase of 10 dBA to be twice as loud. A change of sound level of 2 dBA or lower generally would not be perceptible.

3.5.1.2 Noise Regulations

Noise regulations provide a basis for evaluating potential noise impacts and mitigation measures during construction of the proposed Arena. The City of Seattle has noise regulations in Chapter 25.08 of the Seattle Municipal Code. The Seattle noise limits are based on the land

use districts or zones of both the noise source and receiver, and on the time of day. The Seattle noise regulations are summarized in Table 3.5-1.

Table 3.5-1
City of Seattle Exterior Sound Level Limits

	District of Receiving Property			
District of Sound Source	Residential Day (L_{eq} dBA)	Residential Night (L_{eq} dBA)	Commercial (L_{eq} dBA)	Industrial (L_{eq} dBA)
Residential	55	45	57	60
Commercial	57	47	60	65
Industrial	60	50	65	70

Notes:
1) The exterior sound level limits are based on the L_{eq} during the measurement interval, using a minimum measurement interval of 1 minute for a constant sound source, or a one-hour measurement for a non-continuous sound source.
2) During a measurement interval, L_{max} may exceed the exterior sound level limits by no more than 15 dBA.
3) Sound level limits are reduced by 10 dBA for residential receiving property between 10:00 PM and 7 AM during weekdays and between 10:00 PM and 9:00 AM on weekends and legal holidays (SMC 25.08).

The Seattle noise regulations have specific provisions for construction noise in Section 25.08.425 of the Seattle Municipal Code. Construction activities in Seattle generally have higher noise limits between 7:00 AM and 10:00 PM on weekdays, and between 9:00 AM and 10:00 PM on weekends and holidays; but must meet the lower noise limits in Table 3.5-1 during nighttime hours. The noise limits in Table 3.5-1 may be exceeded in daytime by 25 dBA for large construction equipment such as dozers and drills, by 20 dBA for portable construction equipment such as chainsaws and powered hand tools, and by 15 dBA for maintenance equipment such as lawn mowers.

Noise from construction impact equipment such as jackhammers and pile drivers during any 1-hour period may not exceed a L_{eq} of 90 dBA continuously, 93 dBA for 30 minutes, 96 dBA for 15 minutes, and 99 dBA for 7 1/2 minutes. The higher noise limits for impact equipment may occur between 8:00 AM and 5:00 PM on weekdays and 9:00 AM and 5:00 PM on weekends and holidays.

3.5.2 Stadium District Alternatives – Alternatives 2 and 3

3.5.2.1 Affected Environment

Alternatives 2 and 3 would be located in the southern portion of the Stadium District, which is in the South Downtown area of the City of Seattle (See South Downtown Neighborhoods Figure 3-1 in Chapter 3). The Stadium District site is surrounded by mixed commercial and light industrial uses, including offices, warehouses, parking lots, street-front retail, and restaurants. To the north of the site is the Safeco Field parking garage, Safeco Field, CenturyLink Field, and CenturyLink Event Center. BNSF Railroad facilities are located to the east of the existing stadiums and the Stadium District site.

Noise-sensitive land uses include the commercial area along 1st Avenue S., Safeco Field, CenturyLink Field, and CenturyLink Event Center that are sensitive to noise during events.

Residences are not located in the immediate vicinity of the Stadium District site. The nearest residential areas are located to the north in the International District and Pioneer Square area.

The existing noise environment in and around the Stadium District site is typical of an active urban and industrial area. Existing noise sources include traffic on area roadways, loading-dock operations, rail yards and trains, overhead aircraft, and trucks serving the industrial and Port uses to the south. Major events at Safeco Field and CenturyLink Field also are local noise sources.

3.5.2.2 Impacts of the No Action Alternative at Alternatives 2 and 3 Site

Construction

Under the No Action Alternative, construction noise for a new arena would not occur at the Stadium District site of Alternatives 2 and 3. Other anticipated development projects in the Stadium District areas would temporarily generate noise during construction. Construction noise impacts would not be anticipated under Alternative 1, No Action.

3.5.2.3 Impacts of Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

Construction

Construction activities would intermittently generate noise from demolition, site preparation, construction, and paving activities. Construction noise levels would vary, depending on the equipment being used, location, and time and duration of the construction activity. Noise during construction could be disruptive at times for nearby land uses. Construction noise would be most noticeable at locations near construction activities, and during nighttime construction if proposed. Any potential construction noise impacts would be considered temporary or short-term, and would include reasonable mitigation measures to reduce construction impacts. Construction activities also would comply with the City of Seattle noise regulations where applicable.

Construction noise sources would include earth movers, generators, trucks, and impact equipment. Maximum noise levels of construction equipment would be similar to the typical construction equipment noise levels presented in Table 3.5-2 below.

The construction noise levels in Table 3.5-2 are for individual equipment operating separately, and do not represent L_{eq} levels over any particular period. Average L_{eq} levels would depend on the type and number of construction equipment, how often the equipment operates, location within the construction area, and distances to nearby residences. Because various construction equipment at any time could be turned off, idling, or operating at less than full power, and because construction machinery is typically used to complete short-term tasks, average construction L_{eq} levels would be lower than the maximum sound levels in Table 3.5-2.

Table 3.5-2
Construction Equipment Sound Ranges

Equipment	Examples	Noise Level At 50 feet (dBA)[1]	Noise Level At 100 feet (dBA)[2]	Noise Level At 400 feet (dBA)[3]
Earth Moving	Compacters, loaders, backhoes, tractors, graders, pavers	73-96	67-90	55-78
Materials Handling	Concrete mixers and pumps, cranes, derricks	74-88	68-82	56-70
Stationary	Pumps, compressors, generators	69-87	63-81	51-69
Hauling	Trucks	83-94	77-88	65-76
Impact Equipment	Pile drivers	95-106	89-100	77-88
Impact Tools	Jackhammers, rock drills, pneumatic wrenches	81-98	75-92	63-80

Notes:
1) Noise levels at 50 feet from *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (U.S. EPA 1971).
2) Noise levels at other distances extrapolated by an attenuation rate of 6 dBA per doubling of distance from the source at 50 feet.
3) Noise levels do not consider the shielding effects of buildings and other obstructions.

Pile driving would be the major source of construction noise. Pile driving with impact equipment includes repetitive, loud banging, which could be particularly intrusive to nearby receivers. While pile driving would be intermittent and limited to daytime hours, construction noise from pile driving could be an adverse impact for some nearby land uses.

Pile driving activity related to construction of the Proposed Project (Alternative 2) could result in noise levels in the range of 95 to 106 dBA at 50 feet (Table 3.5-2). Pile driving noise would be highest at the commercial uses along 1st Avenue S. The nearest existing residential receptors to the Stadium District site are the work / live lofts in the Bemis building at 55 South Atlantic, which is approximately 700 feet away from potential pile driving activity. At that distance, pile driving noise levels would be 72 to 83 dBA.

All pile driving would include mitigation to comply with the noise limits in the City of Seattle noise regulations. Potential mitigation measures would include using the quietest available equipment or noise shielding. Pile driving also would be restricted to the time periods of 8:00 AM to 5:00 PM on weekdays and 9:00 AM to 5:00 PM on weekends and holidays.

Ground vibrations could occur during construction as the result of the use of heavy equipment during the demolition of existing structures, ground improvement activities, compaction equipment operations, and truck traffic. These vibrations could be annoying to individuals working or living within the area, and / or potentially cause damage to nearby structures or utilities. Vibration monitoring would be implemented if necessary to prevent offsite adverse effects (see Section 3.1, Geology and Soils).

Construction noise levels would vary over time and location during the construction period. Construction noise from louder construction equipment would be greater at times than background noise levels in the vicinity of the construction activity. An adverse impact could

occur temporarily at noise-sensitive locations near construction activity during daytime hours. If construction were to include pile driving, then noise impacts could occur at adjacent offsite uses. Nighttime impacts are not anticipated, because nighttime construction noise would not occur. Any construction noise impacts would be short-term impacts.

Construction noise would be reduced with reasonable mitigation measures, such as using engine enclosures and mufflers, locating equipment farther from sensitive receptors, and turning off equipment during periods of nonuse. Construction activity also would comply with the applicable provisions of the City of Seattle noise regulations.

It is possible that a NBA or NHL team could be acquired prior to the completion of a new arena. If so, during construction of the Proposed Project, NBA games would need to be played at another location, most likely KeyArena in the Queen Anne area of the City of Seattle. Vehicular noise associated with NBA or NHL games would be similar to traffic noise at other larger events at KeyArena. Because traffic conditions for temporary use of KeyArena would be similar to large events already there, traffic noise in the Queen Anne area are not anticipated to increase substantially. Any traffic mitigation to reduce traffic volumes during temporary use of KeyArena would provide corresponding reductions in traffic noise before and after events.

3.5.2.4 Impacts of Alternatives 3 – Stadium District 18,000-Seat Arena

Construction

Construction noise levels and mitigation would be similar to Alternative 2. An adverse impact could occur temporarily at noise-sensitive locations near construction activity during daytime hours. If construction were to include pile driving, then noise impacts could occur at adjacent offsite uses. Nighttime impacts are not anticipated, because nighttime construction noise would not occur. Any construction noise impacts would be short-term impacts.

3.5.2.5 Mitigation Measures Applicable to Alternatives 2 and 3

Construction

The Proposed Project or Alternative 3 would include reasonable mitigation measures to reduce construction noise impacts at nearby land uses. Because construction noise is subject to the City of Seattle noise regulations, noise mitigation could be required to comply with the City's noise limits. Construction mitigation would be incorporated into construction plans and contractor specifications in the construction contract. Construction mitigation measures for the Proposed Project or Alternative 3 would include the SMC 25.08.425 requirements limiting the hours of noisier construction activities, including:

- Noisier construction activities would be limited to between 7:00 AM and 10:00 PM, eliminating construction noise and vibration during sensitive nighttime hours.

- Pile driving and use of other impact equipment would be limited to between 8:00 AM and 5:00 PM on weekdays and 9:00 AM and 5:00 PM on weekends and holidays pursuant to SMC 25.08.425.C, eliminating impact noise during sensitive nighttime hours.

In addition, the following construction noise mitigation measures are recommended for consideration by DPD:

- Equipping engines of construction equipment with adequate mufflers, intake silencers, or engine enclosures would reduce engine noise.
- Requiring contractors to use the quietest equipment available, maintain all equipment, and train their equipment operators would reduce noise levels and increase efficiency of operation.
- Turning off construction equipment during prolonged periods of nonuse would eliminate noise from construction equipment during those time periods.
- Locating stationary equipment and construction staging areas away from sensitive uses would reduce noise impacts because of greater distances to noise-sensitive receptors. The actual construction staging would be determined during the final design phases of the project.
- Installing temporary noise barriers, shields, or curtains around stationary construction equipment would decrease noise levels at nearby sensitive receptors.
- Routing construction trucks to avoid sensitive receptors.
- Implementing vibration monitoring if necessary to prevent offsite adverse effects.

As noted above, pile driving noise would be limited to the hours allowed in the Noise Ordinance (8:00 AM to 5:00 PM on weekdays and 9:00 AM to 5:00 PM on weekends and holidays). The number of piles and types of pile drivers have not yet been determined. In addition to the restriction on time of day, noise from impact-type pile driving could be reduced by shielding, enclosures, regular maintenance, and other best management practices. The contractors could evaluate substituting auger-drilled piles for driven piles where necessary, which would substantially reduce construction noise and vibration but increase costs.

Nearby land uses could be notified in advance when noise-generating construction activities are scheduled. A telephone hotline number could be published and maintained by the construction company to directly receive calls from the public on noise and vibration impacts and other construction issues.

Under Alternatives 2 and 3, construction activities could be coordinated to limit louder construction noise from disrupting events scheduled at Safeco Field, CenturyLink Field, and CenturyLink Event Center. The contractors could develop and implement a construction noise management plan to reduce noise and vibration during construction. The plan could identify

measures to ensure compliance with the City of Seattle noise limits at receivers near construction activity.

3.5.2.6 Secondary and Cumulative Impacts

Cumulative noise impacts would be related to short-term increases in construction activity near the sites of Alternatives 2 and 3. Cumulative construction impacts could occur from the Proposed Project (Alternative 2) or Alternative 3 and other development projects being constructed at the same time near the Stadium District. Because construction noise under the new Arena and other development projects would be temporary in duration and comply with City noise regulations, short-term cumulative impacts during construction would be low under Alternatives 2 and 3.

Secondary noise impacts could result from economic growth and changes in land uses induced by the Proposed Project or Alternative 3. Any development induced by the Proposed Project or Alternative 3 would incrementally increase noise during construction activities. Although the location and specific amount of new development are unknown, incremental increases in construction noise likely would be small under Alternatives 2 and 3.

Secondary and cumulative noise impacts in the Stadium District would not occur under Alternative 1, No Action.

3.5.2.7 Significant Unavoidable Adverse Impacts

Short-term significant unavoidable adverse noise impacts due to pile driving could occur from the construction of Alternatives 2 or 3.

3.5.3 Seattle Center Area Alternatives – Alternatives 4 and 5

3.5.3.1 Affected Environment

Alternative 4 would be located in the Seattle Center, and Alternative 5 would be located adjacent to Seattle Center. Seattle Center is located in the lower Queen Anne area of the City of Seattle (See Uptown Urban Center Figure 3-3 in Chapter 3). Alternative 4 – KeyArena (KeyArena site) would be located in the western portion of the Seattle Center, while Alternative 5 – Memorial Stadium (Memorial Stadium site) would be located adjacent to the eastern portion of the Seattle Center. The Seattle Center is a mix of entertainment, museum, retail, open space, and recreational uses.

Noise-sensitive land uses include Seattle Center facilities, such as the KEXP Radio studios, SIFF, the VERA Project, Seattle Repertory Theater, the International Fountain and Lawn, Center House, McCaw Hall, and EMP Museum. The Uptown commercial district, which includes a variety of restaurants, is adjacent to the northwest corner of KeyArena. South of KeyArena is the Sacred Heart Catholic Church. East of the Memorial Stadium Site is the Bill & Melinda Gates Foundation headquarters. Multifamily and single-family residences are to the west, south, and north of the Seattle Center.

The existing noise environment in and around the Seattle Center is typical of an active urban area. Existing noise sources include traffic on area roadways, overhead aircraft, and events within the Seattle Center.

3.5.3.2 Impacts of the No Action Alternative at Alternative 4 and 5 Sites

Construction

Under the No Action Alternative, construction noise for a new arena would not occur at the sites of Alternatives 4 and 5. Other anticipated development projects in the Seattle Center area would temporarily generate noise during construction. Construction noise impacts would not be anticipated under Alternative 1, No Action.

3.5.3.3 Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

Construction

Construction noise levels and mitigation would be similar to the Proposed Project (Alternative 2), however the site of Alternative 4 would not require the installation of deep foundation support that would be needed for the site of Alternatives 2 and 3. This may lessen the need for pile driving.

Localized construction noise could be more noticeable at times under Alternative 4, because more sensitive land uses are located near the KeyArena site. If pile driving were required, pile driving noise would be as high as 89-100 dBA at the Fountain Lawn, which would be as close as 100 feet from potential pile driving activity, and potentially higher at the KEXP Radio studios depending on where a new arena were placed on the KeyArena site.

The nearest existing residential receptors to the KeyArena Site are multifamily units to the west across 1st Avenue N., which are approximately 100 - 150 feet away from potential pile driving activity. At that distance, pile driving noise levels would be 85 to 96 dBA.

An adverse impact could occur temporarily at noise-sensitive locations near construction activity during daytime hours. If construction were to include pile driving, then noise impacts could occur at adjacent offsite uses. Nighttime impacts are not anticipated, because nighttime construction noise would not occur. Any construction noise impacts would be short-term impacts.

If there is a new NBA or NHL team in Seattle before a new arena is constructed and open, NBA or NHL games would need to be played at another location, most likely the Tacoma Dome during construction of an arena under Alternative 4. Vehicular noise during NBA games would be similar to traffic noise at other large events at the Tacoma Dome. Because traffic conditions for temporary use of the Tacoma Dome would be similar to large events already there, traffic noise in Tacoma's stadium district is not anticipated to increase substantially. Any traffic mitigation to reduce traffic volumes during temporary use of the Tacoma Dome would provide corresponding reductions in traffic noise before and after events.

3.5.3.4 Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Construction

Construction noise levels and mitigation would be similar to the Proposed Project (Alternative 2), however the site of Alternative 5 would not require the installation of deep foundation support that would be needed for the site of Alternatives 2 and 3. This may lessen the need for pile driving.

Localized construction noise for Alternative 5 would be similar to the impacts of construction noise from Alternative 4, as both locations have sensitive land uses near the sites. Construction of Alternative 5 could include pile driving noise as high as 89-100 dBA at the Fountain Lawn and McCaw Hall, which would be as close as 100 feet from potential pile driving activity.

The nearest existing residential receptors to the Memorial Stadium Site are multifamily units to the north across Mercer Street, which are approximately 500 feet away from potential pile driving activity. At that distance, pile driving noise levels would be 76 to 86 dBA.

An adverse impact could occur temporarily at noise-sensitive locations near construction activity during daytime hours. If construction were to include pile driving, then noise impacts could occur at adjacent offsite uses. Nighttime impacts are not anticipated, because nighttime construction noise would not occur. Any construction noise impacts would be short-term impacts.

3.5.3.5 Mitigation Measures Applicable to Both Alternatives 4 and 5

Construction

Similar to construction at the Stadium District site, the construction of an arena at either the KeyArena or Memorial Stadium sites would include reasonable mitigation measures to reduce construction noise impacts at nearby land uses. Because construction noise is subject to the City of Seattle noise regulations, noise mitigation could be required to comply with the City's noise limits. Construction mitigation could be the same as listed in Subsection 3.5.2.5 for Alternatives 2 and 3.

Under Alternative 4 or 5, construction activities could be coordinated to avoid disrupting events at the Seattle Center.

The contractors could develop and implement a construction noise management plan to reduce noise and vibration during construction. The plan could identify measures to ensure compliance with the City of Seattle noise limits at receivers near construction activity.

3.5.3.6 Secondary and Cumulative Impacts

Cumulative noise impacts would be related to short-term increases in construction activity near the sites of Alternatives 4 and 5. Cumulative construction impacts could occur from the

construction of an arena in the lower Queen Anne area with other development and roadway projects being constructed at the same time near Seattle Center. Because construction noise for a new arena and other development projects would be temporary in duration and comply with City of Seattle noise regulations, short-term cumulative noise impacts during construction would be minor under Alternatives 4 and 5.

Secondary noise impacts could result from economic growth and changes in land uses induced by a new arena at either site of Alternative 4 or 5. Any development induced by a new arena would incrementally increase noise during construction activities. Although the location and specific amount of new development are unknown, incremental increases in construction noise likely would be small under Alternatives 4 and 5.

Secondary and cumulative impacts in the Seattle Center area would not occur under Alternative 1, No Action.

3.5.3.7 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse noise impacts are expected from the construction or operation of an arena at the site of Alternative 4 or 5.

3.6 Land Use

3.6.1 Stadium District Alternatives – Alternatives 2 and 3

3.6.1.1 Affected Environment

Existing Land Use

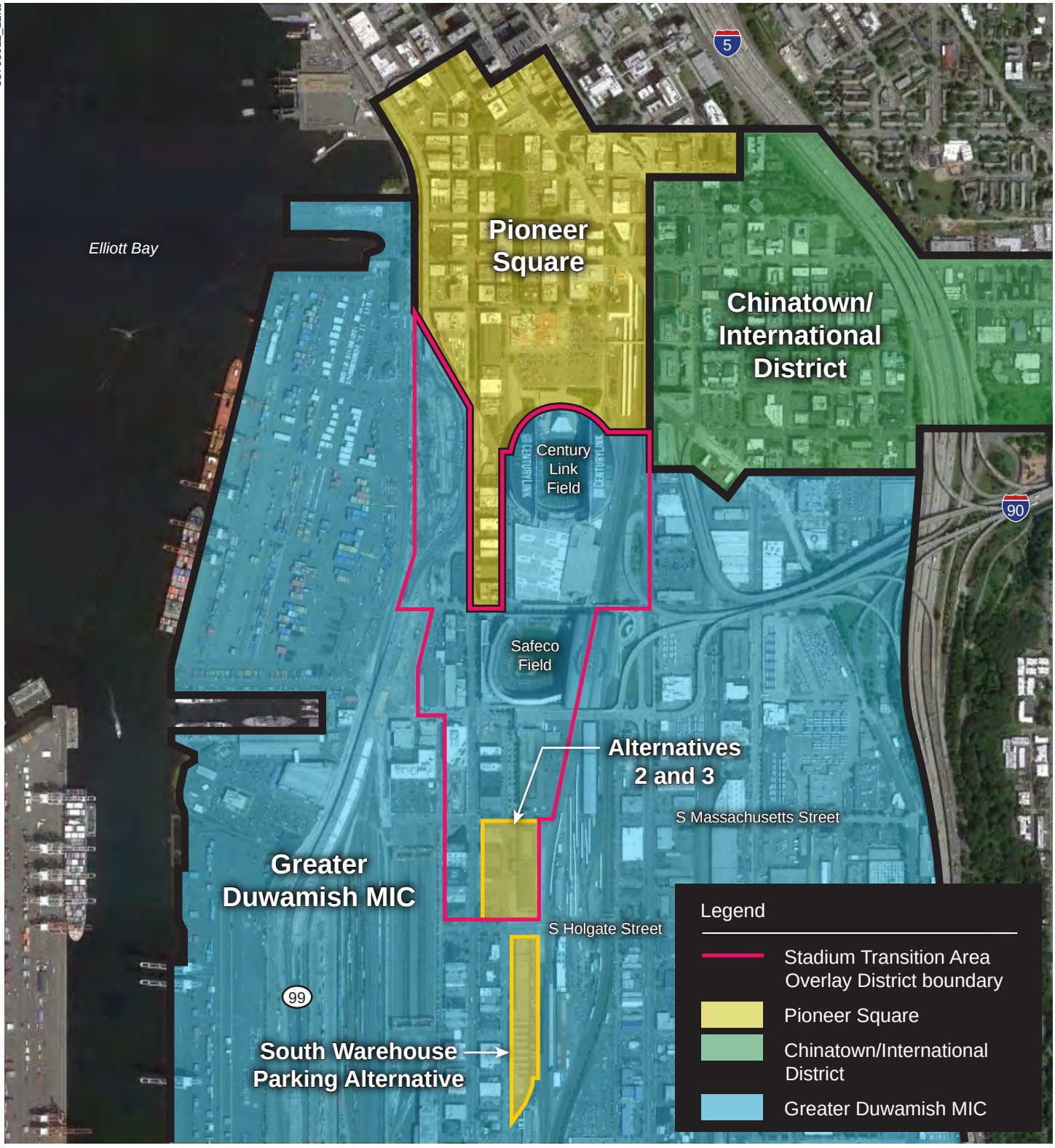
The Proposed Project (Alternative 2) and Alternative 3 would be located on 1st Avenue S. between S. Massachusetts Street and S. Holgate Street. The project site includes the block between 1st Avenue S. and Occidental Avenue S. and properties to the east of Occidental Avenue S. to the railroad right-of-way, between S. Massachusetts Street and S. Holgate Street (See Site Vicinity Figure 2-2 in Chapter 2). Warehouses, small businesses, and parking on undeveloped lots now occupy the project site. The site is surrounded by similar uses. Midrise office and mixed commercial uses with street-front retail and restaurants are to the west of the project site along 1st Avenue S. To the north of the site is the Safeco Field parking garage, Safeco Field, CenturyLink Field, and CenturyLink Event Center. BNSF Railroad facilities are located to the east of the existing stadiums and the site. Facilities include passenger and freight rail lines as well as several structures that support those activities. An area of mixed retail, commercial, warehouses, and light manufacturing is to the south of the site.

Greater Duwamish Manufacturing and Industrial Center (MIC) / South Downtown

South Downtown includes the areas of Pioneer Square, the International District, the Stadium Transition Area (Overlay District) and the North Duwamish neighborhood. The North Duwamish is part of the Duwamish Manufacturing and Industrial Center (MIC) (See Figure 3.6-1 South Downtown Neighborhoods).

The Seattle Comprehensive Plan 2004-2024 job target for the Greater Duwamish is to add 9,750 new jobs. At the time the job target was created in 2004, there were 60,205 jobs in the Greater Duwamish Urban Village. Puget Sound Regional Council 2011 estimates for jobs in the Greater Duwamish Urban Village was 57,833, and showed a decline of 4% for 2004-2010. See DPD's Urban Center / Village Employment Growth Report located at www.seattle.gov/dpd/cms/groups/pan/@pan/documents/web_informational/dpds022046.pdf.

The primary employer is the Port of Seattle. Port-related businesses also account for a substantial number of jobs. There has been an annual decline in covered employment (see Table 3.6-1 for definition of covered employment) since the high of 67,728 in 2008. Port and industrial-related job growth is the goal for development in this area. The Port of Seattle's seaport is made up of 1,543 acres of waterfront land and nearby properties including container terminals, general purpose / cargo terminals, foreign trade zone, break-bulk cargo and refrigerated cargo and storage. Population and households have been declining in this area and, unlike in many other areas of the city, this is an acceptable trend supported by land use policies. New housing is prohibited by code in industrial zones (except for existing caretaker quarters and artist studio/ dwellings).



Source: Google Earth Pro

0 1000 2000

Scale in Feet

Figure 3.6-1

South Downtown Neighborhoods Alternative 2 and Alternative 3

Job No. 33763922

Table 3.6-1
Selected Area Demographics

	Population Change 2000-2010	Covered Employment Change 2004-2010	2010 Housing Units Renter Occupied	2010 Population / HH
Pioneer Square	28%	-15%	85%	2,252 / 937
Chinatown / In District	28%	26%	95%	3,466 / 2,227
Commercial Core	-15%	2%	78%	5,917 / 2,985
Duwamish / SODO	-10%	-4%	48%	2,354 / 994
Seattle-wide	8%	4%	52%	608,660 / 283,510

Source: City of Seattle compiled reports from WA State Employment Security Quarterly Census of Employment and Wages. "Covered employment" typically represents 85-90% of total employment. Covered employment means employment that is subject to the Employment Security Law and on which Unemployment Insurance taxes must be paid and reports filed when the wage liability criteria are met. Covered employment does not include independent contractors and other self-employed persons.

To the north of the site of the Proposed Project and Alternative 3, within Greater Duwamish MIC, CenturyLink Field and Event Center hosts world class soccer matches, Seattle Seahawks football, concerts, consumer shows and other events. Safeco Field is home to Major League Baseball (MLB) and other events. The area covered by both stadiums and associated parking is approximately 65 acres.

Since the development of CenturyLink Field and Event Center and Safeco Field, the City of Seattle has created the Stadium Transition Area Overlay District. The intent is to focus non-industrial uses to specific locations within the overlay district, and to discourage conversion of industrial sites to non-industrial uses in industrial areas located to the south of the overlay district. See Section 3.10 Regulatory Framework for a discussion of zoning and the City of Seattle Comprehensive Plan.

Pioneer Square Neighborhood

The Pioneer Square Neighborhood is located north of the Stadium Overlay District. This neighborhood consists of approximately 142 acres, has an estimated 2010 population of 2,252, and supports 10,124 jobs (2011 estimate, Table 3.6-1). The Pioneer Square neighborhood is home to 937 households. The neighborhood is characterized as a Historic District containing a mix of retail, office, warehouse, and housing.

Chinatown / International District Neighborhood

The International District is the closest concentration of housing in the broader South Downtown area. It is the historic and cultural center of Seattle's Asian community. This neighborhood has an estimated 2010 population of 3,466, and supports 7,840 jobs (2011 estimate, Table 3.6-1). The neighborhood's southern boundary is Dearborn Street. The southern boundary to this neighborhood is separated from the Stadium District site by an area of industrial-commercial uses, warehouses, and rail yards of the northern edge of the Greater Duwamish neighborhood.

3.6.1.2 Impacts of the No Action Alternative at Alternatives 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new arena. The existing warehouses, small businesses, and parking on the site of Alternatives 2 and 3 would remain until any other development would occur.

3.6.1.3 Impacts of Alternatives 2 and 3

Land Use

Construction

No land use impacts during construction are anticipated for the Proposed Project or Alternative 3.

Operation

Either the Proposed Project (Alternative 2) or Alternative 3 would change the land use of the project site from warehouses, vacant lots used for parking, and mixed commercial uses to a spectator sports facility and pedestrian-oriented retail and other small businesses similar to those associated with Safeco Field, CenturyLink Field, and CenturyLink Event Center.

The Proposed Project (Alternative 2) or Alternative 3 would be constructed on 1st Avenue S. between S. Massachusetts Street and S. Holgate Street including the proposed vacation of one block of Occidental Avenue S. A summary of the proposed changes in development is provided in Table 3.6-2.

Table 3.6-2
Summary of Proposed Changes

Site Address, Parcel Number or Area (Listed south to north)	Current Use Alternative 1 - No Action	Proposed Use Alternatives 2 and 3	Approximate Square Feet of Proposed Use
1750 Occidental Ave S. Parcel # 766620-6285	Warehouse	Arena	750,000
1760 1ST AVE S. Parcel # 766620-6425	Restaurant	Arena	
1746 1ST AVE S. Parcel # 766620-6420	Vacant / Undeveloped Parking	Arena	
1740 1ST AVE S. Parcel # 766620-6417	Convenience Store / Gas Station	Arena	
1730 1ST AVE S. Parcel # 766620-6415	Warehouse	Arena	
17xx1 1ST AVE S. Parcel #766620-6410	Vacant Lot	Arena	
1714 1ST AVE S. Parcel # 766620-6405	Warehouse	Arena / Public Plaza	40,500
1700 1ST AVE S. Parcel # 7666206400	Restaurant	Public Plaza	11,000

[1]17xx 1st AVE S is the address shown on the King County Assessor's website for this parcel.

Both the Proposed Project and Alternative 3 would include a street vacation of Occidental Avenue S. between S. Holgate and S. Massachusetts Streets. Land use impacts of the street closure are minimal since the uses related to that street would be demolished in construction of the Proposed Project or Alternative 3. The uses associated along Occidental Avenue S. between S. Holgate and S. Massachusetts Streets would no longer exist. Pedestrians would be able to access to S. Holgate Street businesses via 1st Avenue S. The applicant has proposed to provide parking through either the use of existing off-site parking or by the construction of a new parking structure on the South Warehouse Site south of Holgate Street. Existing land uses would remain adjacent to the site; however, if parking is constructed, the warehouse site south of Holgate would be changed from warehouse to structured parking (See Section 3.6.1.5 for a discussion of Secondary and Cumulative Impacts). The Proposed Project or Alternative 3 likely would encourage commercial, retail, and mixed use development in the vicinity of the site, such as eating and drinking establishments, retail stores, and sports-related businesses.

3.6.1.4 Mitigation Measures Applicable to Alternatives 2 and 3

No mitigation measures have been identified.

3.6.1.5 Secondary and Cumulative Impacts

For Alternatives 2 and 3, there would be a cumulative impact of developing another large spectator sports facility adjacent to the two existing facilities, Safeco Field and CenturyLink Field and Event Center, in the area north of the industrial center. Land uses outside of the Stadium Transition Overlay District would likely change to serve the expanding needs and more commercial character of the Stadium District in contrast to the industrial-commercial and general industrial character of the Port of Seattle and the Greater Duwamish MIC.

ArenaCo owns additional properties within and outside the Stadium Overlay District. No development has been proposed for those properties, however development of the Proposed Project or Alternative 3 could induce the redevelopment of those properties for commercial uses designed to support the Proposed Arena or stadiums. New development would be subject to a site specific evaluation under SEPA and Land Use Code development and use regulations.

The Proposed Project could make the South Downtown area more attractive to non-industrial developers, which could indirectly result in changes to the use of some properties. Such changes could also encourage Port and Manufacturing Industrial Center-related development by providing support services (e.g., offices, office-related retail and eateries) to businesses and workers in the area (Port Terminals 46 and 30 are within a 15-minute (3/4 mile) walking radius of the proposed Seattle Arena site). Property values in the South Downtown area could rise and rents could increase for some businesses.

3.6.1.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse land use impacts are expected.

3.6.2 Alternative 4 – KeyArena 20,000-Seat Arena

3.6.2.1 Affected Environment

Existing Land Use

KeyArena was built in 1962 as the Washington State Pavilion for the Century 21 Exposition and Seattle World's Fair. It has been remodeled over the years to accommodate new tenants including the Seattle SuperSonics and the Women's National Basketball Association (WNBA) Seattle Storm. The arena accommodates approximately 17,000 spectators for sporting events, nationally touring concerts, family shows and conferences. The gross square footage of the existing building is 129,000 on an approximately 11-acre (476,814 SF) site. The building height is 70 feet above ground.

KeyArena hosts multiple tenants and events including the WNBA, Seattle University Men's basketball, Rat City Rollergirls, concerts, ice shows and speakers.

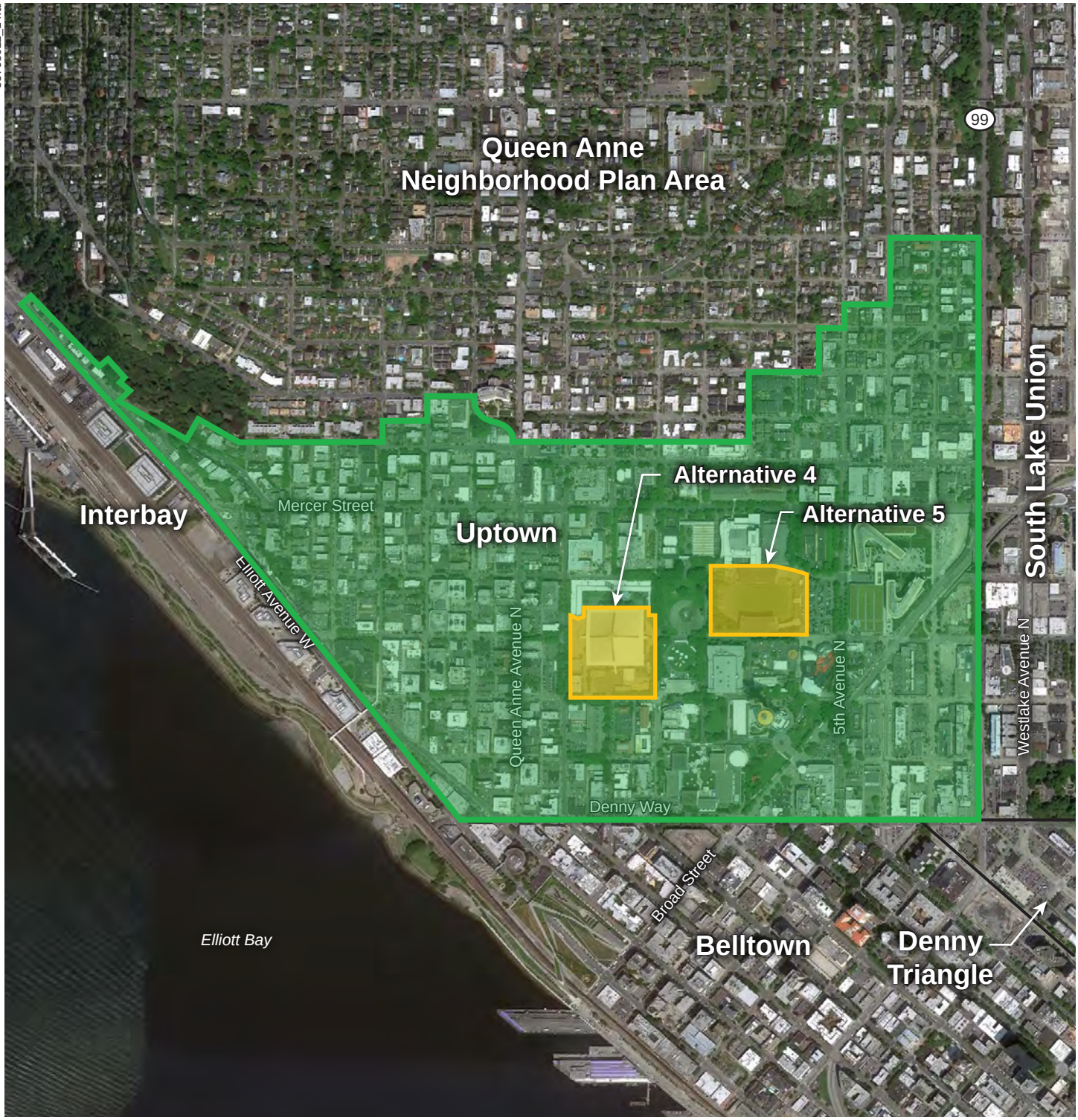
The KeyArena site occupies approximately 17 percent (11 acres) of Seattle Center's total 69-acre area. The Seattle Center is jointly owned by the City of Seattle and various private entities. The existing uses in the vicinity of the KeyArena include assembly, entertainment, commercial, office and storage buildings, surface and structured parking. Main entrances to the Seattle Center campus are located at 2nd Avenue N. and Thomas Street; the Monorail Terminal; and Harrison Street and 5th Avenue N. One of KeyArena's main entrances is located on the western side of Seattle Center at Harrison Street.

Beyond the Seattle Center, land uses in the surrounding area include meeting rooms, parking lots, retail, offices, apartments, condominiums, and restaurants. North of the business district on the nearby slope of Queen Anne Hill, is a mixture of multifamily and single-family residences. To the east of Seattle Center is the Bill and Melinda Gates Foundation headquarters.

The Uptown commercial district is adjacent to the northwest corner of KeyArena. There are a variety of restaurants ranging from fast food to fine dining that benefit from patronage from Seattle Center event-attendees.

Alternatives 4 and 5 are located near the northern boundary of the Downtown Urban Center in the Uptown neighborhood (see Figure 3.6-2). The Uptown Village Center is surrounded by several neighborhoods: Interbay neighborhood to the west; the Uptown Queen Anne neighborhood planning area to the north; the South Lake Union (SLU) neighborhood to the east; Denny Triangle to the southeast; and the Belltown neighborhood to the south.

33763922_14.ai



Source: Google Earth Pro

0 1000 2000

Scale in Feet

Figure 3.6-2

Uptown Urban Center
Alternative 4 and Alternative 5

Job No. 33763922

URS

Four of the surrounding neighborhoods have experienced major population growth since 2000. This would provide a steady demand for entertainment, retail and dining at Seattle Center, and within surrounding neighborhoods. Uptown and SLU have experienced major population and job growth since 2004. Denny Triangle and Belltown have had an increase in housing and population but a decrease in employment (Table 3.6-3).

Table 3.6-3
Uptown Area Demographics

	Population Change 2000-2010	Total Population 2010	Housing Percent 2000-2010	Employment Growth Change 2004-2010
Uptown	44%	7,300	40%	8%
South Lake Union	14%	3,774	213%	50%
Denny Triangle	102%	3,248	221%	-18%
Belltown	41%	11,961	49%	-6%

Source: Census 2010, Summary File 1; City of Seattle, Urban Center / Village Employment Growth Report, November 2012

3.6.2.2 Impacts of the No Action Alternative at Alternative 4 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 4 for a new arena. The existing KeyArena would remain until any other development would occur. No land use impacts would be anticipated.

3.6.2.3 Impacts of Alternative 4

Land Use

An arena replacement for the KeyArena would be consistent with both the current zoning and regulations, as well as compatible with the existing land use. The KeyArena site is currently occupied by a spectator sports facility. The use of the site would remain the same, however, a new structure may exceed the current height of the KeyArena.

No land use impacts are expected under Alternative 4.

Construction

Construction of an arena would temporarily displace some existing uses: current KeyArena activities would shift to other venues on a temporary or permanent basis depending upon the time of year of construction and the seasonally-based activities of some tenants (e.g., WNBA, roller derby). Table 3.6-4 lists major tenants that may be displaced and possible alternative locations for their events.

Depending on the alignment of an arena on the existing KeyArena parcel, temporary or potential permanent displacements to facilities, and activities conducted within the surrounding buildings may include: the West Court building, the NASA building, Seattle Center Pavilion, the Blue Spruce building, the Skatepark and the Restroom Pavilion.

Table 3.6-4
Potential Key Arena Displacements

Tenant	Facility Requirements: Space Type and Capacity	Current Capacity	Regional Options for Relocation / Capacity
WNBA Seattle Storm	Regulation Basketball Court; 14,000-seat capacity*	17,072**	Comcast Arena in Everett / 9,150 Tacoma Dome / 17,100 UW Alaska Airline Arena / 10,000
Seattle University Men's Basketball / NCAA Tournament	Regulation Basketball Court; 14,000-seat capacity	17,072	Comcast Arena in Everett / 9,150 ShoWare Center in Kent / 7,300 Tacoma Dome / 17,100 UW Alaska Airline Arena / 10,000
Rat City Rollergirls	Flat track	Average attendance of 4,420 for 2010 - 2013	Multiple locations*** e.g., Magnuson Park Building #30 (site of 2013 tournament)
Concerts	Stage and seating	16,641 (end-stage concerts) 17, 459 (center-stage)	Comcast Arena in Everett / 10,000 Tacoma Dome / 23,000
Disney on Ice (Ice shows)	Ice Rink	15,177	Comcast Arena in Everett / 8,300

*Seattle Storm WNBA 2010-2012 Attendance: High – 13,659 (2011); Average High 11,452; Low – 7,747 (2002); Average Low 7,747
**Source: www.WNBA.com
***Setting up a flat track for roller derby—"it can be done on any flat surface that is suitable for skating, such as skating rinks, basketball courts, parking lots, and even airplane hangars. This greatly reduces the capital needed to start up a roller derby league." (Source: Women's Flat Track Derby Association website, www.wftda.com)

Operation

Depending on how an arena may be situated on the KeyArena site and the availability of a future arena at this site for events other than NBA and NHL, current KeyArena activities and activities immediately surrounding KeyArena (listed below in Table 3.6-5) may need to shift to other venues on a permanent basis.

Table 3.6-5
Summary of Potential Changes at KeyArena

Seattle Center Building Designations	Current Use Alternative 4 - No Action	Proposed Use Alternative 4	Approximate Square Feet of Proposed Use
KeyArena 411,727 GSF	Arena	Arena	750,000
West Court 11,560 GSF	Commercial and ticket sales	Arena	
NASA 5,600 GSF	Storage	Arena	
Blue Spruce 18,368 GSF	Office	Arena	
Seattle Center Pavilion 17,700 GSF	Exhibit, trade show and event space	Arena	
Skatepark	Skatepark	Arena	
Restroom Pavilion	Public Restroom	Arena	

Uses and impacts would be similar to the existing KeyArena. The KeyArena has a current capacity of 17,000 for sporting events. Alternative 4 would have a capacity of 20,000 visitors.

3.6.2.4 Mitigation Measures Applicable to Alternative 4

If an arena were to replace the existing KeyArena, existing tenants would be displaced for up to two years during the construction period, and may be permanently displaced. Potential mitigation measures include:

- Notice to existing tenants of the construction period as far in advance as possible.
- Assistance in identifying alternative locations in which to hold games, concerts and other events.
- Assistance in publicizing the relocation to the potential attendees.
- Assistance in working with the ArenaCo event schedulers to determine whether the displaced tenants could come back to the new arena once construction is completed.

3.6.2.5 Secondary and Cumulative Impacts

Alternative 4 would not result in a secondary or cumulative land use impact since a new arena would be replacing a similar use (KeyArena) and not compounding uses. Continued growth and expansion of retail, restaurants and entertainment within Seattle Center would help to support surrounding residential and job growth targets identified in the City of Seattle Comprehensive Plan.

3.6.2.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse land use impacts are expected.

3.6.3 Alternative 5 – Memorial Stadium 20,000-Seat Arena

3.6.3.1 Affected Environment

Existing Land Use

Owned by the Seattle School District, Memorial Stadium was built to honor former Seattle high school youths who gave their lives in World War II. It was dedicated in 1948, and a memorial wall, inscribed with the names of the war dead, was erected outside the stadium in 1952. It is now a site for school athletics and various community athletics, concerts and events. Memorial Stadium consists of a spectator stadium, and a 1,800 square foot office building. Memorial Stadium hosts both School District and other public events.

Located near the northern boundary of the Downtown Urban Center in the Uptown neighborhood, the Memorial Stadium site is bordered by the Seattle Center on the north, west, and south, the Interbay neighborhood farther to the west; the Uptown Queen Anne neighborhood farther to the north; the SLU neighborhood to the east; Denny Triangle to the

southeast; and the Belltown neighborhood farther to the south. The Bill and Melinda Gates Foundation headquarters is located across 5th Avenue N. to the east of Memorial Stadium. General land use surrounding the study area site includes parking lots, general retail, offices, apartments, condominiums, and restaurants. North of the business district of the nearby slope of Queen Anne Hill, is a mixture of multifamily and single-family residences.

The demographics for the Uptown neighborhood are described above in Table 3.6-3.

3.6.3.2 Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. The existing Memorial Stadium would remain until any other development Proposed Action would occur. No land use impacts would be anticipated.

3.6.3.3 Impacts of Alternative 5

Land Use

A Seattle arena located on the site of the Memorial Stadium would be consistent with current zoning but may exceed height limits of current regulations. The use would be compatible with the existing land use. The site is currently occupied by a recreational sports facility. Theatre and spectator sports facilities are permitted uses in Neighborhood Commercial 3 (NC3).

Major land use improvements that would be required to implement Alternative 5 include demolition of the existing Memorial Stadium, office building, and surface parking; and redevelopment of the stadium site as an indoor spectator sport arena. The Memorial Wall could be demolished; or preserved or protected in some way.

The use of the Memorial Stadium site for an arena would be compatible with surrounding land uses. Memorial Stadium is surrounded by Neighborhood Commercial zoning, and this zoning provides a buffer between the Memorial Stadium site and neighborhood residences.

Current Memorial Stadium activities would need to shift to other venues on a permanent basis. The Seattle School District would have to either locate and construct a new stadium for school-related activities, or add existing activities to other existing School District facilities.

The displacement of existing recreational users of the Memorial Stadium is described in Recreation section of Public Services and Utilities: Section 3.9.

3.6.3.4 Mitigation Measures Applicable to Alternative 5

If an arena were to be built on the Memorial Stadium site, the proponent would need to acquire the Memorial Stadium property. This could provide the School District with funding for an alternative School District stadium.

3.6.3.5 Secondary and Cumulative Impacts

Alternative 5 could result in a secondary land use impact as the Seattle School District may need to construct a new stadium to accommodate school athletic activities, and that new stadium could potentially displace another existing use.

3.6.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse land use impacts are expected.

3.7 Historic and Cultural Resources

3.7.1 Introduction

Federal, state and local programs authorized under the National Historic Preservation Act (NHPA) of 1966 and the Seattle Landmarks Preservation Ordinance (Seattle Municipal Code [SMC] 25.12) provide a means of evaluating the significance of historic and cultural resources. The NHPA and Washington state law (RCW 27.34 Historic Preservation) establish the National and State Registers of Historic Places, respectively. Historic resources are also identified and protected by the Seattle Landmarks Preservation Ordinance (SMC 25.12) and the International Special Review District and the Pioneer Square Preservation District (SMC 23.66).

3.7.1.1 Historic Resources

The Seattle Landmarks Preservation Ordinance applies to all structures that are over twenty-five years old that meet at least one of the six landmark designation criteria listed in SMC 25.12.350, Standards for designation. Properties are eligible for nomination at 25 years. Nomination is voluntary for structures 25-50 years old, and is mandatory for structures greater than 50 years old. There are four steps to the landmarks designation process: nomination, designation, controls and incentives, and a designating ordinance.

In addition, Title 25 of the Seattle Municipal Code provides policies regarding historical preservation (SMC 25.05.675.H.2).

3.7.1.2 Cultural Resources

Seattle's SEPA Policy on Archaeological Sites, SMC 25.05.675 H.2.e states:

> *e. On sites with potential archaeological significance, the City may require an assessment of the archaeological potential of the site. Subject to the criteria of the Overview Policy set forth in SMC Section 25.05.665, mitigating measures which may be required to mitigate adverse impacts to an archaeological site include, but are not limited to:*
>
> *i. Relocation of the project on the site;*
> *ii. Providing markers, plaques, or recognition of discovery;*
> *iii. Imposing a delay of as much as ninety (90) days (or more than ninety (90) days for extraordinary circumstances) to allow archaeological artifacts and information to be analyzed; and*
> *iv. Excavation and recovery of artifacts.*

3.7.2 Stadium District Alternatives – Alternatives 2 and 3

3.7.2.1 Affected Environment

Historic Resources

In July 2013, a review of structures was conducted on the site of Alternatives 2 and 3 by Nicholson Kovalchick Architects (See Appendix D Historic Building Surveys). Table 3.7-1 lists the 6 structures over 25 years old which are located on the Alternatives 2 and 3 site.

Table 3.7-1
Structures Over 25 Years Old on the Alternatives 2 and 3 Site

Structure Address	Year Built
1750 Occidental Avenue S.	1954
1760 1st Avenue S.	1976
1740 1st Avenue S.	1985
1730 1st Avenue S.	1967
1714 1st Avenue S.	1929-30
1700 1st Avenue S.	1935-36

Of the structures shown in Table 3.7-1, 3 must have an historical building assessment as they are over 50 years old: the building at 1750 Occidental Avenue S.; the building at 1714 1st Avenue S., and the building at 1700 1st Avenue S. Nomination of the other three structures is voluntary as they are between 25 and 50 years old. A summary of the structure review conducted in July 2013 is provided below. See Appendix D for the complete reports.

The building at 1750 Occidental Avenue S. is 61 years old. An addition was constructed on the north side of this building in 1956-57; and in 1987 a second addition was constructed on the west side of the building. According to Nicholson Kovalchick Architects, this building does not appear to meet any of the six landmark designation criteria listed in SMC 25.12.350 that is required for designation: *"Although an unusually sizeable building, it does not rise to the level of significance of a landmark."*

The building at 1714 1st Avenue S. is approximately 85 years old and was constructed in the Art Deco "zigzag" style. It was remodeled in the early 2000s, and all of the original windows on the primary or west elevation were removed and replaced. According to Nicholson Kovalchick Architects, based on the research conducted, the 1714 First Avenue S. building does not appear to meet any of the six landmark criteria at this point, due to renovation of the building in recent years which removed the original windows on the primary façade: "*Although still a recognizably Art Deco building, the current windows are a significant blow to the building's integrity*."

The building at 1700 1st Avenue S. is approximately 79 years old and has been considerably altered since the original construction due to damage suffered during the 1949 and 1965 earthquakes. In addition, significant alterations have been made to the north, east, and west elevations of the building and the building has lost its original integrity. According to Nicholson Kovalchick Architects, this building does not appear to meet any of the six landmark designation

criteria listed in SMC 25.12.350 that is required for designation; in addition, they found that: *"the building has been significantly altered over time and has lost its original integrity."*

See Appendix D for more information on these structures.

Cultural Resources

As part of the environmental review conducted for the Safeco Field project, archaeological resources were studied from the Pioneer Square Preservation District east to the International Special Review District, and the industrial lands extending south to S. Walker Street, including the Project area for Alternatives 2 and 3. Relative to the original Seattle shoreline, the Project area for these alternatives would have originally been underwater. The majority of potentially significant archaeological materials are assumed to have been deposited prior to the fills that occurred in the early 1900s, which generally buried materials 15 to 35 feet below current grades (Washington State Major League Baseball Stadium Public Facilities District 1996).

3.7.2.2 Impacts of the No Action Alternative at Alternative 2 and 3 Site

As this alternative does not include demolition or alteration of existing structures, or earthwork and construction activities, impacts to historic and cultural resources would not occur.

3.7.2.3 Impacts of Alternatives 2 and 3

Construction

Historic Resources

Each of the structures identified in Table 3.7-1 are proposed to be demolished under Alternatives 2 and 3. A historical building assessment would be required prior to any construction or demolition activities for the three structures that are over 50 years old. Per the review conducted in July 2013, it appears that none of the buildings would meet any of the six designation criteria required for nomination. Nomination of the remaining three structures is voluntary and is not proposed.

Any building within Seattle that is over 50 years old must go through the landmark status process before it can be removed. If the landmark status nomination is denied, demolition may proceed and impacts to historic resources would not occur. If the Landmarks Preservation Board designates a property, a Controls and Incentives Agreement for the landmark is negotiated by staff with the property owner. Once an agreement is reached and signed, it is forwarded to the Landmarks Preservation Board for approval at a public meeting. Controls define those features of the landmark to be preserved and outline the Certificate of Approval process for changes to those features. If one or more of the structures are designated as a landmark, any change to the structure would constitute an impact to historic resources.

Cultural Resources

Project activities would require ground disturbance. Per Section 3.1 Geology and Soils, excavation to allow for construction of the foundation may occur at a depth of about 20 feet below the present ground surface. As archaeological materials may be found in the project area between 15 to 35 feet below the ground surface, construction and excavation activities have the potential to affect archaeological and cultural resources. Measures would be in place to protect archaeological materials should they be encountered during construction.

Operation

The operation of an arena at the Stadium District site is not anticipated to have an effect on historic or cultural resources.

3.7.2.4 Mitigation Measures Applicable to Alternatives 2 and 3

Historic Resources

If a building is nominated as an historic landmark, and the landmark status nomination is denied, mitigation would not be required as impacts to historic resources would not occur. If the landmark status nomination is upheld by the Landmarks Preservation Board, the proponent would work with staff to develop a Controls and Incentives Agreement. In addition, any changes to historic features would follow the Certificate of Approval Process.

Cultural Resources

An Unanticipated Discovery Plan would be prepared for the project that provides for notification and consultation among the State Historic Preservation Office Department of Archeology and Historic Preservation (DAHP), Tribes, and the City related to discoveries of unknown archaeological materials or human remains.

3.7.2.5 Secondary and Cumulative Impacts

The Proposed Project or Alternative 3 are not anticipated to have a secondary historic and cultural impact or cumulative cultural impact. Loss of historical landmarks would add to cumulative loss of historic structures; however any loss would be minimized through the Certificate of Approval Process and coordination with the Landmarks Preservation Board.

3.7.2.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to historic or cultural resources are expected from the construction or operation of Alternatives 2 or 3.

3.7.3 Alternative 4 – KeyArena 20,000-Seat Arena

3.7.3.1 Affected Environment

Historic Resources

In March 2013, a historic landmark study was conducted for the KeyArena site and the greater Seattle Center area (Artifacts Architectural Consulting and HistoryLink.org 2013). The study is included in Appendix D. Table 3.7-2 lists the 7 structures over 25 years old which are located on the KeyArena site.

Table 3.7-2
Structures Over 25 Years Old at the KeyArena Site

Structure	Year Built
KeyArena	1962
Blue Spruce Building	1956
NASA Building	1962
Northwest Rooms	1962
Seattle Center Pavilion	1962
West Court Building	1953
International Fountain Pavilion	1961

Of the structures shown in Table 3.7-2, four were deemed eligible for nomination based on meeting at least one of the six landmark designation criteria listed in SMC 25.12.350, Standards for designation: KeyArena, the NASA Building, the Northwest Rooms, and the Seattle Center Pavilion. Subsequent to the study, the Northwest Rooms and International Fountain Pavilion were nominated for landmark designation. The nomination was approved by the Seattle Landmarks Preservation Board on June 19, 2013, a public meeting held on August 7, 2013, to consider landmark designation, and the landmark designation was approved by ordinance by the Seattle City Council. As the KeyArena, NASA Building and the Seattle Center Pavilion are over 50 years old, a historical building assessment must be performed before altering or demolishing the structures.

Cultural Resources

Archaeological resources may be present under the project site; however the site has undergone previous development, including ground disturbance, excavation and grading activities related to KeyArena and the other structures listed in Table 3.7-2.

3.7.3.2 Impacts of the No Action Alternative at Alternative 4 Site

As this alternative does not include demolition or alteration of existing structures, or earthwork and construction activities, impacts to historic and cultural resources would not occur.

3.7.3.3 Impacts of Alternative 4

Construction

Historic Resources

If a new arena were to be built at KeyArena, the existing structure would have to be demolished. As KeyArena is over 50 years old, a historical building assessment must be performed before any changes could occur. If the building is nominated for landmark status and the nomination of KeyArena is denied, construction and demolition activities could proceed.

Cultural Resources

Project activities would require ground disturbance. Due to the extensive ground disturbance performed for the construction of KeyArena, it is unlikely that archaeological materials would be found or affected. Measures would be in place to protect archaeological materials should they be encountered during construction.

Operation

The operation of an arena at the KeyArena site is not anticipated to have an effect on historic or cultural resources.

3.7.3.4 Mitigation Measures

Historic Resources

If a new arena were to be built at KeyArena, the existing building would have to be submitted through a landmark status nomination. If the nomination were denied, a possible outcome would be the removal of KeyArena. If the landmark status nomination is upheld by the Landmarks Preservation Board, the proponent would be required to work with staff to develop a Controls and Incentives Agreement. The agreement may include measures such as preservation of the iconic roofline and façades. In addition, any changes to historic features would follow the Certificate of Approval Process or may be denied.

Cultural Resources

If a new arena were to be built at KeyArena, an Unanticipated Discovery Plan would be prepared that provides for notification and consultation among the DAHP, Tribes, and the City related to discoveries of unknown archaeological materials or human remains.

3.7.3.5 Secondary and Cumulative Impacts

If the eligible buildings (see Table 3.7-2) surrounding the KeyArena are nominated and approved as historic landmarks, the demolition of the KeyArena and its replacement could have a secondary historic impact if the approval of the eligible buildings is based on relationship to

other Century 21-era structures. If the KeyArena is determined to be a historic landmark, the loss of the building would add to cumulative loss of historic landmarks; however any loss would be minimized through the Certificate of Approval Process and coordination with the Landmarks Preservation Board. The replacement of the KeyArena is not anticipated to have secondary or cumulative impacts to cultural resources.

3.7.3.6 Significant Unavoidable Adverse Impacts

The KeyArena has been found eligible for nomination as an historic landmark, however the building has not been nominated and a determination has not been made as to whether it would meet the City's landmark criteria. If declared a landmark, demolition and replacement would be required to comply with a Controls and Incentives Agreement. No significant unavoidable adverse impacts to historic or cultural resources are expected.

3.7.4 Alternative 5 – Memorial Stadium 20,000-Seat Arena

3.7.4.1 Affected Environment

Historic Resources

Memorial Stadium was constructed in 1948 and the Memorial Wall was commissioned and constructed separately in 1952. Both Memorial Stadium and the Memorial Wall are owned by Seattle Public Schools and have draft landmark status nomination applications prepared which were on hold as of March 2013 (Artifacts Architectural Consulting and HistoryLink.org 2013). As of February 2015, neither structure had been designated as a Seattle landmark.

As part of the Century 21 Master Plan Final EIS, Seattle Center proposed initiating a separate nomination process for the Memorial Wall. The Century 21 Master Plan envisions a prominently relocated Memorial Wall adjacent to Fifth Avenue N. as part of the redevelopment of the Memorial Stadium site (City of Seattle 2008a).

Cultural Resources

Archaeological resources may be present under the project site; however the site has undergone previous development, including ground disturbance and grading activities.

3.7.4.2 Impacts of the No Action Alternative at Alternative 5 Site

As this alternative does not include demolition or alteration of existing structures, or earthwork and construction activities, impacts to historic and cultural resources would not occur.

3.7.4.3 Impacts of Alternative 5

Construction

Historic Resources

If an arena were to be built at Memorial Stadium, the existing building and Memorial Wall would have to go through a landmark status nomination. If the nomination were denied, a possible outcome would be the removal of Memorial Stadium and removal and / or relocation of the Memorial Wall.

Cultural Resources

Project activities would require ground disturbance. Due to previous ground disturbance done for the construction of the Memorial Stadium, it is unlikely that archaeological materials would be found or affected. Measures would be in place to protect archaeological materials should they be encountered during construction.

Operation

The operation of an arena at the Memorial Stadium site is not anticipated to have an effect on historic or cultural resources.

3.7.4.4 Mitigation Measures

Historic Resources

If an arena were to be built at Memorial Stadium, the existing building and Memorial Wall would have to go through the historical building assessment process. If the building and wall were nominated and the nomination were denied, a possible outcome would be the removal of Memorial Stadium and relocation of the Memorial Wall. If the landmark status nomination is upheld by the Landmarks Preservation Board, the proponent would work with staff to develop a Controls and Incentives Agreement. The agreement may include measures such as preservation of the roofline or façades. In addition, any changes to historic features would follow the Certificate of Approval Process.

Cultural Resources

If an arena were to be built at Memorial Stadium, an Unanticipated Discovery Plan would be prepared that provides for notification and consultation among the DAHP, Tribes, and the City related to discoveries of unknown archaeological materials or human remains.

3.7.4.5 Secondary and Cumulative Impacts

If the Memorial Stadium is determined to be a historic landmark, the loss of the building would add to cumulative loss of historic landmarks; however any loss would be minimized through the

Certificate of Approval Process and coordination with the Landmarks Preservation Board. The replacement of the Memorial Stadium is not anticipated to have secondary or cumulative impacts to cultural resources.

3.7.4.6 Significant Unavoidable Adverse Impacts

Both Memorial Stadium and the Memorial Wall have draft landmark status nomination applications prepared which are on hold as of March 2013 (Artifacts Architectural Consulting and HistoryLink.org 2013). A determination has not been made as to whether the stadium or the Memorial Wall would meet the City's landmark criteria. If declared a landmark, demolition and replacement would be required to comply with a Controls and Incentives Agreement. No significant unavoidable adverse impacts to historic or cultural resources are expected.

3.8. Transportation

3.8.1 Introduction

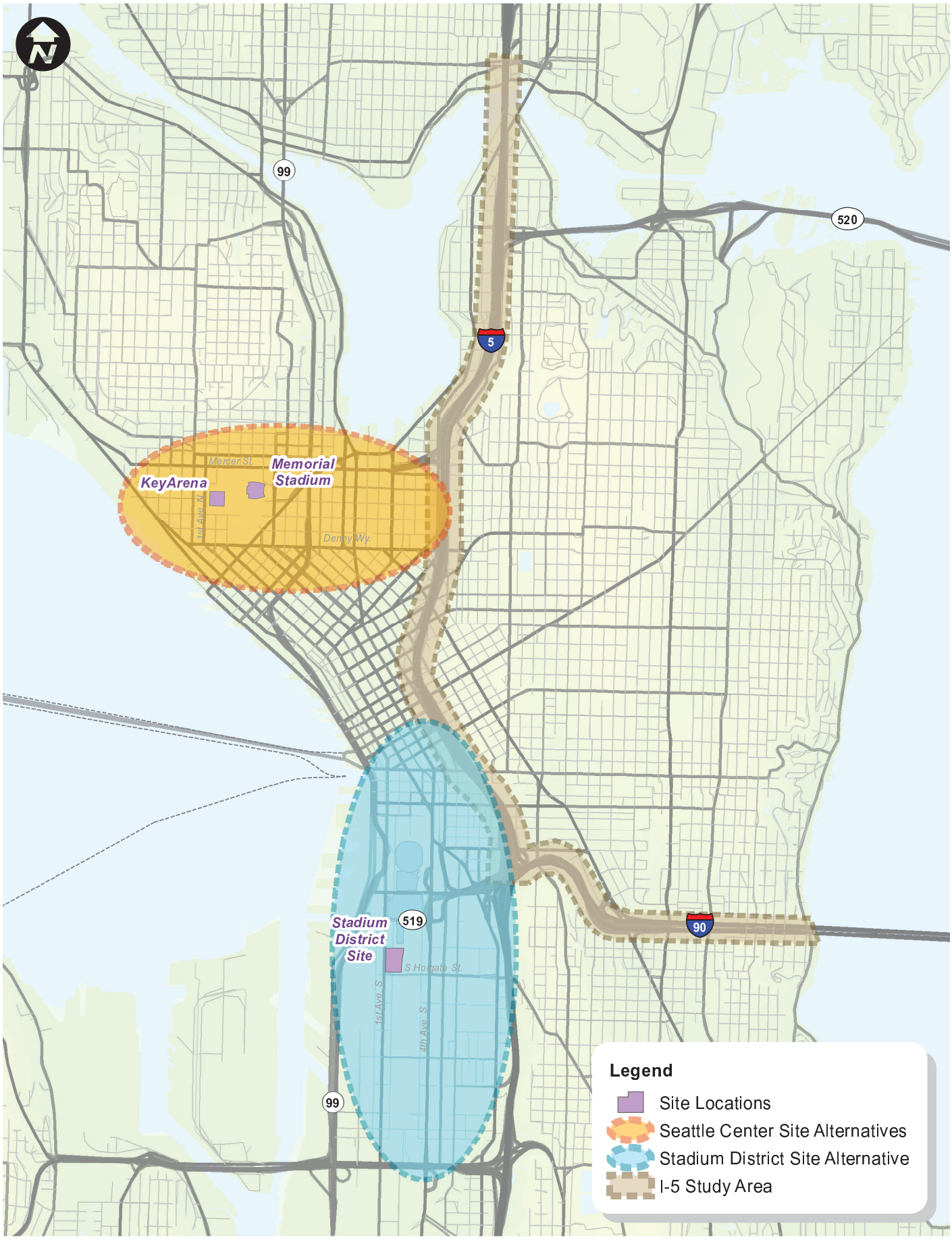
This section summarizes information contained in Appendix E, Transportation Resource Report. Please see Appendix E for additional details on the methodology used for collection of data and analysis, and for additional details contained in figures and tables provided to illustrate the information.

All of the site alternatives are located amidst the evolving transportation infrastructure of Seattle's downtown area. Major investments in transportation infrastructure underway include the Alaskan Way Viaduct / State Route (SR) 99 replacement project, SR 520 Bridge Replacement, the Waterfront Seattle Project, the Mercer Corridor Project, and investments in regional transit infrastructure. Specific transportation changes related to these mega-projects will affect regional transportation patterns as well as those in the vicinity of the Stadium District site, the KeyArena site and the Memorial Stadium site for years into the future; all are in different stages of visioning, design and / or construction. Figure 3.8-1 shows the locations of the Alternatives in the greater downtown area of Seattle.

The Stadium District Site is located immediately south of two other larger event venues, Safeco Field and CenturyLink Field. Further northwest, north and northeast, lies Pioneer Square, with its blend of residential, commercial and office uses. The Port of Seattle operates several port and intermodal terminals immediately to the west, along the Duwamish waterway. The Port operates four major terminals including Terminal 5 in West Seattle, Terminal 18 on Harbor Island, Terminal 25/30, and Terminal 46. Terminal 46 is the largest of these, with primary access via the Atlantic Street / 1st Avenue intersection.

KeyArena is a multipurpose arena with a capacity of over 17,000 people for basketball, about 15,000 people for hockey, and 15,000 to over 17,000 people for concerts, depending on the stage set up and seating configuration. It lies on the west edge of the Seattle Center along 1st Avenue N. KeyArena historically housed the Seattle Supersonics basketball team, and minor league hockey. Recently, it has been home to the Seattle University men's basketball team, the Seattle Storm WNBA team, and a range of other events. KeyArena sits in the heart of the Lower Queen Anne neighborhood, which borders the Seattle Center on the west and north.

Memorial Stadium, owned by the Seattle School District, lies adjacent to the eastern boundary of Seattle Center. Memorial Stadium was originally constructed in 1947. It currently has a capacity of 12,000 people; historically, capacity has been as high as over 17,000 people when the Seattle Sounders professional soccer team played there in the mid-1970s. It is located between Harrison and Republican Streets, west of 5th Avenue N., and separated from 5th Avenue N. by a surface parking lot also owned by Seattle Schools.



Transportation/Parking Analysis Study Areas

Seattle Arena

FIGURE
3.8-1

transpoGROUP

3.8.1.1 Summary of Site Plan Components

A number of site plan components are relevant to the transportation impact evaluation. These include:

- **Proposed Street Vacation** – As part of the project application, the proponent has requested the vacation of Occidental Avenue S. from S. Holgate Street to S. Massachusetts Street.

- **New North-South Connection** – A new north / south connection is proposed to be constructed on the east edge of the site extending from S. Holgate Street to S. Massachusetts Street. It is understood that this connection would generally not be open to the public, except during event conditions, as it would allow potential access to Safeco Field parking garage through an easement.

- **S. Massachusetts Street Realignment** – This roadway will be realigned to the north between 1st and Occidental Avenues S. The new roadway alignment will allow for a pedestrian plaza on the north side of the Arena. It will also eliminate the S. Massachusetts Street offset at the 1st and Occidental Avenues S. intersections. The improvements will provide alignment of S. Massachusetts Street across 1st Avenue S. and coordinate with improvements on the southwest corner of the intersection.

- **Pedestrian Access** – Primary pedestrian access to the site is proposed to be located on the northwest and southwest quadrants of the building. In addition, frontage modifications along S. Holgate Street, 1st Avenue S. and S. Massachusetts Street would include wider sidewalks, street furniture, street trees, rain gardens and understory planting and related building elements.

- **Public / Pedestrian Feature** – A large public plaza that includes seating, water features, pedestrian concrete, and incorporation of permeable pavements, trees and landscaping would be located on the north end of the site.

- **Service and Loading** – The service and loading area would be accessed from the proposed north / south roadway connection, north of S. Holgate Street.

- **Parking** – The applicant has proposed to provide parking for the facility by either use of existing off-site parking or the construction of new off-site parking on a lot south of Holgate Street (referred to in this document as the "South Warehouse site").

3.8.1.2 Horizon Years for Analysis

Transportation impact analysis considered not only the 2018 year of opening, but the status of the major infrastructure projects affecting transportation in the region and downtown area. The analysis was designed to recognize two primary horizon years for analysis as follows:

- **2018 Horizon** – This horizon year enables short term analysis that encompasses the completion of all of the substantive portions of the major infrastructure projects identified in Figure 3.8-2. Regional Transportation Timeline. This includes the expansion of the Streetcar, SR 520, Mercer West, SR 99, Waterfront Seattle, and Phase 1 of the Seawall project.

- **2030 Horizon** – This horizon year is consistent with area-wide transportation modeling of the future condition with all of the transportation infrastructure in-place, as well as the extension of Sound Transit (ST) east and north as indicated.

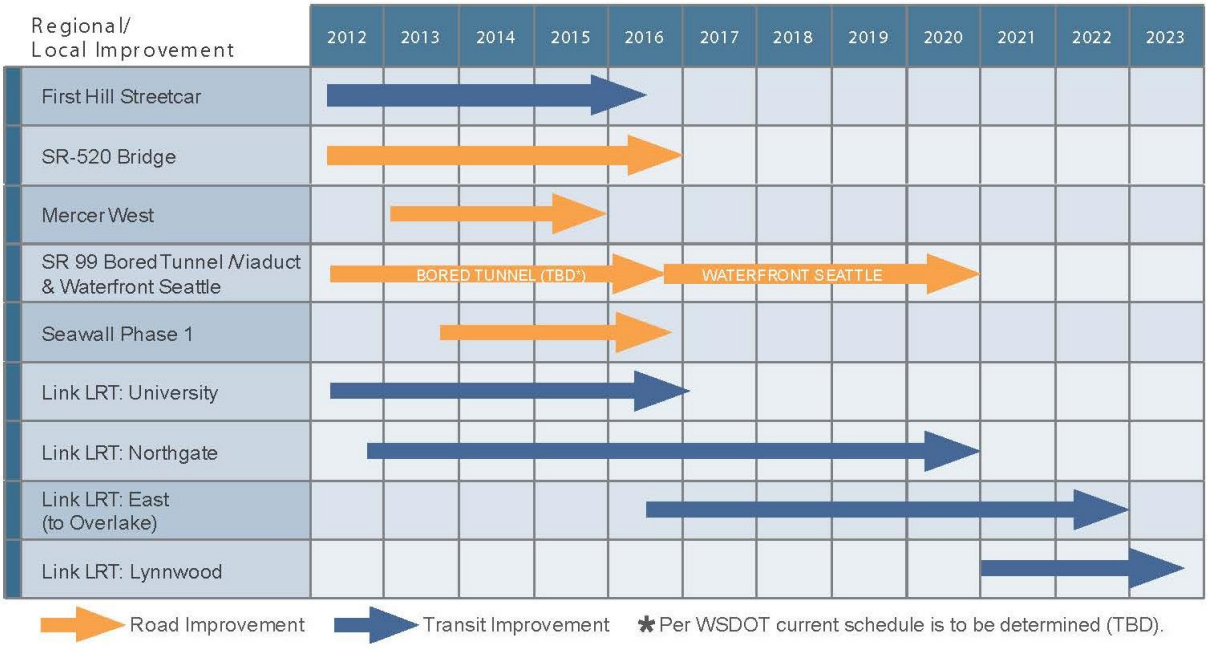


Figure 3.8-2
Regional Transportation Project Timeline

3.8.1.3 Event Analysis Cases

This section describes the basis for determining event cases for analysis of the Stadium District alternatives and the Seattle Center area alternatives, separately, as the factors influencing the determination of the event cases varied between the two site areas. Alternatives 2 and 3 would be located on the same site in the Stadium District of SoDo, and would be influenced by events at CenturyLink Field and Event Center and Safeco Field. Alternatives 4 and 5 would be located on or adjacent to the Seattle Center and would be influenced by activities occurring at the Seattle Center. In the case of the Seattle Center area alternatives, each of the alternatives would displace one of the existing event venues.

These cases were determined in consideration of these factors:

- **Event Venue Major Tenant Activities** – In the Stadium District alternatives, major tenant activities included both the Proposed Project (Alternative 2) or Alternative 3, as well as the activities associated with Safeco Field and CenturyLink Field and Event Center. In the Seattle Center area alternatives, the background level of events at the surrounding Seattle Center venues was assumed to be the same for both Alternative 4 and Alternative 5; however the existing and future uses of the venues to be replaced in each alternative were identified as part of the No Action Alternative.

- **Event Calendars** – Existing and future (with arena) event calendars were reviewed as available to assist in identifying potential seasonal overlaps between venue tenants.

- **Event Attendance Frequencies** – Using the seasonal calendars as appropriate, the frequency of event attendance levels at differing thresholds was summarized.

- **Event Analysis Cases** – Using the combination of the two summaries above, analysis cases were identified that provide a basis for understanding impacts of a single event at a new arena as well as multiple event conditions.

See Appendix E for a detailed description of major tenant activities, event calendars, and existing venue frequencies.

A number of the existing venues have overlapping tenant seasons. The Mariners and Sounders FC schedules overlap from April through November. The Seahawks season starts in August, resulting in a third existing overlapping schedule. Considering the potential for playoffs, there is a generally a four-month window (August to November) where all three existing sports teams could be playing regular season or playoff games.

The current Transportation Management Plan (TMP)[1] developed for Safeco Field and CenturyLink Field addresses this situation and requires that when a dual event is anticipated, and the attendance is expected to exceed 58,000 people for a weekday event and 65,000 people for a weekend event, the events must be separated by a minimum of 4 hours from the completion of one to the start of another.

Event Assumptions for New Arena

The following assumptions were made for events in the new Arena:

- NBA Basketball – 41 home games between November and mid-April; up to 16 home playoff games in April and May; and pre-season games in October.

- NHL Hockey – Similar to NBA with additional NHL games occurring in September.

[1] 2012 Safeco Field TMP – Dual Event conditions

- With a new Arena, the NBA and NHL seasons would generally run concurrently.
- WNBA Basketball – 17 home games from mid-May to late September, plus playoffs.
- Other Arena Events – There is also the potential for increased events unrelated to the professional sports teams. Based on discussion with the proponent a total of 60-65 additional events were assumed to occur, distributed throughout the year, with a slightly higher concentration during November and December.

The primary overlap in schedules with the existing Stadium District venues due to the Proposed Project (Alternative 2) or Alternative 3 would be associated with the WNBA season. This would occur between May and September for the WNBA regular season, extending to October with WNBA playoffs. During these months, the Sounders FC and the WNBA averaged four home games a month. During this same period, the Mariners in 2012 averaged 11-16 home games per month, typically played via 2 week-long home stands. The Mariners and NHL would overlap in September. The most significant potential overlap in schedules would occur in the event that the tenant of the Proposed Project (Alternative 2) or Alternative 3, professional basketball or soccer, is playing a home playoff game and overlapping with a well-attended baseball game in Safeco Field.

Frequency of Event Attendance Levels

A total of 186 events were identified as potentially occurring in the Arena. Based on typical attendance of 75 to 65 percent for NBA and NHL, respectively, the majority of the events are anticipated to have an attendance of 15,000 or less. The impacts associated with a single event occurring at the new arena would be the most common occurrence (See Table 3.8-1).

Table 3.8-1
Arena Event Attendance Ranges

Attendance Range (Persons)	Frequency
0 to 500	2
501 to 2,500	0
2,501 to 5,000	10
5,001 to 10,000	52
10,001 to 15,000	88
15,001 to 18,000	12
18,001 to 20,000	22
Total No. Events	186

3.8.1.4 Stadium District Alternatives – Alternatives 2 and 3

Event Analysis Cases

Table 3.8-2 illustrates the event cases developed for transportation and parking analysis in this document for the Stadium District alternatives.

Table 3.8-2
Stadium District - Event Cases for Analysis

Description	Attendance (Persons)		
	No Action	Action	Project Impact
Alternative 2 - 20,000 Seat Arena			
1 Case S1 – Single Event (Arena Only)			
New Arena	0	20,000	+20,000
Safeco Field	0	0	+0
CenturyLink	0	0	+0
Total Attendance	0	20,000	20,000
2 Case S2 – Dual Event (Arena + Mariners or Sounders)			
New Arena	0	20,000	+20,000
Safeco Field	40,500	40,500	+0
CenturyLink	0	0	+0
Total Attendance	40,500	60,500	20,000
3 Case S3 – Triple Event (Arena + Mariners or Sounders + CenturyLink)			
New Arena	0	20,000	+20,000
Safeco Field	47,500	47,500	+0
CenturyLink	5,000	5,000	+0
Total Attendance	52,500	72,500	20,000
Alternative 3 - 18,000 Seat Arena			
Case S1 – Single Event (Arena Only)			
New Arena	0	18,000	+18,000
Safeco Field	0	0	+0
CenturyLink	0	0	+0
Total Attendance	0	18,000	18,000
Case S2 – Dual Event (Arena + Mariners or Sounders)			
New Arena	0	18,000	+18,000
Safeco Field	40,500	40,500	+0
CenturyLink	0	0	+0
Total Attendance	40,500	58,500	18,000
Case S3 – Triple Event (Arena + Mariners or Sounders + CenturyLink)			
New Arena	0	18,000	+18,000
Safeco Field	47,500	47,500	+0
CenturyLink	5,000	5,000	+0
Total Attendance	52,500	70,500	18,000

The event cases represent the most frequent level of arena impact (Single Event), as well as an illustration of more significant potential, though comparatively rare, multiple event scenarios. Because of the complexity of the analysis, the inclusion of multiple event venues as part of baseline conditions under multiple no action comparison, the event cases have been defined (S1 – S3, reflecting Stadium District Cases 1-3) as follows:

- **Case S1 – Single Event (Arena Only)** – This designation will always describe the event case that includes the Proposed Project (Alternative 2) or Alternative 3, compared to a no action background condition that has no other event added in.

- **Case S2 – Dual Event (Arena plus Mariners or Sounders)** – A well-attended baseball or soccer game together with a capacity event in the Proposed Project (Alternative 2) or Alternative 3 would represent an infrequent, but significant dual event case to illustrate. In this case, the Mariner game would be added to the non-event baseline to provide a Case 2 No Action baseline for analysis comparison.

  For purposes of this analysis, and given the proximity of Safeco Field and CenturyLink Field to the Stadium District site, the dual (and triple) event case is characterized as including a high attendance event at Safeco Field (baseball). It should be recognized that the analysis could just as easily represent a similarly sized soccer event at CenturyLink Field. The event case analysis assumes simultaneous events with uniform arrival and departure times as well as total cumulative attendance.

- **Case S3 – Triple Event (Arena + Mariners / Soccer + CenturyLink Concert)** – A triple event scenario was identified that includes activity at all three venues as described above. While even these scenarios may be addressed, limited, or prohibited as a result of a revised event scheduling agreement, the total attendance level likely from this combination was similar to that occurring in the event of a major event at CenturyLink Field, such as Monday night football. It is assumed that a triple event case that included soccer, baseball, and a major event at a new arena would not be scheduled; this would be clarified in the conditions of approval and event scheduling agreement. In this case, the Case 3 No Action baseline would include both the Mariner game and event at CenturyLink. As noted above, the analysis is constructed to reflect a total cumulative event of the attendance indicated.

3.8.1.5 Seattle Center Area Alternatives

The determination of event cases for study for the Seattle Center area alternatives was conducted with the same overall philosophy as those in the Stadium District alternatives. Differences in context between the Seattle Center and SoDo require a different methodology for determining appropriate event cases for analysis. In the Seattle Center alternatives, a new arena would replace an existing event venue of significance. For Alternative 4, the KeyArena would be replaced; for Alternative 5, Memorial Stadium would be replaced.

Event Analysis Cases

Table 3.8-3 illustrates the event cases developed for analysis for the Seattle Center area alternatives. Similar to the Stadium District, analysis cases are linked to each alternative (Cases K1 and K2 for the KeyArena site; Cases M1 and M2 for the Memorial Stadium site). As mentioned before, Case 1 reflects single events (Arena only), Case 2 reflects dual events (Arena plus a background event). In the case of Alternative 4 (KeyArena site), Case K2 reflects a dual event condition with Memorial Stadium event added to no action. In the case of Alternative 5, Case M2 reflects a dual event condition with an event at KeyArena in the background.

Table 3.8-3
Seattle Center Area Alternatives - Event Cases for Analysis

Description	Attendance (Persons)		
	No Action	Action	Project Impact
Alternative 4 - KeyArena Site			
1 Case K1 - Single Event (Arena Only)			
KeyArena	12,000	20,000	+8000
Memorial Stadium	0	0	+0
Total Attendance	12,000	20,000	+8000
2 Case K2 - Dual Event (Arena + Memorial Stadium Event)			
KeyArena	12,000	20,000	+8000
Memorial Stadium	5,000	5,000	+0
Total Attendance	17,000	25,000	+8000
Alternative 5 - Memorial Stadium Site			
1 Case M1 - Single Event (Arena Only)			
KeyArena	0	0	+0
Memorial Stadium	5,000	20,000	+15000
Total Attendance	5,000	20,000	+15000
2 Case M2 - Dual Event (Arena + KeyArena Event)			
KeyArena	12,000	12,000	+0
Memorial Stadium	5,000	20,000	+15000
Total Attendance	17,000	32,000	+15000

The event cases for analysis were designed to reflect typical anticipated levels of occurrence for events at the Seattle Center. The multi-event case (Case 2) described a basis for understanding a reasonable worst case scenario for multi-venue attendance at the Seattle Center.

3.8.1.6 Event Transportation Demands

This section summarizes the methodology and resulting trip generation and parking demands for the No Action and Alternative event analysis cases. Forecasting of event-related traffic volumes and parking demands considers the identified event case attendance levels, mode-splits, and general arrival patterns. As the event cases defined are unique to each alternative, the following provides a discussion of the Stadium District alternatives followed by the Seattle Center area alternatives.

Sporting event-related arrival patterns were for purposes of the analysis, assumed to be consistent between the Stadium District and Seattle Center area alternatives, based on limited available data and the intention to provide consistency in analysis comparisons. The arrival patterns developed for the project are based on a review of parking accumulation data for SoDo area garages, data from other NBA facilities, and review of traffic volume data in SoDo. See Appendix E for a detailed description of assumptions made for the percentage of people who would be arriving by car, the average number of people per vehicle (AVO), arrival patterns, and what percentage would be arriving during the PM peak hour.

3.8.2 Stadium District Alternatives - Alternatives 2 and 3

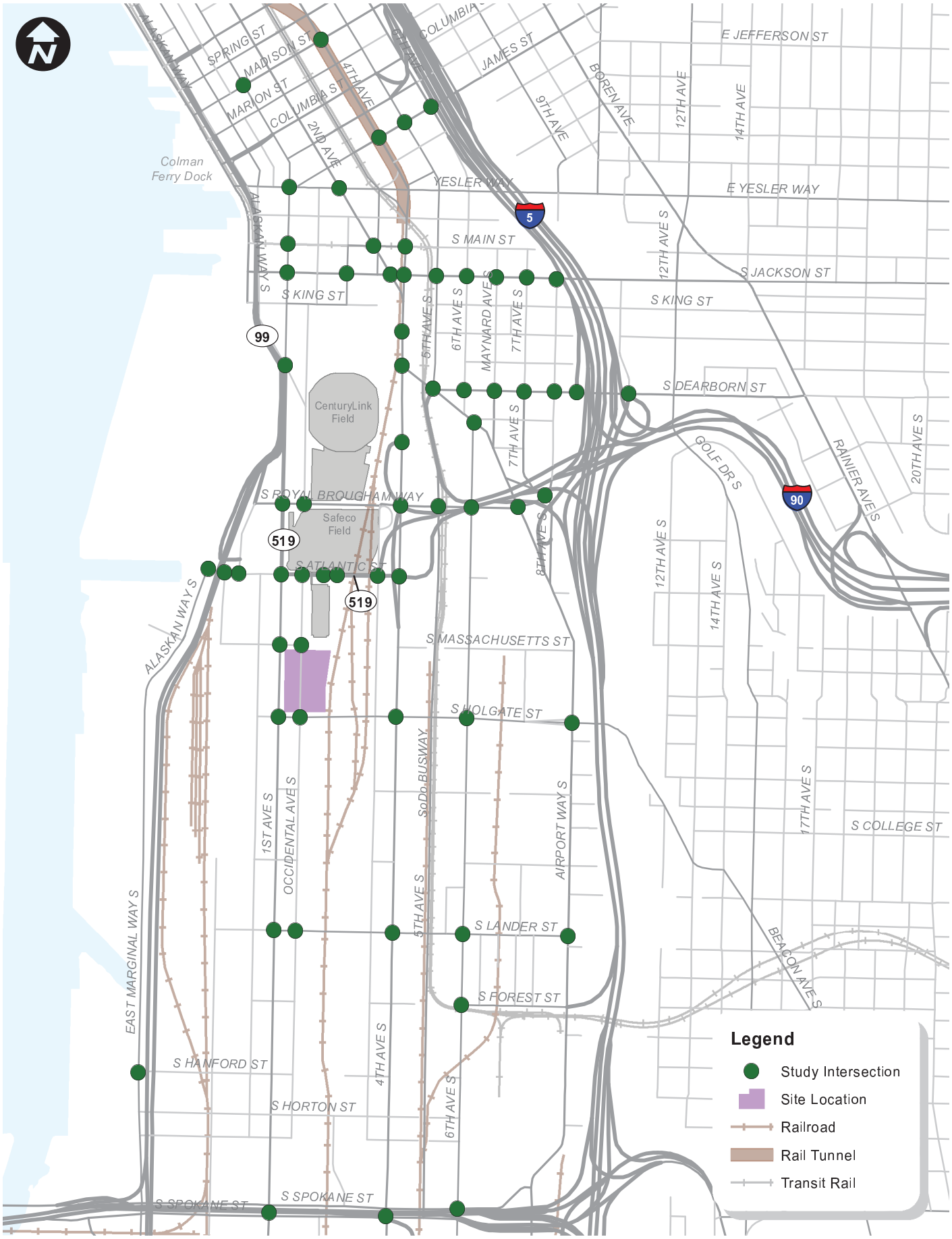
Within the Stadium District, the proposed Seattle Arena would be located at 1700 – 1st Avenue S. on the northeast corner of the 1st Avenue S. / S. Holgate Street intersection. Figure 3.8-3 shows the study area defined for the Stadium District alternatives. The analysis area was determined in consideration of the primary travel patterns for traffic to and from the Stadium District in SoDo, as well as the primary parking areas. The study area generally extends from E. Marginal Way on the west, Interstate 5 (I-5) on the east, Madison Street on the north, and S. Spokane Street on the south. The transportation analysis includes the evaluation of 64 study intersections inclusive of regional access points to the freeway system.

3.8.2.1 Street System

Methodology

The general approach to the evaluation of street system impacts included:

- Inventory of existing roadway infrastructure to determine the current condition of the street system.
- Identification of future transportation projects that would be constructed prior to project completion.
- Evaluation of street system impacts considering three changes to the street network proposed or required as a result of Alternatives 2 and 3.



Stadium District Study Intersections

Seattle Arena

FIGURE
3.8-3

transpoGROUP

Affected Environment

Regional Access: Regional access to the study area is provided via I-90 to the east and I-5 and SR 99 to the north and south. Roadways in the immediate vicinity of the Stadium District site include principal and minor arterials with traffic signals at major intersections. Table 3.8-4 summarizes the characteristics of major corridors within the study area, highlighting the roadway classification, speed limit, number of lanes, and general characterization of the non-motorized facilities.

Table 3.8-4
Stadium District Existing Street System Summary

Roadway	Arterial Classification	Posted Speed Limit	Number of Travel Lanes	Parking?	Sidewalks?	Bicycle Facilities?
1st Ave S.(South of S. Royal Brougham Way)	Principal Arterial	35 mph	5 lanes	Most Blocks	Yes	Yes
1st Ave S.(North of S. Royal Brougham Way)	Minor Arterial	30 mph	4 to 5 lanes	Most Blocks	Yes	Yes
Occidental Ave S	Access Street	25 mph	2 lanes	Yes	Some Blocks	No
S. Lander St	Minor Arterial	30 mph	5 lanes	Most Blocks	Yes	Yes
4th Ave S.	Principal Arterial	35 mph	6 lanes	Most Blocks	Yes	No
6th Ave S.	Minor Arterial	30 mph	2 lanes	Most Blocks	Most Blocks	Yes
Airport Way S.	Principal Arterial	30 to 35 mph	4 to 5 lanes	Few Blocks	Most Blocks	Yes
S. Holgate St (East of 4th Ave S.)	Minor Arterial	35mph	4 lanes	Some Blocks	Some Blocks	No
S. Holgate St (West of 4th Ave S.)	Minor Arterial	30 mph	4 lanes	Most Blocks	Some Blocks	No
S. Atlantic St (West of 1st Ave S.)	Collector Arterial	30 mph	4 lanes	Yes	Yes	No
S. Atlantic St (East of 1st Ave S.)	Access Street	30 mph	4 lanes	No	Yes	No
S. Royal Brougham Way	Principal Arterial / Access Street	35 mph	4 lanes	Most Blocks	Yes	Most Blocks
S. Massachusetts	Access Street	25 mph	2 lanes	Most Blocks	Some Blocks	No
S. Jackson St	Principal Arterial	30 mph	2 to 4 lanes	Few Blocks	Yes	Yes
Yesler Way	Minor Arterial	30 mph	2 lanes	Yes	Yes	Yes
James St	Principal Arterial / Minor Arterial	30 mph	2 to 4 lanes	Most Blocks	Yes	No
2nd Ave	Principal Arterial	35 mph	3 lanes	Most Blocks	Yes	Yes
2nd Ext Ave S.	Principal Arterial	35 mph	3 lanes	Most Blocks	Yes	Yes

The primary arterial routes providing north-south vehicular access in the site vicinity are Alaskan Way S., 1st Avenue S., Occidental Avenue S. and 4th Avenue S. East-west circulation is provided along S. Royal Brougham Way, S. Atlantic Street (Edgar Martinez Drive S.), S. Massachusetts Street, S. Holgate Street, and S. Lander Street.

There is a direct access ramp from 4th Avenue S. at S. Atlantic Street to I-90 and I-5. In addition, I-5 can be access via Spokane Street at 4th Avenue S. further south of the site. Improvements allowing the southbound left-turn from 4th Avenue S. to Spokane Street were completed recently and are not reflected in the operations analysis; given the travel patterns of Arena traffic it is anticipated that use of this movement to access I-5 would be somewhat limited. The main transit corridor in the site vicinity is the SoDo Busway along 5th Avenue S., although a large number of buses travel 4th Avenue S., near the Stadium District site.

Rail crossings: There are both mainline tracks and tail tracks in the area resulting in numerous at-grade crossings along both S. Holgate Street and S. Lander Street. A discussion of the rail facilities and freight activity is included in the Freight and Goods section. Notably, the S. Holgate Street railroad crossings extend from immediately east of the proposed Arena site to west of 3rd Avenue S., a distance over 500 feet of intermittent track crossings.

Event Function – Event Traffic Control Plans: Figure 3.8-4 shows the street functional classifications for the study area. The effective use of several intersections and roadways segments change between without and with event conditions due to closures and restrictions implemented as part of the Traffic Control Plans (TCPs) for Mariners, Seahawks, and Sounders FC games. Figure 3.8-5 illustrates the locations included in the existing TCPs for Safeco Field and CenturyLink Field. The TCPs employed are part of the transportation management for events in the Stadium District and are a function of the event location as well as anticipated attendance levels and associated auto demands. The Seahawks TCPs impacts more locations than the Sounders FC or Mariners due to the higher attendance levels.

Freight Designations: Several of the arterials within the SoDo area have freight designations that include truck streets, heavy haul routes, and seaport and intermodal connectors. These routes are used by freight operators to access Port of Seattle facilities, intermodal rail yards, and other industrial uses in the SoDo area. Those designations are discussed further in the Freight and Goods section of the report and also shown on Figure 3.8-17. Adjacent to the Arena site, 1st Avenue S. and S. Holgate Street are designated freight routes.

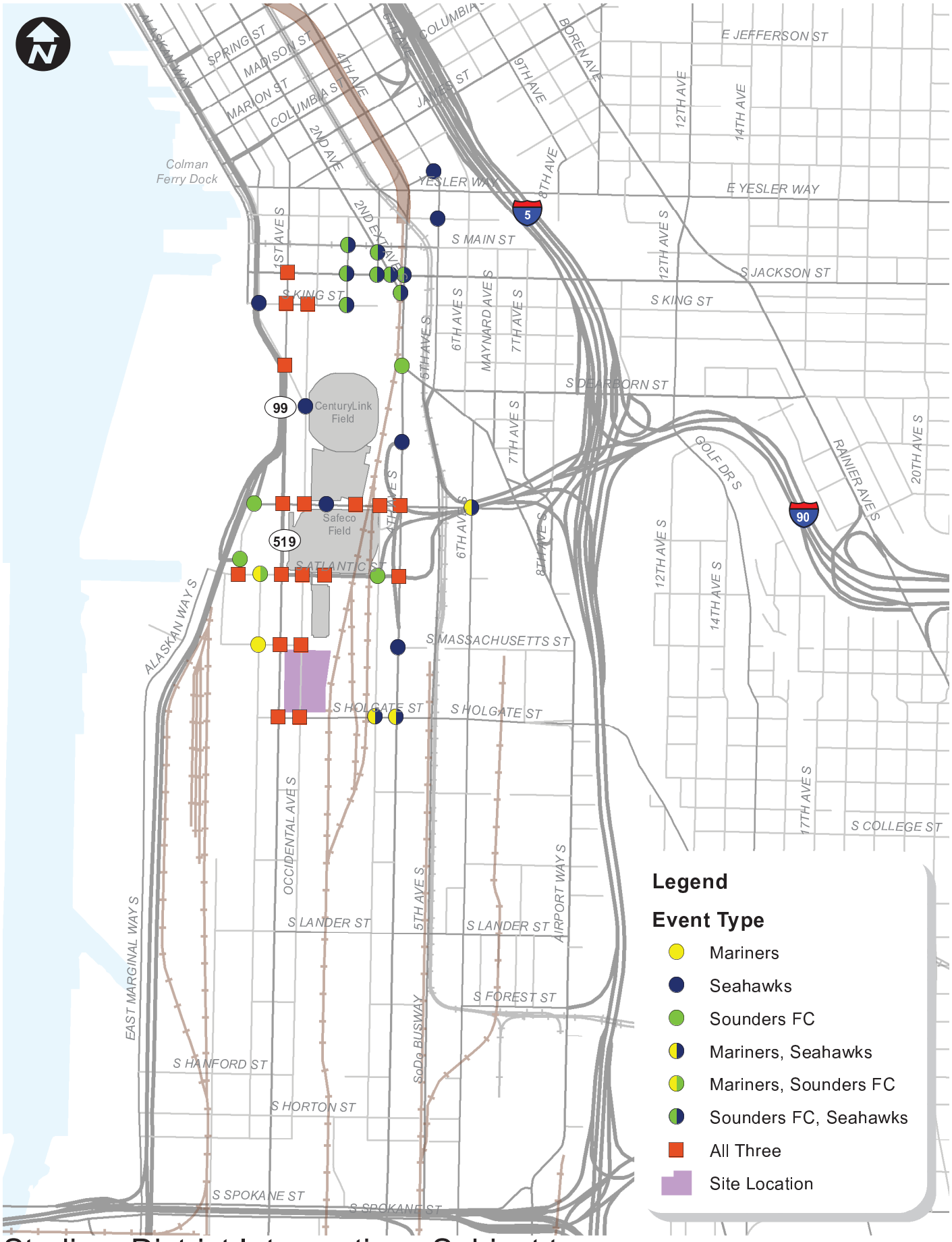


Stadium District Street System

Seattle Arena

FIGURE
3.8-4

transpoGROUP



Stadium District Intersections Subject to Traffic Control Plans

Seattle Arena

FIGURE
3.8-5

transpoGROUP

Occidental Avenue S. Use: Occidental Avenue S. is proposed to be vacated as part of either Alternative 2 or 3. The proposed vacation would likely impact the functions described herein. Occidental Avenue S. and S. Massachusetts Street provide local access in the immediate site vicinity. The primary functions of Occidental Avenue S. include access to / from the Safeco Field parking garage, an alternative corridor to 1st Avenue S. for north / south travel, access route for commercial business between S. Holgate Street and S. Atlantic Street, and charter bus and Metro Access bus staging for Mariners events. S. Massachusetts Street links also provides access to the Safeco Field parking garage, commercial businesses between 1st and Occidental Avenues S. and along Occidental Avenue S.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

The study area is undergoing major transportation system changes. A review of local and regional capital improvement programs and long-range transportation plans was conducted to determine planned funded and unfunded transportation projects that would impact the study area. The review included, but was not limited to, transportation plans from the Washington State Department of Transportation (WSDOT), City of Seattle, King County, ST, and the Port of Seattle. Table 3.8-5 provides a summary of key future transportation projects in the study area. In addition, the table provides an understanding of how these transportation projects were incorporated into the No Action Alternative evaluation. Many of the major street system projects impacting vehicular movements would be completed by 2018. Projects slated to be completed beyond 2018 are primarily related to the non-motorized and transit system and would likely encourage a decrease in dependence on the auto mode, during both typical commuter periods, as well as for events in the Stadium District. See Appendix E for a more detailed discussion on how specific transportation projects impact the study area.

Table 3.8-5
Stadium District: Key Study Area Planned Transportation Projects

Project Description	Responsible Agency	Expected Completion Date	Funded?[1]	Assumed in Analysis?[2]	
				2018	2030
***Alaskan Way Viaduct Replacement*:** SR 99 viaduct replaced with a tunnel between S. Royal Brougham Way and Mercer Street.	WSDOT	TBD[3]	Yes	✓	✓
***SR 520 Bridge Replacement*:** Construction of a new SR 520 floating bridge with two general purpose lanes and one HOV / transit lane per direction. Transit and non-motorized projects between SR 202 and I-5 including adding pedestrian/bicycle facilities across Lake Washington. The eastside, west approach and floating bridge segments are funded. The westside projects in the Montlake Interchange vicinity are not funded.	WSDOT	2017	Partial	✓	✓

Table 3.8-5 (Continued)
Stadium District: Key Study Area Planned Transportation Projects

Project Description	Responsible Agency	Expected Completion Date	Funded?[1]	Assumed in Analysis?[2]	
				2018	2030
Mercer Corridor: Convert Mercer Street, Roy Street, and Valley Street to two-way operations and improve non-motorized access.	SDOT	2015	Yes	✓	✓
First Hill Streetcar: Two-mile streetcar line serving Capitol Hill, First Hill and International District with connections to Link light rail, Sounder commuter rail and bus service.	SDOT	2015	Yes	✓	✓
Link Light Rail: Extension of the regional light rail system. All segments are funded in ST2, but the year of completion may vary depending on revenue available to fund construction. The segments include:	Sound Transit				
North—University District and Capitol Hill		2016	Yes	✓	✓
North—Northgate		2021	Yes		✓
North—Lynnwood		2023	Yes		✓
East—Bellevue and Redmond		2023	Yes		✓
South—Extension to S. 200th Street		2016	Yes	✓	✓
South—Extension to Kent-Des Moines Road		2023	Yes		✓
King Street Station Multimodal Terminal: Improve station access including opening of the Grand Stairs to connect the upper Jackson plaza and King Street Station entrance and a new entrance on Jackson plaza. These connections will transform the station into a transportation hub with easy access to express buses, commuter trains and light rail service.	SDOT	Completed 2013	Yes	✓	✓
Elliott Bay Seawall Replacement: Replacement of the existing seawall along the Seattle waterfront from S Washington Street to Broad Street.	SDOT	2019	Yes		✓
Waterfront Seattle: This project creates a continuous public waterfront between S. King Street and Bell Street and includes the design and construction of the new surface Alaskan Way and Elliott Way arterial streets.	SDOT	2014 and beyond	Partial	✓	✓
Southend Transit Pathway: This project creates a new transit corridor on Alaskan Way and Columbia Street with a pair of bus stops near the Stadium District to replace service currently on the Alaskan Way Viaduct.	SDOT / King County Metro Transit	2017	Yes	✓	✓

Table 3.8-5 (Continued)
Stadium District: Key Study Area Planned Transportation Projects

Project Description	Responsible Agency	Expected Completion Date	Funded?[1]	Assumed in Analysis?[2]	
				2018	2030
Convention Place TOD: Expansion of the Washington State Convention Center to include a reconfiguration or relocation of transit access, layover and passenger amenities at Convention Place Station. The EIS is under way for this project.	King County Metro Transit / King County	Unknown	No		
Rapid Ride: Bus rapid transit service in six corridors (A through F) and the potential to expand into additional corridors in the future. Service has been initiated in four of the six corridors, and the E and F Lines are expected to start service in 2014.	King County Metro Transit	Completed 2014	Yes	✓	✓
Electric Trolleybus Fleet Replacement: Metro will replace its fleet of 159 trolleybus with modern low-floor vehicles providing more capacity on these routes.	King County Metro Transit	2015	Yes	✓	✓
Industrial Way Direct Access Ramps: This project would provide a direct connection from I-5 to and from the south to the SoDo busway through SoDo.	King County Metro Transit / WSDOT	Unknown	No		
Downtown Neighborhood Projects: Installation of pedestrian countdown signals and sidewalk repairs at the 1st Avenue S. intersections with S. Main Street and S. King Street.	SDOT	Completed 2013	Yes	✓	✓
S. Lander Street Grade Separation: This project grade separates S. Lander St. roadway and the BSNF mainline railroad tracks between 1st Avenue S. and 4th Avenue S.	SDOT	Unknown	No		

1. "Yes" means the project is fully funded for construction, "partial" means the project has some, but not complete funding for construction, and "no" means the project does not have any construction funding.
2. A check indicates that the project was assumed in the analysis related to the horizon year.
3. Due to construction delays, the timing of this is to be determined (TBD) per WSDOT's website March 30, 2015. The improvement was assumed in this analysis for both 2018 and 2030 conditions.

Impacts of the Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

Construction

Construction impacts related to the street system would mostly occur on 1st and Occidental Avenues S. and S. Massachusetts and Holgate Streets adjacent to the site. A construction management plan would mitigate these impacts. The plan could include scheduling street closures and other disruptions to the street system during off-peak periods to minimize impacts to the system.

As part of Alternative 2, Occidental Avenue S. between S. Massachusetts and S. Holgate Streets would be vacated. Occidental Avenue S. currently provides secondary access to and from the Safeco Field parking garage, an alternative route for north-south travel, access to the commercial businesses, and charter bus staging area for Safeco Field events.

With development of Alternative 2, the businesses along Occidental Avenue S. between S. Holgate and S. Massachusetts Streets would be removed and the land would be redeveloped with the Seattle Arena. A private access road would be constructed east of the site allowing for the potential for continued local access to the Safeco Field parking garage (for both the 2018 and 2030 horizon years) through an easement. This connection is only proposed to function during events that would use the garage. Traffic currently using Occidental Avenue S. as an alternate north-south route would shift to the parallel 1st Avenue S. corridor.

Other street system changes would occur along the project frontage with the reconstruction of curb faces and the removal of all existing driveways on 1st Avenue S. and S. Holgate Street along the project frontage. S. Massachusetts Street will also be realigned to the north between 1st and Occidental Avenues S. expanding the size of the pedestrian plaza on the north side of the Arena and eliminating the existing roadway offset at its intersections with 1st and Occidental Avenues S.

Operation

As part of Alternative 2, Occidental Avenue S. between S. Massachusetts and S. Holgate Streets would be vacated. Occidental Avenue S. currently provides secondary access to and from the Safeco Field parking garage, an alternative route for north-south travel, access to the commercial businesses, and charter bus staging area for Safeco Field events.

With development of Alternative 2, the businesses along Occidental Avenue S. between S. Holgate and S. Massachusetts Streets would be removed and the land would be redeveloped with the Seattle Arena. Traffic currently using Occidental Avenue S. as an alternate north-south route would shift to the parallel 1st Avenue S. corridor.

Other street system changes would occur along the project frontage with the reconstruction of curb faces and the removal of all existing driveways on 1st Avenue S. and S. Holgate Street along the frontage. The proposal would reestablish a connection to S. Holgate Street by a new

private roadway that would be located on the east edge of the new Arena. This connection is only proposed to function during events that would use the Arena on-site garage. There is a potential for access to the Safeco Field parking garage through an easement.

Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

Construction impacts and mitigation related to development of Alternative 3 would be the same as described for Alternative 2.

No additional modifications to the street system are proposed under Alternative 3 than have been noted for Alternative 2.

3.8.2.2 Public Transportation

Methodology

The general approach to the evaluation of public transportation impacts included:

- Determination of existing transit passenger capacity during pre-and post-event periods for weekday and weekend events.
- Identification of future 2018 and 2030 growth in ridership and change in capacity
- Consideration of event ridership associated with event cases for No Action and Alternatives 2 and 3
- Evaluation of capacity needed to support Alternatives 2 and 3
- Consideration of speed and reliability under existing and future conditions.

The analysis focuses on weekday event conditions because transit ridership and motorized volumes are highest during this timeframe; this provides a conservative estimate of transit capacity and reliability impacts. See Appendix E for a detailed description of the methodology used for each mode of public transportation (bus transit, light rail, Sounder, ferry, and streetcar).

In Fall 2014, Seattle voters approved Proposition 1 to provide funding to maintain current transit service on existing routes in the City of Seattle. The measure came after King County Metro had announced that it would cut 180,000 service hours starting in February 2015.

Transit capacity and route assumptions were not revised to reflect Proposition 1 in this analysis. Proposition 1 affects only Seattle routes, which serve less than half of the event patrons who use transit; thus, the impact of the service change would be minimal. The specific schedule changes resulting from Proposition 1 have not yet been released; however, the transit capacity is not anticipated to change the analysis results in the over capacity zones.

Affected Environment

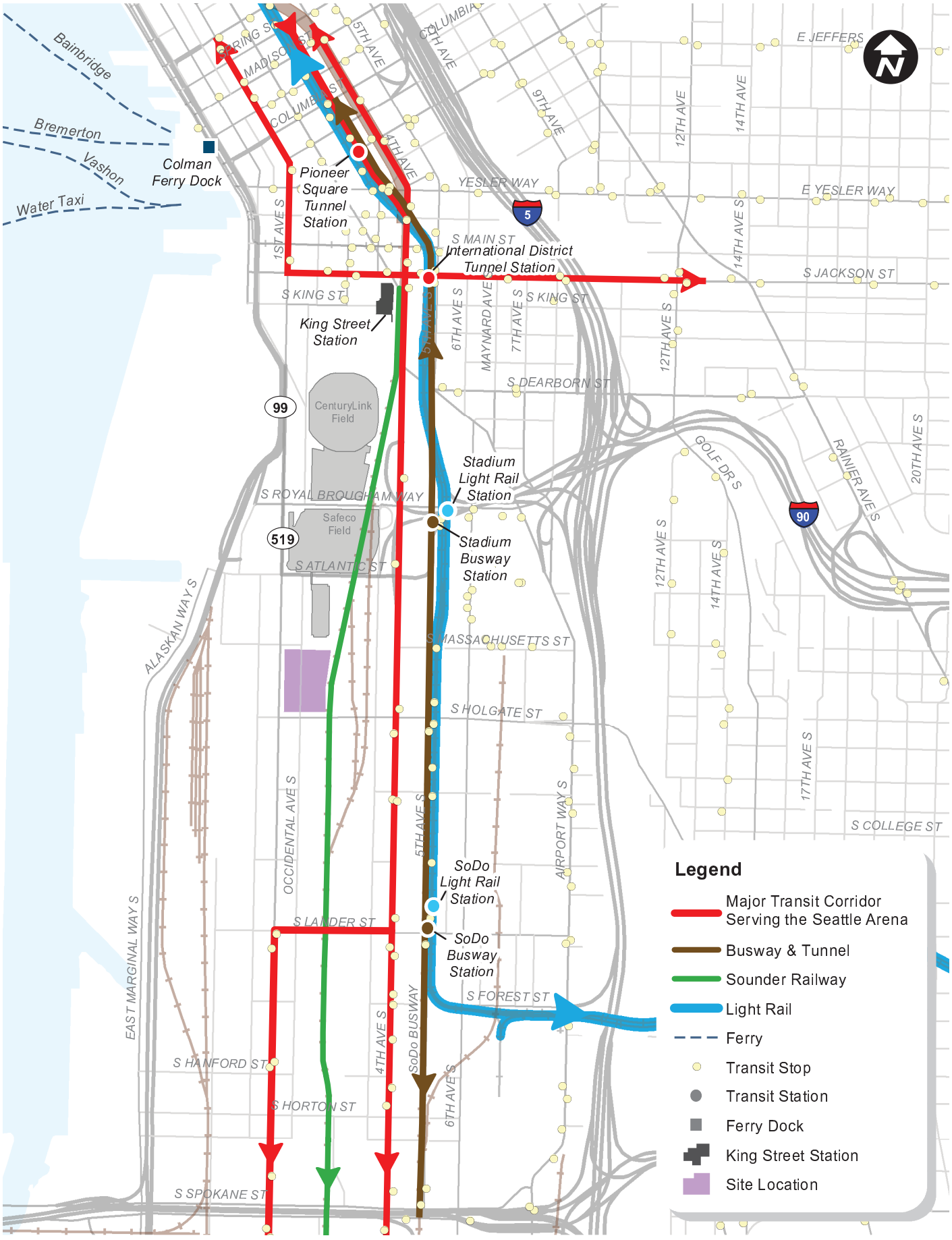
Regional public transit providers offer a number of ways for people to access the Stadium District including bus, light rail, commuter rail and ferry as illustrated in Figure 3.8-6.

The capacity of these transit services to transport people to and from the Stadium District varies by day (weekday or weekend service) and by the time of day (peak commuter period or evening services). This section summarizes the total passenger ridership and available passenger capacity to and from the Stadium District during a weekday evening; this includes inbound to downtown Seattle transit service from 5:00 to 7:00 PM and outbound from downtown Seattle transit service from 9:00 to 11:00 PM with bus stops near the Stadium District site.

Bus Transit

Bus transit for the Stadium District is concentrated along SR 99 / Alaskan Way, 1st Avenue S., S. Jackson St., 4th Avenue S., SoDo Busway (5th Avenue S.), 6th Avenue S., and the International District Station. Bus service to the Stadium District is currently provided by King County Metro Transit and ST. The primary bus stops serving the Stadium District are located on 4th Avenue S. and 5th Avenue S., near S. Royal Brougham Way and S. Lander Street.

The number of buses in service on routes through the Stadium District during the peak weekday afternoon commuter period is higher leaving the downtown Seattle core than entering. The number of buses in service in the late evening is less than the weekday afternoon commuter period. Bus headways, the time between buses at a bus stop, are shorter during peak weekday afternoon commuter periods (10 to 30 minutes) compared to late evening and weekend service (30 to 60 minutes).



Stadium District Transit Facilities and Corridors

Seattle Arena

FIGURE
3.8-6

transpoGROUP

Bus Ridership: Existing bus ridership was provided by King County Metro Transit and ST for buses serving the Stadium District that travel to downtown Seattle from 5:00 to 7:00 PM and out of downtown Seattle from 9:00 to 11:00 PM. The available bus service was grouped into six service zones or corridors for analysis based on the distribution of service in the region:

- Zone 1: Magnolia, Ballard and Fremont area of Seattle
- Zone 2: Along SR 99, I-5, and SR 520, and areas to the north and northeast
- Zone 3: Bellevue, Issaquah, and I-90 to the east
- Zone 4: Southeast Seattle, Tukwila, and Renton
- Zone 5: South on I-5, Federal Way, Burien, and areas to the south
- Zone 6: West Seattle

Bus transit provides almost double the passenger capacity for bringing people to an event from 5:00 to 7:00 PM compared to leaving an event from 9:00 to 11:00 PM. The amount of bus passenger capacity varies to the different areas of King County; there is more bus service along SR 99, I-5, and SR 520 compared to other service centers for buses operating through the SoDo area. The occupancy rate for these buses, which is the total number of passengers on buses through the Stadium District divided by the total passenger capacity of those buses, is approximately 33 percent for inbound (5:00 to 7:00 PM) service and 35 percent for outbound (9:00 to 11:00 PM) service. This means that approximately 6,600 people were traveling to the Stadium District and 3,300 people were traveling away from the Stadium District to areas served by the selected King County Metro Transit and ST routes. The remaining capacity on all buses could accommodate approximately 13,300 passengers inbound and 6,000 outbound during these time frames. During peak commute periods and event days, specific buses and routes within the six zones experience higher ridership and overcrowding.

Weekday bus service (passenger capacity) is reduced by approximately 30 percent from 5:00 to 7:00 PM on weekends and approximately 10 percent from 9:00 to 11:00 PM (for combined King County Metro Transit and ST service). Based on King County Metro Transit ridership, the average number of passengers is approximately 30 percent less on weekends from 5:00 to 7:00 PM compared to weekdays and three percent less from 9:00 to 11:00 PM.

Speed and Reliability: On-time performance information was provided by King County Metro Transit for routes serving the Stadium District, including some ST routes (522, 545, and 550), which was used to determine the reliability of buses to meet schedules. King County Metro Transit and ST bus service to downtown Seattle from 5:00 to 7:00 PM were on-time approximately 75 percent of the time. Buses leaving downtown Seattle from 9:00 to 11:00 PM were on-time approximately 77 percent for King County Metro Transit and 81 percent for ST.

The travel time for buses (an indication of speed and reliability) would be similar to general purpose traffic because they operate in mixed flow through the Stadium District. The corridor travel time evaluation for existing weekday PM peak hour non-event and event conditions shows that increases in travel time as a result of an event are minimal with travel time differences of 30 seconds or less.

Other Service Information: King County Metro Transit has previously provided special service for sporting events such as Seahawks weekend games and Sounder FC games. This special service is paid for by the sports team (Mariners, Sounders FC, and Seahawks). Special park-and-ride services were provided between Northgate Transit Center, South Kirkland Park-and-ride, and the Eastgate Park-and-ride for Seahawks games — this special service has not been provided for weekday games. For Sounders FC games, the special bus service was cancelled in May 2012 due to low demand. Instead of the special park-and-ride service, extra coaches were added on regular King County Metro Transit service to downtown Seattle, as needed, to accommodate Sounders FC fans (source: King County Metro Transit website).

The effects of the passing of Proposition 1 which provides the funding needed to maintain current levels of bus service in the City of Seattle through 2020 were not taken into account in this analysis for reasons documented in the methodology section. Some of the bus service on the Alaskan Way Viaduct is currently subsidized by mitigation funding from WSDOT which expires in 2015. An extension of the funding is being considered by the Washington State Legislature. If not renewed, this could reduce the capacity on the routes currently providing service to SoDo.

ST provides additional bus service as necessary to accommodate passenger loads to special events. Prior to events, an assessment of extra service is determined based on ticket sales for the event.

Light Rail

ST currently provides light rail service from downtown Seattle to the Seattle Tacoma International (SeaTac) Airport via the Central Link light rail. The nearest light rail stations serving the Stadium District are located along the SoDo Busway (5th Avenue S.) at S. Royal Brougham Way (Stadium Station) and S. Lander Street (SoDo Station). Light rail service provides riders with a reliable and uncongested trip into and out of Seattle because routes are entirely within dedicated right-of-ways.

Light rail service currently operates with two car trains per trip; each train was assumed to have a capacity of approximately 200 people. Headways, the times between trains at a station, for inbound service (to downtown Seattle) are 7.5 minutes from 5:00 PM to 6:30 PM and 10 minutes from 6:30 PM to 7:00 PM. Outbound service operates on 10-minute headways from 9:00 PM to 10:00 PM and 15-minute headways from 10:00 PM to the end of service, which is approximately 1:00 AM on weekdays. Weekday light rail service (passenger capacity) is reduced

by approximately 20 percent from 5:00 to 7:00 PM on weekends and does not change from 9:00 to 11:00 PM.

Light rail provides a total capacity for approximately 6,000 passengers traveling inbound to the Stadium District from 5:00 to 7:00 PM and 4,000 passengers outbound from 9:00 to 11:00 PM. During Spring 2012 service, trains had an average maximum load of approximately 50 passengers; approximately 770 passengers were traveling inbound and 480 outbound from downtown Seattle. This represents average maximum passenger loads of less than 30 percent on each train. Total train maximum passenger capacity is approximately 400 people for two-car train sets.

Sounder Commuter Rail Service

ST's Sounder commuter rail service provides service between Lakewood and Seattle with additional stops in Tacoma, Puyallup, Sumner, Auburn, Kent, and Tukwila and between Everett and Seattle with intermediate stops in Mukilteo and Edmonds. The Seattle stop is located at King Street Station. Sounder currently has only regular weekday morning and afternoon service. Trains enter Seattle approximately every 30 minutes during morning commuter periods, from 6:00 to 8:00 AM, and leave approximately every 30 minutes during the evening commuter period or pre-event. Only one train enters Seattle from Everett and two trains from Tacoma (Lakewood stop is not used) during the late evening. No regular weekend service is available. The last weekday train south to Lakewood leaves Seattle at 6:15 PM and to Everett at 6:50 PM. Given that there is no return service for post-event, event attendees would need to find alternative modes; therefore, Sounder commuter rail service was not evaluated.

Only one train provides service to downtown Seattle from Lakewood during the 5:00 to 7:00 PM time frame. This provides capacity for more than 1,900 passengers. Specific ridership information was not available at this time.

Currently, ST provides scheduled special Sounder service to sporting events for the Mariners and Sounder FC games. One train from Lakewood to Seattle and one train from Everett to Seattle are provided for select weekend and holiday games for the Mariners and select weekend games for the Sounder FC. Trains depart Seattle 35 minutes after the end of the event, providing capacity for approximately 1,900 people to Lakewood and 1,100 people to Everett.

Washington State Ferries

Washington State Ferries (WSF) provides ferry service to Seattle at Colman Dock, located near Alaskan Way and Yesler Way. Colman Dock is approximately one-mile northwest of the Stadium District. Ferries to / from Seattle serve Bainbridge Island and Bremerton. The ferries have arrivals and departures scheduled throughout the day with headways of approximately 60 minutes for Bainbridge Island service and approximately 75 minutes for Bremerton service. Ferries serving both of these routes are some of the largest ferries in WSF's fleet, providing

combined vehicle and passenger service. According to WSF's website, these ferries are capable of transporting 2,500 passengers per trip, in addition to vehicles. Weekend ferry service (passenger capacity) increases by approximately 10 percent over weekday ferry service.

WSF Colman Dock service provides a total capacity for approximately 7,300 passengers traveling inbound to the Stadium District from 5:00 to 7:00 PM and 9,800 passengers outbound from 9:00 to 11:00 PM.

An average inbound passenger load of approximately 210 passengers is estimated. During May 2012 service, ferries had an average load of approximately 640 passengers traveling outbound from 9:00 to 11:00 PM.

Passenger Ferry

The King County Ferry District provides passenger-only ferry service between Seattle at Pier 50, and West Seattle and Vashon Island. Ferry departures and arrivals to Pier 50 for the West Seattle route operate on 30-to 60-minute headways, depending on the time of day. Typically, this route stops service at 7:00 PM with no weekend service, but for the summer-fall schedule (April-October), Fridays, Saturdays, and evening events for Mariners, Sounders FC and Seahawks, ferry service is extended to 10:30 PM with 60-minute headways. Passenger-only service between Pier 50 and Vashon Island operates on weekdays only with 60-minute headways.

These vessels have capacity for 170 passengers and 18 bicycles. The West Seattle route provides only two return sailings after sporting events, transporting a total of approximately 340 passengers. The Vashon Island route does not provide return service for sporting events. Ridership information was not available at this time. King County passenger ferries were not assumed to be used by event attendees because of limited service frequency during the winter months.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Year 2018

The Waterfront Seattle project will provide a pair of bus stops for the SR 99 / Alaskan Way route closer to the Stadium District. Although the exact placement of these bus stops has not been determined, they will likely provide a shorter walking distance or eliminate the need to transfer to another transit mode for people accessing the Stadium District. The current routing is along the Alaskan Way Viaduct and has stops along Columbia Street or Seneca Street depending on direction of travel. No change in passenger capacity is assumed. The anticipated completion date for the Waterfront Seattle Project has been delayed to the year 2020, but the improvements were assumed to be in place in the analysis. The new fleet of King County Metro Transit trolleybuses are anticipated to reduce bus loading / unloading times at bus stops, but are not assumed to impact transit passenger demand or capacity. SR-520 will have a new West

Approach Bridge North in 2016 which will add a third westbound lane and bike-pedestrian facilities across Lake Washington.

ST is scheduled to complete the U-Link light rail extension and add a new station south of Sea-Tac Airport on the Central Link alignment, which would extend service. Light rail capacity would be expanded with the addition of up to four three-car trains. Also, the First Hill Streetcar is schedule to be completed in late 2015; this would provide a station near 1st Avenue and Jackson Street north of the Stadium District. First Hill Streetcar hours of operation and headways and the time between streetcars were assumed to be similar to the existing South Lake Union Streetcar operations. This would add streetcar service to the Stadium District. No other passenger capacity changes were assumed.

Bus Transit*:* The number of bus riders was anticipated to increase by approximately two percent per year and headways were assumed to remain unchanged. Bus transit passenger loads would increase by approximately 3,060 inbound passengers and 2,700 outbound passengers for No Action Case S3 compared to existing conditions. This increase in passengers would be slightly less for No Action Cases S1 and S2.

The total passenger load for No Action Case S3 (i.e., Mariners and CenturyLink Event) could be accommodated with assumed bus service levels for all service zones. Because this scenario has the highest assumed passenger demand, the No Action Case S1 and Case S2 could also be accommodated. Similar to existing conditions, some bus routes would experience higher levels of passenger ridership and potentially overcrowding. Travel times under 2018 conditions noticeably increase from existing conditions and further increase with the addition of event traffic, compared to existing conditions.

Light Rail*:* ST estimates light rail ridership will increase approximately 350 percent, or 19.5 percent annually from the year 2013 to 2018. This is largely associated with 2016 completion of U-Link extension and two new stations on the Central Link light rail alignment. ST would also operate fifteen, two-car train sets and four, three-car train set during peak service.

Headways were assumed to remain at 7.5 to 10 minutes from 5:00 to 7:00 PM and 10 to 15 minutes from 9:00 to 11:00 PM. Light rail passenger loads would increase by approximately 3,455 inbound and 2,025 outbound passengers for No Action Case S3 compared to existing conditions. The increase in passengers would be slightly less for the No Action Case S1 and Case S2. The total passenger load for these scenarios could be accommodated with assumed light rail service levels.

Streetcar*:* Streetcar passenger loads would increase by approximately 735 inbound and 635 outbound passengers for No Action Case S3 compared to existing conditions. The increase in passengers would be slightly less for the No Action Case S1 and Case S2. The total passenger load for these scenarios could be accommodated with assumed streetcar service levels.

Washington State Ferry Service*:* No change in the number of WSF vessels serving Colman Dock was assumed from the year 2013 to 2018. The number of walk-on passengers was anticipated to increase by approximately three percent annually from 2013 to 2018. WSF passenger loads would increase by approximately 1,745 inbound and 1,810 outbound passengers for No Action Case S3 compared to existing conditions. The increase in passengers would be the same for the No Action Case S2 and less for the No Action Case S1. The total passenger load for these scenarios could be accommodated with assumed WSF service levels.

Year 2030

By 2030, ST is anticipated to expand light rail service connecting Central Link light rail to downtown Seattle and the eastside communities of Bellevue and Redmond (Overlake) and the Lynnwood Link light rail Extension would extend light rail service north from the University of Washington (UW) in Seattle to the City of Lynnwood. South Link light rail would be extended one additional station to Kent / Des Moines in the vicinity of Highline Community College. This expanded light rail service could result in a reduction in available bus transit capacity in some of the service zones, but King County Metro Transit would redeploy these transit service hours to other parts of the region. Overall transit passenger capacity would increase by 2030.

For all other transit modes (i.e., bus, streetcar, ferry), no change in passenger capacity (service levels) was assumed because of the uncertainty of transit funding.

Bus Transit*:* The number of people who would use bus service was anticipated to increase by approximately two percent annually to year 2030. Headways were assumed to remain unchanged. Bus transit passenger loads would increase by approximately 4,310 inbound passengers and 2,910 outbound passengers for the No Action Case S3 (slightly less for No Action Cases S1 and S2) compared to existing conditions. The passenger demand could be accommodated with assumed bus service levels for all zones. This analysis includes the assumed redeployment of bus service hours for routes that are redundant and would be discontinued with light rail service extensions to the north. If the redeployment of bus service does not occur, then projected passenger demands could be accommodated under all No Action scenarios.

Due to the re-deployment of bus service, it was assumed some bus riders would transfer to other bus routes and / or light rail, which provides connections similar to current bus routes (such as downtown). Complimentary light rail service has the available passenger capacity (approximately 20,000 inbound and 16,500 outbound) to serve these event attendees. This could place additional demand on park-and-ride lots in north Seattle, Shoreline, Mountlake Terrace, and Lynnwood and increase passenger loads on buses connecting to light rail stations. Travel times under 2030 conditions are generally similar to 2018 conditions with some improvement as a result of decreased in vehicular traffic and increases in transit use.

Light Rail Transit*:* Light rail passenger loads would increase by approximately 26,380 inbound passengers and 9,670 outbound passengers for the No Action Case S3 compared to existing

conditions. The increases in passengers would be slightly less with the No Action Case S1 and Case S2. More than half of the inbound ridership from 5:00 to 7:00 PM would be on the North Link Extension. Ridership estimates predict that trains would be near capacity through downtown; however, trains would not yet reach maximum load capacity. Many of the passengers boarding in downtown would be connecting to commuter rail at King Street Station. Similar to passenger loads from 5:00 to 7:00 PM, approximately half of the outbound ridership from 9:00 to 11:00 PM would be on North Link.

The total passenger loads for the 2030 No Action scenarios could be accommodated with assumed light rail service levels.

Streetcar Transit*:* The number of people who would use streetcar transit was anticipated to increase by approximately two percent annually to the year 2030. Headways were assumed to remain unchanged. Streetcar passenger loads would increase by approximately 750 inbound and 635 outbound passengers for the No Action Case S3 compared to existing conditions. The passenger loads would be slightly less for the No Action Case S1 and Case S2. The total passenger loads for these scenarios could be accommodated with assumed light rail service levels.

Washington State Ferry Servic*e:* WSF passenger loads would increase by approximately 1,775 inbound and 1,905 outbound passengers for No Action Case S3 compared to existing conditions. The increase in passengers would be the same for Case S2 and less for Case S1. The total passenger loads for these scenarios could be accommodated with assumed WSF service levels.

Impacts of the Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

Construction of Alternative 2 could result in some increase in ridership as a result of construction workers traveling to and from the site. It is anticipated that public transportation impacts related to construction would be less than a 20,000-seat event at the Seattle Arena, however the transit use would occur on a daily basis during the two year construction period and would occur during AM and PM peak hours. In addition, construction related activities could impact nearby transit routes and stops as well as pedestrian accessibility to these facilities. A construction management plan could be prepared and impacts to transit could be coordinated with the transit agency in advance and appropriate relocation and signage provided.

Year 2018

Approximately 12 percent of Arena event attendees were estimated to use transit to travel to and from events. The travel forecasts were developed based on review of the TMPs for CenturyLink Field and Safeco Field, which included information on how event attendees currently travel to events; a review of what facilities in other cities generally experience in terms of how event attendees travel to events; and an evaluation of the available passenger

capacity on all transit serving the Stadium District. The analysis assumes a fully-attended event, with approximately 2,320 event attendees arriving by bus, light rail, streetcar, and ferry. Approximately 80 event attendees would be ferry passengers who take their vehicle on the ferry and could arrive outside the analysis period such as during the morning commute period as they take ferry to work and then attend an Arena event in the evening. As such, they are included in the No Action condition for parking and are not additive to the impact of the project. Transit service provided in the study area is assumed consistent with No Action conditions.

Bus Transit*:* It was estimated that approximately 28 percent of event attendees on transit would use existing bus service to the proposed Arena. This would add approximately 640 bus passengers traveling to and from the Stadium District for the Proposed Project (Alternative 2) Case S2 and Case S3 event scenarios.

Alternative 2 Case S3 could be accommodated with assumed bus service levels. Because this scenario has the highest assumed passenger demand, the Alternative 2 Case S1 and S2 could also be accommodated. Similar to existing conditions, some bus routes would experience higher levels of passenger ridership and potentially overcrowding. Also, park-and-ride lots served by transit to the Stadium District would likely experience increased use during events.

Light Rail*:* It was estimated that approximately 34 percent of event attendees on transit would use existing and planned light rail service to the proposed Arena. This would add approximately 800 light rail passengers traveling to and from the Stadium District on Central and North Link for Alternative 2 Case S2 and S3. All 2018 Alternative 2 Cases could be accommodated with assumed light rail service levels. The available passenger capacity assumed fifteen two-car train sets and four three-car train set during peak service. The existing Tukwila and planned Angle Lake park-and-ride lots, the only public park-and-ride lots served by the light rail to the Stadium District, are likely to experience increased use during events.

Streetcar*:* It was estimated that approximately seven percent of event attendees on transit would use streetcar service to the proposed Arena. This would add approximately 160 streetcar passengers traveling to and from the Stadium District on the First Hill streetcar for Alternative 2 Case S2 and S3. These scenarios, including Alternative 2 Case S1, could be accommodated with assumed streetcar service levels.

Washington State Ferry Service*:* It was estimated that approximately 31 percent of event attendees on transit would use ferry service to the proposed Arena. This would add approximately 720 ferry passengers traveling to and from the Stadium District for Alternative 2 Case S2 and S3. These scenarios, including the 2018 Alternative 2 Case S1, could be accommodated with assumed WSF service levels.

Year 2030

The Proposed Project (Alternative 2) would construct a new 20,000 person arena in the Stadium District. Approximately 14 percent of event attendees were estimated to use transit to travel to and from events. The analysis assumes a fully-attended event, with approximately 2,720 event attendees arriving by bus, light rail, streetcar, and ferry during the weekday analysis period. Approximately 80 of these event attendees would be ferry passengers who take their vehicle on the ferry and could arrive outside the analysis period such as during the morning commute period as they take ferry to work and then attend an Arena event in the evening. As such, they are included in the No Action condition for parking and are not additive to the impact of the project. Transit service provided in the study area is assumed consistent with No Action conditions.

Bus Transit: It was estimated that approximately 15 percent of event attendees on transit would use bus service to the proposed Arena. This would result in approximately 400 bus passengers traveling to and from the Stadium District for Alternative 2 Case S2 and S3.

Bus riders are likely to shift from bus routes to light rail service when light rail service would connect to similar destinations (such as downtown). Light rail service has available passenger capacity (approximately 17,000 inbound and 14,000 outbound) to serve these riders. This could place additional demand on park-and-ride lots in north Seattle, Shoreline, Mountlake Terrace, and Lynnwood and increase passenger loads on buses connecting to light rail stations. In addition, park-and-ride lots served by transit to and from the Stadium District would likely experience increased use during events.

Light Rail: With the expanded light rail system, it was estimated that approximately 54 percent of event attendees on transit would use light rail service to the proposed Arena. This would add approximately 1,460 light rail passengers traveling to and from the Stadium District on Central, North and East Link for Alternative 2 Case S2 and S3. These scenarios, including the 2030 Alternative 2 Case S1, could be accommodated with assumed light rail service levels. Light rail trains would be highly utilized through downtown Seattle during events with the increased light rail ridership. Non-event riders boarding trains in downtown to connect to Sounder commuter rail at King Street Station could experience near capacity trains and choose to walk or ride a connecting bus as an alternative to light rail during events. Park-and-ride lots served by light rail to the Stadium District would also likely experience increased use on event days.

Streetcar*:* It was estimated that approximately five percent of event attendees on transit would use streetcar service to the proposed Arena. This would add approximately 140 streetcar passengers traveling to and from the Stadium District for Alternative 2 Case S2 and S3. These scenarios, including the 2030 Alternative 2 Case S1, could be accommodated with assumed streetcar service levels.

Washington State Ferry Service*:* It was estimated that approximately 26 percent of event attendees on transit would use ferry service to the proposed Arena. This would add

approximately 720 ferry passengers traveling to and from the Stadium District for Alternative 2 Case S2 and S3. These scenarios, including the 2030 Alternative 2 Case S1, could be accommodated with assumed WSF service levels.

Impacts of One-Hour Post Event Departure

The impacts on outbound passenger load and capacity that would occur within a one-hour post-event time-frame were reviewed. This evaluation provides an understanding of the sensitivity of the length of the post event timeframe. The two-hour transit capacity assumption, presented previously, is reasonable considering that some event patrons leave an event early and others remain in the area for post-game socializing or entertainment. Using a one-hour post event time period provides a conservative assumption for the transit capacity analysis.

The shorter one-hour post event timeframe has less transit capacity available to serve the same number of people exiting an event compared to the two-hour post event timeframe previously analyzed. Remaining passenger capacity decreases in the majority of cases, resulting in over capacity conditions for some modes. The analysis of the two-hour period demonstrates passenger loads could be accommodated for the modes that are over capacity in the one-hour period (i.e., some passengers would need to travel before or after the one-hour period).

Additional detail related to the one-hour post event departure is provided in Appendix E.

Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

This alternative would result in a small reduction in the number of event attendees and slightly reduce transit ridership associated with an arena. The operational and construction impacts would be similar to Alternative 2.

3.8.2.3 Pedestrians

Methodology

The pedestrian impact evaluation included a broad assessment of the pedestrian environment in the study area and a more specific, quantitative evaluation of important pedestrian routes during event conditions. The broad analysis provides an understanding of the study area as a whole and the pedestrian environment along specific routes to and from major transportation stations and parking within this study area. The more specific quantitative analysis focuses on the 1st Avenue S., 4th Avenue S., and S. Holgate Street pedestrian links in close proximity to the Stadium District site where concentrations of pedestrian volumes are higher. Additional context related to the broad study area and key link evaluation method is provided below.

The broad study area was identified based on the location of parking facilities and major transportation stations that would accommodate Arena demands. The key components of the study area evaluation include:

- Existing inventory of pedestrian facilities and identification of planned transportation projects that would impact the study area
- Analysis of the existing and future pedestrian event travel routes to and from major transportation stations and parking in terms of:
    - **Connectivity** or where gaps exist in the pedestrian facilities making it difficult to access the Stadium District site
    - **Quality** or the condition of the pedestrian facilities including lighting and space

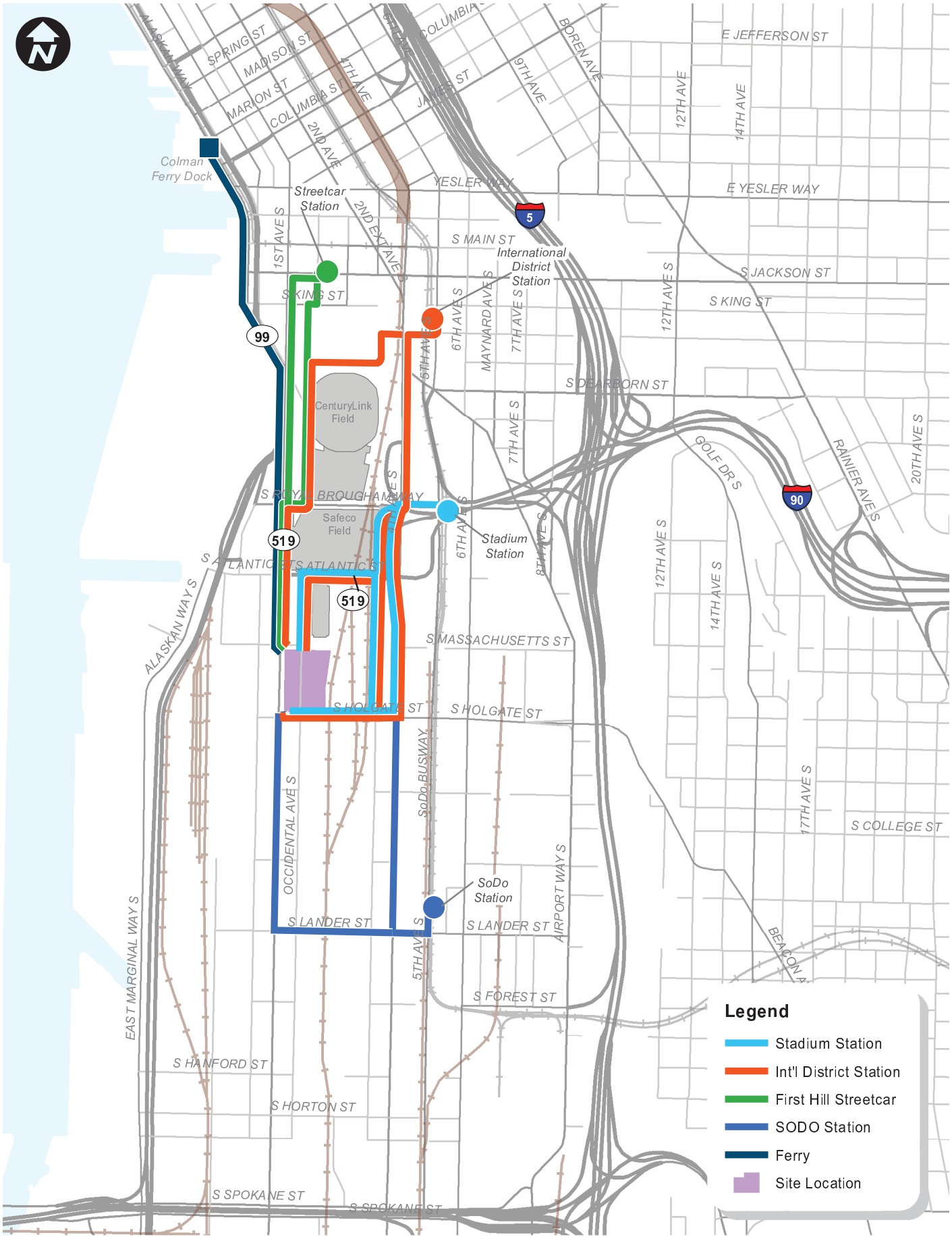
Figure 3.8-7 illustrates the five key pedestrian routes identified for this assessment.

The pedestrian link analysis focuses on weekday post-event conditions when concentrations of pedestrian flows would be highest. Analysis is conducted for one future period representative of both 2018 and 2030 conditions due to the conservative assumptions built into the analysis as well as the fact that the level of pedestrian volumes associated with an event far outweighs non-event background volumes. Pedestrian volumes are a function of event attendance; therefore, based on the same attendance levels 2018 and 2030 volumes would be the same.

The method for the link evaluation includes:

- 1st and 4th Avenues S.: An extension of the traditional Highway Capacity Manual (HCM) methodology was used considering pedestrian flows. It was determined whether sidewalk conditions would be free flow (>10 p/ft/min), restricted (11-23 p/ft/min), or severely restricted (>23 p/ft/min). For severely restricted segments, consideration was given as to whether the conditions were temporary, alternative routes exist, and / or mitigation may be needed to improve conditions.
- S. Holgate Street: The effect of potential railroad activity blocking east-west travel for pedestrians and an evaluation of pedestrian storage needs.

See Appendix E for the basis of estimations of pedestrian volumes and the approach used for each key corridor.



Stadium District Key Pedestrian Routes

Seattle Arena

FIGURE
3.8-7

transpoGROUP

Affected Environment

The inventory of pedestrian facilities included identification of raised sidewalks, trails, and segments that were missing any kind of facility. Figure 3.8-8 summarizes the study area pedestrian network and identifies the existing trails and gaps in sidewalk network.

When reviewing the inventory, there is generally a difference in the density of the sidewalk connections north of S. Holgate Street as compared to the area south of S. Holgate Street. This is likely due to the level and nature of the development that has occurred north of S. Holgate Street and its proximity to the CBD.

Most of the major north-south and east-west arterials have sidewalks on one or both sides of the streets. Impediments were identified throughout the area that included fire hydrants, signage, or power poles. These impediments reduce the useable width of the sidewalk for short distances. Sidewalks are more intermittent along minor streets such as Occidental Avenue S., Utah Avenue S., and 3rd Avenue S., south of S. Royal Brougham Way.

Weekday pedestrian flows in the study area without an event are generally to and from transit and employment centers or business employees walking to food establishments or parking. Employment centers in the study area include the King County offices located at 201 S. Jackson Street immediately north of CenturyLink Field and offices in the area of Union Station between 4th Avenue S. and 5th Avenue S. Transit facilities in the northern area that have a large pedestrian draw include King Street Station and the International District / Chinatown Station. Pedestrian activity near the Seattle Arena site and in the southern portion of the study area is generally low given the primarily industrial land uses. This low pedestrian activity also occurs along Occidental Avenue S. between S. Massachusetts and S. Holgate Streets where there are no sidewalks and the uses are industrial. Higher pedestrian activity in the southern portion of the study area occurs along corridors accessing transit (e.g., near the SoDo Busway and Link Light Rail stations) and larger employers (e.g., near the Starbucks Headquarters at 1st Avenue S. and S. Lander Street).

The pedestrian travel patterns in the study area change with an event conditions as the main draw becomes either CenturyLink Field or Safeco Field, with flows generally coming to and from event parking areas and transit facilities. Pedestrian volumes in the immediate vicinity of the event venues increase, particularly along 1st Avenue S., S. Jackson Street, S. Royal Brougham Way, and at the signalized pedestrian crossing of 4th Avenue S. between the Union Station Parking Garage and CenturyLink Field. 1st Avenue S. serves as a main north-south pedestrian corridor with several large parking garages in the north and parking lots and on-street parking to the south of CenturyLink Field. The pedestrian volumes along S. Jackson Street, S. Royal Brougham Way and at the 4th Avenue S. signalized crossing are generally related to transit or parking in the International District.

Based on the pedestrian travel patterns described above and the major transportation and parking, four specific routes were identified for further review and are described below.

Stadium Station Route

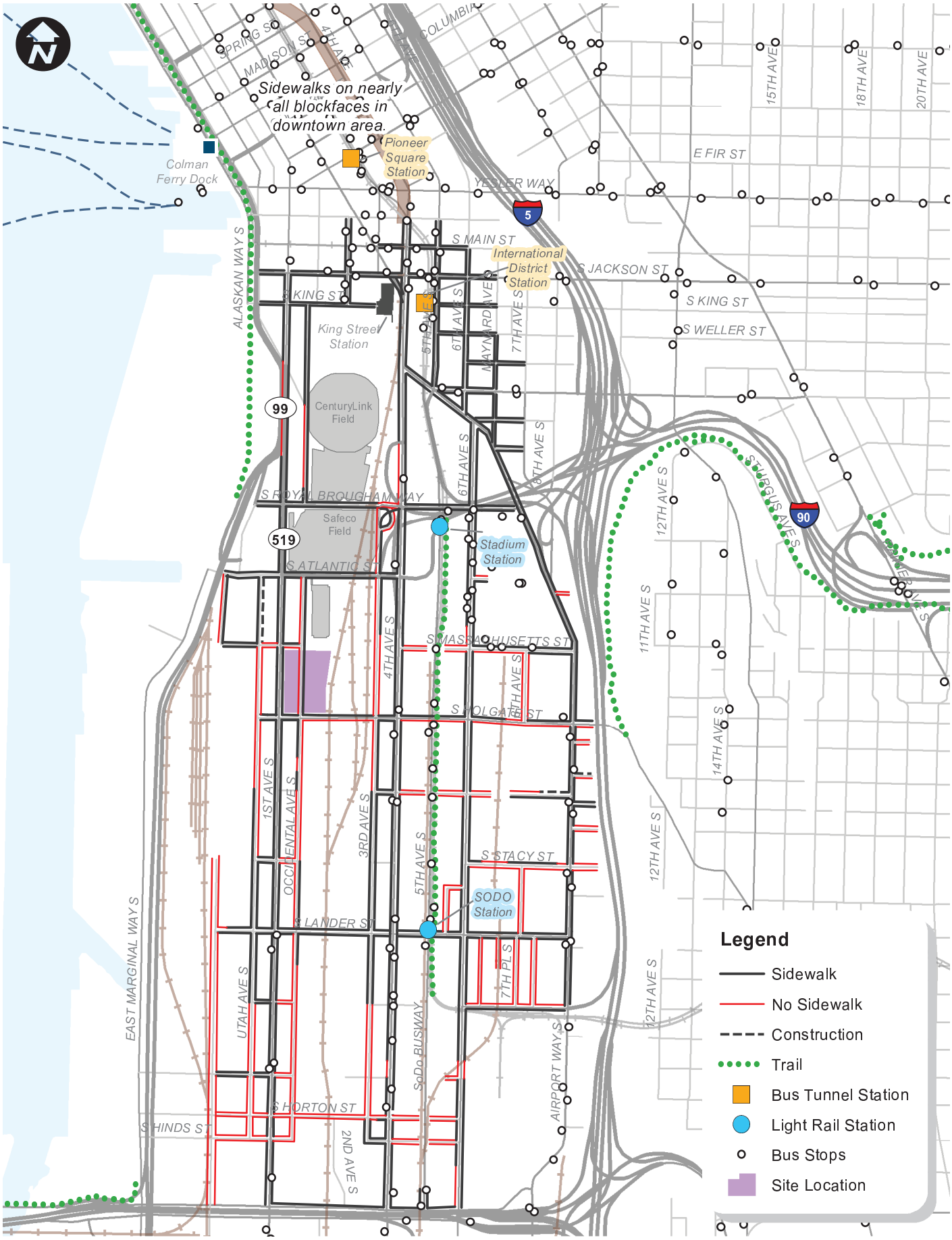
These routes are approximately 1/2-mile long and provide access to the closest transit facility (Stadium Station) to the site. The route from the Stadium Station along S. Atlantic Street and Occidental Avenue S. has newer facilities, wider sidewalks, and is well lit. While the routes along 3rd and 4th Avenues S. are less pedestrian-friendly with minimal to poor lighting and missing or narrow sidewalks. Key issues along this route related to the Stadium District site include: some darker areas where pedestrians walk under large roadway structures as well as minimal lighting along 3rd Avenue S. and poor lighting along 4th Avenue S.; missing sidewalks along 3rd Avenue S. on the west side between S. Atlantic Street and S. Holgate Street and on the east side between S. Massachusetts Street and S. Holgate Street; narrow or constrained sidewalk sections along 4th Avenue S. south of S. Atlantic Street; and pedestrian access issues along S. Holgate Street between 4th Avenue S. and the Stadium District site related to the multiple at-grade crossings that pedestrians need to traverse.

SoDo (Lander) Station Route

The two routes providing access between the site and the SoDo station are both less than one mile long with facilities varying between sidewalks and little to no shoulder. Key issues along these routes related to the Stadium District site include: no sidewalks along S. Holgate Street on the south side; some narrow portions of sidewalk particularly west side of 4th Avenue S. and S. Lander Street; at-grade train crossings could be an access issue as the level of pedestrians increase. Lighting is poor along portions of 1st Avenue S. and all of 4th Avenue S. between S. Holgate Street and S. Lander Street.

International District Station Route

The routes providing access between the site and the International District are both almost one mile. The routes generally provide a pedestrian-friendly environment with sidewalks and enhancements specifically for pedestrians such as the pedestrian bridge between CenturyLink Field and King Street Station, signalized crossing along 4th Avenue S., and the pedestrian ramp at S. Royal Brougham Way and 4th Avenue S. providing access to 3rd Avenue S. There are some deficiencies south of S. Atlantic Street along 3rd and 4th Avenues S. with missing and narrow sidewalk sections and minimal to poor lighting. Key issues along these routes related to the Stadium District site include: some areas are darker where pedestrians walk under large roadway structures when using 4th Avenue S. towards the site as well as minimal lighting along 3rd Avenue S. and poor lighting along 4th Avenue S. south of S. Atlantic Street.; missing sidewalks along 3rd Avenue S. on the west side between S. Atlantic Street and S. Holgate Street and on the east side between S. Massachusetts Street and S. Holgate Street.; narrow or constrained sidewalk sections along 4th Avenue S. south of S. Atlantic Street; and pedestrian access issues along S. Holgate Street between 4th Avenue S. and the Stadium District site related to the multiple at-grade crossings that pedestrians need to traverse.



Stadium District Pedestrian Facilities

Seattle Arena

FIGURE
3.8-8

transpoGROUP

Ferry (Colman Dock) Route

This route is over one mile long. Much of the route is under construction with development and transportation projects in the vicinity. Along this route lighting is poor along the west side of 1st Avenue S. Overall, the pedestrian network is well connected along these key routes with only a few missing links. The environment is pedestrian-friendly and lighting is adequate. Issues that may rise to a level of concern along key links in close proximity to the site include the poor connection across S. Atlantic Street when coming to and from the northeast, missing and narrow sidewalks along 1st, 3rd and 4th Avenues S., south of S. Atlantic Street, and the extensive at-grade train crossings along S. Holgate Street and lack of pedestrian-oriented crossing control.

Link Evaluation

Non-event and post-event pedestrian counts were conducted in May 2013 along the key segments in the vicinity of the site. The post-event conditions represent pedestrian volumes for an attendance level of approximately 13,000. Tables 2-3 and 2-4 in Appendix E provide the link analysis.

1st and 4th Avenues S.: Based on the existing post-event pedestrian volumes along the 1st and 4th Avenues S. study segments flow rates are an acceptable two p/ft/min or less even with the Mariners game. This analysis indicates that the sidewalks on the east and west sides of both 1st and 4th Avenues S. are adequate to accommodate the existing pedestrian demand.

S. Holgate Street*:* Pedestrians routinely get stopped during the traverse of the span of tracks along S. Holgate Street when a train ahead causes a gate drop and in some cases, a train behind. Event pedestrian demands are particularly prone to this as the groups of pedestrians occurring after an event have limited refuge when they are stopped by a closing crossing gate. This dynamic results in a potential for conflict between pedestrians and train crossings.

The sensitivity analysis for existing non-event and post-event pedestrian demands shows:

- Pedestrian queues range from approximately 10 to 125 pedestrians, depending on the duration of the blockage.
- Length of sidewalk storage to accommodate queues based on current blockage levels of around 10 minutes range from 20 feet without an event to 40 feet with a Mariners game of approximately 13,000 attendees.
- Blockages up to 45 minutes (representing increased activity) would result in the need for approximately 140 feet of storage to accommodate existing pedestrian demands, which can be accommodated within the existing sidewalk area along S. Holgate Street on the north side.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

The following describes the No Action pedestrian context in terms of the broad study area and proximate links.

The study area was reviewed for funded planned projects related to non-motorized infrastructure and major transportation destinations. Two multiuse paths would be constructed as part of the Alaskan Way Viaduct Replacement Project, completion of the First Hill Streetcar would create a new transit destination, and improvements would be installed by Amtrak at the S. Holgate Street rail crossings. For the No Action condition, five specific pedestrian travel routes were identified to major transportation including Stadium Station, SoDo Station, International District, the Ferry at Colman Dock, and the First Hill Streetcar. The Stadium Station, SoDo Station and International District routes are anticipated to be consistent with the description provided in the Affected Environment because there are no future infrastructure projects impacting these routes. Improvements are anticipated along the Ferry route as a result of the Alaskan Way Viaduct Replacement Project. See figures in Appendix E showing the First Hill Streetcar pedestrian travel route and the Ferry route. Key characteristics of these two routes are described below.

Ferry (Colman Dock) Route

As part of the Alaskan Way Viaduct project, Railroad Way S. is being planned as an improved direct pedestrian connection between the Waterfront and Stadium District. The City is leading the design of this element of the Alaskan Way Viaduct Replacement project. It will include a variety of treatments and lighting features to invite pedestrians along an enhanced connection. There could still be some lighting deficiencies along this route on the west side of 1st Avenue S. between S. Atlantic and S. Holgate Streets as noted under existing conditions; however, redevelopment is occurring in this area and it likely that at least portions of this will be improved as part of development frontage improvements.

First Hill Streetcar

The nearest streetcar stop to and from the Stadium District site would be the Occidental Mall stop along S. Jackson east of 1st Avenue S. The two routes providing access between the site and the streetcar stop are both less than one mile long with facilities. In general, adequate pedestrian facilities exist to / from the north along Occidental Avenue S. transitioning to 1st Avenue S. south of S. Royal Brougham Way and the two routes are well connected. This route also has poor lighting as discussed above along 1st Avenue S.

Overall, with improvements along 1st Avenue S., Railroad Way S., and Alaskan Way, a more pedestrian-friendly environment would be created and the routes would remain well connected. With No Action, there would continue to be a poor connection across S. Atlantic Street when coming to and from the northeast, missing and narrow sidewalks along 3rd and 4th Avenues S. south of S. Atlantic Street. Planned projects would result in additional at-grade train

crossings on S. Holgate Street with no improvements to pedestrian facilities or provision of pedestrian crossing controls.

Link Evaluation

1st and 4th Avenues S.*:* Based on the No Action post-event pedestrian volumes along the 1st Avenue S. study segments flow rates are acceptable with rates less than 10 p/ft/min. This analysis indicates that the sidewalks on the east and west sides of 1st and 4th Avenues S. are adequate to accommodate the No Action pedestrian demand under all event cases.

S. Holgate Street*:* During train crossings, pedestrian queues range from 5 to 450 pedestrians, depending on the duration of the blockage. Blockages up to 45 minutes (representing increased activity) would result in the need for approximately 505 feet of storage to accommodate the Case S3 representing 52,500 attendees. This pedestrian queue would be greater than could be accommodated between the railroad tracks and 1st Avenue S along S. Holgate Street; therefore, pedestrians would likely stand closer together and/or extend back along the sidewalk along 1st Avenue S. As noted in the Affected Environment, the pedestrian environment along S. Holgate Street, with related lack of storage, and proliferation of rail crossings, creates an environment with opportunity for conflicts between pedestrians and rail activity. With increases in pedestrians associated with the No Action and planned increases in train activity, these issues would likely increase in the future along S. Holgate Street.

Impacts of the Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

Alternative 2 construction would result in intermittent sidewalk closures along the frontage of the site (i.e., 1st Avenue S. and S. Massachusetts and Holgate Streets). A construction management plan would be developed and alternate pedestrian circulation would be provided adjacent to the construction site through the use of temporary walkways, detours and signs.

The following describes the Alternative 2 pedestrian context in terms of the broad study area and proximate links.

Broad Study Area Evaluation

Alternative 2 is not anticipated to change the wider study area or the pedestrian environment along the key travel routes to and from the Stadium District site described in the Affected Environment and No Action.

This alternative would result in the vacation of Occidental Avenue S. between S. Massachusetts Street and S. Holgate Street; therefore, travel patterns for pedestrians using this connection would change. Pedestrian activity occurring along this portion of Occidental Avenue S. is generally minimal during non-event conditions. As event attendance increases, use by pedestrians walking to and from parking located to the south increases. In addition, there are no sidewalk facilities along this segment of Occidental Avenue S., and the environment is poor

given the undefined pedestrian area and the level of business activity occurring. Pedestrians currently using Occidental Avenue S. would likely shift to 1st Avenue S., which has an improved pedestrian environment with a connected sidewalk system. The 1st Avenue S. sidewalk frontage between S. Massachusetts and S. Holgate Streets is proposed at 15 feet, which is adequate to accommodate expected levels of pedestrians for Alternative 2.

Link Evaluation

The evaluation considers frontage improvements along 1st Avenue S. and S. Holgate Street with Alternative 2. Alternative 2 Case S1 pedestrian flows would be restricted and pedestrians would experience crowded conditions assuming the identified peaking characteristics. The multi-event cases (Case S2 and S3) would cause further restricted flows on the east side as well as degrade conditions on the west side of 1st Avenue S. between S. Atlantic and S. Massachusetts Streets.

1st and 4th Avenues S.: Alternative 2 results in a large increase in the pedestrian flow rate along all segments given the proximity of the site to these roadways:

- Alternative 2 Case S1 pedestrian flows on the east side of 1st Avenue S. between S. Atlantic and S. Massachusetts Streets would be severely restricted and pedestrians would experience crowded conditions, assuming the identified peaking characteristics.
- The multi-event cases (Case S2 and S3) would cause further restricted flows on the east side as well as degrade conditions on the west side of 1st Avenue S. between S. Atlantic and S. Massachusetts Streets.
- Given the location of the doors to the Arena along 1st Avenue S. at the northwest (at 1st Avenue S./S. Massachusetts Street) and southwest (1st Avenue S./S. Holgate Street) corners of the building and the approximately 24-foot wide sidewalk (16-foot pedestrian zone) proposed along the frontage, flows along 1st Avenue S. between S. Massachusetts and S. Holgate Streets would be slightly restricted.
- Pedestrian flows along 4th Avenue S. between S. Atlantic and S. Walker Streets would generally experience free flow except on the west side of 4th Avenue S. between S. Atlantic and S. Holgate Streets where the addition of the Arena would result in some crowding due to a constrained sidewalk section. There is capacity on the east side, so pedestrians wanting to avoid crowds could use these facilities. It is noted that along 4th Avenue S. the sidewalk conditions (including width and lack of maintenance) and poor lighting make this route less accessible for pedestrians.

The calculation of pedestrian flow rates suggests that during the peak 15 minutes associated with a capacity event egress sidewalk on the east side of 1st Avenue S. north of Massachusetts Street would be crowded as a result of the Arena. This could be mitigated by rerouting more pedestrians to Occidental Avenue S. immediately north of the site, and / or providing more onsite attractions and amenities to reduce peaking characteristics of post-event egress.

S. Holgate Street*:* The evaluation assumed that the sidewalk along the S. Holgate Street Arena frontage would be widened to 24-foot and that given the crowding during post event conditions up to 8 pedestrians would walk side-by-side. By comparison, the No Action assumes up to 2 pedestrians would walk side-by-side. Alternative 2 would result in substantially more pedestrians along S. Holgate Street than characterized for the No Action conditions during both event ingress and egress. It is likely that conflicts between pedestrians and trains would increase with Alternative 2 exacerbating an issue that exists under current event and non-event conditions. The introduction of an Arena at this location would substantially increase and concentrate demands over currently observed levels.

As illustrated by the sensitivity analysis for Alternative 2 pedestrian demands:

- Pedestrian queues and storage needs would range from approximately 15 to 330 times greater than characterized for the No Action conditions.
- Pedestrian queues attributable to waiting for passing trains would range from approximately 900 to 8,000 pedestrians, depending on the duration of the blockage.
- Sidewalk storage to accommodate queues based on current blockage levels of around 10 minutes would be over 500 feet.
- Blockages up to 45 minutes (representing increased activity) would result in the need for approximately 2,120 square-feet of storage to accommodate just an Arena event. This would mean that pedestrian queues would extend to 1st Avenue S.

As noted in the Affected Environment, there is an existing pedestrian access issue along S. Holgate Street related to the lack of storage. With significant increases in event-related pedestrian volumes associated with Alternative 2 and planned increases in train activity, pedestrian access issues would increase in the future along S. Holgate Street. Accommodating the large storage needs for pedestrians, particularly during post-event egress, would be difficult even with enhanced at-grade crossings and pedestrian treatments.

Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

Alternative 3 construction would result in intermittent sidewalk closures along the frontage of the site (i.e., 1st Avenue S. and S. Massachusetts and Holgate Streets). A construction management plan would be developed and alternate pedestrian circulation would be provided adjacent to the construction site through the use of temporary walkways, detours and signs.

With 10 percent less seats, this would result in a 10 percent reduction in the overall pedestrian demand as compared to the Alternative 2. Overall transportation impacts for Alternative 3 would be slightly less than those described for Alternative 2 and the analysis of Alternative 2 fully encompasses any transportation impacts that would occur as a result of developing Alternative 3.

3.8.2.4 Bicycle

Methodology

The general approach to the evaluation of bicycle impacts included:

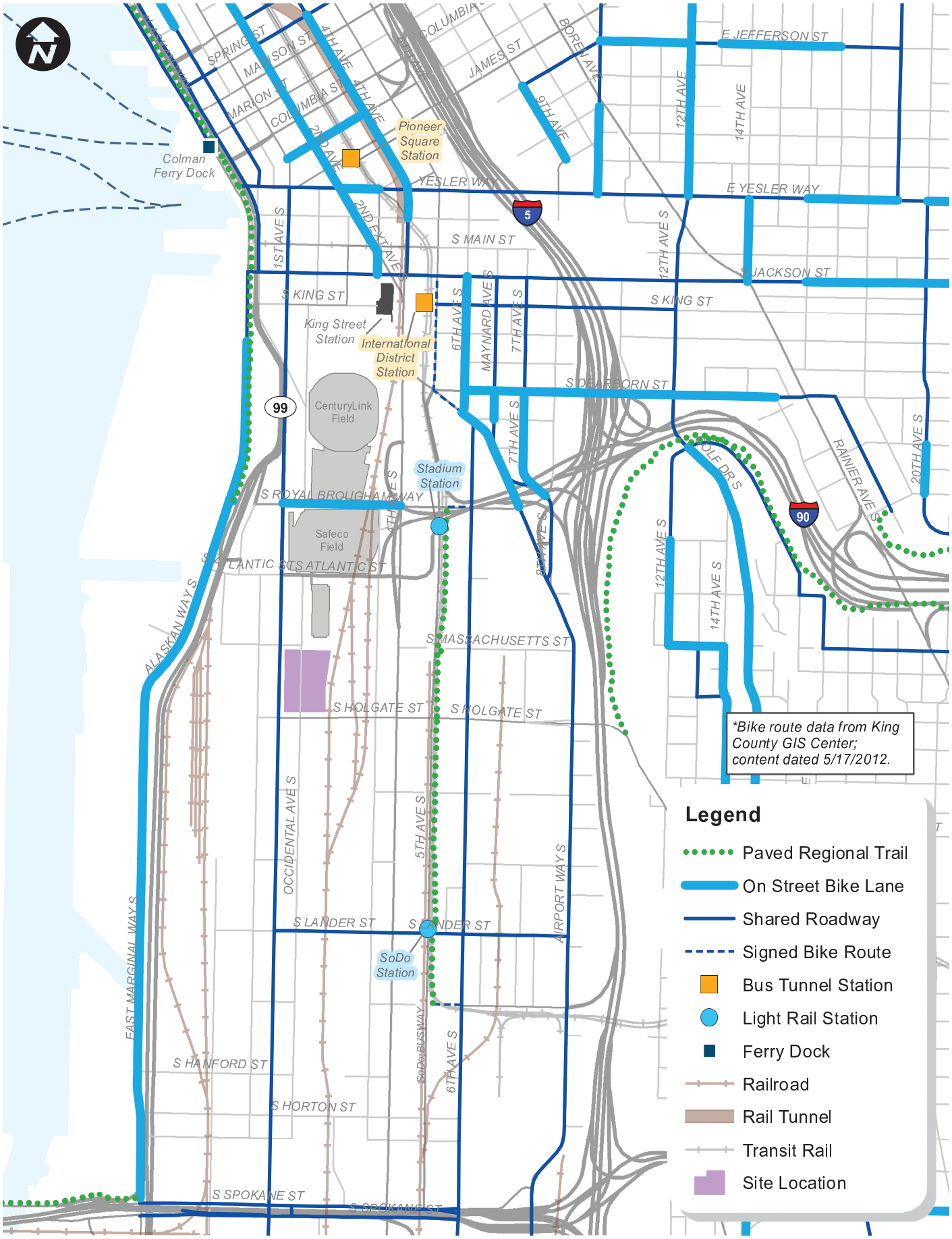
- Inventory of existing bicycle facilities
- Identification of future plans related to bicycle facilities
- Collection of non-event and event bicycle data in the study area
- Evaluation of bicycle impacts considering change in volumes

Affected Environment

Figure 3.8-9 illustrates the bicycle network within the study area. The primary north-south bike corridors include 1st Avenue S. and 6th Avenue S. that include sharrows and shared lanes as well as the bike lane that is provided along E. Marginal Way. The E. Marginal Way bike lane connects to the trail from West Seattle, providing a direct bike connection to downtown.

East-west bicycle connections in the study area are provided by bicycle lanes along S. Royal Brougham Way and shared lane facilities along E. Yesler Way, S. Jackson Street, S. Lander Street and S. Spokane Street.

The Elliott Bay Trail and the SoDo Trail are off-street multi-use trails in the study area. The Elliott Bay Trail runs along Alaskan Way S. in the northwestern part of the study area. It starts at S. Royal Brougham Way and travels north toward the Queen Anne neighborhood. The SoDo Trail is a shorter trail located east of the site between 4th Avenue S. and 6th Avenue S. adjacent to the SoDo Busway. It begins at S. Royal Brougham Way and ends approximately one block south of S. Lander Street. The SoDo Trail can be accessed at S. Royal Brougham Way, S. Holgate Street and S. Lander Street.



Stadium District Bicycle Facilities

Seattle Arena

FIGURE
3.8-9

transpoGROUP

Weekday event and non-event bicycle volumes were collected in May 2013 along key roadways in the vicinity of the Stadium District site including 1st Avenue S., Occidental Avenue S., 3rd Avenue S., 4th Avenue S., S. Holgate Street, and S. Royal Brougham Way. The volumes were reviewed during pre-event (6:00 to 7:00 PM) and post-event conditions. Event conditions represent a Mariners game with approximately 13,000 attendees. A review of the bicycle volumes shows:

- There is little to no post-event bicycle traffic in the vicinity of the site under both non-event and event conditions. The locations with more than a few bicyclists were closer to Safeco Field. North of S. Royal Brougham Way, and 1st and Occidental Avenues S. had approximately 20 to 35 bicyclists post-game, and 1st Avenue S. south of S. Holgate Street had approximately 15 bicyclists. Given the travel patterns, there is a potential that some of this bicycle traffic was related to the Mariners game.

- Pre-event bicycle volumes were generally higher than post-event for both non-event and event conditions.

- A majority of the bicycle traffic was concentrated along 1st Avenue S. where there are sharrows or shared lanes.

- In general, event bicycle volumes were slightly higher than non-event demands along the north-south corridors (i.e., 1st Avenue S. and 4th Avenue S.). For the east-west corridors (S. Royal Brougham Way, S. Atlantic Street and S. Holgate Street) the comparison of bicycle volumes was inconsistent; however, in general, the volumes were lower with the event as compared to non-event.

It is difficult to know with certainty if increased bicycle volumes with events are a result of the event attendees, bicyclists displaced from other routes, or non-event bicyclists who have chosen to ride specifically on days when events are to occur. Overall, the observed proportional change in bicycle traffic is minimal and the actual change in the number of bicycles on the road is unlikely to create a noticeable impact between event and non-event conditions.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Bicycle conditions for 2018 and 2030 No Action cases are described below.

2018 Conditions

Bicycle improvements planned and funded in the SoDo study area were reviewed. The most significant projects within the study area are the two multi-use paths being constructed as part of the Alaskan Way Viaduct Replacement Project to be completed by 2018.

Bicycle use is anticipated to continue to grow in Seattle as transportation congestion and cost of parking increases. Bicycle traffic levels were identified in Affected Environment and were not identified as a significant portion of the traffic stream during the pre- and post-event conditions

in the Stadium District study area. No significant change in bicycle traffic is forecasted; however, there is a likelihood that the new multiuse paths will see significant use, especially during summer months. It is possible that these facilities could attract riders from other, less comfortable street routes, thus decreasing relative bicycle volumes on other street grid routes.

2030 Conditions

There are no additional funded improvements for 2030 at this time; however, the City has adopted the Bicycle Master Plan and developed an Implementation Plan.

Bicycle transportation demands in 2030 are expected to be similar to those described for the 2018 condition, which were similar to existing conditions. No new adverse impacts to bicycle travel would occur, with the exception of increased rail crossing activity (frequency and duration) at Holgate Street. This would continue to result in the increased potential for conflicts between bicyclists and train crossings.

In general, as traffic volumes increase in the study area due to future 2018 and 2030 growth, there is a potential for increased conflict between vehicles and bicyclists.

Impacts of the Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

Construction of Alternative 2 may result in intermittent bicycle facility closures and re-routing along 1st Avenue S. A construction management plan could be developed to mitigate impacts. Protocol could be included in the plan related to alternate bicycle circulation adjacent to the construction site through the use of temporary facilities, detours, and signs.

Alternative 2 is not anticipated to impact bicycle facilities within the study area. As described in the Affected Environment, bicycle volumes within the study area are generally low in the vicinity of the Stadium District site, and minimal increase is anticipated with the development. Development of the Seattle Arena would result in increased vehicular demands on event days within the study area, which would increase the potential conflicts between bicyclists and vehicles. Bicycle impacts in 2018 and 2030 are anticipated to be similar.

Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

Construction of Alternative 3 may result in intermittent bicycle facility closures and re-routing along 1st Avenue S. A construction management plan could be developed to mitigate impacts. Protocol could be included in the plan related to alternate bicycle circulation would be provided adjacent to the construction site through the use of temporary facilities, detours, and signs

With 10 percent less seats, this would result in a 10 percent reduction in the overall vehicular demand as compared to Alternative 2. Given the lesser demand, bicycle impacts with development of Alternative 3 may be slightly less than with Alternative 2.

3.8.2.5 Traffic Volumes

This section provides a summary of the existing and forecast traffic volumes at the study area intersections and presents the methodology used in developing traffic forecasts for the No Action, Alternative 2, and Alternative 3 analyses.

Methodology

Study Area

A total of 64 intersections were included in the Stadium District alternatives study area (see Appendix E for Figure 2-1 showing locations). Study area intersections were defined considering existing conditions, impacts of future road improvements, and potential impacts of the Proposed Project (Alternative 2) or Alternative 3.

Analysis Time Periods

To determine the appropriate analysis period (weekday versus weekend), 24-hour count data from the City of Seattle was obtained and reviewed for several key locations in the vicinity of the site. Traffic volumes observed during the Saturday and Sunday peak hours range from 38 to 76 percent of the weekday PM peak hour. Based on this information, the analysis of event traffic occurring during the weekday period represents the most appropriate basis for detailed traffic analysis through the SoDo area.

Within the weekday period, additional consideration was given to the appropriate hour for which to conduct the traffic analysis. Weekday PM peak period traffic volumes (4:00 PM to 7:00 PM) under event and non-event conditions were compared along key corridors in the study area.[2] Based on this review, the analysis focuses on the weekday PM peak hour (4:30 to 5:30 PM) representing the highest overall traffic volumes for the system. While the event related traffic may represent a lower percentage of the overall traffic, the combined volumes represent the highest volumes within the 4:00 to 7:00 PM time period.

Appendix E provides additional detail on the selection of the analysis time period.

Traffic Forecast Methodology – No Action Non-Event Analyses

Future weekday PM peak hour vehicular traffic volumes were developed based on the following general approach:

- Traffic volume forecasts from the Final EIS's for the Alaskan Way Viaduct Replacement Project (July 2011) were summarized for the overlapping study area intersections.

[2] Weekday PM Peak hour with event traffic volumes were collected on Wednesday, October 17, 2012 during a Sounders FC game with a scheduled start of 7:00 PM

- Traffic forecasts at intersections not included in the Final EIS's for the Alaskan Way Viaduct Replacement Project were estimated based on existing travel patterns and approach volumes for intersections previously reported in the EIS.
- Port of Seattle truck activity for the 2018 and 2030 horizon years was based on data provided by the Port of Seattle, consistent with achieving 3.5 M TEU by 2030.
- Traffic forecasts for the No Action event cases were developed considering a no background event scenario (Case S1) and by adding traffic from either a Mariners game (Case S2) or both a Mariners game and an event at the CenturyLink Field Event Center (Case S3) to the No Action background forecasts.
- Diversion of traffic from S. Holgate Street and S. Lander Street rail crossings to S. Atlantic Street to reflect increased rail crossing closures from increased mainline and non-revenue train activity. Traffic volumes were proportionally diverted consistent with proportional increases to rail crossing closure times.

Weekday PM peak hour without event traffic volumes for the 2018 and 2030 horizon years were estimated based on 2015 and 2030 traffic volume forecasts from the Final EIS for the Alaskan Way Viaduct Replacement Project (July 2011). Traffic volumes developed for the non-tolled bored tunnel alternative were used and account for anticipated changes in traffic volumes and travel patterns.

Traffic volumes developed for 2018 conditions were estimated by interpolating between 2015 and 2030 traffic volumes from the Alaskan Way Viaduct Replacement Project analysis after adjustments were made to account for the revised Port of Seattle cargo estimates. Port of Seattle truck volumes were also scaled to 2018 conditions by interpolating between the 1.87 million TEUs processed by the Port of Seattle in 2012 and the 3.5 million TEUs anticipated by 2030.

Traffic Forecast Methodology – No Action With Event Analyses

Traffic forecasts for the three No Action event cases were developed for the 2018 and 2030 horizon years. Based on this methodology, under 2018 conditions a Mariners game is estimated to generate approximately 3,300 vehicular trips (Case S 2 40,500 attendees) and 4,000 vehicular trips (Case S3 47,500 attendees) during the weekday PM peak hour and the event at the CenturyLink Field Events Center would generate approximately 425 trips. As traffic congestion throughout the Puget Sound region increases, attendees of events in the Stadium District would be increasingly likely to use transportation modes other than passenger cars. For the 2030 conditions, the transit mode split was increased. This increase in transit usage results in a forecast of approximately 3,100 vehicular trips associated with the Case S2 Mariners event in 2030, 37,000 trips for a Case S3 Mariners event, and 400 trips forecast for an event at the CenturyLink Field Event Center.

Traffic from these events was distributed to the study area roadways following the distribution based on a historical travel survey for the Washington State Public Facilities District and review of trip distributions for other Stadium District studies. These trips were then assigned throughout the study area, based on the No Action parking supply. Forty-one percent of vehicular trips to a Mariners game or event at CenturyLink Field Events Center were assumed to travel to the study from the north, 27 percent from the east, 27 percent from the south, and five percent from the west.

Traffic Forecast Methodology – Arena Event Traffic

Future weekday PM peak hour vehicular traffic volumes for the Proposed Project (Alternative 2) were developed by adding traffic from the Seattle Arena to the No Action event cases. Similar to the No Action discussion, traffic forecasts for multiple event cases are presented in this section. Traffic associated with the Arena attendees was forecast based on a 20,000 person attendance level, mode splits, average vehicle occupancies, and arrival patterns.

For 2018 conditions an NBA event at the Arena is estimated to generate approximately 2,190 vehicular trips during the weekday PM peak period. In 2030 as transit ridership is forecast to increase, approximately 2,100 weekday PM peak period vehicular trips would be generated by the forecast NBA event in 2030.

Traffic associated with an event in the Proposed Project (Alternative 2) or Alternative 3 was distributed to the study area roadways following the distribution based on historical travel survey data provided for the Washington State Public Facilities District and review of trip distributions for other Stadium District studies. These trips external to the study area were then distributed throughout the study and are consistent with the No Action parking supply.[3] Since the vacation of Occidental Avenue S. is an element of the Alternative 2 and Alternative 3 development plans, No Action traffic volumes on Occidental Avenue S. between S. Massachusetts and S. Holgate Streets were redirected to 1st Avenue S. In addition, with increased rail crossing closure times and anticipated increasing vehicle diversion to avoid anticipated congestion, no event traffic was assigned across the S. Holgate Street rail crossing; some event traffic was assumed to travel on S. Holgate Street from 1st Avenue S. to Occidental Avenue S. to the south.

Affected Environment

Existing traffic volumes at the study area intersections were collected during without and with event conditions. The following provides an overview of the traffic volumes for both conditions.

[3] This assignment of trips reflected the vacation of Occidental Avenue between S. Massachusetts Street and S. Holgate Street.

Existing Weekday PM Peak Hour Non-Event

Weekday without event traffic counts were collected in early November 2012 from 4:00 to 7:00 PM. The system-wide peak (i.e., one-hour period with the highest volume) occurred between 4:30 and 5:30 PM. Weekday PM peak hour without event traffic volumes along key corridors within the study area are summarized and detailed intersection turning movement volumes are provided in Attachment E-1, which is available from the Seattle Department of Planning and Development (DPD) upon request.

Weekday PM peak hour without event travel is primarily commuter-based with some freight transport and transit activity. Data summarized for the Port of Seattle shows that gate activity begins to decrease during the afternoon period with little-to-no activity typically occurring after 5:00 PM However peak hour truck traffic is dependent on the arrival and departure patterns of the shipping vessels and fluctuates throughout the year, and can extend into the weekday PM peak hour period. This condition occurs on a more infrequent basis and is dependent on ship activities. A more detailed discussion of freight activity in the Stadium District area is included in Section 3.8.3.7.

In the vicinity of the Seattle Arena site, weekday PM peak hour non-event traffic volumes are highest along the principal arterials of 1st Avenue S., 4th Avenue S., and Edgar Martinez Drive S. Along 1st Avenue S., adjacent to the site, weekday PM peak hour volumes of approximately 2,100 vehicles per hour (vph) were observed. Traffic volumes along 4th Avenue S., parallel to 1st Avenue S. were approximately 10 percent higher at 2,350 vph. Peak hour volumes of approximately 250 vph were observed along Occidental Avenue S. Along the east / west corridors including Edgar Martinez Drive S. and S. Holgate Street, weekday PM peak hour traffic volumes observed were approximately 2,200 vph and 650 vph, respectively.

Traffic volumes along Occidental Avenue S. were reviewed to identify approximate numbers of vehicles that use Occidental Avenue S. as an alternative travel route to 1st Avenue S. Weekday peak hour turning movement volumes collected in December 2013 demonstrate that this diversion is greatest during the weekday AM peak hour when approximately 200 westbound vehicles on S. Atlantic Street divert southbound onto Occidental Avenue S. to primarily turn right onto S. Holgate Street (150 vehicles). Hourly traffic volumes collected along 1st Avenue S. over a seven-day period in December 2013 demonstrated that additional capacity appears available on 1st Avenue S., suggesting that the observed diversion may not be due to congestion on 1st Avenue S. Field observations indicated that westbound traffic on S. Atlantic Street can include substantial truck traffic destined for Terminal 46 at the Port of Seattle. When this happens, queuing on S. Atlantic Street occurs, which appears to induce some traffic destined for 1st Avenue S. to turn left onto Occidental Avenue S., then right onto S. Holgate Street, before turning south onto 1st Avenue S.

Traffic volumes observed crossing S. Holgate Street during the weekday PM peak hour were approximately 130 vehicles per hour during the weekday AM peak and 60 vehicles per hour during the weekday PM peak. These volumes are substantially less than the traffic turning

to/from the west onto S. Holgate Street from Occidental Avenue S. with a majority likely using this as an alternate route avoiding the 1st Avenue S./S. Atlantic Street intersection. Truck volumes on the four primary streets that border the site, including 1st Avenue S., 4th Avenue S., S. Holgate Street, and Edgar Martinez Drive S. are generally less than five percent during the weekday PM peak hour. Within the immediate study area, bus traffic is primarily limited to 4th Avenue. King County Metro Transit operates three different bus bases in the area and utilizes 4th Avenue S. as a major transit corridor. Bus volumes during the weekday PM peak hour between Edgar Martinez Drive S. and S. Holgate Street total 20 buses based on scheduling information and data provided by King County Metro Transit. This represents about two percent of the total traffic volumes.

Existing Weekday PM Peak Hour With Event

Weekday PM Peak hour with event traffic volumes were collected on Wednesday, October 17, 2012 during a Sounders FC soccer game with a scheduled start of 7:00 PM. Traffic volumes were collected between 4:00 and 8:00 PM to capture the traffic flows of both commuters and event attendees. The peak one-hour period of combined commute and event traffic occurred between 4:30 and 5:30 PM. When comparing the non-event and event traffic volumes, the largest percentage increase is shown along 6th Avenue S. and Edgar Martinez Drive S. This is due primarily to the location of the venue and overall lower background volumes along 6th Avenue S. as compared to 1st Avenue S. and 4th Avenue S. Increases along Edgar Martinez Drive S. are due primarily to connections to the interstate system and access to the Safeco Field parking garage. With an event, traffic volumes along Occidental Avenue S. were observed to decrease slightly. This difference is likely due to a shift in the background traffic volumes and diversion due to congestion around the Safeco Field parking garage. Existing with-event intersection turning movement volumes are provided in Attachment E-1 which is available upon request from DPD.

Similar to the discussion of the non-event conditions, further analysis of the existing volumes within the core area around the site of Alternatives 2 and 3 was conducted. The traffic counts conducted under event conditions showed varying truck percentages along 1st Avenue S., 4th Avenue S., Edgar Martinez Drive S., and S. Holgate Street as compared to without-event conditions. The largest difference noted is the increase in truck volumes along S. Holgate Street and 4th Avenue S. and decrease in truck volumes along Edgar Martinez Drive S. and 1st Avenue S. Shifts in the observed truck volumes could be attributed to a variety of factors including general fluctuations in truck activity on a daily basis or a change in travel patterns due to the Sounders game.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Forecast traffic volumes for the No Action event cases were developed for the 2018 and 2030 horizon years.

2018 Traffic Volumes

See Appendix E for traffic volumes along key corridors for all three event cases under 2018 conditions. Detailed turning movement volumes for each scenario and at each study intersection are provided in in Attachment E-1, which is available upon request from DPD.

Case S1: By 2018, with the completion of the SR 99 bored tunnel project and completion of the Waterfront project, traffic volumes on the surface arterials are expected to increase significantly within the study area relative to existing conditions. Given historical growth (approximately one to two percent annually) in background traffic the primary contributing factor to the increase in traffic is the shifts due to the configuration of the bored tunnel and the lack of access to the CBD within the tunnel. The regional connections to the Stadium District area along 1st Avenue S., 4th Avenue S., and Edgar Martinez Drive S. show:

- An increase of approximately 100 percent on 1st Avenue S. north of Railroad Way S.
- Volumes on 4th Avenue S. north of the S. King Street pedestrian crossing are anticipated to increase on the order of 50 percent.
- South of the site, along both 1st Avenue S. and 4th Avenue S., traffic volumes are anticipated to increase on the order of 35 percent and 30 percent, respectively.

Future truck volumes assumed in the analysis and projected for the roadways are based on the highest truck percentages observed for the existing non-event and event conditions. This provides a conservative estimate of future truck volumes and related impacts on the level of service (LOS) analysis calculations are not underestimated. In addition to the truck percentages and volumes noted in the existing conditions, additional adjustments were applied to account for the growth in Port traffic as well as other trucks as noted in the *Seattle Industrial Areas Freight Access Project*. The information utilized for Port of Seattle adjustments were provided by Heffron Transportation Inc.

Truck traffic in the core area is generally anticipated to increase in number and percentage of overall traffic. The largest increases are noted along the east / west arterials of Edgar Martinez Drive S. and S. Holgate access. For Port-related traffic, these roads are used to access the regional facilities or access customers in the Stadium District area, east of the railroad tracks. Along the primary freight routes such as 1st Avenue S., 4th Avenue S., S. Holgate Street, and Edgar Martinez Drive S., truck volumes are expected to range between one and seven percent.

Case S2: Traffic volumes under 2018 conditions are forecast to increase approximately 14 percent over without-event conditions throughout the study area with a 40,500 attendee Mariners game. Truck volumes or percent heavy vehicles defined in the No Action without event cases were held constant and no increase in trucks was assumed as a result of the Case S2 event. The following bullets provide an overview of the increased volumes approaching the

Stadium District during the weekday PM peak hour based on the assumptions previously outlined for Mariners event arrivals:

- 1st Avenue S., between S. Royal Brougham Way and S. King Street – 30 percent increase
- 1st Avenue S., south leg of 1st Avenue S. / S. Atlantic Street intersection – 10 percent increase
- 4th Avenue S., north of Airport Way S. intersection – 15 percent increase
- 4th Avenue S., south of S. Atlantic Street ramps – 8 percent increase
- Edgar Martinez Drive S. between Occidental Avenue S. and the Westbound I-90 Off-Ramp – 19 percent increase

Case S3: Increases in traffic volumes under this multiple event scenario are 16 percent greater than existing conditions, or only two percent greater than the Case S2. Truck volumes defined in the No Action without-event cases were also held constant with this analysis. The following bullets provide an overview of the increase in volumes approaching the Stadium District during the weekday PM peak hour between non-event (Case S1) and the multi-event (Case S3) traffic volumes:

- 1st Avenue S., between S. Royal Brougham Way and S. King Street – 48 percent increase
- 1st Avenue S., south leg of 1st Avenue S. / S. Atlantic Street intersection – 14 percent increase
- 4th Avenue S., north of Airport Way S. intersection – 18 percent increase
- 4th Avenue S., south of S. Atlantic Street ramps – 10 percent increase
- Edgar Martinez Drive S. between Occidental Avenue S. and the Westbound I-90 Off-Ramp – 27 percent increase

Traffic volumes can fluctuate by 5 to 10 percent day-to-day. Increases in traffic in the study area would generally remain below a 10 percent increase with the 12,000 person attendance increase (the difference between Case S2 and Case S3) with the exception of 1st Avenue S. between S. Royal Brougham Way and S. King Street.

2030 Traffic Volumes

Similar to the 2018 No Action forecasts, truck volumes were based on a review of existing conditions as well as consideration for growth of Port activity.

Case S1: Forecast 2030 conditions along the Stadium District regional connections along 1st Avenue S., 4th Avenue S., and Edgar Martinez Drive S. show the following when compared to 2013 conditions:

- An increase of approximately 100 percent on 1st Avenue S. north of Railroad Way S.
- Volumes on 4th Avenue S. north of the S. King Street pedestrian crossing are anticipated to increase 70 percent
- South of the site, along both 1st 4th Avenues S., traffic volumes are anticipated to increase 75 percent and 60 percent, respectively
- Traffic volumes along 1st Avenue S., north of S. Atlantic Street are shown to decrease slightly from 2018 to 2030 based on modeling done for the Viaduct project

Along the primary freight routes such as 1st Avenue S., 4th Avenue S., S. Holgate Street, and Edgar Martinez Drive S., truck volumes are expected to range between one and seven percent. These heavy vehicle proportions are similar to those under 2018 conditions and with the additional increase in traffic from 2018 to 2030 conditions, provide a conservative analysis by resulting in an increase in heavy vehicle traffic similar to forecast traffic volumes.

Case S2: When compared to growth from existing conditions to 2018 conditions, growth between 2018 and 2030 would occur at a slower rate based on the forecast increases in background traffic volumes and the small decrease in the proportion of Mariners attendees choosing to travel via passenger car. The following bullets provide an overview of the increased volumes approaching the Stadium District during the weekday PM peak hour based on the assumptions previously outlined for Mariners event arrivals and CenturyLink Field Event Center arrivals:

- 1st Avenue S., between S. Royal Brougham Way and S. King Street – 28 percent increase
- 1st Avenue S., south leg of 1st Avenue S. / S. Atlantic Street intersection – 7 percent increase
- 4th Avenue S., north of Airport Way S. intersection –12 percent increase
- 4th Avenue S., south of S. Atlantic Street ramps – 6 percent increase
- Edgar Martinez Drive S. between Occidental Avenue S. and the Westbound I-90 Off-Ramp – 13 percent increase

Case S3: As with the No Action Case S2, this lesser growth due to the combined events is due increases in background traffic and the increasing likelihood of event attendees to choose travel by modes other than passenger car. The following bullets provide an overview of the increases in volumes approaching the Stadium District during the weekday PM peak hour given

the assumptions outlined above for Mariners event arrivals between non-event (Case S1) and the multi-event (Case S3) traffic volumes:

- 1st Avenue S., between S. Royal Brougham Way and S. King Street – 44 percent increase
- 1st Avenue S., south leg of 1st Avenue S. / S. Atlantic Street intersection – 10 percent increase
- 4th Avenue S., north of Airport Way S. intersection – 15 percent increase
- 4th Avenue S., south of S. Atlantic Street ramps – 7 percent increase
- Edgar Martinez Drive S. between Occidental Avenue S. and the Westbound I-90 Off-Ramp – 18 percent increase

Impacts of the Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

Alternative 2 would result in an increase in traffic volumes due to workers traveling to and from the site, delivery of material, and truck hauling. It is anticipated that the increase in traffic volumes would be less than generated by a 20,000-seat event at the Seattle. The construction traffic would occur on a daily basis for the 2 year duration of construction activities and occur during AM and PM peak hours.

2018 Traffic Volumes

Traffic volumes along key corridors under 2018 conditions for the multiple event cases are provided in Appendix E. Detailed turning movement volumes for each scenario and at each study intersection are provided in Attachment E-1 which is available upon request from DPD.

Table 3.8-6 summarizes the total traffic volumes within the Proposed Project vicinity and shows the percent increase in traffic volumes compared to No Action conditions.

Table 3.8-6
2018 Alternative 2 Arena Site Vicinity Traffic Volumes

	Case S1		Case S2		Case S3	
Location	**No Action**	**Alt. 2**	**No Action**	**Alt. 2**	**No Action**	**Alt. 2**
1st Avenue S. north of S. Massachusetts Street	3,340	3,760 (+13%)[1]	3,685	4,095 (+11%)	3,815	4,215 (+10%)
Edgar Martinez Drive S. west of Westbound I-90 Off-Ramps	2,815	3,375 (+20%)	3,545	4,080 (+15%)	3,790	4,325 (+14%)
S. Holgate Street east of Occidental Avenue S.	830	805 (-3%)	830	805 (-3%)	830	805 (-3%)
4th Avenue S. north of S. Holgate Street	3,455	3,675 (+6%)	3,735	3,945 (+6%)	3,795	4,015 (+6%)

1. Percent increase from No action conditions.

The assignment of Arena event related traffic reflects the overall distribution of parking in the area as well as the travel patterns accessing the Stadium District area. Considering a scenario with no additional events in background traffic (Case S1), roadway volumes increase up to 20 percent within the Proposed Project vicinity. The percent increase is influenced by the level of background traffic, as well as the level of event traffic. Percentage increases associated with the addition of Arena related traffic for subsequent event scenarios decrease although overall traffic volumes increase between 16 and 54 percent with all three events relative to No Action Case S1 condition. The largest increase due to Arena event traffic is forecast along Edgar Martinez Drive S. due primarily to the roadway's connection to and from the regional freeway network and the nearby Safeco Field parking garage. S. Holgate Street volumes remain relatively unchanged with a minor decrease anticipated. This decrease is anticipated due to the shift in traffic associated with the vacation of Occidental Avenue S. and no assignment of event related traffic to the roadway. Event traffic was not assigned to the roadway based on the available parking in the area, capacity constraints on S. Holgate Street due to future rail activity, and anticipated event-related traffic control.

2030 Traffic Volumes

Weekday PM peak hour 2030 Proposed Project traffic volumes are provided in Appendix E. Detailed turning movement volumes for each scenario and at each study intersection are provided in Attachment E-1 which is available upon request from DPD.

Table 3.8-7 summarizes the total traffic volumes within the Proposed Project vicinity compared to 2030 No Action conditions.

Table 3.8-7
2030 Alternative 2 Arena Site Vicinity Traffic Volumes

	Case S1		Case S2		Case S3	
Location	**No Action**	**Alt. 2**	**No Action**	**Alt. 2**	**No Action**	**Alt. 2**
1st Avenue S. north of S. Massachusetts Street	4,110	4,525 (+10%)[1]	4,440	4,830 (+9%)	4,555	4,950 (+9%)
Edgar Martinez Drive S. west of Westbound I-90 Off-Ramps	4,005	4,550 (+14%)	4,680	5,205 (+11%)	4,910	5,435 (+11%)
S. Holgate Street east of Occidental Avenue S.	320	295 (-8%)	320	295 (-8%)	320	295 (-8%)
4th Avenue S. north of S. Holgate Street	4,650	4,865 (+5%)	4,910	5,115 (+4%)	4,970	5,175 (+4%)

1. Percent increase from No action conditions.

As shown in Table 3.8-7, roadway volumes increase up to 14 percent within the Arena vicinity as a result of Arena traffic. The percent increase is influenced by the level of background traffic, as well as the level of event traffic. The percentage increase in traffic associated with the addition of Arena related traffic for subsequent event scenarios decrease, although overall traffic volumes increase up to 36 percent with all three events relative to No Action Case S1 forecasts. Consistent with the 2018 conditions, the largest increase due to Arena event traffic is forecast along Edgar Martinez Drive S. due primarily to the roadway's connection to and from the regional freeway network and the nearby Safeco Field parking garage. Similar to 2018 conditions, S. Holgate Street volumes remain relatively unchanged with a minor decrease anticipated. This decrease is anticipated due to the shift in traffic associated with the vacation of Occidental Avenue S. and no assignment of event related traffic to the roadway. Event traffic was not assigned to the roadway based on the available parking in the area, capacity constraints on S. Holgate Street due to future rail activity, and anticipated event-related traffic control.

Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

Alternative 3 traffic volumes are anticipated to be approximately 10 percent less than those identified for Alternative 2. Given this different, it is anticipated that the impacts of Alternative 3 would be slightly less than identified for Alternative 2. The traffic volume analysis for Alternative 2 fully encompasses impacts that would occur with Alternative 3.

Transportation Concurrency

The transportation concurrency analysis indicates that with traffic generated by the project, the screenlines would have v/c ratios that are less than the City level of service threshold and thus, the conditions would meet concurrency requirements.

3.8.2.6 Traffic Operations

This section evaluates the magnitude of traffic impacts of the project for each of the defined event cases. The traffic operations analysis included a review of four primary areas: intersection levels of service; corridor performance measured through an assessment of travel times; effects of rail traffic on key corridors; and regional impacts as identified through a review of mainline I-5 and I-90 travel speeds, and ramp terminal LOS. See Appendix E for further detail regarding the methodology applied to each of the four analyses. In reviewing this analysis, it is important to remember that each event cases illustrated would occur with differing frequencies. Case S1 would occur most frequent while Cases S2 and S3 would be relatively rare, or never, depending on mitigation for event scheduling.

Methodology

Intersection Level of Service: At signalized and all-way stop-controlled intersections, LOS is measured in average delay per vehicle for all vehicles at the intersection. At two-way stop-sign-controlled intersections, LOS is reported for the worst operating approach of the intersection. Traffic operations for an intersection can be described alphabetically with a range of LOS values (LOS A through F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. Intersection levels of service incorporate several intersection characteristics including signal timing, signal phasing, intersection channelization, traffic volumes, and pedestrian volumes. Description of Level of Service is provided in Appendix E. The City of Seattle's Comprehensive Plan does not define a LOS standard for individual intersections; however, the City generally recognizes LOS E and F as poor operations for signalized locations and LOS F for unsignalized locations. Given the event-related nature of this analysis, and variant frequencies and intensities, traditional intersection LOS standards would not be appropriate as the sole measure of impact on traffic operations.

Corridor Travel Times: Corridor travel times along key corridors were calculated within the study area to provide an additional level of analysis regarding the overall operations of the roadway system. This type of analysis adds context to the results of the intersection LOS described earlier, because it takes into account general travel times between intersections as well as additional delay anticipated at intersections for the specific movements relevant to the identified route.

Travel times were evaluated for four routes and were chosen based on a review of existing travel patterns in the area including key travel routes for commuters and the movement of freight and goods. These routes are generally representative of local circulation or regional travel. The four routes are described as follows:

- **Route 1** focuses on a north-south route along 1st Avenue S. between Railroad Way S. and S. Spokane Street.

- **Route 2** focuses on a north-south route along 4th Avenue S. between S. Spokane Street and the I-90 off-ramp.

- **Route 3** includes north-south travel between I-90 and the CBD along 4th Avenue S. This route represents travel to / from the regional freeway system and the CBD towards the Pioneer Square and International Districts.

- **Route 4** focuses on east-west travel between Port of Seattle facilities west of 1st Avenue S. and the I-5 / I-90 interchange. This route includes S. Atlantic Street from 1st Avenue S. to the freeway ramps on S. Atlantic Street in the vicinity of 4th Avenue S.

Travel times were calculated consistent with HCM methodologies defined for the analysis of arterial systems. This analysis utilized the approach delay for each study intersection along these four routes and a free-flow mid-block travel speed applied to the distance between each study intersection. The mid-block speed is estimated following the Bureau of Public Roads methodology.[4]

Effects of Rail Crossings: Key corridors impacted by rail activity within the study area were analyzed using VISSIM, a microsimulation model.[5] The simulation model of the rail crossings at S. Holgate Street and S. Lander Street was utilized to conduct the assessment due to its ability to model train operations including the arrival and departure patterns associated with delays caused by the gate down times. This analysis focuses on the BNSF mainline tracks that are located immediately west of 4th Avenue S. Several other non-mainline track crossings exist along S. Holgate Street, which accommodate and facilitate the movement of trains within the rail yard, but have not been included in the model since crossing activity is infrequent during the weekday PM peak period.

Freeway / Regional Access Analysis. The analysis of regional access to the SoDo area focused on both mainline performance considering corridor travel speeds as well as the LOS at the ramp intersections with the surface arterials. The analysis included a review of southbound I-5 between NE 145th and I-90 and westbound I-90 between Rainier Avenue and I-5. Information prepared by the King County expert review panel in 2012 for the potential Arena was included in this analysis. This information highlights historical congestion patterns along the I-5 and I-90 corridors under event conditions. Ramp intersections also evaluated as part of the intersection LOS are highlighted in this section. The analysis of the ramp intersections is consistent with the LOS methodology previously described.

[4] NCHRP Report 387

[5] Traffic operations results are presented for the system peak hour. A 20-minute seeding period was used to load traffic onto the roadway network. Vehicular traffic volumes and rail operations during this seeding period replicate traffic volumes and rail operations observed during field data collection.

Affected Environment

The following sections summarize existing traffic operations within the Stadium District study area.

Intersection Operations

As part of the intersection operations analysis, signal timing and phasing information was obtained from either the Seattle Department of Transportation (SDOT) or collected in the field. Lane geometrics and traffic control were confirmed in the field and are summarized for each study area intersection in Attachment E-2 which is available from DPD upon request. The number of intersections operating at LOS C or better, or at LOS D, LOS E, or LOS F is summarized in Figure 3.8-10. Detailed LOS summary tables and worksheets for each scenario are included in Attachment E-3 which is available from DPD upon request.

All study intersections operate at LOS D or better under with event and non-event and without event scenarios with the exception of the six intersections in the non-event and three intersections under the event scenarios.

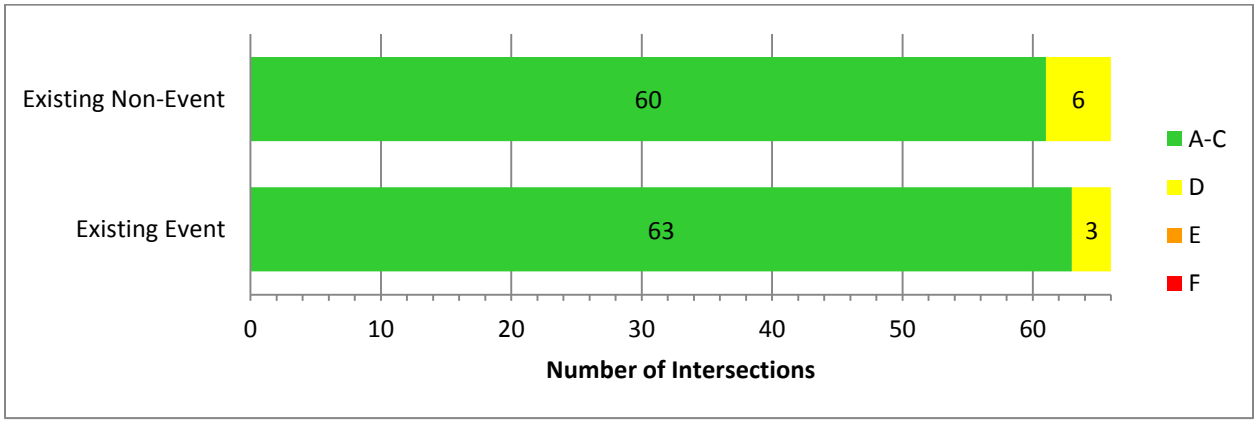


Figure 3.8-10
Stadium District Existing Intersection LOS Comparison

It is noted that actual driver experience may suggest worse LOS than summarized herein. As the LOS reported represents an average delay for the intersection, some movements will operate at a lower level than reported for the overall average. Also, with the high concentrations of pedestrians during events, the analytical tools employed may not fully reflect the level of pedestrian impacts to intersection performance. Intersections that would be subject to these high pedestrian concentrations during observed events include:

- 1st Avenue S. / S. Royal Brougham Way
- 1st Avenue S. / S. Atlantic Street

- 4th Avenue S. / S. Royal Brougham Way

Several locations along S. Jackson Street may be operating better than historical condition due to diversion of traffic caused by existing construction activity. In addition, previous studies and field observations of the 6th Avenue / James Street intersection suggest this intersection has operated worse than currently shown under these existing conditions.

Corridor Travel Times

Table 3.8-8 summarizes the estimated existing travel times on the various routes for weekday PM peak hour non-event and with-event conditions.

Table 3.8-8
Existing Weekday PM Peak Hour Travel Times Non-Event and With-Event Conditions

Route	Extents	Direction	Non-Event (m:ss[1])	With-Event[2] (m:ss)
1	1st Avenue S. from Railroad Way S. to S. Horton Street	NB	6:16	6:31
	1st Avenue S. from S Horton Street to Railroad Way S.	SB	6:49	6:50
2	4th Avenue S. from S. King Street to S. Horton Street	NB	6:20	6:54
	4th Avenue S. from S Horton Street to S. King Street	SB	6:54	6:57
3	4th Avenue S. from S. King Street to I-90	NB	1:43	1:33
	4th Avenue S. from I-90 to S. King Street	SB	3:01	2:53
4	S. Atlantic Street from 1st Avenue S. to I-90	EB	1:39	1:24
	S. Atlantic Street from I-90 to 1st Avenue S.	WB	1:23	1:18

1. m:ss = minutes:seconds
2. Reflects counts taken for a Sounders FC game with attendance = 38,500

As shown in Table 3.8-8, travel times generally increase along the four routes with the addition of traffic from an event. It is noted that the level of change in travel time may not be intuitive as it relates to any event with over 38,000 attendees. A number of factors appear to contribute to this condition:

- The observed event was a Seattle Sounders FC soccer game at CenturyLink Field. While no hard data relative to mode split or net vehicle demands is available, anecdotal evidence suggests a higher reliance on non-auto travel than occurs in relation to other Stadium District events of similar attendance.

- Repeated traffic counts for other events in the area also suggest minimal local street system impacts during the weekday PM peak hour conditions.

- Local businesses and downtown motorists who are aware of a pending event adjust their travel behavior, either by time or by mode to avoid being caught in event-related congestion. Depending on the size of the event, the adjusted background traffic appears

to partially, if not substantially offset the added weekday PM peak hour traffic due to an event.

The slight decreases in travel time along some of the routes for an event condition can be attributed to minor changes in signal timing based on traffic volumes. These can be interpreted to experience little overall added delay during observed event conditions. Several intersections along the travel time routes are shown to have left-turn queue lengths that exceed allowable storage, but occur along arterials that have multiple through lanes. As a result, vehicles potentially blocked by these queues are anticipated to utilize the second through lane, minimizing the impact on the overall intersection capacity.

Effects of Rail Crossings

There are at-grade rail crossings throughout SoDo and the greater Duwamish impacting arterial operations. The grade-crossings that have the highest volume of train activity are located along the BNSF Railway's mainline tracks (between 1st Avenue S. and 4th Avenue S.) and also lead and tail tracks associated with the intermodal rail yards. Crossings of the mainline are located at S. Holgate Street, S. Lander Street, S. Horton Street and surface S. Spokane Street. These mainline tracks, and adjacent spur lines, serve regional activity, trains at the intermodal yards, Sounder commuter rail trains, interstate commerce, international transportation and Amtrak trains. Figure 3.8-11 shows the current rail lines and vehicle and pedestrian queuing areas at the S. Holgate Street crossing immediately adjacent to the Proposed Arena site.

Existing Rail activity was simulated based on field observations at S. Holgate Street conducted In December 2013. Based on these observations, trains were assumed to travel at approximately 10 to 15 mph through the study area and gate down times were noted at approximately 8 minutes and 45 seconds on average. Consistent with the observations, existing rail activity assumed in the model included four passenger trains with eight cars per train and one freight train of 73 cars.

Effects of the rail crossings on S. Holgate Street and S. Lander Street between 1st Avenue S. and 4th Avenues S. on the arterial operations were assessed using a VISSIM microsimulation model. Rather than reporting the queue lengths on S. Holgate Street and S. Lander Street, queue lengths on adjacent arterials (1st Avenue S. and 4th Avenue S.) are considered since existing queues have been observed to extend into the adjacent arterials as documented in the *Coal Train Traffic Impact Study* (October 2012, Parametrix). Queue lengths reported for these locations reflect a combination of effects of signal operations as well as impacts of queuing from the at-grade crossings.

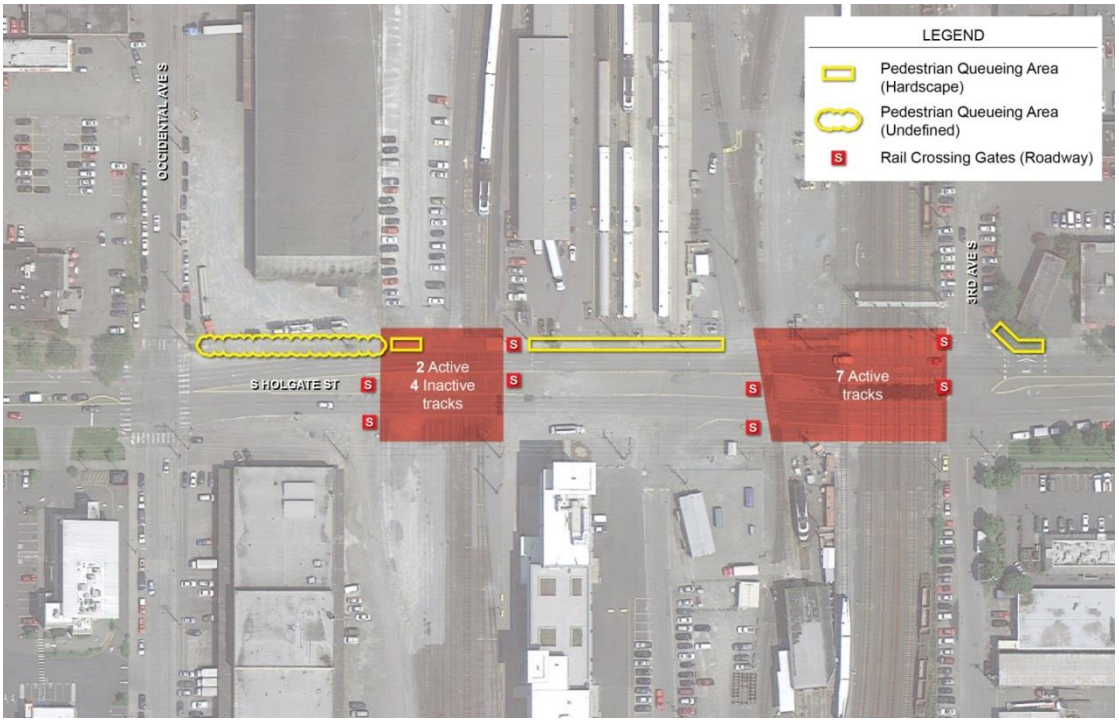


Figure 3.8-11

S. Holgate Street Existing Rail Crossing Locations

Rail crossing gates are activated a total of approximately 8.5 minutes during the weekday PM peak hour with individual closures averaging approximately 2.5 minutes each:

- Maximum queues along 1st Avenue S. and 4th Avenues S. show that maximum queue lengths along the arterial typically increase with the occurrence of the Sounders game.
- The northbound 1st Avenue S. queue at S. Holgate Street is shown to decrease and occurs as a result of increased upstream northbound congestion at 1st Avenue S. / S. Lander Street.

Model results were compared to the values reported in the coal train study for calibration purposes. The queue lengths summarized in the coal train study are generally consistent with previous analyses.

Regional Access Analysis

Primary freeway corridors that provide regional access to the SoDo site include I-5, I-90, SR 520, and SR 99. The weekday PM peak commute period for these corridors occurs between 3:00 and 7:00 PM. I-5 is a north-south corridor with 8 to 10 lanes of capacity through the downtown Seattle area. The corridor serves 7,000 to 7,500 vph in each direction through downtown during the evening commute. The I-5 corridor also includes a set of reversible lanes between

Downtown Seattle and Northgate. This four lane facility operates in the northbound direction during the PM peak period with a volume of 4,500 vph.

Approaching I-5 from the east, I-90 serves up to 9,300 vph during the PM peak period, with higher eastbound volumes leaving Seattle. The I-5 and I-90 corridors experience congestion presently during the PM peak commute (4:00 PM to 7:00 PM). I-5 southbound is congested with speeds less than 30 mph from 145th Street NE through downtown Seattle (north of I-90). These lower speeds are estimated to occur from 4:30 PM to approximately 7:00 PM I-90 westbound operates with speeds less than 30 mph from I-405 to the approach to I-5 during the 4:00 to 7:00 PM window. Figure 3.8-12 depicts typical daily congestion that occurs today on I-5 southbound and I-90 westbound.

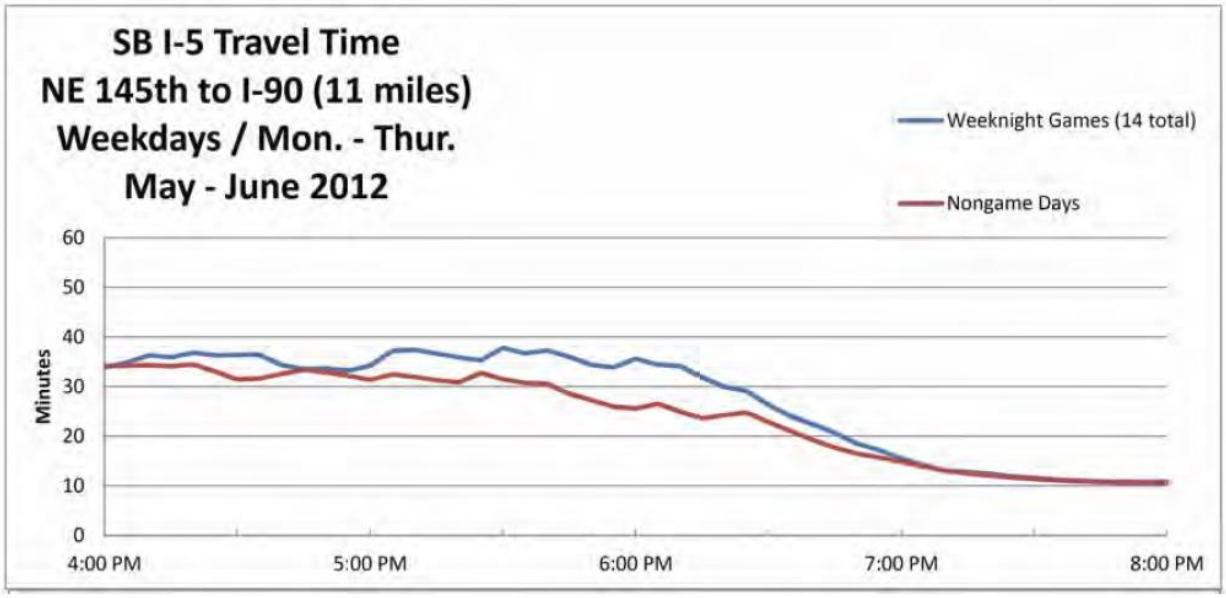
When events occur at existing downtown arenas peak travel times through the city increase. The PM peak travel times (on days with events in 2012) increased by up to eight minutes on southbound I-5 between NE 145th and I-90 and up to four minutes on westbound I-90 between I-405 and Rainer Avenue S.

SR 520 is currently a four lane tolled corridor and serves up to 4,800 vph during the PM peak period. Ultimately, the corridor will be six lanes (two general purpose lanes and an HOV lane in each direction). Portions of the project are funded and under construction.

SR 99 currently provides six lanes through the downtown Seattle area and will be replaced by a four-lane tunnel and expanded Alaskan Way surface street when the project is complete. The tunnel is scheduled to open in 2017, and the new surface street will follow in 2018.

The traffic signals or intersections at the ramp termini operate as a constraint as traffic exits the freeway to access the SoDo area. The overall capacity of the intersection and off-ramp approach of nine arterial intersections at the I-5, I-90, and West Seattle Bridge ramp termini were reviewed to determine existing off ramp constraints. This analysis focuses on the off-ramps only as it is most impacted by the inbound regional flows to the Arena. On-ramp capacity is discussed in the intersection operations section. The analysis was completed for event[6] and non-event conditions.

[6] Event was a Seattle Sounders soccer game with an attendance of 38,500.



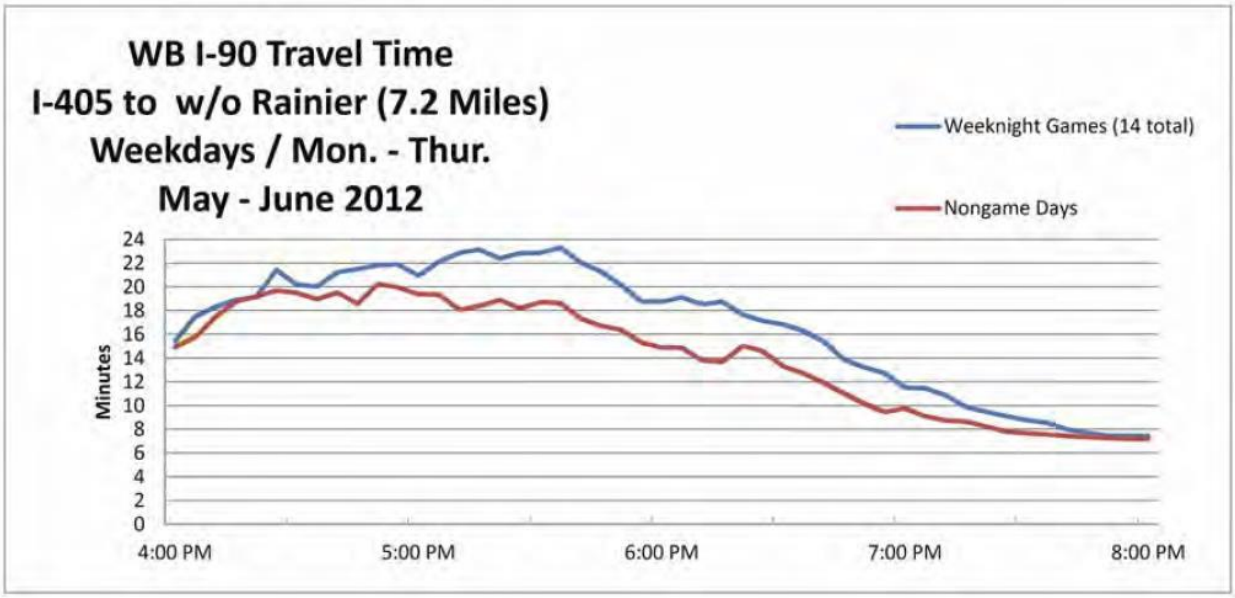


Figure 3.8-12

I-5 and I-90 Existing Travel Times Non-Event and With Event

The study intersections include the following:

- S. Spokane Street / 1st Avenue S.

- S Spokane Street / 6th Avenue S.
- S Forest Street / 6th Avenue S.
- Edgar Martinez Drive S. / I-90 Off-Ramp
- 4th Avenue S. / I-90 Off-Ramp
- S. Dearborn Street / I-90 Off-Ramp
- S. Dearborn Street / I-5 SB Off-Ramp
- S. Dearborn Street / I-5 NB Off-Ramp
- James Street / 6th Avenue

Of the nine study intersections, all the intersections operate with an overall and off-ramp approach of LOS D or better during the normal weekday peak hour and with an event. LOS and delay per vehicle is shown in Table 3.8-9.

Table 3.8-9
Stadium District Existing Ramp Terminal Weekday PM Peak Hour LOS Summary

Ramp Termini Intersection	Scenario	Overall LOS / Delay	Off-Ramp LOS / Delay
Spokane St Viaduct / 1st Ave S.	Non-Event	B / 18	D / 43
	Event[1]	C / 20	D / 42
Spokane St / 6th Ave S.	Non-Event	B / 18	B / 16
	Event	C / 31	C / 26
Forest St / 6th Ave S.	Non-Event	B / 11	B / 14
	Event	B / 11	B / 17
E. Martinez Dr S. / I-90 Off	Non-Event	A / 6	B / 18
	Event	A / 6	B / 16
4th Ave S. / I-90 Off	Non-Event	A / 8	D / 46
	Event	B / 11	D / 38
Dearborn St. / I-90 Off	Non-Event	C / 32	D / 52
	Event	C / 26	D / 47
Dearborn St. / I-5 SB Off	Non-Event	A / 8	D / 42
	Event	A / 7	C / 22
Dearborn St. / I-5 NB Off	Non-Event	B / 19	D / 43
	Event	B / 16	B / 18
James St. / 6th Ave	Non-Event	D / 37	D / 46
	Event	C / 24	C / 31

1. Sounders FC soccer game at 38,500 attendance

Impacts of the No Action Alternative at Alternative 2 and 3 Site

The following sections summarize the results of the traffic operations analysis conducted for the No Action alternative. This analysis reflects the forecast traffic volumes and roadway improvements anticipated to be completed by the 2018 and 2030 horizon years. Consistent with the analysis of the Affected Environment, this section presents the results of the

intersection LOS analysis, corridor performance, effects of rail crossings, and an analysis of regional access to the SoDo area.

Intersection Operations

LOS results for 2018 and 2030 non-event peak hour conditions, with the addition of the assumed Mariners event, and with the Mariners event and an event at the CenturyLink Field Events Center are provided in Appendix E. A summary of the No Action LOS for all study area intersections was prepared and compared to existing conditions as summarized in Figure 3.8-13 for 2018 conditions, and Figure 3.8-14 for 2030 conditions. As summarized in these figures:

- Increased traffic volumes and changes in travel patterns result in a greater number of intersections operating at LOS E/F under both 2018 and 2030 No Action conditions.
- The occurrence of Mariners and CenturyLink Field Events Center events also result in worse operations than non-event conditions throughout the study area. Seven to twelve additional intersections operate at LOS E/F under 2018 conditions with one or both events (Cases S2 and S3) and seven to eight more intersections under 2030 conditions compared to the No Action Case S1 conditions for 2018 and 2030.

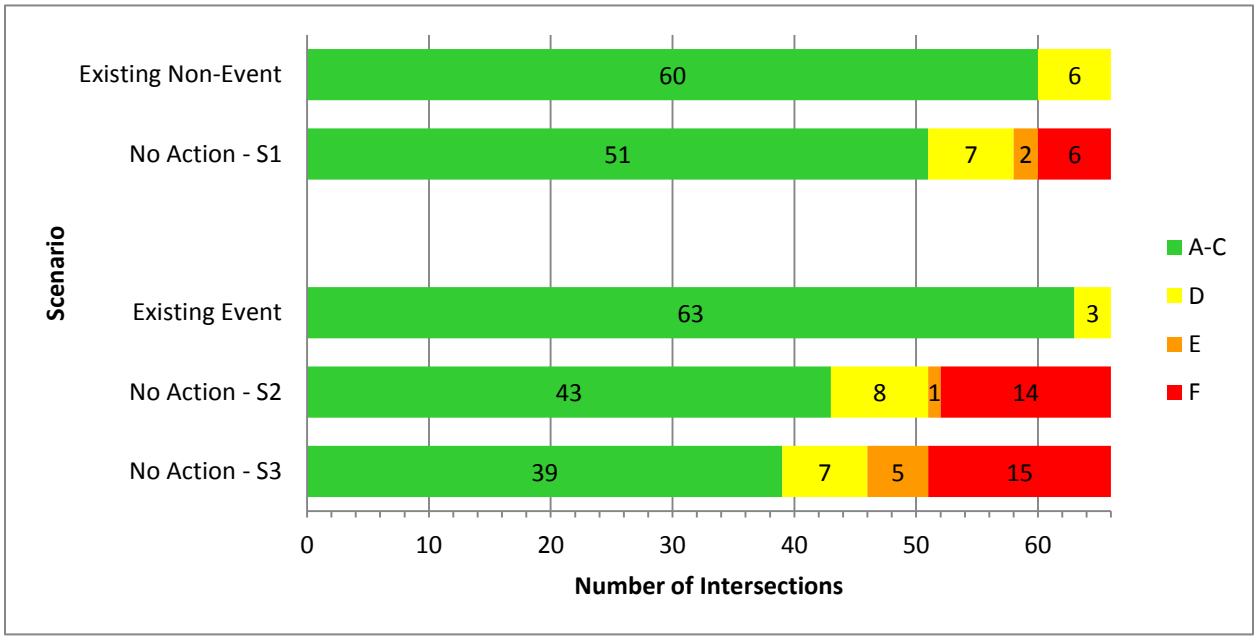


Figure 3.8-13

Stadium District 2018 No Action Intersection LOS Comparison

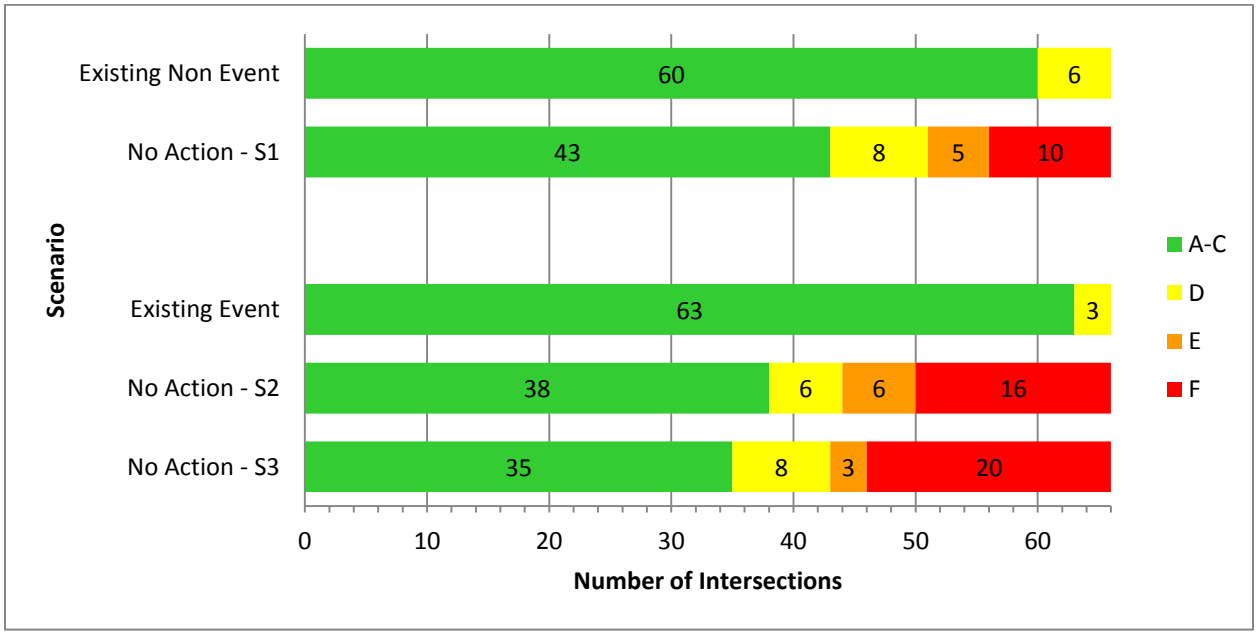


Figure 3.8-14

Stadium District 2030 No Action Intersection LOS Comparison

Of the intersections shown to operate at LOS E or LOS F under 2018 No Action conditions (Cases S1, S2, and S3), seven are located within the vicinity of the Proposed Project site:

- 1st Avenue S. / S. Atlantic Street
- The northbound Occidental Avenue S. approach to Edgar Martinez Drive S.
- Edgar Martinez Drive / East Parking Garage
- The westbound I-90 off-ramp onto Edgar Martinez Drive S.
- The eastbound I-90 on-ramp from Edgar Martinez Drive S.
- The southbound Occidental Avenue S. approach to S. Holgate Street
- 4th Avenue S. / S. Holgate Street

Under 2018 non-event conditions, 1st Avenue S. / S. Atlantic Street operates at LOS F under all event cases. The northbound and southbound Occidental Avenue S. approaches to Edgar Martinez Drive S. and S. Holgate Street operate at LOS D without an event but LOS F with either one or two events. The Edgar Martinez Drive / East Parking Garage, westbound I-90 off-ramp onto Edgar Martinez Drive S., and 4th Avenue S. / S. Holgate Street operate at LOS D for either one or no events, but LOS E under dual events. The eastbound I-90 on-ramp from Edgar Martinez Drive S. operates at LOS E with one event but worsens to LOS F with one or more events. Under 2030 No Action conditions (non-event, single event, or dual event), all nine study

intersections within the project vicinity would operate at LOS F within the vicinity of the Proposed Project site:

- 1st Avenue S. / S. Atlantic Street
- The northbound Occidental Avenue S. approach to Edgar Martinez Drive S.
- Edgar Martinez Drive / West Parking Garage
- Edgar Martinez Drive / East Parking Garage
- The westbound I-90 off-ramp on Edgar Martinez Drive S.
- The eastbound I-90 on-ramp from Edgar Martinez Drive S.
- 1st Avenue S. / S. Holgate Street
- The southbound Occidental Avenue S. approach to S. Holgate Street
- 4th Avenue S. / S. Holgate Street

Under 2030 conditions 1st Avenue S. / S. Atlantic Street, the northbound Occidental Avenue S. approach to Edgar Martinez Drive S, the eastbound I-90 on-ramp from Edgar Martinez Drive S., and 4th Avenue S. / S. Holgate Street would all operate at LOS F regardless of event case. The Edgar Martinez Drive / West Parking Garage intersection would operate at LOS E without an event but worsens to LOS F with one or two events. The Edgar Martinez Drive / East Parking Garage also operates at LOS F with either single or dual events but at LOS D with no event. The remaining three intersections, the westbound I-90 off-ramp onto Edgar Martinez Drive S., 1st Avenue S. / S. Holgate Street, and the southbound Occidental Avenue S. approach to S. Holgate Street, operate at LOS C or better with no event, LOS E with one event, and LOS F with two events.

The methodology adds event traffic to non-event PM peak hour conditions with no regard for capacity constraints. Congestion often results in modified travel behavior for non-event traffic. As a result, the cumulative conditions with an event in all cases likely overstate future congestion levels during the PM peak hour.

Corridor Travel Times

Table 3.8-10 summarizes the calculated travel times under 2018 conditions on the various routes for weekday PM peak hour for all No Action cases. Table 3.8-11 summarizes the estimated travel times under 2030 conditions. Existing conditions are also provided for comparison purposes.

Table 3.8-10
Stadium District 2018 No Action Weekday PM Peak Hour Corridor Travel Times

Route	Extents	Direction	Case S1 (m:ss)[1]	Case S2 (m:ss)	Case S3 (m:ss)
1	1st Avenue S from Horton Street to Railroad Way	NB	8:50 (6:16)[2]	14:44	17:46
	1st Avenue S from Railroad Way to Horton Street	SB	8:04 (6:49)	8:52	9:30
2	4th Avenue S from Horton Street to King Street	NB	8:29 (6:20)	10:48	11:42
	4th Avenue S from King Street to Horton Street	SB	12:19 (6:54)	17:18	18:37
3	4th Avenue S from I-90 to King Street	NB	2:16 (1:43)	3:53	4:57
	4th Avenue S from King Street to I-90	SB	8:24 (3:01)	12:41	14:12
4	S Atlantic Street from 1st Avenue S to I-90	EB	2:02 (1:39)	2:40	3:03
	S Atlantic Street from I-90 to 1st Avenue S	WB	2:22 (1:23)	7:54	10:39

1. m:ss = minutes:seconds
2. (x) = Existing non-event travel times provided for comparison.

As shown in Table 3.8-10:

- Travel times under 2018 conditions noticeably increase from existing conditions and further increase with the addition of event traffic, compared to existing conditions.
- Travel times under 2018 conditions along route #2 southbound are forecast to exceed 10 minutes under Case S1. Under Cases S2 and S3, route #2 northbound and #3 southbound are forecasted to exceed 10 minutes and 15 minutes for northbound route #1 Case S3 and southbound route #2 for Cases S2 and S3.
- Eastbound travel times along route #4 are expected to increase but at a lower percentage than other routes. This direction of travel is opposite the inbound event flows, minimizing the increase in travel times. Route #4 is also subject to TCPs at Occidental Avenue S. and the Safeco Field parking garage. Traffic control at the Safeco Field garage could increase route #4 travel times beyond what is reported. However, the increase is anticipated to be approximately the same under all three No Action cases.

Table 3.8-11
Stadium District 2030 No Action Weekday PM Peak Hour Corridor Travel Times

Route	Extents	Direction	Case S1 (m:ss)[1]	Case S2 (m:ss)	Case S3 (m:ss)
1	1st Avenue S from Horton Street to Railroad Way	NB	9:56 (6:16)[2]	17:10	20:15
	1st Avenue S from Railroad Way to Horton Street	SB	9:01 (6:49)	10:19	11:29
2	4th Avenue S from Horton Street to King Street	NB	13:13 (6:20)	18:07	19:28
	4th Avenue S from King Street to Horton Street	SB	17:59 (6:54)	23:18	24:44
3	4th Avenue S from I-90 to King Street	NB	2:27 (1:43)	5:27	6:51
	4th Avenue S from King Street to I-90	SB	15:11 (3:01)	19:28	21:12
4	S Atlantic Street from 1st Avenue S to I-90	EB	8:27 (1:39)	9:35	10:15
	S Atlantic Street from I-90 to 1st Avenue S	WB	3:15 (1:23)	11:37	14:36

1. m:ss = minutes:seconds
2. (x) = Existing non-event travel times provided for comparison.

As shown in Table 3.8-11:

- Under 2030 conditions travel times are generally higher in comparison to 2018 conditions. Most scenarios (especially case 3) show substantial increase in corridor travel times between 2018 and 2030 conditions.

- Route 4 eastbound in particular shows a sizeable increase in corridor travel time—nearly 4 times higher times for each individual case.

- Changes in forecast travel times result from small decreases in traffic volumes at some study intersections and additional diversion from congested freeways as forecast in the Alaskan Way Viaduct Replacement study.

Overall this suggests that the change in travel times compared to existing conditions is more directly impacted by the traffic shifts associated with the modified infrastructure than growth in general. As previously discussed, the event case methodology likely overstates future travel times and congestion due to events.

Effects of Rail Crossing

Rail activity assumed for future conditions was increased beyond existing conditions for both passenger and freight rail activity. For Amtrak and ST, future increases were identified based on their respective master planning documents for scheduled train crossing (revenue service):

- ST plans included six additional trains a day by 2018.[7] This is assumed to remain unchanged for long-range planning since no further information is available.
- Amtrak Cascades anticipates three additional daily round trips by 2014 and five further daily round trips under long-range planning.[8]
- Freight rail activity was increased by factoring the observed freight trains activity based on Port of Seattle growth forecasts. In addition, coal train activity is anticipated to increase to nine round trips per day under long-term (2023) conditions.[9]

Amtrak plans on adding an additional train crossing just south of the inspection pit tracks that currently terminate on the north side of S. Holgate Street. These tracks will provide access to a planned service building. These tracks are anticipated to service Amtrak trains during the late night hours and thus have not been assumed to add to the train crossing activity along S. Holgate Street during the evening commute peak hour. As noted in the existing conditions, based on anticipated queuing along S. Holgate Street and S. Lander Street and maximum storage being exceeded, queue lengths relative to 1st Avenue S. and 4th Avenue S. are reported:

- Rail crossing gates are activated approximately 17 to 20 minutes during the weekday PM peak hour in 2018 and 41 to 44 minutes in 2030.
- Queues generally increase with traffic growth under future conditions and/or the addition of event generated traffic. However, some are shown to decrease. Note that where this occurs is due to upstream congestion in the simulation model that is caused by increased traffic volumes or rail crossing closure time.

Note that this analysis does not reflect potential effects of the S. Lander Street Grade Separation project. This improvement would eliminate the closure of S. Lander Street when trains are present, and greatly reduce delays and queues associated with rail activity in the study area.

Regional Access Analysis

The primary corridors serving the downtown area are I-5 and I-90. Today during the late afternoon commute, these freeways are congested for approximately two to three hours. The

7 Sound Transit, 2013 Service Implementation Plan
[8] WSDOT, Amtrak Cascades Mid-Range and Long-Range Plans (2008 and 2006, respectively)
[9] Coal Train Traffic Impact Study, Parametrix (October 2012)

corridors are “at capacity” during the peak period today; therefore the traffic volumes served would not significantly increase during the peak period of 4:00 to 6:00 PM for No Action 2018 and 2030 conditions. As traffic demand increases by 2018 and 2030, the hours of congestion or “peak spreading” would lengthen or transit ridership may increase

Regional or freeway access to the Stadium District is constrained by signals at the terminal of the off ramps. Operations of nine arterial intersections at the I-5, I-90, and West Seattle Bridge ramp termini were reviewed for the No Action event cases. The analysis was conducted for the PM peak hour for 2018 and 2030. Under 2018 conditions during the PM peak hour with an event at the existing stadiums, the 4th Avenue S. / I-90 Off-Ramp would operate with an overall LOS F with a dual-event, but operates acceptably at LOS C under Case S1 conditions. In addition, the following off-ramp approach locations would operate at LOS E/F and include two to four intersections, depending on the number of events:

Case S1	Case S2	Case S3
• 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp • Dearborn Street / Southbound I-5 Off-Ramp • Dearborn Street / Northbound I-5 Off-Ramp	• Edgar Martinez Drive S. / I-90 Off-Ramp • 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp • Dearborn Street / I-5 SB Off • Dearborn Street / I-5 NB Off	• Edgar Martinez Drive S. / I-90 Off-Ramp • 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp • Dearborn Street / Southbound I-5 Off-Ramp • Dearborn Street / I-5 NB Off • James Street / 6th Avenue

Under 2030 conditions during the PM peak hour traffic operations near the freeway access to the Stadium District are generally similar to 2018. 4th Avenue S. / I-90 Off-Ramp in particular would operate with an overall LOS E for no event and LOS F for one event and dual event conditions, In addition, the off-ramps approaches located at the following intersections would operate at LOS E/F and include two to four of the nine intersections, depending on the number of events:

Case S1	Case S2	Case S3
• 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp	• Edgar Martinez Drive S. / I-90 Off-Ramp • 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp	• Edgar Martinez Drive S. / I-90 Off-Ramp • 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp

Impacts of the Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

As described for traffic volumes, construction impacts related to traffic operations would occur as a result of increased traffic levels. To minimize impacts to operations, a construction management plan would be developed and could include scheduling the most intensive construction activities such that they are spread out over time and prohibiting material deliveries from leaving or entering the area during AM and PM peak hours when feasible.

The following sections summarize the results of the traffic operation analysis conducted for Alternative 2. This analysis reflects the addition of traffic from a 20,000 attendee event at the Proposed Project site to study area roadways. The No Action traffic forecasts and operations analyses used in establishing the impacts of the project utilized a layering effect of event-related traffic volumes without applying any diversions in background traffic volumes. Based on a review of the non-event and event volume comparisons discussed previously in this report, this approach likely overstates the cumulative and incremental impact of the project.

Intersection Operations

LOS results for 2018 and 2030 peak hour conditions for Alternative 2 Case S1, S2, and S3 are summarized below. Figure 3.8-15 shows the projected Intersection LOS comparison of Alternative 2 for 2018; and information for 2030 is shown on Figure 3.8-16. Detailed LOS summary tables and worksheets for each of these scenarios are Attachment E-3, which is available from DPD upon request.

- The addition of Arena event trips results in a greater number of worsened LOS E/F values under 2018 and 2030 conditions.
- On a single event day, a total of 16 study intersections would operate at LOS E/F under 2018 conditions with an Arena event while a Mariners only event is forecast to have 15 intersections at LOS E/F. Under 2030 conditions with an Arena only event a total of 21 intersections are forecast to operate at LOS E/F whereas with a Mariners only event, 22 intersections are forecast to operate at LOS E/F.

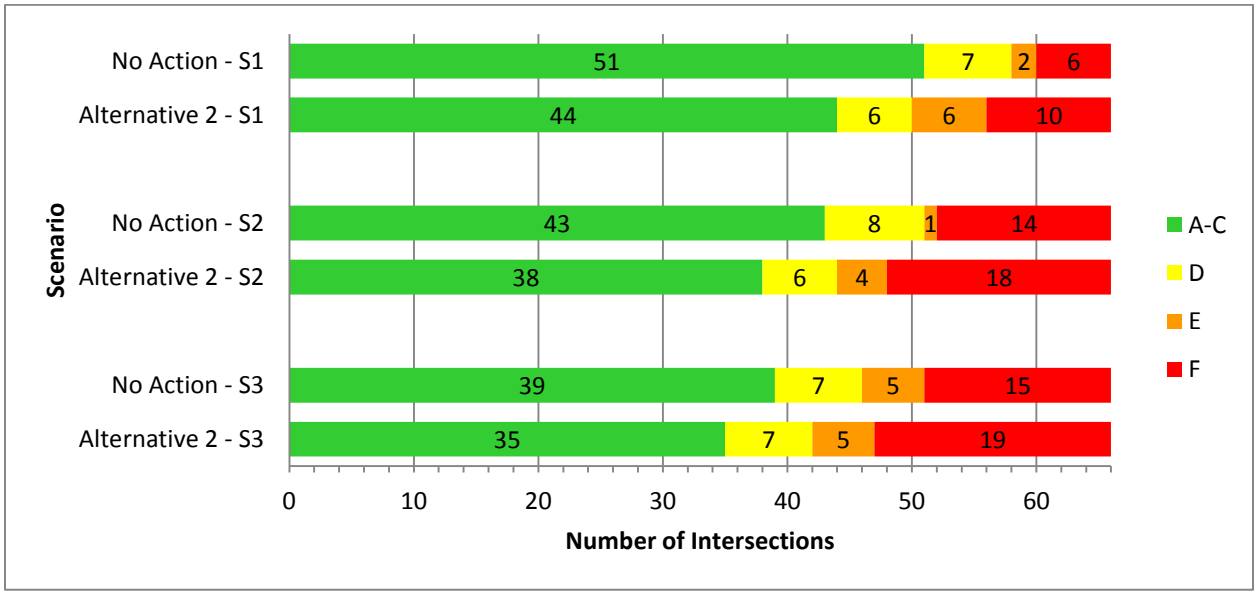


Figure 3.8-15

Stadium District 2018 Alternative 2 Intersection LOS Comparison

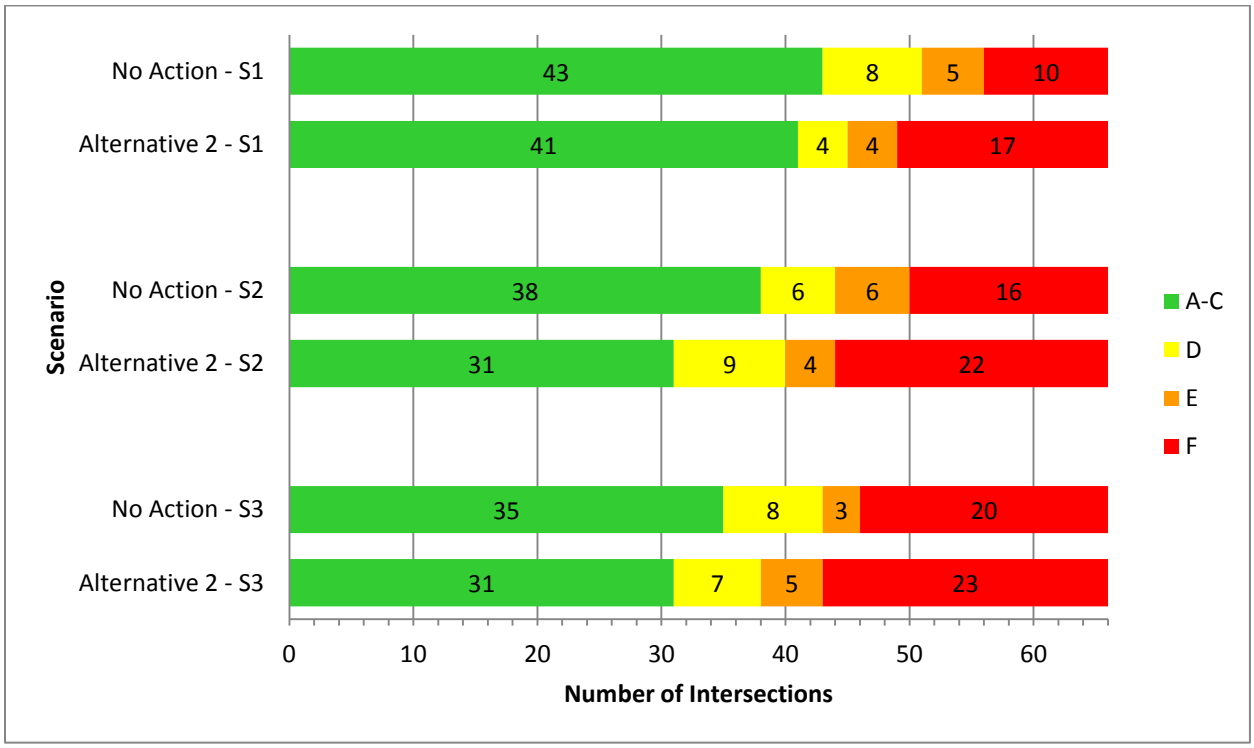


Figure 3.8-16

Stadium District 2030 Alternative 2 Intersection LOS Comparison

- With Case S2 (Arena and Mariners), in 2018, seven additional intersections would operate at LOS E/F for a total of 22 intersection with the addition of Arena traffic. By 2030, four additional intersections would operate at LOS E/F for a total of 26 intersections.

- With Case S3, in 2018, two additional intersections would operate at LOS E/F for a total of 24 intersections with Arena traffic. By 2030, two additional intersections would operate at LOS E/F for a total of 28 intersections.

Table 3.8-12 summarizes the intersections that operate at LOS E or LOS F under 2018 Alternative 2 conditions and forecast results for 2030 conditions are summarized in Table 3.8-13. Note that some intersections would only operate at LOS E or LOS F under the multiple event scenarios (Case S2 and S3).

Table 3.8-12
2018 Alternative 2 Weekday PM Peak Hour Intersections at LOS E or LOS F

Roadway	Case S1		Case S2		Case S3	
	No Action	Alt 2	No Action	Alt 2	No Action	Alt 2
4th Avenue / Madison Street	D	E	D	E	D	E
4th Avenue S. / James Street	C	D	C	D	D	E
6th Avenue / James St	C	C	D	E	E	F
1st Avenue / Yesler Way	F	F	F	F	F	F
1st Avenue S. / Main Street	D[1]	F	F	F	F	F
1st Avenue S. / S. Jackson Street	F	F	F	F	F	F
2nd Avenue S. / S. Jackson Street	D	E	F	F	F	F
2nd Avenue S. Extension / S. Jackson Street	F	F	F	F	F	F
4th Avenue S. / Seattle Boulevard S.-Airport Way S.	F	F	F	F	F	F
5th Avenue S. / Airport Way S. / S. Dearborn Street / I-90 WB Off-Ramp	D	D	D	E	E	E
4th Avenue S. / I-90 WB Off-Ramp	C	F	E	F	F	F
1st Avenue S. / S. Royal Brougham Way	C	E	F	F	F	F
Occidental Avenue S. / S. Royal Brougham Way	F	F	F	F	F	F
4th Avenue S. / S. Royal Brougham Way	C	E	E	F	F	F
1st Avenue S. / S. Atlantic Street	F	F	F	F	F	F
Occidental Avenue S. / Edgar Martinez Drive S.	D	F	F	F	F	F
West Parking Garage Access / Edgar Martinez Drive S	C	D	D	E	D	E
East Parking Garage Access / Edgar Martinez Drive S.	A	C	C	F	E	F
I-90 off-ramp / Edgar Martinez Drive S.	A	C	D	E	D	F
I-90 on-ramp / Edgar Martinez Drive S. / 4th Avenue S.	E	F	F	F	F	F
Occidental Avenue S. / S. Holgate Street	D	C[1]	F	F	F	F
4th Ave S. / S. Holgate Street	D	E	E	E	E	F
1st Ave S. / S. Lander Street	C	D	C	D	D	E
Occidental Avenue S. / S. Lander Street	E	E	F	F	F	F

1. LOS and delay improve with Alternative 2 as a result of reduced conflicts at this intersection due to the vacation of Occidental Avenue S. between S. Holgate Street and S. Massachusetts Street.

Table 3.8-13
2030 Alternative 2 Weekday PM Peak Hour Intersections at LOS E or LOS F

Roadway	Case S1		Case S2		Case S3	
	No Action	Alt 2	No action	No action	Alt 2	No action
4th Avenue / Madison Street	E	E	E	F	E	F
4th Avenue / James St	C	D	C	D	D	E
4th Avenue / James St	C	D	C	D	D	E
6th Avenue / James St	C	C	C	F	D	F
1st Avenue / Yesler Way	F	F	F	F	F	F
1st Avenue S. / Main Street	D	F	F	F	F	F
1st Avenue S. / S. Jackson Street	F	F	F	F	F	F
2nd Avenue S. / S. Jackson Street	D	F	F	F	F	F
2nd Avenue S. Extension / S. Jackson Street	F	F	F	F	F	F
4th Ave S/S Jackson St	D	D	D	E	D	E
1st Avenue S. / Railroad N Way S	C	C	C	C	D	E
4th Avenue S. / Seattle Boulevard S.-Airport Way S.	F	F	F	F	F	F
5th Avenue S. / Airport Way S. / S. Dearborn Street/ I-90 WB Off-Ramp	D	F	E	F	E	F
4th Avenue S. / I-90 WB Off-Ramp	E	F	F	F	F	F
1st Avenue S. / S. Royal Brougham Way	E	F	F	F	F	F
Occidental Avenue S. / S. Royal Brougham Way	F	F	F	F	F	F
4th Avenue S. / S. Royal Brougham Way	F	F	F	F	F	F
1st Avenue S. / S. Atlantic Street	F	F	F	F	F	F
Occidental Avenue S. / Edgar Martinez Drive S.	F	F	F	F	F	F
West Parking Garage Access / Edgar Martinez Drive S.	E	F	F	F	F	F
East Parking Garage Access / Edgar Martinez Drive S.	A	F	F	F	F	F
I-90 off-ramp / Edgar Martinez Drive S.	B	E	E	F	F	F
I-90 on-ramp / Edgar Martinez Drive S./ 4th Avenue S.	F	F	F	F	F	F
1st Ave S. / S. Holgate Street	D	E	E	F	F	F
Occidental Avenue S. / S. Holgate Street	C	B	E	F	F	F
4th Ave S. / S. Holgate Street	F	F	F	F	F	F
Occidental Avenue S. / S. Lander Street	F	F	F	F	F	F
4th Ave S. / S Lander Street	C	C	D	E	D	E
E. Marginal Way/ S. Hanford Street	E	E	E	E	E	E

Corridor Travel Times

Table 3.8-14 summarizes the calculated weekday PM peak hour travel times under 2018 conditions on the defined routes. Table 3.8-15 summarizes the calculated travel times under 2030 conditions. No Action results conditions are shown in parentheses and provided for comparison purposes.

As shown in Table 3.8-14 and Table 3.8-15:

- Travel times increase with the addition of Arena event traffic as compared to No Action conditions. In general, the direction of travel for each route that serves vehicle arrivals for the Arena event (e.g. northbound 1st Avenue S.) experiences the greatest travel time increase while the opposing direction experiences a lesser increase (e.g. southbound 1st Avenue S.).

- Travel times for all travel routes with only an Arena event are less than a No Action Case S2 (Mariners-only event condition) with the exception of 4th Avenue S. from S. King Street to S. Horton Street and S. King Street to I-90. Travel times in specific directions are calculated to see large increases with multiple concurrent events (e.g. northbound 1st Avenue S., and westbound S. Atlantic Street).

- The patterns of travel time changes resulting from an Arena event are similar between 2018 and 2030 conditions with 2030 travel times generally greater than 2018 conditions.

Table 3.8-14
2018 Alternative 2 Weekday PM Peak Hour Corridor Travel Times

Route	Extents	Direction	Case S1 (m:ss)[1]	Case S2 (m:ss)	Case S3 (m:ss)
1	1st Avenue S from Horton Street to Railroad Way	NB	11:16 (8:50)[2]	20:58 (14:44)	24:53 (17:46)
	1st Avenue S from Railroad Way to Horton Street	SB	8:29 (8:04)	9:37 (8:52)	10:56 (9:30)
2	4th Avenue S from Horton Street to King Street	NB	10:06 (8:29)	13:56 (10:48)	14:59 (11:42)
	4th Avenue S from King Street to Horton Street	SB	17:22 (12:19)	22:18 (17:18)	23:53 (18:37)
3	4th Avenue S from I-90 to King Street	NB	3:02 (2:16)	7:28 (3:53)	8:52 (4:57)
	4th Avenue S from King Street to I-90	SB	13:32 (8:24)	17:42 (12:41)	19:29 (14:12)
4	S Atlantic Street from 1st Avenue S to I-90	EB	2:08 (2:02)	2:39 (2:40)	3:01 (3:03)
	S Atlantic Street from I-90 to 1st Avenue S	WB	4:36 (2:22)	12:38 (7:54)	15:48 (10:39)

1. m:ss = minutes:seconds
2. (x) = No Action travel times provided for comparison.

Table 3.8-15
2030 Alternative 2 Weekday PM Peak Hour Corridor Travel Times

Route	Extents	Direction	Case S1 (m:ss[1])	Case S2 (m:ss)	Case S3 (m:ss)
1	1st Avenue S from Horton Street to Railroad Way	NB	15:00 (9:56)[2]	24:37 (17:10)	28:33 (20:15)
	1st Avenue S from Railroad Way to Horton Street	SB	9:17 (9:01)	10:42 (10:19)	12:04 (11:29)
2	4th Avenue S from Horton Street to King Street	NB	16:42 (13:13)	22:51 (18:07)	24:39 (19:28)
	4th Avenue S from King Street to Horton Street	SB	23:17 (17:59)	28:40 (23:18)	30:26 (24:44)
3	4th Avenue S from I-90 to King Street	NB	3:40 (2:27)	8:15 (5:27)	9:43 (6:51)
	4th Avenue S from King Street to I-90	SB	19:06 (15:11)	23:26 (19:28)	25:21 (21:12)
4	S Atlantic Street from 1st Avenue S to I-90	EB	9:36 (8:27)	11:18 (9:35)	12:01 (10:15)
	S Atlantic Street from I-90 to 1st Avenue S	WB	9:05 (3:15)	18:30 (11:37)	21:57 (14:36)

1. m:ss = minutes:seconds
2. (x) = No Action travel times provided for comparison.

Effects of Rail Crossing

Rail activity assumed in the modeling is consistent with the level of rail activity identified for the No Action alternative. The traffic volumes in VISSIM were updated to reflect the forecast traffic volumes for the Alternative 2 analysis cases.

- Rail crossing gates are activated approximately 17 to 20 minutes during the weekday PM peak hour in 2018 and 41 to 44 minutes in 2030.
- Queues generally increase with traffic growth under future conditions and/or the addition of event generated traffic. However, some are shown to decrease. Note that where this occurs is due to upstream congestion in the simulation model that is caused by increased traffic volumes or rail crossing closure time.

Regional Access Analysis

Traffic would access the new Arena in the Stadium District via I-5, I-90, SR 99, and local arterials. It is estimated up to 25 percent of the trips that would access the Arena would come from the north via I-5, 20 percent from the east via I-90, and 20 percent via I-5 from the south. The other 35 percent of the trips would access the area via local arterials and SR 99.

The following analysis was completed for conditions with 20,000 spectators under Case S1 through Case S3. For an event at the new Arena, up to an additional 1,300 vph would enter the

city via I-5 or I-90 to reach the Stadium District arena. This is a 6 to 11 percent increase in trips compared to a typical evening commute on any one of those corridors. Table 3.8-16 shows the typical traffic volumes for a weekday and the anticipated increase in traffic with the Arena, and also with the Arena combined with other events (single and dual event scenarios).

The typical weekday traffic flow values shown in Table 3.8-16 are existing volumes but represent future 2018 conditions. Traffic demand (or volume of vehicles that want to use these corridors) increase as land use changes; however, because the corridors are at or near capacity, additional traffic is not served during the peak hour of congestion. Instead "peak separating" occurs and traffic demand is served over multiple hours. Therefore, existing traffic volumes served through these areas during the peak of congestion would be similar in future years unless capacity was increased for I-5 or I-90, but the duration of congestion would increase as traffic demands increase.

Table 3.8-16 focuses on the travel directions of I-5 and I-90 that would experience the greatest increase in trips from an arena event. During the weekday PM peak hour, the majority of the trips (about 94 percent) associated with the Arena are inbound trips (heading to the Arena).

Table 3.8-16
2018 Alternative 2 Increase in Traffic on Freeway Corridors

Location	Typical Weekday PM Peak Hour Traffic (vph)	Increase in traffic with SoDo Arena (vph / % compared to typical weekday traffic)		
		Case S1	Case S2	Case S3
I-5 Southbound (through downtown CBD)	7,500 vph	550 vph / 7%	1,300 vph / 17%	1, 500 vph / 18%
I-5 Northbound (north of Spokane Street)	7,200 vph	450 vph / 6%	1,000 vph / 14%	1,150 vph / 15%
I-90 Westbound (Approaching I-5)	3,800 vph	450 vph / 11%	1,000 vph 27%	1,150 vph / 29%

The I-5 and I-90 corridors experience congestion presently during the PM peak commute, and events at the existing venues result in increased travel time approaching downtown Seattle. The PM peak travel times (on days with events in 2012) increased by up to eight minutes on southbound I-5 between NE 145th and I-90, and up to four minutes on I-90 between I-405 and Rainer Avenue S. It is anticipated with the Proposed Project traffic, PM peak travel times would increase similar to today for a typical event day only at the new Arena (Case S1).

Traffic volumes and congestion levels on the freeway systems would increase on a game day compared to a typical commute day. About 208 annual events currently occur in the Stadium District, although not all "events" impact weekday PM peak hour commute times equally. The Proposed Project is anticipated to host approximately 22 events per year with attendance in the 18,000 to 20,000 range. These events are assumed to typically be evening events. When

considering all events currently occurring, and those additional events related to the Proposed Project, approximately 40 additional days with events would occur.

Regional or freeway access to the Stadium District is constrained by signals at the terminal of the off ramps. Overall intersection and off-ramp approach operations of nine arterial intersections at the I-5, I-90, and West Seattle Bridge ramp termini were reviewed. The analysis was conducted for the weekday PM peak hour for 2018 and 2030 horizon years, under non-event and with event conditions.

By 2018, during the PM peak hour, three of the freeway terminus study intersections in the Stadium District operate at LOS F, with these representing two additional locations beyond No Action conditions. These include:

- Edgar Martinez Drive S. / I-90 Off-Ramp (Case S2 and S3)
- 4th Avenue / I-90 Off-Ramps (Cases S1, S2 and S3)
- James Street / 6th Avenue (Cases S3)

In addition, the following off-ramps would operate at LOS E or LOS F:

Case S1	Case S2	Case S3
• Edgar Martinez Drive S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp	• Edgar Martinez Drive S. / I-90 Off-Ramp • 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp • James Street / 6th Avenue	• Edgar Martinez Drive S. / I-90 Off-Ramp • 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp • James Street / 6th Avenue

LOS F conditions means the more trips are approaching the intersection than can be served. Queues would build on some approaches through the peak commute and as traffic enters the city to the Stadium District. Advance signing such as the variable message signs on the freeway and cell phone applications with information on parking availability and congestion are types of measures that could help better direct traffic to underutilized ramps.

For Alternative 2 Case S1 in 2030, up to an additional 1,200 vph would enter the city via I-5 or I-90. This is slightly less than 2018 condition as more people are assumed to use transit to access the Arena as a result of additional transit infrastructure. Increases in traffic and the affect to regional travel times on the I-5 and I-90 freeways would be similar in 2030 as experienced in 2018.

In 2030 during the PM peak hour, one additional freeway terminus intersections near the Stadium District would operate at LOS F compared to 2018 conditions, and also two additional locations beyond No Action conditions. These include:

- Edgar Martinez Drive S. / I-90 Off-Ramp (Cases S2 and S3)
- 4th Avenue / I-90 Off-Ramps (Cases S1, S2 and S3)
- Dearborn Street / I-90 Off-Ramp (Cases S1, S2 and S3)
- James Street / 6th Avenue (Case S3)

In addition, the following off-ramps would operate at LOS E or LOS F under 2030 conditions:

Case S1	Case S2	Case S3
• Edgar Martinez Drive S. / I-90 Off-Ramp • Dearborn Street / I-90 off-ramp	• Edgar Martinez Drive S. / I-90 Off-Ramp • 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp • James Street / 6th Avenue	• Edgar Martinez Drive S. / I-90 Off-Ramp • 4th Avenue S. / I-90 Off-Ramp • Dearborn Street / I-90 Off-Ramp • James Street / 6th Avenue

Post-Event Traffic Operations

Post-event traffic volumes associated with the event attendees are typically more concentrated (with respect to duration) than is observed under pre-event conditions. To better understand the relationship between weekday PM peak hour commute patterns and post-event related traffic volumes, traffic counts were conducted at intersections along S. Atlantic Street and S. Holgate Street on Monday December 2, 2013 before and after a Monday Night Football game. While actual volumes varied depending on the location, all observed peak 15-minute post-event traffic volumes were less than traffic volumes observed during 15-minute PM commute peak period intervals, and at most observed locations approximately one-half of the PM commute peak period. Post-event traffic counts for a Mariners game[10] indicate that the peak 15 minutes near the end of an event can range between 30 to 40 percent of the total hourly flow that includes this peak with traffic volumes greatest travelling away from the venue.

[10] April 11, 2013

The evaluation of event attendees departing the Arena site was consistent with the methodologies previously discussed (i.e. travel mode choice, increased rail crossing activity, etc.) but with additional assumptions. Non-event traffic volumes for the weekday post-event time period (approximately 9:15-10:15 p.m.) within the vicinity of the project site were forecast by growing existing (2013) non-event traffic volumes consistent with forecast weekday PM commute hour traffic volumes and adding anticipated late evening Port of Seattle truck traffic. Event traffic was then generated assuming that all but 5 percent of vehicles parked by event attendees would attempt to depart within a one hour period near the end of an event.[11] A Traffic Control Plan (TCP) was also assumed to be in place to divert event traffic away from the event site, consistent with the 2013 Safeco Field TCP.

Traffic operations were evaluated for 2030 Alternative 1 Case 1 (No Action, No Event), Alternative 2 Case S1 (with Arena event only), and Alternative 2 Case S3 (triple event). Forecast (2030) traffic volumes and resulting intersection LOS values are shown in Appendix E.

The Arena site vicinity intersections are forecast to operate at LOS C or better without an event under 2030 post-event period conditions. Intersections along S Atlantic Street are anticipated to operate at LOS F under post-event conditions with either one or more events. The 4th Avenue S./S. Holgate Street intersection would also operate at LOS F under post-event conditions under the triple event scenario (Alternative 2 Case S3). The remaining intersections within the arena vicinity are anticipated to operate at LOS C or better during post-event conditions; however, calculated delays at S. Holgate Street intersections are likely underestimated since LOS methodologies do not directly reflect the impacts of the S. Holgate rail crossing closure during post-event conditions and since traffic volumes were assumed to divert from S. Holgate Street to alternative travel routes due to rail crossing activity.

As a result of this surge, all Stadium District professional sporting events implement a Traffic Control Plan (TCP) to aid in the dispersion of event attendees to the transportation network. A TCP helps to manage traffic associated with outbound event attendees. Because of forecast increases to rail crossing activity and related increased time that S. Holgate Street is blocked, a sensitivity analysis was completed assuming that S. Holgate Street was blocked for an entire one-hour period under weekday post-event conditions. Traffic volumes increase greatest along S. Atlantic Street where the nearest grade separated rail crossing is provided. It was assumed that traffic would divert from S. Holgate Street similar to current TCP strategies. As a result, delays increase at these intersections already operating at LOS F without full-closure of S. Holgate Street under post-event conditions. In contrast, operations at the 4th Avenue S./S. Holgate Street intersection improves to LOS C due to the decreased traffic volumes travelling on S. Holgate Street through this intersection.

[11] Existing peak hour factors (PHFs) were applied in the analysis of Alternative 1 2030 conditions with Case S1 PHFs based on traffic counts in December 2013 without an event and non-event PHFs based on the December 2, 1013 Monday Night Football game.

In addition to the traffic operations impacts outlined above, the increase in the number of event days in the Stadium District and the resulting increases in event traffic volumes related to the Arena would have an impact on emergency vehicle access and circulation to the Stadium District site as well as through the area.

Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

As described for traffic volumes, construction impacts related to traffic operations would occur as a result of increased traffic levels. To minimize impacts to operations, a construction management plan would be developed and could include scheduling the most intensive construction activities such that they are spread out over time and prohibiting material deliveries from leaving or entering the area during AM and PM peak hours when feasible.

Alternative 3 includes the development of an 18,000-person capacity arena on the same site evaluated for Alternative 2. As noted in the traffic volumes section, when considering the mode splits associated with event attendees, the difference between an event with 20,000 and 18,000 attendees equates to approximately 200 vph during the weekday PM peak hour. Given the distribution of traffic to the area, this difference in overall activity would not likely be discernible by the average motorist and would be within the daily fluctuations in the background traffic. Traffic operations measures reported for Alternative 2 are expected to be slightly worse than would occur under Alternative 3, but identified impacts are anticipated to be similar.

3.8.2.7 Freight and Goods Movement

This section describes the existing, No Action, and future impacts associated with the development alternatives on the movement of freight and goods within the SoDo area.

Methodology

The impacts of the alternatives on freight and goods movements are evaluated based on the overall truck volumes, existing and future transportation facilities, and future increases and changes in traffic volumes. This analysis examines the impacts the additional traffic associated with the alternatives have on intersection and arterial performance. Technical data presented in this section is consistent with data presented in the traffic operations section of this report.

Affected Environment

Transportation Network

The transportation network includes designated truck routes, and Port of Seattle terminal facilities, and rail yards and lines.

Truck Routes: The Major Truck Route designation guides the roadway design as well as traffic management. Local and federal agencies have identified several roadway routes as Seaport Highway Connectors and Intermodal Connectors that provide access between Port facilities and

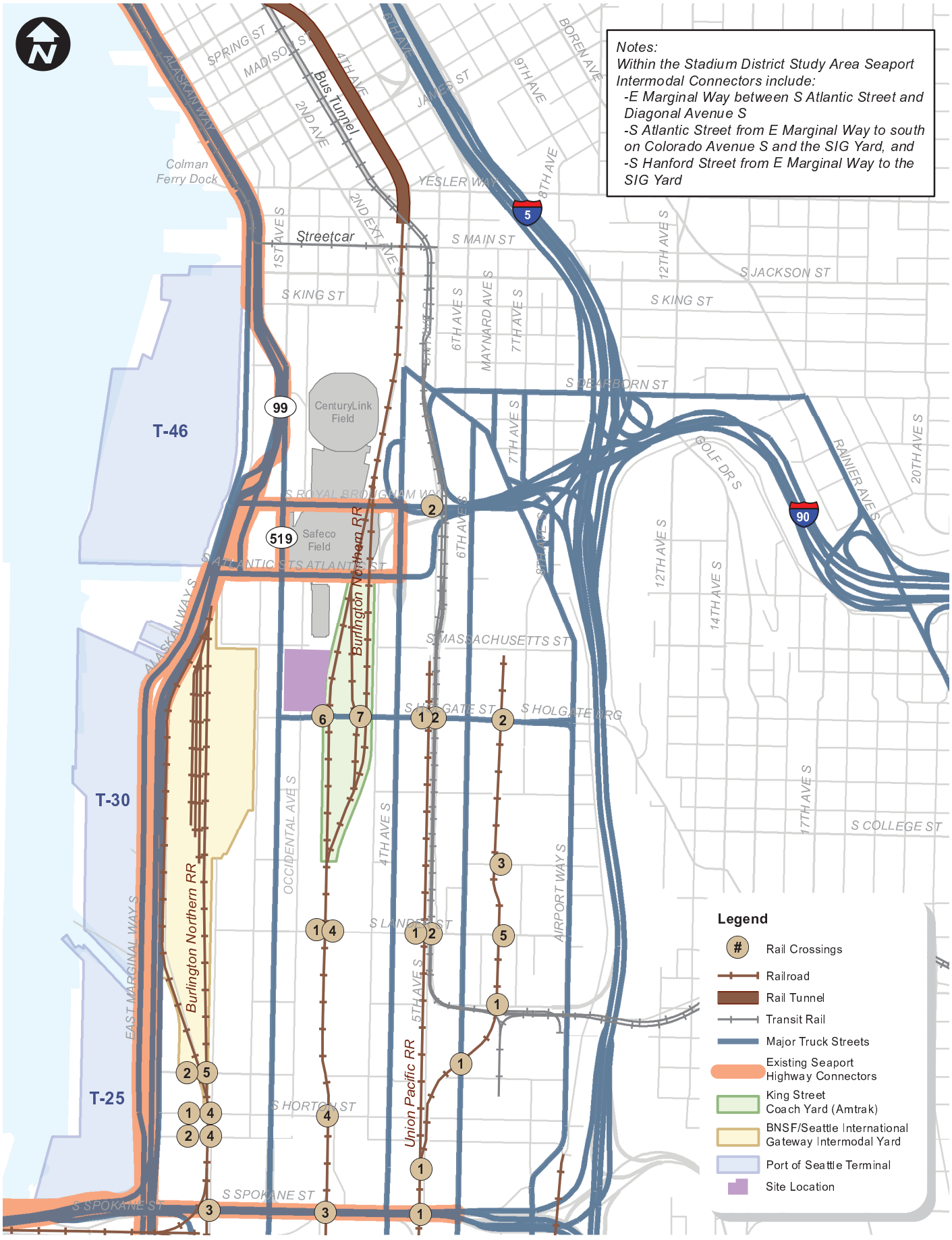
the regional highway system. As shown on Figure 3.8-17, several study area roadways are designated as both a Major Truck Route and a Seaport Highway Connector including E. Marginal Way S., SR 99, the West Seattle Bridge, S. Atlantic Street, and S. Royal Brougham Way. In addition, 1st Avenue S., 4th Avenue S., 6th Avenue S., Airport Way S., S. Dearborn Street, S. Holgate Street, and S. Spokane Street, including the Viaduct and Swing Bridge, are designated as Major Truck Routes.

Port of Seattle Terminals: The Port of Seattle operates four major container terminals (see Figure 3.8-17) located just south of downtown Seattle: Terminal 5 in West Seattle, Terminal 18 on Harbor Island, and Terminals 25/30 and 46 along East Marginal Way S. These terminals facilitate the transfer of import and export cargo containers between ships and land transportation modes such as railcars or trucks. Terminals 5 and 18 support drayage and intermodal transfers as well as have on-dock rail capability, where containers to a common destination can be loaded directly onto a train at the terminal.

Rail Facilities: Within the study area there are three primary freight rail facilities:

- The BNSF mainline railroad tracks
- The BNSF Seattle International Gateway (SIG Yard)
- The Amtrak Pacific Northwest Headquarters and King Street Coach Yard maintenance facility

These facilities and the existing at-grade crossings are shown on Figure 3.8-17. In addition to these facilities, the Union Pacific's (UP) Argo Yard located south of S. Spokane Street provides intermodal service to Port of Seattle terminals, but is located outside of the immediate study area.



Stadium District Rail and Freight Facilities

Seattle Arena

FIGURE
3.8-17

transpoGROUP

BNSF Tracks: The BNSF mainline runs north-south through the SoDo neighborhood providing rail service between Portland, Seattle, and Vancouver B.C. Within the study area, the mainline runs between 1st Avenue S. and 4th Avenue S. from the Great Northern Tunnel near the 4th Avenue S. / S. Washington Street intersection to south of Spokane Street. Several small spur tracks along the mainline serve adjacent businesses. UP operates a spur track that runs along the west side of 5th Avenue S. / SoDo Busway beginning near S. Massachusetts Street and extending south of the West Seattle Bridge. Smaller spur tracks extend further east across 4th Avenue S. and north along 5th Avenue S. to S. Massachusetts Street. These spur lines allow freight train access to the intermodal facilities, industrial uses in the area, and the Port of Seattle facilities.

SIG Yard: The SIG Yard is divided into two facilities, the North SIG Yard, which is accessed by trucks from S. Massachusetts Street at Colorado Avenue, and Main SIG, which is accessed by trucks from S. Hanford Street east of E. Marginal Way. There is no internal truck connection between these two yards. Containers destined to or originating from locations beyond the Pacific Northwest generally make their overland trip by train. This cargo, known as "intermodal," is either loaded on a train on T-5 or T-18 or is trucked between the marine terminal and the near-dock rail yards. All intermodal cargo on the east waterway (Terminals 30 and 46) travels by truck.

The lead and tail tracks that connect to the SIG Yard extend along the east side of SR 99 from south of S. Spokane Street through the yard and north, crossing over Alaskan Way to the west side of Alaskan Way, adjacent to Terminal 46. These tracks support both arriving and departing trains as well as train building, in which segments of a train are put together (or taken apart).

This activity can block street crossings of the lead or tail tracks for long periods of time. A new S. Atlantic Street Overcrossing was opened in January 2014 that provides a grade-separated overpass for vehicles to bypass blockages of surface S. Atlantic Street. Existing conditions were evaluated for 2013 conditions and do not reflect this recent improvement; it is included in the evaluation of future conditions. Train arrivals, departures, and train building activities will continue to block the at-grade crossings located south of the SIG Yard at S. Hanford, Horton, Hinds and Spokane Streets.

Amtrak Maintenance Facility: Amtrak's King Street Coach Yard including the Pacific Northwest headquarters and maintenance facility is located adjacent to the proposed site of Alternatives 2 and 3. The rail yard extends south from Edgar Martinez Drive S. to south of S. Walker Street, east to 3rd Avenue S., and across the rail spur line that serves the King Street Coach Yard. The site currently includes as many as 14 sets of active rail lines. The rail yard serves many functions including locomotive and passenger car maintenance, train washing, and staging / parking as well as significant employee and equipment movement across Holgate Street to the north and south portions of the yard. Along S. Holgate Street a total of 13 rail crossing exist with 9 being active crossings.

Traffic Volumes

Traffic counts throughout the SoDo study area generally show trucks dispersed among multiple streets during the weekday PM peak hour. Truck volumes on major arterial truck routes (i.e. S. Atlantic Street, 4th Avenue S., S. Spokane Street) tend to be greater than on local streets as many trucks access the regional freeway via their arterial connections. Roadways in the immediate vicinity of the project site that accommodate local and regional trucks include S. Atlantic Street, S. Holgate Street, 1st Avenue S., and S. Holgate Street. Truck percentages along these routes range from two to seven percent with the highest percentage of traffic along southbound 4th Avenue S. and the highest PM peak hour truck volumes along 1st Avenue S. based on existing traffic counts. As discussed later in this section, truck volumes can vary day-to-day and month-to-month based on activity at the Port of Seattle terminals.

A detailed summary of BNSF mainline rail traffic, including existing rail traffic observations, within the SoDo neighborhood was completed in October 2012 and was presented within the *Coal Traffic Impact Study* (Parametrix). Additional information was collected over a seven-day period in December 2013. Within SoDo, an average of 88 rail movements were observed per day at the BNSF mainline and train maintenance spur track at-grade rail crossings with trains travelling at average speeds of approximately six to eight mph. On average, the rail activity at the BNSF mainline rail crossings at S. Holgate Street, S. Lander Street, and S. Horton Street blocked each roadway an average of 2.5 minutes per closure. This equates to a total daily closure of 3.8 hours over a 24-hour period.

Truck and rail traffic generated by the Port varies by season and day-to-day. The peak season for import cargo usually occurs beginning in September and peaking in October. During these periods, the potential for having multiple ships in port simultaneously exists. Export cargo peaks are typically associated with agricultural exports from Eastern Washington with a peak season that lasts from mid-summer through late fall. Truck volumes fluctuate on a daily basis according to ship arrivals at the terminals and the sizes of those ships, or as a result of multiple ships in port.

Under normal operations, most of the truck trip activity occurs during the daytime operating hours between 7:30 AM and 5:00 PM However, extended gate operations, either nighttime or early morning operations, can occur for larger ships if a ship is late in arriving due to inclement weather, or for large volumes of cargo dedicated to a few customers.

Truck traffic to and from Port of Seattle facilities within the SoDo study area is driven by the number of container units handled by the local terminals. A total of 7,230 one-way daily truck trips were generated on average per day by the Port of Seattle terminals based on available data from 2010 when 2.1 million TEUs were processed. In 2012, total tonnage was a little over 10 percent less than processed in 2010, to 1.87 million TEUs in 2012. Proportionally scaling 2010 truck volumes results in an estimate of 6,440 daily truck trips for 2012 conditions and data provided by the Port of Seattle suggest a total of 7,300 daily truck trips were generated.

Traffic Operations

Potential traffic operations impacts to the movement of freight and goods within the SoDo study area were evaluated based on intersection and corridor operations, and potential rail crossing impacts in the vicinity of the Proposed Project (Alternative 2).

Near the Proposed Project site, operations at the four intersections shown in Table 3.8-17 are highly utilized by truck traffic and are shown along with their overall intersection LOS and average delay for all vehicle types. Specific details regarding the LOS methodology are summarized in the Traffic Operations section.

Table 3.8-17
Stadium District Existing Weekday PM Peak Hour Intersection Operations at Key Freight Intersections

Intersection	Non-Event LOS / delay	With-Event[1] LOS / delay
1st Avenue S. / S. Atlantic Street	D / 34	C / 26
4th Avenue S. / Edgar Martinez Drive S.	C / 26	B / 18
1st Avenue S. / S. Holgate Street	B / 17	B / 15
4th Avenue S. / S. Holgate Street	C / 26	C / 24

1. Reflects counts taken for a Sounders FC game with attendance = 38,500

As shown in Table 3.8-17, all intersections are calculated to operate at LOS D or better under existing non-event and with-event conditions. The LOS reported represents an average delay for the intersection; some movements will operate at a lower level than reported for the overall average. Also, with the high concentrations of pedestrians during events, the analytical tools employed may not fully reflect the level of pedestrian impacts to intersection performance and additional delay may be incurred for right-turning vehicles. Depending on the specific event and attendance, 1st Avenue S. / S. Atlantic Street and 4th Avenue S. / Edgar Martinez Drive S. would experience high levels of pedestrian demands that could contribute to delays in excess of those reported. In addition, general reductions in traffic volumes in the area associated with pre-event conditions may relate to non-event traffic avoiding travel during known event days.

Three corridors within the SoDo study area are heavily utilized by freight truck traffic: S. Atlantic Street – Edgar Martinez Drive S., 1st Avenue S., and 4th Avenue S. Existing travel times along these corridors are summarized in Table 3.8-18 and specific details regarding the corridor performance methodology are summarized in the Traffic Operations section.

Table 3.8-18
Existing Weekday PM Peak Hour Travel Times Non-Event & With-Event Conditions on Key Freight Corridors

Extents	Direction	Non-Event (m:ss[1])	With-Event[2] (m:ss)
1st Avenue S. from Railroad Way S. to S. Horton Street	NB	6:16	6:31
1st Avenue S. from S. Horton Street to Railroad Way S.	SB	6:49	6:50
4th Avenue S. from S. King Street to S Horton Street	NB	6:20	6:54
4th Avenue S. from S Horton Street to S. King Street	SB	6:54	6:57
S. Atlantic Street from 1st Avenue S. to I-90	EB	1:39	1:24
S. Atlantic Street from I-90 to 1st Avenue S.	WB	1:23	1:18

1. m:ss = minutes:seconds
2. Reflects counts taken for a Sounders FC game with attendance = 38,500

As shown in Table 3.8-18, travel times generally increase along the four routes with the addition of traffic from an event. It is noted that the level of change in travel time may not be intuitive as it related to an event with an approximate attendance of 38,500 people. A number of factors appear to contribute to these conditions:

- The observed event was Sounders FC soccer game and while no specific data relative to mode split or net vehicle demands is available, anecdotal evidence suggests a higher reliance on non-auto travel than occurs in relation to other Stadium District events of similar attendance.
- Repeated traffic counts for other events in the area also suggest minimal local street system impacts during weekday PM peak hour conditions.
- Local businesses and downtown motorists who are aware of a pending event adjust their travel behavior, either by time or mode, to avoid being caught in event-related congestion. Depending on the size of event, the adjusted background traffic appears to partially, if not substantially offset the added weekday PM peak hour traffic due to the event.

There are at-grade rail crossings throughout SoDo and the Duwamish area impacting arterial operations along S. Holgate Street and S. Lander Street with related secondary impacts to the 1st Avenue S. and 4th Avenue S. corridors. Vehicular queues from rail crossings along S. Holgate and S. Lander Streets between 1st and 4th Avenues S. often extend into 1st and 4th Avenues S. This issue along 1st and 4th Avenues S. is further compounded with through traffic being obstructed (or blocked) by the rail crossing queues, resulting in even longer queues and more congestion. Because of this, the effects of the rail crossings on S. Holgate Street and S. Lander Street on 1st Avenue S. and 4th Avenue S. were assessed using the VISSIM model. Existing rail crossing impacts using queue lengths on the adjacent arterials are summarized in Table 3.8-19 and described in further detail in the Traffic Operations section.

Table 3.8-19
S. Holgate Street and S. Lander Street Rail Crossing Summary – Existing PM Peak Hour

	Scenario	Arterial Direction	Maximum Arterial Queue Length[1]
S. Holgate Street Crossing	Weekday PM Peak Hour Non-Event	NB[2] 1st Ave S.	420 ft
		SB 1st Ave S.	350 ft
		NB 4th Ave S.	310 ft
		SB 4th Ave S.	390 ft
	Weekday PM Peak Hour With-Event[3]	NB 1st Ave S.	270 ft
		SB 1st Ave S.	330 ft
		NB 4th Ave S.	380 ft
		SB 4th Ave S.	890 ft
S. Lander Street Crossing	Weekday PM Peak Hour Non-Event	NB 1st Ave S.	310 ft
		SB 1st Ave S.	430 ft
		NB 4th Ave S.	300 ft
		SB 4th Ave S.	400 ft
	Weekday PM Peak Hour With-Event	NB 1st Ave S.	620 ft
		SB 1st Ave S.	510 ft
		NB 4th Ave S.	300 ft
		SB 4th Ave S.	690 ft

1. The reported maximum queue length is an average of the maximum queue lengths recorded across 10 simulation runs and represents the greater of a turning movement towards the rail crossing or the throughout movement along the corridor. Queue lengths are rounded up to the nearest 10 feet and reflect an average gate down time of approximately 8.5 minutes.
2. NB = northbound, SB = southbound
3. Sounders FC game with attendance = 38,500

As shown in Table 3.8-19, rail crossing gates are activated approximately 8.5 minutes during the weekday PM peak hour:

- Queue lengths along 1st Avenue S. and 4th Avenue S. typically increase with the occurrence of the Sounders FC game

The northbound 1st Avenue S. queue at S. Holgate Street is shown to decrease and occurs as a result of increased upstream northbound congestion at 1st Avenue S. / S. Lander Street. When considered in the context of modest changes in LOS and travel times due to the same event, it illustrates the significance of gate closure on traffic operations.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Forecast conditions under the No Action alternative for freight and goods movement within the SoDo study are described in the following sections.

Transportation Network

Several planned projects were identified that may alter truck travel routes within the study area as summarized in the Street System section.

Traffic Volumes

Within the SoDo study area general freight movement volumes are anticipated to increase similarly to background conditions with the exception of Port of Seattle traffic that is directly linked to the number of container units processed. In general, the proportion of truck traffic along study area roadways were assumed equal to existing conditions with adjustments made to reflect forecast increases in Port of Seattle handling and the addition of event related vehicular trips that primarily consist of passenger car travel.

Under future conditions Port of Seattle terminals within the SoDo neighborhood will operate similarly to existing conditions but with an increased amount of processed cargo. The Port of Seattle anticipates increasing the number of shipping containers it processes to 3.5 million TEUs by 2030, which exceeds recent growth trends. The Port of Seattle has indicated that this increase will result in the need to expand the Port's operating hours beyond the typical operating hours of 7:30 AM and 5:00 PM currently in place today such that approximately 20 percent of the container volume is processed between 6:00 and 11:00 PM. For analyses of 2018 conditions, 2.41 million TEUs were forecast for Port of Seattle activity by interpolating between 2012 and 2030 processing rates. Overall growth in container processing is estimated at 29 percent by 2018 and 87 percent by 2030 based on Port of Seattle estimates, when compared with 2012 levels.

As a result of this increased activity, truck trips to and from Port of Seattle facilities would also increase. As previously described, a total of 7,300 one-way daily truck trips were generated on average per day by the Port of Seattle terminals in 2012. Information provided by the Port of Seattle indicates that Port facilities could generate up to 13,700 one-way daily truck trips by 2030. Anticipated changes to both freight and passenger rail activity within the study area are summarized in Table 3.8-20.

Note that the changes shown for passenger rail activity do not reflect the total number of rail crossings under existing and future conditions. The forecast passenger rail crossings reflect increases in scheduled train activity for which fares are paid. The proportionate increases in scheduled activity were also applied to passenger train switching activity. Freight rail crossings are forecast to increase consistent with increases in forecast Port of Seattle activity with forecast increases in coal train activity added. Analysis of rail activity is based on observed scheduled and unscheduled activity and was proportionally increased based on forecast increase in activity.

Table 3.8-20
Anticipated Future Changes to Daily Rail Activity

Operator	2013	2018	2030
SoundTransit[1]	20 scheduled train crossings	26 scheduled train crossings (+30 percent from 2013)	26 scheduled train crossings *estimated[2] (+30 percent from 2013)
Amtrak Cascades[2]	10 scheduled crossings	16 scheduled train crossings (+60 percent from 2013)	26 scheduled train crossings (+160 percent from 2013)
Freight Rail	70 train crossings[5]	100 train crossings *estimated[6] (+43 percent from 2013)	149 train crossings *estimated[6] (+113 percent from 2013)

1. Current Sound Transit schedule (April 2013) and *2013 Service Implementation Plan* (Sound Transit, December 2012).
2. 2030 Sound Transit train crossings were assumed to increase similarly from 2018 to 2030 as from 2013 to 2018, resulting in two addition crossings.
3. Current Amtrak schedule, *Amtrak Cascades Mid-Range Plan* (WSDOT, December 2008), and *Long Range Plan for Amtrak Cascades* (WSDOT, February 2006).
4. Includes coal train activity.
5. Existing freight rail includes all observed freight rail activity including existing coal train activity.

Future freight rail accounts for general freight rail activity increases consistent with forecast Port of Seattle container processing and forecast increases in coal train activity

Traffic Operations

Intersection operations at the four intersections highly utilized by truck traffic near the Proposed Project site are shown in Table 3.8-21 for 2018 and 2030 conditions. Results shown are consistent with the analysis presented in the Traffic Operations section. Existing operations are also included for comparison.

As shown in Table 3.8-21, the 1st Avenue S. / S. Atlantic Street intersection is anticipated to operate at LOS F under 2018 non-event conditions. This doubling of delay is a result of general growth as well as the effects of shifted traffic due to the completion of the Alaskan Way Viaduct South Portal improvements and diversion of traffic from S. Holgate Street and S. Lander Street due to increased rail closure activity. Under Case S2 or S3 overall intersection operations are calculated to further worsen and remain at LOS F with the addition of event traffic. In addition, the 4th Avenue S. / Edgar Martinez Drive S. intersection is forecast to operate at LOS E under Case S1 and LOS F under both Case S2 and Case S3. The 4th Avenue S. / S. Holgate Street intersection is anticipated to worsen to LOS E under Case S3. 1st Avenue S. / S. Holgate Street is anticipated to remain at LOS D or better under all 2018 No Action conditions.

Under 2030 conditions, all four intersections would operate at LOS E or LOS F for all event scenarios with the exception of 1st Avenue S. / S. Holgate Street which would operate at LOS D under no event (Case S1) conditions.

Table 3.8-21
Stadium District Weekday AM Peak Hour No Action Intersection Operations at Key Freight Intersections

	Intersection	Case S1 LOS / delay	Case S2 LOS / delay	Case S3 LOS / delay
2018	1st Avenue S. / S. Atlantic Street	F / 89 (D / 34)[1]	F / >180	F / >180
	4th Avenue S. / Edgar Martinez Drive S.	E / 73 (C / 26)	F / 89	F / 105
	1st Avenue S. / S. Holgate Street	C / 30 (B / 17)	D / 38	D / 42
	4th Avenue S. / S. Holgate Street	D / 42 (C / 26)	D / 55	E / 59
2030	1st Avenue S. / S. Atlantic Street	F / >180	F / >180	F / >180
	4th Avenue S. / Edgar Martinez Drive S.	F / >180	F / >180	F / >180
	1st Avenue S. / S. Holgate Street	D / 52	E / 78	F / 91
	4th Avenue S. / S. Holgate Street	F / 104	F / 162	F / 170

1. (x) - Existing condition non-event operations provided for comparison.

It is noted that all future estimates of event traffic volumes are simply additive to No Action conditions. While existing counts and analysis show modest impacts to traffic volumes and operations on event days, this additive approach likely overestimates future traffic and congestion related to events. However, it does provide a consistent basis for comparing alternatives. There is no reliable way to assess the amount of diverted non-event traffic likely to occur for any given event.

Table 3.8-22 summarizes the calculated weekday PM peak hour travel times along the key corridors utilized for freight and goods movement under 2018 conditions on the defined routes. Table 3.8-23 summarizes the calculated travel times under 2030 conditions. No Action results conditions are shown in parentheses and provided for comparison purposes.

Table 3.8-22
Stadium District 2018 No Action Weekday PM Peak Hour Freight Corridor Travel Times

Extents	Direction	Case S1 (m:ss[1])	Case S2 (m:ss)	Case S3 (m:ss)
1st Avenue S from Horton Street to Railroad Way	NB	8:50 (6:16)[2]	14:44	17:46
1st Avenue S from Railroad Way to Horton Street	SB	8:04 (6:49)	8:52	9:30
4th Avenue S from Horton Street to King Street	NB	8:29 (6:20)	10:48	11:42
4th Avenue S from King Street to Horton Street	SB	12:19 (6:54)	17:18	18:37
S Atlantic Street from 1st Avenue S to I-90	EB	2:02 (1:39)	2:40	3:03
S Atlantic Street from I-90 to 1st Avenue S	WB	2:22 (1:23)	7:54	10:39

1. m:ss = minutes:seconds
2. (x) - Existing travel times provided for comparison.

As shown in Table 3.8-22:

- Travel times for freight corridors under 2018 conditions would increase by as much as approximately 11 minutes to 12 minutes, depending on route, travel direction, and event case.
- Freight corridor travel times along 1st Avenue S. and 4th Avenue S. under 2018 conditions are forecasted to exceed 10 minutes with Case S1 and S2 traffic, and exceed 15 minutes for northbound 1st Avenue S. and southbound 4th Avenue S. with Case S3 traffic.
- Eastbound freight corridor travel times along S. Atlantic Street are expected to increase but less so than other routes. This direction of travel is opposite the inbound event flows, minimizing the increase in travel times. S. Atlantic Street is also subject to TCPs at Occidental Avenue S. and the Safeco Field parking garage. Event traffic control could increase S. Atlantic Street travel times beyond what is reported.

As described earlier, the actual impact due to event traffic is likely to be less than reflected herein since no assumed diversion or reduction in non-event traffic is assumed.

Table 3.8-23
Stadium District 2030 No Action Weekday PM Peak Hour Freight Corridor Travel Times

Extents	Direction	Case S1 (m:ss[1])	Case S2 (m:ss)	Case S3 (m:ss)
1st Avenue S from Horton Street to Railroad Way	NB	9:56 (6:16)[2]	17:10	20:15
1st Avenue S from Railroad Way to Horton Street	SB	9:01 (6:49)	10:19	11:29
4th Avenue S from Horton Street to King Street	NB	13:13 (6:20)	18:07	19:28
4th Avenue S from King Street to Horton Street	SB	17:59 (6:54)	23:18	24:44
S Atlantic Street from 1st Avenue S to I-90	EB	8:27 (1:39)	9:35	10:15
S Atlantic Street from I-90 to 1st Avenue S	WB	3:15 (1:23)	11:37	14:36

1. m:ss = minutes:seconds
2. (x) - Existing non-event travel times provided for comparison.

As shown in Table 3.8-23:

- Under 2030 conditions freight corridor travel times are generally similar but worse than 2018 conditions. Increases range from approximately 2 minutes to 18 minutes when compared to existing conditions.

- Travel time changes result from small changes in forecast volumes at some study intersections and additional diversion from congested freeways as forecast in the Alaskan Way Viaduct Replacement study.

As described earlier, the actual impact due to event traffic is likely to be less than reflected herein since no assumed diversion or reduction in non-event traffic is assumed.

Rail activity assumed for future conditions was increased beyond existing conditions for both passenger and freight rail activity. Additional details are provided in the Traffic Operations section. Total crossing gate arm down times and queue lengths along 1st Avenue S. and 4th Avenues S. are summarized in Table 3.8-24. Maximum queue lengths are reported along 1st and 4th Avenues S. because rail crossing impacts along S. Holgate and S. Lander Streets cause queues to extend into the 1st and 4th Avenues S. intersections.

Table 3.8-24
No Action S. Holgate Street and S. Lander Street Rail Crossing Impact Summary

	Scenario	Gate Down Time (m:ss)[1]	Arterial Direction	Maximum Arterial Queue Length[2]		
				Existing[3]	2018	2030
S. Holgate Street Crossing	Weekday PM Peak Hour Case S1	Existing = 8:30 2018 = 20:30 2030 = 41:45	NB[4] 1st Ave S.	420	640	960
			SB 1st Ave S.	350	380	1,280
			NB 4th Ave S.	310	550	370
			SB 4th Ave S.	390	1,520	3,400
	Weekday PM Peak Hour Case S2	2018 = 20:30 2030 = 41:45	NB 1st Ave S.	420	1,300	1,120
			SB 1st Ave S.	350	440	900
			NB 4th Ave S.	310	620	950
			SB 4th Ave S.	390	1,640	1,710
	Weekday PM Peak Hour Case S3	2018 = 20:30 2030 = 41:45	NB 1st Ave S.	420	1,450	1,320
			SB 1st Ave S.	350	450	1,120
			NB 4th Ave S.	310	630	1,070
			SB 4th Ave S.	390	1,620	1,100
S. Lander Street Crossing	Weekday PM Peak Hour Case S1	Existing = 8:30 2018 = 17:30 2030 = 44:00	NB 1st Ave S.	310	460	1,150
			SB 1st Ave S.	430	540	510
			NB 4th Ave S.	300	370	330
			SB 4th Ave S.	460	670	1,190
	Weekday PM Peak Hour Case S2	2018 = 17:30 2030 = 44:00	NB 1st Ave S.	310	870	550
			SB 1st Ave S.	430	580	700
			NB 4th Ave S.	300	420	470
			SB 4th Ave S.	460	740	490
	Weekday PM Peak Hour Case S3	2018 = 17:30 2030 = 44:00	NB 1st Ave S.	310	720	730
			SB 1st Ave S.	430	570	740
			NB 4th Ave S.	300	430	470
			SB 4th Ave S.	460	650	510

1. Gate down times reported are approximate and may range +/- 1 minutes. Variance due to multiple seeds and VISSIM modeling methodology.
2. The reported maximum queue length is an average of the maximum queue lengths recorded across 10 simulation runs and represents the greater of a turning movement towards the rail crossing or the throughout movement along the corridor. Queue lengths are rounded up to the nearest 10 feet.
3. Representative of non-event case
4. NB = northbound, SB = southbound

As shown in Table 3.8-24:

- Rail crossing gates are activated approximately 17 to 20 minutes during the weekday PM peak hour in 2018 and 41 to 44 minutes in 2030.
- Queues generally increase with traffic growth under future conditions and/or the addition of event generated traffic. However, some are shown to decrease. Note that where this occurs is due to upstream congestion in the simulation model that is caused by increased traffic volumes or rail crossing closure time.

Impacts of the Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

Major truck routes surrounding the site could be intermittently impacted by construction. A construction management plan would be developed to minimize any street closures or other impacts as a result of the Seattle Arena construction. This management plan would include use of manual flaggers and signs to help vehicle circulation. In addition, key stakeholders would be notified of any major roadway closures.

Forecast conditions for freight and goods movement within the SoDo study with a 20,000 attendee event at the Proposed Project site are described in the following sections.

Transportation Network

With the construction of the proposed Arena, the only change to the existing freight system assumed in the analysis is the vacation of Occidental Avenue S. between S. Massachusetts Street and S. Holgate Street. This change does not impact any of the major freight routes within the study area but would in divert local truck deliveries for businesses along Occidental Avenue S. north of S. Massachusetts Street and along S. Massachusetts Street east of 1st Avenue S.

Traffic Volumes

With the addition of event traffic to SoDo study area roadways, truck and rail traffic volumes would not be directly impacted except for local truck patterns impacted by the vacation of Occidental Avenue S. Truck and rail volumes would generally remain the same as No Action conditions for purposes of assessing the alternative generated impacts. Some degree of "event traffic avoidance" may occur similar to existing conditions.

Traffic Operations

Intersection operations at the four intersections highly utilized by truck traffic near the Proposed Project site are shown in Table 3.8-25 for 2018 and 2030 conditions.

As shown in Table 3.8-25, all intersections are anticipated to operate at LOS E or LOS F with the addition of Arena traffic to 2018 conditions under any analysis case with the exception of 1st Avenue S. / S. Holgate Street

Table 3.8-25
Stadium District Alternative 2 Weekday PM Peak Hour Intersection Operations at Key Freight Intersections

	Intersection	Case S1 LOS / delay	Case S2 LOS / delay	Case S3 LOS / delay
2018	1st Avenue S. / S. Atlantic Street	F / 164 (F / 89)[1]	F / >180 (F / >180)	F / >180 (F / >180)
	4th Avenue S. / Edgar Martinez Drive S.	F/ 95 (E / 73)	F / 115 (F / 89)	F / 132 (F / 105)
	1st Avenue S. / S. Holgate Street	D / 35 (C / 30)	D / 46 (D / 38)	D / 55 (D / 42)
	4th Avenue S. / S. Holgate Street/ S. Holgate Street	E / 57 (D / 42)	F / 84 (D / 55)	F / 93 (E / 59)
2030	1st Avenue S. / S. Atlantic Street	F / >180 (F / >180)	F / >180 (F / >180)	F / >180 (F / >180)
	4th Avenue S. / Edgar Martinez Drive S.	F / >180 (F / >180)	F / >180 (F / >180)	F / >180 (F / >180)
	1st Avenue S. / S. Holgate Street	E / 68 (D / 52)	F / 101 (E / 78)	F / 112 (F / 91)
	4th Avenue S. / S. Holgate Street/ S. Holgate Street	F / 164 (F / 104)	F / >180 (F / 162)	F / >180 (F / 170)

1. (x) - No Action operations provided for comparison.

Under 2030 conditions, all four intersections are estimated to operate at LOS E or LOS F with the addition of event traffic and are all worse than No Action conditions. With additional event traffic LOS values would remain the same as 2030 Arena-only conditions but delays would further increase when multiple events occur.

These increases in LOS / delay at key intersections under both 2018 and 2030 conditions would similarly increase delays for freight trucks travelling through these intersections. As shown, the results for both 2018 and 2030 conditions with only Arena event traffic are similar to and slightly better than No Action conditions with only a Mariners event.

As described earlier, all future event cases (Cases S1 to S3) likely overestimate actual demands and thus congestion during these periods since no reduction in non-event traffic was assumed.

- Freight corridor travel times increase with the addition of Arena event traffic with the exception of eastbound S. Atlantic Street. See Tables 2-40 and 2-41 in Appendix E. Changes in 2018 range from approximately 0.25 minutes to 5 minutes under Case S1, to 1.25 minutes to 7 minutes under Case S3. Under 2030 the range of increases is similar to 2018 conditions.

- In general, the direction of travel for each freight corridor travel time route that serves vehicles arriving for the Arena event (i.e. northbound 1st Avenue S.) experiences the

greatest travel time increase while the opposing direction experiences a lesser increase (i.e. southbound vs. northbound 1st Avenue S.).

- Some routes show a small improvement in freight corridor travel time as a result the signal timing optimization procedures, but in general travel time routes will increase as a result of Arena traffic.

- Travel times for freight corridor routes with only an Arena event are generally less than the No Action Case S2 (Mariners only) conditions. Travel times for specific routes and directions are calculated to see large increases with multiple concurrent events (i.e. northbound 1st Avenue S., eastbound S. Atlantic Street).

- The patterns of travel time changes resulting from an Arena event are similar between 2018 and 2030 conditions with 2030 travel times generally greater than 2018 conditions.

As described earlier, all future event cases (Cases S1 to S3) likely overestimate actual demands and thus congestion during these periods since no reduction in non-event traffic was assumed.

Rail activity assumed in the modeling is consistent with the level of rail activity identified for the No Action alternative. The traffic volumes in VISSIM were updated to reflect the forecast traffic volumes for the Alternative 2 event analysis cases. Total crossing gate arm down times and queue lengths along 1st and 4th Avenues S are summarized in Appendix E and are the same as assumed for the No Action conditions.

- Rail crossing gates are activated approximately 17 to 20 minutes during the weekday PM peak hour in 2018 and 41 to 44 minutes in 2030. See Table 2-42 in Appendix E.

- Queues generally increase with traffic growth under future conditions and/or the addition of event generated traffic. However, some are shown to decrease. Note that where this occurs is due to upstream congestion in the simulation model that is caused by increase traffic volumes or rail crossing closure time.

Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

Major truck routes surrounding the site could be intermittently impacted by construction. A construction management plan would be developed to minimize any street closures or other impacts as a result of the arena construction. This management plan would include the use of manual flaggers and signs to help vehicle circulation. In addition, key stakeholders would be notified of any major roadway closures.

Alternative 3 includes the development of an 18,000-person capacity arena on the same site evaluated for Alternative 2. In general, impacts to freight and goods anticipated under Alternative 3 would be slightly less than reported for Alternative 2. Overall traffic volumes for

Alternative 3 are approximately one percent less during the weekday PM peak hour under both 2018 and 2030 conditions.

3.8.2.8 Parking

SMC parking requirements would be reviewed as part of the Master Use Permit application. The proposal includes approximately 100 parking spaces on-site for players, couches, and staff. The remainder of the parking for attendees would be provided through shared parking agreements with existing parking facilities not associated with the Arena and/or through an Arena parking garage located south of Occidental on the South Warehouse site. This initial evaluation assumes parking would be provided through shared parking agreements. An evaluation of the potential South Warehouse parking is described in Section 3.8.2.12. The remainder of this discussion focuses on the impact of the Arena's parking demand on the existing and future parking supply in the study area.

Methodology

The following describes the general approach to the parking analysis:

- Establish the study area and appropriate time period for the evaluation
- Document existing parking for non-event conditions to provide an understanding of the underlying parking without an event
- Document existing parking with an event to provide an illustration of actual parking demand associated with observations during a Mariners game with over 20,000 attendees
- Examine effect of future "pipeline" development on parking supply and demand under the No Action Alternative
- Evaluate No Action conditions associated with the existing event venues (Safeco Field and the CenturyLink Field Event Center) to provide a basis for understanding the impact of the proposed Arena on multiple event conditions
- Add parking demand for the Arena to each of the defined No Action baseline event cases as well as account for displaced parking due to the Arena and compare with Arena parking demand to the No Action condition to identify impacts of Alternatives 2 and 3
- Identify mitigation strategies, where appropriate, to reduce the effect of the identified Alternative 2 and 3 impacts

Study Area

Because of the size of the nearby event venues, the study area for parking is larger than would otherwise be needed if the Arena were located independent of other large event sites. I-5

creates a physical barrier in the study area with little to no pedestrian connections from parking areas between the Stadium District site and parking areas east of I-5; therefore, the study area includes only the areas west of I-5 where there are viable pedestrian connections to the Arena site. The study area was further subdivided into primary and expanded study areas. The primary study area is considered within an approximate one-mile radius of the Stadium District site. It includes the neighborhoods of Pioneer Square, International District and SoDo, and extends from just north of Yesler Street to Spokane Street on the south. This area represents an approximate 5- to 20-minute walking distance for Seattle Arena event attendees.

An expanded study area was also evaluated considering the CBD. The evaluation of the expanded study area helps accommodate parking associated with larger multi-event cases at either CenturyLink Field or Safeco Field. The CBD is divided into three subareas – waterfront, financial, and retail to provide an understanding of the Arena impacts within the larger CBD.

Analysis Time Periods

Event arrival patterns suggest Arena arrivals would generally begin between two-and three-hours prior to the start. The 2012-2013 NBA, 2011-2013 NHL, and 2012 WNBA schedules indicate the typical start time for Arena sporting events is around 7:00 PM. To determine the parking analysis period, existing non-event and Arena hourly parking demands for weekday and weekend conditions between 4:00 and 8:00 PM were examined assuming a 7:00 PM game start. Based on the review of existing parking data, the quantified parking impact illustrations focus on weekday conditions at 7:00 PM (Game Start) and weekend conditions at 8:00 PM (One-Hour after Game Start). These periods encompass the peak parking demand for the study area. A more detailed evaluation of the analysis time periods for the parking impact evaluation is provided in Appendix E.

Parking Supply Assumptions

For the purposes of this analysis, a single parking supply for both weekday and weekend conditions is used to represent physical availability of parking that is generally open to or that could be made available to the public. The supply includes on-street and off-street parking spaces that are available to the general public and would potentially be available for Seattle Arena event parking. This publicly-available parking supply includes private off-street parking lots and garages that are restricted for employee and customer use, but were observed to be open for event parking during data collection. There is a potential that additional private parking spaces could be available for event parking. The parking supply represents conditions at game start on an event day for both weekday and weekend conditions. Parking supply varies by time of day and day of the week. Factors affecting parking supply include:

- **Time of Day and Day of Week.** Parking in the study area is operated differently depending on the day of the week and the time of day.

- On-street parking supply is impacted by time and loading zone restrictions. Parking within Pioneer Square, the International District, and CBD is generally two-hour paid parking Monday through Saturday. Pioneer Square and the Stadium District have time limited or paid parking is until 6:00 PM while the International District and CBD have paid parking until 8:00 PM. Near to the Stadium District Site, 1st Avenue S. parking has a one to two-hour time restriction and along S. Holgate Street there is no parking between 1st Avenue S. and 5th Avenue S., but east of 5th Avenue S. there is some unrestricted on-street parking.

- Many of the study area off-street parking garages close after the commute period (i.e., around 6:00 PM) on weekdays due to limited demand without an event in the Stadium District. These garages are often closed or open limited hours on the weekends.

- **Stadium District Event Conditions.**

  - During an event day, many of the off-street parking lots and garages extend hours of operation. In addition, there are private lots that would otherwise be closed to the public, which allow event parking including the Safeco Field parking garage.

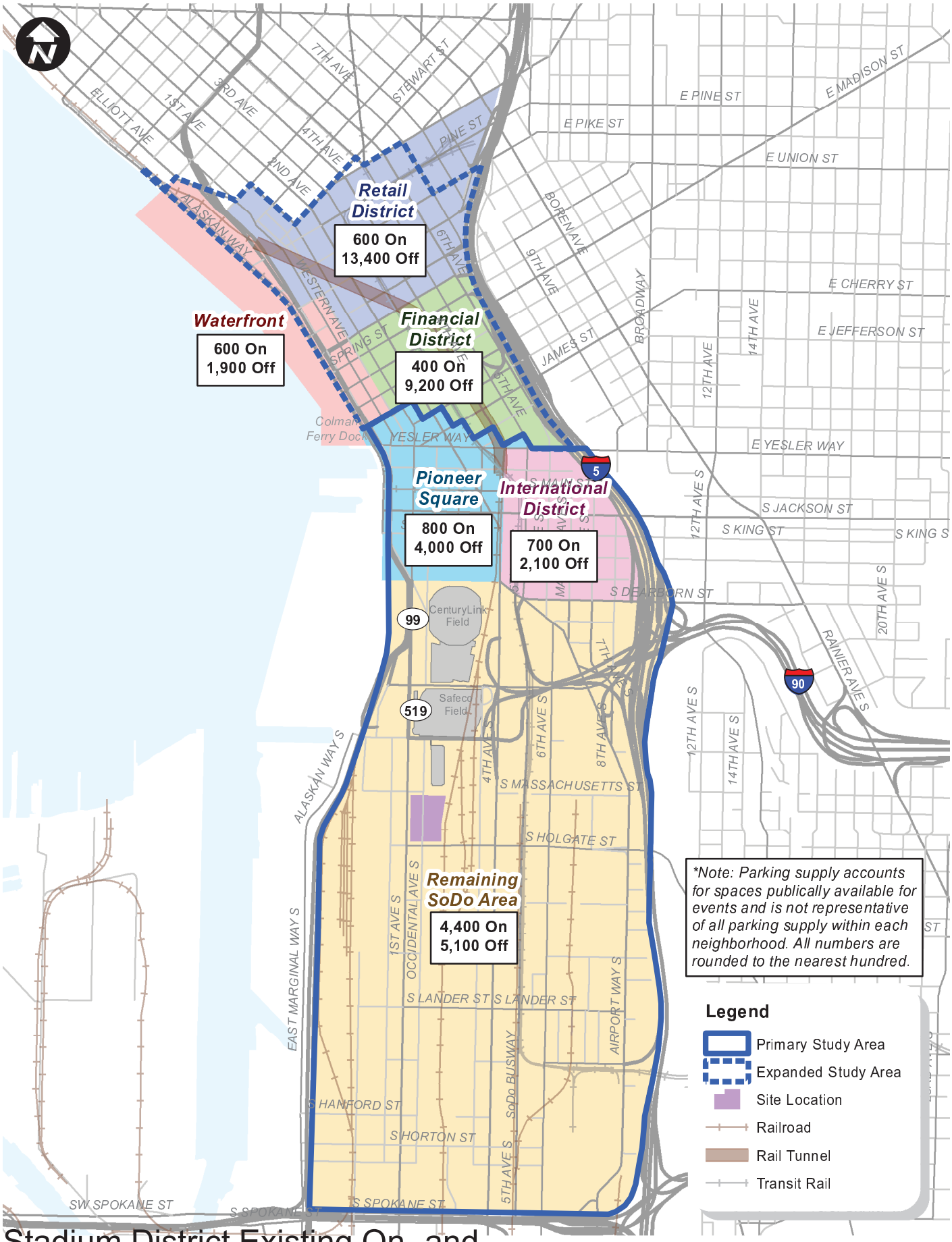
  - The existing Stadium District has TCPs, which result in some on-street parking closures during an event[13].

  - The availability of the CenturyLink and Safeco Field parking facilities for Arena events[14].

Existing Supply: Parking supply is based on data collected by Transpo Group supplemented by data from the SDOT, the Mariners, and PSRC. Figure 3.8-18 illustrates the on-and off-street parking within the primary study area. There are approximately 17,000 parking spaces located within the primary study area and an additional 26,100 within the expanded study area for a total of 43,100 parking spaces. The primary study area has approximately 5,900 on-street and 11,100 off-street spaces while the expanded study area has approximately 1,600 on-street and 24,500 off-street spaces.

[13] The Safeco Field TCP results in approximately 30 parking spaces closed. This was not specifically accounted for in the parking supply; however, there were a number of other conservative assumptions including no increase in parking supply as a result of pipeline development.

[14] The initial Arena evaluation assumes use of the Safeco and Century Link parking facilities with consideration of parking conditions without these facilities provided later in the section.



Stadium District Existing On- and Off-Street Event Parking Supply

Seattle Arena

FIGURE
3.8-18

transpoGROUP

No Action Supply: The City provided information on future pipeline development that would likely be constructed and occupied by 2018. Key development projects considered in the parking forecasts include the North Lot (north of CenturyLink Field) and Home Plate (southwest corner of 1st Avenue S. and S. Atlantic Street) projects. Based on a review of pipeline projects, approximately 2,300 additional parking spaces will be developed with many potentially available for event parking. Even if all residential and retail parking were reserved, a substantial portion of the office parking would likely be available. However, to be conservative, no additional parking supply was assumed under the No Action Alternative.

Action Alternative Supply: Development on the Stadium District site would displace several businesses including approximately 500 event parking spaces located both on- and off-street. As discussed previously, with the development of the Arena, approximately 100 parking spaces would be developed on-site and parking spaces would be reserved at nearby parking facilities through shared parking agreements or by parking developed for the Arena. The evaluation focuses on the event arrival period; therefore, the approximately 100 parking spaces on-site are not considered in the parking supply since these would be filled prior to the event by coaches, players, and staff. Considering the loss in parking, the resulting parking supply would be approximately 16,500 parking spaces within the primary study area and 26,100 spaces in the expanded study area for a total of 42,600 spaces. This is 500 fewer parking spaces within the primary study area than the No Action Alternative.

The following sections describe the existing and 2018 parking demand for the primary and expanded study areas. No additional analysis is provided for the 2030 parking conditions.

Accurately forecasting long-term parking demand is difficult given the uncertainty of area wide development and economic drivers. In addition, changes to parking policies relate to TDM may continue to evolve. With the continued investments in transit (i.e., light rail, streetcar, etc.) by 2030, it is anticipated that there will be a continued mode shift from auto to transit. This will result in a lower overall parking demand. Given this, overall parking impacts for Cases S1, S2, and S3 may be less than described herein for 2030 depending on the amount and type of redevelopment that occurs.

Affected Environment

Parking demand is based on data collected by Transpo Group supplemented by data from the SDOT, the Mariners, and PSRC. To understand how an event in the Stadium District affects parking availability, parking demand was inventoried during a Mariners games on Thursday, April 11 and Saturday, April 13, 2013. The following describes the existing weekday and weekend parking demand within the primary and expanded study areas.

Weekday Occupancy

Appendix E provides details on weekday non-event and event parking occupancy within the primary and expanded study areas.

It becomes difficult to locate parking spaces within an area when occupancies are 85 to 90 percent and generally areas with occupancies at that level are considered "full." Based on the existing supply and weekday demand:

- Non-event occupancies are generally low within both the primary and expanded study areas. Higher occupancy levels are found on-street especially in the International District and Pioneer Square neighborhoods as well as the retail area of the CBD where there are night activities such as restaurants and bars.
- During an event, overall occupancy increases within both the primary and expanded study areas with greater increases near Safeco Field within the primary study area.
- On-street parking becomes "full" within an event in both the International District and Pioneer Square neighborhoods.
- Field observations showed that on-and off-street facilities in the immediate vicinity of Safeco Field were full with a Mariners game. The analysis shows that there is additional parking within both the primary and expanded study areas; however, this parking is generally located in areas that are further from Safeco Field.

Weekend Occupancy

Appendix E provides details on weekend non-event and event parking occupancy within the primary and expanded study areas. The existing weekend parking demand analysis shows:

- Non-event occupancies for the weekend are similar to a weekday where occupancy levels are below 85 percent and higher occupancies are found on-street.
- During an event, overall occupancy increases within both the primary and expanded study areas with greater increases near Safeco Field within the primary study area.
- Field observations showed that on-and off-street facilities in the immediate vicinity of Safeco Field were full with a Mariners game. The analysis show that there is additional parking within both the primary and expanded study areas; however, this parking is generally located in areas that are further from Safeco Field.
- Although the weekend game attendance was slightly higher than the weekday, weekend event occupancies are generally lower than weekdays. The lower weekend occupancy is likely a result of a lower overall non-event parking demand on weekends.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

The Affected Environment provides context related to on-and off-street parking supply; however, projecting specifically where someone would park is difficult because the location depends on a variety of factors such as duration of stay, proximity to use, cost of parking, etc. Given the uncertainty around specific parking behavior, the review of future conditions

considers the parking supply as a whole rather than separate consideration of on-and off-street parking.

Demand Forecasts

For purposes of this analysis and taking into account known development, the existing non-event parking demand was increased by 10 percent on the weekdays and five percent on the weekends for the overall study area. The majority of this increased demand was allocated to SoDo and the CBD where most of the pipeline projects would be located.

For the No Action Case S2 and S3, parking demand for the Mariners and Event Center was added to the non-event conditions. It was assumed that the arrival curve for these events would have 95 percent arrival by 7:00 PM and 100 percent by 8:00 PM (assuming a 7:00 PM event start). The distribution of parking among neighborhoods assumed 80 percent within the primary study area, which is closest to the venues and the remaining 20 percent within the CBD. The No Action parking demand Case S2 and S3 was determined by adding the Mariners and Event Center parking demand to the No Action Case S1 parking demand, simply a layering process, with no adjustments or reductions in non-event demand.

Weekday Occupancy

The analyses of weekday parking occupancy within the primary and expanded study areas show:

- No Action Case S1 occupancies in the primary study area are higher than existing conditions as a result of anticipated development primarily in the Pioneer Square and SoDo areas.
- For the No Action Case S2, representing a Mariners event totaling 40,500 attendees, parking utilization is substantially higher than observed for the Mariner game with approximately 20,000 attendees.
- Parking utilization in the International District and Pioneer Square neighborhoods would continue to increase with the single and dual event conditions.
- Overall primary study area occupancies are calculated to be approximately 60 to 85 percent for the event cases and the utilization of parking would continue to be concentrated around the event venues themselves.
- Parking occupancies for the CBD would be generally very low except for the Waterfront (65 to 80 percent), which is the most proximate area to the Stadium District.

Looking at the primary and expanded study area in combination, the overall parking occupancy of the potential supply would be approximately 20 percent for No Action Case S1, 40 percent

for Case S2, and 50 percent for Case S3 indicating parking is available; however, it may not be in preferred locations depending on where visitors are going.

Weekend Occupancy

The analyses of weekend occupancy for No Action Case S1, S2, and S3 parking occupancy within the primary and expanded study areas show:

- No Action Case S1 occupancies in the primary study area are similar to existing conditions with only slight increases as a result of the anticipated future development.
- For the No Action Case S2 condition, representing a Mariners event totaling 40,500 attendees, parking utilization is substantially higher than observed for the Mariner game with approximately 20,000 attendees.
- Compared to weekday, the weekend No Action Case S2 and S3 occupancies are lower within both the primary and expanded study areas as a result of lower non-event demands. The lower weekend non-event demands within the primary study area allows for more event-related parking to occur within this area.
- Parking utilization in the International District and Pioneer Square neighborhoods would continue to increase with the single and dual event conditions.
- Overall primary study area occupancies are calculated to be approximately 65 to 85 percent for the event cases and the utilization of parking would continue to be concentrated around the event venues themselves.
- Parking occupancies for the CBD would be lower than weekday conditions given the ability to accommodate more of the event parking demand within the primary study area.

Looking at the primary and expanded study area in combination, the overall parking occupancy of the potential supply would be approximately 15 percent for No Action Case S1, 40 percent for Case S2, and 50 percent for Case S3 indicating parking is available; however, parking may not be in preferred locations depending on where visitors are going.

Impacts of the Proposed Project (Alternative 2) – 20,000-Seat Arena

Alternative 2 is compared to the No Action Alternative to identify parking impacts of the Seattle Arena.

Parking impacts related to construction would be minimized by providing off-street parking, securing parking in near-by garages, as well as encouraging use of alternative modes. It is anticipated that parking impacts related to construction would be less than the 20,000-seat Seattle Arena, however during construction, the impacts would occur on a daily basis during the

two-year construction period. In addition, construction activities could result in the need to close on-street parking adjacent to the site. These closures would be coordinated with SDOT and appropriate notice and signs would be provided.

Arena Demand Forecasts

Alternative 2 parking demand represents an Arena event with an attendance of 20,000 people. Based on the arrival curve, 95 percent of the attendee arrivals occur by 7:00 PM and 100 percent by 8:00 PM. Similar to the No Action, 80 percent of the parking was assumed within the primary study area, which is closest to the venues and the remaining 20 percent within the expanded study area or CBD. For the multi-event scenarios (Cases S2 and S3), the parking demand of the combined events exceeds the parking supply within the primary study area; therefore, for these cases, it is assumed parking would occur within the closer neighborhoods until an approximately 90 percent utilization is reached and the remaining parking would occur within the CBD. The total Alternative 2 parking demand for each event case is determine by adding the Seattle Arena parking demand to the No Action Case S1, S2, and S3. A simple layering process was used with no adjustments or reductions in non-event demand.

Weekday Occupancy

The weekday No Action parking demand analysis shows:

- Arena parking demand could be fully accommodated within the primary study area under Case S1 (i.e., no other events at nearby venues).
- Event parking would spill into the expanded study area under multi-event conditions (Case S2 and S3).
- For the Arena plus Mariners and / or Event Center scenarios (Case S2 and S3), parking occupancies within the primary study area would be approximately 90 percent as compared to the No Action event cases, which would have occupancies of approximately 65 to 85 percent.

It is anticipated with any of the event cases parking closer to the Arena and / or other event venues would be more highly utilized. As the areas near the venues become full it would likely become more difficult to find parking. The primary study area would be full for multi-event Cases S2 and S3. There would be parking available within the CBD even with multiple events in the study area; however, in some cases this may be considered less desirable given the greater walking distance from the venue.

Weekend Occupancy

The weekend No Action parking demand analysis shows:

- Similar to weekday conditions, weekend Arena parking demand could be fully accommodated within the primary study area under Case S1 (i.e., no other events at nearby venues).

- Event parking would spill into the expanded study area under multi-event conditions (Case S2 and S3).

- For Alternative 2 Case S3, parking occupancies within the primary study area would be approximately 90 percent as compared to the No Action Case S3, which would have occupancies of approximately 65 to 85 percent.

- Given the lower overall weekend non-event parking demand within the expanded study, occupancies in this area are lower than the weekday.

It is anticipated with any of the event cases parking closer to the Arena and / or other event venues would be more highly utilized. As the areas near the venues become full, it would likely become more difficult to find parking. The primary study area would be full for multi-event cases (Case S2 and S3). There would be parking available within the CBD even with multiple events; however, in some cases this may be considered less desirable given the greater walking distance from the venue.

The proposed Arena would result in an increase in events within the Stadium District regardless of the event case or day of week. The resulting parking demand associated with the Arena could displace some observed SoDo overnight truck parking in publicly available space to other areas (likely south of the Stadium District), which may be consider less convenient locations.

Impacts of Safeco and CenturyLink Field Parking Restriction

The evaluation presented above assumes availability of the Safeco Field and CenturyLink parking facilities for Arena events. If shared parking agreements are not secured with these facilities, there is a potential that during an Arena only event (Case S1) parking may not be available at the Safeco Field and CenturyLink parking facilities. Without these parking facilities, there would be approximately 4,500 fewer parking spaces within the primary study area for a total parking supply of approximately 12,000 parking spaces in the primary study area.

A review of both weekday and weekend conditions shows that without the availability of the Safeco Field and CenturyLink parking facilities:

- Weekday and weekend occupancies in the primary study area would increase by approximately 15 to 25 percent with these parking facilities; however, levels would be less than 75 percent and not be considered full.

- Parking could continue to be accommodated in the primary study area; therefore, occupancies within the expanded study area would be similar with and without the Safeco and CenturyLink parking facilities.

Finding available parking in the vicinity of the Arena would likely become more difficult without the use of Safeco and CenturyLink parking facilities especially given that these make up over 25 percent of the parking in the primary study area and approximately 50 percent of the SoDo parking. With difficulty in finding parking, additional parking may occur in the expanded study area.

Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

Parking impacts related to construction would be minimized by providing off-street parking, securing parking in near-by garages, as well as encouraging use of alternative modes. It is anticipated that parking impacts related to construction would be less than the 18,000-seat Seattle Arena. In addition, construction activities could result in the need to close on-street parking adjacent to the site. These closures would be coordinated with SDOT and appropriate notice and signs would be provided.

With 10 percent less seats, this would result in a 10 percent reduction in the overall parking demand as compared to Alternative 2. Given the lesser demand, overall transportation impacts for the Alternative 3 would be slightly less than those described for the Alternative 2 and the analysis of the Alternative 2 fully encompasses any transportation impacts that would occur as a result of developing Alternative 3.

3.8.2.9 Safety

Methodology

Collisions were reviewed at the study area intersections and at-grade rail crossings. Records of reported collisions were obtained from SDOT for the five-year period between January 1, 2007, and December 31, 2011. A summary of the total and average annual of reported accidents at each study intersection is provided in Attachment E-4, which is available from DPD upon request. The City of Seattle has adopted criteria for assigning high accident location status to signalized intersections with 10 or more reported collisions per year and unsignalized intersections with 5 or more reported collisions per year. Intersections designated as high accident locations are targeted for future safety improvements in an effort to reduce the occurrence of accidents.

Affected Environment

Fewer than 5 collisions per year were reported at each unsignalized study intersections and for the signalized locations only the 6th Avenue / James Street intersection had an average of more than 10 collisions per year. No fatalities were identified in the study area during the five-year period.

A review of the collisions at the 6th Avenue / James Street intersection shows the number of collisions per year has decreased over the 5-year period with 15 collisions in 2007 to 8 collisions in 2011. A majority of the collisions at this location involved left-turning vehicles along James

Street not granting right-of-way to vehicles traveling the opposite direction. These collisions are likely occurring as a result of the high traffic volume and the permitted left-turn phasing on the westbound approach James Street not yielding to oncoming eastbound traffic, which is typical of intersections with dual left-turn lanes with higher levels of turning traffic. The left turning collisions at this location could likely be reduced by providing protected left-turn phasing, which would be a trade-off with traffic operations, likely causing more delay that could increase other types of collisions such as rear-end.

The data were also reviewed for collisions involving pedestrians or bicyclists. Within the study area, 34 of the 64 study locations had collisions involving pedestrians and bicyclists. The only location that averaged more than one collision per year involving a pedestrian or bicyclists is the 5th Avenue S. / S. Jackson Street intersection, which has a much higher pedestrian demand than other locations in the study area. This intersection is located near the International District Station transit hub on the southwest corner of this intersection resulting in higher levels of pedestrian activity.

Collisions were also reviewed at the at-grade railroad crossings along S. Royal Brougham Way, S. Atlantic Street, S. Holgate Street, S. Lander Street, S. Hanford Street, S. Horton Street, and S. Spokane Street based on data provided by SDOT as well as the Federal Railroad Administration (FRA) database of accident reports. Vehicular traffic at these crossings is controlled by gates and non-motorized traffic is generally controlled through passive warning signs. Based on a review of *Pedestrian/Bicycle Warning Devices and Signs at Highway-Rail and Pathway-Rail Grade Crossings* (Illinois Center for Transportation, April 2013), implementation of control devices for non-motorized traffic should be evaluated on a case-by-case basis. There were 12 collisions in the 5-year time period related to trains at the at-grade crossings. These collisions occurred at the S. Atlantic Street, S. Royal Brougham Way, S. Hanford Street, S. Hinds Street, S. Holgate Street, and S. Royal Brougham Way crossings. A majority of the collisions resulted in property damage or injury. Implementation of active warning or gates for pedestrians could help prevent these types of safety issues. There was a pedestrian fatality in 2011 at the S. Holgate Street crossing between 3rd Avenue S. and Occidental Avenue S; however, the collision review shows there were extenuating circumstances and the fatality was not a result of the train track or roadway conditions.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

As traffic volumes increase, the potential for traffic safety issues increases proportionately. The overall vehicular and non-motorized traffic in the area under 2018 and 2030 conditions are anticipated to be higher than occurs under existing conditions. There are changes in transportation infrastructure underway, and the effect of these changes on transportation safety is unknown. The projects are all designed to current standards of practice.

Impacts of the Proposed Project (Alternative 2) – Stadium District 20,000-Seat Arena

Alternative 2 construction would increase vehicular traffic within the study area, which could result in increased conflicts between vehicular, pedestrian, and bicycle traffic. It is anticipated that safety impacts related to construction would be less than the 20,000-seat Seattle Arena, however could occur more frequently during the two-year construction period.

As traffic volumes increase, the potential for traffic safety issues increases proportionately. Alternative 2 would increase both vehicular and non-motorized traffic within the study area. In the immediate vicinity of the site, there are several at-grade rail crossings along S. Holgate Street. Increased pedestrian activity at these locations as a result of travelling to and from the Seattle Arena could result in pedestrian safety issues. The *Pedestrian/Bicycle Warning Devices and Signs at Highway-Rail and Pathway-Rail Grade Crossings* (Illinois Center for Transportation, April 2013) notes that for at-grade crossing active warning devices are generally observed by users more often when paired with gates. This document also says that there is no standard procedure for determining control or warning devices an evaluation should be conducted on a case-by-case basis. The S. Holgate Street corridor has multiple at-grade rail crossings closely spaced in the immediate vicinity of the site and pedestrian gates may not be feasible or appropriate.

As described previously in the Pedestrian section, consideration could also be given to a grade separated pedestrian bridge that would be oriented east-west over the train tracks connecting the Arena to the S. Holgate Street / 3rd Avenue S. intersection or the closure of S. Holgate Street to pedestrians with events.

Impacts of Alternative 3 – Stadium District 18,000-Seat Arena

Alternative 3 construction would increase vehicular traffic within the study area, which could result in increased conflicts between vehicular, pedestrian, and bicycle traffic. It is anticipated that safety impacts related to construction would be less than the 18,000-seat arena.

Alternative 3 would have similar safety impacts as identified with Alternative 2; however, these impacts would be to a less extent since the traffic levels would be lower with the smaller venue.

3.8.2.10 Occidental Avenue South Street Vacation

An element of the Alternative 2 and Alternative 3 proposals includes the vacation of Occidental Avenue S. between S. Holgate Street and S. Massachusetts Street. The cumulative conditions with an arena event, inclusive of the street vacation, were accounted for in the analysis of Alternatives 2 and 3. This section provides a focused comparison of conditions intended to isolate the impacts of the vacation itself. It includes a comparison to developing the site under the current zoning; assuming no vacation of Occidental Avenue S. This additional development scenario is not considered an alternative for purposes of the EIS evaluations but has been included for purposes of assessing the impacts of the Occidental Avenue S. street vacation. This

section evaluates the proposed street vacation, independently, and in the context of the development proposal.

Context

Occidental Avenue S. is classified as an access street. It serves a variety of purposes, ranging from local access for adjacent business and events, staging for events at Safeco Field and CenturyLink Field, event parking, to a potential route bypass to 1st Avenue S. during periods of higher traffic congestion.

North. North of S. Massachusetts Street, Occidental Avenue S. serves as service access and parking for businesses on the west side (with primary frontages on 1st Avenue S.), and provides access to the Safeco Field parking garage, including surface parking to the immediate east side of the garage. This parking access is provided via S. Massachusetts Street, via its intersection with Occidental Avenue S., which also provides access to the Safeco Field parking garage, the surface parking to the east, as well as the service road and fire lane south and west of the Safeco Field garage. In addition, the plaza area adjacent to the Safeco Field parking garage serves as a staging area for Safeco Field events, parking for charter buses, overflow parking, and emergency evacuation. This portion of Occidental Avenue S. carriers a weekday average of approximately 4,300 vehicles per day with a peak of 500 vehicles per hour during the AM peak hour.

Site Area. The area of Occidental Avenue S. to be vacated connects S. Holgate Street with S. Massachusetts Street. The street section serves on-street parking in some sections, as well as access to the parcels adjacent to the street to the east and west. In addition, it provides continuity of connection between S. Horton Street and S. Atlantic Street. This portion of Occidental Avenue S. carriers a weekday average of approximately 3,700 vehicles per day with a peak of 460 vehicles per hour during the AM peak hour.

South. South of S. Holgate Street, Occidental Avenue S. provides access and parking to local commercial businesses with primary frontages on 1st Avenue S. to the immediate west, as well as to freight related warehouse business operations on the east side of Occidental Avenue S., immediately south of S. Holgate Street. It exists as a contiguous connection from S. Atlantic Street to S. Horton Street, a distance of over one mile. This portion of Occidental Avenue S. carriers a weekday average of approximately 2,700 vehicles per day with a peak of 340 vehicles per hour during the AM peak hour.

Local Circulation Issues

The Mariners emphasized the importance of maintaining accessibility to the Safeco Field parking garage and surface parking lot, as well as the service road and fire lane, and noted the use of the plaza area between the parking structure and Occidental Avenue S. for bus staging.

- **Safeco Field Parking Garage – Access and Usage.** The parking garage is used daily by staff and vendors at the facility, with approximately 250 parking spaces identified for these uses. Another 50 spaces are leased to adjacent office properties, except during game days. Access to the garage is provided directly from S. Atlantic Street on the north, as well as on the south and east faces of the garage, which access the street system via S. Massachusetts Street and / or Occidental Avenue S.

- **Service Road / Surface Parking Lot.** This drive, which extends east via an extension of S. Massachusetts Street, provides direct southerly access to the parking garage. In addition, it connects service activity (trucks, food delivery, etc.) for Safeco Field with the local street system, connecting under S. Atlantic Street to Safeco Field itself from east of the parking garage. This connection also serves as the fire lane for Safeco Field.

- **Plaza and Adjacent Right-of-Way.** This section of the sidewalk and right-of-way is open space for pedestrians during most periods; during events at Safeco Field, as well as some CenturyLink Field events, it is used for charter bus staging and pick-up / drop-off, ADA assisted parking.

In addition to the issues raised by the Mariners, concern has been expressed that Occidental Avenue S. is used by freight haulers and other traffic as a bypass to congestion on 1st Avenue S. With a section of Occidental Avenue S. closed, there would be reduced ability to avoid primary arterial congestion.

Methodology

The evaluation of the street vacation on the local transportation network was conducted consistent with the methodology previously discussed in the document. Consistent with the scope of this EIS, the impacts of the proposed street vacation were evaluated for the following transportation elements:

- Trip Generation
- Public Transportation
- Pedestrians
- Bicycle
- Traffic Volumes

Traffic Operations (Intersection Operations, Local Circulation and Traffic Diversion)

- Freight and Goods
- Parking

- Safety

The future 2030 conditions were evaluated for two scenarios. First, the impact of the physical change in street connectivity is evaluated, independent of the proposed development or build-out under the current zoning. Second, the comparative impact of the two site development scenarios is summarized.

1. **Street Vacation Impact:** This scenario provides the most direct basis for understanding the singular effects of the vacation itself, assuming no changes in land use or development. The No Action 2030 conditions without and with a street vacation are compared.

2. **Comparison of Site Development Options:** This scenario compares the results of the analysis conducted for Alternative 2 Case S1, with the vacation of Occidental Avenue S., to the development of an approximately 810,000 sf commercial project on the project site, without the Occidental Avenue S. vacation, assuming build-out under current zoning.

Impacts of the Vacation

Table 3.8-26 provides a summary of the key transportation elements associated comparing the current proposal to future development that would be enabled assuming no Occidental Avenue S. street vacation. Figures 3.8-19, 20, and 21 illustrate the weekday PM, AM, and midday traffic volumes and LOS for the with and without vacation conditions.

Table 3.8-26
Occidental Avenue S. Street Vacation Comparative Analysis

	Street Vacation Impact	Comparison of Site Development Options
Trip Generation	Based on a development potential of 810,000 sf of commercial uses, the site weekday trip generation would be 795 net new trips during the AM peak hour, 102 net new trips during the midday peak hour, and 865 trips during the PM peak hour.	Alternative 2 Case S1 increases trip generation by approximately 1,100 to 1,300 trips during the weekday PM peak hour with a capacity level event as compared to development with an 810,000 sf commercial structure.
Public Transportation	A street vacation would result in minor impacts associated with diversion of traffic and moderate increases in peak hour congestion along the 1st Avenue S. corridor in the immediate site vicinity. Since 1st Avenue S is not a transit corridor, no impacts are anticipated	Increased demand for public transportation associated with the Arena as described in the Public Transportation section of this document. With development under current zoning, increases in transit demand and need to connect pedestrians to transit would occur. The primary route to transit is along the S. Holgate Street corridor, which would connect to transit service along 4th Avenue S. as well as to the Link Light Rail corridor. Impacts to transit service speed and

Table 3.8-26 (Continued)

	Street Vacation Impact	Comparison of Site Development Options
		reliability would occur with the Arena on event days, at the magnitude and frequencies described in the Public Transportation section. With development under current zoning, overall traffic impacts would occur that would also impact transit speed and reliability. Impacts at 4th Avenue S. / S. Holgate Street would be similar to that of the Arena; impacts to the 1st Avenue S. corridor would be somewhat less due to the probable access configuration along the Occidental Avenue S. corridor (Note: No commercial project is proposed; access configuration was assumed for purposes of the analysis.)
Pedestrians	With the street vacation, pedestrians would divert from Occidental Avenue S. to either 1st Avenue S. or 4th Avenue S depending on the origin or destination of the trip Pedestrian volumes were observed to be low along Occidental Avenue S., north of S Holgate with and without an event.	The Arena would result in concentrated, though comparatively infrequent, pedestrian demands during event ingress / egress; pedestrian demands associated with the development under current zoning would result in lower, more evenly distributed pedestrian demands occurring throughout the day, and especially during lunch breaks. In either case, additional pedestrian demands would contribute to increased use of local sidewalks, including S. Holgate Street. Impacts of Arena related pedestrian peak demands are documented in the Pedestrian section; the impacts of the development under current zoning would be less, but also contribute to existing issues with pedestrian accessibility crossing the railroad tracks to the east. Office pedestrians could orient eastward to connect to bus and / or Link Light Rail service for commuting.
Bicycles	Bicycle use of Occidental Avenue S. has been observed to be low; as a result its vacation in the proposed limits would not result in a significant adverse impact. It is acknowledged that, to the extent that bicycles travel on Occidental Avenue S., the vacation of this section would result in inconvenience and diversion, primarily to 1st Avenue S. between S. Holgate Street and S. Massachusetts Street.	With development under current zoning, no disruption in bicycle routing would occur; however, additional trip generation associated with the development would add to traffic on Occidental Avenue S. near the site, and potentially conflict with bicycle travel compared to current conditions. With the proposed Arena, the diversion of bicyclists due to the closure of Occidental Avenue S. would occur as described previously; added events and related traffic would increase the potential for conflict with bicycles throughout SoDo depending on the specific route traveled.

Table 3.8-26 (Continued)

	Street Vacation Impact	Comparison of Site Development Options
Traffic Volumes	Truck traffic currently creates westbound queues along S. Atlantic Street, which induces traffic destined for 1st Avenue S. to turn left onto Occidental Avenue S., then right onto S. Holgate Street, before turning south onto 1st Avenue S. The vacation of Occidental Avenue S. would result in this pattern being altered, with these vehicles turning west onto S. Massachusetts Street to access 1st Avenue S. instead of S. Holgate Street. Traffic volumes observed crossing S. Holgate Street were approximately 130 vehicles per hour during the weekday AM peak and 60 vehicles per hour during the weekday PM peak. These volumes are substantially less than the traffic turning to/from the west onto S. Holgate Street from Occidental Avenue S.	The difference between trip generation associated with development under the current zoning and Alternative 2 would result in the changes listed below in total traffic along links in the immediate vicinity of the Stadium District site. Note that traffic volume changes during AM and mid-day periods are largely a result of shifts due to the Occidental Avenue S. vacation; Arena generated traffic would be minimal during these conditions. 1st Avenue S. from S. Holgate Street to S. Massachusetts Street: ▪ +315 vph as a result of the Arena (PM peak hour) ▪ +370 vph as a result of the Arena project with the street vacation (AM peak hour) ▪ +110 vph as a result of the Arena (midday peak hour) 1st Avenue S. from S. Massachusetts Street to S. Atlantic Street: ▪ +225 vph as a result of the Arena (PM peak hour) ▪ +180 vph as a result of the Arena (AM peak hour) ▪ +75 vph as a result of the Arena (midday peak hour) Occidental Avenue S. from S. Massachusetts Street to S. Atlantic Street: ▪ -620 vph as a result of the Arena (PM peak hour) ▪ -1,025 vph as a result of the Arena (AM peak hour) ▪ -260 vph as a result of the Arena (midday peak hour) S. Atlantic Street east of Occidental Avenue S.: ▪ +50 vph as a result of the Arena (PM peak hour - Note: Westbound traffic volumes would increase by approximately 310 vehicles due to the inbound orientation of weekday PM peak hour Arena traffic) ▪ -550 vph as a result of the Arena (AM peak hour) ▪ -95 vph as a result of the Arena (midday peak hour)

Table 3.8-26 (Continued)

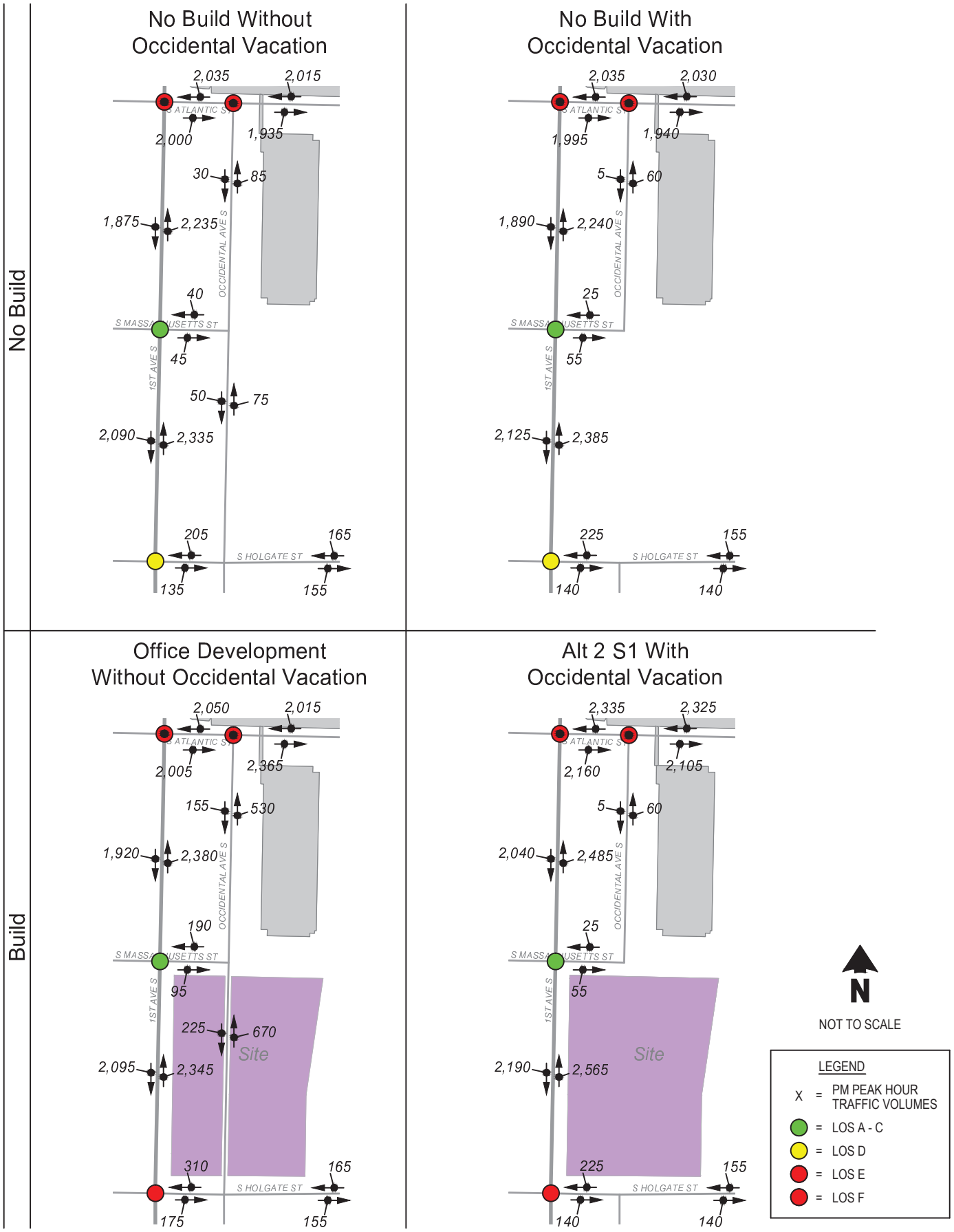
	Street Vacation Impact	Comparison of Site Development Options
Traffic Operations – Intersection Operation	The vacation of Occidental Avenue S. would divert traffic to 1st Avenue S. but the 1st Avenue S. / S. Holgate St. intersection would continue to operate at LOS D even with the increase traffic during the PM peak hour and would continue to operate at LOS C or better during the midday peak hour. During the AM peak hour the intersection would degrade from LOS C or better to LOS D with the shift in traffic.	The Arena (Alternative 2 Case S1) and street vacation would maintain intersection operations along 1st Avenue S. as compared to a 810,000 sf commercial development that could be allowed under the current zoning: 1st Avenue S. / S. Atlantic Street: LOS F (PM and AM peak hours), LOS D (midday Peak hour) 1st Avenue S. / S. Holgate Street: LOS E (PM peak hour), LOS D (AM peak hour), LOS C or better (midday peak hour) The Edgar Martinez Drive/Occidental Avenue S. intersection would operate at LOS F under all development and Occidental Avenue S. vacation scenarios with the exception of mid-day conditions with the vacation and arena development. Under these conditions the trips generated by the arena are low and background traffic volumes along Occidental Avenue S. are also low such that the intersection is forecast to operate at LOS B during mid-day conditions. Traffic volumes and operations east of the site, at 4th Avenue S. / S. Holgate Street would not materially change between the two build scenarios. As described in the traffic operations section, the more concentrated impacts associated with event traffic would occur less frequently than the everyday added congestion associated with site buildout under the current zoning.
Traffic Operations – Local Access and Traffic Diversion	Peak hour traffic volumes would be nominal and minimal impacts to circulation are identified, as described in relation to traffic volumes and operations. With the street vacation, the continuity of Occidental Avenue S. from S. Horton Street to S. Atlantic Street would be interrupted, disrupting a potential parallel route to 1st Avenue S. during periods of congestion. However, northbound and southbound through traffic volumes across S. Holgate Street are minor, and do not represent a substantial movement. Impacts to emergency vehicle access to the	The impact of eliminating the Occidental Avenue S. connection to S. Holgate Street could be mitigated by the Arena proposal to replace it with a north-south drive connecting S. Holgate Street with the extension of S. Massachusetts Street, which could provide access to the Safeco Field garage, surface parking, and service roadway. This new connection would be a private road; however, an agreement could be crafted to assure that the use of the drive would be available during all appropriate event and activity times for Safeco Field operations. Provision of this roadway coupled with the agreement for Safeco Field

Table 3.8-26 (Continued)

	Street Vacation Impact	Comparison of Site Development Options
	south could occur if the street was vacated without providing a parallel replacement link to S. Holgate Street.	use would minimize impacts of the Occidental Avenue S. vacation on Safeco Field operations including deliveries, garage access, and emergency access/evacuation. Increased reliance on access to the Safeco Field garage, Occidental Avenue S. north of the Arena, and the businesses on the west side of Occidental Avenue S. would be enhanced by the proposed realignment of S. Massachusetts Street between 1st Avenue S. and Occidental Avenues S. The new private drive along the east edge of the Arena between the Safeco Field property and Holgate Streets could help support emergency vehicle access to the Safeco Field garage during event periods. With the Arena, which includes the development of a parallel private access drive between S. Holgate and Safeco Field property, and the realignment of S. Massachusetts Street from 1st to Occidental Avenues S., access to the section of Occidental Avenue S. north of S. Massachusetts Street, as well as the plaza adjacent to the right-of-way near the garage would be maintained. The realignment of S. Massachusetts Street also increases the space south of S. Massachusetts Street for pedestrian gatherings associated with the Arena, reducing the likelihood of spillover into the street that would otherwise conflict with traffic accessing Safeco Field garage, service roadway, or surface parking lot.
Freight and Goods	A limited number of trucks currently utilize Occidental Avenue S. for deliveries in the immediate site vicinity. Those trucks serving existing uses along this section of Occidental Avenue S. would be redirected to 1st Avenue S. Based on traffic counts during the weekday PM, AM, and midday peak hours and additional field observations, the amount of truck traffic varies from no trucks to up to 10 vehicles per hour along this section of Occidental Avenue S. The contiguous connection of Occidental Avenue S. between S. Atlantic Street and S. Horton Street would be interrupted by the	Site related truck traffic is likely to decrease except during pre / post-event conditions with the Arena; office development would require on-site loading docks and would receive deliveries throughout the day. Added congestion on event day would impact general area freight along with other traffic; building under no vacation would impact area-wide traffic and freight to a lesser degree, but at a higher frequency.

Table 3.8-26 (Continued)

	Street Vacation Impact	Comparison of Site Development Options
	vacation. To the extent that a freight vehicle uses Occidental Avenue S. to bypass 1st Avenue S. congestion during peak or other periods, this route would be altered. Use of Occidental Avenue S. could occur at realigned S. Massachusetts Street, as well as between S. Holgate and S. Horton Streets.	
Parking	The elimination of this section of Occidental Avenue S. would result in the removal of on-street parking for this street segment. Based on the parking supply surveys and actual usage, approximately 60 spaces could be removed.	With redevelopment under current zoning, the impact to on-street parking is not clear. It is likely that some amount of formal on-street parking would be provided along an improved curb. With new formal parking spaces and the development of commercial uses near street level, the likelihood of higher local parking utilization on an everyday weekday basis would occur. With the Arena, approximately 60 on-street parking spaces would also be removed
Traffic Safety	Addition of pedestrians and bicycles to 1st Avenue S. for the Occidental Avenue S. street vacation could increase vehicle / pedestrian / bicycle conflicts. Sidewalk exists on 1st Avenue S.; thus, pedestrian safety would be unlikely to be noticeably impacted. Bicycles could be required to interact with 1st Avenue S. vehicular traffic, which has a higher level of activity as compared to Occidental Avenue S.; therefore, bicyclists would experience increased conflicts.	In either case, additional pedestrian demands would contribute to increased use of local sidewalk, including S. Holgate Street. Impacts of Arena related pedestrian peak demands are documented previously; the impacts of the development under current zoning would be less, but also contribute to existing issues with pedestrian accessibility crossing the railroad tracks to the east. Office pedestrians could orient eastward to connect to bus and / or Link light service for commuting.



Occidental Avenue S. Street Vacation 2030 Weekday PM Peak LOS & Volumes

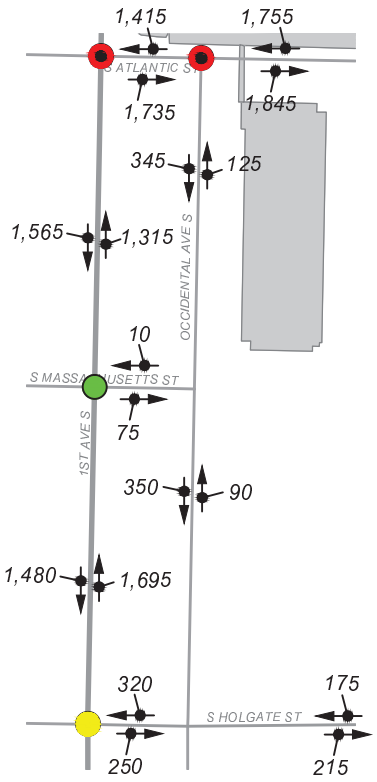
FIGURE **3.8-19**

Seattle Arena

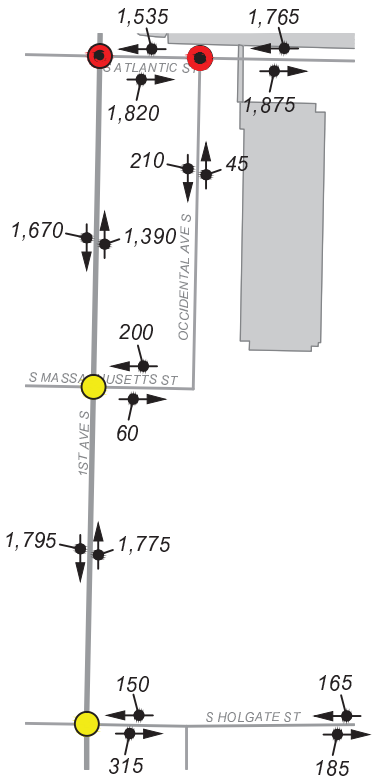
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No Build

No Build Without Occidental Vacation

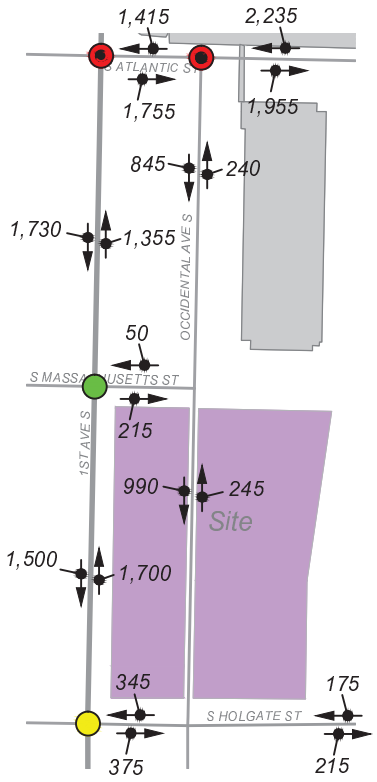


No Build With Occidental Vacation

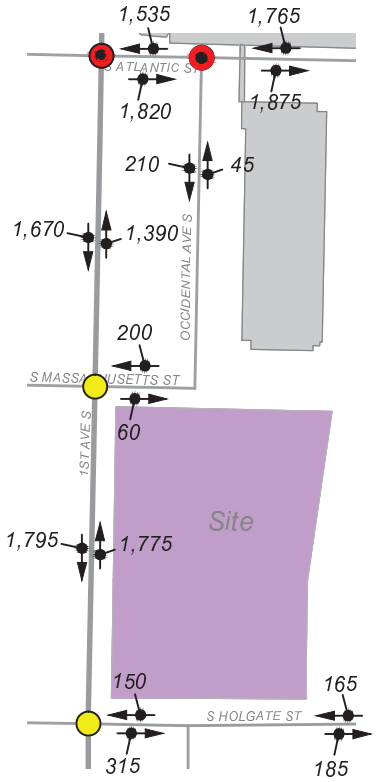


Build

Office Development Without Occidental Vacation



Alt 2 S1 With Occidental Vacation



N

NOT TO SCALE

LEGEND

X = AM PEAK HOUR TRAFFIC VOLUMES

= AM PEAK HOUR LOS

= LOS A - C

= LOS D

= LOS E

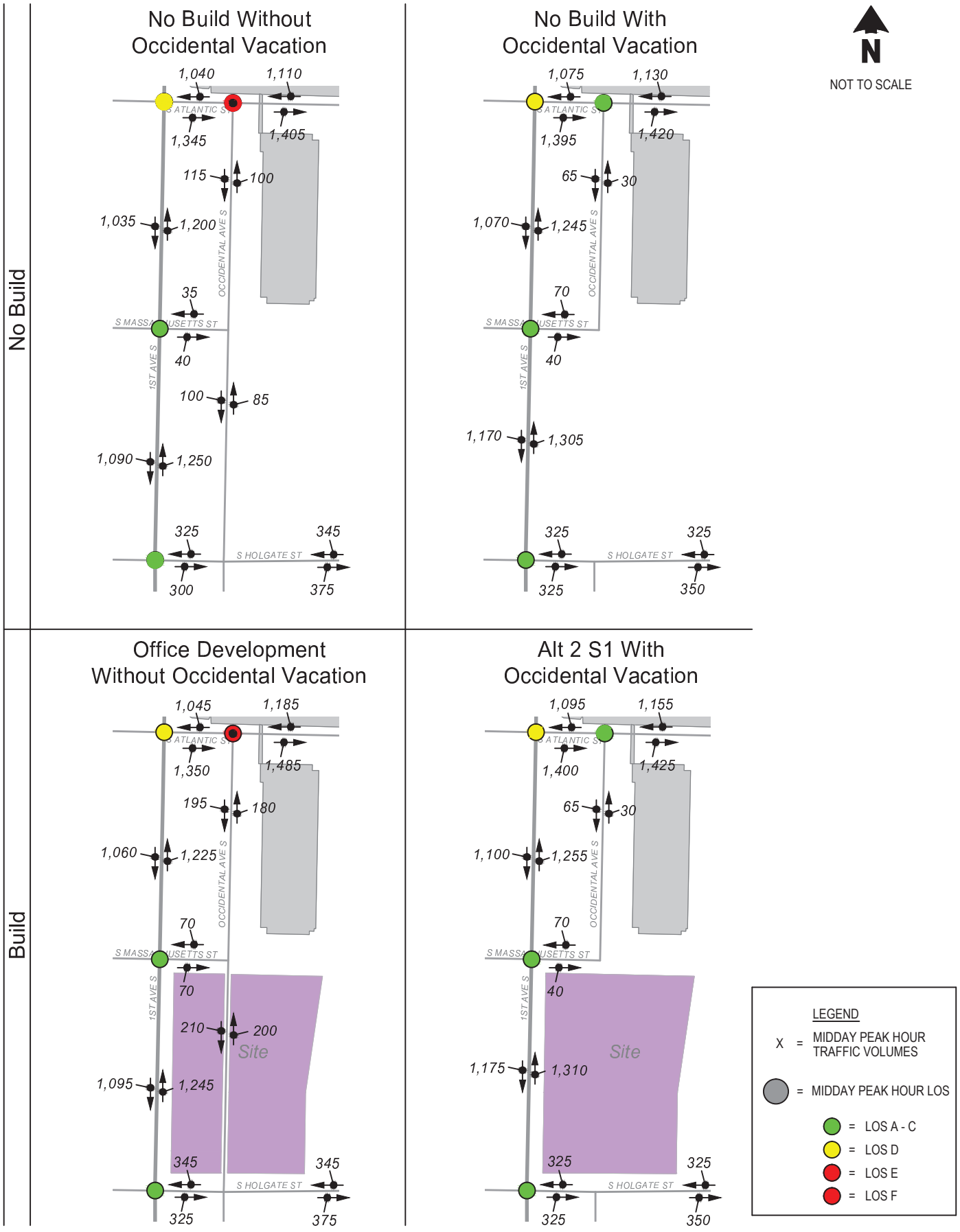
= LOS F

Occidental Avenue S. Street Vacation Weekday AM 2030 LOS & Volumes

Seattle Arena

FIGURE **3.8-20**

transpoGROUP



Occidental Avenue S. Street Vacation Weekday Midday 2030 LOS & Volumes

Seattle Arena

FIGURE **3.8-21**

transpoGROUP

3.8.2.11 Site Access

The proposed Arena would be located north of S. Holgate Street, south of S. Massachusetts Street, and east of 1st Avenue S. The following describes the access and circulation in the vicinity of the site for pedestrians, bicyclists, vehicles, taxi, charter buses, and drop-off/pick-up activity. Figure 3.8-22 illustrates the proposed site plan for the Arena. Alternatives 2 and 3 would have similar access and circulation plans.

Pedestrians

The main entrance to the Arena would be located at 1st Avenue S. and S. Massachusetts Street at the northwest corner of the building. There would be secondary entrances along the 1st Avenue S. frontage and at the southwest corner of the building at 1st Avenue S. and S. Holgate Street. S. Holgate Street would also have service entrances. Along the site frontage, the sidewalks would be widened to 24-feet along 1st Avenue S. and S. Holgate Street. A large pedestrian plaza would be provided along the S. Massachusetts Street frontage, immediately north of the main building entrance.

Bicycles

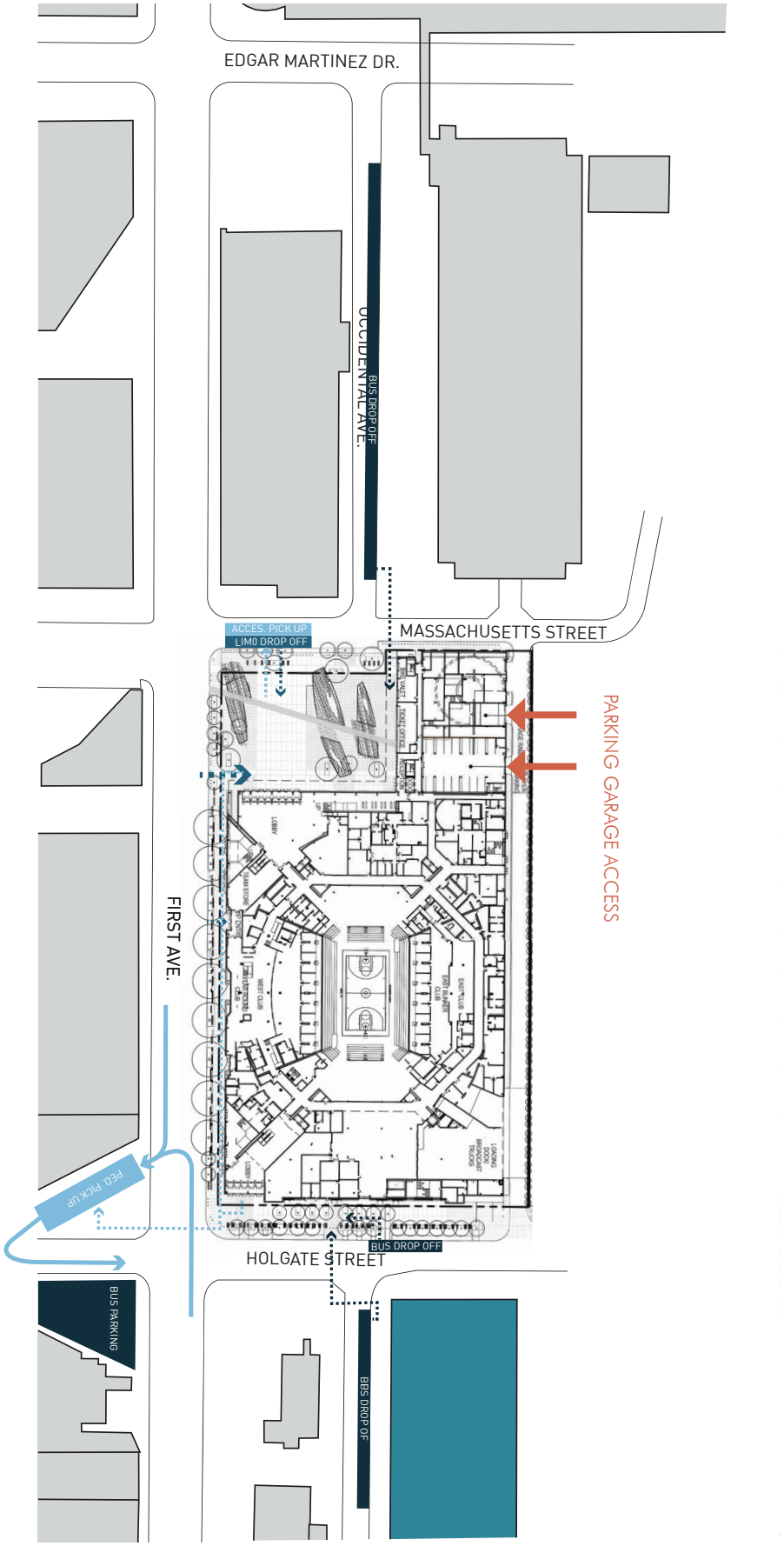
The main access for bicyclists to the Arena would be the S. Massachusetts Street entrance. A bicycle valet with 87 spaces would be provided for attendees using this mode. In addition, 48 bicycle parking spaces would be provided outside the Arena along the 1st Avenue S. street frontage.

Vehicles

On-site parking would be provided for players, coaches, and staff. This parking would be accessed along a private driveway/connection at S. Holgate Street. As described in the evaluation of parking, attendee parking would be provided through shared parking agreements with existing facilities or construction of a new parking garage south of the proposed Arena along S. Holgate Street at Occidental Avenue S. If a new parking garage is provided, it is likely that sidewalks would be improved along the south side of S. Holgate between 1st Avenue S. and the parking garage to facilitate access between the garage and the Arena.

Service and Deliveries

Delivery and service vehicles would also access the site via the private connection at S. Holgate Street. Through an easement, this private connection could also be used to facilitate access and deliveries to the Safeco Field garage.



Stadium District Proposed Arena Site Plan

Seattle Arena

transpogroup

FIGURE
3.8-22

Charter Bus
Drop-off/pick-up for Charter buses would primarily occur along Occidental Avenue S. north of S. Massachusetts similar to what is currently done for Safeco Field events. In the case of multiple events where the area north of the Arena is used by another venue, charter bus staging could be located on Occidental Avenue S. south of S. Holgate Street. If a parking facility is developed on the South Warehouse site, charter bus staging could be integral or adjacent to this garage.

Drop-off/Pick-up
There would be two drop-off/pick-up areas for limos, taxi, other private cars and smaller buses. Personal vehicle drop-off would occur along S. Massachusetts Street in front of the main entrance for those with disabilities and at the northwest corner of the 1st Avenue S./S. Holgate Street intersection for other pedestrians. If a garage is developed south of S. Holgate Street, drop-off could be accommodated along the Occidental Avenue S. frontage.

3.8.2.12 South Warehouse Garage Sensitivity Analysis

Although not included as an integral part of Alternative 2 or 3, an off-site parking garage could be provided to meet parking code requirements should a shared parking agreement not be reached with any existing garage operators to accommodate the code-required parking. This section summarizes the potential impacts associated with the construction of a 1,740 stall parking garage accessed from S. Holgate Street, Occidental Avenue S., and S. Walker Street Potential impacts of the garage were evaluated within the vicinity of the Arena site to identify potential changes to previously presented analysis results. The analysis focuses on the primary transportation elements summarized throughout this document. This includes:

- Traffic volumes
- Pedestrian circulation patterns
- Intersection LOS at intersections within the Arena vicinity
- Freight and Goods
- Parking

The core methodology used to conduct the analysis of each element is consistent with that described previously in each of the respective sections. The analysis was conducted for forecast 2030 conditions based on the same trip generation used for both Alternative 2 Case S1 (Arena only) and Case S3 (Arena, Mariners, and CenturyLink events). The Safeco Field parking garage was assumed to be open and available in both Cases S1 and S3.

Table 3.8-27 provides a summary of the key transportation elements associated with the construction of an approximately 2,025-stall parking garage on Occidental Ave S South of S. Holgate Street.

Table 3.8-27
Parking Garage Transportation Elements

Transportation Element	2030 Alternative 2 With Addition of South Warehouse Garage
Vehicular Traffic Volumes	Provision of a parking garage on the South Warehouse site would result in a shift in traffic accessing the site. The resulting impacts of this shift in traffic distribution include: • For both Case S1 and S3, weekday PM peak hour traffic volumes would generally be similar to the Alternative 2 analysis presented previously with approximately 7 and 16 percent more vehicles westbound vehicles on S. Atlantic Street for Cases S1 and S3, respectively. Southbound on 1st Avenue S. between S. Holgate Street and S. Atlantic Street volumes would increase approximately 11 percent and 30 percent, respectively. • Peak hour activity associated with the garage loading is estimated to total 240 vehicles per hour (vph) under Case S1 and 665 vph under Case S3 during the weekday PM peak hour. • During post-event conditions, garage traffic is unlikely to use S. Holgate Street due to congestion on the roadway from rail crossing activity. Nearly all post-event traffic from the garage is likely to use S. Walker Street to access 1st Avenue S. and the wider roadway network.
Pedestrian Circulation	The South Warehouse garage would double the amount of parking that occurs south of S. Holgate Street from approximately 10 percent to 20 percent. This would result in: • Pedestrian volumes crossing S. Holgate Street at the Occidental Avenue S. and 1st Avenue S. intersections would increase. • There is an existing sidewalk with a width of 10-feet along the south side of S. Holgate Street between 1st Avenue S. and Occidental Avenue S. A review of post event pedestrians flows with the South Warehouse garage along the sidewalk shows severely restricted conditions without widening. At a minimum the sidewalk width would need to be increased to approximately 20-feet to accommodate the post event conditions. • To prevent pedestrians from crossing S. Holgate Street north-south at Occidental Avenue S., physical barriers on the north sidewalk could be considered, which would encourage patrons to use the designated crosswalk at 1st Avenue S.
Traffic Operations	While there is a general shift to the south for traffic accessing the garage, overall intersection operations would be similar to the results previously presented without the garage. Locations where intersection levels of service would change include: • Edgar Martinez Drive S. / I-90 off-ramp worsens from LOS B to LOS C under Case S1 • 1st Avenue S. / S. Massachusetts Street worsens from LOS A to LOS C under Case S3 • 1st Avenue S. / S. Holgate Street worsens from LOS E to LOS F under case S1 • 4th Avenue S. / S. Holgate Street worsens from LOS D to LOS E under case S1 • 4th Avenue S. / S. Lander Street improves from LOS D to LOS C under case S1

Table 3.8-27 (Continued)

Transportation Element	2030 Alternative 2 With Addition of South Warehouse Garage
	• Delays would increase at 1st Avenue S. / S. Atlantic Street and 1st Avenue S. / S. Holgate Street with both operating at LOS F due to either increased vehicular and / or pedestrian volumes. • Since much of the garage traffic would travel through 1st Avenue S./S. Walker Street, this unsignalized intersection would operate at LOS F with the garage. Under post-event conditions, intersection operations generally do not differ from without- garage conditions but the 1st Avenue S./S. Walker Street intersection would also operate at LOS F. The traffic control plans for the Arena would be adjusted to accommodate traffic shifts with garage users directed south on 1st Avenue S. via S. Walker Street.
Traffic Safety	Safety impacts within the study area would remain similar to Alternative 2; however, changes would occur in the immediate vicinity of the South Warehouse garage including: • Additional pedestrians would cross S. Holgate Street resulting in more potential conflicts with vehicular traffic. • As noted above, traffic control plans would be updated to minimize use of S. Holgate Street by vehicular traffic and direct vehicles via 1st Avenue S. and Walker Street.
Freight and Goods	• Occidental Avenue S. south of S. Holgate Street provides access to local businesses and would experience increased traffic volumes and delay. • Additional delay to freight movement along S. Atlantic Street and 1st Avenue S. would occur due to increases in intersection delay.
Parking	• The parking garage would increase the available parking supply and reduce parking demand in other locations such as Downtown, Pioneer Square, and the International District.

3.8.3 Seattle Center Area Alternatives – Alternatives 4 and 5

In the area of Seattle Center, the potential sites for the Seattle Arena are the existing KeyArena and Memorial Stadium. Seattle Center is one of the main performing arts and entertainment areas in the City of Seattle. There are "events" nearly every day throughout the year, from classes to performances to recreational sports, to larger events such as festivals and concerts. Larger events at Memorial Stadium currently have an attendance of approximately 5,000 people, while the average attendance at KeyArena is approximately 12,000 people.
Figure 3.8-20 shows the Seattle Center study area. The study area was defined based on the primary travel patterns for traffic to and from the Seattle Center, as well as anticipated parking impacts. The transportation analysis includes an evaluation of approximately 50 study intersections as illustrated on Figure 3.8-23.

3.8.3.1 Street System

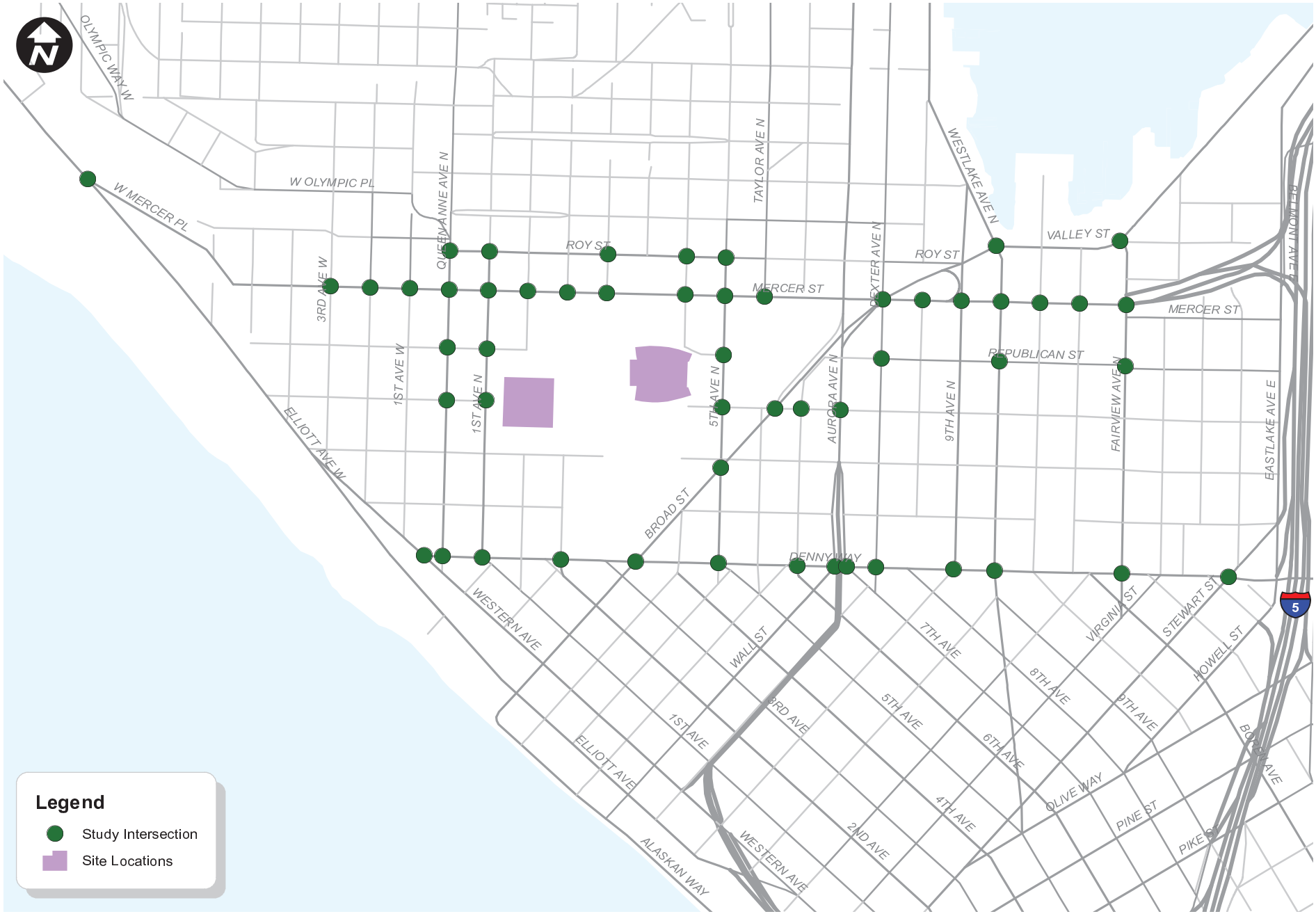
Methodology

The general approach to the evaluation of street system impacts included:

- Inventory of existing roadway infrastructure
- Identification of future transportation projects
- Evaluation of street system impacts considering Alternative 4 and four changes to the street network

Affected Environment

Regional access to the area is provided primarily via I-5 and SR 99 to the east. Table 3.8-28 summarizes the characteristics of major corridors within the study area, highlighting the roadway classification, speed limit, number of lanes, and general characterization of the non-motorized facilities. Roadways in the immediate vicinity of the Seattle Center consist mainly of principal arterials that are a combination of one-and two-way multi-lane streets with on-street parking and sidewalks. Signalized intersections are controlled with actuated traffic signals, which are generally coordinated with adjacent signals. Traffic on the minor approach of unsignalized intersections is controlled with stop signs. The primary arterial routes serving the area are Queen Anne Avenue N., 1st Avenue N. and 5th Avenue N. running north-south and Mercer Street and Denny Way running east-west.



Seattle Center Area Study Intersections

Seattle Arena

FIGURE
3.8-23

transpoGROUP

Table 3.8-28
Seattle Center Area Existing Street System Summary

Roadway	Arterial Classification	Posted Speed Limit	Number of Travel Lanes	Parking?	Sidewalks?	Bicycle Facilities?
Mercer St (West of Aurora Ave N.)	Principal Arterial	30 mph	4 lanes	Some Blocks	Free Flow	Most Blocks
Mercer St (East of Aurora Ave N.)	Principal Arterial	30 mph	5:00 to 7:00 lanes	Free Flow	Free Flow	No
W. Mercer Pl	Principal Arterial	30 mph	2 lanes	Free Flow	Some Blocks	No
W. Mercer St	Principal Arterial	30 mph	2 lanes	Free Flow	Free Flow	No
Roy St (West of 5th Ave N.)	Principal Arterial	30 mph	2 lanes	Most Blocks	Free Flow	Free Flow
Roy St (East of 5th Ave N.)	Access Street	30 mph	2 lanes	Free Flow	Free Flow	No
Denny Way	Principal Arterial	30 mph	4 to 5 lanes	No	Free Flow	No
Broad St	Principal Arterial	30 mph	4 to 5 lanes	No	Free Flow	No
1st Ave N.	Principal Arterial	30 mph	2 to 3 lanes	Most Blocks	Free Flow	Free Flow
Queen Anne Ave N.	Principal Arterial	30 mph	2 lanes	Most Blocks	Free Flow	Free Flow
Elliott Ave W.	Principal Arterial	35 mph	6 to 7 lanes	Most Blocks	Some Blocks	No
9th Ave N.	Principal Arterial	30 mph	2 lanes	Free Flow	Free Flow	Free Flow
Dexter Ave N.	Minor Arterial	30 mph	4 lanes	Free Flow	Free Flow	Free Flow
Westlake Ave N.	Principal Arterial	30 mph	4 lanes	Most Blocks	Free Flow	Most Blocks
Fairview Ave N.	Principal Arterial	30 mph	5 lanes	Most Blocks	Free Flow	No
Stewart St	Principal Arterial	30 mph	4 lanes	Some Blocks	Free Flow	Free Flow
Aurora Ave N.	Principal Arterial	40 mph	6 to 7 lanes	No	Most Blocks	No
5th Ave N.	Principal Arterial	30 mph	4 to 5 lanes	Most Blocks	Free Flow	No
Western Ave N.	Principal Arterial	35 mph	3 lanes	Most Blocks	Free Flow	No
Republican St	Minor Arterial	30 mph	2 lanes	Free Flow	Free Flow	No
Harrison St	Access Street	30 mph	NA	NA	Free Flow	Most Blocks
Valley St	Principal Arterial	30 mph	6 lanes	No	Free Flow	Free Flow

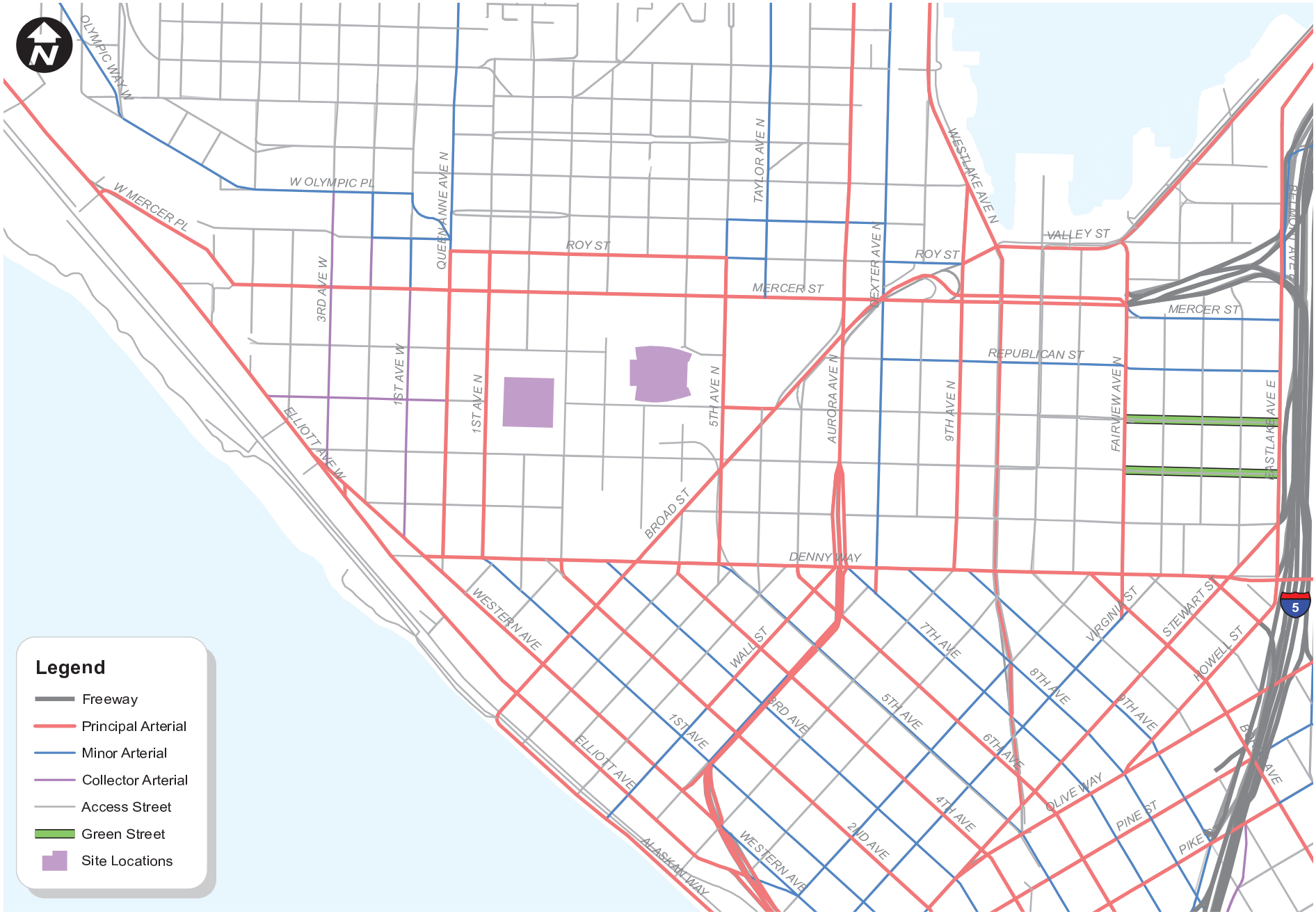
Figure 3.8-24 shows the street functional classifications for the study area. Unlike the Stadium District, the Seattle Center does not have event-related TCPs that change the use of intersections and roadways during events. There were TCPs for the Seattle Center area, when the Sonics NBA franchise played at the KeyArena, including manual traffic control at intersections and key garage exits, lane restrictions, etc. Currently, there are special event signal timing plans for the Mercer Street and Denny Way corridors to flush post-event traffic from the Seattle Center to I-5 and SR 99. This provides for faster egress than would otherwise occur with the surge in traffic after an event. It is noted that these were initiated at a time when Mercer Street was a four-lane one-way eastbound arterial connecting directly to I-5, and the KeyArena still accommodated the Sonics.

Several of the arterials within the Seattle Center area have freight designations. These designations include truck streets, heavy haul routes, and seaport and intermodal connectors. These routes are used by freight operators to access Port of Seattle facilities and the region. Those designations are discussed further in the Freight and Goods section of the report

Impacts of the No Action Alternative at Alternative 4 and 4 Sites

The study area is undergoing major transportation system changes. A review of local and regional capital improvement programs and long-range transportation plans was conducted to determine planned (funded and unfunded) transportation projects that would impact the study area. The review included, but was not limited to, transportation plans from WSDOT, City of Seattle, King County, ST, and the Port of Seattle. Table 3.8-29 provides a summary of key future transportation projects in the study area. In addition, the table provides an understanding of how these transportation projects were incorporated into the No Action Alternative evaluation. Many of the major street system projects impacting vehicular movements would be completed by 2018. Projects slated to be completed beyond 2018 are primarily related to the non-motorized and transit system and would a decrease in dependence on the auto mode, during both typical commuter periods, as well as for events in the Seattle Center.

See Appendix E for a more detailed discussion on how specific transportation project impact the study area. As shown in the table, many of the major projects within the study area are completed prior to 2018.



Seattle Center Area Street System

Seattle Arena

FIGURE
3.8-24

transpoGROUP

Table 3.8-29
Seattle Center: Key Study Area Planned Transportation Projects

Project Description	Responsible Agency	Expected Completion Date	Funded?[1]	Assumed in Analysis?[2]	
				2018	2030
***Alaskan Way Viaduct Replacement*:** SR 99 viaduct replaced with a tunnel between S. Royal Brougham Way and Mercer Street.	WSDOT	TBD[3]	Yes	✓	✓
***SR 520 Bridge Replacement*:** Construction of a new SR 520 floating bridge with 2 general purpose lanes and 1 HOV / transit lane per direction. Transit and non-motorized projects between SR 202 and I-5. The eastside and floating bridge segments are funded. The westside projects in the Montlake Interchange vicinity are not funded.	WSDOT	2017	Partial	✓	✓
Mercer Corridor: Convert Mercer Street, Roy Street, and Valley Street to two-way operations and improve non-motorized access.	SDOT	2015	Yes	✓	✓
First Hill Streetcar: Two-mile streetcar line serving Capitol Hill, First Hill and International District with connections to Link light rail, Sounder commuter rail and bus service.	SDOT	2015	Yes	✓	✓
Link Light Rail: Extension of the regional light rail system. All segments are funded in ST2, but the year of completion may vary depending on revenue available to fund construction. The segments include:	Sound Transit				
North—University District and Capitol Hill		2016	Yes	✓	✓
North—Northgate		2021	Yes		✓
North—Lynnwood		2023	Yes		✓
East—Bellevue and Redmond		2023	Yes		✓
South—Extension to S. 200th Street		2016	Yes	✓	✓
South—Extension to Kent-Des Moines Road		2023	Yes		✓
King Street Station Multimodal Terminal: Improve station access including opening of the Grand Stairs to connect the upper Jackson plaza and King Street Station entrance and a new entrance on Jackson plaza. These connections will transform the station into a transportation hub with easy access to express buses, commuter trains and light rail service.	SDOT	2013	Yes	✓	✓

Table 3.8-29 (Continued)
Seattle Center: Key Study Area Planned Transportation Projects

Project Description	Responsible Agency	Expected Completion Date	Funded?[1]	Assumed in Analysis?[2]	
				2018	2030
Elliott Bay Seawall Replacement: Replacement of the existing seawall along the Seattle waterfront from S Washington Street to Broad Street.	SDOT	2019	Yes		✓
Waterfront Seattle: This project creates a continuous public waterfront between S. King Street and Bell Street and includes the design and construction of the new surface Alaskan Way and Elliott Way arterial streets.	SDOT	2014 and beyond	Partial	✓	✓
Southend Transit Pathway: This project creates a new transit corridor on Alaskan Way and Columbia Street	SDOT / King County Metro Transit	2017	Yes	✓	✓
Convention Place TOD: Expansion of the Washington State Convention Center to include a reconfiguration or relocation of transit access, layover and passenger amenities at Convention Place Station. The EIS is under way for this project.	King County Metro Transit / King County	Unknown	No		
Rapid Ride: Bus rapid transit service in 6 corridors (A through F) and the potential to expand into additional corridors in the future. Service has been initiated in 4 of the 6 corridors, and the E and F Lines are expected to start service in 2014.	King County Metro Transit	2014	Yes	✓	✓
Electric Trolleybus Fleet Replacement: Metro will replace its fleet of 159 trolleybus with modern low-floor vehicles providing more capacity on these routes	King County Metro Transit	2015	Yes	✓	✓
Industrial Way Direct Access Ramps: This project would provide a direct connection from I-5 to and from the south to the SoDo Busway	King County Metro Transit / WSDOT	Unknown	No		
Downtown Neighborhood Projects: Installation of pedestrian countdown signals and sidewalk repairs at the 1st Avenue S. intersections with S Main Street and S. King Street	SDOT	2013	Yes	✓	✓
S. Lander Street Grade Separation: This project grade separates S. Lander St. roadway and the BSNF mainline railroad tracks between 1st Avenue S. and 4th Avenue S.	SDOT	Unknown	No		

1. "Yes" means the project is fully funded for construction, "partial" means the project has some, but not complete funding for construction, and "no" means the project does not have any construction funding.
2. A check indicates that the project was assumed in the analysis related to the horizon year.
3. Due to construction delays, the timing of this is to be determined (TBD) per WSDOT's website March 30, 2015. The improvement was assumed in this analysis for both 2018 and 2030 conditions.

Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

Construction impacts related to the street system would mostly occur on Mercer Street, Denny Way, and 1st Avenue N. adjacent to the site. Street closures and other disruptions to the street system would be minimized and scheduled during the off-peak periods to minimize impacts to the system.

Planned offsite improvements in the study area for 2018 and 2030 conditions are consistent with the No Action Alternative. No additional changes offsite or within the Seattle Center area street system have been identified as a result of Alternative 4. No plans for an Arena on the KeyArena site have been prepared.

Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Construction impacts related to the street system would mostly occur on Mercer Street, Denny Way, and 5th Avenue N. adjacent to the site. Street closures and other disruptions to the street system would be minimized and scheduled during the off-peak periods to minimize impacts to the system.

Planned offsite improvements in the study area for 2018 and 2030 conditions are consistent with the No Action Alternative. No additional changes offsite or within the Seattle Center area street system have been identified as a result of Alternative 5. No plans for an arena on the Memorial Stadium site have been prepared.

3.8.3.2 Public Transportation

Methodology

The general approach to the evaluation of public transportation impacts included:

- Determination of existing transit passenger capacity during pre-and post-event periods for weekday and weekend events
- Identification of future 2018 and 2030 growth in ridership and change in capacity
- Consideration of event ridership associated with event cases for No Action and Alternatives 4 and 5
- Evaluation of capacity needed to support Alternatives 4 and 5
- Consideration of speed and reliability under existing and future conditions

The analysis focuses on weekday event conditions because transit ridership and motorized volumes are highest during this timeframe; this provides a conservative estimate of transit capacity and reliability impacts. The Seattle Center area transit capacity and ridership was developed in the same manner described for the Stadium District. See Appendix E for a detailed description of the methodology used for each mode of public transportation.

In Fall 2014, Seattle voters approved Proposition 1 to provide funding to maintain current transit service on existing routes in the City of Seattle. The measure came after King County Metro had announced that it would cut 180,000 service hours starting in February 2015.

Transit capacity and route assumptions were not revised to reflect Proposition 1 in this analysis. Proposition 1 affects only Seattle routes, which serve less than half of the event patrons who use transit; thus, the impact of the service change would be minimal. The added transit capacity is not anticipated to change the analysis results in the over capacity zones. Also, the specific schedule changes resulting from Proposition 1 have not yet been released.

Affected Environment

Regional public transit is provided by King County Metro Transit and the City of Seattle and offers a number of ways for people to access Seattle Center including bus, streetcar, and monorail transit as illustrated on Figure 3.8-25.

The capacity of these transit services to transport people to and from the Seattle Center varies by day (weekday or weekend service) and by the time of day (peak commuter period or evening services). This section summarizes the total passenger ridership and available passenger capacity to and from the Stadium District during a weekday evening for transit modes; this includes inbound to downtown Seattle transit service from 5:00 to 7:00 PM and outbound from downtown Seattle transit service from 9:00 to 11:00 PM.

Bus Transit

Bus transit for the Seattle Center area is concentrated along 1st Avenue, Queen Anne Avenue N., Mercer Street, Denny Way, 5th Avenue, Aurora Avenue N., and Dexter Avenue N. (see Figure 3.8-25). Bus service to the area is currently provided by King County Metro Transit.

The number of buses in service on routes through the Seattle Center area during the peak weekday afternoon commuter period is higher leaving the downtown Seattle core than entering. Also, the number of buses in service in the late evening is less than the weekday afternoon commuter period. Bus headways are shorter during peak weekday afternoon commuter periods (10 to 30 minutes) compared to late evening and weekend service (30 to 60 minutes).



Seattle Center Area Transit Facilities and Corridors

Seattle Arena

FIGURE
3.8-25

transpoGROUP

Bus Ridership: Existing bus ridership was provided by King County Metro Transit for buses serving the Seattle Center area that travel to downtown Seattle from 5:00 to 7:00 PM and out of downtown Seattle from 9:00 to 11:00 PM. There is no ST service to Seattle Center area. The available bus service was grouped into six service zones or corridors consistent with the Stadium District analysis:

- Zone 1: Magnolia, Ballard and Fremont area of Seattle
- Zone 2: Along SR 99, I-5, and SR 520, and areas to the north and northeast
- Zone 3: Bellevue, Issaquah, and areas east along I-90 to the east
- Zone 4: Southeast Seattle, Tukwila, and Renton
- Zone 5: South on I-5, Federal Way, Burien, and areas to the south
- Zone 6: West Seattle

Bus transit provides almost double the passenger capacity for bringing people to an event from 5:00 to 7:00 PM compared to leaving an event from 9:00 to 11:00 PM. Also, the amount of bus passenger capacity varies to the different areas of King County; there is more bus service to Ballard / Freemont and along SR 99, I-5, and SR 520 compared to other service centers, for buses operating through the Seattle Center area. The occupancy rate for these buses, which is the total number of passengers on buses through the Seattle Center area divided by the total passenger capacity of those buses, is approximately 36 percent for both inbound (5:00 to 7:00 PM) and approximately 33 percent outbound (9:00 to 11:00 PM) service. This means that approximately 3,000 people were traveling to the Seattle Center area and 1,500 people were traveling away from the Seattle Center area to areas served by the selected King County Metro Transit routes. Also, the remaining capacity on all buses could accommodate approximately 5,350 passengers inbound and 3,150 outbound during these time frames. During peak commute periods and event days, specific buses and routes within the six zones experience higher ridership and overcrowding.

Weekday bus service (passenger capacity) is reduced by approximately 30 percent from 5:00 to 7:00 PM on weekends and approximately 10 percent from 9:00 to 11:00 PM. Based on King County Metro Transit ridership, the average number of passengers is approximately 30 percent less on weekends from 5:00 to 7:00 PM compared to weekdays and almost no change from 9:00 to 11:00 PM.

Speed and Reliability. On-time performance information was provided by King County Metro Transit for routes serving the Seattle Center area, which was used to determine the reliability of buses to meet schedules.

King County Metro Transit bus service to downtown Seattle from 5:00 to 7:00 PM was on-time approximately 75 percent of the time. Buses leaving downtown Seattle from 9:00 to 11:00 PM were on-time approximately 77 percent of the time. The travel time for buses (an indication of speed and reliability) would be similar to general purpose traffic because they operate in mixed

flow through the Seattle Center area. The traffic operations impact analysis of this report provides a detailed evaluation of four key routes within the Stadium District including Mercer Street, Denny Way, and 5th Avenue, which have bus service.

Other Service Information. The effects of Proposition 1, which was passed in Fall 2014 to fund current levels of King County Metro bus service in the City of Seattle through 2020, were not taken into account in this analysis for reasons mentioned at the beginning of this section.

ST provides additional bus service as necessary to accommodate passenger loads to special events. Prior to events, an assessment of extra service is determined based on ticket sales for the event. Historically, when the Sonics were playing at KeyArena, ST notes that they did not typically experience a notable ridership uptake because getting to KeyArena would involve a transfer.

South Lake Union Streetcar

The South Lake Union Streetcar provides service between South Lake Union and Westlake shopping center with five intermediate stops along Westlake Avenue and Terry Avenue N. in both directions. Stops are located within a 10-minute walk of the Seattle Center area; the closest stop is located at the intersection of Westlake Avenue and Thomas Street. Currently, the streetcar operates on 15-minute headways. The South Lake Union Streetcar operates from 6:00 AM to 9:00 PM Monday through Thursday, and 6:00 AM to 11:00 PM on Friday and Saturday. Sunday service is operated from 10:00 AM to 7:00 PM. With the existing service, streetcar service would not be available after events from Sunday to Thursday. Weekday streetcar service (passenger capacity) is reduced by approximately 20 percent from 5:00 to 7:00 PM on weekends and no change from 9:00 to 11:00 PM.

Streetcar transit provides a total capacity for approximately 1,120 passengers traveling inbound and outbound to the Seattle Center area (the Streetcar does not provide outbound service from Monday through Thursday). The City of Seattle provided a limited sampling of daily streetcar passenger observations summarized by stop; on average, the South Lake Union Streetcar carried 2,200 passengers. By applying the daily average load at stop closest the Seattle Center area; streetcars would be carrying approximately 165 passengers inbound and 80 passengers outbound from Westlake Center in downtown Seattle. This means the South Lake Union Streetcar has a remaining approximate passenger capacity of 1,235 inbound passengers and 1,040 outbound passengers. Because the average daily passenger load was used in this analysis, it is likely the passenger loads are higher from 5:00 to 7:00 PM and lower from 9:00 to 11:00 PM.

Monorail

The Seattle Center Monorail, which is owned by the City of Seattle, provides a non-stop connection between Westlake Center (near 5th Avenue and Pine Street) to Seattle Center. The Monorail operates on 10-minute headways from 7:30 AM to 9:00 PM Monday through Thursday, and from 7:30 AM to 11:00 PM on Friday. The Seattle Center Monorail also provides

a direct connection to light rail at Westlake Center. Weekend monorail service or passenger capacity from 5:00 to 7:00 PM is the same as weekday service.

Existing monorail ridership was provided by Seattle Monorail Services, the operator of the Seattle Center Monorail. Today, monorail transit provides a total capacity for approximately 2,400 passengers traveling inbound and outbound to Seattle Center. Monorail transit has approximately 240 passengers from Seattle Center to Westlake Center (inbound to downtown Seattle) from 5:00 to 7:00 PM and approximately 120 passengers to Seattle Center from 9:00 to 11:00 PM (Friday-only because service stops at 9:00 PM Monday through Thursday). This means the remaining capacity on monorail could accommodate approximately 2,160 passengers inbound and 2,280 outbound during these time frames.

Seattle Monorail Services noted that monorail ridership increases by approximately 150 to 200 people with events at KeyArena such as concerts and Sonics games. There is a slight increase in ridership of approximately 40 to 50 passengers with events at Safeco Field and CenturyLink Field.

Washington State Ferries Transit

WSF provides ferry service to Seattle at Colman Dock, located near Alaskan Way and Yesler Way. Colman Dock is approximately one and a half miles south of the Seattle Center area. Ferries to / from Seattle serve Bainbridge Island and Bremerton. The ferries have arrivals and departures scheduled throughout the day with headways of approximately 60 minutes for Bainbridge Island service and approximately 75 minutes for Bremerton service. Ferries serving both of these routes are some of the largest ferries in WSF's fleet, providing combined vehicle and passenger service. According to WSF's website, these ferries are capable of transporting 2,500 passengers per trip, in addition to vehicles. Weekend ferry service (passenger capacity) increases by approximately 10 percent over weekday ferry service.

WSF Colman Dock service provides a total capacity for approximately 7,300 passengers traveling inbound to the Seattle Center area from 5:00 to 7:00 PM and 9,800 passengers outbound from 9:00 to 11:00 PM.

An average inbound passenger load of approximately 210 passengers is estimated. During May 2012 service, ferries had an average load of approximately 640 passengers traveling outbound from 9:00 to 11:00 PM.

Impacts of the No Action Alternative at Alternative 4 and 5 Sites

This section describes the impacts of the No Action Alternative for analysis years 2018 and 2030. As compared to weekday, weekend service characteristics were assumed to be similar to existing conditions.

Year 2018

By 2018, the Alaskan Way Viaduct Replacement project is scheduled to be complete and would reconnect John Street, Thomas Street and Harrison Street, which were previously bisected by

SR 99. This improvement was not assumed to change ridership, but would provide alternative pedestrian connections to and from the South Lake Union Streetcar and bus transit routes to the Seattle Center. The new fleet of King County trolley buses are anticipated to reduce bus dwell times at bus stops, but were not assumed to impact passenger demand or capacity.

For all transit modes serving the Seattle Center, no change in passenger capacity (service levels) was assumed because of the uncertainty of transit funding.

Bus Transit: The number of bus riders was anticipated to increase by approximately two percent annually from 2013 to 2018. Headways were assumed to remain unchanged. King County Metro Transit Rapid Ride E-Line began service after this analysis was completed and has increased service in the study area. Bus transit passenger loads would increase by approximately 710 inbound and 545 southbound passengers for No Action Case K2/M2 compared to existing conditions. This includes transit riders for 12,000 patron events at KeyArena and 5,000 patron events at Memorial Stadium as well as background growth.

The total passenger loads for No Action Case K2/M2 could be accommodated with assumed bus service levels for all service zones, Buses do not operate directly from Seattle Center to I-90 in the evening and event attendees would be required to use other bus routes, monorail, or streetcar to transfer to bus service to the east in downtown Seattle. The remaining passenger capacity on these modes is sufficient to accommodate the approximately 290 event attendees connecting from Seattle Center to east side transit service in downtown Seattle. The number of event attendees required to transfer would be less for other No Action scenarios because there are less event attendees.

Because the No Action Case K2/M2 scenario has the highest assumed passenger demand, the No Action Case K1 (12,000 patrons) and Case M1 (5,000 patrons) could also be accommodated. Similar to existing conditions, some bus routes would experience higher levels of passenger ridership and potentially overcrowding. The travel time for buses (an indication of speed and reliability) would be similar to general purpose traffic because they operate in mixed flow through the Stadium District (not including the time it takes for buses to serve bus stops). Travel times under 2018 conditions increase from existing conditions and further increase with the addition of event traffic, compared to existing conditions.

Streetcar Transit: The number of people who would use streetcar transit was anticipated to increase by approximately two percent annually from year 2013 to year 2018. Headways were assumed to remain unchanged. Streetcar passenger loads would increase by approximately 230 inbound and 220 outbound passengers for the No Action Case K2/M2 compared to existing conditions. Because No Action Case K2/M2 has the highest assumed passenger demand and could be accommodated with existing streetcar service levels, No Action Case K1 and Case M1 could also be accommodated.

Monorail Transit: The number of people who would use the Seattle Monorail was anticipated to increase by approximately one percent annually from year 2013 to year 2018. Headways were assumed to remain unchanged. Monorail passenger loads would increase by

approximately 945 inbound and 940 outbound passengers for the No Action Case K2/M2 compared to existing conditions. Because Case K2/M2 has the highest assumed passenger demand and could be accommodated with existing monorail service levels, the No Action Case K1 and Case M1 with an event at either Memorial Stadium or KeyArena could also be accommodated.

Washington State Ferries: No change in the number of WSF vessels serving Colman Dock was assumed from the year 2013 to 2018. The number of walk-on passengers was anticipated to increase by approximately three percent annual from 2013 to 2018. In addition, approximately 340 inbound and 405 outbound passengers would use WSF service for part of their trip to events at Seattle Center for the No Action Case K2/M2. Event attendees would connect between Colman Dock and the Seattle Center area using bus, monorail, streetcar, and / or other services such as a taxi, walking, or bicycling. It is difficult to anticipate the impact of these event attendees on public transit. Many of them would already be in or around the Seattle area, having completed the ferry-leg of their trip in the morning for the commute into work. From 5:00 to 7:00 PM bus routes through downtown would experience an increase in passenger demand as some ferry riders use bus service to travel to an event at the Seattle Center area. Another 80 patrons were assumed to drive to connect to Seattle Center and complete part of their trip using WSF service.

Year 2030

For all transit modes serving the Seattle Center area, no change in passenger capacity (service levels) was assumed because of the uncertainty of transit funding.

Bus Transit: The number of people who would use bus service was anticipated to increase by approximately 2.1 percent annually to year 2030. Headways were assumed to remain unchanged. Bus transit passenger loads would increase by approximately 1,620 inbound and 980 outbound passengers for No Action Case K2/M2 compared to existing conditions. Because No Action Case K2/M2 has the highest assumed passenger demand and could be accommodated with existing bus service levels, No Action Case K1 and Case M1 could also be accommodated.

The No Action Case K2/M2 (assumes 12,000 patrons at KeyArena and another 5,000 patrons at Memorial Stadium) could be accommodated with assumed bus service levels for all service zones, except for:

- Inbound bus routes serving southeast Seattle and Renton areas (Zone 4): Bus passengers would use other bus and light rail service to downtown Seattle accessed via park-and-ride lots or local feeder bus service and transfer in downtown Seattle to bus, monorail, and / or streetcar services. This would impact approximately 65 passengers.

Streetcar Transit: The number of people who would use streetcar service was anticipated to increase by approximately two percent annually to year 2030. Headways were assumed to remain unchanged. Streetcar passenger loads would increase by approximately 450 inbound and 430 outbound passengers for the No Action Case K2/M2 compared to existing conditions.

The total passenger load for this scenario and the 2030 No Action Case K1 and Case M1, which would have few passengers, could be accommodated with assumed streetcar service levels.

Monorail Transit: The number of people who would use the Seattle Monorail was anticipated to increase by approximately one percent annually to year 2030. Headways were assumed to remain unchanged. Monorail passenger loads would increase by approximately 1,180 inbound passengers and 1,160 outbound passengers for the No Action Case K2/M2 compared to existing conditions. The total passenger load for this scenario and the 2030 No Action Case K1 and Case M1, which would have few passengers, could be accommodated with assumed monorail service levels.

Washington State Ferry Service: The number of people who would use ferry was anticipated to increase by approximately three percent annually to the year 2030. No change in the number of WSF vessels serving Colman Dock was assumed from the year 2018 to 2030. Approximately 370 inbound and 500 outbound passengers would use WSF service for part of their trip to events at Seattle Center for the No Action Case K2/M1 scenario. This scenario and the 2030 No Action Case K1 and Case M1, which would have fewer passengers, could be accommodated with assumed ferry service levels.

Event attendees would connect between Colman Dock and the Seattle Center area using bus, monorail, streetcar, and / or other services such as a taxi, walking, or bicycling. It is difficult to anticipate the impact of these event attendees on public transit on weekdays. Many of them would already be in or around the Seattle area, having completed the ferry-leg of their trip in the morning for the commute into work. From 5:00 to 7:00 PM bus routes through downtown would experience an increase in passenger demand as some ferry riders use bus service to travel to an event at Seattle Center. Another 25 patrons would drive to connect to Seattle Center and complete part of their trip using WSF service.

Impacts of Alternatives 4 and 5

Alternative 4 scenarios assume a 20,000-person event at the site of the existing KeyArena with a 5,000-person event at the existing Memorial Stadium. Alternative 5 scenarios assume a 20,000-person event at the site of the existing Memorial Stadium with a 12,000-person event at the existing KeyArena.

Alternative 4 would result in a small reduction in the number of event attendees using transit to travel to the Seattle Center area compared to Alternative 5. The operational and construction impacts would be similar to Alternative 5.

Construction of either Alternative 4 or Alternative 5 could result in some increase in ridership as a result of construction workers traveling to and from the site. It is anticipated that public transportation impacts related to construction would be less than a 20,000-person event at a new arena. In addition, construction related activities could impact nearby transit routes and stops as well as pedestrian accessibility to these facilities. A construction management plan could be prepared and impacts to transit could be coordinated with the transit agency in advance and appropriate relocation and signage provided.

Year 2018

The analysis assumes a fully-attended event, with approximately 2,320 event attendees arriving by bus, light rail (using another transit mode to connect to the Seattle Center area), streetcar, monorail, and ferry: eight percent arrive by transit and another four percent arrive by ferry. As discussed for the Stadium District site, it is anticipated that the passengers driving on the ferry to go to a new arena would be minimal given the estimated traffic congestion between the ferry dock and arena. The analysis assumed that approximately 90 percent of ferry riders would use transit to connect to a new arena.

Approximately 10 percent of event attendees using ferry would take their vehicle on the ferry and could arrive outside the analysis period such as during the morning commute period as they take ferry to work and then attend an Arena event in the evening. As such, they are included in the No Action condition for parking and are not additive to the impact of the project.

Transit service provided in the study area is assumed consistent with No Action conditions. Also, park-and-ride lots served by light rail to the Seattle Center area would experience increased use during events.

Bus Transit: It was estimated that approximately 17 percent of event attendees on transit would use existing bus service to a new arena. This would add approximately 390 bus passengers traveling to and from the Seattle Center area.

Alternative 5 (which assumes 20,000 event attendees at a new arena and 12,000 patrons at KeyArena) Case M2 could be accommodated with assumed bus service levels for all service zones.

Travel times increase with the addition of arena event traffic with a substantial increase of over 30 minutes along westbound Mercer Street.

Streetcar Transit: It was estimated that approximately 10 percent of event attendees on transit would use streetcar service to a new arena. This would add approximately 230 streetcar passengers traveling to and from the Seattle Center area on the South Lake Union streetcar for Case M2. This scenario and the 2018 Case M1 could be accommodated with assumed streetcar service levels.

Monorail Transit: It was estimated that approximately 42 percent of event attendees on transit would use monorail service to the arena. This would add approximately 980 monorail passengers traveling to and from the Seattle Center area for the Alternative 5 Case M2. This scenario and the 2018 Alternative 5 Case M1 could be accommodated with assumed monorail service levels.

Washington State Ferries: No change in the number of WSF vessels serving Colman Dock was assumed from the year 2013 to 2018. The number of walk-on passengers was anticipated to increase by approximately three percent annual from 2013 to 2018. Approximately 720 event

attendees would use WSF service for part of their trip to events at Seattle Center for the Alternative 5 Case M2 scenario; there is sufficient capacity to accommodate event attendees. Event attendees would connect between Colman Dock and the Seattle Center area using bus, monorail, streetcar, and / or other services such as a taxi, walking, or bicycling. It is difficult to anticipate the impact of these event attendees on public transit. Many of them would already be in or around the Seattle area, having completed the ferry-leg of their trip in the morning for the commute into work. From 5:00 to 7:00 PM bus routes through downtown would experience an increase in passenger demand as some ferry riders use bus service to travel to an event at Seattle Center.

Year 2030

Alternative 5 would construct a new 20,000-person arena near the Seattle Center. The analysis assumes a fully-attended event, with approximately 2,720 event attendees arriving by bus, light rail, streetcar, and ferry; 10 percent arriving by transit and another four percent arriving by ferry. Consistent with 2018 conditions, approximately 10 percent of event attendees using ferry would take their vehicle on the ferry and could arrive outside the analysis period such as during the morning commute period as they take ferry to work and then attend an Arena event in the evening. As such, they are included in the No Action condition for parking and are not additive to the impact of the project.

Transit service provided in the study area is assumed consistent with No Action conditions. Also, park-and-ride lots served by light rail to the Seattle Center area would experience increased use during events.

Bus Transit: It was estimated that approximately 13 percent of event attendees taking transit would take bus service to a new arena. This would add approximately 340 bus passengers traveling to and from the Seattle Center area.

Alternative 5 (which assumes 20,000 event attendees at a new arena and 12,000 patrons at KeyArena for Case M2) could be accommodated with assumed bus service levels for all service zones, except for:

- Inbound bus routes serving southeast Seattle and Renton areas (Zone 4): Bus passengers would use other bus and light rail service to downtown Seattle accessed via park-and-ride lots or local feeder bus service and transfer in downtown Seattle to bus, monorail, and / or streetcar services. This would impact approximately 90 passengers.

The number of event attendees required to transfer would be less for other event scenarios because there are less event attendees, but would have the same over capacity considerations except for I-5 and south. Travel times for 2030 are similar to 2018 conditions.

Streetcar Transit: It was estimated that approximately 16 percent of event attendees on transit would use streetcar service to a new arena. This would add approximately 440 streetcar passengers traveling to and from the Seattle Center area on the South Lake Union Streetcar for

Alternative 5 Case M2. This scenario and the 2030 Alternative 4 Case K1 could be accommodated with assumed streetcar service levels.

Monorail Transit: It was estimated that approximately 32 percent of event attendees on transit would use monorail service to a new arena. This would add approximately 650 monorail passengers traveling to and from Seattle Center for Alternative 5 Case M2. Alternative 5 Case M1 could also be accommodated with assumed monorail service levels.

Washington State Ferries: The number of people who would use ferry was anticipated to increase by approximately three percent annually to the year 2030. No change in the number of WSF vessels serving Colman Dock was assumed from the year 2018 to 2030. Approximately 720 event attendees would use WSF service for part of their trip to events at Seattle Center for the Alternative 5 Case M2 scenario. This scenario and 2030 Alternative 5 Case M1 could be accommodated with assumed WSF service levels. Event attendees would connect between Colman Dock and the Seattle Center area using bus, monorail, streetcar, and / or other services such as a taxi, walking, or bicycling. It is difficult to anticipate the impact of these event attendees on public transit. Many of them would already be in or around the Seattle area, having completed the ferry-leg of their trip in the morning for the commute into work. From 5:00 to 7:00 PM bus routes through downtown would experience an increase in passenger demand as some ferry riders use bus service to travel to an event at Seattle Center.

3.8.3.3 Pedestrians

Methodology

The pedestrian environment in the Seattle Center study area is significantly different than that described in the Stadium District. There is a well-connected gridded sidewalk network with multiple paths for pedestrians to take to and from the Seattle Center area. With the multitude of pedestrian paths in the study area capacity is not an issue, and performing a link evaluation does not provide an understanding of pedestrian impacts. Given the difference between the two study areas, a methodology tailored toward the Seattle Center study area was used to evaluate pedestrian impacts. The approach included:

- Inventory of existing pedestrian facilities
- Identification of existing gaps in connectivity
- Review of existing pedestrian volumes
- Determination of future plans related to pedestrian facilities and the potential shift in pedestrian travel patterns with new facilities
- Evaluation of pedestrian impacts considering change in volumes

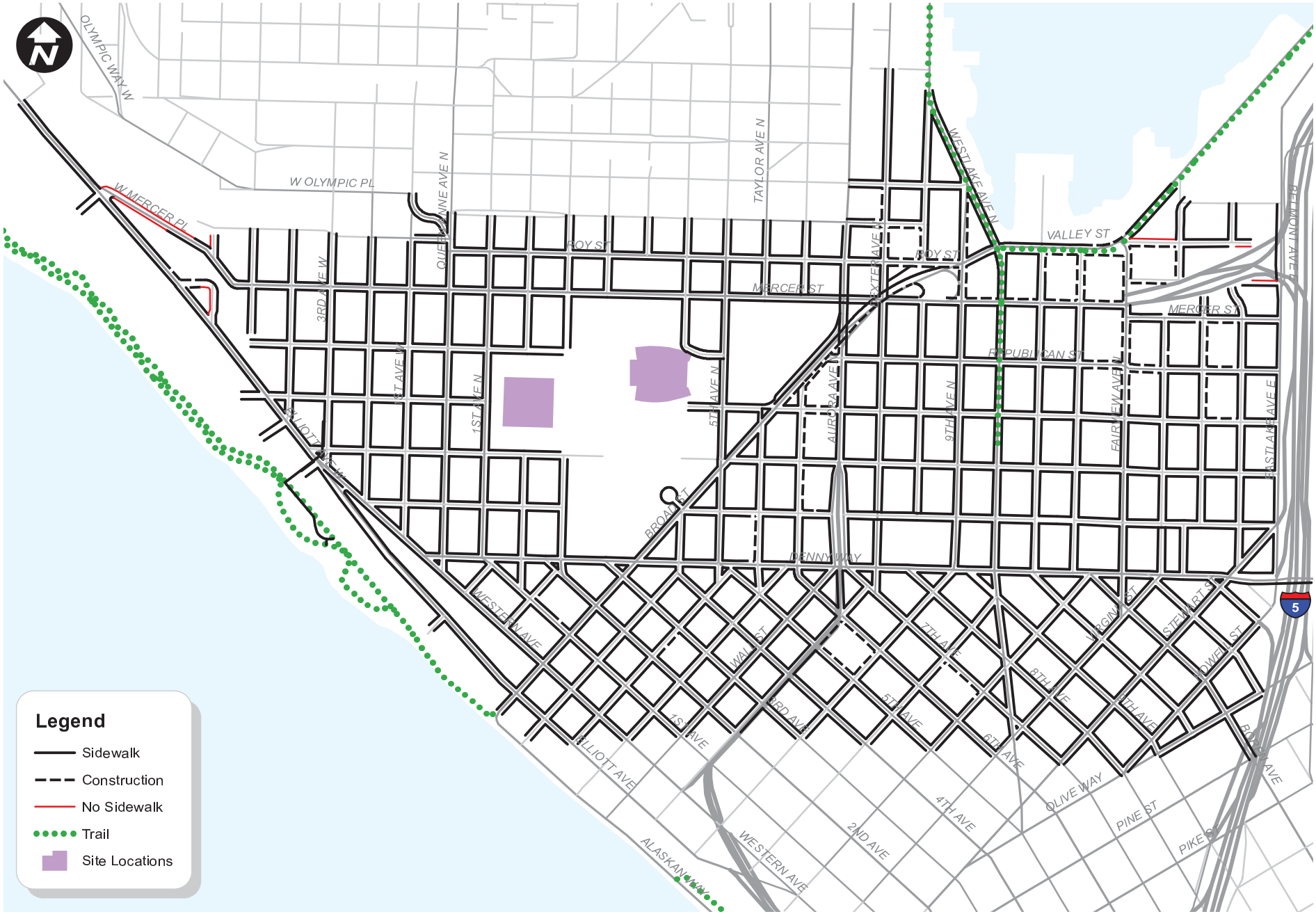
Affected Environment

Figure 3.8-26 shows the pedestrian network in the study area and identifies both existing trails and gaps in the sidewalk network. Sidewalks are provided along nearly all roadways with few exceptions. There is a missing connection in the northwest portion of the study area along West Mercer Place as well as limited east-west connections across SR 99. A large amount of construction is occurring within the study area particularly in the South Lake Union area along Mercer Street.

The study area contains a gridded pedestrian network creating high connectivity between activities centers, businesses and parking; however, as noted above, connectivity from the Seattle Center east to east of SR 99 is limited. Off-street parking surrounds the Seattle Center area, with a large concentration of parking directly to the east (adjacent to Memorial Stadium) and southwest (near KeyArena). Sidewalks connect these parking lots to the Seattle Center area.

There are two off-street multi-use trail in the study area, the Elliot Bay Trail and Cheshiahud Lake Union Loop. The Elliott Bay Trail runs along the waterfront to the west of the study area; it extends between the Waterfront and SoDo neighborhood to the south and to Magnolia on the north. Pedestrians can access the trail at several crossings along Elliot Avenue W. The Cheshiahud Lake Union Trail connects the South Lake Union neighborhood with Gasworks Park and links a number of pocket parks that ring the Lake. Access to the Cheshiahud Trail is currently limited due to the lack of connections across SR 99.

Significant transportation improvement projects have been under construction in the study area for the past several years. Due to the continuing effects of ongoing construction, previous studies and historical data sources were utilized to understand existing pedestrian activity near the Seattle Center. Higher pedestrian volumes are seen along the principal arterials of Mercer Street, Denny Way, Queen Anne Avenue N., 1st Avenue N., and 5th Avenue N. The intersections with the highest pedestrian activity are Queen Anne Avenue N. / Mercer Street and 1st Avenue N. / Mercer Street. These high pedestrian volumes are reflective of the intersection proximity to the Seattle Center and commercial uses in the area.



Seattle Center Area Pedestrian Facilities

Seattle Arena

FIGURE
3.8-26

transpoGROUP

Impacts of the No Action Alternative at Alternative 4 and 5 Sites

There are several area-wide transportation projects that will enhance the pedestrian system in the Seattle Center study area. In addition, planned development is anticipated to increase pedestrian demands. This section focuses on general pedestrian demands and shifting pedestrian orientations associated with new facilities and linkages.

2018 Conditions

The SR 99 North Portal and Mercer Corridor projects will result in enhanced pedestrian connectivity and infrastructure. The Mercer Corridor improvements are scheduled to be completed by 2015. Pedestrian improvements are also included on Roy and Valley Streets. The completion of these improvements will create a viable pedestrian linkage between the Seattle Center area and the South Lake Union Neighborhood as well as the South Lake Union Park and related trail connections.

In addition, the completion of the SR 99 North Portal will result in sidewalk connections across SR 99 at John, Harrison and Thomas Streets, effectively linking the Seattle Center area and the neighborhood surrounding the Bill and Melinda Gates Foundation Campus with the South Lake Union area.

Under No Action, changes in non-motorized demands are likely to occur as a result of ongoing redevelopment associated with neighborhoods surrounding the Seattle Center; however, no significant change in the Seattle Center area pedestrian activity is anticipated. There could be some increase in general pedestrian activity between the Seattle Center and points east, with the enhancements to the Mercer Corridor as well as connections across SR 99 described above. In addition, pedestrian activity would likely increase in South Lake Union and the Denny Triangle neighborhoods as a result of commercial or residential redevelopment. In general, increased pedestrian activity is considered a positive impact since with this activity a sense of pedestrian and personal safety results.

2030 Conditions

No additional major infrastructure projects are funded or planned that would directly affect Seattle Center area non-motorized transportation in 2030. While pedestrian travel is expected to grow between 2018 and 2030, no significant increases or jumps in activity are foreseen.

Overall, the No Action Alternative would not result in an adverse impact to non-motorized transportation for the Seattle Center area alternatives.

Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

Alternative 4 construction would result in intermittent sidewalk and pedestrian facility closures along the frontage of the site. A construction management plan would be developed and adequate pedestrian circulation would be provided adjacent to the construction site through the use of temporary walkways, detours and signs.

Development of Alternative 4 would not result in any changes to the pedestrian facilities within the Seattle Center area. Consistent with the Stadium District, pedestrian levels associated with an event at an arena would be highest during the post-event egress. Currently, average attendance for the KeyArena is approximately 12,000 people. Alternative 4 would result in a net increase of 8,000 pedestrians for a total of 20,000 pedestrians associated with an arena event. As discussed previously, the existing and planned pedestrian network is well-connected and facilities will accommodate increased pedestrian demand levels. This type of pedestrian demand or higher is already accommodated at the Seattle Center with the several festivals held there each year.

Increases in pedestrian as well as vehicle demands on events days would increase the potential for conflicts between these two modes. Pedestrian impacts in 2018 and 2030 are anticipated to be similar.

Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Alternative 5 construction would result in intermittent sidewalk and pedestrian facility closures along the frontage of the site. A construction management plan would be developed and alternate pedestrian circulation would be provided adjacent to the site through the use of temporary walkways, detours and signs.

Pedestrian impacts associated with Alternative 5 are anticipated to be consistent with those described for Alternative 4.

3.8.3.4 Bicycle

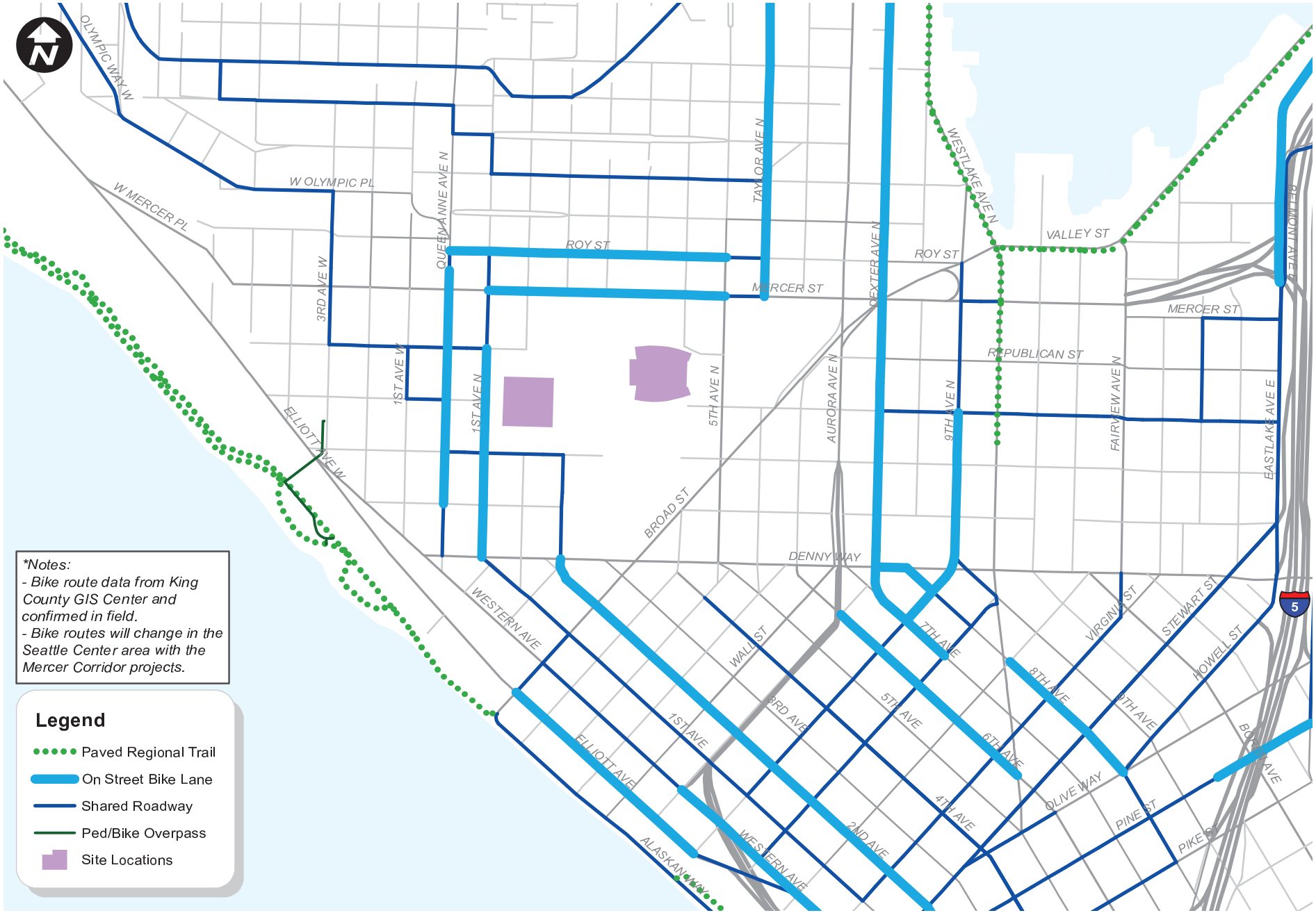
Methodology

The general approach to the evaluation of bicycle impacts included:

- Inventory of existing bicycle facilities
- Identification of future plans related to bicycle facilities
- Evaluation of bicycle impacts considering change in volumes

Affected Environment

Figure 3.8-27 illustrates the bicycle network within the study area. The facilities in the study area consist mostly of bike lanes and designated shared roadways. The roadways with bicycle facilities closest to the arena sites (at KeyArena and Memorial Stadium) are Queen Anne Avenue N. and 1st Avenue N. to the west, and Mercer Street and Roy Street to the north. All four of these streets have a mix of on-street bike lane and sharrows (i.e., marked shared bicycle within the vehicle travel lanes). In addition, portions of the arterial streets to the west and south of Seattle Center are designated routes for bicycles including 2nd Avenue N., Thomas Street, W. Harrison Street, W. Republican Street, and 3rd Avenue W.



Seattle Center Area Bicycle Facilities

Seattle Arena

FIGURE
3.8-27

transpoGROUP

As described in the Pedestrians section, there are off-street multi-use trails in the study area, including the Elliot Bay Trail, and Cheshiahud Lake Union Loop. The Elliot Bay Trail runs along the Waterfront to the west of the study area; it extends between the Waterfront and SoDo neighborhood to the south and to Magnolia on the north. Bicyclists can access the trail at several crossings along Elliot Avenue W. The Cheshiahud Lake Union Trail connects the South Lake Union neighborhood with Gasworks Park and link a number of pocket parks that ring the lake.

SDOT bicycle counts from January and July 2012 were reviewed to understand the level of bicycle traffic within the study area. The SDOT bicycle counts included three locations within the Seattle Center study area. Commuter peak hour bicycle volumes ranged from eight at the Mercer Street / Fairview Avenue N. intersection to 155 at the intersection of Dexter Avenue N. / Denny Way. The Mercer Street / 9th Avenue N. intersection saw 29 bicyclists during the commuter peak hour. The high counts along Dexter Avenue N. are consistent with this street's function as the primary bicycle route to downtown from the north. In addition, the combination of high traffic volumes coupled with construction activity along Mercer Street likely contributes to lower volumes at the Mercer Street / Fairview Avenue N. intersection. While the overall average number of peak hour cyclists in this data was much higher (nearly 50 percent) in the summer compared to winter counts, both Mercer Street intersections were marginally less in the summer than the winter counts, perhaps reflecting peak summer construction activity disrupting bicycle route choices in this area.

Impacts of the No Action Alternative at Alternative 4 and 5 Sites

Bicycle conditions for 2018 and 2030 No Action cases are described below.

2018 Conditions

Bicycle improvements planned and funded in the Seattle Center study area were reviewed. Ongoing projects associated with the Alaskan Way Viaduct North Portal, as well as the Mercer East and West projects will result in enhanced bicycle connectivity and infrastructure. The Mercer Corridor improvements are scheduled to be completed by 2015. Bicycle improvements are included on Roy and Valley Streets, as well as 5th Avenue N. The completion of these improvements will create a viable bicycle linkage between the Seattle Center area and the South Lake Union Neighborhood as well as the South Lake Union Park and related trail connections. In addition, the completion of the North Portal will result in sidewalk connections across SR 99 at John, Harrison and Thomas Streets, effectively linking the Seattle Center area and the neighborhood surrounding the Bill and Melinda Gates Foundation with the South Lake Union area.

Bicycle use is anticipated to continue to grow in Seattle as transportation congestion, and cost of parking increases. Under No Action, changes in bicycle demands are likely to occur as a result of ongoing redevelopment associated with neighborhoods surrounding the Seattle Center area and more direct connections between this area and South Lake Union and the Cheshiahud Lake Union Loop Trail. No significant change in bicycle traffic is forecasted resulting in an adverse impact.

2030 Conditions

There are no additional funded improvements for 2030 at this time; however, the City is going through a draft Bicycle Master Plan and the result of the planning process will be priorities for bicycle improvements.

Bicycle demand is expected to grow between 2018 and 2030; however, no significant increases in bicycle volumes are foreseen and no new adverse impacts to bicycle travel would occur.

In general, as traffic volumes increase in the study area due to future 2018 and 2030 growth, there is a potential for increased conflict between vehicles and bicyclists.

Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

Construction of Alternative 4 may result in intermittent bicycle facility closures or rerouting along Mercer Street and 1st Avenue N. as well as within the Seattle Center area. A construction management plan would be developed and alternate bicycle circulation would be provided adjacent to the construction site through the use of temporary facilities, detours, and signs.

Alternative 4 is not anticipated to impact bicycle facilities within the study area. As described in the Affected Environment, bicycle volumes within the study area vary from one corridor to the next; however, Alternative 4 is anticipated to result in minimal increase in bicycle activity. Development of an arena would result in increased vehicular demands on event days within the study area, which would increase the potential conflicts between bicyclists and vehicles. Bicycle impacts in 2018 and 2030 are anticipated to be similar.

Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Bicycle impacts associated with Alternative 5 are anticipated to be consistent with those described for Alternative 4.

3.8.3.5 Traffic Volumes

This section provides a summary of the existing and forecast traffic volumes at the study area intersections and presents the methodology used in developing traffic forecasts for the No Action (Alternative 1), Alternative 4, and Alternative 5 analyses.

Methodology

Study Area

A total of 53 intersections were addressed for the Seattle Center area alternatives. See Appendix E for locations. Study area intersections were defined considering existing conditions, impacts of future road improvements, and potential impacts of an arena.

Analysis Time Periods

Similar to the SoDo alternatives, the peak periods for the traffic analyses for the Seattle Center Area Alternatives were identified based on a review of existing traffic. To determine the

appropriate analysis period, City of Seattle 24-hour tube counts were reviewed to understand variations in traffic volumes throughout the week, specifically related to weekday and weekend trends.

Traffic volumes observed during the Saturday period ranged between about 80 and 110 percent of the weekday volumes. During a peak hour, volumes on a Sunday are the lightest and range between about 65 and 90 percent of the weekday PM peak hour. Based on this information, the analysis of event traffic occurring during the weekday or Saturday period represents the most appropriate basis for detailed traffic analysis through the Seattle Center area. Data related to Saturday conditions is inconclusive since half of roadway segments have Saturday traffic volumes that are approximately equal to the weekday traffic volumes. Therefore, given that traffic analysis relies on intersection turning movements, data was collected in March 2013 at key locations for Saturday.

Traffic volumes observed during the Saturday period ranged between 62 to 105 percent of the weekday volumes. Based on this information, the analysis of event traffic occurring during the weekday period represents the most appropriate basis for detailed traffic analysis through the Seattle Center area since the weekday traffic volumes are generally higher. Traffic volumes generally fluctuate day-to-day by up to five percent; therefore, the differences at 5th Avenue N. / Mercer Street are within the day-to-day changes in traffic volumes.

Within the Seattle Center study area, significant transportation improvement projects have been under construction for the past several years. Due to ongoing construction activities and impacts to traffic circulation and roadway capacities, existing traffic counts were not conducted within the defined study area. Instead previous traffic models and studies developed for the area were reviewed and utilized to develop estimated “existing” condition traffic volumes and are presented in detail in a later section. A more comprehensive discussion of these models is included in the Affected Environment section of this chapter.

Traffic Forecast Methodology – No Action Analyses

Future weekday PM peak hour vehicular traffic volumes were developed based on the following general approach:

- Traffic volume forecasts from the Final EIS’s for the Alaskan Way Viaduct Replacement Project (July 2011) were summarized for the overlapping study area intersections.
- Traffic forecasts at intersections not included in the Final EIS’s for the Alaskan Way Viaduct Replacement Project were estimated based on existing travel patterns and approach volumes for intersections previously reported in the EIS.
- Traffic forecasts for the No Action event cases were developed by adding traffic from either a 5,000 attendee event at Memorial Stadium, a 12,000 attendee event at KeyArena, or both events.

Traffic volumes developed for 2018 conditions were estimated by interpolating between 2015 and 2030 traffic volumes from the Alaskan Way Viaduct Replacement Project analysis.

Similar to the Stadium District, analysis cases are linked to each alternative (Cases K1 and K2 for the KeyArena site; Cases M1 and M2 for the Memorial Stadium site). As before Case 1 reflects single events and Case 2 reflects dual events. In the instance of a single event, Case K1 reflects the 12,000 attendee event at KeyArena and M1 reflects a 5,000-person event at Memorial Stadium. Case K2 and M2 reflect a dual event condition (referenced jointly as K2/M2 under No Action), and in the instance of the No Action alternative includes both the Memorial Stadium event added to an event at KeyArena.

Traffic forecasts for the three No Action cases were developed for the 2018 and 2030 horizon years. Based on this methodology, under 2018 conditions a 5,000 person event at Memorial Stadium is estimated to generate approximately 360 vehicular trips during the weekday PM peak hour and the 12,000 person event at the KeyArena would generate approximately 850 trips. As traffic congestion throughout the Puget Sound region increases, attendees of events in the Seattle Center area would be increasingly likely to use transportation modes other than passenger cars. For the 2030 conditions, the transit mode split was increased. This increase in transit usage results in a forecast of approximately 350 vehicular trips associated with a Memorial Stadium event in 2030 and 820 trips forecast for a KeyArena event.

Traffic Forecast Methodology – Arena Event Traffic

Traffic forecasts for the 2018 and 2030 horizon years were prepared for Alternative 4 and Alternative 5. Future weekday PM peak hour vehicular traffic volumes for the each alternative were developed by adding traffic from a new arena to the No Action volumes. Similar to the No Action discussion, traffic forecasts for multiple event cases are presented in this section. The Alternative 4 and Alternative 5 event cases are compared to the corresponding No Action event case to define the impacts of the Alternative.

Traffic associated with the arena attendees was forecast based on a 20,000 attendance level, mode splits, average vehicle occupancies, and arrival patterns tailored for the Seattle Center area venues. Forecast traffic volumes for the 2018 and 2030 horizon years for the multiple event cases were developed by adding the arena related to traffic to the No Action event cases.

For 2018 conditions, an NBA event is estimated to generate approximately 2,050 vehicular trips during the weekday PM peak period. As attendees increasingly choose travel modes other than passenger cars further into the future (2030), PM peak hour trip generation would reduce to approximately 1,975 vehicles per hour (vph).

Affected Environment

The following summarizes the existing traffic volumes in the study area.

Existing Weekday PM Peak Hour - Without Event

Within the Seattle Center study area, significant transportation improvement projects have been under construction for the past several years. Due to ongoing construction activities and impacts to traffic circulation and roadway capacities, existing traffic counts were not conducted within the defined study area. Instead previous traffic models and studies developed for the area were reviewed. These studies and the extents of the intersections used from each study are as follows:

- Existing 2010 traffic volumes for the Mercer West project
- Forecast 2010 traffic volumes for the Mercer East project (with two-way travel on Mercer Street)
- Existing 2010 traffic volumes from SDOT's Denny Way Signal optimization

The traffic volumes from each of these studies were then compared and balanced. The balanced 2010 weekday peak hour traffic volumes were then forecasted to 2013 conditions based on an annual growth rate of 1.5 percent per year consistent with studies completed in the South Lake Union area. The resulting 2013 estimated weekday PM peak hour traffic volumes are summarized below, with detailed estimated turning movement volumes provided in Attachment E-1 which is available from DPD upon request.

- Weekday PM peak hour traffic within the study area is concentrated along the Mercer Street, Denny Way, and Elliot Avenue W. corridors.
- Traffic volumes are greatest along Mercer Street in the vicinity of the ramps to and from I-5 and decrease further to the west. Mercer Street has over 1,000 vehicles during the peak hour along the Seattle Center frontage and over 5,000 vehicles near the I-5 / Fairview Avenue N. interchange.
- Denny Way has approximately 2,000 vehicles during the peak hour along Seattle Center frontage and approximately 1,700 vehicles near I-5. Elliot Avenue W. carries approximately 4,000 vehicles during the peak hour near W. Mercer Place.

Truck volumes on the primary streets that border the Seattle Center, including 1st Avenue S., Mercer Street, 5th Avenue N., Broad Street, and Denny Way are generally less than five percent during the weekday PM peak hour.

Impacts of the No Action Alternative to Alternative 4 and 5 Sites

Traffic forecasts for the three No Action event cases were developed for the 2018 and 2030 horizon years.

Based on the methodology used for event cases, under 2018 conditions the 5,000 person event at Memorial Stadium is estimated to generate approximately 300 vehicular trips during the

weekday PM peak hour and the 12,000-person event at Memorial Stadium would generate approximately 700 trips.

As traffic congestion throughout the Puget Sound region increases, attendees of events in the Seattle center would be increasingly likely to use transportation modes other than passenger cars. For the 2030 conditions, the transit mode split was increased. This increase in transit usage results in a forecast of approximately 275 vehicular trips associated with a 5,000-person event at Memorial Stadium in 2030 and 650 trips forecast for a 12,000-person event at the KeyArena.

2018 Traffic Volumes

2018 No Action Case K1 traffic volumes are estimated to increase by the following percentages over existing traffic volumes given the assumption of a 12,000-person event at KeyArena:

- Mercer Street, between 1st Avenue N. and 5th Avenue N. – 148 percent increase
- Denny Way, between 1st Avenue N. and 5th Avenue N. – 15 percent increase
- 1st Avenue N., south of Mercer Street – 20 percent increase
- 5th Avenue N., north of Denny Way – 29 percent increase

Given historical growth (approximately one to two percent annually) in background traffic, the primary contributing factor to the increase in traffic is the shifts due to the configuration of the bored tunnel and the lack of access to the Central Business District from within the tunnel.

2018 No Action Case M1 traffic volumes are estimated to increase by the following percentages over existing traffic volumes given the assumptions outlined above for the 5,000-person event at Memorial Stadium:

- Mercer Street, between 1st Avenue N. and 5th Avenue N. – 118 percent increase
- Denny Way, between 1st Avenue N. and 5th Avenue N. – 12 percent increase
- 1st Avenue N., south of Mercer Street – eight percent increase
- 5th Avenue N., north of Denny Way – 28 percent increase

2018 No Action Case K2/M2 traffic volumes are estimated to increase by the following percentages over existing traffic volumes given the assumptions outlined above for dual events at Memorial Stadium and KeyArena:

- Mercer Street, between 1st Avenue N. and 5th Avenue N. – 155 percent increase
- Denny Way, between 1st Avenue N. and 5th Avenue N. – 15 percent increase
- 1st Avenue N., south of Mercer Street – 21 percent increase

- 5th Avenue N., north of Denny Way – 38 percent increase

2030 Traffic Volumes

2030 No Action Case K1 traffic volumes are estimated to increase by the following percentages over existing traffic volumes given the assumptions outlined above for the 12,000-person event at KeyArena:

- Mercer Street, between 1st Avenue N. and 5th Avenue N. – 146 percent increase
- Denny Way, between 1st Avenue N. and 5th Avenue N. – 19 percent increase
- 1st Avenue N., south of Mercer Street – 18 percent increase
- 5th Avenue N., north of Denny Way – 48 percent increase

2030 No Action Case M1 traffic volumes are estimated to increase by the following percentages over existing traffic volumes given the assumptions outlined above for the 5,000-person event at Memorial Stadium:

- Mercer Street, between 1st Avenue N. and 5th Avenue N. – 117 percent increase
- Denny Way, between 1st Avenue N. and 5th Avenue N. – 16 percent increase
- 1st Avenue N., south of Mercer Street – 6 percent increase
- 5th Avenue N., north of Denny Way – 47 percent increase

2030 No Action Case K2/M2 are estimated to increase by the following percentages over existing traffic volumes given the assumptions outlined above for dual events at Memorial Stadium and KeyArena:

- Mercer Street, between 1st Avenue N. and 5th Avenue N. – 153 percent increase
- Denny Way, between 1st Avenue N. and 5th Avenue N. – 19 percent increase
- 1st Avenue N., south of Mercer Street – 18 percent increase
- 5th Avenue N., north of Denny Way – 57 percent increase

Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

Alternative 4 would result in an increase in traffic volumes due to workers traveling to and from the site, delivery of material, and truck hauling. It is anticipated that the increase in traffic volumes would be less than generated by a 20,000-seat event at the arena, however it would occur on a daily basis during the two-year construction period.

2018 Traffic Volumes

Traffic volumes along key corridors under 2018 conditions for No Action Cases K1 and K2, including detailed turning movement volumes for each scenario, are provided in Appendix E.

Table 3.8-30 summarizes the total traffic volumes at several locations within the arena vicinity under Alternative 4 Cases K1 and K2. This table includes locations with a greater proportion of regional traffic (i.e. Mercer Street east of Terry Avenue N. accessing I-5) and locations near the Seattle Center (i.e. Mercer Street east of 3rd Avenue N.) and shows the percent increase in traffic volumes compared to 2018 No Action conditions.

Table 3.8-30
2018 Alternative 4 Weekday PM Peak Hour Traffic Volumes Comparison

	Case K1		Case K2	
Location	**No Action**	**Alternative 4**	**No Action**	**Alternative 4**
Mercer Street east of Terry Avenue N.	5,765	6,645 (+15%)[1]	5,975	6,855 (+15%)
Denny Way west of Stewart Street	2,575	2,590 (+1%)	2,600	2,615 (+1%)
Western Avenue northwest of Denny Way	3,270	3,285 (+1%)	3,270	3,285 (+1%)
Mercer Street east of 3rd Avenue N.	2,910	3,405 (+17%)	2,995	3,490 (+17%)
Queen Anne Avenue N. south of Mercer Street	1,300	1,555 (+20%)	1,345	1,600 (+19%)
1st Avenue N. south of Mercer Street	1,075	1,085 (+1%)	1,080	1,090 (+1%)
5th Avenue N. south of Mercer Street	1,890	2,280 (+21%)	2,025	2,415 (+19%)

1. Percent increase from No Action conditions.

The assignment of arena event related traffic reflects the overall distribution of parking in the area as well as the travel patterns accessing the Seattle Center area. Comparing No Action Case K1 to Alternative 4 Case K1, roadway volumes increase between 1 and 21 percent within the arena vicinity under either 2018 or 2030. The percent increase is influenced by the level of background traffic, as well as the level of event traffic. As a result, proportional increases under the Case K2 multiple event scenario are slightly less than Case K1, although the total projected volumes increase.

2030 Traffic Volumes

Traffic volumes along key corridors under 2030 conditions for No Action Cases K1 and K2, including detailed turning movement volumes for each scenario, are provided in Appendix E.

Table 3.8-31 summarizes the total traffic volumes within the arena vicinity and shows the percent increase in traffic volumes compared to 2030 No Action Case K2 conditions.

Table 3.8-31
2030 Weekday PM Peak Hour Alternative 4 Traffic Volumes Comparison

Location	Case K1		Case K2	
	No Action	Alternative 4	No Action	Alternative 4
Mercer Street east of Terry Avenue N.	5,785	6,630 (+15%)1	5,990	6,835 (+14%)
Denny Way west of Stewart Street	2,575	2,590 (+1%)	2,600	2,615 (+1%)
Western Avenue northwest of Denny Way	3,530	3,550 (+1%)	3,530	3,550 (+1%)
Mercer Street east of 3rd Avenue N.	2,885	3,360 (+16%)	2,970	3,445 (+16%)
Queen Anne Avenue N. south of Mercer Street	1,395	1,645 (+18%)	1,435	1,685 (+17%)
1st Avenue N. south of Mercer Street	1,055	1,065 (+1%)	1,060	1,070 (+1%)
5th Avenue N. south of Mercer Street	2,175	2,550 (+17%)	2,305	2,680 (+16%)

1. Percent increase from No action conditions.

As shown in Table 3.8-31, roadway volumes increase between 1 and 18 percent within the arena vicinity as a result of the addition of arena traffic under either cases K1 and K2. The percent increase is influenced by the level of background traffic, as well as the level of event traffic. As a result, proportional increases under the Case K2 multiple even scenario are slightly less than for Case K1, although the project volumes increase.

Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Alternative 5 would result in an increase in traffic volumes due to workers traveling to and from the site, delivery of material, and truck hauling. It is anticipated that the increase in traffic volumes would be less than generated by a 20,000-seat event at the arena, however it would occur on a daily basis during the two-year construction period.

2018 Traffic Volumes

Traffic volumes along key corridors under 2018 conditions, including detailed turning movement volumes for each scenario, are provided in Appendix E.

Table 3.8-32 summarizes the total traffic volumes within the arena vicinity and shows the percent increase in traffic volumes compared to 2018 No Action conditions for Cases M1 and M2.

The assignment of arena event related traffic reflects the overall distribution of parking in the area as well as the travel patterns accessing the Seattle Center area. Comparing No Action Case M1 to Alternative 4 Case M1, roadway volumes increase between 5 and 24 percent within the

arena vicinity under either 2018 or 2030. The percent increase is influenced by the level of background traffic, as well as the level of event traffic. As a result, proportional increases under the Case M2 multiple even scenario are slightly less than for Case M1, the single event scenario.

Table 3.8-32
2018 Alternative 5 Weekday PM Peak Hour Traffic Volumes Comparison

	Case M1		Case M2	
Location	**No Action**	**Alternative 5**	**No Action**	**Alternative 5**
Mercer Street east of Terry Avenue N.	5,430	6,585 (+21%)[1]	5,975	7,130 (+19%)
Denny Way west of Stewart Street	2,535	2,590 (+2%)	2,600	2,655 (+2%)
Western Avenue northwest of Denny Way	3,260	3,280 (+1%)	3,270	3,290 (+1%)
Mercer Street east of 3rd Avenue N.	2,565	3,275 (+28%)	2,995	3,705 (+24%)
Queen Anne Avenue N. south of Mercer Street	1,090	1,460 (+34%)	1,345	1,715 (+28%)
1st Avenue N. south of Mercer Street	965	1,010 (+5%)	1,080	1,125 (+4%)
5th Avenue N. south of Mercer Street	1,880	2,335 (+24%)	2,025	2,480 (+22%)

1. Percent increase from No Action conditions.

When compared to the growth identified for the Alternative 4 cases, growth under Alternative 5 is greater. This increase is due to the increase growth in attendees with an arena event at either site. At the KeyArena site the anticipated growth increases from 12,000 attendees to 20,000 attendees for an increase of 8,000 attendees. At Memorial Stadium event attendance would increase from 5,000 to 20,000 for an increase of 15,000 attendees.

2030 Traffic Volumes

Traffic volumes along key corridors under 2030 conditions for No Action Cases K1 and K2, including detailed turning movement volumes for each scenario, are provided in Appendix E.

Table 3.8-33 summarizes the total traffic volumes within the arena vicinity and shows the percent increase in traffic volumes compared to 2030 No Action conditions for Cases M1 and M2.

Table 3.8-33
2030 Alternative 5 Weekday PM Peak Hour Traffic Volumes Comparison

	Case M1		Case M2	
Location	**No Action**	**Alternative 5**	**No Action**	**Alternative 5**
Mercer Street east of Terry Avenue N.	5,460	6,495 (+19%)[1]	5,990	7,025 (+17%)
Denny Way west of Stewart Street	2,535	2,585 (+2%)	2,600	2,650 (+2%)
Western Avenue northwest of Denny Way	3,525	3,545 (+1%)	3,530	3,550 (+1%)

Table 3.8-33 (Continued)

Location	Case M1		Case M2	
	No Action	Alternative 5	No Action	Alternative 5
Mercer Street east of 3rd Avenue N.	2,555	3,185 (+25%)	2,970	3,600 (+21%)
Queen Anne Avenue N. south of Mercer Street	1,190	1,525 (+28%)	1,435	1,770 (+23%)
1st Avenue N. south of Mercer Street	950	990 (+4%)	1,060	1,100 (+4%)
5th Avenue N. south of Mercer Street	2,165	2,575 (+19%)	2,305	2,715 (+18%)

1. Percent increase from No action conditions.

As shown in Table 3.8-33, roadway volumes increase between one and 28 percent within the arena vicinity as a result of the addition of arena traffic under either cases M1 and M2. The percent increase is influenced by the level of background traffic, as well as the level of event traffic. As a result, increases under the Case M2 multiple even scenario are slightly less than for Case M1, the single event scenario.

As explained for 2018 Alternative 5 traffic volumes, growth under Alternative 5 is greater than growth identified for Alternative 4. This proportional increase is due to the increase growth in attendees with an arena event at either site.

Transportation Concurrency

The transportation concurrency analysis indicates that with traffic generated by the project, the screenlines would have v/c ratios that are less than the City level of service threshold and thus, the conditions would meet concurrency requirements.

3.8.3.6 Traffic Operations

This section evaluates the impacts of the project with respect to traffic operations within the defined Seattle Center study area. The traffic operations analysis included a review of three primary areas. This includes an analysis of the intersection levels of service, corridor performance measured through an assessment of travel times, and regional impacts as identified through a review of mainline I-5 and I-90 travel speeds and ramp terminal LOS. See Appendix E for further detail regarding the methodology applied to each of the three analyses.

Methodology

Intersection Level of Service: At signalized and all-way stop-controlled intersections, LOS is measured in average delay per vehicle for all vehicles at the intersection. At two-way stop-sign-controlled intersections, LOS is reported for the worst operating approach of the intersection. Traffic operations for an intersection can be described alphabetically with a range of LOS values (LOS A through F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. Intersection levels of service incorporate several intersection characteristics including signal timing, signal phasing, intersection channelization, traffic volumes, and pedestrian volumes. Description of Level of Service is provided in Appendix E. The City of Seattle's Comprehensive Plan does not define a LOS standard for

individual intersections; however, the City generally recognizes LOS E and F as poor operations for signalized locations and LOS F for unsignalized locations. Given the event-related nature of this analysis, and variant frequencies and intensities, traditional intersection LOS standards would not be appropriate as the sole measure of impact on traffic operations.

Corridor Performance: See Appendix E for a description of the methodology used to evaluate effects on traffic operations. Three primary routes were analyzed:

- **Route 1** focuses on east-west travel along W. Mercer Street between 3rd Avenue W. and Fairview Avenue.
- **Route 2** focuses on an east-west route along Denny Way between Queen Anne Avenue and Stewart Street.
- **Route 3** includes north-south travel along 5th Avenue N. between Denny Way and W. Mercer Street.

Travel times were calculated consistent with HCM methodologies defined for the analysis of arterial systems, consistent with the analysis of Stadium District travel routes associated with the evaluation of Alternatives 2 and 3. This analysis utilized the approach delay for each study intersection along these four routes and a free-flow mid-block travel speed applied to the distance between each study intersection. The mid-block speed is estimated following the Bureau of Public Roads methodology.[15]

Freeway / Regional Access Analysis: The analysis of regional access to the Seattle Center study area focused on both mainline performance considering corridor travel speeds as well as the LOS at the ramp intersections with the surface arterials. The analysis included a review of southbound I-5 between NE 145th and SR 520 and westbound I-90 between Rainier Avenue and I-5. Information prepared by the King County expert review panel in 2012 for the potential Arena was included in this analysis. This information highlights historical congestion patterns along the I-5 and I-90 corridors under event conditions. Ramp intersections also evaluated as part of the intersection LOS are highlighted in this section. The analysis of the ramp intersections is consistent with the LOS methodology previously described.

Affected Environment

The following sections summarize existing traffic operations within the Seattle Center study area.

Intersection Operations

As part of the intersection operations analysis, signal timing and phasing information was obtained from either the Seattle Department of Transportation (SDOT) or collected in the field. Lane geometrics and traffic control were confirmed in the field and are summarized for each study area intersection in Attachment E-2 which is available from DPD upon request. The

[15] NCHRP Report 387

number of intersections operating at LOS C or better, LOS D, LOS E, or LOS F, are summarized in Figure 3.8-28. Detailed LOS summary tables and worksheets for each scenario are included in Attachment E-3 which is available from DPD upon request. All study intersections operate at LOS D or better under existing conditions with the exception of the nine intersections that operate at LOS E or LOS F.

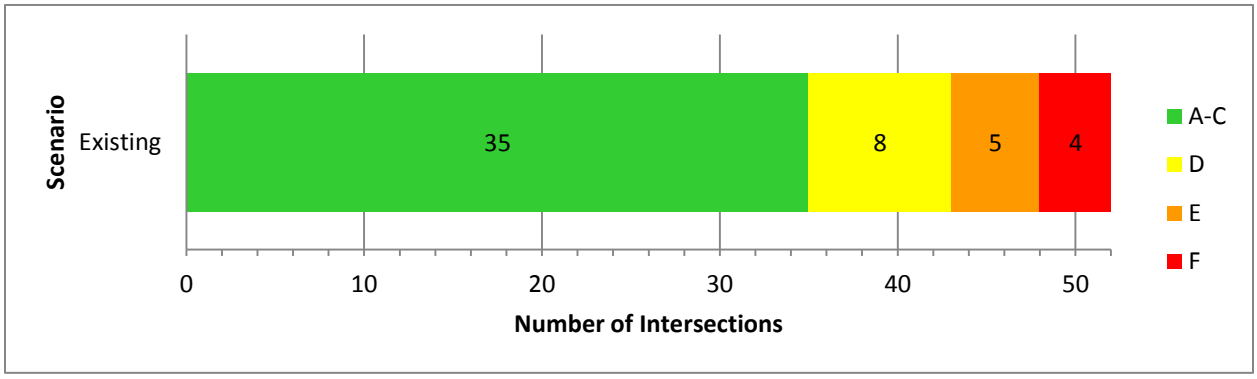


Figure 3.8-28
Existing Seattle Center Intersection LOS Comparison

Corridor Travel Times

Table 3.8-34 summarizes the estimated existing travel times on the various routes for weekday PM peak hour conditions.

Table 3.8-34
Seattle Center Existing Corridor Travel Times

Route	Extents	Direction	Without Event (m:ss)[1]
1	W. Mercer Street from 3rd Avenue W. to Fairview Avenue N.	EB	8:59
	W. Mercer Street from Fairview Avenue N. to 3rd Avenue W.	WB	8:32
2	Denny Way from Queen Anne Avenue to Stewart Street	EB	6:18
	Denny Way from Stewart Street to Queen Anne Avenue	WB	6:54
3	5th Avenue N. from Denny Way to W. Mercer Street	NB	2:55
	5th Avenue N. from W. Mercer Street to Denny Way	SB	2:40

1. m:ss = minutes: seconds

As shown in Table 3.8-34, travel times in both travel directions on each route are similar in each direction. Several intersections along the travel time routes are shown to have left-turn queue lengths that exceed allowable storage, but occur along arterials that have multiple through lanes. As a result, vehicles potentially blocked by these queues are anticipated to utilize the other through lanes, minimizing the impact on the overall intersection capacity.

Regional Access Analysis

Primary freeway corridors that provide regional access to the Seattle Center site include I-5, I-90, SR 520, and SR 99. The PM peak commute period for these corridors occurs between 3:00 and 7:00 PM. The existing volumes and congestion for the freeway corridors are described previously in Section 3.8.2.6 Traffic Operations for the Stadium District Alternatives.

The traffic signals or intersections at the ramp terminals operate as a constraint as traffic exits the freeway to access the Seattle Center area. The overall intersection capacity and off-ramp approach of two arterial intersections at the I-5 ramp terminals were reviewed to determine existing off-ramp constraints. The analysis was completed for existing conditions.

The study intersections include Mercer Street / Fairview Avenue and Denny Way / Stewart Street. Although Denny Way / Stewart Street does not operate as the actual southbound I-5 off-ramp at Eastlake Avenue / Stewart Street, southwest-bound traffic at Denny Way / Stewart Street has been observed to back up into the Eastlake Avenue / Stewart Street and is the source of off-ramp congestions. Both intersections operate with a LOS E or better during normal peak operations and during an event, an acceptable LOS level in the City of Seattle. LOS and delay per vehicle is shown in Table 3.8-35.

Table 3.8-35
Seattle Center Area Existing Weekday PM Peak Hour Ramp Termini Intersection Operations – Existing Conditions, PM Peak Hour

Ramp Terminal Intersection	Overall LOS / Delay	Off-Ramp LOS / Delay
Mercer Street / Fairview Avenue	E / 67	E / 61
Denny Way / Stewart Street	C / 28	D / 36

The peak flow of traffic occurs as event patrons arrive for (5:00 to 7:00 PM) and leave (9:00 to 11:00 PM) and event. The peak or worst operating time period occurs during the evening commute when trips not related to events are also operating at their peak. The weekday PM peak hour represents the combined peak activity associated with a new arena and peak activity related to the PM peak commute. When traffic exits the Seattle Center in the later evening (9:00 to 11:00 PM), other traffic volumes on the system have decreased.

Impacts of the No Action Alternative at Alternative 4 and 5 Sites

The following sections summarize the results of the traffic operations analysis conducted for the No Action alternative for the Seattle Center study area. This analysis reflects the forecast traffic volumes and roadway improvements anticipated to be completed by the 2018 and 2030 horizon years. Consistent with the analysis of the Affected Environment, this section presents the results of the intersection LOS analysis, corridor performance, and an analysis of regional access to the Seattle Center area.

Intersection Operations

LOS results for 2018 and 2030 non-event peak hour conditions, with a 12,000 attendee event at KeyArena (Case K1), a 5,000 attendee event at Memorial Stadium (Case M1), and both events concurrently (Case K2/M2), are included in Appendix E.

A summary of the No Action LOS for all study area intersections was prepared and compared to existing conditions as summarized in Figure 3.8-29 for 2018 conditions, and Figure 3.8-30 for 2030 conditions.

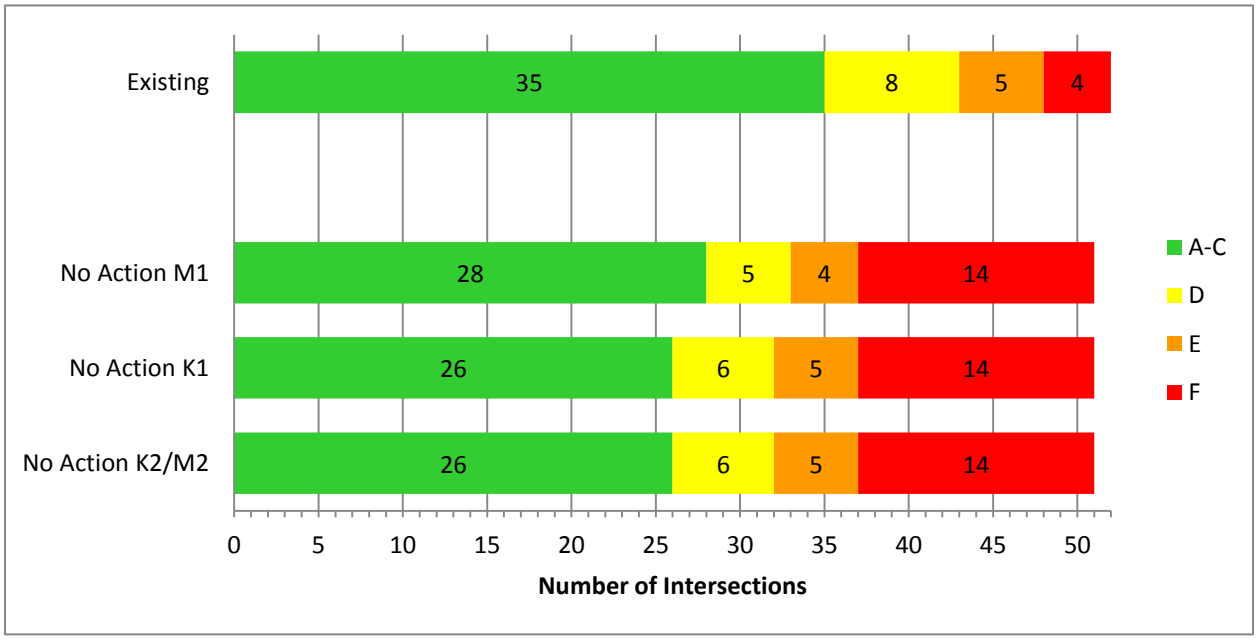


Figure 3.8-29

Seattle Center Area 2018 No Action LOS Comparison

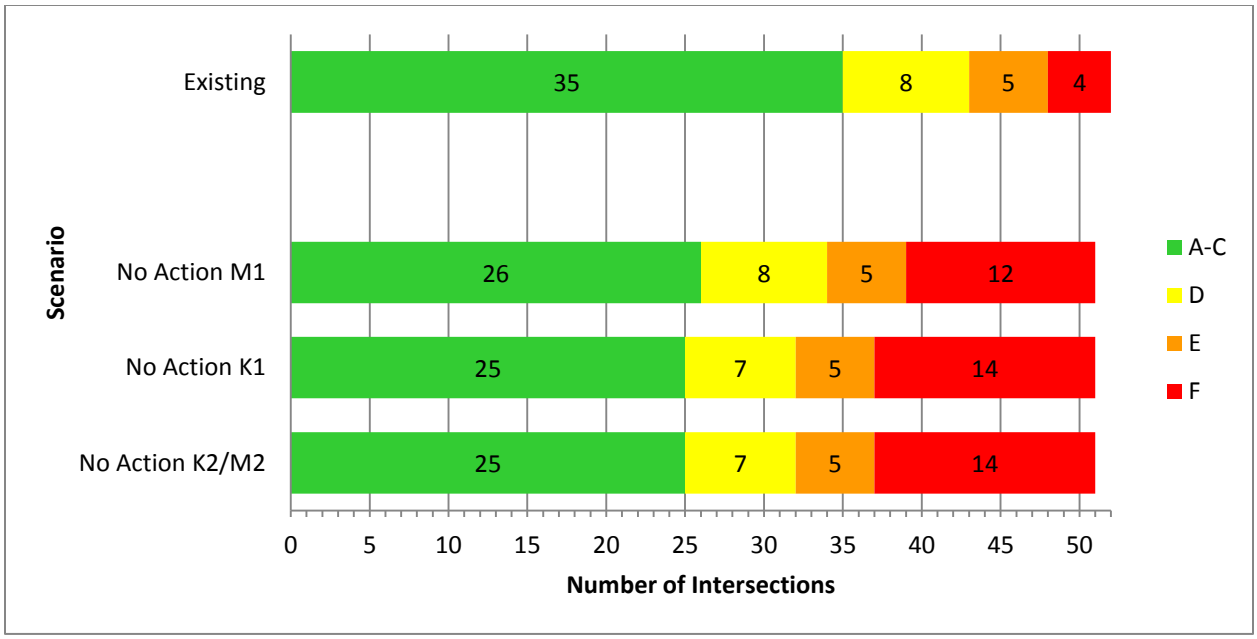


Figure 3.8-30

Seattle Center Area 2030 No Action LOS Comparison

As summarized in these figures:

- Increased traffic volumes and changes in travel patterns result in a greater number of intersections operating at LOS E/F under both 2018 and 2030 conditions.
- The greater attendance level of an event under Case K1 and K2/M2 results in one additional intersection operating at LOS E under 2018 conditions as compared to Case M1 and two additional operating at LOS F for 2030 conditions.

Of the intersections shown to operate at LOS E or LOS F under 2018 No Action conditions (Cases K1, M1, and K2/M2), three are located within the vicinity of the Seattle Center area:

- Warren Avenue N. / Mercer Street
- 5th Avenue N. / Mercer Street
- 5th Avenue N. / Denny Way

All three of these intersections would operate at the same LOS regardless of event Case.

Under 2030 No Action conditions (Cases K1, M1, and K2/M2), up to four intersections would operate at LOS E or LOS F within the vicinity of the Seattle Center area:

- Warren Avenue N. / Mercer Street
- 5th Avenue N. corridor / Mercer Street

- 5th Avenue N. / Denny Way
- 1st Avenue N. / Denny Way

Four of these intersections would operate at the same LOS regardless of event case under 2030 conditions, with the 5th Avenue N. / Mercer Street intersection degrading from LOS E (for Cases K1 and M1) to LOS F under Case K2/M2.

As discussed for the Stadium District alternatives, the methodology adds event traffic to non-event PM peak hour conditions with no regard for capacity constraints. Congestion often results in modified travel behavior for non-event traffic. As a result, the cumulative conditions with an event in all cases likely overstate future congestion levels during the PM peak hour.

Corridor Travel Times

Table 3.8-36 summarizes the calculated travel times under 2018 conditions on the various routes for weekday PM peak hour under non-event and with event conditions. Table 3.8-38 summarizes the estimated travel times under 2030 conditions. Existing non-event conditions are also provided for comparison purposes.

Table 3.8-36
Seattle Center Area 2018 Weekday PM Peak Hour No Action Corridor Travel Times

Route	Extents	Direction	Case M1 (m:ss[1])	Case K1 (m:ss)	Case M2/K2 (m:ss)
1	W. Mercer Street from 3rd Avenue W. to Fairview Avenue N.	EB	17:40 (8:59)[2]	19:30	21:09
	W. Mercer Street from Fairview Avenue N. to 3rd Avenue W.	WB	10:01 (8:32)	12:37	14:47
2	Denny Way from Queen Anne Avenue to Stewart Street	EB	15:14 (6:18)	16:48	17:30
	Denny Way from Stewart Street to Queen Anne Avenue	WB	12:04 (6:54)	12:42	13:06
3	5th Avenue N. from Denny Way to W Mercer Street	NB	5:04 (2:55)	5:16	5:25
	5th Avenue N. from W. Mercer Street to Denny Way	SB	3:00 (2:40)	3:02	3:04

1. m:ss = minutes:seconds
2. Existing non-event travel times provided for comparison.

As shown in Table 3.8-36:

- Calculated travel times under 2018 conditions increase from existing conditions and further increase with the addition of event traffic, under some cases approximately tripling.

- Travel times under 2018 conditions along routes #1 and #2 which are calculated to exceed 10 minutes with the addition of event traffic, with the addition of event traffic resulting in travel times of approximately 20 minutes or greater for eastbound route #1.

- Travel times along route #3 are calculated to increase to a lesser degree than the other routes. This route is along a north-south roadway that does not provide any direct connect to regional facilities under future conditions and as a result would serve less event traffic than route #1 and #2 corridors.

Results noted above likely overstate the future conditions as no diversion of background traffic was assumed in the analysis of event Cases S2 and S3.

Table 3.8-37
Seattle Center Area 2030 No Action Weekday PM Peak Hour Corridor Travel Times

Route	Extents	Direction	Case M1 (m:ss[1])	Case K1 (m:ss)	Case M2/K2 (m:ss)
1	W. Mercer Street from 3rd Avenue W. to Fairview Avenue N.	EB	18:37 (8:59)[2]	21:04	22:38
	W. Mercer Street from Fairview Avenue N. to 3rd Avenue W.	WB	8:28 (8:32)	10:58	13:06
2	Denny Way from Queen Anne Avenue to Stewart Street	EB	19:46 (6:18)	21:37	22:24
	Denny Way from Stewart Street to Queen Anne Avenue	WB	13:00 (6:54)	13:58	14:36
3	5th Avenue N. from Denny Way to W. Mercer Street	NB	5:18 (2:55)	5:26	5:35
	5th Avenue N. from W. Mercer Street to Denny Way	SB	3:09 (2:40)	3:11	3:14

1. m:ss = minutes:seconds
2. Existing non-event travel times provided for comparison.

As shown in Table 3.8-37:

- Under 2030 conditions travel times are generally similar to 2018 conditions. Some travel time routes increase while others decrease under 2030 conditions.

- Travel time changes result from small differences in forecast volumes at some study intersections.

- Similar to 2018 conditions, travel times along route #3 are calculated to only slightly increase since this route does not provide any direct connect to regional facilities under future conditions and would serve less event traffic than route #1 and #2 corridors.

As previously discussed, the event case methodology likely overstates future travel times and congestion due to events.

Regional Access Analysis

The primary corridors serving the downtown area are I-5 and I-90. Today during the late afternoon commute, these freeways are congested for approximately two to three hours. As traffic demand increases by 2018 and 2030, the hours of congestion or "peak spreading" would lengthen or transit ridership may increase. However because the corridors are "at capacity" today, traffic volumes served would not increase during the peak period of 4:00 to 6:00 PM.

The analysis was conducted for the PM peak hour for the Year 2018 and the Year 2030, with and without an event at the existing stadiums. The expected operations of the study intersections are shown in Table 3.8-38.

The analysis was completed for conditions with:

- An event with 12,000-person attendance at KeyArena (Case K1)
- An event with 5,000-person attendance at Memorial Stadium (Case M1)
- An event with 5,000-person attendance at Memorial Stadium plus 12,000 person attendance at KeyArena (Case K2/M2).

LOS and delay per vehicle for the overall ramp intersection terminals in the Seattle Center study area are shown in Table 3.8-38 for 2018 and 2030 conditions.

Table 3.8-38
Seattle Center Area No Action Weekday PM Peak Hour Ramp Terminal Intersection Operations

Ramp Terminal Intersection	Scenario	2018		2030	
		Overall LOS / Delay	Off-Ramp LOS / Delay	Overall LOS / Delay	Off-Ramp LOS / Delay
Mercer Street / Fairview Avenue	Case K1	F / >180	E / >76	F / >180	F / 100
	Case M1	F / >180	F / >79	F / >180	F / 106
	Case M2/K2	F / >180	F / >75	F / >180	F / 97
Denny Way / Stewart Street	Case K1	F / 158	F / >180	F / 164	F / 167
	Case M1	F / 153	F / >180	F / 160	F / 167
	Case M2/K2	F / 162	F / >180	F / 168	F / 169

Under both 2018 and 2030 conditions during the PM peak hour off-ramp intersections are calculated to operate at LOS F at both Denny Way and Mercer Street. I-5 off-ramp approaches operate at LOS F for all cases and analysis years. Long overall intersection delays encountered

by drivers are calculated for 2030 conditions at both intersections, and also would occur for the intersection approach from I-5.

Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

As described for traffic volumes, construction impacts related to traffic operations would occur as a result of increased traffic levels. To minimize impacts to operations, a construction management plan would be developed and could include scheduling the most intensive construction activities such that they are spread out over time and prohibiting material deliveries from leaving or entering the area during AM and PM peak hours when feasible.

The following sections summarize the results of the traffic operation analysis conducted for Alternative 4. This analysis reflects the addition of traffic with a 20,000 attendee event at KeyArena (Case K1), and the further addition of a 5,000 attendee event at Memorial Stadium (Case K2). Consistent with the analysis of the Affected Environment, this section presents the results of the intersection LOS analysis, corridor performance, and an analysis of regional access to the Seattle Center area. Methodologies used in the evaluation of the Proposed Project (Alternative 2) conditions are consistent with those described previously in this chapter.

The No Action traffic forecasts and operations analyses used in establishing the impacts of the project utilized a layering effect of event-related traffic volumes without applying any diversions in background traffic volumes. Based on a review of the non-event and event volume comparisons discussed previously in this report, this approach likely overstates the cumulative and incremental impact of the project.

Intersection Operations

LOS results for 2018 and 2030 peak hour conditions with the arena event at KeyArena (Case K1) and with the addition of the further addition of a 5,000-person event at Memorial Stadium (Case K2) are included in Appendix E.

A summary of the Alternative 4 LOS for all study area intersections was prepared and compared No Action conditions as summarized in Figure 3.8-31 for 2018 conditions, and Figure 3.8-32 for 2030 conditions.

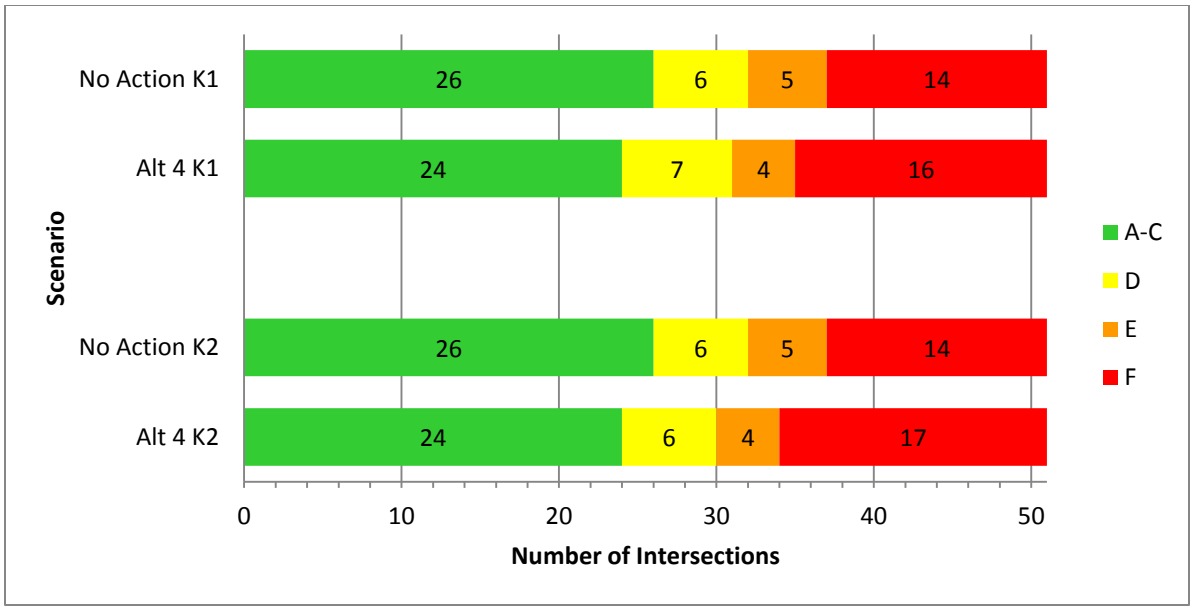


Figure 3.8-31

Seattle Center Area 2018 Alternative 4 Intersection LOS Comparison

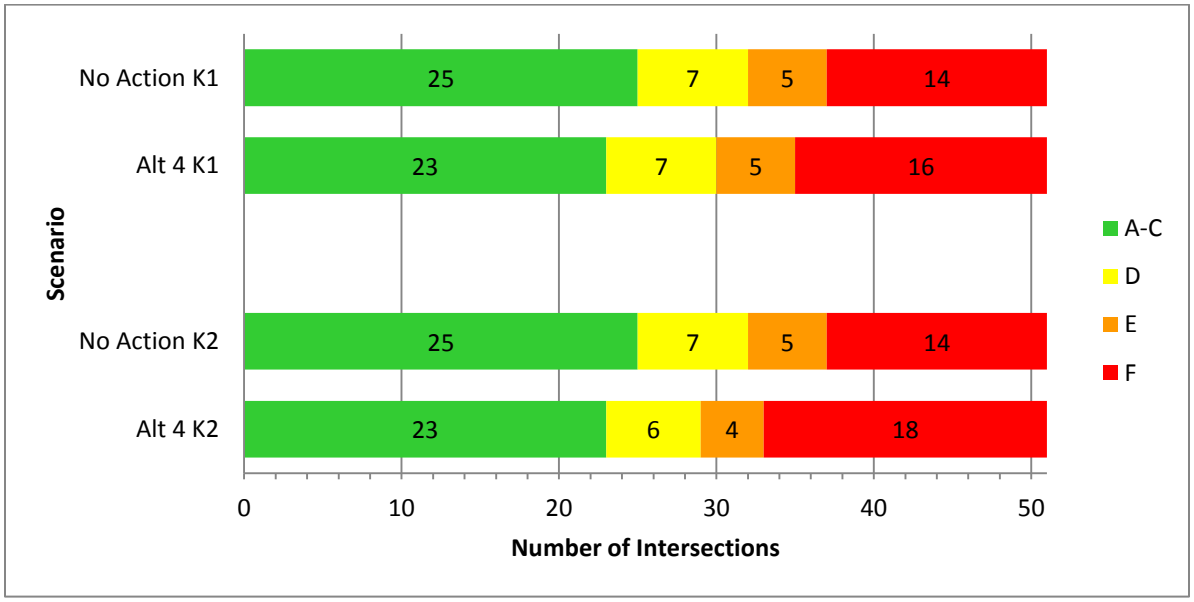


Figure 3.8-32

Seattle Center Area 2030 Alternative 4 Intersection LOS Comparison

As shown:

- Throughout the wider study area, the addition of arena event trips would result in one additional intersection operating at a calculated LOS E/F under 2018 Case K1 and two additional intersections under Case K2.

- Under 2030 conditions two additional intersections would operate at LOS E/F under Alternative 4 Case K1 and three additional intersections would operate at LOS E/F under the multiple event case (Alternative 4 Case K2).

Table 3.8-39 summarizes the intersections that operate at LOS E or LOS F with the addition of arena event traffic under 2018 conditions. Results for 2030 conditions are summarized in Table 3.8-40.

Table 3.8-39
2018 Alternative 4 Weekday PM Peak Hour Intersections at LOS E or LOS F

	Case K1		Case K2	
Roadway	**No Action**	**Alternative 4**	**No Action**	**Alternative 4**
Elliott Avenue W. / W. Mercer Pl	F	F	F	F
Queen Anne Avenue N. / Roy Street	F	F	F	F
Broad Street / Valley Street	F	F	F	F
1st Avenue W. / W. Mercer Street	E	E	E	E
Mercer Street / Queen Anne Avenue N.	F	F	F	F
Mercer Street / Warren Avenue N.	F	F	F	F
3rd Avenue N. / Mercer Street	C	F	C	F
5th Avenue N. / Mercer Street	F	F	F	F
Mercer Street / Taylor Avenue N.	C	D	C	E
Dexter Avenue N. / Mercer Street	F	F	F	F
9th Avenue N. / Mercer Street	F	F	F	F
Mercer Street / Westlake Avenue N.	F	F	F	F
Mercer Street / Terry Avenue N.	E	E	E	F
Fairview Avenue N. / Mercer Street	F	F	F	F
5th Avenue N. / Broad Street	E	E	E	E
5th Avenue N. / Denny Way	E	F	E	F
Aurora Avenue N. / Denny Way	E	E	E	E
Denny Way / Dexter Avenue	F	F	F	F
Denny Way / Westlake Avenue	F	F	F	F
Denny Way / Fairview Avenue	F	F	F	F
Denny Way / Stewart Street	F	F	F	F

Table 3.8-40
2030 Alternative 4 Weekday PM Peak Hour Intersections at LOS E or LOS F

	Case K1		Case K2	
Roadway	**No Action**	**Alternative 4**	**No Action**	**Alternative 4**
Elliott Avenue W. / W. Mercer Pl	F	F	F	F
Queen Anne Avenue N. / Roy Street	F	F	F	F
Broad Street / Valley Street	E	E	E	E
1st Avenue W. / W. Mercer Street	E	E	E	E
Mercer Street / Queen Anne Avenue N.	F	F	F	F
1st Avenue N. / Mercer Street	D	E	D	E
Mercer Street / Warren Avenue N.	F	F	F	F
3rd Avenue N. / Mercer Street	D	F	D	F
5th Avenue N. / Mercer Street	F	F	F	F
Dexter Avenue N. / Mercer Street	F	F	F	F
9th Avenue N. / Mercer Street	F	F	F	F
Mercer Street / Westlake Avenue N.	F	F	F	F
Mercer Street / Terry Avenue N.	E	E	E	F
Fairview Avenue N. / Mercer Street	F	F	F	F
5th Avenue N. / Broad Street	E	E	E	F
1st Avenue / Denny Way	D	D	D	E
5th Avenue N. / Denny Way	E	F	E	F
Aurora Avenue N. / Denny Way	F	F	F	F
Denny Way / Dexter Avenue	F	F	F	F
Denny Way / Westlake Avenue	F	F	F	F
Denny Way / Fairview Avenue	F	F	F	F
Denny Way / Stewart Street	F	F	F	F

Corridor Travel Times

Table 3.8-41 summarizes the calculated weekday PM peak hour travel times under 2018 conditions on the defined routes. Table 3.8-42 summarizes the calculated travel times under 2030 conditions. No Action results conditions are shown in parentheses and provided for comparison purposes.

Table 3.8-41
2018 Alternative 4 Weekday PM Peak Hour Corridor Travel Times

Route	Extents	Direction	Case K1 (m:ss)[1]	Case K2 (m:ss)
1	W. Mercer Street from 3rd Avenue W. to Fairview Avenue N.	EB	23:14 (19:30)[2]	24:31 (21:09)
	W. Mercer Street from Fairview Avenue N. to 3rd Avenue W.	WB	27:02 (12:37)	31:05 (14:47)
2	Denny Way from Queen Anne Avenue to Stewart Street	EB	17:23 (16:48)	17:44 (17:30)
	Denny Way from Stewart Street to Queen Anne Avenue	WB	15:24 (12:42)	16:00 (13:06)
3	5th Avenue N. from Denny Way to W. Mercer Street	NB	6:13 (5:16)	6:24 (5:25)
	5th Avenue N. from W. Mercer Street to Denny Way	SB	3:40 (3:02)	4:02 (3:04)

1. m:ss = minutes:seconds
2. No Action travel times provided for comparison.

As shown in Table 3.8-41 and Table 3.8-42:

- Travel times under both 2018 and 2030 conditions are calculated to increase with the addition of arena event traffic. In particular, westbound Mercer Street increases substantially to over 30 minutes with the addition of arena traffic due to the majority of traffic (approximately 70 percent) travelling to the Seattle Center area utilizing the Mercer Street corridor.
- It is noted that No Action and all future estimates of event traffic volumes are simply additive to No Action conditions. This additive approach likely overestimates future traffic and congestion related to events. However, it does provide a consistent basis for comparing alternatives. There is no reliable way to assess the amount of diverted non-event traffic likely to occur for any given event.

Table 3.8-42
2030 Alternative 4 Weekday PM Peak Corridor Travel Times

Route	Extents	Direction	Case K1 (m:ss[1])	Case K2 (m:ss)
1	W. Mercer Street from 3rd Avenue W. to Fairview Avenue N.	EB	24:11 (21:04)[2]	25:29 (22:38)
	W. Mercer Street from Fairview Avenue N. to 3rd Avenue W.	WB	25:20 (10:58)	29:09 (13:06)
2	Denny Way from Queen Anne Avenue to Stewart Street	EB	22:24 (21:37)	23:10 (22:24)
	Denny Way from Stewart Street to Queen Anne Avenue	WB	17:55 (13:58)	18:48 (14:36)
3	5th Avenue N. from Denny Way to W. Mercer Street	NB	6:19 (5:26)	6:27 (5:35)
	5th Avenue N. from W. Mercer Street to Denny Way	SB	3:46 (3:11)	4:07 (3:14)

1. m:ss = minutes:seconds
2. No Action travel times provided for comparison.

Regional Access Analysis

Traffic would access the new arena in the Seattle Center area via I-5, SR 99, and local arterials. It is estimated up to 20 percent of the trips that would access a new arena would come from the north via I-5 and 55 percent via I-5 from the south. The other 25 percent of the trips would access the area via local arterials and SR 99.

For an event only at the new arena, up to an additional 1,550 vph would enter the city via I-5 to reach a new arena. This is a 6 to 15 percent increase in trips compared to a typical evening commute on any one of those corridors. Table 3.8-43 shows the typical traffic volumes for a weekday and the anticipated increase in traffic with a new arena for each of the event cases.

The typical weekday traffic flow values shown in Table 3.8-43 are existing volumes but represent anticipated traffic volumes in year 2018. Traffic demand (or volume of vehicles that want to use these corridors) typically increase as redevelopment occurs over time. However because the corridors are at or near capacity, additional traffic is not served during the peak hour of congestion. Therefore today's traffic volume served through these areas during the peak of congestion would be similar in future years unless capacity was increased for I-5.

Table 3.8-43 also focuses on the directions and locations of I-5 that would experience the greatest increase in trips from an arena event. During the PM peak hour, the majority of the trips (about 94 percent) associated with a new arena are inbound trips (or trips heading to a new arena).

Table 3.8-43
2018 Alternative 4 Weekday PM Peak Hour Increase in Traffic on Freeway Corridors

Location	Typical Weekday PM Peak Hour Traffic (vph)	Increase in traffic with Arena (vph / % compared to typical weekday traffic)	
		Case K1	Case K2
I-5 Southbound (north of Mercer)	6,700 vph	400 vph / 6%	450 vph / 7%
I-5 Northbound (south of Olive)	6,800 vph	1,050 vph / 15%	1,250 vph / 18%

The I-5 and I-90 corridors experience congestion today during the PM peak commute. Today, events at the downtown arenas results in an increase in travel time approaching the city center. The PM peak travel times (on days with events in 2012) increased by up to eight minutes on southbound I-5 between NE 145th and I-90 and up to four minutes on I-90 between I-405 and Rainer Avenue S. It is anticipated with a new arena with capacity for 20,000 spectators, PM peak travel times would be similarly affected for a typical event day.

For an event only at the new arena, up to an additional 1,500 vph would enter the city via I-5 to reach the new arena in the year 2030. This is slightly less than the year 2018 condition as it's assumed more people would use transit to access this area. This is a result of Link light rail extensions and other transit improvements that will provide event attendees more options. Increases in traffic and effect to regional travel times on the I-5 and I-90 freeways would be similar in the year 2030 as experienced in the year 2018.

Regional or freeway access to the Seattle Center area is constrained by signals at the terminal of the off-ramps. Overall intersection and off-ramp approach operations of two arterial intersections at the I-5 ramp termini were reviewed. The analysis was conducted for the weekday PM peak hour for 2018 and 2030 horizon years, under Case K1 and K2 and summarized in Table 3.8-44.

Table 3.8-44
Alternative 4 Weekday PM Peak Hour Ramp Terminal Intersection Operations

Intersection	Scenario	2018		2030	
		Overall LOS / Delay	Off-Ramp LOS / Delay	Overall LOS / Delay	Off-Ramp LOS / Delay
Mercer Street / Fairview Avenue	Case K1	F / >180	F / 103	F / >180	F / 102
	Case K2	F / >180	F / 122	F / >180	F / 113
Denny Way / Stewart Street	Case K1	F / 160	F / >180	F / 166	F / 169
	Case K2	F / 163	F / >180	F / 169	F / 169

Under both 2018 and 2030 conditions during the PM peak hour off-ramp conditions operate at LOS E/F at both Denny Way and Mercer Street and are similar to No Action conditions.

The further addition of event traffic would add to the already poor off-ramp terminal operations that are forecast to occur under No Action conditions.

In addition to the traffic operations impacts outlined above, the increases in event traffic volumes related to an arena would have an impact on emergency vehicle access and circulation to the KeyArena site as well as through the area. This may require emergency response vehicles to use on-board flashing lights and sirens to navigate through the congestion and reduce delays. In addition, during periods of heavy congestion, manual traffic control may be necessary to facilitate the passage of emergency vehicles.

Post-Event Traffic Operations

At the end of a sporting event at the Seattle Center attendees typically depart the venue in a highly concentrated flow that can affect traffic operations within the vicinity of the venue. Post-event traffic counts for sporting event in the SoDo area[16] indicate that the peak 15 minutes near the end of an event can range between 30 to 40 percent of the total hourly flow that includes this peak with traffic volumes greatest travelling away from the venue.

As a result of this surge, professional sporting events in Seattle typically implement a Traffic Control Plan (TCP) to aid in the dispersion of event attendees to the transportation network. A TCP helps to alleviate this outbound surge in event attendees. However, post-event surge traffic volumes are usually less than the peak 15-minute period during a non-event peak evening commute period. As a result, the analysis of the peak evening commute period represents a worst-case condition.

Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

As described for traffic volumes, construction impacts related to traffic operations would occur as a result of increased traffic levels. To minimize impacts to operations, a construction management plan would be developed and could include scheduling the most intensive construction activities such that they are spread out over time and prohibiting material deliveries from leaving or entering the area during AM and PM peak hours when feasible.

The following sections summarize the results of the traffic operations analysis conducted for Alternative 5. This analysis reflects the addition of traffic with a 20,000 attendee event at Memorial Stadium (Case M1), and the further addition of a 12,000 attendee event at KeyArena (Case M2). Consistent with the analysis of the Affected Environment, this section presents the results of the intersection LOS analysis, corridor performance, and an analysis of regional access to the Seattle Center area. Methodologies used in the evaluation of the Proposed Project (Alternative 2) conditions are consistent with those described previously in this chapter.

[16] Seattle Mariners, April 11, 2013

Intersection Operations

A summary of the Alternative 5 LOS for all study area intersections was prepared and compared No Action conditions as summarized in Figure 3.8-33 for 2018 conditions, and Figure 3.8-34 for 2030 conditions.

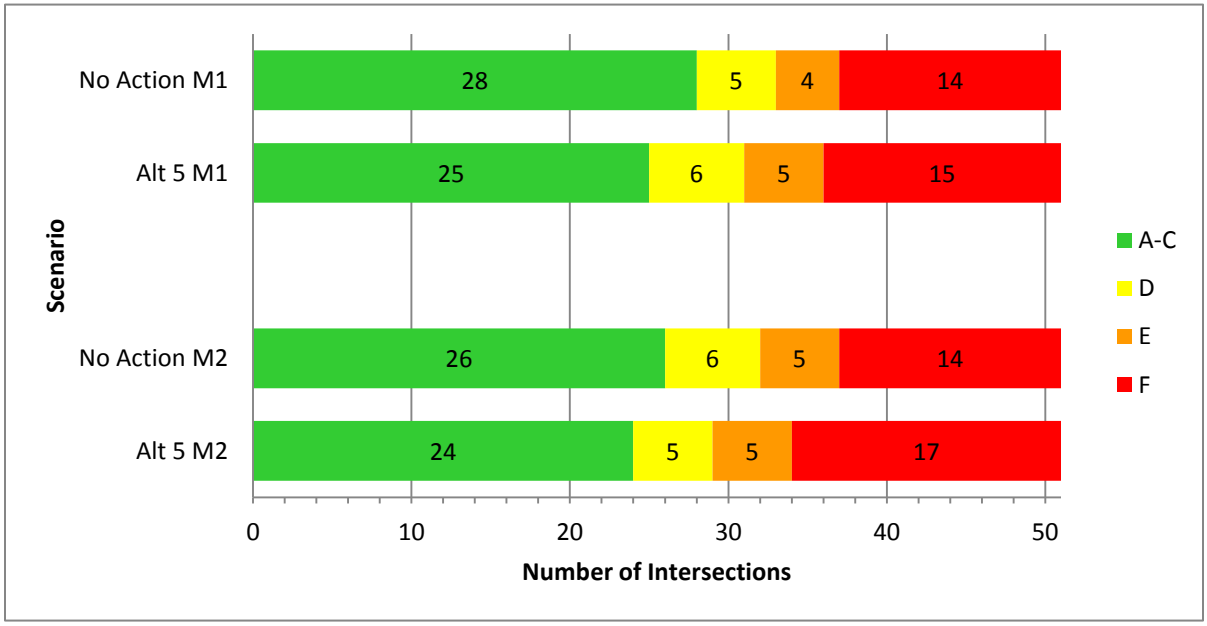


Figure 3.8-33

Seattle Center 2018 Alternative 5 Intersection LOS Comparison

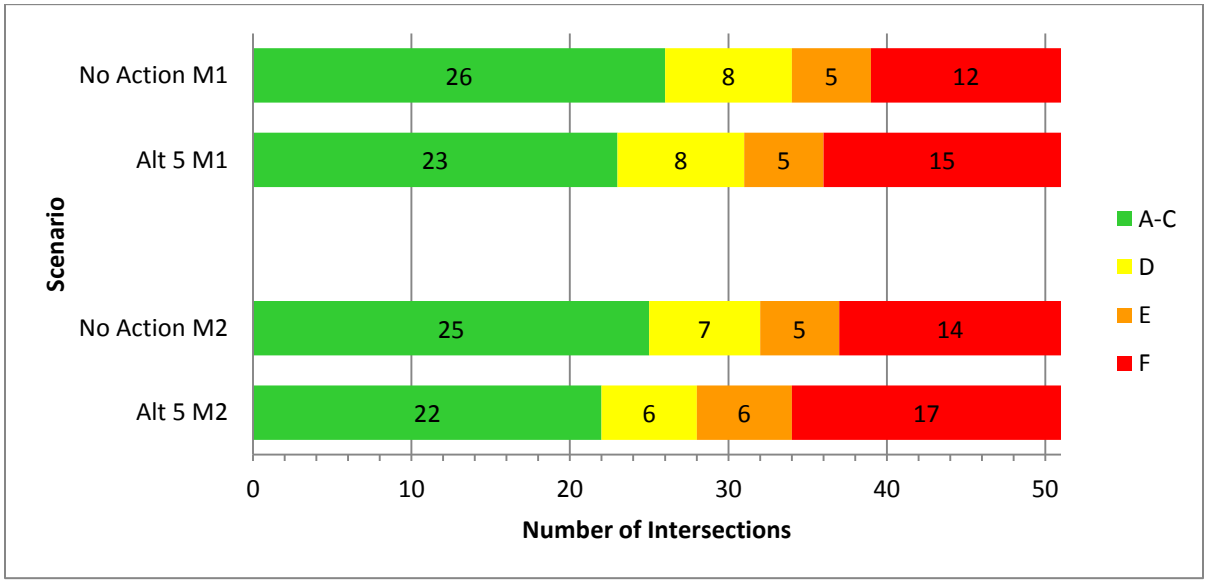


Figure 3.8-34

Seattle Center 2030 Alternative 5 Intersection LOS Comparison

As shown:

- Throughout the wider study area, the addition of arena event trips would result in two additional intersections operating at a calculated LOS E/F under 2018 Case M1 and three additional intersections under Case M2.
- Under 2030 conditions three additional intersections would operate at LOS F for Alternative 5 Case M1 and four additional intersections would operate at LOS E/F for Alternative 5 Case M2.

Table 3.2-45 summarizes the intersections that operate at LOS E or LOS F with the addition of arena event traffic under 2018 conditions. Results for 2030 conditions are summarized in Table 3.8-46. Note that some intersections would only operate at LOS E or LOS F under the multiple event scenario (Case M2).

Table 3.8-45
2018 Alternative 5 Weekday PM Peak Hour Intersections at LOS E or LOS F

	Case M1		Case M2	
Roadway	**No Action**	**Alternative 5**	**No Action**	**Alternative 5**
Elliott Avenue W. / W. Mercer Pl	F	F	F	F
Queen Anne Avenue N. / Roy Street	F	F	F	F
Broad Street / Valley Street	F	F	F	F
1st Avenue W. / W. Mercer Street	E	E	E	E
Mercer Street / Queen Anne Avenue N.	F	F	F	F
1st Avenue N. / Mercer Street	C	D	D	E
Mercer Street / Warren Avenue N.	F	F	F	F
3rd Avenue N. / Mercer Street	B	E	C	F
5th Avenue N. / Mercer Street	F	F	F	F
Mercer Street / Taylor Avenue N.	C	D	C	E
Dexter Avenue N. / Mercer Street	F	F	F	F
9th Avenue N. / Mercer Street	F	F	F	F
Mercer Street / Westlake Avenue N.	F	F	F	F
Mercer Street / Terry Avenue N.	D	E	E	F
Fairview Avenue N. / Mercer Street	F	F	F	F
5th Avenue N. / Broad Street	E	E	E	E
5th Avenue N. / Denny Way	E	F	E	F
Aurora Avenue N. / Denny Way	E	E	E	E
Denny Way / Dexter Avenue	F	F	F	F
Denny Way / Westlake Avenue	F	F	F	F
Denny Way / Fairview Avenue	F	F	F	F
Denny Way / Stewart Street	F	F	F	F

Table 3.8-46
2030 Alternative 5 Weekday PM Peak Hour Intersections at LOS E or LOS F

	Case M1		Case M2	
Roadway	**No Action**	**Alternative 5**	**No Action**	**Alternative 5**
Elliott Avenue W. / W. Mercer Pl	F	F	F	F
Queen Anne Avenue N. / Roy Street	F	F	F	F
Broad Street / Valley Street	E	E	E	E
1st Avenue W. / W. Mercer Street	D	E	E	E
Mercer Street / Queen Anne Avenue N.	F	F	F	F
1st Avenue N. / Mercer Street	D	D	D	E
Mercer Street / Warren Avenue N.	F	F	F	F
3rd Avenue N. / Mercer Street	C	E	D	F
5th Avenue N. / Mercer Street	E	F	F	F
Mercer Street / Taylor Avenue N.	C	C	C	E
Dexter Avenue N. / Mercer Street	F	F	F	F
9th Avenue N. / Mercer Street	E	F	F	F
Mercer Street / Westlake Avenue N.	F	F	F	F
Mercer Street / Terry Avenue N.	D	E	E	F
Fairview Avenue N. / Mercer Street	F	F	F	F
5th Avenue N. / Broad Street	E	E	E	E
1st Avenue / Denny Way	D	D	D	E
5th Avenue N. / Denny Way	E	F	E	F
Aurora Avenue N. / Denny Way	F	F	F	F
Denny Way / Dexter Avenue	F	F	F	F
Denny Way / Westlake Avenue	F	F	F	F
Denny Way / Fairview Avenue	F	F	F	F
Denny Way / Stewart Street	F	F	F	F

Corridor Travel Times

Table 3.8-47 summarizes the calculated weekday PM peak hour travel times under 2018 conditions on the defined routes. Table 3.8-48 summarizes the calculated travel times under 2030 conditions. No Action results conditions are shown in parentheses and provided for comparison purposes.

Table 3.8-47
2018 Alternative 5 Weekday PM Peak Hour Corridor Travel Times

Route	Extents	Direction	Case M1 (m:ss)[1]	Case M2 (m:ss)
1	W. Mercer Street from 3rd Avenue W. to Fairview Avenue N.	EB	22:47 (17:40)[2]	26:37 (21:09)
	W. Mercer Street from Fairview Avenue N. to 3rd Avenue W.	WB	25:40 (10:01)	37:33 (14:47)
2	Denny Way from Queen Anne Avenue to Stewart Street	EB	16:57 (15:14)	19:17 (17:30)
	Denny Way from Stewart Street to Queen Anne Avenue	WB	15:21 (12:04)	17:00 (13:06)
3	5th Avenue N. from Denny Way to W. Mercer Street	NB	6:20 (5:04)	6:44 (5:25)
	5th Avenue N. from W. Mercer Street to Denny Way	SB	3:22 (3:00)	3:51 (3:04)

1. m:ss = minutes:seconds
2. No Action travel times provided for comparison.

Table 3.8-48
2030 Alternative 5 PM Peak Hour Corridor Travel Times

Route	Extents	Direction	Case M1 (m:ss[1])	Case M2 (m:ss)
1	W. Mercer Street from 3rd Avenue W. to Fairview Avenue N.	EB	23:21 (18:37)[2]	27:11 (22:38)
	W. Mercer Street from Fairview Avenue N. to 3rd Avenue W.	WB	22:26 (8:28)	33:18 (13:06)
2	Denny Way from Queen Anne Avenue to Stewart Street	EB	21:55 (19:46)	24:26 (22:24)
	Denny Way from Stewart Street to Queen Anne Avenue	WB	17:29 (13:00)	19:40 (14:36)
3	5th Avenue N. from Denny Way to W Mercer Street	NB	6:19 (5:18)	6:38 (5:35)
	5th Avenue N. from W. Mercer Street to Denny Way	SB	3:28 (3:09)	3:52 (3:14)

1. m:ss = minutes:seconds
2. No Action travel times provided for comparison.

As shown in Table 3.8-47 and Table 3.8-48:

- Travel times under both 2018 and 2030 conditions are calculated to increase with the addition of arena event traffic. In particular, westbound Mercer Street increases substantially to over 30 minutes with the addition of arena traffic due to the majority of

traffic (approximately 70 percent) travelling to the Seattle Center area utilizing the Mercer Street corridor.

- It is noted that No Action and all future estimates of event traffic volumes are simply additive to No Action conditions. While existing counts and analysis show modest impacts to traffic volumes and operations on event days, this additive approach likely overestimates future traffic and congestion related to events. However, it does provide a consistent basis for comparing alternatives. There is no reliable way to assess the amount of diverted non-event traffic likely to occur for any given event.

Regional Access Analysis

Traffic would access the new arena in the Seattle Center area via I-5, SR 99, and local arterials. It is estimated up to 20 percent of the trips that would access a new arena would come from the north via I-5 and 55 percent via I-5 from the south. The other 25 percent of the trips would access the area via local arterials and SR 99.

For an event only at the new arena, up to an additional 1,550 vph would enter the city via I-5 to reach the Seattle Center area. This is a 6 to 15 percent increase in trips compared to a typical evening commute on any one of those corridors. Table 3.8-49 shows the typical traffic volumes for a weekday and the anticipated increase in traffic with a new arena, and also with the combined with other events.

The typical weekday traffic flow values shown in Table 3.8-49 are existing volumes but represent anticipated traffic volumes in year 2018. Traffic demand (or volume of vehicles that want to use these corridors) increase as land use changes. However because the corridors are at or near capacity, additional traffic is not served during the peak hour of congestion. Therefore today's traffic volume served through these areas during the peak of congestion would be similar in future years unless capacity was increased for I-5.

Table 3.8-49 also focuses on the directions and locations of I-5 that would experience the greatest increase in trips from an arena event. During the PM peak hour, the majority of the trips (about 94 percent) associated with a new arena are inbound trips (or trips heading to a new arena).

Table 3.8-49
2018 Alternative 5 Weekday PM Peak Hour Increase in Traffic on Freeway Corridors

Location	Typical Weekday PM Peak Hour Traffic (vph)	Increase in traffic with Arena (vph / % compared to typical weekday traffic)	
		Case M1	Case M2
I-5 Southbound (north of Mercer)	6,700 vph	400 vph / 6%	550 vph / 8%
I-5 Northbound (south of Olive)	6,800 vph	1,100 vph / 15%	1,450 vph / 21%

The I-5 and I-90 corridors experience congestion today during the PM peak commute. Today, events at the downtown arenas results in an increase in travel time approaching the city center. The PM peak travel times (on days with events in 2012) increased by up to eight minutes on southbound I-5 between NE 145th and I-90 and up to four minutes on I-90 between I-405 and Rainer Avenue S. It is anticipated with a new arena with capacity for 20,000 spectators, PM peak travel times would be similarly affected for a typical event day with an event only at the new arena (Case M1).

For an event only at the new arena, up to an additional 1,400 vph would enter the city via I-5 to reach the new arena in the year 2030. This is slightly less than the year 2018 condition as it's assumed more people would use transit to access this area. This is a result of Link light rail extensions and other transit improvements that will provide event attendees more options. Increases in traffic and effect to regional travel times on the I-5 and I-90 freeways would be similar in the year 2030 as experienced in the year 2018.

Regional or freeway access to the Seattle Center area is constrained by signals at the terminal of the off-ramps. Overall intersection and off-ramp approach operations of two arterial intersections at the I-5 ramp termini were reviewed. The analysis was conducted for the weekday PM peak hour for 2018 and 2030 horizon years, under Case M1 and M2.

Under both 2018 and 2030 conditions during the PM peak hour off-ramp conditions operate at LOS E/F at both Denny Way and Mercer Street and are similar to No Action conditions. The further addition of event traffic would add to the already poor off-ramp terminal operations that are forecast to occur under No Action conditions.

In addition to the traffic operations impacts outlined above, the increases in event traffic volumes related to an arena would have an impact on emergency vehicle access and circulation to the Memorial Stadium site as well as through the area. This may require emergency response vehicles to use on-board flashing lights and sirens to navigate through the congestion and reduce delays. In addition, during periods of heavy congestion, manual traffic control may be necessary to facilitate the passage of emergency vehicles.

Post-Event Traffic Operations

At the end of a sporting event at the Seattle Center attendees typically depart the venue in a highly concentrated flow that can affect traffic operations within the vicinity of the venue. Post-event traffic counts for sporting event in the SoDo area[17] indicate that the peak 15 minutes near the end of an event can range between 30 to 40 percent of the total hourly flow that includes this peak with traffic volumes greatest travelling away from the venue.

As a result of this surge, professional sporting events in Seattle typically implement a Traffic Control Plan (TCP) to aid in the dispersion of event attendees to the transportation network. A TCP helps to alleviate this outbound surge in event attendees. However, post-event surge

[17] Seattle Mariners, April 11, 2013

traffic volumes are usually less than the peak 15-minute period during a non-event peak evening commute period. As a result, the analysis of the peak evening commute period represents a worst-case condition.

3.8.3.7 Freight and Goods Movement

This section describes the existing, No Action, and magnitude of future impacts associated with the development alternatives on the movement of freight and goods within the Seattle Center area.

Methodology

The impacts of the alternatives on freight and goods movements are evaluated based on the effect of the added magnitude and frequency of additional event traffic on freight activity. Thus changes in specific intersection and arterial performance at locations along identified truck routes are evaluated.

Affected Environment

Transportation Network

Within the Seattle Center area, the City has designated several roadways as Major Truck Routes and Seaport Highway Connectors. See Figure 3.8-35. Several roadways are designated as truck facilities. Trucks with over-legal loads utilize Mercer Street and Broad Street to access the waterfront and the CBD. These routes maintain a 20’ by 20’ design envelope.

Two classes of truck facility are identified:

- Major Truck Routes and Seaport Highway Connector
    - Elliott Avenue W. north of Broad Street
    - Broad Street south of Mercer Street
    - Aurora Avenue N.
    - Western Avenue from Elliott Avenue W. to Denny Way
    - Denny Way from Western Avenue to Broad Street
    - Mercer Street from Dexter Avenue N. and Broad Street to Fairview Avenue N.
- Major Truck Routes only
    - Western Avenue south of Denny Way
    - Broad Street north of Mercer Street
    - 9th Avenue N. north of Mercer Street

- Westlake Avenue N. north of Mercer Street
- Fairview Avenue N. north of Mercer Street
- Valley Street between Westlake Avenue N. and Fairview Avenue N.
- Elliott Avenue south of Broad Street

Traffic Volumes

Due to ongoing construction along the Mercer Street corridor, current traffic counts were not conducted, as the data would not be indicative of stable conditions. Historical traffic counts[18] along the corridor showed that truck volumes over a 16-hour period totaled 450 semi-trucks utilizing the I-5 ramps, 100 semi-trucks along Broad Street and 50 trucks were noted to use Westlake Avenue. The Synchro traffic models obtained from the City included heavy vehicles percentages of two percent. Future analyses conducted for this evaluation utilized the same assumptions.

Traffic Operations

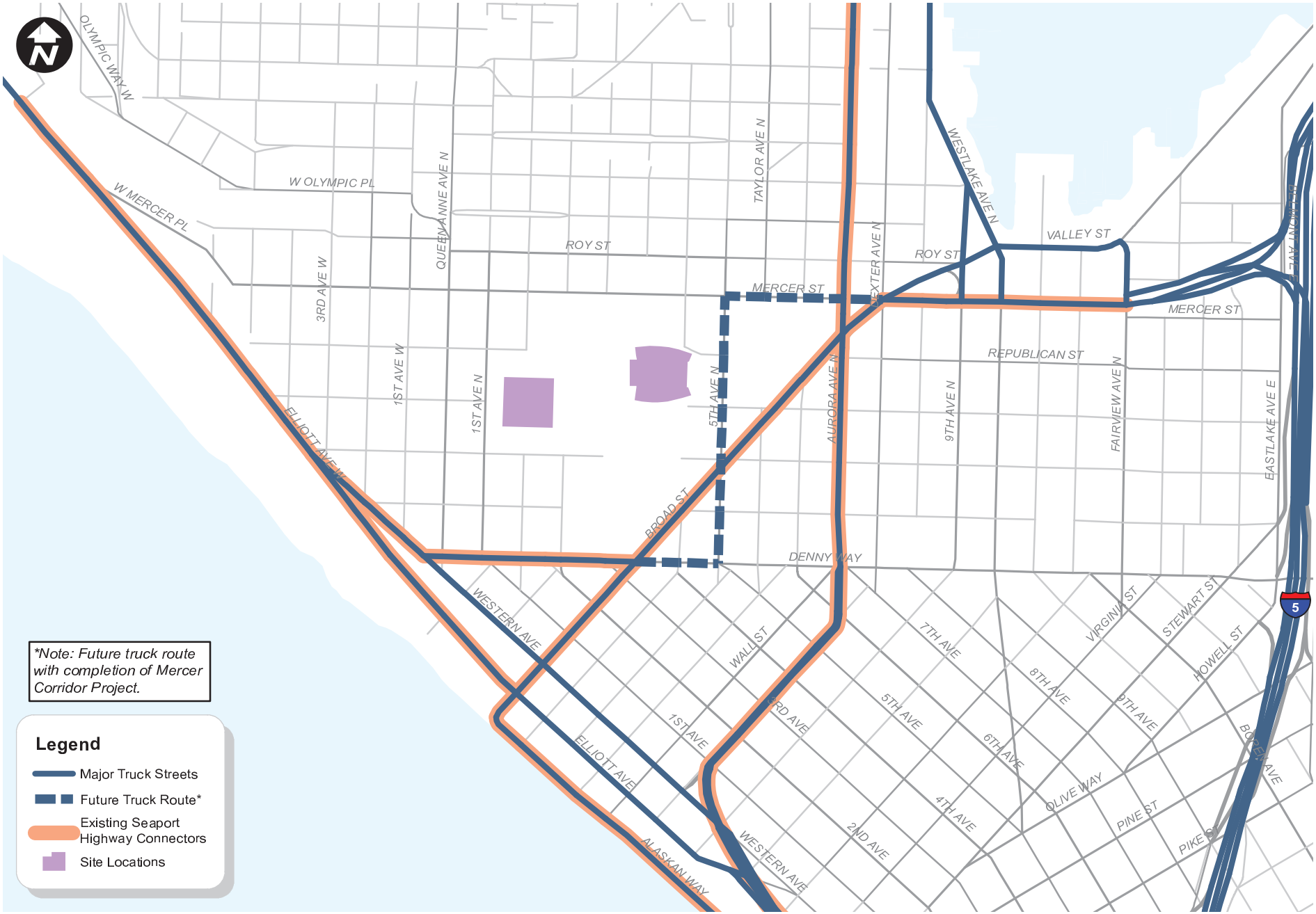
Individual intersection and corridor operations have a significant impact on the efficiency and cost associated with the movement of freight and goods. This section highlights the traffic operations along the key corridors utilized by freight, as designated by the City of Seattle. This analysis focuses mainly on the Mercer Street corridor as that is the primary connection to the area from the regional system.

The analysis of existing conditions reflects the completion of the east section of the Mercer Street corridor. The results of the intersection analysis identified three of the seven intersections east of and including the Dexter Avenue N. intersection that are "currently"[19] operating at LOS E/F during the weekday PM peak hour. Truck traffic utilizing Mercer Street to access Elliot Avenue or Western will incur delay at these intersections commensurate with the delay experienced by all traffic. Likewise, corridor level impacts would experience similar delay and travel time impacts. It is noted that large trucks may experience additional delays during periods of extreme congestion as trucks require more clear space to enter and clear an intersection.

The travel time corridors identified for this review included Mercer Street from 3rd Avenue W. to Fairview Avenue N. This corridor was identified based on its designation as a Major Truck Street as well as its functionality with respect to access to the Seattle Center Area alternative sites. Existing travel times for this section of Mercer Street were calculated at approximately 9 minutes in the eastbound direction and 8.5 minutes in the westbound direction.

[18] Mercer Corridor Improvements Project Transportation Discipline Report, November 2006.

[19] Assumes completion of the east portion of the West Mercer Improvement Project



Seattle Center Area Freight Facilities

Seattle Arena

FIGURE
3.8-35

transpoGROUP

Impacts of the No Action Alternative at Alternative 4 and 5 Sites

Forecast conditions under the No Action alternative for freight and goods movement within the Seattle Center area are described in the following sections. With the changes in roadway infrastructure future discussions focus primarily on the Mercer Street corridor, due to its regional access and future east-west linkages and future impacts of the development alternatives.

Transportation Network

Several planned projects were identified that will affect truck travel within the study area. These include:

- **Alaskan Way Viaduct Replacement – North Portal**: This portion of the project provides connections to the transportation system in the Seattle Center area. This includes the following connections:
    - **Tunnel Access at Republican Street and 6th Avenue N.:** Access to SR 99 will be provided via new ramps at Republican Street. The northbound off-ramp traffic will exit to the east toward Dexter Avenue N. and the southbound traffic will merge onto SR 99 via a reconfigured 6th Avenue N. between Harrison Street and Mercer Street west of SR 99. The new 6th Avenue N. roadway will have one to two lanes in each direction and a traffic signal at the SR 99 ramp intersection.
    - **New Street Connections to Aurora Avenue N. (SR 99):** John Street, Thomas Street, and Harrison Street will connect to Aurora Avenue N. Thomas Street will have bike lanes between Dexter Avenue N and 5th Avenue N. Aurora Avenue N. will have two travel lanes in each direction, an additional transit-only lane, and turn pockets between Denny Way and Harrison Street. The Denny Way intersections with John Street, Thomas Street, and Harrison Street will be signalized.
- **Mercer Corridor:** This project includes the conversion of two-way traffic flows along Mercer Street between I-5 and Elliott Avenue W. The main purpose is to improve the east-west connection in the area by turning Mercer Street into a two-way corridor and improving access for pedestrians and bicyclists. The project is separated into two phases: Mercer East and Mercer West. The impact to the study area of each phase is:
    - **Mercer East:** This portion of the project is located between Fairview Avenue N. and Dexter Avenue N. It provides two-way operations along both Mercer Street and Valley Street. The portion along Mercer Street is complete and has three travel lanes in each direction and sidewalks on both sides. Two new traffic signals are provided along Mercer Street at the Terry Avenue NE and Boren Avenue N. intersections. Valley Street is currently under construction and will have one lane in each direction with bicycle and pedestrian improvements. The project is scheduled to be completed by summer of 2013.

- **Mercer West:** The portion stretches from Dexter Avenue N. to 5th Avenue W. Mercer Street will have three travel lanes in each direction between Dexter Avenue N. and Aurora Avenue N., two lanes in each direction between 5th Avenue N. and 2nd Avenue N., and one lane in each direction between 2nd Avenue N. and 5th Avenue W. Roy Street will also be converted to have two-way operations with one lane of travel lane in each direction. Pedestrian and bicycle improvements will be provided along both Mercer Street and Roy Street, including bike lanes in both directions along Roy Street between 5th Avenue N. and Queen Anne Avenue N., a bike path on the north side of Mercer Street near the Aurora Avenue underpass, and new and / or improved sidewalks along the project corridor. In addition, with completion of the project Broad Street will be removed and the major truck street / seaport highway connector will shift to 5th Avenue N between Denny Way and Mercer Street and Mercer Street from 5th Avenue N to I-5. This project is scheduled to be complete by mid-2015 and will connect to improvements made in the area related to the Alaskan Way Viaduct Replacement Project.

Traffic Volumes

2018 traffic volumes along the Mercer Street corridor are forecast to nominally increase over the existing estimates by less than one percent during the weekday PM peak hour conditions. Traffic forecasts for the year 2030 are approximately two percent greater than the 2018 forecasts. Truck percentages assumed in the future No Action analyses were two percent for all approaches to each intersection. Based on the application of a two percent truck factor, traffic volumes along Mercer Street would total 100 trucks per weekday PM peak hour. Given the estimates of 450 trucks counted at the I-5 off-ramp in a 16-hour period, the assumption of two percent should be considered conservative as it totals approximately 25 percent of the total truck volume. It is unlikely that 25 percent of the observed truck volumes would occur during the 1-hour PM peak hour time period. In fact, many truck drivers specifically avoid travel during these periods given the difficulty of travel.

Along Broad Street the 2018 and 2030 forecasts reflect negligible growth over the existing traffic volumes. This is due primarily due to the reconfiguration of Broad Street and the elimination of the direct connection to W. Mercer Street. Trucks exiting I-5 at W. Mercer Street will still be able to access Broad Street, but utilize the 5th Avenue N. connection to do so.

Traffic Operations

Since the 2030 analysis presented in the Traffic Operations section represents the worst operating condition, this analysis reports operations for 2030 conditions only. The analysis indicates that in the future (2030) five of the seven intersections are forecast to operate at LOS E/F along W. Mercer Street from Dexter Avenue N. to I-5. Truck traffic utilizing Mercer Street to access Elliot Avenue or Western Avenue will incur delay at key intersections increasing travel times through the corridor overall.

The travel time analysis conducted for the W. Mercer Street corridor showed 2030 travel times of 18.5 minutes in the westbound direction and 8.5 in the eastbound direction. This represents no noticeable change in the eastbound direction and increase of approximately 9.5 minutes in the westbound direction as compared to the "existing" conditions. This change is likely due to several factors including development within the South Lake Union neighborhood, planned changes to the roadway including the two-way Mercer Street improvement projects and Alaskan Way North Portal improvements, changes in travel patterns, and varying growth in traffic volumes along the length of the corridor.

Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

Major truck routes surrounding the site could be intermittently impacted by construction. A construction management plan would be developed to minimize any street closures or other impacts as a result of the arena construction. This management plan would use of manual flaggers and signs to provide vehicle circulation. In addition, key stakeholders would be notified of any major roadway closures. Forecast conditions in the Seattle Center area were evaluated for Alternative 4.

Transportation Network

No modifications to the transportation system that would impact freight and goods movements are identified as part of this Alternative.

Traffic Volumes

Traffic volume forecasts were developed for Alternative 4 for both K1 and K2. A comparison of the future volumes for the No Action Alternative and Alternative 4 are summarized in Table 3.8-50. As shown in this table, along W. Mercer Street, east of Terry Avenue, weekday PM peak hour traffic volumes are anticipated to increase by approximately 15 percent under either event case. This increase in traffic is representative of the incremental impact assuming an existing (12,000 attendance) event at the KeyArena. The No Action Case K1 includes the 12,000 attendance event and the No Action Case K2 includes 12,000 attendance at the KeyArena and 5,000 at Memorial Stadium.

Table 3.8-50
2030 Alternative 4 Weekday PM Peak Hour Traffic Volumes Comparison

	Case K1		Case K2	
Location	**No Action**	**Alternative 4**	**No Action**	**Alternative 4**
Mercer Street east of Terry Avenue N.	5,785	6,645 (+15%)[1]	5,990	6,835 (+14%)

Traffic Operations

Intersections along the W. Mercer Street corridor as well as the performance of the corridor itself were reviewed to determine the potential impact on the movement of freight and goods through the corridor. As previously summarized and discussed in the traffic operations section, by 2030 five of the seven intersections along Mercer Street are projected to operate at LOS E/F

under Alternative 4. This is compared to five intersections forecasted to operate at LOS E/F in either of the No Action event cases.

2030 PM peak hour travel times for the W. Mercer Street corridor were reviewed for the Alternative 4 event cases. The results of the analyses are summarized in Table 3.8-51.

Table 3.8-51
2030 Alternative 4 Weekday PM Peak Hour Corridor Travel Times

Route	Extents	Direction	Case K1 (m:ss[1])	Case K2 (m:ss)
1	W. Mercer Street from 3rd Avenue W. to Fairview Avenue N.	EB	24:11 (21:04)[2]	25:29 (22:38)
	W. Mercer Street from Fairview Avenue N. to 3rd Avenue W.	WB	25:20 (10:58)	29:09 (13:06)

1. m:ss = minutes:seconds
2. No Action travel times provided for comparison.

It is noted that No Action and all future estimates of event traffic volumes are simply additive to No Action conditions. While existing counts and analyses show modest impacts to traffic volumes and operations on event days, this additive approach likely overestimates future traffic and congestion related to events. However, it does provide a consistent basis for comparing alternatives.

Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Major truck routes surrounding the site could be intermittently impacted by construction. A construction management plan would be developed to minimize any street closures or other impacts as a result of the arena construction. This management plan would use of manual flaggers and signs to provide vehicle circulation. In addition, key stakeholders would be notified of any major roadway closures. Forecast conditions in the Seattle Center area were evaluated for Alternative 5.

Transportation Network

No modifications to the transportation system that would impact freight and goods movements are identified as part of this Alternative.

Traffic Volumes

Traffic volume forecasts were developed for Alternative 5 for both M1 and M2. A comparison of the future volumes for the No Action and Alternative 5 are summarized in Table 3.8-52. As shown in this table, along Mercer Street, east of Terry Avenue, weekday PM peak hour traffic volumes are anticipated to increase by approximately 17 to 19 percent during under either event case. This increase in traffic is representative of the incremental impact assuming an existing (5,000 attendance) event at Memorial Stadium. The No Action Case M1 includes the 5,000 attendance event and No Action Case M2 includes 5,000 attendance at the Memorial Stadium and 12,000 at KeyArena.

Table 3.8-52
2030 Alternative 5 Weekday PM Peak Hour Traffic Volumes Comparison

Location	Case M1		Case M2	
	No Action	Alternative 5	No Action	Alternative 5
Mercer Street east of Terry Avenue N.	5,460	6,495 (+19%)[1]	5,990	7,025 (+17%)

Traffic Operations

Intersections along the Mercer Street corridor as well as the performance of the corridor itself were reviewed to determine the potential impact on the movement of freight and goods through the corridor. As previously summarized and discussed in the traffic operations section, by 2030 five of the seven intersections along Mercer Street are projected to operate at LOS E/F under Alternative 5. This is compared to five intersections forecasted to operate at LOS E/F in either of the No Action event cases.

2030 PM peak hour travel times for the Mercer Street corridor were reviewed for the Alternative 5 event cases. The results of the analyses are summarized in Table 3.8-53.

Table 3.8-53
2030 Alternative 5 Weekday PM Peak Hour Travel Times

Route	Extents	Direction	Case M1 (m:ss[1])	Case M2 (m:ss)
1	W. Mercer Street from 3rd Avenue W. to Fairview Avenue N.	EB	24:11 (21:04)[2]	25:29 (22:38)
	W. Mercer Street from Fairview Avenue N. to 3rd Avenue W.	WB	25:20 (10:58)	29:09 (13:06)

1. m:ss = minutes:seconds

No Action travel times provided for comparison.

3.8.3.8 Parking

SMC parking requirements would be reviewed as part of the Master Use Permit application. This analysis assumes that no new attendee parking[20] would be built as part of Alternatives 4 and 5. The remainder of this discussion focusses on the impact of arena parking demand on the existing and future parking supply in the study area.

Methodology

The following describes the general approach to the parking analysis:

- Establish the study area and appropriate time period for the evaluation
- Document existing parking conditions to provide an understanding of the underlying parking demands

[20] ArenaCo is currently proposing approximately 100 on-site parking spaces for players and arena staff at the Stadium District site.

- Examine effect of future "pipeline" development on parking supply and demand under the No Action Alternative
- Evaluate No Action conditions associated with the existing large event venues (KeyArena and Memorial Stadium) to provide a basis for understanding the impact of the arena on multiple large event conditions
- Add parking demand for the arena to each of the defined No Action baseline event cases and compare arena parking demand to the No Action condition to identify impacts of Alternatives 4 and 5
- Identify mitigation strategies, where appropriate, to reduce the effect of the identified Alternative 4 and 5 impacts

The balance of this methodology section describes the study area for the parking analysis, how the Seattle Center area parking patterns were used to determine the analysis time periods, and parking supply assumptions. Parking demand assumptions specific to existing and future conditions are described in the individual Affected Environment, No Action, and Alternatives 4 and 5 sections.

Study Area

Similar to the Stadium District sites, a primary and expanded study area were evaluated, with the expanded study area reflecting potential parking supply opportunities in the case of larger attendance events. The Seattle Center primary study area is reflective of approximately the same walking distance as assumed for the Stadium District primary study area.

SR 99 currently creates a barrier in the study area, effectively separating South Lake Union from the Seattle Center area for pedestrians. Future improvements in the study area will provide connections across SR 99 allowing for better access between the Seattle Center area and South Lake Union, which will increase the available parking supply. North of the Seattle Center, steep uphill grades north of Roy Street make parking and accessing the Seattle Center area more difficult; the area is generally restricted to those with residential permits. The primary study area considers parking between I-5, Elliott Avenue W., Roy Street/Valley Street, and Downtown. It includes the neighborhoods of Uptown and Uptown Triangle, Belltown, SLU, and Denny Triangle.

An expanded study area was also evaluated considering the CBD consistent with the Stadium District study area. The evaluation of the expanded study area provides a basis for understanding how parking for larger events may be accommodated by parking available at greater distances from the venues.

Analysis Time Periods

Event arrival patterns suggest Arena arrivals would generally begin between two-and three-hours prior to the start. The 2012-2013 NBA, 2011-2013 NHL, and 2012 WNBA schedules indicate the typical start time for Arena sporting events is around 7:00 PM. To determine the

parking analysis period, existing non-event and Arena hourly parking demands for weekday and weekend conditions between 4:00 and 8:00 PM were examined assuming a 7:00 PM game start. Based on the review of existing parking data, the quantified parking impact illustrations focus on weekday conditions at 7:00 PM (Game Start) and Weekend conditions at 8:00 PM (One-Hour after Game Start). These periods encompass the peak parking demand for the study area. A more detailed evaluation of the analysis time periods for the parking impact evaluation is provided in Appendix E.

Parking Supply Assumptions

For the purposes of this analysis, a single parking supply for both weekday and weekend conditions is used to represent physical availability of parking that is generally open to or that could be made available to the public. These include on-street and off-street parking spaces that are available to the general public and would be available for arena event parking. Different from the Stadium District, the Seattle Center study areas generally do not have private customer, employee, or residential parking that would be available for arena events so there appears to be little practical potential that additional private parking spaces would become available.

Like the Stadium District, parking supply varies by time of day and day of the week. On-street parking supply is impacted by time and loading zone restrictions. There are wide variety of time restrictions that apply Monday through Saturday and a mix of both paid and unpaid on-street parking spaces within the study area. For example, Uptown and Belltown have on-street paid parking until 8:00 PM with a four-hour time limit. Uptown Triangle has a 10-hour time limit until 6:00 PM for paid parking areas and a two-hour time limit until 6:00 PM outside the paid areas.

See Appendix E for a description of the existing supply, and assumptions made for the No Action Alternative.

Affected Environment

Parking demand is based on data collected by Transpo Group supplemented by data from the SDOT and PSRC. Different from the Stadium District, no specific event-day parking demand was collected since events (i.e., performance, recreational sports, etc.) occur at the Seattle Center area on a daily basis. The following describes the existing weekday and weekend parking demand within the primary and expanded study areas.

Weekday Occupancy

It becomes difficult to locate parking spaces within an area when occupancies are 85 to 90 percent and generally areas with occupancies at that level are considered “full.” The analysis shows:

- Within the primary study area, on-street parking is more utilized than off-street parking; however, at these occupancy levels, parking utilization would not be considered full for either location.

- The expanded study area parking utilization is similar to the primary study area with on-street parking more utilized than off-street, but with availability both on-and off-street.
- Field observations showed that immediately proximate to restaurant and retail uses within both the primary and expanded study area on-street parking is difficult to locate.

Weekend Occupancy

An analysis of weekend parking occupancy within the primary and expanded study areas shows:

- Weekend evening activity within the primary study area is considerably higher than weekday evenings especially in the Uptown neighborhood, which is most proximate to restaurants and the Mercer Street arts corridor and in Belltown, which has many restaurants and bars located within the neighborhood.
- On-street parking utilization within Uptown is 85 percent, which is an indicator that drivers have difficulty locating this type of parking without excess circulation.
- Consistent with weekday conditions, field observations showed that immediately proximate to restaurant and retail uses within both the primary and expanded study area on-street parking is more difficult to locate.

Impacts of the No Action Alternative at Alternative 4 and 5 Sites

The No Action conditions provides for a basis for comparing impacts of the proposal related to on-and off-street parking supply. However, projecting specifically where someone would park is difficult because the location depends on a variety of factors such as duration of stay, proximity to use, cost of parking, etc. Given this, the review of future conditions considers the parking supply as a whole rather than separate consideration of on- and off-street parking.

Demand Forecasts

The City provided information on future pipeline development that would likely be constructed and occupied by 2018. Based on the pipeline developments identified in the study area, evening parking demand increases are anticipated to be small compared to the added supply. As a conservative estimate of background parking and consistent with the Stadium District evaluation, the existing parking demand was increased by 10 percent on the weekday and five percent on the weekend for the overall study area. Parking demand in specific neighborhoods within the primary and expanded study areas reflect higher increases for Denny Triangle and South Lake Union where most of the pipeline development would occur.

For the No Action Case K1, K2, M1, and M2, parking demand for the KeyArena and Memorial Stadium was added to the background conditions. It was assumed that there was a 7:00 PM start time for events at these venues and that the arrival curve would be consistent with that described for Alternatives 2 and 3, with 95 percent arrival by 7:00 PM and 100 percent by 8:00 PM. The distribution of parking among neighborhoods assumed 80 percent within the primary study area, which is closest to the venues and the remaining 20 percent within the expanded

study area. The No Action event case parking demand was determined by adding the KeyArena and Memorial Stadium parking demand to the background parking demand with no adjustments or reductions in non-event demand. As described in relation to traffic operations this likely results in an overestimate of actual future demands, but reflects a conservative approach.

Weekday Occupancy

Figures illustrating weekday No Action Cases K1, M1, and K2/M2 parking occupancy within the primary and expanded study areas are provided in Appendix E. Case K2 and M2 are the same relative to the No Action.

The parking analysis shows:

- The No Action occupancy for each of the cases are higher than existing conditions both in the primary and expanded studies areas due to the assumed increases in parking demand caused by anticipated development as well as demand associated with events at KeyArena and Memorial Stadium.
- A comparison of case K1 and M1 shows that utilization is about 13 to 14 percent less in neighborhoods nearest the two sites (Uptown and Uptown Triangle) with No Action Case M1 given the smaller event (i.e., 5,000 attendees) at Memorial Stadium as compared to KeyArena (i.e., 12,000 attendees).
- For single and dual events, Case K1, M1, or M2/K2, all of the anticipated parking demand could be fully accommodated within the primary study area.
- Overall the total primary study area occupancies are calculated to be approximately 39 to 47 percent for the No Action event cases, which would allow for some additional parking.

It is likely that attendees of events at KeyArena or Memorial Stadium would desire to park close to the venues. Based on the review of existing conditions, on-street parking would likely be difficult to find close to the venues; however, off-street parking is more readily accessible and the Seattle Center area has several large garages in close proximity of both venues.

Weekend Occupancy

Figures illustrating weekend No Action Cases K1, M1, and K2/M2 parking occupancy within the primary and expanded study areas are provided in Appendix E.

The parking analysis shows:

- As described in existing conditions, in neighborhoods closest to the venues weekend utilization is generally higher in the primary study area as compared to weekday. Given the higher baseline, the No Action event cases have occupancies up to approximately 85 percent in the Uptown neighborhood.

- For single and dual events, Case K1, M1, or M2/K2, all of the anticipated parking demand could be fully accommodated within the primary study area.
- The primary study area total occupancy would be approximately 43 to 51 percent for No Action event cases indicating approximately 49 to 57 percent of the spaces would be available for arena use.
- The results indicate that there would be limited reliance on the expanded study area to accommodate parking even in multi-event cases.

As discussed previously, attendees of events at KeyArena or Memorial Stadium would likely desire to parking close to the venues. Based on the review of existing conditions, on-street parking would likely be difficult to find close to the venues; however, off-street parking is more readily accessible and the Seattle Center area has several large garages in close proximity of both venues.

Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

Parking impacts related to construction would be minimized by providing off-street parking, securing parking in near-by garages, as well as encouraging use of alternative modes. It is anticipated that parking impacts related to construction would be less than the 20,000-seat arena. In addition, construction activities could result in the need to close on-street parking adjacent to the site. These closures would be coordinated with SDOT and appropriate notice and signs would be provided.

Alternative 4 is compared to the No Action Alternative to identify parking impacts of an arena development on the KeyArena site. No additional parking supply is proposed as part of the development of an arena at this location. Should an arena go forward at this location, code-required parking would have to be satisfied either through added supply or parking agreements.

Arena Demand Forecasts

Alternative 4 parking demand represents an arena event with an attendance of 20,000 people, which represents a net increase of 8,000 attendees as it relates to the KeyArena site. The arrivals patterns are consistent with the Stadium District site and the event arrival curve presented in Appendix E. With a 7:00 PM game start, 95 percent of the attendee arrivals occur by 7:00 PM and 100 percent by 8:00 PM. Similar to the No Action, 80 percent of the parking was assumed within the primary study area, which is closest to the venues and the remaining 20 percent within the expanded study area or CBD. The total Alternative 4 parking demand for each event case is determine by adding the arena parking demand to the No Action Case K1 and K2. A simple layering process was used with no adjustments or reductions in non-event demand, as described earlier.

Weekday Occupancy

The parking analysis shows:

- Alternative 4 Case K1, with a new arena only, would result in an almost 30 percent increase in parking occupancy within the primary study area.
- For a multi-event scenario, Alternative 4 Case K2, the primary study area would reach 55 percent occupancy, an increase of almost 10 percent in parking occupancy compared to No Action.
- Although the overall primary study area would be 55 percent for Alternative 4 Case K2, the Uptown neighborhoods closest to the venue would begin to fill up with occupancies of approximately 80 percent. SLU and Denny Triangle within the primary study area would have ample parking to accommodate arena parking.

Weekend Occupancy

The parking analysis shows:

- The primary study area parking occupancy would reach approximately 55 percent occupancy with Alternative 4 Case K1 and 60 percent with Alternative 4 Case K2, an increase of almost 10 percent in parking occupancy compared to No Action on the weekend.
- Although the overall primary study area would be 55 to 60 percent, the Uptown neighborhoods closest to the venue would be highly utilized and for Alternative 4 Case K2 this area would become full with occupancies of 85 to 90 percent. Finding parking would become more difficult in these areas. SLU and Denny Triangle within the primary study area would have ample parking to accommodate arena parking.

Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Parking impacts related to construction would be minimized by providing off-street parking, securing parking in near-by garages, as well as encouraging use of alternative modes. It is anticipated that parking impacts related to construction would be less than the 20,000-seat arena. In addition, construction activities could result in the need to close on-street parking adjacent to the site. These closures would be coordinated with SDOT and appropriate notice and signs would be provided.

Alternative 5 is compared to the No Action Alternative to identify parking impacts of an arena development on the Memorial Stadium site. Similar to Alternative 4, no additional parking supply is proposed as part of the defined alternative. It is noted that the adopted Seattle Center Master Plan calls for 1,300 spaces to be developed under a new transportation center at the Memorial Stadium site. The compatibility of a new arena with underground parking and transportation would require further analysis. For purposes of this review, no new parking is assumed.

Arena Demand Forecasts

Parking demand forecasts for the arena are consistent with Alternative 4. Alternative 5 parking demand represents a net increase of 5,000 attendees as it relates to the Memorial Stadium site.

Weekday Occupancy

The parking analysis shows:

- For a multi-event scenario, Alternative 5 Case M2, the primary study area would reach 60 percent occupancy, an increase of almost 15 percent in parking occupancy compared to No Action.
- Although the overall primary study area would be 60 percent for Alternative 5 Case M2, the Uptown neighborhoods closest to the venue would be more highly utilized and would become full with an 89 percent occupancy. Finding parking would become more difficult in these areas. SLU and Denny Triangle within the primary study area would have ample parking to accommodate arena parking.

Weekend Occupancy

The parking analysis shows:

- With the arena only on weekends, the primary study area would reach 56 percent occupancy for Alternative 5 Case M1 and 64 percent for Alternative 5 Case M2, an increase of almost 15 percent in parking occupancy compared to No Action.
- During the multi-event scenario on the weekend, the closest parking within the primary study area would reach 90 percent; however, SLU and Denny Triangle have ample parking to accommodate arena parking demand and it is anticipated parking supply would increase in the future with development.

3.8.3.9 Safety

Methodology

Collisions were reviewed at the study area intersections. Records of reported collisions were obtained from SDOT for the five-year period between January 1, 2007, and December 31, 2011. A summary of the total and average annual reported accidents at each study intersection is provided in Attachment E-4, which is available from DPD upon request. The City of Seattle has adopted criteria for assigning high accident location status to signalized intersections with 10 or more reported collisions per year and unsignalized intersections with five or more reported collisions per year. Intersections designated as high accident locations are targeted for future safety improvements in an effort to reduce the occurrence of accidents.

Affected Environment

Fewer than 10 collisions per year were reported at each signalized study intersections and for the unsignalized locations only the Mercer Street / Taylor Avenue intersection had an average of more than five collisions per year. No fatalities were identified in the study area for the five-year period.

A review of the collisions at the Mercer Street / Taylor Avenue intersection shows that roughly one-third of the collisions involved left-turning vehicles and in most of those cases, vehicles were improperly turning. There were four collisions with pedestrians, all of which involved the vehicle not granting right-of-way to the pedestrian. The Mercer West project would signalize this location in the future, which would likely minimize left-turning collisions and improve the overall safety for pedestrian and vehicular traffic at the intersection.

The data was reviewed for locations with collisions involving pedestrians or bicyclists. Of the 52 study intersections reviewed, 35 locations had collisions involving pedestrians and bicyclists over the 5-year study period. All locations with pedestrian or bicycle accidents experience less than two accidents per year. The corridors within the study area are undergoing significant pedestrian and bicycle safety improvements as part of the major transportation infrastructure projects. Elements related to pedestrian and bicyclists include signalized crossings, wider path / sidewalk, new bicycle facilities, etc. along Mercer Street and other nearby corridors. It is anticipated with these improvements conflicts between vehicular and pedestrian / bicycle traffic would be reduced and overall non-motorized safety could improve.

Impacts of the No Action Alternative at Alternative 4 and 5 Sites

As traffic volumes increase, the potential for traffic safety issues increases proportionately. The overall vehicular and non-motorized traffic in the area under 2018 and 2030 conditions are anticipated to be higher than occur under existing conditions; however, there are changes in transportation infrastructure underway and the impact of these changes on transportation safety is unknown. The projects are all designed to current standards of practice.

Impacts of Alternative 4 – KeyArena 20,000-Seat Arena

Alternative 4 construction would increase vehicular traffic within the study area, which could result in increased conflicts between vehicular, pedestrian, and bicycle traffic. It is anticipated that safety impacts related to construction would be less than the 20,000-seat arena.

As noted above, as traffic volumes increase, the potential for traffic safety issues increases proportionately. Alternative 4 would increase both vehicular and non-motorized traffic within the study area, which could potentially increase conflicts between vehicular and non-motorized traffic resulting in the potential for increase safety issues.

Impacts of Alternative 5 – Memorial Stadium 20,000-Seat Arena

Alternative 5 construction would increase vehicular traffic within the study area, which could result in increased conflicts between vehicular, pedestrian, and bicycle traffic. It is anticipated that safety impacts related to construction would be less than the 20,000-seat arena.

Safety impacts associated with Alternative 5 would be similar to those described for Alternative 4.

3.8.4 Mitigation Measures

The analysis preceding this section identified transportation impacts associated with the development of an 18,000 to 20,000 seat multi-purpose arena at either the Stadium District in SoDo or in the Seattle Center area. Potential mitigation measures to address the impacts for each element of the transportation environment (traffic volumes, traffic operations, parking, pedestrians, etc.) are strategically grouped them by type of mitigation.

Mitigation measures have been identified for both construction and operation. There are generally two types of mitigation measures discussed: (1) physical improvements; and (2) programmatic improvements to be identified as part of the Transportation Management Plan (TMP).

3.8.4.1 Construction Management Plan (CMP)

To mitigate potential construction-related impacts, ArenaCo shall develop a CMP in conjunction with site-specific development. This plan would be coordinated with the DPD Noise Abatement Officer and SDOT, and must be submitted and approved prior to issuance of a building permit. The plan would include, but not be limited to, the following elements:

- **Central Construction Coordination Office.** During construction, the construction manager shall maintain coordination with the existing venues and the Port of Seattle to advise them of major phases of construction that may create constraints or disruption along roads and sidewalks in the immediate vicinity of the Arena.
- **Construction Hours and Sensitive Receivers** – Identify demolition and construction activities within permissible construction hours.
- **Construction Noise Requirements** – Include the requirement that all demolition and construction activities shall conform to the Noise Ordinance, except as approved through the variance process.
- **Construction Milestones** – Include a description of the various phases of demolition and construction, including a description of noise and traffic generators, and anticipated construction hours for each phase.

- **Construction Noise Management** – Identify and list techniques and measures to minimize or prevent demolition and construction noise including: timing restrictions, noise reduction construction technologies, process modifications.

- **Construction Parking Management** – Identify areas for construction worker parking. As part of the agreement with the Arena, the general contractor would develop a construction worker parking program, so available public off-street and on-street parking is not adversely impacted by the influx of this large temporary population of workers. This would involve remote parking with a shuttle service, use of parking and loading areas in vacant buildings, or other means of providing construction worker parking without impacting existing on- and off-street public parking.

- **Construction Traffic/Street and Sidewalk Closures** – As part of the Arena construction, the construction manager would be required to identify anticipated street closures, the timing for street closures, and the detour routes and signing plan to guide drivers, bicyclists, and pedestrians around these restrictions. The CMP shall identify potential sidewalk, transit stop, and bicycle lane closures or rerouting, and shall consider the need for construction truck traffic to avoid peak traffic periods (e.g., 6-9 AM, 3-6 PM). This proposal would be reviewed and coordinated with SDOT, the Port of Seattle, and others nearby venues through the Maintenance of Traffic Task Force (MOTTF).

- **Off-site Construction Coordination**. The Transportation Coordinator would regularly attend and / or be informed by the Maintenance of Traffic Task Force (MOTTF) relating to utility and road projects that would potentially impact Arena and other event access in the immediate area as well as more regional transportation projects like the SR 520 and Mercer Corridor projects that shift traffic patterns and may impact access to the Arena.

- **Priority Truck Routing and Loading.** Develop demolition, earthwork excavating, concrete and other truck routing plans and submit those plans for approval through SDOT for site-specific development. The Arena general contractor would specify priority truck routes and loading areas as part of a coordinated Construction Traffic Control Plan. This plan would be reviewed by SDOT and coordinated with other venue transportation managers and the Port of Seattle to ensure that there would be minimal conflicts with existing and scheduled operations.

The following elements shall be included in the CMP if applicable.

- Schedule the most intensive construction activities such that they are spread out over time and prohibit material deliveries from leaving or entering the area during AM and PM peak hours when feasible.

- Schedule street closures and other disruptions to the street system during off-peak periods, unless approved for other hours by SDOT to minimize impacts to the system.

- Provide safe pedestrian and bicycle circulation adjacent to the construction site through the use of temporary facilities, detours, and signs.
- If construction activities cause the need to close on-street parking adjacent to the site, coordinate such closures with SDOT and obtain appropriate street use permits.

3.8.4.2 Operation

Physical Capacity and Safety Improvements for Alternatives 2 and 3
Physical improvements are specific elements that have been identified to enhance the transportation infrastructure in a manner that directly or indirectly reduces the impact of the Arena, or reduces the negative consequences of project or cumulative conditions associated with the Arena.

Required Mitigation or Mitigation Included in Project Proposal for Alternatives 2 and 3
The following mitigation measures have been proposed by the applicant or have been identified to be required of the applicant as a condition of MUP approval:

- **S. Massachusetts Street Realignment.** As part of the Proposed Action, S. Massachusetts Street between Occidental and 1st Avenues S. would be realigned to the north to improve the direct alignment of the street with the section immediately east of Occidental Avenue S. This would enhance accessibility to the Safeco Field garage and service road. In addition, it would allow the pedestrian plaza at the north side of the Arena to be generous in size and limit the potential for pedestrian spillover onto S. Massachusetts Street, avoiding the potential for conflict with S. Massachusetts Street traffic. This realignment would also improve the alignment of this segment of S. Massachusetts Street with the segment west of 1st Avenue S.
- **North-South On-Site Connection.** As part of the Proposed Action, a north-south connection parallel to the proposed vacated Occidental Avenue S. would link S. Holgate Street with the extension of S. Massachusetts Street, along the east side of the property. This link could serve as direct ingress and egress to the Safeco Field garage, as well as replace the connection to the south for emergency and service vehicles to the Safeco Field garage, surface parking, and service and emergency road.
- **Signal System Upgrades.** ArenaCo would be required to make a pro-rata contribution to projects such as the ITS Next Generation project list. The results of the transportation analysis suggest that there is an underlying need for area-wide improvements focusing on achieving a higher efficiency from the existing signal system as well as providing additional east/west connectivity in light of the increase in future rail activity.
- **Traffic Control Equipment Upgrades.** ArenaCo would work with SDOT to upgrade the traffic control equipment at signalized intersections in the Stadium District to increase its reliability through improving communications with the SDOT traffic control center and by utilizing current Adaptive Traffic Control technology. These improvements are more than simply optimizing traffic signals but give signals the flexibility to respond to

unanticipated surges, interruptions, and / or shift in traffic flows due to collisions, road construction projects and / or variation in tenant access patterns.

- **Lander Street Pro-rata Contributions.** ArenaCo would be required to make a pro-rata contribution to the future grade separation of Lander Street. This has been identified based on existing and future deficiencies noted in the analysis. Further pressure would be put on the east/west capacity of the system and increases potential for vehicle/rail safety conflicts due to increases in the north/south rail activity and resulting decrease in capacity of the at-grade street crossings.

- **Pedestrian Improvements.** Implementation of the following pedestrian improvements would contribute to increased safety and / or improved connectivity between the Arena and pedestrian connections to transit and / or offsite parking areas.

    - The north-south crossing of S. Atlantic Street at Occidental Avenue S. would be improved by:

        - Providing manual traffic control at the north-south crossing, and / or,

        - Developing a more-permanent improvement such as adding a staircase to the south side of S. Atlantic Street connecting to 3rd Avenue S.

    - To improve the connectivity and safety of the east-west pedestrian connection between the Arena site and 4th Avenue S., ArenaCo would be required to develop or implement one of the following:

        - Construction of a pedestrian bridge from the Arena along S. Holgate Street to the east spanning such that it clears the easternmost railroad tracks. This would reduce the need for surface management pedestrian traffic control measures before or after events. The pedestrian bridge should directly connect to the Arena with a pathway wide enough to assure free flow of pedestrians during ingress and egress conditions.

        - Alternatively, the applicant may provide operating shuttles or jitneys that follow a fixed route on a fixed headway that link the Washington State Ferry terminal, Link Light Rail and Transit Stations to / from the Arena. The intent of these jitneys and / or shuttles would be to provide an incentive for walk-on ferry passengers, transit users and persons parking in more remote offsite parking spaces. A specific shuttle plan would be developed as part of the TMP. The shuttle option would be coupled with pedestrian lighting and sidewalk improvements along 1st Avenue S. from S. Holgate Street to S. Lander Street, and along S. Lander Street between 1st Avenue S. and 4th Avenue S.

- **At-Grade Way-Finding System**. In coordination with other Stadium District stakeholders, ArenaCo could be required to contribute to development of a way-finding

system to guide pedestrians and cyclists to the various venues in the Stadium District. To the extent possible this system will link with and through the Pioneer Square, International District, and SoDo.

Required Mitigation Measures for Alternatives 4 and 5

There are no proposals to construct an arena at either site of Alternative 4 or 5. The following measure has been identified as a condition of MUP approval if an application is submitted for Alternative 4 or 5:

- **Traffic Control Equipment Upgrade.** The applicant would work with SDOT to upgrade traffic control equipment at signalized intersections in the Seattle Center area to increase its reliability through improving communications with the SDOT traffic control center and by utilizing current Adaptive Traffic Control technology.

Potential Mitigation Measures for Alternatives 2 and 3

These mitigation measures have been identified for consideration by DPD and SDOT:

- **Directional (Dynamic/Static) Event Signage.** Directional signage between the freeway and other limited access facilities could be revised to incorporate the Arena. For Alternatives 2 and 3, this would complement the existing signage that currently exists for CenturyLink Field and Safeco Field.

- **Parking Guidance Signage.** The Arena could participate with the City of Seattle in implementing a parking guidance system that provides direction and information regarding parking availability to those drivers who do not pre-purchase parking. This system could notify drivers as to the location and number of spaces available in public and event garages in the Stadium District area, reducing excess and erroneous circulation. This system will be similar to the downtown parking guidance system.

- **SDOT Traffic Control Center Improvements.** The Arena could contribute to improvements to the SDOT Traffic Control Center. The improved Center would serve not only the Arena, but the other event venues and the surrounding neighborhood. The Traffic Control Center will have the ability to provide video feeds of information from WSDOT and SDOT traffic cameras and allow for posting of current conditions relating to congestion, parking, and traffic incidents that could help drivers' decision-making as they travel to an event at the Arena, Safeco Field, and/or CenturyLink Field, for Alternatives 2 and 3. For maximum effectiveness, this Center should be staffed during major events and the staff should be involved in coordinating the on-ground activities of event traffic control personnel. Additional intelligent transportation system (ITS) equipment such as CCTV cameras could be installed in coordination with the Arena at key locations in the Stadium District or Seattle Center area to better inform traffic management center (TMC) staff on current conditions to effectively manage traffic flows.

- **Pedestrian Scale Street Lighting.** Consider upgrading street lighting to enhance safety for pedestrians in several areas where there are preexisting low light levels. The following locations have been identified as needing improvement or upgrades:
    - 1st Avenue S. from S. Royal Brougham Way to S. Massachusetts (west side)
    - 1st Avenue S. from S. Holgate Street to S. Walker Street (west side)
    - 1st Avenue S. from S. Holgate Street to S. Stacy Street (east side)
    - 1st Avenue S. from S. Holgate Street to S. Lander Street (both sides)
    - S. Lander Street from 4th Avenue S. to the SoDo Busway (both sides)
    - Edgar Martinez Drive S. from S. Occidental Street to 3rd Avenue S. (south side)
    - 3rd Avenue S. from Edgar Martinez Drive S. to S. Royal Brougham Way (east side)
    - 3rd Avenue S. from S. Atlantic Street to S. Holgate Street (both sides)
    - 4th Avenue S. from S. Royal Brougham Way to S. Holgate Street (both sides)
    - S. Royal Brougham Way from 3rd Avenue S. to the SoDo Busway (both sides)
- **Bicycle Route Improvements.** The Arena could participate in marketing and upgrading the bike route system and prioritize bike lanes in the immediate vicinity of the site.

Potential Mitigation Measures for Alternatives 4 and 5

These mitigation measures have been identified for consideration by DPD and SDOT: If an arena were built at the site of Alternative 4 or 5.

Directional (Dynamic/Static) Event Signage. Directional signage between the freeway and other limited access facilities could be revised to incorporate an arena. For Alternatives 4 and 5, it would further integrate with the Seattle Center signage.

Parking Guidance Signage. The Arena could participate with the City of Seattle in implementing a parking guidance system that provides direction and information regarding parking availability to those drivers who do not pre-purchase parking. This system could notify drivers as to the location and number of spaces available in public and event garages in the Seattle Center area, reducing excess and erroneous circulation. This system will be similar to the downtown parking guidance system.

SDOT Traffic Control Center Improvements. The Arena could contribute to improvements to the SDOT Traffic Control Center. The improved Center would serve not only the Arena, but the other event venues and the surrounding neighborhood. The Traffic Control Center will have the ability to provide video feeds of information from WSDOT and SDOT traffic cameras and allow for posting of current conditions relating to congestion, parking, and traffic incidents that could

help drivers' decision-making as they travel to an event at the Seattle Center area attractions for Alternatives 4 and 5. For maximum effectiveness, this Center should be staffed during major events and the staff should be involved in coordinating the on-ground activities of event traffic control personnel. Additional intelligent transportation system (ITS) equipment such as CCTV cameras could be installed in coordination with the Arena at key locations in the Stadium District or Seattle Center area to better inform traffic management center (TMC) staff on current conditions to effectively manage traffic flows.

Programmatic Measures/Transportation Management Plan Applicable to All Action Alternatives

Programmatic measures would be delivered in the form of a comprehensive plan, referred to as a Transportation Management Plan (TMP). A TMP would be required as a condition of approval of a new arena at any location and would be developed in concert with SDOT and other stakeholders. The TMP would include a range of programmatic strategies and actions, summarized within this section.

The finalized TMP would provide greater detail regarding how each measure is tailored to influence the travel and parking habits of each major tenant. For Alternatives 2 and 3, like other Stadium District TMPs, the Arena TMP would be reviewed annually by the City of Seattle Parking and Access Review Committee (PARC) and modified to respond to changed conditions.

To ensure the effectiveness of the mitigation including the TMP, performance measures or goals are proposed as a measure of compliance and achievement (see Table 3.8-54). SDOT has suggested that these goals should be more consistent with TMP goals for other more traditional land use projects in the city by focusing on SOV reduction and transit mode split. In the case of a special event facility, the primary goal is to reduce the number of vehicles. Private vehicle reduction (reduction in traffic volume and parking demand) can be accomplished by encouraging all forms of public and private high occupancy transportation including regular service transit, park-and-ride transit, light link rail, charter bus, and ferry service as well as walking and cycling. While SOV reduction is important, it is equally important to encourage HOVs. Thus, a goal addressing average vehicle occupancy (AVO) addresses both SOV reduction and HOV increases.

The traffic forecast was based on non-automobile mode split and average vehicle occupancy that are reflective of the performance of the special event venues in the Stadium District and Seattle Center.

To ensure consistency with other existing venues, an initial goal consistent with 2018 assumptions is appropriate with progressive increase in non-automobile mode split and Average Vehicle Occupancy (AVO). Thus, goals for measuring the effectiveness of the TMP could include the following:

Table 3.8-54
Transportation Management Program Goals

	Years 1-4 after Opening	Year 5-9 after Opening	Year 10 after Opening
Non-Automobile Mode Split	18%	20%	22%
Average Vehicle Occupancy	2.4 persons per vehicle	2.4 persons per vehicle	2.5 persons per vehicle

The six primary categories of the TMP include the following:

- Event Management
- Public Information and Marketing
- Traffic and Parking Demand Reduction
- Management of Vehicle and Parking Demand
- Traffic Management Plan
- Implementation and Monitoring

Event Management

This program group concentrates on event and facility management measures to: 1) eliminate and/or reduce event conflicts by ensuring coordination with other event facilities and neighbors; 2) ensure consistent and responsive implementation of the Transportation Program; and 3) provide the public and attendees with information on choices to avoid conflicts, take advantage of transportation and parking opportunities to reduce delay and frustration, and take advantage of opportunities that complement the event experience and minimize impact on the surrounding neighborhoods and business operations.

The most effective strategy for reducing the magnitude of traffic and parking impacts is to minimize the frequency of simultaneous or closely schedule time specific events.

- **Event Transportation Coordinator (ETC).** The Arena Manager would identify a staff person to coordinate and manage the Transportation Management Program (TMP) and Arena scheduling such that multiple event days with attendance in excess of an identified threshold are minimized or eliminated. This could be done in the context of an updated Event Scheduling Agreement with the Arena as an added party to the existing group (see Event Scheduling Protocol and Management described below). The ETC would represent the Arena on the Parking and Access Review Committee (PARC) and will coordinate with the City of Seattle, Port of Seattle, King County Metro Transit and other affected public and private transportation operators in the area on event schedules and implementation of the TMP. On an event day,

implementation and monitoring of the TMP would be one of their primary functions prior to and following the event.

- **Event Access Guide.** ArenaCo would develop an event access guide to list alternatives to driving, preferred parking areas and other designated Arena parking areas that offer carpool incentives, neighborhood dinner/parking promotions, and other programs and resources to assist ticket purchasers with options for traveling to and from the area. This event guide will be integrated on the Arena webpage and on the webpages of the primary seasonal tenants.

- **Event Scheduling Protocol and Management.** Considering the existing and proposed event venues, their potential effect on each other and cumulative traffic and parking, and the effect of event traffic on localized freight movements, the City could work with the venues to establish a protocol for scheduling to minimize the conflict with events among the three major Stadium District venues. This protocol would strive to work with major tenants and franchises to minimize the occurrence of simultaneous and closely scheduled major events. When two or more time specific events with the combined forecasted attendance (not ticket sales) of over 58,000 persons appears to be scheduled, the protocol would identify a basic approach for resolving apparent conflicts. The separation of event start and end times could vary dependent on projected attendance levels, time of day, and the host facilities.

  The Port of Seattle could be a part of this protocol or a parallel process to work with Stadium District event facilities to advise them when container ship loading/unloading requires double shifting, so events and TMP activities can be adjusted to accommodate priority truck routes and/or time windows.

- **Port of Seattle Protocols.** The Port of Seattle has expressed concern around increased levels of interference with freight access to and from the Port on days with events, especially when event days coincide with extended gate operations. Consistent with the event scheduling agreement or as part of MOTTF, ArenaCo, the City, the Port and other event stakeholders could work to identify protocols that can be implemented when notice of extended gate operations is provided. Such protocols could involve schedule adjustments, freight routing designations, event traffic routing, or other measures specifically tailored to support minimizing event traffic impacts on Port operations. Effective implementation of such a measure will require consistent engagement by all parties, including the Port of Seattle, in the event scheduling/management discussions.

Public Information and Marketing

The single most effective suite of strategies for managing traffic and parking impacts for special events involves effectively communicating expectations and alternative transportation opportunities so event attendees have realistic expectations and make rational choices to avoid anticipated conflicts:

- **Public Information Coordinator.** The Public Relations coordinator for the Arena or their representative would include in their job responsibilities the development, coordination and distribution of transportation and parking information and advisory services. Information regarding events and community activities could be exchanged and incorporated in these media notices. The webpage may be an effective medium for ensuring timely and accurate updates.

  A major role of this staff person would be to ensure that non-event attendees are aware of an upcoming event. While not reflected in the traffic forecast (to ensure a worst case analysis condition for disclosure of potential impacts), experience at existing event venues have found that background volumes decline when there is a major weekday evening event. The decline in background traffic volumes reflect drivers who make a slight shift in their work or daily commute pattern or schedule, use another mode of travel, or telecommute for all or a portion of the day. These shifts can reduce the background traffic volume by 10 to 20 percent, which results in smaller delays and/or reduced duration of congesting at forced flow intersections.

  In addition, joint marketing programs targeted at event attendees could be pursued with transportation service providers like Washington State Ferries, Sound Transit, Link Light Rail and King County Metro Transit. This could include broadcast and print promotions by both the Arena and the service providers.

- **Survey and Market Research**. In order to better understand travel behavior of arena visitors, six months to 1-year after opening, ArenaCo would be required to conduct market research of the greater Seattle area to identify statistically reliable information on likely event goers (Basketball and NHL game attenders, concerts, family shows, etc.) in order to determine trip origin, how attenders plan to travel to and from the stadium, and how this decision might differ by event type and for weekday vs weekend events. The survey should also include questions that help to understand which factors and incentives might be effective in encouraging public transportation or other travel options. This information should be used to update the TMP document to ensure that TMP elements directly address the impacts of this facility. The information would also be used to inform the types of strategies that should be required for dual/triple events.

- **Static Electronic Media.** ArenaCo would develop a webpage incorporating a transportation access guide as well as significant partnerships with community businesses and associations so the surrounding neighbors gain, to the degree desired, some of the benefits of additional Arena attendee activity. This transportation guide would be coordinated with the primary franchises and tenants.

- **Dynamic Electronic Media.** ArenaCo could use social media such as Twitter, Facebook and mass email broadcasts to alert guests of travel options and more particularly of incidents and real-time congestion and/or safety issues. This could include information about event day traffic conditions and regional traffic constraints (e.g. Alaska Way/Viaduct construction closures and significant incidents).

- **Arena Call Center.** ArenaCo could establish a call center with a central phone number specifically for transportation and parking information and referral.

- **Broadcast Advisory.** ArenaCo could coordinate with the broadcast team for each major franchise to actively promote alternative modes of travel in advance of games and major events and to provide real-time information within four-hours prior to an event. Real-time information could be coordinated with the ETC and video feeds from WSDOT and SDOT traffic control centers. Such advisory services could be coupled with other advertising and promotion through broadcasting contracts.

- **Event Access App (Application).** ArenaCo could develop a cellular phone application that provides event goers with a menu of features ranging from information and links to alternate transportation modes to real-time information regarding congested routes and alternative access. In addition, it would be desirable to link this application with a parking guidance system so those who drive can make more strategic decisions about the route they take before arriving in the immediate vicinity of the Arena. Information regarding parking pricing, comparisons against alternate modes, notification of street closures or restrictions, and other traffic related real-time features could be incorporated in this application.

- **Cross-Marketing with Area Businesses**: In order to spread the arrival and departure rates of fans traveling to and from the arena, ArenaCo could explore opportunities to cross-market events with local businesses (restaurants, bars) to encourage event attendees to arrive in the area before an event and/or stay in the area longer following an event.

Traffic and Parking Demand Reduction.

The programs in this group encourage non-automobile modes of travel including Sound Transit and King County Metro Transit, charter bus, rail (Sounder Commuter Rail, Link Light Rail and Amtrak), waterborne, and non-motorized modes or where possible increase average vehicle occupancy. These programs are intended to reduce the size and intensity of the arrival and departure experience.

The following programs are intended to reduce reliance on use of SOVs.

Transit

- **Premium Transit Service.** ArenaCo would coordinate with King County Metro Transit and Sound Transit (ST) to identify express bus service that connects Park-and-Ride lots in Northgate, South Kirkland, Eastgate and Federal Way with off-loading in the vicinity of the Arena. The intent would be to use under-capacity return routes at the end of the commuter peak. ArenaCo would work with King County Metro Transit on staging return coaches after events similar to the operation that currently exists after Sounders FC matches. Coaches can be staged on Occidental Avenue north of the Arena or south of Holgate Street.

- **Shuttles.** ArenaCo could consider operating shuttles or jitneys that follow a fixed route on a fixed headway that link the Washington State Ferry terminal, Link Light Rail and Transit Stations to/from the Arena. The intent of these jitneys and/or shuttles would be to provide an incentive for walk-on ferry passengers, transit users and persons parking in more remote offsite parking spaces. It is recommended that one stop be at the King Street Station Multimodal Hub. The King Street Station Multimodal Hub was designated in the 2003 Center City Access Study along with Westlake and Colman Dock. The three hubs are key elements of the Center City transportation system that function as both destinations and transfer points for a variety of transportation users. The King Street Station Multimodal Hub includes Historic King Street Station serving both inner-city rail, intra-city bus and commuter rail; the International District Station serving light rail and local bus service; major surface transit stops; and the future terminus of the First Hill Streetcar. The area is also heavily used by pedestrians, cyclists, general traffic and freight.

- **Subsidize Transit Fares.** ArenaCo could work with King County Metro Transit, Sound Transit, and Washington State Ferries, to offer attendees a discount to regular fares to encourage use of these travel modes.

- **Charter Bus/Meal/Ticket Packages.** ArenaCo could work with preformed groups and restaurants to develop packages that involve meals, event admission, and bus transportation for events at the Arena.

- **Add Cars to Link Light Rail Trains**. To increase the capacity of regularly scheduled Link Light Rail prior to and following Arena events, the train's capacity could be expanded from two to four cars. This would reduce crowding on the cars and make light rail a more attractive option for event attendees. As Link Light Rail extends north and east, this service could reduce/supplement park and ride buses.

- **Additional Link Light Rail Trains on Pocket Track.** For larger events, to the extent that multiple events cannot be avoided, or if the demand for Link Light Rail appears to exceed current forecasts, additional capacity could be provided by staging an additional train on a pocket track to provide the extra capacity.

Rail, Waterborne, and Bicycle

- **Rail/Lodging/Ticket Packages.** Similar to the charter bus packages, ArenaCo could work with out-of-town travel companies and businesses to develop rail/lodging/meal packages with tickets to events.

- **Facilitate Washington State Ferry Use.** ArenaCo could work with Washington State Ferries to promote use of ferries from Bremerton and Bainbridge. The Arena could explore the feasibility of operating a shuttle between the ferry terminal and the Arena during winter months and could coordinate with pedicab operators.

- **Facilitate Passenger Ferry Service.** ArenaCo could work with King County to extend passenger service to and from West Seattle on major event days to provide return service after events.

- **Bicycle Racks.** The design for the Arena incorporates bicycle racks as part of the site design, and includes a provision of a bicycle valet. If warranted by need, portable bike racks could be added for events where the attendee demographic warrants additional bike storage similar to the way CenturyLink Field operates during Sounders matches.

Average Vehicle Occupancy

- **Priority Disabled/Taxi/Limousine Loading.** ArenaCo would identify location(s) for limousine/taxi/passenger drop-off and pick-up. The location would be coordinated with SDOT to ensure adequate loading and queuing space while minimizing on-street congestion.

- **Higher Vehicle Occupancy Incentives.** ArenaCo could coordinate with private and public parking operators to develop rates to encourage the use of high occupancy vehicles.

- **HOV Incentives**: The Public Information and Marketing section would state that broadcast, printed materials and electronic media are intended to discourage driving to events, except for carpools/vanpools and would emphasize the ease of arriving and leaving the Arena by transit for the different types of events. High occupancy vehicle (3+) promotions could be offered, such as reserved parking at reduced rates in parking facilities located close to the arena.

Management of Vehicle and Parking Demand.

Programs included in this group focus on parking and traffic management options to direct and control the traffic flows for those who drive to the Arena. These measures are intended to manage local vehicle and non-motorized traffic congestion to enhance safety and minimize delay on event days by efficiently directing drivers to available transportation and parking facilities.

Off-Street Parking

- **Participation in the e-Park Program.** If the new garage is built, it would be included in the City's e-Park program.

- **Establish Parking Agreements.** ArenaCo could establish shared use agreements for available parking. In addition, the reservoirs of shared parking could be distributed around the Arena as widely as possible in order to dilute traffic flows and minimize the concentration of traffic volume entering and leaving before and after events.

- **Parking for Event Staff.** ArenaCo could identify parking opportunities for event staff in areas that do not compete with event attendee parking.

- **Off-street parking reservation.** The TMP could include a centrally coordinated event parking program that would allow fans to reserve and pre-purchase parking passes at facilities convenient to their origin point to minimize driver circulation on the surrounding area of those who make a choice to drive.

- **Pre-Sell Reserved Arena Parking.** Parking could be presold and incorporated as part of ticket packages. The purpose in pre-selling parking is to be clear to attendees that Arena parking, particularly parking that is directly adjacent to the Arena, is sold out so non-season ticket holders do not attempt to drive in the immediate vicinity of the Arena to find parking. This coupled with assigned offsite parking, a parking guidance system, and other dynamic electronic media tools could guide attendees away from streets directly adjacent to the Arena and thus contribute to a net reduction in congestion.

Traffic Management Plan

- **Traffic Control Plan:** To supplement the traffic signal and control upgrades, such as ITS and adaptive signal control, additional staffing at key locations is anticipated. ArenaCo would work with SDOT and SPD to develop an event day traffic control plan that will include a temporary signing plan and a police post plan for pre and post event conditions. Traffic control would be provided for pedestrians, private vehicles and charter/shuttle transit. These plans would be similar to those already employed by Safeco and Century Link Fields in the SODO area. The plan would correspond to graduated attendance levels. Table 3.8-55 provides a general framework for the estimated number of police/traffic control personnel associated with each level. These are generally the same number of officers and traffic control personnel used for Safeco Field for similar attendance levels but actual location of personnel would shift south with a higher staffing levels along Holgate Street.

Table 3.8-55
General Traffic Control Plan Levels

Attendance Level	Police Personnel
<10,000	20
10,000 – 15,000	25
>15,000	32

The temporary traffic control plan would involve selected intersections in the area generally bounded by Royal Brougham Way to Walker Street and Utah to 4th Avenues. The temporary traffic control plan would involve temporary signs, cones and other portable traffic control devices at selected intersections in the area generally bounded by Royal Brougham Way to Walker Street and Utah to 4th Avenues. This temporary traffic control plan would likely be implemented for all Arena events, regardless the attendance. ArenaCo, like other event managers, would fund temporary traffic control.

The traffic control plan for Alternate 4 or 5 would be much more limited and would correspond to similarly sized events at the existing facilities.

- **Post-Opening Traffic Study:** In addition to the Survey and Market Research described above, ArenaCo would conduct a post-opening traffic study six-months to 1 year after opening in order to evaluate traffic conditions, assess the effects of arena-generated traffic on area intersections, and adjust the required TMP elements.

- **Vehicle Wayfinding** : To limit unnecessary circulation around the arena prior to and after events, ArenaCo could work with the City of Seattle and WSDOT to install vehicular wayfinding signage at key locations, including freeway and freeways ramps. The signage will likely be located along major routes to the arena to direct drivers to preferred pathways to available parking areas.

Implementation and Monitoring.
These programs are targeted to achieve 1) continuous improvement of the operational management of the Transportation Management Program (TMP), 2) development of metrics to measure and report the effectiveness of TMP implementation, and 3) exchange of information with neighboring event centers and business operations to avoid conflict:

- **Parking and Access Review Committee (PARC).** The Arena Transportation Manager would become actively engaged as a member of PARC to help integrate the Arena as part of existing Stadium District activity and event management. The annual TMP would be reviewed by PARC as are TMPs associated with other Stadium District venues.

- **Traffic Operations Group.** During the initial years of operation and as major tenants/franchises become tenants in the Arena, the Transportation Manager could periodically assemble Seattle Police Department (SPD), SDOT, parking managers, King County Metro Transit, and any others involved in event day traffic control and parking to debrief on the effectiveness and problems associated with event related traffic management. This group would then make adjustments in a coordinated fashion to ensure that signing, signalization and timing, electronic media, and manual traffic control were all coordinated.

- **Periodic Program Review and Survey.** To evaluate the performance of the Arena Traffic Management Program, a set of metrics could be established to evaluate the performance of major single and multiple event traffic conditions. Surveys during these periods measuring the effectiveness of the traffic control plans could be recorded and reported to PARC annually.

3.8.5 Secondary and Cumulative Impacts

3.8.5.1 Alternatives 2 and 3

There are no identified secondary or cumulative impacts associated with the modifications to the street system associated with Alternative 2 or 3, including the vacation of Occidental Avenue S. As noted the impacts associated with the rerouting of traffic currently using

Occidental Avenue S. are addressed in the analysis of the primary impacts. No secondary or cumulative impacts to vehicular safety have been identified.

The effective implementation of transportation demand reduction strategies through a Transportation Management Program would result in increases in demands on other transportation modes and systems, including pedestrians, transit, and bicycles.

There could be secondary and cumulative impacts to non-event transit users due to additional passengers using transit or park-and-ride lots to attend events at the Proposed Project (Alternative 2) or Alternative 3. Non-event transit users may find transit more crowded, fewer parking spaces at remote lots, and longer commute times during game days.

As light rail service in the region is expanded, transit service providers are anticipated to redeploy service to avoid duplication of transit service. It is unclear how transit service providers would redeploy service, but it is likely to impact event attendees traveling to stadium events.

Major capital projects, such as Waterfront Seattle and the Southend Transit Pathways study, will change how transit connects through and to downtown Seattle. These projects will bring some bus transit stop locations closer to the Proposed Project (Alternative 2) or Alternative 3, resulting in a cumulative benefit to encourage event attendees to use transit for traveling to events.

There would be direct impacts to vehicular operations caused by an increase in traffic volumes and congestion for the No Action Alternative by 2018 and 2030. These impacts would be increased on game days. Secondary and cumulative impacts to traffic operations along other routes could occur if motorist choose to reroute to avoid congestion at specific intersections.

There would be direct impacts to the movement of freight and goods caused by an increase in traffic volumes and congestion for the No Action Alternative by 2018 and 2030. These impacts would be increased on game days. Secondary and cumulative impacts to other motorists could occur by truck drivers choosing to reroute to avoid congestion at specific intersections.

Changes in Port of Seattle operations could change the amount of heavy trucks on some routes through the Stadium District, especially if service hours are extended later in the day and into the evening. This could add delay and congestion on arterial streets and intersections in the project vicinity, and add delay to some surface transit routes in SoDo.

Short term parking restrictions may be implemented to support event related activities as a result of traffic control plans, or other efforts to balance traffic, transit, freight and goods movement, and parking demands. In general, the impacts identified for the proposed Arena without other concurrent events are similar in magnitude and slightly less than for a Mariners event. However, the addition of the proposed Arena would increase the number of days in the SoDo neighborhood where an event occurs and could add cumulatively to a reduction of

parking availability in the SoDo neighborhood. There could also be a cumulative reduction in on-street parking as a result of potential intersection or roadway improvements.

3.8.5.2 Alternatives 4 and 5

A 1st Avenue streetcar currently being considered as part of the Center City Transit Study would provide another way for event attendees, especially those using ferry services, to connect to Seattle Center. This would reduce the number of people using bus, monorail, and South Lake Union Streetcar transit services.

The effective implementation of transportation demand reduction strategies through a Transportation Management Program would result in increases in demands on other transportation modes and systems, including pedestrians, transit, and bicycles.

Similar to secondary and cumulative impacts for Alternatives 2 and 3, there would be direct impacts to the movement of freight and goods caused by an increase in traffic volumes and congestion for the No Action Alternative by 2018 and 2030. These impacts would be increased on game days. Secondary and cumulative impacts to other motorists could occur by truck drivers choosing to reroute to avoid congestion at specific intersections.

Short term parking restrictions may be implemented to support event related activities as a result of traffic control plans, or other efforts to balance traffic, transit, freight and goods movement, and parking demands.

3.8.6 Significant Unavoidable Adverse Impacts

3.8.6.1 Alternatives 2 and 3

No significant unavoidable adverse impacts to the street system, to public transportation, to pedestrian or to bicycle facilities from Alternatives 2 or 3 are expected.

Peak hour traffic volumes would increase substantially over current levels under No Action conditions and the order of magnitude of change in traffic volumes associated with the Arena for any event case falls within the range of current event experience. There would be an increase in traffic volumes during peak conditions on event days, which would occur more frequently with the Arena. A number of measures have been identified to reduce the level of increase in traffic volumes, including demand reduction, and management of vehicles to orient them to the most appropriate route.

Several additional intersections are forecast to operate at LOS E or LOS F under the No Action alternative and with additional traffic due to events at the Arena. On event days, delays would be expected to increase as a result of Arena event traffic and some of these increases may be significant. These conditions would impact freight activity to the extent identified in the impact analysis.

As described in the impact analysis, the increase in event days anticipated with the Arena (especially the increase in high attendance event days) would result in the increased frequency

of parking impacts. This results in greater competition for parking with other area stakeholders, including commercial businesses in neighborhoods such as SoDo, Pioneer Square, and the International District.

Increased frequency of events together with the proximity of the Arena to the S. Holgate Street rail crossings would increase the potential for conflict between pedestrians and rail, east of the site. If a pedestrian overpass were constructed, this issue would be largely eliminated. With at-grade improvements together with increased manual control of pedestrians at crossings, the potential would be reduced but not eliminated.

The vacation of Occidental Avenue for the block between S. Holgate and Massachusetts Streets would result in the permanent interruption of a parallel route to 1st Avenue South from S. Horton Street to S. Atlantic Street. The operation of the intersection at S. Holgate Street at 1st Avenue S. would degrade to LOS F on event days with a capacity event in the Arena; the range of mitigation offered could reduce the level of impact at this location, depending on the effectiveness of the range of public information, traffic routing and management, and final location of any potential new parking facilities.

3.8.6.2 Alternatives 4 and 5

No significant unavoidable adverse impacts to the street system, to public transportation, to pedestrian or to bicycle facilities, or to safety from Alternatives 4 or 5 are expected.

Several additional intersections are forecast to operate at LOS E or LOS F, in No Action and with additional traffic due to events at an arena located in or near Seattle Center. On event days, delays would be expected to increase as a result of arena event traffic. These conditions would impact freight activity to the extent identified in the impact analysis.

Peak hour traffic volumes would increase substantially over current levels under No Action conditions and the order of magnitude of change in traffic volumes associated with an arena for any event case falls within the range of current event experience. There would be an increase in traffic volumes during peak conditions on event days, which would occur more frequently with an arena. A number of measures have been identified to reduce the level of increase in traffic volumes, including demand reduction, and management of vehicles to orient them to the most appropriate route.

The increase in event days anticipated with an arena would result in increased frequency of parking impacts resulting in competition for parking throughout the primary, and, on occasion, the extended study area.

3.9 Public Services and Utilities

3.9.1 Stadium District Alternatives – Alternatives 2 and 3

3.9.1.1 Fire

Affected Environment

The study area for the fire and police service analysis includes the area immediately surrounding the site of both the Proposed Project (Alternative 2) and Alternative 3 site.

Fire protection services to the Stadium District site are provided by the City of Seattle (City) Fire Department. The Seattle Fire Department provides firefighting, building inspections, fire code enforcement, tactical rescues and public education throughout the City from 33 fire stations and Medic One Headquarters at Harborview Medical Center. Headquarters for the department are at 301 2nd Avenue S. Fire Station 10 is within approximately one mile north of the Stadium District site at 400 S. Washington Street. Also within a mile south of the Stadium District site, Fire Station 14 is located at 3224 4th Avenue S. The Medic One Headquarters at Harborview Medical Center and Fire Station 5 are within 1.5 miles of the site of the Proposed Project (Alternative 2) and Alternative 3. Table 3.9-1 provides information on Fire Department personnel and apparatus as reported in 2010 and 2012. The number of uniformed personnel and Emergency Medical Team (EMT) certified staff were approximately 4 percent lower in 2012 than in 2010 (981 staff in 2012 as compared to 1,020 in 2010), however the numbers of other staff and apparatus remained similar or the same.

The Seattle Fire Department (SFD) maintains an overall average first-arrival response time to fire, rescue and hazardous materials calls of 4.15 minutes in 2012. The average response time to basic life support was 3.74 minutes and advanced life support was 3.67 minutes. The response time may be influenced by station location and design, and staffing levels, as well as local rules and procedures for response. SFD serves a population of 608,660 (U.S. Census 2010) in an area of 83.9 square miles. The location of a fire station is not the only factor in determining if that station will respond to an alarm. The Seattle 9-1-1 Dispatch Center determines which fire stations and other emergency units respond depending on the location and nature of the call (e.g., fire, medical emergency) and the availability of resources (Seattle Fire Department 2013).

The Special Events Section of the Seattle Fire Marshal's Office issues temporary permits and establishes conditions to ensure public safety at large public gatherings including fairs, concerts, sporting events, and festivals. They also inspect and issue permits related to trade shows and other high-profile events.

Table 3.9-1
Citywide Seattle Fire Department Personnel and Apparatus (2010 - 2012)

Seattle Fire Department Personnel Profile	2010	2012
Uniformed Personnel	1,020	981
On-Duty Strength	208	207
Department Chiefs	35	38
Emergency Medical Team (EMT) Certified	1,020	981
Paramedics	74	76
Non-Uniformed (Civilian) Personnel	87	84
Seattle Fire Department Apparatus Profile (2010)		
Fire Stations (includes Medic One HQ at Harborview)	34	34
Engines (includes one on-duty Fire Boat)	33	33
Ladder Trucks	12	12
Aid Units (Basic Life Support)	4	4
Medic Units (Advanced Life Support)	7	7
Air Trucks	2	2
Fire Boats	4	4
Hose Wagons	2	2

The SFD has floor plans and layout maps of Safeco Field and CenturyLink Field and Event Center, KeyArena, and Memorial Stadium. The SFD would follow standard procedures in the event of a large-scale emergency (e.g., earthquake). The SFD has mutual aid agreements with adjacent jurisdictions to provide additional resources as needed.

Each of the existing sports facilities has an emergency response and evacuation plan that is reviewed by the SFD.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new Arena. There would be no direct effects to fire services. The existing mix of aging warehouses could pose an increasing risk of fire and possible exposure to hazardous materials if a fire were to occur due to the nature of uses and age of the buildings in the study area. Increased background traffic levels and increased rail traffic could increase fire and police response times.

Impacts Alternatives 2 and 3

During construction, the possibility of injuries could increase the number of medical aid responses. Also, it is possible that response time to the site of the Proposed Project (Alternative 2) and Alternative 3 would increase, primarily as a result of more restricted site access and the presence of construction materials.

The Proposed Project (Alternative 2) or Alternative 3 would replace the existing demand for Fire Department personnel or equipment to serve the existing warehouses, with a new demand to serve an Arena. An Arena would provide required fire and life safety systems. These systems would be installed according to current Fire Code standards and would be properly maintained and inspected throughout the life of the facility. Any hazardous materials would be stored and

handled in accordance with Fire Code requirements. According to the Fire Department, the Department's experience with the provision of service to a variety of events throughout the City would allow them to effectively serve the Proposed Project (Alternative 2) or Alternative 3 during simultaneous events at CenturyLink Field and CenturyLink Field Event Center, and Safeco Field, although adverse impacts to response times could occur with two simultaneous large events at the sports facilities.

It is expected that a slight increase in calls for service to the Project Area would occur as a result of an increased number of people using the site. It is not anticipated that this increase would measurably affect fire service to the site. As with the No Action Alternative, an increase in background traffic, increased rail traffic, and increased traffic associated with the Arena could increase fire and police response times.

3.9.1.2 Police

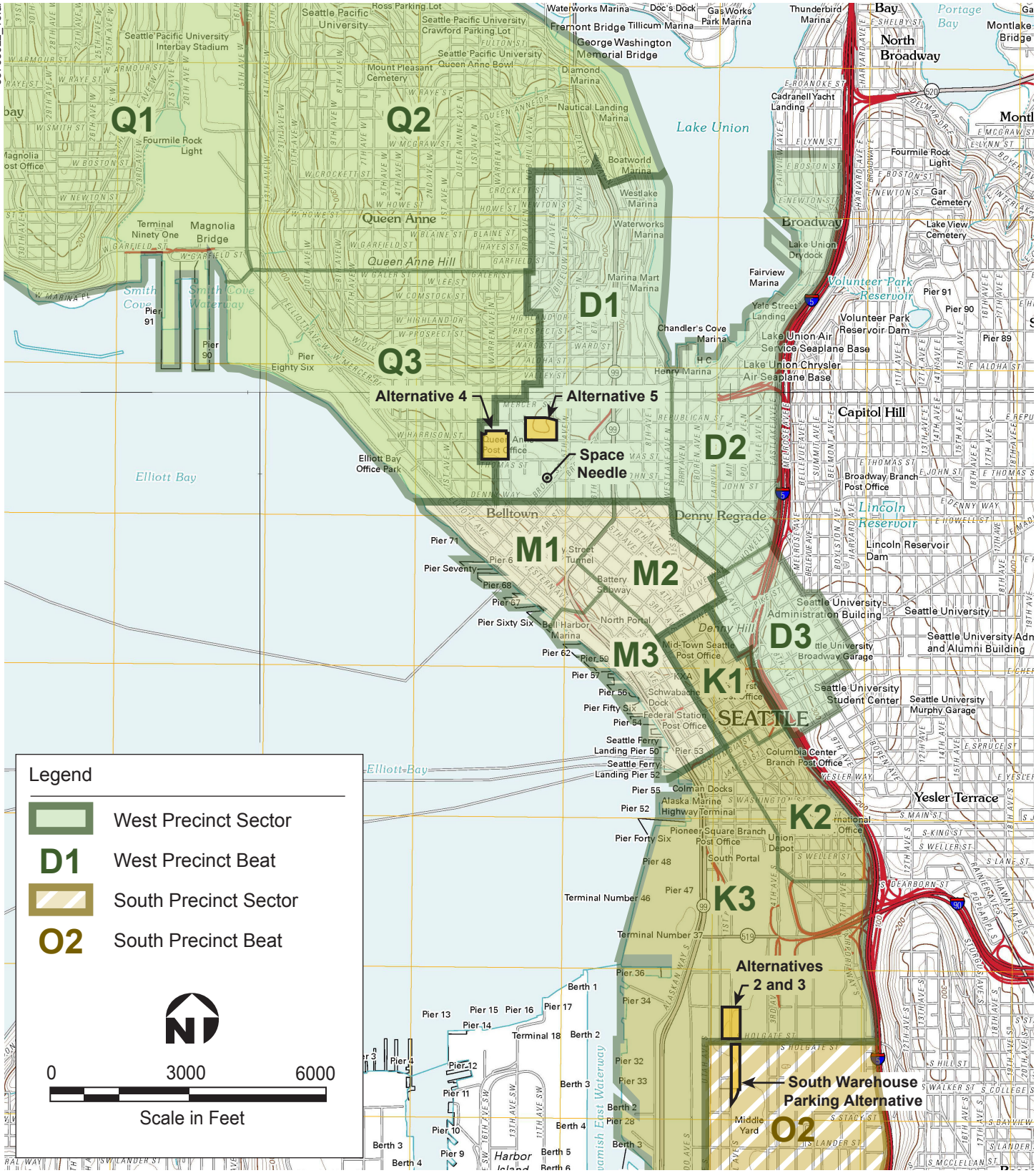
Affected Environment

Police protection at the existing stadiums (Safeco Field and CenturyLink Field) is provided by the City of Seattle Police Department (SPD). Seattle is divided into five geographic areas; within those areas are the five precincts or police stations: North, East, South, West and Southwest. Precinct boundaries were determined through consideration of neighborhood boundaries, geographic and other natural boundaries. Each precinct contains smaller geographic areas called Sectors. There are 17 sectors total in the city. Each of these Sectors is divided into between three smaller sections called Beats. These are the areas that individual patrol officers are assigned responsibility for.

The SPD West Precinct serves the neighborhoods of Downtown Business District, Waterfront, International District, Pioneer Square, Belltown, Queen Anne, West Edge, South Downtown (SoDo), Westlake, Eastlake, Seattle Center, Denny Triangle, Magnolia, and South Lake Union (SLU). The West Precinct is located at 810 Virginia Street, approximately two miles from the Stadium District and the site of the Proposed Project (Alternative 2) and Alternative 3. The site is within SPD King Sector Beat 3 (Figure 3.9-1).

SPD West Precinct Sectors and Beats

Response times are faster when the workload is low but exceeded 7 minutes in 2008 during the busiest times of the week when 9-1-1 call volume is high (SPD 2013a). In mid-2012, SPD reported City-wide average response times of 6.8 minutes against a goal of 7 minutes (SPD 2013c).



Source: USGS 7.5-minute topographic quadrangles, Seattle North, Seattle South, Duwamish Head, and Shilshole Bay, Washington, 2011

Figure 3.9-1

Seattle Police Department West Precinct Sectors and Beats

Job No. 33763922

The West Precinct provides a full range of emergency-response and public safety services to prevent crime and enforce the law in a manner that makes residents and visitors feel safe and be safe in their homes, schools, businesses, and neighborhoods. Precinct personnel also respond to situations they view while patrolling the streets of Seattle, as well as work on solutions to long-standing neighborhood concerns and needs through the Community Policing and Anti-Crime Teams. In addition to the SPD providing law enforcement and public safety in the area, existing venues support their own security within their facilities.

The SPD deploys additional parking enforcement officers working overtime before, during and after regular major events at CenturyLink Field and Event Center and Safeco Field, and for temporary construction-related street or traffic changes.

Typically, the SPD's staffing level for stadium events focuses on traffic control. Staffing levels depend on the estimated crowd size. The department's standard levels of staffing are 24 for crowds of 10,000 to 18,000; 31 officers for crowds of 18,000 to 25,000; 44 officers for crowds of 25,000 to 40,000; 51 officers for crowds of more than 50,000 with personnel at their posts three hours before an event. The typical assignment includes three to four supervising officers and three to four parking enforcement officers, with the remaining officers assigned to traffic and security duties. As attendance increases, additional officers may be needed.

The SPD has found that staffing resources required for a small (10,000 attendance) event to the large event (50,000 or more attendance) range from 250 to 450 hours at a cost of $10,000 to $18,000 per event. Playoff game events would require a higher hour total and could cost as much as $25,000 or more per event.

Despite the perceived need to increase demand for police protection due to sporting event attendee behavior, as the City has grown and developed over the last 25 years, reported major crimes have shown a steady downward trend, including in the stadium district (West Precinct, King Sector, Beat 3). The decline was continuous from 1988 to 2000. Table 3.9-2 and Figure 3.9-2 provide crime statistics for 2008 through 2012. The lowest year for reported major crimes was 2012 when the major crime rate reported was 62 percent lower than the rate reported in 1988. (SPD - Major Crimes a 25 Year Review)

Table 3.9-2
Monthly Average Crime West Precinct King Sector Beat 3 2008-2014
(Alternatives 2 and 3)

	2008	2009	2010	2011	2012	2014
Homicide	0	0	0	0	0	2
Rape	1	0	0	0	0	3
Robbery	5	6	3	2	3	54
Assault	6	6	5	5	5	257
Larceny-Theft	76	79	58	51	51	748
Motor Vehicle Theft	7	6	5	5	3	42
Burglary	6	6	5	3	4	78

A review of the Seattle Police Department's 2014 Precinct Crime Statistics indicates that number of crimes in the West Precinct King Sector Beat 3 were increased over 2012. For the entire year of 2014, there were 2 homicides, 3 rapes, 54 robberies, 257 assaults, 748 larceny-thefts, 42 motor vehicle thefts, and 78 burglaries[1]. On a monthly average basis, the number of crimes were up as much as 50 percent depending on the crime type.

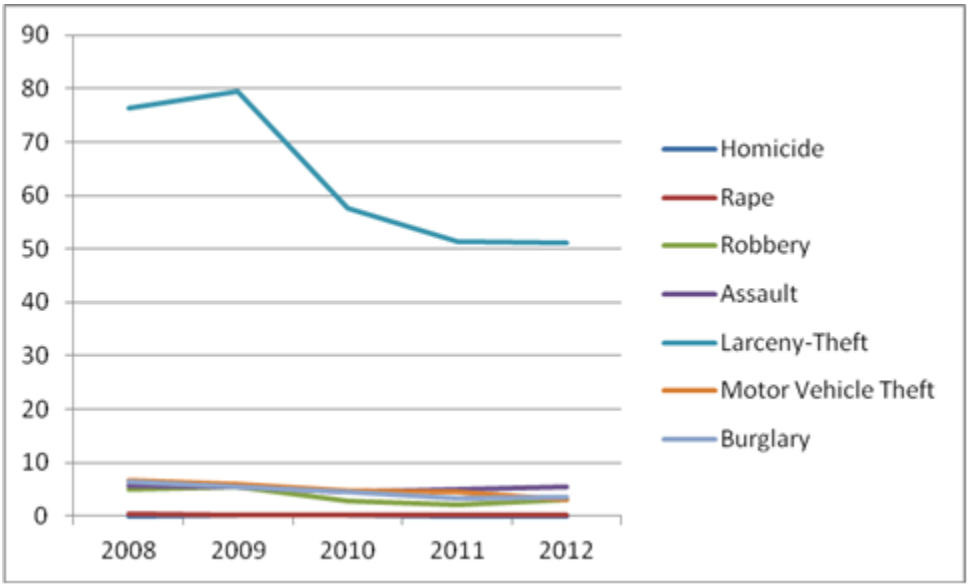


Figure 3.9-2

Monthly Average Crime West Precinct Beat King 3: 2008-2012

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new arena. There would be no direct effects to public police services.

Impacts of Alternatives 2 and 3

During construction, emergency response time to the site may increase. Non-emergency response times could also increase primarily due to temporary street changes, construction vehicles, and equipment. Public services would be affected by increased traffic congestion and delays on the primary roads affected by construction and on roads around the construction area. The increased congestions and delays would have a direct effect on emergency vehicle access to and through the construction area.

As with other sporting events, the SPD could need parking enforcement officers working overtime to staff the Proposed Project (Alternative 2) or Alternative 3 before, during, and after major events since parking will be provided offsite in either existing private lots or a new parking garage on the South Warehouse site south of Holgate Street, and on the streets surrounding the Arena.

[1] http://www.seattle.gov/police/crime/stats.htm

A slight increase in offenses would be expected due to increased number of visitors to the area. Offenses that could increase include robbery, aggravated assault, theft, auto theft, misdemeanor theft, assaults, urinating in public, disturbance, and public drinking. Operation of the Proposed Project (Alternative 2) or Alternative 3 would not have any effect on existing mutual aid agreements.

NBA Guidelines for Arena Security

In 2005, the National Basketball Association (NBA) issued to all teams a revised set of Arena Guidelines, which included policies dealing with the deployment of security personnel, alcohol sales, and a new Fan Code of Conduct.

The Arena Guidelines were prepared in consultation with NBA teams and arena operators, crowd management and security experts, law enforcement officials, members of the concessions industry and representatives of TEAM (Techniques for Effective Alcohol Management).

The NBA Fan Code of Conduct, which sets forth expected standards of decorum for all fans attending NBA games, will be posted prominently in all NBA arenas, and public address announcements concerning some of its key elements will be made during each NBA game. Guests who fail to adhere to these standards will be subject to ejection and revocation of season tickets.

The guidelines also set forth minimum standards regarding the serving of alcohol, including the provision that alcohol be served only until the start of the 4th quarter, restrictions on the size (24 ounces) and number (2) of alcoholic beverages sold per individual customer, the training of arena personnel in effective alcohol management, and the maintenance of designated driver programs in each NBA Arena.

A few key points of the Fan Code of Conduct are:

- Guests will enjoy the basketball experience free from disruptive behavior, including foul or abusive language or obscene gestures.
- Guests will consume alcoholic beverages in a responsible manner. Intervention with an impaired, intoxicated or underage guest will be handled in a prompt and safe manner.
- Guests will not engage in fighting, throwing objects or attempting to enter the court, and those who engage in any of these actions will immediately be ejected from the game.
- Guests will comply with requests from arena staff regarding arena operations and emergency response procedures.

The Fan Code of Conduct states:

> *Arena staff has been trained to intervene where necessary to help ensure that the above expectations are met, and guests are encouraged to report any inappropriate behavior to the nearest usher, security guard or guest services staff member. Guests who choose not to adhere to these provisions will be subject to ejection without refund and revocation of season tickets and may also be in violation of city ordinances resulting in possible arrest and prosecution (NBA.com 2013).*

3.9.1.3 Parks or Other Recreation

Affected Environment

There are no existing formal recreational opportunities in the vicinity of Alternatives 2 and 3; the closest City of Seattle Park is the East Duwamish Greenbelt Park, located approximately 0.7 miles to the east, east of Interstate 5 (I-5).

There are two primary entertainment uses to the north of Alternatives 2 and 3: CenturyLink Field, home to the Seahawks football team and Sounders Football Club; and Safeco Field, home of the Seattle Mariners. For a discussion of these two facilities, see Section 3.6 Land Use.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new arena. There would be no direct effects to parks or other recreation.

Impacts of Alternatives 2 and 3

As there are no recreational facilities in the vicinity of Alternatives 2 and 3, impacts to parks or formal recreational opportunities would not occur.

3.9.1.4 Natural Gas (Puget Sound Energy)

Affected Environment

Existing gas facilities in the vicinity of the site include a gas main in Occidental Avenue S., extending through the length of the project site, and a gas main in 1st Avenue S. near the northwest corner of the project site at the S. Massachusetts Street intersection.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new arena. There would be no direct effects to natural gas utilities.

Impacts of Alternatives 2 and 3

Per a telephone conversation with the gas utility representative for south downtown, Ken Elvsaas of Puget Sound Energy (Infrasource), the gas line in Occidental could likely be capped and abandoned without rerouting or providing additional gas piping. Mr. Elvaas mentioned that the most practical future gas service to an Arena would be near the northwest corner of the site; however the project could also connect to the gas line in Occidental just north of the project site. Per discussion with Puget Sound Energy, it is anticipated that the gas utility has more than adequate serving capacity in the project vicinity and it is unlikely that any upgrades would be required in the public right-of-way.

3.9.1.5 Electrical Infrastructure (Seattle City Light)

Affected Environment

Existing feeder and distribution electrical facilities are located within the public right-of-way on S. Massachusetts Street, 1st Avenue S., S. Holgate Street and Occidental Avenue S. Distribution facilities are 26-kV overhead lines, and include those running along Occidental Avenue S. through the project site.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new arena. There would be no direct effects to electrical utilities.

Impacts of Alternatives 2 and 3

Per the January 29, 2013, meeting with Seattle City Light, temporary and permanent electrical service can be provided to Arena development to meet the preliminary design loads and voltages. Permanent electrical loads for a new Arena are estimated to be 5 MVA, which is approximately the same as the load for Safeco Field. It is anticipated that the 26-kV overhead lines located on the streets bordering the site will be undergrounded prior to excavation and building construction. The overhead lines running along Occidental Avenue S. would be relocated prior to the start of construction on the Arena site.

It is anticipated that the construction contractor would likely require two 122A - 480Y/277 volt temporary services, one from the north and one from the south, for building construction. These services could be fed by pole-mounted transformer banks.

For permanent service, the project designers have discussed installing a redundant service to the building electrical room at the northeast corner of the site with Seattle City Light. Per January 29, 2013, Seattle City Light meeting minutes, the two 26-kV service lines would originate from terminal poles located on the north side of S. Massachusetts Street and the west side of 1st Avenue S. (near the intersection with S. Massachusetts Street). The schedule of service from the west side of 1st Avenue would need to be coordinated with the SR99 tunnel

project as the line currently serves the tunnel boring machine. Once the tunnel boring is completed, the wires could be tapped for the redundant Arena service.

During 2015, project designers discussed three options with the Seattle Design Commission for rerouting the existing 26-kV overhead lines that exist along S. Massachusetts Street: placing the lines underground, replacing the lines above ground, or a combination of underground and above ground.

The project designers will submit a service application to Seattle City Light in addition to the utility clearance exhibit that they submitted in February, 2013.

Seattle City Light is proposing to construct a new electrical substation in South Lake Union, referred to as the Denny Substation. The proposed electrical distribution system improvements would be installed along numerous streets in the South Lake Union neighborhood. A new 230-kV transmission line would need to be constructed between the existing Massachusetts Substation in the SoDo area and the new Denny Substation. The new 230-kV line would extend from the Denny Substation, through downtown Seattle to S Massachusetts Street, and then west along S. Massachusetts Street at the north end of the Seattle Arena site into the existing Massachusetts Substation located at Utah Avenue S. and S. Massachusetts Street. The estimated timing for construction of the transmission line to the Massachusetts Substation is 2018 – 2020.

The Arena team is also working with Seattle City Light on options for both underground and overhead relocations of existing 115-kV transmission lines that are currently aligned over the north portion of the Arena site. In addition to the existing transmission lines, SCL is planning a second 115-kV circuit along S. Massachusetts as part of their Denny Substation project (2018-2020). The relocation alternatives include both existing and proposed transmission lines.

3.9.1.6 Solid Waste

Affected Environment

Solid waste generated in the vicinity of the Stadium District site is collected by the current City contracted waste disposal company, and transported to the transfer station in South Seattle, then hauled to the disposal company's landfill site. Source-separated recyclables (aluminum cans and bottles) are normally picked up by private recycling companies.

Construction and demolition (C&D) materials account for 28 percent of all waste disposed in Seattle. Seattle has recently adopted new recycling requirements for construction and demolition materials through landfill disposal bans, facility certification and waste diversion reporting toward achieving City Council-adopted a goal for recycling 70 percent of construction waste by 2020. The City's Green Building programs also often require salvaging and recycling a large percentage of the construction waste generated by construction activities. To reach this goal, Seattle Public Utilities will:

- Roll out landfill disposal bans on readily recyclable C&D materials

- Certify the recycling levels at recycling facilities which receive and process C&D materials from Seattle jobs
- Require building permit holders for each new construction, remodeling and demolition to file a waste diversion report to show compliance with the disposal bans (City of Seattle Ordinance 124076, Phased Landfill Bans 2012-2016)

Impacts of No Action at Alternative 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new arena. There would be no direct effects to solid waste.

Impacts of Alternatives 2 and 3

Impact from the Proposed Project (Alternative 2) or Alternative 3 construction includes collection and disposal of construction materials from the site while under construction, and the future need for the separation and collection of solid waste and recyclable materials from the new facility. Volumes are within the capacity of the existing solid waste collection and processing facilities and no adverse impacts from the collection of additional solid waste is anticipated.

3.9.1.7 Telecommunications

Affected Environment

Communication services in the project vicinity are currently provided by CenturyLink, with overhead facilities located on 1st Avenue S. and Occidental Avenue S. Comcast and other fiber optic companies are also located in the general vicinity of the development and could provide services to the site if requested.

Impacts of the No Action Alternative at Alternative 2 and 3 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 2 and 3 for a new arena. There would be no direct effects to telecommunication utilities.

Impacts of Alternatives 2 and 3

Communication system requirements of a new Arena will include both conventional telephone and high-speed internet services. Some existing overhead facilities on Occidental Avenue S. are within the new development site boundary and will require relocation. In addition, specific needs of an Arena may require additional facilities and capabilities that are not currently available at the site location. Any additional services or facilities that are required by a new Arena will be supplied by private telecommunications providers through existing or new facilities constructed to serve the development.

3.9.1.8 Mitigation Measures Applicable to Alternatives 2 and 3

Fire

Construction

The Proposed Project (Alternative 2) or Alternative 3 would require coordination with the SFD to develop a plan for emergency vehicle access to and from the Project Area during construction.

Operation

All Build Alternatives would require the establishment of an emergency evacuation plan. Emergency evacuation plans provide procedures in the event of an emergency: e.g., guests should follow evacuation plan instructions given via the public address announcer, seating hosts, uniformed security, police and medical personnel. If an emergency requires evacuation, exit directions will be given over the public address system and scoreboards. During emergencies, elevators and escalators are not to be used. All guests will be directed to exit using the stairs or ramps.

Intelligent traffic signal controls at signalized intersections could be used as a partial mitigation measure for the effects on response times for fire and emergency medical services, particularly during construction. If intelligent traffic signals cannot adequately mitigate the effects on emergency response, additional staff, apparatus, and facilities may be necessary.

The Proposed Project (Alternative 2) or Alternative 3 would not result in significant impacts on fire service; therefore, no other mitigation measures would be necessary.

Police

The project developer would be responsible for maintaining security at construction and staging areas during construction. Traffic mobility during construction in heavily traveled areas could be most affected, especially during peak hours. During events, high-volume traffic and pedestrian areas could require additional police support services to direct and control traffic and pedestrian movements.

Parks or Other Recreation

Impacts to recreation are not anticipated under Alternatives 2 and 3, therefore mitigation measures are not proposed.

Natural Gas (Puget Sound Energy)

There are no adverse impacts on the existing gas facilities, other than the abandonment of a portion of the existing gas main in Occidental Avenue S., and no mitigation is proposed for the project because the abandonment will not require construction of any additional gas piping.

Electrical, Infrastructure (Seattle City Light)

Mitigation for the relocation of the overhead 26-kV overhead lines would include undergrounding of these facilities adjacent to the Project Site and relocating of the overhead lines located within the project site on Occidental Avenue S. No other adverse impacts are anticipated for the electrical system facilities in the vicinity of the Arena development site.

Solid Waste

There are no identified adverse impacts to the solid waste collection system due to the construction of the Arena development and no mitigation measures are proposed. The developer and contractors will comply with the new requirements for construction, demolition, and recycling defined by City of Seattle Ordinance 124076.

Recyclable and yard waste is banned from Seattle's garbage. Businesses are required to arrange for their own recycling and composting (yard waste) services. The City provides multiple resources to assist businesses in managing their recycling needs (Seattle Public Utilities 2013).

Telecommunications

There are no identified adverse impacts to the existing telecommunications systems serving the site vicinity, and no mitigation measures are proposed.

3.9.1.9 Secondary and Cumulative Impacts

Fire

All Build Alternatives

Construction of either Alternatives 2 or 3 in the Stadium District could cause some minor delays in fire service response to the project area during construction. Such delays are typical for any major construction activity in and around downtown Seattle. As part of a Construction Management Plan (CMP), the project developer would work with the SFD to ensure that adequate access to the area is available during construction.

Alternatives 2 and 3

A major long-term construction project, the Alaska Way Viaduct replacement, is in the vicinity of the site of Alternatives 2 and 3. Construction and events at the Proposed Project (Alternative 2) or Alternative 3, events at nearby facilities, and the viaduct replacement project would modify the transportation network in and around downtown, but are not expected to result in significant adverse operational effects on the provision of public services. Depending on the route used, some public service providers would experience increased traffic-related delay. Others would experience less traffic-related delay.

Police

All Build Alternatives

There are major long-term construction projects in the vicinity of all build alternatives. In combination with the construction or operation of any of the build alternatives with events at nearby facilities, any ongoing construction projects the transportation network in and around downtown would be modified. Increased congestion may have operational effects on the provision of public services. Depending on the route used, some public service providers would experience increased traffic-related delay.

The need for additional police support services could be addressed by providing additional permanent or temporary law enforcement officers and / or stations.

Alternatives 2 and 3

Over the long term, the demand for police protection service in the vicinity of the Proposed Project (Alternative 2) or Alternative 3 could increase as a result of the cumulative effect of the proposal and other anticipated development projects in the Stadium District and larger SoDo area. Yet, as the city has grown and developed over the last 25 years, reported major crimes have shown a steady downward trend. The decline was continuous from 1988 to 2000. The lowest year for reported major crimes was 2012 when the major crime rate reported was 62 percent lower than the rate reported in 1988 (SPD 2013b).

Parks or Other Recreation

Construction of an Arena in Seattle would add another venue for spectator sports, providing an additional recreational opportunity for sports fans, or concert attendees.

Utilities

The construction of a new 750,000 square-foot spectator sports facility in Seattle at any of the potential locations would cumulatively add to the need for additional sources of natural gas, electricity, telecommunications, and solid waste pickup and handling. The needs for this type of facility would be similar to any large new facility and potential growth in Seattle is part of the forecasting in the load plans for each utility.

3.9.1.10 Significant Unavoidable Adverse Impacts

There are no significant unavoidable adverse impacts related to the development of a new spectator sports facility in Seattle.

3.9.2 Alternative 4 – KeyArena 20,000-Seat Arena

3.9.2.1 Fire

Affected Environment

The study area for the fire service analysis includes the area immediately surrounding the KeyArena site (Alternative 4) and Seattle Center.

Fire protection services to the Alternative 4 site would be provided by the SFD. The closest fire station is Fire Station 8, approximately one mile north of Seattle Center at 110 Lee Street. In addition, Fire Station 2 is located at 2320 4th Avenue within a mile south of Alternatives 4 and 5. Medic One Headquarters at Harborview Medical Center and Fire Stations 5 and 10 are within 2 miles of Alternatives 4 and 5. (See Table 3.9-1 and Section 3.9.1.1 for the discussion of Seattle-wide capacity information for the Seattle Fire Department).

Impacts of the No Action Alternative at Alternative 4 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 4 for a new arena. There would be no direct effects to fire services.

Impacts of Alternative 4

The impacts to Fire services from Alternative 4 would be the same as identified for Alternatives 2 and 3 in Section 3.9.1.1.

3.9.2.2 Police

Affected Environment

See Section 3.9.1.2 for a discussion of the Affected Environment which covers West Precinct. All alternatives are located within the West Precinct.

SPD's bicycle-mounted police patrol Seattle Center. The Armory has an office for police use, however it is not staffed except for major Seattle Center events.

Despite the perceived need to increase demand for police protection due to sporting event attendee behavior, as the City has grown and developed over the last 25 years, reported major crimes have shown a steady downward trend, with the exception of burglary, including in the vicinity of KeyArena (West Precinct, David Sector, Beat 1). The decline was continuous from 1988 to 2000. The lowest year for reported major crimes in the City of Seattle was 2012 when the major crime rate reported was 62 percent lower than the rate reported in 1988 (SPD 2013b). Table 3.9-3 and Figure 3.9-3 provide crime totals for 2008 through 2012 for the West Precinct David Sector Beat 1 in which the sites of Alternative 4 and 5 are located. 2014 data is also provided on Table 3.9-3.

Table 3.9-3
Crime Totals per Year West Precinct David Sector Beat 1 – 2008-2014
(Alternatives 4 and 5)

	2008	2009	2010	2011	2012	2014
Homicide	1	0	0	0	0	0
Rape	4	4	4	2	4	3
Robbery	20	41	16	19	32	11
Assault	35	30	45	37	27	115
Larceny-Theft	978	1186	698	689	607	714
Motor Vehicle Theft	81	65	70	87	81	90
Burglary	134	104	129	109	181	157

A review of the Seattle Police Department's 2014 Precinct Crime Statistics indicates that number of crimes in the West Precinct David Sector Beat 1 were similar or lower to 2012 levels for homicide, rape, robbery, and burglaries, and increased over 2012 for assault, larceny-thefts, and motor vehicle thefts. For the entire year of 2014, there were 0 homicides, 3 rapes, 11 robberies, 115 assaults, 714 larceny-thefts, 90 motor vehicle thefts, and 157 burglaries. (http://www.seattle.gov/police/crime/stats.htm)

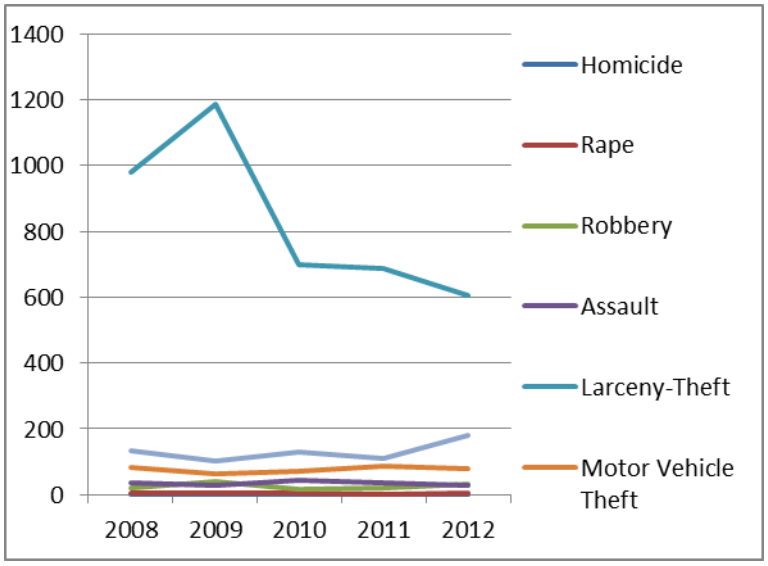


Figure 3.9-3
Monthly Average Crime West Precinct David Sector Beat 1: 2008-2012

Impacts of the No Action Alternative at Alternative 4 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 4 for a new arena. There would be no direct effects to public police services.

Impacts of Alternative 4

The impacts to Police services from Alternative 4 would be the same as identified for Alternatives 2 and 3 in Section 3.9.2.2.

3.9.2.3 Parks or Other Recreation

Affected Environment

The Alternative 4 – KeyArena site contains one public recreation area, the Seattle Center Skatepark, which has a surface area of 10,000 square feet with state-of-the-art skating elements, located south of KeyArena.

In addition to the Skatepark described above, there are several City of Seattle Parks in the vicinity of Seattle Center, including: Tilikum Place Park, Denny Park and Playfields, Myrtle Edwards Park, Ward Springs Park, Counterbalance Park, and Kinnear Place (See Figure 3.9-4).

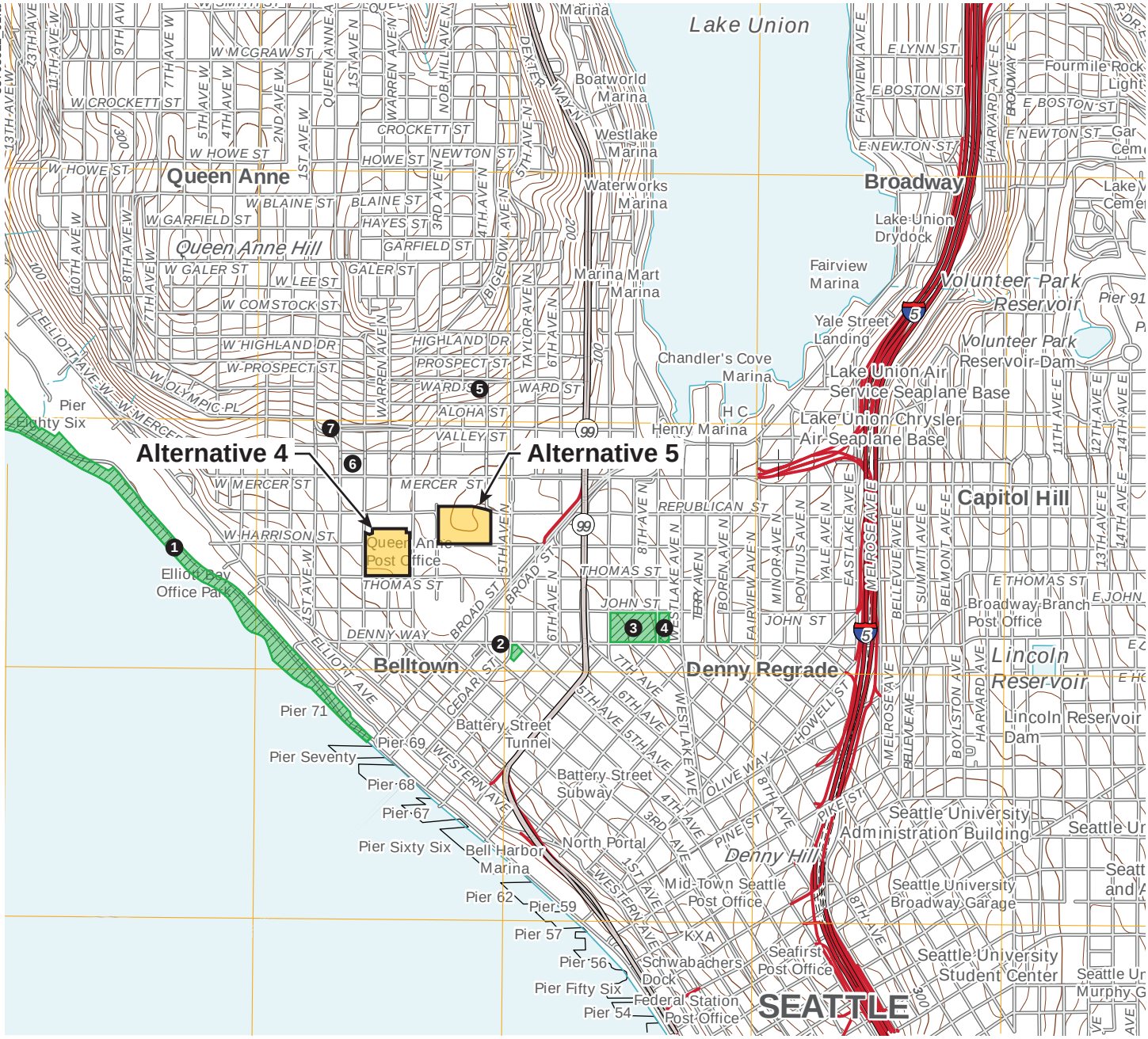
Impacts of the No Action Alternative at Alternative 4 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 4 for a new arena. There would be no direct effects to parks or other recreation.

Impacts of Alternative 4

Construction of an arena at the KeyArena site may necessitate the removal of the Seattle Center Skatepark and other features located south of KeyArena.

According to the City of Seattle Parks and Recreation Department website, there are four skate parks in the following parks: Ballard Commons Park, Dahl Playfield, Jefferson Park, and Woodland Park; there are no other existing skate parks near downtown Seattle. The City of Seattle completed a Citywide Skatepark Plan in 2007 identifying locations for possible new skate spots (neighborhood skate facilities from 1,500-10,000 square feet) and skate dots (small skate elements up to 1,500 square feet that can be integrated into existing parks). Potential locations in the general vicinity of the Seattle Center Skatepark include Myrtle Edwards Park, Magnolia Playfield, Miller Playfield, and Gas Works Park (City of Seattle 2007). If the Seattle Center Skatepark were to be removed, it would displace current users who would be required to find another location to recreate – likely outside of the downtown Seattle area.



Source: USGS 7.5-minute topographic quadrangles, Seattle North and Seattle South, Washington, 2011

Legend

Park

1. Myrtle Edwards Park
2. Tilikum Place Park
3. Denny Park
4. Denny Playfields
5. Ward Springs
6. Counterbalance Park
7. Kinnear Park

0 2000 4000

Scale in Feet

Figure 3.9-4

Parks in the Vicinity of Alternative 4 and Alternative 5

Job No. 33763922

3.9.2.4 Natural Gas (Puget Sound Energy)

Affected Environment

The existing KeyArena site is served from gas mains located within the street rights of way of 1st Ave N. and Thomas St.

Impacts of the No Action Alternative at Alternative 4 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 4 for a new arena. There would be no direct effects to natural gas services.

Impacts of Alternative 4

Per the March 18, 2013, telephone conversation with the gas utility representative for lower Queen Anne, Kevin Haibeck of Puget Sound Energy, it is anticipated that the gas utility has adequate serving capacity in the project vicinity and it is unlikely that any upgrades would be required within the public right-of-way.

3.9.2.5 Electrical, Infrastructure (Seattle City Light)

Affected Environment

The existing KeyArena site is served by underground 13.8 KV electrical distribution lines located south of the site within Thomas Street. It is anticipated that the new arena development will also be served from this location. The historical loads for the KeyArena electrical service range from a low of 1.3 MVA in 2010 to a high of 1.9 MVA in 1999. The existing service is sized for a maximum load of 7.5 MVA, and the estimated load for the new arena is approximately 5 MVA, which is well within the existing service capacity.

Impacts of the No Action Alternative at Alternative 4 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternatives 4 for a new arena. There would be no direct effects to electrical services.

Impacts of Alternative 4

Per the March 15, 2013, meeting with Seattle City Light, temporary and permanent electrical service could be provided to the arena development to meet the preliminary design loads and voltages.

It is anticipated that the contractor would likely require two 122A - 480Y/277 volt temporary services for building construction. These services could be fed by the existing transformer serving the site.

For permanent service, a redundant service to the building electrical room has been discussed with Seattle City Light. There is a separate distribution line located on Mercer Street that could

provide the redundant electrical service, but this would require that the service from the new site be extended across Seattle Center to connect to the redundant power source.

A service application would need to be submitted to Seattle City Light for any connections to the electrical systems for the new development.

3.9.2.6 Solid Waste

Affected Environment

Solid waste generated in the vicinity of the KeyArena is collected by the current City-contracted waste disposal company, and transported to the transfer station in South Seattle, then hauled to the disposal company's landfill site. Source-separated recyclables (aluminum cans and bottles) are normally picked up by private recycling companies.

Construction and demolition waste generated in the site development area is picked up by the current City-contracted waste disposal company and transported similar to other solid waste.

Impacts of the No Action Alternative at Alternative 4 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 4 for a new arena. There would be no direct effects to solid waste services.

Impacts of Alternative 4

Impacts from arena construction would include collection and disposal of construction materials from the site while under construction, and the future need for the separation and collection of solid waste and recyclable materials from the new facility. Volumes are anticipated to be within the capacity of the existing solid waste collection and processing facilities.

3.9.2.7 Telecommunications

Affected Environment

Communication services in the project vicinity are currently provided by CenturyLink, with underground facilities located on 1st Avenue N. and Thomas Street.

Impacts of the No Action Alternative at Alternative 4 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 4 for a new arena. There would be no direct effects to telecommunications.

Impacts of Alternative 4

Communication system requirements of a new arena would include both conventional telephone and high-speed internet services. In addition, specific needs of the arena may require additional facilities and capabilities that are not currently available at the site location.

3.9.2.8 Mitigation Measures Applicable to Alternative 4

Fire

See Section 3.9.1.8 Mitigation Measures Applicable to Both Alternatives 2 and 3. These mitigation measures would also apply to Alternative 4.

Police

See Section 3.9.1.8 Mitigation Measures Applicable to Both Alternatives 2 and 3. These mitigation measures would also apply to Alternative 4.

Parks or Other Recreation

Mitigation may need to be provided for the removal and relocation of the Seattle Center Skatepark if Alternative 4 were implemented. The City would likely convene the Skate Park Advisory Committee to provide guidance to any potential relocation of the skatepark similar to the process followed in 2007 to determine the skatepark's last relocation.

Natural Gas (Puget Sound Energy)

There are no identified adverse impacts on the existing gas facilities and no mitigation is proposed for the project.

Electrical, Infrastructure (Seattle City Light)

No identified adverse impacts are anticipated for the electrical system facilities in the vicinity of the arena development site, and no mitigation is proposed.

Solid Waste

There are no identified adverse impacts to the solid waste collection system due to the construction of the arena development, and no mitigation is proposed.

Telecommunications

There are no identified adverse impacts to the existing telecommunications systems serving the site vicinity, and no mitigation is proposed.

3.9.3 Alternative 5 – Memorial Stadium 20,000-Seat Arena

3.9.3.1 Fire

Affected Environment

The study area for the fire service analysis includes the area immediately surrounding the Alternative 5 site (Memorial Stadium) and Seattle Center.

Fire protection services to Alternative 5 would be provided by SFD. The closest fire station is Fire Station 8, within approximately one mile north of Seattle Center at 110 Lee Street. Fire Station 8 is currently under construction, and it temporarily located at 1431 2nd Avenue North. In addition, Fire Station 2 is located at 2320 4th Avenue within a mile south of Alternatives 4 and 5. Medic One Headquarters at Harborview Medical Center and Fire Stations 5 and 10 are within 2 miles of the Memorial Stadium site. (See Table 3.9-1 and Section 3.9.1.1 for the discussion of Seattle-wide capacity information for SFD).

Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. There would be no direct effects to fire services.

Impacts of Alternative 5

The impacts to Fire services from Alternative 5 would be the same as identified for Alternatives 2 and 3 in Section 3.9.1.1.

3.9.3.2 Police

Affected Environment

See Section 3.9.1.2 for a discussion of the Affected Environment which covers West Precinct. West Precinct covers all alternatives.

Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. There would be no direct effects to police services.

Impacts of Alternative 5

The impacts to Police services from Alternative 5 would be the same as described above for Alternative 4. See Section 3.9.2.2.

3.9.3.3 Parks and Other Recreation

Affected Environment

The Memorial Stadium site is approximately 6.2 acres, seats approximately 12,000 people, and accommodates activities of a traditional athletic nature, primarily football and soccer games. Memorial Stadium hosts both school use and community events. The attendance per school use event is reported to be as high as 3,000 to 5,000, and average attendance to community events is well under 1,000 (Source: Seattle School District). Annual use of the stadium as reported by the Seattle School District is (1) School Use - 1,250 hours per year, athletic practices, high school / middle school games, and all-city band practice; and (2) Community Use - 2,510 hours per year, the majority of which is adult private sports league usage. The stadium is

also used for several Seattle Public School high school commencement ceremonies in June. Memorial Stadium is no longer a venue for the Bumbershoot Festival.

Seattle School District programs have priority for use of Memorial Stadium. After the school program has been established and its needs are met, other groups or individuals may rent the facility on a first come, first served basis. Memorial Stadium is not included in the interagency facility use agreement between the District and the Seattle Parks Department or any other public agency.

Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. There would be no direct effects to parks or other recreation.

Impacts of Alternative 5

If an arena were to be built at Memorial Stadium, the Seattle School District would need to find a new location for athletic practices, high school / middle school games, and all-city band practice. It is assumed that various other school district facilities may need to accommodate the additional events.

Adult users of the field for soccer and football would also be required to find alternative locations. The adult leagues using Memorial Stadium have several alternate field locations for use (for example, the Greater Seattle Soccer League uses over 70 fields). Existing playfields in the more immediate vicinity may not have the capacity to accommodate additional use; however the other locations, not as convenient for current users, may be found in other surrounding neighborhoods.

3.9.3.4 Natural Gas (Puget Sound Energy)

Affected Environment

The existing Memorial Stadium site is served from gas mains within the street rights of way on 5th Ave N. and Mercer St.

Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. There would be no direct effects to natural gas services.

Impacts of Alternative 5

It is anticipated that the gas utility has adequate serving capacity in the project vicinity and it is unlikely that any upgrades would be required in the public right-of-way (March 18, 2013, Kevin Haibeck, Puget Sound Energy).

3.9.3.5 Electrical, Infrastructure (Seattle City Light)

Affected Environment

The existing Memorial Stadium site is served by underground 13.8 KV electrical distribution lines located east of the site within 5th Avenue N. It is anticipated that the new arena development will also be served from this location. The historical loads for the Memorial Stadium electrical service are lower than the estimated load for the new arena, which is approximately 5 MVA. Seattle City Light has determined that the existing system is more than adequate for the additional loads estimated for an arena (March 15, 2013, meeting with Alan Hall, Seattle City Light).

Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. There would be no direct effects to electrical services.

Impacts of Alternative 5

Temporary and permanent electrical service can be provided to an arena development to meet the preliminary design loads and voltages. It is anticipated that the contractor would likely require two 122A - 480Y/277 volt temporary services for building construction. These services could be fed from the existing source on 5th Avenue N.

For permanent service, a redundant service to the building electrical room has been discussed with Seattle City Light. There is a separate distribution line located on Mercer Street that could provide the redundant electrical service, but this would require that the service from the new site be extended across Seattle Center to connect to the redundant power source.

A service application would need to be submitted to Seattle City Light for any connections to the electrical systems for the new development (March 15, 2013, Seattle City Light).

3.9.3.6 Solid Waste

Affected Environment

Solid waste generated in the vicinity of the site is collected by the current City-contracted waste disposal company, and transported to the transfer station in South Seattle, then hauled to the disposal company's landfill site. Source-separated recyclables (aluminum cans and bottles) are normally picked up by private recycling companies.

Construction and demolition waste generated in the site development area is picked up by the current City contracted waste disposal company and transported similar to other solid waste.

Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. There would be no direct effects to solid waste services.

Impacts of Alternative 5

Impact from the a new arena would include collection and disposal of construction materials from the site while under construction, and the future need for the separation and collection of solid waste and recyclable materials from the new facility. Volumes are anticipated to be within the capacity of the existing solid waste collection and processing facilities.

3.9.3.7 Telecommunications

Affected Environment

Communication services in the project vicinity are currently provided by CenturyLink, with underground facilities located on 5th Avenue N. and Mercer Street.

Impacts of the No Action Alternative at Alternative 5 Site

Under the No Action Alternative, there would be no demolition and construction at the site of Alternative 5 for a new arena. There would be no direct effects to telecommunications.

Impacts of Alternative 5

Communication system requirements of a new arena would include both conventional telephone and high-speed internet services. In addition, specific needs of the arena may require additional facilities and capabilities that are not currently available at the site location.

3.9.3.8 Mitigation Measures Applicable to Alternative 5

Fire

See Section 3.9.1.8 Mitigation Measures Applicable to Both Alternatives 2 and 3. These mitigation measures apply to Alternative 5.

Police

See Section 3.9.1.8 Mitigation Measures Applicable to Both Alternatives 2 and 3. These mitigation measures apply to Alternative 5.

Parks or Other Recreation

Advance notice of the closure of Memorial Stadium and construction schedules should be provided to adult soccer and football leagues currently using Memorial Stadium to assist in future scheduling of games.

Natural Gas (Puget Sound Energy)

There are no identified adverse impacts on the existing gas facilities and no mitigation is proposed for the project.

Electrical, Infrastructure (Seattle City Light)

No identified adverse impacts are anticipated for the electrical system facilities in the vicinity of the arena development site, and no mitigation is proposed.

Solid Waste

There are no identified adverse impacts to the solid waste collection system due to the construction of a new arena.

Telecommunications

There are no identified adverse impacts to the existing telecommunications systems serving the site vicinity. Any additional services or facilities that are required by a new arena will be supplied by private telecommunications providers through existing or new facilities constructed to serve the development.

3.9.3.9 Secondary and Cumulative Impacts

Fire

Construction of either Alternatives 4 or 5 could cause some minor delays in fire service response to the Seattle Center area during construction. Such delays are typical for any major construction activity in and around downtown Seattle. As part of a Construction Management Plan, the project developer would work with the SFD to ensure that adequate access to the area is available during construction.

Two major long-term construction projects, the north portal of the Alaska Way Viaduct replacement and the Mercer Corridor Project, are in the vicinity of the Alternatives 4 and 5. In combination with construction of either Alternative 4 or 5 with events at nearby facilities, the viaduct replacement, and Mercer Corridor projects would modify the transportation network in and around downtown. Increased congestion may have operational effects on the provision of public services. Depending on the route used, some public service providers may experience increased traffic-related delay.

Police

All Build Alternatives

There are major long-term construction projects in the vicinity of all build alternatives. In combination with the construction or operation of any of the build alternatives with events at nearby facilities, and ongoing construction projects the transportation network in and around

downtown would be modified. Increased congestion may have operational effects on the provision of public services. Depending on the route used, some public service providers would experience increased traffic-related delay.

The need for additional police support services could be addressed by providing additional permanent or temporary law enforcement officers and / or stations.

Parks or Other Recreation

Construction of an arena in Seattle would add another venue for spectator sports, providing an additional recreational opportunity for sports fans, or concert attendees.

Utilities

The construction of a new 750,000 square foot spectator sports facility in Seattle at any of the potential locations would cumulatively add to the need for additional sources of natural gas, electricity, telecommunications, and solid waste pickup and handling. The needs for this type of facility would be similar to any large new facility and potential growth in Seattle is part of the forecasting in the load plans for each utility.

3.9.3.10 Significant Unavoidable Adverse Impacts

There are no significant unavoidable adverse impacts related to the development of a new spectator sports facility in Seattle.

3.10 Regulatory Framework

Seattle's State Environmental Policy Act (SEPA) ordinance requires an Environmental Impact Statement (EIS) to include, "when appropriate, a summary of existing plans (for example: land use and shoreline plans) and zoning regulations applicable to the proposal, and how the proposal is consistent and inconsistent with them" SMC 25.05.440, SMC 25.05.444 (discuss project's "relationship to existing land use plans..."). This section of the EIS provides that summary and consistency analysis. Unlike potential impacts to the physical environment discussed in other sections of this EIS, this section summarizes the extent to which the alternatives are consistent with zoning regulations and plans.

3.10.1 Stadium District Alternatives - Alternatives 2 and 3

3.10.1.1 Zoning

The site of the Proposed Project (Alternative 2) and Alternative 3 is located within the Stadium Transition Area Overlay zoning district, and the underlying zoning is Industrial-Commercial, 85 foot height limit (IC-85). Spectator sports facilities are permitted outright in the zone. Spectator sports facilities are not subject to the building height limit and other development standards of the underlying zone. See Figure 3.10-1 Stadium Transition Area Overlay District and Area Zoning.

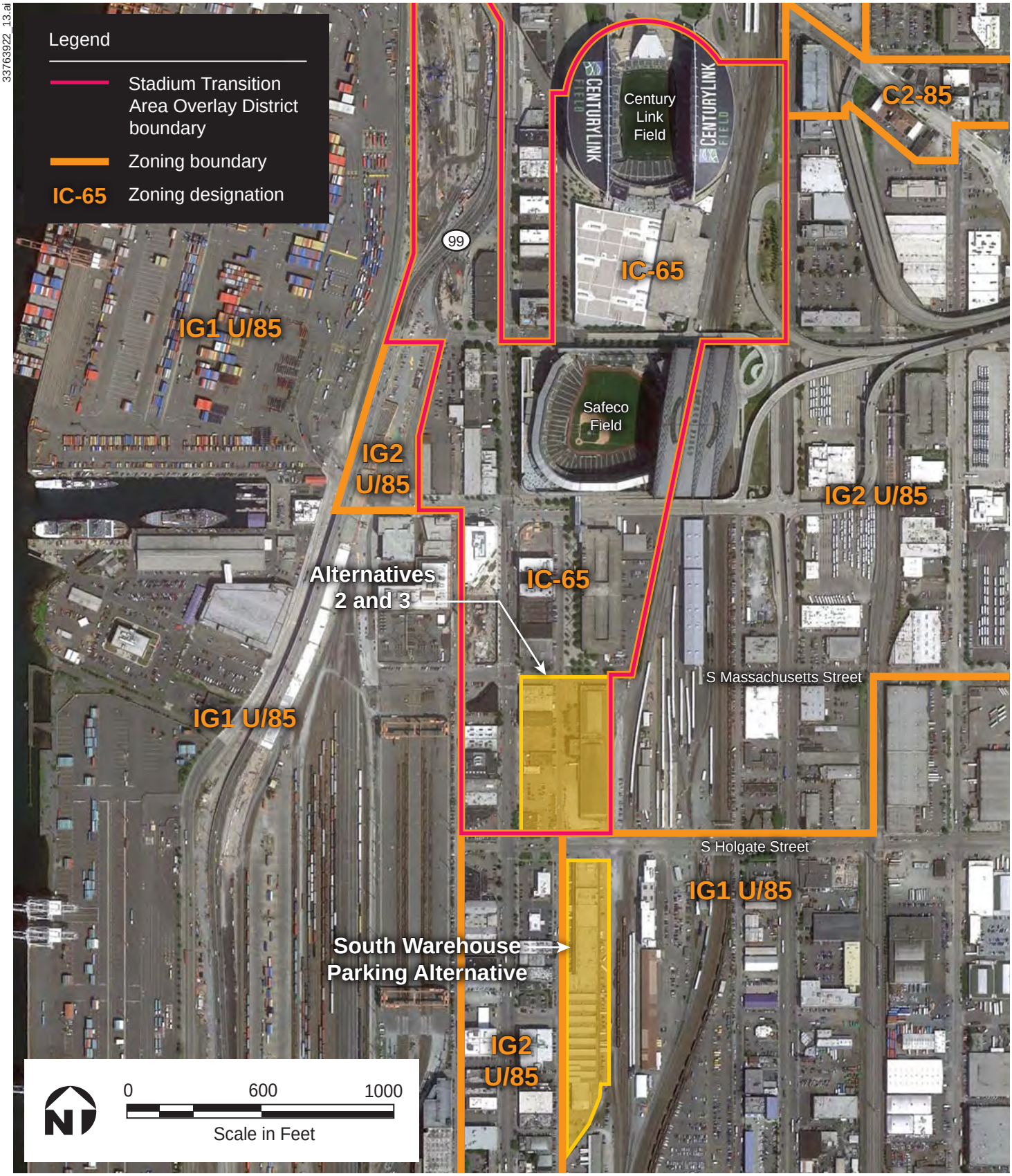
The applicant has proposed to use either existing off-site parking or to build new off-site parking on the South Warehouse Site south of Holgate Street. Per SMC 23.74.008, footnote 1: "Parking required for a spectator sports facility or exhibition hall is allowed and shall be permitted to be used for general parking purposes or shared with another such facility to meet its required parking."

The Proposed Project (Alternative 2) is going through design review, and consistency with Land Use Code development standards will be reviewed as part of the review of the Master Use Permit (MUP) application.

As described above, this EIS summarizes the Project's consistency with zoning regulations, including the fact that a spectator sports facility is a land use that is permitted outright in the Stadium Transition Area Overlay District. As such, the City Council's previous planning decision to allow that use in the zone, which was made when the City Council enacted the Overlay District zone, is a fundamental land use planning decision. State law, RCW 36.70B.030, prohibits the City of Seattle (City) from re-examining that planning decision in the context of project review.

This EIS does not re-examine whether spectator sport facilities should be an allowed use in the zone.

33763922_13.ai



Source: Google Earth Pro

Figure 3.10-1

Stadium Transition Overlay District and Area Zoning

Job No. 33763922

3.10.1.2 City of Seattle Comprehensive Plan

The City's Comprehensive Plan provides general policy guidance in the formulation of the City's development regulations, and generally does not apply to the regulation of specific project proposals. Comprehensive Plan, p. *xi*. In the event of a conflict between development regulations and the Comprehensive Plan, the development regulations control. Although consistency with the Comprehensive Plan is not a zoning standard for review of a proposed spectator sports facility, one Comprehensive Plan policy, GD-P20, addresses the development of such facilities:

> ***GD-P20*** *Seek to integrate stadium and stadium-related uses into the Duwamish Manufacturing/Industrial Center by creating an overlay district limited to the area near the stadiums that discourages encroachment on nearby industrial uses, creates a pedestrian connection from the stadiums north to downtown, and creates a streetscape compatible with Pioneer Square.*

The City adopted the Stadium Transition Area Overlay zoning district to implement that policy. As its name indicates, the purpose of the zone is to accommodate spectator sports facilities within the Duwamish Manufacturing / Industrial Center. Although the Comprehensive Plan contains other policies that pertain to regulations for industrial areas generally and to activity of the Port of Seattle, those policies have no application to the Proposed Project (Alternative 2) or to Alternative 3 in light of the creation of the Stadium Transition Area Overlay zoning district which specifically allows stadiums to be located within the stadium district.

Discussion: If the City and County decide to participate in the proposed Arena project, the Memorandum of Understanding between the City of Seattle, King County and the proponent (October 8, 2013) calls for a study of land use mechanisms to maximize the economic viability of the Manufacturing / Industrial Center, and civic vitality of the Stadium Transition Area Overlay District. These efforts will be coordinated with the transportation planning efforts and investments related to the SODO Transportation Infrastructure Fund.

3.10.1.3 Street Vacation Policies

Alternatives 2 and 3 include the proposed street vacation of Occidental Avenue S. between S. Massachusetts Street and S. Holgate Street. A decision whether to vacate a city street is a legislative decision of the Seattle City Council. When deciding whether to vacate a street, the Council considers the City's Street Vacation Policies (Resolution 31142). Those policies provide three criteria for reviewing street vacation requests:

1. Public Trust Function: First, the City will consider the impact of the proposed vacation upon the circulation, access, utilities, light, air, open space and views provided by the right-of-way. These are defined by these policies as the public trust function of the right-of-way and are given primary importance in evaluating vacation proposals. The policies require mitigation of adverse effects upon these public trust functions. What constitutes adequate mitigation will be determined ultimately by the City Council.

2. Land Use Impacts: Secondly, the City will consider potential land use impacts of the proposed vacation. Potential development involving the vacated right-of-way is reviewed for consistency with City land use policies.

3. Public Benefits: The Council will consider the adequacy of the benefits that may result from the proposed vacation. The proposed action should provide a long-term benefit for the general public.

Discussion: Improvements for pedestrian movement are anticipated as conditions of the street vacation. The following measures would limit impacts to pedestrian movement and be consistent with the requirements of the Stadium Transition Area Overlay District intent and purpose (SMC Section 23.74):

- According to the Early Design Guidance for Seattle Arena (March 5, 2013), the Proposed Project (Alternative 2) and Alternative 3 would provide an enhanced streetscape with widened sidewalks. Public plaza and landscape / pedestrian furnishing zones of the Proposed Project (Alternative 2) and Alternative 3 would assist separating pedestrians from traffic providing for clear pedestrian areas along the industrial transition at 1st Avenue S. and S. Holgate Street. [1]

- The Proposed Project (Alternative 2) and Alternative 3 would meet the development standards for principal pedestrian entrances as described in the Stadium Transition Area Overlay Zone:

    - A principal pedestrian entrance to a structure having a facade along 1st Avenue S. or Occidental Avenue S. shall be located on 1st Avenue S. or Occidental Avenue S., respectively. If the structure has facades along both 1st Avenue S. and Occidental Avenue S., a principal pedestrian entrance is required only on 1st Avenue S. (SMC Section 23.74.010.C.5).

The Proposed Project (Alternative 2) and Alternative 3 are consistent with these criteria.

3.10.2 Alternative 4 – KeyArena 20,000-Seat Arena

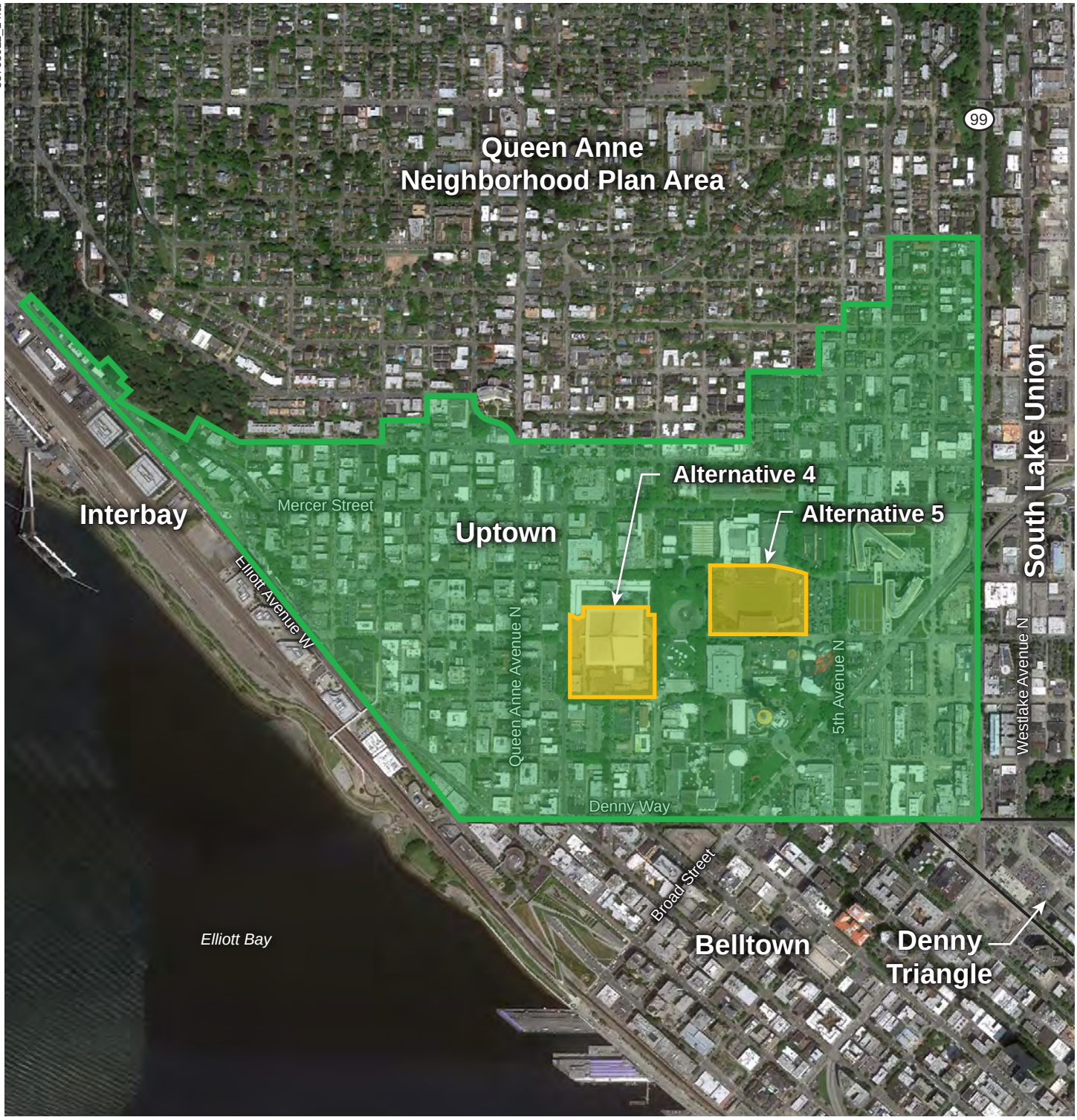
The sites of Alternatives 4 and 5 are both located in the Uptown Urban Center. See Figure 3.10-2 Uptown Urban Center.

3.10.2.1 Zoning

The Seattle Center is zoned Neighborhood Commercial 3 with an 85-foot height limit (NC 3-85). Spectator sports facilities are permitted outright in NC3 (SMC 23.47A004).

[1] Downtown Design Review Board Recommendation, March 5, 2013.

33763922_14.ai



Source: Google Earth Pro

0 1000 2000

Scale in Feet

Figure 3.10-2

Uptown Urban Center
Alternative 4 and Alternative 5

Job No. 33763922

URS

According to the Early Design Guidance for Seattle Arena (March 5, 2013), the Proposed Project (Alternative 2) suggests a building "up to 125 feet in height." If the same structure were to be placed on the site of the existing KeyArena, the height would be inconsistent with the zoning height limit.

The height of the existing KeyArena is 145 feet from the inside floor to the intersection of the roof trusses. However, its above-ground height is 70 feet because part of the building is located below grade. If a new arena were constructed at the KeyArena site, it could also comply with the height limit if part of the building is located below grade.

3.10.2.2 Comprehensive Plan

The City's Comprehensive Plan provides general policy guidance in the formulation of the City's development regulations, and generally does not apply to the regulation of specific project proposals (Comprehensive Plan p. xi). In the event of a conflict between development regulations and the Comprehensive Plan, the development regulations control. Because the NC-3 zoning allows spectator sports facilities, there are no Comprehensive Plan policies that directly apply to the location of such facilities within that zone.

3.10.2.3 Consistency with Seattle Center Century 21 Master Plan

The Seattle Center Century 21 Master Plan was adopted by the Seattle City Council in August 2008. The plan is intended to be used to chart the direction for Seattle Center's growth over a 20-year period.

The Century 21 Master Plan description for the KeyArena (pages 28 and 29) includes:

- *KeyArena is a major revenue generator supporting Seattle Center's operational expenses.*
- *While its major tenant, the Seattle Sonics, will no longer play at KeyArena, KeyArena will continue to be the premiere venue in Seattle for touring concerts and family shows. It can also be a fantastic home court for basketball teams, include the Seattle Storm and / or Seattle University.*
- *The KeyArena Subcommittee, in their 2005 report, identified a minimum level of improvements to enhance the building's performance systems and expand its range of events. These are needed to ensure that KeyArena maintains its competitive edge among similar local venues and expands into new lines of business in the future. The KeyArena Subcommittee report outlines a redevelopment plan to meet current NBA arena standards as part of an effort to attract a new NBA franchise for the citizens of Seattle.*

Redevelopment of the KeyArena site is described in the Century 21 Master Plan to be potentially phased through public-private partnerships (page 31):

- *Like Center House and Memorial Stadium, the area encircling KeyArena is ripe for public-private partnerships. Here at the campus' perimeter, opportunities exist to provide new retail, residential, and restaurant developments that could generate ongoing revenues for Seattle Center and stimulate neighborhood business development with an emphasis on music, sports, art and culture. Redevelopment of the site will likely be complex, as there are many integrated parts and uses, and may need to be implemented over multiple phases with funds from a mix of public and private sources.*

The *Century 21 Design and Planning Principles* are integral to the Master Plan and begin on page 34 of the Century 21 Master Plan. The *Century 21 Planning and Design Principles* developed to guide the Master Planning of the Seattle Center include:

- Long-term investments should enhance the Center's ability to meet its mission, bringing people together to share communal artistic, civic and cultural expressions.
- The design of Seattle Center should foster opportunities to gather people together.
- The mix of activities and amenities should be inviting to the diversity of Seattle Center users.
- Seattle Center should strive to enliven the campus throughout the hours of the day and the days of the year, balancing out the peaks and valleys of programs and activities.
- Development should invigorate and update the campus to appeal to the next generation of users, yet changes should honor the campus' historic character.

Locating a new arena on the Seattle Center campus would be consistent with the *Design and Planning Principles* of the Seattle Center Century 21 Master Plan in the following ways:

- A new arena would represent a long-term investment that would enhance the Center's ability to meet its mission of bringing people together through a diverse set of activities and events.
- A new arena would represent a positive opportunity to embrace new professional sports teams and significant private investment.
- Bringing the Super Sonics back to Seattle and attracting an NHL Hockey franchise would add to the region's considerable sports and arts culture and could attract more visitors to the area during the winter basketball and hockey season helping to balance out the peaks and valleys of programs and activities.
- Arena operations could provide a boost in tourism during the winter sports season.
- New development on the KeyArena site would invigorate and update the campus, adding to the appeal to the next generation of users.

3.10.3 Alternative 5 – Memorial Stadium 20,000-Seat Arena

3.10.3.1 Zoning

The Memorial Stadium site is designated Neighborhood Commercial 3 with an 85-foot height limit (NC 3-85). Spectator sports facilities are permitted outright within the zone. According to the Early Design Guidance for Seattle Arena (March 5, 2013), the Proposed Project (Alternative 2) suggests a building "up to 125 feet in height." If the same structure were to be placed on the site of the existing Memorial Stadium, a 125-foot building height would be inconsistent with the zoned height limit.

3.10.3.2 Comprehensive Plan Designation

The City's *Future Land Use Map*, which is part of the Comprehensive Plan, designates the site of Alternative 5 as "Urban Center" and "Commercial / Mixed Use Areas." The discussion of consistency with the Comprehensive Plan for the Memorial Stadium site is the same as described above for the KeyArena site (Alternative 4) and is in Section 3.10.2.2.

3.10.3.3 Consistency with Seattle Center Century 21 Master Plan

The Seattle Center Master Plan envisions the demolition and replacement of the existing Memorial Stadium with a new outdoor facility capable of being used for both spectator athletic events (including high school football), and as an outdoor concert venue actively contributing to the vibrancy of Seattle Center every day of the year (pages 25 – 27 of the Master Plan). The playing field would be realigned in a north-south direction and used to host football and soccer practices and games during the spring and fall with seating for 5,000 attendees. During the summer months, including Memorial Day and Labor Day weekends, Seattle Center would convert the facility into an amphitheater for outdoor concerts, festival performances and other activities. Seating would be increased to 12,000 seats. For festivals, the expanded International Fountain lawn area to the west is envisioned to be able to seat up to 20,000.

Redevelopment of the Memorial Stadium site is also envisioned in the Century 21 Master Plan as a means of expanding and enlivening the existing International Fountain lawn by almost four acres. Today the space sits empty most days. The expanded International Lawn would sit as a green lid over a new combined 1,300 space underground parking garage, loading and maintenance facility and multi-modal transportation hub – all with direct access to the center of the campus.

Alternative 5 would replace that proposed use of the site with an indoor spectator sports facility and the specific site location would be inconsistent with the Century 21 Master Plan description as it is currently adopted, however the use would be consistent with the Design Guidelines and Principles for the same reasons as stated for Alternative 4 in Section 3.10.2.3.

3.11 Economics

3.11.1 Introduction

The City of Seattle and King County retained Pro Forma Advisors to evaluate the economic impact and fiscal benefits of an 18,000-seat arena in the Stadium District area of Seattle, Washington (Scenario A). The review also included three alternative scenarios including a 20,000-seat Stadium District option (Scenario B), a new 18,000-seat arena replacing KeyArena (Scenario C) and an 18,000-seat arena at the current location of Memorial Stadium (Scenario D).

Pro Forma evaluated:

1. The arena and team operation projections that will be used to pay the City and County annual rent and additional rent, if necessary

2. Fiscal impacts, or tax benefits from construction and on-going operation of the arena, that accrue to the City of Seattle and King County. The majority of this fiscal benefit will be used to pay the public financing of the arena, but some fiscal benefits will accrue to the City and County's general funds.

3. Economic impacts generated by the proposed arena's onsite and offsite direct impacts (i.e. arena jobs, output, and earnings), which spur a series of subsequent indirect impacts (new output, earnings and employment generated because of purchases of industries that supply goods and services to the arena and arena visitors) and induced activities (new output, earnings and employment generated as a result of household purchases by employees).

In 2015, the transportation analysis in the FEIS was updated to integrate additional variables and to modify initial assumptions. The revisions included changes to transit mode split percentages, parallel route reallocations due to possible reduced capacity from forecasted increases in train activity and related street blockages, and updated parking assumptions. These modifications changed the calculated operation at intersections throughout the study area and, as a result, Pro Forma Advisors' Port transportation activity cost impacts changed. The results of the updated transportation analysis reduced the estimated annual costs resulting from port truck delays but increased the estimated annual costs associated with non-port truck delays.

The *Economic Impact Analysis* report is included as Appendix F to this DEIS. The following is a brief summary of the conclusions. Please see the complete report for details.

3.11.2 Summary of Economic Effects

The Economic Impact Analysis concludes that the proposed Seattle Arena will have a total net positive economic benefit of $230 to $286 million to the King County economy (inclusive of the

City of Seattle impacts) and $188 to $236 million to the City of Seattle economy on an annual basis.

The analysis includes an estimate of Port and industrial business impacts, and concludes that there would be a loss of $0.21-0.23 million ($210,000-$230,000) per year within Seattle, and up to $0.23 million ($230,000) per year within King County inclusive of Seattle. This loss is included within the net positive economic benefit numbers of the previous paragraph.

3.11.2.1 Construction

Construction of an 18,000-seat arena on any of the sites would generate one-time economic and fiscal benefits to the region. The economic activity from direct spending and re-spending is estimated at $480 million within Seattle, with an additional $53 million in King County outside of Seattle (total of $533 million within King County including Seattle). Arena construction would support approximately 3,200 jobs and $266 million in earnings within Seattle, with an additional 370 jobs and $23 million in King County outside of Seattle (total of 3,570 jobs and $289 million in King County including Seattle).

3.11.2.2 Operation

The gross regional economic activity associated with operating an 18,000-seat arena in the Stadium District area of Seattle would annually generate approximately $260 million in economic activity in Seattle with an additional $53 million in King County outside of Seattle ($313 million total in King County including Seattle). The total regional annual economic impact generated would be approximately 2,045 jobs and $103 million in earnings in Seattle. The totals for King County including Seattle would be 2,473 jobs and $130 million in earnings.

The fiscal benefits from taxes generated from the operations of the arena are projected at $7.9 million annually to the City of Seattle with an additional $0.6 million to King County. The majority of the fiscal benefit would be available to service any public financing debt for the arena. Additional monies necessary to cover related debt service will come from arena rent payments and, as necessary, income generated from operating the arena.

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Section 5 - Glossary

Air emissions. Gas emitted into the air from industrial and chemical processes, such as ozone, carbon monoxide, nitrogen oxide, nitrogen dioxide, sulfur dioxide and others.

Air pollutant. Any substance in air that could, in high enough concentration, harm humans, other animals, vegetation or material. Pollutants may include almost any natural or artificial composition of airborne matter capable of being airborne. They may be in the form of solid particles, liquid droplets, gases or a combination thereof. Generally, they fall into two main groups: 1) those emitted directly from identifiable sources; and 2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without photoactivation. Exclusive of pollen, fog and dust, which are of natural origin, about 100 contaminants have been identified and fall into the following categories: solids, sulfur compounds, volatile organic chemicals, nitrogen compounds, oxygen compounds, halogen compounds, radioactive compounds, and odors.

Air quality standards. The level of pollutants prescribed by regulations that may not be exceeded during a given time in a defined area.

A-weight. A standard frequency weighting to stimulate the response of the human ear.

Congestion. A condition characterized by unstable traffic flows that prohibit movement on a transportation facility at optimal legal speeds. Recurring congestion is caused by constant excess volume compared with capacity. Nonrecurring congestion is caused by unusual or unpredictable events such as traffic accidents.

Cumulative effect. The effects on the environment that result from the incremental consequences of an action when added to other past, present and reasonably foreseeable future actions.

Emission. Pollution discharged into the atmosphere from smokestacks, other vents and surface areas of commercial or industrial facilities, and from residential and mobile sources.

Environmental impact statement (EIS). A document that identifies and analyzes, in detail, environmental impacts of a proposed action. As a tool for decision-making, the EIS describes positive and negative effects, and lists alternatives for an undertaking.

Grade. The natural surface contour of a lot. Grade can be modified by minor adjustments to the surface of the lot in preparation for construction.

Greenhouse gases. Greenhouse gases (GHGs) are the gases present in the earth's atmosphere which warm near-surface global temperatures through the greenhouse effect. The principal greenhouse gases are carbon dioxide, NOx, methane, and three groups of high-warming potential gases—hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Height. Measurement from grade.

Impervious surface. Surface through which water cannot percolate.

Leq. Equivalent sound level. The level of a constant sound which, in a given time period, has the same energy as does in a time-varying sound.

Level of service (LOS). A gauge for evaluating system performance for roadways, non-motorized and other transportation modes. For example, roadway measures of level of service often assign criteria based on volume-to-capacity ratios.

Mitigation measures. Actions taken to reduce adverse effects on the environment, usually implemented under the State Environmental Policy Act.

MUP. Master Use Permit. The document issued to a project applicant, recording all land use decisions made by the DPD on a master use application. The term excludes construction permits and land use approvals granted by the City Council, by citizen boards or by the state.

National Ambient Air Quality Standards (NAAQS). Standards established by the US Environmental Protection Agency that apply to outside air quality throughout the country.

Nitrogen oxide. A gas formed by combustion under high temperature and high pressure in an internal combustion engine. Changes in nitrogen dioxide in the ambient air contributes to photochemical smog.

Non-attainment area. Area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

State Environmental Policy Act (SEPA). State legislation passed in 1974, which establishes an environmental review process for all development projects and major planning studies prior to taking any action on these projects. SEPA permits early coordination to identify and mitigate any significant issues or impacts that may result from a project or study.

SOV. Single Occupant Vehicle means a motor vehicle occupied by one (1) person, excluding motorcycles.

Transportation Management Program (TMP). A required set of measures to reduce a project building's demand on transportation infrastructure. These measures typically seek to discourage commuting via single-occupant vehicle and encourage alternative commute modes. TMPs must be approved by DPD, SDOT, and the owner of the project building as a condition of the project building's Master Use Permit.

Section 6 - Final EIS Distribution List

6.1 State Agencies

Department of Community Development Historic Preservation Office
Department of Ecology, Environmental Review Section
Department of Transportation (WSDOT)

6.2 Regional Agencies

Port of Seattle
Puget Sound Clean Air Agency
Puget Sound Regional Council
Sound Transit

6.3 Local Agencies

King County Attorney
King County Department of Transportation/Metro Transit

City of Seattle
- City Attorney, Attn: Mr. Robert Tobin
- Department of Planning and Development, Attn: Mr. John Shaw
- Department of Neighborhoods, Landmarks Preservation Board, Attn: Ms. Karen Gordon, Seattle Historic Preservation Officer
- Fire Department
- Parks Department
- Police Department
- Seattle Center, Attn: Ms. Jill Crary
- Seattle Public Utilities, Environmental Review Section
- Seattle Department of Transportation

6.4 Libraries

Seattle Public Library – Central Library
Seattle Public Library – Douglass Truth Branch
Seattle Public Library – International District/Chinatown Branch

6.5 Newspapers

Seattle Daily Journal of Commerce
Seattle Times

Appendix A

Process for Identifying and Screening Locations for Comparative Environmental Analysis

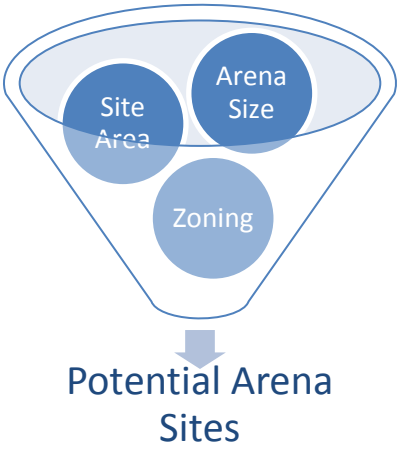
Process for Identifying and Screening Locations for Comparative Environmental Analysis

The following criteria were used to identify potential sites within the City of Seattle where spectator sports arenas might be located, to enable a comparison of potential adverse impacts from those locations with the potential impacts of the proposed ArenaCo facility in the Stadium District south of downtown Seattle (SoDo). No proposal to build an arena exists other than ArenaCo's proposal to build the facility in SoDo.

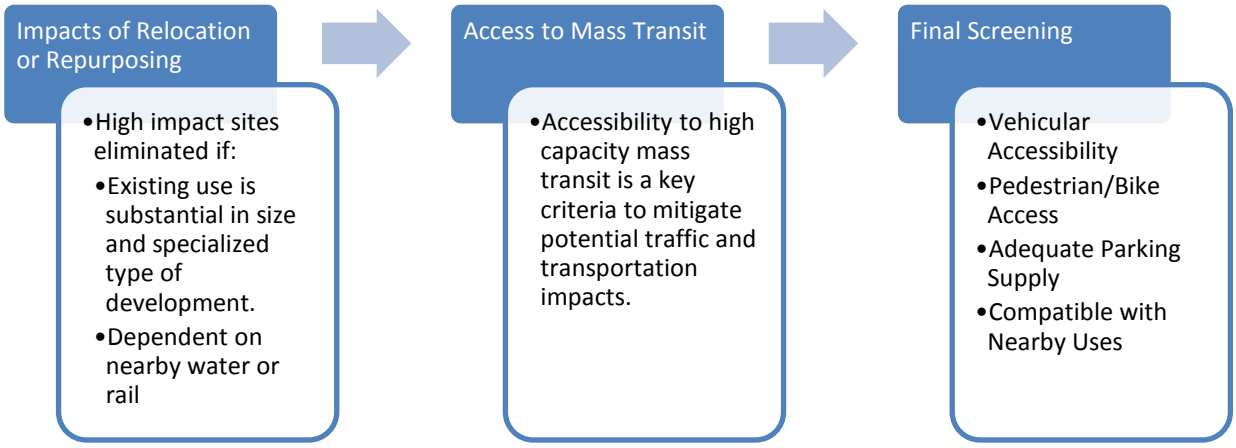
Initial Identification and Screening of Sites

Using the criteria for parcel size, property configuration and zoning, potential sites were identified through a GIS search.

- **Site Area:** minimum of 6 acres on a generally rectangular site, with no dimension less than 400'.
- **Adequate Facility Size:** Site must accommodate a joint NBA / NHL facility: approximately 750,000 SF, 18,000 to 20,000-seat state-of-the art spectator sports arena; a minimum floor plate of 200' by 85' to allow for NHL regulation-sized ice surface with spectator stands.
- **Zoning:** Existing zoning at the site must allow a spectator sports facility. Existing zoning development standards for the site, such as height limits must accommodate the facility.



Next steps Potential sites were then screened for suitability as an arena location through a three-stage process:



The Final Screening revealed the *four alternatives* considered in the DEIS. The results of the screening process are discussed below.

A. IDENTIFICATION OF POTENTIAL SITES

Using the initial identification criteria (site area, adequate facility size, and appropriate zoning), 21 sites were identified through a GIS search for parcel size, property configuration and zoning. The 21 sites are shown on Figure 1 on the following page and are listed on Table 1 from north to south.

Table 1
Initial Site Identification

Site	Acreage	Current Use
Northgate Shopping Center	38 acres	Retail Shopping Center
Northwest Hospital	11 acres	Medical Clinic
King County Transit (Northgate)	8 acres	Transit Center and Parking
Gateway Muirland	7 acres	Office
Fred Meyer Stores	13 acres	Retail
Port of Seattle Salmon Bay	27 acres	Marina, Office and Retail
BNSF (north of Dravus Street)	71 acres	Railway and Rail Yard
Port of Seattle Interbay	31 acres	Port use
BNSF Interbay	20 acres	Railway and Rail Yard
State of Washington	21 acres	Washington National Guard Facility
Port of Seattle South Interbay	7 acres	Port use
Immunex Corporation	39 acres	Office
Port of Seattle	24 acres	Port use – grain terminal
Seattle Public Schools	9 acres	Memorial Stadium
Iris Holdings LLC	10 acres	Bill & Melinda Gates Foundation
City of Seattle/Seattle Center	47 acres	Seattle Center, including KeyArena
Pacific Science Center	7 acres	Pacific Science Center
First & Goal Inc	28 acres	Century Link Field
Washington St Major League	13 acres	Safeco Field
Stadium District 1700 – 1st Avenue South	7 acres	Warehouse
Rainier Electronics LLC	13 acres	Lowe's Home Improvement Store

Seattle Arena Site Parcel Query

Individual parcels or continguous parcels in common ownership in City of Seattle with following parameters:

- Minimum 6 acres in size
- Able to accommodate 400' x 600' rectangle
- With at least 125' height limit
- In one or more of following zones: NC3, C1, C2, SM, DOC1, DOC2, DMC, DRC, DMR, PSM, IDM, DH1, DH2, PMM, IB, IC, IG1 (excluding the Duwamish M/I Center), IG2 (excluding the Duwamish M/I Center).
- All parcels located in the Stadium Transition Overlay District

* this site for an arena would be contingent on a potential rezone to increase the height

Stadium Transition Overlay District

Sites meeting specified criteria

0 0.175 0.35 0.7 Miles

N

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NORTHGATE SHOPPING CENTER (38ac)

KING COUNTY-TRANSIT (8ac)

NORTHWEST HOSPITAL (11ac)

GATEWAY MUIRLAND INC (7ac)

PORT OF SEATTLE (27ac)

FRED MEYER STORES INC (13ac)

BNSF (71ac)

PORT OF SEATTLE (31ac)

STATE OF WASHINGTON (21ac)

PORT OF SEATTLE (7ac)

BNSF (20ac)

SEATTLE PUBLIC SCHOOLS (9ac)

IMMUNEX CORPORATION (39ac)

IRIS HOLDINGS LLC (10ac)

PORT OF SEATTLE (24ac)

PACIFIC SCIENCE CENTER (7ac)

SEATTLE CITY OF CEN (47ac)

FIRST & GOAL INC (28ac)

WASHINGTON ST MAJOR LEAGUE (13ac)

ArenaCo (7ac)

*RAINIER ELECTRONICS LLC (13ac)

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B. INITIAL SCREENING OF IDENTIFIED SITES FOR RELOCATION OR REPURPOSING IMPACTS

The 21 sites were then screened using the following criteria:

- **Minimal Relocation or Repurposing Impacts:** The site should be available for acquisition and establishing the spectator sports facility without the need for substantial, permanent relocation of existing business or residents, and without the need to find replacement sites to fulfill the otherwise intended purpose of the property.

Table 2
Potential Relocation or Repurposing Impacts

Site	Current Use	Relocation or Repurposing Impacts of Conversion to Arena
Northgate Shopping Center	Retail Shopping Center	High Impact
Northwest Hospital	Medical Clinic	Low to Moderate Impact
King County Transit (Northgate)	Transit Center and Parking	High Impact
Gateway Muirland	Office	Low to Moderate Impact
Fred Meyer Stores	Retail	Low to Moderate Impact
Port of Seattle Salmon Bay	Marina, Office and Retail	High Impact
BNSF (north of Dravus Street)	Railway and Rail Yard	High Impact
Port of Seattle Interbay	Port use	High Impact
BNSF Interbay	Railway and Rail Yard	High Impact
State of Washington	Washington National Guard Facility	Low to Moderate Impact
Port of Seattle South Interbay	Port use	High Impact
Immunex Corporation	Office	High Impact
Port of Seattle	Port use – grain terminal	High Impact
Seattle Public Schools	Memorial Stadium	Low to Moderate Impact
Iris Holdings LLC	Bill & Melinda Gates Foundation	High Impact
City of Seattle/Seattle Center	Seattle Center, including KeyArena	Low to Moderate Impact
Pacific Science Center	Pacific Science Center	High Impact
First & Goal Inc	Century Link Field	High Impact
Washington St Major League	Safeco Field	High Impact
Stadium District 1700 – 1st Avenue South	Warehouse	Low Impact
Rainier Electronics LLC	Lowe's Home Improvement Store	Low to Moderate Impact

The impact of relocation or repurposing of a site to construct a Spectator Sports Arena was considered "high" if the existing development was substantial in size and specialized type of development (Northgate Shopping Center, King County Northgate Transit Center, the Bill & Melinda Gates Foundation, Immunex, Pacific Science Center, Century Link Field and Safeco Field), a water-dependent or water-related use that needs the attributes of its existing waterfront property (Port of Seattle properties), properties that are related to the existing railroad line location (BNSF properties). Thirteen of the sites were found to have a "high" impact from relocation or repurposing and were eliminated from further consideration as an alternative site.

C. SECOND SCREENING OF IDENTIFIED SITES FOR ACCESS TO MASS TRANSIT

Accessibility to high capacity mass transit is a key criteria to mitigate potential traffic and transportation impacts. The eight sites remaining from the initial screening were then screened using the following criteria:

- **Access to Mass Transit:** The site should be within 15-minute walking distance of high capacity transit.

Table 3
Third Screening of Remaining Six Alternative Sites for Access to Mass Transit

Site	Is Site Location Within 15 Minutes Walking Distance of High Capacity Transit?
Northwest Hospital	No; There is transit access to the King County Northgate Transit Center, however access is dependent upon SDOT proceeding with plan to construct pedestrian bridge across freeway to connect to Transit Center
Gateway Muirland Inc	Yes; There is transit access to the King County Northgate Transit Center, however bus transit access is limited in capacity and hours of service and may not be able to serve the expected transit ridership of the Arena. Access to high capacity transit would not be available until light rail extension is built to Northgate (service to begin in 2021)
Fred Meyer Stores	No
State of Washington	No
Seattle Public Schools Memorial Stadium	Yes, transit, Monorail and Street Car
City of Seattle/Seattle Center KeyArena	Yes, transit, Monorail and Street Car
Stadium District 1700 – 1st Avenue South	Yes, transit, Link light rail and Sounder commuter rail
Rainier Electronics LLC	Yes, approximately ¼ mile from the Sound Transit Mt. Baker Station

Two sites (Fred Meyer Stores and State of Washington) were eliminated because neither site is served, or planned to be served, by high capacity mass transit.

The Arena year of opening is planned for 2016. The two sites near Northgate (Northwest Hospital clinic site on the west side of I-5, and Gateway Muirland office complex south of the King County Transit Center) are currently served by bus transit to the King County Northwest Transit Center. Bus transit access is limited in capacity and hours of service and may not be able to serve the expected transit ridership of the Arena.

The two Northgate-area sites (Northwest Hospital and Gateway Muirland Inc.) would not be served by high capacity mass transit until Sound Transit completes the Northgate Link Extension. Sound Transit updated its schedule in January 2013 and anticipates 2021 as the year of opening for the Northgate Link. The Northgate Link Extension would stop at the Northgate Transit Center on the east side of I-5. Access to the Northwest Hospital site on the west side of I-5 would be dependent upon SDOT proceeding with a plan to construct a pedestrian bridge across I-5 to connect to the Transit Center. Due to the potential lack of direct connection to the Transit Center, the Northwest Hospital site was removed from consideration.

D. SCREENING OF REMAINING SITES FOR ACCESS, PARKING SUPPLY, AND LAND USE COMPATIBILITY

The five sites remaining after the prior screening were the Gateway Muirland site south of the Northgate Transit Center, Seattle Public Schools Memorial Stadium, the Seattle Center KeyArena, the applicant's Stadium District Site at 1700 – 1st Avenue S., and the Rainer Electronics LLC site at 2700 Rainer Avenue South which is currently occupied by a Lowe's Home Improvement store. These five sites were then evaluated against the following four criteria:

- **Vehicular Accessibility:** The site should be served by major arterials connecting directly to the highway and interstate system.
- **Pedestrian and Bicycle Access:** The site should be located in an area that can accommodate large volumes of pedestrians and non-motorized access.
- **Adequate Parking Supply:** The site should be within 15 minute walking distance of a substantial reservoir of parking opportunities.
- **Compatibility with Nearby Uses:** The site should be located in an area where a spectator sports facility would be compatible both in use and in height/bulk/scale with neighboring uses.

Table 4
Final Screening of Remaining Four Sites

Site	Vehicle Accessibility?	Pedestrian and Bicycle Accessibility?	Adequate Parking Supply?	Land Use Compatibility?
Gateway Muirland Inc	Yes	Yes	No	No
Seattle Public Schools Memorial Stadium Site	Yes	Yes	Yes	Yes
City of Seattle/Seattle Center KeyArena Site	Yes	Yes	Yes	Yes
Stadium District Site	Yes	Yes	Yes	Yes
Rainier Electronics LLC	Yes	Marginal	No	No

Three of the sites (Seattle Public Schools Memorial Stadium site, Seattle Center KeyArena Site, and the Stadium District site in SoDo have been found to meet the final four screening criteria. The Gateway Muirland site south of the Northgate Transit Center and the Rainier Electronics Site (Lowe's) were found to not meet all four criteria as described below.

The Gateway Muirland site contains 7 acres. Development of the site for an arena would consume most of the property and would eliminate the parking that exists at the site. There is no available parking supply in the nearby (walkable) vicinity or land on which parking could be established without displacing other land uses. The northern boundary of the site is NE 100th Street; 3rd Avenue NE abuts the site on the east. The site is zoned NC3-85 and currently occupied by an approximately four-story office building over one level of parking garage. Property immediately abutting the site to the south is zoned NC3-65, and the property across 3rd Avenue NE to the east is zoned NC3-85. Properties to the south and east are zoned LR3, SF 7200 and SF 5000, and the arena use was viewed as incompatible with the residential uses to the south and east. The lack of available land on site for parking, coupled with the close proximity of residentially-zoned properties, were reasons for eliminating this site.

The Rainer Electronics site, currently occupied by Lowe's, is located between Rainer Avenue South and Martin Luther King Jr. Way South. The northern boundary is South Bayview Street and the southern boundary is South McClellan Street. The southern portion of the site is zoned C2-65 (SS-MC) and the northern portion is zoned NC3-65 (SS-MC). Properties to the east across Martin Luther King Jr. Way South are zoned LR3 and SF 5000. Properties to the north, south, and west are zoned for 65 foot height limits (C2-65 to the north, NC3P-65 to the south, and NC3P-65 and NC3-65 to the west on the other side of Rainier Avenue South).

The site is served by light rail, with the Mt. Baker station located approximately ¼- mile to the south. The site has access to I-90 via Rainier Avenue South and access to I-5 via the South Columbian Way exit, leading to South Alaska Street, and then to Martin Luther King Jr. Way South.

The site was deemed "marginal" against the criteria for pedestrian and bicycle access. That criteria is that the site should be located in an area that can accommodate large volumes of pedestrians and non-motorized access. The sidewalks leading to the Mt. Baker Light Rail Station and bicycle access would require improvements to adequately serve large volumes.

The third criteria is whether the site is within 15-minute walking distance of a substantial reservoir of parking opportunities. The site is not located in an area with substantial reservoirs of parking, and surface parking is prohibited adjacent to principal pedestrian streets in pedestrian-designated zones. The only parking areas are those belonging to and used by the commercial businesses along Rainier Avenue South.

The fourth criteria is to be located in an area where a spectator sports facility would be compatible both in use and in height/bulk/scale with neighboring uses. Indoor sports and recreation facilities are permitted in both the NC-3 and C2 zones, however the heights are limited to 65 feet. The Seattle Arena is proposed to be approximately 120 feet tall, a height that would be approximately twice the heights allowed in the immediately surrounding NC3 and C2 zoning, and approximately four times the heights allowed in the SF5000 and LR3 zones. The City Council is currently considering a proposal to increase the height limit on the Lowe's site and adjacent some properties along Martin Luther King Jr. Way South to 120 feet. If that were to occur the proposed height of the arena would be compatible.

The height/bulk/scale of the Arena was deemed incompatible with existing zoning heights and proximity to nearby residential uses.

E. ALTERNATIVES TO BE EVALUATED IN THE ENVIRONMENTAL IMPACT STATEMENT

The EIS will include an evaluation of the following alternatives:

- **Alternative 1 – No Action Alternative**
- **Alternative 2 – Proposed Action – Stadium District 20,000-Seat Arena**: state-of-the-art 20,000-seat spectator sports arena to be located at 1700 – 1st Avenue S.
- **Alternative 3 – Stadium District 18,000-Seat Arena**: state-of-the-art 18,000-seat spectator sports arena to be located at 1700 – 1st Avenue S.

- **Alternative 4 – KeyArena 20,000-Seat Arena**: demolish the KeyArena at Seattle Center and replace it with a state-of-the-art 20,000-seat spectator sports arena
- **Alternative 5 – Memorial Stadium 20,000-Seat Arena**: demolish the Seattle School District's Memorial Stadium and replace it with a state-of-the-art 20,000-seat spectator sports arena

Appendix B
Geotechnical Report

Geotechnical Subsurface Conditions

In 2013, Hart Crowser collected geotechnical information for the site as part of site design work. The following is a summary of their findings and interpretation of the subsurface conditions for the proposed Stadium District site.

Interpretation of Subsurface Conditions

Hart Crowser's interpretation of the subsurface conditions is based on materials encountered in their explorations, laboratory testing of soil samples, and field observations. Hart Crowser advanced borings HC-1 and HC-2 to depths of 156.5 and 155.0 feet, respectively. They installed VWPs at depths of 20 and 70 feet in HC-1 and a depth of 20 feet in HC-2. They also advanced two CPTs; HCPT-1 and HCPT-2, to depths of 117.13 and 135.01 feet, respectively.

Hart Crowser also collected and reviewed historical borings in the vicinity of the project from the Washington Department of Natural Resources Subsurface Geology Information System (WADNR 2013). The locations of the explorations are provided on "Site and Exploration Figure 2". Details of the conditions observed at the exploration locations are shown on the boring logs included as Figure A-2, pages 1-4 and should be referred to for specific information. Results of the laboratory tests for this study are presented following the boring logs.

Regional Subsurface Conditions

The Seattle Arena site is located on the filled-in tidelands of Elliot Bay (Figure 1). The fill includes soil from the Seattle regrade projects and may include wood and sawdust debris from the numerous timber and sawing operations that occupied the former tidelands. The tideland soils include interbedded layers of coarse-grained alluvial and fine-grained estuarine deposits. The tideland deposits are typically underlain by beach and/or glacial outwash and glacial till deposits. Locally, the coarse-grained glacial deposits are underlain by fine-grain grain glacio-marine or glacio-lacustrine deposits.

Figure 2 is a view from the tideflats toward Beacon Hill and First Hill circa 1904.

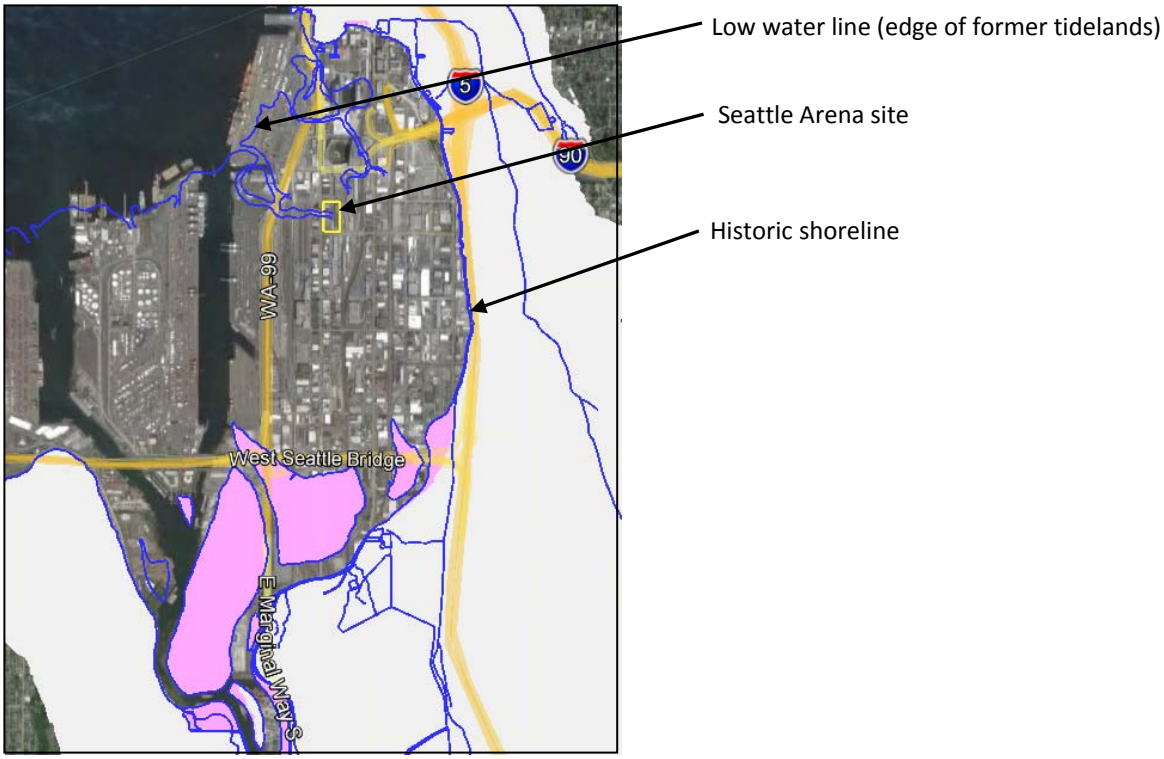


Figure M. Historic shoreline of Elliot Bay and Seattle Arena Site .



Figure H. Beacon Hill and First Hill from tideflats, Seattle, Ca. 1904 (exact location unknown)

Local Soil Conditions

Explorations encountered four general soil units presented starting at the ground surface:

Unit 1. Soil Unit 1 is Fill and typically consists of very loose to medium dense, sand, silt and gravel. Wood debris and abandoned timber piles are common in this unit.

Unit 2. Soil Unit 2 is generally characterized as interbedded alluvial and estuarine deposits. Alluvial dep osits typically consist of very loose to medium dense sand to silty sand. Estuarine deposits typically cons ist of very soft to stiff silt to very sandy silt but may locally include lean to fat clay.

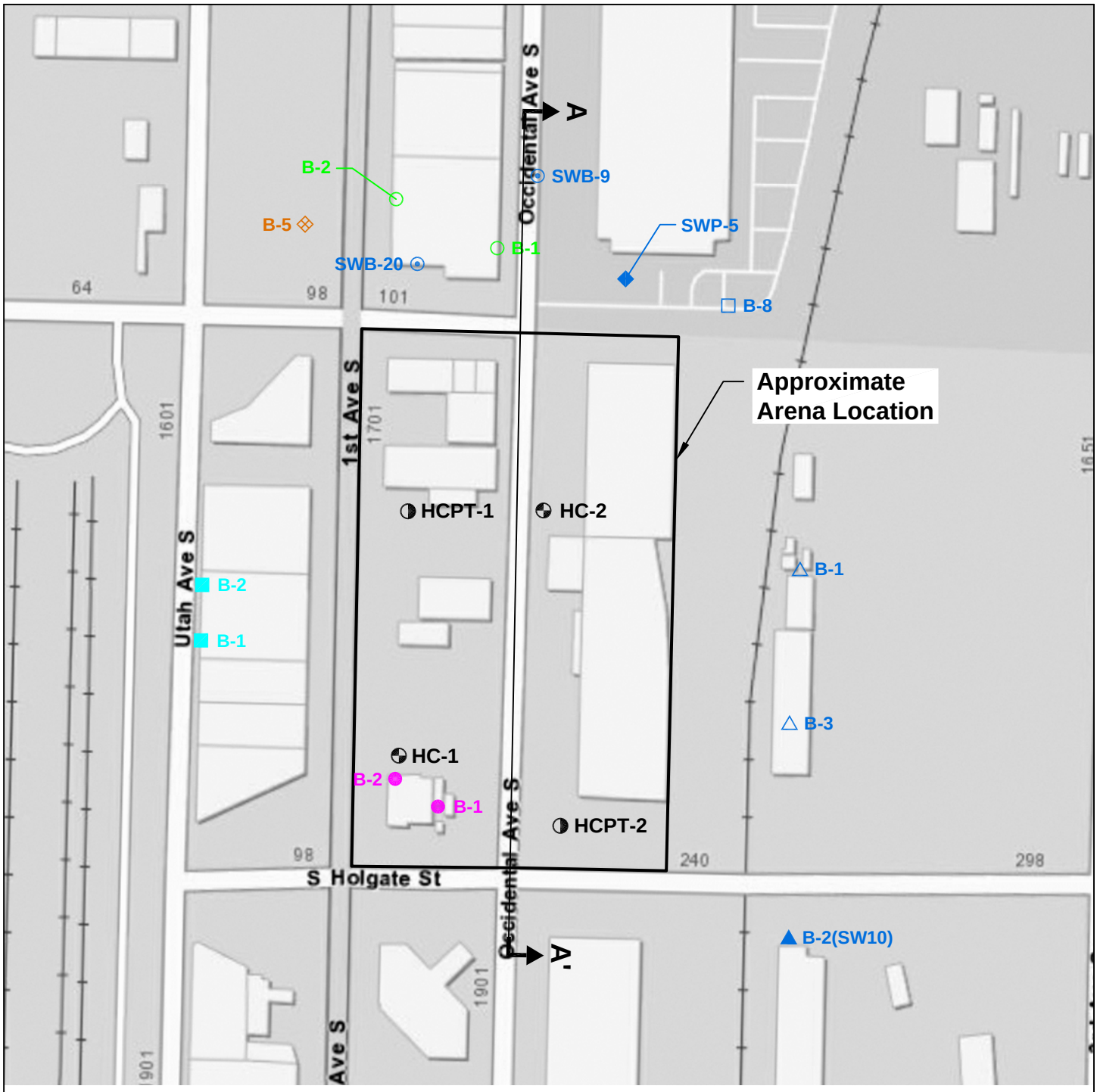
Unit 3. Soil unit 3 typically consists of dense to very dense sand and gravel and may include cobbles and boulders. The expected depth to this unit is about 100 to 140 feet below existing ground surface based on the available information.

Unit 4. Soil unit 4 typically consists of glacially overconsolidated, hard clay and silt. This unit has a much lower permeability than the overlaying granular soils. This unit was encountered in borings HC-1, HC-2, and SWB-9; it is not certain that this unit is continuous across the Arena site or how much the depth to this unit varies across the site.

Local Groundwater Conditions

Hart Crowser installed VWPs in HC-1 and HC-2 and measured the groundwater levels on January 17 and 22, 2013 at about 5 to 8 feet below current ground surface.

For design, Hart Crowser recommends using a groundwater table of elevation -15 feet, or 5 feet below the current ground surface.



Exploration Location and Number

Exploration by Hart Crowser

HC-1 Boring
HCPT-1 Cone Penetrometer Test

Previous Exploration by Others

B-2 Boring (SW, 2010)
B-5 Boring (AESI, 2009)
B-1 Boring (GC, 1999)
B-1 Boring (SW, 1997)
SWB-9 Boring (SW, 1996)
B-1 Boring (EC, 1995)
B-8 Boring (SW, 1990)
B-1 Boring (RL, 1980)
SWP-5 Cone Penetrometer Test (SW, 1996)

0 200 400
Scale in Feet

N

Source: **Base map prepared from ArcGIS Online, 2013.**

Seattle Arena
Seattle, Washington

Site and Exploration Plan

17928-00 2/13

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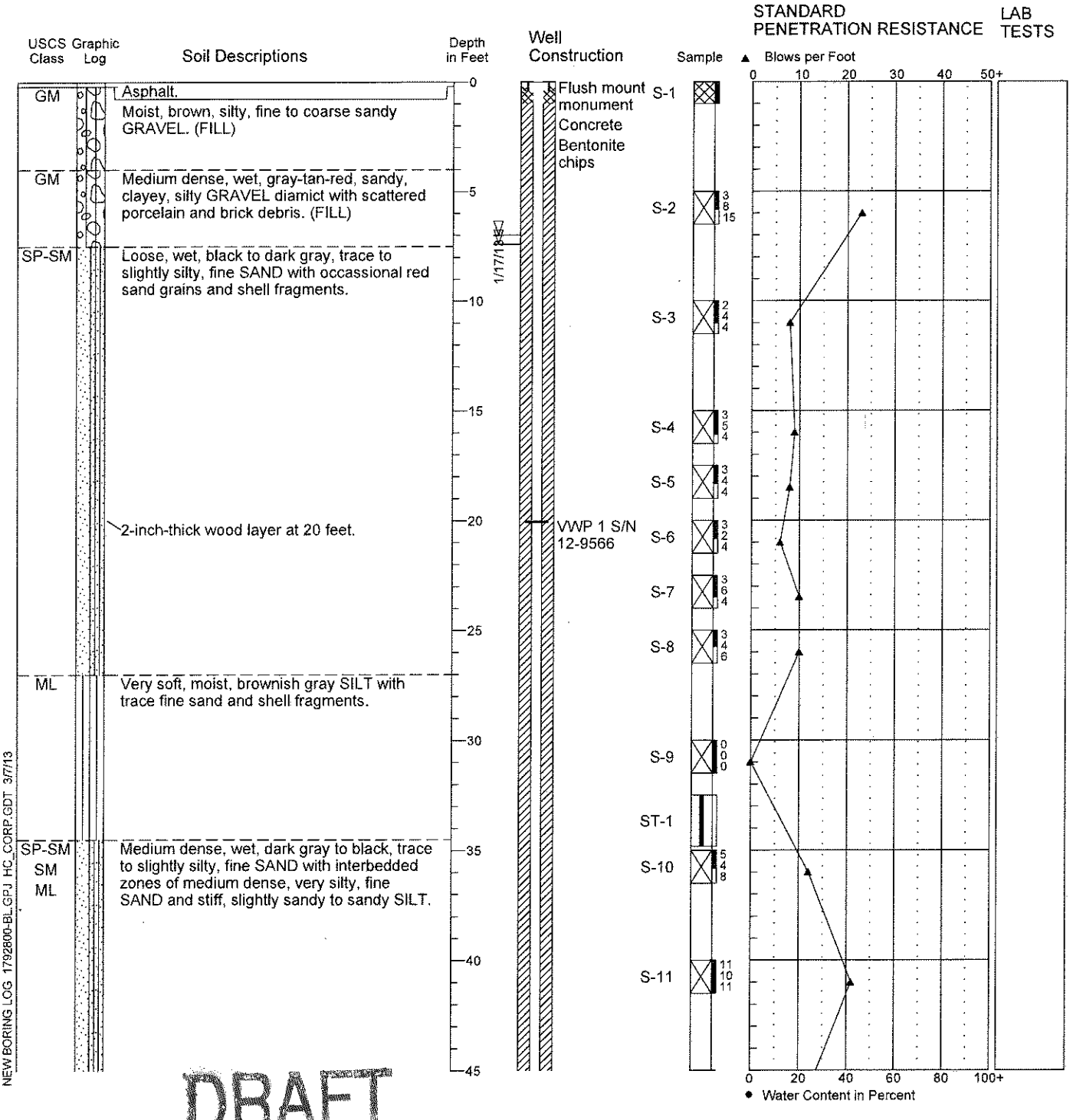
Figure
2

EAL 02/6/13 1792800-002.dwg

Piezometer/Exploration HC-1

Location: 47.586591, -122.333893
Approximate Ground Surface Elevation: 20 Feet
Horizontal Datum: WGS 84
Vertical Datum: NAVD 88

Drill Equipment: Mud Rotary
Hammer Type: SPT w/140 lb. Autohammer
Hole Diameter: 5 inches
Logged By: W. McDonald Reviewed By: B. Cook



DRAFT

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

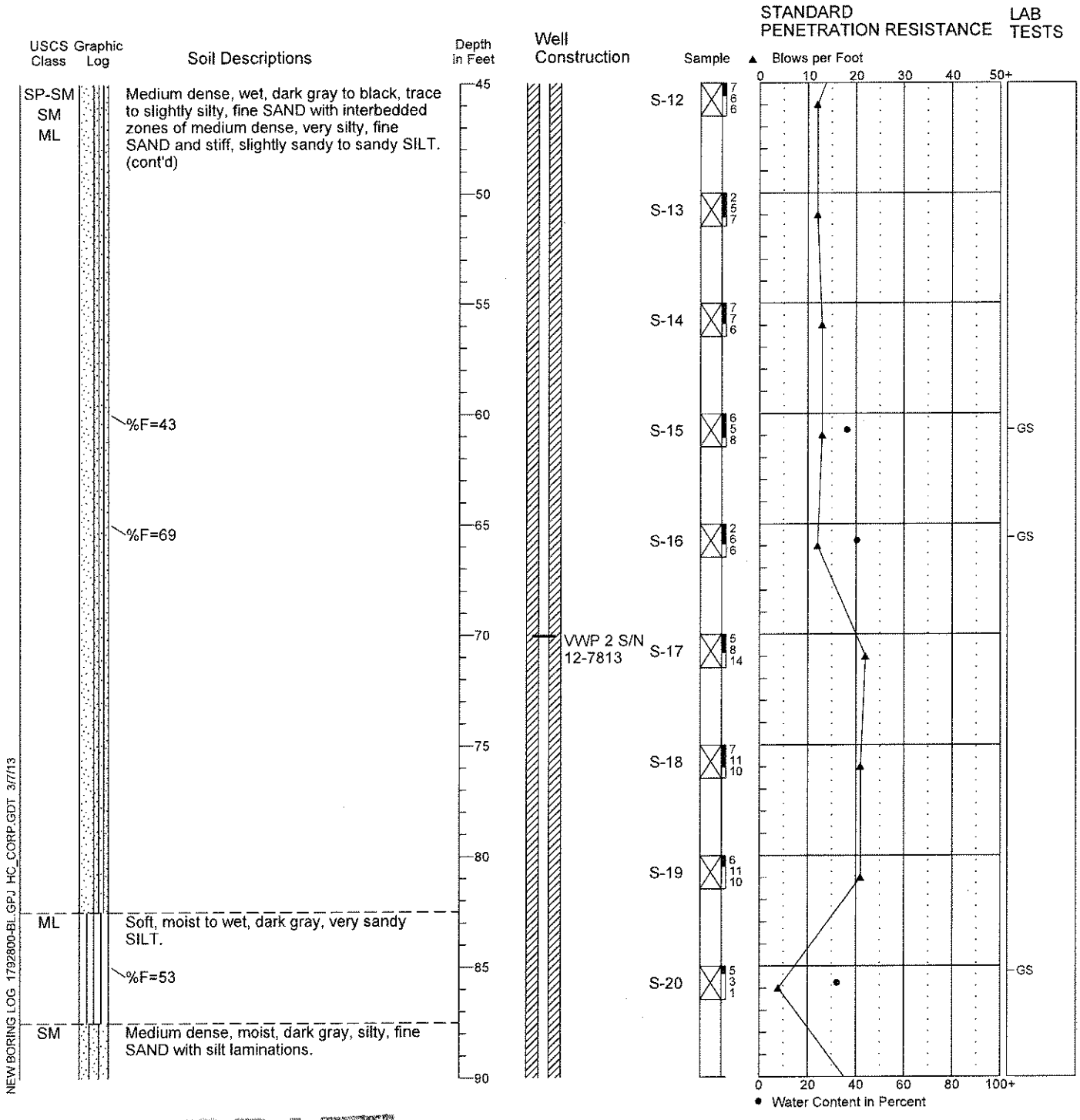
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17928-00 1/13
Figure A-2 1/4

Piezometer/Exploration HC-1

Location: 47.586591, -122.333893
Approximate Ground Surface Elevation: 20 Feet
Horizontal Datum: WGS 84
Vertical Datum: NAVD 88

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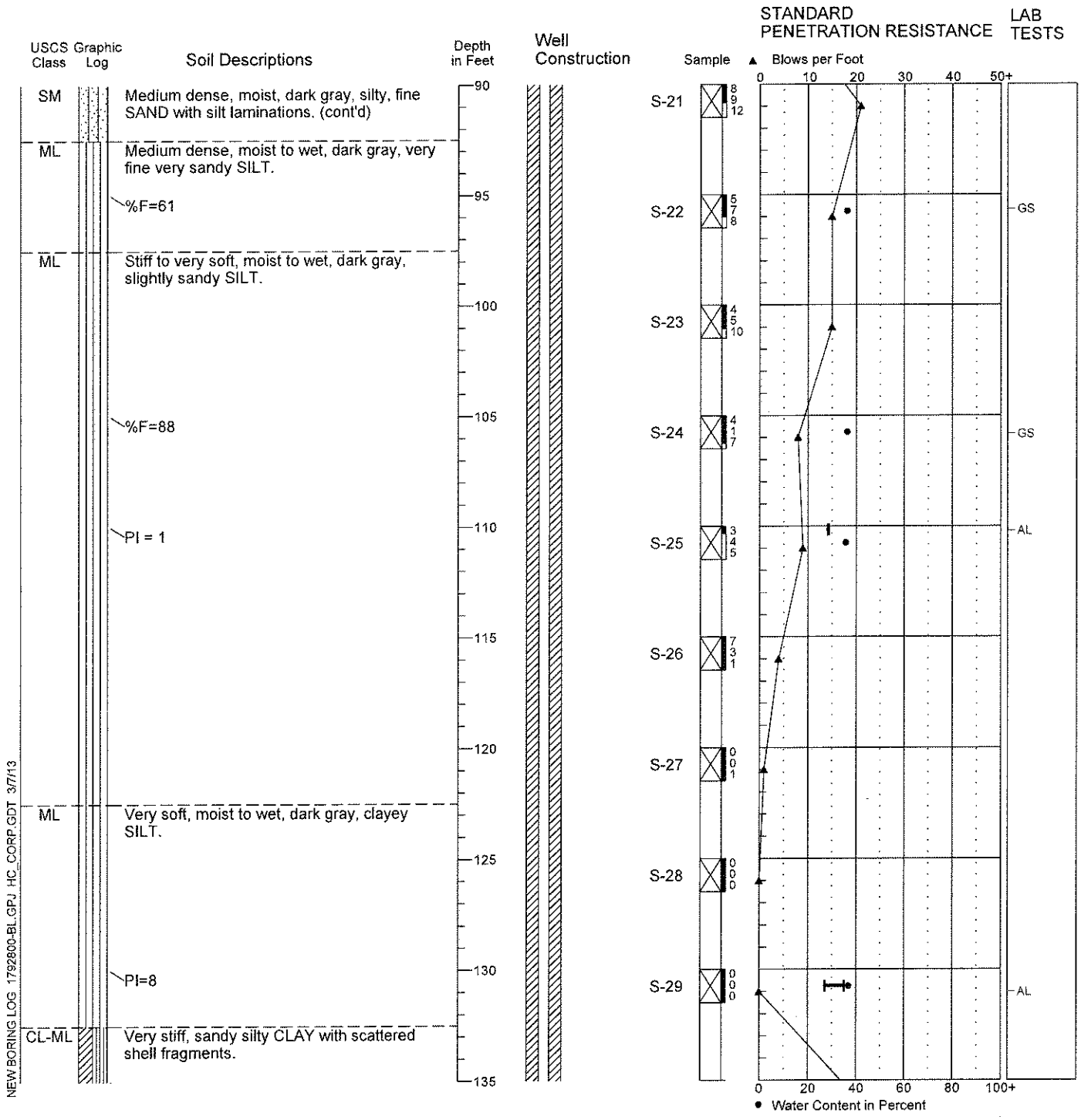
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17928-00 *1/13*
Figure A-2 *2/4*

Piezometer/Exploration HC-1

Location: 47.586591, -122.333893
Approximate Ground Surface Elevation: 20 Feet
Horizontal Datum: WGS 84
Vertical Datum: NAVD 88

Drill Equipment: Mud Rotary
Hammer Type: SPT w/140 lb. Autohammer
Hole Diameter: 5 inches
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NEW BORING LOG 1792800-BL.GPJ HC_CORP.GDT 3/7/13

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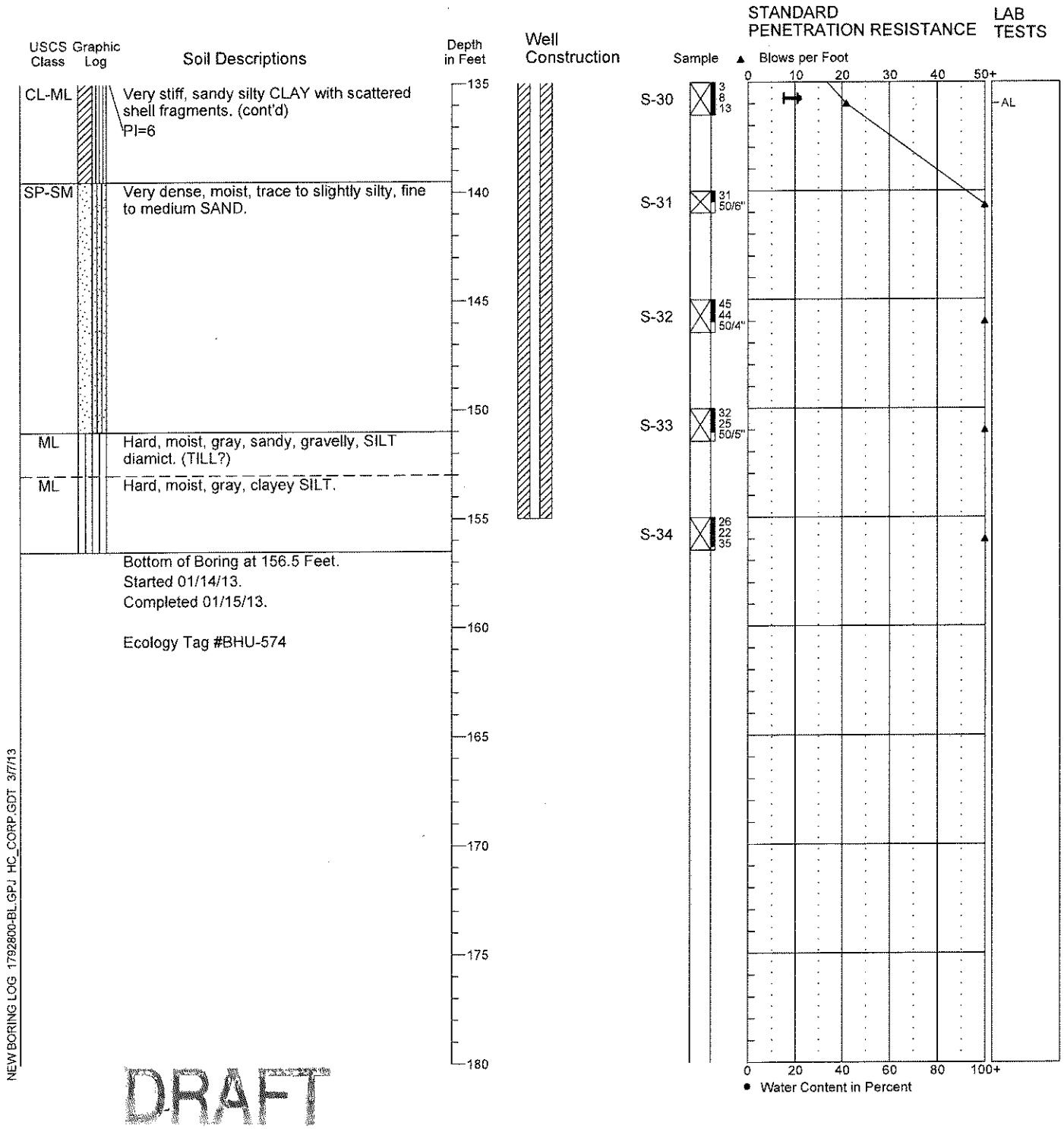
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17928-00 *1/13*
Figure A-2 *3/4*

Piezometer/Exploration HC-1

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NEW BORING LOG 1792800-BL.GPJ HC_CORP.GDT 3/7/13

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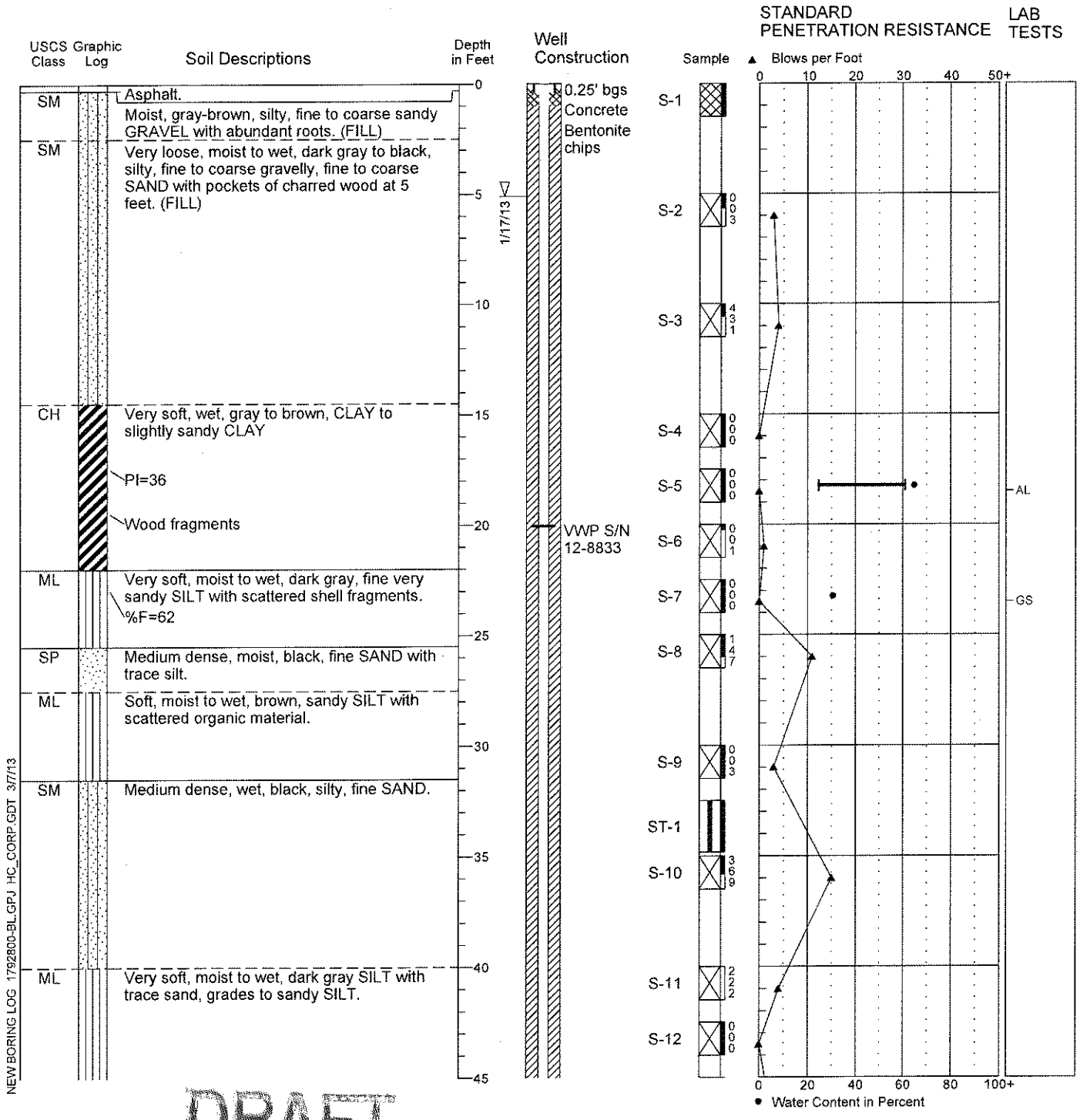
HARTCROWSER

17928-00 *1/13*
Figure A-2 *4/4*

Piezometer/Exploration HC-2

Location: 47.587526, -122. 333123
Approximate Ground Surface Elevation: 20 Feet
Horizontal Datum: WGS 84
Vertical Datum: NAVD 88

Drill Equipment: Mud Rotary
Hammer Type: SPT w/140 lb. Autohammer
Hole Diameter: 6 inches
Logged By: W. McDonald Reviewed By: B. Cook



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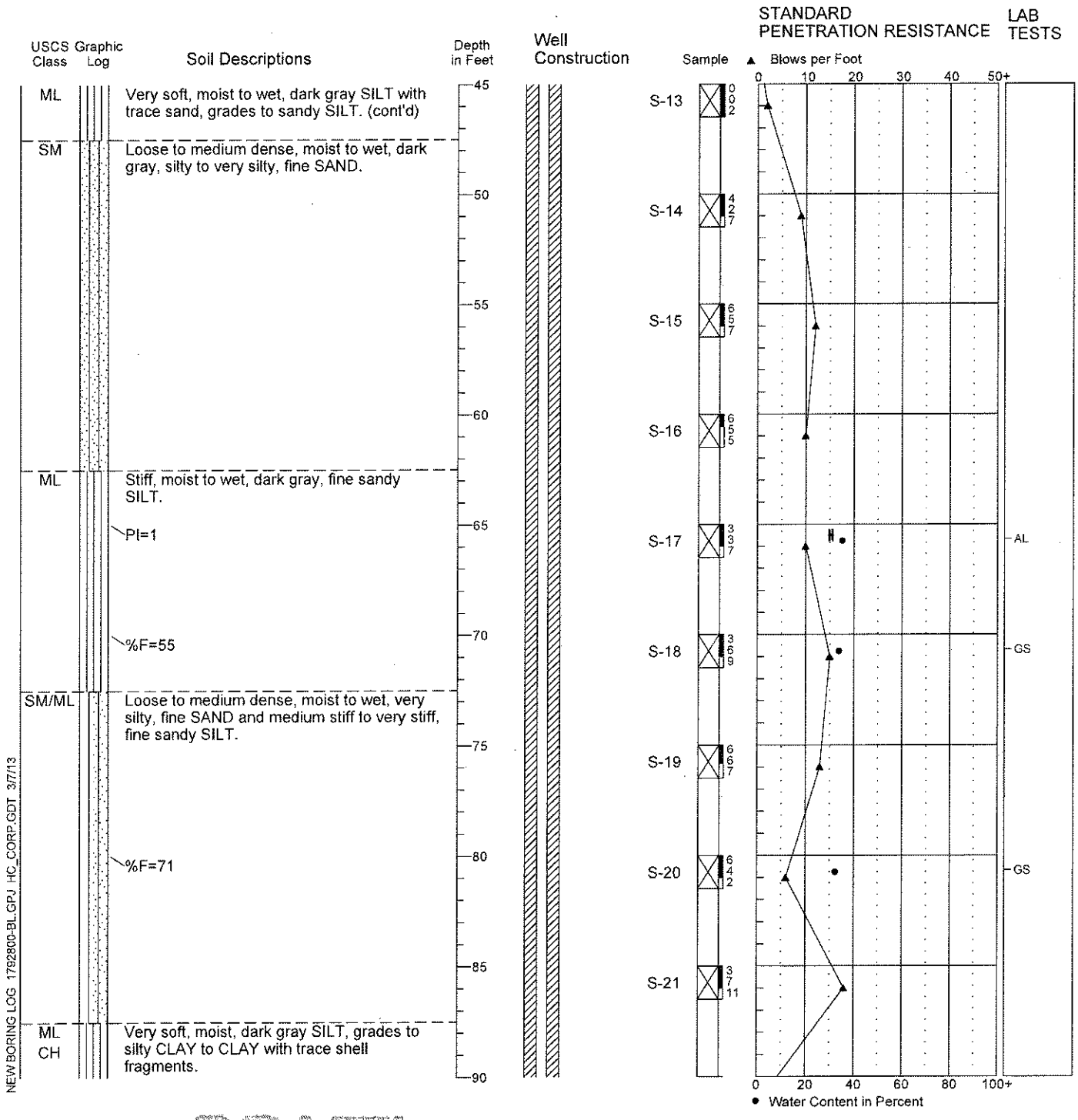
HARTCROWSER

17928-00 *1/13*
Figure A-3 *1/4*

Piezometer/Exploration HC-2

Location: 47.587526, -122. 333123
Approximate Ground Surface Elevation: 20 Feet
Horizontal Datum: WGS 84
Vertical Datum: NAVD 88

Drill Equipment: Mud Rotary
Hammer Type: SPT w/140 lb. Autohammer
Hole Diameter: 6 inches
Logged By: W. McDonald Reviewed By: B. Cook



NEW BORING LOG 1792800-BL.GPJ HC_CORP.GDT 3/7/13

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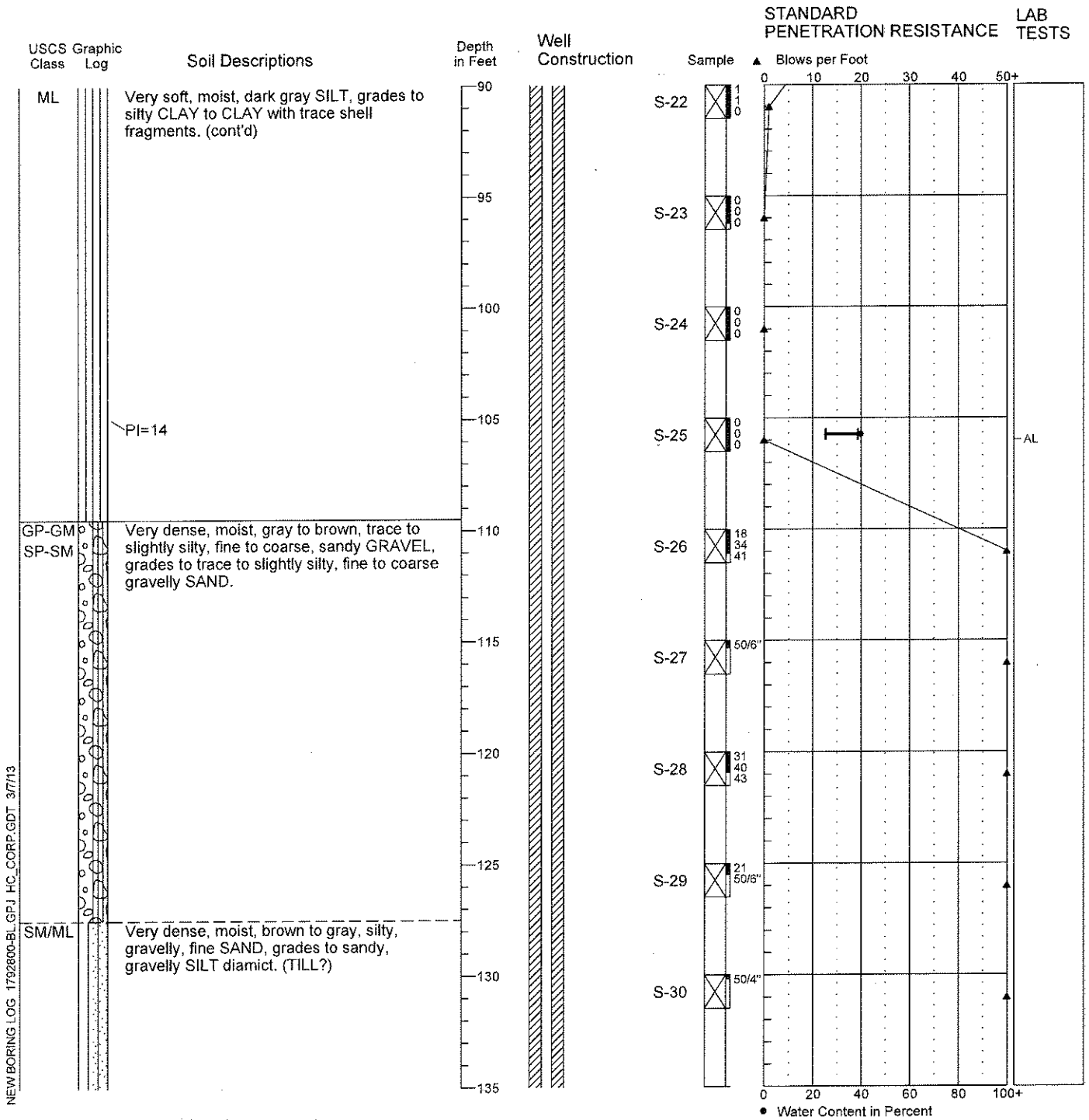
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Piezometer/Exploration HC-2

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Approximate Ground Surface Elevation: 20 Feet
Horizontal Datum: WGS 84
Vertical Datum: NAVD 88

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Hammer Type: SPT w/140 lb. Autohammer
Hole Diameter: 6 inches
Logged By: W. McDonald Reviewed By: B. Cook



NEW BORING LOG 1792800-BL.GPJ HC_CORP.GDT 3/7/13

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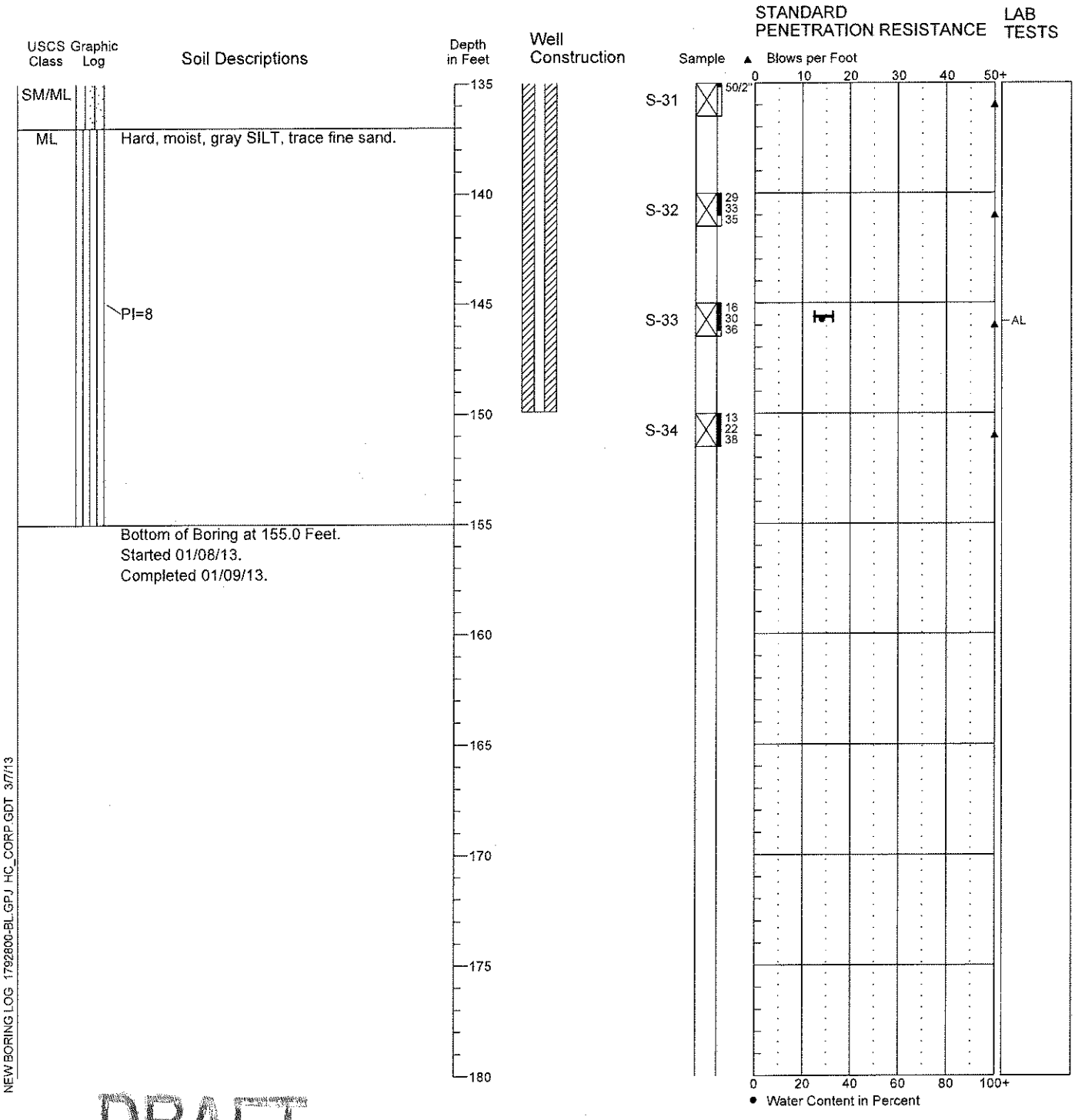
HARTCROWSER

17928-00 *1/13*
Figure A-3 *3/4*

Piezometer/Exploration HC-2

Location: 47.587526, -122. 333123
Approximate Ground Surface Elevation: 20 Feet
Horizontal Datum: WGS 84
Vertical Datum: NAVD 88

Drill Equipment: Mud Rotary
Hammer Type: SPT w/140 lb. Autohammer
Hole Diameter: 6 inches
Logged By: W. McDonald Reviewed By: B. Cook



NEW BORING LOG 1792800-BL.GPJ HC_CORP.GDT 3/7/13

DRAFT

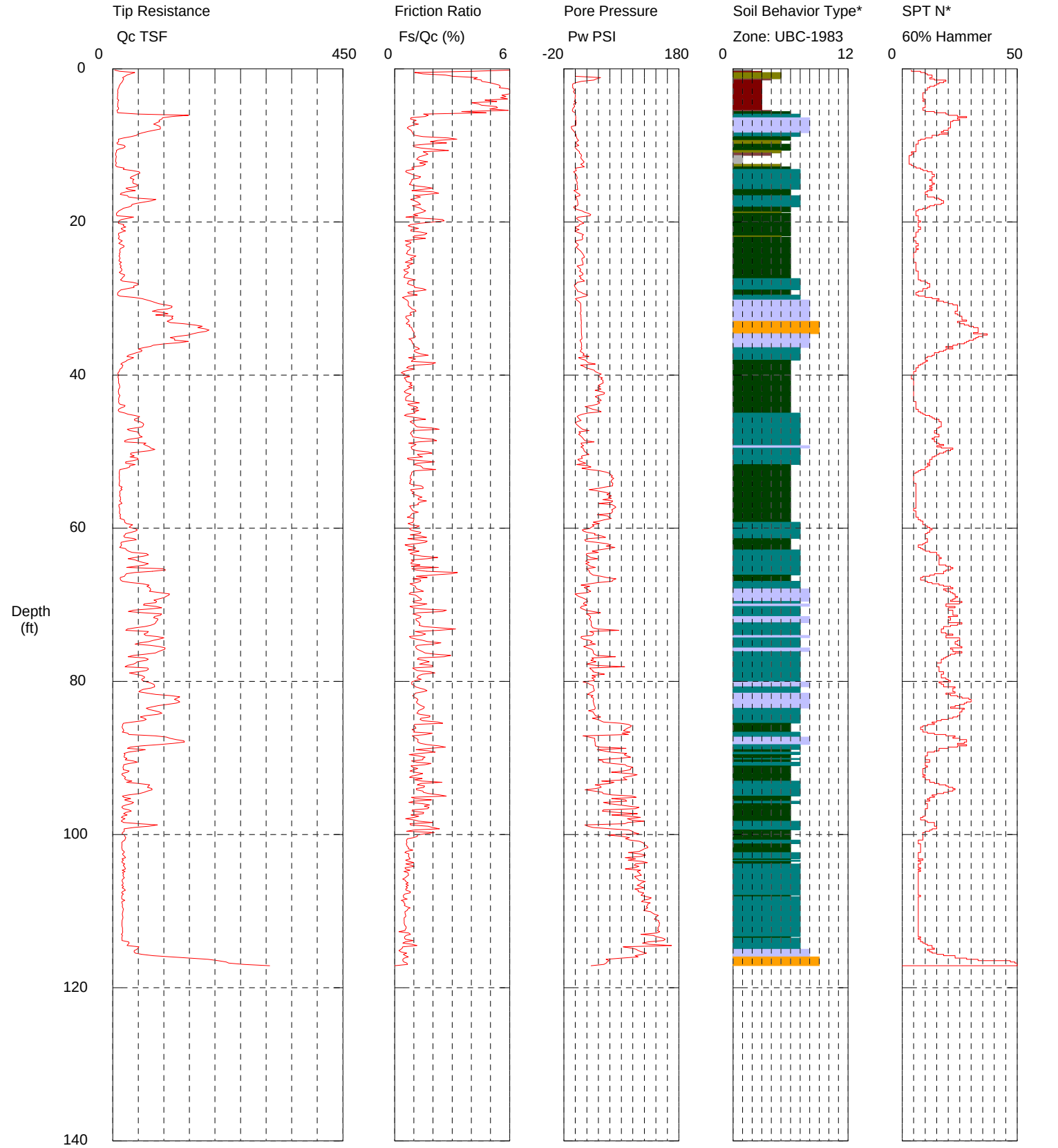
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HARTCROWSER

Hart Crowser

Operator: Gerdes
Sounding: HCPT-1b
Cone Used: DDG1238

CPT Date/Time: 1/24/2013 9:11:53 AM
Location: Seattle
Job Number:



Maximum Depth = 117.13 feet

Depth Increment = 0.164 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

InSitu Engineering

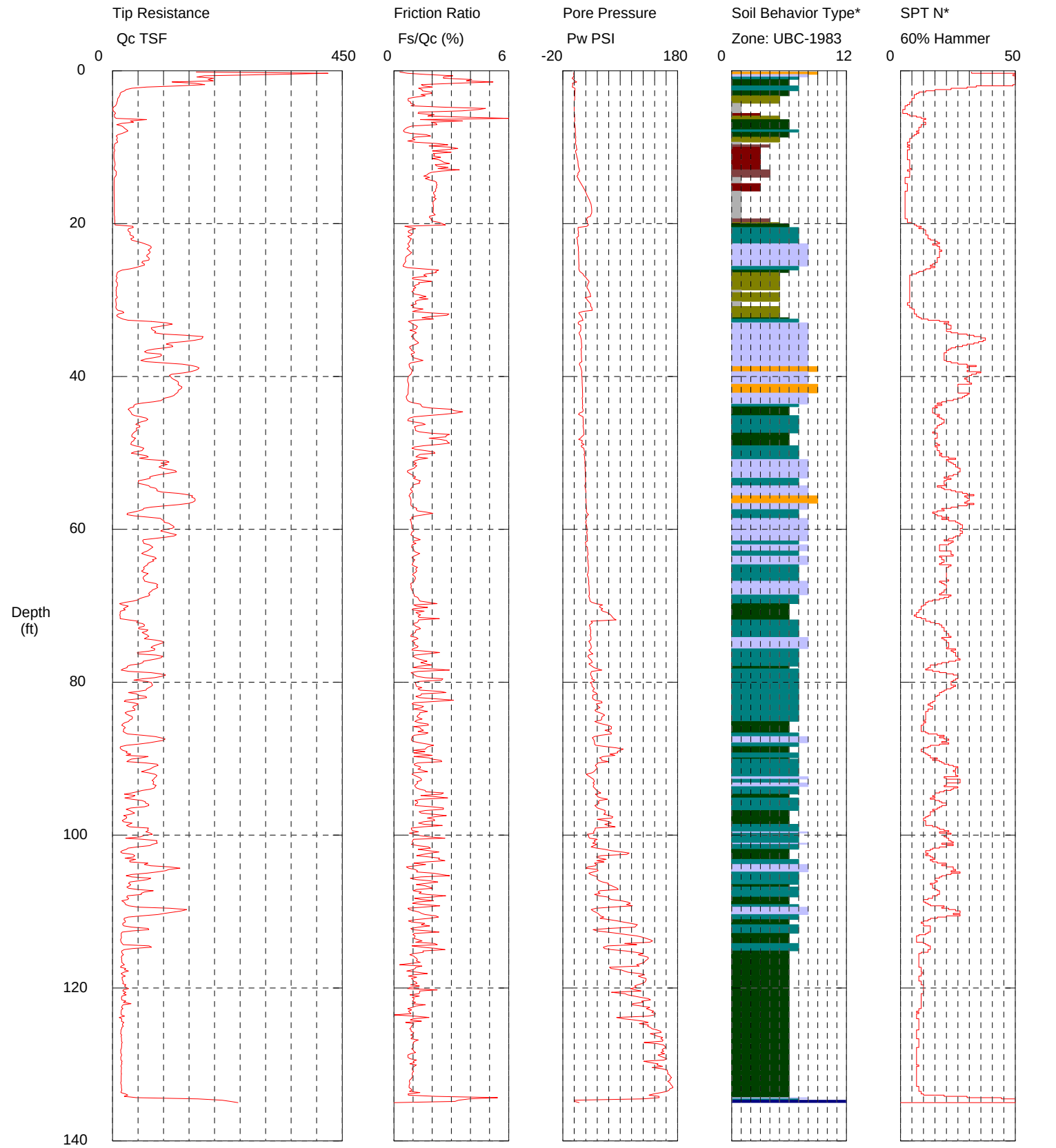
Pre-drilled to 21 feet and backfilled with angular very loose sand.

*Soil behavior type and SPT based on data from UBC-1983

Hart Crowser

Operator: Gerdes
Sounding: HCPT-2b
Cone Used: DDG1238

CPT Date/Time: 1/24/2013 11:15:56 AM
Location: Seattle
Job Number:



Maximum Depth = 135.01 feet

Depth Increment = 0.164 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

InSitu Engineering

Pre-drilled to 21 feet and backfilled with angular very loose sand.

*Soil behavior type and SPT based on data from UBC-1983

Appendix C

Greenhouse Gas Emission Worksheet

King County Department of Development and Environmental Services
SEPA GHG Emissions Worksheet
Version 1.7 12/26/07 (Introduction Revised March 2011)

Introduction

The Washington State Environmental Policy Act (SEPA) requires environmental review of development proposals that may have a significant adverse impact on the environment. If a proposed development is subject to SEPA, the project proponent is required to complete the SEPA Checklist. The Checklist includes questions relating to the development's air emissions. The emissions that have traditionally been considered cover smoke, dust, and industrial and automobile emissions. With our understanding of the climate change impacts of greenhouse gas (GHG) emissions, King County requires the applicant to also estimate these emissions.

Emissions created by Development

GHG emissions associated with development come from multiple sources:

- The extraction, processing, transportation, construction and disposal of materials and landscape disturbance (Embodied Emissions)
- Energy demands created by the development after it is completed (Energy Emissions)
- Transportation demands created by the development after it is completed (Transportation Emissions)

GHG Emissions Worksheet

King County has developed a GHG Emissions Worksheet that can assist applicants in answering the SEPA Checklist question relating to GHG emissions.

The SEPA GHG Emissions worksheet estimates all GHG emissions that will be created over the life span of a project. This includes emissions associated with obtaining construction materials, fuel used during construction, energy consumed during a buildings operation, and transportation by building occupants.

The SEPA GHG Emissions worksheet should not be used to estimate GHG emissions from large, complex projects, such as urban planned developments, major infrastructure projects, or projects that require an Environmental Impact Statement (EIS). For more sophisticated tools that may help with assessing the GHGs of these actions, see the Washington State Department of Ecology's (Ecology) SEPA and climate change website: http://www.ecy.wa.gov/climatechange/sepa.htm

Using the Worksheet

1. Descriptions of the different residential and commercial building types can be found on the second tabbed worksheet ("Definition of Building Types"). If a development proposal consists of multiple projects, e.g. both single family and multi-family residential structures or a commercial development that consists of more than on type of commercial activity, the appropriate information should be estimated for each type of building or activity.
2. For paving, estimate the total amount of paving (in thousands of square feet) of the project.
3. The Worksheet will calculate the amount of GHG emissions associated with the project and display the amount in the "Total Emissions" column on the worksheet. The applicant should use this information when completing the SEPA checklist.

4. The last three worksheets in the Excel file provide the background information that is used to calculate the total GHG emissions.
5. The methodology of creating the estimates is transparent; if there is reason to believe that a better estimate can be obtained by changing specific values, this can and should be done. Changes to the values should be documented with an explanation of why and the sources relied upon.
6. Print out the "Total Emissions" worksheet and attach it to the SEPA checklist. If the applicant has made changes to the calculations or the values, the documentation supporting those changes should also be attached to the SEPA checklist.

Disclaimer – March 2011

This worksheet has not been updated 2007. Since then, new resources have become available that more accurately estimate the greenhouse gas emissions impacts of projects. This worksheet can still be used to provide a coarse estimate of a typical project's climate change impact, but should be used with caution. See Ecology's SEPA and climate change website for additional resources:
http://www.ecy.wa.gov/climatechange/sepa.htm

Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO2e)			Lifespan Emissions (MTCO2e)
			Embodied	Energy	Transportation	
Single-Family Home.....	0		98	672	792	0
Multi-Family Unit in Large Building	0		33	357	766	0
Multi-Family Unit in Small Building	0		54	681	766	0
Mobile Home.....	0		41	475	709	0
Education		0.0	39	646	361	0
Food Sales		0.0	39	1,541	282	0
Food Service		0.0	39	1,994	561	0
Health Care Inpatient		0.0	39	1,938	582	0
Health Care Outpatient		0.0	39	737	571	0
Lodging		0.0	39	777	117	0
Retail (Other Than Mall).....		0.0	39	577	247	0
Office		0.0	39	723	588	0
Public Assembly		750.0	39	733	150	691481
Public Order and Safety		0.0	39	899	374	0
Religious Worship		0.0	39	339	129	0
Service		0.0	39	599	266	0
Warehouse and Storage		0.0	39	352	181	0
Other		0.0	39	1,278	257	0
Vacant		0.0	39	162	47	0

Section II: Pavement.....

Pavement.....		0.00				0

Total Project Emissions: 691,481

Definition of Building Types

Type (Residential) or Principal Activity (Commercial)	Description
Single-Family Home.....	Unless otherwise specified, this includes both attached and detached buildings
Multi-Family Unit in Large Building	Apartments in buildings with more than 5 units
Multi-Family Unit in Small Building	Apartments in building with 2-4 units
Mobile Home.....	
Education	Buildings used for academic or technical classroom instruction, such as elementary, middle, or high schools, and classroom buildings on college or university campuses. Buildings on education campuses for which the main use is not classroom are included in the category relating to their use. For example, administration buildings are part of "Office," dormitories are "Lodging," and libraries are "Public Assembly."
Food Sales	Buildings used for retail or wholesale of food.
Food Service	Buildings used for preparation and sale of food and beverages for consumption.
Health Care Inpatient	Buildings used as diagnostic and treatment facilities for inpatient care.
Health Care Outpatient	Buildings used as diagnostic and treatment facilities for outpatient care. Doctor's or dentist's office are included here if they use any type of diagnostic medical equipment (if they do not, they are categorized as an office building).
Lodging	Buildings used to offer multiple accommodations for short-term or long-term residents, including skilled nursing and other residential care buildings.
Retail (Other Than Mall).....	Buildings used for the sale and display of goods other than food.
Office	Buildings used for general office space, professional office, or administrative offices. Doctor's or dentist's office are included here if they do not use any type of diagnostic medical equipment (if they do, they are categorized as an outpatient health care building).
Public Assembly	Buildings in which people gather for social or recreational activities, whether in private or non-private meeting halls.
Public Order and Safety	Buildings used for the preservation of law and order or public safety.
Religious Worship	Buildings in which people gather for religious activities, (such as chapels, churches, mosques, synagogues, and temples).
Service	Buildings in which some type of service is provided, other than food service or retail sales of goods
Warehouse and Storage	Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).
Other	Buildings that are industrial or agricultural with some retail space; buildings having several different commercial activities that, together, comprise 50 percent or more of the floorspace, but whose largest single activity is agricultural, industrial/ manufacturing, or residential; and all other miscellaneous buildings that do not fit into any other category.
Vacant	Buildings in which more floorspace was vacant than was used for any single commercial activity at the time of interview. Therefore, a vacant building may have some occupied floorspace.

Sources: .....

Residential — 2001 Residential Energy Consumption Survey
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

Commercial — Commercial Buildings Energy Consumption Survey (CBECS),
Description of CBECS Building Types
http://www.eia.doe.gov/emeu/cbecs/pba99/bldgtypes.html

Embodied Emissions Worksheet

Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# thousand sq feet/ unit or building	Life span related embodied GHG missions (MTCO2e/ unit)	Life span related embodied GHG missions (MTCO2e/ thousand square feet) - See calculations in table below
Single-Family Home	2.53	98	39
Multi-Family Unit in Large Building	0.85	33	39
Multi-Family Unit in Small Building	1.39	54	39
Mobile Home	1.06	41	39
Education	25.6	991	39
Food Sales	5.6	217	39
Food Service	5.6	217	39
Health Care Inpatient	241.4	9,346	39
Health Care Outpatient	10.4	403	39
Lodging	35.8	1,386	39
Retail (Other Than Mall)	9.7	376	39
Office	14.8	573	39
Public Assembly	14.2	550	39
Public Order and Safety	15.5	600	39
Religious Worship	10.1	391	39
Service	6.5	252	39
Warehouse and Storage	16.9	654	39
Other	21.9	848	39
Vacant	14.1	546	39

Section II: Pavement

All Types of Pavement			50

	Columns and Beams	Intermediate Floors	Exterior Walls	Windows	Interior Walls	Roofs		
Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building	5.3	7.8	19.1	51.2	5.7	21.3		
Average Materials in a 2,272-square foot single family home	0.0	2269.0	3206.0	285.0	6050.0	3103.0	Total Embodied Emissions (MTCO2e)	Total Embodied Emissions (MTCO2e/ thousand sq feet)
MTCO2e	0.0	8.0	27.8	6.6	15.6	30.0	88.0	38.7

Sources

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Residential floorspace per unit
2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

Floorspace per building
EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building
Athena EcoCalculator
Athena Assembly Evaluation Tool v2.3- Vancouver Low Rise Building
Assembly Average GWP (kg) per square meter
http://www.athenasmi.ca/tools/ecoCalculator/index.html
Lbs per kg 2.20
Square feet per square meter 10.76

Average Materials in a 2,272-square foot single family home
Buildings Energy Data Book: 7.3 Typical/Average Household
Materials Used in the Construction of a 2,272-Square-Foot Single-Family Home, 2000
http://buildingsdatabook.eren.doe.gov/?id=view_book_table&TableID=2036&t=xls
See also: NAHB, 2004 Housing Facts, Figures and Trends, Feb. 2004, p. 7.

Average window size
Energy Information Administration/Housing Characteristics 1993
Appendix B, Quality of the Data. Pg. 5.
ftp://ftp.eia.doe.gov/pub/consumption/residential/rx93hcf.pdf

Pavement Emissions Factors
MTCO2e/thousand square feet of asphalt
or concrete pavement

50 (see below)

Embodied GHG Emissions……Worksheet Background Information

Buildings
Embodied GHG emissions are emissions that are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape disturbance (by both soil disturbance and changes in above ground biomass).

Estimating embodied GHG emissions is new field of analysis; the estimates are rapidly improving and becoming more inclusive of all elements of construction and development.

The estimate included in this worksheet is calculated using average values for the main construction materials that are used to create a typical family home. In 2004, the National Association of Home Builders calculated the average materials that are used in a typical 2,272 square foot single-family household. The quantity of materials used is then multiplied by the average GHG emissions associated with the life-cycle GHG emissions for each material.

This estimate is a rough and conservative estimate; the actual embodied emissions for a project are likely to be higher. For example, at this stage, due to a lack of comprehensive data, the estimate does not include important factors such as landscape disturbance or the emissions associated with the interior components of a building (such as furniture).

King County realizes that the calculations for embodied emissions in this worksheet are rough. For example, the emissions associated with building 1,000 square feet of a residential building will not be the same as 1,000 square feet of a commercial building. However, discussions with the construction community indicate that while there are significant differences between the different types of structures, this method of estimation is reasonable; it will be improved as more data become available.

Additionally, if more specific information about the project is known, King County recommends two online embodied emissions calculators that can be used to obtain a more tailored estimate for embodied emissions: www.buildcarbonneutral.org and www.athenasmi.ca/tools/ecoCalculator/.

Pavement
Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle. For specifics, see the worksheet.

Special Section: Estimating the Embodied Emissions for Pavement

Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle.

The results of the studies are presented in different units and measures; considerable effort was undertaken to be able to compare the results of the studies in a reasonable way. For more details about the below methodology, contact matt.kuharic@kingcounty.gov.

The four studies, Meil (2001), Park (2003), Stripple (2001) and Treolar (2001) produced total GHG emissions of 4-34 MTCO2e per thousand square feet of finished paving (for similar asphalt and concrete based pavements). This estimate does not including downstream maintenance and repair of the highway. The average (for all concrete and asphalt pavements in the studies, assuming each study gets one data point) is ~17 MTCO2e/thousand square feet.

Three of the studies attempted to thoroughly account for the emissions associated with long term maintenance (40 years) of the roads. Stripple (2001), Park et al. (2003) and Treolar (2001) report 17, 81, and 68 MTCO2e/thousand square feet, respectively, after accounting for maintenance of the roads.

Based on the above discussion, King County makes the conservative estimate that 50 MTCO2e/thousand square feet of pavement (over the development's life cycle) will be used as the embodied emission factor for pavement until better estimates can be obtained. This is roughly equivalent to 3,500 MTCO2e per lane mile of road (assuming the lane is 13 feet wide).

It is important to note that these studies estimate the embodied emissions for roads. Paving that does not need to stand up to the rigors of heavy use (such as parking lots or driveways) would likely use less materials and hence have lower embodied emissions.

Sources:

Meil, J. A Life Cycle Perspective on Concrete and Asphalt Roadways: Embodied Primary Energy and Global Warming Potential. 2006. Available: http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/$FILE/ATTK0WE3/athena%20report%20Feb.%202%202007.pdf

Park, K, Hwang, Y., Seo, S., M.ASCE, and Seo, H. , "Quantitative Assessment of Environmental Impacts on Life Cycle of Highways," Journal of Construction Engineering and Management , Vol 129, January/February 2003, pp 25-31, (DOI: 10.1061/(ASCE)0733-9364(2003)129:1(25)).

Stripple, H. Life Cycle Assessment of Road. A Pilot Study for Inventory Analysis. Second Revised Edition. IVL Swedish Environmental Research Institute Ltd. 2001. Available: http://www.ivl.se/rapporter/pdf/B1210E.pdf

Treloar, G., Love, P.E.D., and Crawford, R.H. Hybrid Life-Cycle Inventory for Road Construction and Use. Journal of Construction Engineering and Management. P. 43-49. January/February 2004.

Energy Emissions Worksheet

Type (Residential) or Principal Activity (Commercial)	Energy consumption per building per year (million Btu)	Carbon Coefficient for Buildings	MTCO2e per building per year	Floorspace per Building (thousand square feet)	MTCE per thousand square feet per year	MTCO2e per thousand square feet per year	Average Building Life Span	Lifespan Energy Related MTCO2e emissions per unit	Lifespan Energy Related MTCO2e emissions per thousand square feet
Single-Family Home	107.3	0.108	11.61	2.53	4.6	16.8	57.9	672	266
Multi-Family Unit in Large Building	41.0	0.108	4.44	0.85	5.2	19.2	80.5	357	422
Multi-Family Unit in Small Building	78.1	0.108	8.45	1.39	6.1	22.2	80.5	681	489
Mobile Home	75.9	0.108	8.21	1.06	7.7	28.4	57.9	475	448
Education	2,125.0	0.124	264.2	25.6	10.3	37.8	62.5	16,526	646
Food Sales	1,110.0	0.124	138.0	5.6	24.6	90.4	62.5	8,632	1,541
Food Service	1,436.0	0.124	178.5	5.6	31.9	116.9	62.5	11,168	1,994
Health Care Inpatient	60,152.0	0.124	7,479.1	241.4	31.0	113.6	62.5	467,794	1,938
Health Care Outpatient	985.0	0.124	122.5	10.4	11.8	43.2	62.5	7,660	737
Lodging	3,578.0	0.124	444.9	35.8	12.4	45.6	62.5	27,826	777
Retail (Other Than Mall)	720.0	0.124	89.5	9.7	9.2	33.8	62.5	5,599	577
Office	1,376.0	0.124	171.1	14.8	11.6	42.4	62.5	10,701	723
Public Assembly	1,338.0	0.124	166.4	14.2	11.7	43.0	62.5	10,405	733
Public Order and Safety	1,791.0	0.124	222.7	15.5	14.4	52.7	62.5	13,928	899
Religious Worship	440.0	0.124	54.7	10.1	5.4	19.9	62.5	3,422	339
Service	501.0	0.124	62.3	6.5	9.6	35.1	62.5	3,896	599
Warehouse and Storage	764.0	0.124	95.0	16.9	5.6	20.6	62.5	5,942	352
Other	3,600.0	0.124	447.6	21.9	20.4	74.9	62.5	27,997	1,278
Vacant	294.0	0.124	36.6	14.1	2.6	9.5	62.5	2,286	162

Sources

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Energy consumption for residential buildings
- 2007 Buildings Energy Data Book: 6.1 Quad Definitions and Comparisons (National Average, 2001)
- Table 6.1.4: Average Annual Carbon Dioxide Emissions for Various Functions
- http://buildingsdatabook.eren.doe.gov/
- Data also at: http://www.eia.doe.gov/emeu/recs/recs2001_ce/ce1-4c_housingunits2001.html

Energy consumption for commercial buildings and Floorspace per building
- EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
- Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
- http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

Note: Data in plum color is found in both of the above sources (buildings energy data book and commercial buildings energy consumption survey).

Carbon Coefficient for Buildings
- Buildings Energy Data Book (National average, 2005)
- Table 3.1.7. 2005 Carbon Dioxide Emission Coefficients for Buildings (MMTCE per Quadrillion Btu)
- http://buildingsdatabook.eere.energy.gov/?id=view_book_table&TableID=2057
- Note: Carbon coefficient in the Energy Data book is in MTCE per Quadrillion Btu.
- To convert to MTCO2e per million Btu, this factor was divided by 1000 and multiplied by 44/12.

Residential floorspace per unit
- 2001 Residential Energy Consumption Survey (National Average, 2001)
- Square footage measurements and comparisons
- http://www.eia.doe.gov/emeu/recs/sqft-measure.html

average lief span of buildings,
estimated by replacement time method

	Single Family Homes	Multi-Family Units in Large and Small Buildings	All Residential Buildings
New Housing Construction, 2001	1,273,000	329,000	1,602,000
Existing Housing Stock, 2001	73,700,000	26,500,000	100,200,000
Replacement time:	57.9	80.5	62.5

(national average, 2001)

Note: Single family homes calculation is used for mobile homes as a best estimate life span.
Note: At this time, KC staff could find no reliable data for the average life span of commercial buildings.
Therefore, the average life span of residential buildings is being used until a better approximation can be ascertained.

Sources:

New Housing Construction, 2001
Quarterly Starts and Completions by Purpose and Design - US and Regions (Excel)
http://www.census.gov/const/quarterly_starts_completions_cust.xls
See also: http://www.census.gov/const/www/newresconstindex.html

Existing Housing Stock, 2001
Residential Energy Consumption Survey (RECS) 2001
Tables HC1:Housing Unit Characteristics, Million U.S. Households 2001
Table HC1-4a. Housing Unit Characteristics by Type of Housing Unit, Million U.S. Households, 2001
Million U.S. Households, 2001
http://www.eia.doe.gov/emeu/recs/recs2001/hc_pdf/housunits/hc1-4a_housingunits2001.pdf

Transportation Emissions Worksheet

Type (Residential) or Principal Activity (Commercial)	# people/ unit or building	# thousand sq feet/ unit or building	# people or employees/ thousand square feet	vehicle related GHG emissions (metric tonnes CO2e per person per year)	MTCO2e/ year/ unit	MTCO2e/ year/ thousand square feet	Average Building Life Span	Life span transportation related GHG emissions (MTCO2e/ per unit)	Life span transportation related GHG emissions (MTCO2e/ thousand sq feet)
Single-Family Home	2.8	2.53	1.1	4.9	13.7	5.4	57.9	792	313
Multi-Family Unit in Large Building	1.9	0.85	2.3	4.9	9.5	11.2	80.5	766	904
Multi-Family Unit in Small Building	1.9	1.39	1.4	4.9	9.5	6.8	80.5	766	550
Mobile Home	2.5	1.06	2.3	4.9	12.2	11.5	57.9	709	668
Education	30.0	25.6	1.2	4.9	147.8	5.8	62.5	9247	361
Food Sales	5.1	5.6	0.9	4.9	25.2	4.5	62.5	1579	282
Food Service	10.2	5.6	1.8	4.9	50.2	9.0	62.5	3141	561
Health Care Inpatient	455.5	241.4	1.9	4.9	2246.4	9.3	62.5	140506	582
Health Care Outpatient	19.3	10.4	1.9	4.9	95.0	9.1	62.5	5941	571
Lodging	13.6	35.8	0.4	4.9	67.1	1.9	62.5	4194	117
Retail (Other Than Mall)	7.8	9.7	0.8	4.9	38.3	3.9	62.5	2394	247
Office	28.2	14.8	1.9	4.9	139.0	9.4	62.5	8696	588
Public Assembly	6.9	14.2	0.5	4.9	34.2	2.4	62.5	2137	150
Public Order and Safety	18.8	15.5	1.2	4.9	92.7	6.0	62.5	5796	374
Religious Worship	4.2	10.1	0.4	4.9	20.8	2.1	62.5	1298	129
Service	5.6	6.5	0.9	4.9	27.6	4.3	62.5	1729	266
Warehouse and Storage	9.9	16.9	0.6	4.9	49.0	2.9	62.5	3067	181
Other	18.3	21.9	0.8	4.9	90.0	4.1	62.5	5630	257
Vacant	2.1	14.1	0.2	4.9	10.5	0.7	62.5	657	47

Sources

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

people/ unit

Estimating Household Size for Use in Population Estimates (WA state, 2000 average)
Washington State Office of Financial Management
Kimpel, T. and Lowe, T. Research Brief No. 47. August 2007
http://www.ofm.wa.gov/researchbriefs/brief047.pdf
Note: This analysis combines Multi Unit Structures in both large and small units into one category;
the average is used in this case although there is likely a difference

Residential floorspace per unit

2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

employees/thousand square feet

Commercial Buildings Energy Consumption Survey commercial energy uses and costs (National Median, 2003)
Table B2 Totals and Medians of Floorspace, Number of Workers, and Hours of Operation for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set1/2003excel/b2.xls

Note: Data for # employees/thousand square feet is presented by CBECS as square feet/employee.
In this analysis employees/thousand square feet is calculated by taking the inverse of the CBECS number and multiplying by 1000.

vehicle related GHG emissions

Estimate calculated as follows (Washington state, 2006)_

56,531,930,000	2006 Annual WA State Vehicle Miles Traveled Data was daily VMT. Annual VMT was 365*daily VMT. http://www.wsdot.wa.gov/mapsdata/tdo/annualmileage.htm
6,395,798	2006 WA state population http://quickfacts.census.gov/qfd/states/53000.html
8839	vehicle miles per person per year
0.0506	gallon gasoline/mile This is the weighted national average fuel efficiency for all cars and 2 axle, 4 wheel light trucks in 2005. This includes pickup trucks, vans and SUVs. The 0.051 gallons/mile used here is the inverse of the more commonly known term “miles/per gallon” (which is 19.75 for these cars and light trucks). Transportation Energy Data Book. 26th Edition. 2006. Chapter 4: Light Vehicles and Characteristics. Calculations based on weighted average MPG efficiency of cars and light trucks. http://cta.ornl.gov/data/tedb26/Edition26_Chapter04.pdf Note: This report states that in 2005, 92.3% of all highway VMT were driven by the above described vehicles. http://cta.ornl.gov/data/tedb26/Spreadsheets/Table3_04.xls
24.3	lbs CO2e/gallon gasoline The CO2 emissions estimates for gasoline and diesel include the extraction, transport, and refinement of petroleum as well as their combustion. Life-Cycle CO2 Emissions for Various New Vehicles. RENew Northfield. Available: http://renewnorthfield.org/wpcontent/uploads/2006/04/CO2%20emissions.pdf Note: This is a conservative estimate of emissions by fuel consumption because diesel fuel,
2205	with a emissions factor of 26.55 lbs CO2e/gallon was not estimated.
4.93	lbs/metric tonne
	vehicle related GHG emissions (metric tonnes CO2e per person per year)

average lief span of buildings, estimated by replacement time method — See Energy Emissions Worksheet for Calculations

Commercial floorspace per unit — EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

Appendix D
Historical Building Surveys

NICHOLSON KOVALCHICK ARCHITECTS

July 8, 2013

Historic Preservation and SEPA Review - Appendix A
(Seattle DPD CAM #3000)

Additional Information to determine whether a structure
appears to meet any of the criteria for landmark designation

I. Building Location:

1700 First Avenue S., built c.1935 (parcel 7666206400)

II. Physical Description: Provide a physical description of both the interior and exterior of the structure(s).

The building was constructed in 1935-36 as an "Auto Freight Depot" according to drawings on file at the Seattle Department of Planning and Development Microfilm Library.

Although addressed as 1700 First Avenue S., the building north elevation spans the width of the block along S. Massachusetts Street, from First Avenue S. on the west side, to Occidental Avenue S. on the west side. The north side of the building was originally a continuous loading dock, with multiple bays for truck loading and unloading; these were filled in with masonry block at an unknown date.

The building is two stories on the north and one story on the south. Tax records indicate that the building was originally constructed with (brick?) tile walls on a concrete foundation and base, with post and beam structure supporting the flat roof. Interior trusses appear to be original, and incorporate both wood and steel rod members (for elements in compression and tension) in the design. The adjacent building at 1714 First Avenue S. has similar roof trusses.

The building has been considerably altered since original construction. The building suffered damage to several roof trusses during the powerful 1949 earthquake. Repairs were by William Aiken, architect, and Stevenson & Rubens, structural engineer. At the time, Interstate Freight Lines was the occupant. The roof trusses suffered similar damage again in the 1965 earthquake. Repairs, estimated to cost $2000, were by Harvey Dodd & Associates, engineer. The building was described at that time as a "warehouse and office building." There were also considerable repairs in 1958, estimated to cost $5000, but the nature of these repairs is unknown.

Drawings by Ivary & Associates, architects, are on file for the 2003 conversion of the building from a warehouse to a live music venue, for Lyle Snyder. The building is currently the location of The Showbox SoDo, a music club, restaurant, and bar. At this time, significant alterations were made to the north, east, and west elevations. On the primary (west) elevation, work included new windows and door openings, new (non-original) pilasters were created on the exterior wall, new brick and tile trim around the door and window openings, as well as new light fixtures and a fabric canopy. On the north, three of the four westernmost bays were altered by removing overhead doors and replacing with infill CMU walls and high strip windows.

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III. Architect or Builder: Provide information about the architect/builder; i.e., regarding education, career, other works in Seattle. If other structures were built in Seattle, indicate whether they remain and their location.

The original drawings on file at the DPD Microfilm Library show that Howard H. Riley was the architect. Riley was apparently a relatively prolific architect in Seattle, although he does not appear to be well known today. Information about Riley here is derived mainly from news accounts in The Seattle Times. He and his wife were very frequently mentioned in the society pages. Mentions of Riley first appear as early as the mid-1910s, and end with his death notice at age 61 in 1950. Riley's work appears mainly in the 1920s up to about 1940, and seems to have included apartment buildings, private residences (both high-end and more modest designs), spec homes for builders, usually in applied historicist styles. Notable extant works include the Flemington Apartments (1924) at the northeast corner of Broadway & John; the Fremont Baptist Church (1924) at 717 N. 36th Street; the Wembley Court Apartments (1924) at Franklin & Allison; the Conrad Apartments (1928) at Belmont & Olive Street; and the Westwood Apartments (1928, now the Lauren May Apartments) in Ballard at 22nd Avenue W. & W. 59th Street (see photos). A notable demolished work by Riley was the Venetian Theater, a neighborhood moviehouse, at Pike & 15th (1926, demolished 1959).

IV. Statement of Significance: Current and past uses and owners of the structure(s). The role these uses and/or owners played in the community, city, state or nation.

Polk's city directories were reviewed every decade for occupants of the building, listed below. Tax records and architectural drawings provided information regarding owners and occupants as well.

1938 First Avenue Terminal
- James D. Dow, auto freight
- Interstate Freight Lines
- Mallory Auto Freight
- North Counties Freight Line
- Olympic Peninsular Motor Freight Company Inc.
- Puget Sound Express Inc.
- Star Motor Freight
- Sunrise Trail Inc.
- Valley Milk Transportation Inc.

1948 Interstate Freight Lines Inc., auto freight
1958 Vacant
1968 Safway Steel Products, contractors
1973 The Carpet Exchange (according to tax records)
1978 Easy Up Shelving Inc.; and the Jay Davidner Company, office supplies
1988 Easy Up Shelving Inc.; and Classy Mailing Service Inc., mail consultant

In 1937, tax records indicate that Imagene Franklin Keripner(?) was the fee owner for the property. No additional information could be found on this person.

In 1965 and 1971, the owner listed on architectural drawings and tax records was Alice Franklin Bryant. Alice Franklin Bryant's daughter's name was Imogene; it seems likely that Imagene Franklin Keripner was perhaps her mother or aunt or other older relative, and Alice Franklin Bryant inherited the property from them.

She was born in Missouri, and graduated from the University of Washington in 1919. She moved to the Philippines to teach, and met and married William Chaney Bryant, a coconut plantation manager and former provincial governor. Early in World War II, they were imprisoned in a Japanese camp for over two years. After the war, later became a well-known pacifist and peace activist in Seattle during the 1950s through the 1970s. Her Seattle Times obituary notes that she was a writer, lecturer, poet, and political activist, who was awarded the "First Citizen of Seattle" award from Mayor Wes Uhlman. She ran for the US Senate and Congress several times, but did not win. She died in 1977.

Conclusion regarding significance:
The Seattle Landmarks Preservation Ordinance (SMC 25.12.350) states the following landmark criteria: "Standards of designation: An object, site, or improvement which is more than twenty-five (25) years old may be designated for preservation as a landmark site or 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 into one (1) of the following criteria:

- Criterion A - It is the location of, or is associated in a significant way with, an historic event with a significant effect upon the community, City, state, or nation.
- Criterion B - It is associated in a significant way with the life of a person important in the history of the City, state, or nation.
- Criterion 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.
- Criterion D - It embodies the distinctive visible characteristics of an architectural style, or period, or method of construction.
- Criterion E - It is an outstanding work of a designer or builder.
- Criterion 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."

In our opinion, based on the research conducted for this report, the 1700 First Avenue S. building does not appear to meet any of the six landmark criteria; in addition, the building has been significantly altered over time and has lost its original integrity.

Thank you,



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Bibliography of sources

- DPD Microfilm Library available drawings, and historic permit cards.
- Puget Sound Regional Archives, tax assessor records and photos.
- Sanborn maps, various dates
- Historic Seattle Times searchable database
- Seattle Municipal Archives digital photo collection (SMA)

V. Photographs: Clear exterior photos of all elevations of the building; interior photos of major or significant spaces; available historic photos; neighborhood context photos.

Note: All photos by NKA from February-March 2013 unless noted otherwise.



Neighborhood context: Subject parcel located by the red box. North is up. (2012, Google Maps)



1937 tax assessor photo, view from northwest



Detail of north elevation (facing S. Massachusetts Street), 1937 tax assessor photo



Detail of west elevation (facing First Avenue S.), 1937 tax assessor photo



Detail of far south portion of west elevation, 1937 tax assessor photo of adjacent building, showing partial interior of the subject building, including roof trusses.



1980 tax assessor photo, north elevation (from northeast). Compare to 2013 photo; note alterations to loading bays.



Neighborhood context: View south on Occidental Way S.; east elevation of subject building at far right.



View from the northwest



West elevation (facing First Avenue S.); note alterations to the right side of the facade (compare to 1937 photo).



North elevation (facing S. Massachusetts Street)



North elevation, east portion (facing S. Massachusetts Street)



East elevation (facing Occidental Street)



East elevation, south portion (facing Occidental Street)

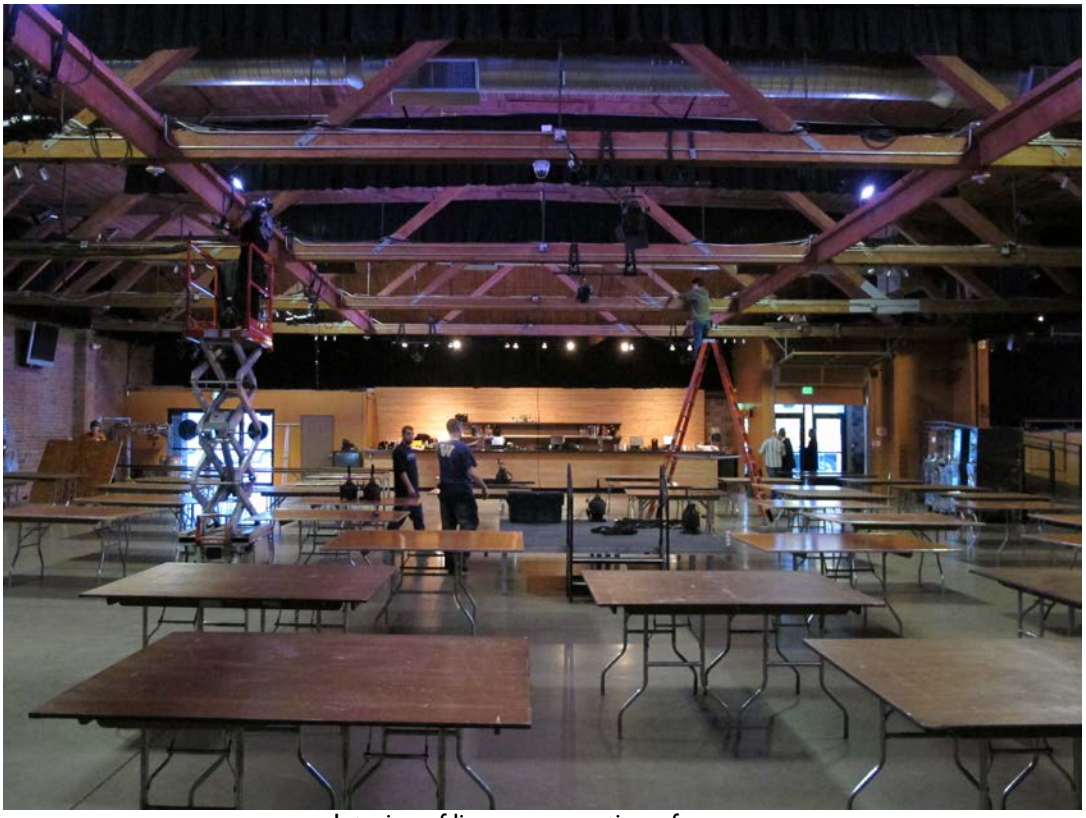




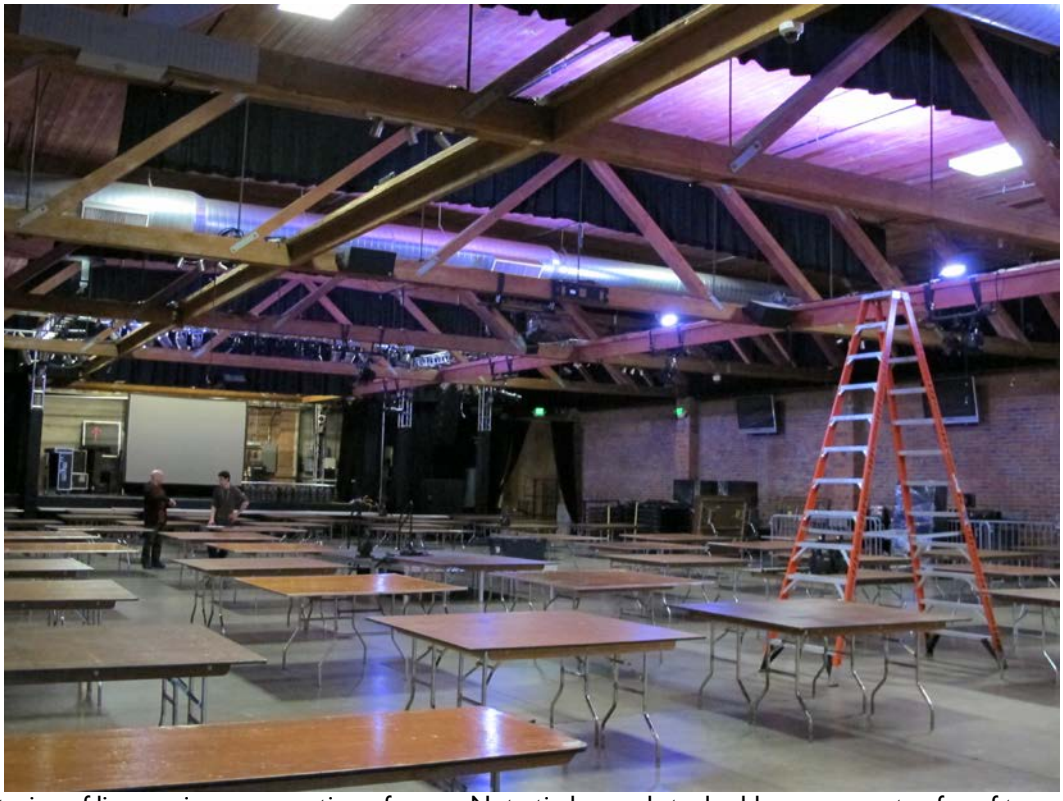
Detail, west elevation (facing First Avenue S.). Diamond-shaped tiles, shaped window headers, windows, and light fixture are non-original and date from a 2003 renovation. Compare to 1937 tax assessor photo.



Detail, west elevation (facing First Avenue S.), showing main entrance.



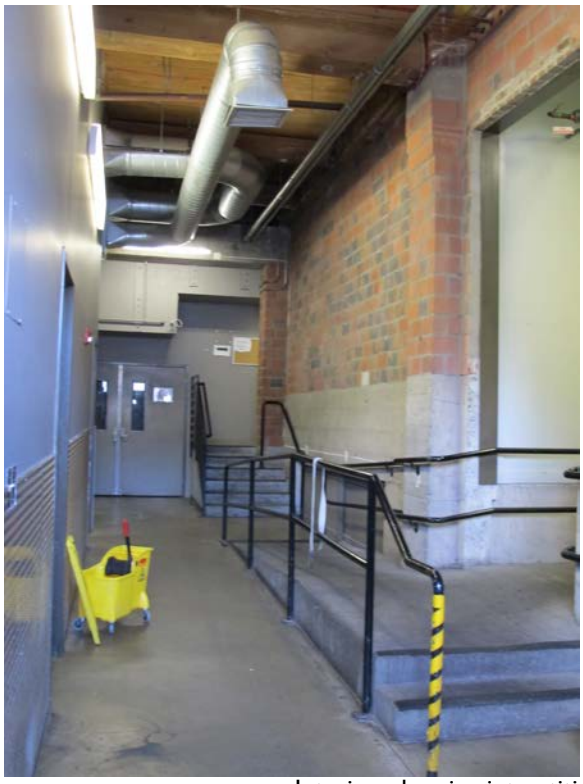
Interior of live venue portion of space.



Interior of live music venue portion of space. Note timber and steel cable components of roof trusses.



Interior showing restaurant portion of building.





Interior, showing interstitial service spaces and kitchen

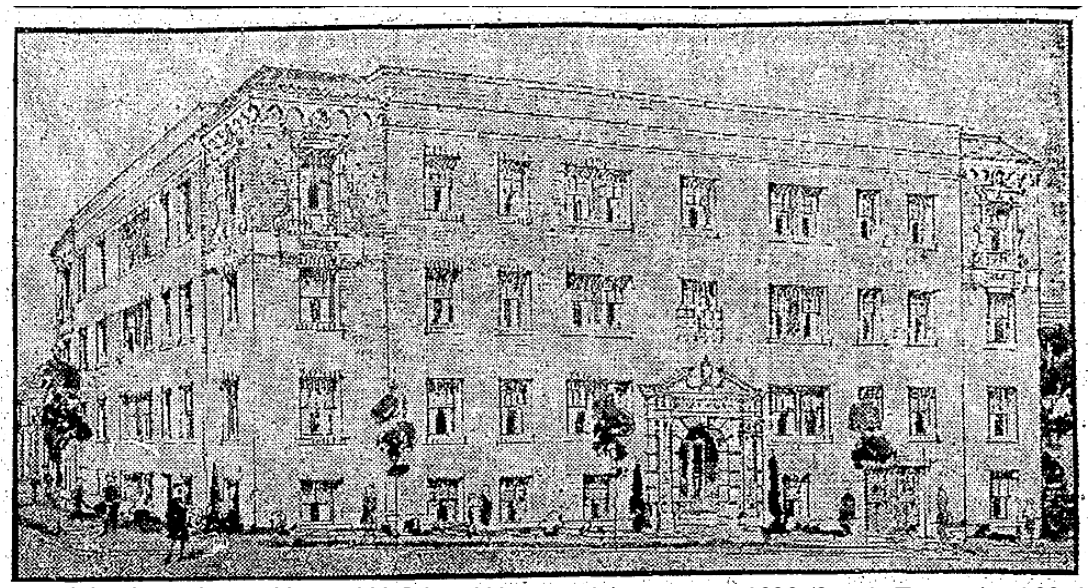


Other work by the architect, Howard H. Riley: Wembley Court Apartments (1924) – tax assessor photo





Other work by the architect, Howard H. Riley:
Wembley Court Apartments (1924) and Fremont Baptist Church (1924) – tax assessor photos



Other work by the architect, Howard H. Riley: Westwood Apartments, 1928 (Seattle Times, April 22, 1928)

NICHOLSON KOVALCHICK ARCHITECTS

July 8, 2013

Historic Preservation and SEPA Review - Appendix A
(Seattle DPD CAM #3000)

Additional Information to determine whether a structure
appears to meet any of the criteria for landmark designation

I. Building Location:

1714 First Avenue S, built c.1929-30 (parcel 7666206405)

II. Physical Description: Provide a physical description of both the interior and exterior of the structure(s).

This Art Deco "zigzag" style building was constructed as a "Warehouse and Track Storage Building" according to very poor drawings dated 1929-30 on file at the DPD Microfilm Library. The architect and engineer was E. Glen Morgan, and the building owner was Russak & Nelson. Taylor Edwards Warehouse & Transfer Company was the lessee. Some tax records state that the building was constructed in 1921, but this appears to be erroneous information.

The structure is two stories tall, with a flat roof, and fully occupies the midblock parcel. It is constructed of brick walls, clad with stucco, and features post and beam on the interior. On the second floor, apparently original trusses supporting the roof incorporate both wood and steel rod members (for elements in compression and tension) in the design. The adjacent building at 1700 First Avenue S. has similar roof trusses. There is no basement. First floor ceilings measure 17 feet, and the second floor measures 23 feet 6 inches.

Because the site has no alley, the building extends to Occidental Avenue S. on the east, where there is a rear (non-primary) facade and access to a auto/truck ramp to the second floor. Apparently original windows remain intact on the rear elevation, although no early photo could be found to confirm that they are original.

The building was remodeled in the past few years, and all of the original windows on the primary or west elevation were removed. The north side of the first floor is currently used as a distillery and apartment. The south side of the first floor is unoccupied, as is the upper floor.

III. Architect or Builder: Provide information about the architect/builder; i.e., regarding education, career, other works in Seattle. If other structures were built in Seattle, indicate whether they remain and their location.

The architect and engineer was E. Glen Morgan. According to the Seattle Historic Preservation Office historic survey listing for this building, Morgan "appears to have begun practicing independently in the cabinetmakers trade as early as 1921, offered building contracting services in 1922 and joined the John Graham Sr. architectural firm as a "superintendent" by 1925. In 1930, he was in business partnership with two other men, serving as the vice president of the Universal Plan Service Inc. He had re-joined John Graham's firm by 1937 as an architect with Graham & Painter. In 1941 he had his own architectural practice. He was no longer living in Seattle by 1948."

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One built work by Morgan that could be found in Seattle Times articles was an office/warehouse building for the Fairbanks Morse Company and a plumbing supply company at 1526 First Avenue S. (1930, much altered), valued at $60,000 and described as reinforced concrete faced with brick (Seattle Times, May 18 and June 1, 1930). In 1943, Morgan is listed in another article as working as an engineer for The Austin Company, building a radio station for the Navy on Bainbridge Island. No additional information regarding architecture could be found about Morgan for this report.

IV. Statement of Significance: Current and past uses and owners of the structure(s). The role these uses and/or owners played in the community, city, state or nation.

The building is addressed as 1712 and 1714 First Avenue S. Polk's city directories were reviewed every decade for occupants of the building, listed below. Tax records and architectural drawings provided information regarding owners and occupants as well.

1938 Marwood Ltd., wholesale electrical appliances
Wilbur B. Driver Co., wire manufacturer

1948 Marwood Ltd., manufacturers agents

1958 Marwood Ltd., manufacturers agents
Acme Cartage Company, garage

1968 Marwood Ltd., power transmission equipment

1978 Marwood Ltd., power transmission equipment
Vacant

1988 Industrial Rebuild Inc., power transmission equipment

1996 Industrial Rebuild (according to tax records)
Q City Sheet Metal (according to tax records)

On the 1929 architectural drawings, the building owner listed was Russak & Nelson, with Taylor Edwards Warehouse & Transfer Company as the lessee. On 1937 tax records, the fee owner is Harry Russak et al.

Harry Russak appears to have been the owner of Harry Russak Truck Company, which begins to appear in classified newspaper advertisements (offering new and used truck parts for sale) as early as 1941. This company at that time was located at 5505 First Avenue. By the 1970s, the Harry Russak Truck Company was located on E. Marginal Way. Russak appears to have died in 1969, and the Harry Russak Truck Company was continued by his children.

Russak & Nelson appear to have been related families, and owned at least a few investment properties in Seattle. At least one of these properties, mentioned in a 1965 news article, was located at 1919 Fourth Avenue S., and leased to Star Rentals, Inc.

Conclusion regarding significance:
The Seattle Landmarks Preservation Ordinance (SMC 25.12.350) states the following landmark criteria: "Standards of designation: An object, site, or improvement which is more than twenty-five (25) years old may be designated for preservation as a landmark site or 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 into one (1) of the following criteria:

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- Criterion B - It is associated in a significant way with the life of a person important in the history of the City, state, or nation.
- Criterion 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.
- Criterion D - It embodies the distinctive visible characteristics of an architectural style, or period, or method of construction.
- Criterion E - It is an outstanding work of a designer or builder.
- Criterion 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."

In our opinion, based on the research conducted for this report, the 1714 First Avenue S. building does not appear to meet any of the six landmark criteria at this point, due to renovation of the building in recent years which removed the original windows on the primary facade. Although still a recognizably Art Deco building, the current windows are a significant blow to the building's integrity.

Thank you,



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Bibliography of sources

- DPD Microfilm Library available drawings, and historic permit cards.
- Puget Sound Regional Archives, tax assessor records and photos.
- Sanborn maps, various dates
- Historic Seattle Times searchable database
- Seattle Municipal Archives digital photo collection (SMA)
- Seattle Historic Preservation Office historic survey database
- Jim Clark, Western America Commercial LLC, the property manager for building

V. Photographs: Clear exterior photos of all elevations of the building; interior photos of major or significant spaces; available historic photos; neighborhood context photos.

Note: All photos by NKA from February-March 2013 unless noted otherwise.



Neighborhood context: Subject parcel located by the red box. North is up. (2013, Google Maps)


Neighborhood context: View south on Occidental Way S.; east elevation of subject building at middle right.



1937 tax assessor photo, west elevation (facing First Avenue S.)



West elevation (facing First Avenue S.)



East elevation (facing Occidental Street) and south party wall



East elevation (facing Occidental Street). Open entrance at left gives access to an auto/truck ramp to the second floor.

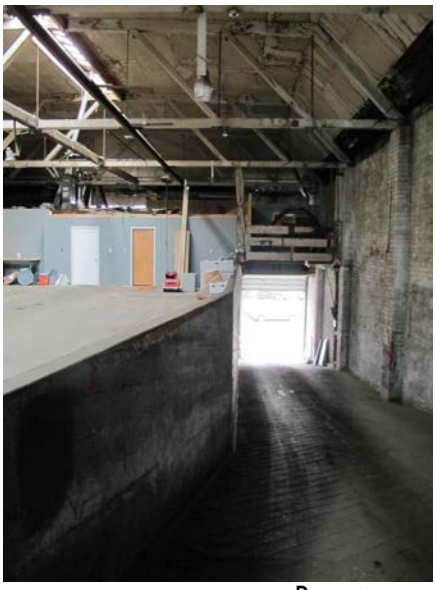


Partial view of north party wall





Detail, west elevation (facing First Avenue S.), and exterior finishes. All windows on this elevation are non-original.

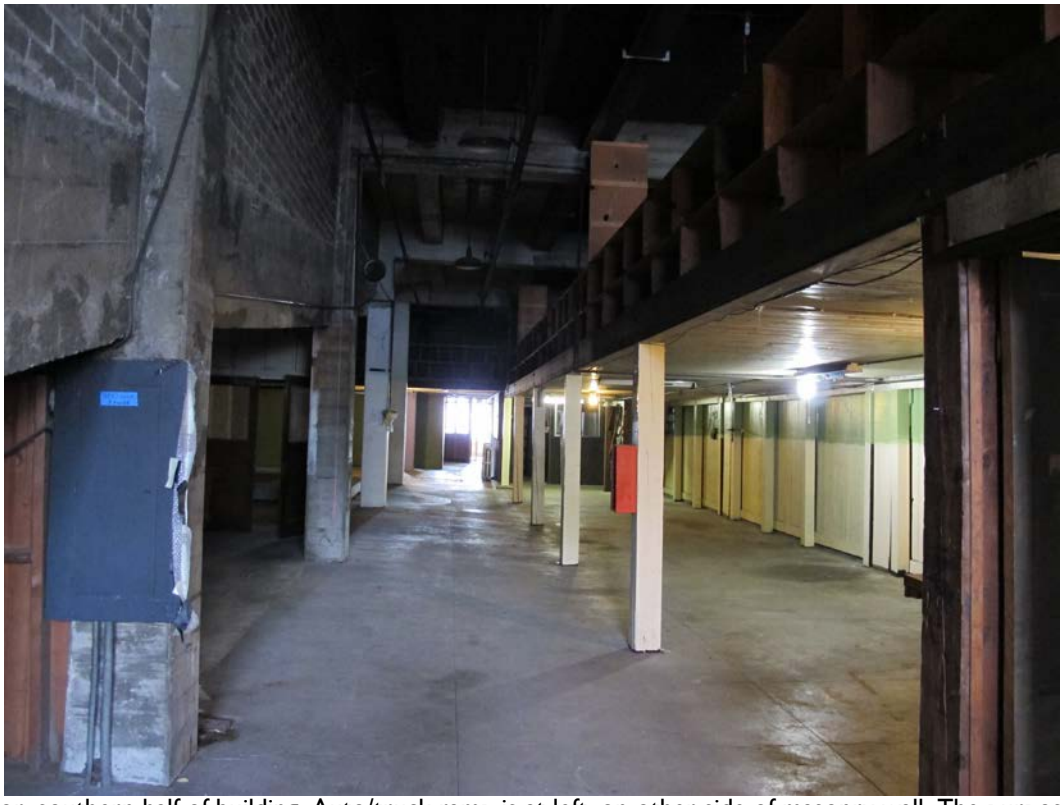




Ramp to second floor, accessed from east side of building.



Second floor, southern half of the building (top of ramp).



First floor, southern half of building. Auto/truck ramp is at left, on other side of masonry wall. The purpose of the openings along the wall at right could not be discerned, but may have been warehouse-related storage spaces.



View into storefront at sidewalk level, south side of main elevation.



Interior of north side of building, first floor (image courtesy of Jim Clark)



Interior of north side of building, first floor (image courtesy of Jim Clark)



Interior of north side of building, first floor (image courtesy of Jim Clark)

NICHOLSON KOVALCHICK ARCHITECTS

July 8, 2013

Historic Preservation and SEPA Review - Appendix A
(Seattle DPD CAM #3000)

Additional Information to determine whether a structure
appears to meet any of the criteria for landmark designation

I. Building Location:

1750 Occidental Avenue S. (parcel 7666206285)

II. Physical Description: Provide a physical description of both the interior and exterior of the structure(s).

The parcel occupies the entire block, with the building sited to the east side of the parcel, nearest the adjacent railroad yard, with a paved parking/loading area covering most of the rest of the site.

The one-story building sizeable in area, measuring approximately 122 feet by 600 feet in plan, and 24 feet in height. The original building was constructed at the southern portion of the site in 1954 and measured 122 feet by 360 feet. It was constructed as a warehouse, for goods delivered by rail and truck. The eastern wall of this portion of the building is angled for over half of its length, due to a spur rail line which originally was located adjacent to the building.

In 1956-57, an addition measuring 122 feet by 240 feet was constructed on the north side, which nearly doubled the length of the building, extending the building to Massachusetts Street. At that time, a loading dock was built at the angled eastern wall of the original portion of the building.

Both the 1954 and 1956 portions of the building are constructed of tilt-up concrete walls, with large wooden bow trusses supporting the roofs. The interior contains both warehouse space and offices. Notes on tax records indicate that the interior features a floating slab concrete floor, which had ongoing settling and "waving" problems (at least in the 1970s) so severe in some places that it caused difficulties in stacking warehouse goods, and serious cracks in exterior walls.

In 1987, a 45 foot by 70 foot addition was constructed on the west side of the building, containing a main entry area, and additional offices.

III. Architect or Builder: Provide information about the architect/builder; i.e., regarding education, career, other works in Seattle. If other structures were built in Seattle, indicate whether they remain and their location.

Listed on tax records as the architect of the 1953 portion was Harry Powell, and the contractor was the S.S. Mullen Company. Powell was actually a local structural engineer, but only a few citations could be found for him. For example, he was structural engineer for the Lowell Apartments (Harry Hudson, 1928) at 8th Avenue and Spring Street; and for a 105,000 square foot, steel and masonry brick factory on 15 acres in Newcastle in 1958, valued at $1.2 million

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dollars and made of prefabricated brick panels. He was apparently best known for his 1957 design of the "Rainbow Bridge" over the Swinomish Channel near LaConner, Washington. Powell died in 1991.

IV. Statement of Significance: Current and past uses and owners of the structure(s). The role these uses and/or owners played in the community, city, state or nation.

The building is addressed as 1700 or 1750 Occidental Avenue S. According to tax records, the fee owner in 1953 was the Northern Pacific (or possibly Burlington Northern) Railroad, which constructed the warehouse and leased the property to the United Wholesale Company.

A review of Polk's city directories provides a review of tenants over the decades. Notably, the building has served a number of food-related wholesale companies. Below is a list of occupants for these years:

1958 Boyle-Midway Inc., cleaning compound manufacturers
Lenihan Distributing Company, wholesale electronic appliances
Ocoma Foods Company, frozen food processors
American Home Foods (Division of American Home Products Corporation)

1968 Lenihan Distributing Company, water heaters and boilers
Kerr Glass Manufacturing Company
Manley Inc, confectioners equipment
PET Milk Company
United Warehouse Company, merchandise wholesaler
Max L. Israel Company, food brokers
American Home Foods (division of American Home Products Corporation), food brokers
Schmoyer Finney & Tischler Inc., food brokers
[Three office spaces are listed as "vacant."]

1978 Lenihan Distributing Company, water heaters and boilers [two spaces are used as "annexes"]
United Warehouse Company, merchandise wholesale
Israel & Agoado Inc., food brokers
[One office space listed as "vacant."]

1988 United Warehouse Company, merchandise wholesaler
Northwest Brokerage Company, candy broker

Conclusion regarding significance:
The Seattle Landmarks Preservation Ordinance (SMC 25.12.350) states the following landmark criteria: "Standards of designation: An object, site, or improvement which is more than twenty-five (25) years old may be designated for preservation as a landmark site or 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 into one (1) of the following criteria:

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- Criterion 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.
- Criterion D - It embodies the distinctive visible characteristics of an architectural style, or period, or method of construction.
- Criterion E - It is an outstanding work of a designer or builder.

- Criterion 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."

In our opinion, based on the research conducted for this report, the 1750 Occidental Avenue S. building does not appear to meet any of the six landmark criteria. Although an unusually sizeable building, it does not rise to the level of significance of a landmark.

Thank you,



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Bibliography of sources

- DPD Microfilm Library available drawings, and historic permit cards.
- Puget Sound Regional Archives, tax assessor records and photos.
- Sanborn maps, various dates
- Seattle Historic Preservation Office online survey database of historic properties
- Historic Seattle Times searchable database
- Seattle Municipal Archives digital photo collection (SMA)

V. Photographs: Clear exterior photos of all elevations of the building; interior photos of major or significant spaces; available historic photos; neighborhood context photos.

Note: All photos by NKA from February-March 2013 unless noted otherwise.



Neighborhood context: Subject parcel located by the red box. Dates of construction of parts of building indicated in parentheses. North is up. (2013, Google Maps)



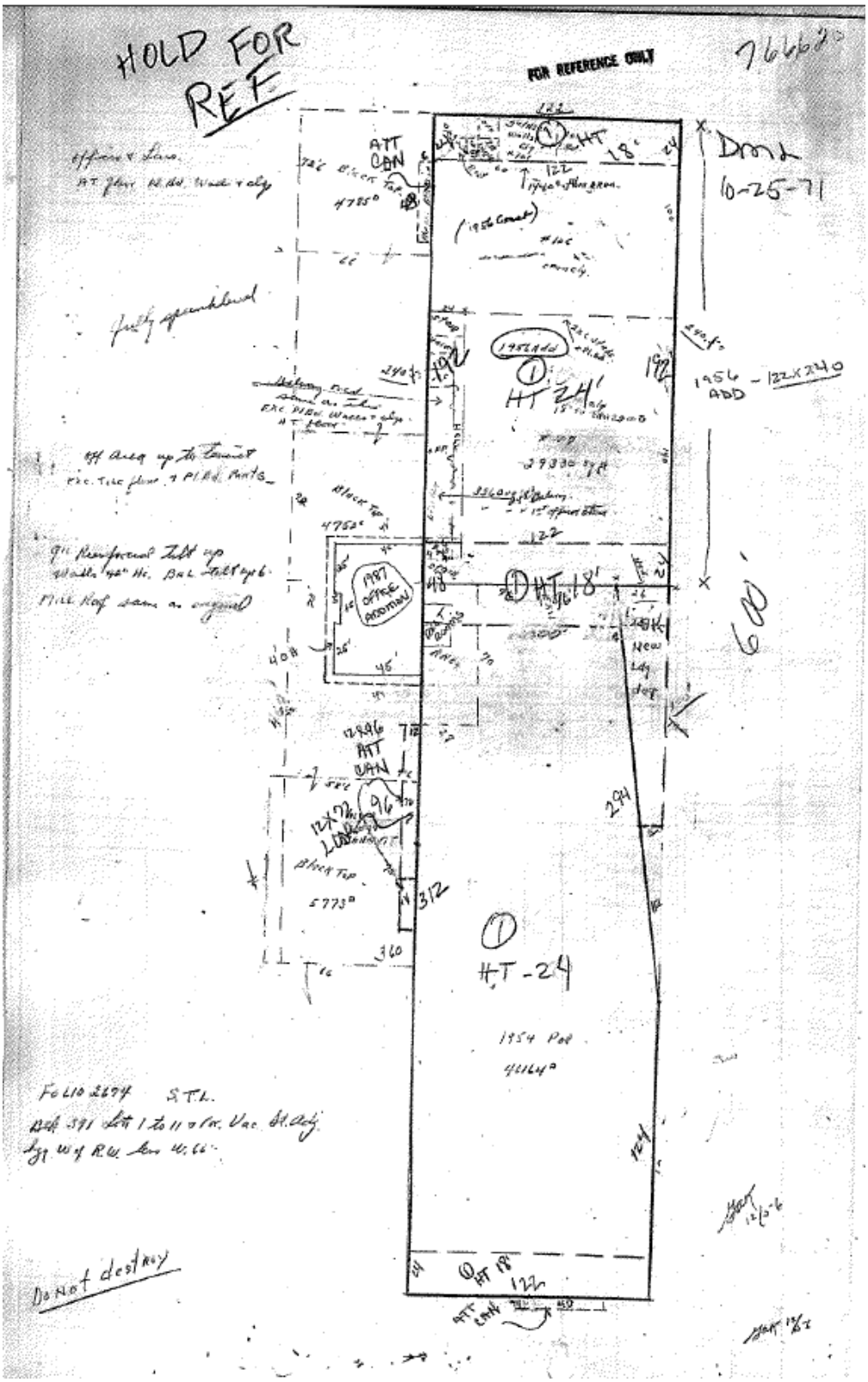
Neighborhood context: View north on Occidental Avenue S.; west elevation of subject building indicated by arrow.



1955 tax assessor photo of north elevation of original building, which occupied only the south portion of the site.



1957 tax assessor photo of original building (foreground) after construction of the addition (visible in the distance), showing south elevation (facing S. Holgate Street) and east elevation (facing railroad tracks).



Plan sketch from tax records



North elevation at left (facing S. Massachusetts Street), west elevation (facing Occidental Avenue S.) at right.



Detail, west elevation, showing windows and exterior finish



Looking southward, midblock on Occidental Avenue S., at the west elevation. Office addition at right.



West elevation, midblock, showing office addition at right.



Looking northward, on Occidental Avenue S.; note office addition at center.



Looking northward, on Occidental Avenue S. at corner of S. Holgate Street, at the west and south elevations. Note office addition at far left.



Looking southward, midblock on Occidental Avenue S. at corner of S. Holgate Street, at the west elevation.



South elevation (facing S. Holgate Street)



View of south (left) and east (right) elevations



Looking northward at the east elevation



Detail, east elevation



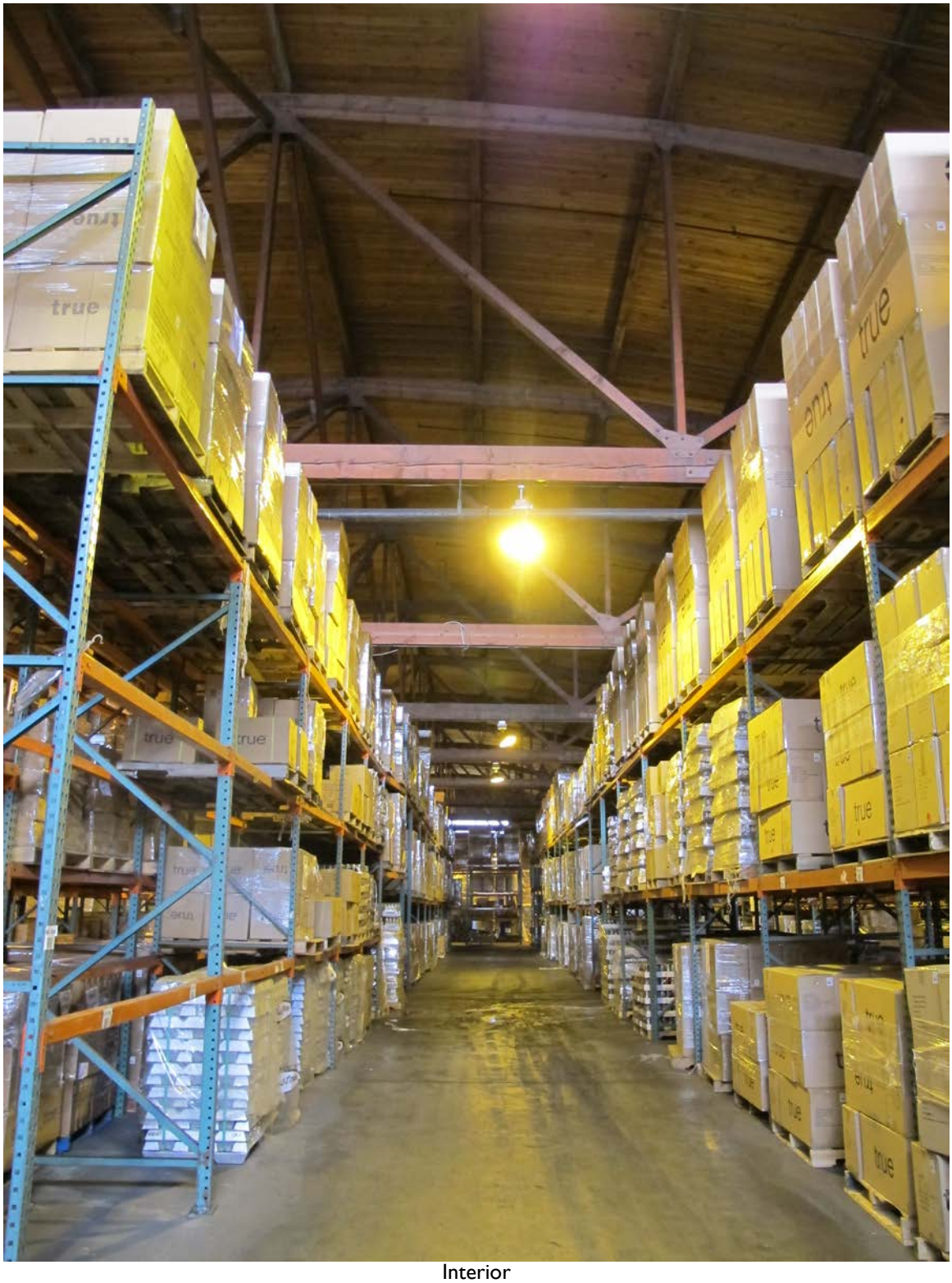
Detail, east elevation



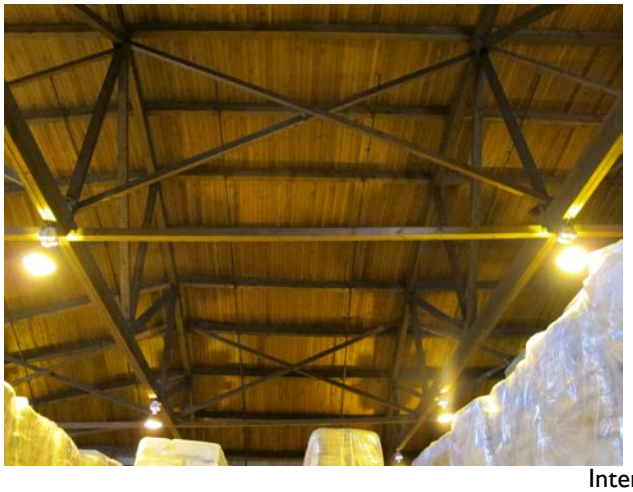
Detail, east elevation, showing former railroad-side loading docks



Interior



Interior




Interior




Interior



Other work by the structural engineer, Harry Powell:
Swinomish Channel or "Rainbow" Bridge, LaConner, Washington (1957)

SEATTLE CENTER

HISTORIC LANDMARK STUDY



MARCH 2013

Publishing Data

Roster Program Category #41

This report Commissioned by the City of Seattle,
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ARTIFACTS
Architectural Consulting

seattlecenter

Cover Image: 1962 postcard of the interior of KeyArena.
Source: Seattle Public Library.

Project Team

Artifacts Consulting, Inc. and HistoryLink.org undertook as partners preparation of this report. Michael Sullivan served as principal-in-charge with Marie McCaffrey providing project visioning. Historians Paula Becker and Alan Stein developed the site context and property specific histories and document review. Paula Becker conducted archival research and assisted with site visits assessing the site and buildings to understand significance and changes over time. Architectural historians Katie Chase and Susan Johnson developed property specific physical descriptions, character-defining feature identification, and chronologies of alterations, as well as participating in field work and archival research. Katie Chase developed the report layout and production. Spencer Howard served as project manager providing project coordination, assisting in archival research, project meetings, field work, mapping, and report development.



1962 image of the Playhouse lobby. Source: University of Washington Special Collections.

TABLE OF CONTENTS

Executive Summary 1

Methodology 3

Context Synopsis 5

Assessment 13

Findings 59



2013 view of the Exhibition Hall which houses the Pacific Northwest Ballet. Source: Artifacts Consulting, Inc.

LIST OF TABLES & FIGURES

Glossary of Current vs Historic Building Names *ix*

Project Area Map *2*

Listed Properties Table *13*

Inventoried Properties Table *15*

Landmark Criteria Table *60*

Landmarks Eligibility Map *62*

Community Open Space Map *64*



2013 view of James Fitzgerald Fountain of the Northwest. Source: Artifacts Consulting, Inc.

Glossary of Current vs Historic Building Names

ID	CURRENT NAME	HISTORIC NAME(S)	SURVEYED
1	KeyArena	Washington State Pavilion, Washington State Coliseum	Yes
2	International Fountain (including associated open space)		Yes
3	1st Avenue North Parking Garage		No, less than 25 years
4	Blue Spruce Building	Blue Spruce Apartments, Administration Building	Yes
5	Armory	Washington State National Guard Armory, Food Circus, Center House	No, listed
6	Central Utility Plant		No, less than 25 years
7	Exhibition Hall/Phelps Center	Fine Arts Pavilion, Exhibition Hall	Yes
8	Playhouse	Intiman, Playhouse Theater	Yes
9	Fisher Pavilion	Flag Pavilion	No, less than 25 years
10	Seattle Repertory Theatre	Bagley Wright Theatre	Yes
13	Marion Oliver McCaw Hall	Civic Auditorium, Opera House	No, extensive alterations
14	Mercer Arts Arena	Arena, Civic Ice Arena, Display Hall	Yes
15	Mercer Street Parking Garage		Yes
16	NASA Building	NASA Building, NASA Pavilion	Yes
17	Northwest Rooms	International Commerce and Industry Buildings	Yes
18	International Fountain Pavilion	Sweden Pavilion, Northwest Craft Center	No, less than 25 years
19	Pottery Northwest/Gardener's Facility	Bressi Garage	Yes
20	Seattle Center Pavilion		Yes
21	Seattle Children's Theatre	Nile Shrine Temple, Club 21	Yes, Nile Shrine only, rest less than 25 years
23	West Court Building	Fair Headquarters, Century 21 Exposition Headquarters	Yes
24	Founders Court	Presidential Court	Yes
26	Kobe Bell		No, listed
27	Horiuchi Mural		No, listed
35	Memorial Stadium		No, previously documented
37	Pacific Science Center	Federal Science Pavilion	No, listed
39	Space Needle		No, listed
40	Skatepark		No, less than 25 years
42	Chihuly Garden and Glass		No, less than 25 years
43	KCTS 9 Building		Yes
44	Experience Music Project		No, less than 25 years
45	Seattle Center Monorail	Monorail Terminals, Seattle Center Station	No, previously documented
46	Next 50 Pavilion		No, less than 25 years
47	Gift Shop	Monorail Office Building, Quick Draw Theater, Seattle Center Administrative Offices/Alweg Building	No, previously documented
48	Kiosk		No, less than 25 years
49	Restroom Pavilion		No, less than 25 years
50	International Plaza		Yes
51	Courtyard, Playhouse	Grand Court	Yes
52	Fisher Green	Plaza of the States, Fisher Green Open Space, South Fountain Lawn	Yes
53	Mural Amphitheatre	Friendship Mall	Yes



1962 view inside of the former Canadian Pavilion, located within the Northwest Rooms. Source: Seattle Public Library



1962 postcard of the Seattle World's Fair. Source: Seattle Public Library.

EXECUTIVE SUMMARY

The recommended approach for grouping properties to present them to the Landmarks Preservation Board is two small concentration areas, each having an assembly of properties associated with a single architectural firm, and then considering remaining properties on an individual basis.

Concentration Areas

Thiry concentration area properties:

International Fountain Pavilion

KeyArena

NASA Building

Northwest Rooms

Seattle Center Pavilion

International Plaza

Kirk concentration area properties:

Exhibition Hall

Mercer Street Parking Garage

Playhouse (including courtyard)

Founders Court

North Gate

Colonnades

Individual

Pottery Northwest, Gardener's Complex

Lesser examples that would not be individually eligible for nomination :

West Court Building

Blue Spruce Building

Marion Oliver McCaw Hall

Community Properties

These are properties that rely nearly exclusively on their open space quality to convey their historical associations. These properties merit further discussion relative to their eligibility as Landmarks and their community role.

International Fountain

Mural Ampitheatre

Fisher Green

Street Grid

Artifacts

Properties and residual property parts that continue to serve an important contextual role within Seattle Center, but do not fit within the Landmark designation process are artifacts. As buildings are adaptively reused, the potential to salvage and reuse elements from the buildings to the benefit of Seattle Center's overall visual character should be considered.



Project Area Map



Historic view of the Exhibition Hall. Source: Mike and Carolyn Nore.

METHODOLOGY

Study Area

The study area encompasses only land owned by the City of Seattle. This includes instances where a building not owned by the City of Seattle stands on land owned by the City of Seattle, such as the KCTS 9 Building at the corner of Mercer Street and Fifth Avenue North.

Property in this study means any site, building, structure, vegetation, open space, or object.

The area is roughly bounded on the north by Mercer Street, south by Broad Street and Thomas Street, the east by Fifth Avenue North, excluding the 9 acres Memorial Stadium site, and Second and First Avenues North on the west. (Refer to Project Area Map)

Planning

Seattle Center initiated this study in 2013 as the majority of properties reached 50 years of age, whereby the City has elected to consider their eligibility for Landmark designation.

Planning studies for Seattle Center providing a relevant management overlay follow below.

Seattle Center Century 21 Master Plan, 2008 and 2011 update as an addendum to the *Final Environmental Impact Statement*, Seattle Center Master Plan establish planning zones for the campus. Page 1.11 of the plan introduces the four zones: the Center of the Center, Memorial Stadium, Theatre District, and KeyArena. Recommendations follow this zone organization.

Landscape Management Plan, 2009, addresses vegetation, hardscape and water feature management for the site. Of particular relevance is chapter 1 on trees. Page 11 starts the discussion of Canopy Trees and tree replacement plan. Legacy and Dedicated Trees are identified on page 24 of the plan by zone. Chapter six addresses landscape features, including water features and hardscape.

Century 21 Design Guidelines, 2009, provide planning and guidelines for architectural design, landscape management, public art, signage, and lighting.

Process

Preparation of this study addressed three key steps: research, field work, and production. The study follows standards set forth by the Department of Archaeology and Historic Preservation in the *Washington State Standards for Cultural Resource Reporting*, 2011.

Research built upon the extensive background and archival research undertaken by Paula Becker and Alan J. Stein in writing *The Future Remembered: The 1962 Seattle World's Fair and Its Legacy*. Previous Landmark nominations and surveys for the site provided additional context and details on the individual buildings. Conversations with Seattle Center staff and the extensive on-site collection of drawings maintained by Seattle Center provided a wealth of detailed information on the properties and changes over time. Our team reviewed Department of Planning and Development permit records, collections at the Washington State Archives, Puget Sound Regional Branch, Seattle Public Library, Seattle Municipal Archives, University of Washington, and King County Archives.

Field work entailed an exterior survey of the properties followed by access to select building interiors. The properties were digitally photographed and notes recorded as to character-defining features, spaces, and alterations.

Production involved writing, editing and assembling the study. As part of this process Artifacts set up a GIS database for the study area to record building, tree, circulation network, and landscape data recorded during the survey and archival research.



Historic image of the International Fountain Pavilion and the east end of the Northwest Rooms. Source: Seattle Public Library.



Postcard of the Space Needle and Plaza of States. Source: Seattle Public Library.

CONTEXT SYNOPSIS

The Site's Early History

The land that became the 74-acre (13 square block) site for the 1962 Seattle World's Fair/Seattle Center was part of David and Louisa Boren Denny's 1853 donation land claim. (Mercer Garage occupies land that was part of Thomas Mercer's donation land claim.) By the late 19th century, the area had been platted and had developed into an urban neighborhood comprised of wood-frame homes, some small businesses, and a few boarding houses. Many of the earliest settlers in the developing neighborhood were employees at Western Mill – the city's largest sawmill – located nearby. The Warren Avenue School (built 1902) and adjoining Mercer Playground (built 1910) served neighborhood families, who were predominantly working class.

The idea of creating a civic center to serve as Seattle's preeminent cultural gathering place was broached in Virgil Bogue's elaborate 1911 "Plan of Seattle" that – had the voters approved it – would have reshaped the area in and around the Denny Regrade neighborhood. Although rejected, the Bogue Plan is significant in that it was the first time the notion of building a civic center in or near lower Queen Anne – where Seattle Center stands – was part of the civic discussion.

Seattle's Chamber of Commerce announced plans for a civic auditorium in April 1926, under banner headlines in local newspapers. They had already purchased a four-block site on lower Queen Anne, using mainly a bequest from pioneer James Osborne, who stipulated that his gift should fund "a public hall." The site was adjacent to Warren Avenue School and Mercer Playground. Along with the auditorium, a civic field and display hall were initially planned. In 1927-1928, the city constructed a cluster of buildings to meet many of the growing city's civic needs: a Civic Auditorium/Exposition Hall (with two distinct spaces: an auditorium for symphony and other performances; and what was referred to as an exposition or display hall, designed to hold conventions and sporting and athletic events, including horse shows); a Civic Ice Arena (used for public skating sessions and for hockey); a Civic Field (used for outdoor sporting events, particularly high school football and professional baseball); and a small Veterans of Foreign Wars facility that also served as a field house. The Seattle City Council appropriated $50,000 to fund construction of the VFW hall. These structures occupied the four-block area bordered by Mercer and Harrison Streets and Third and Fourth Avenues North, while Warren Avenue School and Mercer Playground occupied the two blocks bordered by Warren Av-





Above:1962 view of Everett DuPen's Fountain of Creation outside the Northwest Rooms (Canada Pavilion within International Commerce and Industry Buildings). Source: Mike and Carolyn Nore.

Right: Historic view of southeast corner of KeyArena. Source: Seattle Public Library.

enue North, Third Avenue North, Harrison Street, and Republican Street. This meant that six full blocks of the ultimate 13-block Seattle World's Fair site were already in public use before 1930. Major contributors to the creation of these civic facilities included the Seattle Chamber of Commerce, Central Labor Council, Seattle Public Schools, the Rainier Post of the American Legion, Seattle mayor Bertha Knight Landes, the City Council, and Seattle voters, who approved a $900,000 bond measure to fund construction. While school and playground served primarily nearby residents, the new civic buildings drew people from throughout the city and beyond to what rapidly became a core of civic activity.

In 1939, the Washington National Guard built a massive field armory on the block bordered by Harrison Street, Thomas Street, Nob Hill Avenue, and Third Avenue North, bringing the total number of future fair site blocks in public use to seven. The Armory was used for military purposes, but also as a large public gathering place, serving – for example – as the site of the notorious Canwell Committee hearings on un-American activities in Washington state. The Armory also hosted large scale scouting events, dances, and other similar activities.

In 1947, Seattle Public Schools replaced Civic Field with a stadium. The city condemned the property in the block bordered by Republican and Mercer Streets and 4th and 5th Avenues N to create a parking lot for the stadium. In 1951, the school district added to the stadium a wall memorializing former students who had lost their lives in World War II. By this time, the character of the neighborhood had begun to shift increasingly toward small commercial enterprises. Housing stock, while still plentiful, was aging and frequently not owner-occupied.

The Need

With these core buildings, Seattle had a starter civic center, of sorts, but many residents – especially music lovers who attended Seattle Symphony recitals – felt the 1920s facilities were far from adequate. One problem was the mixed-use Civic Auditorium/Exposition Hall, which served neither function perfectly. The auditorium was built with a flat rather than a raked seating area, meaning that the venue was not suitable for any visual performances such as opera or theater – and acoustics in the barn-like interior were dreadful.

The Seattle Civic Arts Committee, formed by community leaders in 1944, recommended the creation of a civic center to Seattle Mayor William F. Devin in 1946. This committee suggested that the city acquire land adjacent to the existing Washington National Guard Armory, Civic Field, and Civic Auditorium near the Denny Regrade. In late



Historic image of the International Fountain Pavilion. Source: Museum of History And Industry.

1947, members of the Civic Arts Committee formally incorporated as the Seattle Civic Center Association. The group – chaired by University of Washington drama professor Glenn Hughes – worked steadily to build support for a civic center and pushed the city to acquire land, succeeding somewhat in the former effort, but not the latter.

The late 1940s and early 1950s were a period of great growth and change in Seattle and elsewhere in the country as the economy and society in general transitioned from the time of war to peacetime. Seattle, so crucial to the war effort, could finally look beyond the demands of the war-intensified moment to the promise of peacetime leisure, comfort, and relaxation. For a far-thinking core of dedicated civic boosters who loved their city and supported the arts, a real civic center was a steadily increasing desire – a new necessity. In 1954, Seattle Mayor Allen Pomeroy appointed a committee to work toward facilitating the creation of a civic center to meet the city's art, music, theater, and other cultural and community needs.

The Dream

By brilliant happenstance the following year, a group of dedicated Seattle boosters floated the idea of creating a world's fair commensurate with the city's wildly successfully Alaska-Yukon-Pacific Exposition of 1909. They quickly gained the support of the Seattle City Council, Washington Governor Arthur Langlie, and a growing number of state legislators. Seattleite Edward Carlson led the world's fair charge, chairing the Washington World's Fair Commission.

Both the fair and the civic center groups knew their projects would require substantial funding and property acquisition, and both groups examined sites around the region. A major study concluded that the best place for a civic center would be a site near the Denny Regrade area that was already occupied by several buildings serving the community in various ways: performance venue, sports field, skating rink. At Carlson's urging, the World's Fair Commission also examined this promising site.

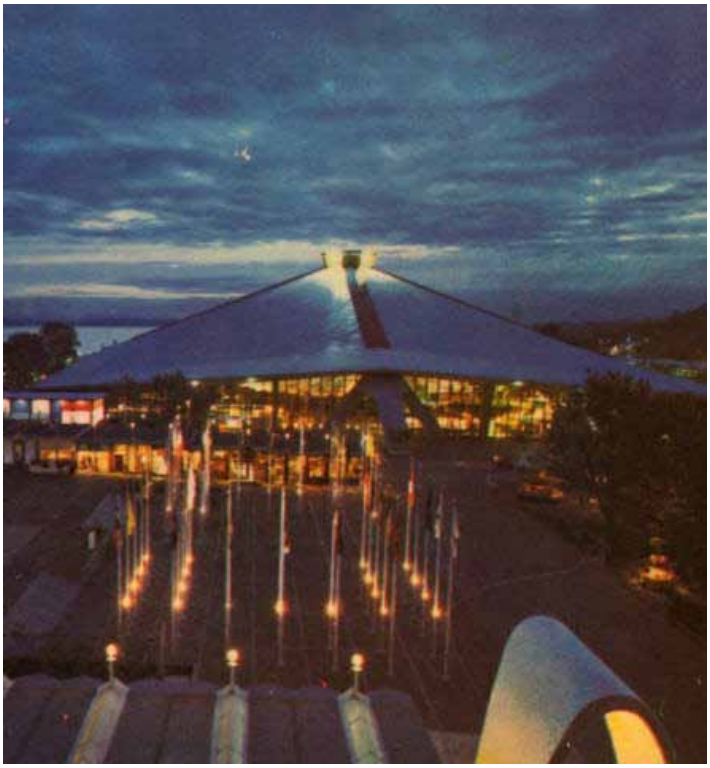
The Goal

World's Fair boosters knew that creating, funding, promoting, and producing an event of magnitude would consume countless resources, both human and financial. Why raise the money, do the work, transform the site, for just a few months' benefit? Their real goal, they realized, meshed perfectly with the aims of the civic center advocates: to create a permanent home for Seattle's arts and culture, a gathering place for the community, a real and lasting legacy that would be the most enduring souvenir of their great World's Fair. On November 6, 1956, Seattle voters approved a $7.5 million bond issue to acquire land and build a civic center.

Site Development

Once the site was chosen, both the World's Fair Commission and the Civic Center Advisory Commission began the complex process of developing it. All of the existing civic buildings, Memorial Stadium, the Armory, and several newer structures were retained and repurposed for the project. The school, the playground, and more than 200 other structures were demolished. Memorial Stadium was leased from Seattle Public Schools for the duration of the fair, the Armory was leased from the Washington National Guard, and the Nile Shrine Temple was leased from the Nile Temple Holding Company. Although the neighborhood's built environment was altering drastically, the street grid that organized it mostly remained, becoming broad avenues used by pedestrians to navigate the fairground.

The fair's first employee, Ewen Dingwall, was hired jointly by Edward Carlson and Civic Center Commission leader Harold Shefelman as project director for the development of the civic center and the World's Fair. Dingwall's first major hire was architect Clayton Young, who oversaw every aspect of the site's transformation for the World's Fair with an eye to its post-fair use as civic center. A volunteer Design Standards Advisory Board was comprised of a group of Washington architects (Perry Johanson, John Detlie, Robert Deitz, and Paul Thiry); Seattle's Planning Commission Director John Spaeth; Seattle-born but Detroit-based architect Minoru Yamasaki; and San Francisco landscape architect Lawrence Halprin.



Above: Image of KeyArena at night, looking west. Source: Seattle Public Library.

In August 1958, Paul Thiry was appointed primary architect for the joint civic center/world's fair project. Thiry worked with Clayton Young to ensure that pre-fair decisions would dovetail with post-fair use. Numerous architects created buildings for the site, and all of their designs had to pass muster with Thiry.

Funding for the more substantial buildings came from the city, King County, the state, and the federal government. Corporate and private exhibitors funded smaller structures. While the fair had benefitted from the voter-approved bond issue that purchased 28 acres of the site and paid for some construction, the civic center (and thus the city and region) benefitted from land and construction financed by these other entities. On February 28, 1961, the civic center was officially named Seattle Center. Century 21 Exposition – the Seattle World's Fair – opened April 21, 1962 and welcomed nearly 10 million visitors before concluding on October 21, 1962. During the fair the site was busy, crowded, its venues heavily programmed. As the fair's end drew near, the question of which structures would be retained became pressing.



Aerial view of Playhouse and Exhibition Hall in the last stages of construction. Source: Seattle Public Library.

Redevelopment for Seattle Center

After the fair, some buildings that were clearly intended to be temporary were demolished, or sold for salvage. Memorial Stadium, owned by Seattle Public Schools, reverted to that body's control. The Armory lease was continued by Seattle Center, and the building was purchased by the city. The Coliseum, the Playhouse, and the Opera House were planned to last post-fair, while the Science Pavilion and the privately-owned Space Needle had very clear architectural and practical significance and had to stay. The Coliseum and the surrounding International Commerce and Industry buildings were altered, as planned, for post-fair use. Many other buildings proved that the fair's built environment provided great post-fair potential. Many small structures that might have been temporary were instead retained after the fair, pressed into service when the need arose, or even inspired Seattle Center staff to dream up creative programming to make them useful. Many of these structures served multiple uses in the decades after the fair, especially during the early years as Seattle Center leaders groped their way toward understanding what they had in all that construction, what they could program into it, who they would partner with, and – especially – how they would fund it.

Changing Needs and Uses

The fair's layout utilized buildings to channel the flow of visitors to four main entrances. Today, the focus is creating a more permeable site resulting in less channeling of the flow of visitors and the use of open space as internal and external connectors. Over subsequent decades, Seattle Center's built environment was periodically pruned and edited to continue this process of opening the campus to its surroundings. This happened most substantially in late 1989 when the fair's massive, 500-foot long Domestic Commerce And Industry Building (also called Building 55), that closed the campus off along Broad Street, was demolished, allowing the creation of the Broad Street Green. It is an example of the complex dance of historical significance and usefulness that is inherent in what all of the fair planners wanted: a civic



Historic image of skybridge crossing over Mercer Street from the Mercer Street Parking Garage to the fair site. Source: Seattle Public Library.

center that serves the citizens of Seattle admirably, a place of cultural and community usefulness that is allowed to transform.

Newer construction has opened Seattle Center to an expanded audience in terms of age (Seattle Children's Theatre, the Skate Park, Vera Project), accessibility (compliance with the Americans With Disabilities Act has helped everyone from stroller-users to wheelchair-users), and cultural taste (Experience Music Project, Chihuly Garden and Glass). As Seattle's population grew and changed over the years, what Seattle's citizens asked of their Seattle Center also changed and evolved. Seattle's built environment gained density, and Seattle Center visitors increasingly appreciated the respite the site's views and open spaces could provide. The city in general grappled with encouraging historic preservation while stimulating new growth, and Seattle Center struggled to respect and celebrate the fair's legacy while responding to deterioration in virtually all of the fair-era buildings. Long-awaited infusions of funding via several bond issues gave Seattle Center the chance to patch and repair the most egregious deterioration on the campus, but never to fix all of it. In recent years, increasingly sophisticated methods of public/private partnerships continue to impact and influence Seattle Center's physical development, exemplified most fully so far by McCaw Hall and Chihuly Garden and Glass. This has been an ongoing struggle, challenge, and opportunity. Seattle Center's Century 21 Master Plan, adopted in August 2008, freshly envisions the center's built environment and open spaces as they connect with each other and with the greater Seattle Center neighborhood. Built to inspire during the fair and to be useful after, Century 21 Exposition's buildings – some architecturally stunning, some utilitarian – have served Seattle Center now for over half a century. Like the campus, they are all workhorses, responding to our evolving community's choices, dreams, and needs.

POST WORLD'S FAIR HISTORY

Seattle Center has served its community for half a century, amply meeting – exceeding – the goals, hopes, and dreams of fair founders and of those who shaped and fought for the Center during its earliest years. Many fledgling arts organizations have found steady footing within Seattle Center buildings. The millions of hours of skill and dedication exercised by performers, designers, and technical staff within the Playhouse, McCaw Hall, Armory/Center Theatre, Seattle Repertory Theatre, and Seattle Children's Theatre have brought Seattle

Center audiences transformative artistic moments that continue to resonate. Seattle Opera and Pacific Northwest Ballet – both gestated, born, and nurtured in the Opera House/ McCaw Hall – flourish and enjoy deep community support.

Seattle Center has hosted some events that instantly became benchmarks in our civic history: The Beatles performance in the Coliseum (now KeyArena) in 1964 brought the white-hot Fab Four together with thousands of screaming Seattle fans. Seattle Art Museum's landmark King Tut Exhibition in 1978 drew thousands of visitors to Seattle Center to marvel at these globally important artifacts. The International Fountain spontaneously became a gathering place for shell-shocked grieving mourners in the days following the September 11, 2001 terrorist attacks, demonstrating Seattle Center's deep worth as a touchstone of community solace. His Holiness the 14th Dalai Lama's appearance at KeyArena in 2008 brought children and young people from throughout the region to focus together on the transformative power of compassion. Seattle's SuperSonics were KeyArena's main tenant, galvanizing and delighting basketball fans – especially after winning the NBA championship in 1979 – until their deeply mourned departure in 2008. And when then-presidential candidate Barak Obama appeared at KeyArena on the chilly morning of February 8, 2008, even that massive venue could not contain the crowds that surged in to shout out, "Yes, We Can."

Countless children – Seattle's future electorate – learn to know and care about Seattle Center on school or family visits to Pacific Science Center, Seattle Children's Theatre, or Seattle Children's Museum. Festivals – especially the annual campus-wide Folklife Festival and Bumbershoot – pack Seattle Center with a huge array of visitors whose backgrounds and culture reflect our ever-diversifying city. Cloudy days find parents treating children to pizza in the Armory, lifting them to peer at the Winterfest model train display, or keeping track of shoes as sock-footed youngsters scramble through giant inflatable rides during Whirligig. When the sun shines, people of all ages and walks of life pause to bask, play, or contemplate around the center of the Center – the glistening International Fountain.



Everett DuPen's Fountain of Creation. Source: Seattle Public Library.





Left: Aerial view of the fair grounds, from brochure. Source: Seattle Public Library.

Above: Aerial view of Pacific Science Center. Source: photo by Werner Leggenhager, courtesy Washington State Archives.

ASSESSMENT

This assessment addresses properties within the Seattle Center campus that are 50 years or older and not previously listed as a City of Seattle Landmark.

The status section provides an overview for the study area of currently listed properties and previous inventory forms.

The building and landscape sections include a brief historical synopsis, physical description, list of character-defining features and spaces, and chronology of alterations. Character-defining features and spaces distinguish the property's visual character and their identification follows methods set forth in the National Park Service Preservation *Brief 17, Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character*. The Chronology of Alterations lists changes for each property, organized by date (when known).

Status

To focus survey efforts, existing City of Seattle Landmarks and previously documented properties were identified. Refer to Listed Properties Table and Listed Properties Map for the listing.

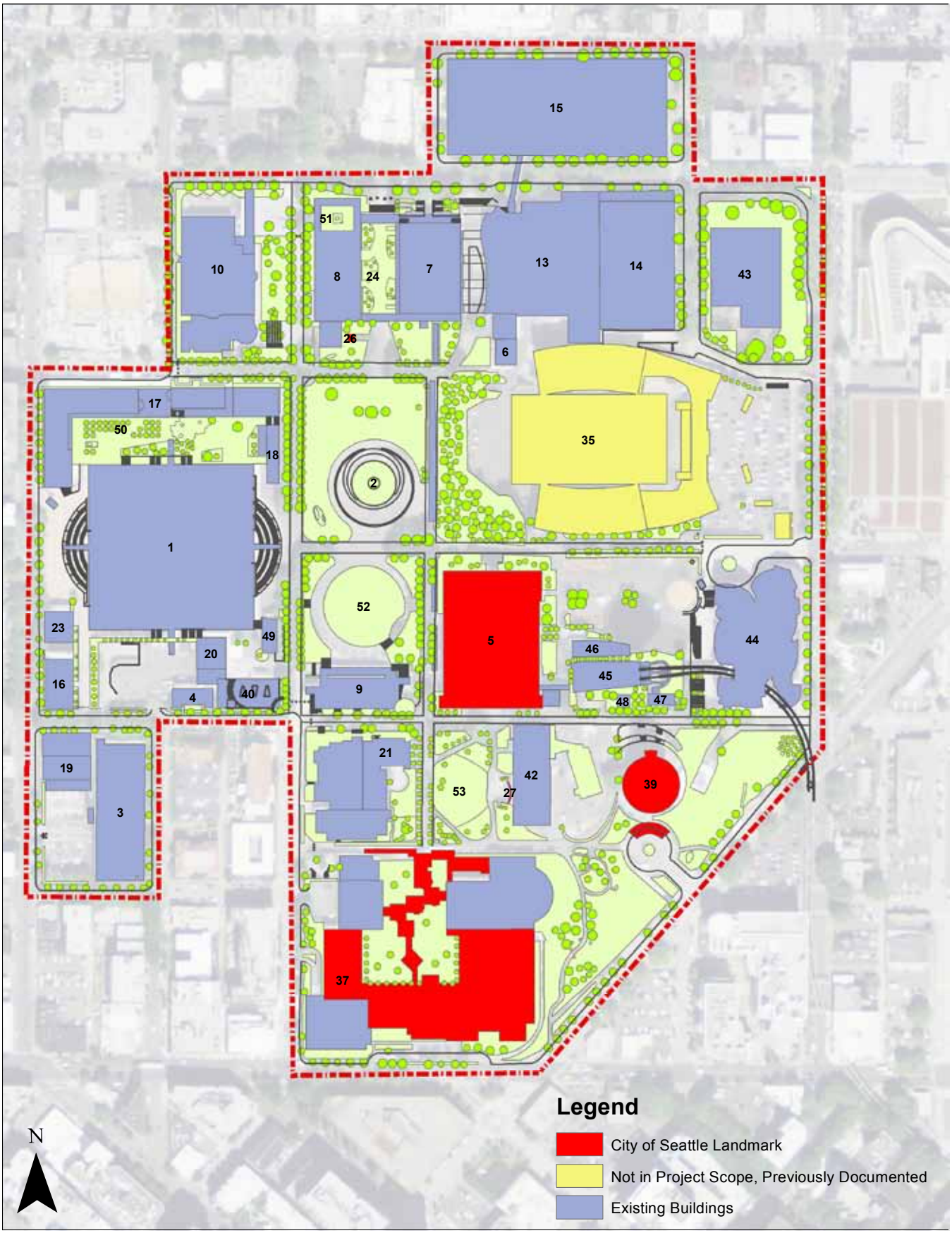
Listed Properties Table

PROPERTY NAME	LISTING DATE	LANDMARK ORDINANCE NUMBER
Space Needle	4/19/1999	119428
Seattle Center House (Armory)	5/10/2010	123298
Pacific Science Center	7/21/2010	Pending
Seattle Monorail	8/4/2003	121240
Kobe Bell	5/10/2010	123297
Horiuchi Mural	5/10/2010	123292

The following list identifies properties within the survey area having unique conditions. The summaries state the reasons for their inclusion or exclusion.

- **Memorial Stadium and Memorial Wall**. Both are owned by Seattle Public Schools ownership and have draft nomination applications prepared which are currently on hold. Consequently, they are not included within this survey of city properties.

Listed Properties Map



- **Monorail**, *Monorail Historic Review and Landmark Nomination* prepared in 2000 addressed the integrity of the monorail and associated facilities. The 2003 ordinance (121240) listed the monorail and identified parts of the Monorail for which a Certificate of Approval is not required. The following lists only those parts at Seattle Center. For this reason, these Monorail-related properties at Seattle Center were not included in the survey:

  - 1962 elements of Seattle Center Station site
  - Skybridge to the Center House
  - Seattle Center Administrative Offices/Alweg Building (exterior and interior) (note the lower portion of the building was enlarged in 1991 to plans by YCK Architecture & Planning)
  - Paving, ramp and stairs at Seattle Center Station
  - Electrical vault building
  - Two ticket booths

- **Mercer Arts Arena,** for which Seattle Center has a long term lease with the Seattle Opera. The responsibility falls to the Seattle Opera, as the long term lessee, to undertake a study, but they have not chosen to at this date. Due to consideration of the associated Mercer Garage, Exhibit Hall/ Phelps Center, and Playhouse an assessment of this building is included to address only the exterior 1961 conversion as part of the fair.
- **McCaw Hall** is included in the survey as a matter of documentation; although McCaw Hall continues its historic function as a performing arts venue, the building exterior, interior, and west plaza have been extensively altered.
- **Contemporary properties** for the purpose of this study are those built in 1989 or later based on study publication in 2013. Contemporary properties are not addressed in this study.

The following Inventoried Properties Table provided a starting point for research and field work by identifying background on properties built in or before 1989 that have been surveyed and recorded in the City of Seattle, Department of Neighborhoods online **Survey Database** or the Washington State Department of Archaeology and Historic Preservation's online **WISAARD** database.

Inventoried Properties Table

PROPERTY NAME	ID	IN CITY DATABASE	IN WISAARD
KeyArena	1	yes	yes, 1979; 2000; 2004
Blue Spruce Building	4	yes	yes, 2000
Exhibition Hall	7	yes	yes, 2000
Playhouse	8	yes	yes, 2000
Mercer Arts Arena	14	yes	yes, 2000
Mercer Street Parking Garage	15	yes	yes, 2000
NASA Building	16	yes	yes, 2000
Northwest Rooms	17	yes	yes, 2000
International Fountain Pavilion	18	yes	yes, 2000
West Court Building	23	yes	yes, 2000
Pottery Northwest / Gardener's Facility	19	yes	yes, 2000
Monorail Terminal	46	yes	yes, 2000
Gift Shop	47	yes	yes, 2000
KCTS 9 Building	43	no	no
Seattle Repertory Theatre	10	no	no
Seattle Children's Theatre	21	yes	yes, 2000



1962 aerial watercolor print of Century 21 Exposition. Source: Seattle Public Library.

Buildings

This section is organized thematically. The two main concentration areas are the Paul Thiry (Thiry) grouping and Kirk, Wallace and McKinley (Kirk) grouping. These correspond with the KeyArena and Theatre District Master Plan zones, respectively. Buildings are listed by the current name followed by historic name(s) in parenthesis (name) and Seattle Center drawing index identification number in brackets [##].

Thiry Concentration

Buildings included in this concentration area:

- International Fountain Pavilion
- KeyArena
- NASA Building
- Seattle Center Pavilion
- Northwest Rooms
- West Court Building

Open spaces included in this concentration area:

- International Plaza

Open spaces are covered in more depth in the Open Space section, but are described briefly in conjunction with each building.



Above: 2013 view of the International Fountain Pavilion. Source: Artifacts Consulting, Inc.



Left: Historic image, looking north, of the International Fountain Pavilion and the east end of the Northwest Rooms. Source: Puget Sound Regional Branch, Washington State Archives.

International Fountain Pavilion [18]

Significance:

This structure was part of Paul Thiry's International Commerce and Industry complex surrounding the Coliseum/KeyArena. Designed by Paul Thiry, the building was funded by King County. During the fair, the Boulevards of the World complex – the fair's main shopping area – separated the Sweden Pavilion from the International Fountain. Boulevards of the World was demolished immediately following the fair.

The building was leased to Northwest Craft Center from 1963 until 2012. Both exterior and interior remain largely unchanged from their appearance during the fair, probably as a result of the building's use by one organization. This building, more than any other built for the fair, retains the most interior and exterior physical integrity. From April 21 to October 21, 2012, it was the site of the Museum of History and Industry's commemorative exhibit on the Seattle World's Fair, a traveling exhibit featuring world's fairs through history, and a photography exhibit depicting young people whose innovative ideas might make them future leaders.

Physical Description:

Completed in 1962, the International Fountain Pavilion is located at the northeast corner of the Coliseum. It formed part of the International Plaza, yet it faces east, away from the other buildings in its group and towards the heart of Seattle Center campus. This Modern style, single-story building had a rectangular footprint on a poured concrete foundation; a contemporary rear (west) utilitarian addition has altered the footprint to a T-shape. The clear span structure has steel columns as a framing system, clad with tilt-up concrete panels and glass. A flat, steel framed roof with wide overhanging eaves caps the building. On all sides of the building, steel joists extend out beyond the walls to support the eaves. Corrugated steel decking comprises the roof structure and the underside of the eaves. The roof extends over the adjoining, mostly intact open-air stairwell to the north. The original cladding and windows are mostly intact. The original plan and interior have been slightly modified.

On the interior, the mostly open volume features exposed roof trusses and roof decking. Three public entrances to the building are spaced along the east (front) facade. These feature replacement doors set within original openings. A fourth entrance, at the north end of the east facade, has been converted to display windows. During the Century 21 World's Fair, carpeting covered at least a portion of the floor. After the fair, the carpeting was presumably changed quickly to asbestos floor tiles, which are largely intact. Shallow steps and ADA ramps navigate slight changes in the floor grade. Freestanding partition walls separate the main exhibit space from service and storage areas along the west side of the floor plan.

Character-Defining Features:

- Footprint and massing
- Flat roof with overhanging, corrugated steel decking eaves
- Steel roof framing

- Painted concrete tilt-up walls with abstract round relief ornament
- Large expanses of glazing, including glass doors and wood framed fixed windows
- Square white light fixtures attached to undersides of eaves

Chronology of Alterations:

- 1964: Adapted to post-fair use as Northwest Craft Center
- 1976: Removed wood stops at window exteriors, temporarily removed glazing to clean and repair existing settings, reinstalled glass panes; bathroom added
- 1976: Electrical upgrade, including new exit lights
- 1996: New exterior doors (three sets); removed northernmost pair of east doors in favor of display windows; existing panels along upper portion of east wall repainted; added roof insulation
- 1990s: ADA work
- Undated: Rear (west) addition



Eave detail on International Fountain Pavilion. Source: Artifacts Consulting, Inc.



1962 view of KeyArena and Plaza of Flags. Source: Photo by Art Hupy, courtesy University of Washington Special Collections.

KeyArena [1]

Significance:

Heralded for its hyperbolic paraboloid roof suspended from a framework of concrete beams, the Washington State Coliseum housed Century 21's theme exhibit, The World of Tomorrow, a honey-comb shaped "cloud" of 3250 aluminum cubes 200-feet across and 60-feet high (as tall as a six-story building). Visitors accessed the cube structure in groups of 100 via Plexiglas Bubbleator elevator. As they ascended, the Bubbleator operator gave the first speech of a 21-minute multi-sensory performance complete with imagery, taped dialogue, odors, dramatic music, and sound and lighting effects that the visitors would navigate. The show's official title was "The Threshold And The Threat" – the threat being nuclear annihilation, and the threshold being the present time. In addition to the iconic roof, the Coliseum's huge size – it covers the majority of four city blocks – and clear span construction placed it among the fair's most noted architecture.

In addition to the theme exhibit, the Coliseum also housed:

- The American Library Association Exhibit
- General Motors Corporation Exhibit
- Pan American Airways Exhibit
- Washington Tourist Information Center
- Government of France Exhibit
- Cancer Research Exhibit
- Radio Corporation of America Exhibit

After the fair, the city of Seattle purchased the Coliseum from the state and converted it into an all-purpose convention and sports facility, to plans by Paul Thiry. This conversion was mainly a reconfiguration of interior spaces and the addition of ramps and partition walls. The Bubbleator was relocated to the Food Circus/Center House/Armory, where it remained until 1980. In 1967, the Coliseum became home to the Seattle Supersonics, the city's first major league sports franchise. The venue has also been used for circuses, rock concerts, ice skating shows, and many other events over the years. Between 1994 and 1995 the building was completely reconstructed, including lowering the court 35 feet below street level. The architectural integrity of Thiry's roofline was maintained by using the existing steel trusses in combination with four new main diagonal trusses. As much of the wood, steel and concrete as could be salvaged were used to construct the new structure. It reopened in 1995 as KeyArena.

Physical Description:

Completed in 1962, KeyArena occupies a square footprint at the west edge of Seattle Center, interrupting Warren Avenue and Harrison Street. This Modern – Populuxe/ Googie style building has a hyperbolic paraboloid form.[1] Four sets of three-legged, massive concrete abutments support this clear span structure. Each facade has one of these four sets of abutments, centered. The abutments support massive external concrete edge beams at the parabolic roof's perimeter as well as four original triangular section girders. The four original triangular section steel trusses in the roof framing are oriented to the cardinal directions. Four diagonal trusses were added in 1995, replacing the original cable-net portion of the roof structure.[2] Replacement aluminum, standing-seam aluminum roofing panels replaced the original aluminum panels. The exterior framing is completed with massive V-shaped concrete piers between the three-legged abutments. The

1 "An Architect's Guidebook to the Seattle World's Fair," *Architecture West,* April 1962, p. 18.
2 Joseph E. Gandy, "Coliseum 21: Going Up!," Progress Magazine, September 1960. Courtesy of the Seattle Public Library's Century 21 Digital Collection.



Historic image of KeyArena, looking west. Source: photo by Ken Prichard, Courtesy Ken Prichard.

glass curtain wall is largely intact, with minor alterations such as relocation of entrances due to the grade excavation around the building. Replacement lites are located around the lower reaches of the curtain wall, with intact lites above.

KeyArena has been extensively altered on the interior, with no changes to the overall building footprint. The main entrances at the west and east plazas had to be lowered after the site was excavated to increase the usable interior space. The concourse around the interior perimeter is open to the ceiling, as is the arena space. The arena bowl, seating and concessions are free-standing. Concrete and steel framing members are exposed on the interior of the arena. The cobblestones laid around the exterior and interior perimeter of the curtain walls came from the original International Fountain, which in turn took them in 1962 from old streets in Seattle.[3]

Character-Defining Features:

- Footprint and massing
- Roof form
- Exposed concrete framing on interior and exterior
- Exterior wall glazing (curtain wall) and slanted orientation of lites
- Glass doors at principal entrances
- Exterior wall fan unit on north facade
- Cobblestones, interior and exterior

Chronology of Alterations:

- By 1979: Interior bowl seating increased from about 12,000 to 15,000 seat capacity. (Later removed and replaced with current seating.)

3 KeyArena, Historic Property Inventory Report, prepared by Michael Houser, Washington Department of Archaeology and Historic Preservation, February 2004.

- 1994-1995: Roofing removed, along with the cable-net suspended roof. The four original trusses left in place, four additional (diagonal) trusses added to replace the cable-net system. Existing bowl seating removed, exhibition floor excavated 35 feet down, new bowl and seating (17,000 seat capacity) constructed. Truss covers replaced.
- 1996: South suite improvements
- 1999: Renovate existing storage area into new food and beverage space and modernization of existing concessions adjacent –east and south concourses
- 2003: New steel canopies and improvements at two entrances (courtside and suite entries)
- 2004: Conversion of south suite space into a club area by removing two walls, opening up the entries, and creating two serving counters and two bars (one at each end)
- Circa 2005: North suite improvements
- Undated: Large downspouts added to exterior; southeast ticket sales addition; conversion of multiple secondary entrances at main level to windows
- Undated: Upper portions plus other select panes of glazing painted black to obscure mechanical systems



2013 view of KeyArena. Source: Artifacts Consulting, Inc.





Left: Historic view of NASA Building. Source: University of Washington Special Collections.

Above: 2013 image of NASA Building. Source: Artifacts Consulting, Inc.

NASA Building [16]

Significance:

NASA's $2 million exhibit was the organization's first large-scale attempt to tell the story of the United States space program. Designed by Paul Thiry, construction of the building was funded by King County. For many fair-goers, exhibits in the NASA Building would have been their first exposure to space exploration outside the realm of science fiction. After the federal government's science exhibit, NASA's was the largest exhibit at the fair. Fair-goers saw models of satellites launched by the United States, including Explorer, Vanguard, Pioneer, Ranger, Mariner, and Topside Sounder. Actual rockets and scaled-down models were also featured. These were joined by John Glenn's Friendship 7 midway through the fair. The spacecraft, in which Glenn had only recently made America's first orbital space flight, was displayed in the NASA Building as the concluding – and only American – stop on a 24-nation global tour during which it was viewed by more than 8-million people. The craft went directly from the fair to the Smithsonian, where it is now the first artifact encountered by visitors to the Smithsonian Museum of Air And Space.

Post-fair, the NASA Building was mainly used as storage space. Part of the building was relocated to Pavilion "B" in 1995 during construction of the loading dock during the Coliseum's renovation into KeyArena, and is now called Seattle Center Pavilion. The portion that remains on the original site is designated "NASA" and used for Seattle Center facilities maintenance equipment.

Physical Description:

Built in 1962, the NASA Building is a single-story, clear span structure at the northeast corner of Thomas Street and 1st Ave N. It is of similar construction and design as the Northwest Rooms and International Fountain Pavilion. Steel columns provide the structural framing. The rectangular footprint rests on a poured concrete foundation. A flat, steel framed roof with wide overhanging eaves caps the building. On all sides of the building, steel joists extend out beyond the walls to support the eaves. Corrugated metal decking comprises the roof structure and the underside of the eaves. Although original designs for the NASA Building called for open sides facing KeyArena, historic photos from the Century 21 World's Fair show the building was always enclosed. The north and east facades had corrugated metal cladding, with tilt-up concrete panels on the west and south facades. There have been moderate changes to the original cladding. The few original windows from the fair were removed at an unknown time.



1962 Werner Leggenhager photograph of east entrance to the NASA Building. Source: Seattle Public Library.

There have been extensive changes to the original plan, notably the removal of the east wing. That wing accounted for more than half of the original footprint. A portion of the removed wing was repurposed and relocated as Seattle Center Pavilion. The southern half of the current NASA Building's east facade was once inside the original NASA Building. A tall freight/loading entryway with a contemporary metal roll-up door has been cut into the east facade's 6th and 7th bays (with 1st at the south end) of the east facade, accessible via a short concrete ramp. To the north on the east facade, a set of double metal security doors provides service access to the building. In the north facade, a single metal door atop a short flight of steps behind a concrete half-wall at the far west end accesses the building. The only other openings in the north facade are two added ventilation louvers high in the wall. The west facade has three similar louvers, also high in the wall. There are no openings in the south facade. Planting strips surround the building on the west, south, and east sides. Surface parking directly abuts the north facade.

Interior access to this building was not necessary, due to the level of alterations and the utilitarian nature of the building.

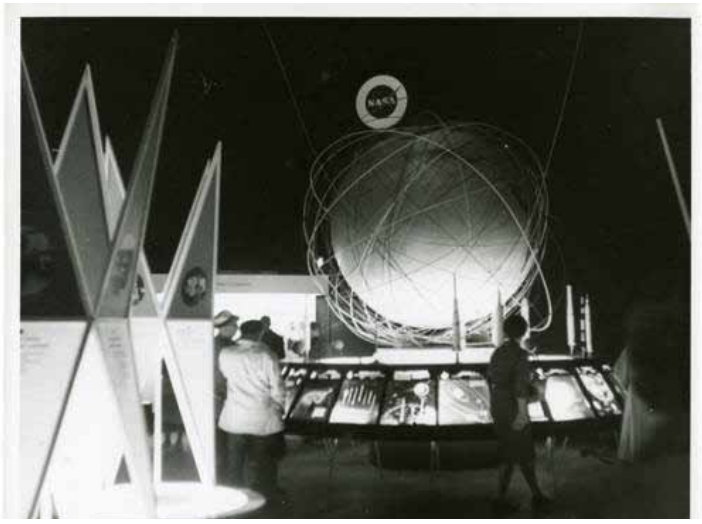
Character-Defining Features:

- Footprint and massing
- Flat roof with overhanging, corrugated steel decking eaves
- Steel roof framing
- Painted concrete tilt-up walls, either plain or with abstract round relief ornament

Chronology of Alterations:

- 1964: Adapted to storage use
- 1980: Previously added roll-up door relocated (on former east wing, now Seattle Center Pavilion); metal louvers added to upper wall reaches
- 1981: Storage facility improvements
- 1995: Removed east wing, relocated to current site of Seattle Center Pavilion; select south and east bays clad with relocated concrete tilt-up panels (both decorative and plain)





Left: 2013 image of relocated portion of the NASA Building. Source: Artifacts Consulting, Inc.

Right: 1962 interior photograph of the NASA Building, taken by Werner Leggenhager. Source: Seattle Public Library.

Seattle Center Pavilion [20]

Significance:

Refer to the significance statement for NASA Building [16].

Physical Description:

Built in 1962, this building (20) is the relocated east wing from the Century 21 Fair's NASA Building. This Modern style building is a single-story, tall volume structure on the south side of the Coliseum, between Warren and 2nd avenues. It is of similar construction as the NASA Building, the Northwest Rooms, and International Fountain Pavilion. The rectangular footprint rests on a poured concrete foundation. This clear span structure is framed with steel columns and originally clad with tilt-up concrete panels and corrugated metal sheets. A flat roof with wide overhanging eaves caps the building. On all sides of the building, steel joists extend out beyond the original building's walls to support the eaves. Corrugated metal decking comprises the roof structure and the underside of the eaves. The cladding has been extensively altered. Decorative tilt-up concrete panels remain on the west and north facades; on the east and south facades, contemporary metal panels and concrete block replace the original cladding. The original plan has been extensively altered, from a relocation of the core as well as an addition to the south. The addition is distinguishable by its lower height and east facade curtain wall. During the fair, the Seattle Center Pavilion (as part of the NASA Building) originally had few or no windows, and it has none today. Doorways are not historic.

Interior access to the Seattle Center Pavilion was not necessary, due to the extensive alterations made to this building.

Character-Defining Features:

- Footprint and massing
- Flat roof with overhanging, corrugated steel decking eaves
- Steel roof framing
- Painted concrete tilt-up walls with abstract round relief ornament

Chronology of Alterations:

- 1995: Relocated to current site (formerly the east wing of the NASA Building; replacement cladding; new roof likely added
- 1996: South storefront addition with canopy, new concrete masonry unit wall added to south facade of main building



Historic view of the southwestern end of the Northwest Rooms, showing the former United Arab Republic Pavilion. Source: Photo by Ken Prichard, Courtesy Ken Prichard.

Northwest Rooms [17]

Significance:

The Bureau of International Expositions – the governing body that granted Century 21 Exposition true World's Fair status – stipulated that participating nations be provided free space, protected from the elements. Designed by Paul Thiry, these spaces were funded by King County. Thiry's buildings were an overarching protective structure for the various free-standing pavilions within, and were fully enclosed after the fair to enable their use as a conference and meeting facility. The Northwest Rooms form an L-shaped complex arranged around a two-level interior courtyard. The International Fountain Building [18] adjoins the Northwest Rooms to create a larger U-shaped edge opening to the International Plaza and KeyArena.

The following national exhibits used these facilities during the fair:

- The United Arab Republic Pavilion
- The Government of Brazil Pavilion
- The European Economic Communities Pavilion
- The Government of Japan Pavilion
- The Government of Denmark Pavilion
- The Government of Mexico Pavilion
- The Government of Canada Pavilion

The city took possession of KeyArena in early 1963, and Paul Thiry's contract overseeing the site was extended through late 1964. Thiry converted these structures to serve as support areas – meeting rooms, lecture halls, banquet halls – for large conventions utilizing KeyArena after the fair. Locker rooms were added beneath the buildings on the north and south sides of KeyArena. Extensive renovations to the interiors of these buildings have occurred over the years.

Physical Description:

Completed in 1962, the Northwest Rooms building is a clear span structure at the northeast corner of Thomas Street and 1st Ave N. It is of similar construction and design as the NASA Building, Seattle Center Pavilion, and the International Fountain Pavilion. The west and north facades, facing the surrounding streets, are solid except for two pass-through areas for site access. Concrete columns provide the structural framing, clad with solid tilt-up concrete wall panels on the north and west facades. The west and north facades have never featured windows. In contrast, the east and south facades are oriented inwards



2013 image of Northwest Rooms, looking north. Source: Artifacts Consulting, Inc.

to the International Plaza and KeyArena. The east and south facades, originally at least partially open-air, were enclosed after the fair with sheets of glass or aluminum. The building rests on a poured concrete foundation. A flat, steel framed roof with wide overhanging eaves caps the building. On all sides of the building, steel joists extend out beyond the walls to support the eaves. Corrugated steel decking comprises the roof structure and the underside of the eaves. An original pre-cast concrete railing borders the concrete stairs at the southeast corner of the west wing. There are two pass-through corridors in the north wing, providing separations between the building segments and circulation for pedestrians between the plaza and Republican Street. The roof is continuous over these corridors, which are open on either end. Added skylights allow increased daylighting to the building.

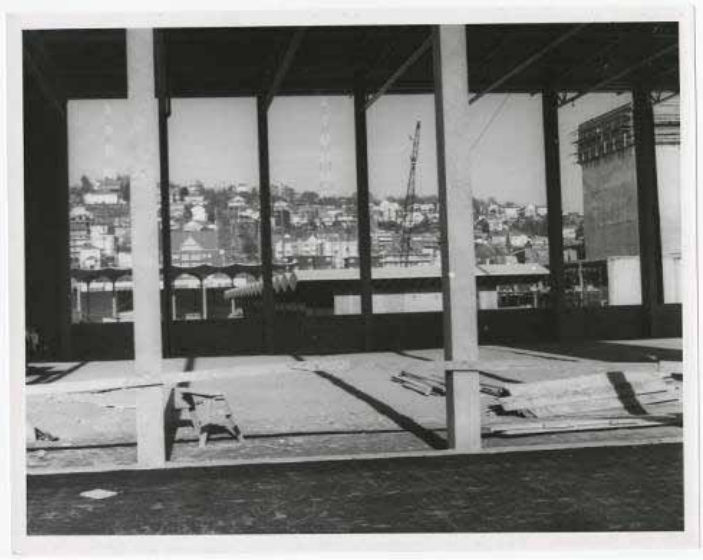
The interior contains a single main story with a basement below the west and northwest portions, and a mezzanine in the eastern portion. A tunnel, excavated as part of the building's original construction, connects these basement spaces with the KeyArena. Interior spaces and finishes have been highly altered throughout the Northwest Rooms. Originally, the entire building 's main floor was designed with an open volume for exhibits. The only exception was the far eastern at grade portion of the Alki Room, which features public restrooms.

Character-Defining Features:

- Footprint and massing
- Flat roof with overhanging, corrugated steel decking eaves
- Concrete columns, exposed on interior and exterior
- Steel roof framing
- Painted concrete tilt-up walls with abstract round relief ornament
- Large expanses of glazing, including glass doors and fixed windows facing inward to the campus
- Square white light fixtures attached to undersides of eaves
- Lower level restrooms at easternmost end of building
- Aluminum louver panels
- Floating second floor in Alki Room, set back from windows
- Exterior Solex glass sunscreens on Alki Room

Chronology of Alterations:

- 1964: Adaptation of existing, partially open exhibit spaces to permanent, enclosed buildings with meeting and exhibit rooms, storage, restrooms, etc.; partition walls added, along with mechanical systems, suspended ceilings, interior floor divisions (mezzanines), etc. Aluminum louvers and glass sunscreens designed by Paul Thiry, 1964.
- 1980: Alki Room renovations (main and upper floors) - new rails, light fixtures, finishes, systems, etc.
- 1981: Northwest Rooms electrical upgrades
- 1983: General Northwest Rooms improvements. New finishes (e.g., replace existing ceiling and floor tiles), door openings, interior walls. Enclose portion of exterior colonnade with storefront system. Hollow metal doors added along Republican Street. Double tempered glass doors in aluminum frames added to other select locations.
- 1988: Rainier Room sewer replacement
- 1991: Added aluminum cladding panels to south and east facades, also in pass-through corridors and north facade of Alki Room; stripped, repainted mullions; new interior finishes, light fixtures and wall alignments for Northwest Rooms; exterior wavy canopies added to north facade; skylights added
- 1993: General Northwest Rooms improvements. New cladding, interior finishes, plan changes



1961 Werner Leggenhager photograph of Northwest Rooms under construction. Source: Seattle Public Library.

- 1995 remodel of basement spaces for staff use in conjunction with the KeyArena conversion
- 2007: Vera Project, with interior room reorganizations and new partition walls added; select south facade glazing painted
- 2010: SIFF alterations with film added over glass
- 2011-12: Remodel of upper level of Alki Room to accommodate SIFF
- Undated: Exterior sunscreens on Alki Room added (before 1991)



Historic view of the West Court Building. Source: Forde Photographers, Courtesy Seattle Center Foundation.

West Court Building [23]

Significance:

This modest two-story reinforced concrete office building housing Western Pacific Insurance Company was sited within the footprint of the fairgrounds. Designed by Alfors V. Peterson and John W. Adams in 1953, the building was purchased by the State of Washington. Instead of demolishing it, fair planners repurposed it to serve as exposition headquarters before and during the fair. Architects Tucker & Shields prepared the designs for remodeling the building for fair use in 1960. All of the fair's top brass, including fair president Joseph Gandy, Washington Governor Al Rosellini, and World's Fair Commission Executive Director Alfred Rochester, had offices here.

After the fair, the building reverted to the state of Washington. It housed the Research Division of the Department of Commerce and Economic Development and the State Military Specifications Library, and then a variety of state offices before being acquired by the city in the mid-1980s. Since then, it has served a variety of utilitarian purposes for Seattle Center. It currently serves as the box office for KeyArena.

Physical Description:

Completed in 1953, the West Court Building is a two-story concrete and steel frame, Modern style building at the southeast corner of KeyArena. The square footprint rises from a poured concrete foundation. A flat roof and parapet cap the building. Expressed concrete piers and concrete spandrels comprise the exterior frame, with steel columns spaced evenly throughout the floor plan to support the second floor and ceiling. Painted stucco clads the exterior of the building. The northwest corner of the ground floor has been cut away under an elliptical canopy. Large contemporary display windows at that corner highlight the new retail space on the interior. Original window openings remain on the second floor in the west, south and east walls, but all window sashes have been replaced. These second floor windows fill the width of the recessed bays between piers. Second floor windows mimic the original fenestration pattern, but consist of replacement aluminum sashes. Select windows have been removed and infilled or converted to other openings (doors, box office windows, ventilation panels) on all facades. There is a single contemporary horizontal, fixed, aluminum framed rectangular sash at the ground floor of the east facade. A solid metal security door accesses the building at the north end of the east facade. A planting strip extends halfway along the east facade. Surface parking directly abuts the south facade. Lighting fixtures extend from the south and east parapets. Concrete pavement directly abuts the west and north facades. A contemporary box office, with multiple ticket windows sheltered by an added shed roof canopy, occupies half of the north facade. A contemporary decorative fin wall

projects midway from the north facade, between the box office and the retail space.

Interior spaces were not accessed. From architectural drawings, this building has been extensively altered on the interior to accommodate shifting uses over time. The footprint has had slight alterations, and the original windows have been extensively altered. The original cladding is intact under added layers of paint; in-kind cladding has been added where windows have been removed.

Character-Defining Features:

- Footprint and massing (except for the cut-away northwest corner and canopy at the ground floor)
- Roof form and parapet
- Expressed concrete piers and recessed bays
- Concrete spandrels
- Fenestration pattern on the upper floor of the west, south and east facades

Chronology of Alterations:

- 1991: Converted second floor to offices for Seattle Arts Commission
- 1994: Inserted box office windows and added metal shed roof canopy over them on north wall exterior; filled existing window openings at ground floor in east wall with new concrete to match existing; created new door opening in the north facade; created new door opening in east wall at north end
- 1995: Created retail space for Sonics at northwest corner of ground floor from former office spaces; cut away northwest corner bays to make a diagonal wall at the first floor with tempered glass display windows and double doors; added elliptical canopy over that corner, supported by added column; added north fin wall; removed an existing window in south wall, replaced with intake louver; removed remaining ground floor south windows and infilled with cast in place concrete to match existing exterior; cut new ground floor window opening in east wall, near north end. An underground tunnel (called the jetway) was constructed connecting the building to the main concourse level of KeyArena.
- 1997: Non-display windows replaced
- Undated: Parapet along north wall extended upward and later reduced again; removed historic canopy over southwest entrance (after 1993); light fixtures added to parapet (since at least 1995)



2013 view of the West Court Building. Source: Artifacts Consulting, Inc.



2013 view of the Exhibition Hall. Source: Artifacts Consulting, Inc.

Kirk Concentration

Buildings included in this concentration area:

- Exhibition Hall
- Playhouse
- Colonnade
- Mercer Street Parking Garage
- Marion Oliver McCaw Hall
- Mercer Arts Arena

Open spaces included in this concentration area:

- Founders Court

Open spaces are covered in more depth in the Open Space section, but are described briefly in conjunction with each building.

Exhibition Hall [7]

Significance:

The Fine Arts Pavilion contained five main galleries housed in a one-story space with a mezzanine balcony around all four sides. Art exhibits held here during the fair are considered to have been major turning points in Seattle's visual arts history, particularly the groundbreaking "Art Since 1950" exhibit. Almost 1.5 million visitors toured the Fine Arts Pavilion during the fair. During the fair, the building's only exterior illumination came through very narrow slit windows along the east and west sides. The cavernous interior was designed for flexible use to suit conventions and exhibitions post-fair, and the building was planned to be used as a major convention center. It was leased for a wide variety of uses after the fair.

In 1993, the upper level of the Exhibition Hall – the formerly unused air space between the ground floor and the roof – was remodeled to house Pacific Northwest Ballet's studios, offices, and ballet school, and reopened as the Phelps Center. Part of the renovation involved the creation of much larger light bay windows, allowing exterior light to penetrate the studios. The lower level houses the Exhibition Hall, a heavily utilized rental venue.

Physical Description:

Constructed in 1961, the Modern – Neo Formalist building, designed by Kirk, Wallace, McKinley & Associates, features a rectangular plan and stands on a poured con-

crete foundation. The three story reinforced concrete building has a concrete folded plate roof. The concrete walls are clad in brick veneer. Cutouts in the brick and tall narrow windows flanking each bay originally provided a visual interruption along the brick walls. Numerous contemporary oriel window additions now provide daylighting to the building's interior. A full-height colonnade runs along the building's north and south elevations, connecting it to McCaw Hall (the former Opera House) and the Playhouse. The building's original cladding appears to be intact. Exterior alterations to the building include an elevator addition on the south elevation with suspended walkways bisecting the colonnade, a contemporary one-story height colonnade along the west elevation, and a re-tooling of the circulation and stairways to the main entrance on the north elevation. New windows punctuate the building's facade.

In addition to the original large open volume for exhibit space, the building had spaces for offices, utilities, and a kitchen. Uninterrupted vertical bands of wall, flanked by narrow windows and capped by the visible underside of the folded plate roof, accentuated the interior's vertical emphasis. Alterations to accommodate the new use divided the original open space into two levels; the new upper level holds the ballet facilities including rehearsal spaces, locker rooms, and offices, while the lower level remains an open space. The lower level retains the original stairs leading from the entrances off of the east and west courtyards down into the space, but numerous structural columns added to support the new floor above visually break up the once open hall.

Character-Defining Features:

- Colonnade
- Folded plate roof
- Cladding
- Brick piercing and tall windows

Chronology of Alterations:

- 1963, Kirk, Wallace, McKinley & Associates, kitchen alterations
- 1967, office alterations and additions
- 1991, William Bain Jr. of NBBJ, new ballet facilities, elevator addition on south elevation, oriel windows added, new lighting



1962 Werner Leggenhager photograph of the Exhibition Hall entrance. Source: Seattle Public Library.

- 1994, Van Horne & Van Horne, Exhibition Hall walkways updated
- 1995, Van Horne & Van Horne, improved ballet facilities, lighting, acoustics, updated restrooms



Historic view of south and east elevations of the Playhouse. Source: University of Washington Special Collections.

Playhouse [8]

Significance:

The 800-seat Playhouse was constructed in just 34 days. During the fair, this venue hosted performers from around the globe. Its peaceful courtyard – including James Fitzgerald's four piece abstract bronze fountain in a center pool – was an oasis of calm nestled against the northern border of the fairgrounds. With a colonnade running along its Mercer Street façade and linking the building with the Exhibition Center, Opera House, and Arena, the Playhouse formed the western anchor to the fair's performing and visual arts corridor. A contemporary architectural reviewer stated, "For me, the element of the fair likely to emerge as the most admirable after all the tumult and hosannas for the more 'spectacular' structures have died down, is the complex designed by Kirk, Wallace & McKinley to house the playhouse, exhibition center, and remodeled opera house and arena. In beautifully restrained style, using no elaborate methods of construction, the Kirk firm has provided a delightful series of exterior and interior spaces which may be said to be socially significant in a large sense … The series of buildings…is tied together by a roof-high colonnade."[4]

In 1963, the Playhouse became home to the newly-formed Seattle Repertory Theatre, an organization that came into being specifically to provide programming and a permanent tenant for the Playhouse. Seattle Rep moved to the newly-constructed Bagley Wright Theatre in 1982, and in 1987 the heavily renovated Playhouse reopened as home to the Intiman Theatre. The 1987 renovation did not significantly alter the building's exterior or lobby, but completely reworked the actual theater space, reducing seating capacity to 446, steeply racking the seating area, and converting the stage from a proscenium arch to a semi-thrust proscenium configuration. This renovation also included construction of a two-story rehearsal studio addition at the building's south side.

In 1989, the Playhouse courtyard was dedicated to World's Fair Vice President/General Manager and long-time Seattle Center Director Ewen Dingwall in apprecia-

4 James T. Burnes, Jr., "The Architecture of Century 21," ***Progressive Architecture***, June 1962, 51.

tion for his vision and enthusiasm for Seattle Center from 1957 to 1988. In 2011, Intiman ceased regular operation (while still occasionally mounting productions). In 2013, Cornish School for the Arts began leasing the building.

Physical Description:

Constructed in 1961, the building originally served as the Playhouse Theater for the Century 21 Exposition. The Modern – Neo Formalist building, designed by Kirk, Wallace, McKinley & Associates, features a rectangular plan and stands on a poured concrete foundation. The two story reinforced concrete building has a flat roof. A fly loft rises from the roof at the southern end of the building. The concrete walls are clad in brick veneer. A colonnade the full height of the building runs along the building's south elevation, connecting it to the former Fine Arts Exhibit building to the east. The western end of the colonnade is bricked in, partially screening the stage door from view. Slim concrete posts and a recessed rounded rectangular detailing of the passage's ceiling characterize the colonnade. Colonnades with the same detailing encircle a courtyard to the north of the building. Brick, matching the building's cladding, fills the spaces between the outer colonnade supports on the north, east, and west, and shelters the courtyard. Access to the courtyard and the building's main entrance is provided through open entranceways on the east and west. A wide flight of stairs leads from the west entrance to an intermediate landing and branches into two side flights to the floor (and main entrance) below. There appear to be moderate changes to the original plan and extensive changes to the original windows. The original cladding appears to be intact. Other alterations include new railings on the stairway, an elevator addition on the south elevation with suspended walkways bisecting the colonnade, and a re-working of the landscaping in the courtyard.

Constructed as the Playhouse, the building continues as a theater. In addition to the auditorium space the building features a main entrance lobby and associated mezzanine with a two-story wall of windows looking north out towards the courtyard. While the building maintains the view out to the courtyard through the wall of windows, the lobby space has been altered with the relocation of the main stairs, which lead from the main level up to the upper level access to the auditorium. Furthermore, the auditorium has been extensively altered to create a more intimate theater and accommodate newer equipment.



2013 view looking of the Playhouse courtyard. Source: Artifacts Consulting, Inc.

Character-Defining Features:

- Courtyard and 1961 James Fitzgerald Fountain of the Northwest, illuminated bronze sculpture.
- 1964 carved river rock sculpture, Barbet, created by James Washington Jr.
- Stairs down into courtyard
- Colonnades
- Cladding
- Massing

Chronology of Alterations:

- 1976, Paul Hayden Kirk of Kirk, Wallace and McKinley, balcony additions, landscaping alterations and new pavers
- 1986, Albert D. Bumgardner, added mechanical spaces and additional stairs from side lobbies to theater
- 1989, Sajan Inc. Consulting Engineers, roof repairs
- 1996, Schreiber & Lane Architects, general improvements
- 1997, Robert E. Wallis, interior lobby stairs relocated, north entrances relocated, new elevator added on south wall with new balcony and concrete beam





Left: 2013 detail of colonnade concrete post base in the Playhouse courtyard. Source: Artifacts Consulting, Inc.

Above: 2013 view looking east along Exhibition Hall's north colonnade. Source: Artifacts Consulting, Inc.

Colonnade

Significance:

Colonnades built as part of the Century 21 Exposition were constructed as integral parts of adjoining buildings. The Exhibition Hall and Playhouse feature prominent colonnades connecting the buildings along their north and south sides. The north colonnade also functioned as the north gate opening to the Presidential Plaza (known today as Founders Court), and they connected the north end of the Playhouse with the Grand Court containing the Fitzgerald's sculpture and fountain. Colonnades were also constructed as extensions of the 1961 renovations of the McCaw Hall building and the Mercer Arts Arena.

Physical Description:

Colonnades run along both the north and south elevations of the Exhibition Hall and continue west across the Founders Court to the Playhouse, visually and physically connecting the two buildings. The colonnade running along the Mercer Arts Arena is intact, but the colonnade which fronted McCaw Hall on the north was removed with the building's 2001 renovation.

Slim concrete posts and a recessed rounded rectangular detailing on the ceiling characterize the colonnade. Colonnades with the same detailing also encircle the Playhouse courtyard.

Character-Defining Features:

- Slim concrete posts
- Pressed rounded rectangular ceiling detailing
- Cylindrical light fixtures

Chronology of Alterations

- 2001 and 2003, LMN Architects, removal of colonnade along north facade of McCaw Hall to accommodate exterior remodel





Above: Historic view of Mercer Street Parking Garage. Source: Bryce Seidl Collection.

Right: 2013 view of concrete detailing on Mercer Garage. Source: Artifacts Consulting, Inc.

Mercer Street Parking Garage [15]

Significance:

Early estimates predicted that 80% of the hoped-for 7.5 to 10 million visitors would drive to the fair. Parking was a high priority, and fair planners worried constantly that a lack of available spaces would hurt ticket sales. The four-level Mercer Garage includes 1,337 parking spaces, covers two city blocks, and was the only parking facility constructed near the fairgrounds, with the exception of surface lots. The city built and owns the Mercer Garage, but the Century 21 Exposition Company leased it during the fair. Despite a nod to decoration – sculptured precast panels designed by Charles Smith – the garage is largely utilitarian. Conveniently located and connected to the campus by an overhead walkway, the Mercer Garage has changed little since serving fairgoers.

Physical Description:

Built in 1961 as a parking garage, the Modern structure designed by Kirk, Wallace, McKinley & Associates with structural engineering by Norman G. Jacobson & Associates features a rectangular plan and stands on a poured concrete foundation. The structure is two blocks long and one block wide. The four-level reinforced concrete parking structure has a flat roof with parapet which serves as the upper parking level. Exposed aggregate concrete panels clad the exterior walls. Precast concrete panels highlights the building's corners, beneath the skybridge, and the entrances on the west and east elevations. The panels at the east and west entrances featured cast bronze elements within the recesses. These bronze elements remain only at the east entrance. Charles Smith designed these sculptural panels. Open stairwells are located in the center of the parking garage's south elevation and at all four corners. An open sky bridge extends from the south elevation across Mercer Street to McCaw Hall. The structure's original plan and cladding appear intact. Alterations to the structure are quite minimal and include added signage and metal panels inserted in an open bay on the west elevation.

The garage features one-way traffic and angle parking on ramps and level sections organized within a four helix interlocking ramp parking system. Cars primarily enter the structure from 3rd Avenue N through a double entrance located on the west elevation. Cars can also exit through the east elevation out onto 4th Avenue N. A secondary entrance is located on the north elevation, off of Roy Street. In addition to the structure's stairwell systems, an elevator provides access to each parking level.

Character-Defining Features:

- Cladding (exposed aggregate concrete panels)
- Fenestration
- Pressed concrete detailing on structure's outer corners (at stairwells)

Chronology of Alterations:

- 1991, K. Michael Nickerson of Church Nickerson Jensen Jonas Architects, office added within southwest corner of the parking structure, included plywood siding and aluminum frame windows
- 2003, Northwest Architectural Company, reconstructed canopy over existing stair





1962 view of McCaw Hall, looking along Mercer Street. Source: Seattle Public Library.

Below: 2013 image of McCaw Hall looking south along the promenade. Source: Artifacts Consulting, Inc.

McCaw Hall [39]

Significance:

Constructed in 1928, the building now known as McCaw Hall originally served as Seattle's Civic Auditorium. In preparation for the Century 21 Exposition, the building was drastically altered in 1961 to function as the fair's Opera House and aesthetically align it with the Mercer Arts Arena, Exhibition Hall, and Playhouse. Priteca and Chiarelli designed the new facade for the Civic Auditorium building in the same Modern – New Formalist style, transforming it into the Opera House. A continuation of the colonnade on the Playhouse Theater and the Exhibition Hall ran across the north elevation of the 1961 building's facade. Sepia colored brick cladded the building's exterior, highlighting it in comparison to the lighter colored brick present on adjacent buildings. A second, large-scale remodel between 2001 and 2003 further altered the appearance of the building and associated plaza along its west side to its current look as McCaw Hall.

Physical Description:

The building now features an irregular-shaped footprint. The two story structural steel building has varied rooflines. A curved curtain wall comprises the entire west elevation. Nine metal mesh scrims form a promenade along the building's west elevation. Metal siding clads the building's other facades. The cladding, plan, and windows of the 1928 and 1961 versions of the building have all been extensively altered.

The building's interior has been extensively modified since its 1928 construction. The building features four levels of lobbies along its western portion and the curved curtain wall provides a view out to the courtyard separating the building from the Exhibition Hall. The building currently features a large 2,891 seat auditorium, a smaller 381 seat lecture hall, and other reception spaces. The building's current interior configuration is vastly different from previous versions.

Character-Defining Features:

- None

Chronology of Alterations:

- 1961, Priteca & Chiarelli, conversion and exterior cladding for the World's Fair
- 1999, Central Utility Plant constructed as a first step in the larger 2001 and 2003 remodel project
- 2001 and 2003, LMN Architects, exterior and interior remodel, including redesign of the courtyard along the building's west facade

Mercer Arts Arena [14]

Significance:

Complete with Wurlitzer pipe organ, the 1928 Civic Ice Arena, designed by Schack, Young & Myers, had served Seattle skaters and hockey fans for decades before its refurbishment for the fair. In 1961, Kirk, Wallace, McKinley & Associates redesigned the exterior for the Century 21 Exposition. Following this redesign, the exterior of the Mercer Arts Arena, McCaw Hall, and the Exhibition Hall shared brick cladding and colonnades, creating visual harmony among the fair's Mercer Street edge. Bassetti & Morse's renovation of the trusty Civic Ice Arena in 2001 converted some restrooms into dressing rooms, added an insulation cover over the ice surface, improved heating and ventilation systems, and added a portable stage platform – all relatively minor changes. The venue hosted a wide variety of family-oriented performers during the fair, including the Roy Rogers and Dale Evans western show, the Ringling Borthers and Shrine circuses, the Benny Goodman and Count Basie orchestras, Ella Fitzgerald, and many others.

After the fair, the Arena was a popular venue for rock concerts, hockey games, and other events. Renamed Mercer Arena in 1995 and Mercer Arts Arena in 2001, the facility hosted Seattle Opera and Pacific Northwest Ballet performances during construction of Marion Oliver McCaw Hall. In 2008 the Seattle Opera signed a long term lease option for Mercer Arts Arena, enabling the company to bring together all its operational departments.

Physical Description:

Originally constructed between 1927 and 1928, renovations on the former Ice Arena in preparation for the Century 21 Exposition drastically altered the building's appearance in 1961. These 1961 alterations served to aesthetically align the arena with other fair buildings designed in the Modern – New Formalist style, including the Playhouse and Exhibition Hall. The architects, Kirk, Wallace, McKinley & Associates, retained the original footprint of the building choosing to encapsulate it within a new exterior facade. The building features a rectangular footprint. The one story poured concrete building has a front gable roof with eight small cupolas projecting up from the ridgeline; the roof system is a remnant of the building's original appearance. Tan colored bricks



2013 image of the Mercer Arts Arena. Source: Artifacts Consulting, Inc.

clad the building. A colonnade runs along the building's north elevation, visually connecting it to the Exhibition Hall and Playhouse Theater. Slim concrete posts and a recessed rounded rectangular detailing of the passage's ceiling characterize the colonnade. Three sets of segmental arch doorways provide access to the building's interior on the north facade. A trio of tall doorways punctuates the center of the elevation; shorter paired doorways are located on either side of the trio. Two bronze lanterns, likely dating from the original building's facade, are present between each set of doorways. While the building's original plan has been obscured and the original cladding extensively altered, the 1961 plan and cladding largely retain their integrity.

The building maintains its original use as an arena, and while it retains a large, open interior volume, the materials and configurations within the space have been altered over the years. The building interior was not accessed.





Above: 1962 view of the Mercer Arts Arena interior. Source: Puget Sound Regional Branch, Washington State Archives.

Right: 2013 view of bronze lantern on Mercer Arts Arena exterior facade. Source Artifacts Consulting, Inc.

Character-Defining Features:

- Colonnade
- Brick
- Bronze lanterns

Chronology of Alterations:

- 1961, Kirk, Wallace, McKinley, & Associates, conversion in anticipation of Century 21 Exposition, increasing lobby spaces and improving arena area
- 1964, James J. Chiarelli of Priteca & Chiarelli, AIA, remodel for use after fair, remodeling of north and east foyers, reworking of arena
- 1979, Rigg Nelson Walker Cavage, arena improvement project
- 2001, arena temporary venue improvements, altered arena seating, exterior box office relocated inside building, interior reconfigured by LMN (Loschky Marquardt & Nesholm)

Individual Buildings and Structures

Buildings included in this section:

- Blue Spruce Building
- Seattle Repertory Theatre
- KCTS 9 Building
- Covered Breezeways
- Pottery Northwest/Gardener's Facility
- Seattle Children's Theatre

Blue Spruce Building [4]

Significance:

Designed by George Bolotin in 1956, the unassuming Blue Spruce apartment building consisted of five one-room and 21 two-room apartments, and served as much-needed office space for fair staffers before and during the exposition. The building was acquired by the City of Seattle and used by the Century 21 Exposition, Inc. for fair departments including Site Development, Purchasing, Personnel, Concessions, Operations and Services, Advance Ticket Sales, and Lodging. Post-fair, the Blue Spruce was leased to tenants including Greater Seattle, and over the years has served as office Space for many Seattle Center tenants and producing organizations. The building's origin as an apartment house is clearly visible – no modifications other than signage have been made to its exterior – and while this references the neighborhood that once occupied the fair/Seattle Center footprint, it has been perhaps the most utilitarian structure of all those used during the fair, with the possible exception of the Mercer Garage.

Physical Description:

Completed in 1956, the Blue Spruce Building occupies a U-shaped footprint on the north side of Thomas Street, just south of the KeyArena. This building has a Modern, multi-family residential form. The three-story, concrete block structure stands on a poured concrete foundation. Exterior walls are clad with concrete block. On the south walls of the east and west stairwells, the concrete blocks are laid in a decorative relief pattern, with alternating quads of blocks recessed or protruding, producing a zigzag effect. A flat roof and surrounding parapet cap the building. Bands of stepped out sheet metal form the parapet. The footprint's U-shape opens to the south, with



1957 image of the Blue Spruce Building (Blue Spruce Apartments, Administration Building). Source: Puget Sound Regional Branch, Washington State Archives.

poured concrete balconies above the ground floor wrapping the courtyard and overlooking Thomas Street. Metal wrought-iron railings line the balconies. Exterior doors at all floors in the south facade access the former apartment spaces, now offices. On the south, east and west facades, large window units allow daylight into the interior. Most windows appear to be original, aluminum-framed, single pane fixed and casement types. Smaller versions of these same window units are regularly spaced across all bays on the north facade and at the ground floor in the east wall. Select windows are replacements, with matte (silver) aluminum frames. Stairwells are located at the east and west ends of the building, featuring poured concrete steps and metal pipe handrails. A single, partially glazed metal door accesses the west stairwell at the ground floor from the east side; the same kind of door accesses the east stairwell from the west side. The west stairwell also has an open eastside doorway protected by a contemporary metal gate. Replacement fiberglass and plywood panels cover the stacked window openings in the south walls of the end stairwells. Original mailboxes are located at the west and east ends of the ground floor, next to the stairwell doors. An aluminum framed, wall mounted building directory is adjacent to the east mailboxes.

The original cladding appears to be intact, along with the footprint and overall plan. There appear to have been moderate changes to the original windows.

Character-Defining Features:

- Footprint and massing
- Roof form
- Floor plan and spatial arrangement
- Balconies (but not railings)

- Mailboxes
- Building directory
- End stairwells
- Aluminum-framed windows and fenestration pattern
- Patterned concrete work in cladding
- Exterior doors
- Finished concrete floor surface along balconies and in stairwells

Chronology of Alterations:

- 1960: Converted to offices for the Century 21 World's Fair
- 1993: Reroofing, alterations to third floor plan
- Undated: Replaced balcony railings and select windows; replaced and/or infilled windows in south walls of stairwells (plywood and fiberglass panels now); rearranged roof drainage system changed (scuppers added, downspouts relocated); added contemporary metal gate to exterior of southwest stairwell entrance



Below: 2013 image of the Blue Spruce Building. Source: Artifacts Consulting, Inc.

Seattle Repertory Theatre [10]

Significance:

Designed by NBBJ in 1981, construction removed all landscaping and existing former fair buildings and structures from the site was formerly occupied by the International Commerce and Industries Buildings surrounding the International Mall.

The International Commerce And Industry Buildings, designed by the firm of Walker & McGough, housed the pavilions of India, Republic of Korea, United Nations, African Nations, Thailand, Philippines, San Marino, City of Berlin, and the Peace Corps. The pavilions were demolished immediately after the fair, and the International Commerce and Industry Buildings were demolished in 1981. The north terminal for the 76 Skyride, located on the International Mall, was dismantled in 1981.

Seattle Repertory Theatre (founded in 1963 and housed in the World's Fair Playhouse) broke ground for their own venue, the future Bagley Wright Theatre, named for the Rep's founding board member, in 1981, mounting their first season there in 1983. The Bagley Wright Theatre was the first major new construction on Seattle Center's campus since the fair. Neon tubing on the front facade done by Stephen Antonakos in 1983. In 1996, the Rep undertook a major addition adding a second stage, the Leo Kreielsheimer Theatre.

Physical Description:

Completed in 1983, the Seattle Repertory Theatre is located in the northwest corner of the Seattle Center campus, occupying most of the city block bordered by Mercer and Republican streets and 2nd and Warren avenues. The building is executed in the Modern style. A poured concrete foundation supports reinforced concrete walls and an irregular footprint. Painted stucco clads the exterior walls. Metal framed, multi-lite, fixed windows are the predominant window type. A varied height (stepped) flat roof caps the structure's irregular internal volume. This building dates to the post-World's Fair period, although the zigzag footprint of the west and north retaining walls are a relic of the fair. A series of entrances is contained within a ribbon of glazing at the southeast corner. The original cladding and windows appear to be intact. There appear to be moderate changes to the original plan, with addition(s) to at least the south end.



2013 image of the Seattle Repertory Theatre. Source: Artifacts Consulting, Inc.

The interior of the theater was not accessed.

Character Defining Features:

- Footprint and massing
- Exterior neon lights
- Curvilinear and stepped walls
- Asymmetrical composition
- Horizontal banding

Chronology of Alterations:

- 1995: Fire protection, mechanical, electrical, technical, site (grading, paving), and structural updates
- 1996: Wall and door system; addition adding a second stage off the south side of the building and a covered walkway off the northeast corner
- 2002: Addition and reroofing
- 2010: the landscaping added as part of the theater construction was redone to form the Theater Commons



2013 view of KCTS 9 Building. Source: Artifacts Consulting, Inc.

KCTS 9 Building [43]

Significance:

Built by KCTS 9 on city-owned Seattle Center property. During the fair, the current KCTS 9 site and open space around it was occupied by the Show Street complex – Century 21's adult entertainment area. Structures designed by Paul Thiry housed diverse attractions including Peep Backstage USA, Bavarian Tavern, Girls of the Galaxy, Gay Nineties Review, Antique Car Show, Diamond Horseshoe, Flor de Mexico, Indian Village/TeePee Salmon Barbeque, Cellier de Pigalle, and Stella. A theater building by Roland Terry contained Les Poupees de Paris nude marionette show, a magic show, and Paris Spectacular wax museum. Howard Dong and Associates designed Gracie Hansen's Paradise International – the pride of Show Street. All of these buildings were funded by Century 21 Exposition, and all were moved or demolished following the fair. Some – most notably the Gracie Hansen building – were given to King County in exchange for funding buildings elsewhere on the fairgrounds. In 1984, KCTS 9 public television constructed a home for all of their operations, which had been scattered across the University of Washington campus. McKinley Architects designed the new building. KCTS sought to build its home at Seattle Center in order to be near the cultural institutions housed there, and planned to broadcast their performances. The site on which KCTS built had been unused since the fair. Although the public television station is much less actively engaged with the live public than most of its neighbors, the cultural programming it produces and broadcasts is consistent with Seattle Center's focus on arts and culture.

Physical Description:

Constructed in 1984 as a broadcast studio, the Modern building features an L-shaped plan and stands on a poured concrete foundation. The two story reinforced concrete building has a flat roof with parapet. Rounded arch shaped parapet walls highlight the north and south elevations. Barrel roofs clad in standing seam metal extend from the parapets. The building's walls are clad in a tan colored brick. Long wall expanses of patterned brick on the west and east elevations are capped by ribbon of windows. Tall narrow windows flank patterned brick expanses on these elevations. Triangular-shaped covered areas, formed by a heavy pillar and a diagonally run wall of windows, are located at both the northwest and northeast corners of the building. The main entrance is located along the northwest diagonal window wall. Two loading bays are present on the building's south elevation. The building's plan, cladding, and windows appear to be intact.

Character-Defining Features:

- Brick cladding and patterned brickwork
- Tall narrow windows

Chronology of Alterations:

- Slight modifications to the rear loading bay

Covered Breezeways

Significance:

Free standing covered breezeways respond to our Pacific Northwest maritime climate, providing shelter from the rain for pedestrians along the main circulation corridors. These represent a 1970s addition to the site.

Physical Description:

Covered breezeways facilitate north-south circulation within the Seattle Center campus. Constructed in 1973, these utilitarian structures feature a rectangular plan. The steel structure of the breezeways rises from poured concrete piers. Steel posts support the pyramidal hipped roof of the breezeway structure. Panes of wire glass fill in between the ribs of the roof, providing shelter from the elements. The structure's materials and plan appear largely intact.

Character-Defining Features:

- Narrow footprint
- Roof glazing

Chronology of Alterations:

- 1984 additional covered walkways added





Above and right: 2013 images of covered breezeways. Source Artifacts Consulting, Inc.



Above: 2013 view of Pottery Northwest /Gardener's Facility building. Source: Artifacts Consulting, Inc.



Right: Detail of original door on east elevation of Pottery Northwest /Gardener's Facility building. Source: Artifacts Consulting, Inc.

Pottery Northwest /Gardener's Facility [19]

Significance:

The brick structure was constructed by contractor Vincent Bressi in 1923 as an automobile repair garage, operated in that function through the 1940s by Dominick Bressi (likely his brother). Architect M. C. Heinemann designed the building. By 1950, it was occupied by the City Transfer & Stage Company. During the fair, World Wide Distributors, Inc., a wholesale general merchandise firm, occupied the building. Its size, condition, and proximity to Seattle Center made it attractive to the city, and in April 1966, Seattle purchased it for $132,000.

Pottery Northwest, founded in 1966 and originally housed on the second floor of the Seattle Center Armory (then called the Food Circus), moved to this site in 1973. Van Horne Architects were hired to design the remodel. They performed seismic upgrades, re-pointed the brick, built out the interior to facilitate meeting and classroom space, clay mixing areas, electric kilns, and made other improvements. The building's adjoining courtyard houses gas-fired kilns. The courtyard's south side now abuts Seattle Center's open parking lots and the entry drive to the First Avenue North garage. When built, the open parking lot site was occupied by a former commercial laundry building that was used as a to-go food concession during the fair. An addition to the building was constructed in 1976, also to plans by Van Horne Architects.

Physical Description:

Constructed in 1923 (according to the county assessor), the one story vernacular commercial-style building built by M.C. Heinemann features a rectangular plan. The poured concrete foundation supports the common bond brick walls. The building has a hip roof set on a flat roof and enclosed by stepped parapet walls on the west and south ends. Situated on a corner lot at the southeast corner of Thomas Street and 1st Ave N, the garage has two prominent facades, the north and west elevations. The west elevation is divided into five bays by wide brick piers. Brick corbels highlight the window openings which feature multi-paned windows below multi-paned transoms. All the windows on the west elevation have been replaced. Brick piers continue on the north elevation, dividing the facade into six bays. The north elevation bays have similar detailing as those on the west. The north elevation retains most of its original multi-paned windows. One bay now features a large overhead door while another has been partially bricked in and now has a contemporary entrance door. The east elevation, accessed via an alley, retains the outline and header for the original auto bays, but



2013 view of southeast corner of Pottery Northwest /Gardener's Facility building. Source: Artifacts Consulting, Inc.

the openings have been filled in with concrete block. The south wall is a shared party wall with an adjacent building, also a part of the former Bressi Garage operations.

The central bay of the south portion has been modified and now features a contemporary entrance door with surrounding mosaic. A wood frame addition, covered by a corrugated metal clad shed roof, projects form the south elevation along almost its entire length. The east elevation, accessed via an alley, appears to retain its original fenestration, with a central entrance bay flanked on either side by two multi-paned wood windows. The alley entrance door is a sliding wood double door; a mullion separates twelve panes of glass on either side of the door. The north wall is a shared party wall with an adjacent building, also a part of the former Bressi Garage operations.

Historically, the interior of the building was most likely a relatively open volume to facilitate the garage business. A 1973 renovation remodeled the garage for use as pottery studio, which kept much of the interior open, but added a locker area, office, display room, and a mezzanine level for a lounge space. A 1986 renovation remodeled the garage for use as a gardener's facility to support Seattle Center maintenance staff.

Character-Defining Features:

- Brick walls and brick detailing
- Bays
- Multi-paned wood windows
- Stepped parapet walls

Chronology of Alterations:

- 1973, Audrey L. Van Horne of Van Horne & Van Horne Architects, garage remodeled into artist studio, shed addition along south elevation to house external kilns
- 1976, south addition
- 1986, Ing & Associates, north facade roll-up door added, original west elevation double door removed, original brick reused to fill door opening, single door added to north elevation, hanging planters added to building exterior, original windows removed on east elevation



1962 Werner Leggenhagger photograph of the Seattle Children's Theatre east entrance. Source: Seattle Public Library.

Seattle Children's Theatre [21]

Significance:

This addresses only the pre Century 21 Exposition Nile Shrine Temple within the larger complex of contemporary buildings and additions known today as the Seattle Children's Theatre.

Built as the Nile Shrine Temple, Club 21 was a private club for top fair brass, Seattle businessmen and their wives, and high-ranking visitors and exhibitors. The building was leased from the Shriners by the Century 21 Exposition, Inc. Members enjoyed dining facilities, meeting rooms, showers and barbershop, switchboard, paging, stenographic services, and nightly entertainment. Club 21's $250 membership fee included a permanent gate pass to the fair and use of all Club 21 facilities for member and wife. With the exception of one female fair staffer from the Public Relations department, all Club 21 members were male. Designed by Samuel Morrison in 1956 and funded by the Nile Temple Holding Corporation. As constructed for the Nile Temple, the L-shaped building included offices, storerooms, lounge and card rooms, and a 700-seat auditorium which could double as a banquet facility.

Although originally planned to revert to its owners after the fair, within a year of the Exposition's conclusion the city entered a lease agreement for the continued use of the property. The Nile Temple was used as the gift shop for the 1978 King Tut exhibit. The city purchased the building in 1979. Beginning in 1983, it housed the Pacific Arts Center and, beginning in 1987, some operations of the Seattle Children's Theatre (then performing at the PONCHO Theatre at Woodland Park Zoo). In 1993 it was renovated and became part of the Seattle Children's Theatre complex (built 1993, expanded 1995). The complex includes the Charlotte Martin Theatre, the Allen Family Pavilion, the Eve Alvord Theatre and the Drama School. The latter two facilities incorporate the former Club 21. Exterior design elements on the entire theater complex are referential to the Nile Temple wavy roofline design.

Physical Description:

The former Nile Shrine Temple is currently part of the Seattle Children's Theatre complex. The complex was constructed in three phases, with the 1991 and 1993 sections comprising the majority of the floor plan. The original building in the complex was built as the Nile Shrine Temple in 1956. It occupies the northeast portion of the current Seattle Children's Theatre complex. The former Nile Temple is located in the southern end of Seattle Center, at the southwest corner of 3rd Avenue North and Thomas Street. This Modern style building originally had an L-shaped floor plan. Rising from a poured concrete foundation, the reinforced concrete framing supports a barrel vaulted roof. Concrete blocks in-fill the walls between the poured concrete piers. Painted stucco and concrete block comprise the cladding. At the northeast entrance, two sets of original double doors are extant but hardware has been removed and the doors are currently locked shut. One set of replacement double doors is operable but no longer used as a public entry. A tall canopy over this entryway, plus lower canopies to either side, is all original. Original window units are arched, multi-lite, metal framed sashes on the upper wall reaches. A ribbon of square and rectangular, multi-lite, metal framed sashes stretch along the east wall's lower level. Select windows have been removed/infilled as part of the current theater use. All original windows on the south and west elevations were lost to new additions. There have been extensive alterations to the original plan and the original windows.

On the interior, the original building has a varied volume, ranging from one to two stories. The main entrance was once through the northeast vestibule, which is now defunct. The current main entrance to the original building is through the set back east entryway, under an extended hard canopy. The Eve Alford Theatre space occupies what was once a general purpose gathering space for the Nile Temple. Behind and above the Alford stage, a mezzanine space reveals a portion of a former proscenium opening. The south wing of the original building features a two-story volume, with a north-south central corridor at each floor. Rooms opening off these corridors serve administrative and classroom purposes. The lower corridor retains more integrity with regard to openings, door surrounds, and spatial arrangement than the upper floor corridor. Rooms on the east side of the corridors retain original window openings and sashes.

Character-Defining Features:

- Massing of original building portion
- Cladding (stucco, concrete block)
- Window openings
- Window sashes
- Canopies
- Roof form
- Northeast entry and vestibule (including double doors)

Chronology of Alterations:

- 1991: Southwest addition(s)
- 1993: Charlotte Martin Theatre addition
- 1995: Eve Alford Theatre renovation and build out
- Undated: ADA ramp on north side, removal and infill of windows in north and south walls of original building, addition of ventilation louvers in northeast vestibule wall, replacement of one set of double doors at northeast entry, removal of hardware from two sets of double doors at northeast entry, replaced doors and extended a hard canopy at the secondary east entrance (set back from street)





Above: Historic view of the Seattle Children's Theatre, showing the former Nile Shrine Temple and Club 21. Source: Puget Sound Regional Branch, Washington State Archives.

Below: 2013 image of the Seattle Children's Theatre, showing the former Nile Shrine Temple and Club 21. Source: Artifacts Consulting, Inc.



Historic aerial view of the Century 21 Exposition grounds. Source: Photo by Ken Prichard, Courtesy Ken Prichard.

Open Space

Main Entrances

Main entrances represent a feature specific to the fair. Since entry to the fairground required ticket purchase, planners reduced public access to the fair grounds to five locations. Today, entrances have all become open spaces to support open connections between the Seattle Center and surrounding neighborhood. Entrance locations:

East Entrance (Fifth Avenue North) defined by multicolored totem poles designed by Bassetti & Morse. This entrance was located on the block just north of the street right-of-way. Today this is the open area near KCTS 9.

South Entrance (Broad Street) defined by multicolored totem poles designed by Bassetti & Morse. Today this area is defined by the Broad Street Green landscape redesign of the green space created by the removal of former pavilions along Broad Street.

West Entrance (West Harrison Street) defined by the direct entry to the KeyArena (Washington State Coliseum), book ended between the Northwest Buildings and Fair Headquarters and groves of trees. Although the axial alignment of West Harrison Street remains and this continues to function as the main public access point to KeyArena, the 1990s redesign of the west plaza, coupled with interior changes to the arena significantly altered this entrance.

Monorail Arrival Entrance via the City of Seattle Landmark designated monorail provided a key connection with downtown Seattle.

North Entrance, also known as the Presidential Gate (today known as Founders Court), was designed by Kirk, Wallace, & McKinley and funded by the City of Seattle. This served as the most formal of the five established entrances. Entering off Mercer Street, this entrance in conjunction with the Presidential Court served as the formal arrival point and sequence for dignitaries. The location and sequence of spaces allowed dignitaries to proceed through directly to the International Fountain at the core of the fairgrounds. With the exception of the Monorail arrival point, this is the only fair-era site entrance still serving as a visually defined entrance to Seattle Center.

Character-Defining Features:

- North Entrance
- Monorail Arrival Entrance

Chronology of Alterations:

- 1964, entrance turnstiles and ticket sales gates were removed at the fair's conclusion from each of the four gates.
- 1984 construction of the KCTS 9 Building completed the slow transition of this block following the fair and its former role as the east gate.
- 2000s Broad Street Green redesign of the landscaping along Broad Street including the former south gate location
- 1995 conversion of the KeyArena and surrounding plazas, including the former west gate location.

Trees

The 2009 *Landscape Management Plan* identifies candidates for Legacy Trees and officially Dedicated Trees having a plaque or documentation within the site by zone and provides the following definitions on page 23 of the plan. Following review of identified trees, no additional trees were identified during our research and field work.

"The definition of Legacy Tree is based on guidelines for determining heritage, historic, legacy, and landmark trees, as provided by the International Society of Arboriculture. One or more of the following characteristics are used to define a tree with special Legacy Tree status:

Size: Some component of tree size, most frequently trunk diameter, is used, but other components of tree size, such as height or canopy spread, may also be used.

Species: Certain species may be special locally, rare, or important to the community.

Age: Older trees are especially valued (age of living trees is difficult to determine).

Historic significance: A tree that is associated with an historical event, person, structure or landscape.

Ecological value: Examples of trees that have special status are ones that provide a roosting or nesting site for certain wildlife species, play a critical role in slope stabilization, or provide critical cover for another plant or animal species.

Aesthetics: Special form, site, and/or function in the landscape is identified.

Location: There is an important contribution to the site such as near a street or building.

Required plantings and retained trees: If trees have been preserved or planted as a requirement of development, the community has a vested interest in ensuring that the trees are protected.

Other unique characteristics: This is a catchall term that may be used when a special tree does not fall neatly into another category.

A Dedicated Tree has a plaque, marker or documentation on file to commemorate its significance. Dedicated Trees by nature memorialize an event, group of people or individual and are presumed to be a long-term addition to the campus."

Landscape

Assessment of the landscape includes site features, sculpture, and open spaces within the campus.

Open spaces within the campus consist of key spaces, courts, plazas, and open areas creating defined areas for public gathering with key views of the associated buildings. The following identify key remaining spaces having high integrity or significant community value:

Street Grid

Significance:

When the site was transformed from a city neighborhood to fairgrounds/civic center, the open space along the former street grid was partially retained within the core of the site. Buildings and landscape elements constructed around the perimeter of the site, prior to, as part of, and following the Century 21 Exposition erased many of the former street alignments. These constructed elements include Memorial Stadium, McCaw Hall, Mercer Street Parking Garage, Exhibition Hall, Chihuly Garden and Glass, Broad Street Green, the Pacific Science Center, and KeyArena. Although the city vacated the streets running through the site, they were unchanged until just prior to the fair, when they were paved with asphalt to bring them level to the abutting ground, eliminating curbs that might cause fairgoers to stumble. During the fair, and during the site's decades as Seattle Center, the open space

of the street grid around the core campus spaces remains. This continuity of open space within the site is, along with several legacy trees near the International Fountain that predate the fair, the site's oldest artifact.

Physical Description:

The former 66-foot wide street grid establishes the underlying organizational pattern. This pattern conveys historical street front orientation and block level relationships of pre-fair buildings. Paul Thiry utilized this grid in the layout and organization of the fairgrounds with many of the new buildings receiving addresses based on the street they fronted. Although access to the campus reduced to four main gates during the fair, within the campus the street grid provide important means of circulation around the core open space bounded by West Republican Street to the north, West Thomas Street and Broad Street to the south, and Second Avenue North on the west and Third Avenue North on the east. As part of the post-fair transition back to a civic center reuse of the open space alignments of the former streets as primarily pedestrian access points renewed their importance connecting with the surrounding neighborhood to create a more permeable campus and further strengthened their internal circulation role.

Key former streets (their right-of-ways have been vacated and are no longer considered city streets or avenues):

West Republican Street serves as part of the north edge along one block behind Northwest Buildings, alignment continues through campus as an important circulation route (now August Wilson Way) along the north side of the International Fountain open space, through to Fifth Ave N and the Memorial Stadium.

West Harrison Street runs to the center of KeyArena, and is the only original street to serve as a main gate entry to the fair (west gate). West Harrison Street also serves as the main central east/west axis (United Nations Way) through the campus with views of KeyArena and over the two central open spaces.

West Thomas Street runs east/west and serves as the main promenade (American Way) passes under the Monorail and along the base of the Space Needle.

Warren Ave North runs north/south through the central axis of the KeyArena. Although not a main gate entry, an opening left in Northwest Buildings provided for continuation of this circulation pattern and has become an important neighborhood entry point following the fair.

Second Avenue North is the main north/south promenade (Boulevard West) through fairgrounds along the west side of the central open spaces. This street passes along the front of the Sweden Pavilion and east side of KeyArena.

Third Avenue North is the main north/south promenade (Boulevard East) through the campus along the east side of the central open spaces. This street leads directly to the Pacific Science Center with views of the Horiuchi Mural and Amphitheater.

Character-Defining Features:

- Open space alignments along former streets and avenues

Chronology of Alterations:

- During the fair, construction of the Federal Science Pavilion (now Pacific Science Center) and the former pavilion along Broad Street cut off the east/west connection of John Street. The right of way was pushed to the north, but no longer maintains a connection with the external street grid.
- Construction of the Mercer Arena and Stadium significantly altered the connections of Fourth Avenue North. During the fair the southern portion provided an important north/south circulation route (Boulevard 21). Changes at the base of the Space Needle and the Chihuly Garden and Glass building have significantly changed this street.

Fisher Green [52]

Significance:

Designed by Richard Bouillon, the Plaza of the States served as a formal venue for ceremonies honoring visiting United States governors, and highlighting their states. Each state was represented by its flag, flying atop a 33-foot pole, and by a plaque. Many civic groups, high school and college bands, and other boosters participated in celebrations and entertainments at the Plaza of the States.

When the nearby Domestic Commerce And Industry Building/Flag Pavilion Building was demolished in 2001



Historic view of the Plaza of the States. Source: Photo by Art Hupy, Courtesy University of Washington Special Collections.

to make way for Fisher Pavilion, the Plaza was demolished to make way for the Fisher Pavilion Green/South Fountain Lawn, retaining its historic role as a public gathering space and enjoying a respite from encroachment by the site's built environment.

Physical Description:

The 2001 redesign of the Fisher Green ties in with original 1961 drawings looking at the connection of this open space to the International Fountain and Open Space to the north with a pavilion at the south end offering views to the north out over the open space. The Fisher Green consists of the Fisher Pavilion along the south edge with an upper level overlooking the Green and a lower level opening to an exterior plaza. The rest of the Green consists of a main circular lawn ringed by a paved walkway with stairs and ramps leading out to the east/west and north connecting with adjoining streets.

Character-Defining Features:

- Open space with views of the surrounding buildings

Chronology of Alterations:

- 2001 construction of the Fisher Pavilion, reworking of the State Flag Plaza, and construction of the Pavilion restrooms to the west. The project removed remaining flag poles and place. Added with a round plaza surrounded by a perimeter seat wall, lawn at the outer corners with a new east ramp, stairways, and pavers along the north side.

Mural Amphitheatre [53]

Significance:

Century 21 Exposition, Incorporated commissioned the glass tile mural as a gift to the city. Heralded at its April 21, 1962 unveiling as "the largest work of art in the Pacific Northwest," it was Horiuchi's first (and only) work of public art. The Seattle Landmarks Preservation Board granted the Seattle Mural landmark status in September 2004.

Cradled within the Armory, Space Needle, Pacific Science Center, and Seattle Children's Theatre – and within the sight lines of all of these – the Mural Ampitheatre is a central survivor of Seattle World's Fair. It serves as a steady backdrop to every event that occurs on the southern portion of Seattle Center's campus.

Physical Description:

Designed by Paul Thiry as part of the fair to be an open amphitheater space with an east/west orientation, pavilions lined the north and south sides framing the view east to the Horiuchi Mural and the Space Needle.



Historic view of Horiuchi Mural. Source: Photo by Ken Prichard, Courtesy Ken Prichard.

The space features a central sloped lawn forming the theater seating facing east towards the City of Seattle Landmarked Horiuchi Mural and Space Needle.

Removal of the pavilions to the north and south following the fair expanded the space. 1964 landscaping introduced groves of trees along the north and south sides to maintain the mall character.

Character-Defining Features:

- Central sloped, open lawn space
- Views of the Space Needle, Armory (Center House), Horiuchi Mural (Seattle Mural), and Pacific Science Center, all City of Seattle Landmarks
- Seattle Mural designed by Paul Horiuchi, mounted on parabolic support structure by Paul Thiry

Chronology of Alterations:

- 1964, landscape design by Richard Haag realigned the circulation routes at the north and south sides and expanded tree plantings along the north and south sides

International Fountain [2]

Significance:

Tokyo architects Shimuzu and Matsushita won Seattle's international competition to design the fountain that would serve as a focal point for the fair and, after, Seattle Center. Designed to shoot water into sculptural forms as much as 150-feet high, the central portion of the fountain was compared to a sunflower, with "seed" nozzles. Machinery deep underground facilitated changes in colored lighting patterns and spray shapes. Taped carillon music accompanied the sprays.

A 1995 renovation replaced the central fountain apparatus while retaining the spray pattern, raised the bowl floor, replaced sharp rocks with aggregate concrete paving, and added a gently sloping spiral ramp that provides wheelchair access and enables water play. The surrounding plaza was redesigned at the same time.

The fountain is constructed on the former site of Mercer Playfield, from 1910 to 1958 the playground for the adjacent Warren Avenue School and for the neighborhood. The fountain's iconic joyful spray patterns and its potential for both active and contemplative appreciation make it a magnet for Seattle Center visitors, retaining its historic World's Fair function as the figurative "heart" of the campus and echoing its playful pre-fair function.

Physical Description:

Built in 1961, the International Fountain space includes the main fountain and the block of surrounding open space. Designed by Tokyo architects Kazuyuki Matsushita, and Hideki Shimizu architects, with assistance by Seattle architects John Phillips and Harry Rich. The fountain served as the center piece for the fair.





Left: Historic view of International Fountain and surrounding open space. Source: Mike and Carolyn Nore.

Above: View of International Fountain at night. Source: Museum of History And Industry.

Original 1961 drawings envisioned a long rectangular mall extending from Thomas to Republican streets between Second and Third Avenues North. The exhibit pavilion at the south end would look out to the north over the mall and the International Fountain.

Character-Defining Features:

- Open space with views of the surrounding buildings

Chronology of Alterations:

- 1969-1971, rewire water lighting display
- 1995 fountain rebuild, removed all rocks, the fountain, perimeter walk and curbing, inner mote, light trough, and cobbles in area. The project added precast concrete planters, a perimeter seat wall, pavers, an orca sculptures off the southwest corner, and installed stainless steel dome fountain. A new sloped concrete slab was installed and a spiral ramp down to the fountain. The project retained below grade tunnels, equipment room, and reservoirs.
- 2001 modification to piping and service platform

International Plaza [50]

Significance:

Designed by Paul Thiry and Otto E. Holmdahl and Associates, L J. Janzen and V. L. Nichols the space was created as part of the larger coliseum compound. This focused on the central KeyArena with supporting buildings and open spaces arranged around the perimeter. Early landscape plans for the upper level plaza had an irregular tree spacing, with later revisions changing this to a more rigid L shaped alignment along the Northwest Rooms. Original trees specified included Crataegus Carrierei and at the lower level kept an existing Atlas Cedar as a dominant planting with the DuPen fountain, as well as a loose grouping of trees (Picea Excelsa, Quercus Pilustris) behind the Swedish Pavilion to soften the windowless rear facade of that building. Two trees (Betula Alba) off the south end of the Sweden Pavilion blocked sight lines from the main International Fountain open space, reinforcing the intimate character of the north space.

Physical Description:

Originally this plaza encompassed the two open areas north and south of the KeyArena. The fair buildings along West Republican Street (north) and Thomas Street (south) defined the outer edges of these spaces.



2013 view of the remaining three bronze sculptures from the Fountain of Creation. Fountain of Creation. Source: Artifacts Consulting.

The north space represented the more important of the two, having a greater diversity of international pavilions and integrated design with the Northwest Rooms bounding its outer north edge. The north space's original design served primarily as an intimate exterior extension of the Northwest Rooms and a transition space between them and the KeyArena.

The south space featured only two pavilions (Republic of China and Great Britain) with the rest of the buildings consisting of administrative offices and the windowless NASA Building.

The north space consists of an upper and lower level, as well as Everett DuPen's Fountain of Creation. A series of small openings around the perimeter allow through access to the rest of the fairgrounds. A broad stairway off the southeast corner of the Northwest Rooms wraps around the building corner to provide access between the upper level and West Entrance of the former fair grounds. A smaller stairway between the Sweden Pavilion and Northwest Rooms provides access from the plaza down to the International Fountain area. The open colonnade along the Northwest Rooms open to the space. The upper level features a former fountain with decorative inset mosaic tiles designed by Paul Thiry (since converted to a planter), which doubles as a mechanical vent for the KeyArena. Contemporary trees planted in a grid occupy the north and west portions of the level. A new concrete railing runs along the east side overlooking the lower level. Large planters and two direct flights along the side of the arena replace the original broad flight of concrete stairs that led down into the KeyArena. A single decorative concrete panel remains at the top of the railing for the new stairs. The lower level prominently features an entirely redone fountain replacing clean lines of the original Fountain of Creation with a contemporary organic form dominated by large rocks. Added planters and contemporary trees

Designed by Everett DuPen in 1961 and funded by the Century 21, Inc., the Fountain of Creation (40 x 120-foot basin) occupied a prominent location within the north space of the International Plaza.

As originally constructed, University of Washington professor Everett DuPen's fountain in the International Plaza near the Canada Pavilion consisted of a large shallow pool from which rose three abstract bronze sculptures depicting the evolution of human life from a single cell to the conquest of space. In spite of its cool formality, the DuPen Fountain's shallow depth, wide expanse, and ease of access tempted fairgoers to wade or revive weary feet – still a common response among 21st Century Seattle Center visitors.

Character-Defining Features:

- Decorative concrete panel off added stairway to arena, as the last remaining example of this work along the former stairs
- Atlas Cedar retained on the lower level
- Stairway off the southeast corner of the Northwest Building
- Stairway off the north end of the Sweden Pavilion
- Enclosed open space between the KeyArena, Northwest Rooms, and International Fountain Pavilion creating a public gathering area
- Atlas cedar
- Concrete vent with inset mosaic tiles, and former pool basin
- Fountain of Creation cast bronze sculptures, Evolution of Man, Flight of Gulls, and Seaweed

Chronology of Alterations:

- 1987, all of north space's upper level redone, while converting the vent pool to a planter and replacing all trees added during and immediately after the fair, as well as replacing all pavement



2013 view looking west within the north space of the International Plaza. Source: Artifacts Consulting.

- 1991, redid the north space's lower level, including replacing Everett DuPen's Fountain of Creation, and replacing the stairs and paving in the breezeway. The project redesigned the Fountain of Creation removing all of the original pool, west wall, curb and concrete pool edges, as well as paving around the pool. The project retained the three original sculptures, but utilized them in new locations within a new organically shaped pool. The project added boulders, and tree grove and new west wall.
- 1994, reworking of the south space, moving a portion of the NASA Building to its current location, removing the south vent and planter, installation of below grade access to the KeyArena and adding a wall of reused concrete panels along the south edge
- 1999, Northwest Future Forests Grove, trees planted as part of the Millennium Celebration in conjunction with American Forests planted in dedication of northwest environmentalism on the 100th anniversary of the birth of Eddie Bauer and his wife Christine. A time capsule resides beneath the stone and plaque to be opened on October 19, 2099.

Founders Court [24]

Significance:

Designed by Kirk Wallace McKinley & Associates, this court served as the Presidential Court, part of the formal entrance sequence in conjunction with the North Entrance. Dignitaries entering through the North Entrance passed directly through the court into the heart of the fairgrounds at the north end of the International Fountain.

The Presidential Plaza continued through the south colonnade, extending to Republic Street at the north end of the International Fountain. The Kobe Friendship Bell, as an important post-World War II effort in international relations, occupied a prominent location on the west side of the Presidential Plaza (off the south end of the Playhouse). The bell was a gift to Seattle in 1962 from Seattle's sister city, Kobe and is housed in a small building built from Japanese cypress. After the Century 21 Exposition, Richard Haag's 1964 landscape designs called for 60 flowering cherries to be planted in a grid pattern around the north, south and west sides of the Kobe Bell Pavilion.

Physical Description:

The overall volume of the space is defined by the original colonnades at the north and south ends, and the east and west facades of the adjacent buildings. Also designed by Kirk Wallace McKinley & Associates, the colonnades and associated buildings work to create a larger version of the Grand Court at the north end of the Playhouse. The views from the Founders Court through the colonnades create a welcoming reception drawing visitors into the fairgrounds. Contemporary paving, curved planters and granite pylons replaced the lighted stone and concrete basins of the 1961 Julius C. Lang Memorial Fountain designed by Kirk Wallace McKinley & Associates and featuring the carved abstract stone column sculpture by Francois Stahly. A contemporary canopy extends along the west facade of the Exhibition Hall.

Character-Defining Features:

- Open space creating a public gathering area
- Original colonnades defining the north and south edges
- East facade of the Playhouse
- West facade of the Exhibition Hall
- Kobe Bell

Chronology of Alterations:

- 1964, Richard Haag landscape revisions around the Kobe Bell Pavilion
- 1996, Founders Court redevelopment replacing the Julius C. Lang Memorial Fountain with the existing concrete planters, granite pylons, and new canopies. Granite pylons by artists Ned Kahn and Horace Washington



Historic view of north entrance; Presidential Court just beyond gates. Source: Seattle Public Library.



2013 view of former north entrance; Founders Court visible beyond the colonnade. Source: Artifacts Consulting, Inc.



View from the Space Needle towards KeyArena.
Source Seattle Public Library.

FINDINGS

Eligibility

The first step in nominating properties for City of Seattle Landmark designation is to assess the full campus to understand what exists and determine which properties are eligible for nomination. There are three parts to considering eligibility: age thresholds, historic associations, and integrity. Each step helps to refine the list of eligible properties. To be eligible for nomination a property must be within the age threshold, meet at least one of six criteria, and possess integrity.

As City of Seattle properties, Seattle Center buildings, structures and landscape are subject to the following age thresholds with regards to City of Seattle Landmark eligibility consideration. This study addresses eligibility for Seattle Center properties for each of these three age thresholds. The majority of the properties are over 50 years of age.

Eligible at 25 years

Nomination voluntary at 25-50 years

Nomination mandatory at 50+ years

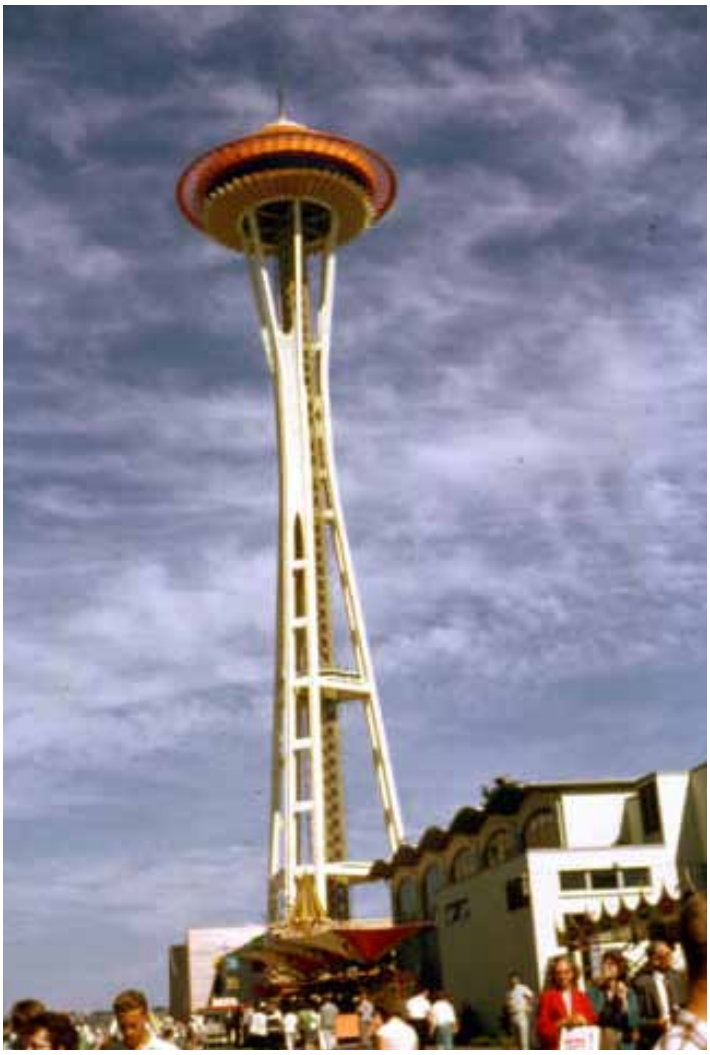
Historical associations are the qualities of historic and architectural significance that make the property important to the community. The Seattle Landmarks Preservation Ordinance (SMC 25.12.350) defines the six criteria for designation. This is addressed for each of the properties meeting the age thresholds.

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; or

b) It is associated in a significant way with the life of a person important in the history of the City, state, or nation; or

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; or

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



1962 view of Space Needle. Source: Seattle Public Library.

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.

Integrity is a measure of how much of the property's original design, materials, spaces and features remain to convey the historic associations for which it is significant.

The **Landmark Criteria Table** identifies applicable landmark designation criteria for Seattle Center properties meeting both the age thresholds and having sufficient integrity to convey their historic associations.

Landmark Criteria Table

PROPERTY NAME	ID	DOC	CRITERIA A	CRITERIA B	CRITERIA C	CRITERIA D	CRITERIA E	CRITERIA F
Thiry Concentration								
International Fountain Pavilion	18	1962	X		X	X		X
KeyArena	1	1962	X	X	X	X	X	X
NASA Building	16	1962	X		X	X		
Northwest Rooms	17	1962	X		X	X		X
Seattle Center Pavilion	20	1962	X		X	X		
International Plaza	50	1962	X		X			
Kirk Concentration								
Exhibition Hall	7	1961	X		X	X		X
Mercer Street Parking Garage	15	1961	X		X	X		X
Playhouse	8	1961	X	X	X	X		X
North Gate	N/A	1961	X		X			
Colonnade	N/A	1961	X			X	X	
Founders Court	24	1961	X		X			
Other								
Seattle Children's Theatre	21	1956	X		X	X		
West Court Building	21	1953						
Covered Breezeways	N/A	1973						
Pottery Northwest / Gardener's Facility	19	1923	X		X	X		
Blue Spruce Building	4	1956						
Fisher Green	52	1962	X		X			
Mural Amphitheatre	53	1962	X		X			
International Fountain	2	1961	X		X			X

Recommendations

Eligible properties can be nominated for City of Seattle Landmark designation individually and as districts. The following provides recommendations based on our assessment.

District

Districts encompass multiple properties. They can be large and small in terms of geographic area. Typically there is a core historic context and development period with which most if not all of the district's properties derive their significance. Properties are identified as contributing/non-contributing to the historical and architectural significance of the district. Evaluation as a collective group places a lower burden on integrity for individual properties since their integrity is measured collectively.

A single historic district encompassing the majority of the site would be strengthened by the inclusion of existing Seattle Landmark properties. Open spaces, views, trees, and smaller artifacts and artwork could be included. Potential impacts due to tenant driven changes to buildings could be measured against the district as a whole, rather than just the building being rehabilitated, allowing greater flexibility in adaptive reuse. However, the process for moving a large district through the designation process can be long. KEXP as the future tenant for the Northwest Rooms will be bringing context level design work to the design commission in February. Planning related to the possible return of a basketball team to Seattle is moving quickly and could potentially impact the KeyArena.

Small historic concentration areas encompassing a concentration of properties designed by a single architecture firm would provide some of the benefits of a large historic district and could move through the designation process at a faster pace. The Paul Thiry (Thiry) concentration area around KeyArena and the Kirk, Wallace, & McKinley (Kirk) concentration area around the Playhouse and the Exhibition Hall present the most uniform groupings of properties. These align with the KeyArena and Theatre District zones identified in the Master Plan, which would help for planning and stewardship purposes.



Postcard view of the Alweg Monorail and the Space Needle. Source: Seattle Public Library.

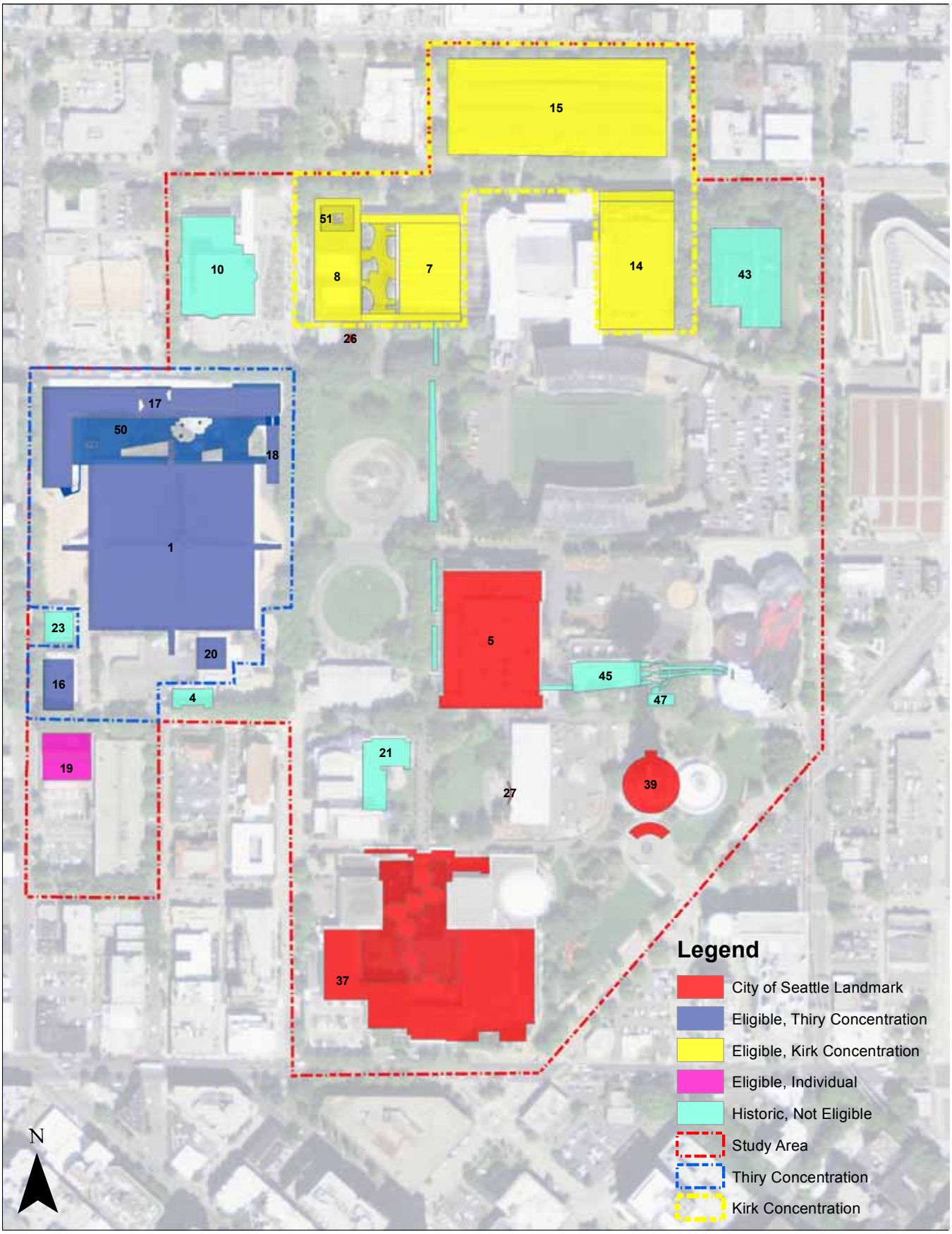
Thiry concentration area properties:

- International Fountain Pavilion
- KeyArena
- NASA Building
- Northwest Rooms
- Seattle Center Pavilion
- International Plaza

Kirk concentration area properties:

- Exhibition Hall
- Mercer Street Parking Garage
- Playhouse
- Founders Court
- North Gate
- Colonnades
- Mercer Arts Arena

Landmarks Eligibility Map





Historic view of KeyArena Source: Seattle Public Library.

Both concentration areas retain a substantially intact collection of properties. They were constructed for the Century 21 Exposition and held key roles as pavilions and exhibit halls in the fair. As part of the 1964 post fair transition to a civic center the majority of these buildings continued to serve anchor roles. Their exterior visual character communicates the past role of the site as the Century 21 Exposition and significance community impact this event exerted. The cohesion of mid-century design elements within each concentration area embody the distinctive characteristics of this architectural style, engineering technology, and period of construction. They represent outstanding works of the architects and engineers involved in their design. Their visual prominence and cohesiveness provide an easily identifiable feature of the neighborhood and a supporting context to the citywide identifiable features of the Seattle Landmark Space Needle and Pacific Science Center.

Individual

Individual nominations address a single property. These properties convey the neighborhood transition to Century 21 Exposition and then to Civic Center.

The best example of these is the **Pottery Northwest/ Gardener's Complex**. The building's exterior remains largely intact. The building's character-defining features convey its architectural style, period and method of construction. The contrast between this building and those of the Thiry concentration area provides a stark example of the neighborhood's transition.

Lesser examples that would not be individually eligible:

West Court Building

Blue Spruce Building

McCaw Hall

Seattle Children's Theatre

The West Court Building experienced extensive exterior and interior alterations. Built just prior to the fair, the building's architectural style can be discerned; however the extent of previous changes has removed the majority of exterior and interior features.

The Blue Spruce Building retains slightly more integrity than the West Court Building; however the building did not have a significant association with the Century 21 Exposition or fair ground's ongoing role as a civic center.

McCaw Hall experienced extensive interior and exterior alterations removing all visible character-defining features of the building's original and 1961 construction.

The former Nile Temple has been incorporated into the Seattle Children's Theatre complex of buildings. While the original architectural style of the former Nile Temple is still discernible, the surrounding Seattle Children's Theatre additions have diminished the integrity of the original building.

Community Properties

These are properties that rely nearly exclusively on their open space quality to convey their historical associations.

International Fountain

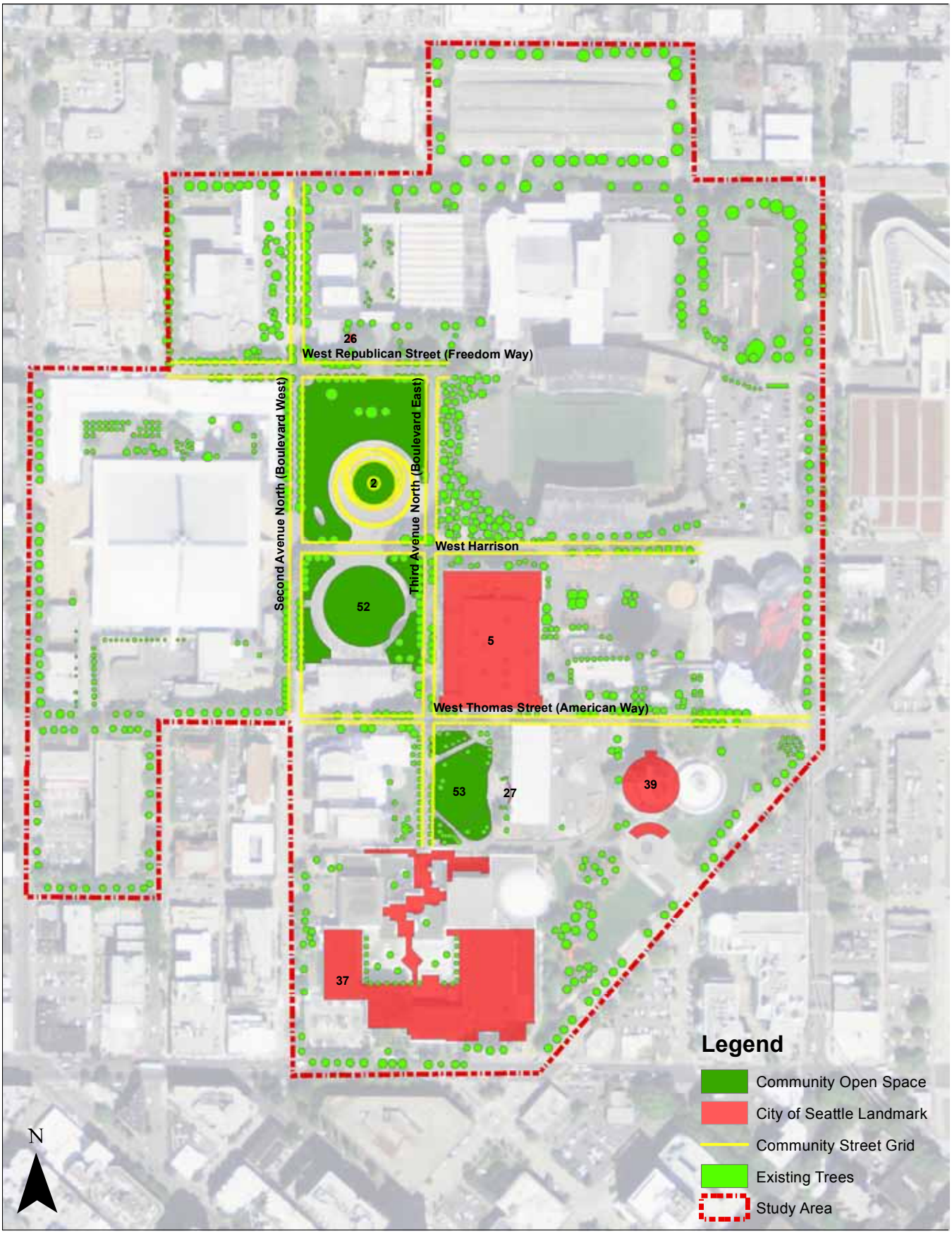
Mural Ampitheatre

Fisher Green

Former Street Grid

Each served an important role in the Century 21 Exposition and the site's transition to a civic center. Part of the International Fountain pre-dated the fair, serving as an athletic field. The former Street Grid provided an underlying organizational structure for the residential neighborhood, fair, and subsequent civic center. Their prominent locations, contrast with the built-up spaces, and views of the surrounding properties provide an easily identifiable

Community Open Space Map



visual feature of the neighborhood. Their loss would detract substantially from the qualities of the campus at large and setting for the Thiry and Kirk concentration areas. These spaces benefit from views of adjacent Seattle Landmarks.

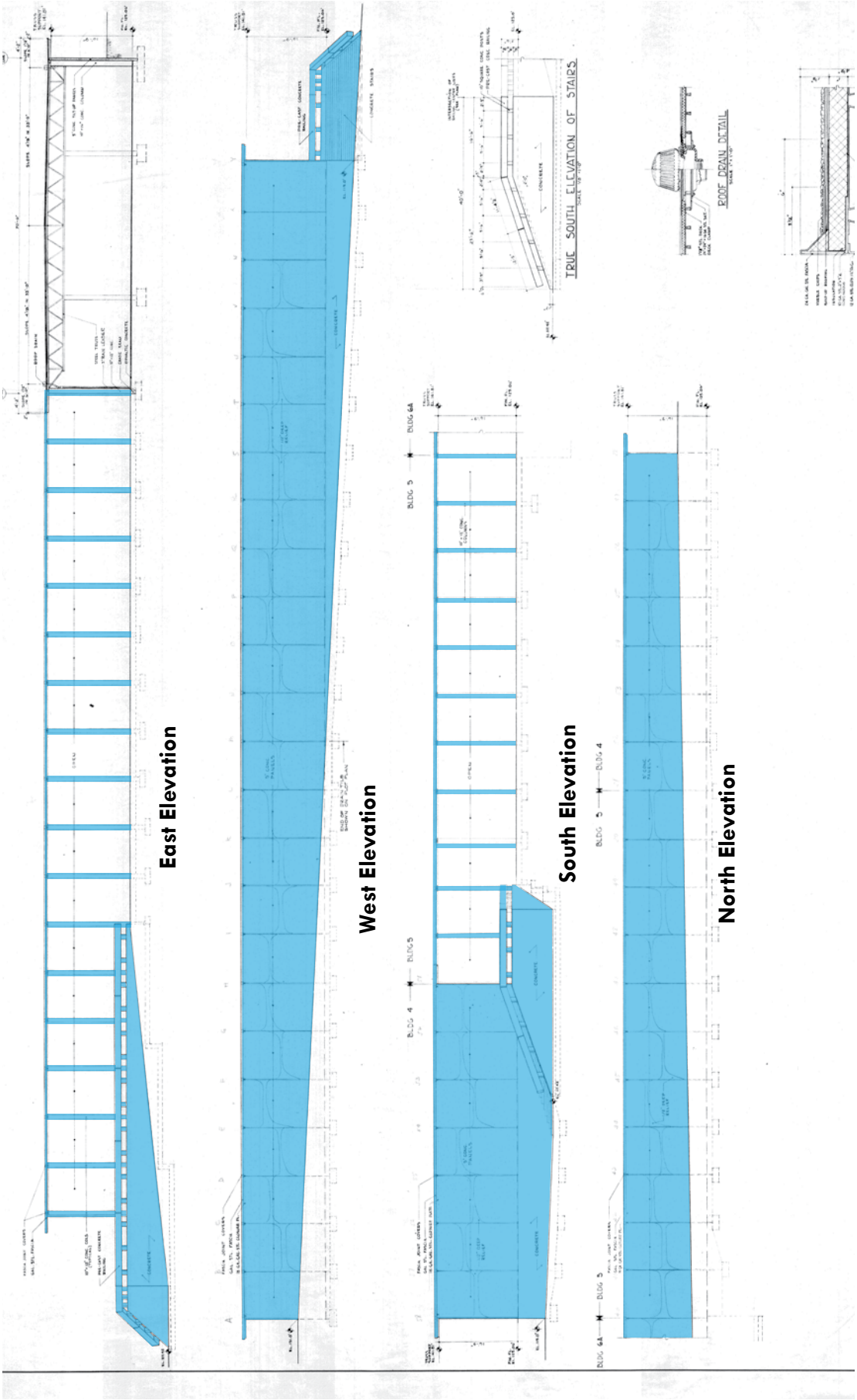
These properties merit further discussion relative to their eligibility as Landmarks and their community role. From the neighborhood perspective these are essential to the public experience, neighborhood connectivity to, and visual qualities of Seattle Center.

Artifacts

Properties and residual property parts that continue to serve an important contextual role within Seattle Center, but do not fit within the Landmark designation process are artifacts. The key to value and reuse is being able to reuse them within their context. Without this context they have minimal to no value. Examples of this category are the cast concrete panels with decorative patterning reused along the south side of the KeyArena site as a fence, as well as the remnant original concrete panel fence off the northwest corner of the NASA Building. As buildings are adaptively reused, the potential to salvage and reuse elements from the buildings to the benefit of Seattle Center's overall visual character should be considered.

Analysis

The following analysis maps were prepared for buildings with high integrity within the Kirk and Thiry concentration areas. Color coding identifies existing original, and 1964 fair to civic center conversion features on the building exteriors. These are intended to inform integrity discussions, and should the buildings be designated, the controls and incentives process. All areas left white represent alterations. Original drawings provide the base drawings for the analysis maps. Feature identification stemmed from archival research, review of original and alteration drawings, and site visit to verify conditions. Blue indicates existing original features and yellow indicates alterations made in 1964.



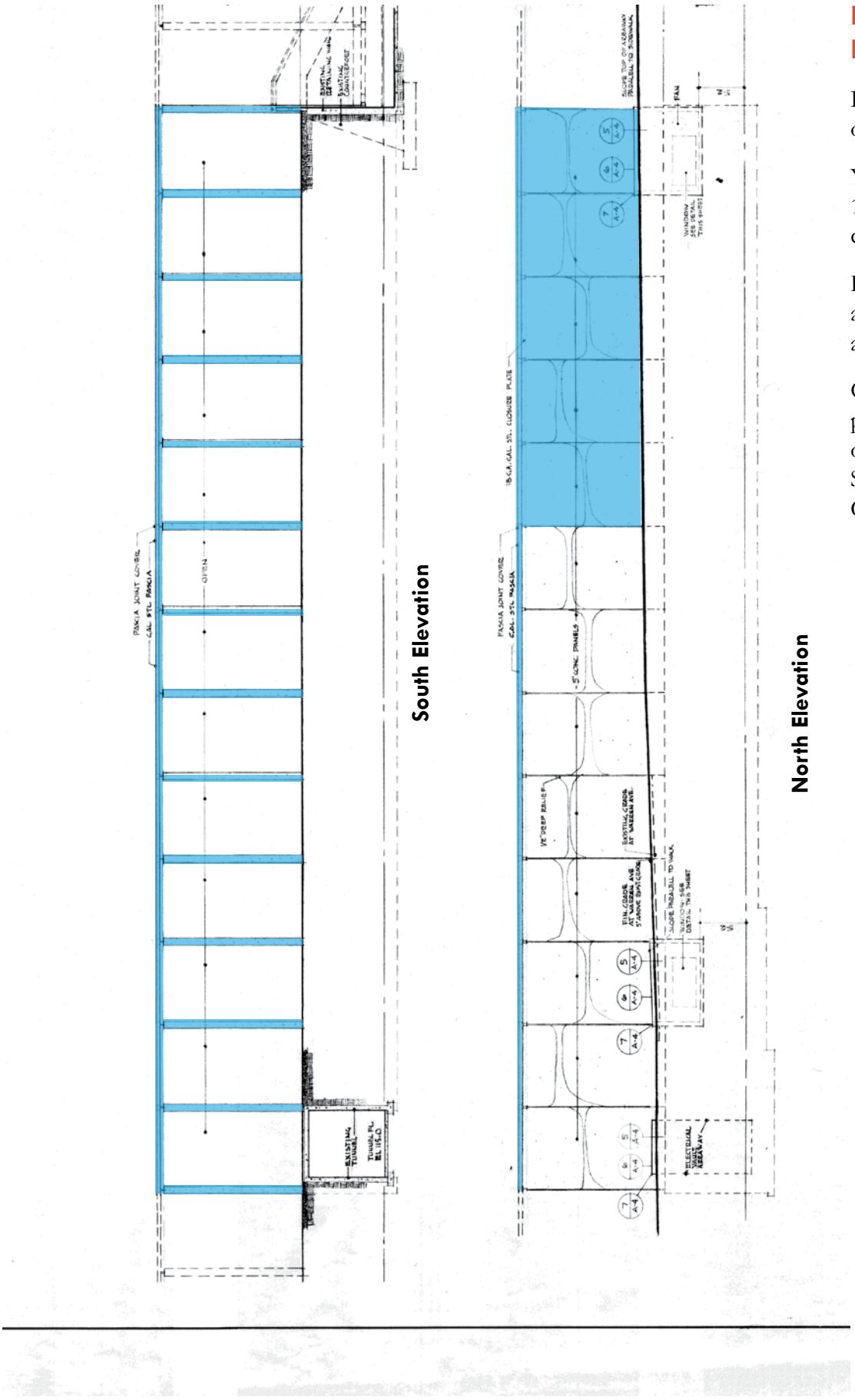
Upper Northwest Rooms

Blue identifies original features

Yellow identifies 1964 fair to civic center changes

Features left white are contemporary alterations

Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.



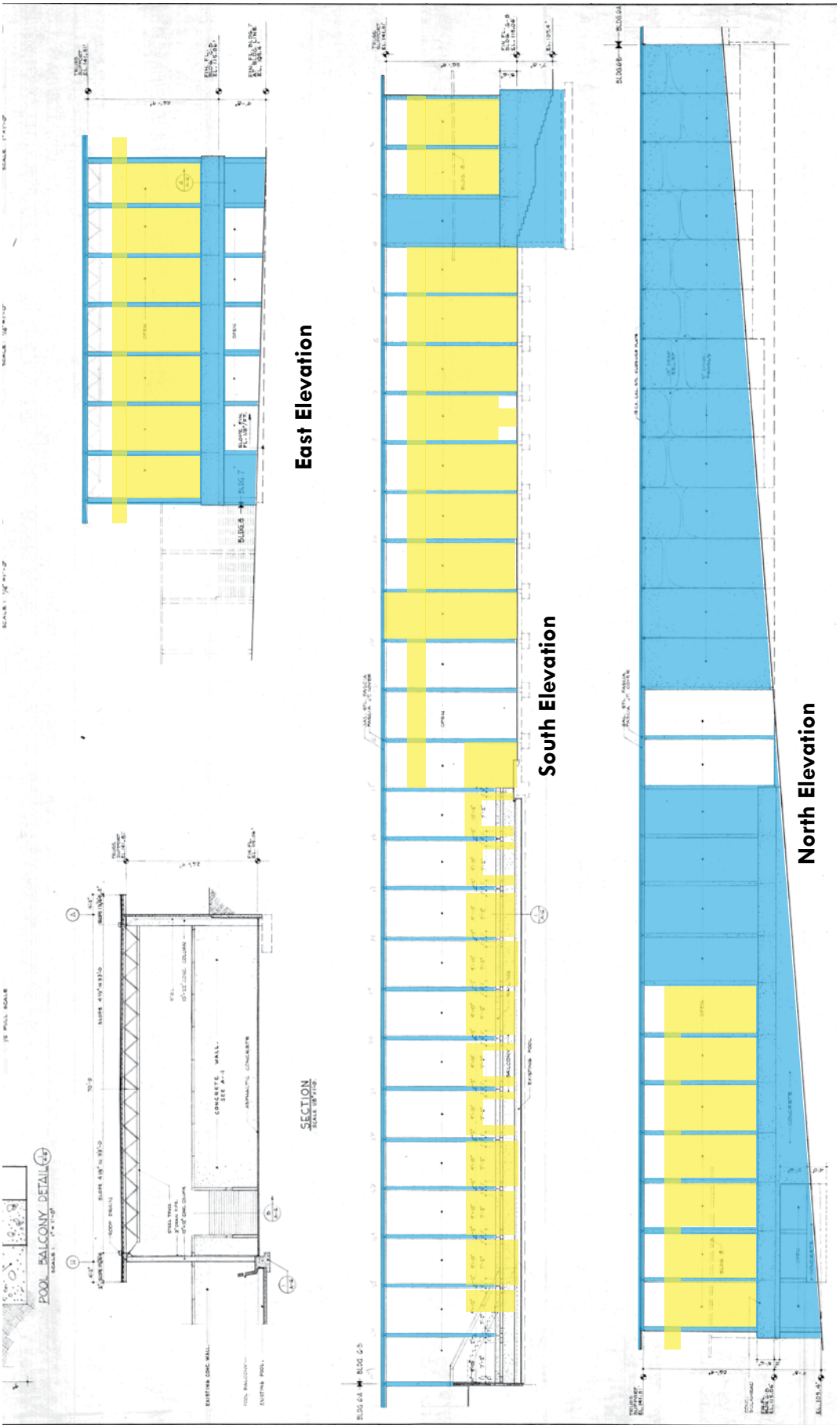
Lower Northwest Rooms

Blue identifies original features

Yellow identifies 1964 fair to civic center changes

Features left white are contemporary alterations

Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.



Northwest Rooms

Blue identifies original features

Yellow identifies 1964 fair to civic center changes

Features left white are contemporary alterations

Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.

NASA Building

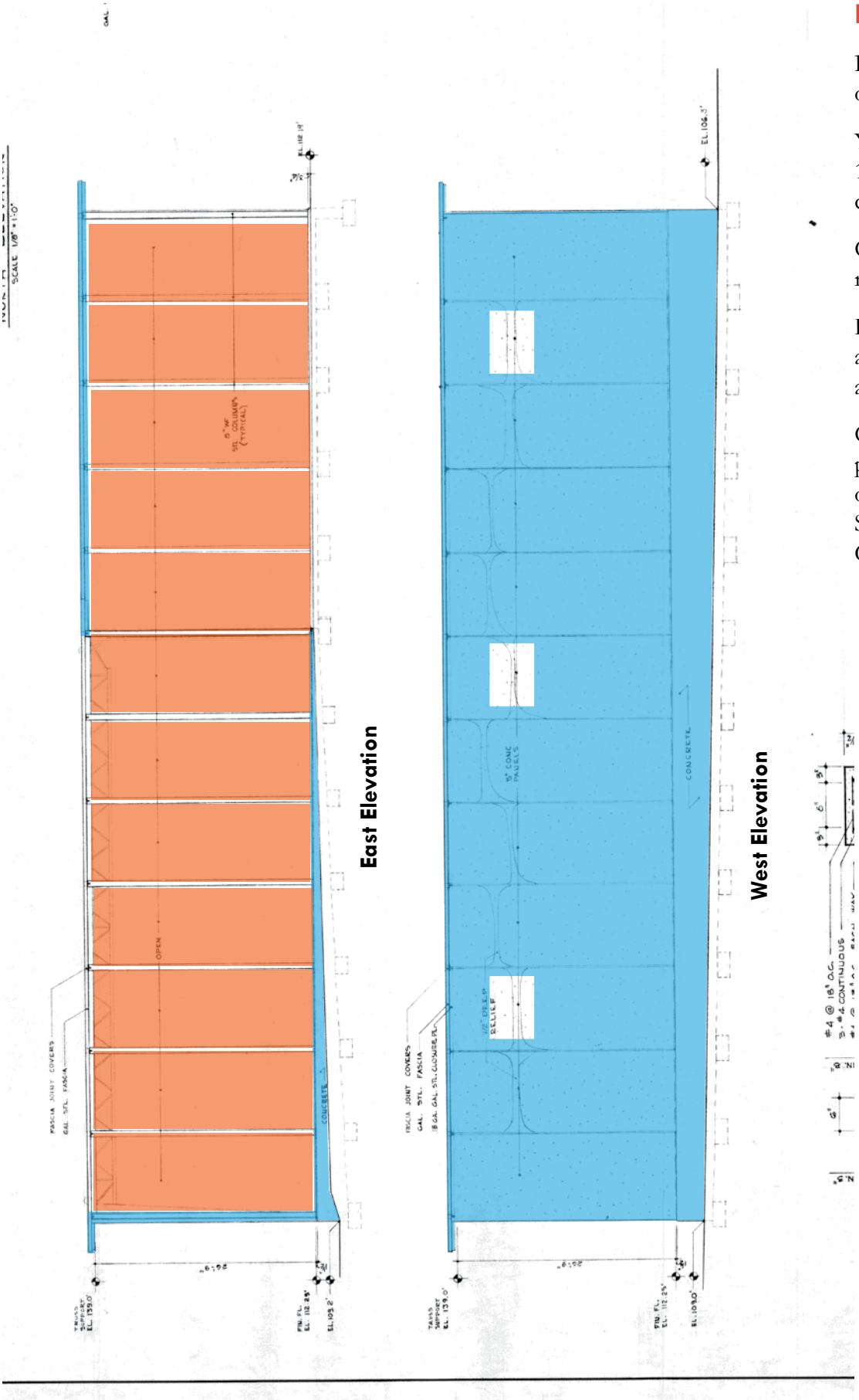
Blue identifies original features

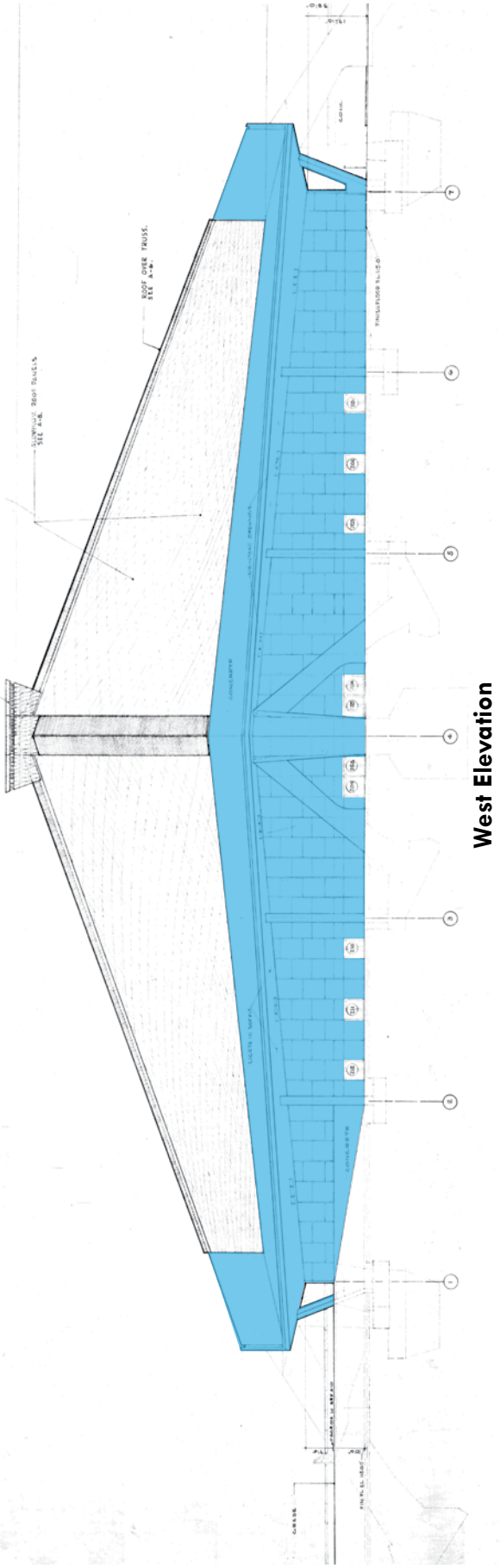
Yellow identifies 1964 fair to civic center changes

Orange identifies relocated features

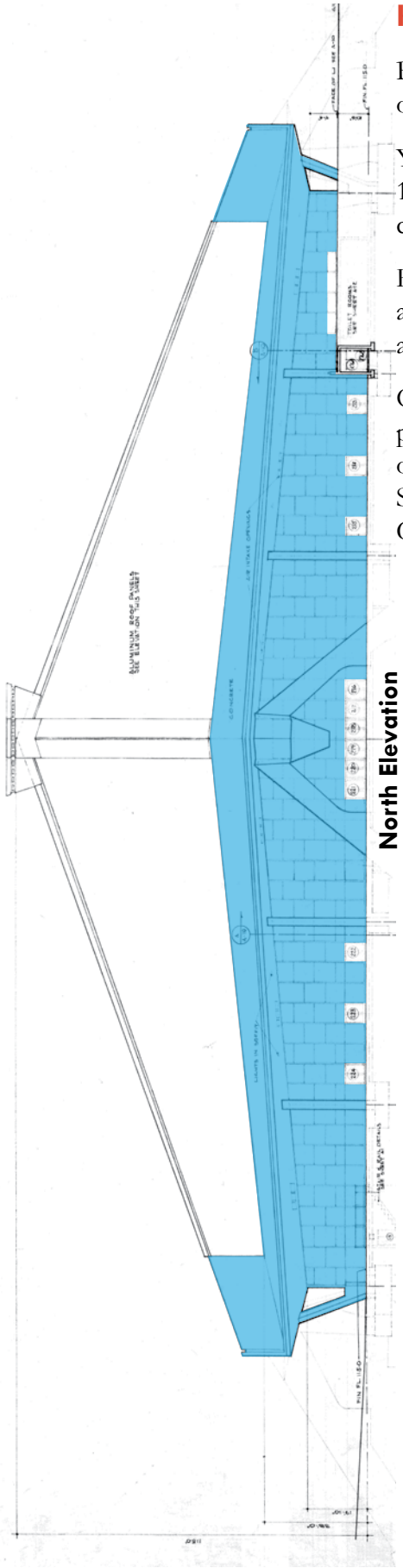
Features left white are contemporary alterations

Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.





West Elevation



North Elevation

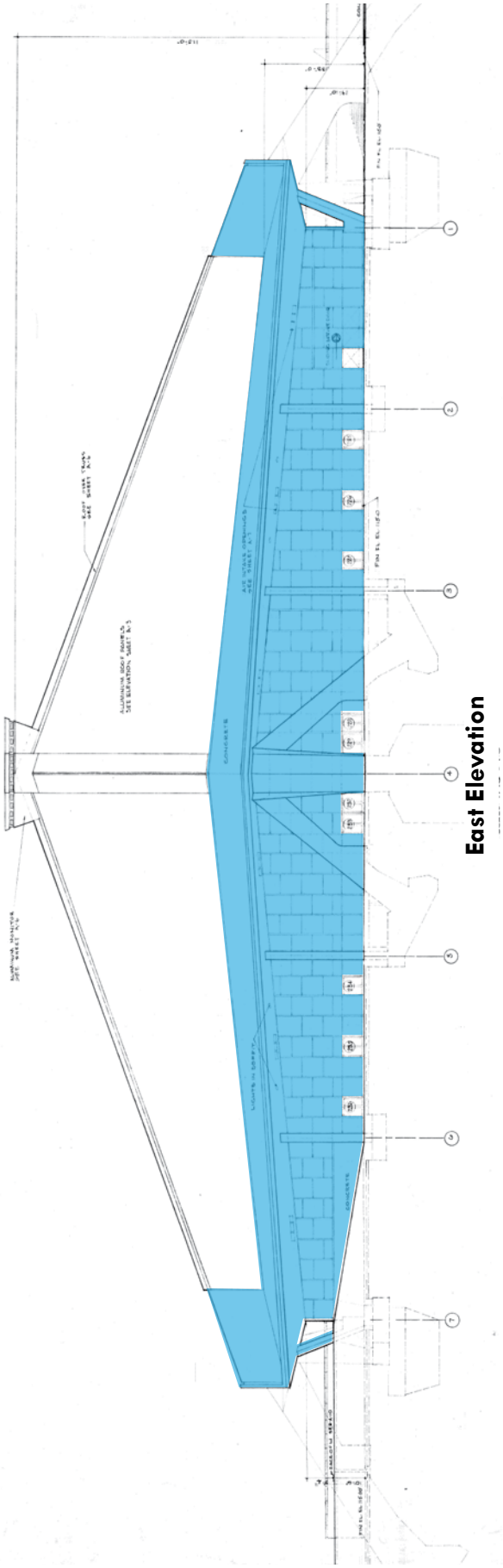
KeyArena

Blue identifies original features

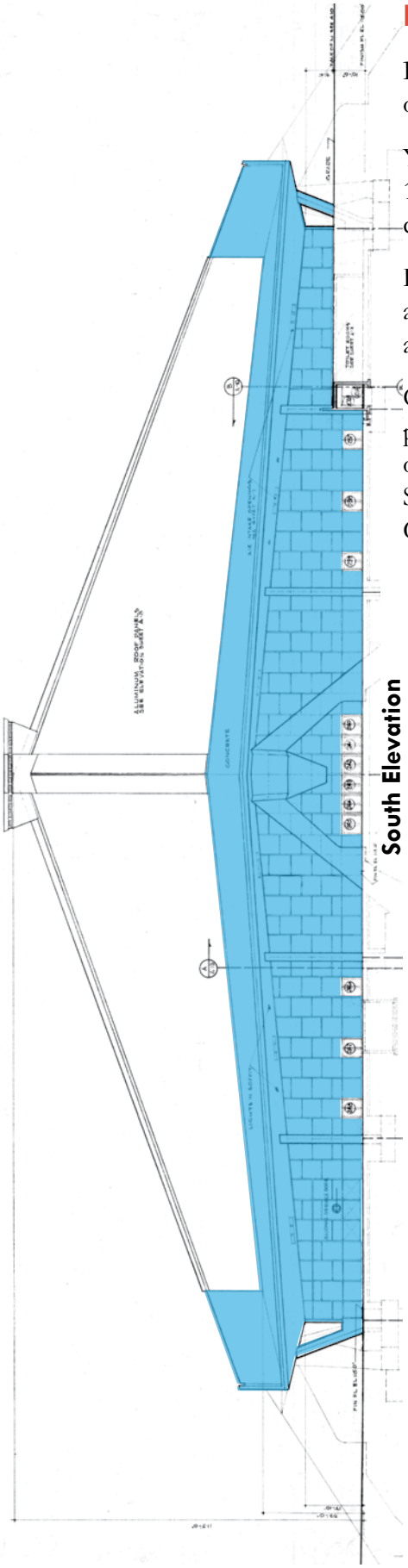
Yellow identifies 1964 fair to civic center changes

Features left white are contemporary alterations

Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.



East Elevation



South Elevation

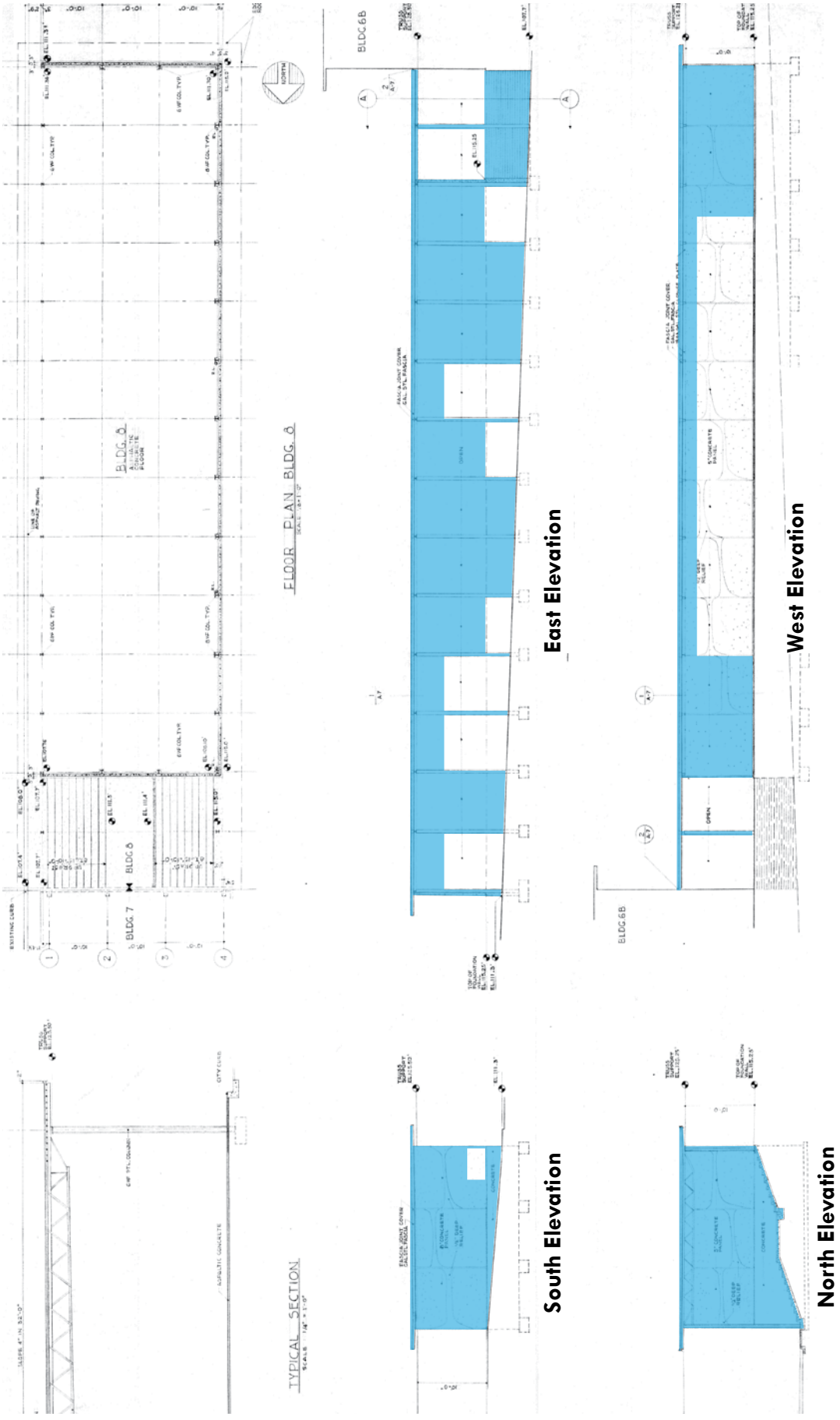
KeyArena

Blue identifies original features

Yellow identifies 1964 fair to civic center changes

Features left white are contemporary alterations

Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.



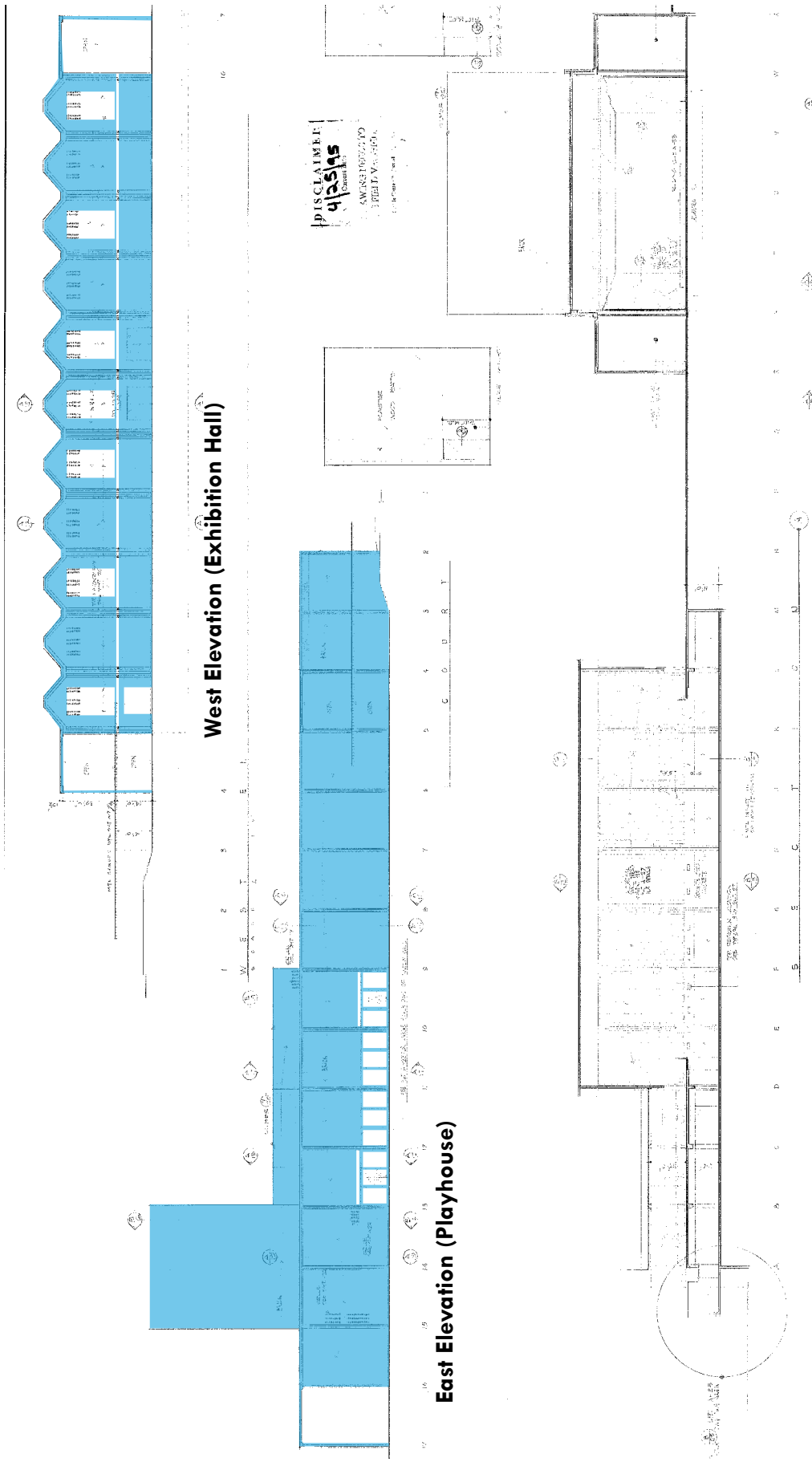
International Fountain Pavilion

Blue identifies original features

Yellow identifies 1964 fair to civic center changes

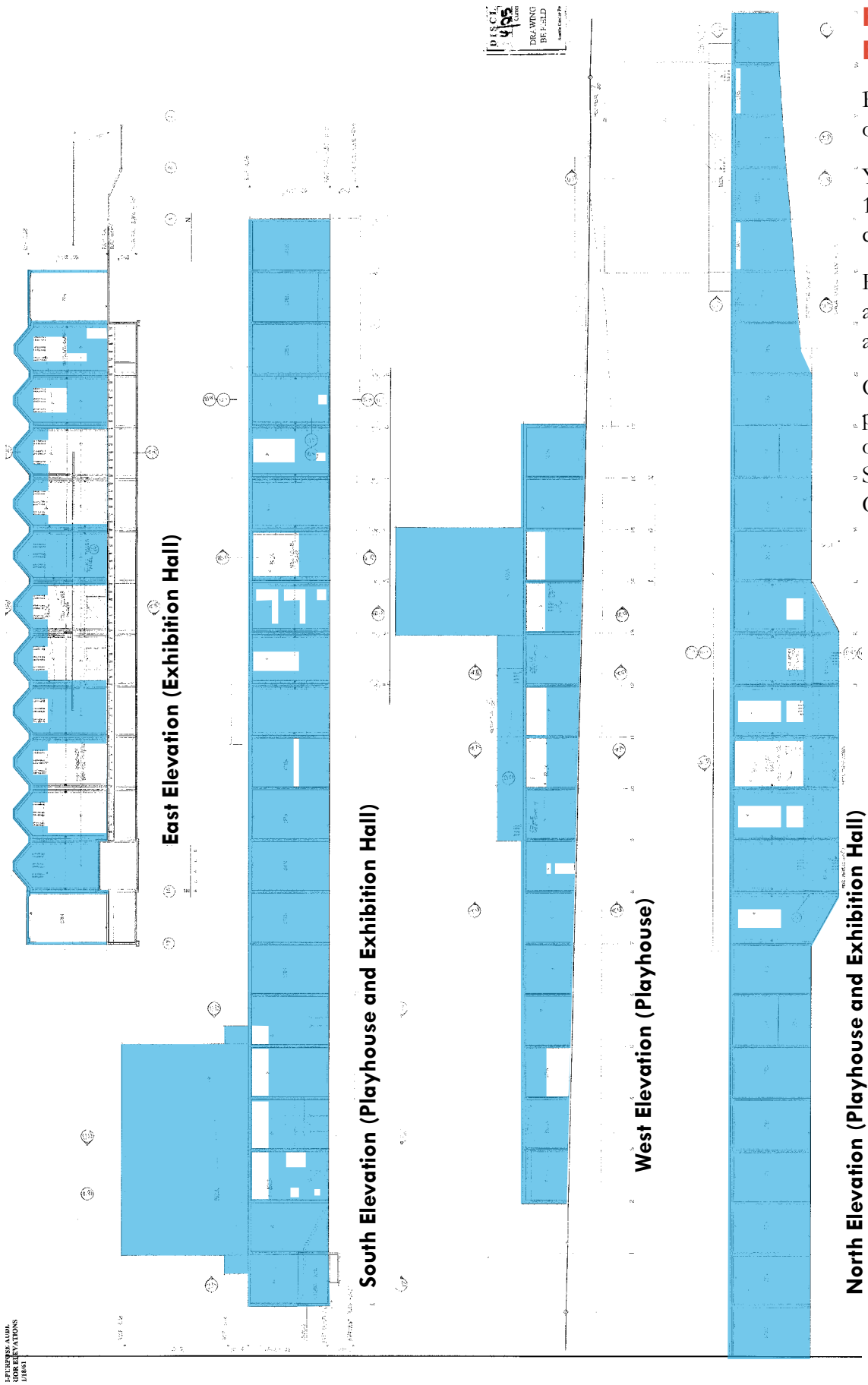
Features left white are contemporary alterations

Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.



Playhouse and Exhibition Hall

- Blue identifies original features
- Yellow identifies 1964 fair to civic center changes
- Features left white are contemporary alterations
- Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.



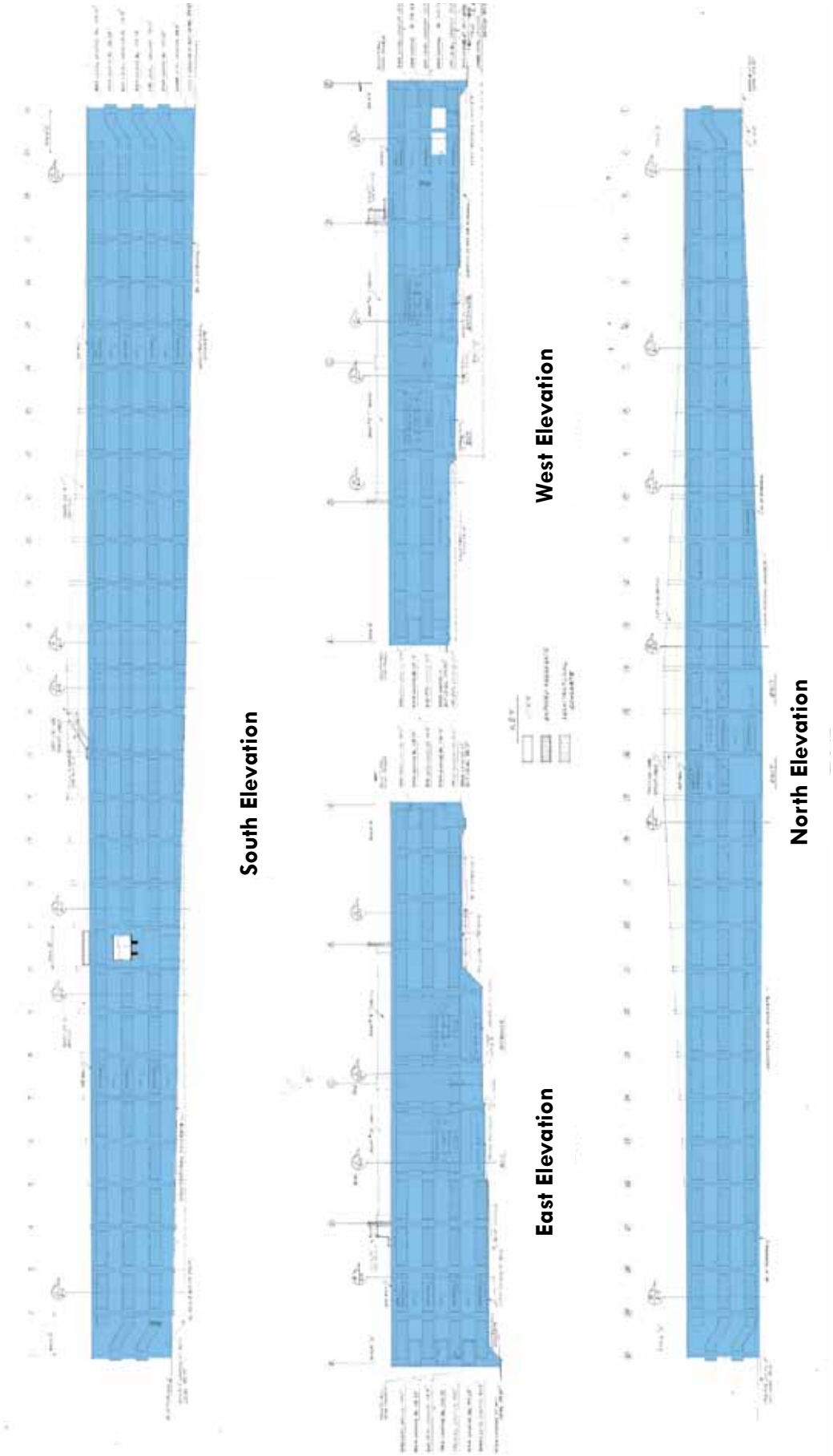
Playhouse and Exhibition Hall

Blue identifies original features

Yellow identifies 1964 fair to civic center changes

Features left white are contemporary alterations

Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.



Mercer Street Parking Garage

Blue identifies original features

Yellow identifies 1964 fair to civic center changes

Features left white are contemporary alterations

Original drawings provided courtesy of Seattle Center. Shading by Artifacts Consulting, Inc.