Appendix Q. Visual Assessment Technical Report

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South Park Bridge Project

Visual Assessment Technical Report

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Chapter 1 Executive Summary

1.1 Project Objectives

The Visual Assessment technical report presents an analysis of existing visual aesthetic conditions and potential visual impacts associated with the removal, rehabilitation or replacement of the South Park Bridge located in King County, Washington. The goal of this assessment is to quantify the visual impacts of this project on the associated viewshed area.

The objective is to systematically assess each of the five alternatives with respect to aesthetics. This visual assessment describes three levels of project aesthetics: (1) vividness (internal aesthetics that consider the object as self-contained); (2) intactness (relational aesthetics that consider the visual relationships between the object and its surroundings; and (3) unity (environmental aesthetics that examine the total enhancement effect of the object upon the quality of the existing environment). These aspects are examined from viewpoints that focus on typical or representative views in and around the landscape districts. The actual viewer groups are determined and further categorized by their potential for exposure to and sensitivity to the view.

To accomplish a repeatable quantitative and qualitative analysis addressing the above levels of project aesthetics and different viewer groups/views, a matrix system applying numeric values to the criteria of vividness, intactness, and unity is evaluated. Each view of the existing conditions is analyzed and rated on a scale where 10 is the highest and 0 is the lowest. Rating the visual quality for the proposed project thus starts from the ratings for the existing conditions and then reassigns numeric values based on the anticipated visual effects of the proposed development.

1.2 Affected Environment

An analysis of existing visual aesthetic conditions serves as a baseline for comparison of the visual impact of each of the alternatives.

1.2.1 Views Toward Project

From the north, long-distance views to the waterway and bridge area are obstructed by the Boeing buildings that were constructed adjacent to the waterfront. The typical foreground view from the north features the paved roadway ramp. Likewise, encroachment of industrial buildings obstructs potential viewpoints from much of the south, except for views of the roadway ramp from the commercial area directly south of the bridge. From a few residences, street ends, Duwamish Waterway Park, and the waterway itself, viewpoints of the bridge project area from the west are accessible, but the bridge does not dominate the prevalent industrial character. From the east, the bridge dominates the view from the marina area.

1.2.1.1 The Boeing Company

The dominant industry of South Park, The Boeing Company, enjoys one of the only true superior (as seen from above) views of the South Park Bridge. Views from Boeing are

dominated by the roadway and so are rated very low in vividness and intactness. Unity is higher as paving is consistent with the industrial backdrop.

1.2.1.2 Small Manufacturing District

The industrial area views the bridge from both normal and inferior positions. Viewers close to the bridge have an inferior position, showcasing the concrete bridge structure, which is uniform with its industrial backdrop. Views from this area rate low in vividness and intactness and higher in unity.

1.2.1.3 Marina/Waterway District

The marina observer's inferior position focuses attention on the bridge, not the water. The surrounding industrial buildings tend to dominate foreground and background views; thus, vividness and intactness score moderately low overall. As a uniformly degraded and industrialized marine environment, the views score low to medium for unity.

1.2.1.4 Commercial District

Views of the bridge are primarily from a normal position in the commercial district. Because of this, one sees little, if any, of the bridge structure. The bridge appears to be a roadway ramp with rails and no marine context is visible. Existing views from the commercial area rate very low in vividness and intactness, but not as low in unity.

1.2.1.5 Residential Neighborhood

The residential neighborhood furnishes mostly distant views of the bridge from a normal position. Existing views rate low in vividness, but higher in intactness and unity. Viewers from Duwamish Waterway Park, downstream of the bridge have a more vivid view as the park is situated to feature the bridge profile in the distance. Foreground intactness and unity rate high, while background views dominated by The Boeing Company rate low.

1.2.2 Views From Project

1.2.2.1 From The Boeing Company

Views from the Boeing side of the bridge would be rated very high when Mt. Rainier is visible. Few motorists would see the waterway below, though pedestrians find its vividness attracts their attention away from the industrial warehouses. For drivers, bland foreground and middleground views of the bridge deck and railing rate low in vividness and intactness, but higher in unity.

1.2.2.2 Commercial District

Motorists and pedestrians approaching the bridge from the commercial district have the opportunity to see distant city views, but are not positioned to view the marina or waterway, due to the height of the railings. Background views rate higher than foreground views for this reason. The middleground is dominated by The Boeing Company office buildings and parking lots and rates low in vividness and intactness, but higher in unity.

1.3 Impacts

Five alternative plans were considered in this analysis, and each was evaluated for direct and secondary impacts as well as operational and construction activity impacts.

1.3.1 Direct Impacts

The No Action Alternative
Since "no action" would ultimately result in bridge removal, the No Action Alternative would achieve slightly increased vividness even though distant views of the city and mountains from the bridge deck vantage point would be gone. The landform and waterforms would both be more easily seen by all viewers. Intactness would increase, as development and encroachment would decrease. Unity would increase greatly as the natural riparian landscape would increase, giving an overall impression of unity with the waterway. Absence of operational impacts would result in increased intactness.

The Rehabilitation Alternative
The Rehabilitation Alternative, by definition, especially if the reconstructed bascule pier were designed to nearly duplicate the design of the existing bascule pier, would not result in significant visual changes. Operational impacts would remain the same.

The Bascule Bridge Alternative
The Bascule Bridge Alternative would result in increased vividness as the new construction should include new "historic" details on the bridge. This could provide opportunity for continuing the new "historic" detailing throughout the nearby community public spaces. Intactness would remain approximately the same. Unity would increase slightly as the natural landscape would probably increase due to habitat mitigation and enhancement requirements, giving an overall impression of unity with the waterway. Operational impacts would remain the same.

The Mid-Level Fixed-Span Bridge Alternative
The Mid-Level Fixed-Span Bridge would result in increased exposure of the residential neighborhood to the view of passing motorists due to the loss of significant buffer buildings between S. Sullivan Street and S. Cloverdale Street. The loss of one more block of commercial buildings between the homes and 14th Avenue S. would change the character of the downtown area from an established and serviceable two-story commercial strip to a one-story residential neighborhood. Remaining buildings on 14th Avenue S. between S. Cloverdale Street and S. Donovan Street would be faced by a bridge ramp abutment, placing passing vehicles at an elevation just above head level of pedestrians on the adjacent sidewalk. In addition to the abutments, a structure for bicycle and pedestrian access to the bridge from S. Thistle Street will visually block views under the bridge to the waterway from the residential area to the west.

The loss of the buildings along 14th Avenue S. will decrease unity by exposing the quiet residential streets to the busy bridge traffic. In addition, these same residential areas decrease in intactness as the new structure encroaches upon the neighborhood and S. Orr Street becomes a dead end. However, intactness could increase slightly as the adjacent natural landscape would increase due to habitat mitigation and enhancement. The

dominance of the new bridge, however, would detract from an overall impression of unity with the waterway. Absence of operational impacts would result in increased intactness.

The High-Level Fixed-Span Bridge Alternative

The High-Level Fixed-Span Bridge Alternative would result in greatly decreased intactness due to encroachment of the new bridge and associated structures throughout South Park. Unity would decrease as the comfortable older character of the few existing buildings would be too sparse to look like a viable commercial district. Those few remaining building facades would be blocked from view by new bridge abutment walls and ramps. The High-Level Fixed-Span Bridge Alternative would also decrease unity of the adjacent residential neighborhood due to the encroachment of the new bridge as it soars high above the existing homes. In addition, in order to accommodate local bus transportation routes, several residences blocks away from the bridge itself would be removed or compromised to accommodate new road alignments. Residences removed due to residential street alignment between S. Donovan Street and S. Trenton Street will reduce unity in the affected neighborhood, but could increase the intactness of the neighborhood if it resulted in more generous setbacks or local access open space. The natural landscape could slightly increase due to habitat mitigation and enhancement, but the dominance of the new bridge would distract from an overall impression of unity with the waterway. Absence of operational impacts would result in increased intactness.

The views of the Seattle skyline would be significantly enhanced, at least for the commuters, though the exposure time of motorists would be very short and from a distant viewpoint. This increase in visual quality would result if the High-Level Fixed-Span Bridge Alternative is selected. Absence of operational impacts would result in increased intactness.

1.3.2 Secondary Impacts

The No Action Alternative

By removing the existing bridge, the No Action Alternative offers the greatest potential for creating open space and public access to the Duwamish Waterway on the north and south banks where the existing bridge would be removed, which lies mostly within the designated shoreline. Secondary changes, therefore, could be subject to shoreline regulations which limit building and paving. Overall, this alternative could result in greatly increased intactness by restricting encroachment.

The Rehabilitation Alternative

The Rehabilitation Alternative would result in a variety of secondary visual changes. Buildings demolished for construction access would result in some property available to be developed as public access areas. Major secondary effects could result from lengthy closure of the bridge. When the bridge is reopened, many small businesses may no longer remain along 14th Avenue S., and the vitality of the downtown area could be substantially diminished.

The Bascule Bridge Alternative

The historic character of the new Bascule Bridge and realignment of 14th Avenue S. (and probable streetscape improvements) could potentially inspire local businesses to restore facades to match the historic character of the new "old" bridge. In contrast to that, new

development replacing the tavern and marine buildings could result in modernization. New development between Dallas Avenue S. and the waterway would likely result in a general tidying up of the north end of the commercial business area.

The Mid-Level Fixed-Span Bridge Alternative
New development replacing the existing buildings could result in redevelopment of a significant portion of the north end of the commercial business area. New development between S. Cloverdale Street and the waterway could result in a general modernization of the north end, decreasing unity with the existing commercial area. Some of the block between S. Donovan Street and S. Cloverdale Street would be flanked by bridge ramp abutments. Some businesses unable to respond to the marketing challenges presented by the loss of visibility and high maintenance of their entry areas would relocate to less challenging sites.

The High-Level Fixed-Span Bridge Alternative
In the case of the High-Level Fixed-Span Bridge Alternative, many vintage building would be replaced by new construction. New development would likely result in decreased unity with the existing commercial area. The block between S. Trenton Street and S. Donovan Street would be flanked by bridge ramp abutments. Some businesses unable to respond to the marketing challenges presented by the loss of visibility and high maintenance of their entry areas would relocate to less challenging sites.

1.3.3 Construction and Demolition Impacts

All of the alternatives would result in visual impacts during the construction phase. Whether these impacts are seen as positive or negative depend somewhat upon one's personal interest and attitudes toward the construction activities occurring on any given day. Watching pile driving progress could be fascinating to nearby industrial workers, but the reminder of a constant annoyance to a nearby daycare provider. Just the opposite could as easily be true. The following summaries outline the different impacts of the various alternatives.

The No Action Alternative
Removal of the bridge would create dust and would result in a temporary influx of vehicles, debris piles, dumpsters, fencing, signage and other construction-related equipment.

The Rehabilitation Alternative
The Rehabilitation Alternative would cause the least visual impact, as the work would be confined to the existing bridge alignment plus some adjacent staging areas. However, due to the bridge closure, impact would be seen longer than with new bridge construction. Construction signing, new traffic patterns, long lines of cars waiting for flaggers, and detour signs throughout the area would be apparent to viewer groups as they approach the bridge. Trucks, workers, and stockpiled materials, barges, cranes, and work occurring at the water line would be visible for the longest period of time with this alternative.

The Bascule Bridge Alternative

Approximately five buildings would be demolished during construction of the Bascule Bridge. This alternative could result in some on-site stockpiles. Fencing, barricades, and detour signage would have less visual impact because motorists would continue to use the existing bridge. Trucks, workers, and equipment would be visible from all districts. Barges, cranes, and work occurring at the water line would be visible from the marina, to some Boeing workers, and from selected residential areas.

The Mid-Level Fixed-Span Bridge

Approximately twelve buildings would be demolished along 14th Avenue S during construction of the Mid-Level Fixed-Span Bridge. This alternative is slightly more likely to result in additional on-site stockpiled material during testing. Construction would continue in a similar fashion to the Bascule Bridge Alternative, except that fencing, barricades, and detour signage would extend even farther south along 14th Avenue S. Trucks, workers, and stockpiled materials would be visible from all districts. Barges, cranes, and work occurring at the water line would be visible from the marina, to some Boeing workers, and from selected residential areas.

The High-Level Fixed-Span Bridge

Approximately thirty-four buildings would be demolished during construction of the High-Level Fixed-Span Bridge. These include all buildings along 14th Avenue S. to just beyond S. Trenton Street. In addition, clearing of several residences would occur in the vicinity of S. Trenton Street and S. 12th Avenue S. to accommodate permanent traffic revisions. Because so much demolition will occur, hazardous wastes are more likely to be found, so this alternative could result in the largest quantity of on-site stockpiled material awaiting test results prior to disposal. Construction would continue in a similar fashion to the Mid-Level Fixed-Span Bridge Alternative, except that construction fencing, barricades, and signage for detours and businesses would be visible in an extended area. Trucks, workers, and stockpiled materials would be visible from all districts. Barges, cranes, and work occurring at the water line would be visible from the marina, to some Boeing workers, and from selected residential areas.

1.3.4 Light and Glare

The No Action Alternative would result in reduced light and glare from the bridge to the adjacent districts. Light and glare from the Rehabilitation and replacement alternatives would begin to affect viewers as soon as construction begins. Stockpiled construction material and machinery would require security lighting. No significant light and glare would directly result from the completed bridge.

For all three replacement bridge alternatives, building demolition along 14th Avenue S. would increase light and glare to the adjacent residential area. Abutments would create dark areas between the bridge and commercial establishments, requiring mitigation lighting that in turn could increase light and glare to the adjacent residential areas. Open bridge support areas could require security lighting, increasing light and glare into the marina and adjacent industrial area. The dead-end streets created by the Mid-Level and High-Level Bridges would increase headlight glare to the adjacent street-end residences from turning vehicles.

1.4 Mitigation

1.4.1 Mitigation for Direct Impacts

Visual mitigation measures may be required no matter which alternative is selected. A number of design options and enhancements exist to mitigate visual impacts.

All Alternatives

- Public interpretive signs could be placed to record and identify the historical significance of the (former) bridge and affected properties.[1]
- Notable features of the bridge could be salvaged (including the Scherzer rolling lift mechanism).
- New access areas, bus shelters or pullouts, and street landscaping would be needed to enhance access to an attractive retail area.
- Potential land use actions should consider future public recreation and shoreline access opportunities.
- Retaining walls may be installed to contain new fill.
- Undergrounding of some utilities may be considered if upgrades are made.

The No Action Alternative
All of the above mitigation plus:

- Supplement proposed planting on east side of the old bridge location to create a visual screen and buffer for the marina.

The Rehabilitation Alternative
All of the above mitigation.

The Bascule Bridge Alternative
All of the above mitigation plus:

- Mitigation for the loss of substrate would involve the installation of natural soils where hardened substrates exist. It would also require planting of native riparian vegetation along the shore of the Duwamish Waterway. This could significantly alter the appearance of the shoreline, which is dominated by nearby industrial complexes.
- Develop a public riverfront access point next to the new bridge. Maintain view of the waterway and marina from the commercial area.
- Salvage bricks from the Red Brick Road to be used in a new location or to repair similar roads in the area.

[1] *South Park Bridge Project: Cultural and Historical Technical Report*; Prepared for King County; February 2004.

- Enhance the visual quality for users of the pedestrian/bicycle path by extending historic lighting fixtures used on the new bridge into the commercial area. Continue the historic theme design, including lighting, site furnishings, landscaping, etc., into open spaces created by demolition of existing industrial buildings.

- To reduce mass and scale of abutment walls and discourage graffiti, consider design treatment such as rustication forms for texture or relief, promoting community-oriented murals, or creating small planting strips directly adjacent to the walls.

- Refer to *Seattle's Comprehensive Plan* and the *South Park Residential Urban Village Plan* for landscaping enhancement concepts for the commercial business area. Streetscape improvements (vegetation) at either ramp end might mitigate the increased quantity of pavement.

The Mid-Level Fixed-Span Bridge Alternative
All of the above mitigation plus:

All of the above mitigation plus:

- Develop a landscaping strip between the residential street ends and the bridge to minimize headlight glare from u-turns and to reduce windblown particulates in the area.

- Consider visual mitigation from as far as two blocks away from the actual proposed bridge rehabilitation area.

- Create a landscape planting strip sufficient in size to accommodate trees adjacent to new retaining wall/abutments, pedestrian ramp, and piers. Plant trees, shrubs, and vines to soften the visual appearance of the wall and provide visual screening or enhancement for affected buildings.

- Restore landscaping disturbed by the construction of the S. Cloverdale Street intersection and introduce landscaping along 14th Avenue S. extending north from the intersection.

The High-Level Fixed-Span Bridge Alternative
All of the above mitigation plus:

- Restore landscaping disturbed by the construction of the S. Cloverdale Street intersection and introduce landscaping along 14th Avenue S. extending south from the intersection. Restore landscaping at affected residential properties along 12th Avenue S. and S. Trenton Street.

1.4.2 Mitigation for Secondary Impacts

Most mitigation for secondary impacts focuses on developing newly vacated land for public access to the waterway. Waterway and marina views should be protected by enforcing zoning codes and regulations during permitting of new and remodeling construction. Newly vacated areas that remain in the public domain might be developed

as open space. Street tree planting could be implemented as redevelopment in the commercial/business district occurs. Gateway signage, information kiosks, benches and trash cans at bus stops, and public art would be encouraged, pursuant to the South Park Residential Urban Village Plan.

1.4.3 Mitigation for Construction Impacts

Minimizing visual impacts of construction for all alternatives would require mitigating for many visual challenges. Signage, lighting and other information would be provided to direct traffic to detour routes and indicate that businesses are open. All alternatives would require restoration and re-vegetation of the natural riparian habitat, thereby introducing trucks and stockpiled landscape material. Temporary screens or curtains may surround stationary equipment.

1.5 Comparison of Alternatives

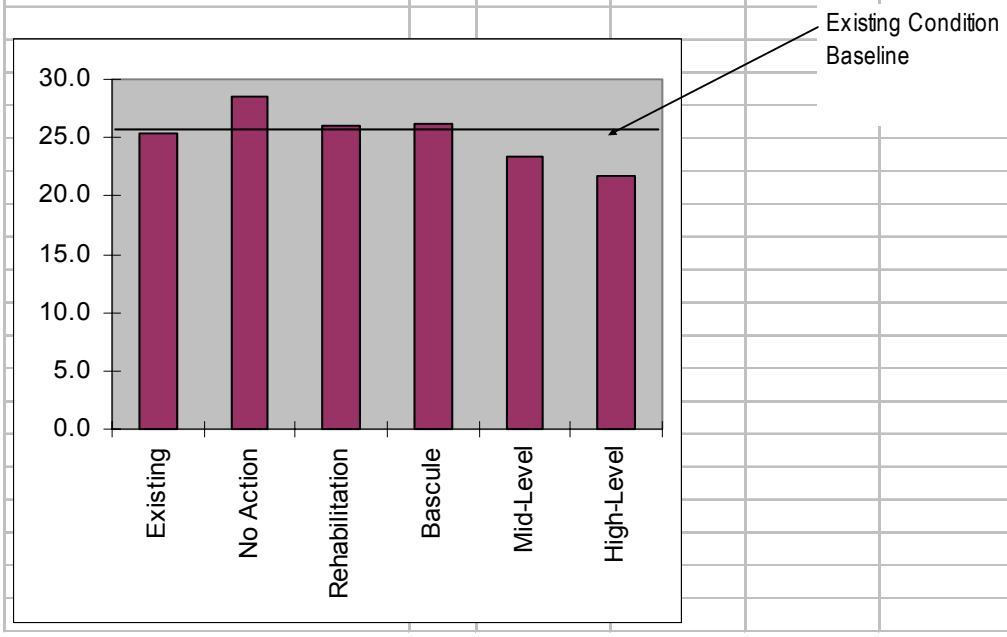
The Rehabilitation and Bascule Bridge Alternatives would have the least visual impact for the South Park community. Table 15 illustrates the average change in visual impact for each of the five alternatives, from the various viewpoints in comparison to the baseline of existing conditions.

The No-Action Alternative, which ultimately results in removal of the bridge, would provide generous open space suitable for public access to both sides of the waterway, and would require the least mitigation. Visually, No-Action would have a positive impact. The Mid-Level Fixed-Span Bridge and the High-Level Fixed-Span Bridge would have a negative visual impact upon the adjacent neighborhood.

In addition to a statistically neutral visual impact upon the South Park community, the Rehabilitation and Bascule Bridge alternatives would have a scale similar to the existing bridge, historic themed detailing consistent with the local neighborhood and would also provide opportunity for developing public access to the waterway. The Bascule Bridge also has the advantage of not requiring as extensive construction mitigation as the Rehabilitation Alternative, and avoids impacts resulting from bridge construction.

Table 1 Comparison of the Visual Impacts of the Project Alternatives

Visual Quality Comparison	Existing	No Action	Rehabilitation	Bascule	Mid-Level	High-Level
A-1 (average visual quality)	*22.1*	*27.3*	*23.5*	*23.5*	*21.1*	*15.8*
A-2 (average visual quality)	*20.7*	*n/a*	*21.3*	*22*	*18.3*	*14*
B-1 (average visual quality)	*22*	*23.3*	*22*	*22*	*18.7*	*19.7*
C-1 (average visual quality)	*28.3*	*28.3*	*28.3*	*29.3*	*25.7*	*29.3*
C-2 (average visual quality)	*30.7*	*30.7*	*30.7*	*31*	*26*	*28.7*
D-1 (average visual quality)	*15.3*	*19.3*	*18.7*	*18.7*	*15.7*	*11.3*
D-2 (average visual quality)	*19.3*	*n/a*	*19.3*	*19.3*	*18.3*	*14*
E-1 (average visual quality)	*30.7*	*29.7*	*30.7*	*30*	*28.7*	*26.7*
E-2 (average visual quality)	*39.3*	*40.7*	*39.3*	*39.3*	*38.3*	*35.7*
Overall Average Visual Quality	25.4	28.5	26.0	26.1	23.4	21.7
Average Change in Visual Quality	0.0	3.1	0.6	0.7	-2.0	-3.7



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Chapter 2 Introduction

Chapter 2 is an introduction to the technical analysis contained in this discipline report. This chapter describes existing conditions, the history of the project, the purpose and need for the project, and the five project alternatives being considered for environmental review. In addition, this chapter summarizes project coordination conducted to date with agencies, local governments, the community advisory group, and members of the public.

2.1 Description of Existing Conditions

This first section describes existing conditions pertinent to the proposed South Park Bridge Project. The project area is defined. The existing bridge and its current condition are described. The local roadway network in the South Park community is described. Non-vehicular transportation in the community is also summarized.

2.1.1 The Project Area

The South Park community is about four miles south of downtown Seattle (see Figure 1). The community lies south of the Duwamish Waterway, the man-made channel portion of the Duwamish River as it enters Elliott Bay. Though originally incorporated as its own city in 1905, much of the area was annexed by the City of Seattle in 1907.[2] The project area lies south of the industrial Georgetown area of Seattle and the King County International Airport (known as Boeing Field). It encompasses the roadway corridor defined by 16th Avenue S. between East Marginal Way S. and the South Park Bridge and 14th Avenue S. between the bridge and S. Trenton Street. Residents and business owners in the project area generally identify with the City of Seattle.
The project area, however, is governed by three local government jurisdictions. The area north of the Duwamish Waterway (between East Marginal Way S. and the waterway) lies within the city limits of both the City of Seattle (northern portion) and the City of Tukwila (southern portion). The area south of the Duwamish Waterway (between the waterway and S. Trenton Street) lies within unincorporated King County and the City of Seattle. The two-block area between the riverbank and Dallas Avenue S. is in King County, and the city blocks to the south are in the City of Seattle.

Land uses in the project area are mixed residential, retail commercial, and industrial. The Boeing Company's Plant 2 dominates the north side of the Duwamish Waterway. On the south side, retail commercial and light industrial land uses front on 14th Avenue S. and along the south bank upstream of the South Park Bridge. Single-family residences, however, generally characterize the area off of this main transportation artery.

[2] City of Seattle, *South Park Residential Urban Village Plan*, 1998.

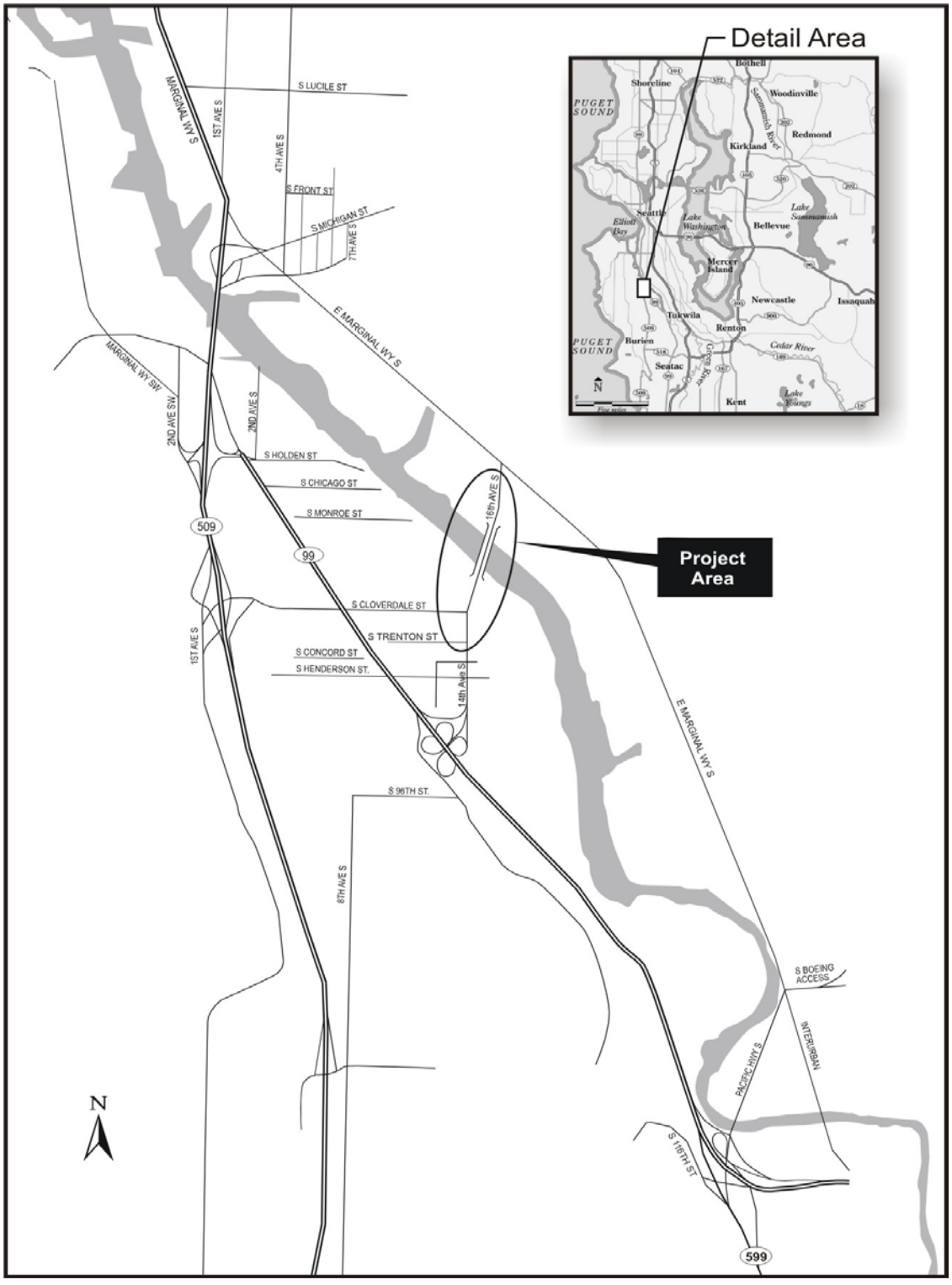

Figure 1 Project Area and Vicinity

2.1.2 The Existing South Park Bridge

The South Park Bridge was constructed in 1929-1931 (see Figure 2). The existing structure consists of a Scherzer rolling-lift double-leaf bascule movable span. Because it is the only operational example of a Scherzer rolling-lift bascule bridge in Washington, the bridge is listed on the National Historic Register.[3]

Each side is flanked by two truss approach spans and twelve concrete slab approach spans. The overall length of the bridge is approximately 1,045 feet abutment-to-abutment and approximately 1,340 feet in entirety to the grade match points. The double-leaf bascule movable span has a center-to-center distance between the front bearing points of approximately 190 feet. The roadway consists of four 9.5-foot lanes. The pavement is 38 feet with 6-foot sidewalks on both sides. Reinforced concrete piers founded on timber piling support the bascule span. Two large in-water piers support the counterweights, track supports, and racks for the rolling lift. The attached towers house the operating machinery, electrical equipment, and operator control room.

The South Park Bridge spans the Duwamish Waterway, which is used for industrial, commercial, and recreational purposes. The bridge is near the upstream limit of heavy industrial uses along the Duwamish Waterway, but it is within the section of the navigation channel maintained by the U.S. Army Corps of Engineers. The existing maximum vertical clearance of the bridge when closed is approximately 34 feet at Mean High Water (MHW). Bridge openings occur approximately three times per day on average to accommodate waterway traffic, although on some days the bridge does not open at all. The existing navigable horizontal clearances is approximately 118 feet at the water level (fender-to-fender), but narrows to 92 feet approximately 114 feet above the water between the open bascule leaves. The depth of the navigation channel is approximately 15 feet at Mean Lower Low-Water (MLLW).

2.1.3 Bridge Condition

In spite of substantial on-going maintenance and repairs, the South Park Bridge has suffered considerable deterioration over the past 70 years. In particular, the bascule piers are cracked and unstable resulting in the misalignment of the movable spans. Consequently, the center lock and glide tracks require on-going modifications and adjustments to allow the bridge to operate properly. Long-term, the stability of the entire bridge is at risk due to the original shallow placement of the supporting piles, which has resulted in movement of the bridge piers over the decades. The condition of the bridge worsened significantly following the Nisqually Earthquake in February 2001, and it remains vulnerable to future seismic events. A 2002 bridge inspection conducted by King County resulted in an existing condition rating of 6.0 out of a possible score of 100

[3] King County Landmarks and Heritage Commission. *Findings and Fact Decision – 14th Avenue South Bridge*, decision made December 19, 1996 and filed January 2, 1997.

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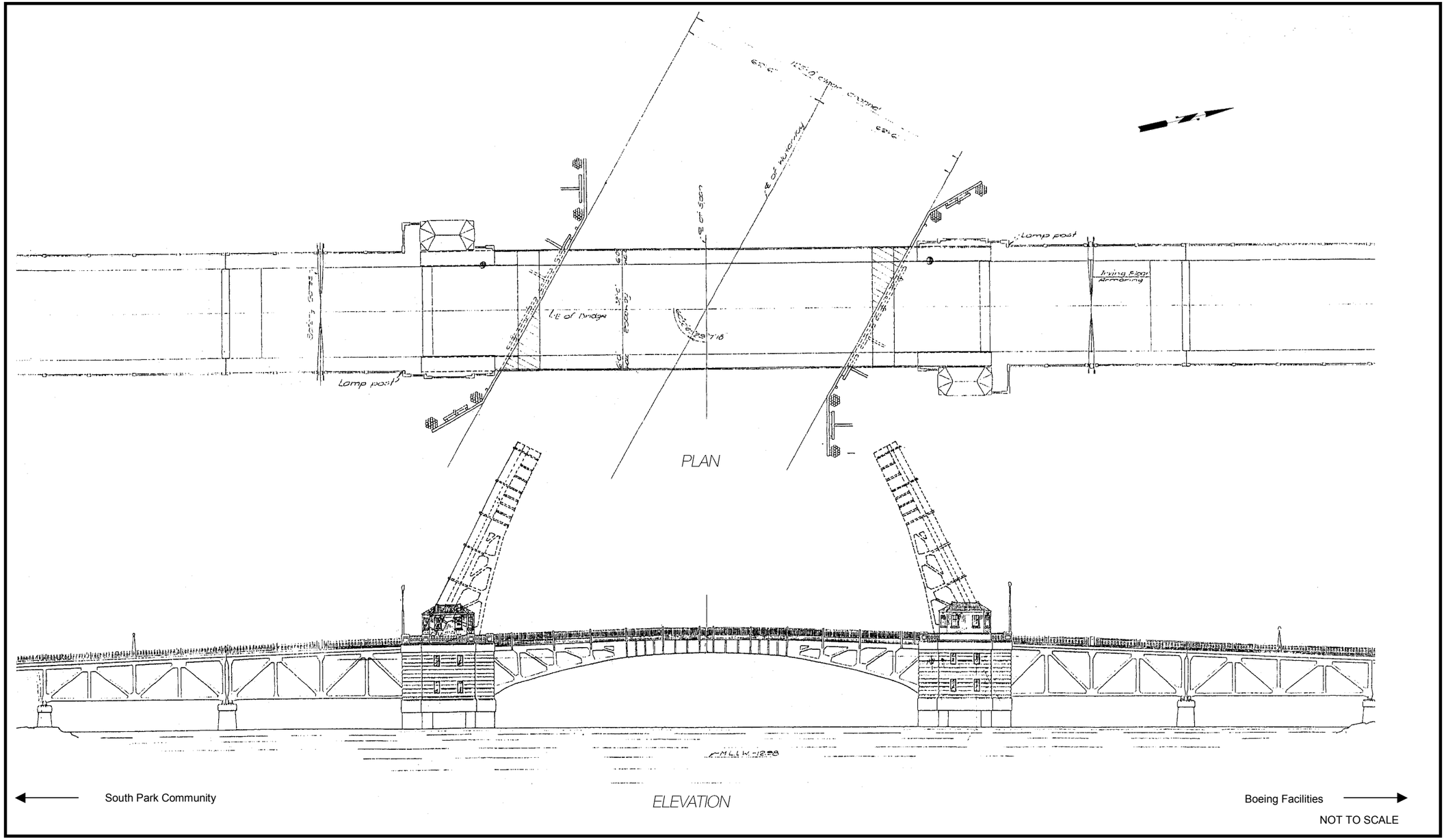

Figure 2 Existing South Park Bridge

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(based on Federal Highway Administration criteria).[4] This was among the lowest ratings given any bridge structure in the State of Washington in 2002.

2.1.4 Roadway Network

The bridge presently accommodates an average daily traffic volume of approximately 20,000 vehicles per day, based on 2001 City of Seattle traffic counts. Many of the vehicle trips originate in residential neighborhoods in the communities of West Seattle, White Center, and SeaTac. For South Park community residents, the bridge is the primary direct means of access to the north, downtown Seattle, and I-5.

The existing roadway network surrounding the South Park Bridge consists of a variety of roadway types. They range from local two-lane streets to major limited-access highways. Regional traffic movement in the South Park area is concentrated to three nearby north-south corridors including SR-99, SR-509, and East Marginal Way S. Local circulation is provided through a system of local and collector streets. Features such as the Duwamish Waterway and large-scale facilities such as Boeing Field and the Boeing Plant 2 create barriers within the road network and limit opportunities for access to and from the major regional routes.

2.1.5 Freight, Transit, and Pedestrians

Freight movement in peripheral areas of the South Park community is significant due to the high concentration of industrial and manufacturing uses in the general area. Major truck traffic is primarily directed along East Marginal Way S. and SR-99. The South Park Bridge and S. Cloverdale Street are also designated truck routes for oversized vehicles. Trucks use S. Cloverdale Street to access the City of Seattle South Recycling and Disposal Station located at 8105 Fifth Avenue S. as well as SR-509 and SR-99 located on the western edge of the South Park community. With respect to rail movements, the only train crossing in the study area exists immediately south of the intersection of East Marginal Way S. and 16th Avenue S.

Bus routes serving the South Park community are primarily located along major north-south corridors, including East Marginal Way S., 14th and 16th Avenues S., and S. Cloverdale Street. Six major King County Metro bus routes serve the area. Routes 60 and 130 cross the South Park Bridge and four of the six bus routes travel along S. Cloverdale Street.

Pedestrians and bicyclists are commonly seen in the South Park area, especially near the community's center near the intersection of 14th Avenue S. and S. Cloverdale Street. Mid-day pedestrian volumes are higher than the morning or evening commute periods due to shopping, transit use, and lunch-related walking trips.

[4] King County, *Bridge Inspection Report*, August 1, 2002.

2.2 History of Project

Since 1931, the moveable bridge has crossed the Duwamish Waterway in the South Park community of the City of Seattle. The following sections contain an overview of the studies preceding the start of the current environmental review effort, a summary of two key documents that framed the initial development of project alternatives, and ongoing reports documenting the changing condition of the bridge.

2.2.1 Overview of Studies

In recent history, over 20 engineering studies have been prepared on the South Park Bridge. Starting in 1987, when the bridge was 56-years-old, King County contracted for the preparation of a general engineering investigation report to assess the condition of the bridge. In 1991 and 1993, additional studies were completed including a geotechnical study, foundation design report, and a life-cycle cost analysis. This information led King County to undertake a series of studies in 1994 addressing liquefaction risks as well as the condition of the concrete, substructures, approach span joints and loading rating. In addition, a study was conducted to evaluate potential replacement alternatives for the bridge and another study investigated community issues related to the bridge. Since 1994, King County has recognized that the bridge required either rehabilitation or replacement and has continued to investigate the condition and vulnerabilities of the bridge in an effort to evaluate these options.

2.2.2 Summary of Key Engineering Reports

Two key engineering studies were conducted that helped to frame the current pursuit to evaluate potential alternatives to rehabilitate or replace the South Park Bridge. A 1994 Sverdrup study evaluated potential design options and a 1999 Entranco study researched and presented the likely steps required to conduct the necessary environmental review of the project alternatives and to complete necessary permitting. These studies are summarized below.

2.2.2.1 Sverdrup Study

In November 1994, Sverdrup Civil, Inc. completed a report titled 14th/16th Avenue South Park Bridge Rehabilitation/Replacement – Design Report for the King County Department of Public Works. The objective of that report was to evaluate alternative alignments and bridge types, impacts of the alternatives studied and to present to King County results, findings, conclusions, and recommendations of a preferred replacement bridge for the existing South Park Bridge.

The 1994 design report studied five alternatives: rehabilitation of the existing bridge; two fixed-span bridge replacements (a 100-foot vertical clearance bridge and a 60-foot vertical clearance bridge); a new moveable bridge (double-leaf bascule bridge); and bridge closure (permanent closure and demolition of the existing bridge). Other alternatives that had been evaluated but were not carried forward, according to this report were: locating the replacement bridge immediately east (upstream) of the existing

alignment; matching the existing alignment; and locating the northbound and southbound lanes on separate structures. These three alternatives were not considered feasible and thus were not studied further.

The 1994 design report concluded that the 60-foot vertical clearance fixed-span bridge design could be used to replace the existing South Park Bridge, with consideration of mitigation of impacts to some users.

2.2.2.2 Entranco Study

In July 1999, Entranco completed the 16th Avenue S. Bridge Replacement Project: Environmental Review Report for the King County Department of Transportation. The objective of this report was to present to King County a summary of environmental review and permitting activities that would likely be required for replacing the bridge.

The report identified the proposed project as a replacement of the existing bridge, including improvements to the approach road – 14th Avenue S. to the south and 16th Avenue S. to the north of the Duwamish Waterway. The project limits were identified as East Marginal Way S. on the north and S. Cloverdale Street on the south. The report asserted three build alternatives should be selected for evaluation in the EIS, including alternatives with differing alignments and bridge types. It was further noted that three alternatives would be the least number needed to provide a reasonable range of alternatives under National Environmental Policy Act (NEPA) and Washington State Environmental Policy Act (SEPA) regulations.

Entranco outlined the various tasks that would be required under the WSDOT Environmental Procedures Manual and Federal Highway Administration (FHWA) guidelines. The report identified these tasks to include the following: the development of bridge alternatives, screening, and selection of alternatives for analysis in the EIS; preliminary engineering design, including an update to the1994 rehabilitation/replacement report; survey and mapping work; hydraulic and geotechnical studies, and conceptual-level design documentation. The report concluded that the alternatives proposed, including rehabilitation of the existing bridge, had not been designed in enough detail to make a decision regarding a preferred alternative. Related to the environmental review process, the report recommended the public involvement program include coordination with an Interdisciplinary Team (IDT) of agency representatives and a community advisory committee. The report also listed 17 specific environmental discipline reports that would likely be required for the preparation of the EIS.

The findings and recommendations presented in the Entranco report formed the basis from which King County staff developed the current contracted scope of work for environmental review. The scope includes engineering, environmental review, agency coordination, and public involvement tasks.

2.2.3 Continuing Deterioration

Since 1999, King County has continued to move forward to develop alternatives for rehabilitating or replacing the existing South Park Bridge. Bridge conditions have

worsened since the engineering studies were conducted in the mid-1990s. In February 2001, the Puget Sound Nisqually Earthquake caused significant and widespread damage to the bridge. Over $740,000 was required to repair the bridge in order to keep it operational.[5] The King County 2001 bridge inspection report recorded a rating of 8.0 out of a total possible score of 100 (based on FHWA criteria).[6] The following year, this rating decreased to 6.0.[7]

2.3 Purpose and Need of Project

As a required element of the EIS, a Purpose and Need Statement was developed for the South Park Bridge Project to clarify the underlying basis for the proposed action. The development of the initial draft Purpose and Need Statement involved review and comment by a number of parties including King County staff and the Project Advisory Committee (PAC) that includes agencies with jurisdiction over the proposed project. The draft Purpose and Need Statement was also revised based on comments received at several public involvement events. In April 2002, King County forwarded the draft Purpose and Need Statement to the Federal Highways Administration (FHWA) for review and approval. The text of the FHWA-approved version of the Propose and Need Statement is presented in the following sub-sections, although minor revisions and footnotes have been included for clarification.

2.3.1 Function and Role of the South Park Bridge

The King County Department of Transportation (KCDOT) is proposing the rehabilitation or replacement of the South Park Bridge located in King County, Washington. Since 1931 the moveable span bridge has carried traffic along the 14th Avenue South and 16th Avenue South corridor across the Duwamish Waterway. On a typical workday, a mix of approximately 20,000 cars, trucks and buses use the bridge to access employment centers in downtown Seattle and the Duwamish industrial area. Many of the vehicle trips originate in residential neighborhoods in the communities of West Seattle, White Center, and SeaTac. For residents of the community of South Park, the bridge is the only immediate means of access to and from destinations east of the community. The moveable structure spans the navigation channel of the Duwamish Waterway. When open, large-size industrial and recreational vessels have access to upriver destinations. The South Park Bridge is also a major route for heavy truck traffic traveling to and from large industrial manufacturers including the Boeing Company.

2.3.2 Purpose of Proposed Project

The purpose of the proposed action is to find the most feasible long-term solution to address the deteriorated condition and increasing seismic vulnerability of the South Park

[5] Tim Lane, King County Department of Transportation, Telephone Conversation, September 23, 2002.

[6] King County, *Bridge Inspection Report*, August 21, 2001.

[7] King County, *Bridge Inspection Report*, August 1, 2002.

Bridge. The proposed action must also maintain the vital transportation linkage for cars, trucks, buses, bicyclists and pedestrians across the Duwamish Waterway.

2.3.3 Need for the Proposed Project

In spite of substantial ongoing maintenance and repairs, the South Park Bridge has suffered substantial deterioration over the past 70 years. Existing problems with the bridge worsened significantly following the Nisqually Earthquake in February 2001 and the bridge remains vulnerable to future seismic events. A recent 2002 bridge inspection conducted by King County resulted in an existing condition rating of 6.0 out of a possible score of 100 (based on FHWA criteria).[8] This is among the lowest ratings given any bridge structure in the State of Washington.

The bridge could be closed as a consequence of excessive structural deterioration or failure of the moveable span operations (particularly in the event of another seismic event). Closure of the bridge would have a significant impact on the transportation system and traffic conditions throughout the lower Duwamish industrial area-- including SR-99, SR-509, First Avenue S. and East Marginal Way S. Improvements are required in the near future to protect public safety and to maintain a transportation corridor that is critical to the local and regional economy.

2.3.3.1 Seismic Vulnerability

The February 28, 2001 Nisqually earthquake (magnitude 6.8, located 35 miles from Seattle and deep below the surface) caused significant damage to the South Park Bridge. Since the earthquake, operation of the moveable span has been less reliable, requiring the bridge to be closed for repairs intermittently for several days. The continuing periodic closure of the bridge for repairs has heightened the awareness of the need for rehabilitation or replacement of the existing bridge.

2.3.3.2 Roadway Design Deficiencies

The South Park Bridge does not meet current roadway design standards and has many design deficiencies. For example, the overall bridge width including lane widths, shoulders and sidewalks should be 64 feet according to current design standards. The existing bridge width is currently only 52 feet (measured outside-to-outside).

2.3.3.3 Transportation Issues

An average of 20,000 daily vehicle trips cross the Duwamish Waterway on the South Park Bridge. It is a significant link between the east and west side of the Duwamish, both locally and regionally. The South Park Bridge is also a route for heavy and oversize truck traffic. According to previous studies, closure of the bridge would have a significant noticeable impact on the transportation system and traffic conditions throughout the lower Duwamish industrial area – including the Highway 99 and East Marginal Way S. corridors.

[8] The original text of the FHWA-approved Purpose and Need Statement cited the condition rating of 8.0 from the 2001 King County Bridge Inspection Report. The current cited condition rating of 6.0 is from the King County *Bridge Inspection Report* dated August 1, 2002.

2.3.4 Key Issues

2.3.4.1 Community Impacts

The existing South Park Bridge is a highly valued feature of the South Park community. There is widespread concern in the community that changes to the bridge could have a significant adverse impact on the community and the emerging economic vitality of the South Park business district centered along 14th Avenue South. The South Park Residential Urban Village Plan of 1998 (the neighborhood plan) identified one of its primary objectives as "finding a solution for the South Park Bridge that is sensitive to the needs of the community."

The South Park community is also ethnically diverse. Approximately 30 percent of the populations' primary language is not English. These factors require greater emphasis on the consideration of environmental justice[9] in order to ensure that the potential adverse effects from the proposed project do not have a disproportionate impact on lower-income or minority populations.

2.3.4.2 Aquatic Habitat Protection

The Duwamish Waterway is an important route for juvenile and adult salmon migrating between the upper Green River, Elliott Bay and the Pacific Ocean. However, much of the waterway in the vicinity of the South Park Bridge currently provides poor habitat for chinook salmon (listed as threatened under the Endangered Species Act) and other marine organisms. The armored shoreline along the waterway in the project area provides minimal habitat for young chinook salmon during their critical rearing period. Recovery plans now underway for threatened and endangered salmon will address potential means of enhancing habitat favorable to the survival and growth of young salmon from the Duwamish/Green River system. Restoration of the shoreline in the vicinity of the project would address immediate and long-term needs for habitat improvement along the Duwamish Waterway.[10]

2.3.4.3 Duwamish Waterway Navigation

The Duwamish Waterway is used for industrial, commercial and recreational purposes. The South Park Bridge is near the upstream limit of heavy industrial uses along the waterway, but it is within the section of the waterway maintained by the U.S. Army Corps of Engineers as a navigation channel. A number of local businesses, as well as the U.S. Coast Guard, have emphasized to King County that any engineering solutions for the South Park Bridge must maintain navigational access upstream of the existing bridge.

[9] Environmental justice concerns the need to avoid disproportionate, significant adverse impact on minority and/or low-income communities.

[10] This section highlights the importance of addressing aquatic habitat values in the project area, as well as the implications for species currently listed under the ESA; however, it is not intended as a complete characterization of the factors that need to be considered in this regard.

2.4 Description of Alternatives

This section describes the No Action Alternative, the Rehabilitation Alternative, and the three replacement bridge alternatives (Bascule, Mid-Level Fixed-Span, and High-Level Fixed-Span bridge alternatives). The first section explains the transportation engineering criteria and standards used to design the Rehabilitation Alternative and the three replacement bridge alternatives. The second section describes the horizontal and vertical profile of the bridge alternatives, navigation channel clearances, and impacts to the local road network. The last section describes construction activities associated with each of the five alternatives for the South Park Bridge Project.

2.4.1 Design Criteria

Except for the No Action Alternative, construction of any of the project alternatives would incorporate current transportation engineering design criteria for the cross-section, alignment, design speed, maximum grade, and transition segment. The road cross-section design is a key design element that would change for any of the build alternatives (see Figure 3). The existing bridge cross-section incorporates four 9.5-foot travel lanes, raised curbs on both sides of the pavement, and a 6-foot sidewalk on either side of the roadway. The outside-to-outside dimension of the existing bridge is 52 feet. These lane widths are non-standard and would be changed for the Rehabilitation Alternative and for the three replacement bridge alternatives. For the Rehabilitation Alternative, the pavement would remain approximately the same width as it is currently, but would be reconfigured for three standard lanes. There would be two 12-foot lanes on the outside and one 11-foot lane in the middle of the roadway. Traffic would use one 12-foot lane for northbound travel and the other two lanes for southbound travel. The 6-foot sidewalk on either side of the roadway would be enlarged to approximately 7.5 feet. In contrast, each of the replacement bridge alternatives would be designed with four standard 11-foot lanes, traffic barriers or a painted median down the center, a traffic barrier on each side of the pavement, and a single combined 13-foot pedestrian/bike path on the west (downstream) side of the bridge. The width of the cross-section for the new replacement bridge alternatives including the exterior barriers would total approximately 68 feet (outside-to-outside of the bridge structure).

An initial range of potential bridge alternatives and alignments was considered based on earlier studies,[11] current input from stakeholders, and the project team. During the course of this initial alternatives development process, it was determined that there were no practical alternative alignments for a replacement bridge other than to parallel the existing bridge. It was determined that replacement bridge alternatives should be aligned to the west (downstream) of the existing bridge in order to minimize impacts to existing land uses. Conceptual engineering for the replacement bridge alternatives set the alignment for these bridges at approximately 80 feet to the west of the centerline of the existing bridge (i.e., as close to the existing structure as practicable without compromising constructability).

[11] Entranco, Inc., *Environmental Review Report: 16th Avenue S. Bridge Replacement*, July 1999.

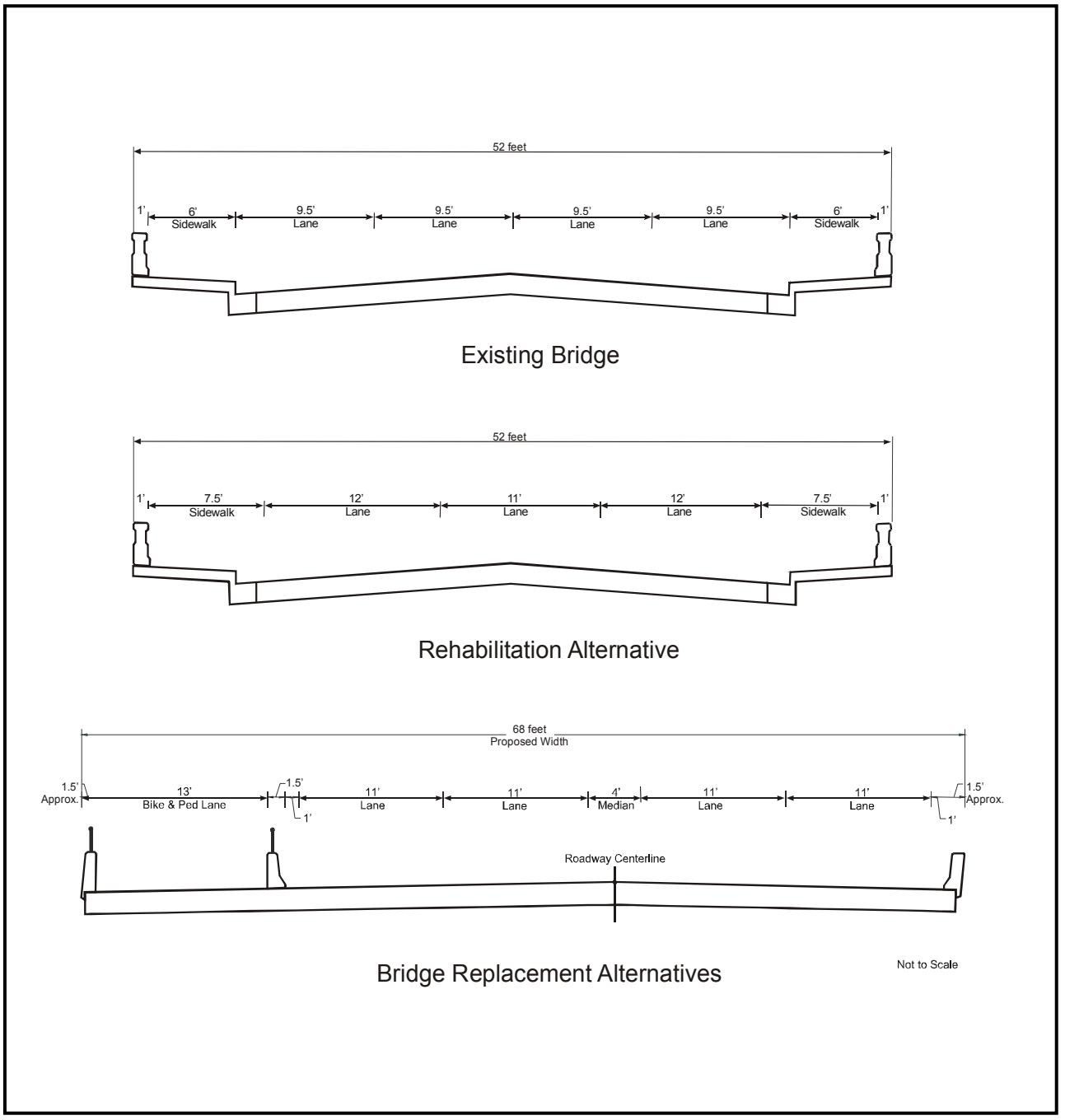

Figure 3 Existing and Proposed Bridge Cross-Section Designs

The initial alignment of the new roadway was the same as the existing road alignment on the south side of the waterway. The existing roadway is quite narrow. Matching the centerline of the new bridge alternatives to the existing would require acquisition of both land and buildings on both sides of 14th Avenue S. To minimize these impacts, the alignment of the new transition segment was shifted slightly to the east of the existing road alignment because there are fewer parcels and buildings located on the east side of the road compared to the west. In addition, more of the buildings located on the east side are set back from the existing sidewalk than on the west side. In this way, the proposed alignment for the replacement alternatives has been developed to avoid or minimize potential land use and relocation impacts.

Other design factors affecting impacts to adjacent properties include the new bridge's design speed and maximum grade. King County road standards call for a 35 mph design speed and a maximum of 8 percent grade. Initially, these standards were incorporated into each of the alternatives. Implementation of an 8 percent maximum grade for the High-Level Fixed-Span Bridge Alternative, however, would have resulted in a very long bridge (project terminus to terminus). For example, the north terminus would have extended across East Marginal Way S. and into Boeing Field. To reduce impacts to land use, the maximum grade for the High-Level Fixed-Span Bridge Alternative would need to slightly exceed 8 percent. In this manner, the north side of the bridge would terminate south of East Marginal Way S. This grade change reduced the overall length of the bridge on both south and north ends of the bridge by several hundred feet for the High-Level Fixed-Span Alternative.

Community impacts would also be affected depending on the design of the transition segment. This is the segment of the roadway that merges the differing widths of the new roadway and the existing narrow roadway. Typically, transition segments begin at the point the grade of the bridge matches the grade of the existing roadway and extends beyond some distance. The actual rate at which the width of the roadway is reduced is defined by transportation engineering design standards. To minimize impacts to land uses along 14th Avenue S., King County proposes to start the transition segment from the abutment for all alternatives. This means that by the time the bridge matches the grade of the existing roadway, the width of the new bridge is nearly the same width as the existing road. As a result, the total length of the roadway is reduced potentially several hundred feet in length. In addition, the width of the transition segment for the Mid-Level Fixed-Span Alternative is further reduced by having the single combined 13-foot pedestrian/bike path split off from the main bridge structure at approximately S. Orr Street and descended to ground level in a zigzag fashion. This design modification further reduced the overall impact of the Mid-Level Fixed-Span Alternative.

Together, the design criteria discussed in this section would allow for the construction of a replacement bridge that provides increased safety for vehicles, bicyclists, and pedestrians.

2.4.2 The Alternatives

A total of five alternatives were selected for evaluation in the environmental review process including: the No Action Alternative, the Rehabilitation Alternative, the Bascule

Bridge Alternative, the Mid-Level Fixed-Span Bridge Alternative, and the High-Level Fixed-Span Bridge Alternative. These alternatives were selected from an initial group of nine preliminary project alternatives.[12] The alternatives proposed for evaluation in the environmental review process were selected because they had fewer potential impacts than the other preliminary alternatives. Based on comparison ratings for seven evaluation criteria (regional mobility, local access, navigation, community impacts, aquatic habitat, construction impacts, and estimated project costs), the following preliminary alternatives were dropped from further consideration: a low-level fixed-span bridge, a movable swing bridge, a vertical lift movable bridge, and a tunnel option. The following sections describe each of the proposed project alternatives to be considered in the environmental review process based on conceptual civil and structural engineering.[13] [14]

2.4.2.1 No Action Alternative

The No Action Alternative assumes that the existing bridge structure's poor condition would require it to be closed at some time in the future. Deterioration due to use could allow the bridge to continue to operate for the foreseeable future, but at some time in the future, the bridge would need to be closed. As such, for purposes of environmental review, it is assumed the existing bridge would be closed permanently sometime before 2027.

However, the bridge could be closed for other reasons than simply deteriorated condition. Another earthquake could cause an unexpected emergency closure of the bridge at any time. The on-going movement of the bridge foundations could eventually cause the moveable spans to become misaligned to the extent that repairs would be infeasible. Or, the cost of maintaining the bridge could become more than King County is willing to expend. Under any of these circumstances, the bridge would be closed.

When closed, no vehicular, bicycle, or pedestrian traffic would be allowed to use the bridge. As a navigable waterway, the U.S. Coast Guard regulates bridges that span waterways such as the Duwamish Waterway. If the bridge were no longer operating, the U.S. Coast Guard regulations would require demolition and removal of the bridge. With no structures remaining, there would be no potential navigation obstructions in the Duwamish Waterway.

Under this alternative, there would be no change in the local street network except 14th and 16th Avenue S. would be dead-ended on both the south and north shores of the Duwamish Waterway.

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[12] Parsons Brinckerhoff. *South Park Bridge Project: Summary Technical Memo - Alternatives Development and Screening*, September 6, 2002.

[13] Parsons Brinckerhoff. *South Park Bridge Project: Conceptual Plans*, June 2003.

[14] Parsons Brinckerhoff. *South Park Bridge Project: Structural Alternatives Study*, November 2003.

Figure 4 shows the existing local street network and Figure 5 shows the local street network following the removal of the existing bridge in the No Action Alternative. As the road does not currently provide direct access to the adjacent Boeing Company properties, the exact location of the road closure on the north side would need to be negotiated with Boeing as well as the owner of the railroad tracks immediately south of East Marginal Way S. In addition, the site of the removed bridge would be restored.

2.4.2.2 Rehabilitation Alternative

For the Rehabilitation Alternative, much of the existing bridge structure would need to be replaced. The existing steel trusses of the approach spans and the bascule leaves would be refurbished and reused. The mechanical and electrical operating systems would be refurbished and/or replaced. Studies have confirmed the existing bridge piers are gradually shifting because the foundation pilings were not originally driven to a sufficient depth. Although the initial goal was to rehabilitate the existing piers, the design team's structural analyses determined that the existing bascule piers and truss approach span piers must be replaced in order to ensure the long-term (approximately 75 years) integrity of the bridge. If the bascule piers were reconstructed, the longevity of the Rehabilitation Alternative would be similar to the expected minimum life of a new bridge structure.

For the Rehabilitation Alternative, the new bascule piers are proposed to be approximately the same size, location, and historic character as the existing piers (see Figure 6). To construct the new bascule piers, the bascule leaves and steel approach spans would need to be removed. The steel truss elements of the bridge structure would be taken to another site for repair, refurbishment, and/or painting before they are re-installed following the construction of the new piers. The concrete shafts or pilings supporting the foundations of the new piers would extend below the existing pilings to a depth beneath the riverbed where stable soils exist. The removal of the steel truss spans would also allow for replacement of the steel approach piers. The concrete approach spans and bridge abutments would be replaced and the bridge deck would be reconstructed. Like the existing bridge, there would be piers both on land and in the water. The first on-land piers would be only an estimated 20 feet from the top of the south embankment and the closest in-water piers would be approximately 20 feet from the top of the embankment. The piers on the north shoreline would extend through the

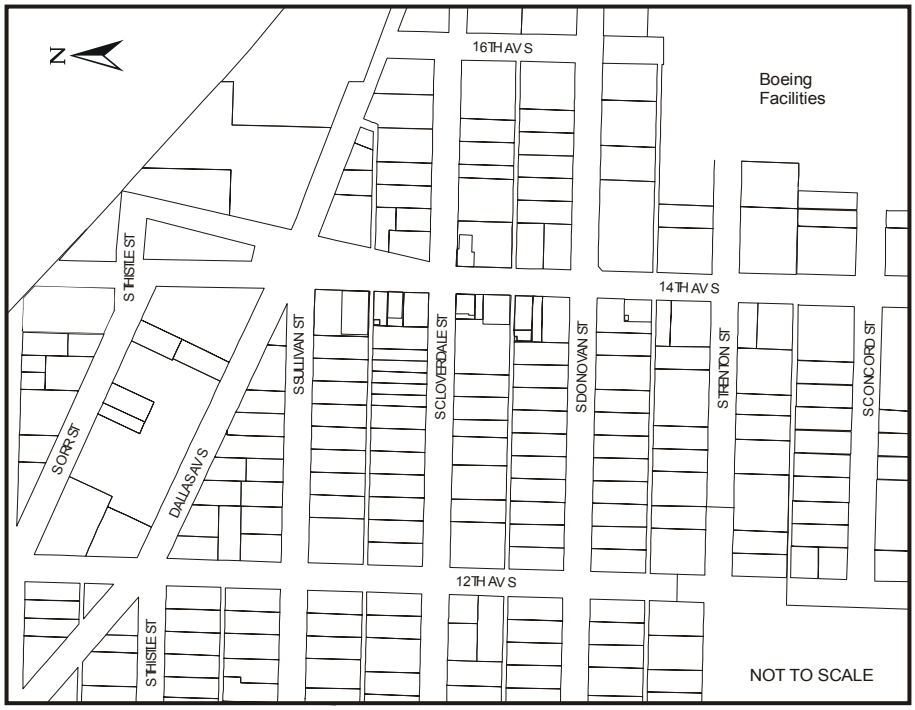

Figure 4 Existing Conditions Street Network

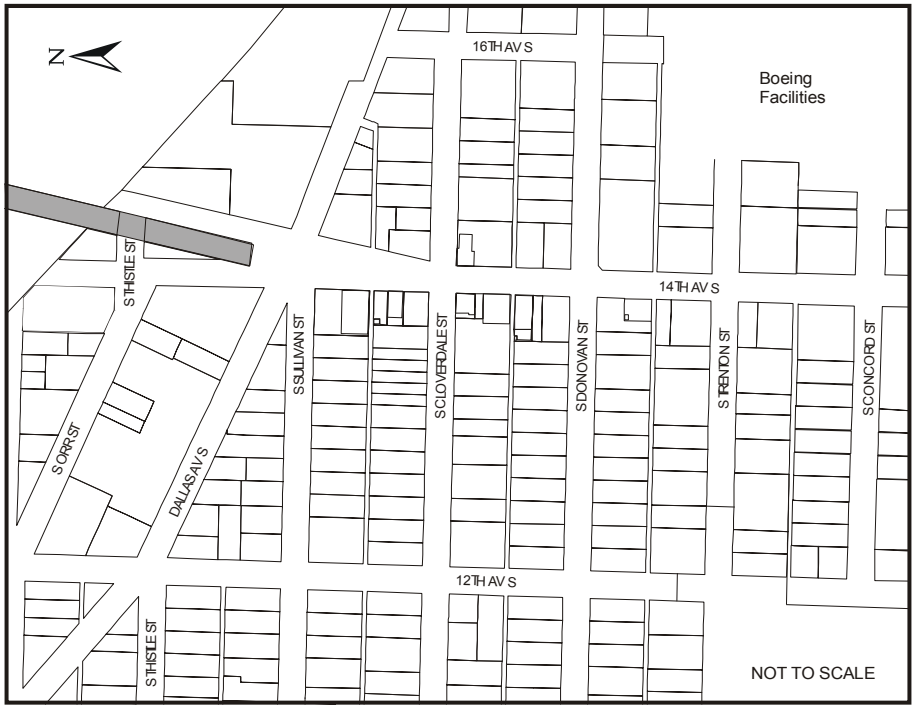

Figure 5 No Action Alternative Street Network

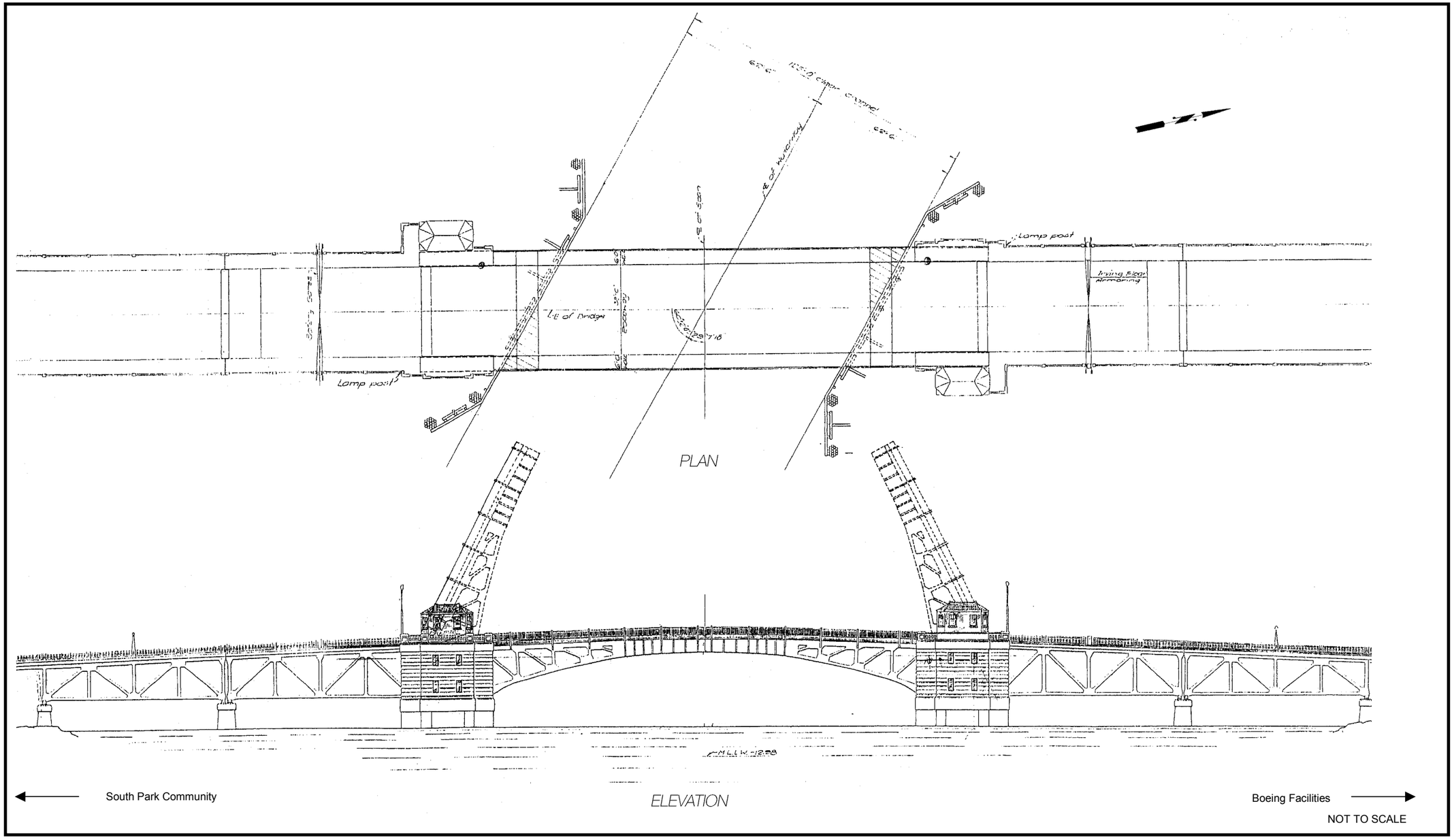

Figure 6 Rehabilitation Alternative

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existing Boeing dock. The conceptual engineering analysis also determined that the mechanical and electrical systems should be replaced. Any required construction activities, including replacement of the bridge railings, bridge tender towers, and lamp posts, would be done in a manner that preserves the historic character of the existing bridge to the greatest extent possible.

To meet current roadway design standards, the new bridge deck would remain approximately the same as the existing, but the pavement would be striped to accommodate three standard traffic lanes. Bicycle and pedestrian traffic would continue to be able to use the bridge via a 7.5-foot pedestrian path on each side of the bridge.

Following construction, the existing 118-foot navigable channel width would be preserved so existing waterway users would be able to continue to use the navigation channel to travel upriver of the South Park Bridge. The extended closure of the bridge during construction, however, would have a significant temporary impact on access to the South Park community.

Following construction, there would be only slight changes in the local street network. Figure 7 shows the local street network in the South Park community following construction activities for the rehabilitation of the existing bridge. The figure also shows the portion of the project alternative that would be elevated for the bridge structure, the bridge touch-down point, and the portion that would have surface roadway improvements. (For comparison, Figure 8 shows the local street network following the construction of the Bascule Bridge Alternative.) To improve vehicular safety, S. Sullivan Street would intersect Dallas Avenue S., which would become the main cross street intersection with 14th Avenue S. The 16th Avenue S. (immediately east of the bridge) intersection with Dallas Avenue S. as well as 14th Avenue S. may also need to be reconfigured. Access to points north via the South Park Bridge would be maintained.

2.4.2.3 Bascule Bridge Alternative

The Bascule Bridge Alternative would result in the construction of a new movable bridge immediately downriver of the existing bridge (see Figure 9). The bridge mechanism could be a Scherzer rolling lift type (no longer a common design for new movable bridges) or another type. The bridge length would be approximately 935 feet from abutment-to-abutment, not including roadway approaches. Road improvements would extend from a point just north of S. Cloverdale Street on the south side of the waterway and north to a point opposite the northeast corner of Boeing Building 2-15. The interior walls of the bridge abutments would be approximately 200 feet from the top of the embankment, or approximately 50 feet closer to the shore than the existing bridge. With fewer piers than the existing bridge, the first on-land piers of this alternative would be approximately 55 feet from the top of the south embankment at the shortest distance and the closest in-water piers would be approximately 65 feet away. On the north shoreline, the closest in-water piers would be approximately 95 feet from the top of the embankment and the closest on-land piers would be approximately 30 feet away. Unlike

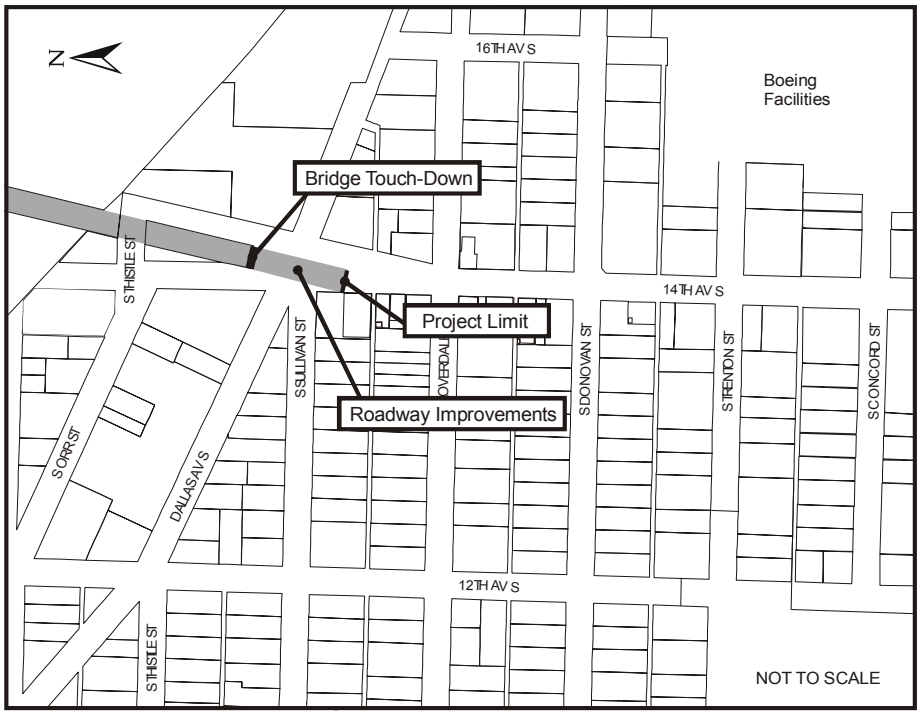


Figure 7 Rehabilitation Alternative Street Network

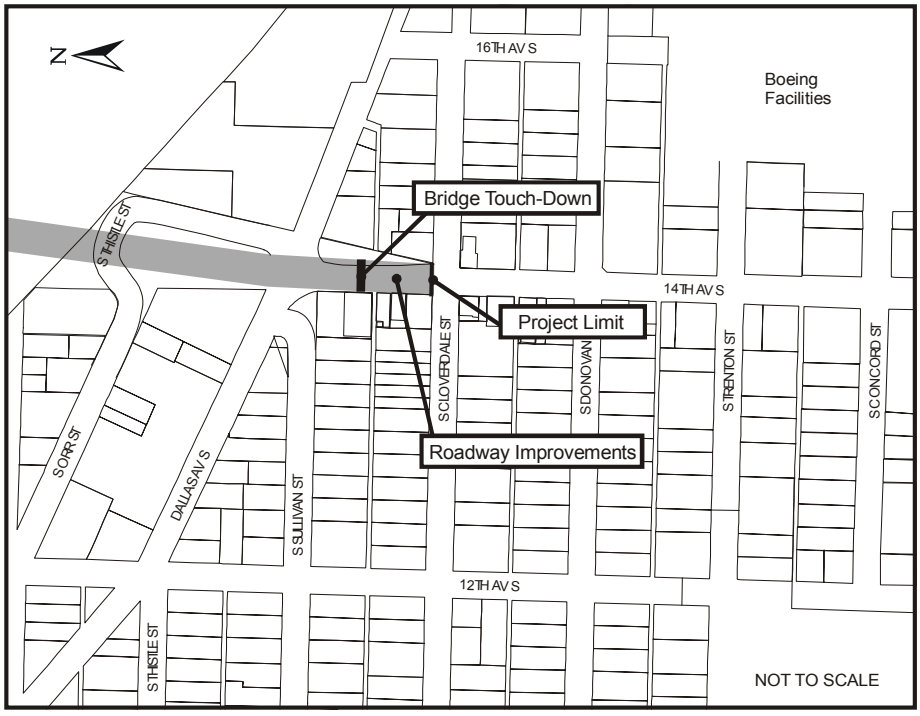
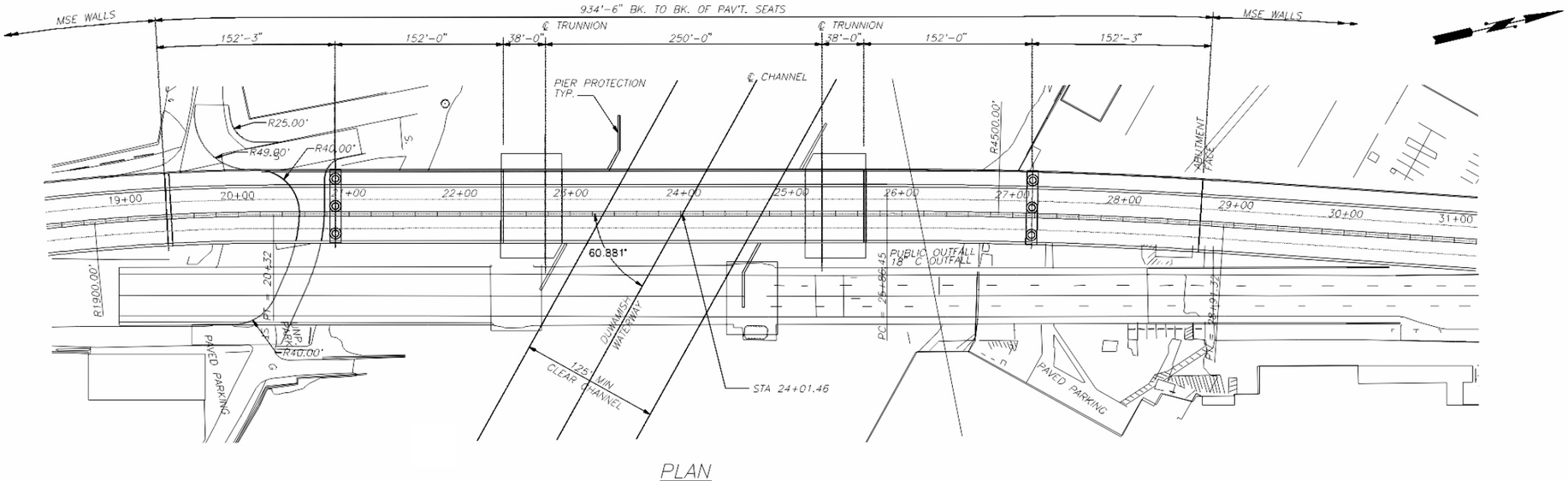
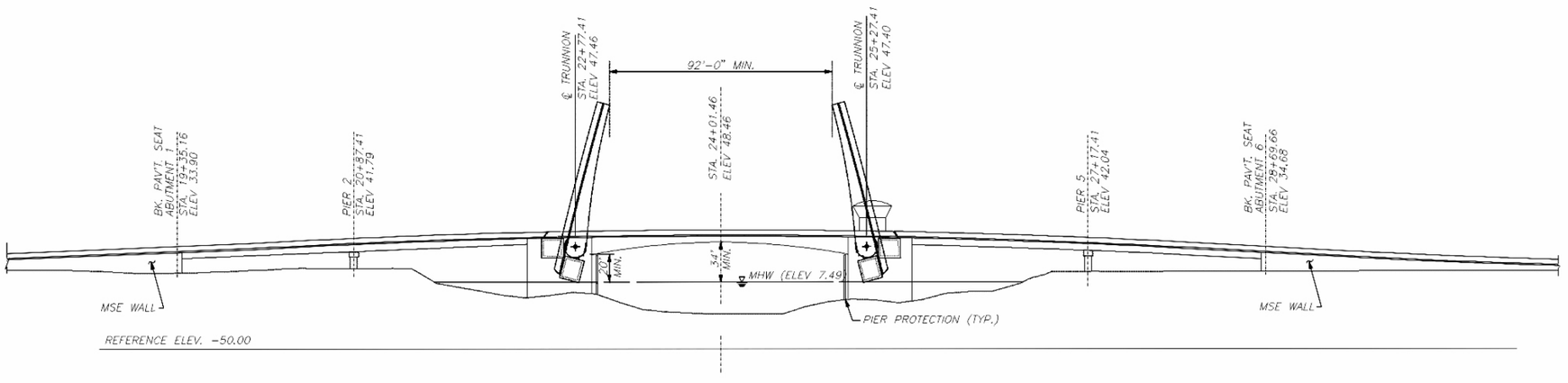


Figure 8 Bascule Bridge Alternative Street Network



PLAN



ELEVATION

South Park Community

Boeing Facilities

NOT TO SCALE

Figure 9 Bascule Bridge Alternative

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the existing bridge's grated bascule leaves, the bridge deck of the bascule leaves would be solid surface to improve vehicle traction and to control stormwater runoff.

Similar to the existing bascule bridge, this bridge profile would be approximately 34 feet above the Duwamish Waterway when in the closed position. The mid-section span would be comprised of two movable leaves that could be raised to open the bridge. The navigation channel would be approximately 125 feet in width (slightly greater than the existing 118-foot-wide channel). This two-leaf bascule bridge would not impose limitations to the height of waterway users passing the bridge, because the new bridge would be approximately 125 feet between the tips of the raised spans.

Following construction, there would be some change in the local street network (see Figure 8). S. Sullivan Street would be permanently closed or reconfigured to improve traffic safety and vehicular and truck turning movements from the new bascule bridge to Dallas Avenue S. S. Sullivan Street would no longer have direct access to 14th Avenue S. and the bridge. The intersection of 16th Avenue S. (immediately east of the bridge) and Dallas Avenue S. may also need to be reconfigured. To ensure adequate vertical clearance for vehicles, S. Thistle Street would need to be slightly realigned further to the north and closer to the Duwamish Waterway. This figure also shows the portion of the project alternative that would be elevated for the bridge structure, the bridge touch-down point, and the portion that would have surface roadway improvements. Access to points north via the South Park Bridge would be maintained. Following construction and transfer of the traffic to the new bridge, the existing bridge would be demolished and removed as described for the No Action Alternative.

2.4.2.4 Mid-Level Fixed-Span Bridge Alternative

The Mid-Level Fixed-Span Bridge Alternative would result in the construction of a non-movable bridge (see Figure 10). The bridge length would be approximately 1,660 feet abutment-to-abutment, not including roadway approaches. The interior walls of the abutments would be approximately 550 feet from the top of the Duwamish Waterway embankment, or 300 feet further setback than the existing bridge. The closest on-land piers would be approximately 85 feet from the south embankment and the closest in-water piers would be approximately 100 feet away. On the north side, the closest in-water piers would be approximately 130 feet from the top of the embankment and the closest on-land piers would be approximately 65 feet away. Road improvements would extend slightly north of S. Donovan Street and north to a point approximately 320 feet south of East Marginal Way S.

The mid-point of the bridge profile across the Duwamish Waterway would be approximately 65 feet above MHW of the Duwamish Waterway. The horizontal clearance would be approximately 125 feet, or slightly greater than the existing clearance. The vertical clearance, however, would restrict use of some waterway traffic, including some tugs and barges. Most vessels that currently pass the existing bridge would continue to be able to use the navigation channel. As described earlier in the discussion of the design considerations, the width of the new mid-level bridge is reduced when the bike-pedestrian path is separated from the elevated approach roadway near the south side abutment. This design feature reduces land use and relocation impacts.

Following construction, there would be changes in the local street network (see Figure 11). (For comparison,

Figure 12 shows the local street network following the construction of the High-Level Fixed-Span Bridge Alternative.) The location of the south abutment and its vertical clearance would require modification of Dallas Avenue S. and S. Sullivan Street. S. Sullivan Street would likely be merged into Dallas Avenue S. just west of the new structure and a new roadway would be constructed under the new bridge. The alignment of this roadway would be slightly to the north to ensure it would have a minimum allowable vertical clearance. Neither street would have direct access to the new South Park Bridge. Figure 11 also shows the portion of the project alternative that would be elevated for the bridge structure, the bridge touch-down point, and the portion that would have surface roadway improvements. A retaining wall supporting the elevated approach roadway would be constructed immediately adjacent to properties fronting on the both sides of 14th Avenue S. for the majority of the distance between S. Sullivan Street and S. Cloverdale Street. Traffic would be able to access the bridge at S. Cloverdale Street, which would be raised a maximum of approximately 5 feet at the intersection to meet the descending grade of the bridge. This change in the intersection would allow traffic on S. Cloverdale Street to continue to have direct access to 14th Avenue S. though a retaining wall would also need to be constructed around the four corners of the intersection of S. Cloverdale Street and 14th Avenue S. due to the grade change. S. Orr Street would be closed due to the location of the support structures for the proposed separated pedestrian/bike path, which would allow bicyclists and pedestrians to descend from the bridge level to the street level. In addition, S. Thistle Street would be closed as it would no longer be able to connect to S. Orr Street. Following construction and transfer of the traffic to the new bridge, the existing bridge would be demolished and removed as described for the No Action Alternative.

2.4.2.5 High-Level Fixed-Span Bridge Alternative

The High-Level Fixed-Span Bridge Alternative is a non-movable bridge (see Figure 13). The bridge length would be approximately 2,332 feet abutment-to-abutment, not including roadway approaches. The interior walls of the abutments would be approximately 900 feet from the top of the Duwamish Waterway embankment, or 650 feet further set back than the existing bridge. The on-land and in-water piers of this alternative are approximately in the same location as proposed for the Mid-Level Fixed-Span Bridge Alternative. Road improvements would extend from S. Trenton Street and continue north to East Marginal Way S. This alternative would require minor modification of the 16th Avenue S. East Marginal Way S. intersection and of the existing railroad track crossing immediately south of this intersection.

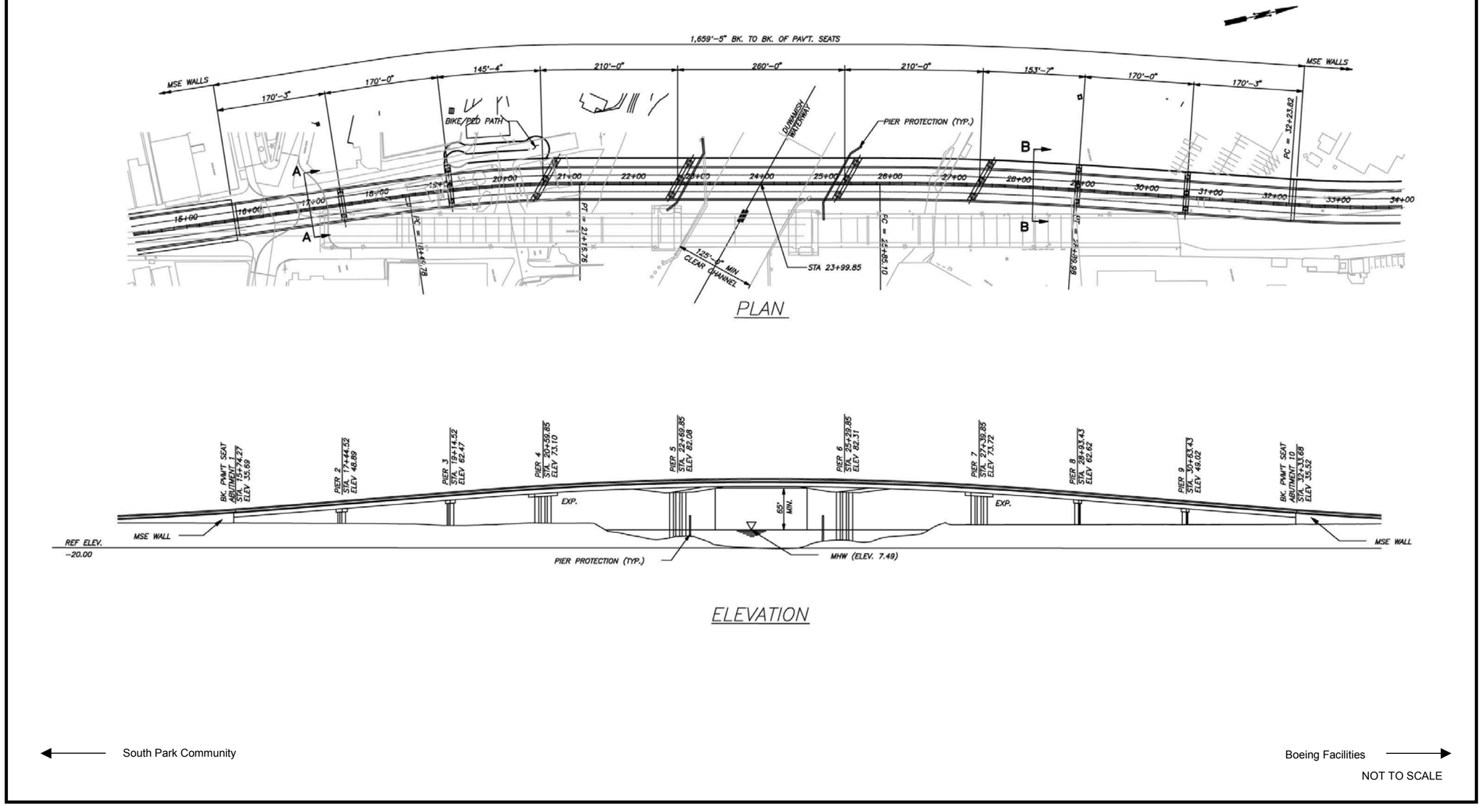

Figure 10 Mid-Level Fixed-Span Bridge Alternative

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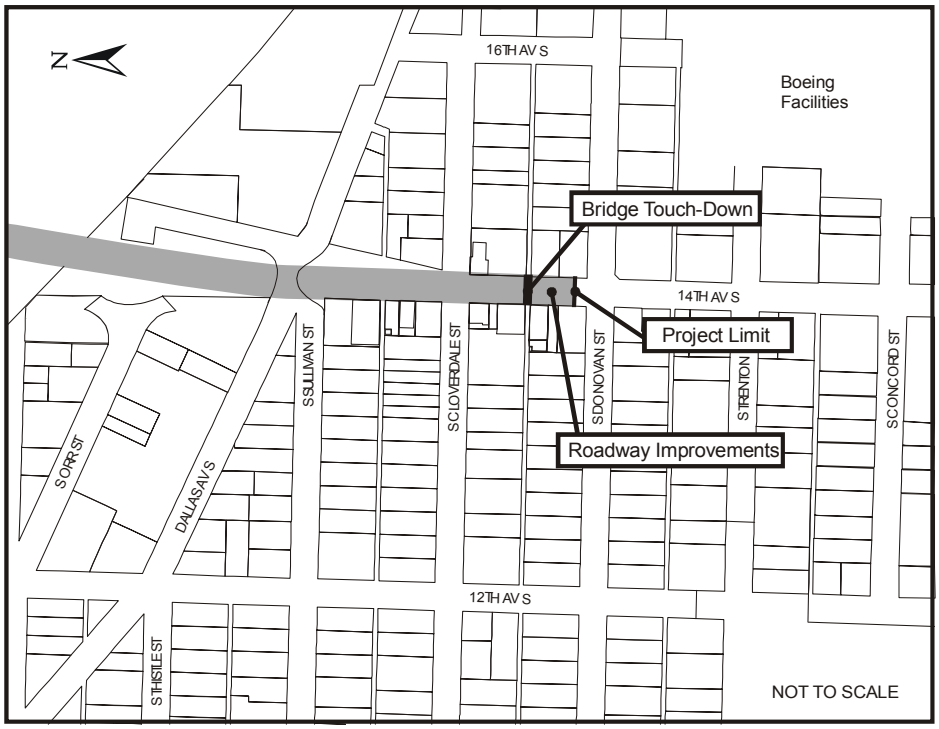

Figure 11 Mid-Level Fixed-Span Bridge Alternative Street Network

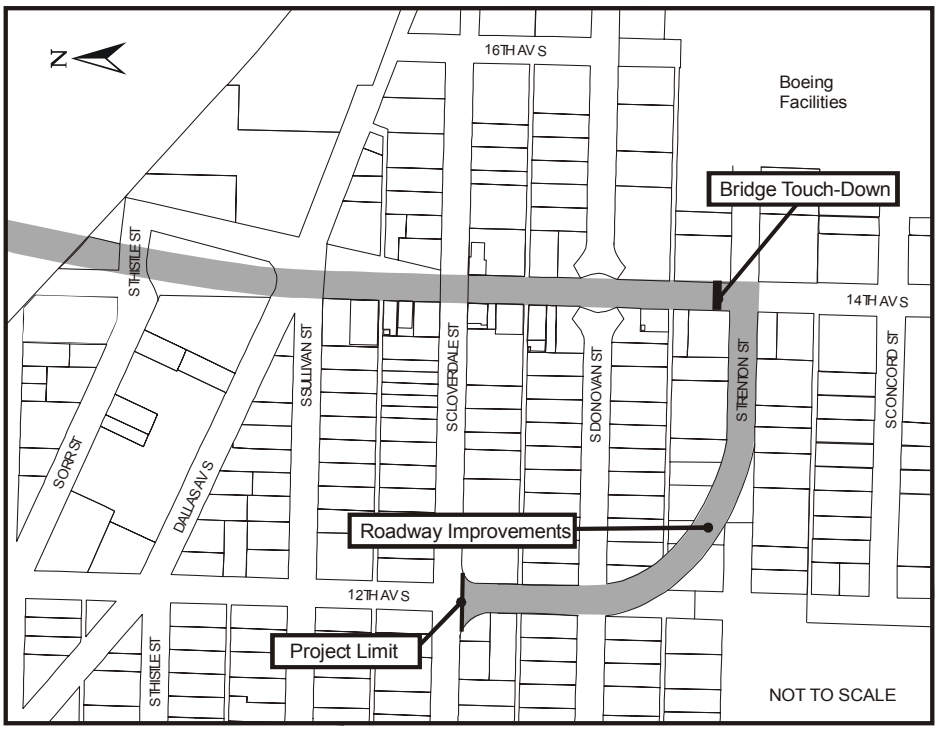

Figure 12 High-Level Fixed-Span Bridge Alternative Street Network

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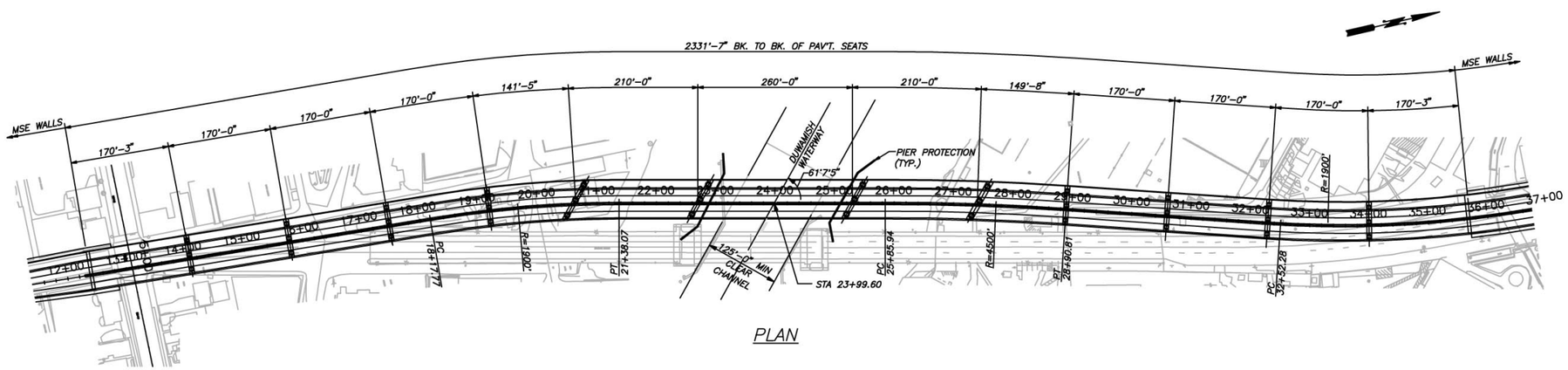
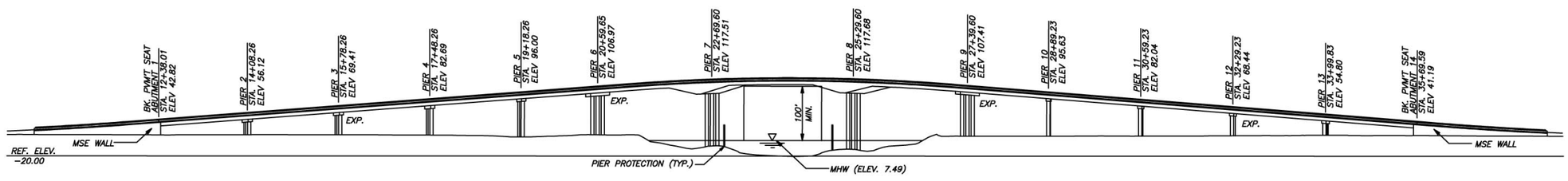


PLAN



ELEVATION

South Park Community

Boeing Facilities

NOT TO SCALE

Figure 13 High-Level Fixed-Span Bridge Alternative

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The bridge design would allow for approximately 100 feet of vertical clearance above the MHW of the Duwamish Waterway as requested by the U.S. Coast Guard. The horizontal waterway clearance for the navigation channel would be approximately 125 feet, which is slightly greater than the existing 118-foot clearance (fender-to-fender). The bridge's vertical clearance would not be expected to limit the height of boats and barges currently passing the bridge. However, vessels larger than those currently using the navigation channel might not be able to pass the bridge in the future.

Following construction, there would be numerous changes in the local street network as shown in Figure 12. The figure also shows the portion of the project alternative that would be elevated for the bridge structure, the bridge touch-down point, and the portion that would have surface roadway improvements. The bridge south abutment would require Dallas Avenue S., S. Sullivan Street, and S. Cloverdale Street to be converted to underpasses under the new South Park Bridge. A retaining wall supporting the elevated approach roadway would be constructed immediately adjacent to properties fronting on both sides of 14th Avenue S. for the majority of the two-block distance between S. Cloverdale Street and S. Trenton Street. S. Donovan Street would be closed at 14th Avenue S. due to obstruction from the bridge abutment and a vehicle turn-around would be constructed on either side of the abutment on S. Donovan Street. To allow traffic to access the new South Park Bridge, a new principle arterial roadway would need to be constructed between S. Trenton Street and 12th Avenue S. and road improvements would be required on 12th Avenue S. north to S. Cloverdale Street. This new route would allow traffic, trucks, and buses to continue to access the new South Park Bridge from S. Cloverdale Street via 12th Avenue S. and S. Trenton Street. Following construction and transfer of the traffic to the new bridge, the existing bridge would be demolished and removed as described for the No Action Alternative.

2.4.3 Construction Durations and Activities

Construction of a rehabilitation or replacement bridge for the existing South Park Bridge is planned to take approximately two to three years, including the demolition and removal of the existing bridge. Construction is anticipated to start within the next several years and opening of the rehabilitation or a replacement bridge is currently anticipated to occur by 2009. The actual time required for construction activities vary for each of the alternatives. Construction activities associated with the No Action Alternative involves only demolition of the existing bridge and restoration of the site. The construction period for this alternative would be the shortest of all alternatives, approximately 8 months. The other alternatives would additionally require rehabilitation or construction of a new replacement bridge. Anticipated construction durations (demolition of existing and construction of new) would be approximately 32 months for the Rehabilitation Alternative, 33 months for the Bascule Bridge Alternative, 20 months for the Mid-Level Fixed-Span Bridge Alternative, and 24 months for the High-Level Fixed-Span Bridge Alternative.[15]

From a construction perspective, the five project alternatives include three different types of construction activities. The No Action Alternative assumes the existing bridge

[15] Parsons Brinckerhoff. *South Park Bridge Project: Structural Alternatives Study*, November 2003.

condition would eventually require closure and removal of the bridge structures. Construction activities would focus on demolishing the existing bridge and restoring the project area. The Rehabilitation Alternative would require bridge closure for approximately 30 months for rehabilitation or replacement of various elements of the existing bridge. The Bascule, Mid-Level Fixed-Span, and High-Level Fixed-Span bridge alternatives would all result in constructing a replacement bridge approximately 80 feet downstream of the existing bridge. For these three alternatives, the new bridge would be constructed while the existing bridge continues to be operational. When the new bridge is connected to the existing road, there would be short-term temporary bridge closures. These closures could be limited to weekends or could extend for approximately one month, depending on the alternative. Once the new bridge is completed, traffic would be rerouted to the new bridge and then the existing bridge structure would be demolished in a similar fashion as described for the No Action Alternative.

Rehabilitation of the existing bridge would require closure of the existing bridge for approximately 30 months, although efforts would be made to minimize the closure period as much as possible. Reconstruction activities would begin as soon as possible after completion of design engineering and acquisition of construction permits. Traffic would be given advance notice to take alternate routes prior to closure of the existing bridge. The construction of a temporary dock and a construction staging area would be required on both banks of the waterway (see Figure 14). Construction of the new bascule piers would likely be the first major construction activity. This would entail removing the existing pier protection fenders, installing temporary supports for the bridge superstructure, removing the bascule leaves as well as the steel truss spans, installing cofferdams around the existing steel truss approach piers and bascule piers, and demolishing the existing piers.

The bascule leaves and steel truss approach spans would be removed from the construction site for refurbishment. Construction of the new piers would involve drilling shafts through the existing timber piles, constructing the pile cap, dewatering the construction area inside the cofferdam, constructing the upper portions of the pier, removing the cofferdam, and finally reconstructing the upper portions of the bascule pier and bridge towers. Workers would reconstruct the concrete approach spans and replace the abutments. Workers would also reconstruct the bridge deck and replace the mechanical and electrical systems used to operate the bridge. Replacement of the piers, bridge tender towers, bridge railings, and lamp posts would be done in a manner that would preserve the historic character of these features of the existing bridge.

Major construction activities and sequencing would be similar for the Bascule, Mid-Level Fixed-Span, and High-Level Fixed-Span bridge alternatives. The construction duration and the impact area for each of these three alternatives, however, would clearly differ. Following completion of design engineering, acquisition of construction permits, purchase of needed property, and relocation of residents and businesses, construction activities would begin. The first activities would include establishing the construction staging areas and constructing temporary docks with pilings on both sides of the waterway (see Figure 14).

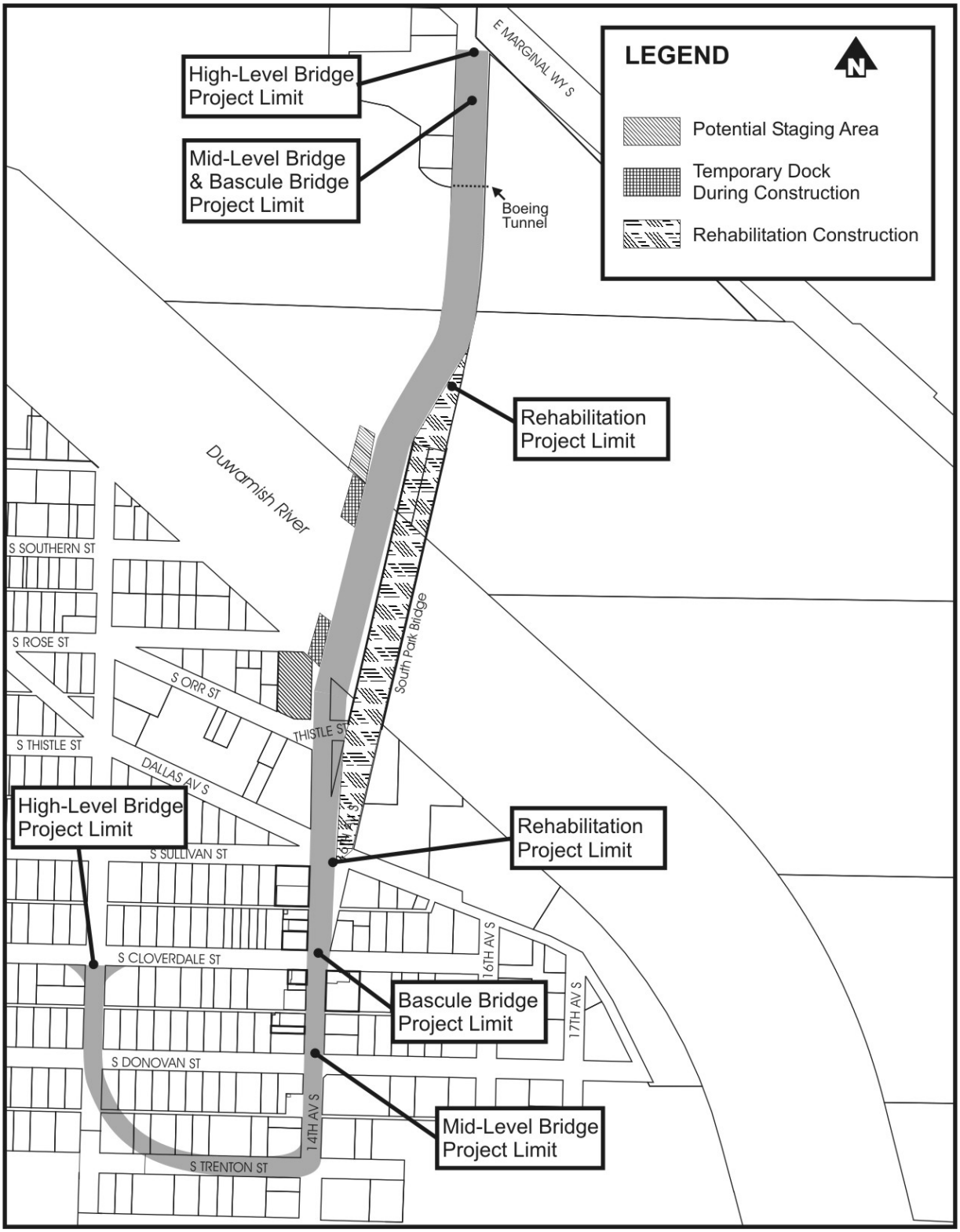

Figure 14 Proposed Construction Staging Areas

Buildings affected by the construction activities would be demolished and utilities would be either temporarily or permanently relocated. To minimize traffic impacts, construction activities would begin with the construction of the in-water piers. Construction activities would progress landward from the central portion of each bridge alternative. Both in-water and on-land construction would begin with construction of the sub-structures (piers and abutment) and would be followed by placement of the superstructure (beams, deck, rails). On-land construction of the piers, abutment, retaining walls, and transition segments at either end of the bridge would likely require temporary closure of adjacent or nearby roads and rerouting of local traffic. If possible, these temporary closures would be limited to weekend and/or night times to minimize impacts to the community. Construction activities on the north and south portions of the new bridge structures could also occur either separately or concurrently. The last of the construction activities would be the construction of the new curb and gutter of the at-grade roadway, and paving the roadway to match the existing width of 14th Avenue S. Figure 14 shows the project limits, or start and end points, of construction activities for each of the project build alternatives.

For the rehabilitation and new bridge alternatives, new girders and other oversized materials would most likely be delivered to the project site by barge. Large cranes located on the barges or temporary docks would off-load the materials and place them in the nearby construction staging area. Removal of the existing bridge pier foundations and construction of the new bascule and steel truss piers would all require the use of cofferdams to isolate the construction activities. Construction of the new approach-span piers would use drilled shafts, which would likely incorporate the use of temporary casings to isolate the construction activities. This in-water work would be performed by equipment operated from the temporary docks or from barges.

Demolition of the existing bridge would involve disassembly and removal of the existing bascule leaves, superstructure, bridge piers, protection fenders, and abutment. Cranes would use the existing bridge structure and approaches as much as possible to remove the various elements of the bridge. Barges would likely be used to remove oversized materials. At this time, this demolition work is not planned to require construction of temporary docks or the acquisition or temporary use of property on the banks of the Duwamish Waterway for a staging area. Removal of the abutment foundations, however, would likely require temporary short-term closure of adjacent and/or nearby streets. During this time, local traffic would be temporarily rerouted from the immediate area.

Following the completion of the construction activities associated with any of the project alternatives, disturbed areas would be restored. Conceptual site restoration plans would be developed for each alternative based on additional consultation with resource agencies and other stakeholders.

2.4.4 Cost Estimates for the Alternatives

Cost estimates for each of the proposed project alternatives have been prepared by the project engineers (see Table 2).[16] The cost estimate for each project alternative, including

[16] Parsons Brinckerhoff. *South Park Bridge Project: Structural Alternatives Study*, November 2003.

the No Action alternative, is broken down into the following components: 1) plans, specifications, and estimates (PS&E), 2) right-of-way costs, and 3) construction and construction-related costs. The total cost estimates are provided in 2003 dollars as well as estimated costs escalated for 2008, the anticipated mid-point of the project construction period. These cost estimates were calculated based on the conceptual engineering plans that were prepared for each of the alternatives.[17]

Clearly, the No Action Alternative is the least expensive as the existing bridge would not be rehabilitated nor would a new replacement bridge be constructed. The cost to remove the existing bridge structure would be approximately $7,000,000 (2003 dollars). The estimated costs to either rehabilitate or replace the existing bridge structure range between approximately $62 million to $77 million in 2003 dollars. The least costly of the build alternatives is the proposed Mid-Level Fixed-Span Alternative, which is estimated to cost approximately $61,523,000 to design and construct. The Rehabilitation Alternative is estimated to cost approximately $63,930,000 and the High-Level Fixed-Span Alternative is estimated to cost approximately $70,460,000. The most costly of the build alternatives is the Bascule Bridge Alternative, which is estimated to cost $77,334,000. The escalated 2008 dollar estimates to design and construction the project alternatives are also shown in the table.

Table 2 Cost Estimates of the Project Alternatives

	PS&E	Right-of-Way	Construction	Total (2003 dollars)	Total (2008 dollars)
No Action	$ 250,000	$ 0	$ 6,750,000	$ 7,000,000	$ 9 M
Rehabilitation	$ 6,843,000	$ 754,000	$56,333,000	$63,930,000	$ 74 M
Bascule	$ 8,253,000	$ 3,655,000	$ 65,426,000	$ 77,334,000	$ 90 M
Mid-Level Fixed-Span	$ 4,235,000	$ 6,377,000	$ 50,911,000	$61,523,000	$ 71 M
High-Level Fixed-Span	$ 5,261,000	$ 15,310,000	$ 49,889,000	$ 70,460,000	$ 82 M

Source: Parsons Brinckerhoff, November 2003.

2.5 Project Coordination

Coordination to date for the South Park Bridge Project has involved members of the public, a special community advisory group, and representatives of government agencies. Formal scoping was initiated through publication of the NEPA Notice of Intent and the SEPA Determination of Significance and Scoping Notice on February 7, 2002 and February 14, 2002, respectively. Separate scoping meetings were conducted in the South

[17] Parsons Brinckerhoff. *South Park Bridge Project: Conceptual Plans*, June 2003.

Park community for relevant agencies and members of the public. Both meetings were held on February 28, 2002. Written and verbal comments received through the scoping process were reviewed by King County and used in the development of the project alternatives and topics for environmental impact assessment.

A public involvement plan for the proposed South Park Bridge Project was developed during the initial stages of project planning. The Project Advisory Committee (PAC) and the Community Advisory Group (CAG) reviewed this document and provided comments to King County. The first public involvement efforts began prior to the formal scoping period. A public workshop was held in the South Park community on January 17, 2002. At this meeting, the nine preliminary project alternatives were presented. A second public workshop was held on June 19, 2002. At this meeting, the five proposed project alternatives were presented. Members of the public were encouraged to provide comments at both of these meetings. To facilitate participation and input from Hispanic persons living in the community, a bilingual translator attended all meetings. In addition, handouts and newsletters for the project were published in English and Spanish, and public notices were published in "Siete Dias", a local Spanish-speaking newspaper. Future opportunities for public involvement are also planned, including a public hearing and workshop following publication of the Draft Environmental Impact Statement in 2004.

Establishing a CAG was a significant component of the public involvement plan. A total of 17 individuals were chosen to participate in the CAG to represent community stakeholder interests and public concerns. The CAG meets periodically to be briefed on the progress of the project and to provide input to the South Park Bridge project team. Again, a bilingual English-Spanish translator attends the meeting to facilitate communication with Spanish-speaking individuals on the CAG. To date, CAG meetings have been held on April 10, May 21, June 4, June 11, and October 29 of 2002 and on January 7 and November 18, 2003. Additional CAG meetings are planned for the future.

As part of the environmental review process, King County periodically meets with the Project Advisory Committee (PAC) to give a status report of the project, answer questions, and to solicit comments. This committee is comprised of members of various agencies that have potential jurisdiction over the proposed South Park Bridge Project. The committee is the Interdisciplinary Team (IDT) required under NEPA implementation guidelines and provides technical support to King County staff. To date, the PAC has met on January 10, February 20, May 9, May 23, and October 10 of 2002. Coordination with the PAC is planned at critical future steps in the environmental review process.

A non-scientific survey was also conducted of South Park businesses located on 14th Avenue S. during the late spring of 2003.[18] The goal of the survey was to help assess potential impacts to businesses, especially minority-owned and –operated (employees) businesses. The survey respondents were also asked to identify their particular concerns about the proposed rehabilitation or replacement of the existing South Park Bridge. A total of 18 businesses were successfully surveyed. Spanish and Vietnamese translators

[18] Parsons Brinckerhoff. *South Park Bridge Project: Survey of 14th Avenue South Businesses*, August 22, 2003.

were provided, as needed, to assist business representatives understand and respond to the questions. In addition, the data was used to assess the potential effects displaced businesses and jobs would have on the South Park community. The analysis of the survey findings are discussed in detail in the Economic, Social, and Relocation technical reports supporting the analysis in the EIS.

As key issues have arisen during development of the project alternatives and in assessing potential environmental impacts, special meetings have also been held with key stakeholders and organizations in the South Park community, as well as with other government agencies and jurisdictions with an interest in the project. For example, on December 3, 2002, King County met with owners of property along 14th Avenue S, and information booths were set up at the Sea-Mar Community Health Center-sponsored annual Fiesta Patrias on September 14, 2002 and at a family night event held at the Concord Elementary School on September 27 and November 22 of 2002. Periodic coordination meetings have also been held with representatives of the City of Seattle and the City of Tukwila, and other government agencies. These coordination activities will continue to occur on an on-going basis as the EIS is prepared and finally adopted.

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Chapter 3 Studies and Coordination

3.1 Related Studies

Information in this visual impact assessment is coordinated with other technical reports being prepared for the project. Information reviewed in preparation of this report includes: 1) descriptions, figures, plans, profiles, and sections for the proposed project; and 2) South Park Bridge Project Summary Technical Report: Alternatives Development and Screening (September 6, 2002).

Other related documents reviewed in preparation of this report include:

Entranco, Inc., *Environmental Review Report*, prepared for King County, June 23, 1999.

Sverdrup Civil, *14th/16th Avenue South Park Bridge Rehabilitation/Replacement-Design Report*, prepared for King County, November 1994.

3.2 Coordination

3.2.1 Jurisdictional Boundaries

The site crosses several jurisdictional boundaries. The design would need to comply with City of Seattle, City of Tukwila, and King County regulations and ordinances which may influence development in terms of size and scale of buildings, parking areas, landscaping, habitat restoration, enhancement and/or mitigation.

Coordination efforts also include consultation with the Department of Natural Resources (DNR), USFWS, NMFS, and Washington Department of Fish and Wildlife.[19]

3.2.2 Shoreline Designation

The shoreline of the project lies within King County jurisdiction. The project area is in the Urban Shoreline environment as defined in the King County Shoreline Master Program. Specifically, shoreline management regulations call for providing, at the very least, "visual access available to the general public to the shoreline and the adjacent waterbody." (King County 25.08.020) In addition, Ordinance 3688, Section 415 provides that "Water viewing, nature study, recording and viewing shall be accommodated by space, platforms, benches or shelter, consistent with public safety and security" (King County 25.16.200).

Shoreline regulations would also influence construction activities such as temporary docks, barges and staging areas.

3.2.3 City of Seattle Comprehensive Plan

Seattle has jurisdiction over the project area comprised of 14th Avenue S., south of Dallas Avenue S. In this area, the project would need to comply with *Seattle's Comprehensive*

[19] *South Park Bridge Project: Fish, Vegetation and Wildlife Technical Report*; Prepared for King County; February 2004.

Plan[20]. Aesthetics is one of many goals intended to promote the urban village strategy outlined in the plan. South Park is designated as a Residential Urban Village, which is intended to function primarily as a compact residential neighborhood. The target of residential growth for South Park is approximately 350 households by 2020. Because South Park has limited land available for new development, the city may be interested in preserving open space created by the project for potential housing.

The comprehensive plan is very specific regarding shoreline access, especially where views are concerned (L 322). History, culture, restoration and enhancement goals include upgrading and/or beautifying the public shoreline (LG 104). Because shoreline public access opportunities are a compelling element in *Seattle's Comprehensive Plan* and because there is a potential interest in annexation, Seattle may encourage King County to look for opportunities to maximize shoreline access.

3.2.4 South Park Residential Urban Village 1998 Plan

While not officially adopted, valuable community input may be derived from the South Park Residential Urban Village Plan[21]. While there are few references to aesthetics in the plan, it does address aesthetic appurtenances such as gateway signage, information kiosks, benches and public art. One specific public art suggestion is to provide historic lighting for South Park Bridge, thereby documenting its importance to the community.

3.2.5 South Park Community Input

Proceedings from a Public Scoping Meeting held in February of 2002 have been transcribed and the majority of the comments trend toward the practical and quantitative (i.e. economics, noise pollution and vibration) and not aesthetics. In addition to that collected at the scoping meeting, public comment data was assembled from January 3, 2002 through July 4, 2002. Most aesthetic comments reflect a fondness for the scale, style and character of the old bridge. The comment data pertinent to the visual assessment is included in the Appendix C.

3.2.6 Other Community Resources

The Seattle Post-Intelligencer archives include an article showcasing the South Park neighborhood as a part of their Seattle Neighborhood series[22].

[20] *Seattle's Comprehensive Plan*; December 2002.

[21] City of Seattle, *South Park Residential Urban Village Plan,* 1998.

[22] Seattle Post Intelligencer, *Obscure neighborhood on the rebound*, Regina Hackett, July 3, 1999

The goal of the assessment is to quantify the visual impacts of this project on the viewshed area. The objectives are to systematically assess each of the five alternatives with respect to all three levels of aesthetics.

The assessment work included a kick-off meeting with the King County Project Manager and Parsons Brinckerhoff staff, who discussed the visual quality issues related to the EIS alternatives. The assessment also involved field inspections, photographic analysis of existing conditions, and a study of plans, profiles, and cross sections for the proposed project.

4.1 Assessment Criteria

4.1.1 Aesthetic Criteria

Per FHWA guidelines, three levels of project aesthetics are considered in this study: 1) internal aesthetics or the aesthetics of the built project alternatives without relation to surroundings; 2) relational aesthetics or the visual relationships between a built project and its physical surroundings; and 3) environmental aesthetics or the visual quality of the total affected environment of the built project. In addition, viewer groups and their related viewer exposures (districts) are analyzed. These viewer groups include: 1) motorists and passengers with a view from the north- and southbound lanes on the bridge (Viewpoints A-2 and D-2); 2) residents, commercial/business owners and recreational users (park) and users with views of the bridge from generally at grade or below (Viewpoints A-1, D-1, E-1 and E-2); and 3) industrial and/or recreational users (marina) with views of the highway generally from below grade (Viewpoint B-1, C-1, and C-2). The districts studied are located and shown on Figure 25.

Direct visual impact is determined by comparing the visual quality ratings of the existing conditions with the ratings of the project alternatives- rehabilitation or three potential replacement alternatives, including the Bascule, Mid-Level Fixed-Span, and High-Level Fixed Span Bridge Alternatives. Mitigation measures are proposed to lessen individual impacts of each project alternative as described in Chapter 2.

4.1.2 Tables

The primary tables are constructed to quantitatively evaluate each alternative from each viewpoint (see Appendix A). A secondary group of tables summarizes this evaluation and compares the alternatives to each other. A bar chart graphically displays the change in visual information at each viewpoint from the existing baseline.

4.2 References and Scale

To accomplish a quantitative and qualitative analysis addressing the above levels of project aesthetics and different viewer groups/views, a matrix system applying numeric values to the criteria of vividness, intactness, and unity is evaluated. In the matrix numeric values system, a rating of 10 is the highest score and indicates high visual quality while 0 is the lower score and is characterized by very low visual quality. Each view of the

existing conditions is analyzed and rated. The ratings for the existing conditions form the baseline for visual quality of the project area that would be affected by the proposed project. Rating the visual quality for the proposed project thus starts from the ratings for the existing conditions and reassigns numeric values based on the anticipated visual affects of the proposed development

The quantitative criteria for rating visual quality are defined below:

Vividness – measures the memorable aspects of landscape components as they combine in striking and distinctive patterns. There are four elements of vividness (Landform, Water form, Vegetative form, and Human-made form) that may be present and affect landscape views. This criterion is defined by the distinctiveness, memorable aspect and quality of a specific element or group of elements within a landscape scene.

Intactness – measures the integrity of the natural and human-built landscape, and their freedom from encroaching elements. Intactness is subdivided into two categories: the level of human development and the degree of visual encroachment. Human development is the level of built environment within a view. Encroachment is a measure of the presence or absence of visually unpleasant or dominant elements in a landscape.

Unity – measures the visual coherence and compositional harmony of the landscape considered as a whole. Human and natural unity considers how the human development in a view blends with the surrounding landscape. Overall unity is the degree to which there is overall coherence and harmony between viewscape elements.

Table 3 Evaluation Scale

EVALUATION SCALE				
SCALE	**VIVIDNESS**	**INTACTNESS**		**UNITY**
		HUMAN-MADE DEVELOPMENT	*NATURAL ENVIRONMENT*	
10	Very High	No Development	Very High, No Encroachment	Very High
9	High	Little Development	High, Little Encroachment	High
7, 8	Moderately High	Some Development	Moderately High, Some Encroachment	Moderately High
4, 5, 6	Average	Average Level of Development	Average, Average Level of Encroachment	Average
2, 3	Moderately Low	Moderately High Level of Development	Moderately Low, High Level of Encroachment	Moderately Low
1	Low	High Level of Development	Low, High Level of Encroachment	Low
0	Very Low	Very High Level of Development	Very Low, Very High Level of Encroachment	Very Low
-	Not Present or Visible	Not Present or Visible	Not Present or Visible	Not Present or Visible

South Park began as a farming community in the early 1900's. The first land use code applied in 1923 zoned all of the land for industrial use, though a good portion was already residential or still farm land. Only as recently as 1967 was the land use code zoning map adjusted to reflect and protect the existing residential areas of the neighborhood. Thus, the industrial areas continued to expand and encroach into the neighborhoods, unabated by the land use code. This has resulted in a patchwork of the visual environment and overlapping landscape types.

The South Park community is seeking to improve its visual appearance through City of Seattle neighborhood funds. Public comments indicate more interest in preserving and enhancing the existing historic context than modernizing or undergoing a "facelift".

5.1 Landscape Districts

Districts are landscape units, based not upon their land use zones, but upon their common character and orientation to the project site. No area has a distinct boundary, so that the intent is to group similar viewpoints without attempting to define exact boundaries. No one district is homogenous; each district naturally has indistinct developments, such as the mobile home area at the Marina that is also home to small repair and manufacturing businesses. Nevertheless, viewers from each area would be presumed to have a similar context from which to view the project. Five typical landscape districts occur in the project viewshed: (1) The Boeing Company, (2) Small Manufacturing, (3) Marina/Waterway, (4) Commercial and Business, and (5) Residential (See Figure 15).

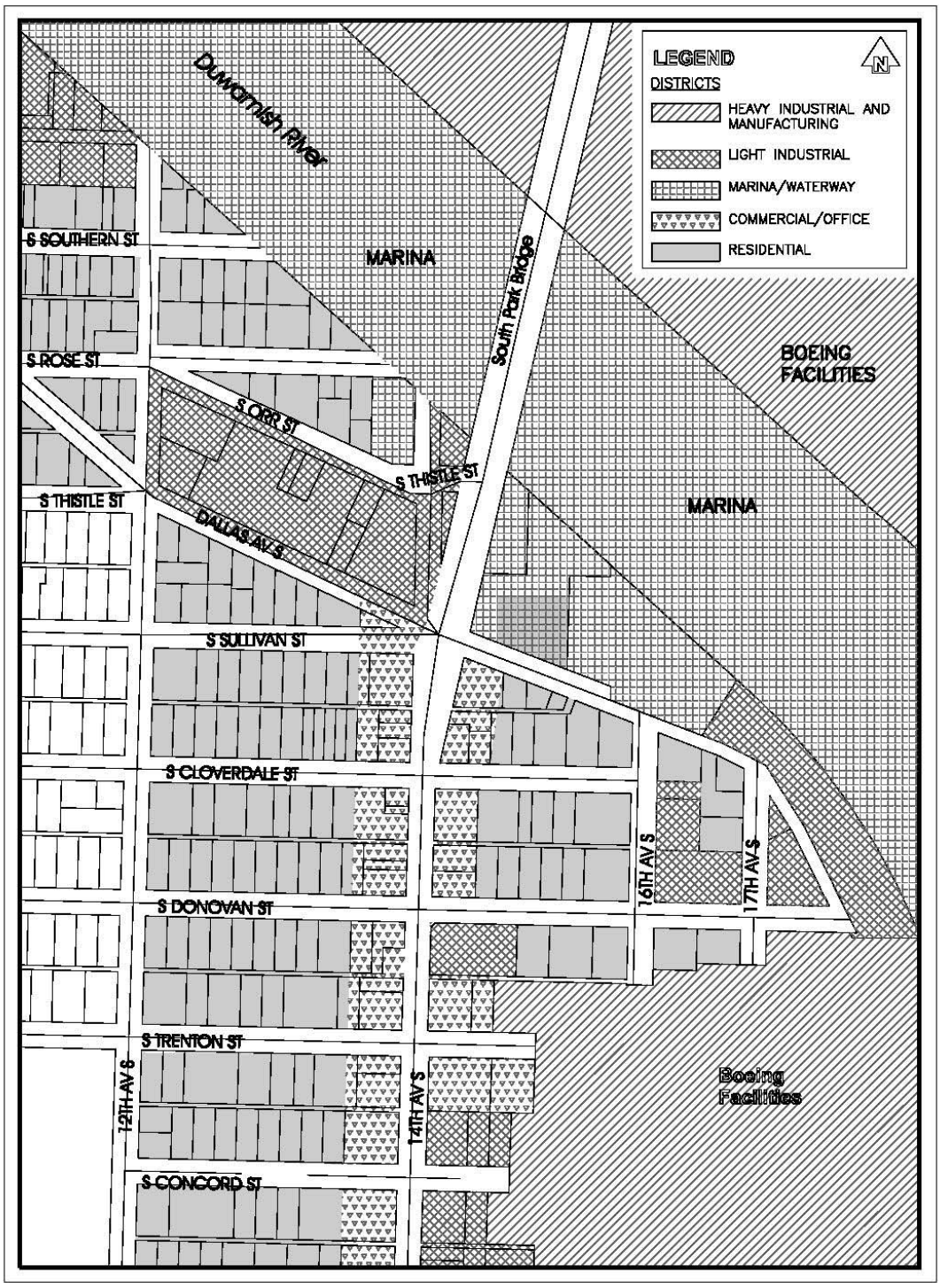


Figure 15 Landscape Districts

Figure 16 The Boeing Company, view north across Duwamish Waterway from South Park

5.1.1 The Boeing Company

North of the Duwamish Waterway, The Boeing Company's industrial and manufacturing complex dominates the landscape. Boeing's extensive offices, factory buildings, warehouses and vast parking lots are associated with the adjacent airfield and surround the north end of the bridge, including the entire approach to it from any direction. Along East Marginal Way S., executive offices with showplace landscaping overlook large parking lots and industrial warehouse-style metal buildings. Most of these buildings are the equivalent of 4-5 stories, or about 48-60 feet tall. While landscaping occurs along East Marginal Way South, it does not penetrate the Boeing site. For the most part, long-distant views of the waterway and bridge are obstructed by the Boeing buildings that were constructed adjacent to the waterfront. Since windows on the manufacturing buildings were designed primarily for daylighting they do not afford views of the waterway or bridge to the Boeing workers

Figure 17 Small Manufacturing District

5.1.2 Small Manufacturing District

Scattered throughout the area to the east and clustered to the south and west of the bridge, small manufacturing businesses line the blocks adjacent to the bridge. The manufacturing area is confined and dense and abruptly abuts the residential and commercial businesses further south and west. Consisting of metal buildings or older homes converted to industrial use, most of the buildings are around 12-20 feet in height. A few warehouse buildings are as tall as 30-35 feet high. Many are surrounded by chain link fences (some topped with barbed wire). Typically, local street shoulders provide overflow employee parking. These small industrial buildings are dwarfed by the Boeing building and parking complex across the waterway.

Figure 18 Marina/Waterway District upstream of South Park Bridge

5.1.3 Marina/Waterway District

While a boat ramp immediately east of the bridge provides access to recreational users, the area immediately south and east of South Park Bridge serves primarily marine-oriented businesses. The marina is busy, well maintained and is surrounded by boat maintenance businesses. Adjacent to the marina parking lot, many boats can be seen on land as they undergo repair and/or maintenance. Parking is limited and access roads to and from the marina are narrow and awkward, as they are shoehorned in through the nearby residential neighborhood and out underneath the bridge.

Several of the dry-docked boats and trailers form a picturesque setting that is more industrial than residential. These host a small number of residents in addition to the live-aboards at the marina. The restroom/shower and laundry facility serves also as the mail delivery depot for these residents.

Figure 19 Existing waterfront access

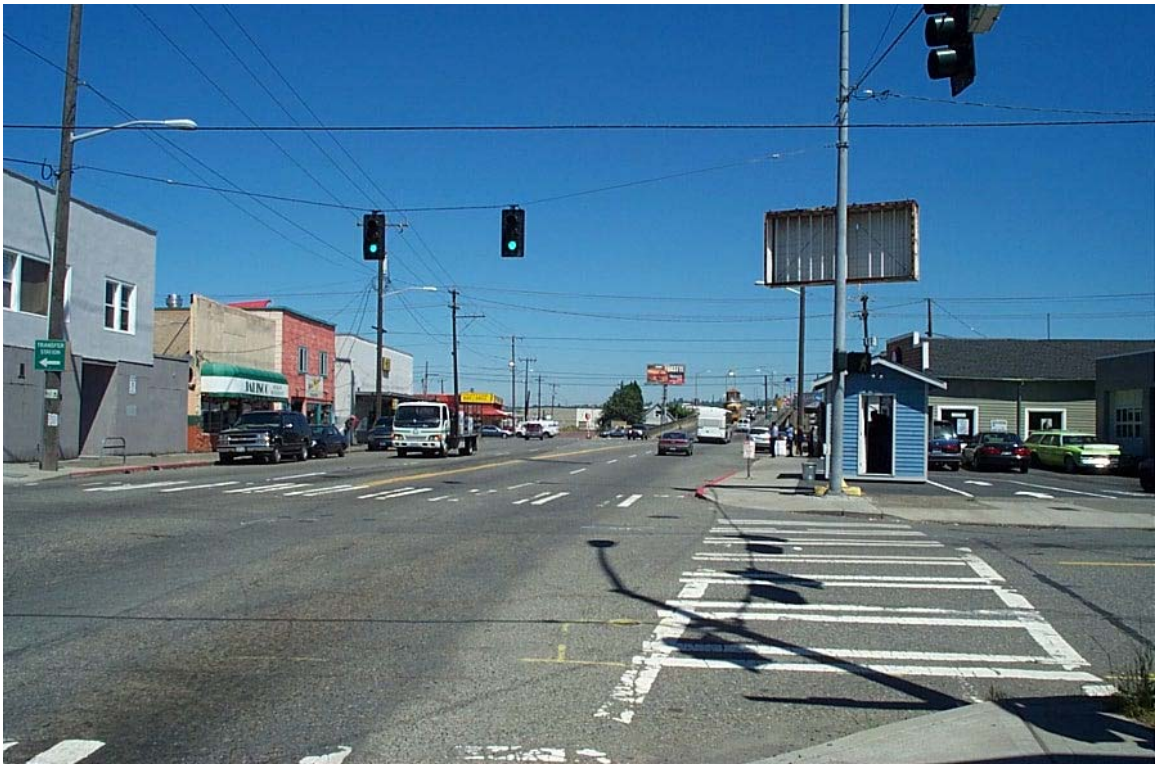


Figure 20 Commercial and Business District on 14th Avenue S.

5.1.4 Commercial and Business District

The retail commercial area lining both sides of 14th Avenue S. is dominated by small restaurants that appear popular with both the locals and Boeing personnel who walk across the bridge at lunchtime. While parking lots are busy, many of the business patrons arrive as pedestrians. From the local industrial population to local residents buying a gallon of milk at the mini-mart, this area serves a large pedestrian community. Businesses serve local needs and interests and identify closely with their distinctive location at the end of the bridge. Historic buildings of a similar vintage to the bridge provide an unpretentious and unified image with a distinctly Hispanic influence.

The historic bridge anchors the district and provides both a focal point and a memorable sense of arrival to a unique and somewhat understated Seattle neighborhood.

Figure 21 Bridge Ramp from 14th Avenue S.

Figure 22 Residential neighborhood

5.1.5 Residential Neighborhood.

Residential areas flank 14th Avenue S. on the east, west, and south. Though much of the residential population crosses the bridge on a daily basis, few residences have a direct view of the bridge. The bridge dominates the landscape mostly from vehicles on the residential streets due to alignment of the streets toward the bridge. Long-distance views of the bridge are typical past the small scale houses from many east-west streets. It is a quiet neighborhood of smaller, older homes, many with character and detail of an era similar to that of the bridge. There is evidence of modest renovation and upgrading throughout the district, though as many are boarded up and appear abandoned. This district maintains its cohesiveness not through uniformity, but through its common relationship to the bridge.

5.2 Viewer Groups

5.2.1 Viewer Positions

Viewer response forms the basis for evaluation of the viewed landscape. Viewers from the different districts see the bridge from unique frames of reference, respective of their position, exposure and sensitivity. Viewer positions are defined as inferior, normal, or superior. An inferior view perspective views the bridge from below grade. Views at grade are considered normal. Views from above are termed superior view position. Superior views from the bridge are dramatically different from inferior views of the bridge. Some districts boast several possible viewpoints while others have only one. The viewpoints have been selected to represent the range of views from which the project is likely to be seen from that district.

5.2.2 Major Viewer Groups

Major viewer groups include commuters and pedestrians with views to and from the road, residential and recreational viewers from afar, and viewers from the roadside commercial and industrial areas.

5.2.3 Viewer Exposure

When crossing the bridge, pedestrians and bicyclists share a similar and more leisurely viewing experience than commuters who are traveling at a much greater speed. On the other hand, bored with the tedium of the industrial view, some astute commuters may observe the view as keenly as the pedestrians. Local industrial workers who walk to South Park restaurants for lunch potentially have direct exposure and a longer duration of exposure with which to view the bridge, but only if they do not choose a direct route to their destination. The exposure and duration of exposure for viewers to the bridge from the marina is unchanging and remains more constant than in other districts. Only a few residences have direct exposure to the bridge, though there are peek-a-boo views at the ends of many residential streets.

5.2.4 Viewer Sensitivity

Boeing workers in buildings have only a distant view and are probably not acutely aware of the bridge or the waterway beneath it. Commuters with their superior view perspective would see mostly pavement and railings. On a good weather day they may notice the distant Seattle skyline or Mt. Rainier. Most of the nearby small manufacturing workers probably see the bridge roadway as a primary access to their place of business and the bridge structure secondarily as a piece of background scenery. Motorists may easily pass through the Small Manufacturing district without noticing either the bridge or the waterway, as the concrete bridge structure blends in with other industrial buildings in the area. Motorists passing through the marina parking lot as well as viewers on the waterway itself might catch only a glimpse of the water, as the inferior view perspective focuses all attention on the bridge structure. Visitors to the commercial district view the bridge from a normal position, and though there is a clear view of the paved ramp leading up to the waterway, these viewers see little if any of the bridge structure. While the residential neighborhood affords many views of the bridge, most are distant and all are viewed from a normal position. Few residences have a direct view of the bridge, and even fewer appear to be sited to take advantage of the view of the bridge.

5.2.5 Frequency of Exposure

Commuters over the bridge and commuters to the nearby industrial area have a regularly recurring exposure to the view. Non-commuting pedestrians and bicyclists may not be such frequent users. Marina residents, both live-aboard and in the mobile home park, have daily, nearly constant exposure for foreground viewing. It is possible that they selected this residential area for the bridge and waterway view. Commercial area business owners and patrons have frequent opportunity to view the ramp area of the bridge. Residential viewers are most likely to glimpse a street-end view as they drive the adjacent streets, but very few residences have a viewing position that favors the bridge. More frequent users would be at the Duwamish Waterway Park, where the bridge view is featured.

5.2.6 Duration of View

Commuters have only brief exposure to bridge views. Non-motorized viewers, including bicycle commuters and local industrial workers who choose to walk to South Park restaurants for lunch may have direct exposure and a longer duration of exposure to the bridge and the waterway. Boat traffic also experiences longer duration views of the bridge and waterway. The duration of exposure for viewers to the bridge from adjacent marina properties and residences with views is unchanging and remains more constant than in vehicular-oriented districts. Most residences have, however, only a very brief and subtle street-end view of the bridge structure.

5.2.7 Numbers of Viewers

The commercial businesses, and their patrons and Boeing employees who commute over the bridge comprise the largest groups of viewers. There appears to be frequent non-motorized bridge use around noon on dry days. Most of the small industrial businesses appear to be small wholesale manufacturing enterprises unlikely to draw many visitors to the area. A few mobile home residents are located in the south end of the marina parking lot, and there appears to be a few live-aboards in the marina itself. Park and marina users would not be impacted as continually as the local business people and residents, but they would generally be seeking a respite from industrial activity. Visual impacts could be so severe during construction that park users seeking a "natural" experience might avoid the area.

There could also be park users attracted by construction activity. Depending upon the attitude toward construction of the individual viewer, the sight of bridge construction activities could greatly enhance the recreational experience of those users. However, they are probably fewer in number than those offended by a temporary industrial backdrop imposed upon the tranquil but limited local recreational opportunities.

Figure 23 Boeing Lunch Crowd

5.3 Existing Conditions

Views from the bridge may be appreciated as a driver, pedestrian or bicyclist. Views from the bridge are dramatically different from views of the bridge. Likewise, structurally dominated inferior views make a very different impression from scenic superior views. Some districts boast several possible viewpoints while others have only one. The following viewpoints have been selected to represent the range of views from which the project is likely to be seen.

Five viewpoints of the existing conditions are analyzed in Table 4. Figure 25 shows the location and direction of the viewpoints. Included are summer photographs taken from various viewpoints. These photographs and field observations are the basis for the

quantitative visual quality analysis of existing conditions. These ratings are used to compare ratings for each alternative.

5.3.1 Representative Viewpoints

Viewpoints throughout the landscape districts were selected to represent views to and from the project area. They represent varied viewer positions, exposure and sensitivity. View positions cause a shift in viewer focus so that foreground, middleground or background views vary in their influence.

Landform is subtle, as the non-waterway terrain is fairly flat and shrouded by the built environment. The Duwamish Waterway is barely visible between the artificial industrial canyon walls. Vegetation that has survived consists of introduced invasive shrubs and a few trees downstream at Duwamish Waterway Park. The man-made environment is the dominant visual theme throughout all of the representative districts.

5.3.2 Views Toward Project

From the north, long-distance views to the waterway and bridge area are obstructed by the Boeing buildings that were constructed adjacent to the waterfront. The typical foreground view from the north features the paved roadway ramp. Likewise, the presence of industrial buildings obstructs potential viewpoints from much of the south, except for views of the roadway ramp from the commercial area directly south of the bridge. From a few residences, street ends, Duwamish Waterway Park, and the waterway itself, viewpoints of the bridge project area from the west are accessible but the bridge does not dominate the prevalent character.

From the east, the bridge dominates the view from the marina area.

Figure 24 One of Few Residential Street End Views

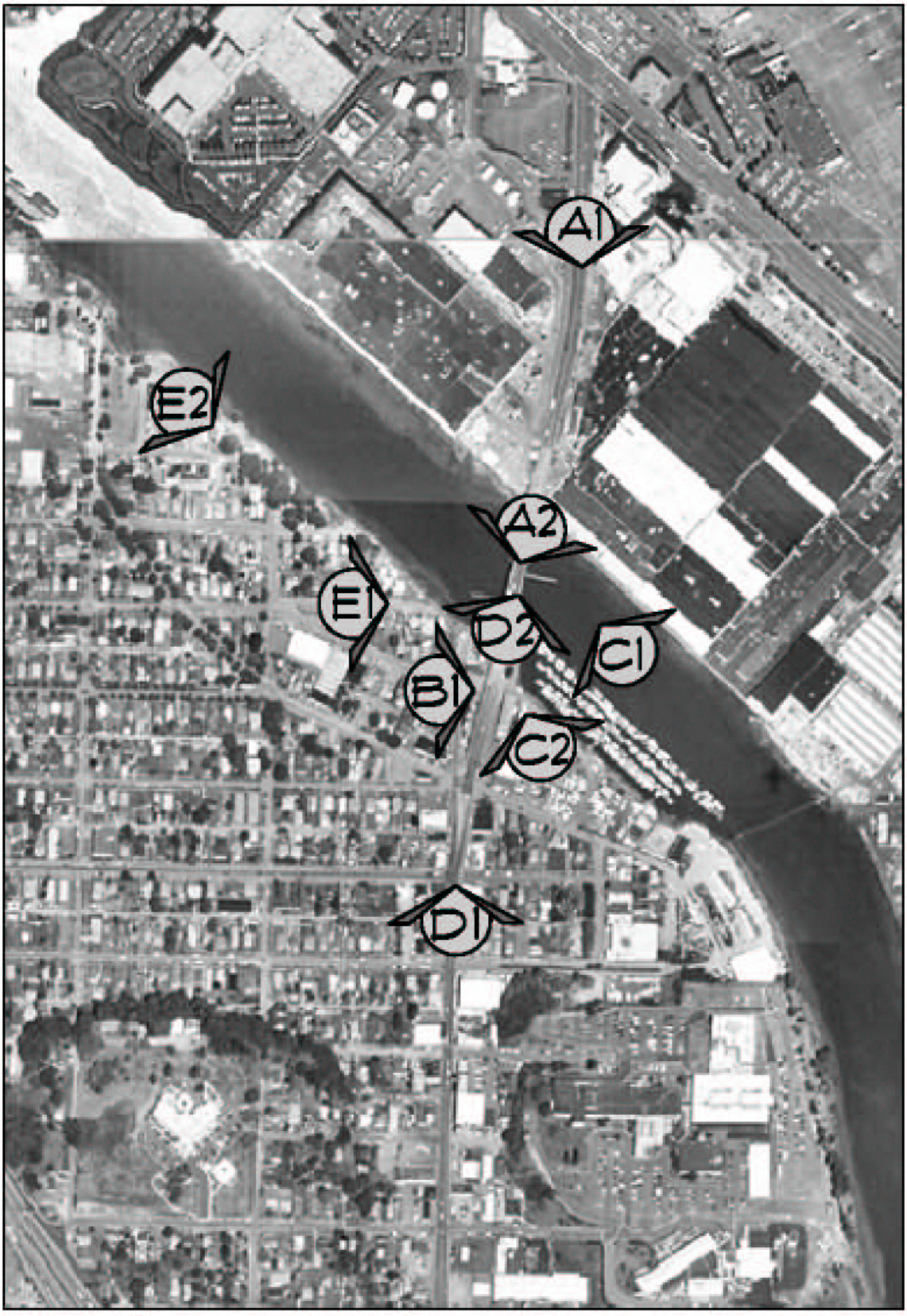


Figure 25 Viewshed Diagram

5.3.3 Views From Project

Views from the bridge area may be appreciated as a driver, passenger, pedestrian or bicyclist. Motorist views from the bridge are predominantly north and south, with the bridge deck and railing dominant in the foreground and the mountain and skyline views faintly visible in the distance on clear days. Pedestrians may take advantage of east and west views of the waterway not available to the motorists due to the railing height and seated position of vehicle occupants.

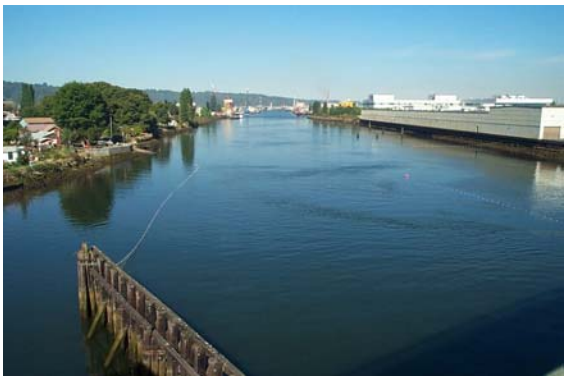


Figure 26 Downriver, Duwamish Waterway

5.3.4.1 The Boeing Company

The heavy industrial and manufacturing district (The Boeing Company) of South Park enjoys one of the only true superior views of the South Park Bridge. Views from Boeing are dominated by the roadway (Viewpoint A-1) and so are rated very low in vividness and intactness. Unity is higher as paving is consistent with the industrial backdrop.

Figure 27 Viewpoint A-1

The incidental tourist would be surprised to note that the Duwamish Waterway passes through such a highly industrialized area and may note it to be a most unlikely location for a marina, thereby missing the mountain view in the distance. However, a daily commute predisposes one to look for the remarkable Mt. Rainier view, and if the mountain is "out," the view for that day would be rated very high. While drivers are surely aware of the bridge, they are not positioned to view the marina or waterway, due to the height of the railings.

Pedestrians, on the other hand, may find the vividness of the waterway below (Viewpoint A-2) attracts their attention away from the industrial warehouses or the distant mountain. For drivers, bland foreground and middleground views of the bridge deck and railing rate low in vividness and intactness but higher in unity. The background views dominated by the Duwamish Waterway nestled between large industrial buildings rate moderately low in vividness and intactness, but relatively high in unity.

Figure 28 Viewpoint A-2

5.3.4.2 Small Manufacturing District

Views from the small manufacturing districts are from both normal and inferior positions. Views close to the bridge have an inferior position, showcasing the concrete bridge structure, which is uniform with its industrial backdrop. Views from this area rate low in vividness and intactness and higher in unity. The highly industrial theme from this vantage point earns it predictably low scores for intactness.

Due to the presence of development and fences in this area, waterfront access (and therefore viewing) is not possible. The industrial warehouses are not predisposed to providing waterfront views for their workers as their inferior viewing position features the concrete bridge supports as just one more industrial statement in a predominantly man made landscape.

Figure 29 Viewpoint B-1

Though this area does offer some inferior views at street ends (Viewpoint B-1), motorists may easily pass through the manufacturing district without noticing either the bridge or the waterway until they are under the bridge.

5.3.4.3 Marina/Waterway District

The viewer's inferior position from all marina and waterway locations focuses attention on the bridge, not the water (Viewpoint C-1). The surrounding industrial buildings tend to overwhelm the waterway so vividness scores moderately low overall. Furthermore, since the waterway habitat is so degraded, and the absence of riparian vegetation so complete, foreground views to South Park Bridge from the waterway (Viewpoint C-1) score moderately low in intactness. As a uniformly degraded and industrialized marine environment, the views score average to low for unity.

Figure 30 Viewpoint C-1

Figure 31 Viewpoint C-2

5.3.4.4 Commercial District

Most commercial district viewers are pedestrians along 14th Avenue S. and patrons of local businesses and restaurants. These viewers observe the bridge from the south end (Viewpoint D-1), and because of this, see little if any of the bridge structure. From the commercial district, no marine context is visible and the bridge appears to be an overpass with rails. Existing views of the bridge from the commercial area rate very low in vividness and intactness, but not as low in unity.

Motorists crossing the bridge from the commercial district have the opportunity to see a distant city view, but are not positioned to view the marina or waterway, due to the height of the railings. Background views rate higher than foreground views for this reason. The middleground is dominated by The Boeing Company office buildings and parking lots. It rates low in vividness and intactness, but higher in unity.

Figure 32 Viewpoint D-1

The spectacular Seattle skyline view to the north (Viewpoint D-2) is so dominated by the large industrial buildings in the middleground, that even for pedestrians this view rates moderately low in vividness, but relatively high in unity. In spite of the faraway views, with such an obviously manmade expanse stretching before one, intactness is moderately low.

Figure 33 Viewpoint D-2

5.3.4.5 Residential Neighborhood

Views of the bridge and surroundings from the residential area are similar but more distant than those from the nearby small manufacturing area. Residential neighborhood views of the bridge are mostly distant peek-a-boo views from street ends (Viewpoint E-1). Only a few residences have a direct view of the bridge. Existing views rate low in vividness but higher in intactness and unity.

Figure 34 Viewpoint E-1

Views from Duwamish Waterway Park, downstream of the bridge (Viewpoint E-2), have a more vivid view as the park's orientation features the waterway and the bridge profile in the distance.

Figure 35 Viewpoint E-2

Because the bridge is far enough away to be seen as a whole and in context with the waterway, views from Duwamish Waterway Park score average to medium in vividness. However, this vista highlights the encroachment and lack of unity more than other more consistently developed views. Foreground intactness and unity rate high, while background views dominated by The Boeing Company rate low.

Table 4 Existing Conditions

Viewshed	VIVIDNESS												INTACTNESS						UNITY						AVERAGES
	I				II				III				I		II		III		I		II		III		
	FOREGROUND				MIDDLEGROUND				BACKGROUND				FORE		MIDDLE		BACK		FORE		MIDDLE		BACK		
	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	
A-1, Motorist Southbound, N	1	3	2	7	3	5	3	6	7	6	3	5	2	1	2	2	2	1	1	1	2	2	3	3	
Average	3.25				4.25				5.25				1.5		2		1.5		1		2		3		2.64
A-2, Pedestrian Southbound, S	3	3	0	6	4	7	1	5	8	7	2	5	1	1	2	1	2	1	1	1	2	1	2	2	
Average	3.00				4.25				5.50				1.00		1.50		1.50		1.00		1.50		2.00		2.36
B-1, Adjacent Industrial District, I	2	2	2	7	3	2	2	7	4	2	2	8	3	2	3	3	4	5	3	1	2	1	2	1	
Average	3.25				3.50				4.00				2.50		3.00		4.50		2.00		1.50		1.50		2.86
C-1, Duwamish Waterway, I	6	8	3	3	8	8	2	4	7	7	2	7	5	1	4	1	3	1	5	4	4	1	2	0	
Average	5.00				5.50				5.75				3.00		2.50		2.00		4.50		2.50		1.00		3.53
C-2, Marina Parking Lot, I	4	5	3	7	6	7	2	7	7	8	2	7	3	3	4	3	5	2	2	3	3	3	4	1	
Average	4.75				5.50				6.00				3.00		3.50		3.50		2.50		3.00		2.50		3.81
D-1, Business/CommercialDistrict, I	1	0	1	4	2	0	2	5	2	0	3	5	2	3	3	3	3	3	3	1	2	2	2	1	
Average	1.50				2.25				2.50				2.50		3.00		3.00		2.00		2.00		1.50		2.25
D-2, Motorist/Pedestrian Northbound, N/S	1	0	1	4	2	0	2	5	6	0	3	8	2	3	3	3	4	7	3	1	2	2	2	1	
Average	1.50				2.25				4.25				2.50		3.00		5.50		2.00		2.00		1.50		2.72
E-1, Adjacent Residential District, N	3	0	5	6	4	0	6	7	3	0	7	8	5	5	5	5	5	6	5	5	4	4	3	3	
Average	3.50				4.25				4.50				5.00		5.00		5.50		5.00		4.00		3.00		4.42
E-2, Duwamish Waterway Park,N	8	7	9	3	8	8	8	4	7	9	7	6	7	5	5	3	3	1	6	5	4	4	2	1	
Average	6.75				7.00				7.25				6.00		4.00		2.00		5.50		4.00		1.50		4.89

Table 5 Evaluation Scale Definitions

EVALUATION SCALE				
SCALE	**VIVIDNESS**	**INTACTNESS**		**UNITY**
		HUMAN-MADE DEVELOPMENT	*NATURAL ENVIRONMENT*	
10	Very High	No Development	Very High, No Encroachment	Very High
9	High	Little Development	High, Little Encroachment	High
7, 8	Moderately High	Some Development	Moderately High, Some Encroachment	Moderately High
4, 5, 6	Average	Average Level of Development	Average, Average Level of Encroachment	Average
2, 3	Moderately Low	Moderately High Level of Development	Moderately Low, High Level of Encroachment	Moderately Low
1	Low	High Level of Development	Low, High Level of Encroachment	Low
0	Very Low	Very High Level of Development	Very Low, Very High Level of Encroachment	Very Low
-	Not Present or Visible	Not Present or Visible	Not Present or Visible	Not Present or Visible

DEFINITIONS

VIEW DISTANCE

Foreground	¼ mile
Middleground	¼ - 3 miles
Background	Beyond 3 miles

VIEWSHED

Viewshed:	All surface area visible from an observer's viewpoint

VIEWER POSITION

S	Superior or viewer positioned above highway
N	Normal or viewer positioned at level of highway
I	Inferior or viewer positioned below level of highway

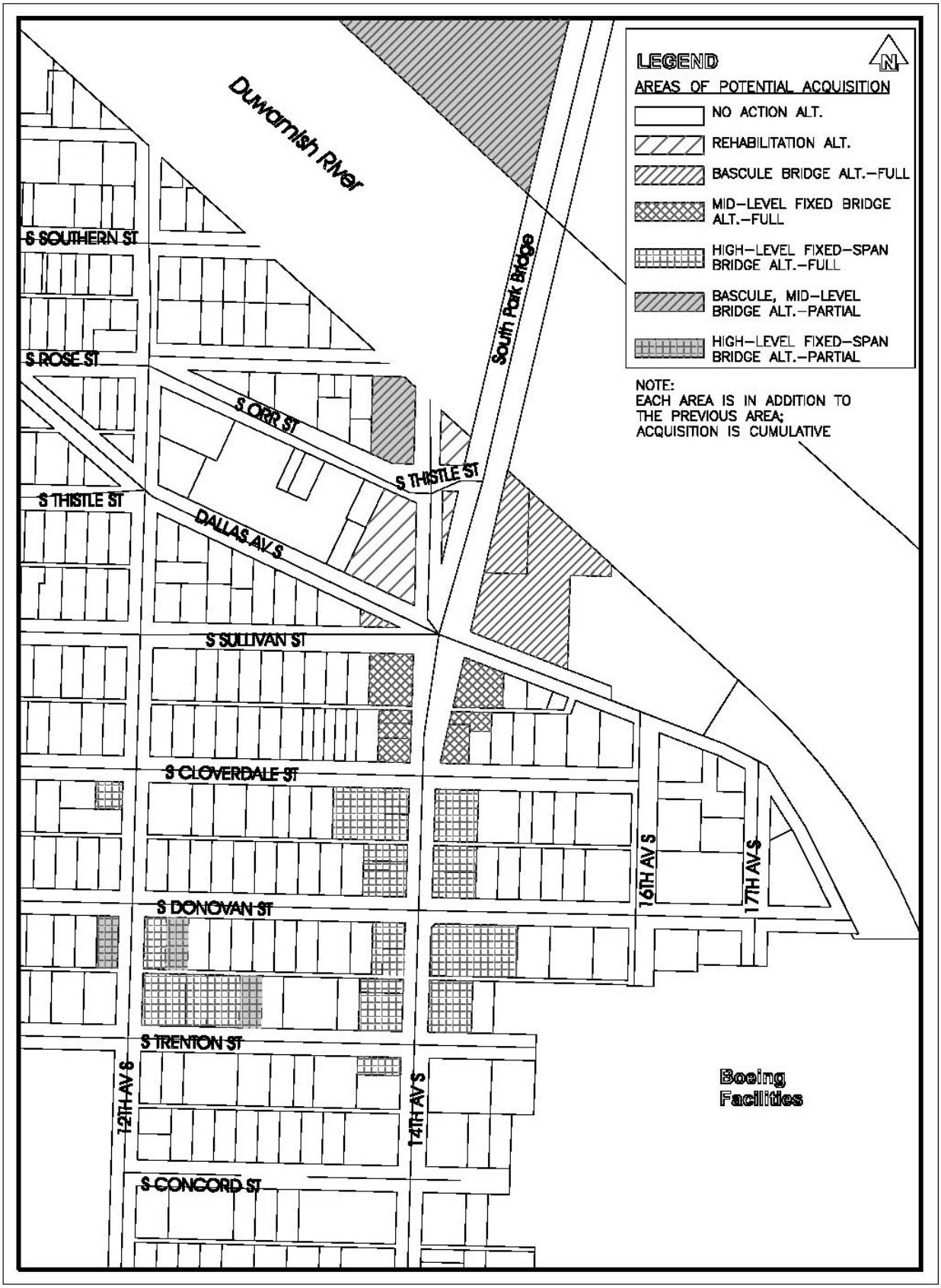


Figure 36 Areas of Potential Acquisition

Chapter 6 Impacts

6.1 Direct Impacts

Notable visual impacts for the proposed project vary greatly with respect to the alternatives when viewed from the viewpoints. Visual quality for direct, operational, secondary and construction impacts was evaluated by comparing viewer response of each alternative's visual impact to the existing conditions. These determinations were then compared to each other to assess visual impact. Figure 36 illustrates the properties and how they are affected by each of the project alternatives[23].

Staging areas would be graded and seeded for erosion control as soon as construction is completed. Shallow water habitat construction would be required as mitigation for lost habitat or lost habitat function, and would be installed as soon as practical after construction. When permanently relocating utilities and/or making necessary upgrades to utilities during construction, King County may consider undergrounding utilities to improve the aesthetics of the South Park Community. Finally, public interpretive signs may need to be installed to identify and mitigate changes to historical features.

The No Action Alternative, which proposes removing the existing bridge, results in a major visual change. For purposes of this assessment, it is assumed that the open space created when the bridge is removed would be graded and seeded for erosion control.

The Rehabilitation Alternative should result in no major visual change. However, three buildings are located immediately adjacent to the west side of the bridge and it is expected that in order to provide construction access, even for rehabilitation work, those buildings would be removed.

All three new replacement bridge alternatives and their associated new alignments require demolition of several nearby community buildings, industrial/small manufacturing buildings, a billboard, and some vegetation (See Figure 32). This demolition of the commercial buildings could create the most dramatic visual change (See Figure 20), as it changes the overall character of 14th Avenue S. from two-story commercial to one-story residential. The actual extent of this change, and hence the visual impact, would be determined by the final replacement alternative. For example, both fixed-span alternatives, with their longer ramps would result in more commercial building removal. In addition, bridge abutments and walls would result in impaired views to and from the remaining adjacent buildings.

The High-Level Fixed-Span Bridge Alternative and its associated extended ramps and subsequent street, bus, and truck traffic revisions, would trigger the removal and/or relocation of many buildings and even some residences several blocks away.
Shifting the roadway alignment to the west of the existing alignment, as proposed by all three new bridge alternatives, would create open space between the bridge and marina users. This realignment would also create an opportunity to visually connect the nearby

[23] *South Park Bridge Project: Relocations Technical Report*; February 2004.

commercial area to the Duwamish Waterway and the marina, thus exposing a potential focal point for the community.

Please refer to the color photo supplement (Appendix C) for illustrations of the alternatives.

6.1.1 The No Action Alternative

The No Action Alternative requires eventual removal of the existing historic bridge. It requires no demolition of nearby buildings or old brick street paving. Removal of the existing bridge opens vistas to nearby industrial buildings now being screened from view by the bridge itself. This alternative also decreases the quantity of pavement visible from the commercial area (Viewpoint D-1) and Boeing (Viewpoint A-1). Distant views of the city and mountains from the bridge deck, however, would no longer be possible (Viewpoints A-2 and D-2).

The No Action Alternative would result in slightly increased vividness because the landform and waterform would both be more easily observed by all viewers, even though distant views of the city and mountains from the bridge deck vantage point would be gone. Intactness would increase, as development and encroachment would decrease. Unity would increase greatly as the natural landscape would probably increase, giving an overall impression of unity with the waterway. Absence of operational impacts would result in increased intactness.

6.1.2 The Rehabilitation Alternative

The goal of the Rehabilitation Alternative by definition, especially if the reconstructed bascule pier were designed to nearly duplicate the design of the existing bascule pier, would not result in significant visual changes. This alternative also avoids changing the immediate adjacent commercial area. Anticipated visual changes include creation of construction staging areas which would eliminate three buildings. Since these particular buildings are less well-maintained than the neighborhood in general; their removal could improve the appearance of the area. Also, the character of the warehouse building closest to the waterway is inconsistent with the historical context of the residential neighborhood and the older commercial buildings on 14th Avenue S. Its removal would result in increased unity. The adjacent historic brick pavement would be removed and possibly relocated. Following construction, the staging areas would at a minimum be graded and seeded, possibly repaved (outside the shoreline area), or re-vegetated to enhance the habitat value of the immediate shoreline as well as mitigate for construction impacts to the area in general.

The Rehabilitation Alternative would therefore result in a few generally insignificant visual changes. Operational impacts would remain the same.

Figure 37 Viewpoint C-1 No Action Alternative

Figure 38 Viewpoint E-2 No Action Alternative

Figure 39 Viewpoint C-1 Rehabilitation Alternative

Figure 40 Viewpoint E-2 Rehabilitation Alternative

6.1.3 The Bascule Bridge Alternative

Of the replacement alternatives, the Bascule Bridge Alternative most closely replicates the style and scale of the existing bridge. It would result in the removal of the same three nearby buildings discussed in the previous section. However, because its proposed alignment is parallel to the existing location, the approach passes much closer to the buildings to the west. Because of the construction and access issues presented with this alternative, several additional structures would be removed. Existing single-family residences to the west would appear exposed, in contrast to the protection and buffer now provided by the existing buildings.

On the positive side, removal of the existing bridge could create views to and across the Duwamish Waterway, as well as increase the potential area available for public waterfront access. Marina activity could also be viewed from as far away as the commercial area to the south. The parallel alignment also presents an opportunity for enhancement of the S. Sullivan Street/Dallas Street and 14th Avenue S. five-way intersection. This could provide opportunity for continuing the new "historic" detailing throughout the nearby community public spaces.

The Bascule Bridge Alternative could result in increased vividness as the new construction could include new "historic" details on the bridge. Intactness would remain approximately the same. Since this new bridge alternative preserves much of the existing adjacent commercial district, the Bascule Bridge Alternative possesses the most potential for maintaining visual unity. Unity could also increase slightly as the natural landscape would probably increase due to habitat mitigation and enhancement requirements, giving an overall impression of unity with the waterway. Operational impacts would remain the same.

6.1.4 The Mid-Level Fixed-Span Bridge Alternative

The Mid-Level Fixed-Span Bridge is less dramatic in height and ramp length than the High-Level alternative. However, even these extended ramps would greatly alter the S. Cloverdale Street intersection. Grades at this intersection and extending to the side streets would have to be raised about 5 feet to meet the bridge grade. This bridge, with its increased height would be more visible from the north and south than it is presently, due to the increased pavement width. From a distance, the bridge would appear to match the looming scale of the Boeing Company buildings that now dominate the landscape. In contrast, motorists passing through would have a brief but improved view of the distant Seattle skyline and its height may be perceived as a positive change to the commuting viewers.

Figure 41 Viewpoint C-1 Bascule Bridge Alternative

Figure 42 Viewpoint E-2 Bascule Bridge Alternative

Figure 43 Viewpoint C-1 Mid-Level Fixed-Span Bridge Alternative

Figure 44 Viewpoint E-2 Mid-Level Fixed-Span Bridge Alternative

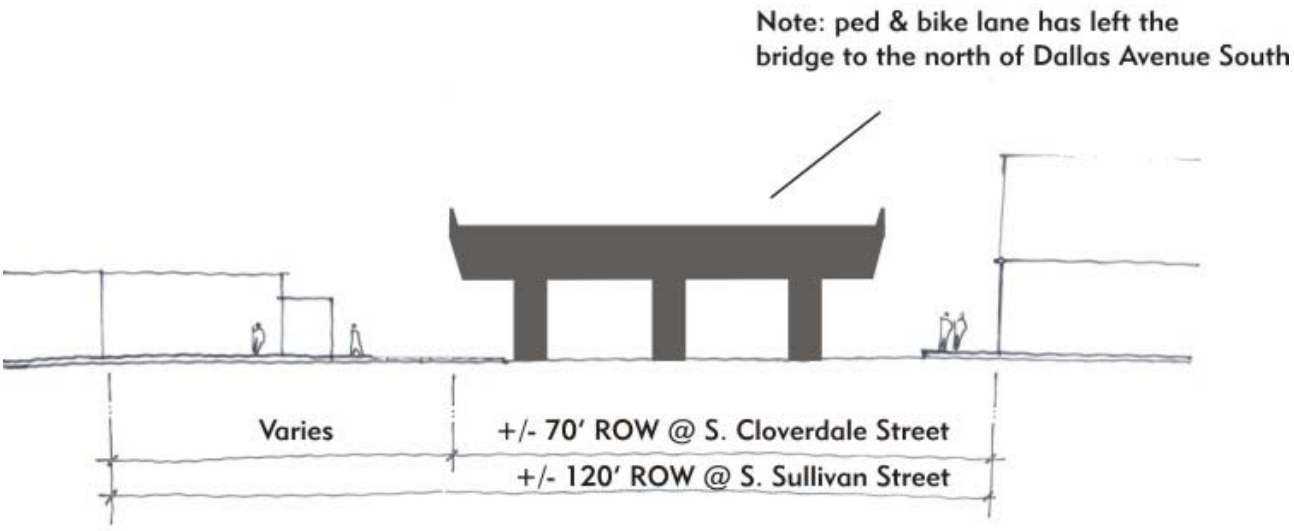


Figure 45 Mid-Level Fixed-Span Bridge Alternative at S. Cloverdale Street and S. Sullivan Street

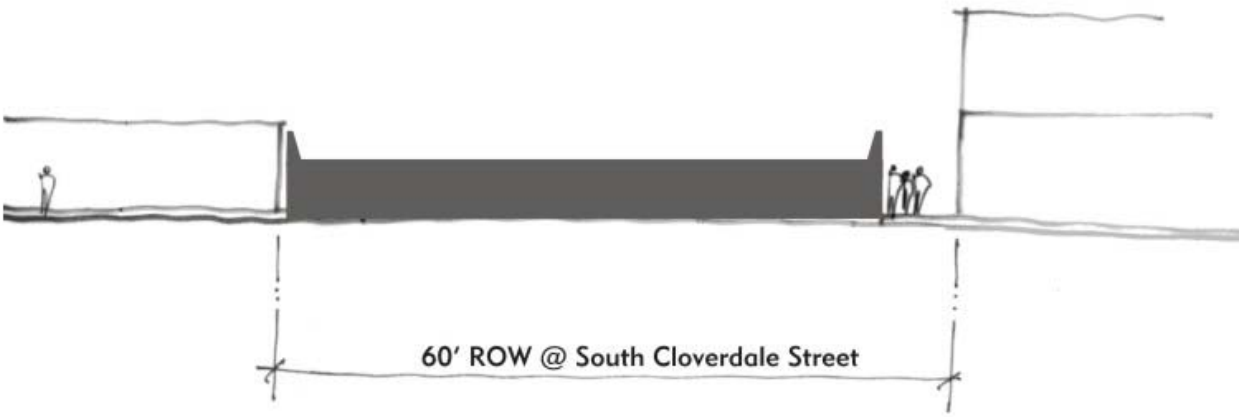


Figure 46 Mid-Level Fixed-Span Bridge Alternative at S. Cloverdale Street

The Mid-Level Fixed-Span Bridge would result in increased exposure of the residential neighborhood to the view of passing motorists due to the loss of significant buffer between S. Sullivan Street and S. Cloverdale Street The loss of one more block of commercial buildings between the homes and 14th Avenue S. would change the character of the downtown area from an established and serviceable two-story commercial strip to a one-story residential neighborhood. The 14th Avenue S. lots remaining after demolition are small properties with extremely limited access and virtually no parking opportunity, so no immediate rebuilding or remodeling is anticipated. Some of the solid visual buffer lost by removing commercial establishments would be replaced with solid bridge abutments of a similar scale but less familiar façade. Remaining buildings on 14th Avenue S. between S. Cloverdale Street and S. Donovan Street would be faced by a bridge ramp abutment placing passing vehicles at an elevation just above head level of pedestrians on the adjacent sidewalk. In addition to the abutments, the structure for bicycle and pedestrian access to the bridge from S. Thistle Street will visually block views under the bridge to the waterway from the residential area to the west.

Much of the character of the "downtown" South Park business district is derived from the combined character of the aging buildings lining the west side of 14th Avenue S. The popularity and noontime bustle to and from the restaurants in this block contribute greatly to the appearance of a lively and friendly atmosphere. The overall loss of these familiar and serviceable, albeit unremarkable buildings along 14th Avenue S. will decrease unity by exposing the quiet residential streets to the busy bridge. In addition these same residential areas decrease in intactness as the new structure encroaches upon the neighborhood. Because S. Orr Street would become dead-ended, residences near the bridge would be subject to light and glare from turning vehicles, as well as the sight of the additional expanse of asphalt necessary to provide for the new turn-around area. However, intactness could increase slightly as the adjacent natural landscape would increase due to habitat mitigation and enhancement. The dominance of the new bridge, however, would detract from an overall impression of unity with the waterway. Absence of operational impacts would result in increased intactness.

Figure 45 and Figure 46 illustrate the visual impact the Mid-Level Fixed-Span Alternative Bridge will have on the existing commercial district. The shaded areas represent the scale of the new bridge, compared to the existing conditions represented by the line drawing.

6.1.5 The High-Level Fixed-Span Bridge Alternative

The High-Level Fixed-Span Bridge would add a highly visible elevated structure that would be readily apparent to motorists, pedestrians, residents and business district patrons. To achieve the height needed for spanning the river, the bridge would not only be tall, but the ramps leading to it would extend well into the existing commercial area. The extended ramps, abutments and subsequent street, bus, and truck traffic revisions, would trigger the removal of all buildings lining 14th Avenue S. between the waterway and S. Trenton Street. The bridge would soar well above the remaining marine-oriented buildings as it nears the water. The commercial area that now exists would essentially cease to exist. Because of the ramp height on 14th Avenue S., S. Donovan Street would be dead-ended, leaving no direct access to 14th Avenue S. from either side of S. Donovan Street. This would visually widen

the apparent gap from one side of the street to the other. With almost all of the buildings gone, little remains to entice pedestrians to cross over to either side of 14th Avenue S.

In this way, the High-Level Fixed-Span Bridge would forever change the appearance of the South Park commercial area. The S. Cloverdale Street intersection, now perceived as "central downtown," would be raised up in the High-Level Fixed-Span Bridge Alternative, with retaining walls facing any remaining business entrances at that corner. Dallas Avenue S. and S. Sullivan Street would become an underpass. Remaining buildings on 14th Avenue S. between S. Cloverdale Street and S. Trenton Street would be faced by a bridge ramp abutment placing passing vehicles at an elevation just above head level of pedestrians on the adjacent sidewalk. To the north, 14th Avenue S. would become a dominating bridge structure featuring 8-foot diameter columns in sets of three all the way across the water. The reconfigured intersections and dozens of buildings demolished and removed to accommodate the ramps and abutment walls would greatly alter the view of the bridge from the residences suddenly exposed to the affected area on 14th Avenue S. The nearby residences fortunate enough to be located back from the new construction, but not impacted enough to be removed, would gain primarily a view of the underside of the bridge, with little chance of appreciating newly opened views to the waterway. The opportunity for graffiti, road grime on windows, siding, and parked cars, and litter accumulation may be problematic in these remaining commercial and exposed residential areas.

The High-Level Fixed-Span Bridge would result in greatly decreased intactness due to encroachment of the new bridge and associated structures throughout South Park. Unity would decrease as the comfortable older character of the few existing buildings would be too sparse to look like a viable commercial district. Those few remaining building facades would be blocked from view by new bridge abutment walls and ramps. The High-Level Fixed-Span Bridge would also decrease unity of the adjacent residential neighborhood due to the encroachment of the new bridge as it soars high above the existing homes. In addition, in order to accommodate local bus transportation routes, several residences blocks away from the bridge itself would be removed or compromised to accommodate new road alignments. Residences removed due to residential street re-alignment between S. Donovan Street and S. Trenton Street near 12th Avenue S. will reduce unity in the affected neighborhood, but could increase the intactness of the neighborhood if it resulted in more generous setbacks or local access open space. Because S. Donovan Street would become a dead-end, residences on both sides of the bridge ramp would be subject to light and glare from turning vehicles, as well as the sight of the additional expanse of asphalt necessary to provide for the new turn-around area.

The quantity of natural landscape could slightly increase due to habitat mitigation and enhancement directly under the bridge at the waterway, but the dominance of the new bridge would distract from an overall impression of unity with the waterway. Absence of operational impacts would result in increased intactness. The views of the Seattle skyline would be significantly enhanced, at least for the commuters, though the exposure time of motorists would be very short and from a distant viewpoint (Figure 33 Viewpoint D-2). This increase in visual quality would result if the High-Level Fixed-Span Bridge Alternative is selected.

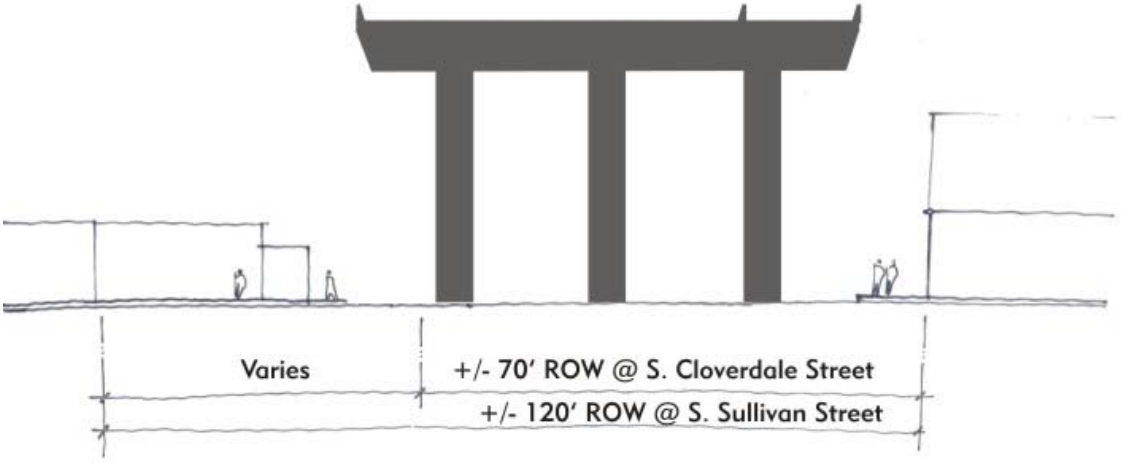


Figure 47 High-Level Fixed-Span Alternative Bridge at S. Cloverdale Street and S. Sullivan Street

Figure 47, Figure 48 and Figure 49 illustrate the visual impact the High-Level Fixed-Span Alternative Bridge will have on the existing commercial district. The shaded areas represent the scale of the new bridge, compared to the existing conditions represented by the line drawing.

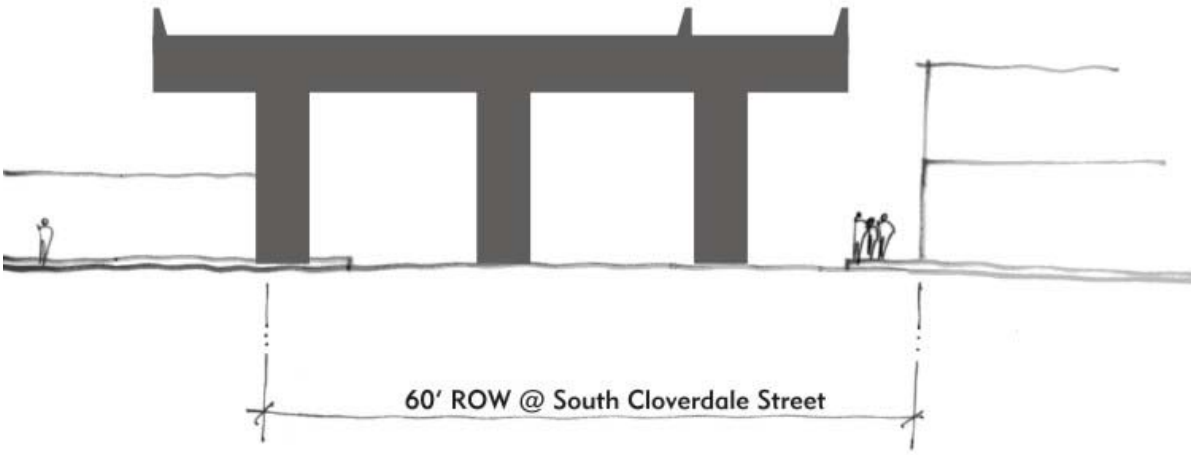


Figure 48 High-Level Fixed-Span Bridge Alternative at S. Cloverdale Street

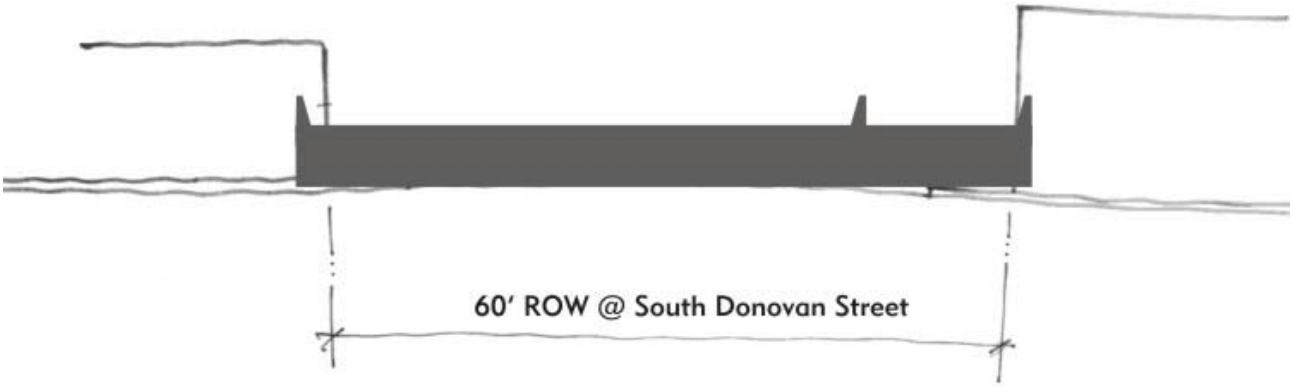


Figure 49 High-Level Fixed-Span Bridge Alternative at S. Donovan Street

Figure 50 Viewpoint C-1 High-Level Fixed-Span Bridge Alternative

Figure 51 Viewpoint E-2 High-Level Fixed-Span Bridge Alternative

6.2 Affected Views

The following tables provide a graphic representation of the visual changes anticipated for each alternative as seen from each district. The graphs are intended to illustrate a relative difference rather than a true statistical difference. (Please refer to Chapter 4 Methodology and Table 5 Evaluation Scale Definitions for an explanation of how the numbers in the table are derived.) Affected views from each district may be summarized as follows:

6.2.1 Boeing (Viewpoints A-1 and A-2)

No Action Alternative
Bridge demolition would allow views to and across the waterway. Bridge support demolition near the waterfront would introduce opportunities for public access. Please note that in the No Action Alternative, the bridge would be removed, and therefore, viewpoint A-2 would cease to exist.

Rehabilitation Alternative
Building demolition near the waterfront could introduce opportunities for public access. No significant visual changes.

Bascule Bridge Alternative
Bridge demolition would allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access. The bridge could assume a similar scale and style to emulate the existing structure.

The Mid-Level Fixed-Span Bridge Alternative
Bridge demolition would allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access. Building demolition and abutments along 14th Avenue S. would decrease the apparent length of the viable commercial business area. The bridge would assume an increased scale and a potentially more contemporary style.

The High-Level Fixed-Span Bridge Alternative
Bridge demolition would allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access. Extensive building demolition and abutments along 14th Avenue S. would eliminate most of the apparent viable commercial business area. New bridge would assume an imposing scale and a potentially more contemporary style.

Table 6 Visual Analysis Matrix - Viewpoint A-1

Viewpoint: A-1, Motorist Southbound View Position: Normal		Existing		No Action	Rehabilitation	Bascule	Mid-Level	High-Level
Vividness *(Average of View Distance)*	Landform	3.6		6.0	2.6	2.6	2.6	2.0
	Waterform	4.6		7.0	5.0	5.0	4.0	2.3
	Vegetative	2.6		1.7	2.6	2.6	2.6	2.6
	Human-made	6.0		4.3	8.0	8.0	7.3	7.6
Intactness *(Average of View Distance)*	Development	2.0		3.0	2.0	2.0	2.0	1.0
	Encroachment	1.3		2.7	1.3	1.3	1.0	0.3
Unity *(Average of View Distance)*	Overall	2.0		2.7	2.0	2.0	1.6	0.0
Total Visual Quality		**22.1**		**27.3**	**23.5**	**23.5**	**21.1**	**15.8**

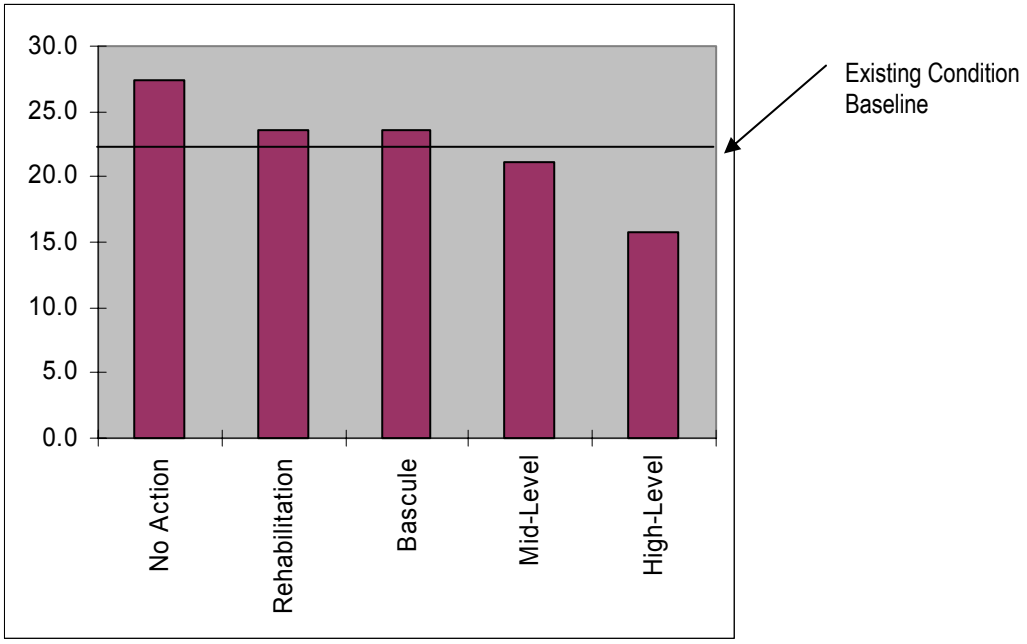
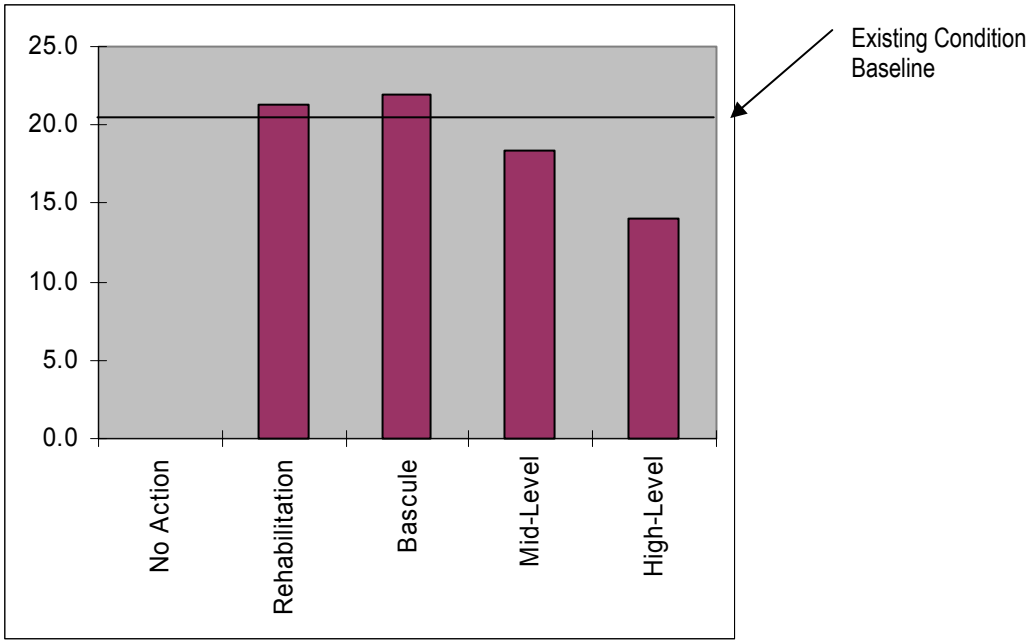


Table 7 Visual Analysis Matrix - Viewpoint A-2

Viewpoint: A-2, Pedestrian Southbound View Position: Superior		Existing		No Action	Rehabilitation	Bascule	Mid-Level	High-Level
Vividness *(Average of View Distance)*	Landform	6.0		n/a	4.0	4.0	3.3	2.7
	Waterform	5.7		n/a	5.7	5.7	4.7	2.0
	Vegetative	1.0		n/a	1.0	1.0	1.0	0.7
	Human-made	5.3		n/a	7.0	7.0	5.7	7.7
Intactness *(Average of View Distance)*	Development	1.7		n/a	1.7	1.7	1.3	0.7
	Encroachment	1.0		n/a	1.0	1.0	1.0	0.0
Unity *(Average of View Distance)*	Overall			n/a	1.0	1.7	1.3	0.3
Total Visual Quality		**20.7**		**n/a**	**21.3**	**22.0**	**18.3**	**14.0**



6.2.2 Small Manufacturing District (Viewpoint B-1)

No Action Alternative
Bridge demolition would allow views to and across the waterway. Bridge support demolition near the waterfront would introduce opportunities for public access.

Rehabilitation Alternative
Building demolition directly adjacent to the bridge would remove assorted fences, stored vehicles, and associated debris and tarps.

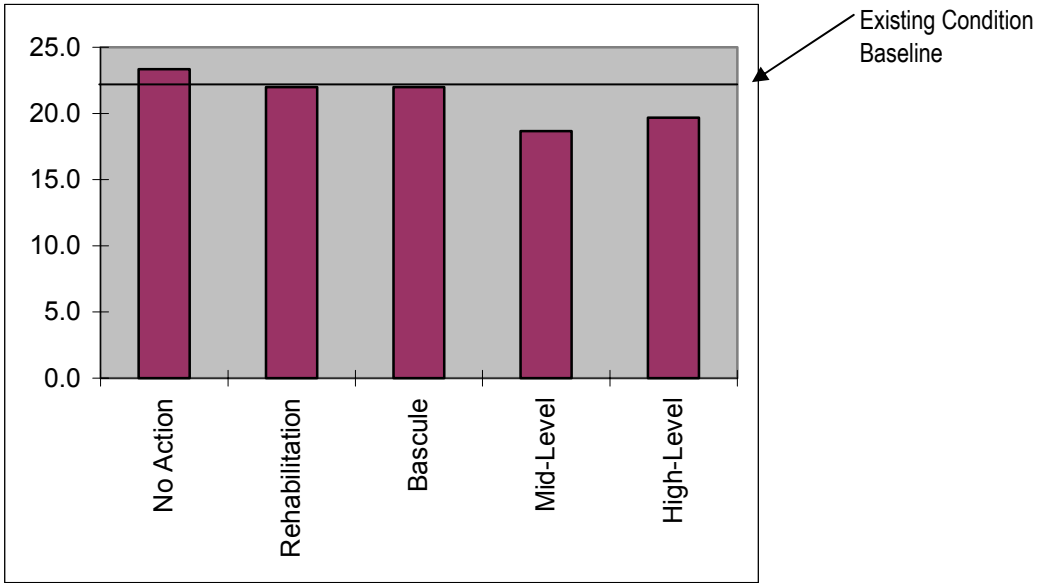
Bascule Bridge Alternative
Bridge demolition would expose views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access. The new bridge would assume a similar scale and style to the existing.

The Mid-Level Fixed-Span Bridge Alternative
Bridge demolition would allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects while the pedestrian and bicycle access ramp would impair views to the waterway and marina. Building demolition along 14th Avenue S. would decrease the apparent length of the viable commercial business area. The new bridge would assume an increased scale and contemporary style.

The High-Level Fixed-Span Bridge Alternative
Bridge demolition would allow views to and across the waterway and marina. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects. Extensive building demolition along 14th Avenue S. would eliminate the apparent viable commercial business area. The new bridge would assume an imposing scale and contemporary style.

Table 8 Visual Analysis Matrix - Viewpoint B-1

Viewpoint: B-1, Adjacent Industrial District View Position: Inferior		Existing		No Action	Rehabilitation	Bascule	Mid-Level	High-Level
Vividness *(Average of View Distance)*	Landform	3.0		3.0	3.0	3.0	3.0	3.0
	Waterform	2.0		2.3	2.0	2.0	2.0	2.0
	Vegetative	2.0		2.0	2.0	2.0	2.0	2.0
	Human-made	7.3		6.3	7.3	7.3	5.3	7.3
Intactness *(Average of View Distance)*	Development	3.3		4.0	3.3	3.3	2.7	2.7
	Encroachment	3.3		3.7	3.3	3.3	2.7	2.0
Unity *(Average of View Distance)*	Overall	1.0		2.0	1.0	1.0	1.0	0.7
Total Visual Quality		**22.0**		**23.3**	**22.0**	**22.0**	**18.7**	**19.7**



6.2.3 Marina/Waterway District (Viewpoints C-1 and C-2)

No Action Alternative

Bridge demolition would allow views to and across the waterway. Bridge support demolition near the waterfront would introduce opportunities for public access.

Rehabilitation Alternative

Building demolition directly adjacent to the bridge would remove assorted fences, stored vehicles, and associated debris and tarps

Bascule Bridge Alternative

Bridge demolition would allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects. The new bridge would assume a similar scale and style to the existing.

The Mid-Level Fixed-Span Bridge Alternative

Bridge demolition would allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects while the pedestrian and bicycle access ramp would impair views to the waterway and marina. The new bridge would assume an increased scale and contemporary style.

The High-Level Fixed-Span Bridge Alternative

Bridge demolition would allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects. The new bridge would assume an imposing scale and contemporary style. The height of the new bridge potentially opens views to and from the few remaining nearby small industrial buildings.

Table 9 Visual Analysis Matrix - Viewpoint C-1

Viewpoint: C-1, Duwamish Waterway View Position: Inferior		Existing		No Action	Rehabilitation	Bascule	Mid-Level	High-Level
Vividness *(Average of View Distance)*	Landform	7.0		7.0	7.0	7.0	6.3	7.0
	Waterform	7.7		7.0	7.7	7.7	7.0	7.7
	Vegetative	2.3		2.3	2.3	2.3	2.3	2.3
	Human-made	4.7		5.3	4.7	4.7	4.3	5.0
Intactness *(Average of View Distance)*	Development	4.0		3.7	4.0	4.0	3.0	3.7
	Encroachment	1.0		1.7	1.0	2.0	1.0	2.0
Unity *(Average of View Distance)*	Overall	1.7		1.3	1.7	1.7	1.7	1.7
Total Visual Quality		**28.3**		**28.3**	**28.3**	**29.3**	**25.7**	**29.3**

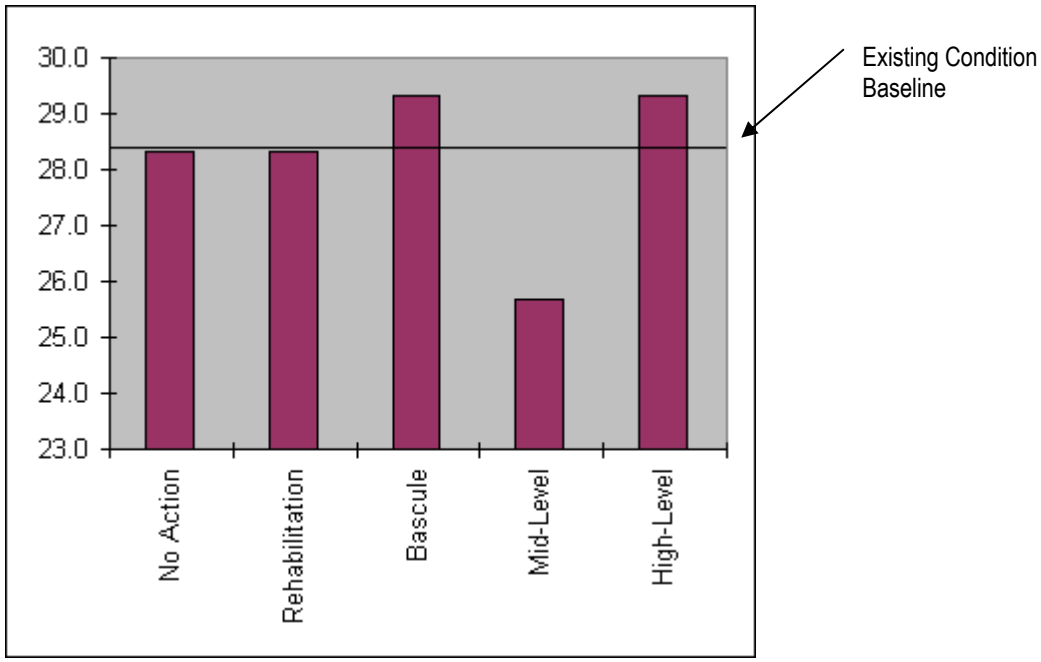
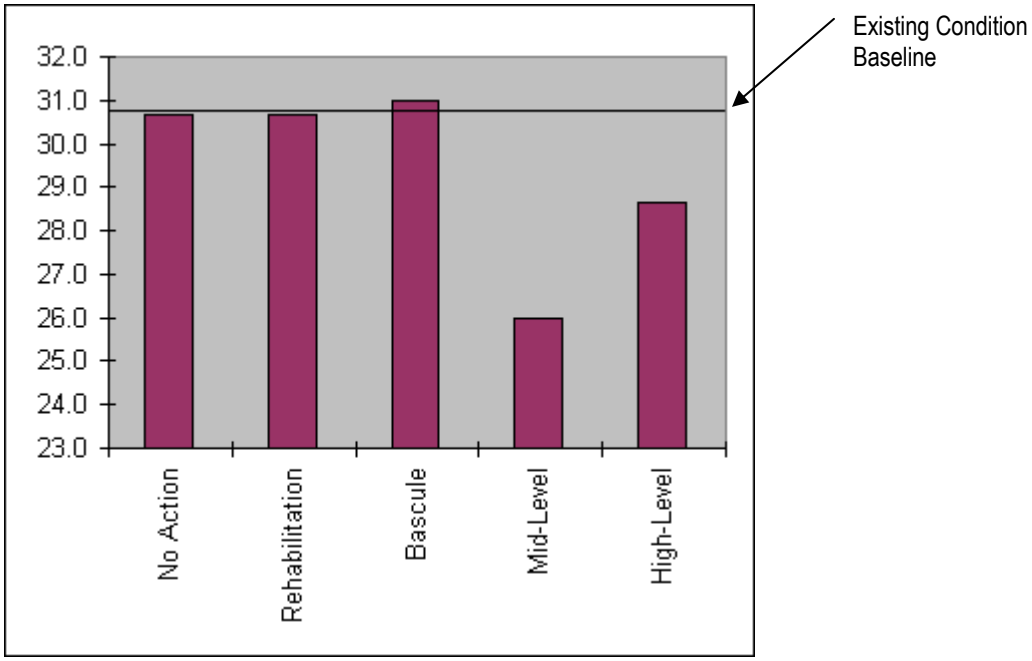


Table 10 Visual Analysis Matrix - Viewpoint C-2

Viewpoint: C-2, Marina Parking Lot View Position: Inferior		Existing		No Action	Rehabilitation	Bascule	Mid-Level	High-Level
Vividness *(Average of View Distance)*	Landform	5.7		5.3	5.7	5.7	5.0	5.7
	Waterform	6.7		6.3	6.7	6.7	5.7	5.3
	Vegetative	2.3		2.3	2.3	2.3	2.3	2.3
	Human-made	7.0		6.3	7.0	7.0	5.7	7.7
Intactness *(Average of View Distance)*	Development	4.0		4.3	4.0	4.0	3.3	3.0
	Encroachment	2.7		3.0	2.7	3.0	2.0	2.3
Unity *(Average of View Distance)*	Overall	2.3		3.0	2.3	2.3	2.0	2.3
Total Visual Quality		**30.7**		**30.7**	**30.7**	**31.0**	**26.0**	**28.7**



6.2.4 Business and Commercial District (Viewpoints D-1 and D-2)

No Action Alternative
Bridge demolition would allow views to and across the waterway. Bridge support demolition near the waterfront would introduce opportunities for public access. Please note that in the No Action Alternative, the bridge would be removed, and therefore, viewpoint D-2 would cease to exist.

Rehabilitation Alternative
Building demolition directly adjacent to the bridge would remove assorted fences, stored vehicles, and associated debris and tarps.

Bascule Bridge Alternative
Bridge demolition would allow views to the waterway. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects. Building demolition along 14th Avenue S. would be limited to a few buildings just beyond the apparent commercial business strip, and thus, their character and/or loss neither contributes nor detracts from the business area proper. The new bridge would assume an increased scale and contemporary style.

The Mid-Level Fixed-Span Bridge Alternative
Bridge demolition would allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects. Building demolition along 14th Avenue S. would expose adjacent homes to the view of the new bridge, associated ramps, the bicycle/pedestrian ramp at S. Orr Street and abutments. The bridge abutments and walls would partially obstruct views to and from remaining buildings along 14th Avenue S. The new bridge would assume an increased scale and contemporary style.

The High-Level Fixed-Span Bridge Alternative
Bridge demolition would allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects. Extensive commercial building demolition along both sides of 14th Avenue S. would fundamentally remove the apparent core of the South Park commercial district, leaving bridge ramps and abutments as a replacement. Extensive imposing bridge abutments and ramps would partially or completely obstruct views to and from remaining buildings further south along 14th Avenue S. The new bridge would assume an imposing scale and contemporary style.

Table 11 Visual Analysis Matrix - Viewpoint D-1

Viewpoint: D-1, Business/Commercial District View Position: Inferior		Existing		No Action	Rehabilitation	Bascule	Mid-Level	High-Level
Vividness *(Average of View Distance)*	Landform	1.7		3.0	1.7	1.7	2.3	0.7
	Waterform	0.0		1.0	0.0	0.0	0.0	0.0
	Vegetative	2.0		2.3	2.0	2.0	2.0	0.3
	Human-made	4.7		5.0	8.0	8.0	6.7	8.0
Intactness *(Average of View Distance)*	Development	2.7		3.0	2.7	2.7	2.0	1.0
	Encroachment	3.0		3.3	3.0	3.0	2.0	0.7
Unity *(Average of View Distance)*	Overall	1.3		1.7	1.3	1.3	0.7	0.7
Total Visual Quality		**15.3**		**19.3**	**18.7**	**18.7**	**15.7**	**11.3**

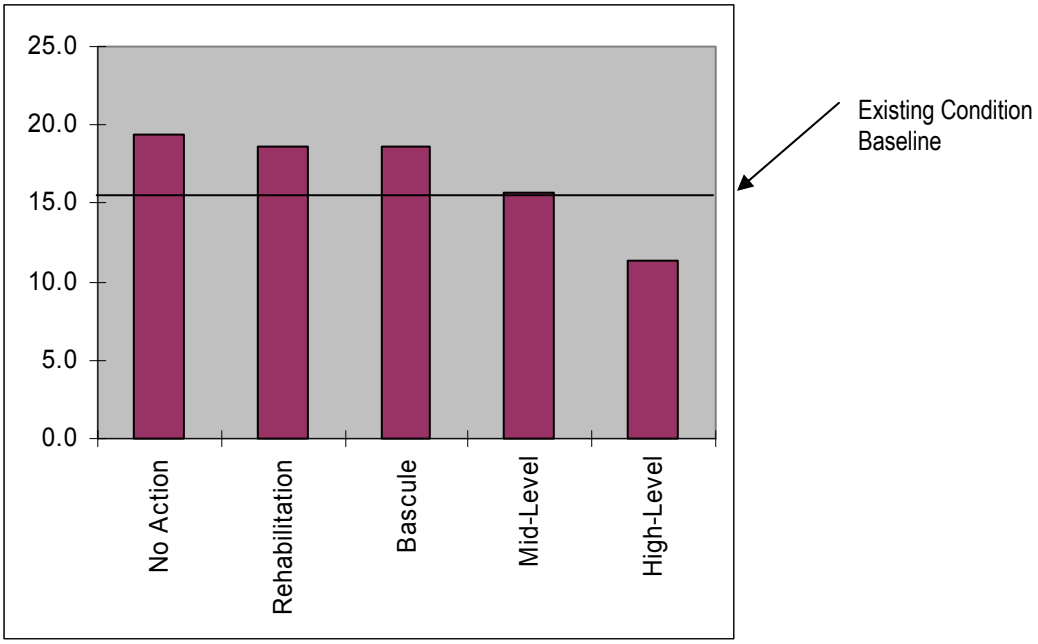
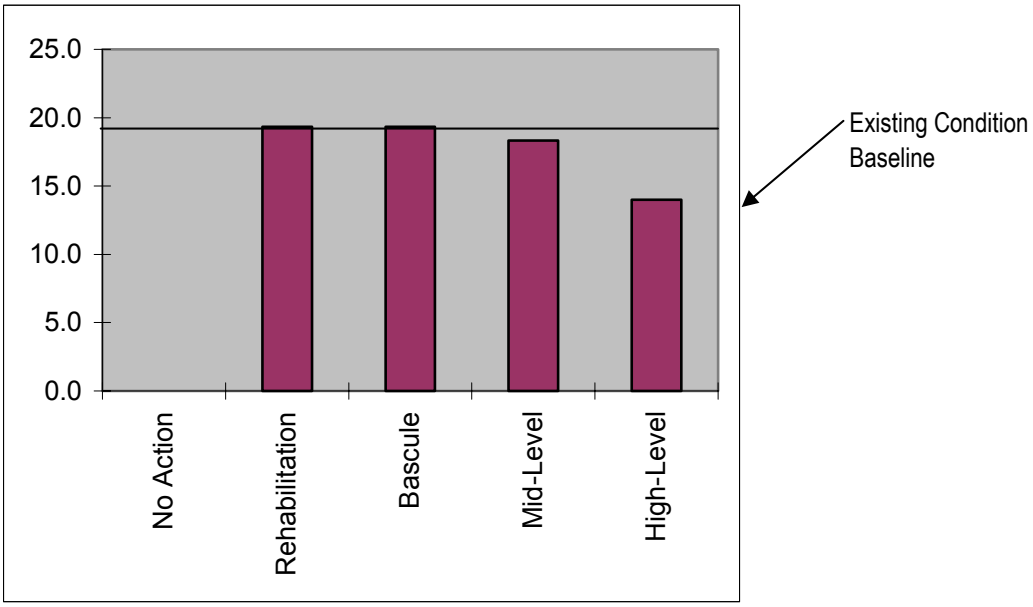


Table 12 Visual Analysis Matrix - Viewpoint D-2

Viewpoint: D-2, Motorist/Pedestrian Northbound View Position: Normal/Superior		Existing		No Action	Rehabilitation	Bascule	Mid-Level	High-Level
Vividness *(Average of View Distance)*	Landform	3.0		n/a	3.0	3.0	3.0	2.3
	Waterform	0.0		n/a	0.0	0.0	0.0	1.7
	Vegetative	2.0		n/a	2.0	2.0	2.0	0.7
	Human-made	5.7		n/a	5.7	5.7	7.0	8.3
Intactness *(Average of View Distance)*	Development	3.0		n/a	3.0	3.0	2.0	0.7
	Encroachment	4.3		n/a	4.3	4.3	3.3	0.0
Unity *(Average of View Distance)*	Overall	1.3		n/a	1.3	1.3	1.0	0.3
Total Visual Quality		**19.3**		**n/a**	**19.3**	**19.3**	**18.3**	**14.0**



6.2.5 Residential Neighborhood (Viewpoints E-1 and E-2)

No Action Alternative
Bridge demolition may allow views to and across the waterway. Bridge support demolition near the waterfront would introduce opportunities for public access.

Rehabilitation Alternative
Building demolition directly adjacent to the bridge would remove assorted fences, stored vehicles, and associated debris and tarps.

Bascule Bridge Alternative
Bridge demolition may allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access. Building demolition directly adjacent to the bridge would remove assorted fences, stored vehicles, and associated debris and tarps. Commercial building demolition along 14th Avenue S. would be limited to a few buildings now buffering the homes from views of the existing bridge and business district. Their industrial character detracts from the style of the immediately adjacent residential neighborhood, and their removal could be seen as an increase in unity. Intactness would decrease as the visual buffer of the homes from the bridge and business district disappears. The new bridge would assume a similar scale and style to the existing.

The Mid-Level Fixed-Span Bridge Alternative
Bridge demolition may allow views to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects. Building demolition directly adjacent to the bridge would remove assorted fences, stored vehicles, and associated debris and tarps. Commercial building demolition along 14th Avenue S. would remove many buildings now buffering the adjacent homes from views of the existing bridge and business district. Their cumulative character defines the style of the South Park commercial business district, and their removal would be seen as a decrease in unity. Intactness would also decrease as the visual buffer of the homes from the bridge and business district disappears. The new bridge would assume an increased scale and contemporary style.

The High-Level Fixed-Span Bridge Alternative
Bridge demolition combined with the height of the new bridge potentially opens views to and from the marina and to and across the waterway. Building demolition near the waterfront would introduce opportunities for public access and/or public area enhancement projects. Building demolition directly adjacent to the bridge would remove assorted fences, stored vehicles, and associated debris and tarps. Commercial building demolition along 14th Avenue S. would remove most of the vital restaurants and buildings currently serving the needs of the neighborhood, thereby eliminating the noontime bustle and lively character of "downtown" South Park. The cumulative character of these buildings defines the style of the South Park commercial business district, and their removal would be seen as a dramatic decrease in unity. Intactness would also decrease as the visual buffer of the homes from the bridge and business district disappears. The new bridge would assume an imposing scale and contemporary style.

Table 13 Visual Analysis Matrix - Viewpoint E-1

Viewpoint: E-1, Adjacent Residential Neighborhood View Position: Normal		Existing		No Action	Rehabilitation	Bascule	Mid-Level	High-Level
Vividness *(Average of View Distance)*	Landform	3.3		3.3	3.3	3.3	3.3	3.3
	Waterform	0.0		0.0	0.0	0.0	0.0	0.0
	Vegetative	6.0		6.0	6.0	6.0	6.0	6.0
	Human-made	7.0		6.3	7.0	7.0	6.3	6.7
Intactness *(Average of View Distance)*	Development	5.0		5.0	5.0	5.0	4.7	4.3
	Encroachment	5.3		4.7	5.3	4.7	4.7	3.3
Unity *(Average of View Distance)*	Overall	4.0		4.3	4.0	4.0	3.7	3.0
Total Visual Quality		**30.7**		**29.7**	**30.7**	**30.0**	**28.7**	**26.7**

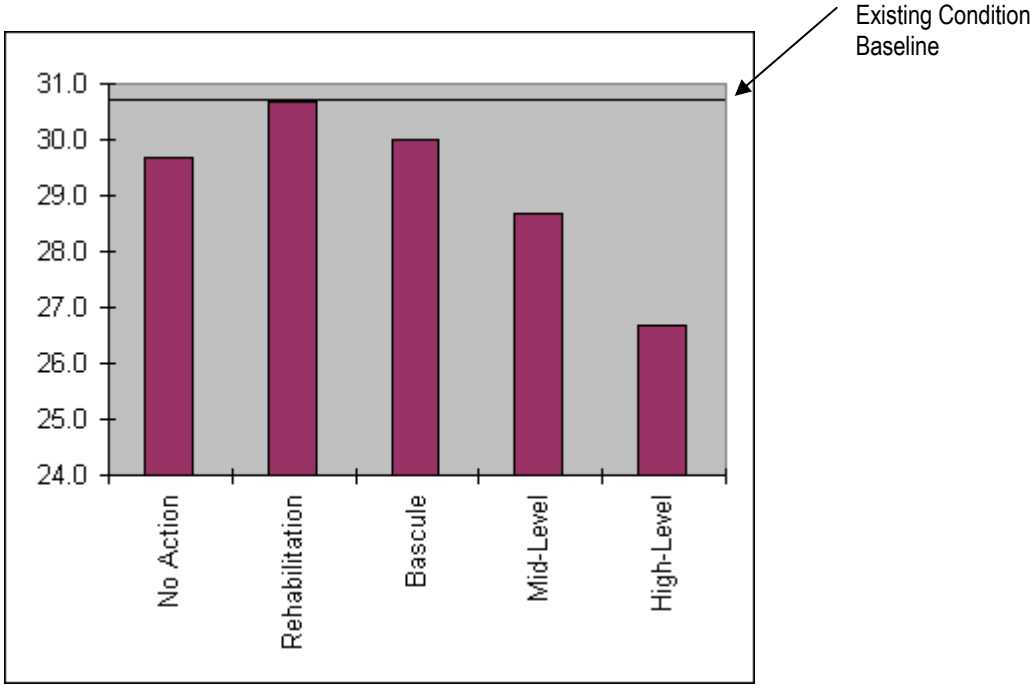
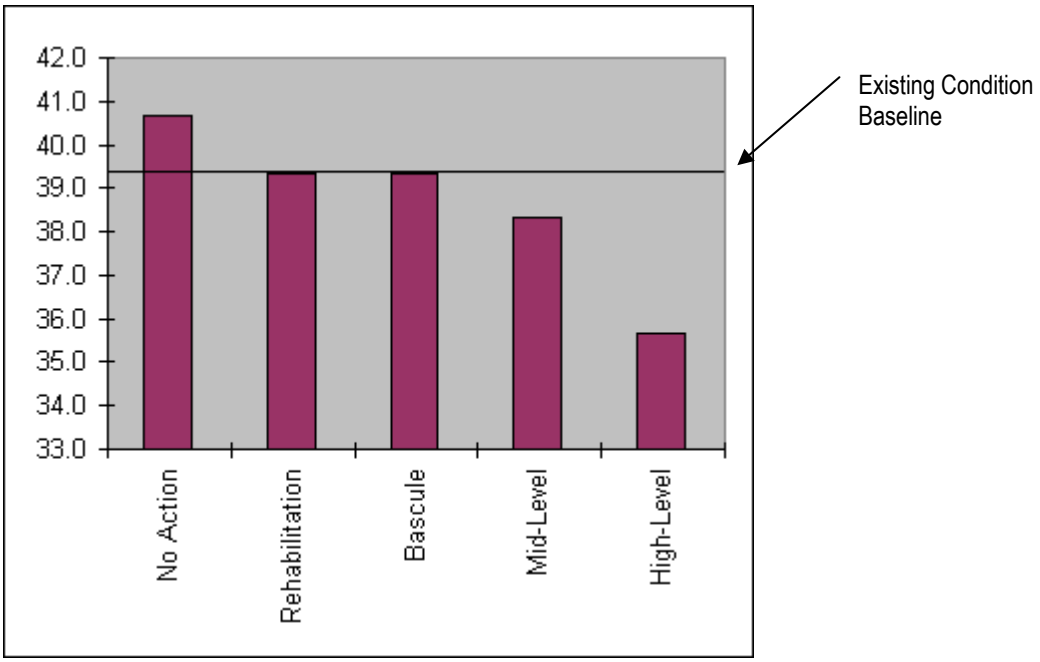


Table 14 Visual Analysis Matrix - Viewpoint E-2

Viewpoint: E-2, Duwamish Waterway Park View Position: Normal		Existing		No Action	Rehabilitation	Bascule	Mid-Level	High-Level
Vividness *(Average of View Distance)*	Landform	7.7		7.7	7.7	7.7	7.7	7.7
	Waterform	8.0		8.0	8.0	8.0	7.7	8.0
	Vegetative	8.0		8.0	8.0	8.0	8.0	8.0
	Human-made	4.3		4.7	4.3	4.3	4.0	3.0
Intactness *(Average of View Distance)*	Development	5.0		5.0	5.0	5.0	5.0	4.0
	Encroachment	3.0		3.7	3.0	3.0	3.3	2.3
Unity *(Average of View Distance)*	Overall	3.3		3.7	3.3	3.3	2.7	2.7
Total Visual Quality		**39.3**		**40.7**	**39.3**	**39.3**	**38.3**	**35.7**



6.3 Light and Glare

Light and glare would begin to affect viewers as soon as construction begins. Night security lighting at construction and staging areas would impact the adjacent commercial and small manufacturing areas and would also be visible to nearby residences. Directional lighting and screening could be used to limit light and glare for all of the alternatives.

No Action Alternative
Bridge demolition would probably occur during daylight hours. Stockpiled salvage material would require minimal security lighting. Once the bridge is removed, light and glare would be reduced.

Rehabilitation Alternative
Stockpiled construction material and machinery would require security lighting. Work performed at night, if necessary to minimize traffic interference (this is the only alternative in which the bridge would be closed for lengthy periods of time), would temporarily increase light and glare to adjacent commercial and residential areas, including the marina. No significant change in light and glare would result from the completed bridge.

Bascule Bridge Alternative
Building demolition along 14th Avenue S. would increase light and glare to the adjacent residential area. In order to avoid interference with traffic, some work could be performed at night. Night work would temporarily increase light and glare to adjacent commercial and residential areas, including the marina. Stockpiled construction material and machinery would require security lighting. New efficient bridge lighting could result in decreased light and glare to the nearby residences compared to existing overhead bridge lighting.

The Mid-Level Fixed-Span Bridge Alternative
Building demolition along 14th Avenue S. would increase light and glare to the adjacent residential areas from 14th Avenue S. due to the loss of the two story commercial buildings lining both sides of the street. In order to avoid interference with traffic, work could be performed at night. Night work would temporarily increase light and glare to adjacent commercial and residential areas, including the marina. Stockpiled construction material and machinery would require security lighting. New efficient bridge lighting could result in decreased light and glare compared to existing overhead bridge lighting. Abutments would create dark areas between the bridge and remaining commercial establishments, requiring mitigation lighting that could in turn increase light and glare to the adjacent residential areas. The new S. Orr Street dead-end created by the pedestrian and bicycle ramp could increase headlight glare from u-turning vehicles. Accessible bridge support areas could require long-term security lighting, increasing light and glare into the marina and adjacent industrial area.

The High-Level Fixed-Span Bridge Alternative
Building demolition along 14th Avenue S. would increase light and glare to extended adjacent residential areas. In order to avoid interference with traffic, work could be completed at night. Night work would temporarily increase light and glare to adjacent

commercial and residential areas, including the marina. Large amounts of stockpiled construction material and machinery would require security lighting. New efficient bridge lighting could result in decreased light and glare compared to existing overhead bridge lighting. Extensive abutments would create dark corridors between the bridge and commercial establishments, requiring mitigation lighting that in turn could increase light and glare to the adjacent residential areas. The new S. Donovan Street dead-ends could increase headlight glare from u-turning vehicles. Increased bus and truck traffic through residential areas could increase light and glare from vehicle headlights. Accessible bridge support areas could require security lighting, increasing light and glare into the marina and adjacent industrial area. Warning lights for the nearby airfield may be needed at the high point.

6.4 Visual Impacts During Construction and Demolition

All of the alternatives would result in temporary visual impacts to the South Park neighborhood during the construction phase. Whether these impacts are seen as positive or negative depend somewhat upon one's personal interest and attitudes toward the construction activities occurring on any given day. Watching pile driving progress could be fascinating to nearby industrial workers, but the reminder of a constant annoyance to a nearby daycare provider. Just the opposite could as easily be true.

Best Management Practices (BMP's) and construction mitigation requirements relative to erosion control, habitat restoration, historic resources, utility relocations, etc, could result in temporary visual impacts during construction. Thus, even the No Action Alternative, which includes demolition of the bridge, would have considerable visual impacts. Removal of the bridge would require less time than the rehabilitation and replacement bridge alternatives. All of the alternatives would require temporary fencing and signage for traffic revisions and buildings. Due to soil testing and sorting of recyclable building debris, all alternatives could result in temporary on-site stockpiles. The historic brick road is designated to be the staging area for all of the alternatives and may not survive construction activities in its existing location.

In addition to the visual impacts common to all the alternatives, individual differences on visual impact vary dramatically from alternative to alternative.

6.4.1 No Action Alternative

Removal of the bridge would create dust and would result in a temporary influx of vehicles, debris piles, dumpsters, fencing, signage and other construction-related equipment.

6.4.2 Rehabilitation Alternative

The Rehabilitation Alternative would cause the least visual impact, as the work would be confined to the existing bridge alignment plus some adjacent staging areas. However, due to the bridge closure, impact would be felt longer than with new bridge construction. Approximately two buildings would be demolished during construction, immediately west of the existing bridge. Construction signing, new traffic patterns, and detour signs throughout the area would be apparent to viewer groups as they

approach the bridge. Trucks, workers, and stockpiled materials would be visible from all districts. Barges, cranes, and work occurring at the water line would be visible from the marina, to some Boeing workers, and from selected residential areas.

6.4.3 Bascule Bridge Alternative

Approximately five buildings would be demolished during construction of the Bascule Bridge. If hazardous waste is found during building demolition, this alternative could result in on-site stockpiled material during construction while testing is performed.[24] Fencing, barricades, and detour signage would have less visual impact because motorists would continue to use the existing bridge. Trucks, workers, and stockpiled materials would be visible from all districts. Barges, cranes, and work occurring at the water line would be visible from the marina, to some Boeing workers, and from selected residential areas.

6.4.4 Mid-Level Fixed-Span Bridge Alternative

Approximately twelve buildings would be demolished along 14th Avenue S during construction of the Mid-Level Fixed-Span Bridge. If hazardous waste is found during building demolition, this alternative could result in lengthy views of on-site stockpiles while testing is performed. Construction would continue in a similar fashion to the Bascule Bridge Alternative, except that fencing, barricades, and detour signage would extend farther south along 14th Avenue S. Trucks, workers, and stockpiled materials would be visible from all districts. Barges, cranes, and work occurring at the water line would be visible from the marina, to some Boeing workers, and from selected residential areas.

6.4.5 High-Level Fixed-Span Bridge Alternative

Approximately thirty-four buildings would be demolished during construction of the High-Level Fixed-Span Bridge. These include all buildings all along 14th Avenue S. to just beyond S. Trenton Street. In addition, clearing of several residences would occur in the vicinity of S. Trenton Street and S. 12th Avenue S. to accommodate permanent traffic revisions. Because so much demolition will occur, hazardous wastes are more likely to be found. Therefore, this alternative could result in the largest quantity of on-site stockpiled material awaiting test results prior to disposal. Construction would continue in a similar fashion to the Mid-Level Fixed-Span Bridge Alternative, except that construction fencing, barricades, and signage for detours and businesses would be visible in an extended area. Trucks, workers, and stockpiled materials would be visible from all districts. Barges, cranes, and work occurring at the water line would be visible from the marina, to some Boeing workers, and from selected residential areas.

6.5 Secondary Impacts

Several buildings are clearly in the path of the new bridge alignment and would be removed in all three replacement bridge alternatives. A few buildings on 14th Avenue S.

[24] *South Park Bridge Project: Hazardous Materials Technical Report*; Prepared for King County; February 2004.

would lose their street access and visibility. Others would lose parking lots or on-street parking upon which their patrons rely. The removal of existing buildings has the immediate effect of creating "open space" in the form of vacant lots. A few residences north of S. Cloverdale Street could gain temporary waterway views, until rebuilding occurs on the vacated lots. The secondary effects occur as the area begins rebuilding.

Government property acquired during the construction process could become available for public open space. More likely, however, it would be sold to private developers in order to offset acquisition/condemnation costs. Buildable parcels would probably be sold at market value. Developers able to purchase multiple parcels may aggregate small lots to build new commercial or residential complexes. Existing buildings that have lost access may take advantage of vacant lots to provide alternate access points. Non-marketable areas without sensitive area issues would then be the most likely parcels to become public access open space.

Some of the resulting vacant land in each alternative is waterfront, and thus could be subject to shoreline regulations.[25] The shoreline and its buffer could potentially be set aside entirely for sensitive area mitigation. Most likely, the newly cleared area would become public access, park, or recreation land, incorporating all of the various types of mitigation that may be required.

Major secondary effects could result from lengthy closure of the bridge. (In the case of the No Action Alternative, these effects could be permanent.) Many businesses (especially restaurants) depend on the lunchtime crowd crossing the bridge from Boeing. When the bridge is reopened, many small businesses may no longer remain along 14th Avenue S., and the vitality of the downtown area could be substantially diminished. In any case, closure of the bridge would cause the neighborhood to become more self-contained. This would lead to a mix of residential and neighborhood retail uses consistent with existing zoning, along with commercial and industrial uses that are not dependent on the bridge. [26]

6.5.1 No Action Alternative

No Action Alternative offers the greatest potential for creating open space and public access to the Duwamish Waterway on the north and south banks where the existing bridge would be removed, which lies mostly within the designated shoreline. Secondary changes, therefore, would be subject to shoreline regulations which limit building and paving. Overall, this alternative could result in greatly increased intactness by restricting encroachment.

6.5.2 Rehabilitation Alternative

The Rehabilitation Alternative would result in a variety of secondary visual changes. Buildings demolished for construction access would result in some property available to

[25] South Park Bridge Project: Fish, Vegetation and Wildlife Technical Report; Prepared for King County; February 2004.

[26] South Park Bridge Project; Land Use Technical Report; Prepared for King County; February 2004.

be developed as public access areas. Major secondary effects could result from lengthy closure of the bridge. By the time the bridge is reopened, many small businesses could have failed, or changed location, and the vitality of the downtown area could be substantially diminished.

6.5.3 Bascule Bridge Alternative

The historic character of the new Bascule Bridge and realignment of 14th Avenue S. (and probable streetscape improvements) could potentially inspire local businesses to restore facades to match the historic character of the new "old" bridge. In contrast, new development replacing the tavern and marine businesses could result in modernization. New development between Dallas Avenue S. and the waterway would likely result in a general tidying up of the north end of the commercial business area.

6.5.4 Mid-Level Fixed-Span Bridge Alternative

New development replacing the existing buildings could result in redevelopment of a significant portion of the north end of the commercial business area. Property could be combined to provide access, parking, or to create larger, more viable sites. The new bridge could potentially be more contemporary in design. Without the character of the existing historic bridge to set a standard, future developers would be less inspired to continue the historic theme. New development between S. Cloverdale Street and the waterway could result in a general modernization of the north end, decreasing unity with the existing commercial area.

Some of the block between S. Donovan Street and S. Cloverdale Street would be flanked by bridge ramp abutments. This would reduce visibility and create inconvenient access to those affected businesses. Litter, grime, and graffiti could become problematic, eventually resulting in a "run-down" appearance at the entry to these buildings. Some businesses unable to respond to the marketing challenges presented by the loss of visibility and high maintenance of their entry areas would be more likely to relocate to less challenging sites.

6.5.5 High-Level Fixed-Span Bridge Alternative

In the case of the High-Level Fixed-Span Bridge Alternative, where so many buildings along 14th Avenue S. would be removed, many vintage buildings would be replaced by new construction. As with the Mid-Level Bridge alternative, property could be combined to provide access, parking, or to create larger, more viable sites. Since the High-Level Fixed-Span Bridge could potentially be a contemporary style, and many older buildings will be removed, future developers could be less inspired to continue the historic theme. New development would very likely result in decreasing unity with the existing commercial area.

The block between S. Donovan Street and S. Trenton Street would be flanked by bridge ramp abutments. This would reduce visibility and create inconvenient access to those affected businesses. Litter, grime, and graffiti could become problematic, eventually resulting in a "run-down" appearance at the entry to these buildings. Some businesses unable to respond to the marketing challenges presented by the loss of visibility and high maintenance of their entry areas would be more likely to relocate to less challenging sites.

Chapter 7 Strategies for Mitigation

7.1 Mitigation for Direct Impacts

Visual mitigation measures may be required no matter which alternative is selected. A number of design options and enhancements exist to mitigate visual impacts.

7.1.1 All Alternatives

- Public interpretive signs could be placed to record and identify the historical significance of the (former) bridge and affected properties.[27]
- Notable features of the bridge could be salvaged (including the Scherzer rolling lift mechanism).
- New access areas, bus shelters or pullouts, and street landscaping would be needed to enhance access to an attractive retail area.
- Potential land use actions should consider future public recreation and shoreline access opportunities.
- Retaining walls may be installed to contain new fill.
- Undergrounding of some utilities may be considered if upgrades are made.

7.1.2 The No Action Alternative

All of the above mitigation plus:

- Supplement proposed planting on east side of the old bridge location to create a visual screen and buffer for the marina.

7.1.3 The Rehabilitation Alternative

All of the above mitigation.

7.1.4 The Bascule Bridge Alternative

All of the above mitigation plus:

- Mitigation for the loss of substrate would involve the installation of natural soils where hardened substrates exist. It would also require planting of native riparian vegetation along the shore of the Duwamish Waterway. This could significantly alter the appearance of the shoreline, which is dominated by nearby industrial complexes.[28]

[27] *South Park Bridge Project: Cultural and Historical Technical Report*; Prepared for King County; February 2004.

[28] *South Park Bridge Project: Fish, Wildlife & Vegetation Technical Report*; Prepared for King County; February 2004.

- Develop a public riverfront access point next to the new bridge. Maintain view of the waterway and marina from the commercial area.

- Salvage bricks from the Red Brick Road to be used in a new location or to repair similar roads in the area.

- Enhance the visual quality for users of the pedestrian/bicycle path by extending historic lighting fixtures used on the new bridge into the commercial area. Continue the historic theme design, including lighting, site furnishings, landscaping, etc., into open spaces created by demolition of existing industrial buildings.

- To reduce mass and scale of abutment walls and discourage graffiti, consider design treatment such as rustication forms for texture or relief, promoting community-oriented murals, or creating small planting strips directly adjacent to the walls.

- Refer to *Seattle's Comprehensive Plan* and the *South Park Residential Urban Village Plan* for landscaping enhancement concepts for the commercial business area. Streetscape improvements (vegetation) at either ramp end might mitigate the increased quantity of pavement.

7.1.5 The Mid-Level Fixed-Span Bridge

All of the above mitigation plus:

- Develop a landscaping strip between the residential street ends and the bridge to minimize headlight glare from u-turns and to reduce windblown particulates in the area.

- Consider visual mitigation from as far as two blocks away from the actual proposed bridge rehabilitation area.

- Create a landscape planting strip sufficient in size to accommodate trees adjacent to new retaining wall/abutments, pedestrian ramp, and piers. Plant trees, shrubs, and vines to soften the visual appearance of the wall and provide visual screening or enhancement for affected buildings.

- Restore landscaping disturbed by the construction of the S. Cloverdale Street intersection and introduce landscaping along 14th Avenue S. extending north from the intersection.

7.1.6 The High-Level Fixed-Span Bridge

All of the above mitigation plus:

- Restore landscaping disturbed by the construction of the S. Cloverdale Street intersection and introduce landscaping along 14th Avenue S. extending south from the intersection. Restore landscaping at affected residential properties along 12th Avenue S. and S. Trenton Street.

7.2 Mitigation for Secondary Impacts

Once an alternative is selected and the acquisition parcels are identified, the South Park community has the opportunity to revisit the Residential Urban Village Plan with regard to enhancement of this area. The plan may need to be adjusted to accommodate the bridge and/or road alignment changes. A community outreach program could be implemented to solicit community input regarding post-construction site restoration and enhancement. Some areas may remain in the public domain and could therefore be potential open space or public access sites. Careful advance planning would ensure that future public recreation and shoreline access opportunities are not overlooked by hasty placement of off-street parking lots, private development, or new industrial warehouses.

7.2.1 The No Action Alternative

- Acquire property or easements for new or expanded public waterfront access.

7.2.2 The Rehabilitation Alternative

- This alternative would provide opportunity for continuing "historic" detailing throughout the nearby community public spaces.

7.2.3 The Bascule Bridge Alternative

All of the above mitigation plus:

- Implement street tree planting.
- Develop open space in areas that remain in the public domain.
- Protect waterfront views by enforcing zoning codes and regulations during permitting of new and remodel construction. Establish view corridors.
- Provisions should be made for replacement bus shelters or pullouts, street trees, and other amenities to create an attractive and accessible environment.

7.2.4 The Mid-Level Fixed-Span Bridge

All of the above mitigation.

7.2.5 The High-Level Fixed-Span Bridge

All of the above mitigation.

7.3 Mitigation for Construction Impacts

Minimizing visual impacts of construction for all alternatives would require mitigating for many visual challenges. Signage and other information would be provided to direct traffic to detour routes and indicate that businesses are open. All alternatives would require restoration and re-vegetation of the natural riparian habitat, thereby introducing trucks and stockpiled landscape material. Silt fences, straw bales, ditches, berms, sedimentation ponds, honey buckets, construction access roads and tire washing facilities would all be in place for

the duration of construction. Temporary screens or curtains may surround stationary equipment.

Piles of stockpiled soil and building debris must remain on site until testing is complete and determination is made for its proper disposal. Efficient and timely testing could limit the time the stockpiles remain on site. Efficient separation and access to recyclable building debris could also decrease the quantity of material stockpiled on site at any given time.[29]

Staging areas for all alternatives would require restoration.

7.3.1 The No Action Alternative

- Restoration of natural riverine habitat would be required to mitigate for lost habitat or lost habitat functions during bridge removal. Restoration of river and riparian substrates would also occur at this time.

- Post signage indicating that revegetation in disturbed areas is planned but would occur after bridge construction is completed.

- Indicate, with signage, the extent of rehabilitation and enhancement to the neighborhood and streetscape that would occur as an integral part of the bridge construction.

- Use directional spot lights (not flood lights) for security at staging areas.

- Remove and stockpile brick road for possible reuse.

- Screen staging and storage areas adjacent to residences and buildings with temporary screened fences.

- Ensure that the entire project site, including barges, fences, storage areas, and miscellaneous equipment are maintained and tidy throughout construction.

7.3.2 The Rehabilitation Alternative

All of the above mitigation, plus:

- New riparian and/or shallow water habitat would be required immediately downstream from the bridge on the left bank of the Duwamish Waterway.

7.3.3 The Bascule Bridge Alternative

All of the above mitigation, plus:

- Minimize impacts of construction-related demolition, clearing, and grading by phasing ramp construction to allow existing businesses to operate normally as long as possible.

[29] *South Park Bridge Project: Hazardous Materials Technical Report*; Prepared for King County; February 2004.

7.3.4 The Mid-Level Fixed-Span Bridge

All of the above mitigation, but extended farther south along 14th Avenue S. to South Cloverdale Street (see Figure 14).

7.3.5 The High-Level Fixed-Span Bridge

All of the above mitigation, but extended farther south along 14th Avenue S. to South Trenton Street, as well as along 12th Avenue S. south of S. Donovan Street where it would connect to S. Trenton Street (see Figure 14).

7.4 Conclusion

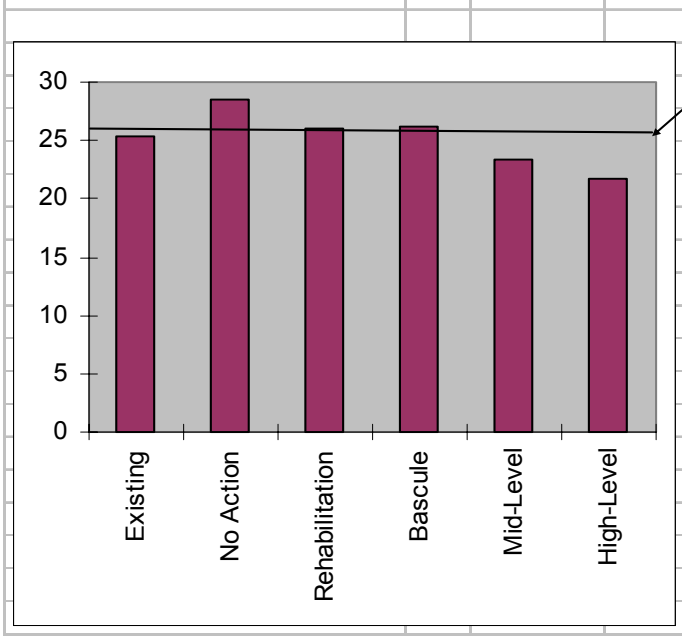
In comparison to the existing condition, the Rehabilitation and Bascule Bridge Alternatives would have the least visual impact for the South Park community. The visual impact for both are not statistically significant. Table 15 illustrates the average change in visual impact for each of the five alternatives, from the various viewpoints in comparison to the baseline of existing conditions.

The No-Action Alternative, which ultimately results in removal of the bridge, would provide generous open space suitable for public access to both sides of the waterway, and would require the least mitigation. Visually, No-Action would have a positive impact. The Mid-Level Fixed-Span Bridge and the High-Level Fixed-Span Bridge would have a negative visual impact upon the adjacent neighborhood, as shown by significantly lower visual quality ratings for those alternatives.

In addition to a statistically neutral visual impact upon the South Park community, the Rehabilitation and Bascule Bridge alternatives would have a scale similar to the existing bridge, historic themed detailing consistent with the local neighborhood and would also provide opportunity for developing public access to the waterway. The Bascule Bridge also has the advantage of not requiring as extensive construction mitigation as the Rehabilitation Alternative, and avoids impacts resulting from bridge construction. For these reasons, the Bascule Bridge Alternative offers the greatest opportunity for creating a positive visual impact upon the South Park community.

Table 15 Overall Comparison of the Visual Impacts of the Project Alternatives

Visual Quality Comparison	Existing	No Action	Rehabilitation	Bascule	Mid-Level	High-Level
A-1 (average visual quality)	*22.1*	*27.3*	*23.5*	*23.5*	*21.1*	*15.8*
A-2 (average visual quality)	*20.7*	*n/a*	*21.3*	*22*	*18.3*	*14*
B-1 (average visual quality)	*22*	*23.3*	*22*	*22*	*18.7*	*19.7*
C-1 (average visual quality)	*28.3*	*28.3*	*28.3*	*29.3*	*25.7*	*29.3*
C-2 (average visual quality)	*30.7*	*30.7*	*30.7*	*31*	*26*	*28.7*
D-1 (average visual quality)	*15.3*	*19.3*	*18.7*	*18.7*	*15.7*	*11.3*
D-2 (average visual quality)	*19.3*	*n/a*	*19.3*	*19.3*	*18.3*	*14*
E-1 (average visual quality)	*30.7*	*29.7*	*30.7*	*30*	*28.7*	*26.7*
E-2 (average visual quality)	*39.3*	*40.7*	*39.3*	*39.3*	*38.3*	*35.7*
Overall Average Visual Quality	25.4	28.5	26.0	26.1	23.4	21.7
Average Change in Visual Quality	0.0	3.1	0.6	0.7	-2.0	-3.7



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Appendix A Evaluation Matrices - Direct Impacts

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Evaluation Matrices - Direct Impacts

EVALUATION SCALE				
SCALE	**VIVIDNESS**	**INTACTNESS**		**UNITY**
		HUMAN-MADE DEVELOPMENT	*NATURAL ENVIRONMENT*	
10	Very High	No Development	Very High, No Encroachment	Very High
9	High	Little Development	High, Little Encroachment	High
7, 8	Moderately High	Some Development	Moderately High, Some Encroachment	Moderately High
4, 5, 6	Average	Average Level of Development	Average, Average Level of Encroachment	Average
2, 3	Moderately Low	Moderately High Level of Development	Moderately Low, High Level of Encroachment	Moderately Low
1	Low	High Level of Development	Low, High Level of Encroachment	Low
0	Very Low	Very High Level of Development	Very Low, Very High Level of Encroachment	Very Low
-	Not Present or Visible	Not Present or Visible	Not Present or Visible	Not Present or Visible

DEFINITIONS

VIEW DISTANCE

Foreground	¼ mile
Middleground	¼ - 3 miles
Background	Beyond 3 miles

VIEWSHED

Viewshed:	All surface area visible from an observer's viewpoint

VIEWER POSITION

S	Superior or viewer positioned above highway
N	Normal or viewer positioned at level of highway
I	Inferior or viewer positioned below level of highway

Evaluation Matrices - Direct Impacts

Direct Impacts: No Action Alternative

Viewshed	VIVIDNESS												INTACTNESS						UNITY						AVERAGES
	I				II				III				I		II		III		I		II		III		
	FOREGROUND				MIDDLEGROUND				BACKGROUND				FORE		MIDDLE		BACK		FORE		MIDDLE		BACK		
	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	
A-1, Motorist Southbound, N	7	7	2	3	6	7	1	4	5	7	2	6	4	5	3	2	2	1	6	4	4	2	2	2	
Average	4.75				4.50				5.00				4.50		2.50		1.50		5.00		3.00		2.00		3.64
A-2, Pedestrian Southbound, S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Average	0				0				0				0		0		0		0		0		0		0.00
B-1, Adjacent Industrial District, I	2	3	2	5	3	2	2	6	4	2	2	8	4	3	4	3	4	5	4	3	3	2	2	1	
Average	3.00				3.25				4.00				3.50		3.50		4.50		3.50		2.50		1.50		3.25
C-1, Duwamish Waterway, I	6	6	3	5	8	8	2	4	7	7	2	7	4	3	4	1	3	1	5	3	4	1	2	0	
Average	5.00				5.50				5.75				3.50		2.50		2.00		4.00		2.50		1.00		3.53
C-2, Marina Parking Lot, I	4	5	3	7	5	6	2	5	7	8	2	7	3	3	5	4	5	2	2	3	6	5	4	1	
Average	4.75				4.50				6.00				3.00		4.50		3.50		2.50		5.50		2.50		4.08
D-1, Business/CommercialDistrict, I	3	1	2	5	4	2	2	5	2	0	3	5	2	3	4	4	3	3	3	1	5	3	2	1	
Average	2.75				3.25				2.50				2.50		4.00		3.00		2.00		4.00		1.50		2.83
D-2, Motorist/Pedestrian Northbound, N/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Average	0				0				0				0		0		0		0		0		0		0.00
E-1, Adjacent Residential District, N	3	0	5	6	4	0	6	7	3	0	7	6	5	5	5	5	5	4	5	5	4	4	5	4	
Average	3.50				4.25				4.00				5.00		5.00		4.50		5.00		4.00		4.50		4.42
E-2, Duwamish Waterway Park, N	8	7	9	3	8	8	8	4	7	9	7	7	7	5	5	3	3	3	6	5	4	4	3	2	
Average	6.75				7.00				7.50				6.00		4.00		3.00		5.50		4.00		2.50		5.14

Evaluation Matrices - Direct Impacts

Direct Impacts: Rehabilitation Alternative

Viewshed	VIVIDNESS												INTACTNESS						UNITY						AVERAGES
	I				II				III				I		II		III		I		II		III		
	FOREGROUND				MIDDLEGROUND				BACKGROUND				FORE		MIDDLE		BACK		FORE		MIDDLE		BACK		
	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	
A-1, Motorist Southbound, N	1	3	2	9	3	5	3	8	4	7	3	7	2	1	2	2	2	1	1	1	2	2	3	3	
Average	3.75				4.75				5.25				1.5		2		1.5		1		2		3		2.75
A-2, Pedestrian Southbound, S	3	3	0	8	4	7	1	7	5	7	2	6	1	1	2	1	2	1	0	0	1	1	2	2	
Average	3.50				4.75				5.00				1.00		1.50		1.50		0.00		1.00		2.00		2.25
B-1, Adjacent Industrial District, I	2	2	2	7	3	2	2	7	4	2	2	8	3	2	3	3	4	5	3	1	2	1	2	1	
Average	3.25				3.50				4.00				2.50		3.00		4.50		2.00		1.50		1.50		2.86
C-1, Duwamish Waterway, I	6	8	3	3	8	8	2	4	7	7	2	7	5	1	4	1	3	1	7	4	4	1	2	0	
Average	5.00				5.50				5.75				3.00		2.50		2.00		5.50		2.50		1.00		3.64
C-2, Marina Parking Lot, I	4	5	3	7	6	7	2	7	7	8	2	7	3	3	4	3	5	2	2	3	3	3	4	1	
Average	4.75				5.50				6.00				3.00		3.50		3.50		2.50		3.00		2.50		3.81
D-1, Business/CommercialDistrict, I	1	0	1	9	2	0	2	8	2	0	3	7	2	3	3	3	3	3	3	1	2	2	2	1	
Average	2.75				3.00				3.00				2.50		3.00		3.00		2.00		2.00		1.50		2.53
D-2, Motorist/Pedestrian Northbound, N/S	1	0	1	4	2	0	2	5	6	0	3	8	2	3	3	3	4	7	3	1	2	2	2	1	
Average	1.50				2.25				4.25				2.50		3.00		5.50		2.00		2.00		1.50		2.72
E-1, Adjacent Residential District, N	3	0	5	6	4	0	6	7	3	0	7	8	5	5	5	5	5	6	5	5	4	4	3	3	
Average	3.50				4.25				4.50				5.00		5.00		5.50		5.00		4.00		3.00		4.42
E-2, Duwamish Waterway Park, I	8	7	9	3	8	8	8	4	7	9	7	6	7	5	5	3	3	1	6	5	4	4	2	1	
Average	6.75				7.00				7.25				6.00		4.00		2.00		5.50		4.00		1.50		4.89

Direct Impacts: Bascule Bridge Alternative

Viewshed	VIVIDNESS												INTACTNESS						UNITY						AVERAGES
	I				II				III				I		II		III		I		II		III		
	FOREGROUND				MIDDLEGROUND				BACKGROUND				FORE		MIDDLE		BACK		FORE		MIDDLE		BACK		
	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	
A-1, Motorist Southbound, N	1	3	2	9	3	5	3	8	4	7	3	7	2	1	2	2	2	1	1	1	3	2	3	3	
Average	3.75				4.75				5.25				1.5		2		1.5		1		2.5		3		2.81
A-2, Pedestrian Southbound, S	3	3	0	8	4	7	1	7	5	7	2	6	1	1	2	1	2	1	0	0	3	3	2	2	
Average	3.50				4.75				5.00				1.00		1.50		1.50		0.00		3.00		2.00		2.47
B-1, Adjacent Industrial District, I	2	2	2	7	3	2	2	7	4	2	2	8	3	2	3	3	4	5	3	1	2	1	2	1	
Average	3.25				3.50				4.00				2.50		3.00		4.50		2.00		1.50		1.50		2.86
C-1, Duwamish Waterway, I	6	8	3	3	8	8	2	4	7	7	2	7	5	4	4	1	3	1	7	4	4	1	2	0	
Average	5.00				5.50				5.75				4.50		2.50		2.00		5.50		2.50		1.00		3.81
C-2, Marina Parking Lot, I	4	5	3	7	6	7	2	7	7	8	2	7	3	5	4	3	5	2	2	3	3	3	4	1	
Average	4.75				5.50				6.00				4.00		3.50		3.50		2.50		3.00		2.50		3.92
D-1, Business/CommercialDistrict, I	1	0	1	9	2	0	2	8	2	0	3	7	2	3	3	3	3	3	3	1	3	2	2	1	
Average	2.75				3.00				3.00				2.50		3.00		3.00		2.00		2.50		1.50		2.58
D-2, Motorist/Pedestrian Northbound, N/S	1	0	1	4	2	0	2	5	6	0	3	8	2	3	3	3	4	7	3	1	2	2	2	1	
Average	1.50				2.25				4.25				2.50		3.00		5.50		2.00		2.00		1.50		2.72
E-1, Adjacent Residential District, N	3	0	5	6	4	0	6	7	3	0	7	8	5	3	5	5	5	6	5	5	4	4	3	3	
Average	3.50				4.25				4.50				4.00		5.00		5.50		5.00		4.00		3.00		4.31
E-2, Duwamish Waterway Park,N	8	7	9	3	8	8	8	4	7	9	7	6	7	5	5	3	3	1	6	5	4	4	2	1	
Average	6.75				7.00				7.25				6.00		4.00		2.00		5.50		4.00		1.50		4.89

Direct Impacts: Mid-Level Fixed-Span Bridge Alternative

Viewshed	VIVIDNESS												INTACTNESS						UNITY						AVERAGES
	I				II				III				I		II		III		I		II		III		
	FOREGROUND				MIDDLEGROUND				BACKGROUND				FORE		MIDDLE		BACK		FORE		MIDDLE		BACK		
	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	
A-1, Motorist Southbound, N	1	2	2	7	3	4	3	8	4	6	3	7	2	1	2	1	2	1	1	1	2	2	3	2	
Average	3				4.5				5				1.5		1.5		1.5		1		2		2.5		2.50
A-2, Pedestrian Southbound, S	2	2	0	5	3	5	1	6	5	7	2	6	1	1	1	1	2	1	0	1	1	1	2	2	
Average	2.25				3.75				5.00				1.00		1.00		1.50		0.50		1.00		2.00		2.00
B-1, Adjacent Industrial District, I	2	2	2	5	3	2	2	5	4	2	2	6	2	1	2	2	4	5	1	1	1	1	1	1	
Average	2.75				3.00				3.50				1.50		2.00		4.50		1.00		1.00		1.00		2.25
C-1, Duwamish Waterway, I	6	8	3	3	6	6	2	3	7	7	2	7	3	1	3	1	3	1	5	4	3	1	2	0	
Average	5.00				4.25				5.75				2.00		2.00		2.00		4.50		2.00		1.00		3.17
C-2, Marina Parking Lot, I	4	5	3	7	5	6	2	5	6	6	2	5	3	3	3	2	4	1	2	2	2	2	2	2	
Average	4.75				4.50				4.75				3.00		2.50		2.50		2.00		2.00		2.00		3.11
D-1, Business/CommercialDistrict, I	3	0	1	7	2	0	2	6	2	0	3	7	1	1	2	2	3	3	2	0	1	1	2	1	
Average	2.75				2.50				3.00				1.00		2.00		3.00		1.00		1.00		1.50		1.97
D-2, Motorist/Pedestrian Northbound, N/S	1	0	1	6	2	0	2	7	6	0	3	8	1	2	2	2	3	6	2	1	2	1	2	1	
Average	2.00				2.75				4.25				1.50		2.00		4.50		1.50		1.50		1.50		2.39
E-1, Adjacent Residential District, N	3	0	5	6	4	0	6	7	3	0	7	6	5	5	5	5	4	4	5	5	4	4	2	2	
Average	3.50				4.25				4.00				5.00		5.00		4.00		5.00		4.00		2.00		4.08
E-2, Duwamish Waterway Park, N	8	7	9	3	8	8	8	4	7	8	7	5	7	5	5	4	3	1	6	5	3	2	2	1	
Average	6.75				7.00				6.75				6.00		4.50		2.00		5.50		2.50		1.50		4.72

Direct Impacts: High-Level Fixed-Span Bridge Alternative

	VIVIDNESS												INTACTNESS						UNITY						
	I				II				III				I		II		III		I		II		III		
	FOREGROUND				MIDDLEGROUND				BACKGROUND				FORE		MIDDLE		BACK		FORE		MIDDLE		BACK		
Viewshed	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	LANDFORM	WATERFORM	VEGETATION	HUMANMADE	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	DEVELOPMENT	ENCROACHMENT	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	HUMAN/NATURAL	OVERALL	AVERAGES
A-1, Motorist Southbound, N	1	2	2	8	2	1	3	7	3	4	3	8	1	0	1	1	1	0	0	0	1	0	0	0	
Average	3.25				3.25				4.5				0.5		1		0.5		0		0.5		0		1.50
A-2 Pedestrian Southbound, S	2	1	0	8	3	3	1	8	3	2	1	7	1	0	1	0	0	0	0	0	1	0	1	1	
Average	2.75				3.75				3.25				0.50		0.50		0.00		0.00		0.50		1.00		1.36
B-1, Adjacent Industrial District, I	2	2	2	7	3	2	2	7	4	2	2	8	3	2	3	3	2	1	1	1	1	1	1	0	
Average	3.25				3.50				4.00				2.50		3.00		1.50		1.00		1.00		0.50		2.25
C-1, Duwamish Waterway, I	6	8	3	5	8	8	2	5	7	7	2	5	6	4	4	1	1	1	5	4	2	1	0	0	
Average	5.50				5.75				5.25				5.00		2.50		1.00		4.50		1.50		0.00		3.44
C-2, Marina Parking Lot, I	4	5	3	7	6	5	2	8	7	6	2	8	3	4	3	2	3	1	2	3	3	3	4	1	
Average	4.75				5.25				5.75				3.50		2.50		2.00		2.50		3.00		2.50		3.53
D-1, Business/CommercialDistrict, I	0	0	0	9	0	0	0	8	2	0	1	7	0	0	1	1	2	1	1	0	1	1	1	1	
Average	2.25				2.00				2.50				0.00		1.00		1.50		0.50		1.00		1.00		1.31
D-2 Motorist/Pedestrian Northbound, N/S	2	1	0	8	2	2	1	8	3	2	1	9	1	0	1	0	0	0	0	0	1	0	1	1	
Average	2.75				3.25				3.75				0.50		0.50		0.00		0.00		0.50		1.00		1.36
E-1, Adjacent Residential District, N	3	0	5	6	4	0	6	5	3	0	7	9	5	5	5	5	3	0	5	5	3	3	1	1	
Average	3.50				3.75				4.75				5.00		5.00		1.50		5.00		3.00		1.00		3.61
E-2, Duwamish Waterway Park, N	8	7	9	3	8	8	8	4	7	9	7	2	7	5	4	2	1	0	6	5	3	3	1	0	
Average	6.75				7.00				6.25				6.00		3.00		0.50		5.50		3.00		0.50		4.28

Appendix B Public Comment Regarding Aesthetics

The following are excerpts from written comment forms submitted by members of the public at the public scooping meeting held in February 2002. They are included to provide the context for the preparation of this Visual Assessment Technical Report.

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As an architect, I would urge the review process to please consider scale in the choice of alternatives. Apart from all the other concerns is ease of large-volume traffic afforded by a long fixed-span bridge, what the greater area around South Duwamish/South Park or anybody in the area wants? We will just keep escalating traffic ... think scale! Thank you.

I support the movable bridge alternatives. The replacement bridge, should it be chosen, needs to emulate the current bridge in look. Even if the two towers are not needed for their current purpose as with the retrofit, the bridge should continue to look the same as it does now. There are too many negative effects to businesses and to the ongoing livability of the South Park neighborhood with the fixed span alternatives.

Whichever alternative is chosen, I would not like to see the South Park Bridge become part of a freight corridor. We are part of an interlocal agreement with other cities and county to restore Des Moines Memorial Drive to its true status as a World War I memorial. This is the only WWI memorial drive left in the nation I believe. I am also concerned with the brick road. If it is necessary to use that area for the bridge, I would hope that the bricks could be saved. They could be part of an historic plaza near the bridge and could be quite an attractive focal point for the community. Thank you for adding me to your mailing list.

I like the look of the bridge, and do not want a large, intrusive one.

I believe you should restore the 14th Ave. bridge and use the bridge by the Boeing area across from the Flight Museum and Randy's restaurant. I am a taxpayer and you work for us. The people of South Park have spoken. Leave our wonderful 14th Ave. bridge (ALONE). It is one of the last historical memories of our past that future generations can & should enjoy.

OUR SPACE, a residential group in South Park, was formed over concerns people (living near toxic emissions and illegal business practices leading to toxic dumping) had for themselves and their children's health. We have also taken on the City of Seattle's Dept. of construction and Land Use to stop Long Painting's illegal activities in our midst. We have been successful so far. Public outcry has forced Seattle and Long to do the right thing - lawful abiding of rules they'd broken. We also feel that King County is breaking the rules by even entertaining the idea of substituting the South Park Bridge by another bridge project. Other bridges have suffered damage and earthquake. Retrofitting and repair has kept them going strong. We take pride in our landmark bridge and hope you will repair and restore it no matter what the cost! Too many things in Seattle and King County are torn down too easily! Twin Teepees - South Park Field and house - downtown theaters, etc. Our landmarks are us - our history and our art! Keep and protect this bridge!

Our preferred option is the complete rehabilitation of the existing bridge. We are painfully aware of its defects, resulting from its age, construction methods, seismic vulnerability, and lack of consistent maintenance funding over the years. We believe t... If, for engineering reasons, the rehabilitation option proves to be impossible, we favor a bridge of similar scale to the existing structure. It should mimic or reflect to some extent the style of our existing bridge. It must be an opening span to provide... This brings us to two other options that have been discussed: the 55/60' and 100' fixed spans proposed in various county study documents. Under no circumstances are these options acceptable. Our neighborhood, divided as it is by both highways 99/599 and 5...

I urge you to consider this project from multiple angles - an engineering approach is necessary, but by no means sufficient. FIXED HIGH LEVEL: This is, to me, a worst case scenario. Besides the visual impact this bridge will have (which is significant) it will have a detrimental effect on the neighborhood. The South Park Bridge, as the name suggests, helps to define the neighborhood. This design has no redeeming qualities in this respect. Last, but certainly not least, putting bike lanes on any bridge with 8+% is a farce. FIXED MID LEVEL: Essentially, this design has the same problems as the high level design - just moderated. MOVABLE SPAN BASCULE: This is a design project I would live with. The critical piece in this proposal is the actual design detailing. RETROFIT: I have no plausible reasons why this proposal would not be the most desirable. As someone whose main view is of the bridge, I cannot overstate the significance of its aesthetics. Like I said before, this bridge does and always will help define the character of this community. Three lanes will sufficiently support traffic volumes. Please consider the importance of our built environment as it directly impacts the quality of our neighborhood, the social structure and "feeling of oneness" (for lack of a better term). Also, I believe the retrofit has a considerable advantage in that it does not require a road realignment.

We would like to see the existing bridge repaired. If that is not possible, then we would like the same size and type of bridge built. We definitely do not want a large span bridge.

The size of trucks should be limited on the existing bridge.

Please eliminate obviously bad alternatives as soon as possible. There is strong community support for retro fitting the existing bridge. Of the new construction alternatives, the movable span bascule bridge is least offensive. Effort to replicate historical details including the lamp posts removed from the existing bridge would be appreciated. as a bicyclist, I feel a separation between vehicle traffic by height and/or weight is preferable to added width. The fixed span options are an obvious waste of public funds to study. They would wreck South Park's commercial area. The low bridge wouldn't allow any commercial boat traffic. The medium bridge would require a crane! Is that a joke? The high bridge leaves little remaining community. A tunnel would have negative impacts on toxic sludge and/or salmon. Doing nothing prevents the community (has prevented us for many years) from developing.

Appendix C Color Photo Supplement

1. No Action Alternative – Viewshed C-1
2. No Action Alternative – Viewshed E-2
3. Rehabilitation Alternative – Viewshed C-1
4. Rehabilitation Alternative – Viewshed E-2
5. Bascule Bridge Alternative – Viewshed C-1
6. Bascule Bridge Alternative – Viewshed E-2
7. Mid-Level Fixed-Span Bridge Alternative – Viewshed C-1
8. Mid-Level Fixed-Span Bridge Alternative – Viewshed E-2
9. High-Level Fixed-Span Bridge Alternative – Viewshed C-1
10. High-Level Fixed-Span Bridge Alternative – Viewshed E-2

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1. No Action Alternative – Viewshed C-1

2. No Action Alternative – Viewshed E-2

3. Rehabilitation Alternative – Viewshed C-1

4. Rehabilitation Alternative – Viewshed E-2

5. Bascule Bridge Alternative – Viewshed C-1

6. Bascule Bridge Alternative – Viewshed E-2

7. Mid-Level Fixed-Span Bridge Alternative – Viewshed C-1

8. Mid-Level Fixed-Span Bridge Alternative – Viewshed E-2

9. High-Level Fixed-Span Bridge Alternative – Viewshed C-1

10. High-Level Fixed-Span Bridge Alternative – Viewshed E-2