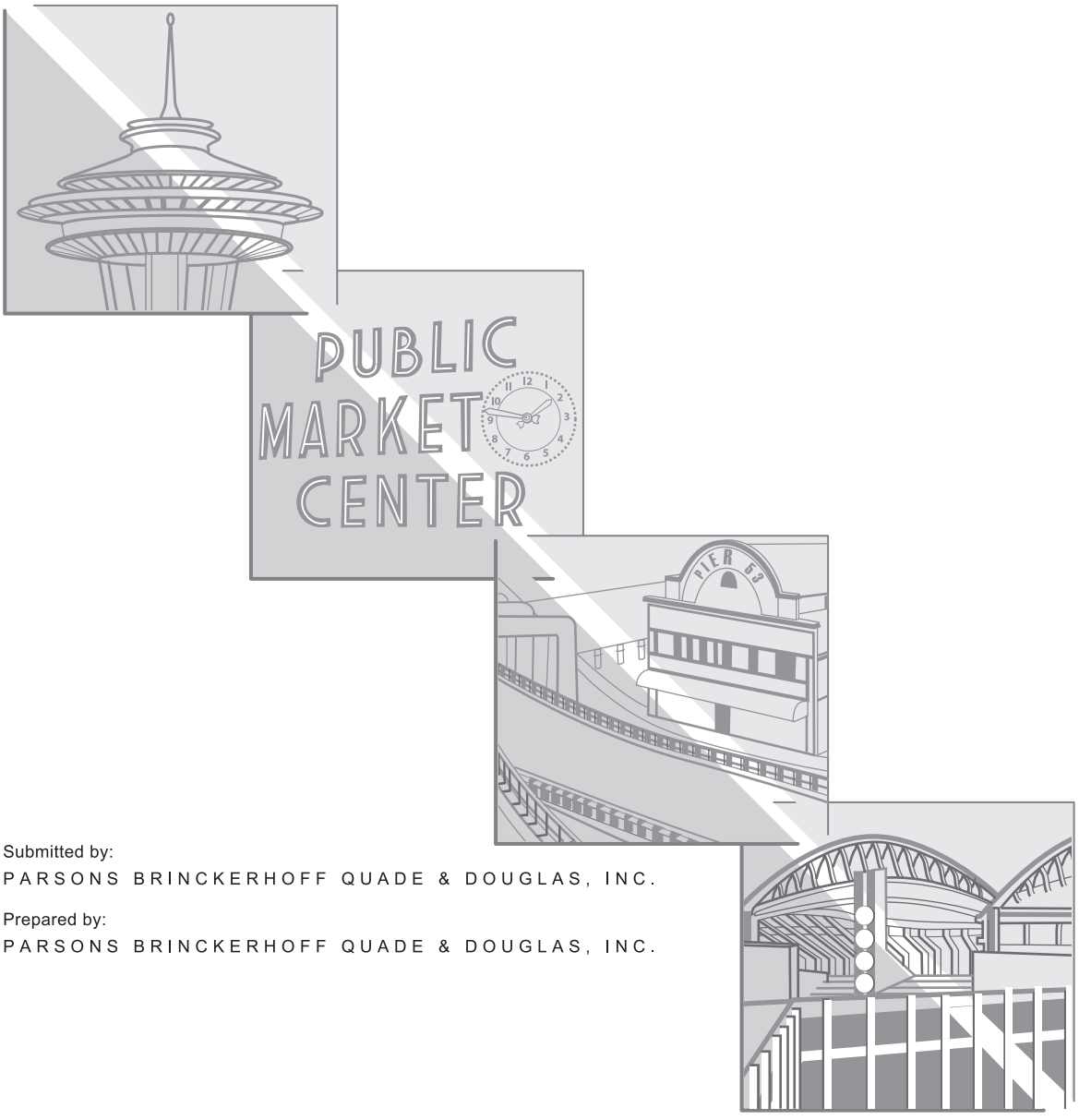
SR 99: ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT

Supplemental Draft Environmental Impact Statement

APPENDIX P

Economics Technical Memorandum



Submitted by:
PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

Prepared by:
PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

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U.S. Department of Transportation
Federal Highway Administration

Washington State
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City of
Seattle

SR 99: ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT

Supplemental Draft EIS

Economics Technical Memorandum

AGREEMENT NO. Y-7888

FHWA-WA-EIS-04-01-DS

Submitted to:

Washington State Department of Transportation
Alaskan Way Viaduct and Seawall Replacement Project Office
999 Third Avenue, Suite 2424
Seattle, WA 98104

The SR 99: Alaskan Way Viaduct & Seawall Replacement Project is a joint effort between the Washington State Department of Transportation (WSDOT), the City of Seattle, and the Federal Highway Administration (FHWA). To conduct this project, WSDOT contracted with:

Parsons Brinckerhoff Quade & Douglas, Inc.

999 Third Avenue, Suite 2200
Seattle, WA 98104

In association with:

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ATTACHMENTS

ACRONYMS

AWV	Alaskan Way Viaduct and Seawall Replacement
B&O	business and occupation
BEA	U.S. Department of Commerce Bureau of Economic Analysis
BINMIC	Ballard Interbay Northend Manufacturing and Industrial Center
BNSF	Burlington Northern Santa Fe Railway Company
CBD	Central Business District
CEVP®	Cost Estimate Validation Process
EIS	environmental impact statement
I-5	Interstate 5
LID	Local Improvement District
O&M	operations and maintenance
RIMS II	Regional Input-Output Modeling System
SODO	South of Downtown
SR	State Route

PREFACE

The technical appendices present the detailed analyses of existing conditions and predicted effects of each alternative. The results of these analyses are summarized and presented in the main text of the Supplemental Draft Environmental Impact Statement (EIS).

The Supplemental Draft EIS appendices are intended to add new information and updated analyses to those provided in the Draft EIS, published in March 2004. Information that has not changed since then is not repeated in these appendices. Therefore, to get a complete understanding of the project area conditions and projected effects, you may wish to refer to the appendices that were published with the Draft EIS. These are included on a CD in the Supplemental Draft EIS. To make it easier to understand where there is new information or analyses, the supplemental appendices present information in the same order as it was presented in the Draft EIS appendices.

The Supplemental Draft EIS and the technical appendices evaluate the effects of three construction plans: the shorter plan, the intermediate plan, and the longer plan. These plans vary in how long SR 99 would be completely closed, in how long the periodic closures may be, and in the total construction duration. For the purposes of the analyses in the technical appendices, two construction plans are evaluated with the Tunnel Alternative and one plan is evaluated with the Elevated Structure Alternative. However, each alternative could be built with any of the three plans. The construction durations and the sequencing would not be the same for a particular construction plan if paired with a different alternative; however, the effects would be within the ranges presented by the analyses.

There are several differences in how the information is presented between the main text of the Supplemental Draft EIS and how it is presented in these appendices. The Supplemental Draft EIS text refers to possible variations within the alternatives as "choices" while these appendices use the term "options." (For example, Reconfigured Whatcom Railyard versus Relocated Whatcom Railyard is referred to as a design choice in the Supplemental Draft EIS and as an option in the appendices.) In either case, the intent is to describe the various configurations that could be selected and the effects for each design.

One design choice in particular is handled very differently between the Supplemental Draft EIS text and the technical appendices. For the Tunnel Alternative in the central waterfront area, there is a choice between a stacked tunnel alignment and a side-by-side tunnel alignment. In the appendices, to simplify the discussion, these two alignments, as well as the Elevated

Structure Alternative, are each paired with a different set of options throughout the corridor and presented as complete sets that are evaluated separately. The Supplemental Draft EIS text communicates this information differently by describing one Tunnel Alternative and one Elevated Structure Alternative and evaluating the effects of the different design choices (or mix-and-match components) separately. While it may appear that there are three alternatives analyzed in the appendices and two in the Supplemental Draft EIS text, there are in fact only two alternatives. Each alternative has many potential components or design choices that can be made throughout the corridor.

The organization of the analysis of the alternatives is also a little different between the main body of the Supplemental Draft EIS and the appendices. In the Supplemental Draft EIS text, we identify two alternatives: a Tunnel Alternative and an Elevated Structure Alternative. The Supplemental Draft EIS text compares these alternatives directly by comparing effects (for example, the effects of both alternatives on water quality are presented together). The appendices present the effects of each alternative separately (for example, all of the effects of the Tunnel Alternative are presented first, followed by all of the effects of the Elevated Structure Alternative). The substance of both discussions is the same. The organization of the Supplemental Draft EIS technical appendices mirrors that of the Draft EIS appendices, allowing you to more easily find comparable information in the Draft EIS appendices.

Chapter 1 SUMMARY

Local, state, and federal transportation agencies are working together to develop and evaluate alternatives to improve State Route (SR) 99, including the Alaskan Way Viaduct and Alaskan Way Seawall in the city of Seattle. Five Build Alternatives and a No Build Alternative for the Alaskan Way Viaduct and Seawall Replacement (AWV) Project were evaluated in a Draft Environmental Impact Statement (EIS) in March 2004 (WSDOT et al. 2004). Lead agencies for the AWV Project are the Federal Highway Administration (FHWA), Washington State Department of Transportation (WSDOT), and City of Seattle.

In December 2004, the project proponents selected the Tunnel Alternative as the Preferred Alternative and carried the Rebuild Alternative, which is now called the Elevated Structure Alternative, forward for further analysis as well. Since that time, engineering and design has been refined and updated for the Tunnel and Elevated Structure Alternatives. This document evaluates the changes to these alternatives.

This Economics Technical Memorandum, prepared in support of the AWV Project Supplemental Draft EIS, provides detailed information about the economic context of the AWV Corridor and potential effects that could directly or indirectly result from the updated Tunnel and Elevated Structure Alternatives. The following sections summarize the affected economic environment, updated alternatives, impacts and benefits to the local and regional economies, and recommended mitigation for adverse impacts.

1.1 Methodology, Studies, and Coordination

The project's northern boundary has been extended three blocks from Ward Street to Comstock Street. The project area being studied to describe the affected economic environment and evaluate direct impacts extends one block from either side of the project alternatives and includes associated construction staging areas. A new survey of businesses and parking was conducted for the expanded project corridor. The methodology for assessing economic impacts associated with the project has not changed from that used in the 2004 Draft EIS Appendix P, Economics Technical Memorandum. Updated parcel acquisition data was used in Chapter 5. The March 2004 Draft EIS assumed that all parcels were full acquisitions. The parcel acquisition data has been updated to identify full and partial acquisitions for the updated Tunnel and Elevated Structure Alternatives and the new alignment options. Updated capital costs and sources of funding for the project are presented in

Section 6.1.1 and form the basis for the construction impacts and benefits analyzed in Chapter 6.

1.2 Affected Environment

Characteristics of the affected environment are assumed to be unchanged from those described in the 2004 Draft EIS Appendix P, Economics Technical Memorandum, with the exception of short-term on-street parking revenues and inventory of existing businesses. These economic characteristics of the environment are described in Sections 1.2.1 through 1.2.7 of the 2004 memorandum. Although general economic conditions have improved since the publishing of the Draft EIS, these changes do not affect the economic analysis of the Build Alternatives presented in the Draft EIS and this Supplemental Draft EIS. Updates to the affected environment, including improvements in general economic conditions, will be presented in the Final EIS. The short-term parking revenue data were updated to include the City of Seattle's recent introduction of electronic pay stations and the removal of individual parking meters for short-term on-street parking; the updated parking revenue status is presented in Section 1.2.1 (below). The business inventory was updated to include the expanded project area to the north; the updated business inventory is presented in Section 1.2.2 (below).

1.2.1 Short-Term On-Street Parking Revenue

Beginning in early 2005, the City of Seattle began replacing single-space parking meters with pay stations. One pay station is intended to replace a block's worth of single-space parking meters. The pay stations allow users to pay with currency, credit card, or debit card. In addition, as part of the City's 2004 budget, the City Council approved a meter rate increase from $1.00 to $1.50 per hour for pay stations and electronic meters. This is the first increase in on-street parking rates in more than 10 years.

Currently, the City has 525 parking spaces controlled by pay stations in the area along the waterfront between Yesler Way and the Pike Place Market. These pay stations have been in operation since May 2005. Because of the increase in hourly rates, as well as changes in the behavior of the parking public, the City is realizing a substantial increase in revenue per parking space per year compared to the use of single-space parking meters. Based on the pay stations currently in operation along the waterfront, each parking space generates approximately $3,958 per year in revenue for the City's general fund. The City expects to have converted the majority of single-space parking meters throughout the city to pay stations by the end of 2007.

1.2.2 Inventory of Existing Businesses

The area of direct effects for the inventory includes businesses within one block of proposed changes to existing facilities or proposed new facilities. The business inventory was updated to include the area of direct effects along Aurora Avenue N. between Roy Street and Lee Street, which is one block north of Comstock Street. This minor addition to the length of the project corridor does not change the affected business districts. For this technical memorandum, the total number of businesses that would be directly affected by the project is approximately 1,200.

Businesses operating in Commercial Office space accounted for over half (52.6 percent) of the type of businesses operating within the area of direct effects. Other Service accounted for 15.7 percent of businesses operating within the area of direct effects; over half (58.2 percent) of the Other Service businesses were involved in food service other than retail grocery. Commercial Retail accounted for 11.4 percent of the business activity within the area of direct effects. Other represented about one-tenth of the business activity within the area of direct effects; the majority of other activity identified was parking (44.8 percent). Residential Multi-Family use represented about 7 percent of the business activity within the area of direct effects. The sum of Industrial (both Marine and Non-Marine Dependent) and Government Service represented 3.7 percent of the business activity within the area of direct effects.

The vast majority (80 percent) of the businesses operating in the area of direct effects was estimated to be small (less than 20 employees). Medium-sized businesses (20 to 100 employees) accounted for 15.5 percent of the businesses operating in the area of direct effects. The remainder was almost equally split between large businesses (greater than 100 employees) at 2.4 percent and vacant businesses (no discernable business activity) at 2.1 percent.

The visual survey indicated that for a majority of businesses (58.5 percent) in the area of direct effects, street parking is a critical component in their parking considerations for employees and customers. A little over a third of all businesses (35.4 percent) use on-site parking for employees and customers. The remainder had either directly identifiable off-street parking (4.9 percent) or had access that would be directly affected by the project (1.2 percent).

1.3 Alternatives and Options

The updated Tunnel (Preferred) and Elevated Structure Alternatives differ slightly in their alignments and options when compared to those presented in the Draft EIS. Some options previously being considered are no longer included in the updated alternatives, and new options have been developed.

The 2006 Supplemental Draft EIS Appendix B, Alternatives Description and Construction Methods Technical Memorandum, provides detailed information about the project alternatives.

In the south, two options are being considered for both the Tunnel and Elevated Structure Alternatives where SR 99 crosses the Whatcom Railyard's lead track:

- The Reconfigured Whatcom Railyard Option would retain the existing SR 99 in its current alignment between the Burlington Northern Santa Fe Railway Company (BNSF) Seattle International Gateway (SIG) Railyard on the east and the Whatcom Railyard to the west. A short bridge would carry SR 99 over the new tail track and connection between the railyards.

- The Relocated Whatcom Railyard Option would place SR 99 at-grade adjacent to E. Marginal Way and relocate the tracks to the east.

The updated Tunnel Alternative has two potential tunnel alignments:

- The stacked tunnel alignment (the preferred alignment).
- The side-by-side tunnel alignment.

In the central section, two options are being considered for the Tunnel Alternative at Elliott and Western Avenues:

- SR 99 passing Under Elliott and Western Avenues (preferred).
- SR 99 extending Over Elliott and Western Avenues.

The AWV project team combined elements of the Aerial and Rebuild Alternatives evaluated in the Draft EIS into the new Elevated Structure Alternative. In the central waterfront section, the Elevated Structure Alternative would be wider than the Rebuild Alternative evaluated in the Draft EIS, but not quite as wide as the Aerial Alternative. The Elevated Structure Alternative does not include the option to go under Elliott and Western Avenues.

The alternatives in the Draft EIS only considered a fire and life safety upgrade of the Battery Street Tunnel. The updated Tunnel and Elevated Structure Alternatives include lowering the roadway to increase the vertical clearance to 16.5 feet throughout the Battery Street Tunnel. The Tunnel Alternative also includes an option to widen the curves at the north and south portals of the Battery Street Tunnel.

The revised project alignment now includes an extension of the northern limit of the project. The north area of the project now extends to about Comstock Street, about 0.8 mile north of the Battery Street Tunnel. With the Partially

Lowered Aurora Option (part of the preferred alignment, but also paired with the Elevated Structure Alternative), Aurora Avenue N. would be lowered between the north portal of the Battery Street Tunnel and Republican Street, with roadway improvements and widening up to Aloha Street. Thomas and Harrison Streets would be reconnected with bridges crossing over Aurora Avenue N., while Mercer Street would cross under Aurora Avenue N.

The Lowered Aurora Option was included in the Draft EIS Aerial Alternative. This option has been revised to further widen SR 99 and extend improvements almost to Comstock Street. SR 99 would be lowered below grade with retaining walls on either side, allowing Thomas, Harrison, Republican, and Roy Streets to pass at grade over SR 99. Mercer Street would be widened more than was considered in the Draft EIS and would cross over SR 99 on a new bridge.

Two construction plans are evaluated for the Tunnel Alternative:

- The intermediate plan would close SR 99 to north-south traffic for no less than 18 months (1.5 years) and up to 27 months (2.25 years or longer). The intermediate plan assumes periods where either the northbound or southbound lanes are closed. For the stacked tunnel alignment, the overall construction duration for the intermediate plan would be 8.75 years. The side-by-side tunnel alignment's approximate construction duration would be 8 years.
- The shorter plan would fully close SR 99 to north-south traffic for a minimum of 42 months (3.5 years). In the shorter plan, the majority of construction work would occur with the corridor closed, with the exception of the initial utility relocations. The duration of construction with the shorter plan would be approximately 7 years for either tunnel alignment.

Only one construction plan is being evaluated for the Elevated Structure Alternative:

- The longer plan would keep two lanes on SR 99 open in each direction except when SR 99 would be closed to all traffic for 3 months. The construction would last approximately 10 years.

The First Avenue S. and Broad Street Detours would both be used as alternate routes during the construction of the Elevated Structure Alternative and would both affect adjacent businesses, increase congestion, and reduce parking availability for prolonged periods.

1.4 Operational Impacts and Benefits

General economic impacts and benefits associated with the updated Tunnel and Elevated Structure Alternatives analyzed in this technical memorandum are similar to the analysis for the Tunnel Alternative and the Rebuild Alternative analyzed in the Draft EIS. Several updates to the 2004 Draft EIS Appendix P, Economics Technical Memorandum, are summarized in the following sections.

1.4.1 Transportation, Access, and Visibility

Economic impacts and benefits associated with traffic, access, and visibility for the Tunnel and Elevated Structure Alternatives remain largely the same as those described in the Draft EIS for the Tunnel and Rebuild Alternatives. For travel times during peak-hour travel, the updated Elevated Structure Alternative operates more like the Draft EIS Aerial Alternative.

1.4.2 Parking

The number of parking spaces required has increased compared to the Draft EIS due to the proposed improvements north of the Battery Street Tunnel, project design changes, and updated parking counts. The Elevated Structure Alternative would result in the fewest parking spaces taken out of service (Exhibit 1-1). The side-by-side tunnel alignment would result in the most permanently lost parking spaces. After completion of the project, the stacked tunnel alignment would result in 1,723 parking spaces taken out of service, with a loss of 376 short-term (metered) on-street parking spaces. The side-by-side tunnel alignment would result in 1,754 parking spaces taken out of service, with a loss of 345 short-term (metered) on-street parking spaces. The Elevated Structure Alternative would result in 822 parking spaces taken out of service and an overall decrease of 68 short-term (metered) on-street parking spaces.

Exhibit 1-1. Comparison of Parking Impacts

Property and Business Elements	Tunnel Alternative		Elevated Structure Alternative
	Stacked Tunnel	Side-by-Side Tunnel	
Net change in no. of parking spaces	-1,723	-1,754	-882
Change in no. of on-street short-term parking spaces	-376	-345	-68
Change in no. of on-street long-term parking spaces	-430	-430	-276
Change in no. of off-street parking spaces	-917	-979	-538

1.4.3 Acquired Property

The Tunnel and Elevated Structure Alternatives would result in approximately equivalent economic impacts related to acquired parcels (by square-footage), area of work space relocated or displaced, and number of permanent jobs relocated or displaced (Exhibit 1-2). The stacked tunnel alignment with the Reconfigured Whatcom Railyard requires the acquisition of 47 parcels and 14 buildings, and approximately 455 workers would be displaced. The side-by-side tunnel alignment with the Relocated Whatcom Railyard and the Lowered Aurora Option requires the acquisition of 74 parcels and 29 buildings, and approximately 637 workers would be displaced. The Elevated Structure Alternative with the Reconfigured Whatcom Railyard would require the acquisition of 47 parcels and 13 buildings and displace approximately 440 workers. The Elevated Structure Alternative with the Relocated Whatcom Railyard would require the acquisition of 51 parcels and 16 buildings and would displace approximately 530 workers.

Exhibit 1-2. Comparison of Acquired Property Impacts

	Tunnel Alternative		Elevated Structure Alternative	
Property and Business Elements	Stacked Tunnel	Side-by-Side Tunnel	Reconfigured Whatcom Railyard	Relocated Whatcom Railyard
No. of parcels subject to acquisition	47	74	47	51
No. of parcels fully acquired	29	58	28	31
No. of buildings acquired	14	29	13	16
Area of work space relocated or displaced (square feet)	418,371	654,459	405,971	558,549
Estimated no. of permanent jobs relocated or displaced	455	637	440	530
Property tax paid by fully acquired parcels in 2002 ($)	339,016	705,933	299,406	377,271
Area of fully acquired tax-paying parcels (square feet)	271,245	753,303	264,454	484,832

1.4.4 Local Government Revenues

Both alternatives would result in a permanent decrease in the number of parcels currently paying property tax due to parcel acquisition (see Exhibit 1-2). Due to the net loss in metered parking spaces, the Tunnel Alternative would result in a permanent decrease in annual local government revenues, while the Elevated Structure Alternative would result in a smaller permanent decrease in revenue (Exhibit 1-3). Potential mitigation measures for the loss of this revenue are the same as those presented in Chapter 8,

Operational Mitigation, of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

Exhibit 1-3. Comparison of Parking Meter Revenue Impacts

Revenue Stream	Local Government Net Revenue Decrease		
	Tunnel Alternative		Elevated Structure Alternative
	Stacked Tunnel	Side-by-Side Tunnel	
Parking meters	-$1,488,208	-$1,365,510	-$269,144

1.4.5 Operations and Maintenance Costs

Operations and maintenance (O&M) costs are expected to increase with the Tunnel and Elevated Structure Alternatives. O&M for the Tunnel Alternative is estimated at 87 percent more than for the No Build Alternative. The Elevated Structure Alternative O&M is estimated at 19 percent more than the No Build annual expense. Since O&M continues to be financed by local revenue sources, the additional O&M expense likely reflects a shift of local revenues from other transportation elements in the Puget Sound region. No net beneficial economic impact would be expected from the increase in O&M costs.

1.5 Construction Impacts and Benefits

Increased employment and economic stimulus to the local economy from construction activities would be the primary economic benefit from implementing the Tunnel or Elevated Structure Alternative. Both alternatives require relatively long construction periods that would disrupt normal business activities occurring in the study area. Businesses along the Waterfront District and in the Pioneer Square Historic District would likely endure the greatest disruption due to proximity of the viaduct.

Sales taxes would be generated through the purchase of goods and materials related to construction. The Tunnel Alternative would generate between $223 million and $243 million in sales tax revenue, and the Elevated Structure Alternative would generate $141 million.

1.5.1 Increased Employment and Economic Activity

Capital costs to construct the Tunnel and Elevated Structure Alternatives have increased since the analysis conducted in the Draft EIS; however, the amount of "new money" (funds that are uniquely available for expenditure on the AWV Project that would otherwise not enter the regional or state economies) is assumed to be constant. Thus, employment and economic activity associated with construction of these alternatives at a higher capital cost would result in

additional (gross) employment and activity throughout all economic sectors within the Puget Sound region and the state of Washington. This gross employment and economic activity is derived from the multiplication effects on the capital expenditures for the project. Although the amount of new money is a lesser percent of the total capital cost (compared to estimates presented in the Draft EIS), the absolute amount of new money and its impact on the regional and state economies has not changed since the Draft EIS.

Examples of capital expenditures include the direct hiring of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new right-of-way. The Tunnel Alternative, with the highest estimated capital cost, would generate the most direct, indirect, and induced jobs and activity within the Puget Sound region.

The number of new jobs that could be directly associated with these alternatives as the result of new money entering the Puget Sound regional economy ranges between 1,800 and 2,300 jobs for the Tunnel and Elevated Structure Alternatives. The amount of new earnings (wages) entering the Puget Sound regional economy ranges from $132 million to $137 million.

1.5.2 Disruption to Local Businesses

Any major construction project, public or private, inconveniences or disturbs the residents, businesses, and business customers adjacent to that construction project. These temporary effects include:

- Presence of construction workers, heavy construction equipment, and materials.
- Temporary road closures, traffic diversions, and alterations to property access.
- Airborne dust.
- Noise and vibrations from construction equipment and vehicles.
- Decreased visibility and loss of access to businesses by customers.

Up to 169 active commercial and industrial buildings are located within 50 feet of the project alignment and would not be acquired. Some businesses located in these buildings may suffer little or no adverse impacts, while others may experience a noticeable decline in sales, increase in costs, and/or decrease in efficiency.

Based on an inventory performed of all existing parking spaces within the project footprint, it was determined that 3,703 spaces would be lost for the entire construction period. These spaces include a mix of short-term on-street (metered) (1,020), long-term on-street (626), and off-street (2,057) spaces.

Specific business districts that rely heavily on available on-street parking, as presented in Section 4.2 (Inventory of Existing Businesses), include Pioneer

Square, the waterfront, and the central downtown section/commercial core. Each of these districts relied on on-street parking as their primary parking requirement for at least 50 percent of the existing businesses within the district. All three of these districts would be affected by the loss of parking spaces within the central section.

The economic impacts to ferries and cruise ships are the same as those described in the 2004 Draft EIS Appendix P, Economics Technical Memorandum (Section 6.1.5).

1.6 Secondary and Cumulative Impacts and Benefits

Secondary and cumulative impacts would be the same as described in the Draft EIS; refer to Sections 1.5 and 1.6 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

1.7 Operational Mitigation

Mitigation measures would be the same as described in the 2004 Draft EIS Appendix P, Economics Technical Memorandum (Chapter 8).

1.8 Construction Mitigation

Some commercial activity within the project area would be adversely affected by the duration of construction activities, the physical extent of the project area, the complexity of construction, and the accumulation of direct construction impacts, such as traffic restrictions and congestion, and noise. While these impacts would not be permanent, they would be comparatively long-term.

In the Draft EIS, the longer plan during construction was assumed for all the Build Alternatives; this plan assumed that two traffic lanes in each traffic direction would remain open on SR 99 for the majority of construction. For the alternatives in this technical memorandum, two new construction plans are being considered, the intermediate plan and the shorter plan. The updated longer plan (associated with the Elevated Structure Alternative) would close SR 99 to all traffic for a 3-month period. The intermediate plan and shorter plan would close SR 99 to all traffic for a minimum of 18 months and a maximum of 42 months and are only proposed for the Tunnel Alternative.

The specific detour routes identified with the construction plans need to take traffic directly off of SR 99 and connect it back to SR 99. The First Avenue S. Detour would be in place for about 27 months with the Elevated Structure Alternative. Businesses located on First Avenue S. could be affected by

increased congestion and reduced parking during construction. The Broad Street Detour, used with the Elevated Structure Alternative, would affect businesses, cause increased congestion, and reduce parking along Broad Street for approximately 51 months during construction.

Mitigation measures proposed for the Tunnel Alternative under the intermediate plan and shorter plan would include the mitigation measures described in Chapter 10, Question 14 of the Draft EIS except as noted below. Mitigation measures proposed for the Elevated Structure Alternative under the longer plan would include the measures described in the Draft EIS for the Aerial Alternative except as noted below. Please see Chapter 9 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

The following mitigation measures proposed in the Draft EIS do not apply under the intermediate plan and shorter plan but still apply to the longer plan:

- On SR 99, two lanes of traffic would be maintained or a designated detour would be provided. This mitigation measure does not apply to the intermediate plan and shorter plan because SR 99 would be closed for at least 18 months and possibly for as long as 42 months for the Tunnel Alternative.
- Access to SR 99 at S. Royal Brougham Way and S. Atlantic Street would be maintained during periods when downtown access is closed. This mitigation measure does not apply to the intermediate plan and shorter plan because SR 99 would be closed for at least 18 months and possibly for as long as 42 months for the Tunnel Alternative.

The following mitigation measure was proposed in the Draft EIS but does not apply because of changes to mitigation strategies:

- Consider raising parking meter rates or installing additional meters to mitigate the loss of revenue associated with the loss of short-term on-street parking during construction. The Seattle Department of Transportation intends to closely manage on-street parking by increased enforcement of existing parking regulations for on-street parking not directly affected by the project. This would increase turnover of on-street parking spaces as well as ensuring that revenue from existing meters is maximized.

Thirty-one traffic construction management strategies have been identified for evaluation and testing. These strategies generally fall within the framework of regionwide transportation planning strategies identified in the Draft EIS and have been updated in Section 6.4.1 of the 2006 Supplemental Draft EIS Appendix C, Transportation Discipline Report. A refined package of

transportation management strategies will be presented in the Final EIS in the Construction Transportation Management Plan. The following transportation management strategies have economic components that were not discussed in the Draft EIS:

- Expand arterial flow map coverage to include key truck routes. The flow system would provide real-time traffic and congestion information for users of major truck streets to facilitate trip planning. The use of real-time congestion monitoring for trip planning would lessen the degree to which freight mobility is affected during construction.
- Facilitate or provide incentives for off-street parking lot operators to convert a percentage of their spaces to either short-term or long-term metered parking spaces. The conversion of off-street parking to metered or short-term parking would lessen the degree to which the loss of on-street parking affects those businesses in Pioneer Square and the central waterfront that rely primarily on on-street parking for use by customers and employees.

Construction activities, especially along the central waterfront, will likely interfere with access to businesses and properties adjacent to the project on either side of the right-of-way. A primary goal of construction planning is to maintain adequate access to all businesses so they can continue to operate. As construction phasing and staging is refined in the coming months, it may be determined on a case-by-case basis that it is neither reasonable nor feasible to maintain access to some businesses. If adequate access cannot be maintained, impacts to affected businesses will be mitigated under policies to be identified in the project's Business Mitigation Plan. If the provisions of the Uniform Relocation Act are met, then relocation assistance would be provided.

Economic mitigation strategies for managing impacts to businesses during construction are being developed and will be presented in the Final EIS through the Business Mitigation Plan. The Business Mitigation Plan will evolve over time, starting at the corridor level with a master list of potential mitigation measures (similar to that contained in the Draft EIS). Those measures would then be matched with specific impacts by business district (South of Downtown [SODO], Pioneer Square, central waterfront, etc.). Finally, as construction nears, the plan would be refined by construction phase for the specific business/facility impacts and location.

Chapter 2 METHODOLOGY

The project area being studied to describe the affected economic environment and evaluate direct impacts extends one block from either side of the project alternatives and includes associated construction staging areas, tunnel vent shaft locations, and connecting roadways. This area is generally bounded by S. Spokane Street to Comstock Street and from the Elliott Bay shoreline to Fourth Avenue. Secondary and cumulative impacts are described for a broader area, such as the city of Seattle, King County, and the King-Pierce-Snohomish Counties region.

For this Economics Technical Memorandum, the acquired properties data presented in Chapter 5, Operational Impacts and Benefits, which are associated with the alternatives, are only those properties that must be acquired to construct the facility. The March 2004 Draft EIS assumed all parcels were full acquisitions. The parcel acquisition data have been updated to identify full and partial acquisitions for the Tunnel (Preferred) and Elevated Structure Alternatives and the new alignment options.

The remaining methodology used in this technical memorandum to analyze economic impacts is the same as identified in Chapter 2 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

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Chapter 3 STUDIES AND COORDINATION

Information sources for this technical memorandum remain the same as those identified in Chapter 3 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

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Chapter 4 AFFECTED ENVIRONMENT

Existing economic conditions for King County and the King-Pierce-Snohomish Counties region remain largely the same as described in the Draft EIS. The amount of revenue that the City of Seattle collects from on-street short-term parking has substantially increased. This is due to the replacement of single-space parking meters with electronic pay stations, together with the increase in the hourly parking rate.

The project area in the north has been extended three blocks farther north from Ward Street to Comstock Street. This area is primarily residential, with some retail services also located along the east side of Aurora Avenue N. (SR 99). The following updates are provided to supplement the information in Chapter 4 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

4.1 Short-Term On-Street Parking Revenue

Beginning in early 2005, the City of Seattle began replacing single-space parking meters with pay stations. One pay station is intended to replace a block's worth of single-space parking meters. The pay stations allow users to pay with currency, credit card, or debit card. In addition, as part of the City's 2004 budget, the City Council approved a meter rate increase from $1.00 to $1.50 per hour for pay stations and electronic meters. This is the first increase in on-street parking rates in more than 10 years.

Currently, the City has 525 parking spaces controlled by pay stations in the area along the waterfront between Yesler Way and the Pike Place Market. These pay stations have been in operation since May 2005. Because of the increase in hourly rates, as well as changes in the behavior of the parking public, the City is realizing a substantial increase in revenue per parking space per year versus the use of single-space parking meters. Based on the pay stations currently in operation along the waterfront, each parking space generates approximately $3,958 per year in revenue for the City's general fund. The City expects to have converted the majority of single-space parking meters throughout the city to pay stations by the end of 2007.

4.2 Established Business Districts

The project is located within and near several retail/commercial centers, manufacturing/industrial centers, and urban centers. These districts and centers include the Ballard Interbay Northend Manufacturing and Industrial Center (BINMIC), Duwamish Manufacturing and Industrial Center, International District, Pike Place Market, Pioneer Square Historic District,

Seattle Central Business District (CBD), Seattle Center, South Lake Union Urban Center, Uptown Urban Center, Waterfront District, and Westlake Center. No additional business districts are located within the extended project area along Aurora Avenue N. from Ward Street to Comstock Street.

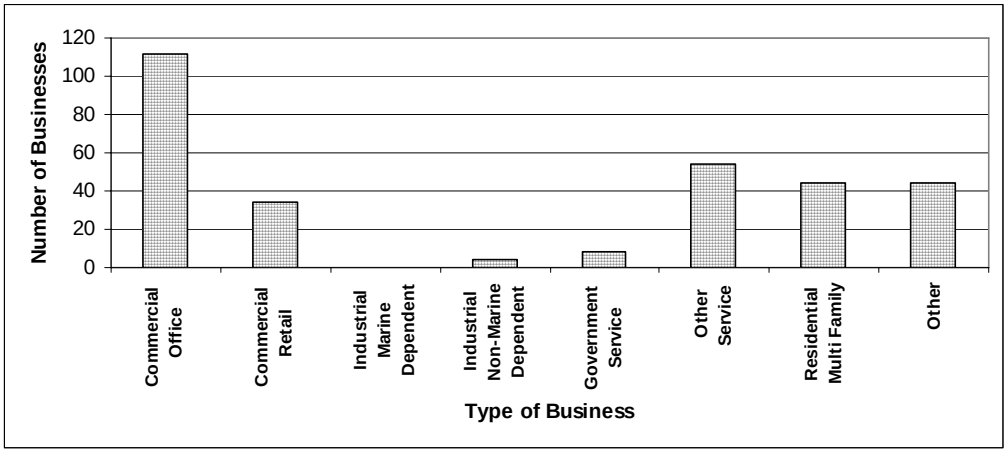
4.3 Inventory of Existing Businesses

For the Draft EIS, the AWV Environmental Team performed a physical inventory of businesses within one block of the proposed changes to existing facilities or proposed new facilities. Limits of the Draft EIS inventory were from Andover Street and SR 99 in the south to Roy Street and Aurora Avenue N. in the north. Additionally, for this technical memorandum, a small area along Aurora Avenue N. was also inventoried for businesses within one block of the proposed facility improvements from Roy Street to Lee Street (one block north of Comstock Street). These additional blocks are located within the Uptown Urban Center and the South Lake Union business districts.

North Section

The inventory of businesses was updated to include the extension of the north section to Comstock Street. Within this portion of the project, 300 existing businesses were identified along the east and west sides of Aurora Avenue N. Commercial Office is the primary business type (37.3 percent). The mix of business types is roughly evenly distributed between Other Service (18 percent), Residential Multi-Family (14.7 percent), and Other (14.7 percent). Commercial Retail composed approximately 11.3 percent of the business. The remaining businesses are Government Service (2.7 percent) and Industrial Non-Marine Dependent (1.3 percent). This distribution is shown in Exhibit 4-1.

Exhibit 4-1. Business Types for North Section

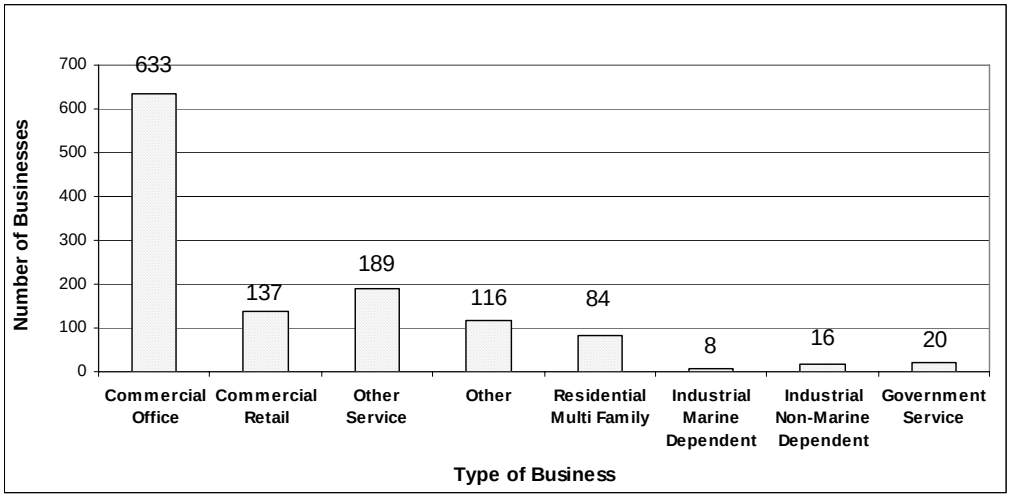


The majority of the businesses were characterized as small businesses (71 percent), with about 20 percent characterized as medium-sized. Ten businesses appeared to be large, and 18 were vacant. Parking favors on-site (57 percent) over on-street (40 percent). Five businesses (3 percent) were relying on off-street parking.

Project-Wide Findings

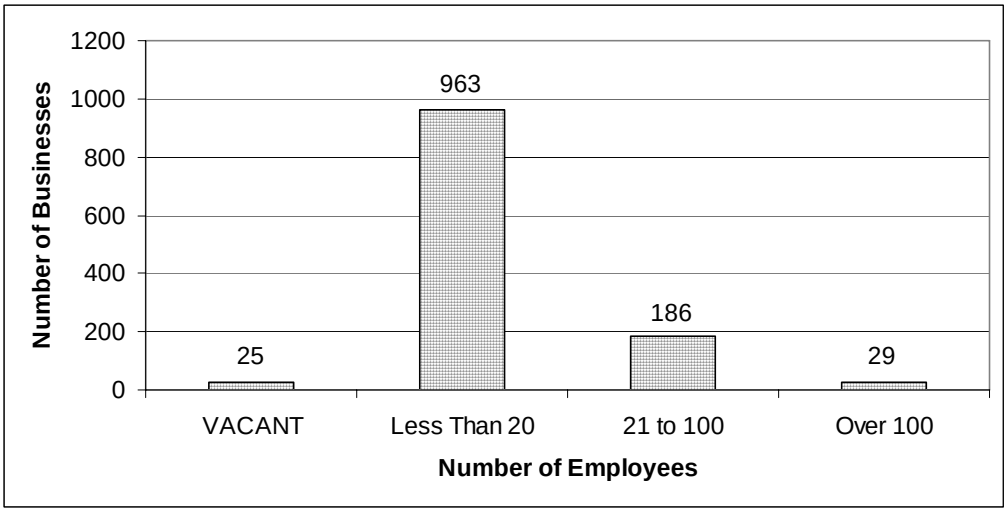
Approximately 1,200 businesses were identified within the area of direct effects studied for this technical memorandum (the area within one block from the proposed changes, including the additional area described above). The breakdown of the types of businesses within one block of the project is presented in Exhibit 4-2. Businesses operating in Commercial Office space accounted for over half (52.6 percent) of the businesses operating within the area of direct effects. Other Service accounted for 15.7 percent of businesses operating within the area of direct effects; over half (58.2 percent) of the Other Service businesses are involved in food service other than retail grocery. Commercial Retail accounted for 11.4 percent of the business activity within the area of direct effects. Other represented about 9.6 percent of the business activity within the area of direct effects; the majority of other activity identified is parking (44.8 percent). Residential Multi-Family use represents about 7 percent of the business activity within the area of direct effects. The sum of Industrial (both Marine and Non-Marine Dependent) and Government Service represented 3.7 percent of the business activity within the area of direct effects.

Exhibit 4-2. Business Types within One Block of the Project



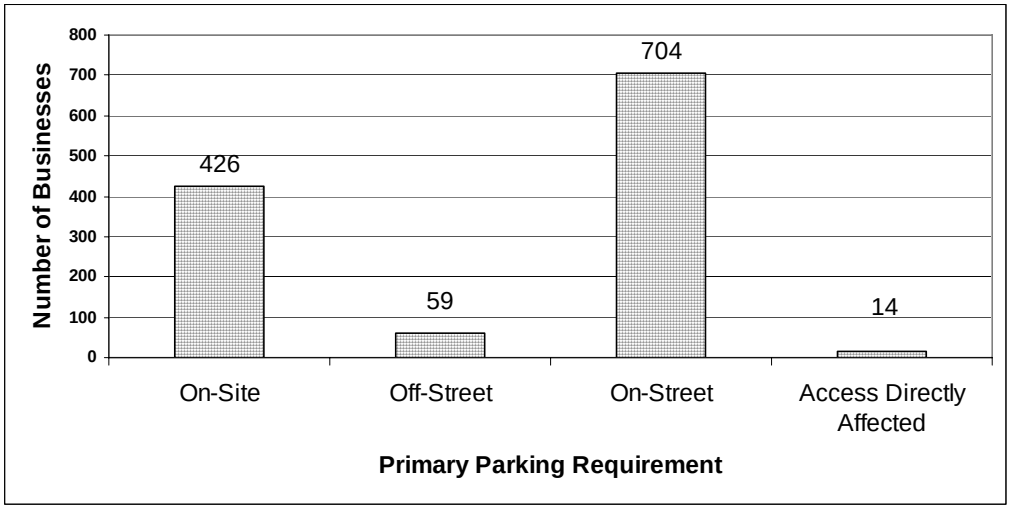
The breakdown of the size of businesses within one block of the project is presented in Exhibit 4-3. The vast majority (80 percent) of the businesses operating in the area of direct effects was estimated to be small (less than 20 employees). Medium-sized businesses (20 to 100 employees) accounted for 15.5 percent of the businesses operating in the area of direct effects. The remainder was almost equally split between large businesses (greater than 100 employees) at 2.4 percent and vacant businesses (no discernable business activity) at 2.1 percent.

Exhibit 4-3. Size of Businesses within One Block of the Project



The breakdown of primary parking availability for the businesses surveyed is presented in Exhibit 4-4. The visual survey indicated that the majority of businesses (58.5 percent) in the area of direct effects consider street parking the major element in their parking strategies for customers and employees. Almost a third of all businesses (35.4 percent) provide on-site parking for employees and customers. The remainder had either directly identifiable off-street parking (4.9 percent) or had access that would be directly affected by the project (1.2 percent).

Exhibit 4-4. Primary Parking Availability within One Block of the Project



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Chapter 5 OPERATIONAL IMPACTS AND BENEFITS

Potential impacts and benefits associated with the long-term operation and maintenance of each proposed alternative are identified and discussed below. Impacts and benefits resulting from construction activities are discussed in Chapter 6, Construction Impacts and Benefits. For each Build Alternative, the following issues are evaluated for long-term economic impacts: transportation, access (freight, commuter, and tourist), and visibility; parking; acquired property; and loss of government revenue. For the effects of the No Build Alternative, please refer to the discussion in Section 5.1 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

5.1 Impacts Common to the Tunnel (Preferred) and Elevated Structure Alternatives

Please refer to the discussion in Section 5.2 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

Exhibit 5-1 presents the estimated yearly O&M costs for the No Build and Build Alternatives.

Exhibit 5-1. Operations and Maintenance Costs by Alternative ($millions/year)

Alternative	O&M Cost Estimate	Variance in O&M Costs Over No Build Alternative
No Build	1.87	0
Tunnel (Preferred)	3.50	+1.63 (+87%)
Elevated Structure	2.22	+0.35 (+19%)

Compared with the No Build Alternative, annual O&M costs are somewhat higher for the Elevated Structure Alternative and substantially higher for either tunnel alignment. Since O&M continues to be financed by local revenue sources, the additional O&M expense likely reflects a shift of local revenues from other transportation elements in the Puget Sound region.

5.2 Tunnel Alternative (Preferred Alternative)

5.2.1 Traffic, Access, and Visibility

The Tunnel Alternative has one full interchange and several partial interchanges. There would be a split diamond interchange at S. Atlantic Street and S. Royal Brougham Way with access to S. King Street as well. The

Seneca and Columbia Street ramps would be removed. The highway-related measures of effectiveness that have a bearing on the economic performance of the project area include:

- Connectivity between other streets and highways.
- Pedestrian access.
- Freight traffic travel time between existing industrial areas.
- Freight train movements.

A discussion of the potential visibility of existing businesses by vehicle occupants from the road is presented below.

Duwamish/Harbor Island/SR 519 Connections – Connections in this area and related freight travel are generally the same as described in the 2004 Draft EIS Appendix P, Economics Technical Memorandum (Section 5.5.1).

Ballard Interbay Northend Manufacturing and Industrial Center (BINMIC) – For the Tunnel Alternative, the on-/off-ramps at Elliott and Western Avenues would be rebuilt. Two options are considered: on-/off-ramps over Elliott and Western Avenues with an overcrossing of the BNSF railroad tracks, or under Elliott and Western Avenues with an overcrossing of the BNSF railroad tracks and with Elliott and Western Avenues on bridges. Trucks traveling to and from BINMIC would use the same route as they currently do. Improvements to the Elliott/Western ramps under this alternative would improve freight connections compared to the existing facility.

Downtown Seattle Connections – Please refer to the discussion in Section 5.5.1 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

Pedestrian Access – Pedestrian access between the waterfront and the CBD is generally the same as described in Section 5.5.1 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum. The addition of three roadway bridges over Aurora Avenue N. would link the Uptown Urban Center business district with the South Lake Union business districts for pedestrians, bicyclists, and automobiles.

Travel Time – Travel times for the a.m. and p.m. peak hour travel are generally the same as those described in Section 5.5.1 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

Freight Train Movements – Although the new split diamond interchange configuration has been modified from the design considered in the Draft EIS, benefits to freight train movement remain.

Visual impacts and benefits associated with the Tunnel Alternative remain similar to those described in Section 5.5.1 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

5.2.2 Parking

A physical count of existing parking spaces within the project footprint was conducted for the project. Subsequently, estimates of potential parking were conducted for both of the alternatives. The estimates used the AWV Project Basic Configuration Drawings (June 2005) conceptual plan sets for on-street parking lanes and affected off-street parking areas. These conceptual plans are to be considered preliminary design efforts. The actual number of displaced parking spaces may be different based on the final design. The number of parking spaces required has increased compared to the Draft EIS due to the proposed improvements north of the Battery Street Tunnel, project design changes, and updated parking counts.

Specific business districts that rely heavily on available on-street parking, as presented in Section 4.7 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum (Inventory of Existing Businesses), include Pioneer Square, the waterfront, and the central section/commercial core. Fifty percent (50 percent) of the existing businesses within each of these districts rely on on-street parking as their primary parking requirement. The loss of between 840 and 871 on-street parking spaces is expected to especially affect small and medium-sized businesses in the Seattle CBD and central waterfront.

Stacked Tunnel

The stacked tunnel alignment would cause the permanent removal of approximately 1,723 parking spaces, of which 806 spaces would be on-street and 917 spaces would be off-street parking. The removal of 806 on-street parking spaces includes the loss of 376 short-term, metered parking spaces, which results in an annual decrease in City of Seattle parking revenues of $1,488,208. The loss of 376 short-term parking spaces represents about 6.0 percent of the short-term parking available within the Seattle CBD. The loss of 917 off-street parking spaces represents 1.7 percent of the long-term parking available within the Seattle CBD.

Option: Side-by-Side Tunnel

The side-by-side tunnel alignment would cause the permanent removal of approximately 1,754 parking spaces, of which 775 spaces would be on-street parking and 979 spaces would be off-street parking. The removal of 775 on-street parking spaces includes the loss of 345 short-term, metered parking spaces. The loss of these metered spaces would result in an annual decrease in City of Seattle parking revenues of $1,365,510. The loss of 345 short-term parking spaces represents about 5.5 percent of the short-term parking available within the Seattle CBD. The loss of 979 off-street parking spaces

represents 1.8 percent of the long-term parking available within the Seattle CBD.

5.2.3 Acquired Property

Stacked Tunnel

Construction of the stacked tunnel alignment would subject 47 parcels to acquisition (Exhibit 5-2). Of those 47 parcels subject to acquisition, 29 would be full acquisitions, while the remaining 18 would be partial acquisitions. Parcels subject to partial acquisition would retain any existing buildings (with the exception of Pier 36 – U.S. Coast Guard facilities), maintain their current function, and continue to pay property taxes. The amount of property taxes paid may change for properties subject to partial acquisition if they are reassessed by King County Department of Assessments. Because these reassessments would be on a case-by-case basis and would occur sometime after the completion of the right-of-way acquisition, we are not able to predict for this analysis what the change in property tax paid would be for parcels subject to partial acquisition.

Exhibit 5-2. Acquired Property Impacts from the Stacked Tunnel Alignment[1]

Property and Business Elements	Section			
	South	Central	North	Total
No. of parcels subject to acquisition	12	13	22	47
No. of parcels subject to full acquisition	4	11	14	29
No. of buildings acquired	3	5	6	14
Area of work space relocated or displaced (square feet)	73,580	179,031	165,760	418,371
Estimated no. of permanent jobs relocated or displaced	184	163	108	455
Property tax paid by fully acquired parcels ($)	13,248	123,510	202,258	339,016
Area of fully acquired tax-paying parcels (square feet)	42,403	94,826	134,016	271,245

[1] With Reconfigured Whatcom Railyard.

The economic impact of fully acquiring these parcels would be to permanently convert them from private to public ownership. Parcels in public ownership are exempt from paying King County and state property taxes on the assessed value of the parcel. The total amount of non-exempt (taxable) land to be fully acquired is 271,245 square feet (6.2 acres). Consequently, King County and the state would lose the ability to collect taxes from properties that paid approximately $339,016 in annual property

taxes. This estimate was based on actual amounts collected in 2002 by the King County Finance and Business Operations for all of the parcels to be acquired. The 2002 assessed value was used to compare the alternatives evaluated in this technical memorandum to those in the Draft EIS. This estimate is for 1 year and represents 0.1 percent of all property tax revenue collected by King County in 2002. The stacked tunnel alignment would cause a slight but permanent decrease in the number of available parcels across which the property tax load can be distributed.

Fourteen buildings representing 418,371 square feet of built space would need to be torn down in order to construct the stacked tunnel alignment. In addition to the economic impact associated with the loss of property tax revenue, the loss of parcels with buildings would result in the permanent displacement of approximately 455 workers. The number of workers was estimated based on the total square footage of each individual building, the use of the building (office, warehouse, retail), and the average square feet required per worker based on the use of the building (U.S. Department of Energy 2002). The permanent displacement of 455 workers represents 0.3 percent of the total 2000 Seattle CBD workforce.

In addition to relocated or displaced businesses and workers, potential losses in sales and use and business and occupation (B&O) tax revenues would occur. The potential loss of these tax revenues from the general tax revenue stream may be minimized if the displaced businesses relocate within the city of Seattle (see Appendix K, Relocations Technical Memorandum of the Draft EIS and Supplement al Draft EIS). Displaced businesses that relocate within the city of Seattle would continue to pay B&O taxes. The businesses and workers for these businesses would continue to pay sales and use taxes related to the expenditure of earnings within the regional economy. Even if the relocated or displaced businesses leave the city of Seattle but remain in the region, the jurisdiction of the new location would continue to collect B&O taxes that would continue to support the regional economy. The regional economy would only lose B&O revenue if the businesses close or relocate outside of the region.

Option: Side-by-Side Tunnel

Construction of the side-by-side tunnel alignment would subject 74 parcels to acquisition (Exhibit 5-3). Of those 74 parcels subject to acquisition, 58 would be full acquisitions, while the remaining 16 would be partial acquisitions. Parcels subject to partial acquisition would retain any existing buildings (with the exception of Pier 36 – U.S. Coast Guard facilities), maintain their current function, and continue to pay property taxes. The amount of property taxes paid may change for properties subject to partial acquisition if they are reassessed by King County Department of Assessments. Because these

reassessments would be on a case-by-case basis and would occur sometime after the completion of the right-of-way acquisition, we are not able to predict for this analysis what the change in property tax paid would be for parcels subject to partial acquisition. The total amount of non-exempt (taxable) land to be fully acquired is 753,303 square feet (17.3 acres). As a result of this alignment, King County and the state would lose the ability to collect taxes from properties that paid approximately $705,933 in annual property taxes. This estimate is for 1 year and represents 0.2 percent of all property tax revenue collected by King County in 2002. This alignment would cause a slight but permanent decrease in the number of available parcels across which the property tax load can be distributed.

Twenty-nine buildings representing 654,459 square feet of built space would need to be torn down in order to construct the side-by-side tunnel alignment. In addition to the economic impact associated with the loss of property tax revenue, the loss of parcels with buildings would result in the permanent displacement of approximately 637 workers. The permanent displacement of 637 workers represents 0.5 percent of the total 2000 Seattle CBD workforce.

Exhibit 5-3. Acquired Property Impacts from the Side-by-Side Tunnel Alignment[1]

Property and Business Elements	Section			
	South	Central	North	Total
No. of parcels subject to acquisition	16	16	42	74
No. of parcels subject to full acquisition	7	14	37	58
No. of buildings acquired	6	6	17	29
Area of work space relocated or displaced (square feet)	226,158	195,631	232,670	654,459
Estimated no. of permanent jobs relocated or displaced	274	177	186	637
Property tax paid by fully acquired parcels ($)	91,113	148,811	466,009	705,933
Area of fully acquired tax-paying parcels (square feet)	262,781	117,790	372,732	753,303

[1] With Relocated Whatcom Railyard.

5.2.4 South – S. Spokane Street to S. Dearborn Street

In the south section of the project, the stacked tunnel alignment would result in the full acquisition of four parcels and slightly less than 12,000 square feet of workspace. In addition, two of the buildings at Pier 36, which is a portion of the Terminal 46 parcel, that are currently used by the U.S. Coast Guard would be acquired through partial acquisition of Port of Seattle property. The two U.S. Coast Guard buildings are estimated at 61,700 square feet in total.

The side-by-side tunnel alignment would require fully acquiring seven parcels and slightly less than 165,000 square feet of workspace, in addition to the acquisition of the two U.S. Coast Guard buildings.

In the south section (the stadium region), both the stacked and the side-by-side tunnel alignments would result in a loss of 416 on-street parking spaces and a loss of 374 off-street parking spaces.

5.2.5 Central – S. Dearborn Street to Battery Street Tunnel

In the central section of the project, the stacked tunnel alignment would result in the full acquisition of 11 parcels and slightly less than 180,000 square feet of workspace. The side-by-side tunnel alignment would require fully acquiring 14 parcels and slightly more than 195,000 square feet of workspace.

For either tunnel alignment, the on-street parking in the central section would decrease overall by 259 spaces. The majority of the on-street parking spaces lost (225 spaces) would be under the viaduct from Yesler Way to Pine Street. Off-street parking in the central section would be reduced by 433 spaces for the stacked tunnel alignment and by 302 spaces for the side-by-side tunnel alignment.

5.2.6 North Waterfront – Pine Street to Broad Street

In the north waterfront section, property acquisitions for the current alternatives are limited to the Pier 62/63 area, are the same for both alternatives, and are accounted for in the discussion of impacts to the north section for both alternatives. Pier 62/63 is required for construction staging (as opposed to right-of-way).

Both the stacked and the side-by-side tunnel alignments would result in a net increase of 22 on-street parking spaces. No off-street parking spaces would be lost with either the stacked or side-by-side tunnel alignments.

5.2.7 North – Battery Street Tunnel to Comstock Street

This section of the project corridor would experience the bulk of the acquired property impacts associated with the Tunnel Alternative. For the stacked tunnel alignment, 14 parcels, 6 buildings, and slightly more than 165,000 square feet of workspace would be fully acquired. The side-by-side tunnel alignment would require fully acquiring 37 parcels, 17 buildings, and slightly more than 230,000 square feet of workspace.

North of the Battery Street Tunnel, the stacked tunnel alignment would result in a decrease of 11 short-term, on-street parking spaces while the side-by-side tunnel alignment would result in an increase in 20 short-term, on-street

parking spaces. Off-street parking would be reduced by 110 spaces for the stacked tunnel alignment and 303 spaces for the side-by-side tunnel alignment.

5.2.8 Seawall – S. Washington Street to Broad Street

There would be no parking and acquired property impacts associated with this section.

5.3 Elevated Structure Alternative

5.3.1 Traffic, Access, and Visibility

The updated Elevated Structure Alternative would be similar to the Aerial Alternative described in the Draft EIS, because the new Elevated Structure Alternative would be wider than the existing viaduct. Impacts and benefits to traffic, access, and visibility would be similar to those described in Section 5.4.1 of the Draft EIS for both the Rebuild and Aerial Alternatives.

5.3.2 Parking

The Elevated Structure Alternative would cause the permanent removal of approximately 822 parking spaces, of which 344 would be on-street parking and 538 would be off-street parking. The removal of 344 on-street parking spaces includes the loss of 350 long-term parking spaces and a loss of 68 short-term, metered parking spaces. The loss of these metered spaces would result in an annual decrease in City of Seattle parking revenues of $269,144. The loss of 68 short-term parking spaces represents about 1.1 percent of the short-term parking available within the Seattle CBD. The loss of 538 off-street parking spaces represents 1.0 percent of the long-term parking available within the Seattle CBD.

5.3.3 Acquired Property

Reconfigured Whatcom Railyard

Construction of the Elevated Structure Alternative with the Reconfigured Whatcom Railyard would subject 47 parcels to acquisition (Exhibit 5-4). Of those 47 parcels subject to acquisition, 28 would be full acquisitions, while the remaining 19 would be partial acquisitions. Parcels subject to partial acquisition would retain any existing buildings (with the exception of Pier 36 – U.S. Coast Guard facilities), maintain their current function, and continue to pay property taxes. The amount of property taxes paid may change for properties subject to partial acquisition if they are reassessed by King County

Department of Assessments. Because these reassessments would be on a case-by-case basis and would occur sometime after the completion of the right-of-way acquisition, we are not able to predict for this analysis what the change in property tax paid would be for parcels subject to partial acquisition.

Exhibit 5-4. Acquired Property Impacts from the Elevated Structure Alternative with Reconfigured Whatcom Railyard

Property and Business Elements	Section			
	South	Central	North	Total
No. of parcels subject to acquisition	12	13	22	47
No. of parcels subject to full acquisition	4	10	14	28
No. of buildings acquired	3	4	6	13
Area of work space relocated or displaced (square feet)	73,580	166,631	165,760	405,971
Estimated no. of permanent jobs relocated or displaced	184	147	109	440
Property tax paid by fully acquired parcels ($)	13,248	83,900	202,258	299,406
Area of acquired tax-paying parcels (square feet)	42,403	88,035	134,016	264,454

The economic impact of fully acquiring these parcels would be to permanently convert them from private to public ownership. Parcels in public ownership are exempt from paying King County and state property taxes on the assessed value of the parcel. The total amount of non-exempt (taxable) land to be fully acquired is 264,454 square feet (6.1 acres). Consequently, King County and the state would lose the ability to collect taxes from properties that paid approximately $299,406 in annual property taxes. This estimate was based on actual amounts collected in 2002 by the King County Finance and Business Operations for all of the parcels to be acquired. The 2002 assessed value was used to compare the alternatives evaluated in this technical memorandum to those in the Draft EIS. This estimate is for 1 year and represents 0.1 percent of all property tax revenue collected by King County in 2002. This alternative would cause a slight but permanent decrease in the number of available parcels across which the property tax load can be distributed.

Thirteen buildings representing 405,971 square feet of built space would need to be torn down to construct the Elevated Structure Alternative with the Reconfigured Whatcom Railyard. In addition to the economic impact associated with the loss of property tax revenue, the loss of parcels with buildings would result in the permanent displacement of approximately

440 workers. The permanent displacement of 440 workers represents 0.3 percent of the total 2000 Seattle CBD workforce.

Option: Relocated Whatcom Railyard

Construction of the Elevated Structure Alternative with the Relocated Whatcom Railyard Option would subject 51 parcels to acquisition (Exhibit 5-5). Of those 51 parcels subject to acquisition, 31 would be full acquisitions, while the remaining 20 would be partial acquisitions. Parcels subject to partial acquisition would retain any existing buildings (with the exception of Pier 36 – U.S. Coast Guard facilities), maintain their current function, and continue to pay property taxes at their current rates. The total amount of non-exempt (taxable) land to be fully acquired is 484,832 square feet (11.1 acres). Consequently, King County and the state would lose the ability to collect taxes from properties that paid approximately $377,271 in annual property taxes. This estimate is for 1 year and represents 0.1 percent of all property tax revenue collected by King County in 2002. This alignment would cause a slight but permanent decrease in the number of available parcels across which the property tax load can be distributed.

Exhibit 5-5. Acquired Property Impacts from the Elevated Structure Alternative with Relocated Whatcom Railyard

Property and Business Elements	Section			
	South	Central	North	Total
No. of parcels subject to acquisition	16	13	22	51
No. of parcels subject to full acquisition	7	10	14	31
No. of buildings acquired	6	4	6	16
Area of work space relocated or displaced (square feet)	226,158	166,631	165,760	558,549
Estimated no. of permanent jobs relocated or displaced	274	147	109	530
Property tax paid by fully acquired parcels ($)	91,113	83,900	202,258	377,271
Area of acquired tax-paying parcels (square feet)	362,101	88,035	134,016	484,832

Sixteen buildings representing 558,549 square feet of built space would need to be torn down to construct the Elevated Structure Alternative with the Relocated Whatcom Railyard Option. In addition to the economic impact associated with the loss of property tax revenue, the loss of parcels with buildings would result in the permanent displacement of approximately 530 workers. The permanent displacement of 530 workers represents 0.4 percent of the total 2000 Seattle CBD workforce.

Another economic impact from acquiring property for the project is the potential loss in sales, use, and B&O tax revenues, as described previously in Section 5.2.3.

5.3.4 South – S. Spokane Street to S. Dearborn Street

In the south section of the project, the Elevated Structure Alternative with the Reconfigured Whatcom Railyard would require fully acquiring four parcels, including one building with about 12,000 square feet of workspace. The Elevated Structure Alternative with the Relocated Whatcom Railyard Option would result in fully acquiring seven parcels, including four buildings with about 165,000 square feet of workspace. For both options, two of the buildings at Pier 36, which is a portion of the Terminal 46 parcel, that are currently used by the U.S. Coast Guard would be acquired through partial acquisition of Port of Seattle property. The two U.S. Coast Guard buildings are estimated at 61,700 square feet in total. The Elevated Structure Alternative would result in a loss of 283 on-street parking spaces and 34 off-street parking spaces in the south. The 283 on-street parking spaces include 22 short-term parking spaces and 261 long-term parking spaces.

5.3.5 Central – S. Dearborn Street to Battery Street Tunnel

In the central section of the project, 10 parcels would need to be fully acquired, including four buildings with a little over 165,000 square feet of workspace. The Elevated Structure Alternative would decrease the on-street parking overall by 135 spaces. The 135 on-street parking spaces include 120 short-term parking spaces and 15 long-term parking spaces. The majority of the on-street short-term spaces lost (104 spaces) would be under the viaduct from Yesler Way to Pine Street. Off-street parking in the central section would be reduced by 114 spaces.

5.3.6 North Waterfront – Pine Street to Broad Street

In the north waterfront section, property acquisitions for the current alternatives are limited to the Pier 62/63 area, are the same for both alternatives, and are accounted for in the discussion of impacts to the north section for both alternatives. Pier 62/63 is required for construction staging (as opposed to right-of-way).

The Elevated Structure Alternative would result in an increase of 85 short-term, on-street parking spaces. No off-street parking spaces would be lost.

5.3.7 North – Battery Street Tunnel to Comstock Street

As with the Tunnel Alternative, this section of the project corridor would experience the bulk of the acquired property impacts. Fourteen parcels, including six buildings, would be fully acquired. A little more than 165,000 square feet of built space would be lost with the acquisition of the six buildings.

North of the Battery Street Tunnel, the Elevated Structure Alternative would result in a loss of 11 short-term, on-street parking spaces. There would be no loss of on-street long-term parking. Off-street parking would be reduced by 110 spaces.

5.3.8 Seawall – S. Washington Street to Broad Street

There would be no parking and acquired property impacts associated with this section.

5.4 Operational Benefits

5.4.1 Transportation, Access, and Visibility

Operational benefits to transportation, access, and visibility for both the Tunnel and Elevated Structure Alternatives remain similar to the benefits for each respective alternative described in the Draft EIS. In addition, both the Tunnel and Elevated Structure Alternatives would benefit from options to lower Aurora Avenue N. and the improved transportation linkages north of the Battery Street Tunnel.

5.4.2 Indirect Benefits

Economic benefits could result from implementing either the Tunnel or Elevated Structure Alternative; however, the degree of economic benefits would depend on the final design of the facility. Both Build Alternatives would benefit from either the Partially Lowered Aurora or the Lowered Aurora Option north of the Battery Street Tunnel. Pedestrian access would also benefit from three new through streets linking South Lake Union and the Uptown Urban Center neighborhoods.

It is expected that a subsurface structure (the Tunnel Alternative) would have substantially less visual and noise impacts than an elevated structure (the Elevated Structure Alternative) along the central waterfront. The proposed Elevated Structure Alternative would require a larger footprint than the existing viaduct in order to correct roadway width deficiencies. This would increase the visual impact for the Elevated Structure Alternative compared to both the No Build Alternative and the Tunnel Alternative. However, the

Elevated Structure Alternative would still have lower sound levels than the No Build Alternative due to the implementation of noise impact mitigation in the form of sound absorptive treatment. Dust and air pollution would also be less with the Tunnel Alternative.

A subsurface structure could help facilitate additional pedestrian activity along the central waterfront and a greater sense of connection between the waterfront and downtown. This increased sense of connection would be the result of the removal of a visual barrier and a continuous noise source that would exist between the Seattle CBD and the waterfront under the No Build and Elevated Structure Alternatives. The increased activity and sense of connectivity could generate a less inhibited and more attractive environment for reinvestment than currently exists. The resulting economic benefits would be increased opportunities for investment, vitality, and revitalization of nearby areas.

According to the City of Seattle's *Draft Seattle's Central Waterfront Concept Plan* (Seattle Department of Planning and Development 2006), new development offers the opportunity to create public space and other amenities that complement the public realm. For the reasons listed above, it would be expected that the Tunnel Alternative would provide a substantially higher degree of investment opportunity along the central waterfront than the Elevated Structure Alternative. For the portions of the project corridor other than the central waterfront, both the Tunnel and Elevated Structure Alternatives would provide roughly the same degree of investment opportunity because of the similarity of design between the two alternatives.

These benefits would occur over time with the revitalization and reinvestment in the project area, particularly in the central waterfront, once construction activities are complete. Revitalization and reinvestment could increase surrounding property values, stimulate more economic activity (such as new visitor spending), enable opportunities for new or expanded business and employment, and generate more increased revenues. This revitalization and redevelopment associated with the waterfront portion of the Tunnel Alternative could result in substantially increased economic activity compared to the waterfront portion of both the Elevated Structure Alternative and the No Build Alternative.

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Chapter 6 CONSTRUCTION IMPACTS AND BENEFITS

6.1 Impacts Common to the Tunnel (Preferred) and Elevated Structure Alternatives

6.1.1 Regional Economic Activity

Significant regional and state economic impacts would result from the construction of either of the Build Alternatives relative to the No Build Alternative. The intent of this chapter is to assess the likely overall economic impacts that would be attributed to construction, as measured by increases in regional and state activity, employment, and associated job earnings. The detailed analysis, including the implementation of the Regional Input-Output Modeling System (RIMS II) input-output model, is presented in Attachment A of this technical memorandum as well as Section 6.1 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

Construction expenditures would occur over a number of years, directly creating new demand for construction materials and labor. These direct impacts would then lead to indirect or secondary impacts, as the production of output by firms in other industries increases to supply the demand for inputs to the construction industry. Both the direct and indirect impacts of construction expenditures cause firms in all industries to employ more workers to meet increases in demand; this leads to induced impacts as the additional wages and salaries paid to workers lead to higher consumer spending.

Project Capital Costs

For purposes of assessing the economic impacts on output, earnings, and employment, the focus is placed on the project capital costs (construction and right-of-way acquisition) of the two Build Alternatives as an accurate measure of the capital investment that would likely occur for the project. It is assumed that no project capital costs would be incurred in the No Build Alternative (Scenario 1 only).

Exhibit 6-1 lists the project capital cost estimates, distribution of funding sources, and regional and state new money estimates for both of the Build Alternatives. The distribution of funding sources has been developed by the design team and is only a list of potential funding mechanisms currently available. Percentage shares of the capital cost estimates are also provided. For purposes of examining the regional economic impacts, all of the federal earmark grants and federal general funding are assumed to be new money

that would otherwise not be spent either regionally or within the state in the absence of the project. All state, regional, and city funding sources are assumed to be expended with or without this project as these are tax-based funding of local and/or state residents specifically earmarked for transportation projects within the region or state.

Exhibit 6-1. Capital Costs and Funding Sources by Alternative

Alternative	Capital Cost Estimate ($ millions)	Funding Source ($ millions and Share)					New Money Impacts ($ millions and Share)	
		Federal Committed	State Committed	City Committed	City Committed and Anticipated	Surplus/ Gap	Tacoma Seattle Region Committed	State Committed
Tunnel Alternative								
Stacked Tunnel (Preferred)	3,420	240 (7.0%)	2,193 (64%)	16 (0.5%)	766 (22%)	Gap 206–972	240 (7.0%)	240 (7.0%)
Side-by-Side Tunnel	3,760	240 (6.4%)	2,193 (58%)	16 (0.4%)	766 (20%)	Gap 546–1,312	240 (6.4%)	240 (6.4%)
Elevated Structure Alternative	2,261	240 (10.6%)	2,193 (97%)	16 (0.7%)	766 (34%)	Surplus 187–953	240 (10.6%)	240 (10.6%)

This calculation of "new money" impacts does not take into account the effect of additional funding for the Tunnel Alternative that would not otherwise be spent in the region or state on transportation projects. For example, if a Local Improvement District (LID) is created, it could generate money that would be spent only if the tunnel is built. This "new (local) money" would change the share of new money impacts. If the LID generated $250 million, then the new money would provide 14.3 percent for the Tunnel Alternative compared to 10.6 percent for the Elevated Structure Alternative, using the estimated costs in Exhibit 6-1 and in Exhibit A-1 in Attachment A. Up to $1 billion of new local money might be generated from all sources, in which case the Tunnel Alternative share would rise to 29.2 percent. There may be a distinction between the local and state impacts of this new money, and this will be further analyzed in the Final EIS after the additional funding sources are identified.

Summary of Gross Economic Impacts

For each of the alternatives, for every dollar spent on construction capital cost, two dollars of additional economic activity would be generated in the Seattle-Tacoma region, and slightly more than two dollars statewide. The additional economic activity would occur across all economic and labor sectors. For each of the alternatives, every dollar spent on capital costs translates directly into $0.55 in new wages and salary earnings for the jobs generated outside of the construction field.

Under the stacked tunnel alignment, new demand for construction would generate gross direct impacts equal to the capital cost of $3,420 million of construction dollars. The gross multiplied impact on output would total approximately $6,880 million for all industries not directly involved with the reconstruction of the viaduct. Of this amount, $1,951 million would be paid to workers as wage and salary earnings for the jobs generated beyond those directly involved with the reconstruction of the viaduct. The estimated average number of jobs related to the construction of the Tunnel Alternative would range between 1,085 and 1,125 jobs per year, representing about $112 million in wages per year. The average number of jobs related to the construction of the Elevated Structure Alternative under the longer construction plan is estimated to be about 670 jobs per year representing about $67 million in wages per year.

These figures do not include the secondary benefits presented in Section 5.4.2 that are related to indirect benefits that may occur after completion of the reconstruction of the viaduct.

For the Elevated Structure Alternative, new demand for construction would generate gross direct impacts equal to the capital cost of $2,261 million of construction dollars. The gross multiplied impact on output would total approximately $4,494 million for all industries not directly involved with the reconstruction of the viaduct. Of this amount, $1,249 million would be paid to workers as wage and salary earnings for the jobs generated beyond those directly involved with the reconstruction of the viaduct.

Summary of Net Economic Impacts

For the portion of the project funding that comes from the federal government (outside of the region or state), the net impact on the regional economy on this new money would be less than the gross impact associated with the expenditure of all of the construction capital cost. Under the stacked tunnel alignment, the same new demand for construction expenditures would generate net direct impacts equal to $239 million (7.0 percent of $3,420 million) of construction dollars after accounting for local funds that would otherwise still be spent in the regional economy with similar multiplied impacts. The net multiplied impact on output would total $482 million for all industries not directly involved with the reconstruction of the viaduct. Of this amount, $137 million would be paid to workers as wage and salary earnings for the net new jobs created beyond those directly involved with reconstruction of the viaduct. This does not include the secondary benefits presented in Section 5.4.2 that are related to the indirect benefits that may occur after completion of the reconstruction of the viaduct.

For the Elevated Structure Alternative, the same new demand for construction expenditures would generate net direct impacts equal to $240 million (10.6 percent of $2,261 million) of construction dollars after accounting for local funds that would otherwise still be spent in the regional economy with similar multiplied impacts. The net multiplied impact on output would total $476 million for all industries not directly involved with the reconstruction of the viaduct. Of this amount, $132 million would be paid to workers as wage and salary earnings for the net new jobs created beyond those directly involved with reconstruction of the viaduct.

Summary of Benefits for Regional Economic Activity

The cost associated with construction of either of the Build Alternatives would result in additional (gross) activity throughout all economic sectors within the Puget Sound region and the state of Washington. This gross economic activity is derived from the multiplication effects on the capital expenditures for the project. Examples of capital expenditures include the direct hiring of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new right-of-way.

The amount of new economic activity directly associated with these alternatives that is the result of new money entering the Puget Sound regional economy is roughly equivalent for the Tunnel and Elevated Structure Alternatives and ranges between $476 million and $482 million. The amount of new earnings (wages) entering the Puget Sound regional economy ranges from $132 million to $137 million. The amount of new money is assumed to be fixed (equal across all alternatives), and the portion of new money to overall construction costs ranges from 6.4 to 10.6 percent depending on the Build Alternative. All other fund sources are coming from within either the state or the Puget Sound region and would likely be spent in the local economy, even in the absence of this project.

6.1.2 Temporary Economic Effects to Businesses, Including Construction Expenditures on Sales Tax Revenue

Sales Tax Revenue

Sales taxes would be generated through the purchase of goods and materials related to construction. Exhibit 6-2 lists the estimated amount of sales tax generated for either alternative based on construction costs only. Sales tax estimates were not generated for non-construction costs such as right-of-way acquisition and engineering.

Exhibit 6-2. Total Construction Costs and Sales Tax Generated ($ millions)

Alternative	Total Construction Cost	Total Sales Tax Generated
Tunnel Alternative		
Stacked Tunnel (Preferred)	3,050	223
Side-by-Side Tunnel	3,330	243
Elevated Structure Alternative	1,900	141

The project sales tax estimates are based on the construction cost estimates presented in Section 6.1.1. These estimates will be refined once additional information is known regarding project design and funding.

These sales tax estimates are only related to direct construction expenditures. This analysis does not include an evaluation of the change in sales tax revenue collected by businesses in the project area that potentially would be affected by construction activities.

Disruption to Businesses and Neighborhoods

Any major construction project, public or private, inconveniences or disturbs the residents, businesses, and business customers adjacent to that construction project. As a result of the inventory of existing businesses (Section 4.3) within one block of the existing alignment, the design team has identified approximately 1,200 businesses (including multi-family residential buildings) adjacent to the project that would experience disruption due to construction. These temporary effects include:

- Presence of construction workers, heavy construction equipment, and materials.
- Temporary road closures, traffic diversions, and alterations to property access (see Appendix C, Transportation Discipline Report of the Draft EIS and Supplemental Draft EIS).
- Loss of parking, especially on-street short-term parking (Section 6.1.6).
- Airborne dust (see Appendix Q, Air Quality Discipline Report of the Draft EIS and Supplemental Draft EIS).
- Noise and vibrations from construction equipment and vehicles (see Appendix F, Noise and Vibration Discipline Report of the Draft EIS and Supplemental Draft EIS).
- Decreased visibility and loss of access to businesses by customers.

Up to 169 active commercial and industrial buildings are located within 50 feet of the project alignment that are not candidates for acquisition. Many of these buildings in the central section have multiple businesses occupying them. Some businesses located in these buildings may suffer little or no

adverse impacts, while others may experience a noticeable decline in sales, increase in costs, and/or decrease in efficiency.

Without proper planning and implementation of mitigation, these construction-related effects could adversely affect the comfort and daily life of residents and inconvenience or disrupt the flow of customers, employees, and materials and supplies to and from businesses. Construction impact controls will be integrated into the Project Management Plan, the Business Mitigation Plan, and the project's contract specifications and special provisions.

6.1.3 Temporary Change in Vehicular, Transit, and Pedestrian Access to Existing Businesses in the Construction Area

A detailed analysis of the impacts on the existing roadway system during construction is presented in the 2006 Appendix C, Transportation Discipline Report. In general, the Tunnel and Elevated Structure Alternatives would cause severe traffic impacts during construction in the corridor. Although the Elevated Structure Alternative's longer construction plan would completely close the SR 99 corridor for only 3 months, it would not necessarily result in fewer or more moderate traffic impacts than the Tunnel Alternative with the intermediate plan's SR 99 closure of 18 to 27 months or with the shorter plan's complete closure of the corridor for up to 42 months (3.5 years).

6.1.4 Temporary Jobs Created During Construction

With adoption of either Build Alternative, temporary jobs would be created to construct the project. The duration of these temporary jobs varies by alternative and construction plan but is expected to be between 7 and 10 years.

Estimates of the direct labor force needed to construct the project were prepared for each alternative. The estimates of the direct jobs generated by the project were calculated based on the approximate cost for construction contracts, assuming that 40 percent of the total construction cost would be absorbed by labor and that the average labor rate in 2005 would be $48 per hour (with an escalation for inflation in later years).

For the Tunnel Alternative, the average number of jobs directly related to construction would range from 1,086 to 1,125 jobs per year, although up to 1,500 workers per day could be required during the most intense period of construction. For this analysis, an average of 1,100 jobs per year is generally assumed. These direct jobs needed to construct the Tunnel Alternative would generate approximately $112 million in direct wages per year. Assuming that the duration of the reconstruction follows the intermediate plan (between

8 and 8.75 years), the total construction labor for the project would range from 9,000 to 9,500 person-year jobs.

For the Elevated Structure Alternative, the average number of jobs directly related to construction would be about 670 jobs per year. The Elevated Structure Alternative would generate approximately $67 million in direct wages per year. Assuming that the duration of the reconstruction follows the longer plan (10 years), the total construction labor for the project would be 6,700 person-year jobs.

Under the Tunnel Alternative, new demand for construction would generate gross direct impacts equal to the capital cost of $3,420 million to $3,760 million of construction dollars. The gross multiplied impact on output would total approximately $6,880 million to $7,550 million for all industries not directly involved with the reconstruction of the viaduct. Of this amount, $1,951 million to $2,137 million would be paid to the 28,100 to 28,800 workers as wage and salary earnings for the jobs generated beyond those directly involved with the replacement of the viaduct.

Under the Elevated Structure Alternative, new demand for construction would generate gross direct impacts equal to the capital cost of $2,261 million of construction dollars. The gross multiplied impact on output would total approximately $4,494 million for all industries not directly involved with the reconstruction of the viaduct. Of this amount, $1,323 million would be paid to the 21,300 workers as wage and salary earnings for the jobs generated beyond those directly involved with the replacement of the viaduct.

The amount of new indirect and induced earnings (wages) as a result of new money entering the Puget Sound economy ranges from $132 million (Elevated Structure Alternative) to $137 million (Tunnel Alternative), which are roughly equivalent.

Summary of Benefits for Employment

Compared with the existing conditions, the employment associated with the construction of either of the Build Alternatives would result in additional (gross) employment throughout all economic sectors within the Puget Sound region and the state of Washington. This gross employment is derived from the multiplication effects on the capital expenditures for the project. Examples of capital expenditures include the direct hiring of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new right-of-way. Of the two alternatives evaluated in this technical memorandum, the Tunnel Alternative has the greater estimated capital cost, which would generate the most direct, indirect, and induced jobs within the Puget Sound region.

The number of new jobs directly associated with these alternatives that are the result of new money entering the Puget Sound regional economy is roughly equivalent for the Tunnel and Elevated Structure Alternatives and ranges between 1,800 and 2,300 jobs. This is because the amount of new money is assumed to be fixed (equal across all alternatives), and the portion of new money to overall construction costs ranges from 6.4 to 10.6 percent depending on the Build Alternative. All other fund sources are coming from within either the state or the Puget Sound region and would likely be spent in the local economy even without this project.

6.1.5 Economic Impacts to Ferries and Cruise Ships

The economic impacts to ferries and cruise ships are the same as those described in Section 6.1.5 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

6.1.6 Economic Impacts of the Potential Loss of Available Parking

Based on an inventory of all existing parking spaces within the project footprint, it was determined that 3,703 spaces would be lost for the entire construction period. The number of parking spaces required has increased compared to the Draft EIS due to the proposed improvements north of the Battery Street Tunnel, project design changes, and updated parking counts. These spaces include a mix of short-term on-street (metered), long-term on-street, and off-street spaces. The 3,703 existing spaces are broken down as follows:

- South section (S. Spokane Street to S. Dearborn Street) – 1,360 total spaces split between on-street short-term (101), on-street long-term (415), and off-street (844) spaces.
- Central section (S. Dearborn Street to Battery Street Tunnel) – 1,396 total spaces split between on-street short-term (611), on-street long-term (15), and off-street (770) spaces.
- North Waterfront section (Pine Street to Broad Street) – 185 total spaces, all of which are on-street short-term spaces.
- North section (Battery Street Tunnel to Comstock Street) – 762 total spaces split between on-street short-term (123), on-street long-term (196), and off-street (443) spaces.

The loss of on-street short-term parking would result in the annual loss of approximately $4,037,160 in parking meter revenue for the City of Seattle. This loss would occur each year for the duration of the construction phase of the project. The City would also lose revenue associated with off-street parking garage license fees.

The loss of 1,020 short-term parking spaces represents about 16.2 percent of the short-term parking available within the Seattle CBD. The loss of 2,057 off-street parking spaces represents 3.8 percent of the long-term parking available within the Seattle CBD. The 2004 Parking Inventory for the Central Puget Sound Region, published by the Puget Sound Regional Council in November 2004, found that the parking occupancy rate for off-street parking in the Seattle CBD was 63.9 percent.

Specific business districts that rely heavily on available on-street parking, as presented in Section 4.7 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum (Inventory of Existing Businesses), include Pioneer Square, the waterfront, and the central section/commercial core. Fifty percent (50 percent) of the existing businesses within each of these districts rely on on-street parking as their primary parking requirement. All three of these districts would be affected by the total loss of 1,396 spaces counted within the central section.

In the Draft EIS, the Fifth Avenue parking lot at the Seattle Center was identified for project-related parking during construction; however, this lot is no longer available. Up to 2,000 spaces may be required during the most intense periods of construction activities. One alternative would be for construction contractors to arrange for off-street parking in the vicinity of construction. These costs would likely be included in construction capital costs.

Another alternative is to transport workers via buses from outlying areas into the construction area. This alternative would be expected to increase non-productive labor time and therefore project cost. However, downtown workers, business customers, and tourists would continue to have access to and use of parking lots and parking spaces in the CBD and in close proximity to the waterfront.

6.2 Tunnel Alternative (Preferred Alternative)

6.2.1 Stacked Tunnel Alignment

The stacked tunnel alignment would have all of the same construction-related effects described above for the various economic factors. There are two construction plans being considered for the stacked tunnel alignment. The first is an intermediate plan, defined as the SR 99 corridor being closed for 18 to 27 months. The intermediate plan assumes periods where the northbound lanes are closed and the southbound lanes are open and vice versa. For either tunnel alignment, the overall construction duration for the intermediate plan would be 8 to 8.75 years.

The second construction plan is a shorter plan, defined as the SR 99 corridor being fully closed for a minimum of 42 months. The overall construction duration for the shorter plan would be 7 years for either tunnel alignment.

For more detail on the construction sequencing and stages for the Tunnel Alternative, see the 2006 Supplemental Draft EIS Appendix B, Alternatives Description and Construction Methods Technical Memorandum.

With respect to disruption to businesses, approximately 144 active commercial and industrial buildings are located within 50 feet of the project alignment for the stacked tunnel alignment that are not candidates for acquisition.

6.2.2 Side-by-Side Tunnel Alignment

The side-by-side tunnel alignment would have all of the same construction-related effects described above for the various economic factors.

As with the stacked tunnel alignment, the intermediate plan and shorter plan are being considered.

With respect to disruption to businesses, approximately 169 active commercial and industrial buildings are located within 50 feet of the project alignment for the side-by-side tunnel alignment that are not candidates for acquisition. Many of these buildings in the central section have multiple businesses occupying them. These are a subset of the approximately 1,200 businesses identified within one block of the existing alignment that would be affected during construction. Some businesses located in these buildings may suffer little or no adverse impacts, while others may experience economic hardships, such as a noticeable decline in sales, increase in costs, and/or decrease in efficiency.

6.2.3 Intermediate Plan

This construction plan would close SR 99 for between 18 and 27 months. The closure of SR 99 would force traffic to use the existing surface street network, which would have potential economic effects within the project area. These potential economic effects would primarily be because of the increased traffic and congestion on the existing surface streets and can be grouped into the following categories:

Immediate Corridor – Use of the existing Alaskan Way surface street (between S. Walker Street and the southern portal of the Battery Street Tunnel) during the entire construction period would be severely curtailed and would be limited to only local access. Some of the surface street traffic may use Western Avenue, one block east of the immediate corridor, but most of the traffic would be displaced from the immediate corridor. The closure of the Alaskan Way surface street to through traffic, together with the presence

of construction materials, equipment, and activities, would make access to the businesses along the corridor very difficult and would inhibit pedestrian use of the Alaskan Way surface street. These traffic impacts could result in secondary economic impacts to the businesses along the corridor by decreasing the number of customers willing to patronize those businesses.

Displacement from the Corridor – Most of the displaced traffic would use the existing network of north-south streets (First, Second, Fourth, and Fifth Avenues) and Interstate 5 (I-5) while the viaduct is closed. This spillover onto the downtown street network would increase traffic and congestion within downtown and would result in secondary economic impacts on downtown businesses. In addition, it may be necessary to remove a substantial portion of on-street parking on the streets that receive the spillover traffic in order to maintain capacity. The number of removed on-street short-term parking spaces will be quantified for the Final EIS. This would result in additional lost revenue for the City of Seattle, above and beyond that presented in Section 6.1.6. The removal of additional parking would also have a secondary effect on the removal of truck delivery unloading zones. This would increase the difficulty of delivering food, office equipment, office supplies, and retail products to businesses within the Seattle CBD. Some of the existing on-street parking on east-west streets may have to be converted to truck delivery unloading zones or truck deliveries may have to be restricted to off-peak hours during the construction period.

With the exception of I-5, none of the streets listed above within the CBD are designated as Major Truck Streets by the Seattle Department of Transportation. Consequently, freight traffic that currently moves between the BINMIC and the Duwamish Manufacturing and Industrial Center on the viaduct would have to take I-5, which is already at or near capacity, unless another truck route is designated through downtown Seattle. This would cause delays in freight movement, with the resultant loss of productivity, between the manufacturing and industrial centers.

Regional Displacement – A secondary economic impact at the regional level may also occur due to the perception that the downtown Seattle core is not an attractive destination due to the increase in traffic and congestion while the viaduct is closed. Businesses in the downtown core may suffer, even though their individual location is not immediately affected by an increase in traffic and congestion, due to a regional perception that travel into downtown Seattle is too difficult (hassle factor). Regional customers that would normally patronize downtown businesses could seek other more proximate businesses to patronize. While total economic activity within the Puget Sound region would not be affected, the businesses within downtown could be negatively affected.

6.2.4 Shorter Plan

This construction plan would close SR 99 for a minimum of 42 months. The closure of SR 99 would force traffic to use the existing surface street network, which would have potential economic effects within the project area. These potential economic effects would primarily be because of the increased traffic and congestion on the existing surface streets as described above for the intermediate plan. Although the closure duration is longer for this plan, the overall construction schedule is shorter than for the intermediate plan (7 years versus 8 to 8.75 years).

6.3 Elevated Structure Alternative

For the Elevated Structure Alternative there is only a longer plan. Again, for more detail on the construction sequencing and stages for the Elevated Structure Alternative, see the 2006 Supplemental Draft EIS Appendix B, Alternatives Description and Construction Methods Technical Memorandum.

Although the longer plan would only completely close SR 99 for 3 months, travel on SR 99 would be restricted for 84 months (out of the 120-month construction schedule). Restrictions would include closure of portions of the northbound and southbound segments as well as closure of existing access ramps.

Impacts on traffic flow within the corridor, displacements from the corridor, and regional displacements for the Elevated Structure Alternative would generally be lower and more moderate than those identified for the intermediate plan (Section 6.2.3) for the Tunnel Alternative. Traffic flow in the immediate corridor on the surface street would not be disrupted to the same extent because there would not be any tunnel excavation; however, construction of the seawall, construction of the new elevated structure, and removal of the existing viaduct would still require the presence of construction equipment and staging areas in the immediate corridor. It is assumed that one lane of traffic could be maintained on the surface street and that transverse access to the waterfront properties would be easier to maintain. There would still be some displacement from the immediate corridor, especially when the viaduct is completely closed. Most of the displaced traffic would use the existing network of north-south streets (First, Second, Fourth, and Fifth Avenues) and I-5 while the viaduct is either closed or at reduced capacity. This spillover onto the downtown street network would increase traffic and congestion within downtown and would result in secondary economic impacts on downtown businesses. Regional displacement would remain roughly the same as for the intermediate plan.

Approximately 162 active commercial and industrial buildings that are not candidates for acquisition are located within 50 feet of the Elevated Structure Alternative for either Whatcom Railyard option.

6.4 Construction Benefits

The primary economic benefit from implementing either of the Build Alternatives is increased employment and economic stimulation for the local economy from construction activities and supplies.

Sales taxes would be generated through the purchase of goods and materials related to construction. The project would generate sales tax of approximately $141 million for the Elevated Structure Alternative and between $223 million and $243 million for the Tunnel Alternative.

Employment and economic activity associated with the construction of either of the Build Alternatives would result in additional (gross) employment and activity throughout all economic sectors within the Puget Sound region and the state of Washington. This gross employment and economic activity is derived from the multiplication effects on the capital expenditures for the project. Examples of capital expenditures include the direct hiring of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new right-of-way. The alternative with the highest estimated capital cost would generate the most direct, indirect, and induced jobs and activity within the Puget Sound region.

The number of new jobs generated beyond those directly involved with the construction of the viaduct that are the result of new money entering the Puget Sound regional economy is roughly equivalent for either the Tunnel or Elevated Structure Alternative and ranges between 1,800 and 2,300 jobs. The amount of new earnings (wages) entering the Puget Sound regional economy ranges from $132 million to $137 million, which are also roughly equivalent.

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Chapter 7 SECONDARY AND CUMULATIVE IMPACTS

Secondary and cumulative impacts would be the same as described in Chapter 7 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

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Chapter 8 OPERATIONAL MITIGATION

Mitigation measures would be the same as described in Chapter 8 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

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Chapter 9 CONSTRUCTION MITIGATION

Mitigation measures proposed for the Tunnel (Preferred) Alternative under the intermediate plan and shorter plan would include the mitigation measures described in Chapter 10, Question 14 of the Draft EIS except as noted below. Mitigation measures proposed for the Elevated Structure Alternative under the longer plan would include the measures described in the Draft EIS for the Aerial Alternative except as noted below. Please see Chapter 9 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

The following mitigation measures were proposed with the longer plan for the Build Alternatives in the Draft EIS; they do not apply under the intermediate plan and shorter plan but still apply to the longer plan:

- On SR 99, two lanes of traffic would be maintained, or a comparable detour would be provided. This mitigation measure does not apply to the intermediate plan or shorter plan because SR 99 would be closed for at least 18 months and possibly for as long as 42 months for the Tunnel Alternative.
- Access to SR 99 at S. Royal Brougham Way and S. Atlantic Street would be maintained during periods when downtown access is closed. This mitigation measure does not apply to the intermediate plan or shorter plan because SR 99 would be closed for at least 18 months and possibly for as long as 42 months for the Tunnel Alternative.

The following mitigation measure was proposed in the Draft EIS but does not apply because of changes to mitigation strategies:

- Consider raising parking meter rates or installing additional meters to mitigate the loss of revenue associated with the loss of short-term on-street parking during construction. The Seattle Department of Transportation intends to more closely manage on-street parking by increasing enforcement of existing parking regulations for on-street parking not directly affected by the project. This would increase turnover of on-street parking spaces as well as ensuring that revenue from existing meters is maximized.

Thirty-one traffic construction management strategies have been identified for evaluation and testing. These strategies generally fall within the framework of regionwide transportation planning strategies identified in the Draft EIS and have been updated in Section 6.4.1 of the 2006 Supplemental Draft EIS Appendix C, Transportation Discipline Report. A refined package of transportation management strategies will be presented in the Final EIS

through the Construction Transportation Management Plan. The following transportation management strategies have economic components that were not discussed in the Draft EIS:

- Expand arterial flow map coverage to include key truck routes. The flow system would provide real-time traffic and congestion information for users of major truck streets to facilitate trip planning. The use of real-time congestion monitoring for trip planning would lessen the degree to which freight mobility is affected during construction.
- Facilitate or provide incentives for off-street parking lot operators to convert a percentage of their spaces to either short-term or long-term metered parking spaces. The conversion of off-street parking to metered or short-term parking would lessen the degree to which the loss of on-street parking affects those businesses in Pioneer Square and the central waterfront that rely primarily on on-street parking for use by customers.

Construction activities, especially along the central waterfront, would interfere with access to businesses and properties adjacent to the project on either side of the right-of-way. A primary goal of construction planning is to maintain adequate access to all businesses so they can continue to operate. As construction phasing and staging is refined in the coming months, it may be determined that it is neither reasonable nor feasible to maintain access to some businesses. If adequate access cannot be maintained, impacts to affected businesses will be mitigated under policies to be identified in the project's Business Mitigation Plan. If provisions of the Uniform Relocation Act are met, then relocation assistance would be provided.

Economic mitigation strategies for other types of impacts to businesses during construction are being developed and will be presented in the Final EIS through the Business Mitigation Plan. The Business Mitigation Plan will evolve over time, starting at the corridor level with a master list of potential mitigation measures (similar to that contained in the Draft EIS). Those measures would then be matched with specific impacts by business district (SODO, Pioneer Square, central waterfront, etc.). Finally, as construction nears, the plan would be fine-tuned by phase and specific business/facility impacts and location.

9.1 Multiple Transportation Project Construction Activities

Mitigation measures proposed for coordinating multiple transportation projects would remain the same as described in the Draft EIS. Please see Section 9.3 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum.

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Chapter 10 REFERENCES

References remain the same as listed in Chapter 10 of the 2004 Draft EIS Appendix P, Economics Technical Memorandum, with the following additions.

Puget Sound Regional Council. 2004. 2004 parking inventory for the central Puget Sound region. Available at http://www.psrc.org/datapubs/data/trans/parking.htm.

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U.S. Department of Energy. 2002. 1999 commercial buildings energy consumption survey (CBECS) detailed tables. Released August 2002. Available at http://www.eia.doe.gov/emeu/cbecs/detailed_tables_1999.html.

WSDOT (Washington State Department of Transportation), City of Seattle, and U.S. Department of Transportation, Federal Highway Administration. 2004. SR 99: Alaskan Way Viaduct & Seawall Replacement Project Draft Environmental Impact Statement. Washington State Department of Transportation, Urban Corridors Office, Seattle, Washington.

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ATTACHMENT A

RIMS II Detailed Model Analysis for Construction Impacts

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Regional Economic Activity

Significant regional and state economic impacts would result from the construction of either of the Build Alternatives relative to the No Build Alternative. The intent of this analysis is to assess the likely overall economic impacts that would be attributed to construction, as measured by increases in regional and state activity, employment, and associated job earnings.

Terminology and Methods

To analyze the economic impacts of the Alaskan Way Viaduct and Seawall Replacement Project capital investment, it is necessary to examine the economic reactions that an increase in the demand for construction goods and services creates. Economists use input-output (I-O) models to analyze how changes in the production of a specific firm or industry alter the flow of funds into and out of all other industries as well as households. By tracing how production in one economic sector consumes the output of other sectors as production inputs and how each of these other sectors in turn influences the demand for the output of yet other sectors, input-output analysis facilitates the calculation of multipliers. These multipliers provide a quantitative estimate of changes in economic activity, employment, and job earnings within the local economy (state or region) that compound from initial new expenditures.

Defining the following terms aids in understanding how project construction would lead to multiplied economic impacts on the economies of the central Puget Sound region and the state of Washington.

- Direct Impacts: The increase in demand for roadway construction and related materials and services within a defined regional or state economy arising from undertaking the Alaskan Way Viaduct and Seawall Replacement Project; direct impacts are usually measured as construction expenditures, but also can be expressed in the number of new construction jobs or job earnings.
- Indirect Impacts: The sum of all inter-firm and inter-industry transactions that filter through the regional or state economy resulting from the purchase of material and labor inputs by the firms directly affected in the course of producing their construction-related output.
- Induced Impacts: The increase in household consumption of goods and services of all firms within the regional or state economies by the workers who receive additional earnings resulting from either the direct or indirect impacts of construction.

- Total Impacts: The sum of the direct, indirect, and induced economic impacts as measured by the overall increase in economic activity, employment, and/or earnings within the regional or state economies; also referred to as the total multiplied impacts, where the multiplier is the factor ratio of total to direct impacts.
- Gross Impacts: The economic effects of total project expenditures—in terms of direct, indirect, and induced impacts—prior to assessing what proportion of those expenditures and subsequent impacts would likely have still occurred in some other manner in the absence of the project being evaluated.
- Net or "New Money" Impacts: Only those economic effects—in terms of direct, indirect, and induced impacts—attributable to funds that are uniquely available for expenditure on the subject project, and would otherwise not enter the regional or state economies. Economists tend to place more emphasis on the net or new money impacts as more accurate measures of the true increases in output, employment, and earnings.

Construction expenditures would occur over a number of years, directly creating new demand for construction materials and labor inputs. These direct impacts would then lead to indirect or secondary impacts, as the production of output by firms in other industries increases to supply the demand for inputs to the construction industry. Both the direct and indirect impacts of construction expenditures cause firms in all industries to employ more workers to meet increases in demand; this leads to induced impacts as the additional wages and salaries paid to workers lead to higher consumer spending.

The economic impacts at the regional and state levels due to influx of capital construction funds are quantified as direct and indirect impacts. The direct and indirect impacts are calculated using multipliers provided by the U.S. Department of Commerce Bureau of Economic Analysis' (BEA) Regional Input-Output Modeling System (RIMS II) for the central Puget Sound region and the state of Washington. The central Puget Sound region is defined as King, Pierce, and Snohomish Counties. The detailed application of these RIMS II multipliers is presented below.

Economic Impacts

For purposes of assessing the economic impacts on output, earnings, and employment, the focus is placed on the project capital costs (construction and right-of-way acquisition) of the two Build Alternatives as an accurate measure of the capital investment that would likely occur for the project. It is assumed that no project capital costs would be incurred with the No Build Alternative (Scenario 1 only).

The project capital cost estimates (Exhibits A-1 and A-2) are based on possible ranges of construction and right-of-way costs based on overall risk. The process used to estimate project costs and durations for this project is called the Cost Estimate Validation Process (CEVP®). The cost estimates presented in this document represent the 90th percentile of costs calculated through the CEVP. This means that 90 percent of the time, a construction activity will cost the same or less as what is estimated. The most recent CEVP review of the project occurred in October 2005. In the analysis below, economic impacts for the Tunnel Alternative (Preferred Alternative) are separated for the stacked and side-by-side tunnel alignments.

Exhibit A-1. Capital Costs and Funding Sources by Alternative

Alternative	Capital Cost Estimate ($ millions)	Funding Source ($ millions and Share)				Surplus/ Gap	New Money Impacts ($ millions and Share)	
		Federal Committed	State Committed	City Committed	City Committed and Anticipated		Tacoma-Seattle Region Committed	State Committed
Tunnel Alternative								
Stacked Tunnel (Preferred)	3,420	240 (7.0%)	2,193 (64%)	16 (0.5%)	766 (22%)	Gap 206–972	240 (7.0%)	240 (7.0%)
Side-by-Side Tunnel	3,760	240 (6.4%)	2,193 (58%)	16 (0.4%)	766 (20%)	Gap 546–1,312	240 (6.4%)	240 (6.4%)
Elevated Structure Alternative	2,261	240 (10.6%)	2,193 (97%)	16 (0.7%)	766 (34%)	Surplus 187–953	240 (10.6%)	240 (10.6%)

This calculation of "new money" impacts does not take into account the effect of additional funding for the Tunnel Alternative that would not otherwise be spent in the region or state on transportation projects. For example, if a Local Improvement District (LID) is created, it could generate money that would be spent only if the tunnel is built. This "new (local) money" would change the share of new money impacts. If the LID generated $250 million, then the new money would provide 14.3 percent for the Tunnel Alternative compared to 10.6 percent for the Elevated Structure Alternative, using the estimated costs in Exhibit 6-1 and in Exhibit A-1. Up to $1 billion of new local money might be generated from all sources, in which case the Tunnel Alternative share would rise to 29.2 percent. There may be a distinction between the local and state impacts of this new money, and this will be further analyzed in the Final EIS after the additional funding sources are identified.

Exhibit A-2. Capital Costs by Industry Expenditure/Multiplier Categories

Alternative	Capital Cost Estimate ($ millions)	Expenditure by Multiplier Categories ($ millions)	
		Total Construction Cost	Right-of-Way Acquisition
Tunnel Alternative			
Stacked Tunnel (Preferred)	3,420	3,050	370
Side-by-Side Tunnel	3,760	3,330	430
Elevated Structure Alternative	2,261	1,900	361

Exhibit A-1 lists the project capital cost estimates, distribution of funding sources, and regional and state new money estimates for both of the Build Alternatives. The distribution of funding sources has been developed by the design team and is only a list of potential funding mechanisms currently available. Percentage shares of the capital cost estimates are also provided. For purposes of examining the regional economic impacts, all of the federal earmark grants and federal general funding are assumed to be new money that would otherwise not be spent either regionally or within the state in the absence of the project. All state, regional, and city funding sources are assumed to be expended with or without this project as these are tax-based funding of local and/or state residents specifically earmarked for transportation projects within the region or state. The difference between the capital cost and new money net direct impact for each alternative is assumed to be expended with or without the project, thereby qualifying the difference only as a gross impact.

Application of RIMS II Multipliers

Three classes of RIMS II final demand multipliers and one class of direct effect multipliers were used to estimate the gross and net impacts:

- Final Demand Output Multipliers translated the initial project capital expenditures (demand) for construction outputs to the total multiplied effect on the demand for output of all firms/industries (in dollars) within the regional and state economies.
- Final Demand Earnings Multipliers translated the same direct project expenditures into the total multiplied effect on wage and salary earnings within the regional and state economies.
- Final Demand Employment Multipliers converted project expenditures into the total multiplied effect on employment within the regional and state economies, expressed in person-year jobs. This is generally used when there is no estimate of direct employment available.

- Direct Effect Employment Multipliers translated direct employment into the total multiplied effect on employment within the regional and state economies, expressed in person-year jobs.

For application of the RIMS II final demand multipliers, capital costs were divided into two categories. Exhibit A-2 presents the capital cost distribution for each alternative by two industry expenditure/multiplier categories. Exhibit A-3 presents final demand multipliers, as well as the direct effect multipliers, for both the central Puget Sound region and the entire state of Washington. All construction labor, construction materials, and right-of-way acquisition was assumed to be obtained locally.

The gross total (direct, indirect, and induced) impacts on output and earnings can be calculated by multiplying the expenditure in millions of dollars by category in Exhibit A-2 by the appropriate final demand multiplier in Exhibit A-3.

Exhibit A-3. Capital Costs Multipliers

Expenditure Category	BEA RIMS II Multiplier Industry Classification & No.	Final Demand Multipliers			Direct Effect Multipliers	
		Output (dollars)	Earnings (dollars)	Employment (jobs)	Earnings (dollars)	Employment (jobs)
State of Washington Multipliers						
Construction	11.0400 Highways and Streets	2.1764	0.6486	17.5	2.1609	2.7379
Right-of-Way	71.0201 Real Estate Agents, Managers, Operators, and Lessors	1.5792	0.2508	10.0	2.8422	2.2966
Central Puget Sound Regional Multipliers						
Construction	11.0400 Highways and Streets	2.0627	0.6093	16.4	2.0837	2.6392
Right-of-Way	71.0201 Real Estate Agents, Managers, Operators, and Lessors	1.5920	0.2517	10.1	2.8933	2.3467

Using the stacked tunnel alignment (the preferred alignment) as an example, expenditures of $3,050 million in the construction category would yield a gross output impact on all regional economy industries of ($3,050M × 2.0627) = $6,291M.

However, some of this regional economic output would have occurred anyway without construction of this project. The more realistic measure of net impacts on economic output can be assessed by multiplying the gross output impact by the average of the percentages of general construction expenditures in representing new money to the region listed in Exhibit A-1. This gives ($3,050M × 7.0% × 2.0627) = $440M (slight difference due to rounding), which represents the net increase in economic output attributable to new money entering the central Puget Sound region. Note that the gross

and net impacts form the upper and lower boundaries within which the true impacts will likely fall, with net impacts being the lower bound. Though the true magnitude of the impacts will be closer to the net impacts, in the absence of this project, some of the non-new money tax and/or consumer dollars spent elsewhere may result in smaller multipliers than with this project. Similar calculations can be performed for the other expenditure categories.

Summary of Economic Impacts

The gross and net total impacts on output and earnings for both the central Puget Sound region and the state are exhibited in the following tables. The gross and net impacts on employment are presented in Section 6.1.4. Exhibit A-4 presents the gross total economic impacts for both the central Puget Sound region and the entire state. Under the stacked tunnel alignment, new demand for construction would generate gross direct impacts equal to the capital cost of $3,420 million in midyear (midpoint) of construction dollars. Adding in the indirect and induced impacts on the output of other regional firms, the gross multiplied impact on output would total approximately $6,880 million over the construction period. In addition, $1,951 million would be paid to workers as wage and salary earnings for the jobs generated. By defining a larger boundary for the affected economy and therefore capturing a greater portion of the multiplied impacts before the funds leak out, the statewide figures exceed the regional economic impacts projected in Exhibit A-4.

Exhibit A-4. Gross Total Regional and Statewide Economic Impacts[1]

Alternative & Expenditure Category	Direct Gross Expenditures ($ millions)	Seattle-Tacoma Region Gross Total Impacts		Statewide Gross Total Impacts	
		Output ($ millions)	Earnings ($ millions)	Output ($ millions)	Earnings ($ millions)
Tunnel Alternative					
Stacked Tunnel (Preferred)	**3,420**	**6,880**	**1,951**	**7,222**	**2,071**
Construction	3,050	6291	1,858	6,638	1,978
Right-of-Way	370	589	93	584	93
Side-by-Side Tunnel	**3,760**	**7,553**	**2,137**	**7,926**	**2,268**
Construction	3,330	6,869	2,029	7,247	2,160
Right-of-Way	430	685	108	679	108
Elevated Structure Alternative	**2,261**	**4,494**	**1,249**	**4,705**	**1,323**
Construction	1,900	3,919	1,158	4,135	1,232
Right-of-Way	361	575	91	570	91

[1] Includes only impacts directly associated with the expenditure of construction and right-of-way funds and does **not** include secondary economic benefits presented in Section 5.5.2.

Exhibit A-5 presents the net total economic impacts attributable to new money for both the central Puget Sound region and the entire state. Under the stacked tunnel alignment, the same new demand for construction expenditures would generate net direct impacts equal to $239 million (7.0 percent of $3,420 million) in midyear construction dollars after accounting for local funds that would otherwise still be spent in the regional economy with similar multiplied impacts. Adding in the indirect and induced impacts on the output of other regional firms, the net multiplied impact on output would total $482 million over the construction period. Of this amount, $137 million would be paid to workers as wage and salary earnings for the net new jobs created. As with the gross economic impact, the statewide figures exceed the regional economic impacts projected in Exhibit A-5.

Exhibit A-5. Net New Money Total Economic Impacts[1]

Alternative & Expenditure Category	Direct Gross Expenditures ($ millions)	Average Percent Contribution Due to New Money Funds	Seattle-Tacoma Region Net Total Impacts		Statewide Net Total Impacts	
			Output ($ millions)	Earnings ($ millions)	Output ($ millions)	Earnings ($ millions)
Tunnel Alternative						
Stacked Tunnel (Preferred)	**3,420**	**7.0%**	**482**	**137**	**506**	**145**
Construction	**3,050**		441	130	465	139
Right-of-Way	**370**		41	7	41	6
Side-by-Side Tunnel	**3,760**	**6.4%**	**481**	**136**	**505**	**144**
Construction	3,330		438	129	462	138
Right-of-Way	430		44	7	43	7
Elevated Structure Alternative	**2,261**	**10.6%**	**476**	**132**	**498**	**140**
Construction	1,900		415	123	438	131
Right-of-Way	361		61	10	60	10

[1] Includes only impacts directly associated with the expenditure of construction and right-of-way funds and does **not** include secondary economic benefits presented in Section 5.5.2.

While the gross total economic impacts are useful for examining the overall magnitude of the project, the net total economic impact measures represent more generally accepted and appropriate estimates of the true economic impacts that would arise solely from project construction. Note that the gross and net impacts form the upper and lower boundaries within which the true impacts will likely fall, with net impacts being the lower bound. Though the true magnitude of the impacts will be closer to the net impacts, in the absence

of this project, some of the non-new money tax and/or consumer dollars spent elsewhere may result in smaller multipliers than with this project.

Summary of Benefits for Regional Economic Activity

This discussion of benefits only includes benefits directly associated with the expenditure of construction and right-of-way funds during the construction period and does not include indirect economic benefits after construction is completed as presented in Section 5.5.2. The cost associated with construction of either of the Build Alternatives would result in additional (gross) activity throughout all economic sectors within the Puget Sound region and the state of Washington. This gross economic activity is derived from the multiplication effects on the capital expenditures for the project. Examples of capital expenditures include the direct hiring of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new right-of-way.

The amount of new economic activity directly associated with these alternatives that are the result of new money entering the Puget Sound regional economy is roughly equivalent for the Tunnel and Elevated Structure Alternatives and ranges between $476 million and $482 million. The amount of new earnings (wages) entering the Puget Sound regional economy ranges from $132 million to $137 million. The amount of new money is assumed to be fixed (equal across all alternatives), and the portion of new money to overall construction costs ranges from 6.4 to 10.6 percent depending on the Build Alternative. All other fund sources are coming from within either the state or the Puget Sound region and would likely be spent in the local economy, even in the absence of this project.

Temporary Economic Effects to Businesses, Including Construction Expenditures on Sales Tax Revenue

Sales Tax Revenue

Sales taxes would be generated through the purchase of goods and materials related to construction. Exhibit A-6 lists the estimated amount of sales tax generated for either alternative based on construction costs only. Sales tax estimates were not generated for non-construction costs such as right-of-way acquisition and engineering.

Exhibit A-6. Total Construction Costs and Sales Tax Generated ($ millions)

Alternative	Total Construction Cost	Total Sales Tax Generated
Tunnel Alternative		
Stacked Tunnel (Preferred)	3,050	223
Side-by-Side Tunnel	3,330	243
Elevated Structure Alternative	1,900	141

The project sales tax estimates are based on the construction cost estimates presented in Section 6.1.1. These estimates will be refined once additional information is known regarding project design and funding.

These sales tax estimates are only related to direct construction expenditures. This analysis does not include an evaluation of the change in sales tax revenue collected by businesses in the project area that potentially would be affected by construction activities.

Disruption to Businesses and Neighborhoods

Any major construction project, public or private, inconveniences or disturbs the residents, businesses, and business customers adjacent to that construction project. As a result of the inventory of existing businesses (Section 4.3) within one block of the existing alignment, the design team has identified approximately 1,200 businesses (including multi-family residential buildings) adjacent to the project that would be disrupted by the construction. These temporary effects include:

- Presence of construction workers, heavy construction equipment, and materials.
- Temporary road closures, traffic diversions, and alterations to property access (see Appendix C, Transportation Discipline Report of the Draft EIS and Supplemental Draft EIS).
- Loss of parking, especially on-street short-term parking (Section 6.1.6).
- Airborne dust (see Appendix Q, Air Quality Discipline Report of the Draft EIS and Supplemental Draft EIS).
- Noise and vibrations from construction equipment and vehicles (see Appendix F, Noise and Vibration Discipline Report of the Draft EIS and Supplemental Draft EIS).
- Decreased visibility and loss of access to businesses by customers.

Up to 169 active commercial and industrial buildings are located within 50 feet of the project alignment that are not candidates for acquisition. Many of these buildings in the central section have multiple businesses occupying them. Some businesses located in these buildings may suffer little or no

adverse impacts, while others may experience a noticeable decline in sales, increase in costs, and/or decrease in efficiency.

Without proper planning and implementation of controls, these construction-related effects could adversely affect the comfort and daily life of residents and inconvenience or disrupt the flow of customers, employees, and materials and supplies to and from businesses. Construction impact controls will be integrated into the Project Management Plan, the Business Mitigation Plan, and the project's contract specifications and special provisions.

Temporary Change in Vehicular, Transit, and Pedestrian Access to Existing Businesses in the Construction Area

A detailed analysis of the impacts on the existing roadway system during construction is presented in the 2006 Appendix C, Transportation Discipline Report. In general, the Tunnel and Elevated Structure Alternatives would cause severe traffic impacts during construction in the corridor; however, the Elevated Structure Alternative would cause fewer traffic impacts based on complete closure of the SR 99 corridor for only 3 months with the longer plan, versus complete closure of the corridor for up to 42 months (3.5 years) during construction of the Tunnel Alternative using the shorter plan.

Temporary Jobs Created During Construction

With adoption of either Build Alternative, temporary jobs would be created to construct the project. The duration of these temporary jobs varies by alternative and construction plan but is expected to be between 7 and 10 years.

A hybrid approach was used to estimate the gross and net increases in employment attributable to new money entering the central Puget Sound region and the state of Washington. Both direct effect and final demand multipliers (see Exhibit A-3) were used to estimate employment impacts for each of the Build Alternatives. Direct effect multipliers were used on the estimates of the direct labor force to be employed in constructing each alternative, as presented in Exhibit A-7. Final demand multipliers were used to estimate capital costs for right-of-way acquisition, as no direct labor estimates have been generated by the project design team for this expenditure category.

Estimates of the direct labor force needed to construct the project were prepared for each alternative. The estimates of the direct jobs generated by the project were calculated based on the approximate cost for construction contracts, assuming that 40 percent of the total construction cost would be absorbed by labor and that the average labor rate in 2005 would be $48 per hour (with an escalation for inflation in later years). The direct effect of these

temporary construction jobs on the regional and state economies would cause the indirect effect of creating additional jobs throughout the central Puget Sound region and state. Using the direct effect multipliers for highway and street construction presented in Exhibit A-3, we can calculate the secondary impact of regional and statewide job creation in the same manner used to calculate the gross output and earnings using only the direct gross expenditures.

No estimate of the direct labor force to perform right-of-way acquisition was prepared by the project design team for the alternatives; consequently, the capital costs associated with this task are used to quantify employment impacts in the same manner that gross output and earnings were estimated for all capital costs using final demand multipliers in Section 6.1.1.

Using the stacked tunnel alignment as an example, direct gross expenditures of $370 million in the right-of-way category would yield a gross employment impact on all regional industries of ($370M × 10.1) = 3,737 person-year jobs.

For the construction expenditure category, a direct generation of 9,500 person-year jobs would yield a gross employment impact on all regional economies of (9,500 person-year jobs × 2.6392) = 25,072 person-year jobs.

Summing these gross employment impacts together yields the total gross employment impact to the central Puget Sound regional economy of 28,809 person-year jobs.

However, some of these jobs would have occurred without construction of the viaduct. The more realistic measure of net impacts on employment can be assessed by multiplying the gross total employment impact by the percentage of capital expenditures in representing new money to the region listed in Exhibit A-1. This gives ($370M × 10.1) + (9,500 person-year jobs × 2.6392)) × 7.0%) = 2,000 person-year jobs (slight difference due to rounding), which represents the net increase in employment attributable to new money entering the central Puget Sound region.

Exhibit A-7. Gross Regional and Statewide Total Employment Impacts and Net New Money Total Employment Impacts

Alternative & Expenditure Category	Direct Gross Expenditures ($ millions)	Central Puget Sound Region Final Demand Employment (prs-yr jobs)	Statewide Final Demand Employment (prs-yr jobs)	Annual Average Construction Employment (jobs)	Construction Duration (years)	Total Construction Labor (prs-yr jobs)	Central Puget Sound Region Direct Effect Employment (prs-yr jobs)	Statewide Direct Effect Employment (prs-yr jobs)	Central Puget Sound Region Gross Employment (prs-yr jobs)	Statewide Gross Employment (prs-yr jobs)	Average Percent Contribution Due to New Money Funds	Central Puget Sound Region Net Employment (prs-yr jobs)	Statewide Net Employment (prs-yr jobs)
Tunnel Alternative													
Stacked Tunnel (Preferred)									**28,809**	**29,710**	**7.0%**	**2,018**	**2,081**
Construction				1,086	8.75	9,500	25,072	26,010					
Right-of-Way	370	3,737	3,700										
Side-by-Side Tunnel									**28,096**	**28,941**	**6.4%**	**1,790**	**1,843**
Construction				1,125	8.0	9,000	23,753	24,641					
Right-of-Way	430	4,343	4,300										
Elevated Structure Alternative									**21,329**	**21,954**	**10.6%**	**2,259**	**2,326**
Construction				669	10.0	6,700	17,683	18,344					
Right-of-Way	361	3,646	3,610										

prs-yr jobs = person-year jobs.
Construction duration assumes the intermediate plan for the Tunnel Alternative and longer plan for the Elevated Structure Alternative.
Central Puget Sound Region is defined as King, Pierce, and Snohomish Counties.
Final Demand Employment shows the translation from right-of-way gross expenditures into direct, indirect, and induced employment.
Direct Effect Employment shows the translation from temporary construction employment into direct, indirect, and induced employment.
Gross Employment is the sum of Final Demand Employment and Direct Effect Employment. Gross Employment is all direct, indirect, and induced employment.
Net Employment is that fraction of Gross Employment that represents all direct, indirect, and induced employment associated with new money.

Summary of Benefits for Employment

Compared with the existing conditions, the employment associated with the construction of either of the Build Alternatives would result in additional (gross) employment throughout all economic sectors within the Puget Sound region and the state of Washington. This gross employment is derived from the multiplication effects on the capital expenditures for the project. Examples of capital expenditures include the direct hiring of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new right-of-way. Of the two alternatives evaluated in this technical memorandum, the Tunnel Alternative has the greater estimated capital cost, which would generate the most direct, indirect, and induced jobs within the Puget Sound region.

The number of new jobs directly associated with these alternatives that is the result of new money entering the Puget Sound regional economy is roughly equivalent for the Tunnel and Elevated Structure Alternatives and ranges between 1,800 and 2,300 jobs. This is because the amount of new money is assumed to be fixed (equal across all alternatives), and the portion of new money to overall construction costs ranges from 6.4 to 10.6 percent depending on the Build Alternative. All other fund sources are coming from within either the state or the Puget Sound region and would likely be spent in the local economy even without this project.

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