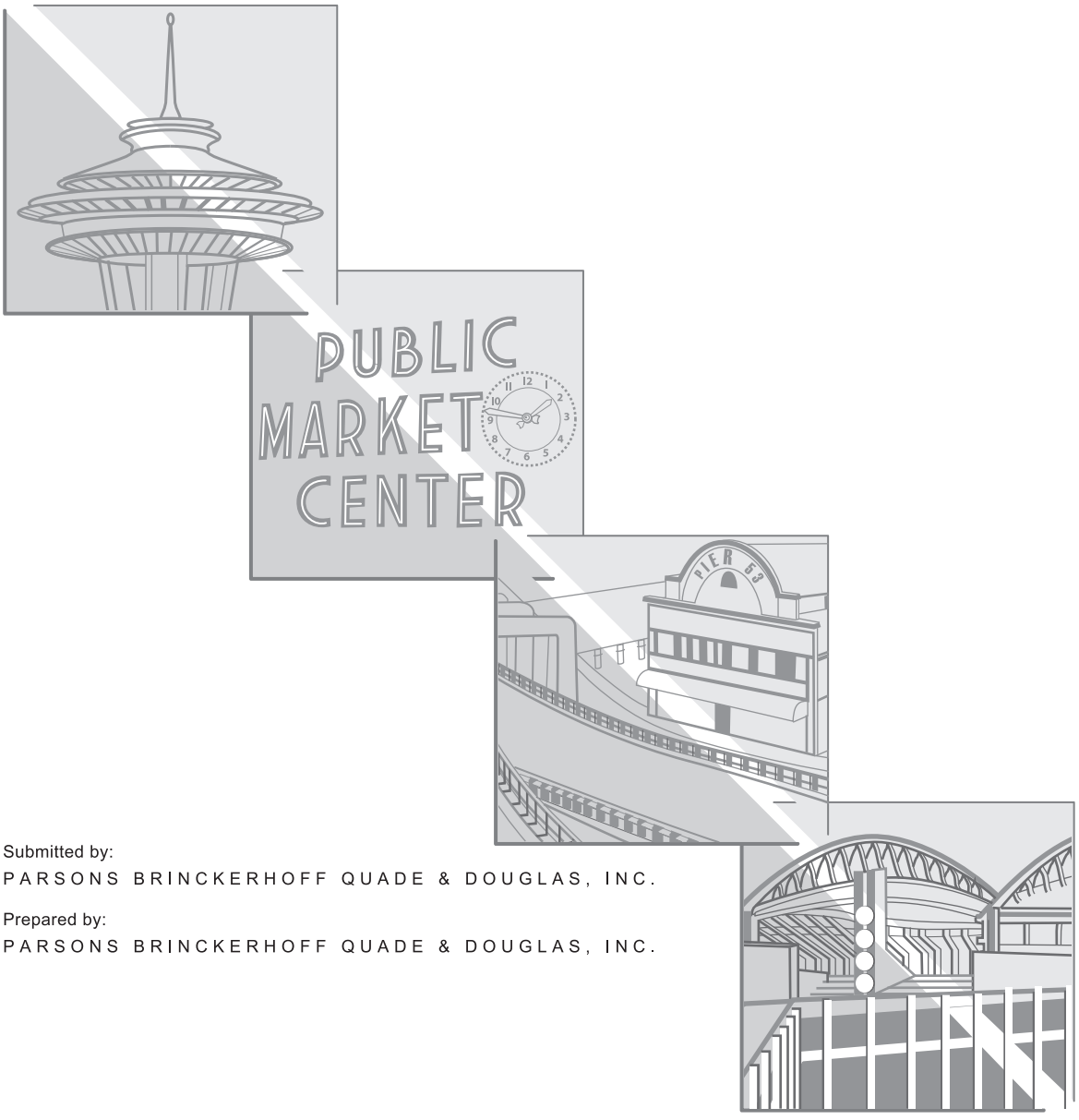
SR 99: ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT

Supplemental Draft Environmental Impact Statement

APPENDIX V

Energy Technical Memorandum



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U.S. Department of Transportation
Federal Highway Administration

Washington State
Department of Transportation

City of
Seattle

SR 99: ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT

Supplemental Draft EIS
Energy Technical Memorandum

AGREEMENT NO. Y-7888

FHWA-WA-EIS-04-01-DS

Submitted to:

Washington State Department of Transportation
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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:

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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 ENERGY CONSUMPTION

The Alaskan Way Viaduct and Seawall Replacement Project Draft Environmental Impact Statement (EIS) (WSDOT et al. 2004) evaluated the energy demands of construction and operation of five Build Alternatives as well as a No Build Alternative. Changes that were subsequently proposed to the alternatives and construction methods could potentially change the findings related to energy consumption, but changes in construction methods would not be expected to cause substantive changes in energy consumption.

In December 2004, the lead agencies narrowed the five alternatives down to two—Tunnel and Rebuild. They identified the Tunnel Alternative as the Preferred Alternative and carried the Rebuild Alternative forward for analysis as well. Since that time, engineering and design has been updated and refined for the Tunnel and Rebuild Alternatives. Due to the magnitude of the changes in the design of the Rebuild Alternative, it has been renamed the Elevated Structure Alternative. The Elevated Structure Alternative combines elements of the Aerial and Rebuild Alternatives that were evaluated in the Draft EIS.

Energy is consumed during the construction and operation of transportation projects. It is used during construction to manufacture materials, transport materials, and operate construction machinery. Energy used during project operation includes fuel consumed by vehicles using the project and a negligible amount of energy used for signals, lighting, and maintenance. This memorandum follows the methods and assumptions established in the 2004 Energy Technical Memorandum included as Appendix V to the Draft EIS.

1.1 Operational Impacts and Benefits

Regional operational traffic patterns would not differ substantially between the alternatives evaluated in the Draft EIS and the Tunnel (Preferred) and Elevated Structure Alternatives evaluated in the Supplemental Draft EIS. The Tunnel Alternative with the Partially Lowered Aurora Option and the addition of the Elliott Avenue and Western Avenue ramps would change local traffic patterns, but these changes are not expected to substantially alter the magnitude of traffic within the study area or change the relative differences between the alternatives. Operational energy consumption for the stacked and side-by-side tunnel alignments would be similar to the Tunnel Alternative described in the Draft EIS. Energy consumption for the Elevated Structure Alternative would be similar to the Aerial Alternative evaluated in the Draft EIS.

1.2 Construction Impacts

Energy consumption during construction would differ from the alternatives evaluated during the Draft EIS, largely because of the additional construction related to the modifications to Aurora Avenue N. north of the Battery Street Tunnel. As shown in Exhibit 1-1, the energy required during construction would be somewhat greater for the current Tunnel and Elevated Structure Alternatives than for the corresponding Tunnel, Rebuild, and Aerial Alternatives evaluated in the Draft EIS. However, this would not put substantial additional demand on the state's energy sources or fuel availability during the construction period.

Exhibit 1-1. Total Construction Energy Consumption by Alternative

	Construction Cost	Energy Consumption	
	(billion 2002 dollars)	Giga Joules	Million BTUs
Tunnel Alternative			
Stacked Tunnel Alignment	3.00	33,200,000	31,500,000
Side-by-Side Tunnel Alignment	3.32	36,800,000	34,900,000
Elevated Structure Alternative	1.80	19,900,000	18,900,000

BTU = British Thermal Unit

1.3 Operational and Construction Mitigation

Like the Draft EIS, the Tunnel and Elevated Structure Alternatives would not require any operational or construction mitigation because they would decrease long-term energy use compared to the No Build Alternative.

Chapter 2 REFERENCES

Please refer to the 2004 Appendix V, Energy Technical Memorandum, for references.

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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