PUGET SOUND HOV PRE-DESIGN STUDIES

FINAL REPORT

MAY 5, 1997

Washington State
Department of Transportation
Office of Urban Mobility

PB 100 YEARS

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FINAL REPORT

Submitted to:

Washington State
Department of Transportation
Office of Urban Mobility

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1. INTRODUCTION

This report documents the process and results of the Puget Sound HOV Pre-Design Studies Project (HOV Pre-Design Studies). An extensive variety of freeway improvements, designed to accommodate HOV traffic, have been implemented in the greater Seattle/Puget Sound region over the last twenty years. The Washington State Department of Transportation (WSDOT) has recently completed evaluating the HOV system as it now stands and has defined the remaining improvements necessary to make the Puget Sound's HOV network function as an integrated system to optimally meet the needs of both carpools and transit. This report documents these efforts.

1.1. BACKGROUND

The Washington State Department of Transportation (WSDOT) has identified a regional core system of high occupancy vehicle lanes (HOV) within the Puget Sound Region. This system consists of both operating HOV links, roadway links programmed for construction, and unfunded projects. In 1995, the WSDOT Office of Urban Mobility completed Phase I of the Puget Sound HOV Pre-Design Studies (HOV PRE-DESIGN STUDIES), evaluating a number of direct access alternatives for providing direct connections between this system of HOV lanes and the supporting urban arterial and transit networks feeding the freeway system. In late 1995, WSDOT embarked on Phase II of the HOV Pre-Design Studies study to refine their evaluation of the proposed direct access links as well as to evaluate a number of additional HOV links which might logically be added to the core HOV network and programmed for immediate design and construction.

In parallel to the HOV Pre-Design Studies Phase I study, the WSDOT Olympic Region evaluated the addition of potential HOV lanes to the I-5 mainline between DuPont and the Pierce—King County line (i.e., the SR 5: Mounts Road Interchange to Port of Tacoma Road Interchange HOV Study). This evaluation suggested a number of opportunities for providing HOV lanes and direct access facilities in Pierce County. The Phase II portion of the HOV Pre-Design Studies Study added the findings of the Olympic Region Study to the base analysis conducted by the Office of Urban Mobility. The resulting Phase II HOV Pre-Design Studies Study encompassed a regional highway network stretching from Mounts Road to Marysville. It stretches east to the Eastgate and Auburn areas and west to Puget Sound and Purdy along State Route 16.

1.2. PROJECT PURPOSE

The study location and area for this project are shown in Figure 1-1. A primary goal of the project was to develop a series of conceptual designs and recommend prioritized treatments that will improve the access, operation, performance, safety, and reliability of the Puget Sound area HOV system. This project addressed a wide variety of facilities, including HOV lanes, HOV direct access ramps, transit flyer stops, and direct freeway-to-freeway connections for HOV vehicles at major interchanges. The project also addressed enhancements to the HOV system, policy changes supporting safety and enforcement, and lane conversion from general purpose to HOV use.

The focus of the HOV Pre-Design Studies project has been primarily on improving access into and out of HOV lanes, and providing connections between HOV lanes on intersecting freeways. The stated purposes of the project are as follows:

- To develop conceptual designs and recommended treatments to improve access, operation, and reliability of the Puget Sound area HOV system;
- To compile a list of potential projects;
- To determine feasibility, cost, and relative benefit for those potential projects; and
- To assist in expediting those projects chosen for final design development.

1.3. PROJECT OVERVIEW

The scope of work for this project included a series of separate and independent studies, grouped into two phases. Phase I was composed of system-wide and sub-area studies, proposing improvements of a systemic and local nature, respectively. Phase II was designed to allow for supplementary work to address issues that were uncovered during Phase I. It also evaluated the proposals from a systems analysis perspective, in order to determine a final set of proposed improvements, and included further sub-area studies which were determined to be necessary after completion of Phase I.

Phase I of the project focused on six corridor sub-areas within King and Snohomish Counties. Each sub-area was examined for potential opportunities for implementation of direct HOV access as well as improved HOV safety and enforcement facilities. Phase II took the recommendations brought forward from Phase I and incorporated results from the Olympic Region's SR 5 HOV Study in Pierce County. It refined the analyses to be consistent across all sub-areas, and evaluated and prioritized recommendations from an integrated system perspective. Additionally, the existing regional core HOV lane network system plan was reevaluated in Phase II, and a number of adjustments recommended, including additions, deletions, and general purpose lane conversions.

During the study, long range transit plans were in flux due to voter rejection of a regional transit initiative in March of 1995. Improvement alternatives were therefore developed to address varying levels of investment and development, with a variety of possible roles for the HOV system serving varying levels of transit service.

This project has been a highly collaborative and participative process which included consultation with stakeholders and an interagency Project Advisory Committee, involving over 100 transit, city, county, state, and federal agency staff in all. The system alternatives take into account improvements identified in previous WSDOT studies affecting this region. Study findings are directly applicable for future preparation of Washington State Department of Transportation (WSDOT) design report documents, and include project justification, description, analysis of alternatives, and identification of significant environmental issues. Many of the recommended direct access projects have been included in the Regional Transit Authority's current system plan (Sound Move).

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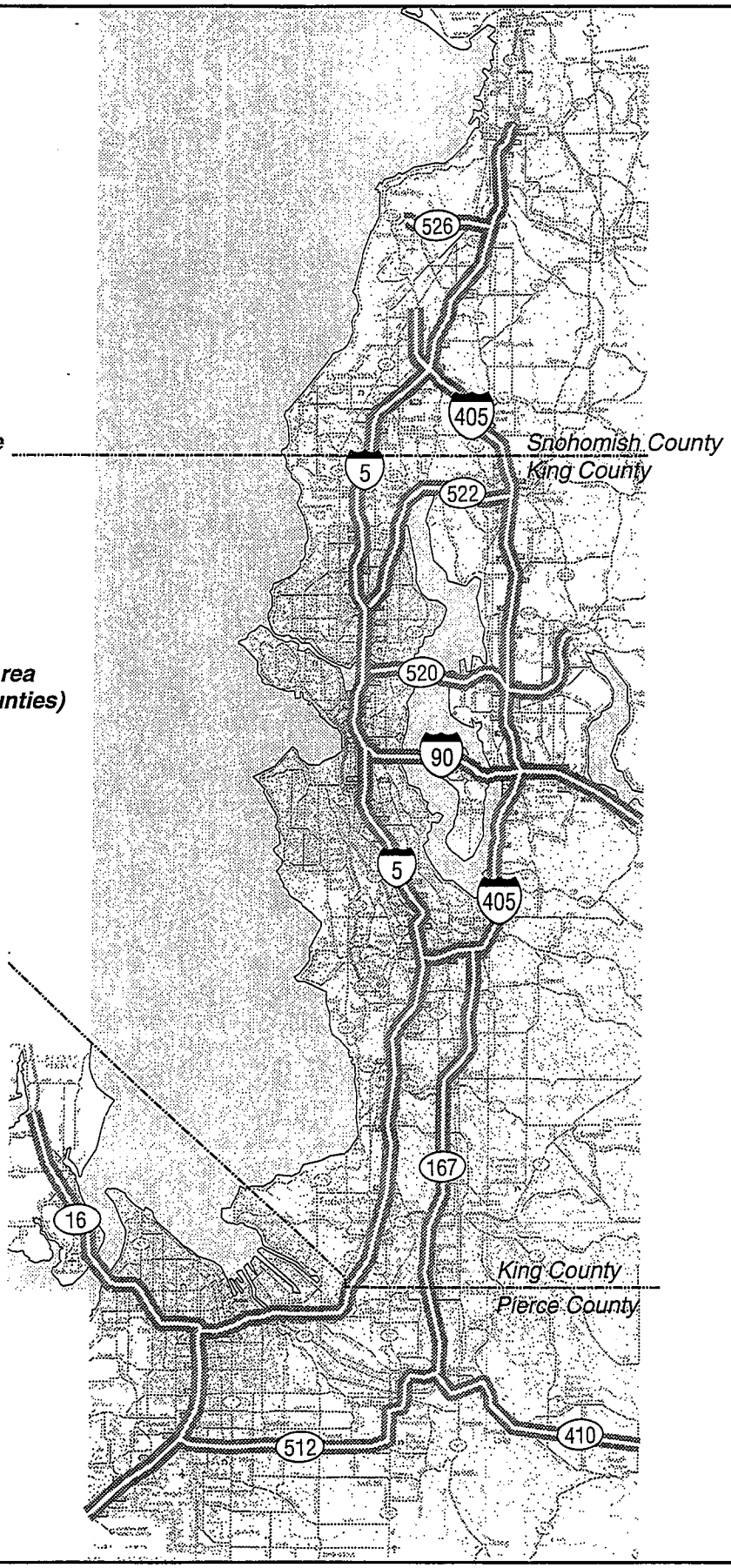

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Study Area Corridors

Puget Sound HOV Pre-Design Studies

Final Report

FIGURE 1-1

This Final Report presents and summarizes the findings from Phases I and II of this project. It integrates the results of the individual studies into a system evaluation, and is intended as a decision document recommending projects to complete and integrate the regional HOV system as well as changes to the WSDOT Core Freeway HOV Program. A summary of the findings and conclusions from each project study is included in this report; the reader is referred to the individual studies themselves for methodology and alternative development details. (See the Bibliography for sources.)

An outline of the individual studies completed under Phase I and Phase II follows:

PHASE I

Methodology Report

System-Wide Studies
- System Traffic Analysis
- Travel Market Presentations
- HOV Lane Conversion
- HOV Safety and Enforcement

Sub-Area Studies
- South King County to Seattle HOV Corridor Alternatives
- I-90 Corridor HOV Direct Access
- I-405 Corridor HOV Direct Access
- Central Seattle HOV Corridor
- Snohomish County HOV Direct Access
- SR 522 HOV Corridor
- Freeway-to-Freeway HOV Connections

PHASE II

Supplemental Pre-Design Work
- I-405/SR 520 Freeway-to-Freeway HOV Connection
- Freeway-to-Freeway HOV Interchanges
- Central Seattle HOV Alternatives Evaluation
- HOV Direct Access Analysis: I-5 at NE 145th
- HOV Direct Access Analysis: SR 167 at SW 27th

Travel Time Refinement

Design and Cost Refinement

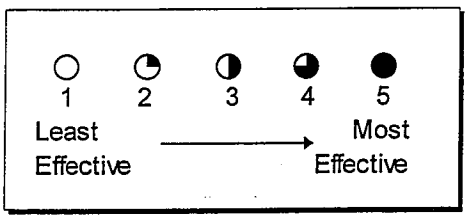
HOV Lane Segment Evaluation
- Additions to HOV Core Lane Program
- HOV Lane Conversion

Priority List and Phasing Plan

1.4 RATING AND RANKING ALTERNATIVES

To narrow down the variety of alternatives, various "Measures of Effectiveness" (MOEs) were used to evaluate and screen alternatives for the different direct access, HOV Lane, freeway-to-freeway connection, and safety and enforcement alternatives. Oftentimes the MOEs were broadly defined at the initial screening stages and defined in more detail during the later evaluation stages.

For all of the studies, "Consumer Reports" style symbols were used to compare and rate the alternatives. A five-point scale from least effective to most effective corresponds to the five symbols shown here. Least effective was a blank circle and most effective was a solid circle. These rating symbols are used throughout this report.



1.5. REPORT ORGANIZATION

This report summarizes the goals, findings, and recommendations of each of the above studies. Chapter 2 contains a comprehensive summary of the project and its recommendations as were written in the newsletter, *"Puget Sound HOV Pre-Design Studies, Summary Project Digest,"* January 1996, produced by WSDOT. Chapter 3 includes a detailed evaluation of the regional HOV core system including lane conversion, Central Seattle HOV lanes, and HOV treatments for SR 522. Chapter 4 reviews in more detail evaluations and recommendations made for HOV direct access facilities between local streets and freeways and integrates the results on the study and recommendations into an overall system-wide evaluation. Chapter 5 looks at evaluation and recommendations for direct HOV connections at freeway interchanges throughout the system, as well as integrating the results into a system-wide evaluation. In Chapter 6, the evaluation and recommendations to improve HOV-related safety and enforcement are summarized, including both physical and policy changes. Three appendices follow Chapter 6. They are:

- Appendix A - a glossary of terms used for this study;
- Appendix B - a list of all project stakeholder committee participants;
- Appendix C - a bibliography of all final reports published for this study.

Additional appendices contained in a separate document include the following:

- A review of the methodology consistently applied across all the project studies;
- Detailed documentation of the approach and results of the travel time savings estimation;
- A summary of costs, including updated cost estimates;
- A presentation of the system-wide traffic analyses and of travel markets research performed in the early stages of the project; and
- The overall project grouping and prioritization.