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METRO

Agenda

MEETING:	METRO COUNCIL WORK SESSION
DATE:	January 20, 2009
DAY:	Tuesday
TIME:	2:00 PM
PLACE:	Metro Council Chamber

CALL TO ORDER AND ROLL CALL

2:00 PM	**1.**	**DISCUSSION OF AGENDA FOR COUNCIL REGULAR MEETING, JANUARY 22, 2009/ADMINISTRATIVE/CHIEF OPERATING OFFICER COMMUNICATIONS**	
2:15 PM	**2.**	**HIGH CAPACITY TRANSIT SYSTEM PLAN REVIEW: INITIAL AND SCREENED CORRIDORS AND EVALUATION CRITERIA**	Roberts/ Mendoza
3:00 PM	**3.**	**BREAK**	
3:05 PM	**4.**	**COLUMBIA RIVER CROSSING DISCUSSION IN PREPARATION FOR JOINT PORTLAND CITY COUNCIL /METRO COUNCIL WORK SESSION**	Roberts
4:05 PM	**5.**	**COUNCIL BRIEFINGS/COMMUNICATION**	

ADJOURN

METRO COUNCIL

Work Session Worksheet

Presentation Date: 1/20/09 Time: 3:20pm Length: 30 minutes

Presentation Title: High Capacity Transit System Plan Update

Department: Planning and Development

Presenters: Ross Roberts, Tony Mendoza

ISSUE & BACKGROUND
Consider for discussion the actions taken by MPAC and JPACT regarding the screened corridors and evaluation criteria.

OPTIONS AVAILABLE

IMPLICATIONS AND SUGGESTIONS
See attached memo.

QUESTION(S) PRESENTED FOR CONSIDERATION

LEGISLATION WOULD BE REQUIRED FOR COUNCIL ACTION __Yes X No
DRAFT IS ATTACHED ___Yes X No

ATTACHMENTS
Metro Council Memo: Metro Council work session HCT presentation, Jan. 14, 2009
JPACT Memo: High Capacity Transit (HCT) System Plan, Jan. 7, 2009
JPACT Memo: Initial set of screened corridors for advancement through the evaluation process, Jan. 7, 2009
Detailed HCT Evaluation Framework – Draft for discussion, Jan. 6, 2009

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Metro | *Memo*

Date: January 14, 2009

To: Metro Council

From: Tony Mendoza, Transit Project Analysis Manager

Re: Metro Council work session HCT presentation

Purpose
Discuss the screened corridors (Attachment 2, Figure 4 – page 8 of this packet) and evaluation criteria for prioritizing corridors (Attachment 3 – page 13 of this packet).

Status
MPAC and JPACT will consider for approval screened corridors and the evaluation criteria on Jan. 14 and Jan. 15, 2009, respectively. The attached JPACT memo (Attachment 1) demonstrates the request for action made to both committees. Also included in this packet are memos that illustrate the work to date on screening the wide range of over 55 potential corridors and improvements to a reasonable set of approximately 15 corridors to be advanced through a feasibility and prioritization process.

Next Steps

- Jan. 14, 2009: MPAC – Consider for approval screened corridors and evaluation criteria.
- Jan. 15, 2009: JPACT – Consider for approval screened corridors and evaluation criteria.
- Jan. 20, 2009: Metro Council work session – Discuss screened corridors and evaluation criteria.
- Feb. 10, 2009: Metro Council work session – Consider for approval screened corridors and evaluation criteria.

Attachments
Attachment 1: JPACT Memo: High Capacity Transit (HCT) System Plan, Jan. 7, 2009
Attachment 2: JPACT Memo: Initial set of screened corridors for advancement through the evaluation process, Jan. 7, 2009
Attachment 3: Detailed HCT Evaluation Framework – Draft for discussion, Jan. 6, 2009

Attachment 1

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Metro | *Memo*

Date: January 7, 2009

To: JPACT

From: Tony Mendoza, Transit Project Analysis Manager

Re: High Capacity Transit (HCT) System Plan

Introduction
The High Capacity Transit System Plan is being developed as a component of the RTP. The *HCT System Plan* will be a 30-year plan for prioritizing HCT investments in new corridors and changes to existing corridors. The results will be incorporated and further studied in the RTP and will be the basis for initiating future project development steps necessary to qualify for funding. Of the variety of public transit system functions (e.g., local bus, paratransit, regional bus, frequent bus and HCT), the *HCT System Plan* is designed to focus on the HCT element of the public transit system. HCT modes can include light rail, commuter rail, bus rapid transit or rapid streetcar and includes a significant amount of exclusive right-of-way. Non-HCT transit is planned by TriMet, SMART and other transit providers. The *HCT System Plan* is not a funding plan. Future decisions will be made regarding investing in HCT projects versus other needed transit service improvements.

The *HCT System Plan* tells us where the best locations are for major rail and bus transit capital investments based on evaluation criteria derived from the *RTP.* The *RTP* tells us whether HCT is the right transportation choice relative to other potential transportation investments. *Making the Greatest Place* tells us whether HCT is the right transportation choice to support the land use in any given corridor or center. The role of HCT within the region is being considered as part of this plan, including weighing the benefits of providing more localized direct access compared to faster, regional access.

Status
JPACT received an update of the HCT System Plan Dec. 11, 2008. The attached memos illustrates work to date on screening the wide range of over 55 potential corridors and improvements to a reasonable set of approximately 15 corridors to be advanced through a feasibility and prioritization process. The Evaluation Criteria will be finalized by Metro Council and applied to these screened corridors for prioritization.

Action
Consider for approval the screened corridors (Attachment 1, Figure 4 – page 7 of this packet) and evaluation criteria for prioritizing corridors (Attachment 2 – page 12 of this packet).

Next Steps
- Jan. 14, 2009: MPAC – Consider screened corridors and evaluation criteria.
- Jan. 15, 2009: JPACT – Consider screened corridors and evaluation criteria.
- Jan. 20, 2009: Metro Council work session – Discuss screened corridors and evaluation criteria.
- Feb. 10, 2009: Metro Council work session – Consider screened corridors and evaluation criteria.

Attachments:
Attachment 1: JPACT Memo: High Capacity Transit System Plan Screened Corridors, 1-6-09
Attachment 2: Detailed HCT Evaluation Framework – Draft for discussion, 1-6-09

Attachment 2

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Metro | *Memo*

Date: January 7, 2009

To: JPACT

From: Tony Mendoza, Transit Project Analysis Manager

Re: Initial set of screened corridors for advancement through the evaluation process

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The attached Screening Criteria (Figure 1) was finalized and confirmed by the MTAC/TPAC HCT Subcommittee on October 22, 2008, by TPAC on October 31, 2008 and MTAC on November 5, 2008. The Screening Criteria constitutes the first phase of the HCT evaluation framework (Figure 2). The Screening Criteria was applied to the wide array of High Capacity Transit Corridors and System Improvements assembled for the RTP Scenario B[1] and suggested in stakeholder interviews, public workshops, and Metro Committee meetings that began in July 2008.

The Corridor Screening Results and the Evaluation Criteria were confirmed by MTAC on December 3, 2008 and by TPAC on December 5, 2008. The initial screened corridors proposed for advancement through the evaluation criteria are shown on Figure 4 and described in Figure 5.

Attachments:
Figure 1 – Screening Criteria
Figure 2 – Evaluation Framework diagram
Figure 3 – Evaluation Time Frame
Figure 4 – Initial Draft Map of Corridor Screening Results
Figure 5 – Initial Draft List of Corridor Screening Results
Figure 6 – Screening Results by Segment chart
Figure 7 – Screening Results by Corridor chart

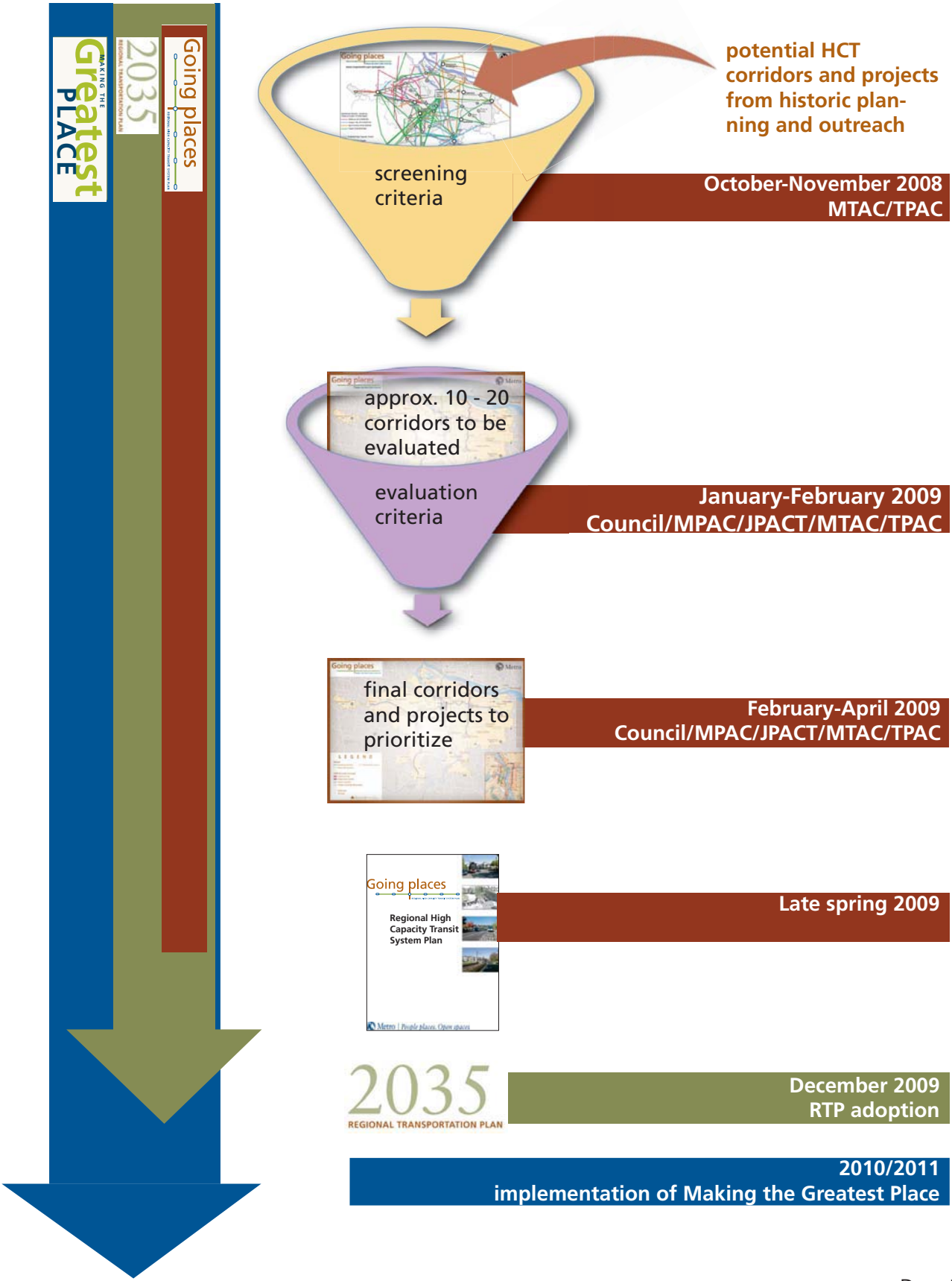
1 Scenario B HCT improvements were gathered from the following sources: Region 2040 Concept, TriMet Transit Investment Plan (2007), RTP Federal Component (2007), and local jurisdiction comments received from TPAC/MTAC/JPACT/MPAC.

Figure 1: Initial Screening Criteria FINAL REVISED DRAFT, 11-7-08, based on 10-22-08 Subcommittee, 10-31-08 TPAC and 11-05-08 MTAC

CRITERION	MEASUREMENT	PROPOSED SCREENING TARGET	
QUANTITATIVE CRITERIA			
Existing Potential Ridership	Transit Orientation Index	High	> 5.0 riders per acre
		Medium-High	4.0-5.0 riders per acre
		Medium	3.0-4.0 riders per acre
		Low-Medium	1.5-3.0 riders per acre
		Low	< 1.5 rider per acre
Future Potential Ridership	Transit Orientation Index	High	> 5.0 riders per acre
		Medium-High	4.0-5.0 riders per acre
		Medium	3.0-4.0 riders per acre
		Low-Medium	1.5-3.0 riders per acre
		Low	< 1.5 rider per acre
QUALITATIVE CRITERIA			
Corridor Availability and Cost	Qualitative assessment of right of way availability and associated access improvements (Includes geological hazards)	High	Minimal right of way or few structures required
		Medium	Moderate right of way or structures required
		Low	Major land acquisition, tunneling, bridge work or extensive ROW required
Environmental Constraints	Qualitative assessment of impact on natural resources	High	Minimal potential negative impacts to natural resources
		Medium	Moderate potential negative impacts to natural resources
		Low	Significant potential negative impacts to natural resources
Equity	Qualitative assessment of social equity needs	Does promote equity	Directly serves low-income and minority communities
		Slightly promotes equity	Provides indirect access to low-income and minority communities
		Does not promote equity	No access provided to low-income and minority communities
Connectivity and System	Qualitative assessment of transit system connectivity, intermodal connectivity, maintenance yard site or other transit system needs.	High	Strong connectivity and/or system benefits
		Medium	Moderate connectivity and/or system benefits
		Low	Poor connectivity, and/or system benefits

Congestion	Recognition of congestion parallel to proposed corridor	High	LOS F (2035 PM Peak 2-Hour; Mid-Day 1-Hour); Vehicle/Capacity Ratio
		Medium-High	LOS E (2035 PM Peak 2-Hour; Mid-Day 1-Hour); Vehicle/Capacity Ratio
		Medium	LOS D (2035 PM Peak 2-Hour; Mid-Day 1-Hour); Vehicle/Capacity Ratio
		Low-Medium	LOS C (2035 PM Peak 2-Hour; Mid-Day 1-Hour); Vehicle/Capacity Ratio
		Low	LOS A-B (2035 PM Peak 2-Hour; Mid-Day 1-Hour); Vehicle/Capacity Ratio
2040 Land Use	Support Region 2040 land use designations based on RTP priority areas	High	• Central city • Regional centers • Industrial areas • Freight and Passenger Intermodal facilities
		Medium	• Employment areas • Town centers • Station Communities • Corridors • Main Streets
		Low	• Inner neighborhoods • Outer neighborhoods

High Capacity Transit System Plan
Evaluation framework



Dec. 3, 2008

High Capacity Transit System Plan
Evaluation timeframe

Tasks	Timeframe					
	October 2008	**November 2008**	**December 2008**	**January 2009**	**February-April 2009**	**April-June 2009**
Confirm screening criteria	TPAC	MTAC				
Apply screening criteria and confirm initial set of screened corridors and projects		TPAC MTAC	TPAC MTAC MPAC JPACT	MPAC JPACT Metro Council	Metro Council	
Confirm evaluation criteria		TPAC MTAC	TPAC MTAC MPAC JPACT	MPAC JPACT Metro Council	Metro Council	
Review initial evaluation of corridors and projects					TPAC MTAC	
Approve prioritized corridors and projects and adopt plan						TPAC MTAC MPAC JPACT Metro Council

Dec. 4, 2008

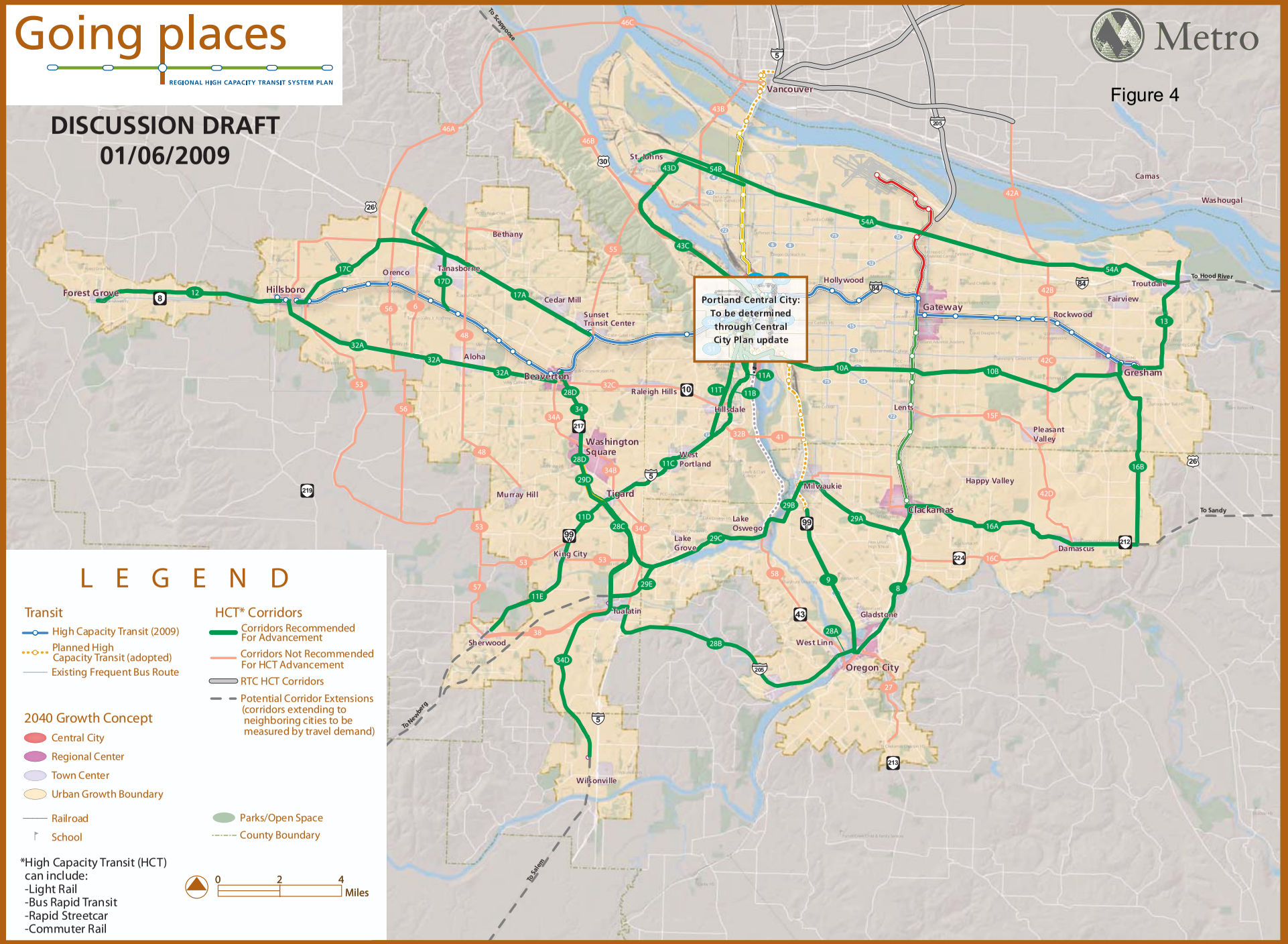
Going places

REGIONAL HIGH CAPACITY TRANSIT SYSTEM PLAN

DISCUSSION DRAFT
01/06/2009

Metro

Figure 4



L E G E N D

Transit
- High Capacity Transit (2009)
- Planned High Capacity Transit (adopted)
- Existing Frequent Bus Route

HCT* Corridors
- Corridors Recommended For Advancement
- Corridors Not Recommended For HCT Advancement
- RTC HCT Corridors
- Potential Corridor Extensions (corridors extending to neighboring cities to be measured by travel demand)

2040 Growth Concept
- Central City
- Regional Center
- Town Center
- Urban Growth Boundary

- Railroad
- School
- Parks/Open Space
- County Boundary

*High Capacity Transit (HCT) can include:
-Light Rail
-Bus Rapid Transit
-Rapid Streetcar
-Commuter Rail

0 2 4 Miles

High Capacity Transit System Plan
Initial Screened Transit Corridors
Metro Council Review 11/25/08
Not in priority order

Segment / Corridor ID*	Segment / Corridor Name
18	Improvements to Steel Bridge
19	Bridge/Rose Quarter Access Improvements
49	Eastside Connector
50	Downtown Tunnel - Lloyd 11th to Goose Hollow 18th
51	Downtown Jefferson/Columbia via 1st Ave
52	Downtown Everett/Glisan to 18th Ave
8	(CTC - OCTC) via I-205
9	(Park - OCTC) via McLoughlin
10	(Portland - Gresham) via Powell
11	(Portland to Sherwood) via Barbur Hwy 99w
12	(Hillsboro - Forest Grove)
13	(Gresham - Troutdale MHCC) via Kane Dr
16	(CTC - Damascus)
17	(STC - Hillsboro)
17D	(Red Line extension to Tanasbourne) - with revisions from WaCo and Hillsboro
28	(Oregon City - WSTC)
29	(Washington Square - Clackamas)
32	(Hillsboro - Hillsdale)
34	(Beaverton - Wilsonville)
43	(St. Johns - Vancouver/Union Station)
54	(Troutdale - St. Johns)
6	(Amber Glen to Tanasbourne)
48	(Murray Hill - Bethany)
56	(Orenco - Clark Hill Rd)
15	(Lents to Pleasant Valley) via Foster Road
27	(Oregon City - Clac CC) - via Hwy213/RRROW
38	(Tualatin - Sherwood) via Sherwood Rd
41	(Lake O - McLoughlin connector)
42	(Vancouver - Damascus)
46	(Cornell - St. Johns)
53	(Hillsboro - Tualatin)
55	(Sunset TC - St. Johns)
57	(Scholls Ferry - Sherwood) via Roy Rogers Rd
17C+46A+46B+43B	(Hillsboro - Vancouver)
41+32B+32C	(McLoughlin - Beaverton)

*Note: Corridors extending to neighboring cities were not considered in this analysis

LEGEND
Central City improvement - staff/Subcomittee recommended for advancement
Corridor - staff/Subcomittee recommended for advancement
Corridor - staff/Subcomittee considered, but not recommended for advancement

Figure 6

Screening Results by Segment/Project

		Screening Results									
		1-3	1-5	1-5	1-5	1-3	1-3	1-3	1-5	1-5	1-3
Segment / Corridor ID	Segment / Corridor Name	Connectivity and System Score	O-D	Existing Potential Ridership	Future Potential Ridership	Corridor Availability and Cost	Environmental Constraints	Equity	Congestion (Midday)	Congestion (Peak)	2040 Land Use
6	(Amber Glen to Tanasbourne)	Low	Low	Low	Low-Medium	Medium	High	Low	Low	Medium-High	Low
8	(CTC - OCTC) via I-205	High	Medium	Low	Low-Medium	Medium	Medium	Medium	Medium-High	High	Medium
9	(Park - OCTC) via McLoughlin	High	Low	Low	Low	Medium	Medium	Low	Low	High	Medium
10	(Portland Mall - Gresham) via Powell	Medium	Low-Medium	Low-Medium	Medium	Medium	Medium	High	High	High	High
10A	(Portland Mall - I-205) via Powell	High	High	Medium	High	Low	Medium	Low	High	High	High
10B	(I-205 - Gresham) via Powell	Medium	Low-Medium	Low	Low	Medium	High	High	High	High	High
11	(Portland to Sherwood) via Barbur Hwy 99w	Low	Low-Medium	Low-Medium	Medium	Medium	Medium	Low	High	High	High
11A	(Portland to Terwilliger) via Barbur Hwy 99W	Medium	Medium-High	High	High	Low	Medium	Low	Low	High	High
11B	(Terwilliger to Multnomah) via Barbur Hwy 99w	Low	Medium	Low	Low	Low	Medium	Low	Low	High	High
11C	(Multnomah to Tigard) via Barbur Hwy 99w	Low	Low	Low	Low-Medium	Medium	Medium	Low	Medium-High	High	High
11D	(Tigard -King City) via Barbur Hwy 99w	Low	Low	Low	Low	Medium	High	Low	High	High	High
11E	(King City - Sherwood) via Barbur Hwy 99w	Low	Low	Low	Low	Medium	High	Low	High	High	High
11T	(Portland to Multnomah) via TUNNEL Barbur hwy 99w	Medium	Medium-High	Medium	High	Low	Medium	Low	Low	High	High
12	(Hillsboro - Forest Grove)	Medium	Medium	Low	Low	High	Medium	High	Medium-High	High	Medium
13	(Gresham - Troutdale MHCC) via Kane Dr	Medium	Low	Low	Low-Medium	Medium	Medium	Low	Low	High	Medium
15	(Lents to Pleasant Valley) via Foster Road	Low	Low	Low	Low	Medium	Medium	Low	Medium-High	High	Low
16	(CTC - Damascus)	Medium	Low-Medium	Low	Low	High	Medium	High	High	High	Medium
16A	(CTC - Damascas) via Sunnyside	Medium	Low-Medium	Low	Low-Medium	Medium	High	Low	Medium	High	Medium
16B	(Gresham - Damascus) via 232nd/242nd Ave	Low	Low	Low	Low	High	High	Low	Medium	High	Medium
16C	(CTC - Damascas) via Hwy 212/224	Medium	Low-Medium	Low	Low	Medium	Medium	High	High	High	Medium
17	(STC - Hillsboro)	Low	Low-Medium	Low	Low-Medium	High	Medium	Low	Medium-High	High	Medium
17A	(Shute - St Vincent) via Evergreen/US26	Medium	Low-Medium	Low	Low-Medium	Medium	Medium	Low	Medium-High	High	Medium
17B	(Hillsboro -Shute) via Evergreen	Low	Medium	Low	Low	Medium	High	Low	Medium	High	Medium
17C	(Hillsboro-Shute) via Cornel/Shute	Low	Medium	Low	Low-Medium	High	Medium	Low	Medium	High	Medium
17D	(Tanasbourne - Blue Line)	Low	Medium	Low	Medium	Medium	Medium	Low	Low	Medium-High	Medium
18	Improvements to Steel Bridge	High	High	High	High	High	High	Low	Low	Medium	High
19	Bridge Improvements	High	High	High	High	Medium	Low	Medium	Low	Medium	High
27	(Oregon City - Clac CC) - via Hwy213/RRROW	Low	Low	Low	Low	Medium	Low	Low	Medium-High	High	Low
28	(Oregon City - WSTC)	Low	Low	Low	Low-Medium	High	Medium	Low	High	High	Medium
28A	(Oregon City - West Linn) via new bridge	Low	Low	Low	Low	Low	Low	Low	High	High	Medium
28B	(West Linn - Tualatin) via I-205	Low	Low-Medium	Low	Low	Medium	Medium	Low	Medium	High	Medium
28C	(Tualatin - Tigard) via WES	Medium	Low	Low-Medium	Low-Medium	High	High	Low	High	High	Medium
28D	(Tigard - WSTC) via WES	Low	Low-Medium	Low-Medium	Medium	High	High	Low	Low	High	Medium
29	(CTC - Clackamas)	Medium	Low	Low	Low-Medium	High	Medium	High	Medium-High	High	Medium
29A	(CTC - Milwaukie) via Hwy 224	Medium	Low-Medium	Low	Low-Medium	Medium	Medium	Medium	Medium	Medium-High	Medium
29B	(Milwaukie - Lake O) via RR bridge	High	Low	Low	Low-Medium	High	Medium	Medium	Medium-High	High	Medium
29C	(Lake O - Tigard TC) via RR ROW	Medium	Low	Low	Low-Medium	High	Medium	Low	Medium-High	High	Medium
29D	Tigard TC - WSTC) via WES ROW	Low	Low-Medium	Low-Medium	Medium	High	Medium	Low	Medium-High	High	Medium
29E	(Boones Ferry - Tualatin) via RR ROW	Low	Low-Medium	Low-Medium	Low-Medium	High	Medium	Low	Medium-High	High	Medium
29F	(Milwaukie - Clackamas)	High	Low-Medium	Low	Low-Medium	Medium	High	Low	Low	Low	Medium
32	(Hillsboro - Hillsdale)	Low	Low	Low	Low-Medium	High	Medium	Medium	Medium-High	High	Medium
32A	(Hillsboro - Aloha - Beaverton) via TV Hwy	Medium	Low-Medium	Low	Low-Medium	High	Medium	High	Medium-High	High	Medium
32B	(Barbur - Lake O connector)	Low	Low	Low	Low	Medium	Medium	Low	Medium-High	High	Medium
32C	(Beaverton - Raleigh Hills - Hillsdale) via Beaverton Hillsdale	Low	Low-Medium	Low	Low-Medium	Medium	Medium	Low	Medium	High	Medium
34	(Beaverton - Wilsonville)	Low	Low	Low	Low-Medium	Medium	Medium	Medium	High	High	Medium
34A	(Beaverton - Washington Sq) via Hall	Medium	Medium	Low-Medium	Medium	Medium	High	Low	Medium	High	Medium
34B	(Washington Sq - Tigard) via Hall	Low	Low-Medium	Low	Low-Medium	Medium	High	Low	Medium-High	High	Medium
34C	(Tigard - Tualatin) via 217/I5	Low	Low	Low-Medium	Medium	Medium	Medium	Low	High	High	Medium
34D	(Tualatin - Wilsonville) via I5	Low	Low	Low	Low	Medium	High	Low	High	High	Medium
38	(Tualatin - Sherwood) via Sherwood Rd	Low	Low	Low	Low	Medium	High	Low	Medium	High	Low
41	(Lake O - McLoughlin connector)	Medium	Low	Low	Low	Low	Medium	Low	High	High	Low
42	(Vancouver - Damascus)	Low	Low	Low	Low	Medium	Low	Medium	Medium-High	High	Medium

		Screening Results									
		1-3	1-5	1-5	1-5	1-3	1-3	1-3	1-5	1-5	1-3
Segment / Corridor ID	Segment / Corridor Name	Connectivity and System Score	O-D	Existing Potential Ridership	Future Potential Ridership	Corridor Availability and Cost	Environmental Constraints	Equity	Congestion (Midday)	Congestion (Peak)	2040 Land Use
42A	(Marine Drive - Vancouver) via 182nd	Low	Low	Low	Low	Low	Low	Low	Low	Medium-High	Low
42B	(Marine Drive - Rockwood) via 182nd	Low	Low-Medium	Low	Low-Medium	Medium	Medium	Low	Low	Medium-High	Medium
42C	(Rockwood - Pleasant Valley) via 182nd	Low	Low	Low	Low	Medium	Medium	Medium	Low	High	Medium
42D	(Pleasant Valley - Damascas) via Foster	Low	Low	Low	Low	High	High	Low	Medium-High	High	Low
43	(St. Johns - Vancouver/Union Station)	Low	Medium-High	Low-Medium	Medium	High	Low	High	High	High	High
43A	(St. Johns to RR)	Low	Medium	Low	Low-Medium	High	Medium	Low	Low	Low	High
43B	(RR to Vancouver) via UPRR Railroad Bridge	Low	Low	Low	Low-Medium	High	Low	Medium	Low	Medium	High
43C	(Union Station - St. Johns) via RR Bridge	Medium	High	Low-Medium	High	High	Medium	Medium	High	High	High
43D	(St. Johns - Vancouver) via Freight Corridor	Medium	Low	Low	Low	High	Low	Low	Low	High	High
46	(Comell - St. Johns)	Low	Low	Low	Low	High	Low	Low	High	High	Medium
46A	(Comell to UPRR) via Com Pass Tunnel	Low	Low	Low	Low	High	Low	Low	High	High	Medium
46B	(UPRR - St. Johns) via Freight	Low	Low	Low	Low	High	Low	Medium	High	High	Medium
46C	(Com Pass - St. Johns) via Northern Bridge	Low	Low	Low	Low	High	Low	Low	Low	Low	Medium
48	(Murray Hill - Bethany)	Low	Low	Low	Low	Low	Medium	Low	Medium	High	Low
49	Eastside Connector	High	Medium	High	High	Low	Medium	High	Low	Medium	High
50	Downtown Tunnel - Lloyd 11th to Goose Hollow 18th	High	Low-Medium	High	High	Low	Medium	High	Low	Low	High
51	Downtown Jefferson/Columbia via 1st Ave	Low	High	High	High	Low	Medium	Medium	Low	Medium	High
52	Downtown Everett/Glisan to 18th Ave	Low	High	High	High	Low	High	Medium	Medium	Medium	High
53	(Hillsboro - Tualatin)	Low	Low	Low	Low	Medium	Low	High	Low	High	Medium
54	(Troutdale - St. Johns)	Low	Low	Low	Low	High	Low	High	Low	Medium-High	Medium
55	(Sunset TC - St. Johns)	High	Low	Low	Low	Low	Low	Low	High	High	Low
56	(Orenco - Clark Hill Rd)	Low	Low	Low	Low	Medium	Low	Medium	Low	High	Low
57	(Scholls Ferry - Sherwood) via Roy Rogers Rd	Low	Low	Low	Low	Medium	Low	Low	High	High	Low
28A+28B	(Oregon City - Tualatin)	High	Low	Low	Low	Low	Medium	Low	Medium-High	High	Medium
17C+46A+46B+43B	(Hillsboro - Vancouver)	Low	Low	Low	Low	High	Low	High	Medium-High	High	High
41+32B+32C	(McLoughlin - Beaverton)	Medium	Low	Low	Low-Medium	Low	Medium	Low	Medium-High	High	Medium

Note: Methods for determining High, Medium, Low rankings are described in detail in the Screening Results Technical Memorandum
Note: All High ratings indicate positive results as related to project viability; all low ratings indicated negative results

Figure 7

Screening Results by Corridor

		Screening Results									
		1-3	1-5	1-5	1-5	1-3	1-3	1-3	1-5	1-5	1-3
Segment / Corridor ID	Segment / Corridor Name	Connectivity and System Score	O-D	Existing Potential Ridership	Future Potential Ridership	Corridor Availability and Cost	Environmental Constraints	Equity	Congestion (Midday)	Congestion (Peak)	2040 Land Use
6	(Amber Glen to Tanasbourne)	Low	Low	Low	Low-Medium	Medium	High	Low	Low	Medium-High	Low
8	(CTC - OCTC) via I-205	High	Medium	Low	Low-Medium	Medium	Medium	Medium	Medium-High	High	Medium
9	(Park - OCTC) via McLoughlin	High	Low	Low	Low	Medium	Medium	Low	Low	High	Medium
10	(Portland Mall - Gresham) via Powell	Medium	Low-Medium	Low-Medium	Medium	Medium	Medium	High	High	High	High
11	(Portland to Sherwood) via Barbur Hwy 99w	Low	Low-Medium	Low-Medium	Medium	Medium	Medium	Low	High	High	High
12	(Hillsboro - Forest Grove)	Medium	Medium	Low	Low	High	Medium	High	Medium-High	High	Medium
13	(Gresham - Troutdale MHCC) via Kane Dr	Medium	Low	Low	Low-Medium	Medium	Medium	Low	Low	High	Medium
15	(Lents to Pleasant Valley) via Foster Road	Low	Low	Low	Low	Medium	Medium	Low	Medium-High	High	Low
16	(CTC - Damascus)	Medium	Low-Medium	Low	Low	High	Medium	High	High	High	Medium
17	(STC - Hillsboro)	Low	Low-Medium	Low	Low-Medium	High	Medium	Low	Medium-High	High	Medium
18	Improvements to Steel Bridge	High	High	High	High	High	High	Low	Low	Medium	High
19	Bridge Improvements	High	High	High	High	Medium	Low	Medium	Low	Medium	High
27	(Oregon City - Clac CC) - via Hwy213/RRROW	Low	Low	Low	Low	Medium	Low	Low	Medium-High	High	Low
28	(Oregon City - WSTC)	Low	Low	Low	Low-Medium	High	Medium	Low	High	High	Medium
29	(CTC - Clackamas)	Medium	Low	Low	Low-Medium	High	Medium	High	Medium-High	High	Medium
32	(Hillsboro - Hillsdale)	Low	Low	Low	Low-Medium	High	Medium	Medium	Medium-High	High	Medium
34	(Beaverton - Wilsonville)	Low	Low	Low	Low-Medium	Medium	Medium	Medium	High	High	Medium
38	(Tualatin - Sherwood) via Sherwood Rd	Low	Low	Low	Low	Medium	High	Low	Medium	High	Low
41	(Lake O - McLoughlin connector)	Medium	Low	Low	Low	Low	Medium	Low	High	High	Low
42	(Vancouver - Damascus)	Low	Low	Low	Low	Medium	Low	Medium	Medium-High	High	Medium
43	(St. Johns - Vancouver/Union Station)	Low	Medium-High	Low-Medium	Medium	High	Low	High	High	High	High
46	(Cornell - St. Johns)	Low	Low	Low	Low	High	Low	Low	High	High	Medium
48	(Murray Hill - Bethany)	Low	Low	Low	Low	Low	Medium	Low	Medium	High	Low
49	Eastside Connector	High	Medium	High	High	Low	Medium	High	Low	Medium	High
50	Downtown Tunnel - Lloyd 11th to Goose Hollow 18th	High	Low-Medium	High	High	Low	Medium	High	Low	Low	High
51	Downtown Jefferson/Columbia via 1st Ave	Low	High	High	High	Low	Medium	Medium	Low	Medium	High
52	Downtown Everett/Glisan to 18th Ave	Low	High	High	High	Low	High	Medium	Medium	Medium	High
53	(Hillsboro - Tualatin)	Low	Low	Low	Low	Medium	Low	High	Low	High	Medium
54	(Troutdale - St. Johns)	Low	Low	Low	Low	High	Low	High	Low	Medium-High	Medium
55	(Sunset TC - St. Johns)	High	Low	Low	Low	Low	Low	Low	High	High	Low
56	(Orenco - Clark Hill Rd)	Low	Low	Low	Low	Medium	Low	Medium	Low	High	Low
57	(Scholls Ferry - Sherwood) via Roy Rogers Rd	Low	Low	Low	Low	Medium	Low	Low	High	High	Low
28A+28B	(Oregon City - Tualatin)	High	Low	Low	Low	Low	Medium	Low	Medium-High	High	Medium
17C+46A+46B+43B	(Hillsboro - Vancouver)	Low	Low	Low	Low	High	Low	High	Medium-High	High	High
41+32B+32C	(McLoughlin - Beaverton)	Medium	Low	Low	Low-Medium	Low	Medium	Low	Medium-High	High	Medium

Note: Methods for determining High, Medium, Low rankings are described in detail in the Screening Results Technical Memorandum
Note: All High ratings indicate positive results as related to project viability; all low ratings indicated negative results

memo

To	HCT Team		
Cc			
From	Steer Davies Gleave & Nelson\Nygaard		
Date	6 January 2009		
Project	Portland HCT	Project No.	22026001

Subject Detailed HCT Evaluation Framework –DRAFT FOR DISCUSSION

Overview

In order to select and prioritize the 'best' HCT corridors for investment a robust, coherent and transparent framework for the detailed evaluation of options is required. To date a long list of corridors has been refined to a short list of corridors (~15) that will be subject to the detailed evaluation.

The objective for the detailed evaluation framework is to enable a comparative assessment of the corridors to be made. The framework therefore must:

- Assume a common baseline scenario (2035 Regional Transportation Plan Financially Constrained System) against which each corridor is compared
- Ensure a consistent level of detail across the criteria and be commensurate with the level of project information available
- Enable sufficiently disaggregate scoring, in order that the level of impact can be differentiated between corridors
- Present the information clearly, concisely and on a consistent basis so that decision makers can compare corridors against each other

It is proposed that no explicit weighting is given to the criteria. Having undertaken the initial evaluation there will be a review phase to gain agreement on the prioritization of corridors; for this it is important that decision makers can consider the implications and understand the potential effect of implicitly applying different weightings.

Associated with this approach the assessment of each criterion will be quantified (potentially, as appropriate, as a monetary value) or qualitatively scored, e.g. adverse, beneficial. The intention of this approach is to avoid the addition of scores and the creation of a 'single' number for each corridor, which would negate the whole ethos of undertaking the multiple account evaluation.

Evaluation Approach

The detailed evaluation is not a 'single step' in the process, but rather a tool that is employed on an ongoing basis to assist the shaping and refinement of the corridor prioritization. For each short listed corridor it is anticipated that the project development phase will identify the most plausible forms of mode investment for each corridor based upon the screening assessment (e.g. potential ridership, environmental, land take issues). For example light rail may be the only mode option for corridors which are extensions of the existing system, whereas for other corridors light rail, BRT, commuter rail and streetcar[1] options may be identified and evaluated.

Therefore for each of the (~15) short listed corridors it is likely that there will be several plausible mode investments defined. It is against these definitions that the preliminary evaluation will be undertaken.

The output from this will support confirmation that the appropriate mode investments have been assumed and inform the strongest candidate, by highlighting the trade-offs that could occur and may deserve further investigation. As appropriate, the draft definition may be refined and the evaluation results revised accordingly.

Supporting this iterative process will be the consideration of the system network effects, in order to ensure the definition of individual corridors does not result in precluding valuable opportunities for integration and delivering benefits due to the 'whole being greater than the sum of the parts'.

Proposed MAE Framework

The Multiple Account Evaluation (MAE) approach is consistent with the Regional Transportation Plan (RTP) Outcomes-Based Evaluation Framework. The framework is organized in three evaluation categories:

- Community
- Environment
- Economy

[1] The 2035 RTP transit policy does not currently contain rapid streetcar as a HCT mode. This concept will be further explored in the context of the HCT system plan, and may result in policy refinements to the 2035 RTP.

Each of the categories is focused upon the effect once the investment is made, namely the transit line opens. However, for the evaluation of the corridors it is also important to consider the implications of attempting to implement the identified transit solution. A fourth account is therefore included in the MAE to address deliverability.

The MAE framework aligns with the hierarchy of objectives.

- Region 2040 Vision
- Council Adopted Definition of what makes a successful region
- 2035 RTP –implementing the Region's 2040 Vision
- HCT – supporting the RTP Goals

The Council Adopted Definition of what makes a successful region includes six goals to promote:

- Vibrant, walkable communities
- Sustained economic competitiveness and prosperity
- Safe and reliable transportation choices
- Minimal contributions to global warming
- Clean air, clean water, healthy ecosystems
- Benefits and burdens of growth distributed equitably

The 10 RTP Goals are:

- Foster vibrant communities and compact urban form
- Sustain economic competitiveness and prosperity
- Expand transportation choices
- Effective and efficient management of transportation system
- Enhance safety and security
- Promote environmental stewardship
- Enhance human health
- Ensure equity
- Ensure fiscal stewardship
- Deliver accountability

These goals can be grouped under the three evaluation categories used in the RTP, which provide the structure for the MAE framework (see Figure 1), alongside the consideration of deliverability and a summary of the corridor characteristics as

produced from the screening exercise. For each evaluation category criteria addressing different aspects of the category are presented.

The evaluation will be both quantitative and qualitative, depending on the level of project development and extent of information available. As more information becomes available the assessment can be revisited.

Deriving from the framework structure will be a summary sheet designed to provide an overview for each corridor that will allow decision makers to identify and confirm the mode investments and corridors to be prioritized. Appendix A presents an example of a summary sheet. Associated documentation will provide supporting evidence for the detailed evaluation findings.

In the summary sheet, commentary will present the most significant findings against the criteria and provide a justification of the assessment score (including any assumptions made due to the absence of full information). Where mitigation of a negative impact would be required, it will be described and the score will reflect the mitigated effect.

In the initial stage the scoring will be based upon a seven-point scale:

- Significant benefit
- Moderate benefit
- Slight benefit
- Neutral
- Slightly adverse
- Moderately adverse
- Significantly adverse

Multiple Accounts

The following sections detail the specific criteria that will be used to evaluate corridors against the four accounts:

- Community
- Environment
- Economy
- Deliverability

A description of essential corridor characteristics will also be provided as part of the evaluation. This information is described in the first table of Figure 1.

System Expansion Policy

It is important to note that this level of evaluation is designed to provide a preliminary prioritization of corridors and narrow mode investment options. The assessment will be based on current and projected land use conditions. However, it is recognized that projections are never completely accurate and that conditions will change over time. To account for these changes, a System Expansion Policy including a separate set of criteria required for project advancement is proposed.

These criteria would provide communities along a corridor an opportunity to make proactive changes to land use and access policies. Jurisdictions benefiting from a proposed alignment or project would be required to submit Ridership Development and Financial Plans before moving to the next phase of project advancement.

The following graphic illustrates how HCT projects are prioritized in the System Plan process and the role of proposed project advancement criteria, which would allow jurisdictions to change the priority of an adopted HCT system project.

HCT System Plan Evaluation and System Expansion Policy

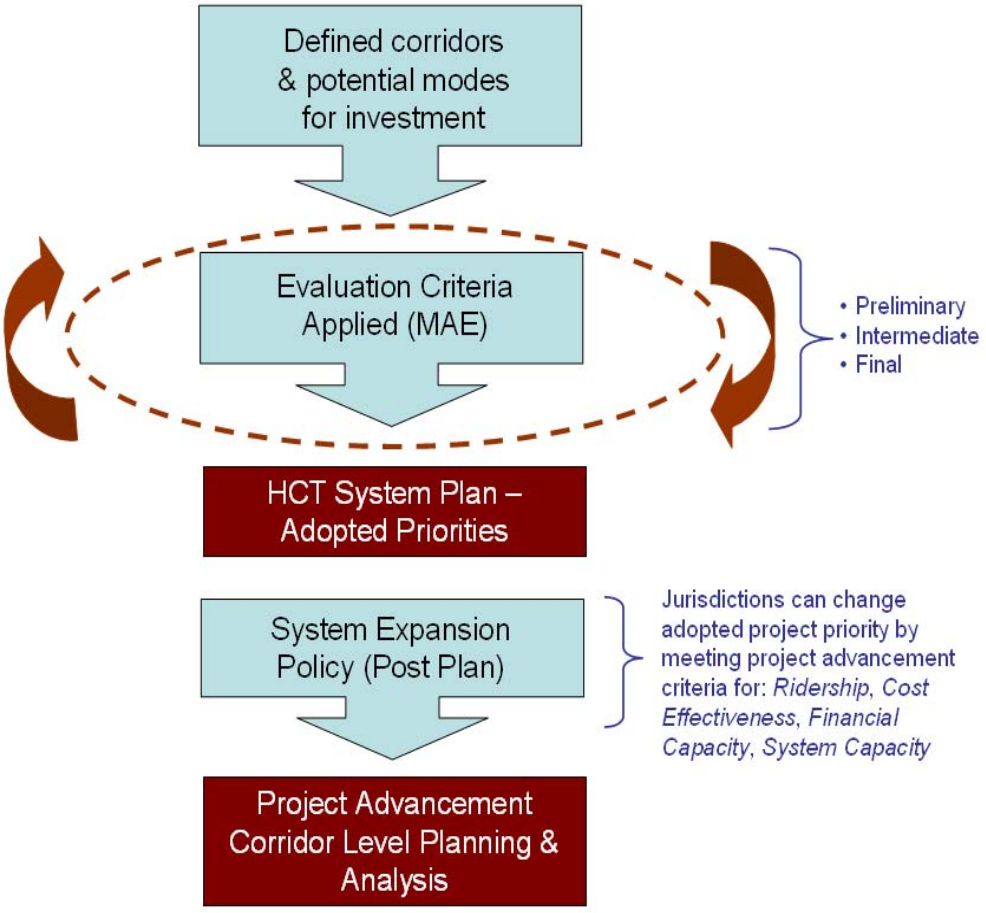


Figure 1 – MAE FRAMEWORK

COMMUNITY EVALUATION CATEGORY

Criteria	Measure	Role	Method
Supportiveness of existing local land use and adopted local transportation plans and policies	Qualitative scoring based on plan review	Identification in strategic terms of consistency or inconsistency with other proposed plans or policies	Existing LU
Acceptability to local communities	Qualitative scoring based on *Local Aspirations* outputs	Local populations may or may not wish to trade-off improved transit against other potential investments or may have concerns about the impact of HCT on urban form. Since a high level of local commitment is required for project development, communities that display strong commitment to project success should be acknowledged.	Rely on Metro Local Aspiration Process (reflective of regional goals/policies) Criterion to support local aspirations process with INDEX model
Ridership generators	Identification of major activity centers served, e.g. ▪ Hospital & medical centers ▪ Major retail sites ▪ Major social service centers ▪ Colleges / universities ▪ Major Federal / State Government offices ▪ Employers > 500 employees ▪ Sports sites / venues	Ensuring the proposed corridor encompasses both current and future key demand attractors and generators and meets the requirements of transit to provide a service to and from where people wish to travel.	Evaluate TriMet's top 30 generators; o-d date from travel demand model. Housing not included as a major activity center, but is captured via TOI analysis
Support 2040	1. Central City, Regional Centers, Industrial areas, Freight and Passenger Intermodal facilities 2. Employment areas, Town	Rank based on Service to 2040 land use types, consistent with RTP for service types related to primary, secondary and other	Support Region 2040 land use designations based on RTP priority areas

COMMUNITY EVALUATION CATEGORY

Criteria	Measure	Role	Method
	Centers, Station Communities, Corridors, Main Streets 3. Inner and Outer Neighborhoods	urban components.	
Transportation network integration - Transit	Identification of full trip benefits due to integration with transit transfer centers and interchange opportunities	Consideration of the network benefits that can be achieved, including both physical integration (i.e. good interchange opportunities), system integration (i.e. timetabling connecting services, through ticketing) and redundancy	Metro and TriMet to conduct a similar exercise to the screening criterion
Transportation network integration – Roads, use of ROW	Where roadways may be used for HCT ROW planned status of ROW (i.e. are plans in place to use ROW, including whether the facility is NHS and/or freight route.	Help to clarify what is the function of the facility.	Review of jurisdictional plans.
Transportation network integration – Ability to avoid congestion	Consider HCT ability to bypass congested areas compared to comparable non-HCT transit in mixed traffic		
Equity	Catchment analysis for social groups (low income and minority census tracts) within walking access (1/4 mile) to a stop Analysis of % of households with no vehicle available	Consideration of those who may receive greatest benefit from the transit investment due to reduction of current barriers to travel reduced cost of travel. Members of these households are likely transit consumers. Analysis includes: low and very-low income, racial minority, seniors,	Census and Metro Transportation Equity Analysis for the RTP

COMMUNITY EVALUATION CATEGORY

Criteria	Measure	Role	Method
		disabled people, low car ownership.	
Safety	Qualitative, based on adherence to good design standards	Direct safety impacts due to design and placement of HCT in ROW (i.e. physically segregated, running with general traffic, on-street stops).	Selection of corridors that have extraordinary conditions that may present a safety issue (e.g., freeway, elevated, trench, etc)
Health (Promote physical activity)	Comprehensiveness of pedestrian and cycling network Increase in average bicycle and pedestrian mode share	Assess benefits from increased physical activity caused by greater pedestrian access to transit and increased walking and cycling within the corridor.	Model and spreadsheet analysis
Housing + Transportation Affordability Index	Analysis of housing and transportation costs as percent of total household income.	Indirect measure of areas where transit demand by assessing the impact of transportation costs on housing choices.	Metro
Placemaking/Urban Form	Identification of impacts on urban composition and public space function	Potential to enhance land development; increase mix of land uses; enhance public spaces	Focus this on an assessment of vacant and underdeveloped land. Metro has done work on developable land in the region.
Transportation efficiency (Users)	Average travel time benefit per rider and distribution of benefits across the line and the system. This measure will also determine whether HCT is an effective mode compared to non-HCT transit through congested areas.	The average travel time benefit will demonstrate the effectiveness of the option across the system. The assessment of distribution will identify the 'winners and losers' across the system (e.g. if an extension results in new demand causing crowding on an existing section of route).	Model/TriMet

ENVIRONMENT EVALUATION CATEGORY

Criteria	Measure	Role	Method
Emissions & disturbance	Change in VMT and resulting emission levels for CO2 and other harmful pollutants such as NOx and SOx. (Potentially for the full project life-cycle)	Impacts on local air pollution, greenhouse gases and noise. Transportation related environmental impacts tend to track closely to VMT, making it a valuable proxy for emissions and air quality related measures.	Model
Natural resources	Length of alignment impacting identified sensitive habitats and/or natural resources	Impacts on environmentally sensitive areas due to land take or proximity to major infrastructure.	RLIS
4(f) resources	Acres of 4(f) resources impacted	Impacts on the amenity value of parkland, schools and other 4(f) resources.	RLIS

ECONOMY EVALUATION CATEGORY

Criteria	Measure	Role	Method
Transportation efficiency (Operator)	Cost per rider	To identify the financial performance of the day-to-day operations.	Model/TriMet
Economic competitiveness	Change in employment catchment	Improved transit and land use will increase the labor market's access to employment centers and promote re-development of employment sites.	Metro
Redevelopment	Vacant and redevelopable land		Metro

DELIVERABILITY EVALUATION CATEGORY

Criteria	Measure	Role	Method
Feasibility (Construction)	Capital cost	Flag for instances where negative impacts from construction of the project may be so great as to outweigh project benefits.	Sketch level engineering
Feasibility (Operations)	Operating cost	Ensure design of the project enables efficient operations; assess impact of project on existing system function/capacity.	Also focus on what impact new corridor operations would have on existing lines. TriMet should be involved in this evaluation.
Ridership	Ridership	Evaluate total ridership, ridership per revenue hour and revenue mile, system ridership impact	Model
Funding potential	Initial assessment of local and federal funding opportunities to cover estimated capital and operating costs	Most projects will not have funding sources identified. The intent is to identify key obstacles to successful funding or reward any project that has substantial identified local funding. A more detailed funding plan will be required at the project advancement phase.	Not to focus on existing FTA program criteria but assessment of likelihood of receiving federal funds.

Agenda Item Number 4.0

COLUMBIA RIVER CROSSING DISCUSSION IN PREPARATION FOR JOINT PORTLAND CITY COUNCIL /METRO COUNCIL WORK SESSION

Metro Council Work Session
Tuesday, January 20, 2009
Metro Council Chamber

METRO COUNCIL

Work Session Worksheet

Presentation Date: January 20, 2009 Time: ?? Length: 60 minutes

Presentation Title: Columbia River Crossing: Preparation for upcoming project decisions and joint Metro Council/Portland City Council worksession on January 26th.

Service, Office, or Center: Planning and Development

Presenters (include phone number/extension and alternative contact information):
Ross Roberts, Metro (503) 797-1752
Richard Brandman, CRC Project Director (360) 816-8865

ISSUE & BACKGROUND

Purpose - The purpose of the January 20th Council worksession is to discuss key topics and upcoming decisions related to the project prior to a joint Metro/Portland City Council worksession on January 26th. Individual Councilor briefings have also been scheduled to provide more detail and answer questions prior to the joint worksession.

Agenda - the following topics are proposed for today's worksession:

- Project update
- Expert review panel findings on travel demand forecasting and greenhouse gases
- Analysis of number of add/drop lanes
- Induced travel demand and land use effects
- Marine Drive interchange options
- Discussion regarding agenda for the January 26th joint worksession with the Portland City Council

Background - The Columbia River Crossing project locally preferred alternative (LPA) was approved by the Council in July 2008. As part of that action, the Council selected light rail as the preferred transit option with a terminus in Vancouver, tolling on I-5 with three through-lanes and the number of additional auxiliary (add/drop) lanes within the bridge influence area to be the subject of a future RTP amendment.

Pursuant to the LPA adoption, the Governors of Oregon and Washington established a Project Sponsors Council (PSC) that consists of representatives from Portland, Vancouver, Metro, RTC, TriMet, C-Tran, ODOT and WSDOT. The co-chairs of the previous 39-member Task Force, Hal Dengerink and Henry Hewitt, co-chair the committee. Council President Bragdon is Metro's representative on the PSC. The PSC has met three times and has been briefed on a variety of topics including the number of lanes, and independent expert reviews of greenhouse gas effects and travel demand forecasting methods and assumptions.

Since July, the project team has been developing information regarding the number of add/drop lanes to be added to the three through-lanes in each direction. Designs have also been developed for four Marine Drive interchange options which would have

varying degrees of impact on the Expo Center. The PSC is expected to make a decision on the number on add/drop lanes at their February 6th meeting.

OPTIONS AVAILABLE

Number of Lanes– Options being considered by the PSC include three through lanes with one, two or three add/drop lanes within the bridge influence area (BIA). These add/drop lanes connect interchanges within the BIA and facilitate merges and weaves from six closely-spaced interchanges including Victory Boulevard/Delta Park, Marine Drive and Hayden Island in Oregon and SR-14, Mill Plain, and SR-500 in Washington. The attached materials summarize the lane configurations and the benefits and impacts of these options on safety, operations, capacity, vehicle miles travelled, and other key indicators.

Marine Drive Interchange – The Marine Drive Stakeholder Committee will be meeting on January 28th to develop a consensus recommendation on the interchange alignment. Four alternatives are being considered, including the Southern, Central, Standard and Standard Modified alignments. The Standard alignment is preferred by Metro and MERC/Expo staff because if its superior functionality for freight movement to Port facilities, improved traffic operations, ability to accommodate intensification of use by Expo on the site and the opportunity to orient new development to the Vanport Wetlands natural area to the south. The other options would take more land area from the Expo site and/or provide serious impacts to access the existing exhibit halls. Expo's current Conditional Use Master Plan update process has developed promising concepts that are complemented by the standard alignment.

IMPLICATIONS AND SUGGESTIONS

Number of Lanes – determination of the number of lanes for the bridge and through the BIA is a key critical path item for the project. Preliminary Engineering of both the highway and light rail elements of the project depend on determining the number of lanes. The number of lanes drives the width of the bridge structure, pier location, ramp configurations and environmental mitigation. The decision is also key to advancing the discussion on tolls and the approach for developing toll rates.

Marine Drive Interchange - As with the number of lanes, the design of this interchange will need to be set before engineering can advance. This design issue does not have the same impact on the overall project as the number of lanes decision, but is important to Metro and Expo as we work with the City of Portland to update the Expo Conditional Use Master Plan. The timing of this decision may not be as imminent as the number of lanes.

QUESTION(S) PRESENTED FOR CONSIDERATION

Does the Council wish to review more information prior to advising Council President Bragdon on the number of lanes decision?

Does the Council concur with the CRC's findings on induced demand and land use effects?

What agenda topics would the Council like to see for the joint Metro Council/Portland City Council worksession?

LEGISLATION WOULD BE REQUIRED FOR COUNCIL ACTION __Yes X No

Legislation is not required, however a resolution is anticipated for the Council's January 29th and/or February 5th meetings to advise Council President Bragdon on how to vote on the number of lanes decision at the Project Sponsor's Council meeting on February 6th. Timing of this resolution will be better defined at the worksession.

DRAFT IS ATTACHED ___Yes _X No

Columbia River CROSSING

Traffic effects of 8, 10 and 12 lane scenarios

	No Build	8 Lanes	10 Lanes	12 Lanes
Locations of Unsafe and Poor Service Level Conditions on I-5	Northbound I-5: 1. Denver/Victory Blvd. on-ramp merge area 2. Marine Drive on-ramp merge area 3. Hayden Island on-ramp merge area 4. SR-14 off-ramp diverge area Southbound I-5: 5. SR 500 on-ramp merge area 6. 4th Plain on-ramp merge area 7. Mill Plain on-ramp merge area 8. SR-14 on-ramp merge area 9. Hayden Island off-ramp diverge area	Northbound I-5: 1. Hayden Island off-ramp to Marine Drive on-ramp 2. Hayden Island on-ramp merge area 3. SR 14 off-ramp diverge area 4. Mill Plain/4th Plain off-ramp to SR 14 on-ramp Southbound I-5: 5. 4th Plain off-ramp to SR 500 on-ramp 6. SR 14 off-ramp to Mill Plain on-ramp 7. Mill Plain on-ramp merge area 8. North of Hayden Island off-ramp 9. Marine Drive off-ramp to Hayden Island on-ramp	Northbound I-5: 1. Hayden Island off-ramp to Marine Drive on-ramp 2. Mill Plain/4th Plain off-ramp to SR 14 on-ramp Southbound I-5: 3. 4th Plain off-ramp to SR 500 on-ramp 4. SR 14 off-ramp to Mill Plain on- ramp 5. North of Hayden Island off-ramp	None
Local Streets Impacted by I-5 Backups	Due to northbound I-5 impacts: 1. Denver/Victory 2. Marine Drive 3. Hayden Island Due to southbound I-5 impacts: 1. SR 500 and Main Street 2. 4th Plain 3. Mill Plain 4. SR 14 and City Center 5. Hayden Island	Due to northbound I-5 impacts: 1. Marine Drive 2. Hayden Island 3. SR 14 4. Mill Plain Due to southbound I-5 impacts: 1. SR 500 and Main Street 2. 4th Plain 3. Mill Plain 4. SR 14 and City Center 5. Hayden Island	Due to northbound I-5 impacts: 1. Marine Drive 2. SR 14 Due to southbound I-5 impacts: 1. SR 500 and Main Street 2. 4th Plain 3. Mill Plain 4. SR 14 and City Center	None
I-5 AM and PM Hours of Congestion	15 hours	7 to 9 hours	5 to 7 hours	3.5 to 5.5 hours
Annual Collisions	750	300	240	200
I-5 Traffic	184,000 vehicles (No tolls)	165,000 vehicles (Includes tolling I-5)	174,500 vehicles (Includes tolling I-5)	178,000 vehicles (Includes tolling I-5)
I-205 Traffic	210,000 vehicles	219,000 vehicles	214,500 vehicles	213,000 vehicles
Total River Crossing Traffic	394,000 vehicles	384,000 vehicles	389,000 vehicles	391,000 vehicles
Diversion to I-205 from No Build	-	9,000 vehicles	4,500 vehicles	3,000 vehicles
Regional Vehicle Miles Travelled (VMT)	56.658 million regional VMT	56.770 million regional VMT 0.20% increase over No Build	56.750 million regional VMT 0.16% increase over No Build	56.746 million regional VMT 0.15% increase over No Build
I-5 Transit Riders	8,800	+1-5% over 12 lane	+1-3% over 12 lane	18,200* (15,800 on light rail)
HOV Lane Potential?	Very unlikely based on current history in corridor	Unlikely as two of the four lanes will act as merge lanes	Possible with more impacts for lane conversion	Highest potential for future lane conversion

Note: All figures are for the year 2030

Revised December 29, 2008

**Ridership is based on DEIS Alternative 3 Light Rail Transit Efficient Operations with a Clark College Terminus. Currently more park and ride spaces are planned as part of the Locally Preferred Alternative, therefore ridership will be somewhat higher. However, differences due to number of lanes will not change substantially.*

Columbia River CROSSING

January 6, 2009

TO: CRC Project Sponsors Council

FROM: CRC Staff

SUBJECT: **Impacts of the CRC Project on Land Uses in Oregon and Washington**

Summary Conclusions of the CRC Project on Land Uses in Oregon and Washington

Studies of "induced travel demand" have found that under certain conditions improvements in highway capacity lowers the cost (time and money) of travel, resulting in additional traffic and vehicle miles of travel. These studies also found that improved highway access may lead to greater levels of urban development on the fringes of the metropolitan area, influencing urban sprawl.

The conditions that create significant induced demand, including urban sprawl, are not present for the CRC project. Consequently, significant induced demand is not anticipated for any of the lane configuration options being considered by the PSC.

Specifically, this analysis found:

- The CRC Project, including all of its lane configuration options, would not provide additional through capacity on I-5 outside the bridge influence area or any new access to fringe development areas. The improved accessibility benefits of the project would be derived from the travel time savings in the bridge influence area.

- Drivers consider the total cost of a trip, both the value of travel time and the cost of the trip, when determining if, when, how, and where to travel. Trip-making is particularly sensitive to a toll because it is a direct, out-of-pocket expense.

- Tolling the I-5 Bridge would offset the limited induced demand that would otherwise be generated by the modest increase in highway capacity provided by the add/drop lane options within the bridge influence area:

    - Because of tolls, the modeling shows all bridge configuration options exhibit lower volumes of cross-river trips (3,000 -10,000 daily trips depending on the option) compared to the No Build.
    - The number of add/drop lanes on the I-5 Bridge have only a minor impact on the volume of river crossing trips. The 12-lane option exhibits only 2,000 more daily trips than the 10-lane option; the 10-lane option 4,500 more than the 8-lane option.

    - The higher the number of add/drop lanes on the I-5 Bridge, the less diversion of trips to I-205, and the lower the VMT. The 12-lane option diverts 3,000 daily trips to I-205; the 10-lane diverts 4,500; and the 8-lane 7,500. As a result, the 12-lane option

exhibits 4,000 less daily vehicle miles of travel than the 10-lane option, and 24,000 less than the 8-lane option.

- The form of urban development in the I-5 Bridge impact area will be largely dictated by adopted land use plans and policies; the traffic impacts of the I-5 Bridge options are not sufficiently large to have a major affect.

- Land use plans are in place on both sides of the river that ensure that the urban development effects of the CRC Project would occur within urban growth areas, would not create urban sprawl, would support urban densities, and would be consistent with adopted 20-year plans that provide for efficient and sustainable use of land and resources.

Impacts of the CRC Project on Land Uses in Oregon and Washington

Background

Issues and concerns have been raised about the relationship between land use and the number of lanes associated with the CRC project and the potential to increase sprawl on the fringe of the urban area. In order to understand this relationship, it is important to understand the context for the discussion in terms of how the proposed add/drop lanes would affect the capacity and function of the through lanes. This relationship is key to determining whether the improved accessibility provided by the CRC project would be sufficient to increase demand for land at the periphery of the region or induce more travel compared to the No-Build condition.

There are many factors that influence the demand for more land at the edge of adopted urban growth boundaries in the metropolitan area. They include the supply of land available to be urbanized inside currently adopted urban growth boundaries; the policies regulating growth inside these boundaries; the cost and the market for a given set of land uses as well as transportation mobility and accessibility; and other infrastructure costs. No one factor in isolation can cause urban growth to occur.

As an integral link in the Interstate highway system, the CRC project area is vital to the movement of freight and people up and down the west coast, as well as within the Portland/Vancouver region. The CRC project is analyzing the appropriate number of lanes to safely and efficiently move the very high number of auto and truck trips that are entering and exiting I-5 in a very short congested area, as well as accommodating the high overall number of trips on the Interstate itself.

There are seven high volume interchanges within the project area. The area warrants a standard two-mile spacing to accommodate the heavy traffic volumes; however, these seven interchanges have an average spacing of less than the minimum standard of one mile. The merging and weaving created by these closely spaced interchanges creates unsafe and congested conditions. This section of I-5 has the highest accident rate of any Interstate highway in the entire state of Oregon. In 2030 it is projected to be congested for as much as 15 hours a day if no improvements are made.

The add/drop lanes being considered are new lanes that would connect the closely spaced interchanges with the heaviest on/off volumes. They would provide better access to areas that have reduced development capacity, such as the Marine Drive corridor and Hayden Island; as well to improve safety and manage the operation of the freeway. Their primary purpose is not to add new capacity.

Overview of Analysis

The CRC project team evaluated whether and how this project could change travel behavior and consequentially influence land use patterns. The evaluation was presented in the May 2008 Draft Environmental Impact Statement (EIS) and subsequently reviewed by an independent panel of experts.

As noted in the Draft EIS, the project's analysis concluded that the CRC project is unlikely to induce growth around the region's urban periphery ("sprawl"). However, CRC is likely to promote transit-oriented development around new light rail stations on Hayden Island and in downtown Vancouver, and to promote additional density of jobs and housing near the I-5 corridor. An evaluation summary can be found in the Draft EIS (Section 3.19.4, pages 3-427, 3-428) and additional details are presented in the Land Use Technical report. Both documents are available online: www.ColumbiaRiverCrossing.org.

In October, 2008, the project convened a panel of national experts to review the travel demand model methodology and conclusions, including a land use evaluation. The panel unanimously concluded that CRC's methods and the conclusions were valid and reasonable. Specifically, the panel noted that CRC would "have a low impact to induce growth…because the project is located in a mature urban area," and that it would "contribute to a better jobs housing balance in Clark County…a positive outcome of the project" (page 16).

Land Use Evaluation

The CRC project's evaluation of the potential to induce land use changes included four analytical methods, which are summarized in the Draft EIS and described below.

1. A survey of national research and case studies on how transportation infrastructure can indirectly impact land use,
2. An analysis of growth management techniques in Washington and Oregon land use planning,
3. The results of travel demand modeling and operational analysis for the CRC project alternatives, and
4. Integrated land use/transportation modeling that estimates how the CRC project might or might not influence the location of future growth in housing and employment.

1. Survey of research and case studies

National research and case studies revealed a variety of important factors that influence whether and how transportation investments change travel and land use patterns. In general, some transit projects tended to promote higher density development, particularly around new transit stations, while some highway projects increased automobile use when adding through capacity and could have the potential to induce low-density, auto-oriented development further from urban centers. At the same time, other transit projects and highway projects did not have these effects. The most relevant findings from the national research were the answers to the following two questions:

- What factors were associated with highway projects that tended to increase auto use and low density development, and
- What factors were associated with high capacity transit projects that tended to increase transit-oriented and higher density development?

The answers identified in the national research are summarized on the left side of the following two tables. The right side of each table identifies the extent to which each of those factors is or is not included in the CRC project and project area.

TABLE 1: Factors associated with highway projects that influence induce auto travel and sprawl	**Does the CRC project exhibit these factors?**
Does the project provide new access to areas previously un-served or greatly underserved by highways?	**No.** CRC is entirely within an urbanized area, and I-5 has been an Interstate corridor since 1958. Project adds no new interchanges.
Does the project provide new highway access to land on the urban edge?	**No.** CRC improvements are located 7 miles inside Vancouver Urban Growth Area boundary to the north, and over 13 miles inside Metro Urban Growth Boundary to the south.
Does the project substantially improve highway travel times?	**Yes but induced demand impacts from travel time savings are offset by the higher cost of tolls.** Drivers consider both the value of travel time and the cost of the trip, when determining if, when, how, and where to travel. Compared to the No Build, the 12-lane bridge configuration has a 23-minute travel time savings for a round trip between 179th and I-84 during peak periods. Applying a travel time penalty to offset the cost of the toll negates almost 3/4ths of the trip-making effect of this travel time savings. The net effect of these countervailing factors is equivalent to a 6% decrease in travel time; which does not have a material impact on induced demand or access to fringe areas.
Does the project reduce auto travel costs?	**No**. CRC adds a toll on the highway that increases auto travel costs relative to No Build alternative.
Are local and regional land use regulations ineffective at managing growth?	**No**. Effective growth management controls backed by state law exist in the I-5 corridor on both sides of the river that require; • the vast majority of future growth to occur within urban growth areas that reduce sprawl and that are sized to meet population and employment forecasts; • comprehensive plans that implement efficient and sustainable urban development within urban growth areas; • minimum densities in urban areas; and, • protections for rural, agricultural, and environmentally sensitive areas.
Are there real estate markets supporting low density development?	**Yes, but these areas are extremely minor and distant from the Project's influence area.** The minimum average densities required to be achieved in Vancouver growth management areas is notably higher than that required in Metro's "Inner Neighborhood" designation. In certain locations densities as high as those targeted for Town Centers, Station Areas, and Main Streets are anticipated. The minimum densities required in the urban growth areas of Washougal, Battle Ground, Camas, and Ridgefield are similar to the densities required in Metro's "Outer Neighborhoods." The two urban growth areas that allow low densities are Yacolt (20 miles from Vancouver) and La Center (15 miles from Vancouver). These growth areas are distant and quite small, representing only 0.9% of the County's population in 2004, and 1.7% of the County's projected population in 2024; no material urban sprawl is anticipated in these areas from the CRC Project.

TABLE 2: Factors associated with high capacity transit projects that tend to promote higher density and/or transit oriented development	**Does the CRC project exhibit these factors?**
Would the project increase transit ridership?	**Yes**. Transit mode split is projected to be about 17 percent with the project, compared to 7 percent with the No Build alternative.[1]
Does the project provide new access to developable/redevelopable land previously unserved or underserved by transit?	**Yes**. The project area is not currently served by high capacity transit and there is substantial latent demand for cross-river transit service
Are there real estate markets supporting such development?	**Yes**. The majority of the recent and planned developments in downtown Vancouver are high density and/or mixed use.

1 PM Peak period transit mode split for I-5 crossings

Is there positive public perception of transit?	**Yes**. Over 70 percent of residents polled support extending light rail across the river to Vancouver.[2]
Do local and regional land use regulations effectively manage growth?	**Yes**. Comprehensive plans and implementing regulations, including zoning, exist on both sides of the river that (a) require minimum densities in urban areas, (b) encourage compact nodal and mixed-use development, and (c) encourage transit-oriented development.

As evident from the tables, and supported by the independent expert review panel, the CRC project is far more likely to encourage compact, higher density development in established urban areas than promote auto-oriented, lower density development on the urban fringe.

This project would decrease travel times, improve travel reliability and reduce congestion. However, tolling the river crossing offsets much of the potential for inducing auto travel. It serves to reduce total auto trips and increase transit mode share. The light rail extension into Vancouver further increases transit ridership and promotes transit-oriented development around the new stations on Hayden Island and downtown Vancouver. Ultimately, the transit and highway improvements are more likely to help realize long-term, regional land use visions by supporting concentrated growth in established urban centers.

2. Analysis of Washington and Oregon growth management

The national research and case studies emphasized the importance of local land use regulations for influencing the type and magnitude of effect from transportation improvements. Metro has a long history of effective growth management, and the City of Portland has a sophisticated zoning code with provisions for focusing growth where desired and encouraging compact mixed-use development around transit facilities. The land use regulations in the City of Vancouver and Clark County also have robust growth management policies and regulations. The Vancouver Comprehensive Plan targets growth in designated urban centers and corridors connecting these centers in a growth management approach comparable to Metro's 2040 Growth Concept. Vancouver also has a Transit Overlay District allowing for "higher densities and more transit-friendly urban design" than afforded by base zoning. This overlay zone is similar to Portland's Light Rail Transit Station Zone that is an overlay zone allowing for "increased densities for the mutual re-enforcement of public investments and private development". Also, in preparation for the construction of the CRC project, the City of Vancouver has recently made changes to the downtown plan (the Vancouver City Center Vision) and is implementing regulations that encourage complimentary development along the light rail alignment.

In 1990, the Washington Growth Management Act (GMA) established requirements for counties to plan for and manage growth. The GMA requires local governments to identify and protect critical and natural resource lands, designate urban growth areas, and prepare comprehensive plans to be implemented through capital investments and development regulations.

A comparison of urban growth area expansions by Metro and Clark County since 2000, shows Metro and Clark County added approximately 21,000 and 16,400 acres respectively. Clark County and the City of Vancouver have planned residential densities of approximately 16 and 20 persons per acre. This compares favorably to Metro's "inner neighborhood" and "outer neighborhood" areas that target 14 and 13 persons per acre, respectively. Metro has other significant goals applied throughout its jurisdiction, tied to designations such as Regional, Town Centers and Main Streets with much higher density targets. The City of Vancouver does have policy and regulations encouraging higher densities in planned sub-areas, downtown, and along transit corridors that are comparable to the densities anticipated in Metro's Town Centers and Main Streets.

[2] Riley Report / Portland-Vancouver Area Survey. Riley Research Associates. June 18, 2008. A scientific telephone poll of 504 randomly selected households in Multnomah, Washington, and Clackamas Counties in Oregon, and Clark County in Washington.

3. Travel demand modeling and traffic operations analysis

Travel time and resulting accessibility can influence the demand for land at both the urban fringe and in established urban areas. Travel demand modeling and traffic micro-simulation could provide valuable information about how the CRC project might change travel behavior and, in turn influence land use patterns. Significant improvements in travel time from areas along the urban periphery to key destinations such as downtown Portland could increase pressure for suburban residential development in northern Clark County. At the same time, increases in transit ridership could promote higher density development around transit stations the central Vancouver area. The modeling results presented in the Draft EIS indicate this project has a far greater effect on transit ridership than I-5 travel times. Though CRC would substantially reduce congestion within the project area compared to the No Build alternative, travel times are not as dramatically changed because this project improves a relatively small portion of the region's highway system, and because the toll on the I-5 crossing would add a perceived penalty to auto travel[3]. In fact, because of the toll and the introduction of a reliable and efficient transit alternative, modeling shows that the project would actually lower the number of vehicles using the I-5 crossing each day by about 3 percent[4]. In contrast, transit ridership would increase over 250 percent during the p.m. peak hour.[5]

4. Transportation-land use modeling (Metroscope)

The fourth method for evaluating this project's potential for inducing land use changes entailed evaluating a Metroscope model analysis that included transportation improvements in the corridor similar to the CRC locally preferred alternative (LPA). The analysis included a replacement bridge with four through lanes and light rail to Clark College. Metroscope is an integrated land use and transportation model designed by Metro to predict how changes in several factors, including transportation infrastructure, could change the future distribution of employment and housing throughout the region. In 2001, as part of the I-5 Partnership Study, Metro used its Metroscope model to estimate land use changes if I-5 were to increase to four through-lanes between Going Street in Portland and 134th Street in Vancouver, and light rail were extended to Clark College. This scenario had the same transit improvements as the LPA, but added capacity to a significantly longer portion of I-5, and did not include a toll on the bridge. These differences resulted in greater travel time savings and increased vehicle use compared to the project's LPA.

Under this scenario, Metroscope showed only minimal changes in employment location and housing demand compared to the No Build alternative. Metroscope estimated a one percent regional redistribution of jobs to the I-5 corridor with 4,000 more in North and Northeast Portland and 1,000 more in Clark County. The model estimated very modest changes in residential values (a proxy for residential demand), with the highest increase in some Clark County and North Portland areas experiencing up to three percent greater values by 2020, equating to about 0.12 percent growth per year. This analysis also concluded the land-use policies in the Metro boundary and in Clark County were far more likely to influence growth patterns than the CRC project.

Conclusion

Rigorous analysis and independent review suggest that CRC is more likely to encourage compact, higher density development in established urban areas, than promote auto-oriented, lower density development

3 Modeling the toll entailed incurring a 9 minute time penalty to simulate drivers' response to paying this fee. Travel time savings on I-5 between I-84 and 179th Street during the PM peak (3pm to 7pm) period shrink from 18 minutes without accounting for the toll to 9 minutes with the toll.

4 184,000 cars would travel over the I-5 bridges under the No Build alternative versus 178,000 with a replacement crossing, a toll on I-5, and light rail.

5 With a replacement crossing, a toll on the I-5 bridges, and light rail, 7,250 people would ride transit during the PM peak period compared to 2,050 people for the No Build alternative.

on the urban fringe. These findings were in the Draft EIS analysis, and they have been confirmed by the independent panel of experts that reviewed this analysis in October 2008.

As the research indicates, there are many land use and economic policy factors beyond the scope of the CRC project that would have a much larger impact on the urban growth pattern of the bi-state region than the CRC project alone.

Columbia River Crossing

Travel Demand Model Review Panel Report

November 25, 2008

November 25, 2008

The enclosed report presents the findings of the Columbia River Crossing Travel Demand Review Panel, which met October 13 and 14, 2008 to review the project analysis and methodology as requested by project sponsors and the Oregon and Washington Departments of Transportation.

We were asked to respond to seven specific questions about the model and project analysis completed in the Draft Environmental Impact Statement. Our report provides findings and recommendations for each specific question as well as some recommendations outside of the scope of the project. For the reasons we explain in our report, we strongly believe the travel demand model and project analysis are valid and comprehensive.

The Review Panel would like to express its appreciation to Metro, RTC and CRC staff for providing the information that allowed us to evaluate the seven questions we were asked to consider. We enjoyed our discussions and staff's willingness to openly debate the technical aspects of the travel demand model and its application to the CRC Project.

We appreciate the opportunity to provide you with our thoughts on the travel demand model and its application to the CRC Project.

Maren Outwater, Chair
Bruce Griesenbeck
Arash Mirzaei
Guy Rousseau

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Introduction

The Travel Demand Model Review Panel (Panel) was tasked with reviewing and evaluating the assumptions implicit in the travel demand model for the CRC project. This review was requested by partner agencies in July 2008, as part of the selection of a Locally Preferred Alternative for the project. Resolutions passed by partner agencies made the following recommendations related to review of the CRC travel modeling assumptions:

- Further analysis is required of the greenhouse gas and induced automobile demand forecasts for this project. The results of the analysis must be prominently displayed in the Final Environmental Impact Statement. The analysis should include comparisons related to the purpose and function of the so-called "auxiliary" lanes. A reduction in vehicle miles traveled should be pursued to support stated greenhouse gas reduction targets as expressed by legislation in Oregon and Washington and by the Governors. (Metro Council, Resolution 08-3960B, July 17, 2008).

- The CRC project shall contract for an independent analysis of the greenhouse gas and induced automobile travel demand forecasts for the project. (City of Portland Council, Resolution 36618, Exhibit A, July 9, 2008).

- The CRC project shall contribute to a reduction of vehicle miles traveled (VMT) per capita in the bi-state metropolitan area. (City of Portland Council, Resolution 36618, Exhibit A, July 9, 2008).

- Independent validation of the greenhouse gas and climate change analysis conducted in the Draft Environmental Impact Statement to determine the project's effects on air quality, carbon emissions and vehicle miles traveled per capita (CRC Task Force, Resolution Recommendations, June 24, 2008).

The Panel met on October 13 and 14, 2008 to provide an independent review of the key travel demand modeling inputs and results related to regional modeling and the CRC project. Review of the greenhouse gas analysis requested in the resolution recommendations will be conducted as part of a separate process. This will occur after the travel demand model review process is complete.

Summary of Panel's Findings Regarding the Travel Demand Model

This report presents the conclusions and recommendations of the Travel Demand Model Review Panel prepared in response to seven specific questions. The panel's findings and general observations are summarized below. This section includes a synopsis of the responses to each question along with an overall observation of the application of the Travel Demand Model to the CRC Project and the resulting outputs. A more complete discussion of each question, topic area and the panel's discussion and conclusions is

provided in later sections of this report. Additional recommendations, outside the scope of the project, are included at the end of report.

Specifically, the Panel addressed the following questions related to the Locally Preferred Alternative resolutions:

- Are fuel price and vehicle operating cost assumptions used in the model reasonable?
- Are the tolling methods used in the model reasonable?
- Are the traffic projections for I-5 and I-205 from the model reasonable?
- Are the vehicle miles travelled results reasonable?
- Are the bridge auxiliary lanes modeled correctly?
- Was the approach used to estimate induced growth reasonable?
- Were the induced growth findings reasonable?

The Travel Demand Review Panel concluded that the Travel Demand Model used by the region is an advanced trip-based tool and that it represents a valid tool for a project of this type:

- The destination choice features of the trip distribution model used for all trip purposes is a positive and allows for fuller consideration of accessibility and policy variables in the analysis.
- The peak factors applied to skims is a better way to represent weighted averages than standard practice, which assumes peak conditions for work trips and off-peak conditions for non-work trips.
- The use of VISSIM offers a more rigorous evaluation of congestion than is possible with a regional planning model.
- The use of Metroscope as one method to evaluate induced growth is an advanced practice for a project evaluation. Normally this type of analysis is used for systemwide / regional transportation planning efforts and not specific project evaluations.

The panel also provided long-term recommendations for the Portland Metro regional travel demand and land use forecasting models, but these long-term recommendations were beyond the scope of the CRC project and were not considered to impact the outcome of the project findings. The long-term recommendations were intended to inform the next generation of models for the Portland Metro region.

Question 1 - Are fuel price and vehicle operating cost assumptions used in the model reasonable?

The Panel concluded that the vehicle operating cost assumptions, of which fuel costs are a component, used in the model for the primary travel demand forecasts were reasonable. The Panel confirmed that vehicle operating costs (which consists of gasoline and oil, tire, and general maintenance costs on a per mile basis) is the appropriate measure to use as it reflects the long-term relationship between fuel price and vehicle fleet fuel efficiency. In the Panel's opinion there was an adequate stratification of fuel cost, other costs and buildup of auto operating costs in the modeling process.

Question 2 - Are the tolling methods used in the model reasonable?

The Panel concluded that the overall approach to the tolling analysis employed by the CRC Project is within standard practice. The resulting volumes on the I-5 Bridge with tolls compared to No-Build volumes demonstrate that the tolling methods are reasonable.

Question 3 - Are the traffic projections for I-5 and I-205 from the model reasonable?

The Panel concluded that model results that indicated that the Build Alternative (LPA) volume difference relative to the No-Build Alternative (6,000 fewer vehicles per day / 3 percent reduction on I-5 and 3,000 additional vehicles per day / 1 percent increase on I-205) are reasonable, due to the fact that:

- There is a higher level of transit service and a resulting higher transit share in the Build alternative which reduces auto volumes on I-5;
- There are tolls on I-5 in the Build alternative versus no tolls in the No-Build alternative which also reduces auto volumes on I-5 and increases volumes on parallel facilities, like I-205;
- There is no added highway capacity north of or south of the project limits; and
- There are changes to trip distribution resulting in a decrease of discretionary trips crossing the river because of the toll.

Question 4 - Are the vehicle miles traveled (VMT) results reasonable?

The Panel concluded that the results showing a decrease in auto VMT on I-5 and a net regional increase (small) overall is reasonable because:

- There is a higher level of transit service and a resulting higher transit share in the Build alternative, which results in lower auto VMT on I-5; and
- There are tolls on I-5 in the Build alternative versus no tolls in No-Build alternative which results in diversion and higher regional VMT.

Question 5 - Are the bridge auxiliary lanes modeled correctly?

The Panel concluded that while the coding of a four-mile continuous auxiliary lane may be unusual in some urban areas, there are local examples of long auxiliary lanes that currently operate and are modeled similarly in the Metro region. Since this length of an auxiliary lane is consistent with regional coding (modeling) practices, this is a reasonable assumption for this project.

Question 6 - Was the approach used to estimate induced growth reasonable?

The Panel concluded that the use of Metroscope and the travel demand model results supported the national research findings. They felt that the use of multiple methods (i.e., case studies, Metroscope, national research) to evaluate induced growth was helpful. The evaluation of a worst case scenario in Metroscope (it assumed a larger build project then the LPA and no tolling) was useful and appropriate

Question 7 - Were the induced growth findings reasonable?

The Panel agreed that the conclusion of the CRC project that the highway capacity improvement would have a low impact to induce growth was reasonable for this corridor because the project is located in a mature urban area/built corridor.

Panel Members

Four experts, each with substantial experience in travel demand modeling in large metropolitan areas, served on the Panel. Each expert is currently in charge of travel demand modeling for a metropolitan planning organization.

Maren Outwater, Chair

Maren Outwater is the Director of Data Systems and Analysis at the Puget Sound Regional Council (PSRC). She specializes in the planning, evaluation, and modeling of land use, transportation and air quality systems. She has 23 years of experience in developing passenger forecast models for transit and highway systems, forecast models of goods movements, and land use forecasts for regional and state governments. She also has 18 years of progressive experience in managing complex multi-modal development efforts. At PSRC, she is leading the current efforts to integrate land use, travel, and air quality modeling to improve the agency's ability to model climate change and address pricing studies. Prior to working at PSRC, Outwater was a Principal at Cambridge Systematics. She has a Masters of Urban Planning in Transportation Planning and a Bachelors of Science in Civil Engineering from the University of Michigan.

Bruce Griesenbeck

Currently Bruce Griesenbeck is the Principal Transportation Analyst for the Sacramento Council of Governments (SACOG). He serves as the team leader for the forecasting, model operations, and model development teams. Primary areas of work for model development have been managing the development of an activity-based tour regional travel demand model, and supervision of the land use and travel network data inputs of this model. He managed the development of a "shortcut" version of the four- step travel demand model for use in modeling citizen-defined transportation alternative in a series of 13 public workshops for the 2007 Metropolitan Plan. Prior to SACOG, Griensenbeck was the project manager for various transportation and analysis and planning projects including light rail extension feasibility studies. Griesenbeck holds a Bachelors of Arts in Sociology and Psychology from Swarthmore College and a Masters of Science. in Civil Engineering and Master of City Planning, both from the University of California at Berkeley.

Arash Mirzaei

Arash Mirzaei is the Travel Model Development Program Manager for the North-Central Texas Council of Governments (NCTCOG) in the Dallas/Fort Worth area, where he has worked for more than ten years. Arash Mirzaei is responsible for travel model development, data collection and analysis activities, and transportation application projects that involve traffic and revenue analysis, preparation of environmental documents, air quality and conformity applications, roadway corridor studies, transit alternative analysis, combined land use and transportation applications, environmental justice analysis and activity-based modeling examinations. Mirzaei has a Bachelors of Science and Masters of Science in Civil Engineering from Sharif University of

Technology in Tehran, Iran, and a Masters of Science in Computer Science and Engineering from the University of Texas at Arlington.

Guy Rousseau

Guy Rousseau has over 20 years of experience working with and managing modeling and traffic engineering teams. He currently works as the Modeling Manager for the Atlanta Regional Commission (ARC). In this position, he oversees modeling of the long range transportation plan updates. This process involves network coding, trip generation, trip distribution, modal split, and traffic assignment and emissions analysis for a variety of network year analyses, as well as base year calibrations and validations involving the population synthesizer. Rousseau also manages the traffic modeling efforts feeding into air quality modeling and related emissions analysis, as well as some post-processing methodology and traffic micro-simulations. Rousseau has a Bachelors of Science. in Civil Engineering from the University of Montreal, a Masters of Science in Civil Engineering from Laval University in Quebec, and has finished all coursework at Tulane/ University of New Orleans towards a doctoral degree in civil engineering and transportation planning, with a dissertation remaining.

Peer Review Process

The Travel Demand Model Review Panel met on two consecutive days (October 13 and 14, 2008) to review and consider the seven specific questions. Background material in the form of a Travel Demand Model Review notebook was provided to each Panel member in advance of the meeting. Information included in the notebook provided background on the CRC project and the LPA as well as technical documentation and context related to the model and its assumptions.

During the Panel sessions, technical presentations from Metro, RTC and CRC staff were provided as background to each question and the Panel asked questions of staff during and following each presentation. Following the presentations, the four Panel members adjourned to a separate room to consider the information presented and to address the seven questions. Two staff members representing the CRC project were in the room with the Panel members to record the discussion and findings. They did not participate in the technical review or the formation of recommendations. The findings presented below represent the conclusions reached exclusively and by consensus by the members of the Travel Demand Model Review Panel.

At the end of the second day the review Panel members verbally presented preliminary findings and recommendations to an audience of agency staff and interested parties. The findings presented in this report represent the final conclusions of the Travel Demand Model Review Panel related to the seven specific questions asked of them.

Panel Response to Questions

The following presents the Panel's discussion on each specific question. Panel discussion on each question was preceded by a presentation by staff on the specific topic. The panel then discussed the question and asked questions of staff when necessary. The Panel's findings and / or recommendations are presented at the end of each question.

Question 1:

Are fuel price and vehicle operating cost assumptions used in the model reasonable?

Staff Presentations

Staff provided a PowerPoint presentation ("Metro Modeling Efforts – Fuel and Auto Operating Costs") that discussed the fuel and auto operating cost assumptions included in the Metro model and the research that supported the assumptions. Staff noted that the recent spike in fuel prices has lead some parties to question the fuel price assumptions, particularly in relation to the auto operating cost assumptions contained in the model.

Staff discussed that in the Metro model, fuel costs are considered as part of auto operating cost, which consists of gasoline and oil, tires, and general vehicle maintenance

costs on a per mile basis. Auto operating cost is used instead of fuel prices because it reflects the long-term relationship between fuel price and automobile fleet fuel efficiency (through technological changes, consumer preferences, and government regulations). Metro assumes the historical trend of relatively stable auto operating costs will continue into the future, as it has in the past.

Staff noted that the current fuel cost assumptions relied on national trends and averages prepared by AAA. Future fuel price assumptions relied upon the "worst-case", or highest, year 2030 forecasts provided by the Energy Information Administration (EIA), the statistical agency of the U.S. Department of Energy. Auto operating costs, which include fuel costs, are a factor in the mode choice model.

Panel Discussion

A panel member noted that his experience with the travel demand model in Sacramento indicated that the traditional four-step modeling process was not very sensitive to changes in fuel prices. It was noted that the transit model is very sensitive to fuel price. The Panel asked what impact a change in fuel pricing would have on VMT and transit use. Staff indicated that Metro tested a range ($0.05 to $0.13 per mile) and the impact on both categories was minimal.

The Panel asked if the destination choice model was based on income and, if so, what were the results? Staff indicated that this model did include income factors and the result was that the longer trip lengths were typically associated with specialty/higher income jobs. Lower income jobs tended to be associated with shorter trip lengths. Staff noted that the land use model used travel time to forecast behavior, not auto operating costs.

The Panel asked staff if you change the vehicle operating costs, what changes result in the model? Staff response was that mode share changes, transit ridership increased, but destination choices do not change.

The Panel did note that overall economic conditions are more of a factor, particularly for discretionary trips. The Panel also noted that statewide or regional (i.e., West Coast) fuel prices would probably be a better source when fuel price assumptions for the Metro area. These tend to be a little higher then the national average prices.

Panel's Findings and/or Recommendations

The Panel concluded that the vehicle operating cost assumptions, of which fuel costs are a component, used in the model for the primary travel demand forecasts were reasonable. The Panel confirmed that vehicle operating costs (which consists of gasoline and oil, tire, and general maintenance costs on a per mile basis) is the appropriate measure to use as it reflects the long-term relationship between fuel price and vehicle fleet fuel efficiency. In the Panel's opinion there was an adequate stratification of fuel cost, other costs and buildup of auto operating costs in the modeling process.

The Panel requested staff to look at alternative reasonable VMT / price elasticity relationships. The results of staff's analysis were that regional VMT could vary by minus six percent to plus six percent if fuel prices were at the lower or higher range of forecasts for 2030 as provided by the independent Energy Information Administration.

Please see "Additional Panel Findings and/or Recommendations" for long-term recommendations – beyond the scope of the CRC project – for the region to consider.

Question 2:

Are the tolling methods used in the model reasonable?

Staff Presentation

Staff provided a PowerPoint presentation ("Metro Modeling Efforts – Tolling Methodology") that discussed how tolling costs were implemented in Metro's model. Staff noted that there has been no single best-practice method identified for implementing tolls within travel demand models. Staff's research indicates that each region and project is unique and, therefore, the approaches to tolling tend to differ widely across the nation. Staff described the unique character of the CRC corridor and the lack of alternative routes. Staff noted that the model assumed peak and non-peak tolling costs and did not assume a toll on I-205. Tolling is reflected in the model as a time penalty assigned to categories of travel (auto peak/non-peak, medium trucks peak/non-peak and heavy trucks peak/non-peak).

Staff described how the tolling methodology and assumptions and how they affected destination choice, mode choice and final assignments in the model. Staff concluded with a discussion of the impacts of tolling on these three categories:

- Destination Choice: 7 percent fewer Washington-Oregon crossings and 11 percent fewer Oregon-Washington crossings;
- Mode choice: Increase in mode split from 9 percent to 11 percent; and
- Final Assignment: During the AM 4-hour southbound period with No Toll there was a 53 percent/47 percent split between traffic on I-5 versus I-205 (62,000 total trips) and with an I-5 Toll there was a 43 percent/57 percent split between I-5; and
- I-205 (59,000 total trips).

Panel Discussion

A panel member asked at what point do tolling costs come into play in the model? Staff indicated at all steps, except trip generation. Staff noted that in the model assignment

there was no differentiation between income groups, but for revenue forecasting income differentiation will be a part of the revenue assessments.

The Panel asked - what is the effective Value of Time (VOT)? The Metro model uses a value of time of $13 per hour in 2005 dollars. For a $2 toll, this translates into 9.23 minutes of additional time impedance. The destination choice model uses 25% of the toll cost and the mode choice model uses 75% of the toll cost. The panel noted that research shows that VOT does vary by income group and also other factors such as purpose of trip. A panel member noted that tolling costs do not effect distribution at all in the Atlanta regional model. It was also noted that in Dallas-Fort Worth, tolling doesn't affect their model.

The Panel asked – how many "feedbacks" (iterations) are there in the modeling process and when are tolling costs included? Staff indicated that there were six to seven "feedback iterations" for the base scenario and basically the same for each alternative. Normally two to three iterations are acceptable when running the regional model, but additional iterations were tested because this is such a saturated corridor. Staff noted that they did not see much difference in the model results between the alternatives and that transit ridership was the main difference. Staff noted that tolling costs were implemented in the "final iteration" of each alternative.

The Panel was informed that there would be tolls on I-5 at river crossing with this project and that not tolling was not an option. Bikes and pedestrians would not be subject to the toll. It was noted that there are currently tolled facilities in the State of Washington – Tacoma Narrows and a pilot HOT project.

The Panel discussion then focused on some of the technical details of tolling and the modeling process including: weighting factors, stopping criteria, speeds, micro-simulation and model assumptions related to capacity and auxiliary lanes. Staff addressed each issue in their comments.

Panel's Findings and/or Recommendations

The Panel concluded that the overall approach to the tolling analysis employed by the CRC Project is within standard practice (given the current range of limitations for modeling tolls). The treatment of tolls in destination choice (i.e., partial cost included) is an appropriate methodology. The resulting volumes on the I-5 Bridge with tolls compared to No-Build volumes demonstrate that the tolling methods are reasonable. The Please see "Additional Panel Findings and/or Recommendations" for long-term recommendations – beyond the scope of the CRC project – for the region to consider.

Question 3:

Are the traffic projections for I-5 and I-205 from the model reasonable?

Staff Presentation

Staff provided a PowerPoint presentation ("CRC Project Alternatives and Performance Results") that provided a more detailed description of the corridor, Bridge Influence Area (BIA), travel characteristics within the corridor including travel patterns, crash data, transit ridership, and peaking characteristics. Staff then reviewed the results of the extensive analysis for the No-build and Bridge Replacement Alternatives. Staff described the components of the LPA including the replacement bridge, the auxiliary lanes, and light rail alignment. Finally, Staff provided an overview of existing travel conditions and congestion levels and the VISSIM model.

Panel Discussion

The Panel asked – how did the Metro model compare to the license plate data collection conducted by CRC? Staff responded that the results matched up fairly closely, but the regional model did have some minor inconsistencies associated with dealing with the super-saturated nature of the corridor. The Panel then asked – how did the overall model results compare to the data? Staff indicated that the results for the corridors mainline matched well and that some adjustments needed to occur on the ramps to I-5, but the project was able to accomplish this. The resulting travel times and speeds on the bridge were good. In terms of model "post-processing" staff indicated that they used the NCHRP 255 methodology, using the difference method. Four screen lines were used in this 23-mile long VISSIM model area.

The Panel asked - with congested traffic traveling at 30 mph, what's your corresponding level of service (LOS) and what is the region's standard? Staff responded that the resulting LOS was E/F, but noted that traffic demands are too high to build a feasible project that could meet peak period LOS standards. The Project is trying to improve mobility and safety conditions in the corridor and reduce the duration of congestion, among other things.

The Panel asked about the use of Park-and-Ride lots and how Metro models this type of access. Staff indicated that park-and-ride is one of the modes in the model. They don't model kiss and ride directly, but from survey work staff knows that it constitutes about 15 percent. Staff also noted that the park-and-ride lots in Clark County are at capacity and identified their locations.

The Panel asked if HOV lanes across the I-5 Bridge had been considered. Staff indicated that yes they were considered during earlier screening, but because the project is only

five miles long, staff found no benefit without some larger HOV lane system. If there is future policy direction for a broader HOV lane implementation, that might be looked at. Also, with so many trips getting on and off I-5 in a short five-mile area, it becomes difficult to accommodate them with an HOV lane.

The Panel asked - what's your definition of no-build? Staff indicated that they assumed all the financially constrained projects in the RTP and MTP. Staff noted that there was just one project (SR-502 Interchange) upstream from the project in the I-5 corridor.

Panel's Findings and/or Recommendations

The Panel concluded that model results that indicated that the Build Alternative (LPA) volume difference relative to the No-Build Alternative (6,000 fewer vehicles per day / 3 percent reduction on I-5 and 3,000 additional vehicles per day / 1 percent increase on I-205) are reasonable, due to the fact that:

- There is a higher level of transit service and a resulting higher transit share in the Build alternative;
- There are tolls on I-5 in the Build alternative versus no tolls in the No-Build alternative;
- There is no added highway capacity north of or south of the project limits; and
- There are changes to trip distribution resulting in a decrease of discretionary trips crossing the river because of the toll.

Please see "Additional Panel Findings and/or Recommendations" for long-term recommendations – beyond the scope of the CRC project – for the region to consider.

Question 4:

Are the vehicle miles traveled (VMT) results reasonable?

Staff Presentation

Staff's PowerPoint presentation ("CRC Project Alternatives and Performance Results") introducing Question 3 also included information on Vehicle Miles Traveled (VMT) related to Question 4. Staff reviewed the VMT results with the No-Build and Build Alternatives. These results indicate lower VMT in both the I-5 Bridge Influence Area and the I-5 Corridor with the Replacement Bridge compared to the No-Build Alternative.

Panel Discussion

There was little discussion on the part of the Panel on this question because it was closely related to Question 3. Please see the discussion details above.

Panel's Findings and/or Recommendations

The Panel concluded that the results showing a decrease in VMT on I-5 and a net regional increase (small) overall is reasonable because:

- There is a higher level of transit service and a resulting higher transit share in the Build alternative; and
- There are tolls on I-5 in the Build alternative versus no tolls in No-Build alternative.

Please see "Additional Panel Findings and/or Recommendations" for long-term recommendations – beyond the scope of the CRC project – for the region to consider.

Question 5:

Are the bridge auxiliary lanes modeled correctly?

Staff Presentation

Staff's PowerPoint presentation ("CRC Project Alternatives and Performance Results") introducing Question 3 also included information on Auxiliary Lanes related to Question 5. Staff reviewed the purposes of and the need for auxiliary lanes in this project. Staff described how they were designed into the No-Build and Replacement Bridge Alternatives and discussed the lane capacities that were assigned to these lanes. Staff also presented various examples of existing auxiliary lanes in the Metro Region.

Panel Discussion

The Panel asked for clarification on the length of the auxiliary lanes and capacities assigned to each lane. A panel member noted that in the Sacramento region, they are having discussions about the meaning of auxiliary lanes, which sometimes mean different things to different people. Some concern was expressed about the length (four miles) of the auxiliary lanes, but it was understood that the region has examples of existing auxiliary lanes of this length. Also, the Panel was assured the coding practice was consistent throughout the regional model network.

The Panel asked - did you look at different combinations of auxiliary lanes fewer than three? Staff indicated that there is testing going on right now along those lines. Three lanes were chosen to accomplish lane balance and safety improvements.

The Panel asked if staff made use of collector/distributor roads in the project area? Staff noted that they have a limited set of collector/distributor roads within the project area, but the auxiliary lanes that are shown are part of the I-5 mainline.

The Panel asked if the land use assumptions were the same for all alternatives. Staff indicated that the land use assumptions were the same.

Panel Findings and/or Recommendations

The Panel concluded that while the coding of a four- mile continuous auxiliary lane may be unusual in some urban areas, they were presented with local examples of long auxiliary lanes that currently operate in the Metro region. Since this length of an auxiliary lane is consistent with regional coding practices, this is a reasonable assumption for this project.

The Panel also noted that the project's assignment of reduced lane capacity to the auxiliary lanes is reasonable.

Please see "Additional Panel Findings and/or Recommendations" for long-term recommendations – beyond the scope of the CRC project – for the region to consider.

Question 6:

Was the approach used to estimate induced growth reasonable?

Staff Presentation

Staff provided a PowerPoint presentation ("Induced Growth") that described the topic within the context of NEPA and the CRC Project. Staff began by defining what induced effects were and how they were evaluated in the Draft Environmental Impact Statement. Staff noted that the CRC staff conducted national research on induced effects, including reviewing case studies. Staff then discussed the conclusions of the national case studies. Staff discussed the variety of factors the national research identified as particularly relevant to induced growth, including new access to previously unserved areas, significant improvement to highway travel times, reductions in auto-operating costs, and local regulations that don't manage growth.

Staff noted two key findings particularly relevant to the CRC project and the conclusion that first, the project is unlikely to induce substantial auto travel demand or incur consequential auto-oriented land use changes and second, the project is likely to promote increased densities around new high capacity transit stations.

- Adding highway capacity in a well-planned urban area with a full range of infrastructure and services is unlikely to have substantial indirect effect on land use patterns.
- Improving high capacity transit in a location with supportive land use regulations and markets is likely to promote higher density and TOD, and improve transit mode share.

Staff provided a discussion on the land use regulatory context in Oregon and Washington that will influence the project. Staff then talked about the travel demand model results that related to factors potentially associated with induced growth. A discussion on Metroscope and its application to the project followed. Staff noted that the Metroscope analysis conducted for the project was a "worst-case" scenario – it assumed more new highway lane miles than all of the DEIS alternatives and did not assume a toll on the bridge. The key finding of Metroscope was that there was a potential for a small job growth shift (one percent) from other areas of the region into the I-5 Corridor area as a result of the CRC improvements, and a potential minor increase (less than three percent) in housing prices/demand in Clark County, Vancouver, and north Portland around the I-5 corridor.

Panel Discussion

The Panel asked - how many regional centers are included in Metro's 2040 Regional Growth Concept and how was the Urban Growth Boundary addressed in the model? Staff indicated 10 to 12 centers (combination of regional and town centers). Staff further noted that the UGB identified where the region's buildable land was and, therefore, where future growth would occur. Staff noted that the UGB is reviewed and updated every five years so the Metro region can maintain a 20-year supply of buildable land.

The Panel wanted to know if Metroscope was used for project-level evaluations. Staff indicated that Metroscope was not typically used for project-level evaluation, that it is normally used for the RTP and system-wide analyses.

The technical aspects of Metroscope and the travel demand model were explored by the Panel. They discussed the census tract level analysis Metroscope operates on the relationship of Metropscope results to VISSIM. The Panel asked for additional information on VMT and person trips (this information was provided to the Panel).

Panel discussion then focused on the likelihood for City of Vancouver support for high-capacity transit. How likely is it that the LRT portion within downtown Vancouver would be highly used and see a lot of transit-oriented development? How much support for the intra-Vancouver portion of LRT is there? Staff thought there was increased support for LRT in Vancouver. Staff indicated that given the length of the line, it's likely they'll see more of a reverse commute on LRT from North Portland than from farther north in Clark County. It will function more as a commuter route and for shorter distance intra-

downtown trips. Staff felt there was a strong potential for increased TOD development in Vancouver and noted recent higher density projects that have been built in Vancouver.

The follow-through on the stated intent by Vancouver and Clark County to focus development in the station areas will be critical to the overall success of the LRT portion of the project and the panel findings on induced growth.

Panel discussion then focused on the minor reallocation of jobs into the I-5 Corridor. The Panel wanted to know where the jobs relocated from, which areas of the region contributed to the shift of jobs to the corridor and whether, as a consequence of the shift, was the resulting shift more or less VMT-efficient. Staff indicated that the reallocation didn't come from one specific area, that it was widespread, throughout the region. Staff did note again that the potential shift was minor.

Panel's Findings and/or Recommendations

The Panel concluded that the Metroscope and the travel demand model results appeared to support the national research findings. They felt that the use of multiple methods (case studies, Metroscope, national research) to evaluate induced growth was very helpful. The evaluation of a worst case scenario in Metroscope (it assumed no toll, more new highway lane miles and more auto trips than the LPA) is useful and appropriate. The use of the year 2020 for Metroscope analysis was reasonable at the time it was conducted. The Panel felt that the overall evaluation of induced growth impacts was thorough and robust.

Please see "Additional Panel Findings and/or Recommendations" for long-term recommendations – beyond the scope of the CRC project – for the region to consider.

Question 7:

Were the induced growth findings reasonable?

Panel Discussion

The Panel discussion that occurred on this specific question occurred during the discussion on Question 6.

Panel's Findings and/or Recommendations

The Panel did conclude that the CRC project finding would have a low impact to induce growth is reasonable for this corridor because the project is located in a mature urban area. Insofar as the Metroscope analysis indicates that the project contributes to a better jobs housing balance in Clark County, the Panel believes that this is a positive outcome of the project.

Please see "Additional Panel Findings and/or Recommendations" for long-term recommendations – beyond the scope of the CRC project – for the region to consider.

Additional Panel Findings and/or Recommendations

The Panel also identified a series of long-term regional model improvements. These were not considered as significant to project outcomes at this time and are presented for information only for consideration by Portland Metro in their future enhancements of the regional land use and travel demand forecasting models:

- The Panel noted that the 1994 household survey is 14 years old and suggested that the region consider conducting a new survey soon. Typically, household surveys are conducted every ten years for regional planning purposes.
- The region should consider using the North American Industrial Classification System (NAICS) rather than the Standard Industrial Classification (SIC) codes for employment. NAICS is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. NAICS was developed under the auspices of the Office of Management and Budget (OMB), and adopted in 1997 to replace the Standard Industrial Classification (SIC) system.
- Multinomial mode choice factors in the model limits consideration compared to the use of a fully nested mode choice. Nested logit models can provide a more accurate representation of tradeoffs between modes that are similar (like rail and bus) compared to modes that are more different (like auto and transit).
- Destination choice should consider a Central Business District dummy variable instead of deleting the full cost from destination choice. This was a tradeoff identified by Portland Metro staff during the calibration of the model. The inclusion of full costs in destination choice will provide a more accurate picture of the impacts of tolls, parking costs, operating costs, and fares on traveler's decisions to make a trip across the river or not. This change will require a recalibration of the destination choice models.
- The use of fixed-time factors are a limitation for the evaluation of variable pricing. Variable pricing is designed to shift travelers from congested periods to less congested periods and these shifts are not currently represented by the fixed time factors.
- Updating the future travel demand modeling efforts to redirect the feedback loop from trip distribution to trip generation and to show effects of accessibility on trip generation should be considered. This will involve revising the trip generation model to incorporate accessibility as an input and will provide changes in trip-making as a result of changes in accessibility.

- The incorporation of auto operating and other costs to the trip generation, destination, time of day, and assignment components of the travel demand model should be considered.
- The region should consider testing the use of the activity-based model for evaluation of tolls for future analysis. There is a growing body of research that shows that activity-based models can evaluate the effects of tolls more accurately than trip-based models. This is primarily because of the disaggregate nature of activity-based models, which can identify individual responses to tolls and the value of time.
- In future modeling efforts, the region should consider the inclusion of the full cost of tolls in destination choice. As well, introducing tolls after the last equilibration model loop should be fully tested and compared to full feedback with tolls.
- The Panel felt that the Value of Time (VOT) should be segmented in the model assignment by income and purpose, and an updated VOT should be explored in light of more recent revealed choice surveys and planned CRC stated preference surveys for revenue projections.
- The region should consider "splitting-out" the transit riders without a toll from all other trips with a toll during trip distribution so that transit trips do not divert due to a toll. There is a potential for an under-estimation of transit unless this is done. (However, the Panel concluded that the potential for underestimation of transit riders would not have a significant effect on highway volumes. Staff provided additional analysis that showed that cross river transit trips would increase by about 900 daily person trips (if park-and-ride lot capacity in Vancouver was expanded substantially beyond what has been agreed to as part of the LPA), which represents roughly three percent of total daily cross river transit trips, or less than one percent of cross river auto trips.)
- The region should consider coding auxiliary lanes with lower free flow speeds. For multiple auxiliary lane segments, staff should review the Highway Capacity Manual for less-than-1/2 lane capacity coding for additional auxiliary lanes.
- Future travel demand modeling could include sensitivity testing with Metroscope to evaluate the impacts of highway capacity on regional VMT and trips. This would provide an assessment of how sensitive Metroscope is to changes in highway capacity compared to other research in this area.

Conclusion

This report presented the findings and recommendations of the Travel Demand Model Review Panel to the seven specific questions presented to them on October 13 and 14, 2008. Following the intensive two-day review session, panel members provided specific conclusions and recommendations that indicated overall agreement with the outcomes of the technical modeling process followed in the CRC Draft Environmental Impact Statement process. Specific recommendations intended to improve future travel demand modeling efforts were also provided by panel members.

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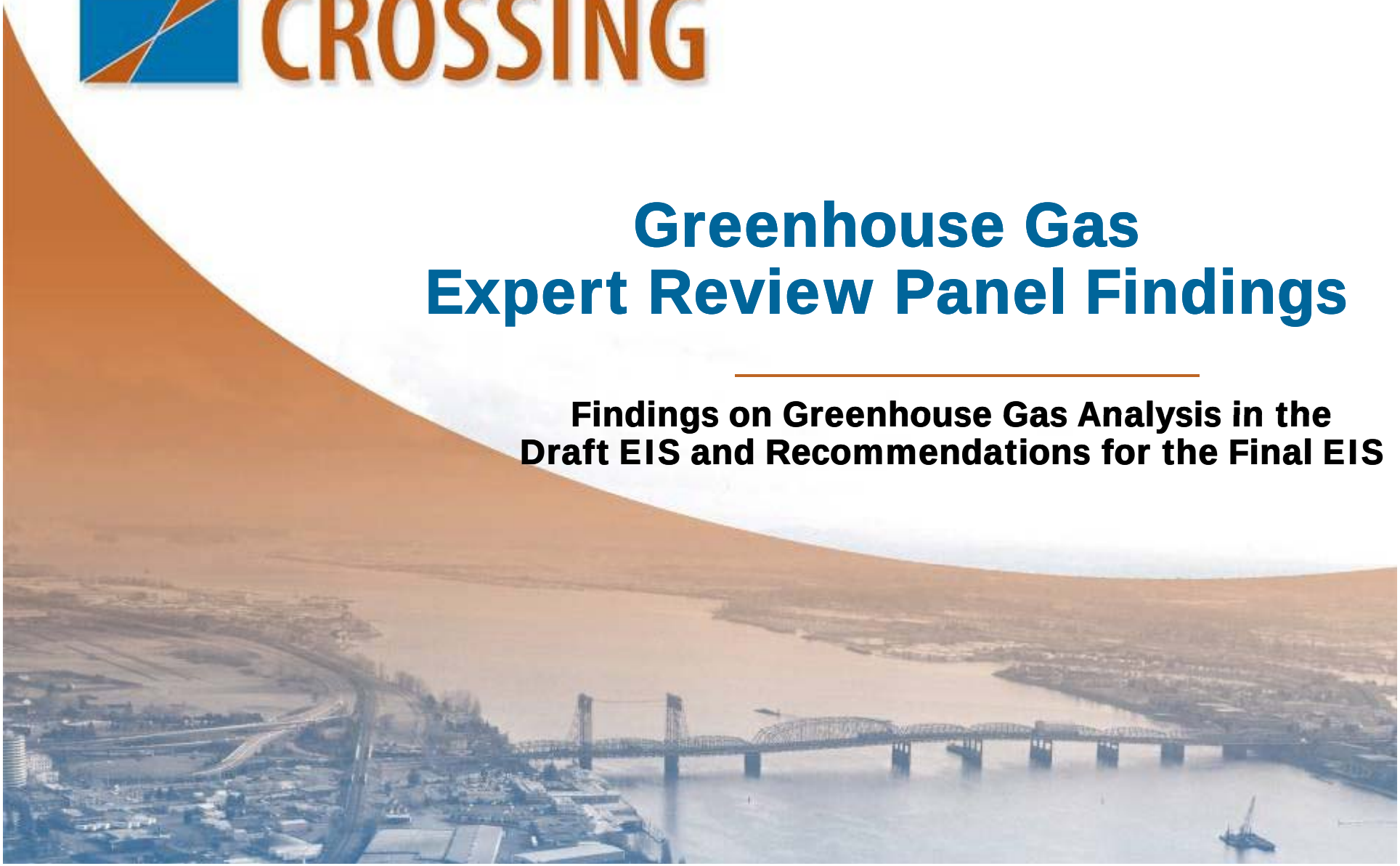
Greenhouse Gas Expert Review Panel Findings

Findings on Greenhouse Gas Analysis in the Draft EIS and Recommendations for the Final EIS



Forming the Panel

Solicited nominations through:

- The National Academies, Transportation Research Board – contacted over 300 members of various research committees
- Other sources

Received names of about 20 potential candidates

- Eliminated those without appropriate expertise
- Eliminated those not considered “independent”

Final Three Panel Members came from TRB nominations:

- Kelly McGourty, Principal Planner, Puget Sound Regional Council
- Kelly Dunlap, JD, NEPA and Climate Change Analysis Lead, Caltrans
- Dr. Ed Beimborn, Professor Emeritus, University of Wisconsin

Questions for the GHG Panel

1. Were the CRC project's methods for modeling greenhouse gas emissions in the Draft EIS reasonable?
2. Were our findings in the Draft EIS regarding greenhouse gas emissions reasonable?
3. Is our proposed approach for estimating greenhouse gas emissions in the Final EIS reasonable?
4. Are there specific and realistic opportunities for this project to further reduce greenhouse gas emissions that should be considered in the Final EIS?

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Panel Activities

Panel received in advance:

- Relevant sections of Technical reports – Energy and GHG, Transportation, Land Use
- Relevant sections of the Draft EIS
- Representative comments on the Draft EIS
- The GHG Review questions

Panel met for full day workshop on Nov 20, 2009:

- Heard presentations from CRC staff
- Asked questions of CRC staff
- Responded to questions from City of Portland OSD staff
- Deliberated privately to respond to research questions
- Developed draft report on findings

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GHG Panel Findings

Question 1: Were the CRC project's methods for modeling greenhouse gas emissions in the Draft EIS reasonable?

Findings:

- The methods used in the Draft EIS were reasonable
- CRC is one of the first transportation infrastructure projects to do such an evaluation
- The use of VISSIM to calculate the inputs for the emissions estimate is an excellent approach
- Refinements could be made to improve the methodology
- The refinements would not change the basic findings of the analysis (LPA reduces GHG emissions compared to No Build)

GHG Panel Findings (cont.)

Question 2: Were our findings in the Draft EIS regarding greenhouse gas emissions reasonable?

Findings:

- The findings in the Draft EIS are reasonable
- The Draft EIS analysis likely understates the potential for the LPA to reduce GHG emissions relative to No Build
  - Estimates for No Build and existing conditions did not include GHG from the congestion due to bridge lifts and collisions
- The narrative in the Draft EIS could be clarified to better explain the difference in GHG emissions between highway and transit sources
  - Make the scale of analysis the same for traffic and transit, or keep the GHG estimates for traffic and transit separate

Proposed Final EIS Approach

Based on staff suggestions and panel recommendations:

- Same type of data input as Draft EIS
  - Traffic: VISSIM model output for estimating GHG emissions
  - Transit: Travel demand model for buses and electrical use for light rail to estimate GHG emissions
- Recommended Refinements include:
  - Separate transit and highway for reporting and comparison, or make geographic boundaries equal
  - Include greater length of I-5 and I-205 in highway analysis
  - Include emissions from other affected highways
  - Evaluate the effect of bridge lifts and traffic collisions

GHG Panel Findings (cont.)

Question 3: Is our proposed approach for estimating greenhouse gas emissions in the Final EIS reasonable?

Findings:

- The proposed approach is reasonable
- Including the staff- and panel-proposed refinements would increase the precision and completeness of the evaluation
- The use of VISSIM to calculate inputs is excellent and should continue to be used in the Final EIS
- Final EIS should include more detail of the analysis and results; explain the results

GHG Panel Findings (cont.)

Question 4: Are there specific and realistic opportunities for this project to further reduce greenhouse gas emissions that should be considered in the Final EIS?

Findings:

- We commend CRC for looking at additional GHG reduction, but mitigation is not needed because the project has lower emissions than No Build
- Further, there are no state or federal regulations imposing GHG thresholds
- The strategies suggested in the Draft EIS for further reducing GHG emissions should be considered in regional and state policy:
  - Planting trees
  - Improving bike/pedestrian access at light rail stations
  - Using right of way to generate green energy
  - Requiring construction contractors to use alternative fuels
  - Increasing rideshare and commute choice programs
  - Providing electric vehicle recharge stations at park and rides.

Summary of Independent Expert Review of CRC's Greenhouse Gas Analysis

- We find the Draft EIS methods and findings to be reasonable
- We suggest methodology refinements but don't expect them to change basic conclusions (LPA has lower emissions than No Build)
- We suggest providing more explanation in the Final EIS so readers understand how and why the toll and transit help reduce traffic emissions below No Build.
- We commend the project for identifying additional ways to reduce GHG emissions, but mitigation is not needed
- We suggest that the Draft EIS strategies for further reducing GHG emissions be considered in regional and state policy

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