METRO

High Capacity Transit System
Detailed Evaluation
DRAFT

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Section I: Introduction

Metro and its regional partners are developing a plan to expand the regional High Capacity Transit (HCT) system over the next 20 to 30 years. Metro is currently working through a detailed evaluation process to prioritize regional HCT investments identified in an earlier phase of work and adopted by Metro Council in February 2009. The Regional HCT System Plan is being conducted in close coordination with the Regional Transportation Plan (RTP) update and the final plan will be integrated into the RTP. Since the RTP, including the HCT element is updated every four years, regional HCT priorities will be reassessed regularly over time. Critical outputs of the HCT plan include: short-term HCT investment priorities for the region, a clear policy framework that can be used to update HCT priorities as part of regular RTP updates, and clear action steps for jurisdictions located on developing HCT corridors to improve HCT implementation viability.

This draft report provides an evaluation of those corridors adopted by Metro Council as part of the long-term Regional High Capacity Transit System against a set of evaluation criteria, which were also adopted by the Metro Council in February 2009. The work document in this report is a technical evaluation designed to assist regional policy makers in prioritizing regional HCT investments.

Project Summary to Date

The Regional HCT System Plan process is entering the final phase of corridor evaluation. To date significant work has been done by Metro's technical team as well as the HCT Subcommittee and other Metro policy committees. Primary steps completed in the process include:

- Early Plan Public Outreach
- Stakeholder Interviews
- Formation and Meetings with "Think Tank" Group
- Development of Screening Criteria
- Application of Screening Criteria to Long List of Corridors
- Development and Adoption of Regional HCT System Plan Network
- Development and Adoption of Evaluation Criteria for evaluation and prioritization of Regional HCT System Plan Network

Figure 1 on the following page outlines the HCT plan process.

Regional High Capacity Transit System Network

On February 12, 2009 the Metro Council unanimously adopted a network of future regional high capacity transit corridors and enhancement projects. The corridors included in the adopted HCT Network Map in Figure 2 are the focus of evaluation and prioritization process now underway. All corridors will be included in the RTP as part of the long term HCT network; this report documents the first step in prioritizing these corridors for implementation and/or to receive other forms of staff and financial support that will help to achieve land uses, development practices and policies supportive of future HCT investment.

Figure 1: Regional High Capacity Transit Plan Process Diagram

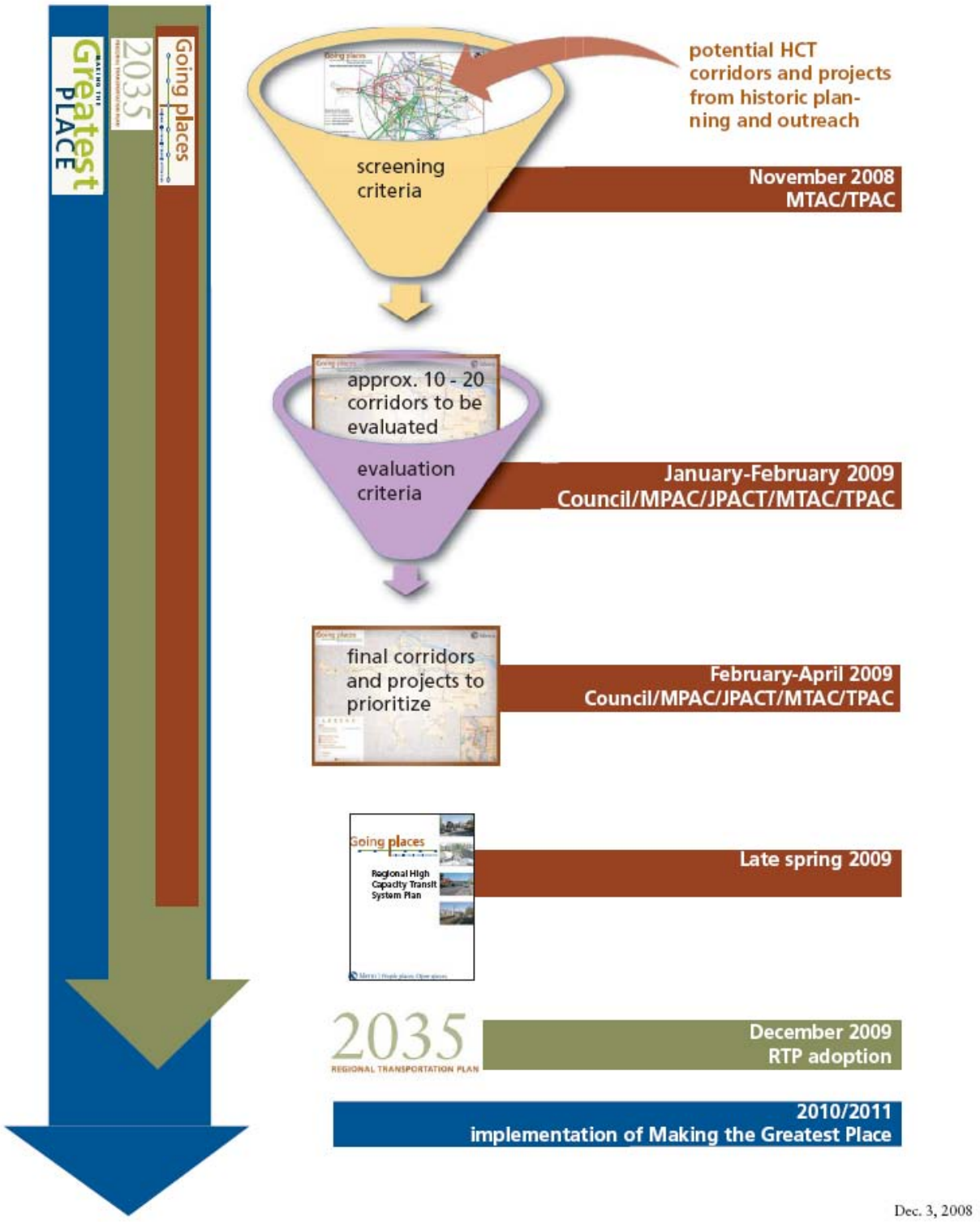
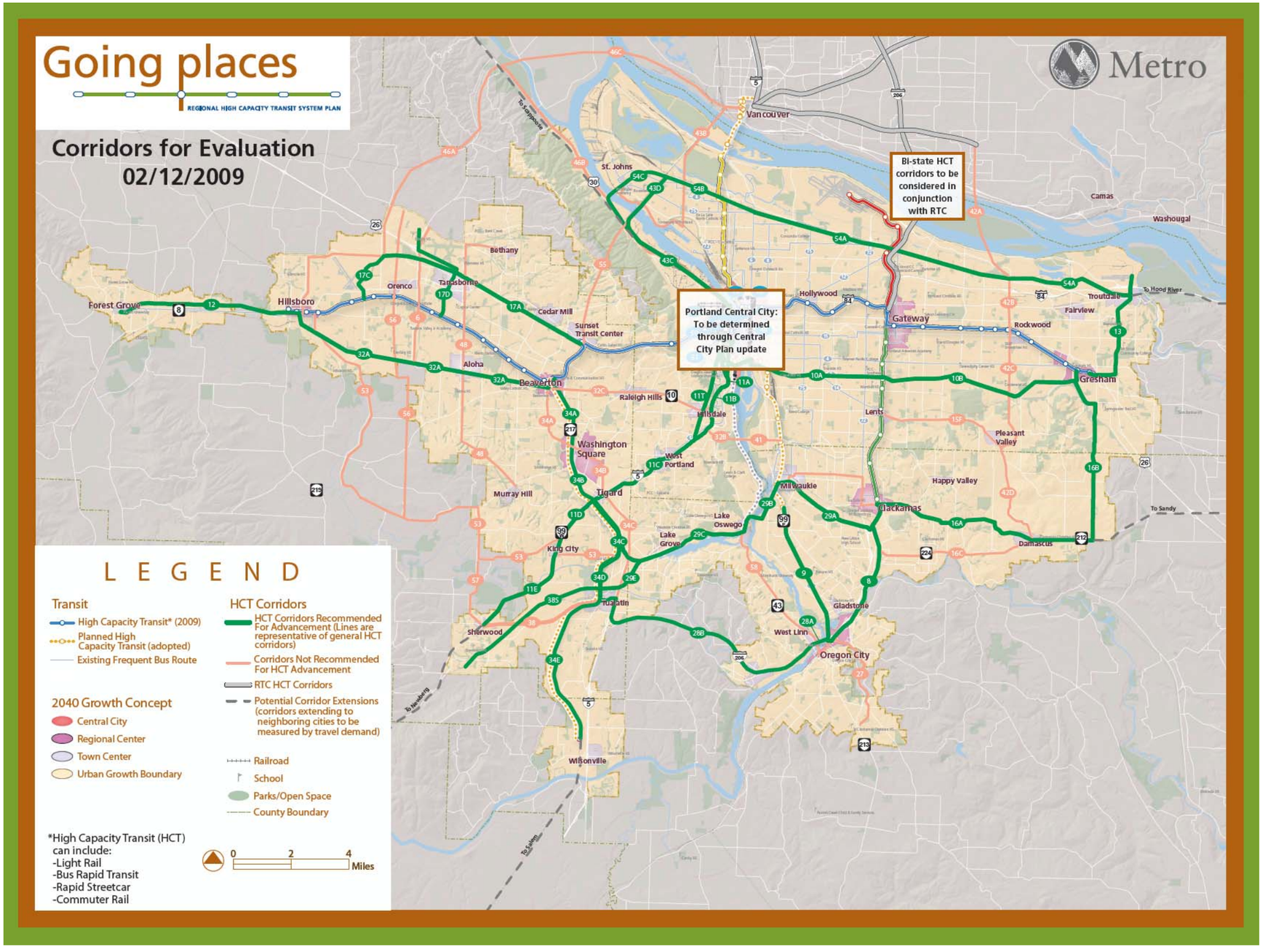


Figure 2: Regional High Capacity Transit Network Map (Adopted)



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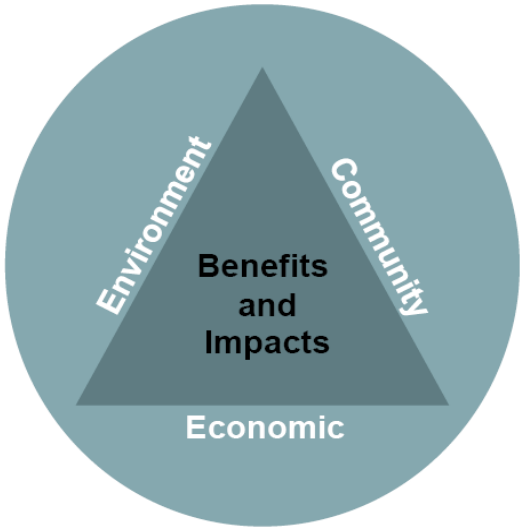
Section II: Evaluation Approach

This evaluation uses a Multiple Account Evaluation (MAE) approach. This approach is adopted and refined from a standardized methodology employed in the United Kingdom for evaluation of major transportation projects.

The 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

Figure 3: 2035 RTP Evaluation Framework



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. To identify short-term priorities some criteria focus on current conditions. A fourth account is therefore included in the MAE to address deliverability.

The MAE framework aligns with the hierarchy of objectives.

- Region 2040 Vision
- 2035 RTP – implementing the Region's 2040 Vision
- HCT – supporting the RTP's Goals

The 10 RTP's 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

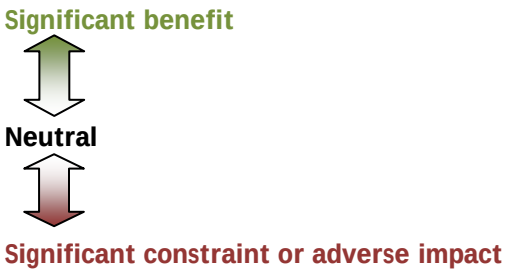
These goals can be grouped under the three evaluation categories used in the RTP, which provide the structure for the MAE framework, alongside the consideration of *deliverability*. Regional partners have agreed on a set of criteria for each category tailored to reflect conditions and priorities in the region.

The evaluation will be both quantitative and qualitative, depending on the criteria and extent of information available. As more information becomes available from committee discussions and input the assessment can be revisited; the evaluation structure can be used for future updates to the HCT element of the RTP.

Evaluation tools developed in this memo include:

Full evaluation summary table: This is a high level summary table that groups all evaluation criteria onto a single page using a high level scoring system to illustrate how corridors rank against a baseline or reference case (where applicable) and against one another. This table can be viewed in Figure 9 and is color coded for ease of comparison.

In the initial stage the scoring will be based on the following scale:



Where quantitative data is available as part of a criterion evaluation, natural data breaks were employed in the scoring process. Where possible, criteria are rated against a baseline or reference case (in this case the RTP 2035 Reference Case) and scoring for all corridors shown as either having a beneficial or adverse impact.

Figure 4: Criteria Scoring Method

Assessment	Natural Data Break	Rating
Significant Benefit	4th	3
Moderate Benefit	3rd	2
Slight Benefit	2nd	1
Neutral	1st	0
Slight Constraint/Adverse Impact	2nd	-1
Moderate Constraint/Adverse Impact	3rd	-2
Significant Constraint/Adverse Impact	4th	-3

Note: For most criteria with quantitative evaluation outputs, four natural data breaks were applied indicating the level of benefit or constraint. In all cases the first break was considered to fall close to neutral and was indicated as such. For several of the criteria, it was determined that the corridors needed to be scored using the full range of impacts – from significantly adverse to significant benefit – in which case seven natural breaks were used.

Individual criterion evaluation: Detailed evaluation of each criterion is presented, providing a summary of the criterion purpose/role in the evaluation, methodology and data used, and any limitations in the evaluation structure. More detailed data results and supporting analysis can be found in these descriptions in Section III of this report.

Corridor summaries: A map and summary sheet is provided as an overview for each corridor allowing decision makers to review specific considerations, assessment summaries and key data results for each individual corridor. 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). These corridor summaries can be found in Section IV of this report. This section will be completed over the coming weeks as the evaluation progresses. HCT Sub-Committee members and other stakeholders are invited to contribute key issues or concerns to be included in this section of the evaluation. *(This section is not yet complete and will be ready for the next version of this report).*

Evaluation Criteria for Adopted Corridors

Over a several month period in the Fall of 2008 and early 2009, Metro worked with the community and its regional partners to develop and refine a set of evaluation criteria to be used in evaluating and prioritizing regional investments in the adopted Regional HCT Network (see Figure 2). The specific criteria adopted by the Metro Council in February 2008 are listed in detail in Appendix A.

The evaluation criteria which are employed in the draft evaluation detailed in this memorandum are organized in four major benefit accounts:

- Community
- Environment

- Economy
- Deliverability

Figure 5 summarizes the specific criteria under each account. It should be noted the criteria, *Safety and Security*, and *Risk of 4(f)* were not evaluated at the corridor level because the results would not show a difference between the corridors. These criteria will be described separately in a "white paper" that will provide detailed guidance on these topics.

Figure 5: Evaluation Accounts and Criteria (Adopted)

Community	**Environment**	**Economy**	**Deliverability**
C1: Supportiveness of Existing Land Uses C2: Local Aspirations C3: Placemaking and Urban Form C4: Ridership Generators C5: Support of regional 2040 Growth Concept C6: Integration with Regional Transit System C7: Integration with Other Road Uses C8: Congestion Avoidance Benefit C9: Equity Benefit C10: Health (Promotion of Physical Activity) C11: Safety and Security *(Addressed in White Paper)* C12: Housing + Transportation Affordability Benefit C13: Transportation Efficiency or Travel Time Benefit to Individual User C14: Transportation Efficiency or Travel Time Benefit to All Corridor Users	EN1: Reduction in Emissions and Disturbance EN2: Risk of Natural Resource Disturbance EN3: Risk of 4(f) Resource Disturbance *(Addressed in White Paper)*	EC1: Transportation Efficiency (Operator) EC2: Transportation Efficiency (User) EC3: Economic Competitiveness EC4: Rebuilding/ Redevelopment Opportunity	D1: Total Project Capital Cost (Exclusive & Non-Exclusive ROW Options) D2: Capital Cost Per Mile (Exclusive & Non-Exclusive ROW Options) D3: Operating & Maintenance Cost D4: Ridership D5: Funding Potential

Evaluation Outcomes

The adopted evaluation approach is not a 'single step' process, but rather a tool that is employed on an ongoing basis to assist the shaping and refinement of the corridor prioritization. At this stage in the evaluation all corridors are being evaluated assuming LRT as the investment mode. This decision was made to simplify modeling requirements and to ensure that all corridors are initially evaluated on an even playing field. The ridership estimates from the initial model runs, along with other elements of the corridor evaluation, will help to indicate which corridors are priorities for further analysis.

Since all the corridors being evaluated in this phase are part of the adopted Regional High Capacity Transit Network, the primary intent of this evaluation is to prioritize regional investments in the HCT system. There are several critical factors that guide regional decision making and prioritization of projects:

- **Project benefits and viability**: Any HCT project identified as a regional priority must show a minimum level of ridership potential and project benefit (particularly as measured by FTA funding programs).
- **Local Aspirations**: HCT projects with potential to contribute to the achievement of regional environmental, economic and community development goals will be those that have strong local leadership and willingness and desire to intensify land use patterns in station areas. While it may be difficult to gauge a community's long term political stance on HCT investments, corridors that are ranked in higher tiers should demonstrate a willingness to take actions that support regional growth management and placemaking goals.
- **Agency capacity to study and implement HCT corridor projects**: Regional agencies have limited capacity and funding to take on major corridor projects; therefore the number of corridors identified as Regional Priorities need to be limited to a realistic number of projects that are achievable within the next RTP cycle.
- **Project readiness**: Since the ranking from this plan will be used to identify which regional projects are candidates for further study and implementation in the short-term, current land use and ridership potential are important factors in assessing project readiness.
- **Funding availability/feasibility**: Funding availability is addressed only at the highest level in this long-term evaluation; however, there are specific criteria that provide indications of project competitiveness for federal funds. There may be other considerations of funding availability under specific programs, such as FTA's Small Starts program, that drive decision making about project priority in the region and suggest the need to prioritize certain project types (i.e., projects with small capital budgets).

Corridor Tiers

A number of the corridors under evaluation would require significant changes in land use to support future High Capacity Transit; for those corridors the most important outcome of the Regional HCT Plan will be clear direction on what policy and program actions are needed to create an environment supportive of HCT. On the other hand, a few corridors or projects are already viable for HCT investment. The evaluation process will help to identify these projects that have high regional significance (short-term viability) and to categorize other projects into tiers that align with associated actions for Metro, corridor jurisdictions and other partner agencies. The

intent is to provide a framework that clearly identifies regional priorities and supports corridor communities in advancing their projects as future regional priorities.

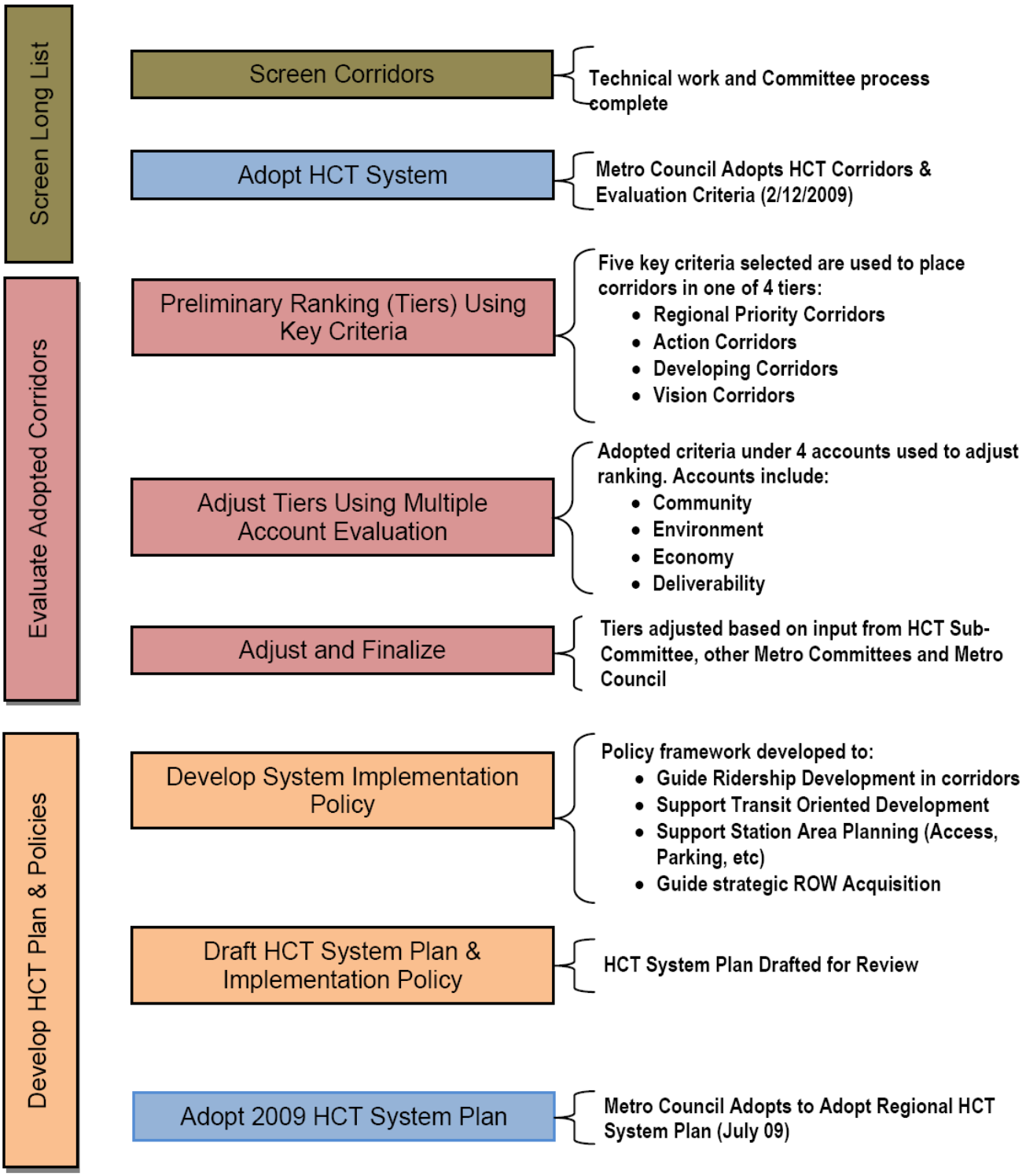
A key organizing factor in placing projects in tiers is agency capacity to conduct corridor evaluations and implement new services. In the past 25 years Metro and TriMet have taken on a major investment analysis about every three years. This plan assumes that the agencies will be more aggressive, striving for a project every two years or two projects every four-year RTP cycle.

Figure 6 provides a brief summary of how projects would be organized by priority in the Regional HCT System Plan. Figure 7 provides a summary of the Regional HCT System Plan process and is followed by a more detailed description of priorities tiers and potential associated actions to be implemented by Metro and regional partners.

Figure 6: Summary of Corridor/Project Prioritization

Tier	Summary	Timeframe	Corridors/ Projects
Regional Priority Corridors	Corridors most viable for implementation in next four years.	Progress into Alternative Analysis in next 4 years	2 to 3
Regional and Local Action Corridors	Corridors where future HCT investment may be viable if recommended planning and policy actions are implemented	Focused local and regional actions in next 4 years. Progress into Alternative Analysis in 5-12 years	Up to 6
Developing Corridors	Corridors where projected 2035 land use and commensurate ridership potential are not supportive of HCT implementation, but which have long-term potential due to political aspirations to create HCT supportive built form	Local and regional planning in next 4 years. Progress into Alternative Analysis in 13-20 years	Up to 6
Vision Corridors	Corridors where projected 2035 land use and commensurate ridership potential are not supportive of HCT implementation and where land use aspirations are for low-intensity built form	Support corridors in long-range planning, such as corridor preservation. Progress into Alternative Analysis in 21 years +	No limit

Figure 7: HCT System Plan Process



Description of Proposed HCT Corridor/Project Tiers

As described in Figure 7, adopted Regional HCT System corridors have been grouped into one of four tiers. This initial assignment of corridors tiers is preliminary and is expected to be adjusted by input from the HCT Sub-Committee and other Metro policy committees. Also, the actions suggested for each tier are preliminary and are presented as a draft policy concept; they will require further review and revision.

The recommended tiers and descriptions are as follows:

- **Regional Priority Corridors**: Corridors most viable for implementation in next four years (one RTP cycle). This tier includes projects for which Metro or TriMet is likely to initiate an Alternatives Analyses in the upcoming RTP cycle. This tier will include no more than two major corridor projects and possible one smaller project (i.e., extensions, on-street BRT, existing system upgrades, etc.).

  Actions for Regional Priority Corridors:

  - Initiate Alternative Analysis/Environmental Impact Statement
  - Form Corridor Working Group
  - Complete Corridor Ridership Development Plan
  - Conduct Station Access and Parking Plans
  - Complete a System Expansion Implementation Plan

- **Local and Regional Action Corridors:** Corridors where HCT investment may be viable in next 5 to 12 years (2nd and 3rd RTP cycle) if recommended planning and policy actions are implemented. Corridors included in this tier are those that are in a strong position to become Regional Priorities once top tier projects are implemented. Corridors in this tier will likely require some level of land use changes (densification in station areas) or policy changes (parking policy, TDM, etc) to be elevated to regional priorities. Metro's focus for corridors in this tier would be to provide staff and (potentially) funding support to implement supportive actions. This tier will include no more than 6 major corridor projects.

  Actions for Action Corridors:

  - Initiate Preliminary Alternative Analysis
  - Conduct Land Use/TOD Plans for Centers/Station Areas
  - Conduct Station Area Access Plans
  - Complete a System Expansion Implementation Plan for consideration to be elevated to a Priority Corridor

- **Developing Corridors**: Corridors where projected 2035 land use and commensurate ridership potential are not supportive of HCT implementation, but which have long-term potential due to political aspirations to create HCT supportive communities. Corridors in this category are not expected to be ready for HCT implementation any sooner than 13 to 20 years (4th and 5th RTP cycles). This tier will include no more than 6 major corridor

projects. Metro actions for Developing Corridors could include land use planning and TOD assistance and funding.

Actions for Developing Corridors:

- Conduct General Land Use Plan
- Conduct Station Area/TOD Plans
- Initiate Right-of-way Preservation Program

- **Vision Corridors**: Corridors where projected 2035 land use and commensurate ridership potential are not supportive of short-term HCT implementation and where land use aspiration are for low-intensity built form. These corridors are not positioned for a major HCT investment in the next 20 years or don't currently support land use aspirations that are compatible with HCT investments. Metro actions for Vision Corridors include coordination with TriMet to review lower intensity transit service.

  Actions for Vision Corridors:

  - Consider of lower intensity transit mode
  - Initiate Right-of-way preservation program

Grouping Corridors

The Federal Transit Administration requires that projects seeking New Starts funding be based upon the results of an alternatives analysis. A key step in the alternatives analysis process is to identify conceptual alternatives that take a broad look at how regional connections are made, including identifying and evaluating multiple alignments. A number of the corridors included in the adopted Regional HCT System (see Figure 2) serve similar regional travel connections and would most likely be reviewed as part of a single project exploration, not as individual projects. Therefore, in our prioritization process, we have grouped corridors where we believe they would be covered under the same alternatives analysis and where it is likely that the region would chose to invest in one project or the other, not both.

Initial Ranking of Corridors

The Multiple Account Evaluation (MAE) framework provides a wide range of information for decision makers to use in prioritizing regional investments. However, there is a need to begin to organize priorities with a limited set of criteria that best represent regional priorities. The initial placement of corridors into tiers is based on five key criteria that stakeholders and policy makers have indicated as having primary importance and/or technical staff know are critical to project deliverability. The memorandum provided in Appendix B provides a summary of which criteria members of the Think Tank and Metro's standing committee's felt were most important in prioritizing regional HCT projects.

- **Ridership (long-term business case):** Ridership is a significant indicator of the region's ability to build a business case for a corridor investment. Numerous other criteria are based on this projection or are directly aligned with it. For example, ridership is indicative of projected land use and urban form, it is the most critical driver of cost effectiveness measures (operating cost per passenger, capital cost per passenger, etc), and it drives almost every other environmental and social benefit calculation (i.e., VMT reductions or housing + transportation affordability. Ultimately the value of any regional transit investment will be measured by the number of riders attracted to the line.
- **Project readiness (short-term business case):** 2035 ridership provides a good sense of future corridor viability; however, an assessment of current land use and ridership potential is critical as top-tier projects will move forward long before 2035. The 2005 Transit Orientation Index (Land Use Criterion) will be used to assess the readiness of each corridor
- **Local Aspirations (political desire and placemaking case)**: In line with 2040 Growth Management policies, policy makers and stakeholders, such as the Think Tank group organized for this project, have indicated that land use outcomes of regional HCT investments are a paramount consideration in prioritizing regional investment. To this end, Metro has dedicated significant resources to undertaking dialog with partner cities to understand their political desire to accommodate future regional growth, to adopt policies that ensure that growth is transit-oriented and to maximize the potential for transit investments to shape compact, walkable and vital communities.
- **Project cost (deliverability):** To compare projects based on cost it is important to consider costs in relation to measurable benefits of the investment. In this case we use *annualized capital and operating cost per passenger* boarding as to assess the overall cost to build and operate the project in relation to the benefit achieved. Ridership is a good proxy for many of the other primary and secondary benefits of a transit investment, environmental benefit, placemaking, reduction of income spent on housing and transportation, etc.
- **Federal Project Fundability (deliverability):** The Federal Transit Administration's formula for calculating Transportation System User Benefits (TSUB), a key comparative criterion for funding under its New Starts program, provides a good benchmark for how various corridor projects would compete for federal capital dollars required to build the project. This is an important criterion as it helps to ensure that the region is putting forth projects that are most likely to compete successfully for limited federal capital funds.

The draft tiers presented in Figure 8 are based on the combined scores of the five criteria described in this section (detailed scoring for each criteria can be reviewed in Section III of this report).

Figure 8: *Preliminary* Ranking Based on Key Criteria

Regional Priority Corridors
• **11** (Portland to Sherwood via Barbur Hwy 99w) & **34** (Beaverton - Wilsonville) • **10** (Portland - Gresham via Powell)
Local and Regional Action Corridors
• **29** (Washington Square TC – Clackamas TC) & **28** (Washington Square TC - Clackamas TC via I- 205) • **17** (STC - Hillsboro), 17D (Red Line extension to Tanasbourne),& **32** (Hillsboro - Hillsdale) • **8** (Clackamas TC – Oregon City TC) via I-205 & **9** (Park – Oregon City TC) via McLoughlin
Developing Corridors
• **13D** (Troutdale - Damascus) & 13 (Gresham - Troutdale MHCC via Kane Dr) • **43** (St. Johns - Vancouver/Union Station) • **38S** (Tualatin-Sherwood)
Vision Corridors
• **12** (Hillsboro - Forest Grove) • **16** (Clackamas TC - Damascus) • **54** (Troutdale - St. Johns)

The summary results of all adopted evaluation criteria are presented in Figure 9. While these are not considered in the preliminary ranking presented above, they are intended for use by policy makers in adjusting priorities in the next phases of this process.

Figure 9: Evaluation Summary Matrix

Corridor	Description	Community	C1. Supportiveness of Existing Local Land Use	C2. Local Aspirations	C3. Placemaking and Urban Form	C4. Ridership Generators	C5. Support Regional 2040 Growth Concept	C6. Integration with Regional Transit System	C8. Congestion Avoidance	C9. Equity Benefit	C10. Health (Promote Physical Activity)	C12. Housing + Transportation Affordability Benefit	C13. Transportation Efficiency (Users)	C14. Transportation Efficiency (Corridor)	Environment	EN1. Emissions & Disturbance	EN2. Natural Resources	Economy	EC1. Transportation Efficiency (Operator)	EC2. Transportation Efficiency (System)	EC3. Economic Competitiveness	EC4. Rebuilding Potential	Deliverability	D1. Feasibility of Construction (Exclusive ROW)	D1. Feasibility of Construction (Non-Exclusive ROW)	D2. Cost per Mile (Exclusive ROW)	D2. Cost per Mile (Non-Exclusive ROW)	D3. Operating and Maintenance Costs (HCT line)	D4. Ridership	D4. Ridership per Revenue Mile	D4. Ridership per Revenue Hour	D4. Change in Corridor System Ridership	D5. Funding Potential	Supporting Criteria	Capital Costs (Sidewalks)
8	Clackamas Town Center to Oregon City via I-205 (LRT)		0	2	0	0	2	2	1	1	1	1	1	1		1	-1		0	-1	0	1		0	-1	0	-3	-1	1	1	1	1	2		-2
9	Park Ave to OCTC via McLoughlin (LRT extension)		0	1	2	0	2	3	1	0	1	1	1	0		0	-1		0	-1	0	0		-1	-1	-3	-3	-1	1	2	2	1	1		-3
10	Portland to Gresham via Powell (LRT)		3	3	3	3	3	3	2	1	2	3	0	2		1	-2		-1	-1	3	1		-2	-2	-3	-3	-3	2	1	1	0	1		0
11	Portland to Sherwood via Barbur/Hwy 99 (LRT)		3	3	2	3	3	3	2	1	2	2	2	3		2	-3		0	-1	3	2		-3	-3	-3	-3	-2	3	2	3	2	3		-1
12	Hillsboro to Forest Grove (LRT extension)		0	2	0	2	1	1	0	3	1	1	2	1		1	-1		-2	-2	0	2		-1	-1	-1	-1	-1	0	1	0	1	-1		-1
13	Gresham to Troutdale Extension (LRT Extension)		0	2	-1	2	3	1	0	1	2	1	1	1		0	-1		0	-1	0	0		0	0	-3	-3	0	0	2	2	0	1		0
13D	Troutdale to Damascus (LRT)		0	2	-3	2	3	1	1	0	1	0	1	1		3	-3		-2	-3	1	3		-3	-3	-2	-2	-2	1	1	1	2	1		0
16	Clackamas Town Center to Damascus via Sunnyside (LRT)		0	1	-2	1	2	1	0	1	0	0	1	1		0	0		-2	-2	0	2		-1	-1	-3	-3	-1	0	0	0	0	-2		-2
17	Sunset Transit Center to Hillsboro via Hwy 26 / Evergreen		2	3	-1	2	3	1	2	2	2	1	0	1		2	-2		-1	-1	3	2		-2	-2	-1	-1	-2	2	1	1	2	0		0
17D	Tanasborne (LRT extension)		1	3	-2	1	2	1	0	1	1	0	0	0		1	-1		0	-1	1	1		0	0	-1	-1	0	0	3	3	0	0		-2
28	Clackamas Town Center to Washington Square via I-205/217 (LRT)		1	1	-1	1	3	1	3	1	1	2	2	3		3	-3		-2	-1	3	3		-3	-3	-1	-1	-3	2	1	1	3	2		-2
29	Clackamas Town Center to Washington Square via RR ROW (LRT)		3	1	-1	2	3	2	3	1	1	2	3	3		3	-3		-2	-2	3	1		-2	-2	-2	-2	-3	2	1	2	2	3		-2
32	Beaverton to Hillsboro via TV Highway (LRT)		2	2	1	2	3	1	1	2	3	2	1	1		1	-2		-1	-1	2	1		-2	-2	-3	-3	-1	1	1	1	1	0		-1
34	Beaverton to Wilsonville (LRT upgrade)		3	2	-2	1	3	2	3	2	3	2	1	2		3	-3		0	0	3	2		-2	-2	-1	-3	-2	3	2	3	3	2		0
38S	Sherwood to Tualatin (VERIFY)		1	1	-2	0	1	0	1	1	1	0	0	0		0	-2		-1	-1	0	2		0	-2	0	-3	0	0	0	0	0	0		0
43	Downtown Portland to Yellow Line via St. Johns (LRT)		3	2	2	2	3	1	0	3	1	2	0	1		0	-3		-3	-2	2	0		-1	-1	-2	-2	-2	0	0	0	1	-2		0
54	Troutdale to St. Johns via US 50 (LRT)		0	1	1	2	2	1	0	3	2	2	3	2		1	-3		-3	-3	2	2		-3	-3	-2	-2	-3	0	0	0	1	-1		-2

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Adjustments to Ranking of Corridors

As noted above, the draft ranking of corridors does not yet consider the numerous other MAE criteria presented in this report. These will be used to further adjust corridor prioritization through a dialog with the HCT Sub-Committee and other Metro policy and technical committees. The following is a summary of the process:

- **HCT Sub-Committee Meeting #5** (March 25th): Presentation of evaluation framework and draft of detailed criteria evaluation. This is the first opportunity for the Sub-Committee to review the draft evaluation results and comment on prioritization.
- **HCT Sub-Committee Meeting #6** (April 9th): At this point the HCT Sub-Committee will have had an opportunity to review evaluation results in more detail and should be prepared to make any final recommendations on adjustment to HCT corridor/project priorities (tiers).
- **Public Outreach** (March/April): Public outreach will be conducted to gauge public priorities. Outreach efforts include the Build-A-System tool exercise and a number of outreach events.
- **HCT Sub-Committee Meeting #7** (May): This meeting will provide a final opportunity for HCT Sub-Committee members to comment on adjusted HCT corridor/project priorities (tiers)

HCT Modes Considered

To ensure that all corridors were evaluated evenly in the first phase of this evaluation, it was assumed that all HCT corridors would be constructed as light rail. This was also done to limit the extent of the evaluation, which would grow exponentially if every possible mode was considered for every corridor.

Metro will be soliciting feedback on preliminary recommendations on corridors that should be evaluated for other modal investments. It is important to keep in mind that:

- For Regional Priority Corridors, Metro and TriMet are committing to conduct a full Alternatives Analysis, which requires a full examination of mode and alignment options.
- For projects that fall into lower tiers, where HCT investments will only be viable with significant changes to land use patterns, there is value in exploring fully dedicated HCT modes, however, express bus or other more cost effective transit treatments could be more appropriate in these corridors.

There are specific factors that encourage the evaluation of modes other than LRT in certain adopted corridors:

- **Demand**: Future ridership demand modeled for certain corridors suggests a lower cost transit solution could increase project viability
- **Corridor Characteristics/Cost Implications**: Existing ROW configuration and demand patterns in certain corridors suggest that rubber-tired transit alternatives that could use existing travel lanes (at least in less congested segments) could be considered at lower cost.
- **Political Will**: Corridor communities may be interested in exploring whether other transit modes (ie, BRT or Rapid Streetcar) could improve the viability of their project.

Figure 10 provides an initial summary of corridors that could be considered for other modal investments. This will be refined with feedback from the HCT Sub-Committee and corridor communities.

Figure 10: Potential Corridors for Alternative Mode Analysis

Table being developed

Section III: Detailed Criteria Evaluation

This section describes each evaluation criteria in detail and summarizes the methodology used in the evaluation and for ranking corridors. The criteria are organized by benefit account as follows:

- Community Criteria (C)
- Environment Criteria (EN)
- Economy Criteria (EC)
- Deliverability Criteria (D)
- Supporting Criteria (S)

Ranking the Data

In most cases, the natural breaks method was used to categorize the data. This method divides data into categories based on the natural groups in the data distribution. It uses a statistical formula (Jenk's optimization) that calculates groupings of data values based on the top four deltas between each adjacently sorted corridor. If the results of a particular criterion were only perceived as being a benefit or constraint (adverse impact), then only four categories were used to break the data (e.g., 0 = neutral, +/- 1 = slight benefit/constraint, +/- 2 = moderate benefit/constraint and +/- 3 = significant benefit/constraint). If the results for a criterion were perceived to have both benefits and constraints, then seven categories were used to break the data (e.g., -3 = significant constraint, -2 = moderate constraint, -1 = slight constraint, 0 = neutral, +1 = slight benefit, +2 = moderate benefit, +3 = significant benefit).

C1: Supportiveness of Existing Local Land Use

Description	Measures readiness of existing local land use plans and policies to support a high capacity transit investment. This criterion is important in identifying the short-term viability of corridors under consideration, as a key goal of this process is to conduct a temporal prioritization of regional projects. It was determined that a quantitative analysis using the Transit Orientation Index , which estimates transit demand based on the land use characteristics of household density, employment density and retail employment density, was most instructive in identifying the readiness of current land use plans and policies to support high capacity transit.
Data Sources	This analysis was based on 2005 household and employment data developed by Metro for the entire region.
Methodology	A rough estimate of ridership potential was generated by the Transit Orientation Index (TOI), which focuses on residential density, employment density and retail job densities around potential HCT corridors. This analysis was conducted in the following steps: Step 1: Conduct GIS analysis ● Calculate area of TAZs within a half mile from alignments ● Create a half mile buffer around alignments ● For the segment analysis, split buffers into smaller segments ● Join employment, household and retail data with TAZs in GIS. All TAZs are assigned 2005 data ● Clip TAZs using a half mile buffer ● Calculate an area of the clipped TAZs ● Calculate a percentage of area that fall within the half mile buffer for each TAZ ● Export the output into Excel Step 2: Calculate TOI score in Excel ● Multiply the area percentage of TAZs with employment, retail and household data for each TAZs ● Sum the values to calculate a total number of employment, retail and households for each alignment ● Calculate a total area of TAZs for each alignment ● Calculate densities of employment, retail, and household (per acre). ● Apply the equation below: Ridership/acre = 0.162648 * employment/acre + 0.000185 * employment/acre, squared + 0.046332 * households/acre, squared + 0.001648 * retail employment/acre, cubed
Ranking Methodology	Corridors were categorized as follows: • Significant benefit = > 3.0 riders or acre • Moderate benefit = 1.0 - 2.0 riders per acre • Slight benefit = < 1.0 rider per acre

Issues/ Limitations	A significant number of employment and retail in downtown Portland influences an overall TOI score. For a corridor with a segment in downtown, even if a majority of a corridor receives a low to moderate TOI score, the high score for downtown segments results in increasing an overall TOI score for the corridor. This methodology is reflective of current land uses more than adopted plans and policies. It was determined that the impact of plans and policies is captured in the Local Aspirations criteria and that this criteria should focus on actual conditions.

C1: Analysis Results (Supportiveness of Existing Local Land Use)

Corridor	corridor description	Riders per Acre (TOI) 2005	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	0.65	1	Slight benefit
9	Milwaukie-Oregon City (McLoughlin)	0.57	0	Neutral
10	Portland-Gresham (Powell)	1.48	3	Significant benefit
11	Portland-Sherwood (Barbur/Hwy 99)	1.33	3	Significant benefit
12	Hillsboro-Forest Grove	0.55	0	Neutral
13	Gresham-Troutdale	0.58	0	Neutral
16	Clackamas Town Center-Damascus	0.54	0	Neutral
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	1.02	2	Moderate benefit
28	Clackamas Town Center-Washington Square	0.83	1	Slight benefit
29	Clackamas Town Center-Washington Square (RR ROW)	1.30	3	Significant benefit
32	Beaverton-Hillsboro (TV Hwy)	0.95	2	Moderate benefit
34	Beaverton-Wilsonville	1.38	3	Significant benefit
43	Downtown Portland-St. John's-Yellow Line	1.39	3	Significant benefit
54	Troutdale-St. John's	0.59	0	Neutral
17D	Tanasbourne	0.83	1	Slight benefit
38S	Tualatin-Sherwood	0.65	1	Slight benefit
13D	Troutdale-Damascus	0.31	0	Neutral

C2: Local Aspirations

Description	This criterion measures the political desire for corridor communities (in aggregate) to accommodate land use density and to promote urban form that is supportive of high capacity transit and meets the region's 2040 growth management objectives.
Data Sources	Planning director descriptions of stated aspirations for growth, values, and investments needed or barriers as submitted as part of Metro's Local Aspirations work, supplemented by interviews and results of the HCT/Local aspirations workshops.
Methodology	Metro staff first reviewed responses from local jurisdiction staff and determined that responses to three primary inquiries would be relevant to scoring Local Aspirations relative to High Capacity Transit: • Is a form of HCT desired by the local jurisdiction? • Does the jurisdiction have adopted population and employment growth aspirations for that would support HCT? • Does the local jurisdiction have plans to update land use policies to help support HCT? Based on the responses to each of these questions, a qualitative score was developed for each jurisdiction in the region. A weighted score for the corridor was then developed based on the length of that corridor within a particular jurisdiction. A summary of how each corridor was scored, as well as the jurisdiction scores, are provided after the summary table that is presented on the following page.
Ranking Methodology	The weighted score for each corridor was rounded up or down and scored based on the following scale: • Significant benefit = 3 • Moderate benefit= 2 • Slight benefit= 1 • Neutral= 0
Issues/ Limitations	All of the corridors would provide at least a slight benefit to the HCT system based on their future growth plans.

C2: Analysis Results (Local Aspirations)

Summary

Corridor	Corridor Description	Total Score	Assessment
8	Clackamas Town Center-Oregon City (I-205)	2	Moderate Benefit
9	Milwaukie-Oregon City (McLoughlin)	1	Slight Benefit
10	Portland-Gresham (Powell)	3	Significant Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	3	Significant Benefit
12	Hillsboro-Forest Grove	2	Moderate Benefit
13	Gresham-Troutdale	2	Moderate Benefit
13T	Troutdale-Damascus	2	Moderate Benefit
16	Clackamas Town Center-Damascus	1	Slight Benefit
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	3	Significant Benefit
17D	Tanasbourne	3	Significant Benefit
28	Clackamas Town Center-Washington Square	1	Slight Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	1	Slight Benefit
32	Beaverton-Hillsboro (TV Hwy)	2	Moderate Benefit
34	Beaverton-Wilsonville	2	Moderate Benefit
38S	Tualatin-Sherwood	1	Slight Benefit
43	Downtown Portland-St. John's-Yellow Line	2	Moderate Benefit
54	Troutdale-St. John's	1	Slight Benefit

Weighted Scores Detail

Jurisdiction/Corridor	Miles	% of Corridor	Jurisdiction Score	Weighted Score
Corridor 8				
Oregon City	1.7	35%	4	2.33
Gladstone	0.9	18%	0	
Clackamas County	2.3	48%	2	
Total Miles	**4.8**	**100%**		
Corridor 9				
Oregon City	0.8	15%	4	2.01
Gladstone	0.8	15%	0	
Clackamas County	3.6	70%	2	
Total Miles	**5.1**	**100%**		
Corridor 10				
Portland (Powell)	10.4	79%	4	4.00
Gresham	2.8	21%	4	
Total Miles	**13.2**	**100%**		
Corridor 11				
Portland (Barbur)	9.5	55%	4	3.33
Washington County	1.9	11%	0	
Sherwood	0.8	5%	2	
Tigard	3.8	22%	4	
Tualatin	1.1	7%	2	
Total Miles	**17.1**	**100%**		
Corridor 12				
Washington County	1.0	16%	0	2.41
Hillsboro	1.2	19%	4	
Forest Grove	2.2	35%	3	
Cornelius	1.9	30%	2	
Total Miles	**6.3**	**100%**		
Corridor 13				
Troutdale	2.4	54%	2	2.92
Gresham	2.1	46%	4	
Total Miles	**4.5**	**100%**		
Corridor 13D				
Damascus	5.1	38%	2	2.88

Jurisdiction/Corridor	Miles	% of Corridor	Jurisdiction Score	Weighted Score
Gresham	5.9	44%	4	
Troutdale	2.4	18%	2	
Total Miles	**13.5**	**100%**		
Corridor 16A				
Damascus	1.3	22%	2	2.00
Happy Valley	2.2	38%	2	
Clackamas County	2.3	40%	2	
Total Miles	**5.8**	**100%**		
Corridor 17				
Hillsboro	7.9	65%	4	4.00
Beaverton	4.2	35%	4	
Total Miles	**12.1**	**100%**		
Corridor 17D				
Washington County	0.2	5%	0	3.79
Hillsboro	4.0	95%	4	
Total Miles	**4.2**	**100%**		
Corridor 28				
Oregon City	1.9	9%	4	2.34
West Linn	3.9	19%	2	
Washington County	1.5	7%	0	
Clackamas County	6.2	30%	2	
Tualatin	2.2	11%	2	
Gladstone	0.9	4%	0	
Tigard	3.9	19%	4	
Beaverton	0.1	1%	4	
Total Miles	**20.5**	**100%**		
Corridor 29				
Lake Oswego	4.8	31%	2	2.33
Milwaukie	2.9	19%	1	
Washington County	0.0	0%	0	
Clackamas County	3.6	23%	2	
Tigard	3.9	25%	4	
Beaverton	0.1	1%	4	
Total Miles	**15.4**	**100%**		
Corridor 32A				

Jurisdiction/Corridor	Miles	% of Corridor	Jurisdiction Score	Weighted Score
Washington County	2.4	25%	0	3.00
Hillsboro	4.8	49%	4	
Beaverton	2.6	26%	4	
Total Miles	**9.7**	**100%**		
Corridor 34				
Washington County	2.8	18%	0	2.43
Clackamas County	1.6	10%	2	
Tualatin	3.1	20%	2	
Beaverton	3.1	20%	4	
Tigard	3.9	24%	4	
Wilsonville	1.4	9%	1	
Total Miles	**16.0**	**100%**		
Corridor 38S				
Washington County	0.2	3%	0	1.94
Sherwood	2.5	49%	2	
Tualatin	2.5	48%	2	
Total Miles	5.2	100%		
Corridor 43				
Portland (St. Johns)	9.3	100%	3	2.00
Total Miles	**9.3**	**100%**		
Corridor 54				
Portland (Columbia)	13.4	73%	2	2.23
Troutdale	0.8	5%	2	
Wood Village	0.7	4%	3	
Fairview	1.7	9%	2	
Gresham	1.8	10%	4	
Total Miles	**18.4**	**100%**		

Jurisdiction Details

Jurisdiction	Aspirations for HCT (1)	Attended Local Aspirations Workshop?	Pop/Emp (2)	Incentives (3)	Total Score	Notes
Beaverton	1	1	1	1	4	
Clackamas Co.	1	1	0	0	2	**
Cornelius	1	1	0	0	2	**
Damascus	1	1	0	0	2	**
Fairview	1	1	0	0	2	
Forest Grove	1	1	1	0	3	
Gladstone	0	0	0	0	0	*
Gresham	1	1	1	1	4	
Happy Valley	1	1	0	0	2	
Hillsboro	1	1	1	1	4	
King City	1	1	0	0	2	**
Lake Oswego	1	1	0	0	2	
Milwaukie	0	1	0	0	1	
Multnomah Co.	0	1	0	0	1	
Oregon City	1	1	1	1	4	
Portland (Barbur)	1	1	1	1	4	
Portland (Columbia)	0	1	0	1	2	
Portland (Powell)	1	1	1	1	4	
Portland (St. Johns)	0	1	1	1	3	
Sherwood	1	0	0	1	2	
Tigard	1	1	1	1	4	
Troutdale	0	1	0	1	2	
Tualatin	1	1	0	0	2	**
Washington Co.	0	0	0	0	0	*
West Linn	1	1	0	0	2	
Wilsonville	1	0	0	0	1	
Wood Village	1	1	0	1	3	

* No information received from jurisdiction

**Participated at workshops, but have not submitted Local Aspirations

(1) Aspirations for HCT: Is a form of HCT desired by the local jurisdiction?

(2) Population/Employment: Does the jurisdiction have aspirations for population growth to accommodate HCT?

(3) Incentives: Are there plans to update land use policies to help support HCT?

C3: Placemaking and Urban Form

Description	This is a quantitative assessment of potential for a corridor to foster strong transit-oriented urban form and placemaking. Given the cost and complexity of building new infrastructure and attracting neighborhood serving retail, corridors already in possession of the critical "building blocks" of vital urban neighborhoods including a favorable street and block pattern and urban living infrastructure (amenities) are favored. Factors evaluated include: • Street Density (street miles per corridor mile) • Block Density (blocks per corridor mile) • Urban Living Infrastructure (urban amenities per corridor mile)
Data Sources	This analysis was based on existing RLIS data including Streets and Tax Lots. ESRI Business Analyst data was used to generate the urban amenity point data.
Methodology	Using GIS, the following steps were conducted for all corridors: • Created half mile buffers around the corridors • Calculated area geometry of corridors in square miles • Derived "Blocks" by dissolving the borders of all contiguous Tax Lots • Spatially joined Streets, Blocks and Urban Amenities to half mile corridor buffers • Used spatial joins to sum Street lengths and number of Blocks and Urban Amenities within individual corridors • Normalized corridors using individual Corridor areas (square miles)
Ranking Methodology	Corridor were scored by totaling the amount of the elements critical to vital urban neighborhoods and using natural breaks into the following seven categories: • Significant potential = 3 • Moderate potential = 2 • Slight potential = 1 • Neutral = 0 • Slightly constrained = -1 • Moderately constrained = -2 • Significantly constrained = -3
Issues / Limitations	As is demonstrated by the quantitative differences between the "Inner Powell" and "Outer Powell" segments, placemaking potential can be impaired by the sometimes significant changes in urban form likely to occur over longer distances and geographies. Conversely, corridors in a more urban environment benefit from their limited geography in an urban setting. This methodology does not capture Greenfield development opportunities; the presence of a large Greenfield development site may be a strong motivator to invest in an HCT line that would support a large planned community.

C3: Analysis Results (Placemaking / Urban Form)

Corridor	Corridor Description	Urban Amenity Density	Block Density	Street Density	Total	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	6	26	43	75	0	Neutral
9	Milwaukie-Oregon City (McLoughlin)	11	30	50	91	2	Moderate Potential
10	Portland-Gresham (Powell)	15	45	62	122	3	Significant Potential
11	Portland-Sherwood (Barbur/Hwy 99)	12	30	52	94	2	Moderate Potential
12	Hillsboro-Forest Grove	8	26	37	71	0	Neutral
13	Gresham-Troutdale	8	17	39	64	-1	Slightly Constrained
13D	Troutdale-Damascus	5	10	27	42	-3	Significantly Constrained
16	Clackamas Town Center-Damascus	5	13	35	53	-2	Moderately Constrained
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	8	17	41	66	-1	Slightly Constrained
17D	Tanasbourne	6	9	39	54	-2	Moderately Constrained
28	Clackamas Town Center-Washington Square	8	19	37	64	-1	Slightly Constrained
29	Clackamas Town Center-Washington Square (RR ROW)	10	18	40	68	-1	Slightly Constrained
32	Beaverton-Hillsboro (TV Hwy)	12	24	45	81	1	Slight Potential
34	Beaverton-Wilsonville	11	13	33	57	-2	Moderately Constrained
38S	Tualatin-Sherwood	6	13	31	50	-2	Moderately Constrained
43	Downtown Portland-St. John's-Yellow Line	10	37	45	92	2	Moderate Potential
54	Troutdale-St. John's	5	31	44	80	1	Slight Potential

C4: Ridership Generators

Description	This criterion identifies the location of major transit demand generators that exist today within proposed HCT corridors. The intent of the criterion is to provide credit for corridors that would immediately service major trip generators, particularly those land uses that are likely to have higher than average levels of transit demand, such as colleges and hospitals.
Data Sources	Data includes GIS data (RLIS and ESRI), TriMet LIFT September 2008 top boarding locations, PDC's 2007 Largest Metro Employers report, Oregon Employment Department Employer Database, various websites of public agencies, such as Metro, PDC, Portland Business Alliance, and the City of Portland.
Methodology	Step 1: Develop a list of key ridership generators Seven types of ridership generators were identified, and the following data sources were used. • Hospitals and medical centers (data source: RLIS data) • Major retail sites (internet resources including a website of Portland Business Alliance) • Major social service centers (LIFT monthly pick-up counts provided by TriMet. The social services with more than 200 monthly pick-up counts were selected.) • Colleges and universities (RLIS data) • Major Employers, >1500 employees (PDC 2007 Largest Metro Employers and Oregon Employment Department employer database). • Sports and attraction sites: (ESRI data) • Major government sites: (websites of public agencies including Metro and City of Portland) Step 2: Assess access to key generators along each corridor After ridership generators were geocoded, GIS was used to count the number of ridership generators within a half mile from alignments was counted for each corridor.
Ranking Methodology	Corridors were ranked based on a number of ridership generators within a half-mile from the alignments. ● Significant potential = 3 (6-8 ridership generators) ● Moderate potential = 2 (3-5) ● Slight potential = 1 (1-2) ● Neutral = 0 (None)
Issues / Limitations	This analysis excluded employers with less than 1,500 employees due to a limited employer data source for the Metro region. This may result in excluding potential trip demand attractors, such as Adidas' headquarters, which has approximately 700 employees. This criterion evaluates current conditions and does not account for future changes in employment or institutional siting.

C4: Analysis Results (Ridership Generators)

Corridor	Corridor Description	Number of Trip Generators	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	0	0	Neutral
9	Milwaukie-Oregon City (McLoughlin)	0	0	Neutral
10	Portland-Gresham (Powell)	8	3	Significant benefit
11	Portland-Sherwood (Barbur/Hwy 99)	8	3	Significant benefit
12	Hillsboro-Forest Grove	4	2	Moderate benefit
13	Gresham-Troutdale	3	2	Moderate benefit
13D	Troutdale-Damascus	4	2	Moderate benefit
16	Clackamas Town Center-Damascus	1	1	Slight benefit
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	4	2	Moderate benefit
17D	Tanasbourne	1	1	Slight benefit
28	Clackamas Town Center-Washington Square	2	1	Slight benefit
29	Clackamas Town Center-Washington Square (RR ROW)	4	2	Moderate benefit
32	Beaverton-Hillsboro (TV Hwy)	4	2	Moderate benefit
34	Beaverton-Wilsonville	2	1	Slight benefit
38S	Tualatin-Sherwood	0	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	5	2	Moderate benefit
54	Troutdale-St. John's	3	2	Moderate benefit

C5: Support of Regional 2040 Growth Concept

Description	This is an assessment of the corridors' ability to serve 2040 land uses which are designated as important in the Regional Transportation Plan.
Data Sources	GIS shapefiles from Metro Regional Land Information System (RLIS).
Methodology	Analysis and Scoring Methodology Step 1: Intersection of corridors/segments with other land use types ● HCT routes intersecting polygons of the other land use design types (City Center, Regional Centers, Industrial Centers, etc.) from the RLIS Applied Concept areas shapefile were flagged in the attribute table. Additional segments of a route were also flagged. ● Since a buffer was not used, routes that clearly served a land use design type were also flagged by visual inspection. Step 2: Identification of Main Streets and Corridors ● HCT routes were clipped to main street and corridor polygons from the RLIS Applied Concept areas shapefile. ● Matching routes were flagged in the attribute table and the length of overlap in miles was calculated for each matching route segment. ● Since a buffer was not used, routes that clearly followed main streets or corridors were also flagged by visual inspection. ● Routes that only crossed main streets or corridors were manually eliminated. Step 3: Rank corridors into Significant benefit , Moderate benefit and Slight benefit categories ● Significant benefit = 8 - 10 ● Moderate benefit = 5 - 7 ● Slight benefit = 2 - 4 Step 3: Rank corridors and segments Each of the land use categories was given a point score based on their relative importance compared to other land use types: Screening Category Land Use Designation Points for Ranking City Center 3 Regional Center 3 Industrial Areas 3 Medium Employment Areas 2 Town Centers 2 Station Communities 2 Corridors 2 Main Streets 2 Low Inner Neighborhoods 1 Outer Neighborhoods 1

	For each potential HCT alignment, a total score was then calculated based on how many land use types were served by the alignment. The following breaks were then used to rank the alignments.
Ranking Methodology	• Significant benefit = 10 - 15 • Moderate benefit = 5 - 10 • Slight benefit = 0 - 5 • Neutral = n/a
Issues / Limitations	

C5: Analysis Results (Support Regional 2040 Growth Concept)

Corridor	Corridor Description	Support of the Regional 2040 Growth Concept (1)	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	**11**	**2**	Moderate Benefit
9	Milwaukie-Oregon City (McLoughlin)	**9**	**2**	Moderate Benefit
10	Portland-Gresham (Powell)	**14**	**3**	Significant Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	**16**	**3**	Significant Benefit
12	Hillsboro-Forest Grove	**14**	**1**	Slight Benefit
13	Gresham-Troutdale	**16**	**3**	Significant Benefit
13D	Troutdale-Damascus	**16**	**3**	Significant Benefit
16	Clackamas Town Center-Damascus	**12**	**2**	Moderate Benefit
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	**17**	**3**	Significant Benefit
17D	Tanasbourne	**13**	**2**	Moderate Benefit
28	Clackamas Town Center-Washington Square	**17**	**3**	Significant Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	**17**	**3**	Significant Benefit
32	Beaverton-Hillsboro (TV Hwy)	**17**	**3**	Significant Benefit
34	Beaverton-Wilsonville	**15**	**3**	Significant Benefit
38S	Tualatin-Sherwood	**8**	**1**	Slight Benefit
43	Downtown Portland-St. John's-Yellow Line	**15**	**3**	Significant Benefit
54	Troutdale-St. John's	**13**	**2**	Moderate Benefit

(1) Score represents a total based on number of primary component (3 pts each), Secondary components (2 pts each), and other urban components (1 pt each)

C6: Integration with Regional Transit System

Description	This criterion provides a qualitative assessment of intermodal connectivity and other transit system needs was conducted for all corridors. This assessment evaluates the ability for the line to effectively integrate with the existing transit system and to make valuable transit connections that match regional travel demands.
Data Sources	This was a qualitative evaluation conducted by Metro and TriMet operations and planning staff, no quantifiable data sources were used.
Methodology	As with the screening process, a group of TriMet, Metro and Consultant Team planners were assembled to discuss and concur on scoring. Nine planners were present to evaluate each of the corridors. Prior to evaluating the corridors, the group developed a set of criteria from which to systematically evaluate the corridors: • Does the corridor make a new system connection? • Is the corridor compatible with the existing HCT system? • Does the corridor further the completion of the HCT system? • Does the corridor expand the coverage of the HCT system and does this further the goals of the 2040 Growth Concept? • Does the new corridor contribute to capacity relief of other transit services in the region? • Does the new corridor improve routing choice in the region? • Does the new corridor contribute to regional mobility?
Ranking Methodology	The corridors were ranked by having each member of the group consider the criteria above and provide a single "score" for the corridor using the following scale: • Significant benefit = +3 • Moderate benefit = +2 • Slight benefit = +1 • Neutral = 0 • Slightly adverse = -1 • Moderately adverse = -2 • Significantly adverse = -3 A total score was then calculated for the group to arrive at an assessment for the corridor.
Issues / Limitations	Group members noted that nearly all of the corridors would provide at least a neutral or slight benefit to regional intermodal connectivity and that none of the corridors would have an adverse impact.

C6: Analysis Results (Transit Integration)

Corridor	corridor description	Transit Integration Score	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	18	2	Moderate benefit
9	Milwaukie-Oregon City (McLoughlin)	23	3	Significant benefit
10	Portland-Gresham (Powell)	24	3	Significant benefit
11	Portland-Sherwood (Barbur/Hwy 99)	27	3	Significant benefit
12	Hillsboro-Forest Grove	12	1	Slight benefit
13	Gresham-Troutdale	12	1	Slight benefit
13D	Troutdale-Damascus	6	1	Slight benefit
16	Clackamas Town Center-Damascus	9	1	Slight benefit
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	12	1	Slight benefit
17D	Tanasbourne	12	1	Slight benefit
28	Clackamas Town Center-Washington Square	11	1	Slight benefit
29	Clackamas Town Center-Washington Square (RR ROW)	22	2	Moderate benefit
32	Beaverton-Hillsboro (TV Hwy)	11	1	Slight benefit
34	Beaverton-Wilsonville	14	2	Moderate benefit
38S	Tualatin-Sherwood	12	1	Neutral
43	Downtown Portland-St. John's-Yellow Line	10	1	Slight benefit
54	Troutdale-St. John's	6	1	Slight benefit

C7: Integration with Other Road Uses

This criterion was intended to assess the impact of HCT on freight corridors. It was decided that this evaluation should be deferred to the Mobility Corridor work being conducted by Metro to assess this impact. This work is underway and will be incorporated for use by the HCT Sub-Committee and other policy makers in April 2009.

C8: Congestion Avoidance

Description	This criterion provides a quantitative assessment of the ability of high capacity transit to bypass auto congestion that would affect non-HCT transit on parallel routes in each corridor.
Data Sources	The analysis used the Metro travel demand forecasting model to measure congested lane miles of streets that parallel each HCT corridor.
Methodology	GIS was used to identify the travel demand model auto links that most closely paralleled each high capacity transit corridor. Auto links were chosen that either support bus routes today or would be the most logical route for buses compared to each HCT line modeled. From the demand model assignment results, congested links were identified. Links were considered congested if they met or exceeded a volume-to-capacity ratio of 0.95. The lengths of congested links (in miles) were then summed for each corridor.
Ranking Methodology	Natural breaks in the data were then used to rank the corridors: • Significant benefit = More than 25 miles • Moderate benefit = 12 – 25 miles • Slight benefit = 7-12 miles • Neutral = 0-7 miles
Issues / Limitations	

C8: Analysis Results (Congestion Avoidance)

Corridor	Corridor Description	Corridor Congestion Lane Miles Bypassed	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	12	1	Slight Benefit
9	Milwaukie-Oregon City (McLoughlin)	9	1	Slight Benefit
10	Portland-Gresham (Powell)	17	2	Moderate Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	25	2	Moderate Benefit
12	Hillsboro-Forest Grove	5	0	Neutral
13	Gresham-Troutdale	1	0	Neutral
13D	Troutdale-Damascus	9	1	Slight Benefit
16	Clackamas Town Center-Damascus	7	0	Neutral
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	18	2	Moderate Benefit
17D	Tanasbourne	1	0	Neutral
28	Clackamas Town Center-Washington Square	49	3	Significant Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	61	3	Significant Benefit
32	Beaverton-Hillsboro (TV Hwy)	12	1	Slight Benefit
34	Beaverton-Wilsonville	41	3	Significant Benefit
38S	Tualatin-Sherwood	8	1	Slight Benefit
43	Downtown Portland-St. John's-Yellow Line	6	0	Neutral
54	Troutdale-St. John's	4	0	Neutral

C9: Equity Benefit

Description	This criterion provides a qualitative assessment of potential for a corridor to serve communities of concern as identified in Metro's report on Environmental Justice in Transportation Planning. Corridors that serve census block groups identified by Metro as having high concentrations of three communities of concern would be favored: • Low-income or very low income • Minority and/or Hispanic populations • Disabled and senior populations
Data Sources	This analysis was based on the shapefiles previously created for Metro's Environmental Justice planning process. The GIS shapefiles contained census block groups with significant population of various racial groups, seniors, people with disabilities and low income populations. Significant population is defined as 2.5 times higher than the regional average. For this analysis, the shapefiles were grouped into three data categories: • Minorities, including Hispanics, Asian, African-American, Hawaiian / and Pacific Islander • Low income and very low income populations • Seniors aged 65 year and older and people with disabilities
Methodology	GIS was used to calculate the total area of census block groups that overlap a half mile buffer of all corridors. The following steps were conducted for all corridors: • Create a half mile buffer around the corridors • Clip communities of concern census block groups using a half mile buffer • Calculate the area of the clipped census block groups • Sum the areas to calculate a total area of census block groups with significant population of communities of concern for each corridor and segment • Split corridors that have multiple segments
Ranking Methodology	Natural breaks in the data were then identified and corridors were scored based on the following values: • Significant benefit = 57-81% • Moderate benefit = 31-56% • Slight benefit = 9-30% • Neutral = 0-8%
Issues / Limitations	Only 2000 Census data is available for this analysis. It is very difficult to project future concentrations of population groups. Since no projections of this type exist this analysis has limited value in projecting the value of an HCT investment made in 15 or 20 years time. It's value is more relevant for short-term priorities.

C9: Analysis Results (Equity Benefit)

		Minorities (2.5x Average [1])		Seniors + Disabled (2.5x Average [1])		Low-income (2.5x Average [1])		All Combined			
corridor	corridor description	Area (Acres)	Area % of Total	Area (Acres)	Area % of Total	Area (Acres)	Area % of Total	Area (Acres)	Area % of Total	Quantitative Measure [2]	Assessment
8	Clackamas Town Center-Oregon City (I-205)	-	0%	293	8%	619	17%	912	26%	1	Slight benefit
9	Milwaukie-Oregon City (McLoughlin)	-	0%	107	3%	-	0%	107	3%	0	Neutral
10	Portland-Gresham (Powell)	2,629	29%	422	5%	755	8%	2,766	30%	1	Slight benefit
11	Portland-Sherwood (Barbur/Hwy 99)	1,713	18%	322	3%	168	2%	2,114	22%	1	Slight benefit
12	Hillsboro-Forest Grove	3,675	81%	-	0%	882	19%	3,675	81%	3	Significant benefit
13	Gresham-Troutdale	625	19%	41	1%	437	13%	666	20%	1	Slight benefit
13D	Troutdale-Damascus	667	8%	41	0%	437	5%	708	8%	0	Neutral
16	Clackamas Town Center-Damascus	723	17%	-	0%	129	3%	852	20%	1	Slight benefit
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	3,202	39%	-	0%	268	3%	3,202	39%	2	Moderate benefit
17D	Tanasbourne	849	27%	-	0%	-	0%	849	27%	1	Slight benefit
28	Clackamas Town Center-Washington Square	2,993	22%	304	2%	619	5%	3,916	29%	1	Slight benefit
29	Clackamas Town Center-Washington Square (RR ROW)	2,078	20%	367	4%	337	3%	2,782	27%	1	Slight benefit
32	Beaverton-Hillsboro (TV Hwy)	3,771	56%	64	1%	473	7%	3,771	56%	2	Moderate benefit
34	Beaverton-Wilsonville	3,764	38%	74	1%	70	1%	3,774	38%	2	Moderate benefit
38S	Tualatin-Sherwood	882	23%	-	0%	-	0%	882	23%	1	Slight benefit
43	Downtown Portland-St. John's-Yellow Line	5,154	80%	99	1%	693	11%	5,175	80%	3	Significant benefit
54	Troutdale-St. John's	8,288	68%	159	1%	775	6%	8,301	68%	3	Significant benefit

(1) For each category, area represents census block groups with a "significant" population, defined as 2.5 times higher than the regional average

(2) A value of "0" indicates that the presence of minorities, seniors & disabled, and low-income population is not significantly greater than the regional average

C10: Health (Promote Physical Activity)

Description	This criterion provides a qualitative assessment of the expected health benefits from increased physical activity due to greater pedestrian access to transit. The assessment was based on walking accessibility and trail connectivity.
Data Sources	Walking Accessibility: The Metro regional travel demand forecasting model was used to project daily boardings for each corridor where the primary access to transit mode was walking. Trail Connectivity: GIS shapefiles from Metro Regional Land Information System (RLIS) were used to compare corridors, including regional trails, regional bike routes, and slope. A pedestrian density was calculated based on intersection density and sidewalks. The assumptions being that stations with excellent trail connectivity will encourage high levels of bicycle and walk access to the HCT line.
Methodology	Walking Accessibility: Walking accessibility was based on the projected daily walk boardings along the corridor. Direct walk-to-HCT trips and transfer-to/from-HCT trips were considered to have a walk at both the boarding and alighting ends, with the assumption that the majority of HCT transfers from buses initiated their trip with a walk to the bus. For park and ride trips, a walk on only one end of the trip was assumed. These walk trips were summed to create the total walk trips per HCT corridor. Trail Connectivity: Trail connectivity was based on existing and future bicycle and pedestrian connections in a corridor, and the potential for an HCT corridor to serve those connections. The following eight criteria in four categories were used to evaluate each corridor: • Trail connectivity (existing and future trails) o number of trail intersections per mile of segment o percentage of parallel facilities within 1/2 mile area of segment • On-street bicycle connectivity (existing and future bike lanes, low-volume streets) o number of bike route intersections per mile of segment o percentage of parallel facilities within 1/2 mile area of segment • Pedestrian density (existing sidewalks and intersection density) o percentage of line segment in a high pedestrian density area o percentage of high pedestrian density area within total 1/2 mile buffer area • Slope (areas with a slope greater than 10%) o percentage of line segment in areas of high slope (greater than 10% slope) percentage of high slope areas (greater than 10% slope) The trail connectivity analysis was performed on both the corridor line segments and an area buffer of 1/2 mile around the corridor line. The following steps were used to calculate trail and on-street connectivity: • Created half-mile buffer around corridors • Overlayed evaluation criteria (RLIS trails and RLIS bicycle routes) • Measured the length of parallel bicycle facilities within buffer • Divided by length of corridor segment (equals percentage of parallel facilities) • Intersected corridor segment with evaluation criteria (RLIS trails and RLIS bicycle routes)

<table>
<tr><td></td><td>

Summed the number of intersecting line segments (RLIS trails and RLIS bicycle routes)
Divided by length of corridor segment (equals number of intersections per mile)

The following steps were used to calculate pedestrian density and slope:

Measured total distance of line segment
Intersected line segment with evaluation criteria (pedestrian density, slope)
Divided intersected line length by total length (equals percentage of line segment)
Created half-mile buffer around corridors
Calculated area of corridor buffer in square miles
Intersected with evaluation criteria (pedestrian density, slope)
Divided intersected area by total buffer area (equals percentage of criteria in buffer area)

</td></tr>
<tr><td>Ranking Methodology</td><td>Both walking accessibility (total daily boardings) and trail connectivity (total of all indicators) were scored using the following method. The ranges were determining using natural breaks. An average of both scores was used for the overall health impact score.
<table>
<tr><th>Assessment</th><th>Quantitative Measure</th><th>Walking Accessibility</th><th>Trail Connectivity</th></tr>
<tr><td>Significant benefit</td><td>+3</td><td>25,000.1+</td><td>14.1+</td></tr>
<tr><td>Moderate benefit</td><td>+2</td><td>16,000.1 – 24,000</td><td>12.1 – 14</td></tr>
<tr><td>Slight benefit</td><td>+1</td><td>9,000.1 – 16,000</td><td>6.1 – 12</td></tr>
<tr><td>Neutral</td><td>0</td><td>5,000 – 9000</td><td>4.0 – 6</td></tr>
</table>
</td></tr>
<tr><td>Issues Limitations</td><td>This analysis considered the geographic location of bicycle and pedestrian facilities. A qualitative factor accounting for attractiveness of a given trail or bicycle facility could provide better characterization of which facilities are more frequently used. While this analysis normalized each criterion along the length of the entire corridor, distribution of bicycle and pedestrian facilities greatly differs along the length of a corridor. Station location is also an important consideration for connecting to a facility. This analysis did consider future trail connections based on regional trails plan; some of those trails may not be constructed in the future. Areas with a high connectivity rating based on the existence of future trail connections will have a lower connectivity if those trails and/or bicycle facilities are not completed.</td></tr>
</table>

C10: Analysis Results (Health)

		Walking Accessibility		Trail Connectivity										Overall	
Corridor	Corridor Description	Corridor Daily Walk Boardings	Walking Score	Parallel Trails (% rank)	Trail Intersections/mile (rank)	Parallel Bike Routes (rank)	Bike Route Intersections/mile (rank)	Ped Network Density (Length) (% rank)	Ped Network Density (Area) (rank)	Slope (Line) % > 10% (rank)	Slope (Area) % > 10% (rank)	Sum Total	Trail Score	Quantitative Measure (Avg. of Walking and Trail Scores)	Overall Health Assessment
8	Clackamas Town Center-Oregon City (I-205)	12,000	1	3	2	3	2	2	0	-1	-1	**10**	1	1	Slight Benefit
9	Milwaukie-Oregon City (McLoughlin)	14,000	1	3	2	3	2	1	1	0	-1	**11**	1	1	Slight Benefit
10	Portland-Gresham (Powell)	25,000	2	1	1	2	2	2	3	3	0	**14**	2	2	Moderate Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	33,000	3	1	2	3	1	1	1	-2	-2	**5**	0	2	Moderate Benefit
12	Hillsboro-Forest Grove	7,000	0	2	2	2	1	1	2	2	2	**14**	2	1	Slight Benefit
13	Gresham-Troutdale	10,000	1	2	2	3	3	3	3	0	1	**17**	3	2	Moderate Benefit
13D	Troutdale-Damascus	16,000	1	1	1	1	2	1	1	0	-1	**6**	0	1	Slight Benefit
16	Clackamas Town Center-Damascus	5,000	0	0	2	2	2	1	1	0	-3	**5**	0	0	Neutral
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	21,000	2	0	2	2	2	1	2	1	2	**12**	1	2	Moderate Benefit
17D	Tanasbourne	8,000	0	2	2	1	1	2	2	1	3	**14**	2	1	Slight Benefit
28	Clackamas Town Center-Washington Square)	25,000	2	2	2	2	1	0	1	-2	-2	**4**	0	1	Slight Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	21,000	2	3	2	0	1	1	0	-2	-1	**4**	0	1	Slight Benefit
32	Beaverton-Hillsboro (TV Hwy)	18,000	2	3	1	2	1	2	2	3	3	**17**	3	3	Significant Benefit
34	Beaverton-Wilsonville	29,000	3	3	2	2	1	1	1	1	2	**13**	2	3	Significant Benefit
38S	Tualatin-Sherwood	7,000	0	2	2	2	1	1	1	2	1	**12**	1	1	Slight Benefit
43	Downtown Portland-St. John's-Yellow Line	9,000	0	3	2	2	1	1	2	-1	0	**10**	1	1	Slight Benefit
54	Troutdale-St. John's	10,000	1	3	1	2	1	1	2	1	2	**13**	2	2	Moderate Benefit

C11: Safety

This criterion was adopted to assess personal safety or users on the system and those using facilities that support system operations (i.e., streets and stations). At this stage of planning it is not possible to understand design details needed to make this assessment. Information on best practices for HCT safety (design) and security will be provided in a separate white paper.

C12: Housing + Transportation Affordability Benefit

Description	This criterion provides a qualitative assessment of each corridor's potential to serve low-income populations with high percentages of household income used for transportation and housing costs.
Data Sources	This analysis used GIS shape files of the HCT corridors and of census tracts, and used annualized housing and transportation cost data estimated as a post processor from Metro's MetroScope model demographic and transportation output. The 2000 Census is the basis for this information.
Methodology	GIS was used to measure the intersection of each corridor with census tract. The number of households with high transportation and housing cost burdens in each census tract accessed by the corridor was summed. Populations with high cost burdens were defined as renter households with annual incomes of $12,500, or less, that spent 50% or more of income on transportation and housing.
Ranking Methodology	The number of households with high transportation and housing cost burdens by corridor were ranked by using natural breaks in the data: • Significant Benefit = 3,732 – 5,859 • Moderate Benefit = 1,573 – 3,731 • Slight Benefit = 724 – 1,572 • Neutral = 0 - 723
Issues / Limitations	The housing and transportation cost data are available only at the census tract level of geography, which divides the region into 425 zones.

C12: Analysis Results (Housing + Transportation Affordability Benefit)

Corridor	Corridor Description	Household Burden	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	1,040	1	Slight Benefit
9	Milwaukie-Oregon City (McLoughlin)	1,372	1	Slight Benefit
10	Portland-Gresham (Powell)	5,859	3	Significant Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	3,731	2	Moderate Benefit
12	Hillsboro-Forest Grove	1,405	1	Slight Benefit
13	Gresham-Troutdale	1,089	1	Slight Benefit
13D	Troutdale-Damascus	567	0	Neutral
16	Clackamas Town Center-Damascus	367	0	Neutral
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	917	1	Slight Benefit
17D	Tanasbourne	604	0	Neutral
28	Clackamas Town Center-Washington Square	3,245	2	Moderate Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	2,916	2	Moderate Benefit
32	Beaverton-Hillsboro (TV Hwy)	2,604	2	Moderate Benefit
34	Beaverton-Wilsonville	2,930	2	Moderate Benefit
38S	Tualatin-Sherwood	723	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	2,370	2	Moderate Benefit
54	Troutdale-St. John's	2,877	2	Moderate Benefit

(1) Number of households with high transportation and housing cost burdens in census tracts accessed by the corridor

C13: Transportation Efficiency – Users

C14: Transportation Efficiency – Corridor

Description	This criterion provides a quantitative assessment of the travel time benefit accrued by future high capacity transit riders in each corridor.
Data Sources	The analysis used the Metro travel demand forecasting model to measure the aggregate and average in-vehicle travel time savings of riders of modeled HCT lines compared to in-vehicle times of transit routes between their origins and destinations without HCT lines.
Methodology	For each HCT corridor, the transportation analysis zones (TAZ) with direct access to the modeled HCT line were identified and grouped. The pm peak-period, in-vehicle transit travel time was calculated for each modeled transit trip between the identified zones and all other zones in the network. The travel times for these same zone pairs were also calculated under No-Build conditions. Travel time difference with HCT was calculated by subtracting the Build travel times from the No-Build travel times for each origin-destination pair. The number of transit riders traveling between each zone pair was multiplied by the travel time change to obtain an aggregate total transit person travel time change. These data were summed for each corridor TAZ group, and divided by the sum of all transit riders between the zone pairs to create the average travel time savings per rider of HCT in the corridor.
Ranking Methodology	The data was then categorized into the following categories based on natural breaks in the data. Peak period average time savings per rider: • Significant Benefit = more than 6.9 minutes • Moderate Benefit = 4.2 – 6.8 minutes • Slight Benefit = 2.8 – 4.1 minutes • Neutral = 0- 2.7minutes Aggregate transit person travel time change: • Significant Benefit = More than 35,001 minutes • Moderate Benefit = 20,001 – 35,000 minutes • Slight Benefit = 11,001 – 20,000 minutes • Neutral = 0 – 11,000 minutes
Issues / Limitations	

C13/C14: Analysis Results (Transportation Efficiency – Users & System)

		Peak Period Average Travel Time Benefit per Rider			Peak Period Aggregate Person Travel Time Benefit		
Corridor	**Corridor Description**	**Benefit Per Rider**	**Quantitative Measure**	**Assessment**	**Aggregate Benefit**	**Quantitative Measure**	**Assessment**
8	Clackamas Town Center-Oregon City (I-205)	3.3	1	Slight Benefit	15,583	1	Slight Benefit
9	Milwaukie-Oregon City (McLoughlin)	3.3	1	Slight Benefit	10,179	0	Neutral
10	Portland-Gresham (Powell)	2.3	0	Neutral	23,105	2	Moderate Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	5.8	2	Moderate Benefit	67,864	3	Significant Benefit
12	Hillsboro-Forest Grove	6.3	2	Moderate Benefit	14,881	1	Slight Benefit
13	Gresham-Troutdale	4.1	1	Slight Benefit	12,400	1	Slight Benefit
13D	Troutdale-Damascus	3.4	1	Slight Benefit	16,748	1	Slight Benefit
16	Clackamas Town Center-Damascus	3.3	1	Slight Benefit	12,359	1	Slight Benefit
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	1.7	0	Neutral	18,196	1	Slight Benefit
17D	Tanasbourne	2.1	0	Neutral	7,953	0	Neutral
28	Clackamas Town Center-Washington Square	6.8	2	Moderate Benefit	57,781	3	Significant Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	8.3	3	Significant Benefit	62,031	3	Significant Benefit
32	Beaverton-Hillsboro (TV Hwy)	2.9	1	Slight Benefit	19,245	1	Slight Benefit
34	Beaverton-Wilsonville	3.5	1	Slight Benefit	33,753	2	Moderate Benefit
38S	Tualatin-Sherwood	2.7	0	Neutral	2,953	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	2.3	0	Neutral	12,666	1	Slight Benefit
54	Troutdale-St. John's	7.6	3	Significant Benefit	25,193	2	Moderate Benefit

EN1: Reduction in Emissions & Disturbance

Description	This criterion provides assessment of each HCT corridor's contribution to emissions reduction.
Data Sources	The analysis used the Metro travel demand forecasting model (year 2035) to measure the total new transit person miles traveled resulting from new HCT service in each corridor. This measure acts as surrogate for system-wide vehicle miles traveled (VMT) reduction (see limitations section). For this analysis, motor vehicle VMT is the sole indicator of emissions and assumes that at a system level, VMT is a good surrogate for a number of important emissions categories including Carbon Dioxide (CO2), Nitrogen Oxide (NOx) and Sulfur Dioxide (SOx)
Methodology	For each HCT corridor, the transportation analysis zones (TAZ) with direct access to the modeled HCT line were identified and grouped. For both the Build and the No-Build conditions, the distance and number of all modeled transit trips between the identified zones and all other zones in the network were calculated. The number of trips originating from or destined to each TAZ group under the No-Build condition was subtracted from the number of trips in the Build condition to indicate the number of new transit trips generated by HCT in each corridor. The number of new trips was multiplied by the distance for each trip (from the model's trip distance matrix) to create the number of miles traveled by new transit riders in the corridor. This value was considered a surrogate for the auto VMT reduction caused by each corridor, with the assumption that the new transit riders under the Build condition would have driven between their origins and destinations under the No-Build condition.
Ranking Methodology	VMT reduction was measured for all corridors and ranked using natural breaks in the data: • Significant benefit = More than 80,000 • Moderate benefit = 50,001 – 80,000 • Slight benefit = 31,001 – 50,000 • Neutral = 0 – 31,000
Issues / Limitations	System auto vehicle miles traveled (VMT) is a standard output of the travel demand model assignment and is customarily used to measure emissions effects. Because of the many transit lines modeled in this study, however, it was necessary to model several lines simultaneously. For each model run, a combination of HCT corridors that were far apart geographically was chosen to minimize the effect the lines would have on each other. With multiple lines per model run, it was not possible to calculate each corridor's share of the system VMT reduction, so the above methodology was created to indicate each corridor's isolated effect on emissions.

EN1: Analysis Results (Emissions & Disturbance)

Corridor	Corridor Description	Corridor VMT Reduction Indicator	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	38,630	1	Slight Benefit
9	Milwaukie-Oregon City (McLoughlin)	29,676	0	Neutral
10	Portland-Gresham (Powell)	37,184	1	Slight Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	79,055	2	Moderate Benefit
12	Hillsboro-Forest Grove	34,239	1	Slight Benefit
13	Gresham-Troutdale	30,300	0	Neutral
13D	Troutdale-Damascus	102,249	3	Significant Benefit
16	Clackamas Town Center-Damascus	20,240	0	Neutral
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	65,533	2	Moderate Benefit
17D	Tanasbourne	38,587	1	Slight Benefit
28	Clackamas Town Center-Washington Square	137,323	3	Significant Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	101,603	3	Significant Benefit
32	Beaverton-Hillsboro (TV Hwy)	49,090	1	Slight Benefit
34	Beaverton-Wilsonville	130,682	3	Significant Benefit
38S	Tualatin-Sherwood	16,486	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	28,229	0	Neutral
54	Troutdale-St. John's	41,944	1	Slight Benefit

EN2: Risk of Natural Resource Disturbance

Description	This is a qualitative assessment of the potential environmental risk for each corridor. Corridors which present a risk to valuable habitat and conservation areas are disfavored.
Data Sources	This analysis was based on existing shapefiles identifying sensitive habitat areas and environmental protection zones. Data Source — Qualifiers City of Portland Environmental Zone — None (both conservation and preservation zones) RLIS - Rivers — None RLIS - National Wetlands Inventory — System = Riverine, Palustrine, or Lacustrine RLIS - Exception Land — Zone_Class = FF (Agriculture or Forestry) RLIS - Resource Land — Zone_Class = FF (Agriculture or Forestry)
Methodology	GIS was used to calculate the length of each corridor within a ¼ mile buffer around sensitive habitat areas and environmental protection zones. The following steps were conducted for each type of area or feature class: • To determine the extent of overlap between HCT corridors and each feature class: o A ¼ mile buffer was created around each feature class o HCT corridors were clipped to the resulting buffer. The result was the segments of the corridors overlapping the feature class o The length in miles of the overlapping segments was calculated • To determine the total extent of overlap between HCT corridors and all areas: o A union of all the buffers around the above feature classes was created, representing the overall area of environmental constraint o HCT corridors were clipped to the union of the buffers. The result was the segments of the corridors overlapping one or more feature classes o The total length of overlap in miles was calculated
Ranking Methodology	Corridors were evaluated using both the length and percentage of the corridor within natural resources, conservation, and/or preservation zones. Quantitative scores were based on natural breaks; the lowest score was taken. "Significantly adverse" indicates significant potential environmental risk while "neutral" indicates minimal potential risk. Assessment — Quantitative Measure — Length — % of Corridor Significant benefit — +3 — - — - Moderate benefit — +2 — - — - Slight benefit — +1 — - — - Neutral — 0 — 0.14 – 1.07 Miles — 0.0 – 9.0% Slightly adverse — -1 — 1.08 – 3.47 Miles — 9.1 – 58.7% Moderately adverse — -2 — 3.48 – 7.07 Miles — 58.8 – 80.4% Significantly adverse — -3 — 7.08 – 14.79 Miles — 80.5 – 100.0%
Issues / Limitations	

EN2: Analysis Results (Risk of Natural Resource Disturbance)

Corridor	Corridor Description	Length of Potential Risk (miles)					Total Length [1]	Total %	Quantitative Measure [2]	Assessment
		City of Portland Environmental Zone	Rivers	Wetlands	Exception Farm & Forest Land	Resource Farm & Forest Land				
8	Clackamas Town Center-Oregon City (I-205)	0.0	2.6	2.6	0.0	0.9	2.8	58.7%	-1	Slightly Adverse
9	Milwaukie-Oregon City (McLoughlin)	0.0	1.1	2.3	0.0	0.0	2.3	45.0%	-1	Slightly Adverse
10	Portland-Gresham (Powell)	2.0	2.8	2.3	0.0	0.0	4.8	35.2%	-2	Moderately Adverse
11	Portland-Sherwood (Barbur/Hwy 99)	6.9	1.3	3.1	0.6	2.0	11.3	78.6%	-3	Significantly Adverse
12	Hillsboro-Forest Grove	0.0	0.0	3.3	2.0	2.0	3.4	54.3%	-1	Slightly Adverse
13	Gresham-Troutdale	0.0	0.6	2.2	0.0	0.0	2.2	48.5%	-1	Slightly Adverse
13D	Troutdale-Damascus	0.0	2.6	5.7	0.0	1.0	7.8	61.6%	-3	Significantly Adverse
16	Clackamas Town Center-Damascus	0.0	0.0	0.5	0.0	0.0	0.5	9.0%	0	Neutral
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	0.0	0.0	5.8	0.0	0.0	5.8	47.7%	-2	Moderately Adverse
17D	Tanasbourne	0.0	0.0	1.6	0.1	0.0	1.7	41.1%	-1	Slightly Adverse
28	Clackamas Town Center-Washington Square	0.0	7.5	14.4	0.4	1.7	14.6	71.1%	-3	Significantly Adverse
29	Clackamas Town Center-Washington Square (RR ROW)	0.0	5.8	10.5	0.0	0.0	10.5	68.1%	-3	Significantly Adverse
32	Beaverton-Hillsboro (TV Hwy)	0.0	0.0	3.2	0.0	1.5	4.7	48.7%	-2	Moderately Adverse
34	Beaverton-Wilsonville	0.0	1.0	10.8	0.6	1.1	10.8	74.2%	-3	Significantly Adverse
38S	Tualatin-Sherwood	0.0	0.9	6.7	0.0	1.0	7.1	79.9%	-2	Moderately Adverse
43	Downtown Portland-St. John's-Yellow Line	6.0	6.3	7.2	0.0	0.0	9.3	100.0%	-3	Significantly Adverse
54	Troutdale-St. John's	9.5	5.3	12.6	0.0	0.0	14.8	80.4%	-3	Significantly Adverse

1. Due to the overlap between features, the total length may not equal the sum of individual features
2. Quantitative measure is based on natural breaks for both total length and % of corridor; the lowest of the two scores was taken

EN3: Protection of 4(f) Resources

This criterion is intended to assess the risk of encountering school and park lands in aligning high capacity corridors. Since typical practice is to avoid 4(f) resources when aligning a major transit investment, no detailed evaluation was conducted at this point. A separate white paper evaluation of the issue will be developed as part of the Regional HCT System Plan process.

EC1: Transportation Efficiency (Operator)

EC2: Transportation Efficiency (User)

Description	These two criteria utilize D4 (Ridership), D3 (Operating Costs) and D1/D2 (Capital Costs) to calculate two important indicators of transportation efficiency: • Annualized operating cost per passenger • Annualized operating and capital cost per passenger
Data Sources Methodology	See D1/D2 (Capital Costs), D3 (Operating Costs) and D4 (Ridership) for detail on data sources and methodology.
Ranking Methodology	Using the natural breaks method, the results of these two criteria were categorized as follows: Transportation Efficiency – Operator (Operating Cost per Passenger) • Neutral = $0.69 - $0.91 • Slightly Adverse = $0.91 - $1.22 • Moderately Adverse = $1.22 - $1.74 • Significantly Adverse = $1.74 – $3.80 Transportation Efficiency – User (Operating and Capital Cost per Passenger) • Neutral = $0 - $1.90 • Slightly Adverse = $1.90 - $18.19 • Moderately Adverse = $18.19 - $27.14 • Significantly Adverse = $27.14 – $42.76
Issues / Limitations	

EC1: Analysis Results (Transportation Efficiency – Operator)

corridor	corridor description	Annual O&M Costs	Corridor Daily Boardings	Corridor Annual Boardings (1)	Operating Cost per Rider	quantitative measure	assessment
8	Clackamas Town Center-Oregon City (I-205)	$4,100,000	15,000	4,919,000	$0.83	0	Neutral
9	Milwaukie-Oregon City (McLoughlin)	$4,400,000	16,000	5,246,000	$0.84	0	Neutral
10	Portland-Gresham (Powell)	$11,200,000	28,000	9,181,000	$1.22	-1	Slightly Adverse
11	Portland-Sherwood (Barbur/Hwy 99)	$10,400,000	38,000	12,460,000	$0.83	0	Neutral
12	Hillsboro-Forest Grove	$4,200,000	8,000	2,623,000	$1.60	-2	Moderately Adverse
13	Gresham-Troutdale	$2,700,000	12,000	3,935,000	$0.69	0	Neutral
13D	Troutdale-Damascus	$8,500,000	19,000	6,230,000	$1.36	-2	Moderately Adverse
16	Clackamas Town Center-Damascus	$4,000,000	7,000	2,295,000	$1.74	-2	Moderately Adverse
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	$8,700,000	22,000	7,214,000	$1.21	-1	Slightly Adverse
17D	Tanasbourne	$3,000,000	10,000	3,279,000	$0.91	0	Neutral
28	Clackamas Town Center-Washington Square	$14,300,000	30,000	9,837,000	$1.45	-2	Moderately Adverse
29	Clackamas Town Center-Washington Square (RR ROW)	$11,600,000	25,000	8,198,000	$1.41	-2	Moderately Adverse
32	Beaverton-Hillsboro (TV Hwy)	$6,500,000	19,000	6,230,000	$1.04	-1	Slightly Adverse
34	Beaverton-Wilsonville	$9,600,000	35,000	11,477,000	$0.84	0	Neutral
38S	Tualatin-Sherwood	$2,600,000	8,000	2,623,000	$0.99	-1	Slightly Adverse
43	Downtown Portland-St. John's-Yellow Line	$9,100,000	10,000	3,279,000	$2.78	-3	Significantly Adverse
54	Troutdale-St. John's	$13,700,000	11,000	3,607,000	$3.80	-3	Significantly Adverse

(1) Corridor annual boardings estimated by calculating the daily boarding value by 327.9 days.

EC2: Analysis Results (Transportation Efficiency – User)

corridor	corridor description	Annual O&M Costs	Corridor Daily Boardings	Corridor Annual Boardings (1)	Total Capital Cost - Existing ROW to Extent Possible ($M)	Annualized (2) Capital Cost - Existing ROW	Annualized Capital and Operating Cost per Rider	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	$4,100,000	15,400	5,050,000	$649	$48,645,000	$10.44	-1	Slightly Adverse
9	Milwaukie-Oregon City (McLoughlin)	$4,400,000	15,900	5,214,000	$683	$51,255,000	$10.67	-1	Slightly Adverse
10	Portland-Gresham (Powell)	$11,200,000	27,700	9,083,000	$1,582	$118,627,500	$14.29	-1	Slightly Adverse
11	Portland-Sherwood (Barbur/Hwy 99)	$10,400,000	38,300	12,559,000	$1,930	$144,720,000	$12.35	-1	Slightly Adverse
12	Hillsboro-Forest Grove	$4,200,000	8,300	2,722,000	$860	$64,507,500	$25.24	-2	Moderately Adverse
13	Gresham-Troutdale	$2,700,000	12,000	3,935,000	$616	$46,230,000	$12.43	-1	Slightly Adverse
13D	Troutdale-Damascus	$8,500,000	19,200	6,296,000	$2,646	$198,472,500	$32.87	-3	Significantly Adverse
16	Clackamas Town Center-Damascus	$4,000,000	7,000	2,295,000	$777	$58,290,000	$27.14	-2	Moderately Adverse
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	$8,700,000	22,500	7,378,000	$1,358	$101,835,000	$14.98	-1	Slightly Adverse
17D	Tanasbourne	$3,000,000	10,300	3,377,000	$508	$38,130,000	$12.18	-1	Slightly Adverse
28	Clackamas Town Center-Washington Square	$14,300,000	30,000	9,837,000	$2,195	$164,655,000	$18.19	-1	Slightly Adverse
29	Clackamas Town Center-Washington Square (RR ROW)	$11,600,000	25,300	8,296,000	$2,053	$153,997,500	$19.96	-2	Moderately Adverse
32	Beaverton-Hillsboro (TV Hwy)	$6,500,000	19,400	6,361,000	$1,396	$104,670,000	$17.48	-1	Slightly Adverse
34	Beaverton-Wilsonville	$9,600,000	34,900	11,444,000	$162	$12,127,500	$1.90	0	Neutral
38S	Tualatin-Sherwood	$2,600,000	8,400	2,754,000	$496	$37,200,000	$14.45	-1	Slightly Adverse
43	Downtown Portland-St. John's-Yellow Line	$9,100,000	10,000	3,279,000	$984	$73,815,000	$25.29	-2	Moderately Adverse
54	Troutdale-St. John's	$13,700,000	11,300	3,705,000	$1,930	$144,720,000	$42.76	-3	Significantly Adverse

(1) Corridor annual boardings estimated by calculating the daily boarding value by 327.9 days.

(2) Annualized by multiplying total cost by 7.5%.

EC3: Economic Competitiveness

Description	This criterion provides a quantitative analysis of potential for a corridor to serve employment in 2035. Corridors that serve areas identified by Metro as having high concentrations of employment would be favored.
Data Sources	This analysis is based on shapefiles produced by Metro's Metroscope land use/transportation model. The geographic information system (GIS) shapefiles contained transportation analysis zones (TAZ) with data reflecting the total number of jobs in each zone.
Methodology	GIS was used to calculate the total area of TAZ's that intersect (fall within partially or totally) a half mile buffer of all corridors. The following steps were conducted for all corridors: • Create half mile buffers around corridors • Clip all TAZ's using a half mile buffer • Calculate the area of the clipped TAZ's • Create a ratio of clipped TAZ area over total TAZ area • Apply the area ratio to the 2035 employment value for every affected TAZ • Sum the TAZ 2035 employment values to derive a total 2035 employment value in each corridor (overlap was allowed as each corridor is evaluated discretely)
Ranking Methodology	Qualitative scores were chosen based on a natural breaks method. The natural breaks method divides data into categories based on the natural groups in the data distribution. It uses a statistical formula (Jenk's optimization) that calculates groupings of data values based on the top four deltas between each adjacently sorted corridor. ● Significant benefit = 98,305 -120,724 jobs ● Moderate benefit = 57,155 - 67,462 jobs ● Slight benefit = 36,628 - 37,404 jobs ● Neutral = 17,493 – 27,424 jobs
Issues / Limitations	

EC3: Analysis Results (Economic Competitiveness)

corridor	corridor description	Number of Jobs Served in 2035	quantitative measure	assessment
8	Clackamas Town Center-Oregon City (I-205)	22,438	0	Neutral
9	Milwaukie-Oregon City (McLoughlin)	17,493	0	Neutral
10	Portland-Gresham (Powell)	113,099	3	Significant Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	120,724	3	Significant Benefit
12	Hillsboro-Forest Grove	27,424	0	Neutral
13	Gresham-Troutdale	21,277	0	Neutral
13D	Troutdale-Damascus	36,628	1	Slight Benefit
16	Clackamas Town Center-Damascus	23,473	0	Neutral
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	102,440	3	Significant Benefit
17D	Tanasbourne	37,404	1	Slight Benefit
28	Clackamas Town Center-Washington Square	102,444	3	Significant Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	98,305	3	Significant Benefit
32	Beaverton-Hillsboro (TV Hwy)	57,155	2	Moderate Benefit
34	Beaverton-Wilsonville	116,012	3	Significant Benefit
38S	Tualatin-Sherwood	23,093	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	65,990	2	Moderate Benefit
54	Troutdale-St. John's	67,462	2	Moderate Benefit

EC4: Rebuilding Potential

Description	This is a quantitative analysis to measure the total area of vacant and rebuildable lands in a corridor study area. Corridors that serve areas identified by Metro as having high volumes of vacant and rebuildable lands would be favored.
Data Sources	This analysis was based on the shapefiles previously created by Metro. This is defined as: "lands appearing unimproved on aerial photography, without regard to developability and accessibility. On partially developed parcels, only undeveloped areas 1/2 acre or larger are included.
Methodology	A geographic information systems (GIS) was used to calculate the total area of vacant and rebuildable land that intersects (falls within partially or totally) a half mile buffer of all corridors. The following steps were conducted for all corridors: • Create half mile buffers around corridors • Clip all vacant and rebuildable land using a half mile buffer • Calculate the area of the clipped vacant and rebuildable polygons • Sum the areas to calculate a total vacant and rebuildable land area in each corridor buffer (overlap was allowed as each corridor is evaluated discretely)
Ranking Methodology	Qualitative scores were chosen based on a natural breaks method. The natural breaks method divides data into categories based on the natural groups in the data distribution. It uses a statistical formula (Jenk's optimization) that calculates groupings of data values based on the top four deltas between each adjacently sorted corridor. ● Significant benefit = 3,204 - 3,372 Acres ● Moderate benefit = 1,032 - 2,049 Acres ● Slight benefit = 610 - 962 Acres ● Neutral = 267 - 470 Acres
Issues / Limitations	Metro's Vacant Land Definitions: ● Every tax lot is determined to be vacant, partially vacant, or developed. ● Vacant tax lots are those that have no building, improvements or identifiable land use. ● Developed lots must have improvements and specific land uses. For example, a paved parking lot is developed but an unpaved lot where trucks are parked is vacant. ● Lots under site development are only considered developed if structure activity is evident. For example, earthwork and grading are considered vacant but buildings under construction (foundation or more) are considered developed. ● If a developed tax lot has 1/2 acre (20,000-sq. ft.) or greater portion that is vacant, the lot is considered to be partially vacant and partially developed. A polygon is delineated around the occupied portion, which includes buildings, landscaped yards, etc. The remaining portion (greater than 1/2 acre) is coded vacant (vac = 1). ● Parks and open spaces are treated as developed. ● During the assessment of each tax lot, no consideration is given to constrained land, suitability for building, or to redevelopment potential.

EC4: Analysis Results (Rebuilding Potential)

Corridor	Corridor Description	Rebuildable Land (Acres)	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	936.85	1	Slight Benefit
9	Milwaukie-Oregon City (McLoughlin)	267.03	0	Neutral
10	Portland-Gresham (Powell)	610.50	1	Slight Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	1,453.49	2	Moderate Benefit
12	Hillsboro-Forest Grove	1,468.11	2	Moderate Benefit
13	Gresham-Troutdale	464.84	0	Neutral
13D	Troutdale-Damascus	3,372.46	3	Significant Benefit
16	Clackamas Town Center-Damascus	1,569.19	2	Moderate Benefit
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	1,482.32	2	Moderate Benefit
17D	Tanasbourne	722.50	1	Slight Benefit
28	Clackamas Town Center-Washington Square	3,204.44	3	Significant Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	898.08	1	Slight Benefit
32	Beaverton-Hillsboro (TV Hwy)	962.54	1	Slight Benefit
34	Beaverton-Wilsonville	1,873.11	2	Moderate Benefit
38S	Tualatin-Sherwood	1,032.59	2	Moderate Benefit
43	Downtown Portland-St. John's-Yellow Line	470.19	0	Neutral
54	Troutdale-St. John's	2,049.45	2	Moderate Benefit

D1: Feasibility of Construction (Capital Costs for Exclusive and Non-Exclusive ROW)

D2: Capital Cost Per Mile (Capital Costs for Exclusive and Non-Exclusive ROW)

Description	These two criteria provide a quantitative assessment of corridor capital costs to construct a new LRT line or to upgrade an existing facility to LRT. Two capital cost estimates were developed: a cost that assumes the alignment will be constructed solely in new right-of-way and a cost that assumes that the line will use existing right-of-way (to the extent possible). All corridor costs include an estimate of maintenance and vehicle costs required to operate LRT in the corridor as well as costs to construct stations. Costs per mile are calculated to normalize overall capital cost based on length of the corridor. All costs are in 2009 dollars.
Data Sources	Actual construction costs from TriMet using South Corridor (I-205) as a basis and adjustments as necessary. Tunnel and elevated costs based on cost per mile estimates from other comparable projects around the country.
Methodology	Cost estimates were developed using the following steps: Step 1: Identify valuation scenarios Nine possible "valuation scenarios" were developed by evaluating all corridors to be evaluated. For each scenario, a high-level cost per mile was developed using recent data primarily from TriMet and from other recently completed LRT projects. These valuation scenarios include: A. In-street median B. New ROW adjacent to existing streets C. New ROW retained fill adjacent to existing streets D. Aerial guideway E. Tunnel F. Abandoned rail ROW G. Existing rail ROW H. Existing rail ROW in cut J. LRT in existing freeway median Step 2: Assign valuation scenarios to corridors and corridor segments. Each corridor was first examined through either aerial photographs or on-site visits. The consultant worked directly with TriMet to assign valuation scenarios to each segment of the corridor. The total mileage was calculated for each valuation scenario type and a total capital cost was calculated. Step 3: Estimate vehicle and maintenance costs. Based on an estimate of 2 vehicles per mile and $1.5 million per vehicle, an estimate of vehicle

	and maintenance costs per mile was applied to the total capital cost per corridor.
Ranking Methodology	The corridors were ranked by looking at natural breaks in the data: Assessment / Quantitative Measure / Cost ($ Millions) Neutral / 0 / $496 - $1,070 Slightly adverse / -1 / $1,070 - $1,743 Moderately adverse / -2 / $1,743 - $2,314 Significantly adverse / -3 / $2,314 - $3,057
Issues / Limitations	These are very high level cost estimates and were developed prior to any facility design or alignment selection. They should be considered only rough order-of-magnitude estimates and are to be used only as a comparative tool.

D1: Analysis Results (Capital Costs)

Additional Right-of-Way (ROW) Required

						Total Costs			Cost Per Mile	
Corridor	Corridor Description	Miles	Capital Costs ($M)	Vehicle & Maint. Facility ($M)	Total Capital Costs ($M)	Quantitative Measure	Assessment	Corridor Cost per Mile ($M)	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	4.6	$520	$51	$570	0	Neutral	$124	0	Neutral
9	Milwaukie-Oregon City (McLoughlin)	5.1	$745	$56	$801	-1	Slightly Adverse	$157	-3	Significantly Adverse
10	Portland-Gresham (Powell)	11.1	$1,621	$122	$1,743	-2	Moderately Adverse	$157	-3	Significantly Adverse
11	Portland-Sherwood (Barbur/Hwy 99)	14.4	$2,155	$158	$2,314	-3	Significantly Adverse	$161	-3	Significantly Adverse
12	Hillsboro-Forest Grove	6.1	$793	$67	$860	-1	Slightly Adverse	$141	-1	Slightly Adverse
13	Gresham-Troutdale	4.6	$672	$51	$722	0	Neutral	$157	-3	Significantly Adverse
13D	Troutdale-Damascus	19.1	$2,597	$210	$2,807	-3	Significantly Adverse	$147	-2	Moderately Adverse
16	Clackamas Town Center-Damascus	5.8	$847	$64	$911	-1	Slightly Adverse	$157	-3	Significantly Adverse
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	9.6	$1,232	$106	$1,337	-2	Moderately Adverse	$139	-1	Slightly Adverse
17D	Tanasbourne	4.1	$511	$45	$557	0	Neutral	$136	-1	Slightly Adverse
28	Clackamas Town Center-Washington Square	21.4	$2,821	$235	$3,057	-3	Significantly Adverse	$143	-1	Slightly Adverse
29	Clackamas Town Center-Washington Square (RR ROW)	14.5	$1,914	$160	$2,073	-2	Moderately Adverse	$143	-2	Moderately Adverse
32	Beaverton-Hillsboro (TV Hwy)	9.9	$1,445	$109	$1,554	-2	Moderately Adverse	$157	-3	Significantly Adverse
34	Beaverton-Wilsonville	14.7	$1,911	$162	$2,073	-2	Moderately Adverse	$141	-1	Slightly Adverse
38S	Tualatin-Sherwood	4.0	$452	$44	$496	0	Neutral	$124	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	7.1	$992	$78	$1,070	-1	Slightly Adverse	$151	-2	Moderately Adverse
54	Troutdale-St. John's	14.4	$2,003	$158	$2,162	-3	Significantly Adverse	$150	-2	Moderately Adverse

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D2: Analysis Results (Capital Costs)

Use Existing Right-of-Way (Minimize use of additional ROW 1)

						Total Costs			Cost Per Mile	
Corridor	Corridor Description	Miles	Capital Costs ($M)	Vehicle & Maint. Facility ($M)	Total Capital Costs ($M)	Quantitative Measure	Assessment	Corridor Cost per Mile ($M)	Quantitative Measure	Assessment
8	Clackamas Town Center-Oregon City (I-205)	4.6	$598	$51	$649	-1	Slightly Adverse	$141	-3	Significantly Adverse
9	Milwaukie-Oregon City (McLoughlin)	5.1	$627	$56	$683	-1	Slightly Adverse	$134	-3	Significantly Adverse
10	Portland-Gresham (Powell)	11.1	$1,460	$122	$1,582	-2	Moderately Adverse	$142	-3	Significantly Adverse
11	Portland-Sherwood (Barbur/Hwy 99)	14.4	$1,771	$158	$1,930	-3	Significantly Adverse	$134	-3	Significantly Adverse
12	Hillsboro-Forest Grove	6.1	$793	$67	$860	-1	Slightly Adverse	$141	-1	Slightly Adverse
13	Gresham-Troutdale	4.6	$566	$51	$616	0	Neutral	$134	-3	Significantly Adverse
13D	Troutdale-Damascus	19.1	$2,436	$210	$2,646	-3	Significantly Adverse	$139	-2	Moderately Adverse
16	Clackamas Town Center-Damascus	5.8	$713	$64	$777	-1	Slightly Adverse	$134	-3	Significantly Adverse
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	9.6	$1,252	$106	$1,358	-2	Moderately Adverse	$141	-1	Slightly Adverse
17D	Tanasbourne	4.1	$463	$45	$508	0	Neutral	$124	-1	Slightly Adverse
28	Clackamas Town Center-Washington Square	21.4	$1,960	$235	$2,195	-3	Significantly Adverse	$103	-1	Slightly Adverse
29	Clackamas Town Center-Washington Square (RR ROW) [2]	14.5	$1,894	$160	$2,053	-2	Moderately Adverse	$142	-2	Moderately Adverse
32	Beaverton-Hillsboro (TV Hwy)	9.9	$1,287	$109	$1,396	-2	Moderately Adverse	$141	-3	Significantly Adverse
34	Beaverton-Wilsonville [2]	14.7	$0	$162	$162	-2	Moderately Adverse	$11	-3	Significantly Adverse
38S	Tualatin-Sherwood	4.0	$452	$44	$496	-2	Moderately Adverse	$124	-3	Significantly Adverse
43	Downtown Portland-St. John's-Yellow Line	7.1	$906	$78	$984	-1	Slightly Adverse	$139	-2	Moderately Adverse
54	Troutdale-St. John's	14.4	$1,771	$158	$1,930	-3	Significantly Adverse	$134	-2	Moderately Adverse

(1) Where it would not be possible to utilize the existing ROW for a segment of the corridor, the cost of the additional ROW option was used for that segment . These segments are identified by a "-" in the Existing ROW column of the "Description of Sections" table that follows

(2) For corridor 34 (and thereby the portion of 29 which overlaps with 34), use of existing ROW assumes that there is no active freight rail use of the WES corridor

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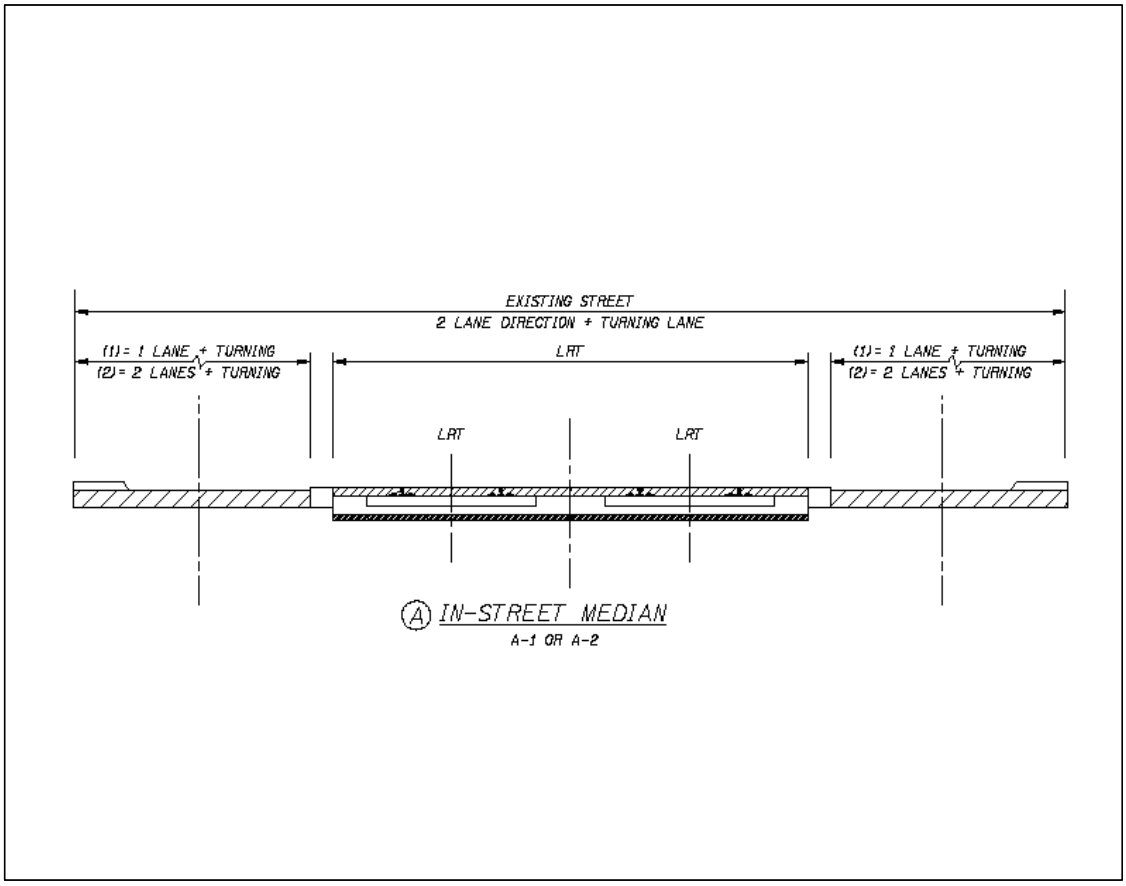
D1/D2: Description of Sections Used for Capital Costing

Corridor	Section	Corridor or Segment Description	Description Cross Sections	
			Additional ROW	Existing ROW
8	1	I-205 & Hwy 224 (SE 94th) - Hwy 212	G2	J
	2	Hwy 212 (SE 94th/RR) - E Arlington St (Edgewater Rd)	G2	J
	3	E Arlington St (Edgewater Rd) - Center & 14th	G2	J
9	1	SE Park - SE Concord	B1	A2
	2	SE Concord - SE Britton	B1	A2
	3	SE Britton - Center & 14th	B1	A2
10A	1	Powell SE 17th - SE 38th	B1	B1
	2	Powell SE 38th - I-205	B1	B1
10B	1	Powell I-205 - SE 115th	B1	A2
	2	Powell SE 115th - SE 170th	B1	A2
	3	Powell SE 170th - NE 10th/NE Hood	B1	A2
11A		SW Jackson - SW Slavin	C1	A2
11B		SW Slavin - SW Bertha & Barbur	D2	A2
11C	1	SW Bertha & Barbur - SW Alfred	C1	A2
	2	SW Alfred - SW Center	B1	A2
11D		SW Center - SW 116th & SW 99 W	B1	A2
11E	1	SW 116th & SW 99th - SW Cipole	B1	A2
	2	SW Cipole - SW Tualatin-Sherwood & 99W	B1	A2
11T	1	Barbur Tunnel	E1	E2
	2	Barbur Tunnel	E1	E2
12	1	"A" St / 19th - N 1st Place	F	F
	2	N 1st Place - SW 331st	F	F
	3	SW 331st - SW Adams	F	F
13	1	NE Perimeter - SW 20th (on 257th)	B1	A2
	2	SW 20th - NE Liberty (on 257th/Kane/Divn)	B1	A2
16A	1	Clackamas TC - SE 151st (Sunnyside Rd)	B1	A2
	2	SE 151st - SE Foster / Hwy 212 (Sunnyside Rd)	B1	A2
16B	1	SE Powell & Hood - SE 36th (Roberts Ave)	B1	B1
	2	SE 36th - SE Sunshine Valley Rd (Hogan Rd)	B2	B2
	3	SE Sunshine Valley Rd - Hwy 212 (242nd)	B2	B2
	4	Hwy 212 (242nd) - SE Foster Rd & Hwy 212	B2	B2
17A	1	NW Shute / NW Evergreen - NW 188th (Evergreen Pkwy)	B2	A2
	2	NW 188th - NW Murray (Evergreen Pkwy/ Hwy 26)	B1 / J	-
	3	NW Murray - Sunset TC (Hwy 26)	J	-
17C	1	NW Shute / NW Evergreen - Hillsboro Airport (Brookwood Pkwy)	B2	A1
	2	Hillsboro Airport - Blue Line (Brookwood Pkwy)	B2	A1
17D	1	(Tanasbourne) NW Mauzey (RR) - NW 194th (Hwy 26)	F	B2

Corridor	Section	Corridor or Segment Description	Description Cross Sections	
			Additional ROW	Existing ROW
	2	NW 194th (Hwy 26) - NW 205th (Amberglen)	A1	B2
28A		Center & 14th St - I-205/Willamette Dr	D1	-
28B	1	SW Tual/Sher/Boones Ferry - SW Prindle Rd	J	J
	2	SW Prindle Rd - S Woodbine Rd	J	J
	3	S Woodbine Rd - I-205/Willamette Dr	J	J
28C		Tualatin - Tigard (via WES)	G1	-
28D		Tigard - WSTC (via WES)	G2	-
29A	1	SE Washington/ SE 30th - SE Carrie-Lynn (Hwy 224)	J	B1
	2	SE Carrie-Lynn (Hwy 224) - Hwy 224 / I-205 to Clackamas TC	J	B1
29B1		SE Washington/ SE 30th - SE 21st (Washington)	F / H	F / H
29B2		SE 21st - N State (Washington/UP Tillamook Branch)	G1	G2
29C	1	WES / Bonita - Reese Rd (UP Tillamook Branch)	G1	G1
	2	Reese Rd - N State (UP Tillamook Branch)	G2	G2
32A	1	NE Washington St - SE 10th	B1	A2
	2	SE 10th - SW 234th	G1	A2
	3	SW 234th - SW 177th	G1	A2
	4	SW 177th - Beaverton TC	G1	B1
34A	1	Beaverton TC (TM ROW - WES)	F	-
	2	WaSq/Hall-Nimbus Sta/P&R (TM ROW - WES)	F	-
34B		WaSq/Hall-Nimbus Sta/P&R - SW Center & 99W (TM ROW - WES)	F	-
34C		SW Center & 99W - WES & Bonita Rd (TM ROW - WES)	F	-
34D	1	WES & Bonita Rd - Bridgeport (TM ROW - WES)	F	-
	2	Bridgeport - SW Tual/Sher/Boones Ferry (TM ROW - WES)	F	-
34E	1	SW Tual/Sher/Boones Ferry - Fuller (TM ROW - WES)	F	-
	2	Fuller - SW Elligsen Way (TM ROW - WES)	F	-
	3	SW Elligsen Way - SW Barber (TM ROW - WES)	F	-
Hall Blvd. Alt		Beaverton TC - SW Tual/Sher/Boones Ferry	C1	-
38S		WES to Sherwood via freight tracks	G2	-
43C	1	N Willamette - Kittridge (BNSF ROW/Willbridge Ave)	G1	G2
	2	NW 19th - Kittridge (BNSF ROW/Front Ave)	G1	-
	3	Union Station (5th/6th) - NW 19th (BNSF ROW/Front Ave)	G2	-
43D		N Willamette - N Columbia (BNSF ROW - Cut)	H	H
49		Rose Quarter (Eastside I-5) to OMSI (Water Ave)	J	-
50T		(Corridor 18 Steel Br Improvements - Model Grp 1) Tunnel - Lloyd Ctr to Goose Hollow	E-1	-

Corridor	Section	Corridor or Segment Description	Description Cross Sections	
			Additional ROW	Existing ROW
54A	1	I-5 & N Columbia - NE 41st	B1	A2
	2	N Columbia - NE 41st - I-205	B1	A2
	3	I-205 - 152nd (UPRR or Sandy Blvd)	B1	A2
	4	152nd - 207th (UPRR or Sandy Blvd)	B1	A2
	5	207th - 257th (UPRR or Sandy Blvd)	G2	A2
54B		N Columbia - Yellow Line @ Interstate Ave	B2	A2
54C		N Columbia - N Lombard & N Burlington	A1	-

Section A



A1	2 - lane	118,000,000	per mile
A2	4 - lane	123,000,000	per mile *

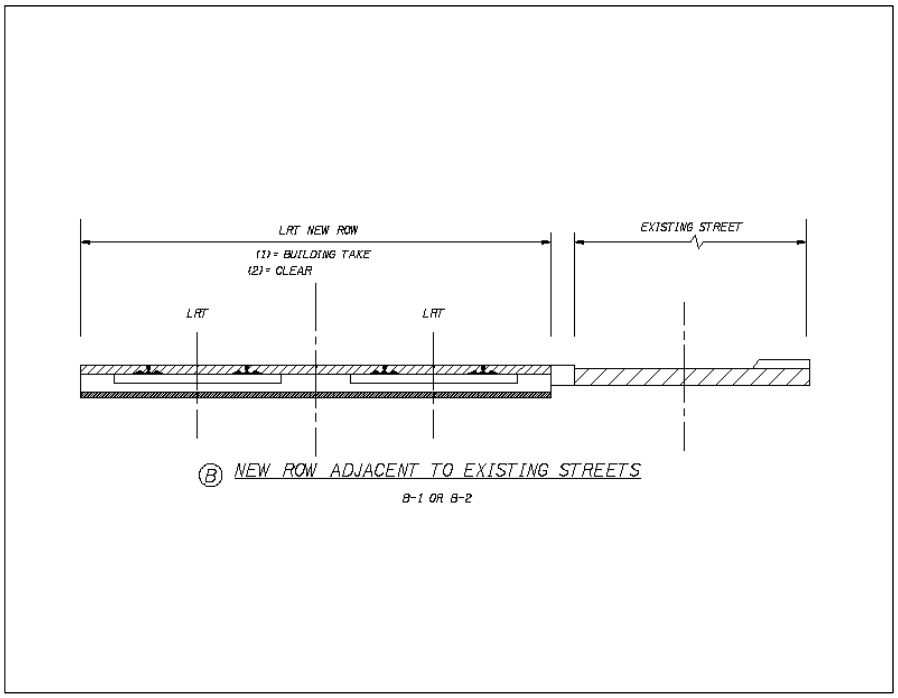
Assumptions
Original Interstate was 4 lanes converted to LRT + 2 lanes and left turns at major intersections
LRT was a combination of paved and ballasted trackage

		04 $	escalation	2009 $	Miles	2009 $ / Mile	
	LS 10AB w/mods	91,888,494	136.0%	124,965,607	4.25	29,403,672	
	TES/OCS	9,972,100	136.0%	13,561,758	5.75	2,358,567	
	Signals	13,653,453	136.0%	18,568,288	5.75	3,229,268	
	Comm	13,206,685	136.0%	17,960,697	5.75	3,123,599	
	Stations (8)	5,835,000	136.0%	7,935,426	4.25	1,867,159	
	Fare collection	1,542,710	136.0%	2,098,040	5.3	395,857	
	Track Materials	4,332,417	136.0%	5,891,958	5.75	1,024,688	
	Insurance	4,009,592	136.0%	5,452,925	5.75	948,335	
	ROW/Real Estate	11,094,800	136.0%	15,088,597	5.75	2,624,104	
+	Interim Financing					28,000,000	
	Startup	6,047,808	136.0%	8,224,838	5.75	1,430,407	
	E&A (adjusted)	116,270,935	136.0%	158,124,998	5.75	27,500,000	
	Contingency (adjusted)	69,463,499	136.0%	94,468,283	5.75	16,429,267	
		347,317,493		472,341,414		118,334,921	avg cost / mile
	These are "finished costs" - contingency was origninally at 10.6% of total					36,930,700	350,000,000

* 4-lanes version assumes addition of 15' per direction for pavement, additional ROW, financing, E&A
\+ Interim Financing figures based on current Portland to Milwaukie requirements
NOTE: not included are vehicles or maintenance facility costs
Fare collection based on 8 stations in LS 10AB & 2 in LS 10C

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

Section B



B1 - Building take	146,000,000	per mile
B2 - clear (open)	113,000,000	per mile

Assumptions - South Corridor, I-205 used as model account "hwy" adjacent to new LRT ROW, without bridges or retaining wall pricing included
B1 assumes ROW cost, building demo, relocation costs & impacts. Could be ballasted or paved track
B2 assumes ROW cost - but not buildings to demo or business relocations. Same track assumptions

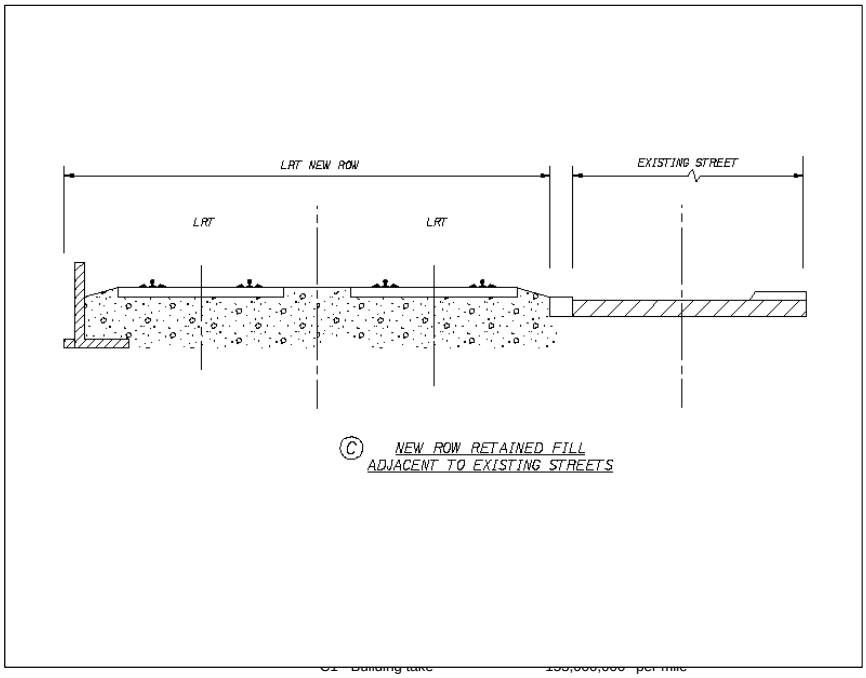
		06 $	escalation	2009 $	Miles	2009 $ / Mile	
	I-205 w/mods	83,421,538	114.4%	95,442,081	6.5	14,683,397	no retaining fill, retaining walls or aerial structures (bridges)
	Stations (8)	10,115,186	114.4%	11,572,724	6.5	1,780,419	
	P&R Structure (630)	15,525,795	114.4%	17,762,969	6.5	2,732,764	
	Roadway allowance	5,681,351	114.4%	6,500,000	6.5	1,000,000	
	TES/OCS	13,439,526	114.4%	15,376,081	6.5	2,365,551	
	Signals	12,986,643	114.4%	14,857,940	6.5	2,285,837	
	Comm	8,583,118	114.4%	9,819,894	6.5	1,510,753	
	Fare collection	1,166,826	114.4%	1,334,959	6.5	205,378	
	Track Materials	6,371,211	114.4%	7,289,264	6.5	1,121,425	
	Insurance	5,902,440	114.4%	6,752,946	6.5	1,038,915	
	ROW/Real Estate					30,000,000	ROW values - see assumptions below add based on a % basis
+	Interim Financing					28,000,000	
	Startup	8,000,000	114.4%	9,152,752	6.5	1,408,116	
	E&A (adjusted)	156,237,165	114.4%	178,750,003	6.5	27,500,000	
	Contingency (adjusted to 25%)	81,857,700	114.4%	93,652,903	6.5	14,408,139	
		409,288,499		468,264,517		130,040,694	avg cost / mile

Existing roadway may or may not need improvements due to LRT - an allowance of $1 mil / mile Included
\+ Interim Financing figures based on current Portland to Milwaukie requirements
NOTE: not included are vehicles or maintenance facility costs
Fare collection based on 2 per station - stations assumed at ? Intervals

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

ROW assumptions

B1 = use 50' average width (takes) needed ROW min @ 34'	$8750 / Running RF	(50' x $175)	46,200,000
assumes only 1 side of existing street ROW needed (this could vary widely if adjacent properties are 100' lots instead of 50'			29,700,000
B2 = use 50' average width (takes) needed ROW min @ 34'	$2500 / Running RF	(50' x $50)	13,200,000
assumes only 1 side of existing street ROW needed			
(see ROW assumptions in ROW Values workbook)			



C1 - Building take	155,000,000	per mile
C2 - clear (open)	120,000,000	per mile

Assumptions - South Corridor, I-205 used as model account "hwy" adjacent to new LRT ROW, with bridges and retaining wall pricing included
Assumes ROW cost, building demo, relocation costs & impacts. Could be ballasted or paved track

	06 $	escalation	2009 $	Miles	2009 $ / Mile	
I-205 w/mods	115,664,385	114.4%	132,330,929	6.5	20,358,604	Includes retaining fill, retaining walls and aerial structures (bridges) based on I-205 costs
Stations (8)	10,115,186	114.4%	11,572,724	6.5	1,780,419	
P&R Structure (630)	15,525,795	114.4%	17,762,969	6.5	2,732,764	
Roadway allowance	5,681,351	114.4%	6,500,000	6.5	1,000,000	
TES/OCS	13,439,526	114.4%	15,376,081	6.5	2,365,551	
Signals	12,986,643	114.4%	14,857,940	6.5	2,285,837	
Comm	8,583,118	114.4%	9,819,894	6.5	1,510,753	
Fare collection	1,166,826	114.4%	1,334,959	6.5	205,378	
Track Materials	6,371,211	114.4%	7,289,264	6.5	1,121,425	
Insurance	5,902,440	114.4%	6,752,946	6.5	1,038,915	
ROW/Real Estate					30,000,000	ROW values - see assumptions below
+ Interim Financing					28,000,000	
Startup	8,000,000	114.4%	9,152,752	6.5	1,408,116	
E&A (adjusted)	156,237,165	114.4%	178,750,003	6.5	27,500,000	
Contingency (adjusted to 25%)	89,918,412	114.4%	102,875,115	6.5	15,826,941	
	449,592,058		514,375,576		137,134,704	avg cost / mile

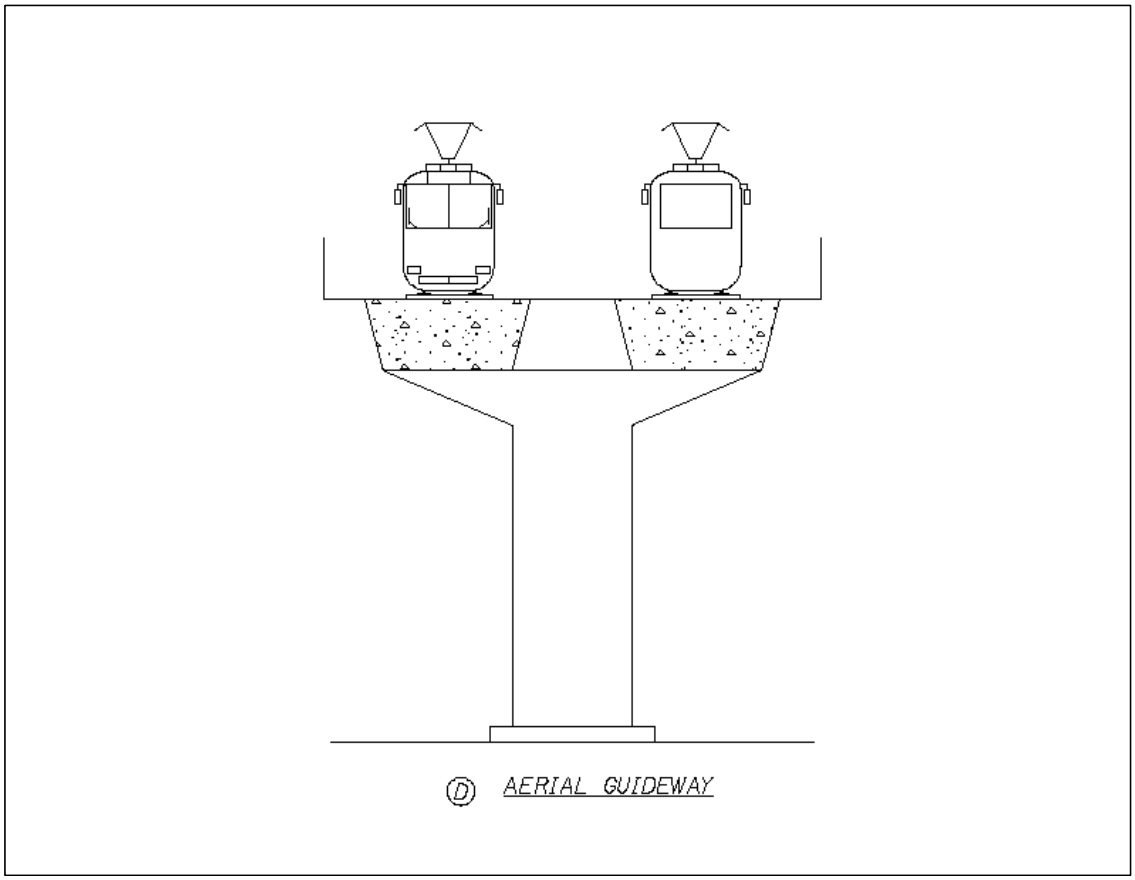
Existing roadway may or may not need improvements due to LRT - an allowance of $1 mil / mile Included
+ Interim Financing figures based on current Portland to Milwaukie requirements
NOTE: not included are vehicles or maintenance facility costs
Fare collection based on 2 per station - stations assumed at ? Intervals

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

ROW assumptions

B1 = use 50' average width (takes) needed ROW min @ 34'	$8750 / Running RF	(50' x $175)	46,200,000	
assumes only 1 side of existing street ROW needed (this could vary widely if adjacent properties are 100' lots instead of 50'				29,700,000
B2 = use 50' average width (takes) needed ROW min @ 34'	$2500 / Running RF	(50' x $50)	13,200,000	
assumes only 1 side of existing street ROW needed				
(see ROW assumptions in ROW Values workbook)				

Section D



D1 - Building take	167,000,000	per mile
D2 - clear (open)	161,000,000	per mile

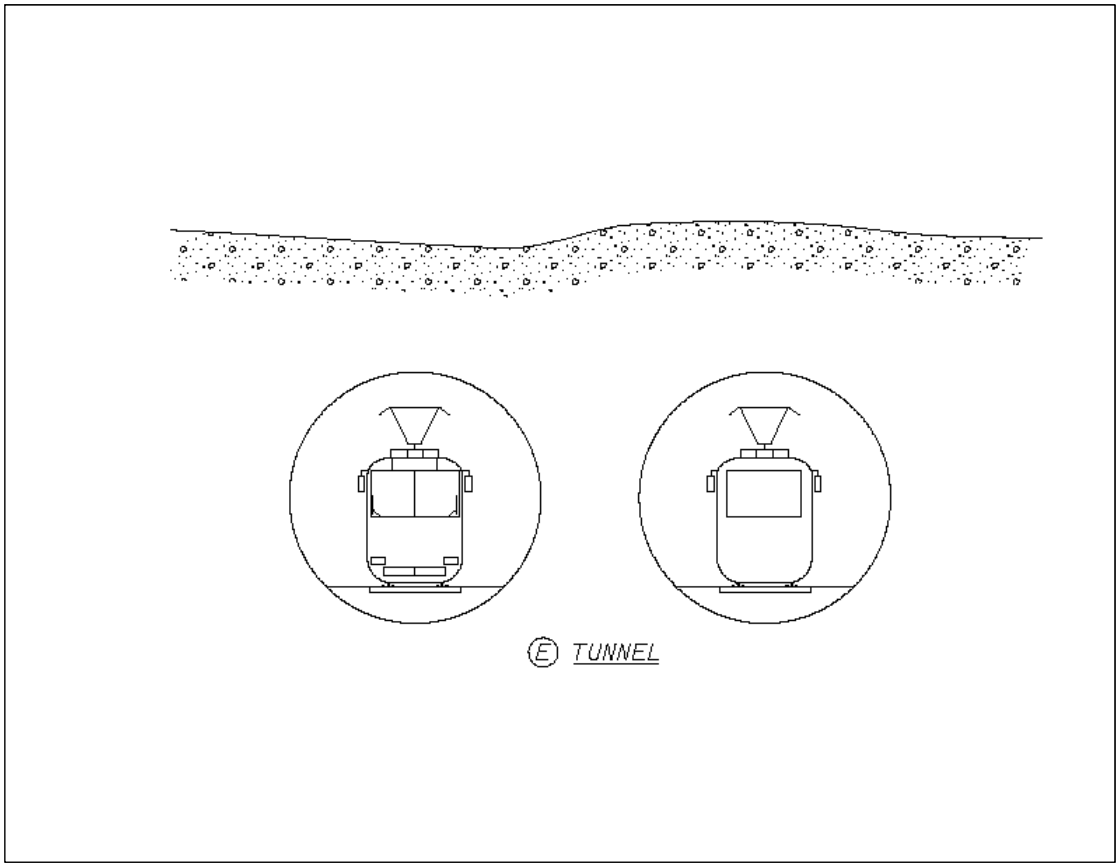
	Cost / Mile	
Aerial Structure	56,000,000	
Stations (0)	-	
P&R Structure (0)	-	
Roadway allowance	-	
TES/OCS	3,750,000	
Signals	2,750,000	
Comm	1,350,000	
Fare collection	-	
Track Materials	5,400,000	
Insurance	1,000,000	
ROW/Real Estate	3,960,000	ROW values - see assumptions below
Interim Financing	28,000,000	
Startup	1,400,000	
E&A	27,500,000	
Contingency (adjusted to 25%)	32,750,000	
	163,860,000	avg cost / mile

NOTE: not included are vehicles or maintenance facility costs
No fare collection or station costs are included

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

ROW assumptions	NOTE: Assumes no buildings demo'd - just "overflown"				
B1 = use 50' average width (takes) needed ROW min @ 34'	$8750 / Running RF (50' x $175)	46,200,000	0.15	6,930,000
assumes only 1 side of existing street ROW needed (this could vary widely if adjacent properties are 100' lots instead of 50'				
B2 = use 50' average width (takes) needed ROW min @ 34'	$1250 / Running RF (50' x $25)	6,600,000	0.15	990,000
assumes only 1 side of existing street ROW needed				
(see ROW assumptions in ROW Values workbook)				

Section E



Note: could be Cut & Cover, Drill & Blast, Bored

E - Building above	223,000,000	per mile
E - clear (open)	220,000,000	per mile

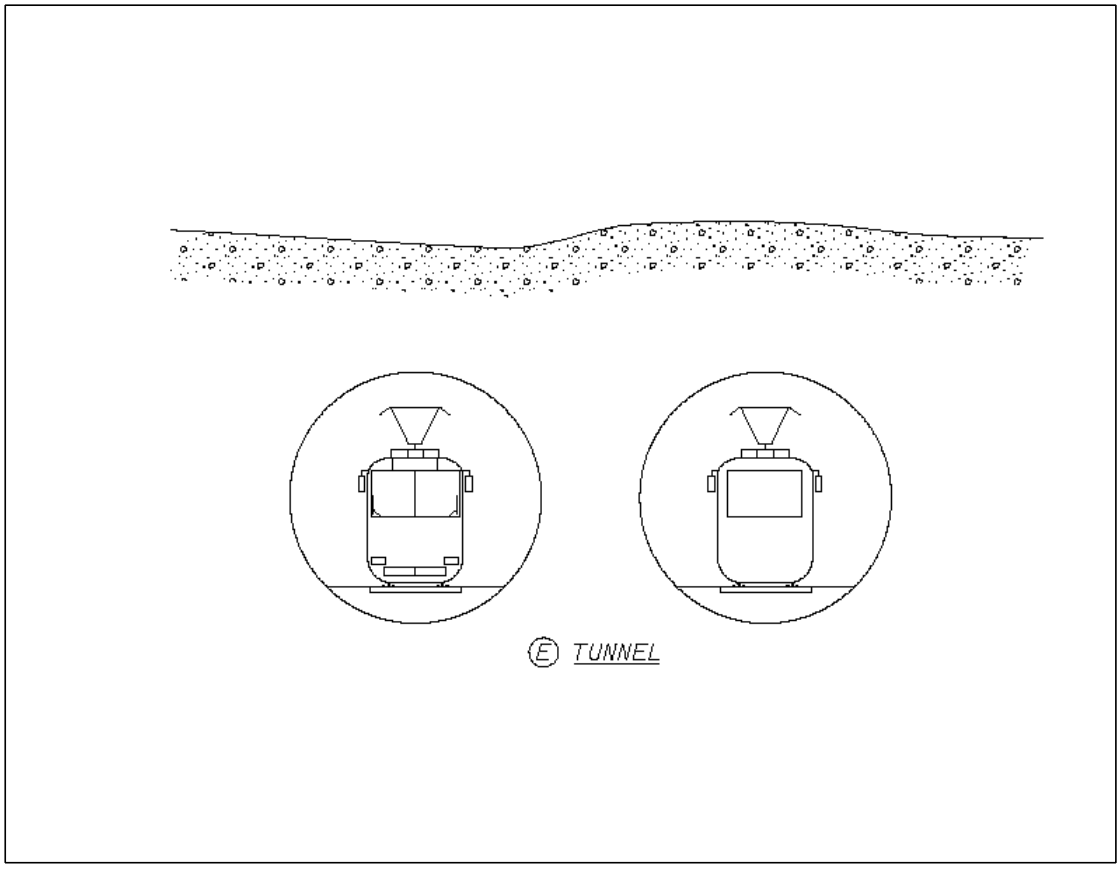
		96 $	escalation	2009 $	Miles	2009 $ / Mile
TBM/Drill-Blast	LS 5	187,000,000	159.3%	297,975,883	3	99,325,294
	TES/OCS					3,750,000
	Signals					2,750,000
	Comm					1,350,000
	Track Materials					5,400,000
	Insurance					1,000,000
5%	ROW/Real Estate					1,320,000
	Interim Financing					28,000,000
	Startup					1,400,000
	E&A					33,000,000
	Contingency (adjusted to 25%)					44,323,824
						221,619,117 avg cost / mile

NOTE: not included are vehicles or maintenance facility costs
No fare collection or station costs are included

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

ROW assumptions

B1 = use 50' average width (takes) needed ROW min @	$8750 / Running RF	(50' x $175)	46,200,000	0.05	2,310,000
assumes only 1 side of existing street ROW needed (this could vary widely if adjacent properties are 100' lots instead of 50'					
B2 = use 50' average width (takes) needed ROW min @	$1250 / Running RF	(50' x $25)	6,600,000	0.05	330,000
assumes only 1 side of existing street ROW needed					
(see ROW assumptions in ROW Values workbook)					



Note: could be Cut & Cover, Drill & Blast, Bored "AORTA" = SUBWAY UNDER CBD

E1 - Building above 628,000,000 per mile
E1 - clear (open) 626,000,000 per mile

		2003 $	escalation	2009 $	Miles	2009 $ / Mile	
TBM/Drill-Blast	URS $	##########	136.1%	##########	3.6	423,514,022	
	TES/OCS					3,750,000	
	Signals					2,750,000	
	Comm					1,350,000	
	Track Materials					5,400,000	
	Insurance					1,000,000	
5%	ROW/Real Estate					2,310,000	-
	Interim Financing					28,000,000	
	Startup					1,400,000	
	E&A					33,000,000	
	Contingency (adjusted to 25%)					125,371,000	
						627,845,021	avg cost / mile

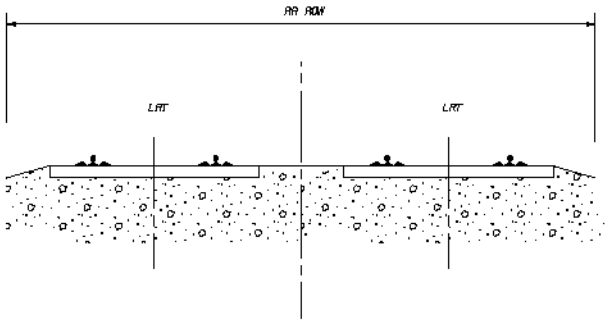
NOTE: not included are vehicles or maintenance facility costs
No fare collection or station costs are included

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

ROW assumptions

B1 = use 50' average width (takes) needed ROW min @	$8750 / Running RF	(50' x $175)	46,200,000	0.05	2,310,000
assumes only 1 side of existing street ROW needed (this could vary widely if adjacent properties are 100' lots instead of 50'					
B2 = use 50' average width (takes) needed ROW min @	$1250 / Running RF	(50' x $25)	6,600,000	0.05	330,000
assumes only 1 side of existing street ROW needed					
(see ROW assumptions in ROW Values workbook)					

Section F



Ⓕ ABANDONED RAIL ROW

F2 - clear (open) 130,000,000 per mile

Assumptions - South Corridor, I-205 used as model account "hwy" adjacent to new LRT ROW, without bridges or retaining wall
B1 assumes ROW cost, building demo, relocation costs & impacts. Could be ballasted or paved track
B2 assumes ROW cost - but not buildings to demo or business relocations. Same track assumptions

	06 $	escalation	2009 $	Miles	2009 $ / Mile	
I-205 w/mods	83,421,538	114.4%	95,442,081	6.5	14,683,397	no retaining fill, retaining walls or aerial structures (bridges)
Stations (8)	10,115,186	114.4%	11,572,724	6.5	1,780,419	
P&R Structure (630)	15,525,795	114.4%	17,762,969	6.5	2,732,764	
Roadway allowance	5,681,351	114.4%	6,500,000	6.5	1,000,000	
TES/OCS	13,439,526	114.4%	15,376,081	6.5	2,365,551	
Signals	12,986,643	114.4%	14,857,940	6.5	2,285,837	
Comm	8,583,118	114.4%	9,819,894	6.5	1,510,753	
Fare collection	1,166,826	114.4%	1,334,959	6.5	205,378	
Track Materials	6,371,211	114.4%	7,289,264	6.5	1,121,425	
Insurance	5,902,440	114.4%	6,752,946	6.5	1,038,915	
ROW/Real Estate					30,000,000	ROW values - see assumptions below
Interim Financing					28,000,000	
Startup	8,000,000	114.4%	9,152,752	6.5	1,408,116	
E&A (adjusted)	156,237,165	114.4%	178,750,003	6.5	27,500,000	
Contingency (adjusted to 25%)	81,857,700	114.4%	93,652,903	6.5	14,408,139	
	409,288,499		468,264,517		130,040,694	cost / mile

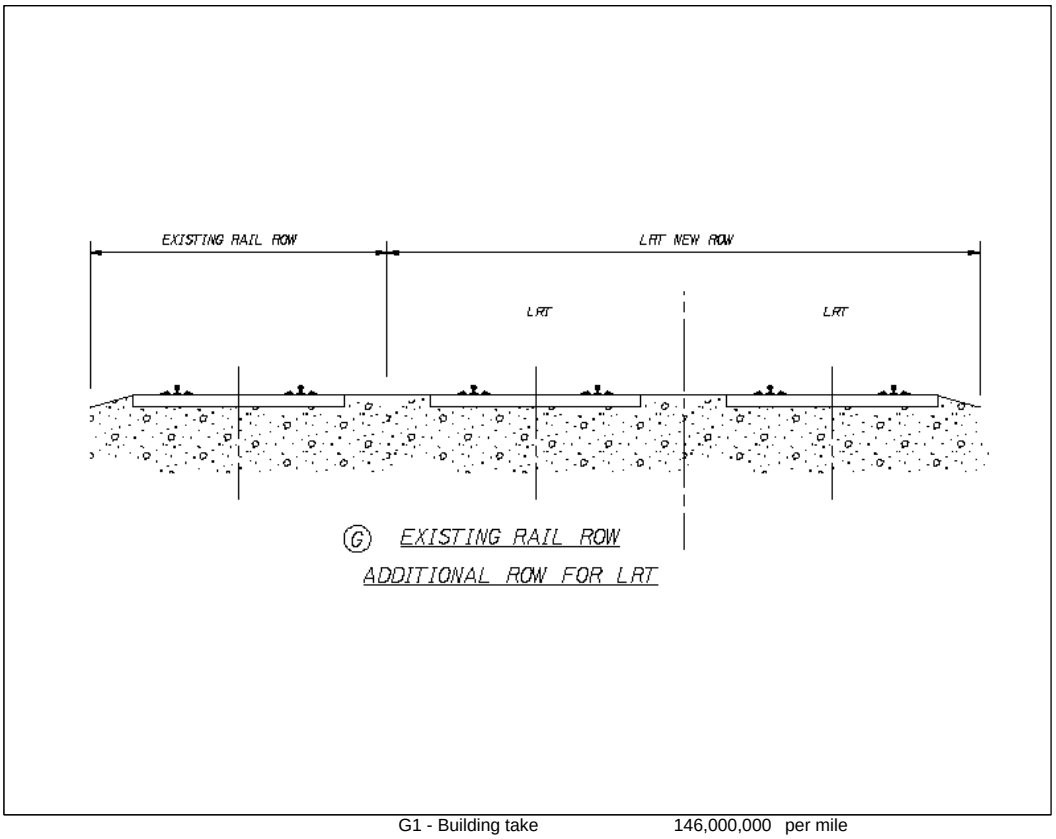
Existing roadway may or may not need improvements due to LRT - an allowance of $1 mil / mile Included

NOTE: not included are vehicles or maintenance facility costs
Fare collection based on 2 per station - stations assumed at ? Intervals

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

ROW assumptions
B1 = use 50' average width (takes) needed ROW min @ 34' $8750 / Running RF (50' x $175) 46,200,000
assumes only 1 side of existing street ROW needed (this could vary widely if adjacent properties are 100' lots instead of 50' 29,700,000
B2 = use 50' average width (takes) needed ROW min @ 34' $2500 / Running RF (50' x $50) 13,200,000
assumes only 1 side of existing street ROW needed
(see ROW assumptions in ROW Values workbook)

Section G



G1 - Building take	146,000,000	per mile
G2 - clear (open)	113,000,000	per mile

Assumptions - South Corridor, I-205 used as model account "hwy" adjacent to new LRT ROW, without bridges or retaining wall
B1 assumes ROW cost, building demo, relocation costs & impacts. Could be ballasted or paved track
B2 assumes ROW cost - but not buildings to demo or business relocations. Same track assumptions

	06 $	escalation	2009 $	Miles	2009 $ / Mile	
I-205 w/mods	83,421,538	114.4%	95,442,081	6.5	14,683,397	no retaining fill, retaining walls or aerial structures (bridges)
Stations (8)	10,115,186	114.4%	11,572,724	6.5	1,780,419	
P&R Structure (630)	15,525,795	114.4%	17,762,969	6.5	2,732,764	
Roadway allowance	5,681,351	114.4%	6,500,000	6.5	1,000,000	
TES/OCS	13,439,526	114.4%	15,376,081	6.5	2,365,551	
Signals	12,986,643	114.4%	14,857,940	6.5	2,285,837	
Comm	8,583,118	114.4%	9,819,894	6.5	1,510,753	
Fare collection	1,166,826	114.4%	1,334,959	6.5	205,378	
Track Materials	6,371,211	114.4%	7,289,264	6.5	1,121,425	
Insurance	5,902,440	114.4%	6,752,946	6.5	1,038,915	
ROW/Real Estate					30,000,000	ROW values - see assumptions below
Interim Financing					28,000,000	
Startup	8,000,000	114.4%	9,152,752	6.5	1,408,116	
E&A (adjusted)	##########	114.4%	178,750,003	6.5	27,500,000	
Contingency (adjusted to 25%)	81,857,700	114.4%	93,652,903	6.5	14,408,139	
	##########		468,264,517		130,040,694	cost / mile

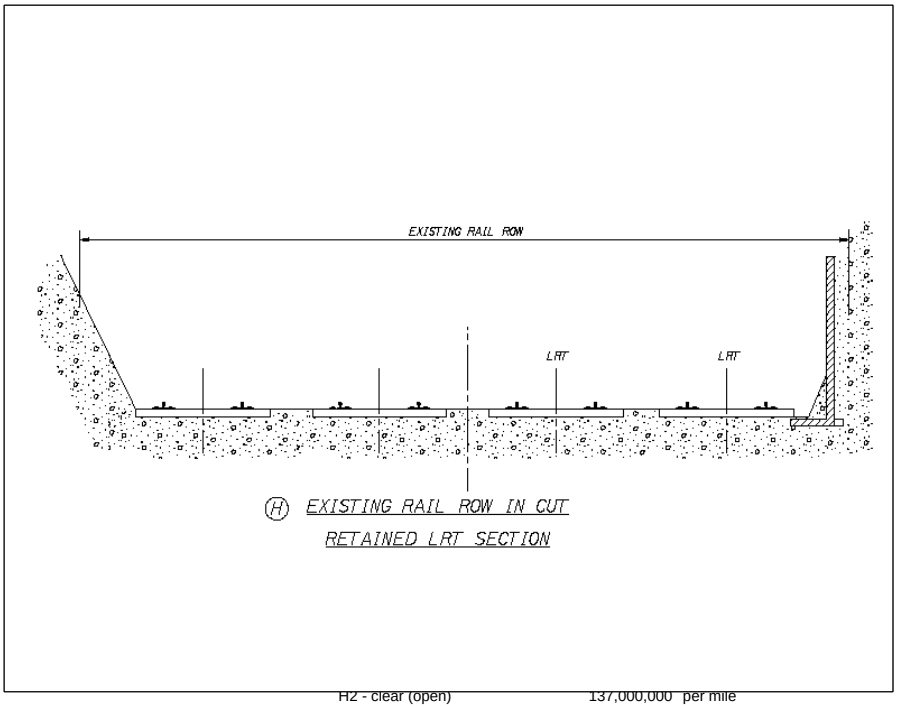
Existing roadway may or may not need improvements due to LRT - an allowance of $1 mil / mile Included

NOTE: not included are vehicles or maintenance facility costs
Fare collection based on 2 per station - stations assumed at ? Intervals

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

ROW assumptions

G1 = use 50' average width (takes) needed ROW min @ 34'	$8750 / Running RF	(50' x $175)	46,200,000	
assumes only 1 side of existing street ROW needed (this could vary widely if adjacent properties are 100' lots instead of 50'				29,700,000
G2 = use 50' average width (takes) needed ROW min @ 34'	$2500 / Running RF	(50' x $50)	13,200,000	
assumes only 1 side of existing street ROW needed				
(see ROW assumptions in ROW Values workbook)				



H2 - clear (open) 137,000,000 per mile

Assumptions - South Corridor, I-205 used as model account "hwy" adjacent to new LRT ROW, with bridges and retaining wall pricing
Assumes ROW cost, building demo, relocation costs & impacts. Could be ballasted or paved track

	06 $	escalation	2009 $	Miles	2009 $ / Mile	
I-205 w/mods	115,664,385	114.4%	132,330,929	6.5	20,358,604	Includes retaining fill, retaining walls and aerial structures (bridges) based on I-205 costs
Stations (8)	10,115,186	114.4%	11,572,724	6.5	1,780,419	
P&R Structure (630)	15,525,795	114.4%	17,762,969	6.5	2,732,764	
Roadway allowance	5,681,351	114.4%	6,500,000	6.5	1,000,000	
TES/OCS	13,439,526	114.4%	15,376,081	6.5	2,365,551	
Signals	12,986,643	114.4%	14,857,940	6.5	2,285,837	
Comm	8,583,118	114.4%	9,819,894	6.5	1,510,753	
Fare collection	1,166,826	114.4%	1,334,959	6.5	205,378	
Track Materials	6,371,211	114.4%	7,289,264	6.5	1,121,425	
Insurance	5,902,440	114.4%	6,752,946	6.5	1,038,915	
ROW/Real Estate					30,000,000	ROW values - see assumptions below
Interim Financing					28,000,000	
Startup	8,000,000	114.4%	9,152,752	6.5	1,408,116	
E&A (adjusted)	156,237,165	114.4%	178,750,003	6.5	27,500,000	
Contingency (adjusted to 25%)	89,918,412	114.4%	102,875,115	6.5	15,826,941	
	449,592,058		514,375,576		137,134,704	cost / mile

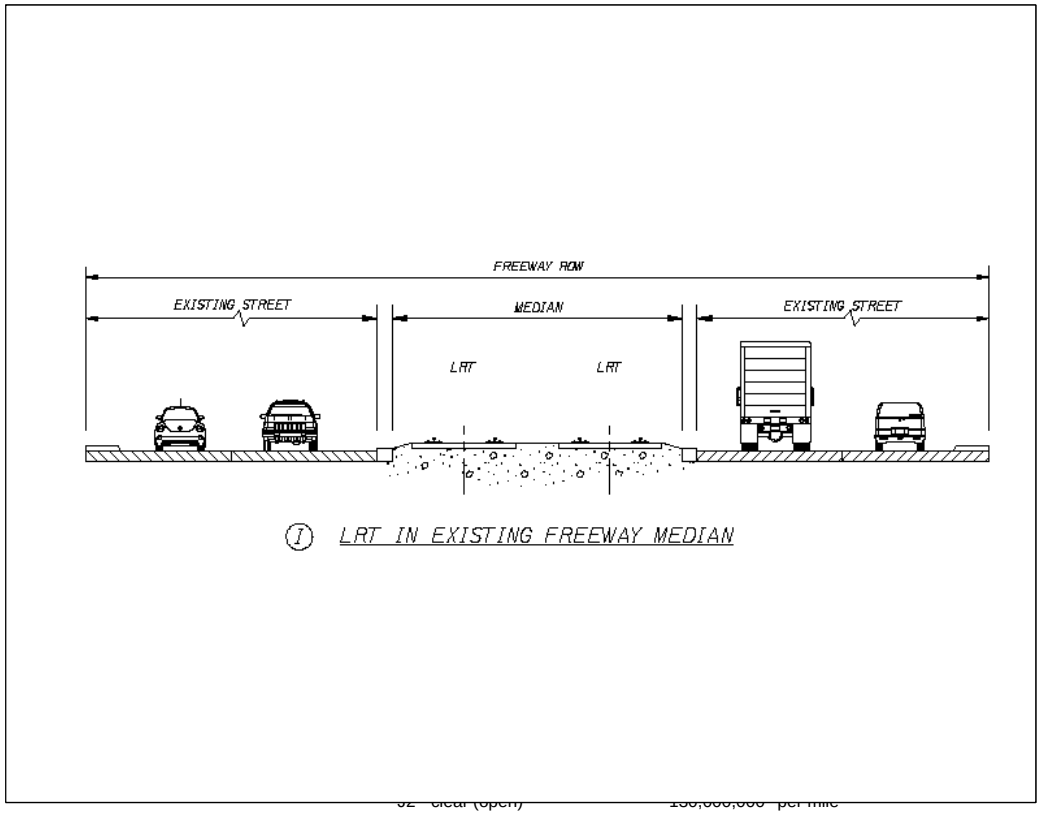
Existing roadway may or may not need improvements due to LRT - an allowance of $1 mil / mile Included

NOTE: not included are vehicles or maintenance facility costs
Fare collection based on 2 per station - stations assumed at ? Intervals

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

ROW assumptions

B1 = use 50' average width (takes) needed ROW min @ 34'	$8750 / Running RF	(50' x $175)	46,200,000
assumes only 1 side of existing street ROW needed (this could vary widely if adjacent properties are 100' lots instead of 50'			
B2 = use 50' average width (takes) needed ROW min @ 34'	$2500 / Running RF	(50' x $50)	13,200,000
assumes only 1 side of existing street ROW needed			
(see ROW assumptions in ROW Values workbook)			



① LRT IN EXISTING FREEWAY MEDIAN

Assumptions - South Corridor, I-205 used as model account "hwy" adjacent to new LRT ROW, without bridges or retaining wall pricing
B1 assumes ROW cost, building demo, relocation costs & impacts. Could be ballasted or paved track
B2 assumes ROW cost - but not buildings to demo or business relocations. Same track assumptions

	06 $	escalation	2009 $	Miles	2009 $ / Mile	
I-205 w/mods	83,421,538	114.4%	95,442,081	6.5	14,683,397	no retaining fill, retaining walls or aerial structures (bridges)
Stations (8)	10,115,186	114.4%	11,572,724	6.5	1,780,419	
P&R Structure (630)	15,525,795	114.4%	17,762,969	6.5	2,732,764	
Roadway allowance	5,681,351	114.4%	6,500,000	6.5	1,000,000	
TES/OCS	13,439,526	114.4%	15,376,081	6.5	2,365,551	
Signals	12,986,643	114.4%	14,857,940	6.5	2,285,837	
Comm	8,583,118	114.4%	9,819,894	6.5	1,510,753	
Fare collection	1,166,826	114.4%	1,334,959	6.5	205,378	
Track Materials	6,371,211	114.4%	7,289,264	6.5	1,121,425	
Insurance	5,902,440	114.4%	6,752,946	6.5	1,038,915	
ROW/Real Estate					30,000,000	ROW values - see assumptions below
Interim Financing					28,000,000	
Startup	8,000,000	114.4%	9,152,752	6.5	1,408,116	
E&A (adjusted)	156,237,165	114.4%	178,750,003	6.5	27,500,000	
Contingency (adjusted to 25%)	81,857,700	114.4%	93,652,903	6.5	14,408,139	
	409,288,499		468,264,517		130,040,694	cost / mile

Existing roadway may or may not need improvements due to LRT - an allowance of $1 mil / mile Included

NOTE: not included are vehicles or maintenance facility costs
Fare collection based on 2 per station - stations assumed at ? Intervals

Per John Griffiths - TM (Mgr RailOps Planning) use 2 vehicles / mile & $1.5mil per veh for the Maintenance Facility

ROW assumptions ODOT is based on adjacent "over the fence" values - pricing averaged

B1 = use 50' average width (takes) needed ROW min @ 34'	$8750 / Running RF	(50' x $175)	46,200,000	
assumes only 1 side of existing street ROW needed (this could vary widely if adjacent properties are 100' lots instead of 50'				29,700,000
B2 = use 50' average width (takes) needed ROW min @ 34'	$2500 / Running RF	(50' x $50)	13,200,000	

assumes only 1 side of existing street ROW needed
(see ROW assumptions in ROW Values workbook)

D3: Operating and Maintenance Costs (HCT Line)

Description	This is an assessment of the operating and maintenance costs for each corridor.
Data Sources	The analysis used the Metro travel demand forecasting model and TriMet cost data for existing high capacity transit.
Methodology	Using data provided by TriMet, the average cost per minute and the average cost per mile for the current Interstate MAX line were calculated. This line was chosen because, compared to other TriMet lines in use today, it has headways and other operating characteristics most similar to the lines modeled in the HCT Study. The cost per minute and cost per mile values were applied to each modeled HCT line, and the two results were for each line were averaged produce the projected operating and maintenance cost.
Ranking Methodology	Costs were ranked based on natural breaks in the data: Neutral - $0 - $3,000,000 Slightly Adverse - $3,000,001 - $7,000,000 Moderately Adverse - $7,000,001 - $10,500,000 Significantly Adverse – more than $10,500,001
Issues / Limitations	For the HCT System Plan, many of the physical and operating characteristics of the modeled lines that affect operating and maintenance costs, such as line routing, station locations, and speeds were assumed without the level of planning and engineering involved in a project study.

D3: Analysis Results (Operating Costs – HCT Line)

Corridor	Corridor Description	Annual O&M Costs	Quantitative Score	Assessment
8	Clackamas Town Center-Oregon City (I-205)	$4,100,000	-1	Slightly Adverse
9	Milwaukie-Oregon City (McLoughlin)	$4,400,000	-1	Slightly Adverse
10	Portland-Gresham (Powell)	$11,200,000	-3	Significantly Adverse
11	Portland-Sherwood (Barbur/Hwy 99)	$10,400,000	-2	Moderately Adverse
12	Hillsboro-Forest Grove	$4,200,000	-1	Slightly Adverse
13	Gresham-Troutdale	$2,700,000	0	Neutral
13T	Troutdale-Damascus	$8,500,000	-2	Moderately Adverse
16	Clackamas Town Center-Damascus	$4,000,000	-1	Slightly Adverse
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	$8,700,000	-2	Moderately Adverse
17D	Tanasbourne	$3,000,000	0	Neutral
28	Clackamas Town Center-Washington Square	$14,300,000	-3	Significantly Adverse
29	Clackamas Town Center-Washington Square (RR ROW)	$11,600,000	-3	Significantly Adverse
32	Beaverton-Hillsboro (TV Hwy)	$6,500,000	-1	Slightly Adverse
34	Beaverton-Wilsonville	$9,600,000	-2	Moderately Adverse
38S	Tualatin-Sherwood	$2,600,000	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	$9,100,000	-2	Moderately Adverse
54	Troutdale-St. John's	$13,700,000	-3	Significantly Adverse

D4: Ridership

Description	This is a quantitative assessment of daily ridership for the entire corridor.
Data Sources	Data was generated from the Regional Travel Demand Model.
Methodology	
Ranking Methodology	Ridership was ranked based on natural breaks in the data: Total daily corridor ridership • Neutral = 6,976 – 12,024 • Slight Benefit = 12,025 – 19,406 • Moderate Benefit = 19,407 – 30,004 • Significant Benefit = 30,005 – 38,300 Ridership per Revenue Hour • Neutral = 90-189 • Slight Benefit = 190-294 • Moderate Benefit = 295-397 • Significant Benefit = 398-603 Ridership per Revenue Mile • Neutral = 4-7 • Slight Benefit = 8-12 • Moderate Benefit = 13-19 • Significant Benefit = 20-26 Change in Corridor Shed Ridership • Neutral = 917 – 3,469 • Slight Benefit = 3,470-7,781 • Moderate Benefit = 7,782-13,124 • Significant Benefit = 13,125-25,084
Issues / Limitations	

D4: Analysis Results (Ridership)

corridor	corridor description	Corridor Daily Boardings	quantitative measure	assessment	Change in Corridor Shed Transit Ridership	quantitative measure	assessment	Corridor Ridership per Revenue Hour	quantitative measure	assessment	Corridor Ridership per Revenue Mile	quantitative measure	assessment
8	Clackamas Town Center-Oregon City (I-205)	15,000	1	Slight Benefit	4,000	1	Slight Benefit	259	1	Slight Benefit	12	1	Slight Benefit
9	Milwaukie-Oregon City (McLoughlin)	16,000	1	Slight Benefit	5,000	1	Slight Benefit	319	2	Moderate Benefit	18	2	Moderate Benefit
10	Portland-Gresham (Powell)	28,000	2	Moderate Benefit	1,000	0	Neutral	286	1	Slight Benefit	12	1	Slight Benefit
11	Portland-Sherwood (Barbur/Hwy 99)	38,000	3	Significant Benefit	12,000	2	Moderate Benefit	467	3	Significant Benefit	16	2	Moderate Benefit
12	Hillsboro-Forest Grove	8,000	0	Neutral	4,000	1	Slight Benefit	178	0	Neutral	8	1	Slight Benefit
13	Gresham-Troutdale	12,000	0	Neutral	3,000	0	Neutral	397	2	Moderate Benefit	19	2	Moderate Benefit
13D	Troutdale-Damascus	19,000	1	Slight Benefit	12,000	2	Moderate Benefit	246	1	Slight Benefit	9	1	Slight Benefit
16	Clackamas Town Center-Damascus	7,000	0	Neutral	1,000	0	Neutral	189	0	Neutral	7	0	Neutral
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	22,000	2	Moderate Benefit	12,000	2	Moderate Benefit	288	1	Slight Benefit	11	1	Slight Benefit
17D	Tanasbourne	10,000	0	Neutral	3,000	0	Neutral	603	3	Significant Benefit	26	3	Significant Benefit
28	Clackamas Town Center-Washington Square	30,000	2	Moderate Benefit	21,000	3	Significant Benefit	252	1	Slight Benefit	10	1	Slight Benefit
29	Clackamas Town Center-Washington Square (RR ROW)	25,000	2	Moderate Benefit	13,000	2	Moderate Benefit	324	2	Moderate Benefit	10	1	Slight Benefit
32	Beaverton-Hillsboro (TV Hwy)	19,000	1	Slight Benefit	8,000	1	Slight Benefit	294	1	Slight Benefit	12	1	Slight Benefit
34	Beaverton-Wilsonville	35,000	3	Significant Benefit	25,000	3	Significant Benefit	492	3	Significant Benefit	14	2	Moderate Benefit
38S	Tualatin-Sherwood	8,000	0	Neutral	2,000	0	Neutral	144	0	Neutral	5	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	10,000	0	Neutral	6,000	1	Slight Benefit	157	0	Neutral	6	0	Neutral
54	Troutdale-St. John's	11,000	0	Neutral	5,000	1	Slight Benefit	90	0	Neutral	4	0	Neutral

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D5: Funding Potential

Description	This is an assessment of each corridor's potential to qualify for federal funding under Federal Transit Administration (FTA) program guidelines. FTA funding of guideway capital investments requires demonstration of cost-effectiveness of the project. For FTA purposes, cost effectiveness is determined by comparing the costs, ridership, and travel times of the project to the costs, ridership, and travel times of a comparable non-HCT mode. This comparable HCT mode is referred to as the Baseline Alternative.
Data Sources	The analysis used Metro travel demand forecasting model outputs produced for other evaluation criteria, each described elsewhere in Section III. These criteria are ridership, capital costs, operating and maintenance costs, average in-vehicle travel time savings per rider.
Methodology	For each corridor, capital costs were annualized using a factor of .07. It was assumed that the operating and maintenance costs for a Baseline alignment are 25% of the cost of the Build project. Ridership was calculated using the Regional Travel Demand Model and adjusted to estimate the difference between the build alignment and a Baseline alignment The sum of the capital costs and operating costs were divided by the ridership number to obtain a cost per user benefit value. These values were then ranked. The peak-period, average in-vehicle travel time saved per rider was multiplied by the corridor ridership to obtain a total rider minutes saved value for each corridor. These values were then ranked. Finally, the 2 scores for each corridor were combined and that score was used to rank the corridors.
Ranking Methodology	Corridors were scored using the following categories: ● Significant potential = 3 ● Moderate potential = 2 ● Slight potential = 1 ● Neutral = 0 ● Slight constraint = -1 ● Moderate constraint = -2 ● Significant constraint = -3
Issues / Limitations	In a formal FTA study, an alignment developed for the Baseline Alternative would closely replicate the route of the Build alignment, and would be thoroughly analyzed for cost estimates and ridership projections to develop differences to the Build alignment. These differences could vary significantly between corridors. In this study, cost differences were estimated using a percentage change that applied to each corridor, and the No-Build conditions were used as a surrogate for a Baseline Alternative for ridership and travel times. As a result, cost, ridership, and travel time changes indicate, but would not replicate the values that would result from a formal FTA study. For some corridors, the No-Build transit may adequately represent the alignment developed for a Baseline Alternative. For other corridors, however, the existing No-Build transit would not replicate the HCT alignment as well as a developed Baseline Alternative. In these cases, this methodology

	may overestimate travel times savings of the Build alignment, resulting in an artificially high score. Specifically, corridors 13D, 16, 28, and 54 would likely perform worse relative to the other corridors if formal Baseline alignments were developed. For other corridors, the cost of a Baseline alignment would be higher than the costs estimated under this methodology, so these corridors would likely perform better relative to other corridors. An example of this is corridor 28, in which a Baseline Alternative would have to travel long distances to replicate the service of an HCT line which would cross the Willamette River between Milwaukie and Lake Oswego.

D5: Analysis Results (Funding Potential)

Corridor	Corridor Description	Total Score	Assessment
8	Clackamas Town Center-Oregon City (I-205)	2	Moderate Potential
9	Milwaukie-Oregon City (McLoughlin)	1	Slight Potential
10	Portland-Gresham (Powell)	1	Slight Potential
11	Portland-Sherwood (Barbur/Hwy 99)	3	Significant Potential
12	Hillsboro-Forest Grove	-1	Slight Constraint
13	Gresham-Troutdale	1	Slight Potential
13T	Troutdale-Damascus	1	Slight Potential
16	Clackamas Town Center-Damascus	-2	Moderate Constraint
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	0	Neutral
17D	Tanasbourne	0	Neutral
28	Clackamas Town Center-Washington Square	2	Moderate Potential
29	Clackamas Town Center-Washington Square (RR ROW)	3	Significant Potential
32	Beaverton-Hillsboro (TV Hwy)	0	Neutral
34	Beaverton-Wilsonville	2	Moderate Potential
38S	Tualatin-Sherwood	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	-2	Moderate Constraint
54	Troutdale-St. John's	-1	Slight Constraint

Supporting Criteria

Description	Several additional criteria were evaluated that were not adopted by the Metro Council but were considered good supporting criteria: • Sidewalk capital costs necessary for improved pedestrian connectivity • Operating costs for supporting bus (still waiting for data) • Capital costs for supporting bus (still waiting for data)
Data Sources	All data on gaps in the sidewalk network comes from a GIS analysis conducted with Regional Land Information System (RLIS) data.
Methodology	The sidewalk capital costs were calculated based on an assessment of gaps in the sidewalk network and an estimated cost of $75.00 per foot for construction costs. Two methodologies were utilized: 1) an estimate of sidewalk deficiencies only within a ½ mile buffer around identified stations, and 2) an estimate of sidewalk deficiencies within ½ mile buffer of the entire corridor.
Ranking Methodology	
Issues / Limitations	

Analysis Results – Supporting Criteria

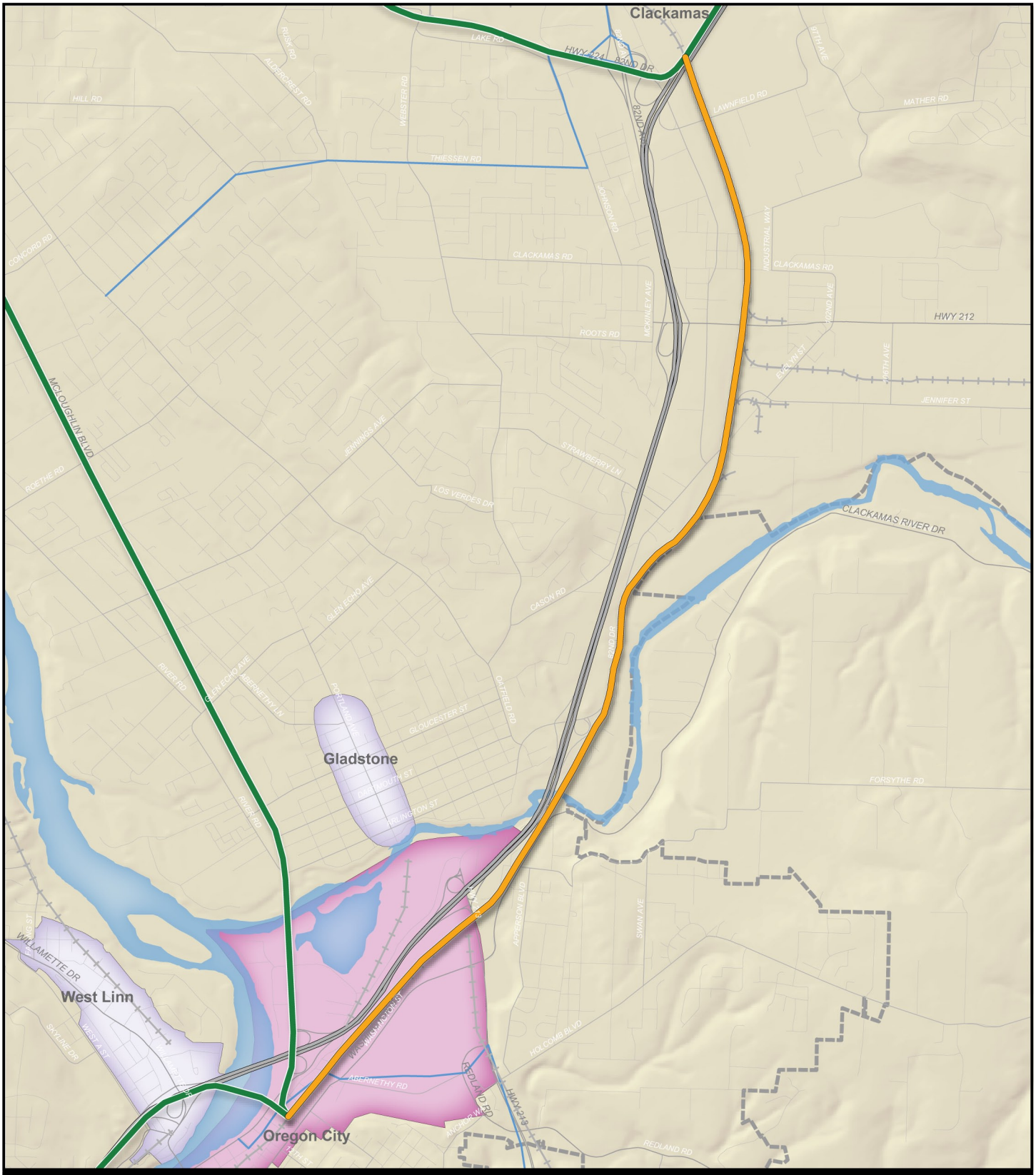
Capital Costs – Sidewalks (Method 1: Modeled station points and half-mile station areas)

Corridor	Corridor Description	Total Street Length	Total Sidewalk Needed	Sidewalk Cost	Quantitative Score	Assessment
8	Clackamas Town Center-Oregon City (I-205)	204,711	255,985	$19,198,861	-2	Moderately Adverse
9	Milwaukie-Oregon City (McLoughlin)	342,568	481,053	$36,078,974	-3	Significantly Adverse
10	Portland-Gresham (Powell)	767,209	433,051	$32,478,797	0	Neutral
11	Portland-Sherwood (Barbur/Hwy 99)	781,656	901,569	$67,617,697	-1	Slightly Adverse
12	Hillsboro-Forest Grove	322,180	244,280	$18,320,975	-1	Slightly Adverse
13	Gresham-Troutdale	272,818	148,645	$11,148,347	0	Neutral
13D	Troutdale-Damascus	375,676	226,394	$16,979,568	0	Neutral
16	Clackamas Town Center-Damascus	152,544	113,441	$8,508,060	-2	Moderately Adverse
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	494,417	407,035	$30,527,634	0	Neutral
17D	Tanasbourne	177,636	136,154	$10,211,553	-2	Moderately Adverse
28	Clackamas Town Center-Washington Square	384,754	436,699	$32,752,450	-2	Moderately Adverse
29	Clackamas Town Center-Washington Square (RR ROW)	436,924	537,517	$40,313,756	-2	Moderately Adverse
32	Beaverton-Hillsboro (TV Hwy)	547,294	443,663	$33,274,762	-1	Slightly Adverse
34	Beaverton-Wilsonville	255,441	235,869	$17,690,168	0	Neutral
38S	Tualatin-Sherwood	34,498	25,694	$1,927,049	0	Neutral
43	Downtown Portland-St. John's-Yellow Line	111,142	59,402	$4,455,126	0	Neutral
54	Troutdale-St. John's	662,422	551,433	$41,357,493	-2	Moderately Adverse

Capital Costs – Sidewalks (Method 2: Complete Corridor)

Corridor	Corridor Description	Total Street Length	Total Sidewalk Needed	Sidewalk Cost	Quantitative Score	Assessment
8	Clackamas Town Center-Oregon City (I-205)	354,523	479,592	$35,969,373	-2	Moderately Adverse
9	Milwaukie-Oregon City (McLoughlin)	534,749	797,704	$59,827,787	-3	Significantly Adverse
10	Portland-Gresham (Powell)	1,510,346	898,076	$67,355,666	-1	Slightly Adverse
11	Portland-Sherwood (Barbur/Hwy 99)	1,244,661	1,476,225	$110,716,873	0	Neutral
12	Hillsboro-Forest Grove	484,932	448,550	$33,641,215	-1	Slightly Adverse
13	Gresham-Troutdale	372,206	234,304	$17,572,765	0	Neutral
13D	Troutdale-Damascus	546,033	362,404	$27,180,271	-2	Moderately Adverse
16	Clackamas Town Center-Damascus	226,394	185,840	$13,937,992	0	Neutral
17	Sunset TC-Hillsboro (Hwy 26/Evergreen)	854,157	678,485	$50,886,356	-3	Significantly Adverse
17D	Tanasbourne	303,043	191,208	$14,340,568	-3	Significantly Adverse
28	Clackamas Town Center-Washington Square	1,103,948	1,198,790	$89,909,258	-2	Moderately Adverse
29	Clackamas Town Center-Washington Square (RR ROW)	1,113,248	1,519,597	$113,969,763	-2	Moderately Adverse
32	Beaverton-Hillsboro (TV Hwy)	814,432	657,413	$49,305,989	0	Neutral
34	Beaverton-Wilsonville	845,856	726,800	$54,510,026	-1	Slightly Adverse
38S	Tualatin-Sherwood	278,612	180,488	$13,536,604	-3	Significantly Adverse
43	Downtown Portland-St. John's-Yellow Line	656,407	378,414	$28,381,070	-1	Slightly Adverse
54	Troutdale-St. John's	1,411,776	1,268,952	$95,171,434	-2	Moderately Adverse

Section IV: Corridor Maps



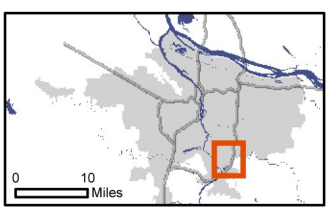
High Capacity Transit System Plan

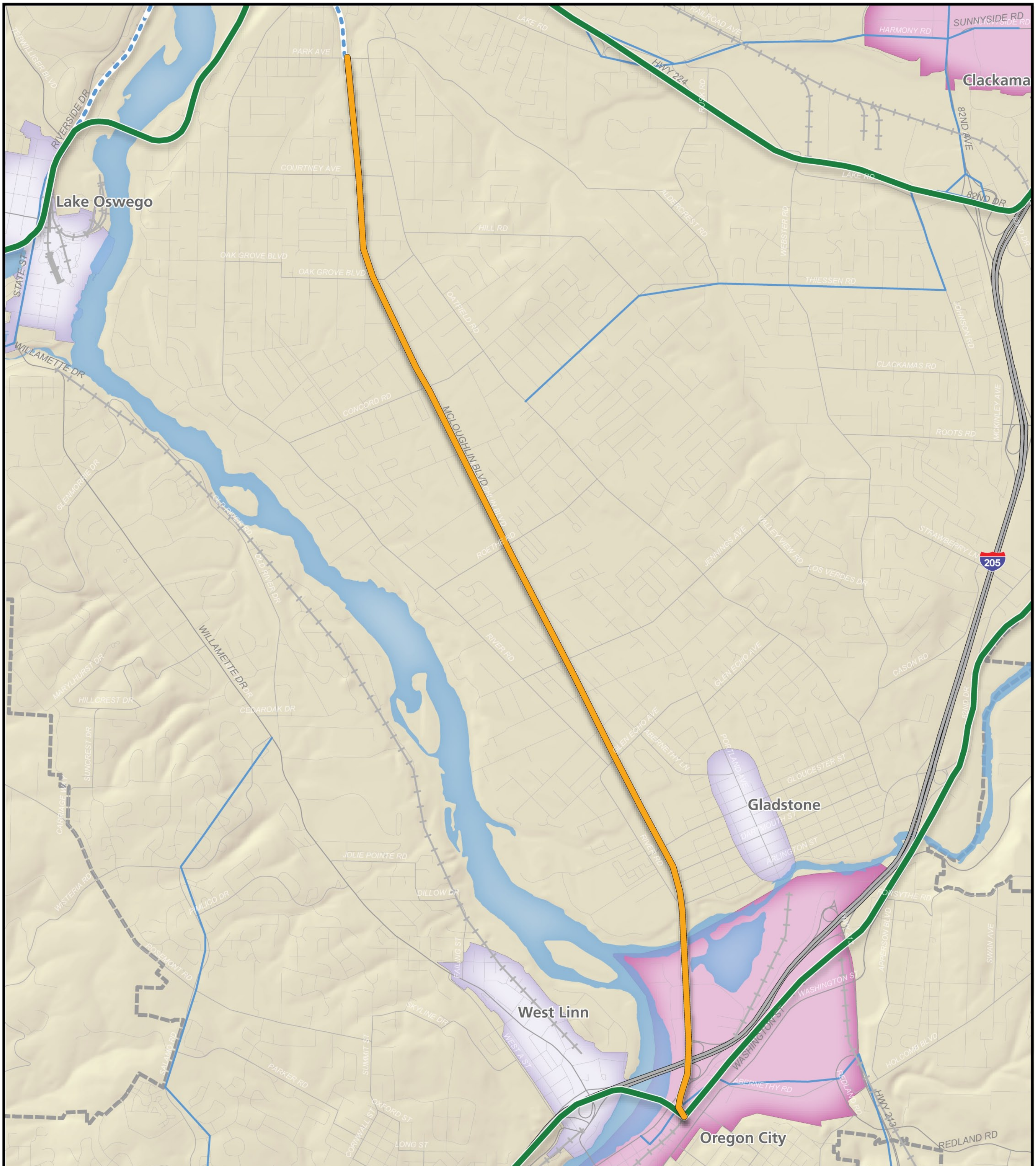
Corridor 8 - Clackamas to Oregon City

- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

0 0.25 0.5 Miles

March 2009





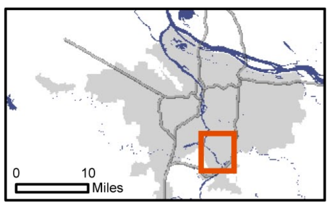
High Capacity Transit System Plan

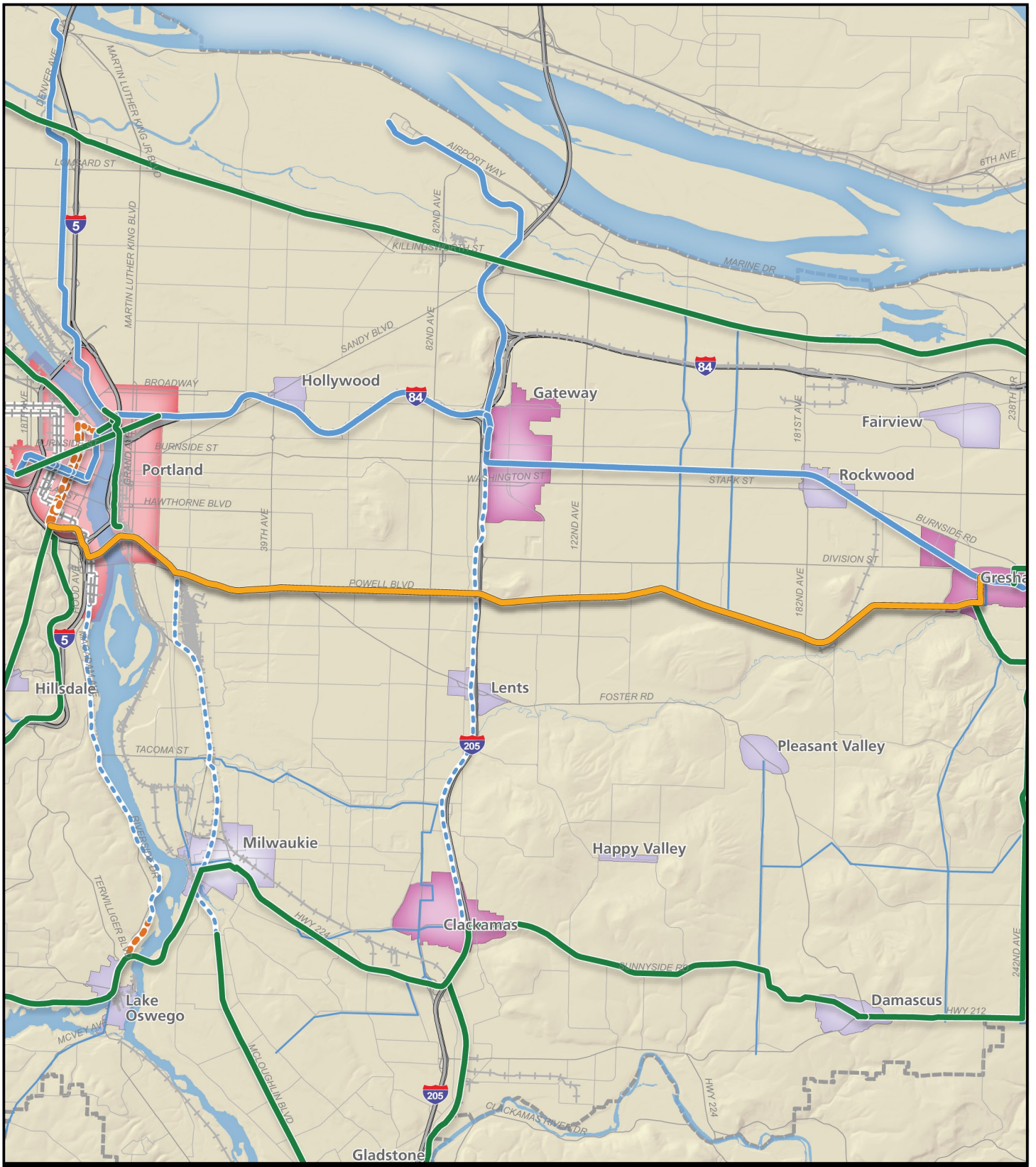
Corridor 9 - Oak Grove to Oregon City

- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Planned/Under Construction LRT
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

0 0.25 0.5 Miles

March 2009





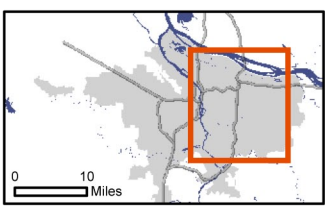
High Capacity Transit System Plan

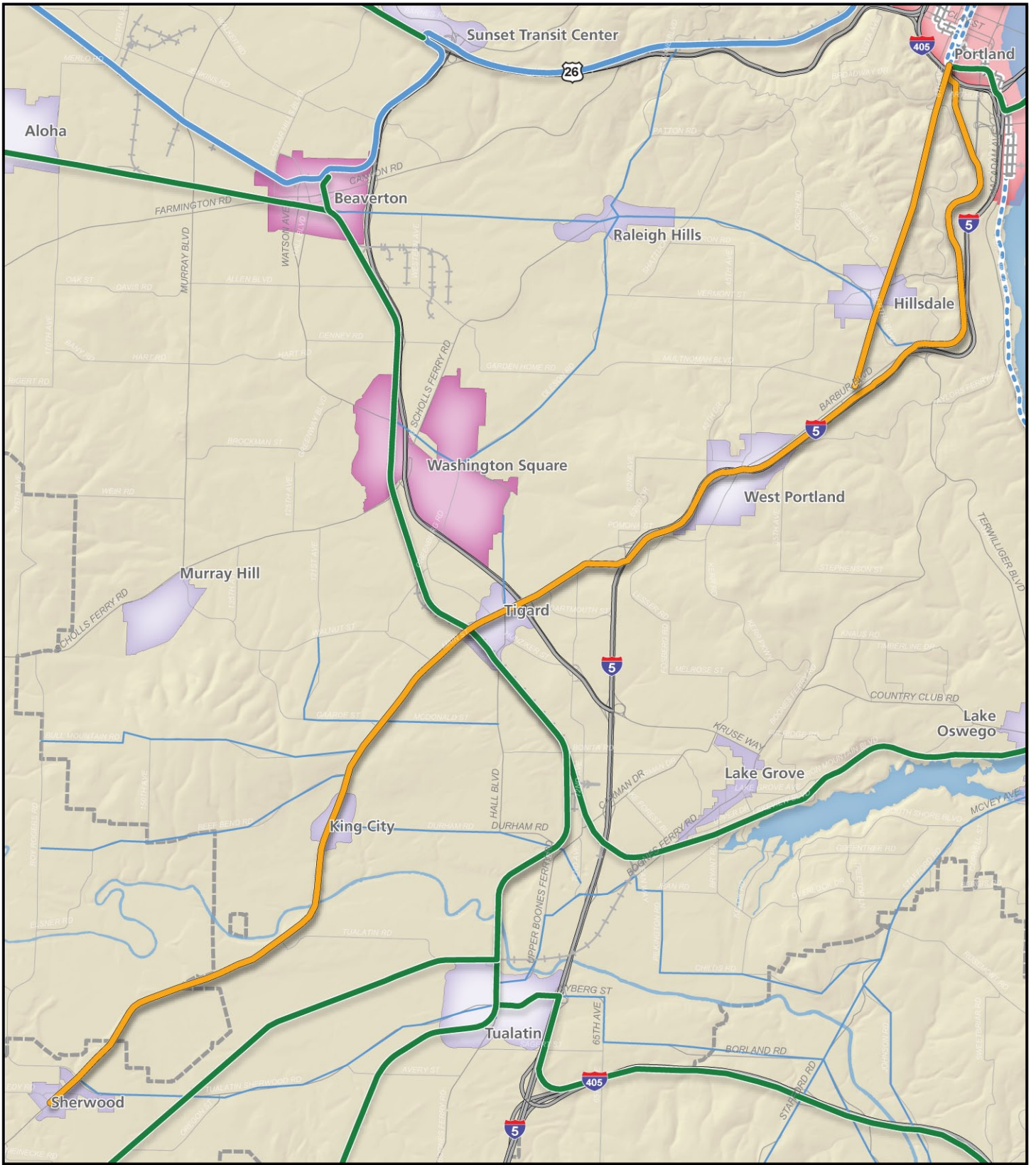
Corridor 10 - Powell Boulevard

- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Planned/Under Construction LRT
- Existing Street Car
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

0 1 2 Miles

March 2009





High Capacity Transit System Plan

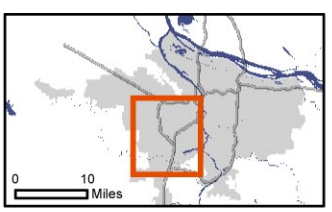
Corridor 11/11T - Barbur Boulevard/Barbur Tunnel

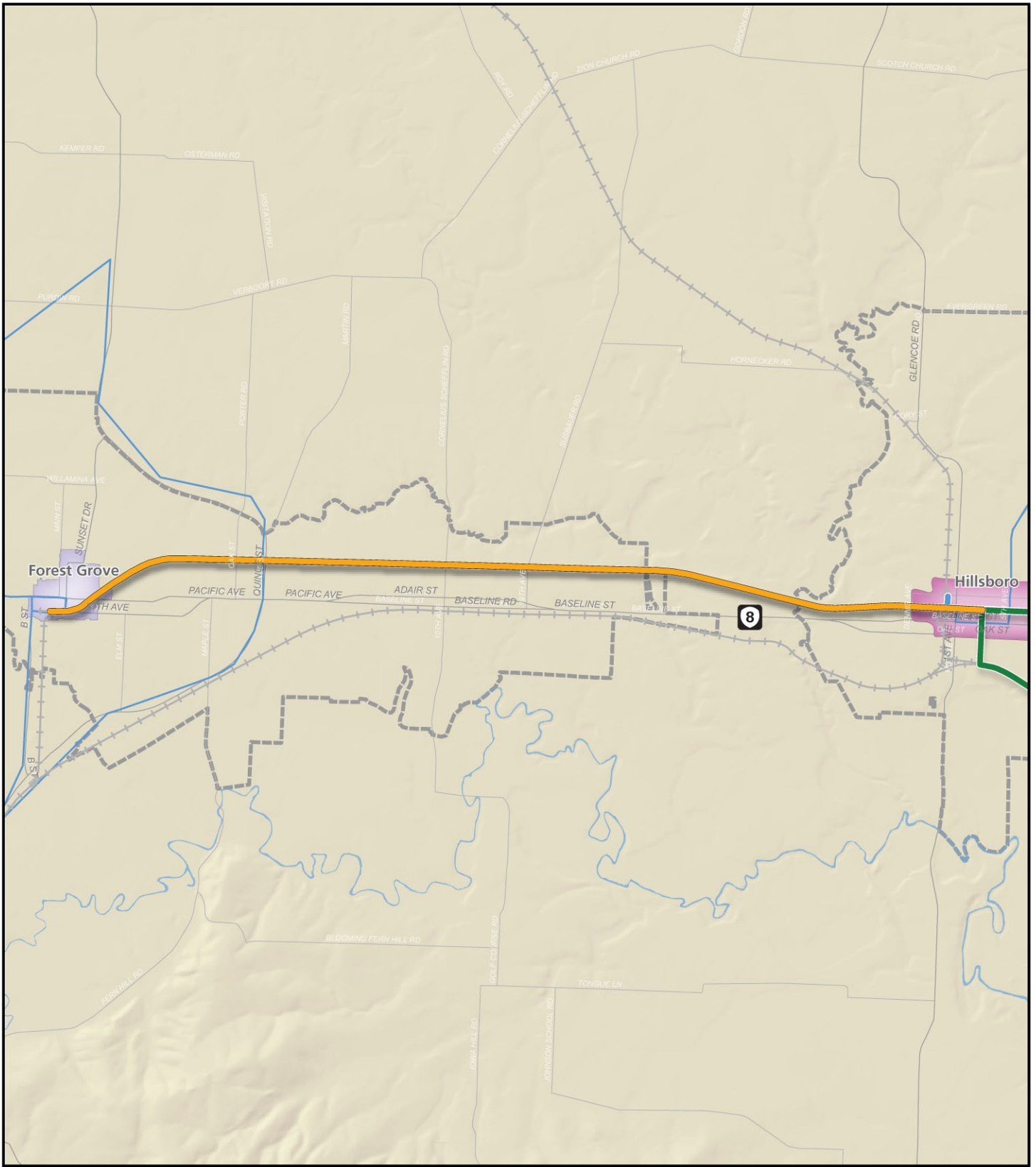
- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Planned/Under Construction LRT
- Existing Street Car
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

N

0 0.5 1 Miles

March 2009





High Capacity Transit System Plan

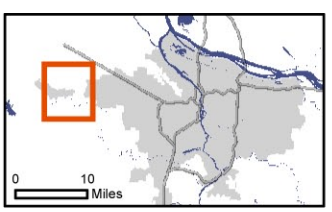
Corridor 12 - Forest Grove Extension

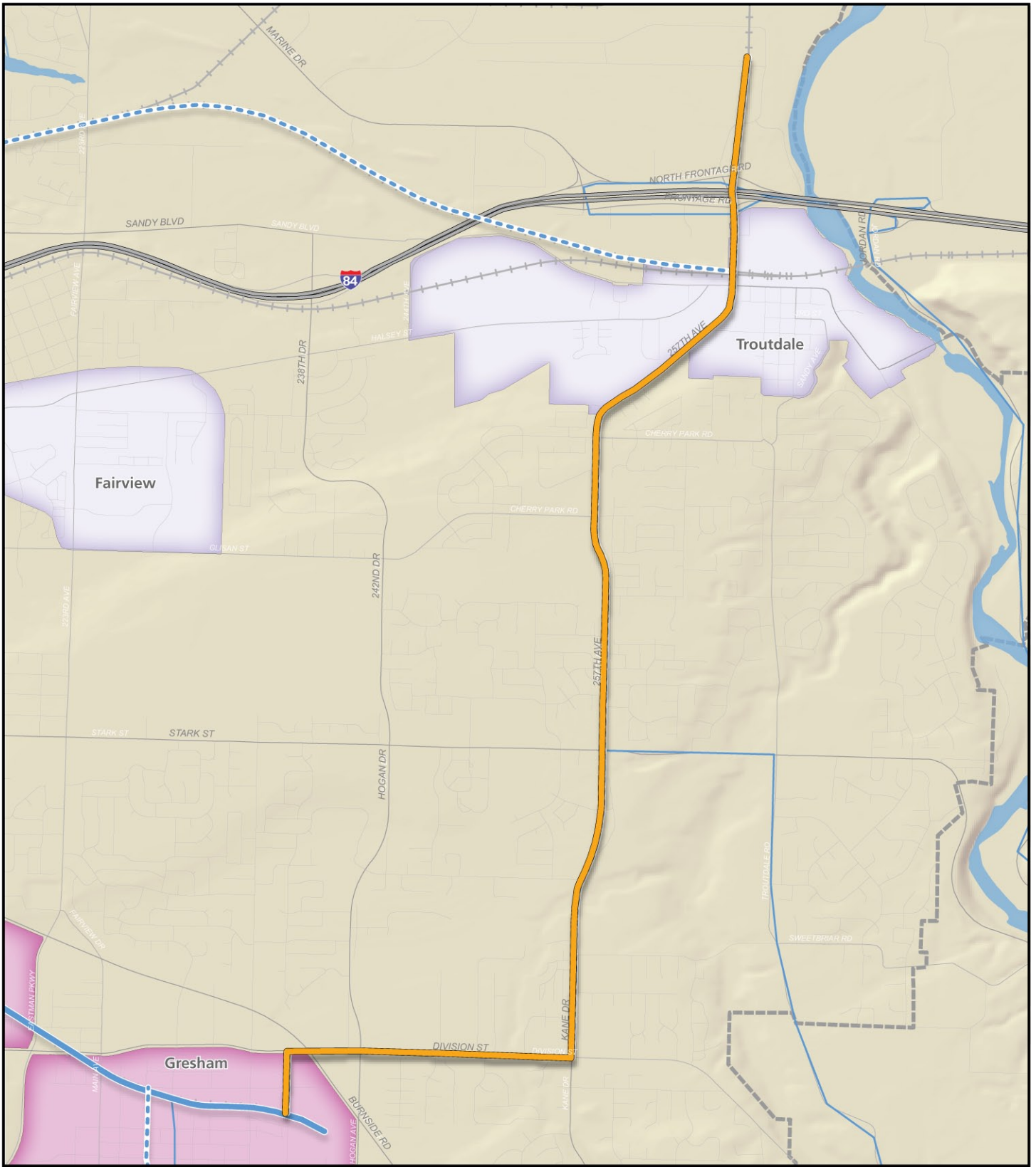
- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

N

0 0.5 1 Miles

March 2009





High Capacity Transit System Plan

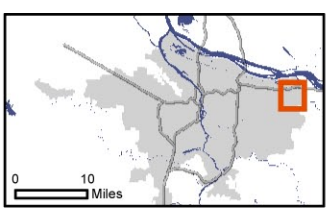
Corridor 13 - Gresham to Troutdale

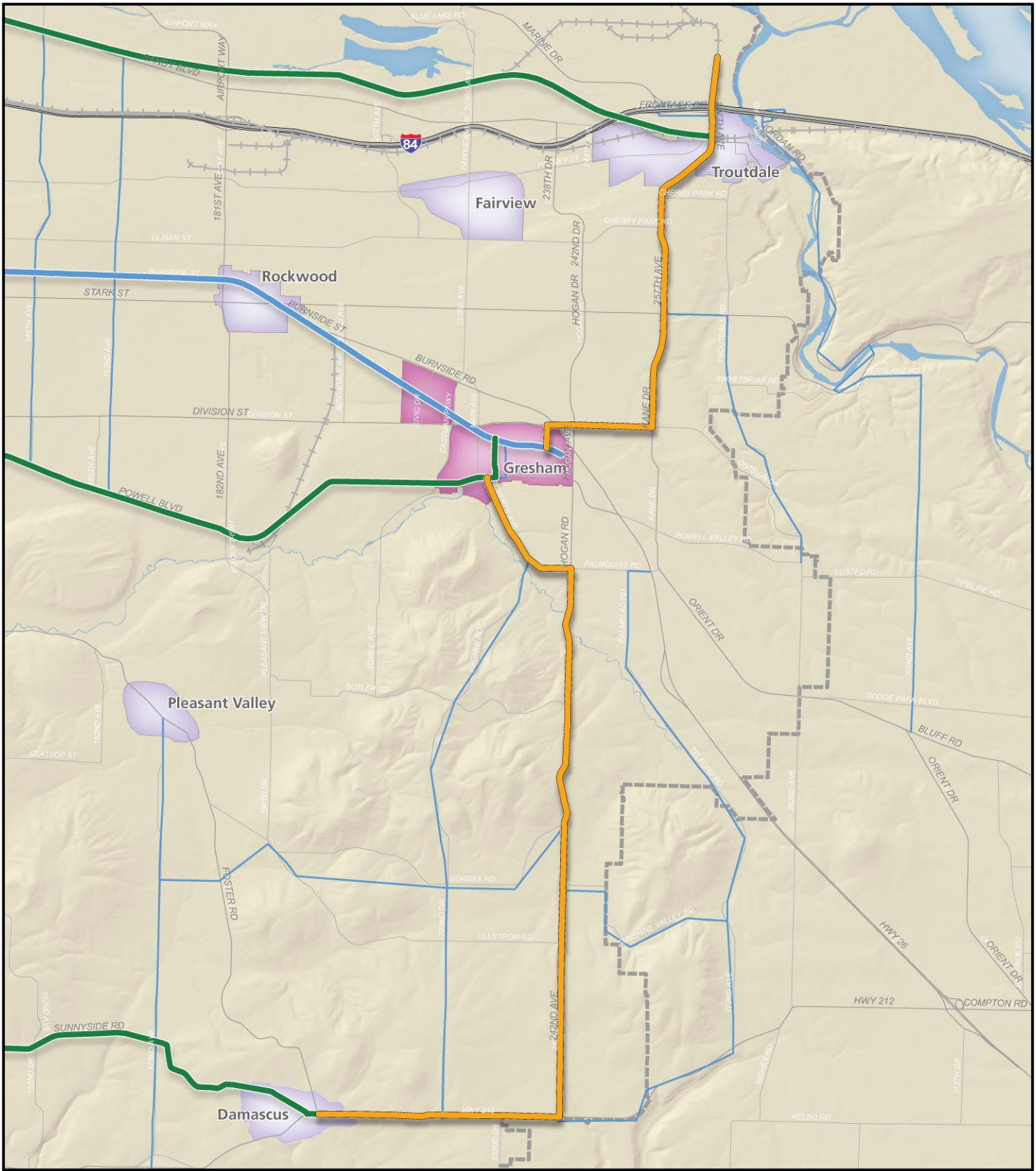
- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

N

0 0.25 0.5 Miles

March 2009





High Capacity Transit System Plan

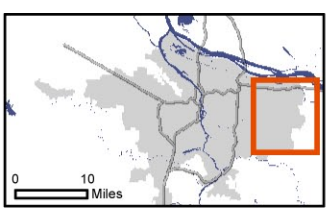
Corridor 13D - Damascus to Troutdale

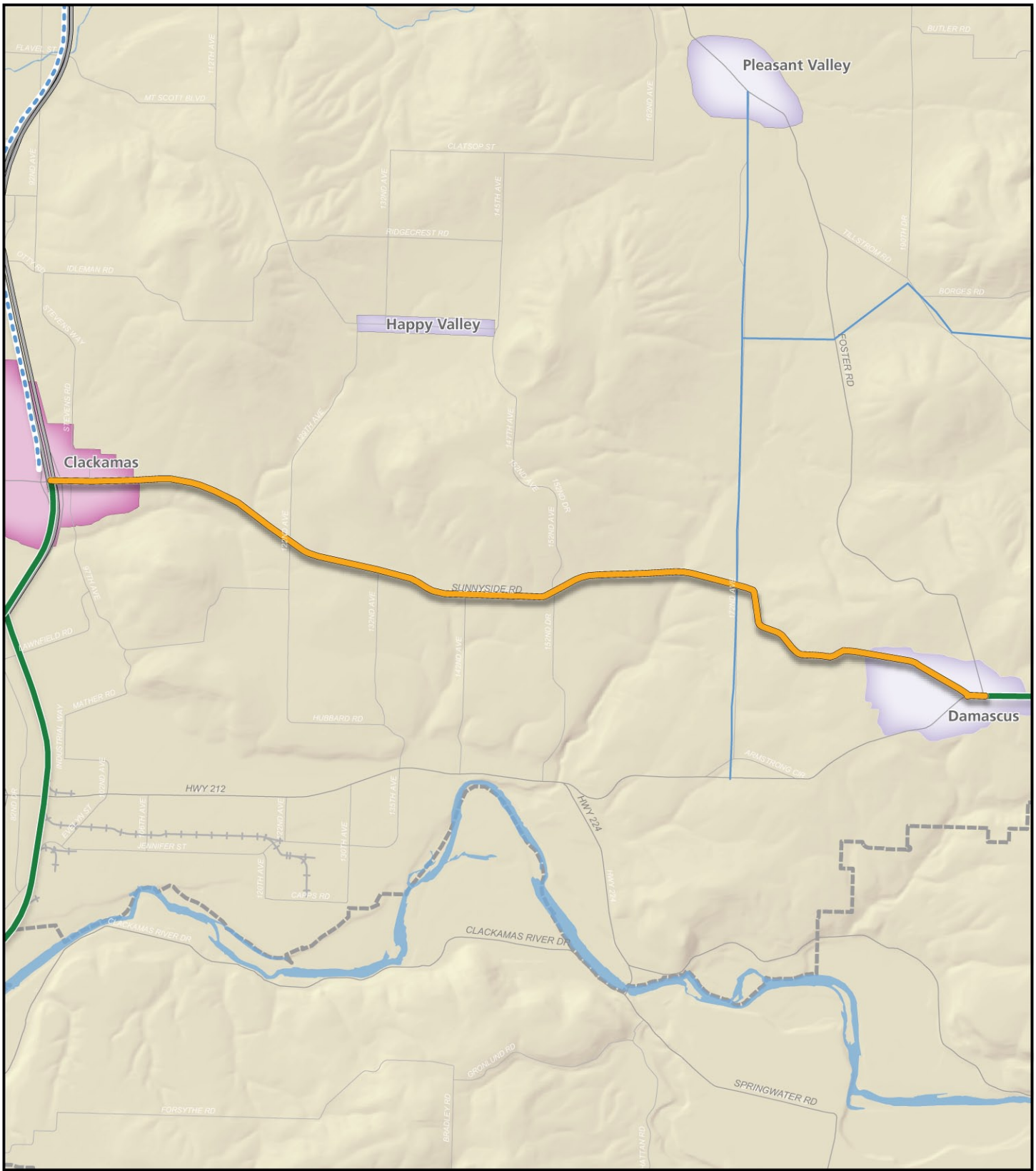
- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

N

0 0.5 1 Miles

March 2009





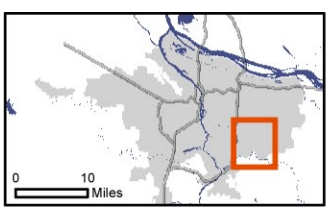
High Capacity Transit System Plan

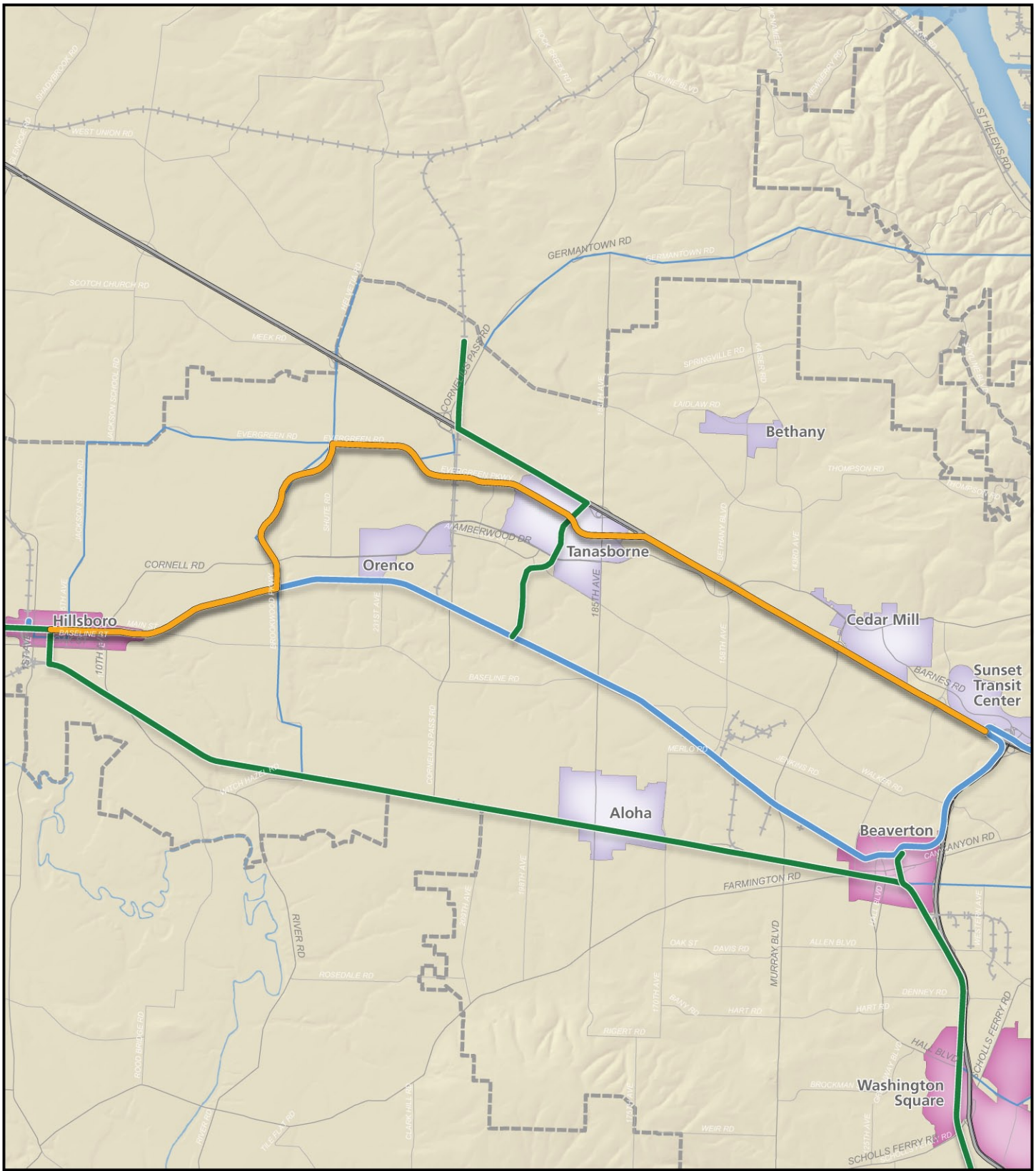
Corridor 16 - Clackamas to Damascus

- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Planned/Under Construction LRT
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

0 0.5 1 Miles

March 2009





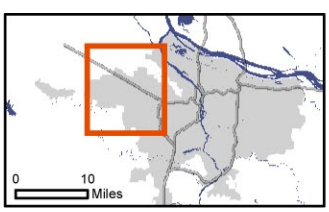
High Capacity Transit System Plan

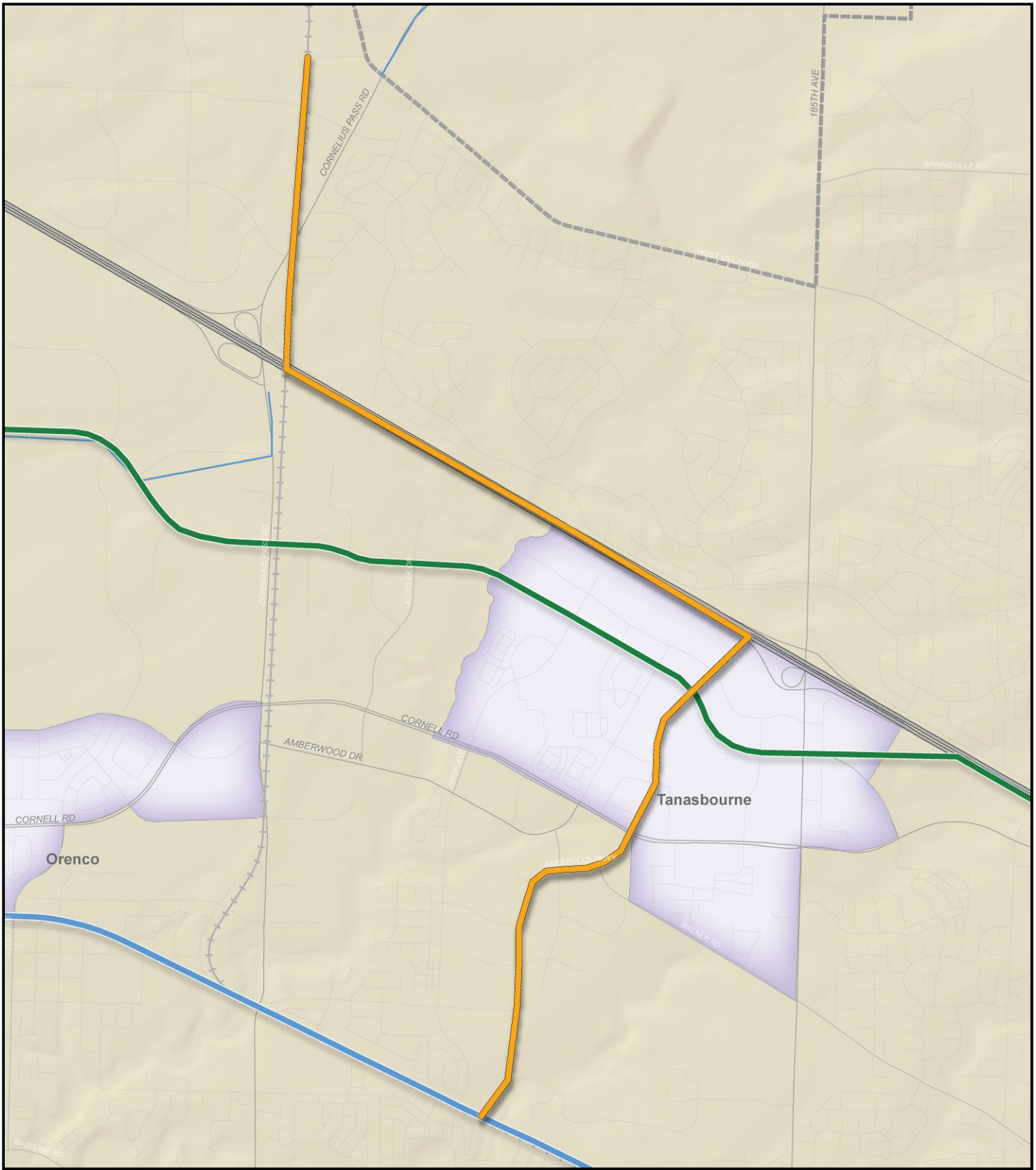
Corridor 17 - Sunset to Hillsboro

- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

0 0.5 1 Miles

March 2009





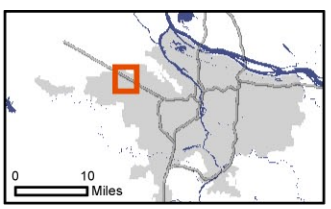
High Capacity Transit System Plan

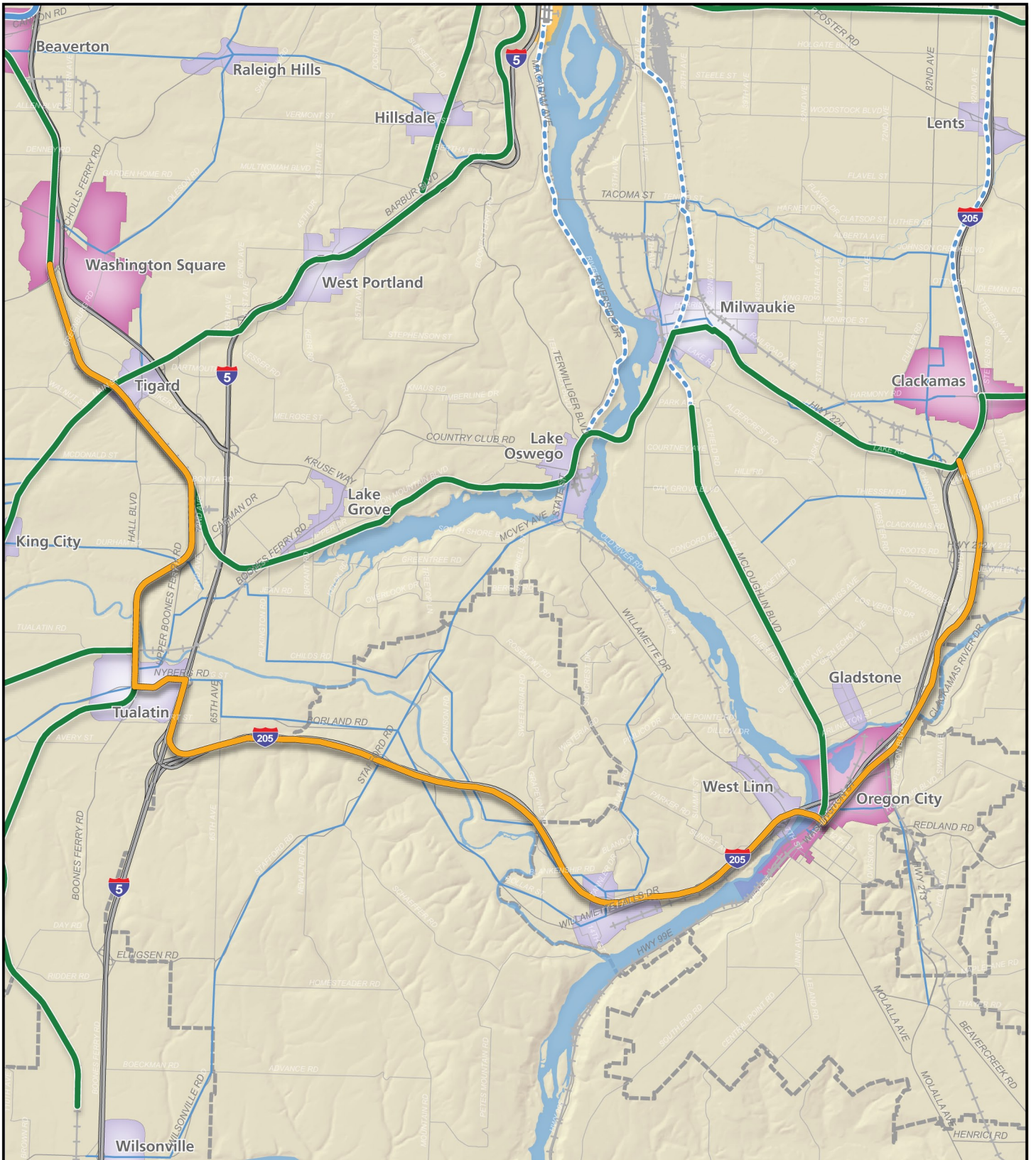
Corridor 17D - Existing LRT to Tanasbourne

- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

0 0.25 0.5 Miles

March 2009





High Capacity Transit System Plan

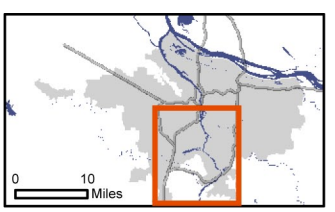
Corridor 28 - Clackamas to Washington Square

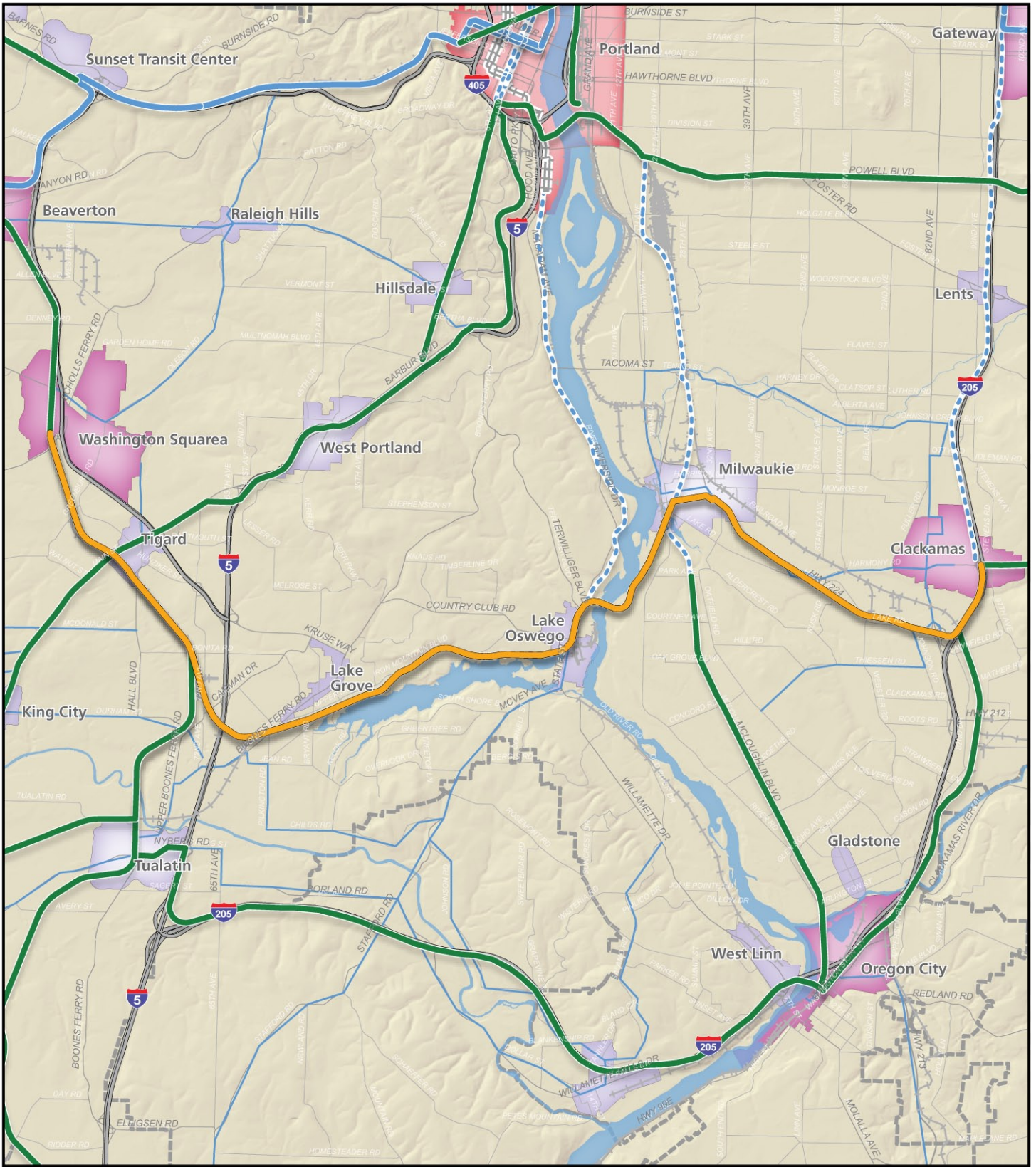
- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Planned/Under Construction LRT
- Existing Street Car
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

N

0 0.5 1 Miles

March 2009





High Capacity Transit System Plan

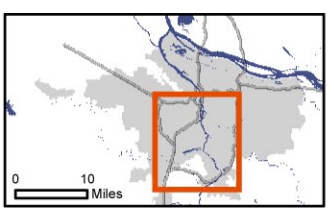
Corridor 29 - Clackamas to Washington Square

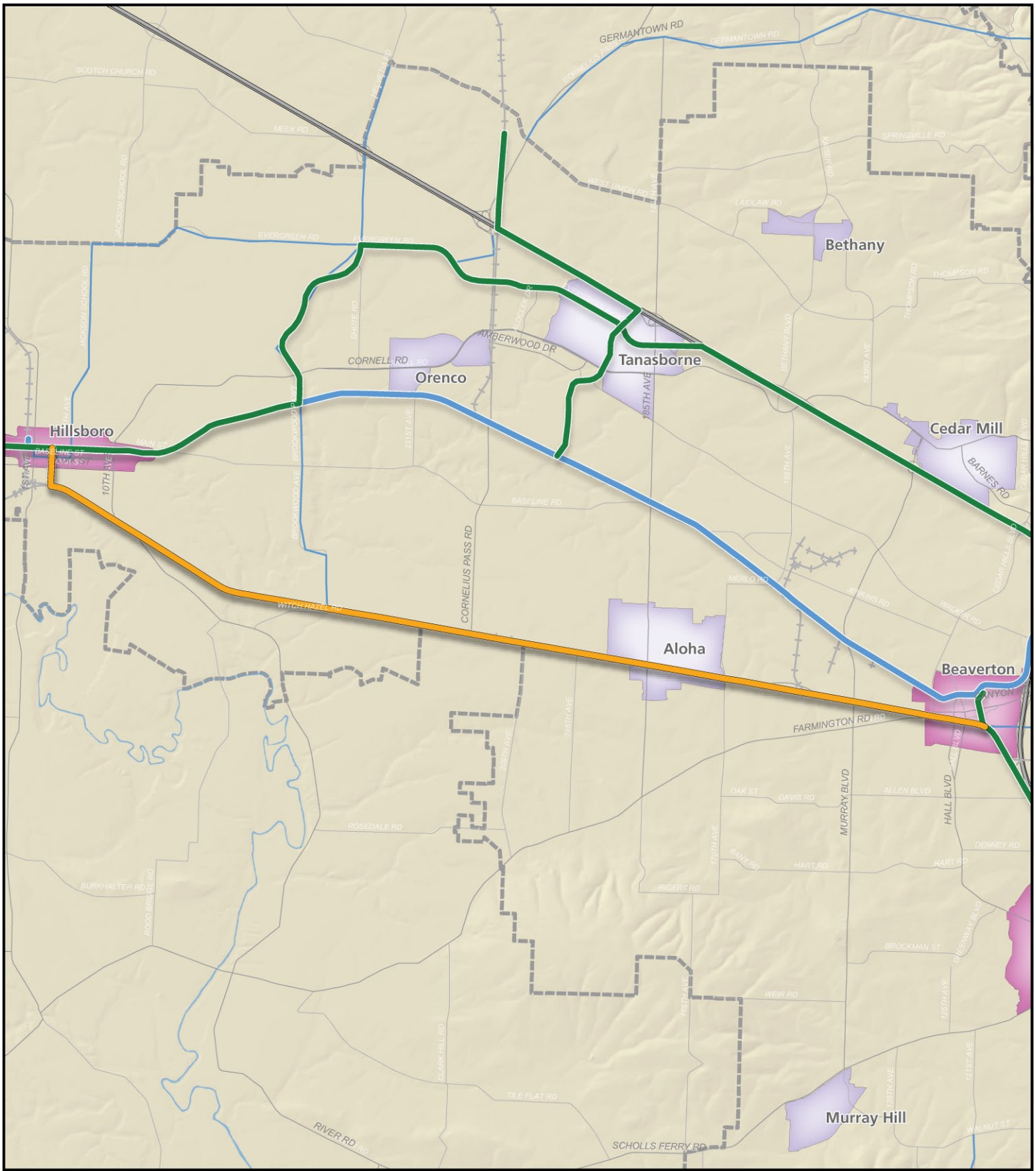
- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Planned/Under Construction LRT
- Existing Street Car
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

N

0 0.5 1 Miles

March 2009





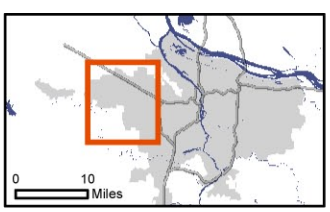
High Capacity Transit System Plan

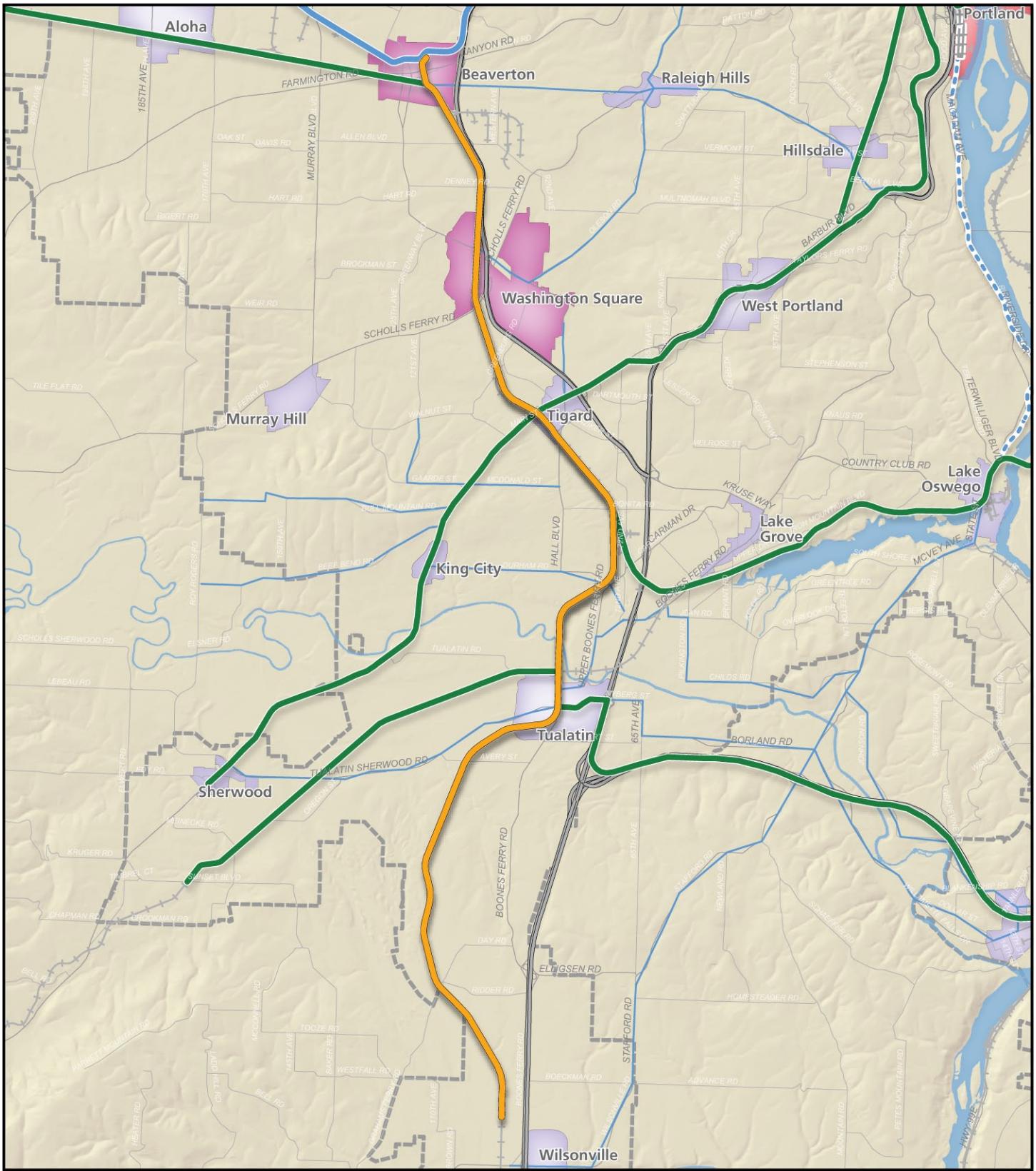
Corridor 32 - Beaverton to Hillsboro (TV Highway)

- Evaluated Corridor
- HCT Corridors for Evaluation
- Existing LRT
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

0 0.5 1 Miles

March 2009





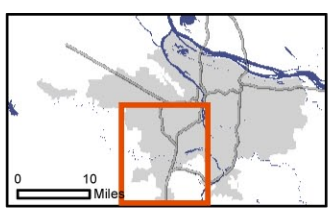
High Capacity Transit System Plan

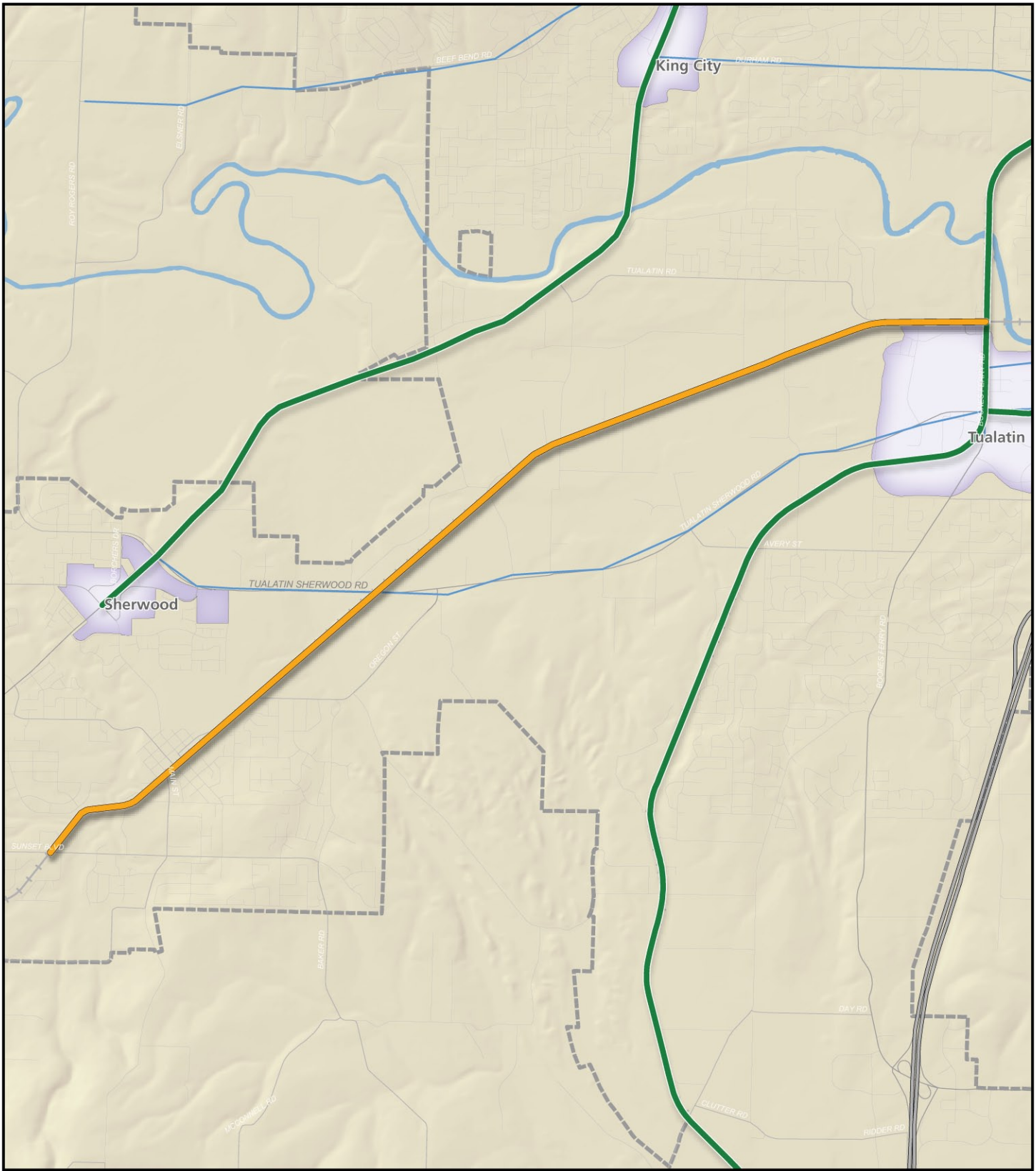
Corridor 34 - Westside Express Service

- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Planned/Under Construction LRT
- Existing Street Car
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

0 0.5 1 Miles

March 2009





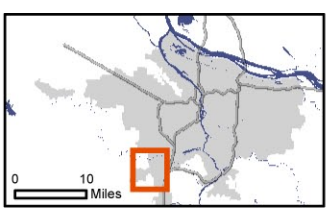
High Capacity Transit System Plan

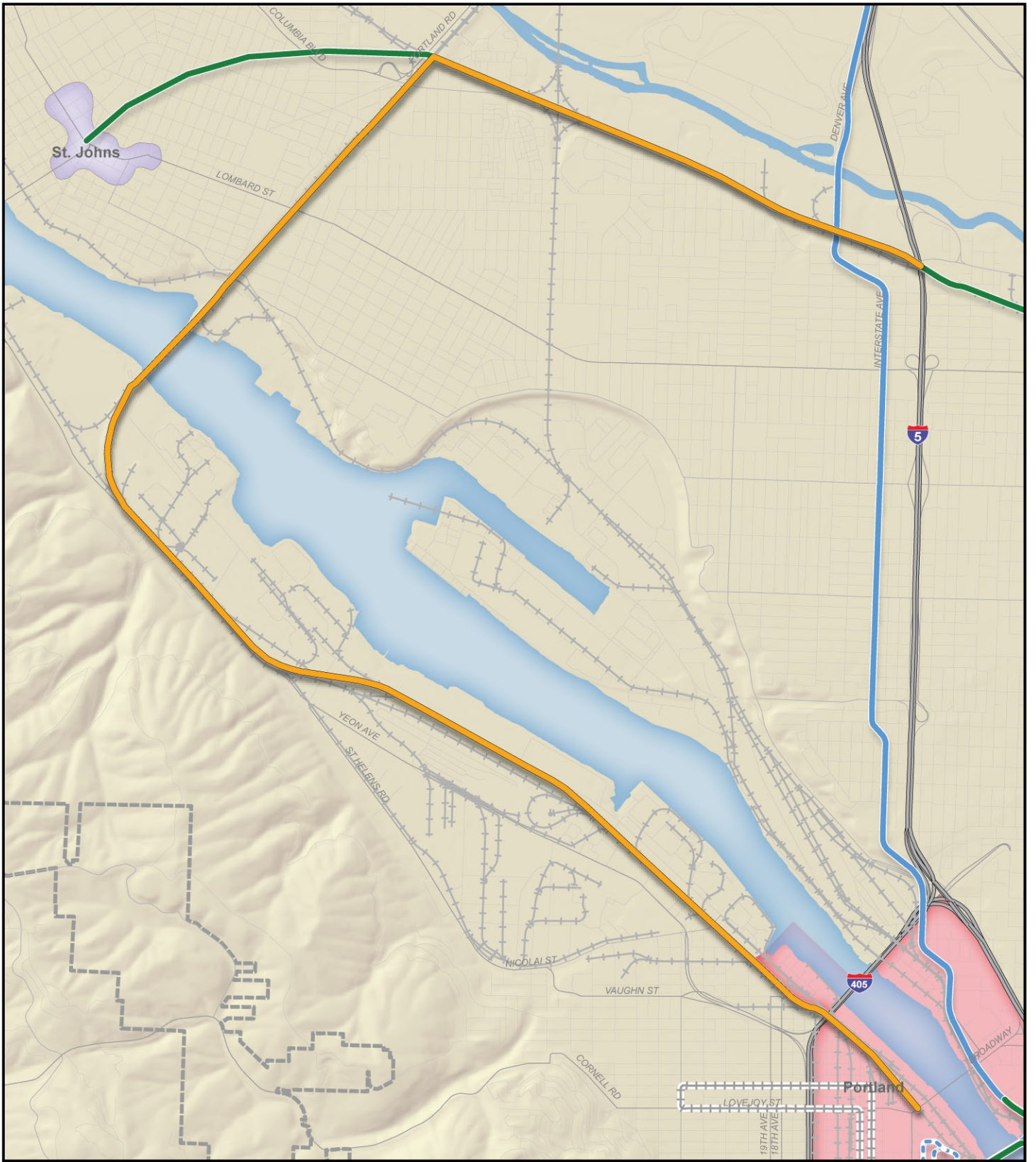
Corridor 38S - Tualatin to Sherwood

- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

0 0.25 0.5 Miles

March 2009





High Capacity Transit System Plan

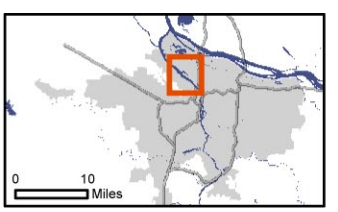
Corridor 43 - Downtown Portland to St. Johns

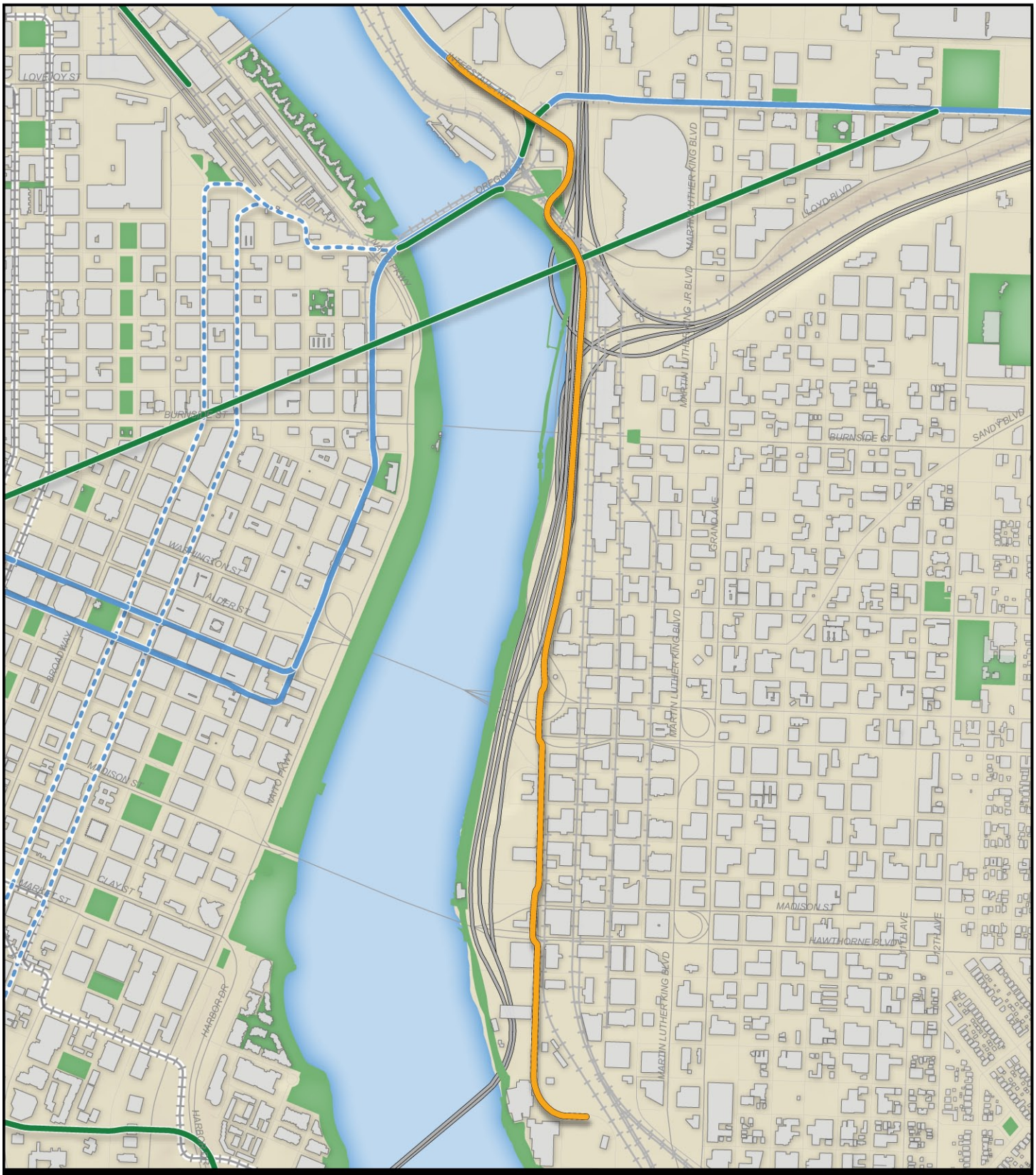
- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Planned/Under Construction LRT
- Existing Street Car
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

N

0 0.25 0.5 Miles

March 2009





High Capacity Transit System Plan

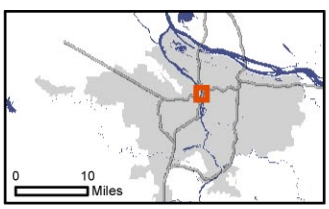
Corridor 49 - Eastside Connector

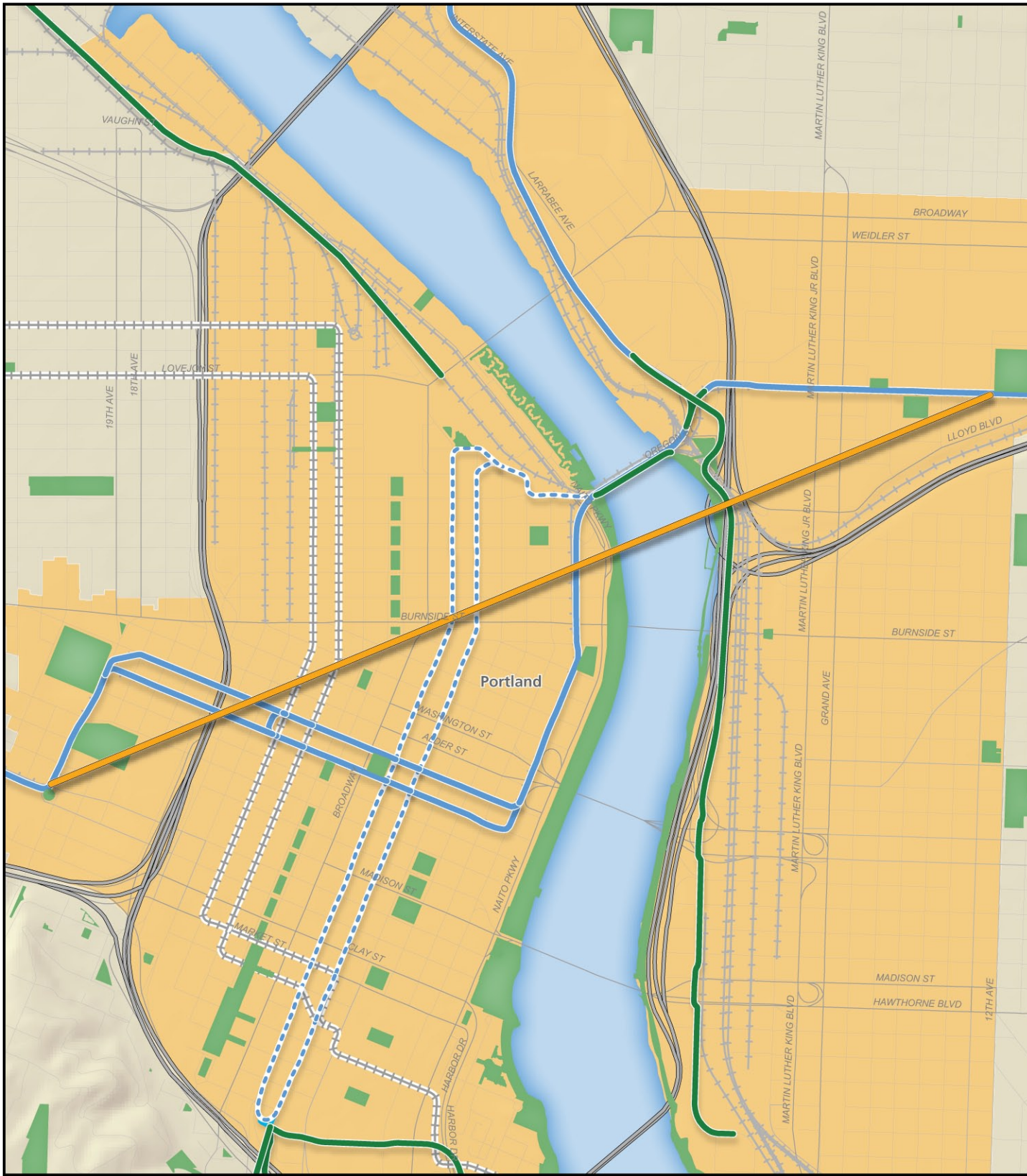
- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Planned/Under Construction LRT
- Existing Street Car
- Railroads
- Parks

N

0 500 1,000 Feet

March 2009





High Capacity Transit System Plan

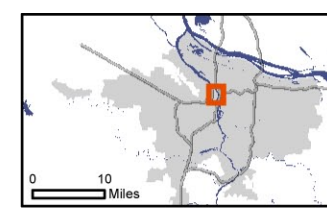
Corridor 50T - Downtown Tunnel

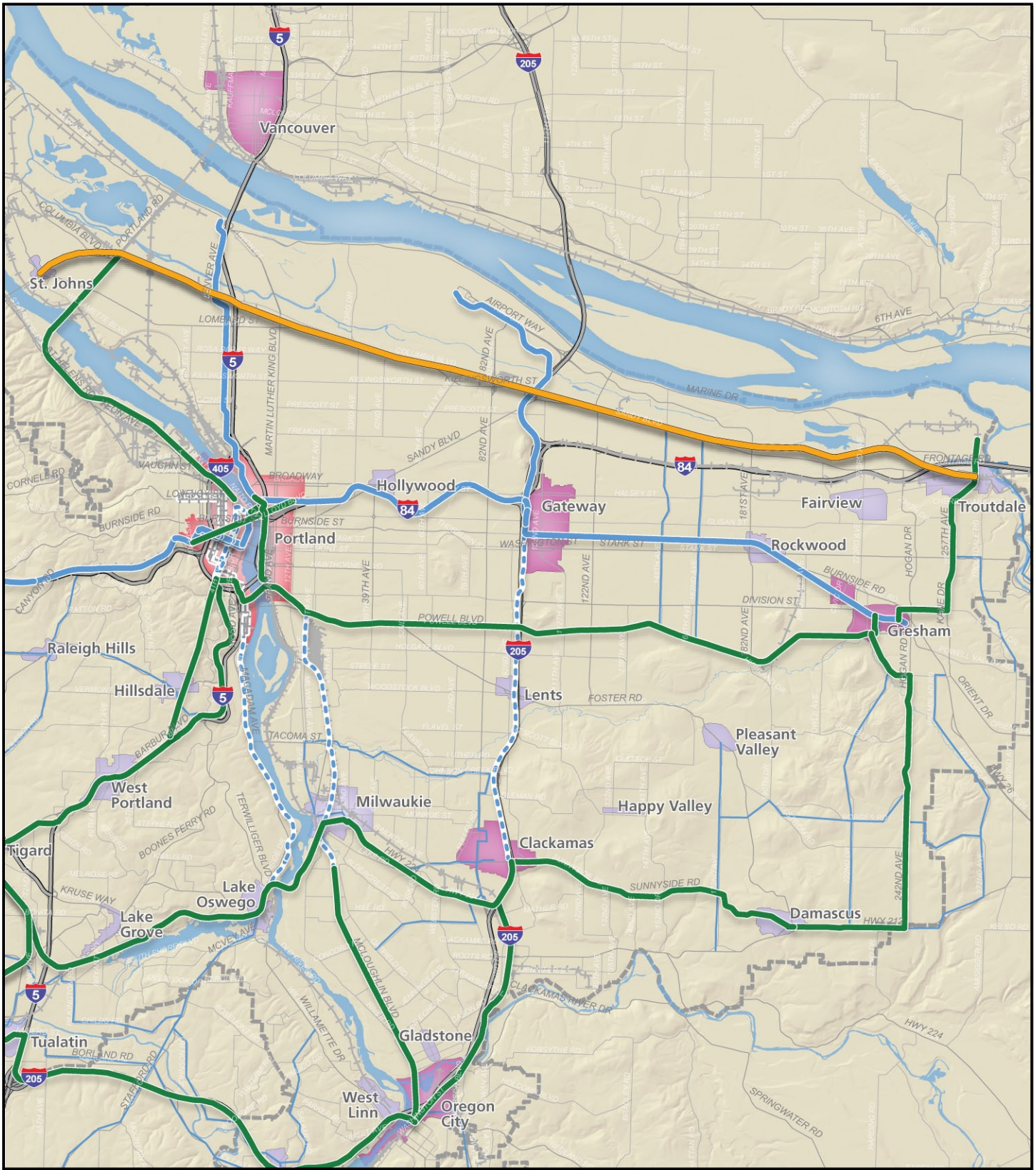
- Evaluated Corridor
- HCT Corridors for Evaluation
- Existing LRT
- Planned/Under Construction LRT
- Existing Street Car
- Railroads
- Central City
- Parks

N

0 500 1,000 Feet

March 2009





High Capacity Transit System Plan

Corridor 54 - Troutdale to St. Johns

- Evaluated Corridor
- Other HCT Corridors for Evaluation
- Existing LRT
- Planned/Under Construction LRT
- Existing Street Car
- Frequent Bus
- Railroads
- Town Centers
- Regional Centers
- Central City
- Urban Growth Boundary

Appendix A: Adopted Evaluation Criteria

The following evaluation criteria were adopted by Metro Council on February 12, 2009.

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
Aspirations of local communities	Qualitative scoring based on *Local Aspirations* process	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. l Hospital & medical centers l Major retail sites l Major social service centers l Colleges / universities l Major Federal / State Government offices l Employers > 500 employees l 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

COMMUNITY EVALUATION CATEGORY

Criteria	Measure	Role	Method
Support the regional 2040 Growth Concept	1. Central City, Regional Centers, Industrial areas, Freight and Passenger Intermodal facilities 2. Employment areas, Town Centers, Station Communities, Corridors, Main Streets 3. Inner and Outer Neighborhoods	Rank based on Service to 2040 land use types, consistent with RTP for service types related to primary, secondary and other urban components.	Support Region 2040 land use designations based on RTP priority areas
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	Consideration of those who may receive greatest benefit from the transit investment due to reduction of current barriers to travel reduced cost of travel.	Census and Metro Transportation Equity Analysis for the RTP

COMMUNITY EVALUATION CATEGORY

Criteria	Measure	Role	Method
	Analysis of % of households with no vehicle available	Members of these households are likely transit consumers. Analysis includes: low and very-low income, racial minority, seniors, 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	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'	Model/TriMet

COMMUNITY EVALUATION CATEGORY

Criteria	Measure	Role	Method
	mode compared to non-HCT transit through congested areas.	across the system (e.g. if an extension results in new demand causing crowding on an existing section of route).	

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.	Metro/TriMet
Transportation efficiency (System)	Annualized capital and operating cost per rider	To identify the overall cost-effectiveness of the corridor.	Metro/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
Rebuildability	Vacant and rebuildable		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.
Cost per mile	Capital cost per mile	To act as a comparative tool to measure corridors of different length.	Sketch level engineering.

Appendix B: Values and Evaluation Criteria Input Summary

Overview

Approximately 55 people have completed a comment form, which was distributed during community briefings discussing the Regional High Capacity Transit Study and the Build a System tool. The same questions were distributed using an online form to Think Tank members, members of Metro's standing committees on land use and transportation, and the interested parties who receive materials for Metro's standing committees.

Respondents

Affiliation	Number of respondents
Transportation Policy Advisory Committee (TPAC) member or alternate	10
Metropolitan Technical Advisory Committee (MTAC) member or alternate	14
Joint Policy Advisory Committee on Transportation (JPACT) member or alternate	1
Metropolitan Policy Advisory Committee (MPAC) member or alternate	10
Think Tank member	17
Community member or interested individual	8
Community Briefing Community members	55

Summary of responses to questions

Criteria within the community evaluation category

The table below shows frequency of responses within the community evaluation category.

	Very important	Important	Neutral	Not very important	Not important
Serves major ridership generators	55	40	13	0	1
Supports existing local land use and local transportation plans and policies	49	30	19	3	1
Provides opportunities to link to existing transit centers or link to existing transit service	48	41	9	1	1
Provides reduced travel times for riders and across the system	48	41	11	1	1
Supports regional land use plans as expressed in the 2040 Growth Concept	43	37	14	5	3

Supports placemaking and efficient urban form	43	28	18	5	5
Allows transit to bypass traffic near congested roadways	27	50	20	1	1
Provides opportunity to design transit to be safe	34	48	14	2	1
Provides HCT access to neighborhoods with high proportions of low-income or minority households	15	44	32	5	2
Is embraced by local communities	40	42	13	3	2
Promotes affordable transportation to areas where housing and transportation costs comprise a high percentage of income	28	37	29	2	3
Uses existing road right of way for HCT service	13	24	45	11	5
Promotes physical activity	21	27	38	7	7

Think Tank members said that supporting placemaking and efficient urban form was the most important criteria, as were supporting the 2040 Growth Concept, supporting local land use and transportation plans and policies, and serving major ridership generators.

TPAC/MTAC members said that supporting regional land use plans, supporting placemaking and efficient urban form, providing opportunity to design transit to be safe, and serving major ridership generators were the most important criteria.

JPACT/MPAC members said that proving HCT access to neighborhoods with high proportions of low-income or minority households, supporting regional land use plans, are embraced by local communities, and providing reduced travel times for riders and across the system were the most important criteria.

Community Briefing attendees said that serving major ridership generators, providing opportunities to link to existing transit centers or link to existing transit service, providing reduced travel times for riders and across the system, supporting existing local land use and local transportation plans and policies, and those that are embraced by local communities were the most important criteria.

Interested community members (who receive Metro Committee meeting materials) said that serving major ridership generators, allowing transit to bypass traffic near congested roadways, and proving reduced travel times for riders and across the system were the most important criteria.

Criteria within the environmental evaluation category

The table below shows frequency of responses within the environmental evaluation category.

	Very important	Important	Neutral	Not very important	Not important
Minimizes impacts to natural resources	50	33	8	2	4
Reduces greenhouse gas pollutants	47	38	7	2	4
Minimizes impact to parklands and schools	31	41	17	5	2

Think Tank members said that reducing greenhouse gas and minimizing impacts to natural resources were the most important criteria.

TPAC/MTAC members said that reducing greenhouse gas and minimizing impacts to parklands and schools were the most important criteria.

JPACT/MPAC members said that minimizing impacts to natural resources, parklands and schools were the most important criteria.

Community Briefing attendees said that minimizing impacts to natural resources were the most important criteria.

Criteria within the economic evaluation category

The table below shows frequency of responses within the economic evaluation category.

	Very important	Important	Neutral	Not very important	Not important
Maximizes cost-effectiveness based on the number of riders, operating costs and capital costs	48	43	4	2	0
Provides high capacity transit service to employment areas	38	54	6	0	0
Provides high capacity transit services near vacant land or land suitable for redevelopment	16	36	31	10	4

Think Tank members said that maximizing cost-effectiveness based on the number of riders, operating costs and capital costs was very important, while total number of jobs served with high capacity transit and providing high capacity transit service near vacant land or properties that could be rebuilt were the most important criteria.

TPAC/MTAC members said that maximizing cost-effectiveness based on the number of riders, operating costs and capital costs and providing high capacity transit service to employment areas were the most important criteria.

JPACT/MPAC members said that maximizing cost-effectiveness based on the number of riders, operating costs and capital costs and providing high capacity transit service to employment areas were the most important criteria.

Community Briefing attendees said that maximizing cost-effectiveness based on the number of riders, operating costs and capital costs and providing high capacity transit service to employment areas were the most important criteria.

Interested community members (who receive Metro Committee meeting materials) said that maximizing cost-effectiveness based on the number of riders, operating costs and capital costs was the most important criteria.

Criteria within the deliverability evaluation category

The table below shows frequency of responses within the deliverability evaluation category.

	Very important	Important	Neutral	Not very important	Not important
Total ridership	51	33	10	0	1
Total capital (construction) cost	25	48	19	2	1
Capital (construction) cost per mile	26	41	26	1	1
Funding potential considering all possible funding sources	35	40	19	1	1
Total operating cost	30	31	16	1	0

Think Tank members said that total capital and operating cost and capital cost per mile, and total ridership were the most important criteria.

TPAC/MTAC members said that total capital and operating cost and capital cost per mile were the most important criteria.

JPACT/MPAC members said that total ridership, capital cost per mile, and funding potential considering all possible funding sources were the most important criteria.

Community Briefing attendees said that total capital cost, operating cost and ridership were the most important criteria.

Interested community members (who receive Metro Committee meeting materials) said that total operating cost and capital cost per mile were the most important criteria.

Overall top criteria

Think Tank Members said that the top five criteria were:

TPAC/MTAC members said that the top five criteria were:

- Total operating cost

- Supports regional land us plans
- Serves major ridership generators
- Minimizes impacts to parklands and schools
- Provides high capacity transit service to employment areas
- Total capital cost

JPACT/MPAC members said that the top five criteria were:
- Provides opportunities to link to existing transit centers or link to existing transit services
- Support existing local land use and local transportation plans and policies
- Supports regional land use plans
- Provides reduced travel times for riders and across the system
- Maximizes cost-effectiveness based on the number of riders, operating costs, and capital costs
- Provides high capacity transit service to employment areas
- Total ridership
- Funding potential considering all possible funding sources
- Capital cost per mile

Interested community members (who receive Metro Committee meeting materials) said that the top five criteria were:
- Total capital cost
- Total operating cost
- Capital cost per mile
- Maximizes cost-effectiveness based on the number of riders, operating costs, and capital costs
- Serves major ridership generators

Community Briefing attendees said that the top five criteria were:
- Serves major ridership generators
- Provides opportunities to link to existing transit centers or link to existing transit service
- Provides reduced travel times for riders and across the system
- Minimizes impacts to natural resources
- Reduces greenhouse gas pollutants