Date:	February 11, 2009
To:	Core 4, Reserves Steering Committee
From:	Core 4 Technical Team
Re:	Preliminary Analysis of Providing Urban Level Transportation Service Within Reserves Study Area

Background & Overall Analysis Approach

The purpose of the Urban and Rural Reserves project is, in part, to designate appropriate land for each reserve type by addressing the factors listed in Oregon Administrative Rule 660 Section 27. The set of urban reserve factors that must be considered range in scale from assessing whether land can be served with public facilities and services in an efficient and cost-effective manner to determining whether areas can be designed to be walkable with a well-connected transportation system. For this reason, the Core 4 Technical Team (Tech Team), made up of staff from the three counties and Metro, chose to conduct a suitability of land analysis using a phased approach.

This memo describes the first step in this phased approach. It consists of an initial screening of the entire approximately 400,000-acre study area to address the following two urban reserve factors in the state rule:
UR-1: *Can be developed at urban densities in a way that makes efficient use of existing and future public and private infrastructure investments.*
UR-3*: Can be efficiently and cost-effectively served with public schools and other urban level public facilities and services by appropriate and financially capable service providers.*

The state rule defines 'public facilities and services' as sanitary sewer, water, transportation, storm water management facilities and public parks. Due to the sheer size of the study area, the Tech Team looked at it through a broad landscape-scale lens to assess suitability of the land for meeting these two reserve factors. This approach led to the Tech Team limiting this first screen analysis to sewer, water and transportation. Service providers of storm water management, public schools and public parks confirmed this screening decision.

The particular methodology and results for the transportation element is discussed below. The result of this element is expressed graphically on the attached maps showing areas that are ranked as 'higher', 'medium' or 'lower' to serve. This map, combined with those from the sewer and water elements, will be used to form a primarily assessment that begins to answer the two reserve factors above. The next phase of this process is described under Next Steps below.

Transportation Element Strategy & Methodology
A group of experts in the transportation field representing local jurisdictions and agencies was convened in October 2008 to undertake an exercise to assess the potential within the Reserves study area for accommodating an urban level of transportation service. This exercise consisted of developing a theoretical road network using the connectivity standards in the Regional Transportation Plan (RTP). The experts were able to use their knowledge of the land and existing rural transportation system to make informed decisions on where to place arterial and collector level roadways to attempt to meet the RTP standard. The ideal spacing for arterials is one mile apart, and the ideal spacing for collectors is one-half mile from another collector or arterial. This strategy reflects the evidence that such a connected system best accommodates an urban-level development pattern including vehicular, transit, bicycle and pedestrian travel.

To facilitate the exercise, Tech Team staff provided maps to the group with the following information:

- Existing rural road network
- Existing RR lines
- Topographical information in increments of 0%-7%, 7%-25% and over 25% slope
- Floodplains, streams & wetlands
- Proposed HCT corridors

In addition, a Google-earth terminal was set up to check actual on-the-ground development and features. Participating in this exercise were representatives from the following organizations: Clackamas, Multnomah and Washington counties; the cities of Gresham, Oregon City, Portland and Tualatin; ODOT; Tri-met; and Metro.

After completion of the exercise, Metro staff digitized the road network and set up a database of information that could be queried for such things as number of lane miles, both existing and added, number of intersections and distance to destinations. This information was used, in part, to develop a rough capital cost estimate of the improved network for specific geographic sub areas. The costing approach was derived from the ODOT Highway Economic Requirements System (HERS), which is used for planning-level capital costs for roadway projects. This methodology includes assigning higher roadway costs to major bridge crossings, wetlands and steep slope areas. It includes a standard right of way cost factor and is expressed as a unit cost per lane mile.

This exercise is a first screen for illustrating an arterial/collector level system upon the landscape and assessing whether an area is suitable for accommodating urban level development. From the GIS-level data, a rough cost comparison can be made among sub-areas. It is not meant to depict an actual complete urban roadway network or reflect detailed costs for construction of such a system, but rather provide preliminary information on how certain sub areas compare relative to other sub areas. Transit considerations for potential candidate urban areas, as well as a specific sub area's impact on major roadways connecting to the existing UGB will be analyzed during the next screening process; the former through working with Tri-met staff, the latter likely through transportation modeling of chosen sub areas.

In order to make a first-cut choice on which areas to query and thus enable a comparative analysis of sub areas, the Tech Team overlaid the sanitary sewer and water maps to derive areas for further exploration. These two maps are the products of consultation with experts in their respective fields.[1] The team chose areas on the sewer and water maps that indicated a higher ability to serve future urban development.

[1] For more information, see the two memos and associated maps on sanitary sewer service and water service.

Transportation Results

The results of the digitized roadway networks and interpretation of data is shown on the three attached maps. As indicated above, the sub areas were derived from the sewer and water service analyses. There are 15 distinct sub areas shown on the map. Each sub area has been ranked to indicate its ability to accommodate urban-levels of development.

The suitability rankings are based on three data sets: Cost per system lane mile; cost per added land mile; and number of intersections per square mile. The first two rankings are rough, preliminary cost estimates and do not factor in the cost of local streets or needed improvements to mobility corridors and other connections back into the existing urban area. They reflect the higher cost of constructing arterial and collector roadways in areas with steeper topography and natural resource features (cost per added lane mile) and in areas with fewer existing roadways (cost per system lane mile). The connectivity ranking is expressed in intersections per square mile, which is a good indicator of the relative density of streets in a given network. This, in turn, is an indicator of how well an area can be served by a connected transportation network, which facilitates better access to various land uses and creates the most efficient travel patterns for all modes of travel. The sub areas are ranked for the three suitability factors as follows:

<u>Higher Suitability</u> – The particular data set showed that these areas are among the most suitable for providing a transportation system capable of accommodating urban levels of development.

<u>Medium Suitability</u> - The particular data set showed that these areas are somewhat suitable for providing a transportation system capable of accommodating urban levels of development.

<u>Lower Suitability</u> - The particular data set showed that these areas are among the least suitable for providing a transportation system capable of accommodating urban levels of development.

Based on this initial analysis of the three suitability factors, some general observations can be made and caveats should be noted:

1. Flatter areas rank as higher (more suitable) for connectivity, due to the ability to construct a more complete grid system; though they often rank medium to lower (less suitable) for cost per system lane mile, in part, due to the very limited existing rural road network. These same areas are scattered from higher to lower suitability for cost per added lane mile, depending on the amount of natural resource land present.
2. The geographic extent of the sub areas, while initially based on preliminary sewer and water provision mapping, were in some cases modified to account for the particular needs of constructing a transportation network. Increasing, decreasing or otherwise modifying these areas could, of course, result in different rankings. Indeed, such modification will take place as candidate urban reserve areas become refined to better reflect subsequent finer-texture screens resulting from analysis of the six remaining urban factors listed under Next Steps below.
3. For this exercise, each sub area was isolated as much as possible in order to allow a first-screen comparison of them with each other. For this reason, the connections from the sub areas not adjacent to the existing UGB that would be needed were not factored in to the two cost factors during this screen. These areas would likely have higher costs to construct an urban-level arterial/collector network without urbanizing the intervening study areas.

These initial screening results offer an opportunity to look at the relative trade-offs of various sub areas within the overall Reserves Study Area. It is a way of starting to assess the viability of such areas to accommodate an urban level network and should be combined with the information from the sanitary sewer and water suitability efforts to narrow down this overall study area into candidate urban reserve areas.

Next Steps
The three transportation suitability maps are one component to be used in assessing the first screen analysis for candidate urban reserve areas. Information derived from these maps in conjunction with the sanitary sewer and water suitability maps should provide a basis for eliminating some of the study area from further consideration as urban reserves. The next screen analysis will involve more detailed analyses of the remaining potential urban reserve areas. These areas will be referred to as priority candidate urban reserve areas.

For reference, the additional urban reserve factors outlined in the Administrative Rule that will be applied to the candidate urban reserve areas, in addition to refining factors 1 and 3 are:

UR-2: Includes sufficient development capacity to support a healthy economy;
UR-4: Can be designed to be walkable and served with a well-connected system of streets, bikeways, recreation trails and public transit by appropriate service providers;
UR-5: Can be designed to preserve and enhance natural ecological systems;
UR-6: Includes sufficient land suitable for a range of needed housing types;
UR-7: Can be developed in a way that preserves important natural landscape features included in urban reserves; and
UR-8: Can be designed to avoid or minimize adverse effects on farm and forest practices, and adverse effects on important natural landscape features, on nearby land including land designated as rural reserves.

Map attachments:

1. Preliminary System Lane Cost Suitability
2. Preliminary Added Lane Cost Suitability
3. Preliminary Connectivity Suitability

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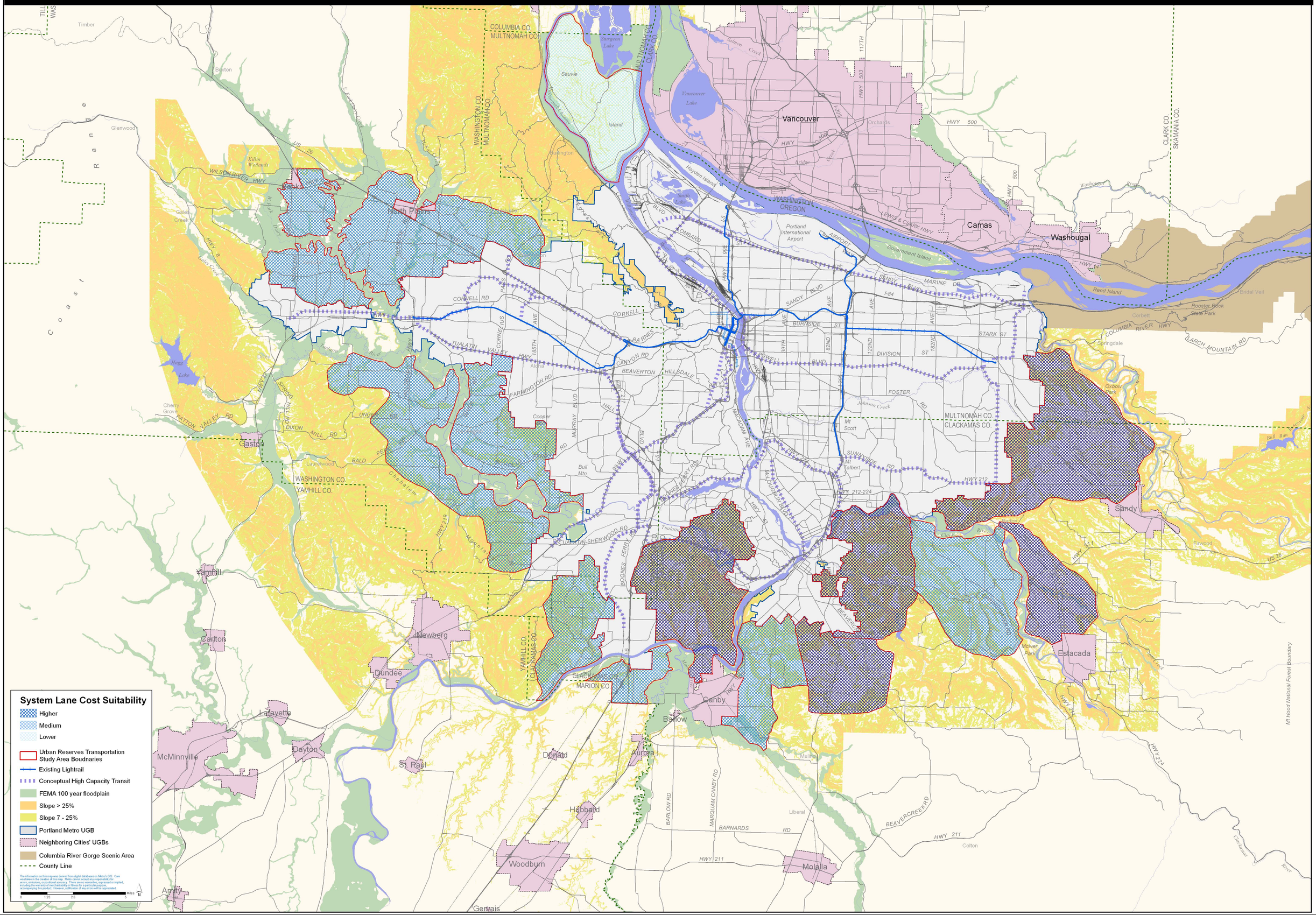
Urban Reserve Transportation Study Areas

Preliminary System Lane Cost Suitability



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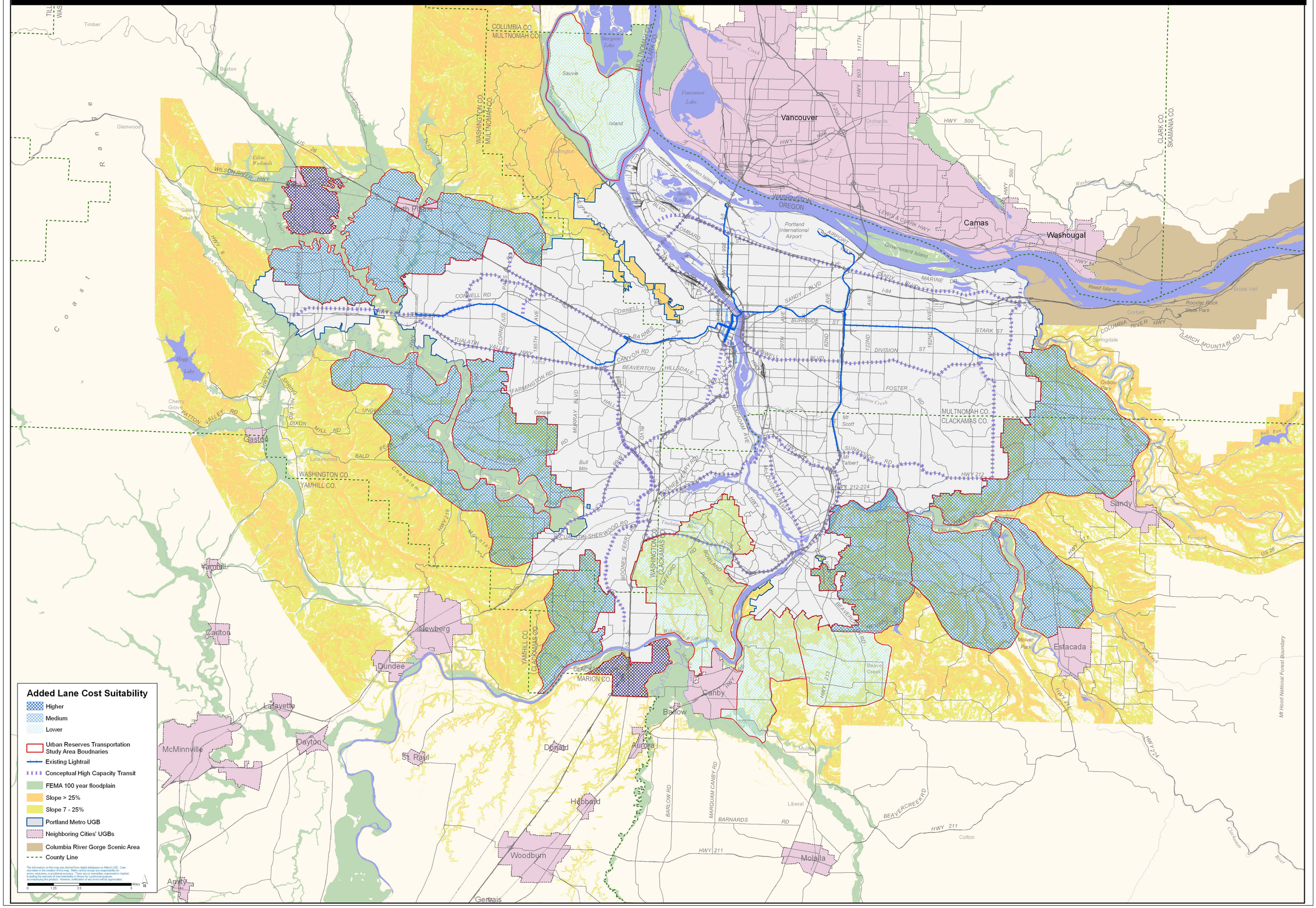
Urban Reserve Transportation Study Areas

Preliminary Added Lane Cost Suitability



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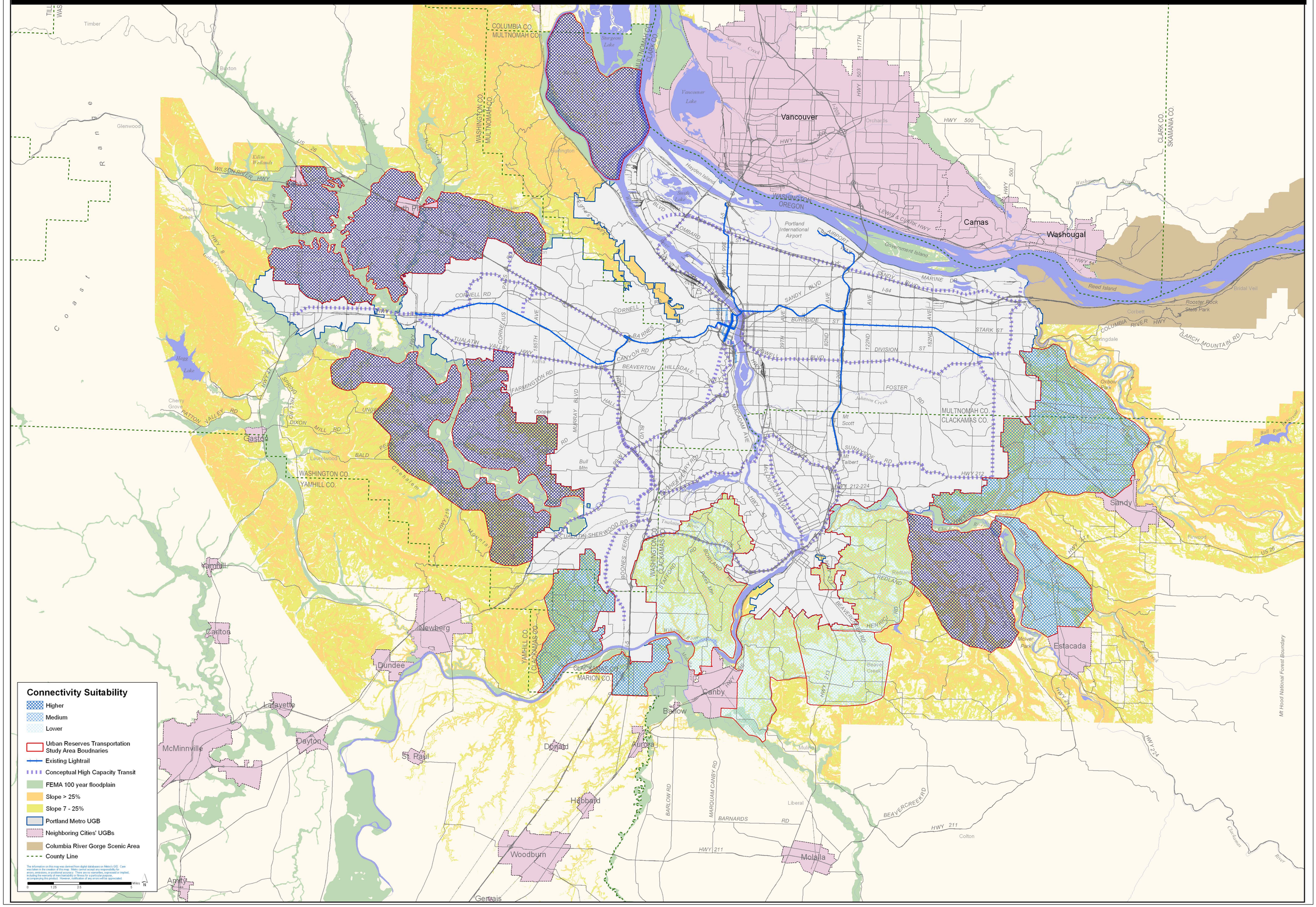
Preliminary Connectivity Suitability