Task 4.4: Performance Measures Review

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To: Alex Georgevitch, City of Medford

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Project: City of Medford TSP/UGB Amendment
Subject: Performance Measures Review

This memorandum presents a comparison of the performance measures being applied in other jurisdictions and on corridors. This effort identifies how other agencies manage their transportation system, particularly within urban environments. This also includes consideration of how a balance between multi-modal goals and development of parallel routes can be incorporated.

PERFORMANCE MEASURE REVIEW

To inform this process, performance measures of other agencies within Oregon and Washington were reviewed. The following items were reviewed:

- ODOT alternative mobility targets
- Draft TRIP97 performance metrics
- City of Eugene, Oregon
- City of Portland, Oregon
- City of Bend, Oregon
- City of Vancouver, Washington
- Downtown Vancouver multi-modal reductions

A review of each of these policies and approaches, and how they pertain or could be applied to Medford, is summarized below.

ODOT Alternative Mobility Targets

ODOT has historically relied on a volume-to-capacity ratio as a singular metric for highway performance. Within the 1999 Oregon Highway Plan, Policy 1F.6 describes the mobility standards for State Highway Facilities. This was prepared as two separate standards, one within the Portland-Metro Region to account for the higher congestion, and a second standard for all other areas of the State. The mobility standard varies based on whether or not the location is within an Urban Growth Boundary, a Metropolitan Planning Organization (MPO), the posted speed, the

State classification of the highway, and whether special highway designations have been applied. The Policy does not explicitly distinguish between signalized and unsignalized intersections, though regional interpretations may make this distinction by applying the minor street classification to stop-controlled intersections in considering the appropriate standard.

The framework for application of ODOT mobility targets is as follows:

- Assess the 30th highest annual hour
- Consider conditions during the peak fifteen minutes of this hour
- Include an 8-percent capacity reduction (ideal saturation flow rate reduction) at traffic signals in areas outside of the Portland-Metro area to account for reduced driver attentiveness in less congested areas.
- Consider conditions during the controlling period of the adopted Transportation System Plan(s), which requires analysis of 15-years (for compliance with the State Transportation System Plan) or more depending on City or County plans.

The application of these stringent mobility targets, particularly with less available funding, was considered through a joint committee meeting between the Land Conservation Development Commission and the Oregon Transportation Commission in 2011. This joint session led to the creation of Senate Bill 795, which required revisions to the mobility targets and to policies governing plan amendments to address the unintended consequences of these policies.

Changes that were subsequently implemented include revision of ODOT "mobility standards" to "mobility targets." This maintained the same overall structure and application of the v/c ratio, but increased the mobility threshold across all classifications. At the same time, the OHP revisions now allow performance measures other than a v/c ratio so that agencies can better balance the economic, multi-modal, urban density, or community goals with automobile throughput.

While other measures and considerations are allowed, ODOT has provided additional guidance on ways that the existing v/c ratio can be modified as a surrogate for these other goals. Following guidance from ODOT's December 30, 2009 interoffice memo[1], the following steps are provided for setting alternative mobility targets:

1. Identify all feasible improvements (based on reasonable expectations of funding likely through the planning horizon).
2. If the intersection meets the mobility target with improvements, no changes are needed.
3. If the intersection is greater than the mobility target but less than a v/c ratio of 1.0, establish the standard based on the projected performance.
4. Identify whether the overall hour (versus the 15 minute peak) can remain below a v/c ratio of 1.0.

[1] December 30, 2009 interoffice memo *Methodology for OHP Alternate Mobility Standards in Region 2,* written by Erik Havig.

5. Consider the average annual v/c ratio rather than the 30th highest design hour.
6. Consider an alternative analysis period (such as second highest hour).
7. All changes to highway mobility targets need to request adoption from the OTC.

These same steps are identified within the Planning Business draft for Alternative Mobility Targets[2], and continue to remain centered on the v/c ratio, but with changes to how it is applied, the hourly period it is applied within, and the seasonal period.

TRIP97 Performance Measures

Transportation Reinvestment Innovation and Planning (TRIP) US 97 is a multi-agency partnership established to develop a set of performance measures, funding mechanisms, and a governance structure to manage the US 97 corridor through Deschutes and Jefferson Counties in Central Oregon. The project was developed to fundamentally alter the "point" based analysis of each intersection on the highway, considering only automobile mobility during the peak-fifteen minutes of the 30th highest hour at the end of the planning horizon, and instead assessing the highway at a corridor level. This approach allows the partnership to prioritize investments based on where they could provide the greatest benefit to the system, and to better inform and balance the safety, mobility, and context tradeoffs being made.

The performance measures for TRIP97 encompass a range of metrics that allow the Partnership to assess how projects or growth affects the overall corridor vision. This vision identifies the overarching goals for the corridor, which includes an emphasis on safety, continued highway mobility, limiting impacts to the built and natural environment, improved local/supporting system connectivity and access to the highway, supporting job growth, and promoting alternative travel modes.

As the US 97 corridor includes both urban and rural segments, and "Main Street" as well as urban expressway segments, the performance measures could not be applied uniformly as different measures have varying degrees of importance depending on the context. To address this, performance measures were divided into two categories: 1) corridor metrics, that holistically evaluate the entire highway section between Deschutes and Jefferson Counties; and 2) segment metrics, that assess individual sections of the highway.

Corridor metrics are entirely monetizable, and lend themselves to a cost/benefit ratio. These measures provide a system perspective, and include the following metrics:

- Average Travel Time
- Travel Time Reliability
- Change in Job Potential

[2] Pre-dated draft 2013 Planning Business Line Item Operational Notice, *Alternative Mobility Targets,* number PB-02.

- Expected Crash Frequency
- Greenhouse Gas Emissions

Segment metrics include various units of measures, and cannot be readily combined. They are measured as a percent change relative to a standard or normalized value, and scored between +3 and -3. These values are then given a weighting by the managing agencies for each individual segment. These are then combined into a numeric score for each individual corridor segment. Segment metrics include the following:

- Average Travel Time
- Travel Time Reliability
- Side Street Delay
- Expected Crash Frequency
- Turning Movement Opportunities per Mile
- Percent of North-South traffic on US 97
- Multi-modal Level of Service

Analysis of these performance measures is provided by existing software programs, ODOT Travel Demand Models, and adaptation of tools that were constructed through national research efforts. It is expected that the tools will be simplified as software fully incorporates the Highway Capacity Manual 2010 methodologies.

TRIP97 Relevance to the City of Medford

The performance measures within TRIP97 provide a holistic assessment of the US 97 corridor, but the additional complexity would not be appropriate to apply on a citywide basis within the City of Medford. TRIP97 was intended to address larger-scale planning issues (such as UGB amendments or major employment centers) where the additional analysis effort is warranted. Within Medford, this construct would be best suited toward managing critical corridor segments, particularly those with changing characteristics or management goals, or of a regional importance.

City of Bend, Oregon

The City of Bend performance measures are intersection based, and vary by intersection control type. All operational analysis within the City of Bend is focused on the overall hour, though the City experiences sharp peaking characteristics around 5:00 p.m. A summary of performance measure by control type is provided below:

- Two-way stop-controlled intersections: The City of Bend does not have a performance standard for low-volume intersections. At stop-controlled intersections serving more than

100 peak hour trips on the minor (stop-controlled) approach the City requires that the approach operate better than Level of Service "F" (less than 50 seconds of delay).

- All-way stop-controlled intersections require that the overall average delay is less than 80 seconds (Level of Service "E" or better).
- The analysis of roundabouts is conducted based on the overall intersection, and requires that it operate below capacity (v/c ratio less than 1.0).
- Signalized intersections are required to operate with a v/c ratio of less than 1.0 (below capacity). Intersections that are located within historic areas, or built-out to its master-planned size must operate with a v/c ratio of less than 1.0 during the hour preceding or following the peak hour.

In addition to these standards, the City of Bend has a concurrency requirement to ensure transportation facilities are provided when needed. The City also contains a pro-rata contribution requirement, which allows the City to collect fees toward intersections that are currently operating acceptably where master-planned improvements are not in place. The pro-rata system is intended to avoid the "last man in" construct where the developer that exceeds the performance measure is required to pay the entire mitigation costs.

The City of Bend actively considers intersection safety in its mitigation needs. The City requires that intersection crash records be reviewed at all intersections, and actively enforces sight distance and clear zone requirements. The City places a high emphasis on pedestrian, transit, and bicycle connectivity during the site plan review phase of development projects, and actively looks to limit individual or direct property access where feasible.

Relevance to the City of Medford

The City of Medford's performance standard is based on the peak 15-minute period and applies universally to all control types. As delay is defined differently for various control forms, Medford's Level of Service "D" standard applies a more conservative requirement to minor stop-controlled intersections, where infrastructure improvements may be undesirable or unnecessary. The City of Bend assesses all of its intersections during the peak hour (rather than fifteen-minute period) and generally accepts all operations short of failure.

City of Eugene Performance Measures

Performance measures for the City of Eugene can be found within 9.9650 of the City's Development Code. The City of Eugene (and Lane County) base intersection operations on level-of-service (LOS). Both jurisdictions currently specify the maintenance of LOS "D" at signalized intersections. This performance standard is used to ensure reliable and acceptable roadway system performance, and is applied to private developments, zone changes, and system planning.

As exception to this policy is within Eugene's Central Area Transportation Study (CATS) area boundary (primarily downtown and near the University of Oregon campus), where the city allows LOS "E" for intersection operations. The City code also notes that while service levels may be substandard, improvements may not be feasible. Where safety is not being compromised the City may accept the deficiency temporarily while system constraints (such as environmental, public agency financial resources, or land use constraints) are overcome or addressed through alternative strategies (such as Transportation Demand Management, land use changes, or short-term safety improvements).

The City of Eugene also provides requirements for transit, bicycle, and pedestrian modes. These are generally to increase the attractiveness, connectivity, and convenience of these travel modes. New bikeways are required as part of new or reconstructed arterial and major collector streets, and sidewalks are required along all arterial and collector roadways.

Relevance to the City of Medford

A similar approach to the City of Eugene's adopted CATS boundary could be applied to specific areas in Medford where higher tolerance for congestion would be allowed. This could include areas such as the identified Transit Oriented Districts, downtown area, or built-out areas where further widening would not be desirable. The City of Medford also provides general requirements for other travel modes so that system adequacy can be considered for all users.

City of Portland Performance Measures

Detailed analysis is typically required only for rezones, conditional uses, parking reviews, master plans, and impact mitigation plans. New development zoned outright typically is required only to assess the general safety and circulation needs at the access points, as system impacts are assumed to be accounted for within the City's adopted transportation plans.

Where assessment of facilities is required, the City of Portland typically uses a Level of Service "D" standard when assessing system adequacy per City Policy 11.13. The City allows alternative measures to be applied in mixed-use areas, areas with mode splits consistent with the established targets, areas with maximum parking ratios, or where adequate street connectivity exists.

Areas that currently exceed the performance standards, but are expected to meet the alternative requirements in the future must develop an action plan. This plan must assess future impacts of motor vehicle traffic on multimodal travel, establish mitigation strategies, and establish a performance standard and monitoring system to implement the action plan.

Relevance to Medford

The City of Portland maintains a similar Level of Service "D" approach, but is selective as to what development review processes this standard is applied to. The City also provides alternative performance measures, largely based on increasing modal splits or development/monitoring of action plans, where this standard cannot be met.

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City of Vancouver, Washington Performance Measures

The City of Vancouver contains performance measures along with a concurrency requirement, similar to the City of Medford. The intersection performance measures are separated by intersection control type, distinguish between fully built-out areas (with an adopted corridor management plan), and provide exceptions to the adopted standards when significant safety hazards would be created or worsened with a proposed development.

The City performance standards, as identified in Vancouver Municipal Code Section 11.90.020(e)(2) are as follows:

- Signalized intersections must operate better than LOS "F"
- Signalized intersections at LOS "E" must have a v/c ratio less than 0.95.
- Unsignalized intersections must operate with a v/c ratio of less than 0.95 on any lane/approach.

Concurrency, defined as provision of adequate transportation facilities to serve demand, is measured by the City in terms of corridor travel speeds along the City's defined concurrency corridors. These corridors are comprised of City-managed arterials, which are further divided into smaller segments. Concurrency modeling is completed periodically by the City, and is based on traffic counts, expected regional growth, and trip information submitted by development projects. Corridor operating speeds are calculated using posted operating speeds, with travel times supplemented with signalized intersection delays. Corridor targets in the City range between 10 and 15 miles per hour, varying by roadway and by the individual segments.

When corridor service level deficiencies occur, pro-rata fees, minor intersection improvements, or capital improvement projects are identified for mitigation. These improvements supplement Transportation System Development Charges (Traffic Impact Fees in Vancouver) and other mitigation that may be needed.

Relevance to the City of Medford

The City of Vancouver distinguishes between intersection control types and generally accepts operations short of intersection failure. The City's concurrency process, while adding a degree of

difficulty to manage and assess, also includes a review of corridor travel speeds. The use of pro-rata fees to fund major infrastructure needs that are beyond the scope of a single developer helps the City maintain its concurrency policies while avoiding development moratoriums.

Downtown Vancouver Trip Reduction

The City of Vancouver downtown trip reduction methodology was an effort to refine the City's concurrency policies within their downtown. Growth within the area, and application of suburban trip generation rates was conflicting with the City's urbanization and density goals, while over-projecting traffic impacts. This analysis considered area-wide factors, mixed-use factors, and transportation demand management programs.

Area Factors

To calibrate the standard trip generation rates, which are based on drive-alone trends, information was obtained from census data within the affected downtown block groups, and compared to citywide census data to provide a relative comparison. This showed those living within the downtown made 10.7 percent fewer drive-alone commute trips, 68 percent more transit commute trips, and 3.8 times as many walking or bicycling commute trips. Overall, this showed approximately 20 percent fewer driving trips to the downtown than would be estimated using standard trip generation rates.

Mixed-Use Development

The location of various uses within close proximity results in interaction between uses, and within a downtown environment these trips are increasingly by walking or bicycling. The Vancouver methodology recommended internal reductions within the downtown area based on the methodologies and information compiled through National Cooperative Highway Research Program (NCHRP) 8-51. The project methodology avoids duplication of the area-wide adjustments in this process.

Transportation Demand Management

Florida Department of Transportation (FDOT) and the Environmental Protection Agency (EPA) have developed models to predict the level of automobile trip reductions through various combinations of Transportation Demand Management (TDM) strategies. These agencies created spreadsheet models to simplify this process. Through testing the EPA model (COMMUTER) was found most responsive to a wide range of program measures, and allowed testing of a range of typical to exemplary measures.

Taken as a whole, these three elements would allow development or the downtown to more realistically assess its impacts within the surrounding context, and would provide options for development to invest in TDM program elements in lieu of infrastructure improvements.

Relevance to the City of Medford

The outcome of this project resulted in a white paper and a spreadsheet calculator for City demonstration purposes and has not been adopted. However, the idea of calibrating travel patterns (particularly in Transit Oriented Development or within the downtown area) can be used to encourage density, more realistically reflect impacts (which can further reduce conflicts with the City's performance/concurrency requirements), or allow investment in demand management programs, infrastructure, or strategies.

CITY OF MEDFORD PERFORMANCE MEASURE RECOMMENDATIONS

Based on review of performance standards in other urban communities it is recommended that the City of Medford performance standards be revised to incorporate the following:

- Distinguish between intersection control types to reflect the changes in how level of service is defined for these different intersection types. Consider a system such as that within the City of Bend where low-volume unsignalized intersections may not have a specific standard (or include a standard that ensures secondary/parallel access routes and safety review).

- Distinguish between built-out and developing areas. Require higher reserve capacity in new areas, or areas built below the ultimate facility plans, and increased emphasis on parallel routes or multi-modal improvements in built environments.

- Implement a specific safety review/mitigation requirement. This will ensure that additional congestion is not creating an unsafe environment.

- Consider an hourly analysis versus a fifteen-minute peak. This will avoid infrastructure investments for temporary conditions that can be more readily planned around.

- Incorporate intersection capacity within the City performance measures. Capacity refers to the physical ability of an intersection to process travelers, whereas level of service refers to the delays that are experienced. Both measures are readily available from the same analysis software without additional effort.

In addition to the measures above that describe the framework of how the City assesses adequacy, further testing will be needed to assess whether Level of Service "D" is an appropriate standard. Acceptance of Level of Service "E" is likely needed in more developed urban areas, whereas Level of Service "D" can remain for construction projects or within developing areas.

Following review and discussion with City of Medford and ODOT staff, this memorandum will be incorporated into Technical Memorandum #4, with additional testing of the recommended performance measures. Please let us know if you have any questions or comments regarding this qualitative comparison of UGB scenarios.