DKS Associates
TRANSPORTATION SOLUTIONS

TECHNICAL MEMORANDUM #1

May 3, 2011

To: Project Management Team

From: Carl Springer, PE, Julie Sosnovske, PE

Subject: **I-84 257th Avenue IAMP, Task 3: Problem Identification, Boundaries and Maps** P09042-011

This memorandum identifies the project purpose, problem statement, interchange function, and expectations for the IAMP. In addition, it summarizes draft Management Area and Study Area boundaries, project goals and objectives, and alternative evaluation criteria.

PURPOSE AND BACKGROUND

An IAMP is required for any new or significantly reconstructed interchange by OAR 734-051-0155(6). More importantly, the purpose of an IAMP is to protect the function of the interchange and, consequently, the state's investment in the facility. New interchanges and improvements to existing interchanges are very costly. State and local government and their citizens have an interest in ensuring that their interchanges function efficiently. Design work is currently underway for improvements to the I-84 257th Avenue interchange and this IAMP is being conducted to ensure that the design will effectively reflect the needs of the interchange for at least the next 20 years.

PROBLEM STATEMENT

The I-84 257th Avenue (Exit 17) interchange has experienced congestion at several of its intersections and the eastbound off-ramp regularly backs up onto I-84. Over the years, a number of improvements have been identified, some of which have been recently constructed and others for which funding is currently available or will be available in the near future.

Funds have been allocated through the Governor's Jobs and Transportation Act (JTA) in 2009 to construct projects within the interchange area to support job growth and economic development in this area.

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The Oregon Department of Transportation (ODOT), City of Troutdale and the Port of Portland have outlined a series of specific improvement projects that will address existing safety and mobility needs identified in past planning studies, as well as provide capacity enhancement to serve economic growth in the area.

In 2005, the City of Troutdale adopted an update to its Transportation System Plan (TSP). This TSP identified the need for improvements in the vicinity of the I-84 257th Avenue interchange as well as the need for an Interchange Area Management Plan (IAMP). Additionally, recent traffic studies associated with the Troutdale Reynolds Industrial Park (TRIP) have shown that the I-84 257th Avenue interchange will not meet performance standards in the future with development of the Industrial Park.

Based on the preceding analysis, a series of interchange improvements have been constructed, or are planned. In fall of 2009, ODOT partnered with the Port of Portland and City of Troutdale to complete construction on widening the South Frontage Road at Graham Road to include a second dedicated eastbound right turn lane.

JTA funded interchange improvements are in the design process and planned for construction in summer 2011 (see Table 1 for details).

Table 1: Current JTA Funded Project List of 257th Avenue Interchange Improvements

Location	Description
I-84 Eastbound off-ramp	Add third lane approach to ramp terminal to increase vehicle queue space.
South Frontage Road	Add third eastbound lane between Marine Drive and Graham Road
North Frontage Road	Add third westbound lane from Graham Road to Marine Drive. The third lane will become a right-turn only lane onto Marine Drive
Graham Road / North Frontage Road	Construct 2nd northbound left turn lane Add westbound right-turn lane Add southbound free flow right-turn lane which merges into new 3rd westbound lane
Various Intersections	Traffic signal upgrades

These improvements are needed because the I-84 eastbound off-ramp at Marine Drive is likely to back up onto the mainline freeway in the future, which is a serious safety concern. South Frontage Road is congested during morning and evening peak periods and heavy truck traffic further exacerbates the congestion. The intersection at Graham Road/North Frontage Road experiences a significant amount of congestion, particularly during the AM peak period. This congestion is due, in part, to vehicles heading northbound from Troutdale to westbound I-84 toward Portland conflicting with vehicles coming from the east on I-84 into Troutdale. This intersection will be further impacted as TRIP develops.

If additional JTA funding is available, ODOT, the City of Troutdale and the Port of Portland will work together to determine the best use of the funding. Potential future improvements are summarized in Table 2.

Table 2: Potential future JTA Funded Project List of 257th Avenue Interchange Improvements

Location	Description
Marine Drive	Extend south of the South Frontage Road, looping east to form a 'backage' road to the commercial uses and connect to Graham Road at 257th Way (opposite the Outlet Mall)
I-84 Underpass at Marine Drive	Reconstruct underpass between the North Frontage Road and South Frontage Road to allow for standard vertical and horizontal clearance, and provide two additional travel lanes. This construction would allow for two-way circulation as identified in the Troutdale TSP. Provide northbound left-turn lane, two northbound through lanes Widen I-84 Eastbound Off-Ramp to provide an eastbound left-turn lane onto Marine Drive
I-84 Eastbound Off-Ramp / Marine Drive	Widen approach to provide an additional eastbound through lane

INTERCHANGE FUNCTION, MODE AND GENERAL LOCATION

Generally, an interchange is defined as the junction of two or more roads at different elevations through a system of connections that separate the roads to permit movements to occur without crossing the streams of traffic. The functions of the interchange are established by the functions of the connecting roads. The I-84 257th Avenue interchange is a component of Interstate 84, an Interstate Highway and freight route.

The primary function of this interchange is to provide access to industrial land between I-84 and the Columbia River, as well as serve goods movement and Troutdale Town Center.

The Oregon Highway Plan (OHP) classifies I-84 as an interstate highway. According to OHP, the primary function of an interstate freeway is to "provide connections to major cities, regions of the state, and other states. A secondary function in urban areas is to provide connections for regional trips within the metropolitan area." (OHP, p. 41)

North Frontage Road and South Frontage Road and the free right turn from North Frontage Road onto Marine Drive are owned and maintained by ODOT. Marine Drive is owned and maintained by Multnomah County from the north City Limits to North Frontage Road and Graham Road is owned and maintained by the City of Troutdale, north of North Frontage Road and south of South Frontage Road. ODOT owns and maintains Graham Road and Marine Drive between the North and South Frontage

Roads. The Troutdale Transportation System Plan (TSP) classifies North Frontage Road and South Frontage Road and Marine Drive and Graham Road (between the North and South Frontage Roads) as arterials within the vicinity of the interchange. Marine Drive north of North Frontage Road is classified as a Collector and Graham Road north of North Frontage Road is classified as a local street. Graham Road south of South Frontage Road is classified as an arterial. North Frontage Road, South Frontage Road, Marine Drive and Graham Road all provide both a connection to the interstate freeway system and access to local services in town.

Much of the land surrounding the I-84 257th Avenue interchange is already developed, especially to the south. The interchange provides access to Troutdale's Town Center area as well as industrial and residential areas in the City. Many accesses are provided along the South Frontage Road to a number of businesses, most of them commercial, many serving truck traffic that passes through as it heads between Portland and the Columbia River Gorge. Many of the accesses are not in compliance with OHP standards within a ¼ mile of the interchange. Most accesses along South Frontage Road are private driveways rather than public roadways. There are only two accesses located along the North Frontage Road, midway between Graham Road and Marine Drive, serving the Troutdale Airport and another use. There are no accesses on Marine Drive or Graham Road within the interchange area.

Future alternatives in this IAMP assume that undeveloped lands within the Study Area will be developed in a manner consistent with what is allowed under the City of Troutdale Comprehensive Plan and existing zoning, except for the "Pig Farm" property (located north of Halsey Street between NE 244th Avenue and west of SW Edgefield Meadows Avenue) which is expected to be rezoned sometime in the future. The chapter on Future Travel Forecasts and Needs Analysis details the assumptions for this development.

EXPECTATIONS FOR THE IAMP

The City of Troutdale and the Port of Portland have been working with ODOT to identify improvements to the interchange that would protect existing capacity. The City of Troutdale, the Port of Portland and ODOT are currently in the design phase of the improvements to the Troutdale I-84 257th Avenue Interchange described in Table 1.

The expectation of the Troutdale I-84 257th Avenue IAMP is that it will provide a framework for the design of future improvements as part of the interchange reconstruction project.

Reconstruction of the I-84 257th Avenue interchange will improve connections between I-84 and the City of Troutdale. The improved interchange will support the development that is authorized in the Troutdale Comprehensive Plan and is not intended as a basis to encourage rezoning of property for uses that will generate greater volumes of traffic than is already planned based on land use designations in Troutdale's Comprehensive Plan. The IAMP provides land use and transportation management policies that ensure that future demand on the interchange will be consistent with planned land uses and will not outpace the improvements that have been designed.

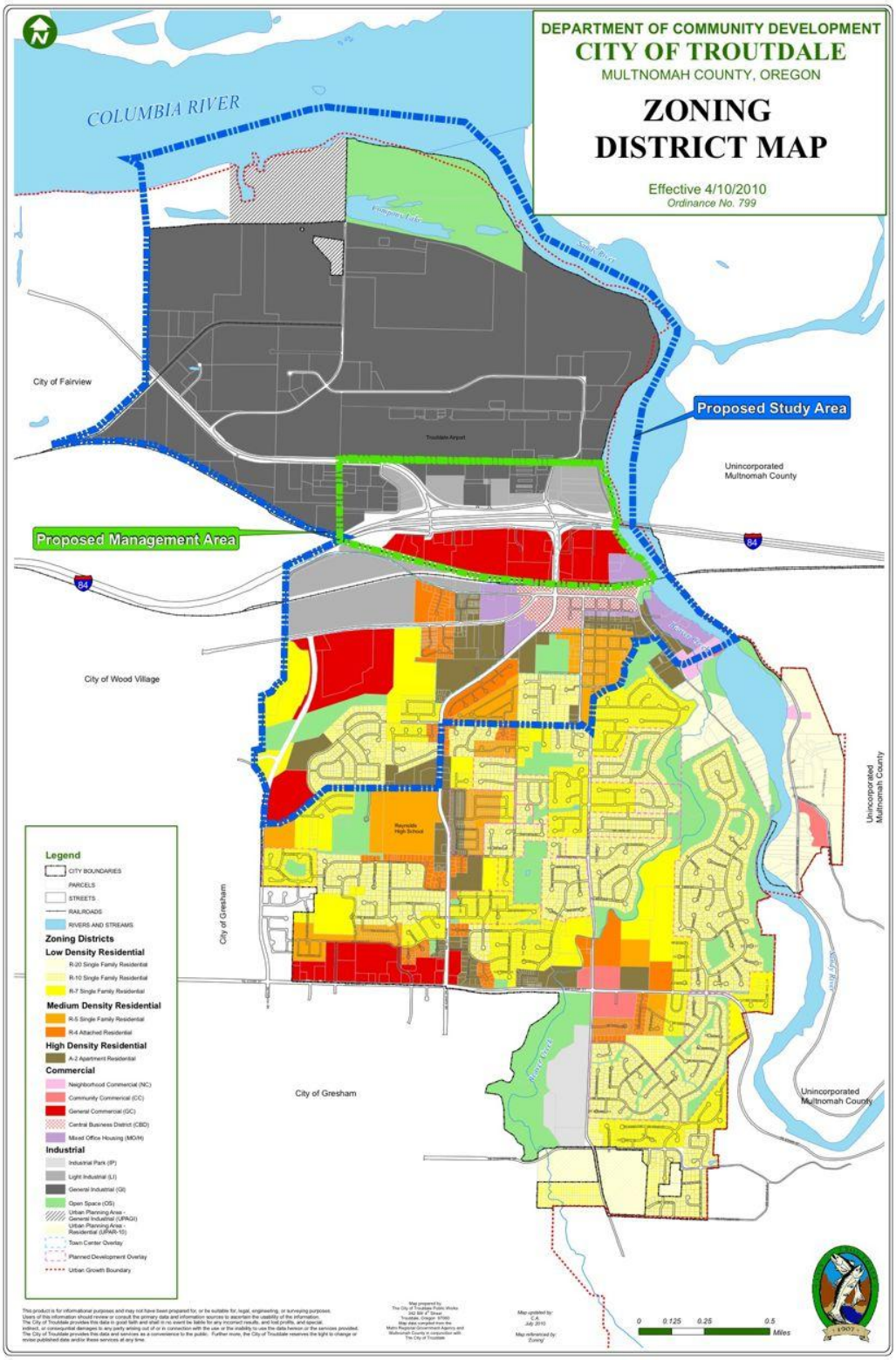
MANAGEMENT AREA/STUDY AREA RECOMMENDATIONS

Figure 1 illustrates the proposed Interchange Management Area (IMA). The IMA delineates the area around the I-84 257th Avenue interchange in which specific IAMP access and management regulations apply to land use decisions. The IMA includes those properties that currently have or are expected to have the greatest impact on operations at the interchange.

The management area is defined by tax lot parcel boundaries extending from the railroad tracks just north of the Historic Columbia River Highway to the south, just north of the airport to the north, approximately ½ mile to the west and approximately ½ mile to the east of the interchange ramp terminals.

Figure 1 also illustrates the project Study Area. The Study Area extends from the Columbia River to the north, the Sandy River to the east, the Troutdale City Limits line to the west and Cherry Park Road to the south. The traffic analysis for the IAMP assumed development of much of the undeveloped land within the Study Area (more detail in Future Conditions).

Figure 1: Proposed Management Area/Study Area



GOALS AND OBJECTIVES

The goals and objectives for the I-84 257th Avenue IAMP should reflect the intentions and interests of ODOT, the City of Troutdale, the Port of Portland, Multnomah County and other key stakeholders for the interchange and transportation operations in the area. The goals and objectives should be guided by, but not re-statements of, OHP policies and OAR language. The objectives need to be concrete statements that relate what the plan is trying to accomplish and should be achievable and measurable. The objectives serve as the basis for data collection and research and as alternative evaluation criteria to guide alternatives analysis and selection of the preferred alternative, and to guide management decisions.

GOAL 1: PROTECT THE FUNCTION AND OPERATION OF THE INTERCHANGE AND THE STATE HIGHWAY AS FOLLOWS:

I-84 is classified as an Interstate Highway. It is part of the National Highway System and is a designated freight route between Portland and points east. The operational objective for Interstate Highways is to provide safe and efficient high-speed travel in urban and rural areas.

Objective 1a: The preferred IAMP will consider FHWA Interchange design requirements and will address design-year (2035) traffic demands.

Objective 1b: The IAMP alternatives developed for consideration address the OHP requirement that the maximum volume-to-capacity (V/C) ratio for the ramp terminals of interchange ramps be either 0.85 or 0.90 (as defined in the OHP).

Objective 1c: The preferred IAMP alternative will meet or move in the direction of ODOT access management spacing standards for access along interchange crossroads.

GOAL 2: PROVIDE FOR AN ADEQUATE SYSTEM OF LOCAL ROADS AND STREETS FOR ACCESS AND CIRCULATION WITHIN THE INTERCHANGE AREA THAT MINIMIZES LOCAL TRAFFIC THROUGH THE INTERCHANGE AND ON THE INTERCHANGE CROSS ROADS.

Objective 2a: The preferred IAMP alternative will include necessary supporting improvements to the surface street system in the vicinity of the interchange. Improvements to the local street network will be adopted into the local comprehensive plan, including identified funding sources, as part of the City of Troutdale's actions to implement the IAMP.

Objective 2b: The IAMP alternatives will propose surface street improvements that either meet the ODOT established access management standards or improve on the current conditions.

Objective 2c: The IAMP alternatives will propose surface street improvements that will operate in conformance with applicable standards over the 20-year planning horizon.

GOAL 3: PROVIDE SAFE AND EFFICIENT MULTI-MODAL TRAVEL BETWEEN THE CONNECTING ROADWAYS (AND THE SURFACE STREET NETWORK, IF APPLICABLE).

Objective 3a: While recognizing existing capacity constraints, the IAMP alternatives will improve safety by adding capacity to reduce congestion and/or correcting geometric conditions that do not meet current applicable standards.

Objective 3b: The IAMP alternatives will improve bicycle and pedestrian safety by providing upgraded bikeways and walkways that meet current applicable standards and include facility infill and extensions where needed to provide a continuous network.

GOAL 4: ENSURE FUTURE CHANGES TO THE PLANNED LAND USE SYSTEM ARE CONSISTENT WITH PROTECTING THE LONG-TERM FUNCTION OF THE INTERCHANGE AND THE SURFACE STREET SYSTEM AND THE INTEGRATION OF FUTURE TRANSPORTATION PROJECTS AND LAND USE CHANGES.

Objective 4a: The IAMP alternatives will be developed in partnership with affected property owners in the interchange area, the City of Troutdale, the Port of Portland, Multnomah County, and the Oregon Department of Transportation (ODOT), as well as other stakeholders, including interchange users.

Objective 4b: The City and County Comprehensive Plans and/or Transportation System Plans will be found consistent, or amendments will be proposed to ensure consistency, with the preferred IAMP alternative.

Objective 4c: The City and County will adopt land use policies that ensure future land use actions in the IAMP Management Area, including requests for comprehensive plan amendments and/or zoning amendments, and promote land development that is compatible with the planned interchange capacity for the IAMP planning horizon.

GOAL 5: RECOGNIZE THE IMPORTANCE OF THE INTERCHANGE FUNCTION TO SUPPORT LOCAL AND REGIONAL ECONOMIC DEVELOPMENT GOALS AND PLANS.

Objective 5a: The IAMP alternatives are expected to reduce delay for vehicles, including commercial vehicles, accessing the freeway and to increase safety.

Objective 5b: The IAMP alternatives will facilitate access to, through, and from businesses in Troutdale.

GOAL 6: ENSURE THAT THE NEEDS OF REGIONAL THROUGH TRIPS AND THE TIMELINESS OF FREIGHT MOVEMENTS ARE CONSIDERED WHEN DEVELOPING AND IMPLEMENTING THE IAMP, IN PARTICULAR WHEN PLANNING FOR IMPROVEMENTS THAT DIRECTLY IMPACT FREIGHT ROUTES.

Objective 6a: The IAMP alternatives will facilitate freight access to and from the many industrial freight destinations in the interchange study area.

ALTERNATIVE EVALUATION CRITERIA

To rank potential improvement alternatives, evaluation criteria were created and focus on compliance with state and local plans and policies, engineering design requirements, and a desire to maximize positive (and minimize negative) economic, social (livability), and environmental impacts. The evaluation criteria and scoring developed are presented in Table 3.

Table 3: I-84 257th Avenue IAMP Technical Evaluation Scoring

Measure of Effectiveness	Evaluation Score
Safety	***-1 to +1***
Reduce Vehicular Conflict Points Reductions in conflicts through better access management, roadway design, or other means are essential for enhanced safety.	+1 Reduction in conflict points 0 Same number of vehicular conflict points -1 Increase in vehicular conflict points
Geometric Design/Driver Expectations Predictable routing and roadway designs contribute to driver safety.	+1 No geometric design or routing problems 0 Same geometric design or routing problems -1 Increase in quantity of geometric design or routing problems.
Livability	***-1 to +1***
Quality of Life While quality of life can be difficult to quantify, Troutdale's quality of life is dependent on sustaining and preserving the qualities that make it a cohesive community and a desirable place to live. Alternatives should support Troutdale's small town character and lifestyle with access to larger urban areas and amenities, attractive downtown, and community pride.	+1 Positive impact on current quality of live 0 Neutral impact on current quality of life -1 Negative impact on current quality of life
Increase Economic Vitality of City of Troutdale The wellbeing of a city is dependent upon its ability to meet the economic needs of its citizens. These needs primarily include employment opportunities and commercial services/products. Alternatives should provide good access to and mobility between the I-84 freight corridor and industrial/commercial areas	+1 Good access and mobility to and from I-84 0 Marginal access and mobility to and from I-84 -1 Poor access and mobility to and from I-84
Balance Service to All Users The ability of the transportation system to serve the needs of the users of all transportation modes is an	+1 Pedestrians, cyclists, transit users, and vehicles all accommodated 0 At a minimum, pedestrians and vehicles

important element for the wellbeing of the community. Alternatives should incorporate basic serviceability elements (e.g. a sufficient number of traffic lanes, pedestrian crossings and sidewalks, transit stops, bike lanes and paths, etc.) for all transportation modes.	accommodated -1 Only vehicles accommodated
Low Environmental Impact A healthy and well-cared for environment, including natural resources, contributes to a community's wellbeing. Those alternatives that have a lower impact on the environment and associated natural resources should be given preference.	+1 Reduced environmental impact compared to current conditions 0 Insignificant environmental impact compared to current conditions -1 Increased environmental impact compared to current conditions
Mobility	***-1 to +1***
Meet V/C Mobility Standards All study intersections are required to meet the following ODOT V/C standard: **0.85**	+1 Intersections well within standards 0 Intersections meet standards -1 Intersections do not meet standards
Facilitate Pedestrian and Bicycle Movements Proposed alternatives should accommodate pedestrian and bicycle needs.	+1 Significant increase in pedestrian and/or bicycle facilities 0 Minor increase in pedestrian and/or bicycle facilities -1 No increase in pedestrian and/or bicycle facilities
Facilitate Truck Movements Trucks are a principal method for transporting freight to and from the City of Troutdale. Where applicable (e.g. at interchange ramp terminals and major intersections) facilities should accommodate truck movements through adequate turning radii and turn lane storage capacity.	+1 Truck movements accommodated at all intersections 0 Truck movements accommodated at only major intersections -1 Not all truck movements at major intersections are accommodated
Feasibility	***-1 to +1***
Meet Adopted Policies or Plans Alternatives considered should not conflict with adopted policies or planned improvements in the City of Troutdale TSP unless it is reasonable to assume that adopted plans would be amended by the City to remove such conflicts.	+1 Meets adopted policies and plans 0 Would require deviation or probable amendment -1 Does not meet adopted policies and plans
Minimize Costs To accommodate budget and spending priorities, low cost solutions should be given preference	+1 Low cost 0 Moderate cost -1 High cost
Minimize Private Property Impacts Alternatives with no private property impacts would be the most desirable. While private property impacts	+1 No private property impact 0 Minor private property impact

should be minimized where feasible, impacts that would not require purchasing the entire property and would allow current development to continue operating are preferable.	-1 Significant private property impact
<u>Minimize Impact During Construction Stage</u> Alternatives that can be constructed or implemented with little impact to traffic flow should be rated higher than those that would require the elimination of travel lanes during construction.	+1 No construction impact 0 Minor construction impact -1 Significant construction impact