South Medford Interchange (27) Interchange Area Management Plan

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LIST OF ACRONYMS

AMS	Access management strategy
ATMS	Advanced Transportation Management Strategies
DLCD	Department of Land Conservation and Development
EIS	Environmental Impact Statement
HDM	Highway Design Manual
I-5	Interstate 5
IAMP	Interchange Area Management Plan
ITS	Intelligent Transportation Systems
LDC	Land Development Code
LOS	Level of service
MPO	Metropolitan Planning Organization
OAR	Oregon Administrative Rule
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
OR	Oregon Route
OTIA	Oregon Transportation Investment Act
OTC	Oregon Transportation Commission
RTP	Regional Transportation Plan
RVCOG	Rogue Valley Council of Governments
RVMPO	Rogue Valley Metropolitan Planning Organization
RVTD	Rogue Valley Transportation District
SFR	Single-family residential
SMI	South Medford Interchange
SPUI	Single point urban interchange
TAC	Technical Advisory Committee
TAZ	Transportation Analysis Zone
TDM	Transportation Demand Management
TMA	Transportation Management Association
TOD	Transit oriented development
TPR	Transportation Planning Rule
TSM	Transportation System Management
TSP	Transportation System Plan
UGB	Urban growth boundary
v/c	volume to capacity

TABLE OF CONTENTS

Page

APPENDICES

LIST OF FIGURES

Follows Page

LIST OF TABLES

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1 EXECUTIVE SUMMARY

An Interchange Area Management Plan (IAMP) is a planning document used to help protect the investment in an interchange over the long-term. The IAMP for the South Medford Interchange (SMI) is required by Oregon Administrative Rules and by specific requirements of the Oregon Transportation Commission related to a construction project now underway.

Extensive planning and traffic analysis, including preparation of an Environmental Impact Statement (EIS), was undertaken leading to the design of the new interchange that will be constructed during 2006 to 2009. The new interchange will replace the existing interchange at Barnett Road, with one connecting to a new arterial, the Garfield-Highland Connector. The new interchange is designed as a Single Point Urban Interchange (SPUI) that brings the I-5 northbound and southbound ramps to a single intersection with the cross street. This varies from the more usual practice of having two separate ramp terminals for northbound and southbound ramps.

This IAMP does not propose or consider any redesign of the new interchange now under construction. Instead, the analysis performed for the IAMP focused on making certain, in light of new population and employment forecasts developed for the recently-adopted Regional Transportation Plan (RTP), that the interchange would have an operational life of at least twenty years.

Using the forecast population and employment values from the RTP and the traffic volumes forecast using the regional traffic forecasting model, the operational analysis showed that the SPUI would meet Oregon Department of Transportation (ODOT) mobility standards in year 2030. The forecast population and employment values and traffic volumes are based on uses permitted under the City of Medford's adopted comprehensive plan and Land Development Code (LDC).

The analysis also addressed an Alternative Development Scenario that used the same employment values from the RTP and added some additional dwelling units in the study area. This scenario, which does not anticipate any change in zoning, focuses on assessing the impacts if expected future employment included in the model for the study area features high traffic generation. In addition, the Alternative Development Scenario reflects a recent trend toward additional residential development in the study area. The traffic analysis of this scenario also indicated the SPUI would meet ODOT mobility standards in year 2030.

Even though the SPUI was calculated to meet ODOT mobility standards and provide for good traffic operations for more than twenty years, a variety of potential management actions were examined for possible application in the area. Though not needed during the next twenty years, such measures could extend the operational life of the interchange for a longer period. Nine measures were examined for possible implementation. Some are currently being implemented to varying degrees and most are also included in the RTP or Medford Transportation System Plan. Only two management actions are recommended.

- ODOT will implement the access management strategy developed during the design process for the new interchange.
- The IAMP includes provisions from Medford's TSP and Land Development Code that protect the new interchange. After the OTC adopts the IAMP, any amendments to these

local provisions would require a corresponding amendment to the SMI IAMP. The specific policy and ordinance language upon which the SMI IAMP relies is as follows:

Medford TSP – Goals, Policies and Implementation Measures

Goal 1: To provide a multi-modal transportation system that supports the safe, efficient and accessible movement of all people and goods, and recognizes the area's role as the financial, medical, tourism and business hub of Southern Oregon and Northern California.

- **Policy 1-D:** The City of Medford's second priority for the use of transportation funds shall be to maximize efficient use of the existing transportation system through use of Transportation System Management (TSM) and Transportation Demand Management (TDM) measures prior to expending transportation funds on capacity improvements.

Goal 2: To provide a comprehensive street system that serves the mobility and multi-modal transportation needs of the Medford planning area.

- **Policy 2-G:** The City of Medford shall undertake efforts to reduce per capita vehicle miles traveled (VMT) and single-occupancy vehicle (SOV) demand through TDM strategies.
- **Policy 2-H:** The City of Medford shall manage and maintain the transportation system in an efficient, clean and safe manner.
    - **Implementation 2-H(1):** Require Traffic Impact Analysis (TIAs), as appropriate, in conjunction with development applications to assess impacts on the existing and planned transportation system, and require transportation system improvements that are identified through the TIA or by other Municipal Code requirements as a condition of approval of development permits and land use actions.
    - **Implementation 2-H(2):** Utilize access management, including access location and spacing, to increase the capacity and safety of the transportation system. Incorporate access management techniques, such as raised medians, access management plans, driveway consolidation, driveway relocation, and closure of driveway access, into Arterial and Collector street design and development applications.
    - **Implementation 2-H(3):** Continue to modernize the traffic signal system and improve its efficiency by ultimately connecting all signals to the centralized traffic control center. Employ traffic signal timing plans that maximize efficiency during different time periods. Provide a program to identify locations for new/modified signals.
    - **Implementation 2-H(4):** Utilize Intelligent Transportation Systems (ITS) such as real-time traffic monitoring cameras and management projects, that provide motorist information and incident response/clearance programs to alleviate traffic congestion.
- **Policy – 2-L:** The City of Medford shall require an appropriate supply and design of off-street parking to promote economic vitality, neighborhood livability, efficient use of urban space, reduced reliance on single occupancy vehicles and to make TODs more pedestrian friendly.

  - **Implementation 2-L(1):** Require a minimum and maximum of off-street parking spaces based on the typical daily needs of the specific land use type.

- **Policy 2-M:** The City of Medford shall undertake efforts to contribute to a reduction in the regional per capita parking supply to promote the use of alternatives to the single occupancy motor vehicle.
  - **Implementation 2-M(1):** Every five years, estimate the parking supply in areas designated for commercial, industrial and institutional uses by the Medford Comprehensive Plan in order to monitor progress toward meeting the goal of reducing parking supply per capita by ten percent over the 20-year planning period.

Goal 3: To facilitate the increased use of public transportation in the Medford area as the adequacy of transit service is a measure of the quality of life in a community.

- **Policy 3-A:** The City of Medford shall undertake efforts to increase the percentage of total daily trips taken in the Medford planning area by transit, consistent with the target benchmarks in the Alternative Measures of the RTP.
- **Policy 3-B:** The City of Medford shall support the provision of convenient and accessible transit service to, from and within the Medford planning area, especially to higher density residential areas, employment centers and major commercial areas.
- **Policy 3-C:** The City of Medford shall undertake efforts to increase the percentage of dwelling units in the Medford planning area located within ¼ mile walking distance of transit routes, consistent with the target benchmarks in the Alternative Measures of the RTP.

Goal 8: To maximize the efficiency of Medford's transportation system through effective land use planning.

- **Policy 8-B:** The City of Medford shall undertake efforts to increase the percentage of dwelling units and employment located in Medford's adopted TODs, consistent with the targeted benchmarks in the Alternative Measures of the RTP.

Medford TSP – Projects

- **Project #532:** Fiber optic system upgrade at arterial or collector locations.
- **Project #538:** Install ITS equipment to facilitate traffic flow and enhance system communications.

Medford Land Development Code

- **Section 10.227 Zone Change Criteria:** Requires applicants to demonstrate that Category A urban services or facilities are available, or can and will be provided for the subject property. Streets and street capacity must be provided by either i) streets that presently exist and have adequate capacity, ii) existing streets that will either be improved or new streets constructed to provide adequate capacity, by the time of building permit issuance, iii) for streets that must be constructed or improved, the Planning Commission may find that the street to be adequate if improvements are fully funded, iv) for streets that need to be improved, specific improvements must be identified and demonstrated to result in street adequacy.

- **Section 10.462 Maintenance of Level of Service D:** Whenever level of service is determined to be below level D for arterials or collectors, development is not permitted unless the developer makes the roadway or other improvements necessary to maintain level of service D respectively.

- **Section 10.744 - Joint Use of Parking Facilities:** The off-street parking requirements of two or more uses may be satisfied by the same parking or loading space used jointly to the extent that it can be shown by the owners or operators of the uses that their operations and parking needs to not overlap in point of time.

2 IAMP Definition, Background, and Authority

2.1 Purpose of IAMPs Generally

An Interchange Area Management Plan (IAMP) is a planning document used to help protect the function of the interchange over time and consequently the state's investment in the facility. New interchanges are very costly and it is in the interest of the state, local governments and citizens to ensure that the interchange functions as it was designed, for as many years as possible. The Oregon Administrative Rules (OAR) address IAMPs, with OAR 734-051-0155 establishing a requirement for IAMPs for new or substantially modified interchanges. In addition, Oregon Highway Plan (OHP) policies direct the Oregon Department of Transportation (ODOT) to plan and manage interchange areas for safe and efficient operation.

An IAMP is intended to evaluate existing conditions, assess limitations, identify long-range needs, and recommend potential management actions to protect the function of the interchange.

2.2 Purpose of the South Medford Interchange IAMP

The IAMP for the South Medford Interchange (SMI) addresses the new Interstate-5 (I-5) Single Point Urban Interchange (SPUI) that will be located approximately one-half mile south of the existing interchange at Barnett Road. The SPUI will replace the existing Barnett Road interchange, but Barnett Road will remain as a freeway overpass. The IAMP has been developed specifically to address the long-range issues related to the new interchange and does not address issues related to the current the Barnett Road interchange.

This IAMP is required by OAR 734-051-0155 and also by the Oregon Transportation Commission (OTC) as a condition for the use of Oregon Transportation Investment Act (OTIA) funds for the construction of the new interchange. This condition, which was placed in the 2006-2009 State Transportation Improvement Program (STIP), specified that ODOT develop an IAMP and an Access Management Strategy (AMS) in accordance with OAR and OHP provisions. The OTC also required that the City of Medford indicate acceptance of the IAMP and AMS by adoption. Recent Administrative Rule changes now allow jurisdictions to indicate acceptance of an IAMP by affirming that the IAMP is consistent with the local transportation system plan (TSP), and the City of Medford has provided a letter affirming this consistency. Also, as the AMS is a strategy rather than a plan, it has been determined that it is not subject to adoption. Instead, the City has indicated acceptance of the AMS and implementation is occurring with construction of the project.

During the planning for the current interchange reconstruction project, Intergovernmental Agreements between ODOT and the City of Medford were signed in September of 2003 and December of 2005, to transfer state facilities that operate as local streets to the jurisdiction of the City. The Final Environmental Impact Statement (EIS) for the project was completed in February of 2004. The AMS has been completed and will be implemented during the construction of the SMI.

2.3 Interchange Function

The SMI is an urban interchange that serves the entire southern part of the City and connects I-5 with the city's commercial core and Oregon Route (OR) 99. The original configuration of the SMI utilizes ramps that connect I-5 to Barnett Road. A new interchange, which will be constructed during 2006 to 2009, will utilize Garfield Street and Highland Drive, instead of Barnett Road, as its connection with the arterial street system. Once its ramps to I-5 are severed, Barnett Road will serve as the main east-west arterial in the study area. The function of the reconfigured interchange will remain the same as the original.

2.4 Interchange Reconstruction Project

Reconstruction of the SMI was a concept developed several years ago and considerable planning was undertaken prior to the reconstruction project that began in 2006. The project was included in the Rogue Valley Metropolitan Planning Organization (RVMPO) Regional Transportation Plan (RTP) and the City of Medford's TSP.

An Environmental Impact Statement (EIS) was prepared assessing the impacts of the project on the surrounding area. The Draft EIS was completed in September 2001 and the Final EIS was completed in February 2004.

The OTC approved funding for the interchange reconstruction project as part of the Statewide Transportation Improvement Program. The OTC found that the interchange reconstruction project is consistent with the City of Medford Comprehensive Plan, the RVMPO RTP, and Policy 1G of the OHP. The conditions of approval require that the IAMP "…will provide for the protection of safe and efficient operation of the interchange between connecting roadways and will minimize the need for major improvements to existing interchanges."

The interchange project is intended to reduce congestion while improving both the function and safety of the interchange. In addition, completion of the new interchange will enable related improvements to the City's street system such as new limited-access local streets, connecting the interchange with Oregon Route (OR) 99 and Barnett Road.

Key features of the interchange reconstruction project include the removal of existing ramps at Barnett Road and the construction of new ramps connecting to a new overpass about half a mile to the south. The existing on- and off-ramps at Barnett Road will be removed leaving Barnett Road as an overpass. The new interchange design is known as a SPUI. This design will direct most turning movements to occur at a signalized intersection located on the interchange structure extending over I-5. A SPUI also tends to minimize the amount of right-of-way required for on and off- ramps, an important consideration in the environmentally and developmentally constrained areas associated with Bear Creek. The project will include travel lanes, turn lanes, bike lanes, sidewalks, landscaped areas and other roadway-related facilities.

ODOT completed an access management strategy (AMS) during the design phase of the reconstruction project. The AMS changes some of the property access in the vicinity of the interchange. The City of Medford staff reviewed the AMS for possible impact on streets under the city's jurisdiction. The IAMP does not feature any re-design of the new interchange or any changes to the AMS.

2.5 Problem Statement

The problem to be addressed in this IAMP for the SMI is simply to assess whether, in light of recent development activity and new estimates of future development in the south Medford area, the SPUI can still be shown to have an operational life of at least 20 years.

The analysis undertaken for this IAMP represents an update of the analyses performed for the EIS. Since the traffic analysis was undertaken for the EIS, new information was compiled for population variables (number of households and population) and for employment (number of employees by employment category). The population and employment information was not updated because of deficiencies or inadequacies of the prior data, but rather, as part of a regular effort to make use of the most recent data for planning efforts including the update of the RVMPO RTP. The newer base year population and employment data is from year 2002. The future year used for the IAMP is 2030, the same year used for the RTP adopted in 2005.

The analysis conducted for the IAMP takes advantage of the new population and employment data by using information developed by the staff of the RVMPO in cooperation with local agencies. This data is used in the regional transportation forecasting model run by ODOT's Transportation Planning and Analysis Unit (TPAU). The model, including the base year and future year data, is the same as that used to analyze transportation needs, traffic operations, and the air quality analysis conducted for the RTP.

In conducting the transportation analysis for the IAMP, we were also able to use 2004 traffic counts provided by the City of Medford as the basis for our assessment of traffic operations. These data were several years newer than the base volumes used in the EIS and account for much recent development that occurred in the interchange area in the late 1990's.

The focus of this IAMP is on the central element of the new interchange project: the SPUI. Testing to confirm that the SPUI meets mobility standards specified in the OHP for at least the next twenty years helps to assure that the substantial investment being made for the interchange project by ODOT and local partners is protected.

2.6 Goals and Objectives

The goals and objectives to guide the development of this IAMP were based upon the OTC's conditions of approval specified in the 2006-2009 State Transportation Improvement Plan (STIP). The STIP is the document used by the OTC to make funding decisions and commitments for projects.

Goal

Maintain the function of the interchange over the 20-year planning period to preserve the investment in the facility.

Objectives

Assess the traffic operations at the SPUI using the most recent available data and most recent forecasts of year 2030 traffic to determine whether the mobility standards prescribed in the OHP will be met for at least 20 years.

Manage access, including devising an access management strategy in compliance with applicable OAR 734 Division 51.

Goal
Minimize the need for future major improvements to the interchange.

Objectives
Identify whether future land uses might be inconsistent with the operation and safety of the new interchange and, if such land uses were identified, develop and recommend strategies for land use controls.

Ensure ODOT is involved in future land use decisions that could affect the function of the interchange.

2.7 Study Area

The study area for this IAMP includes all of the road segments that were considered in the design of the new interchange plus an area where traffic was predicted to have a substantial impact on the interchange. The study area centers on the new interchange and includes parcels along I-5, OR 99, and Barnett Road (see Figure 1).

The boundaries of the study area are Siskiyou Boulevard on the north, the city limits/urban growth boundary (UGB) on the south, Olympic Avenue/Murphy Road on the east, and the UGB and South Holly Street on the west. This area excludes the downtown, but still encompasses a substantial portion of the commercial, industrial, and multi-family residential (MFR) land in south-central Medford.

The IAMP study area boundary matches the transportation analysis zone (TAZ) boundaries used in the same version of the Rogue Valley traffic forecasting model that was used for the adopted RTP and for the environmental impact statement for the South Medford Interchange design project. The study area accounts for more than ten percent of the region's total employment and about two percent of the region's households.

This study area was selected for the purpose of evaluating the growth potential as specified in the RTP between 2002 and 2030. It also represented the area within which it was assumed that management measures might prove most effective if such measures were determined to be needed. The evaluation of growth potential in the study area quickly revealed that much of the area is fully developed and that there is little potential for new development in several TAZs. Further discussion about growth and development potential within the study area is contained in Section 3.3.

2.8 Public and Agency participation

This IAMP has been prepared with participation from the City of Medford, ODOT and with input from a variety of stakeholders and the general public.

A public meeting was held on May 25, 2005 in the Medford City Hall, to introduce the concept of the IAMP and to enable public comment. Several informational presentations were made before City of Medford committees. The first presentation occurred on November 11, 2004 before the Medford City Council and the second was held on January 25, 2006 with the Joint Transportation Subcommittee. In addition, three study sessions were held. On February 26, 2007, a joint study session was held with the Medford Planning Commission and the Joint Transportation Subcommittee. Study sessions to present the final draft of the IAMP were held with the City Council on September 13, 2007 and with the Planning Commission on September 24, 2007. The IAMP was also placed on the City's website to enable a wider public review.

The IAMP Technical Advisory Committee (TAC) for the project, which included representatives of the City, ODOT, Department of Land Conservation and Development (DLCD), the Rogue Valley Metropolitan Planning Organization (RVMPO) and Jackson County, met seven times throughout the plan development period.

3 Existing Conditions Analysis

3.1 Consistency with Plans and Regulatory Framework

Adopted transportation plans and land use plans were reviewed to assess the relationship between the SMI reconstruction project and the IAMP. The purpose of this review was to help ensure consistency with applicable plans and regulations so that the IAMP would meet state and community goals for the area and to identify how local planning efforts, policies, and regulations would protect the interchange. Two key planning documents that specifically reference the SMI are the RTP and the City of Medford's TSP. Section 7 of the IAMP goes into greater detail to identify specific local plan and ordinance language that supports management measures that protect the function of the Interchange. Appendix A of the IAMP presents findings of consistency with the relevant transportation and land use plans and policies, and further identifies how they influence planning for the SMI.

3.1.1 Regional Transportation Plan (RTP)

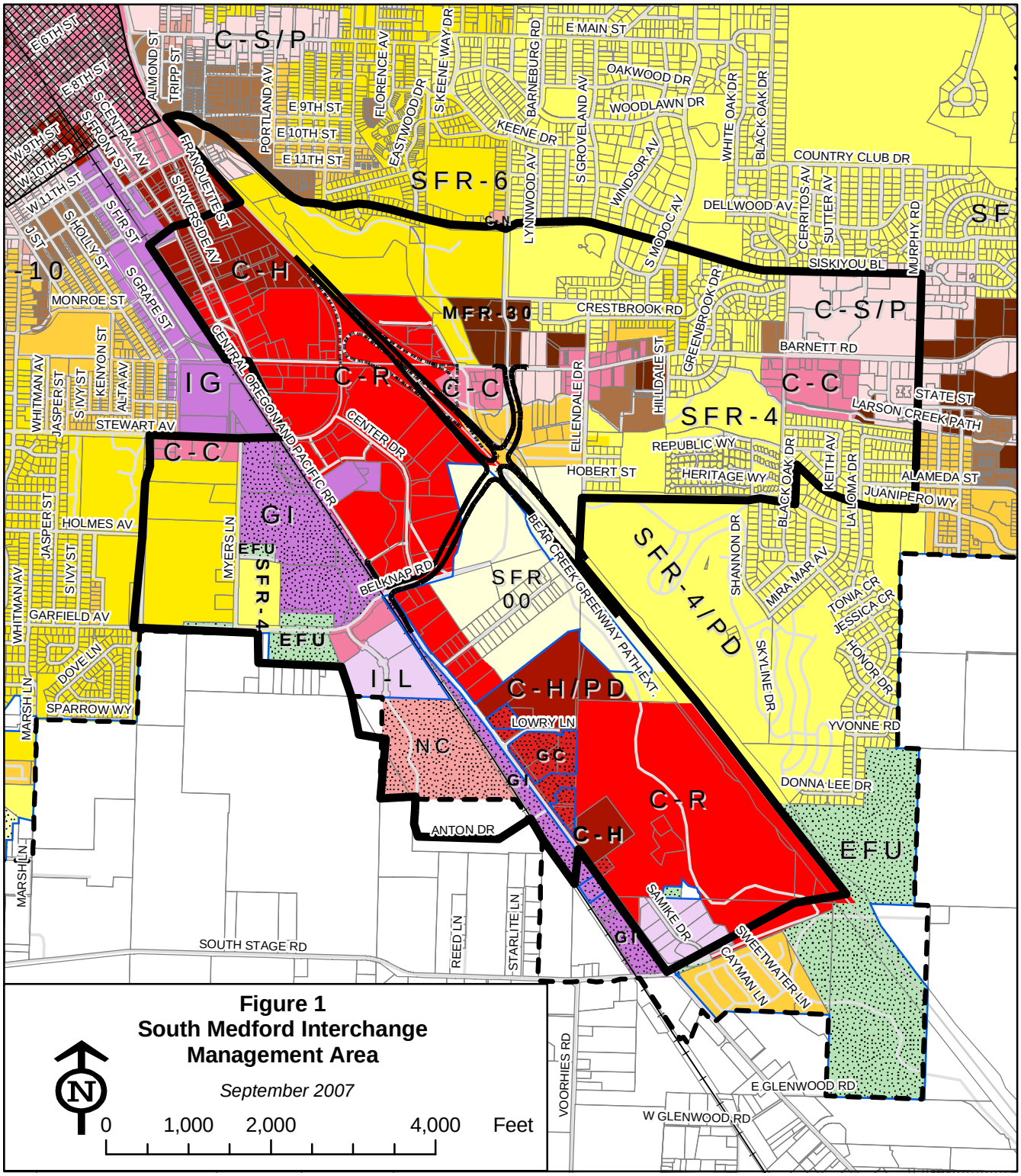
The RVMPO RTP includes a street system project list that specifically identifies construction of the new SMI as a short-range project (project number 900 in RTP Figure 8-3). Short-range projects are expected to be needed within five years of plan adoption. The RTP lists ODOT and the City of Medford as the sources of funding for the SMI project.

Three RTP policies require consistency and coordination:

> **Policy 7-4**. The Rogue Valley Regional Transportation Plan shall be consistent with the adopted elements of the Oregon Transportation Plan.
>
> **Policy 7-5**. Local transportation plans will be consistent with those developed at the regional and state level.
>
> **Policy 7-6**. Local governments shall coordinate transportation planning and construction efforts with those of the RVMPO.

3.1.2 Medford Transportation System Plan (TSP)

The City TSP Implementation Measure 1-B(5) "[a]dopt[s] the Regional Transportation Plan (RTP) by reference in the Medford Comprehensive Plan to the extent that this Plan is consistent



Legend

- South Interchange Management Area
- UGB
- City Limits
- Taxlots
- Downtown Medford TOD
- New SPUI and Garfield Avenue-Highland Drive Connector
- Ramps Removed as part of Interchange Project

Zoning

City Residential

- Multi-Family Residential - 30 Units/Acre (MFR-30)
- Multi Family Residential - 20 Units/Acre (MFR-20)
- Multi-Family Residential - 15 Units/Acre (MFR-15)
- Single Family Residence - 10 Units/Acre (SFR-10)
- Single Family Residence - 6 Units/Acre (SFR-6)
- Single Family Residence - 4 Units/Acre (SFR-4)
- Single Family Residence - 2 Units/Acre (SFR-2)
- Single Family Residence - 1 Unit/Acre (SFR-00)

City Commercial

- Heavy (C-H)
- Regional (C-R)
- Community (C-C)
- Neighborhood (C-N)
- Service/Professional (C-S/P)

City Industrial

- Heavy (I-H)
- General (I-G)
- Light (I-L)

County Residential

- Suburban - 1 Acre Minimum (SR-1)
- Suburban - 2.5 Acre Minimum (SR-2.5)
- Rural - 5 Acre Minimum (RR-5)
- Farm - 5 Acre Minimum (F-5)

County Resource

- Exclusive Farm Use (EFU)
- Open Space Reserve (OSR)

County Commercial

- General (GC)
- Neighborhood (NC)

County Industrial

- General (GI)
- Light (LI)
- WHITE Unknown/Missing

with the Medford Transportation System Plan." The City of Medford's TSP also specifically includes the SMI project. The TSP identifies it as an ODOT Tier 1 short-range (2004-2008) improvement (project number 3, TSP Table 13-2). In Chapter 5 (Street Plan), the section on operations and capacity deficiencies on state highways discusses the SMI and the IAMP. It reiterates the OTC OTIA funding conditions of approval, including the specification that the City adopt the IAMP and access management strategy. However, recent Administrative Rule changes have amended the requirement for adoption to instead require affirmation that the IAMP is consistent with the City's TSP. To meet this requirement, the City of Medford has submitted a letter that affirms that the IAMP is consistent with the City's TSP. The Access Management Strategy for the Interchange will also not be subject to adoption, as it is a strategy that covers ODOT right-of-way only rather than a plan. Implementation of this strategy is occurring with construction of the project.

3.1.3 Land Use Notification and Coordination with ODOT

The Medford LDC 10.146, Referral Agencies, Distribution, establishes the types of authorizations that the City notifies other agencies for review. The Medford Planning Department notifies ODOT of all major comprehensive plan amendments, which are legislative actions initiated by the planning commission or city council for an amendment that affects a large area, or adoption of new elements of the comprehensive plan, TSP, or sub-area plan. The planning department notifies ODOT of the following types of proposals within or abutting ODOT's jurisdiction:

- Minor comprehensive plan amendment—this is a quasi-judicial decision affecting individual properties
- Annexation (except for land that is surrounded by City land, then no notice is given)
- Zone change
- Planned unit development,
- Land division
- Site plan and architectural review
- Transportation facility development

For conditional use permits, the City notifies ODOT if the proposal includes new buildings or building additions that take access from a state facility. The planning department does not routinely notify ODOT of LDC amendments, street vacations, or requests for a departure from the literal requirements of the code (exception). However, LDC 10.146 allows the Planning Director to exercise discretion and send requests for review to agencies for proposals not listed. In addition, the Transportation Planning Rule (TPR) (OAR 660-012-0060 Plan and Land Use Regulation Amendments) requires the City of Medford to coordinate with ODOT in making the determination of effect whether a plan amendment or regulation would significantly affect I-5 or the SMI. OAR Section 660—012-045(2)(f) also includes regulations directing local governments to notice public agencies including MPOs and ODOT regarding land use applications that require public hearings, for subdivisions, for road approaches and for applications that affect airport operations.

ODOT coordinated with the City of Medford throughout the IAMP planning process. The City of Medford provided input on the population and employment data used in the regional transportation forecasting model used for the IAMP traffic analysis. Representatives from the City served on the IAMP TAC, along with representatives of the RVMPO, DLCD and Jackson

County. During the IAMP preparation process, the TAC provided a forum for the discussion of land use and transportation issues. Based on the traffic operations analysis, the TAC concluded that no land use actions were needed to protect the function of the interchange for the 20-year planning period.

3.2 Existing Land Use and Zoning

Figure 1 shows existing zoning designations. The study area contains a mix of residential, commercial, industrial lands and open space.

Information used for the RTP, including base year population and employment data from 2002, was used to assess existing conditions. Year 2002 was also the most recent year for which data was available for both population and employment when this study began.

A significant amount of single-family residential (SFR) development can be found in the planning area, especially east of I-5. The study area contains approximately 1000 residences. Though much of the residential land is developed, a small amount of vacant residential land remains in the study area. Most of the vacant land designated and zoned for residential uses is in the eastern portion of the study area.

Employment is the more important component of land uses within the study area, accounting for over 9000 employees. Service and retail sector employment accounts for about 85 percent of the employment in the IAMP planning area and includes big box retail, specialty retail and fast food restaurants many of which are found along the Barnett Road and OR 99 corridors. There is currently some vacant and under-utilized commercially zoned land in the area with the largest parcels planned for commercial use adjacent to Center Drive and OR 99.

The Rogue Valley Medical Center and nearby medical services, concentrated along Barnett Road between Murphy Road and Black Oak Drive, fall into the service sector employment category. The medical center and nearby facilities serve the entire region and have high volumes of traffic throughout the day.

Industrial employment accounts for about ten percent of the employment in the IAMP planning area. Industrial development can also be found along the OR 99 corridor. This area also features some vacant or under-utilized land with industrial zoning designations, with most of the vacant industrial land located on the west side of OR 99. More industrial development along this corridor can be expected. Industrial employment has less intense trip generation characteristics than retail, service or residential.

As described above, some vacant land zoned for residential use is available in the study area. According to the forecasts of households and population used in the RTP, a total of about 400 new households are assumed to be developed within the entire study area by 2030. Most of these are assumed to be developed on vacant land east of Black Oak Drive in east part of the study area.

Vacant land zoned for commercial development and for industrial use is also available in the study area. According to the employment forecasts used for the RTP and the land use designations in the Medford Comprehensive Plan, the study area is predicted to add about 1500 employees by year 2030 for a total of approximately 10,600 employees in the study area. More detailed information on the future employment predicted for the study area can be found in Section 5.1.

3.3 Existing Population, Households and Employment

TAZs are the basic geographic building blocks used to represent population, household and employment information used in regional traffic forecasting models. The TAZs used in the regional traffic forecasting model in the south part of Medford are illustrated in Figure 2.

Table 1 summarizes the key population, household and employment data for the study area with information presented by TAZ and by employment category. The data in Table 1 are estimates for year 2002, the latest year for which both population and employment estimates were available at the beginning of this study. Employment is broken down to sub-categories of retail, service, industrial or other.

Table 1. IAMP Planning Area Household and Employment Data by TAZ, Year 2002

			Employment by Category				
TAZ	**Population**	**Households**	**Retail**	**Service**	**Industrial**	**Other**	**Total**
351	119	43	30	188	48	298	564
352	188	64	208	308	53	34	603
353	145	63	18	59	3	10	90
354	250	108	1	61	5	3	70
355	345	124	0	116	6	1	123
357	39	15	1	2,153	0	6	2,160
362	45	16	88	176	67	43	374
369	132	50	1,747	622	318	143	2,830
370	27	12	26	88	3	129	246
371	34	15	181	404	23	8	616
372	478	223	24	191	2	101	318
373	526	197	33	384	0	137	554
380	143	66	123	176	201	4	504
382	92	39	29	0	15	24	68
Total	2,563	1,035	2,509	4,926	744	941	9,120

Table 2 summarizes the same key population, household and employment data listed in Table 1, except that it includes the estimates for year 2010. This is the year when the new SPUI is expected to be operational.

Table 2. IAMP Planning Area Household and Employment Data by TAZ, Year 2010

			Employment by Category				
TAZ	**Population**	**Households**	**Retail**	**Service**	**Industrial**	**Other**	**Total**
351	119	43	30	201	50	260	541
352	188	64	211	356	55	1	623
353	146	63	18	67	3	0	88
354	265	115	6	68	5	0	79
355	352	127	0	118	6	0	124
357	39	15	1	2,173	0	5	2,179
362	45	16	90	218	69	7	384
369	183	68	1,764	650	395	136	2,945

370	27	12	79	269	3	6	357
371	36	16	183	438	24	0	645
372	505	239	24	242	2	55	323
373	640	254	40	428	0	107	575
380	180	84	131	218	207	0	556
382	89	39	36	44	28	5	113
Total	2,814	1,155	2,613	5,490	847	582	9,532

Year 2010 traffic volumes were forecast using the household and employment data from Table 2 and similar year 2010 data for the remainder of the RVMPO area. The results of the year 2010 traffic analyses are discussed in Section 4.

4 Transportation Facilities and Traffic Operations – Year 2010

4.1 Key Transportation Facilities

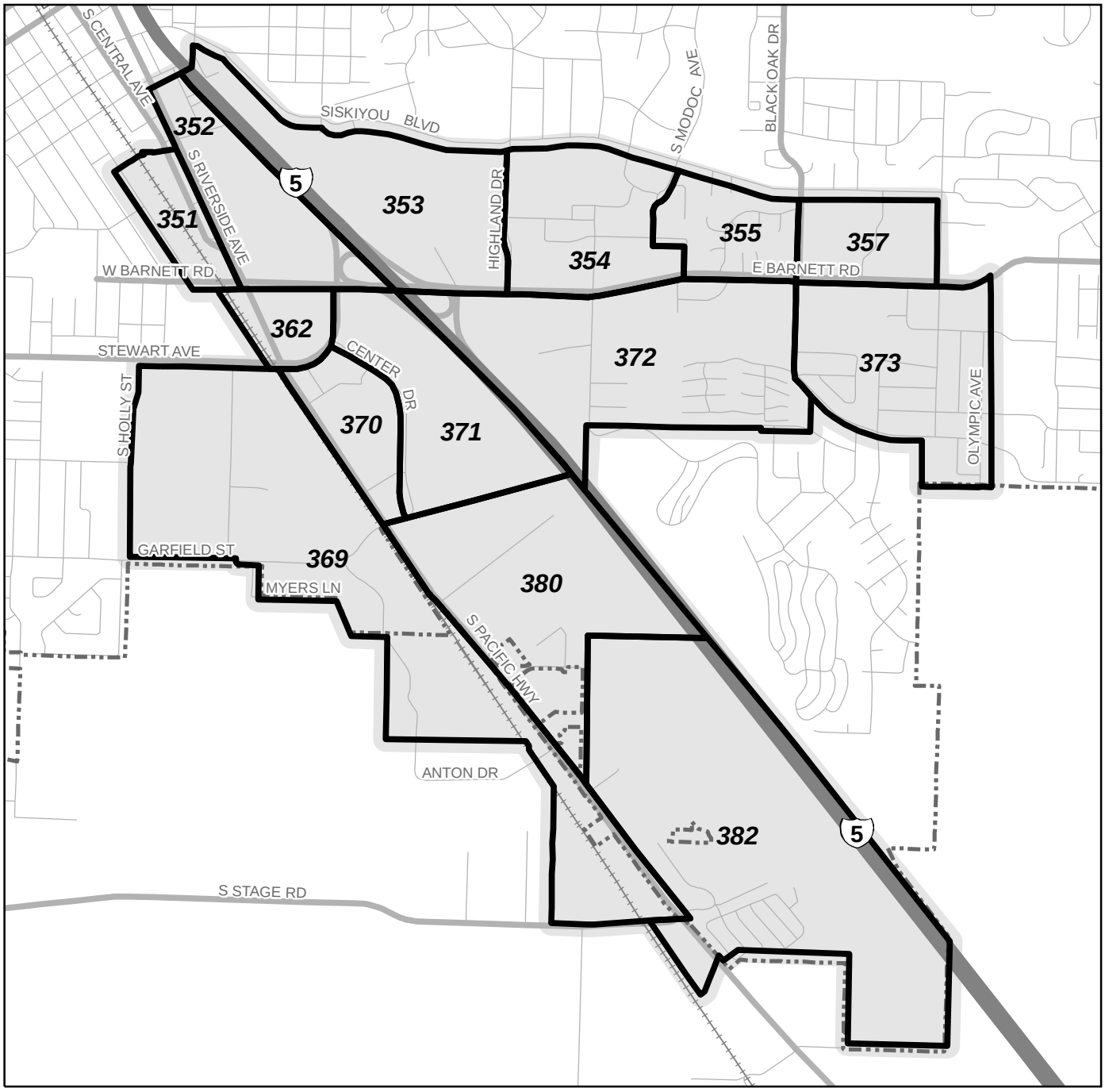
This IAMP assumes that the new interchange is in place and street improvements associated with the interchange project have been constructed. The interchange is expected to be fully operational in 2010.

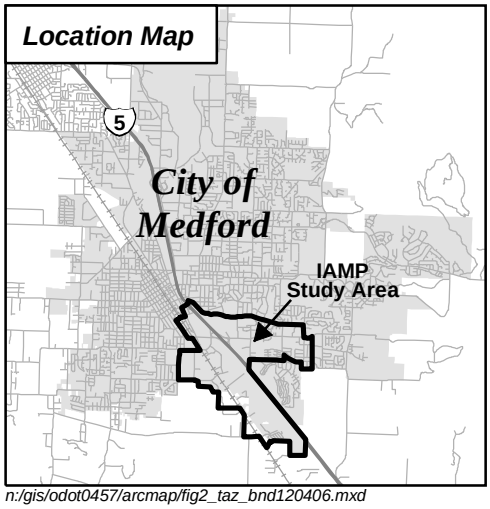
The central feature of the new interchange is the new SPUI. Unlike more conventional interchange configurations where each ramp has a separate intersection with the cross street, a SPUI has a single point where traffic from both northbound and southbound ramps intersect with the cross street. The new Garfield-Highland connector, an arterial street being constructed as part of the interchange project, is the cross street connection.

The Garfield Avenue – Highland Drive Connector will extend from Barnett Road to OR 99. Beginning at Barnett Road, the new arterial street will serve as the south leg of the signalized intersection of Barnett Road and Highland Drive. From this intersection, the Garfield – Highland connector will extend south to the new SPUI where it will provide full directional access to I-5. From the SPUI, the Garfield – Highland Connector will continue southwest to connect with OR 99 at its signalized intersection. A raised median will run from OR 99 to Barnett Road with openings at the signalized Center Drive intersection and the on- and off-ramps for the I-5 SPUI. The arterial will provide two travel lanes in each direction with sidewalks and bike lanes on both sides. At the I-5 SPUI, dual left-turn lanes will be provided for access to the north- and southbound I-5 on-ramps. Dual left-turn lanes will also be provided at the intersection of the arterial with OR 99.

As described in Section 2, the focus of this IAMP is to ensure that traffic operations of the SPUI meet ODOT's mobility standards for a period of at least twenty years. Assessing the long-range operational standards and planning for other system changes for the remainder of the region's transportation system are most appropriately performed in the context of the RTP and the City's TSP.

Figure 3 shows configuration of the interchange including the SPUI.





n:/gis/odot0457/arcmap/fig2_taz_bnd120406.mxd

Figure 2

South Medford Interchange IAMP
Study Area and TAZ Boundaries

Legend

- Transportation Analysis Zones (TAZ)
- South Medford Interchange Area Management Plan (IAMP) Study Area
- Medford City Limits
- Interstate
- Major Roads
- Local Streets
- Railroads

N

0 0.25 0.5

Miles

Single Point Urban Interchange Configuration for SMI

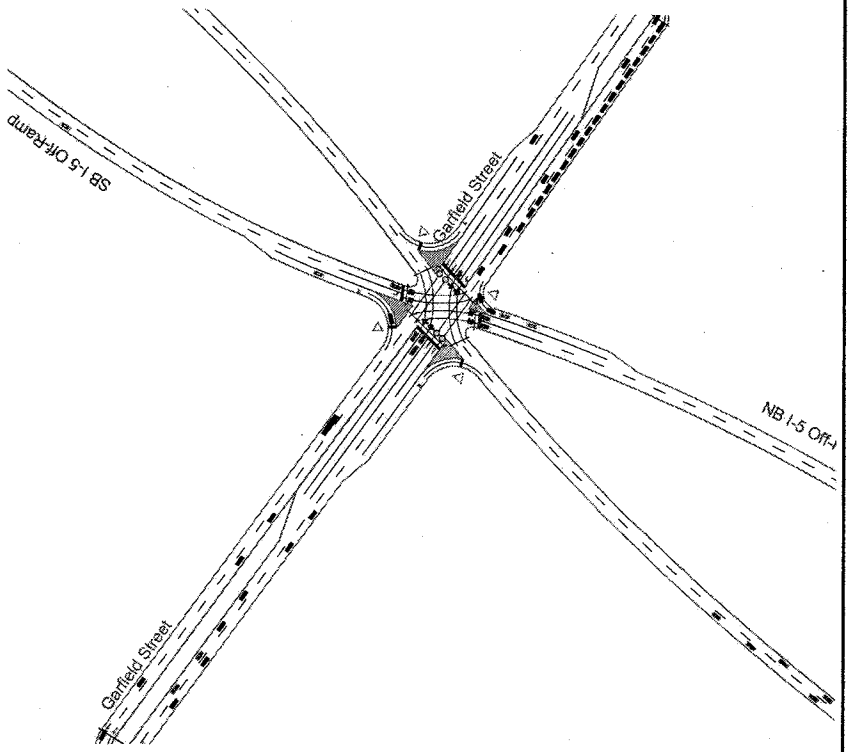


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FIGURE 3

SPUI Configuration

Interchange 27 IAMP

4.2 Traffic Operations Standards

Transportation engineers have established various descriptors of traffic operations at intersections. The two principal measures to assess how well an intersection is operating are the volume-to-capacity (v/c) ratio and the LOS.

ODOT's mobility standard is presented as a volume-to-capacity (v/c) ratio. A v/c ratio of less than 1.0 indicates that the volume is less than capacity. When it is closer to 0.0, traffic conditions are generally good with little congestion and low delays for most intersection movements. As the v/c ratio approaches 1.0, traffic becomes more congested with unstable flow and longer delays.

ODOT applies two sets of operational standards (mobility standards) to different types of projects. For planning and for the analysis of existing conditions and no-build conditions the applicable mobility standards are found in Table 6 of the OHP. For analysis of build alternatives, the applicable mobility standards are specified in Table 10-1 of the 2003 Highway Design Manual (HDM). Mobility standards are dependent on the roadway classification and area type and apply during peak operating conditions through the planning horizon year of 2030.

According to the OHP, the standard for freeway ramp terminals is a v/c of 0.85. The OHP has provisions that may allow a v/c as high as 0.90.

Another standard for measuring the quality of service of roadways at intersections is LOS. At both stop-controlled and signalized intersections, LOS is a function of control delay. Control delay consists of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Six standards have been established ranging from LOS A, where there is little or no delay, to LOS F, where delay exceeds 80 seconds at signalized intersections.

It should be noted that delays can be long for some movements at a stop-controlled intersection even when the v/c ratio indicates that there is adequate capacity to process the demand for that movement. Similarly at signalized intersections, some movements may have relatively low v/c ratios, but still experience long delays. Such conditions often occur on side street approaches or left turns onto side streets where motorists may experience longer delays because they receive only a small portion of the green time during a signal cycle. Though ODOT uses the v/c ratio exclusively, it is sometimes informative to examine both v/c ratio and LOS when evaluating overall intersection operations. Both measures are presented in the tables summarizing traffic operations in this document.

4.3 Projected Year 2010 Traffic Volumes

The year 2010 traffic volumes were developed from household, population, and employment data in the RVMPO RTP and land use models.

As discussed above, the new interchange is predicted to be fully operational in year 2010. Due to the reconfiguration of the interchange, traffic patterns in the area will be considerably altered by the new interchange.

One of the priorities of this IAMP was to update the traffic operations analysis performed for the EIS. Updating the operations analysis for the SPUI required estimating the year 2010 traffic volumes. This calculation involved using the latest traffic volumes (2004) provided by the City of Medford staff and the most recent traffic volume forecasts from the MPO's regional transportation model.

Projected year 2010 traffic volumes were developed by analyzing the actual traffic counts in the area from 2004 and results of the runs of the regional model for the base year, and year 2010. The regional model was also used to determine travel patterns of traffic using the new northbound and southbound ramps. The projected year 2010 volumes using this information are presented in Figure 4.

Further explanation of the methodology for projecting year 2010 volumes is found in Appendix B.

4.4 Predicted Year 2010 Traffic Operations

The traffic operations for the SPUI were analyzed using the Synchro and SimTraffic analysis packages. These analysis tools are based on the Highway Capacity Manual. Unlike the regional model, which reports traffic volumes, the traffic operations analysis packages such as Synchro and SimTraffic show the v/c ratios, delay, and queues at intersections.

Most traffic operations analysis software packages including Synchro have undergone considerable refinement and have proven to be quite effective for analysis of typical four-leg intersections, including those with very complex signal timing. A SPUI is an unusual configuration and at least two variations have been used to model the operational results at such intersections. At a SPUI, all four left-turn movements (from both exit ramps and from the cross street to both entrance ramps) and the through movements on the cross street all go through the central signalized portion of the intersection. The right turns from the two exit ramps are not subject to the traffic signal, but are simply required to yield where they make right turns onto the cross street.

One variation used to model a SPUI using Synchro simulates the SPUI using a signalized, central intersection flanked by two unsignalized intersections. The central intersection accounts for all the movements except for the right turns from the ramps to the cross street. Each of the flanking "intersections" represents the portion of each off-ramp where right turns are made to the cross street. This variation was used to simulate the SPUI in the original traffic analysis in the EIS. One of the concerns about using this variation to simulate a SPUI is that this variation does not accurately account for the periods of each signal cycle when motorists making right turns from the ramps have no interfering traffic on the cross street. This occurs when traffic is turning left from the cross street onto the on-ramps, a major movement at the SPUI. The SimTraffic runs performed using this variation to model the SPUI did show good operations with little delay on the ramps even though a high v/c ratio was reported.

Staff from Trafficware, the developers of Synchro and SimTraffic, provided staff of David Evans and Associates with a different variation for modeling and simulating a SPUI that had been used successfully elsewhere. This variation was used for testing of the SMI SPUI for year 2010 and for year 2030. The Synchro outputs of these tests are included in Appendix C.

Table 3 presents the summary of the year 2010 results for the PM peak hour using the SPUI modeling configuration adapted from the version provided by Trafficware staff. The traffic operations analysis showed that the SPUI would meet the OHP's mobility standard.

Table 3. Traffic Operations Analysis Summary – Year 2010

2010 Volumes for IAMP from Regional Forecasting Model

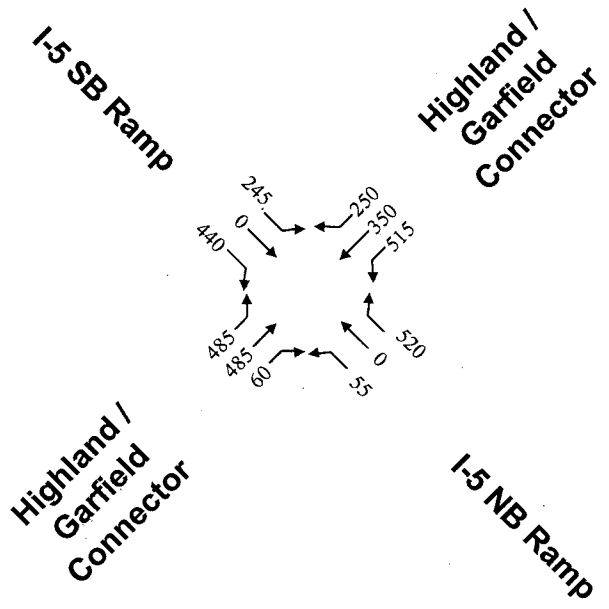

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FIGURE 4

2010 PM Peak Hour Traffic Volumes

Interchange 27 IAMP

SPUI		Calculated V/C Ratio	ODOT V/C Standard	Calculated LOS
Overall		0.47	0.85	B
I-5 Southbound Off-Ramp	LT	0.71	na	C
	RT	0.31	na	A
I-5 Northbound Off-Ramp	LT	0.16	na	C
	RT	0.37	na	A
Garfield Northeast-bound	LT	0.78	na	C
	Thru	0.46	na	B
	RT	0.04	na	A
Highland Southwest-bound	LT	0.80	na	C
	Thru	0.32	na	B
	RT	0.18	na	A

In addition to calculating the v/c ratio for the intersection as a whole and for each approach, an analysis was also conducted of the queuing that occurs at the SPUI. The queuing at the SPUI is reported in Table 4.

Table 4. Queuing Summary – Year 2010

SPUI	Movement	Calculated 95th Percentile Queue	Storage Distance
Southbound Off-Ramp	LT	125	na
	RT	75	200
Northbound Off-Ramp	LT	50	na
	RT	125	200
Garfield Northeast-bound	LT	175	300
	Thru	175	na
	RT	50	200
Highland Southwest-bound	LT	200	300
	Thru	125	na
	RT	50	200

The results of this analysis were checked with the results from Final EIS and were found to be comparable. The differences in the entering volumes and the differences in v/c ratios could be attributed to the use of different versions of the regional travel forecasting model and updated population and employment data.

5 Future Land Use and Traffic Operations – Year 2030

5.1 Forecast Year 2030 Population, Households and Employment

As described in Section 3.3, some vacant land is available in the study area for new households and for a variety of employment growth. All assumptions about population, household and employment growth are the same as used in the RTP.

Table 5 summarizes the same key population, household and employment data listed in Tables 1 and 2, except that it includes the estimates for year 2030, which is twenty years beyond the year when the new SPUI is expected to be operational.

Table 5. IAMP Planning Area Household and Employment Data by TAZ, Year 2030 (Based on RTP Assumptions)

			Employment by Category				
TAZ	**Population**	**Households**	**Retail**	**Service**	**Industrial**	**Other**	**Total**
351	120	43	30	215	53	192	490
352	188	64	218	394	57	1	670
353	148	64	19	71	3	0	93
354	304	132	19	76	5	0	100
355	368	133	0	120	6	0	126
357	39	15	2	2,220	0	5	2,227
362	46	16	96	232	74	8	410
369	311	113	1,805	706	586	124	3,221
370	28	13	212	408	5	6	631
371	41	19	189	502	26	0	717
372	573	278	24	245	2	62	333
373	926	398	56	462	0	107	625
380	273	130	151	317	222	0	690
382	83	39	55	138	63	19	275
Total	3,448	1,457	2,876	6,106	1,102	524	10,608

As discussed in Section 3, some vacant land is available within the study area for both residential development and for new employment sites.

For ease of comparison, Table 6 presents the growth in population, households and employment as used in the RTP within the study area between 2002 and 2030.

Table 6. IAMP Planning Area Household and Employment Change by TAZ between Year 2002 and Year 2030 (Based on RTP Assumptions)

			Employment by Category				
TAZ	**Population**	**Households**	**Retail**	**Service**	**Industrial**	**Other**	**Total**
351	1	0	0	20	5	-95	-70
352	0	0	10	53	4	0	67
353	3	1	1	5	0	0	6
354	54	24	18	11	0	0	29
355	23	9	0	3	0	0	3
357	0	0	1	66	0	0	67
362	1	0	8	20	7	2	37
369	179	63	58	79	268	-17	388
370	1	1	186	195	2	0	383
371	7	4	8	89	3	0	100
372	95	55	0	4	0	10	14
373	400	201	23	48	0	0	71

380	130	64	28	138	21	0	187
382	-9	0	26	132	48	19	225
Total	885	422	367	863	358	-81	1,507

It is evident from Tables 6 that almost half the residential growth in the study area is predicted in TAZ 373 and only three others (TAZs 369, 372, and 380) are expected to add more than 50 households. Likewise, employment growth in the study area is expected to be concentrated. TAZ 369 and 370 are expected to account for half the employment growth in the study area, with each accounting for almost 400 new employees. Only two others (TAZs 380 and 382) are expected to add more than 100 new jobs.

5.2 Projected Year 2030 Traffic Volumes

As explained in Section 4, the traffic volumes were developed from household, population, and employment data in the RVMPO RTP and land use models. Since the goal of the IAMP is to assess traffic operations for a twenty-year period, year 2030 was used as the basis for future traffic operations analysis. Appendix B provides further explanation of the development of the future traffic volumes.

Year 2030 traffic volumes were developed by analyzing the actual traffic counts in the area from 2004 and results of the runs of the regional model for year 2010 and year 2030. The projected year 2030 volumes using this information are presented in Figure 5.

5.3 Predicted Year 2030 Traffic Operations Analysis

The traffic at the SPUI for year 2030 was analyzed using the same methodology described for year 2010 conditions. The configuration of the SPUI is identical, only the traffic volumes are changed. Synchro and SimTraffic were also used for the 2030 analysis.

Table 7 summarizes traffic operations analysis results for projected year 2030 traffic volumes.

Table 7. Traffic Operations Analysis Summary – Year 2030

SPUI		Calculated V/C Ratio	ODOT V/C Standard	Calculated LOS
Overall		0.58	0.85	B
I-5 Southbound Off-Ramp	LT	0.61	na	C
	RT	0.35	na	A
I-5 Northbound Off-Ramp	LT	0.27	na	C
	RT	0.46	na	A
Garfield Northeast-bound	LT	0.80	na	C
	Thru	0.59	na	B
	RT	0.05	na	A
Highland Southwest-bound	LT	0.80	na	C
	Thru	0.38	na	B
	RT	0.14	na	A

In addition to calculating the v/c ratio for the intersection as a whole and for each approach, an analysis was also conducted of the queuing that occurs at the SPUI. The queuing at the SPUI is reported in Table 8.

Table 8. Queuing Summary – Year 2030

SPUI	Movement	Calculated 95th Percentile Queue	Storage Distance
Southbound Off-Ramp	LT	100	na
	RT	50	200
Northbound Off-Ramp	LT	150	na
	RT	225	200
Garfield Northeast-bound	LT	200	300
	Thru	225	na
	RT	75	200
Highland Southwest-bound	LT	225	300
	Thru	150	na
	RT	25	200

The results of this analysis were checked with the results from Final EIS and were found to be very similar. The minor differences in v/c ratios could be attributed to the use of different versions of the regional travel forecasting model and updated population and employment data.

The overall conclusion from this analysis is that the SPUI is expected to meet ODOT mobility standards through year 2030.

6 Alternative Development Scenario and Traffic Analysis

6.1 Alternative Future Development Scenario

As described in Sections 3 and 5, the RVMPO staff in cooperation with city representatives used the cities' comprehensive plans to develop the household, population and employment assumptions for the RTP. These household, population and employment data were used in the regional traffic forecasting model.

Two concerns were raised about employment and population assumptions during the development of the IAMP. The first was whether the traffic predicted by the regional traffic forecasting model reflected the type of employment that might occur in the study area. The second was whether the assumptions in the RTP adequately reflected the amount of residential development that might be expected in the study area, especially in light of the recent residential development proposals.

On a regional basis and within the IAMP study area, employment forecasts are believed to be reasonable and accurate. The issue that arose was a question as to whether more traffic might be generated by development in the immediate vicinity of the interchange than forecast in the regional model.

2030 Volumes for IAMP from Regional Forecasting Model

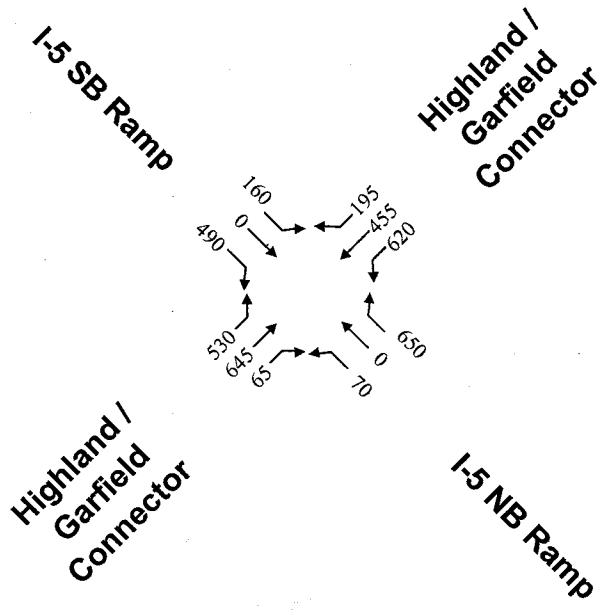

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FIGURE 5

2030 PM Peak Hour Traffic Volumes

Interchange 27 IAMP

As indicated in Table 6, much of the employment growth in the study area is in the retail and service categories. These two categories include a wide range of specific uses including some with especially high rates of traffic. Many land uses that produce high volumes of traffic are permitted outright in commercial zoning districts and are consistent with the comprehensive plan designations. The Alternative Development Scenario was designed to answer the question, "What if employment growth in the study area is concentrated in land uses that have higher traffic volumes than the regional averages for service and retail employment?"

With regard to residential development, the RTP assumptions indicated an increase of approximately 400 dwelling units in the study area. Recent development activity made some question the validity of this assumption. To assess the impact of additional residential development, the Alternative Development Scenario was also used to assess the impact of an additional 820 dwelling units in the study area beyond the RTP assumption.

6.2 Alternative Development Scenario Trip Rates

The Alternative Development Scenario was based on the same employment levels described in Section 5 and summarized in Table 5. Instead of the rates used in the regional model, the Alternative Development Scenario was based on trip rates derived from the Institute of Transportation Engineers' *Trip Generation*, a standard reference document that provides data on trips generated by a wide variety of land uses. Trip generation rates from *Trip Generation* are typically applied to specific development proposals and are the basis for traffic impact studies required for site plan review, zoning changes and other land use actions. The Alternative Development Scenario does not, however, propose or assume any zoning changes or comprehensive plan amendments.

Assessing the traffic impact of the Alternative Development Scenario involved several steps. The first was developing a combination of high trip generation uses representing the service and retail categories that predominate in the study area. The second was to develop trip rates per employee using data from *Trip Generation*. The third step involved adjustments to account for pass-by trips, which have an impact on the streets in the immediate vicinity of the development site, but do not result in "new" trips on the regional street system. Additional discussion of the development of trip generation rates can be found in Appendix D.

Based on the type of residential development that has been proposed in the study area, the Alternative Development Scenario was also assumed to include additional multi-family residential uses. Trip rates were taken from ITE's *Trip Generation* using land use category 220 – Apartment. This land use category produces 0.62 trips per dwelling unit during the PM peak hour. Unlike employment trips that have a significant pass-by component, residential trips are all considered "new" trips.

Table 9 indicates the trip rates applied to the Alternative Development Scenario for the retail, service, industrial, and other employment categories and for residential development.

Table 9. PM Peak Hour Trip Rates Applied to the Alternative Development Scenario

Employment Category (trip rate per employee)				Residential (trip rate per dwelling unit)
Retail	**Service**	**Industrial**	**Other**	Apartment
2.1	4.1	0.57	0.58	0.62

6.3 Alternative Development Scenario Trip Potential and Traffic Volumes

Six TAZs (352, 369, 370, 371, 380 and 382) were included in the Alternative Development Scenario because of their potential for additional residential development or their forecast employment growth in the retail and service sectors and their proximity to the SMI. The development of new trip generation forecasts and traffic was applied to these TAZs using the higher trip rates from Table 9. The increased trip generation potential related to the Alternative Development Scenario and the comparison with the trip generation potential from the regional model is summarized in Table 10.

Table 10. Comparison of Trips Generated by the Alternative Development Scenario and by the Regional Model for Key Zones in the IAMP Planning Area

TAZ	PM Peak Hour 2030 Trips Using Original Rate from Traffic Forecasting Model	PM Peak Hour 2030 Trips Using Alternative Development Scenario Trip Rates from Table 9
352	571	688
369	2832	3018
370	523	1351
371	567	809
380	576	1319
381	205	708
Total	5274	7893

As shown in Table 10, the Alternative Development Scenario produces more than 2600 additional PM peak hour trips in these key zones. This is directly attributable to the higher trip rates assumed for new retail and service employment or to additional residential development. It is important to note that the impact of these additional trips is spread throughout the region and a relatively small portion of these trips go through the SPUI. Select zone runs from the regional model were used to distribute the trips resulting from the more intense development of these TAZs. Additional details are also found in Appendix D.

Traffic volumes at the SPUI for year 2030 developed from the Alternative Development Scenario are shown in Figure 6.

6.4 Traffic Operations Analysis for Alternative Development Scenario

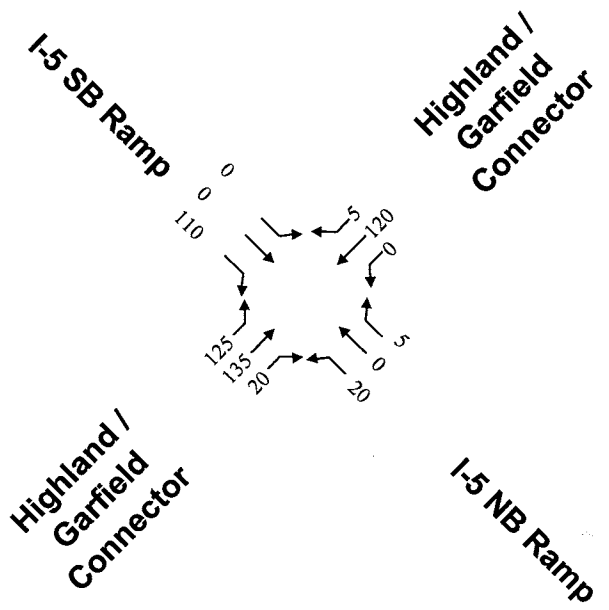
The analysis of the Alternative Development Scenario year 2030 traffic at the SPUI was conducted using the same methodology described for year 2010 and the original 2030 volumes.

Table 11 summarizes traffic operations analysis results for Alternative Development Scenario year 2030 traffic volumes.

Table 11. Traffic Operations Analysis Summary – Alternative Development Scenario - Year 2030

SPUI		Calculated V/C Ratio	ODOT V/C Standard	Calculated LOS
Overall		0.70	0.85	B
I-5 Southbound Off-Ramp	LT	0.78	na	D
	RT	0.43	na	A
I-5 Northbound Off-Ramp	LT	0.44	na	C

Added Volumes from the Alternative Development Scenario



2030 Volumes Based on Alternative Development Scenario

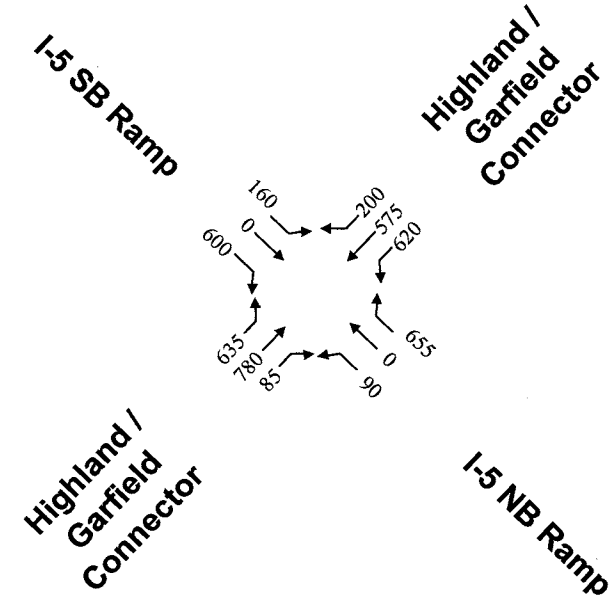


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FIGURE 6

2030 PM Peak Hour Traffic Volumes Alternative Development Scenario

Interchange 27 IAMP

SPUI		Calculated V/C Ratio	ODOT V/C Standard	Calculated LOS
	RT	0.47	na	A
Garfield Northeast-bound	RT	0.70	na	B
	Thru	0.87	na	D
	LT	0.06	na	A
Highland Southwest-bound	RT	0.67	na	B
	Thru	0.63	na	C
	RT	0.14	na	A

In addition to calculating the v/c ratio for the intersection as a whole and for each approach, an analysis was also conducted of the queuing that occurs at the SPUI. The queuing at the SPUI is reported in Table 12.

Table 12. Queuing Summary – Alternative Development Scenario - Year 2030

SPUI	Movement	Calculated 95th Percentile Queue	Storage Distance
Southbound Off-Ramp	LT	75	na
	RT	125	200
Northbound Off-Ramp	LT	275	na
	RT	250	200
Garfield Northeast-bound	LT	175	300
	Thru	225	na
	RT	50	200
Highland Southwest-bound	LT	225	300
	Thru	175	na
	RT	25	200

The results of this analysis showed that additional traffic that might occur from the Alternative Development Scenario resulted in only a slight degradation of performance of the SPUI. Even with this additional traffic, the SPUI is expected to meet ODOT mobility standards through year 2030. The only concern is the potential for queuing to exceed the available storage capacity during PM peak hour conditions. There is enough uncertainty in the development assumptions and modeling results that this may not actually occur. In addition, signal timing and other operational adjustments may be made to reduce the potential that queues will exceed available storage.

7 Potential Management Measures

As indicated in Sections 5 and 6, the SPUI is predicted to continue to operate acceptably and meet ODOT mobility standards through year 2030 without any mitigation measures. However, part of the goal of an IAMP is to maximize the operational life of an interchange. So, in keeping with this goal, potential management measures are discussed in this section for possible use in the study area and the region, not because they are needed to meet mobility standards for a twenty-year horizon, but instead to extend the operational life of the interchange even further.

The potential management measures discussed in this section could be applied within the entire region, a portion of the region, or just within the IAMP study area. They may also be considered in connection with individual transportation projects or future updates of the City TSP or the RTP.

The following sections contain a brief description of several potential management measures, a summary of their existing or potential use to protect the new interchange and citations showing support from local plans.

7.1 Transportation Demand Management (TDM) Strategies

7.1.1 Description

TDM strategies are designed to reduce vehicle miles traveled, especially in the peak periods. These strategies focus on the provision of services or facilities intended to shift travelers to different travel modes, or to travel at non-peak times, or to offer trip substitution choices such as telecommuting. The most common mode choice alternatives are transit and carpool/vanpool options. These are generally most attractive for daily commuters rather than for shopping trips. TDM strategies are also most effective where there are high concentrations of employment or at least one employer with a large number of employees. The presence of a Transportation Management Association (TMA) can also encourage the use of TDM strategies by pooling the efforts of multiple employers.

7.1.2 Existing or Potential Use

The SMI study area has characteristics that enable TDM strategies to be successful. This area is served by a TMA, which was established in 2002 to meet an OTC requirement prior to the approval of alternative mobility standards for the existing South Medford interchange at Barnett Road. Employers were encouraged to participate in the TMA and were assisted in developing incentives for employees to reduce congestion on the way to work, by reducing reliance on single occupancy vehicles. As of September 2004, the TMA included both private sector employer members and public agencies, including Bear Creek Corporation, Asante Health System, Rogue Community College, the City of Medford, Jackson County, Rogue Valley Transportation District (RVTD), RVCOG and ODOT.

RVTD already provides transit service twice per hour to Southgate Center within the study area, from both downtown Medford and Ashland. Additional service could be provided if demand warrants it. RVTD also promotes other TDM strategies, such as education programs, trip reduction incentives, bikes on buses, carpools, vanpools, park-and-ride, and employer outreach.

Operation of the TMA to promote TDM strategies in the SMI study area would assist in the reduction of overall and peak hour traffic. In addition, policies in both the Medford TSP and the RVMPO RTP support the implementation of TDM strategies.

7.1.3 Local Plan Support

The **RTP** provides policy to support the implementation of regional TDM strategies:

- **Policy 6.A:** Foster increased transportation demand management (TDM) to reduce SOV (single-occupancy vehicles).
- **Policy 6.A-1:** The implementation of a regional TDM program shall be an important component of a comprehensive strategy to reduce demands placed on the transportation system.

- **Policy 6.A.2:** TDM measures should be considered before transportation capacity expansion is determined to be necessary.
- **Policy 6.A.3:** Local governments and ODOT shall support and encourage the growth of the Rogue Valley Transportation Management Association (TMA).
- **Policy 6.A.5:** Develop public-private partnerships with employers to adopt trip reduction goals, policies and programs to reduce trip generation, and offer incentives to foster TDM.

The **Medford TSP** also contains Goals and Policies to support TDM. TSP Chapter 8 includes the TDM plan and lists strategies that include an active participation in and support of the TMA.

Goal 1: To provide a multi-modal transportation system that supports the safe, efficient and accessible movement of all people and goods, and recognizes the area's role as the financial, medical, tourism and business hub of Southern Oregon and Northern California.

- **Policy 1-D:** The City of Medford's second priority for the use of transportation funds shall be to maximize efficient use of the existing transportation system through use of Transportation System Management (TSM) and Transportation Demand Management (TDM) measures prior to expending transportation funds on capacity improvements.

Goal 2: To provide a comprehensive street system that serves the mobility and multi-modal transportation needs of the Medford planning area.

- **Policy 2-G:** The City of Medford shall undertake efforts to reduce per capita vehicle miles traveled (VMT) and single-occupancy vehicle (SOV) demand through TDM strategies.

Goal 3: To facilitate the increased use of public transportation in the Medford area as the adequacy of transit service is a measure of the quality of life in a community.

- **Policy 3-A:** The City of Medford shall undertake efforts to increase the percentage of total daily trips taken in the Medford planning area by transit, consistent with the target benchmarks in the Alternative Measures of the RTP.
- **Policy 3-B:** The City of Medford shall support the provision of convenient and accessible transit service to, from and within the Medford planning area, especially to higher density residential areas, employment centers and major commercial areas.
- **Policy 3-C:** The City of Medford shall undertake efforts to increase the percentage of dwelling units in the Medford planning area located within ¼ mile walking distance of transit routes, consistent with the target benchmarks in the Alternative Measures of the RTP.

7.2 Transportation System Management (TSM) Strategies

7.2.1 Description

TSM strategies are designed to make maximum use of existing transportation facilities and include traffic engineering measures such as signal timing changes, provision of turn lanes, turn restrictions, and restricting on-street parking to increase the number of travel lanes.

7.2.2 Existing or Potential Use

In the past, both the City of Medford and ODOT have used TSM strategies to maximize the function of the existing transportation system. The City currently operates a fully interconnected traffic signal system that could be used to implement timing plans via a centralized traffic control center. ODOT and Medford traffic engineers responsible for traffic operations in the interchange area already make decisions to balance traffic flow, minimize congestion, protect the safety of all system users and minimize negative impacts on adjacent neighborhoods. Traffic operations are regularly reviewed and will be fine-tuned after construction of the SPUI to assure that it operates at optimal efficiency and safety. If necessary in the future, operational protocols could be implemented to place the highest priority on traffic operations at the ramp terminals. Signals could be timed at intersections nearest the interchange to prevent long queues from developing on the approaches to the ramp terminals. Signal timing could also be adjusted to both limit traffic approaching the interchange and encourage the use of alternate routes.

7.2.3 Local Plan Support

Both the Medford TSP and the RVMPO 2005-2030 RTP make specific reference to coordination of traffic signal systems and their use to optimize traffic flow.

The **RTP** provides policies that support Transportation System Management (TSM) strategies.

Goal 5: Maximize the efficient utilization of existing and future transportation infrastructure to facilitate smooth movement of people and motorized and non-motorized vehicles.

- **Policy 5-1**: Where appropriate and cost–effective, local governments and ODOT shall update existing signals and signal systems to improve mobility. This may include coordinating and linking signals to a master control system to optimize system efficiency.

The Medford TSP includes a TSM plan in Chapter 8 which includes traffic signal coordination and control, and a recommendation that the city should use signal timing plans that maximize operational efficiency during different time periods. The following Policy and Implementation measure provide further support for the use of TSM strategies and system coordination.

- **Policy 1-D:** The City of Medford's second priority for the use of transportation funds shall be to maximize efficient use of the existing transportation system through use of Transportation System Management (TSM) and Transportation Demand Management (TDM) measures prior to expending transportation funds on capacity improvements.
    - **Implementation 2-H(3):** Continue to modernize the traffic signal system and improve its efficiency by ultimately connecting all signals to the centralized traffic control center. Employ traffic signal timing plans that maximize efficiency during different time periods. Provide a program to identify locations for new/modified signals.

7.3 Intelligent Transportation Systems (ITS) Management Strategies

7.3.1 Description

Another dimension of improving operations at or near the interchange is the use of Intelligent Transportation Systems (ITS) technology. When congested traffic conditions occur on one roadway, traffic on adjoining roadways or freeway interchanges in the corridor are also impacted. ITS can enable agencies to monitor traffic, respond to traffic accidents faster and communicate with the motoring public in real time. Real time traffic information can be shared

with travelers by variable message signs, highway advisory radio, the 511 number, web sites, and specialized warning systems (such as fog warnings), to help them make travel decisions.

Other technologies that could be used to control traffic without adding traffic capacity in the vicinity of the interchange include transit signal priority, lane control signals and variable speed limit signs. All these technologies aim at smoothing the flow of traffic by improving travel time and thereby reducing congestion.

7.3.2 Existing or Potential Use

The City of Medford's existing ITS system includes variable message signs, traffic monitoring cameras, call boxes for motorist assistance, photo violation detection and incident management. The City also has three permanent electronic traffic counters. In fiscal year 2004, the RVMPO began work on an ITS Architecture Plan for the Rogue Valley area. Oversight was provided by a TAC, with the City of Medford assuming a prominent role as the major city in the region. In subsequent years, the MPO with the guidance of the TAC, has continued to update and refine the plan. To enable this ITS Turbo Architecture, which is software that enables the electronic coordination of the ITS infrastructure, has been installed at the MPO for use in the Rogue Valley region.

7.3.3 Local Plan Support

The **RTP** includes both policy and projects that will improve the capability of the City's incorporation of ITS.

- **Policy 9-1:** Implement a comprehensive Intelligent transportation System program.
- **Project #543:** Upgrade the fiber optic system on various arterial and collector locations.
- **Project #550:** Install ITS equipment to enhance traffic flow and system communication on arterial and collector streets as needed.

The **Medford TSP** contains policy and projects supporting ITS.

- **Policy 2-H(4):** Utilize Intelligent Transportation Systems (ITS) such as real-time traffic monitoring cameras and management projects, that provide motorist information and incident response/clearance programs to alleviate traffic congestion.
- **Project #532:** Fiber optic system upgrade at arterial or collector locations.
- **Project #538:** Install ITS equipment to facilitate traffic flow and enhance system communications.

7.4 Ramp Metering

7.4.1 Description:

Ramp meters are typically used on the on-ramps to freeways and other limited access highways, to meter the rate of traffic flow entering the highway. In its simplest application, ramp meters use a fixed-time signal to set minimum intervals between vehicles entering the freeway from the ramp. More sophisticated ramp metering adjusts the rate of entering vehicles in response to the actual, real-time flow on the freeway and the number of vehicles waiting to enter on the on-ramp.

Ramp meters are successful when deployed throughout the corridor system and have a greater influence on the freeway mainline and downstream interchanges, than they have at the

interchange at which they are installed. This means that to help alleviate congestion at the South Medford Interchange, ramp metering should be considered on all ramps entering I-5 over the entire MPO area.

7.4.2 Existing or Potential Use

Ramp metering is a proven management tool on freeways and ODOT currently uses ramp meters on I-5, I-205, I-84 and US 26. Since ramp metering is specifically mentioned in the RTP policies, further policy actions are not likely to be required prior to implementation. Beginning in FY 2008, ODOT will be conducting a study of the I-5 corridor in the RVMPO area, to both monitor congestion and to determine the most effective locations to place ramp meters. Placement would be such that all potentially congested interchanges in the MPO area would be positively impacted.

7.4.3 Local Plan Support

The **RTP** includes policy regarding the use of ramp meters.

- **Policy 5-7:** ODOT, in consultation with local governments, shall consider the installation of ramp signals at freeway on-ramps to meter the amount of traffic entering the freeway, thereby maintaining acceptable flow conditions on the freeway system.

7.5 Adopt Revised Standards for Parking with Lower Minimums and Maximums

7.5.1 Description

Free or low-cost parking makes it difficult to encourage the use of transportation modes other than vehicles. Reducing parking helps to discourage automobile use especially if combined with TDM measures that provide positive incentives for people to use transit or carpooling for their trips. Local zoning codes that specify a lower parking supply (low minimum required parking, low maximum parking ratios, and allowing shared parking) can also lessen automobile use.

7.5.2 Existing or Potential Use

Medford's TSP was given conditional acknowledgement by the DLCD pending the development of a work program that will include the drafting of a parking plan. This plan is intended to result in the adoption of code amendments that will be consistent with the parking standards in the TPR (OAR 660-012-00455(5d)).

7.5.3 Local Plan Support

The **RTP** contains policies that enable a reduced supply of parking.

Goal 6.B: Manage parking supply in a manner that discourages SOV reliance.

- **Policy 6.B-1**: Local governments shall consider the adoption of maximum parking requirements in their zoning codes to reduce excessive off-street parking supply.
- **Policy 6.B-2**: Local governments should establish low minimum parking requirements in their zoning codes to encourage in-fill development.
- **Policy 6.B-4**: Local governments and ODOT where appropriate shall manage the roadway space so as to eliminate excess on-street parking in the region in favor of such projects as bike lanes, bus stops and narrower street widths that promote use of alternative modes.

The **Medford TSP** also contains policies supporting the reduction of available parking. In Chapter 12 - Parking Management, strategies are established to meet the parking standards of the TRP.

Goal 2: To provide a comprehensive street system that serves the mobility and multi-modal transportation needs of the Medford Planning area.

- **Policy – 2-L:** The City of Medford shall require an appropriate supply and design of off-street parking to promote economic vitality, neighborhood livability, efficient use of urban space, reduced reliance on single occupancy vehicles and to make TODs more pedestrian friendly.
    - **Implementation 2-L:** Require a minimum and maximum of off-street parking spaces based on the typical daily needs of the specific land use type.
- **Policy 2-M:** The City of Medford shall undertake efforts to contribute to a reduction in the regional per capita parking supply to promote the use of alternatives to the single occupancy motor vehicle.
    - **Implementation 2-M(1):** Every five years, estimate the parking supply in areas designated for commercial, industrial and institutional uses by the Medford Comprehensive Plan in order to monitor progress toward meeting the goal of reducing parking supply per capita by ten percent over the 20-year planning period.

Medford's Land Development Code contains regulations to encourage the provision of a minimum of parking spaces.

- **Section 10.744 - Joint Use of Parking Facilities:** The off-street parking requirements of two or more uses may be satisfied by the same parking or loading space used jointly to the extent that it can be shown by the owners or operators of the uses that their operations and parking needs to not overlap in point of time.

7.6 Limiting New Trips or Land Use Changes in a Specific Study Area

7.6.1 Description

At other interchanges, trip caps or trip budgets have been considered to limit the amount of additional traffic generated by new development in a specified management area. Zoning and comprehensive plan designations may allow a variety of uses with widely varying traffic generation characteristics. To assure that traffic generated from a wide variety of uses does not exceed the amount anticipated, additional mechanisms can be incorporated to control trips generated by new development. Where such management measures have been implemented, the city or county adopted legislation implementing a trip budget, trip cap ordinance, or other mechanism.

7.6.2 Existing or Potential Use

Traffic originating in or destined for businesses and residences in the immediate vicinity of an interchange can account for a significant portion of the traffic using that interchange. This was found to be true for the SMI. Fortunately, traffic analysis using both the regional model and the Alternative Development Scenario, indicated that the SPUI is calculated to operate acceptably even accounting for substantial growth in the study area.

The TPR already requires that local agencies and developers assess the traffic generating implications of rezoning, and refer plan amendments and UGB expansions to ODOT for comment. Specific procedures are required and approval criteria are established (OAR 660-012-0060). The City of Medford complies with its obligations specified under state law, with specific standards and procedures for traffic impact studies and mitigation to meet the applicable mobility standards.

7.6.3 Local Plan Support

The **Medford TSP** contains policies that have the effect of limiting new trips, influencing land use changes and requiring mitigation to assure mobility. Four Transit Oriented Development (TOD) areas have been identified appropriate locations for more intense development to occur. Three of the four are at the edges of the UGB, far from the South Medford interchange area. They are the North, West (central), and Southeast Medford TODs. The Downtown Medford TOD is approximately three-quarters of a mile north of the interchange study area. Figure 1 shows the location of the Downtown Medford TOD relative to the South Medford Interchange. Locating future high traffic generating uses away from the interchange will help provide long-term protection for the facility's function.

Goal 2: To provide a comprehensive street system that serves the mobility and multi-modal transportation needs of the Medford planning area.

- **Policy 2-H:** The City of Medford shall manage and maintain the transportation system in an efficient, clean and safe manner.
    - **Implementation 2-H(1):** Require Traffic Impact Analysis (TIAs), as appropriate, in conjunction with development applications to assess impacts on the existing and planned transportation system, and require transportation system improvements that are identified through the TIA or by other Municipal Code requirements as a condition of approval of development permits and land use actions.

Goal 8: To maximize the efficiency of Medford's transportation system through effective land use planning.

- **Policy 8-B:** The City of Medford shall undertake efforts to increase the percentage of dwelling units and employment located in Medford's adopted TODs, consistent with the targeted benchmarks in the Alternative Measures of the RTP.

Chapter 5 - Street Plan: Establishes Level of Service (LOS) D as the threshold for determining when street improvements or development mitigation for traffic impacts will be required.

Medford's Land Development Code also contains ordinance language that protects the function of the interchange. These facility adequacy requirements assure the provision of a suitable local street network that will in turn benefit the new interchange.

- **Section 10.227 Zone Change Criteria:** Requires applicants to demonstrate that Category A urban services or facilities are available, or can and will be provided for the subject property. Streets and street capacity must be provided by either i) streets that presently exist and have adequate capacity, ii) existing streets that will either be improved or new streets constructed to provide adequate capacity, by the time of building permit issuance, iii) for streets that must be constructed or improved, the Planning Commission may find that the street to be adequate if improvements are fully funded, iv) for streets

that need to be improved, specific improvements must be identified and demonstrated to result in street adequacy.

- **Section 10.462 Maintenance of Level of Service D:** Whenever level of service is determined to be below level D for arterials or collectors, development is not permitted unless the developer makes the roadway or other improvements necessary to maintain level of service D respectively.

7.7 Access Management

7.7.1 Description

Access management is a set of techniques that state and local governments can use to control access to highways, major arterial streets, and other roadways. Access management involves a compromise between efficiency of movement on major roads and access to adjacent parcels. Its benefits include improved movement of traffic, reduced crashes, and fewer vehicle conflicts. Access management techniques that can be employed are:

***Access Spacing*:** The flow of traffic on major arterials can be improved by increasing the distance between traffic signals. This also reduces congestion and improves air quality for heavily traveled corridors.

***Driveway Spacing*:** Fewer driveways spaced further apart allows for a more orderly merging of traffic and presents fewer challenges to drivers.

Turning Lanes: Dedicated left- and right-turn lanes, and indirect left-turns and U-turns are techniques that keep through-traffic flowing.

Median Treatments: Non-traversable, raised medians are some of the most effective means to regulate access and reduce accidents.

7.7.2 Existing or Potential Use

The new design for the SMI analyzed in this IAMP is an example of the benefits of access management in connection with a design project. An Access Management Strategy, completed in August of 2003, included numerous access treatments to the new interchange and its vicinity. The components of the strategy, which are shown in Figure 7, are being constructed with the new interchange.The locations and access treatments that comprise the Access Management Strategy are shown in Figure 8 and Table 13. Access changes also include the removal of the interchange ramps from Barnett Road and improving it as an east/west arterial.

The good performance predicted for the SPUI can be credited in part to the Access Management Strategy that is being implemented with the SMI construction project. The IAMP recommends it as one of the management tools to protect the function of the interchange.

7.7.3 Local Plan Support

The **RTP** includes policies that relate to access management.

- **Policy 5-5** directs local governments to manage access points (curb cuts) for their major street systems.

The **Medford TSP** also contains policies that relate to access management. The Access Management Strategy that is being implemented by the construction of the new interchange is consistent with the following policy and implementation measure.

Goal 2: To provide a comprehensive street system that serves the mobility and multi-modal transportation needs of the Medford Planning area.

- **Policy 2-H:** The City of Medford shall manage and maintain the transportation system in an efficient, clean and safe manner.
    - **Implementation 2-H(2):** Utilize access management, including access location and spacing, to increase the capacity and safety of the transportation system. Incorporate access management techniques, such as raised medians, access management plans, driveway consolidation, driveway relocation, and closure of driveway access, into Arterial and Collector street design and development applications.

7.8 Adopt local TSP Policies and Ordinance Provisions

7.8.1 Description

Previously IAMPs were required to be adopted as amendments to the local TSP. However, recent administrative rule changes now allow jurisdictions to indicate acceptance of an IAMP by affirming that it is consistent with the local transportation system plan and related ordinances. The City of Medford has provided a letter stating that the IAMP is consistent with the City's TSP.

7.8.2 Existing or Potential Use

Adopt with the IAMP, provisions from Medford's TSP and Land Development Code that offer additional protection for the new interchange. This would assure consistency between the IAMP, and the City's TSP and Land Development Code. Regional Transportation Plan policies provide additional assurance that local policies support the application of management measures as warranted. Any subsequent changes to local policy or ordinance language adopted with the IAMP would require an amendment to the IAMP, to assure that consistency remains constant.

7.8.3 Local Plan and Ordinance Support

The Medford TSP contains the following goals, policies, implementation measures and projects that directly support the management measures to protect the function of the new interchange and local street system. The Medford Land Development Code contains ordinance language, including facility adequacy requirements, which also serve to protect the function of the interchange. These provisions are listed above under the specific management measures that they support and are also recommended for adoption with the IAMP at the end of the following Section 8.

Table 13. Access List

Access number	Station	Left/ Right	Paved Width	Description	Public or Private	Code
G-H Line – Garfield Highland Connector						
1	0+626	L	4.2	ODOT Maintenances access to water quality facility and bridges	Private	MAJOR
2	0+014	L	10.3	Access for PP&L substation maintenance – right-in/right-out only	Private	C-O
3	0+046	L	10.3	Access for PP&L substation maintenance – right-in/right-out only	Private	MAJOR
4	0+075	L		Closing existing Les Schwab access	N/A	D-O
5	0+095	L		Closing existing Les Schwab access	N/A	D-O
A	0+032	R		Center Drive – replaced by access "A-new" -	N/A	B-O

Figure 7
Access Management Strategy Components
South Medford Interchange

Not to Scale

ODOT Jurisdiction

- Full Access Control
  (except for ODOT maintenance and PP&L substation maintenance)
- Right-In, Right-Out
- Reduced Access
  (some access closed and some access combined)

City Jurisdiction

- Full Access Control
- Right-In, Right-Out

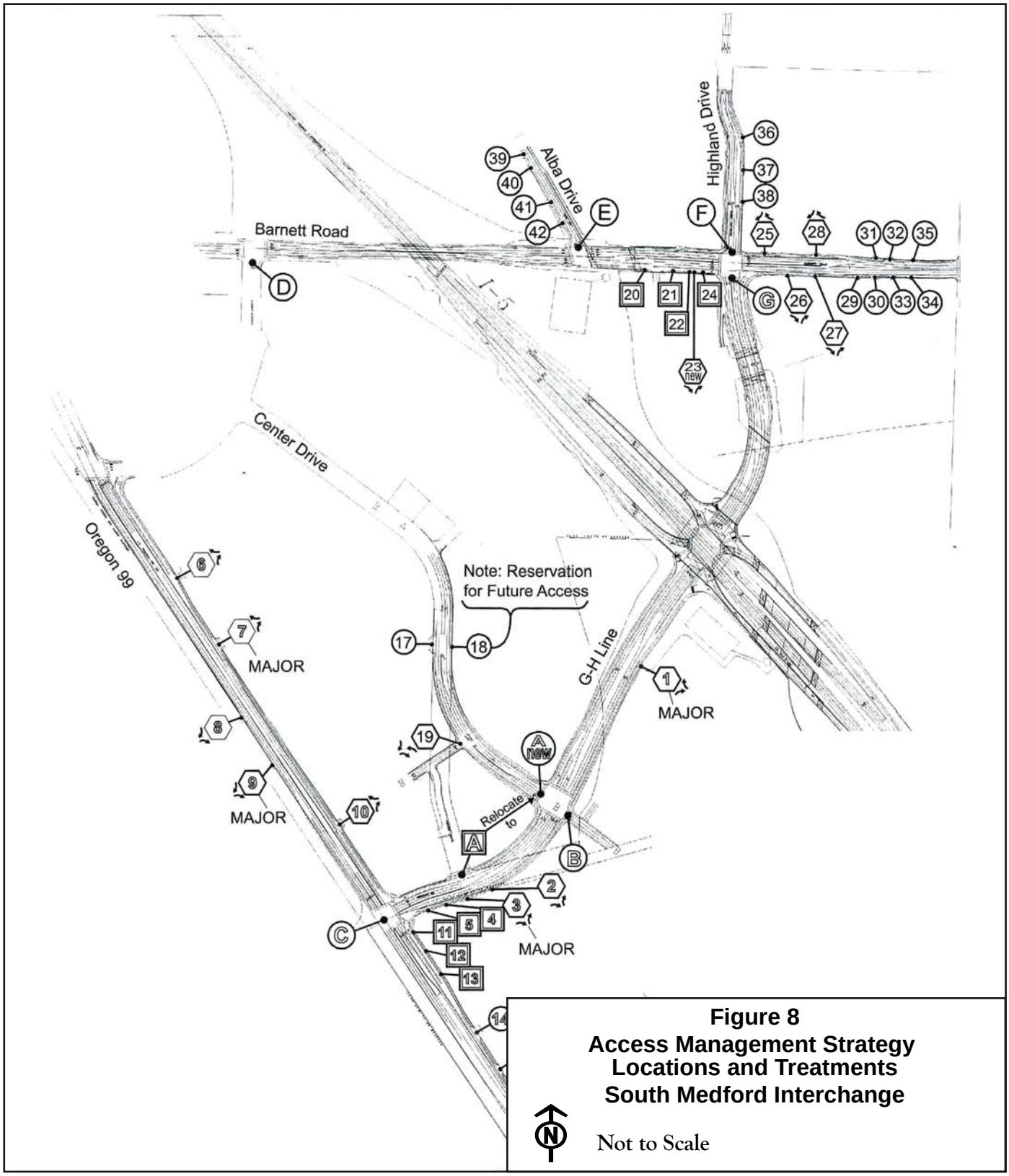

Figure 8
Access Management Strategy
Locations and Treatments
South Medford Interchange

Not to Scale

(1) -- Permitted Full Movement

(1) -- Limited Movement (Permitted Movements Indicated)

[1] -- Access Closed

MAJOR -- Access Requires Major Deviation

(1) -- Block Number Indicates ODOT Jurisdiction

Note: *Letters indicate Public Access*
Numbers indicated Private Access

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Access number	Station	Left/ Right	Paved Width	Description	Public or Private	Code
				signalized		
A-New	0+861	R	21.6	Center Drive (Relocated from A) - signalized	Public	A-O
B	0+861	L	11.4	Future public road, access for existing residence	Public	A-O
Highway 99						
C	0+893	L/R	26.0	Garfield-signalized-public road	Public	A-O
6	0+320	L	7.7	Armory Drive-right-in/right-out only	Private	C-O
7	0+432	L	11.4	Miles Field access-right-in/right-out only	Private	MAJOR
8	0+536	R	18.0	Oil Company-right-in/right-out only	Private	C-O
9	0+618	R	13.5	Oil Company-right-in/right-out only	Private	MAJOR
10	0+742	L	7.7	Rogue Federal Credit Union/Miles Field-right-in/right-out only	Private	C-O
11	0+925	L		Closing existing Les Schwab/Skinner access	N/A	D-O
12	0+963	L		Closing existing Les Schwab/Skinner access	N/A	D-O
13	0+001	L		Closing existing Les Schwab/Skinner access	N/A	D-O
14	0+101	L	16.7	Skinner/Naumes-full movement	Private	C-O
15	0+162	L	12.2	Naumes-full movement	Private	MAJOR
16	0+206	L		Closing existing restaurant access	N/A	D-O
Barnett Road						
20	0+596	R		Closing existing gas station access	N/A	D-M
21	0+614	R		Closed motel/restaurant access	N/A	D-M
22	0+638	R		Closing existing restaurant access	N/A	D-M
23 New	0+667	R	9.0	Motel and restaurant access-replaces 22 and 24 right-in/right-out	Private	B-M
24	0+678	R		Closing existing motel access	N/A	D-M
25	0+768	L	6.9	Highlander apartments- right-in/right-out only	Private	C-M
26	0+802	R	6.1	Vacant lot access- right-in/right-out only	Private	C-M
27	0+841	R	9.7	State farm westerly access- right-in/right-out only	Private	C-M
28	0+842	L	9.2	Vacant lot access- right-in/right-out only	Private	C-M
29	0+902	R	7.3	State Farm easterly access- right-in/right-out only	Private	A-M
30	0+927	R	9.2	Residence	Private	A-M
31	0+928	L	6.8	Woodcreek apartments and townhomes	Private	A-M
32	0+948	L	6.8	Lazy Creek professional condominiums	Private	A-M
33	0+954	R	6.2	Party Place-full movement	Private	A-M
34	0+978	R	7.5	Rogue Valley Manor Community Services	Private	A-M
35	0+981	L	3.9	AAA of Oregon	Private	A-M
D	0+033	R	21.2	Stewart Avenue-signalized-SB off-ramp removed	Public	A-M
E	0+513	L	9.9	Alba Drive-signalized with NB off-ramp removed	Public	A-M
F	0+721	L	20.1	Highland Drive intersection-north leg-signalized-public	Public	A-M
G	0+724	R	27.6	Highland Drive intersection-south leg-signalized-public	Public	A-O
Center Drive						
17	0+334	R	11.0	Miles Field/Armory access-full movement-future signal (per City)	Private	A-M
18	0+334	L	11	Reservation for future access to development (per City)	Private	A-M
19	0+475	R	7.3	RFCU/Miles Field-right-in/right-out, left turn only	Private	C-M
Highland Drive						
36	0+212	L	8.5	Apartment access north of Lazy Creek-full movement	Private	A-M

Access number	Station	Left/ Right	Paved Width	Description	Public or Private	Code
37	0+257	L	7.6	Apartment access-full movement	Private	A-M
38	0+303	L	7.1	Apartment access-full movement	Private	A-M
Alba Drive						
39	0+006	R	9.4	Motel 6 access-full movement	Private	A-M
40	0+029	R	7.6	Dairy Queen drive through-full movement	Private	A-M
41	0+086	R	9.5	Dairy Queen-full movement	Private	A-M
42	0+120	R	9.4	Dairy Queen/motel-full movement	Private	A-M
G-H Line – Garfield Highland Connector						
1	0+626	L	4.2	ODOT Maintenances access to water quality facility and bridges	Private	MAJOR
2	0+014	L	10.3	Access for PP&L substation maintenance – right-in/right-out only	Private	C-O
3	0+046	L	10.3	Access for PP&L substation maintenance – right-in/right-out only	Private	MAJOR
4	0+075	L		Closing existing Les Schwab access	N/A	D-O
5	0+095	L		Closing existing Les Schwab access	N/A	D-O
A	0+032	R		Center Drive – replaced by access “A-new” - signalized	N/A	B-O
A-New	0+861	R	21.6	Center Drive (Relocated from A) - signalized	Public	A-O
B	0+861	L	11.4	Future public road, access for existing residence	Public	A-O
Highway 99						
C	0+893	L/R	26.0		Public	A-O
6	0+320	L	7.7		Private	C-O
7	0+432	L	11.4		Private	MAJOR
8	0+536	R	18.0		Private	C-O
9	0+618	R	13.5		Private	MAJOR
10	0+742	L	7.7		Private	C-O
11	0+925	L			N/A	D-O
12	0+963	L			N/A	D-O
13	0+001	L			N/A	D-O
14	0+101	L	16.7		Private	C-O
15	0+162	L	12.2		Private	MAJOR
16	0+206	L			N/A	D-O
Barnett Road						
20	0+596	R			N/A	D-M
21	0+614	R			N/A	D-M
22	0+638	R			N/A	D-M
23 New	0+667	R	9.0		Private	B-M
24	0+678	R			N/A	D-M
25	0+768	L	6.9		Private	C-M
26	0+802	R	6.1		Private	C-M
27	0+841	R	9.7		Private	C-M
28	0+842	L	9.2		Private	C-M
29	0+902	R	7.3		Private	A-M
30	0+927	R	9.2		Private	A-M
31	0+928	L	6.8		Private	A-M
32	0+948	L	6.8		Private	A-M
33	0+954	R	6.2		Private	A-M
34	0+978	R	7.5		Private	A-M
35	0+981	L	3.9		Private	A-M
D	0+033	R	21.2		Public	A-M
E	0+513	L	9.9		Public	A-M
F	0+721	L	20.1		Public	A-M
G	0+724	R	27.6		Public	A-O
Center Drive						

Access number	Station	Left/ Right	Paved Width	Description	Public or Private	Code
17	0+334	R	11.0		Private	A-M
18	0+334	L	11		Private	A-M
19	0+475	R	7.3		Private	C-M
Highland Drive						
36	0+212	L	8.5		Private	A-M
37	0+257	L	7.6		Private	A-M
38	0+303	L	7.1		Private	A-M
Alba Drive						
39	0+006	R	9.4		Private	A-M
40	0+029	R	7.6		Private	A-M
41	0+086	R	9.5		Private	A-M
42	0+120	R	9.4		Private	A-M

Note: Some widths may be revised as the design is refined.

A-M Full movement approach – Medford jurisdiction
A-O Full movement approach – ODOT jurisdiction
B-M Approaches to be combined or relocated – Medford jurisdiction
B-O Approaches to be combined or relocated – ODOT jurisdiction
C-M Approaches to be converted to right-in, right-out– Medford jurisdiction
C-O Approaches to be converted to right-in, right-out— ODOT jurisdiction
D-M Approaches to be closed– Medford jurisdiction
D-O Approaches to be closed— ODOT jurisdiction
MAJOR Major deviation required– ODOT jurisdiction
MINOR Minor deviation required– ODOT jurisdiction

8 Recommended Measures

Based on the analyses performed during this project, it is predicted that the SPUI will operate acceptably and will meet ODOT mobility standards throughout the twenty-year planning period.

Most of the measures discussed in Section 7 are beneficial, but no new measures that require City legislative action are shown to be needed to maintain and protect the function of the interchange for the twenty-year planning period. These management measures might provide means to extend the operational life of the interchange beyond the twenty-year planning period or prove useful if other transportation deficiencies are discovered during updates of the Medford TSP or the RTP.

The IAMP recommends only two management measures for inclusion in the IAMP to protect the function of the new South Medford Interchange during the 20-year planning period. These are the Access Management Strategy and the existing provisions of the Medford TSP and Land Development Code.

8.1 Implement Access Management Strategy

The first management measure to be recommended by the IAMP is the implementation of the access management strategy developed during the design phase for the SMI. This is not a new management measure. Its inclusion in this section is simply a reaffirmation that this measure should be implemented.

During the design phase for the interchange reconstruction project, ODOT developed the *Access Management Strategy – South Medford Interchange Project* in 2003 for the new south Medford interchange in compliance with the OHP, Division 51, the City of Medford Comprehensive Plan and other local plans and policies. The strategy, which the Medford staff was given an opportunity to review, includes access management recommendations that support the project

objectives of the South Medford Interchange Project balanced with the City of Medford's land use, local street, and economic development goals. All are consistent with state access management requirements for safe and efficient highway operations. The IAMP summarizes the access management strategy, but recommends no changes to it.

The access management strategy provides a comprehensive inventory of all public and private approaches in the interchange area and identifies strategies that meet or improve current conditions by moving towards the appropriate access management standards. The inventory identifies all rights of access between the adjoining properties and the state highway, including reservations and grants of access. It contains findings for Division 51 requirements, including deviations. The strategy also develops a basis for a future intergovernmental agreement to transfer access review responsibility.

Access management strategies were carefully developed during the design phase for the South Medford Interchange. Key provisions of the access management strategy were:

- Access along the Garfield-Highland Connector between Riverside Avenue and Barnett Road will substantially meet OHP access management guidelines. Exceptions will be for the private, little-used accesses to the ODOT water quality facility and the PP&L substation.
- Access changes to OR 99 will also be implemented. Changes will include the closure of four existing access points and the conversion of some existing accesses to right-in, right-out only.
- Access along Barnett Road will also be changed. The closure of four existing driveways will be implemented. Some driveways will be combined and some will be restricted to right-in, right-out. A new signalized intersection will replace the existing Center Drive intersection.

Figure 7 shows access management for the interchange area by jurisdiction and level. Figure 8 and Table 13 further explain the locations and access features that comprise this strategy.

8.2 Include in the IAMP provisions from Medford's TSP and Land Development Code

Section 7 contains a discussion of potential management measures that will serve to protect the function of the new interchange. Both the RTP and the Medford TSP contain goals and policies that support the management measures, and the TSP also contains projects and implementation strategies. As a second management measure, the IAMP recommends that the following goals, policies, implementation measures and projects from the Medford TSP and the ordinance language from the Medford Land Development Code are included in the IAMP. The adoption of the IAMP will assure consistency between the IAMP and the Medford TSP and local code. Any local amendments to these policies or ordinance language will necessitate a corresponding amendment to the IAMP.

Medford TSP – Goals, Policies and Implementation Measures

Goal 1: To provide a multi-modal transportation system that supports the safe, efficient and accessible movement of all people and goods, and recognizes the area's role as the financial, medical, tourism and business hub of Southern Oregon and Northern California.

- **Policy 1-D:** The City of Medford's second priority for the use of transportation funds shall be to maximize efficient use of the existing transportation system through use of

Transportation System Management (TSM) and Transportation Demand Management (TDM) measures prior to expending transportation funds on capacity improvements.

Goal 2: To provide a comprehensive street system that serves the mobility and multi-modal transportation needs of the Medford planning area.

- **Policy 2-G:** The City of Medford shall undertake efforts to reduce per capita vehicle miles traveled (VMT) and single-occupancy vehicle (SOV) demand through TDM strategies.
- **Policy 2-H:** The City of Medford shall manage and maintain the transportation system in an efficient, clean and safe manner.
    - **Implementation 2-H(1):** Require Traffic Impact Analysis (TIAs), as appropriate, in conjunction with development applications to assess impacts on the existing and planned transportation system, and require transportation system improvements that are identified through the TIA or by other Municipal Code requirements as a condition of approval of development permits and land use actions.
    - **Implementation 2-H(2):** Utilize access management, including access location and spacing, to increase the capacity and safety of the transportation system. Incorporate access management techniques, such as raised medians, access management plans, driveway consolidation, driveway relocation, and closure of driveway access, into Arterial and Collector street design and development applications.
    - **Implementation 2-H(3):** Continue to modernize the traffic signal system and improve its efficiency by ultimately connecting all signals to the centralized traffic control center. Employ traffic signal timing plans that maximize efficiency during different time periods. Provide a program to identify locations for new/modified signals.
    - **Implementation 2-H(4):** Utilize Intelligent Transportation Systems (ITS) such as real-time traffic monitoring cameras and management projects, that provide motorist information and incident response/clearance programs to alleviate traffic congestion.
- **Policy – 2-L:** The City of Medford shall require an appropriate supply and design of off-street parking to promote economic vitality, neighborhood livability, efficient use of urban space, reduced reliance on single occupancy vehicles and to make TODs more pedestrian friendly.
    - **Implementation 2-L(1):** Require a minimum and maximum of off-street parking spaces based on the typical daily needs of the specific land use type.
- **Policy 2-M:** The City of Medford shall undertake efforts to contribute to a reduction in the regional per capita parking supply to promote the use of alternatives to the single occupancy motor vehicle.
    - **Implementation 2-M(1):** Every five years, estimate the parking supply in areas designated for commercial, industrial and institutional uses by the Medford Comprehensive Plan in order to monitor progress toward meeting the goal of reducing parking supply per capita by ten percent over the 20-year planning period.

Goal 3: To facilitate the increased use of public transportation in the Medford area as the adequacy of transit service is a measure of the quality of life in a community.

- **Policy 3-A:** The City of Medford shall undertake efforts to increase the percentage of total daily trips taken in the Medford planning area by transit, consistent with the target benchmarks in the Alternative Measures of the RTP.
- **Policy 3-B:** The City of Medford shall support the provision of convenient and accessible transit service to, from and within the Medford planning area, especially to higher density residential areas, employment centers and major commercial areas.
- **Policy 3-C:** The City of Medford shall undertake efforts to increase the percentage of dwelling units in the Medford planning area located within ¼ mile walking distance of transit routes, consistent with the target benchmarks in the Alternative Measures of the RTP.

Goal 8: To maximize the efficiency of Medford's transportation system through effective land use planning.

- **Policy 8-B:** The City of Medford shall undertake efforts to increase the percentage of dwelling units and employment located in Medford's adopted TODs, consistent with the targeted benchmarks in the Alternative Measures of the RTP.

Medford TSP – Projects

- **Project #532:** Fiber optic system upgrade at arterial or collector locations.
- **Project #538:** Install ITS equipment to facilitate traffic flow and enhance system communications.

Medford Land Development Code

- **Section 10.227 Zone Change Criteria:** Requires applicants to demonstrate that Category A urban services or facilities are available, or can and will be provided for the subject property. Streets and street capacity must be provided by either i) streets that presently exist and have adequate capacity, ii) existing streets that will either be improved or new streets constructed to provide adequate capacity, by the time of building permit issuance, iii) for streets that must be constructed or improved, the Planning Commission may find that the street to be adequate if improvements are fully funded, iv) for streets that need to be improved, specific improvements must be identified and demonstrated to result in street adequacy.
- **Section 10.462 Maintenance of Level of Service D:** Whenever level of service is determined to be below level D for arterials or collectors, development is not permitted unless the developer makes the roadway or other improvements necessary to maintain level of service D respectively.
- **Section 10.744 - Joint Use of Parking Facilities:** The off-street parking requirements of two or more uses may be satisfied by the same parking or loading space used jointly to the extent that it can be shown by the owners or operators of the uses that their operations and parking needs to not overlap in point of time.

South Medford Interchange (27)
Interchange Area Management Plan
APPENDIX A

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COMPLIANCE WITH TRANSPORTATION AND LAND USE PLANS, POLICIES, AND REGULATIONS

Based on the review of plans and regulations below, the SMI IAMP is found to be consistent with all applicable state and local goals, plans, and regulations. In addition, the SMI IAMP relies on the Jackson County Land Development Ordinance (Amended 2004; effective date: February 15, 2005), the Medford Transportation System Plan (November 20, 2003) and the Land Development Code for the City of Medford (2001).

- Oregon Administrative Rule 731-015-0065 (Coordination Procedures for Adopting Final Facility Plans)
- Statewide Planning Goals 2 (Land Use Planning), 11 (Public Facilities and Services), 12 (including Oregon Administrative Rule 660 Division 12, the "Transportation Planning Rule"), and 14 (Urbanization);
- Oregon Transportation Plan (1992)
- Oregon Highway Plan
- Oregon Administrative Rule Chapter 734, Division 51 (Highway Approaches, Access Control, Spacing Standards and Medians)
- Rogue Valley Metropolitan Planning Organization 2005-2030 Regional Transportation Plan (Adopted by the RVMPO on April 5, 2005)
- Jackson County Comprehensive Plan (Adopted 1972; Board of Commissioners approved amendments on January 12, 2004; effective March 12, 2004) and Transportation System Plan (Amended and approved by Jackson County on March 15, 2005; effective May 15, 2005)
- City of Medford Comprehensive Plan (Adopted 1975; Amended 1997), Transportation System Plan (2003), and Land Development Code (2001)

Oregon Administrative Rule 731-015-0065 (Coordination Procedures for Adopting Final Facility Plans)

The State Agency Coordination rule requires that the Oregon Transportation Commission (OTC) adopt findings of fact when adopting facility plans. Pursuant to these requirements, the Oregon Department of Transportation (ODOT or Department) provides the following findings to support the OTC adoption of the South Medford Interchange Area Management Plan (SMI IAMP).

(1) Except in the case of minor amendments, the Department shall involve DLCD and affected metropolitan planning organizations, cities, counties, state and federal agencies, special districts and other interested parties in the development or amendment of a facility plan. This involvement may take the form of mailings, meetings or other means that the Department determines are appropriate for the circumstances. The Department shall hold at least one public meeting on the plan prior to adoption.

> ***Finding:*** The SMI IAMP was prepared with participation from the City of Medford, ODOT, and with input from a variety of stakeholders and the general public. A public meeting was held in the Medford City Hall on May 25, 2005 to introduce the concept of the IAMP and to enable comment. Prior to the meeting, ODOT issued a news release announcing the public meeting. ODOT published the notice in the Medford Mail Tribune.

Five informational presentations were made before City of Medford bodies. On November 11, 2004 a presentation was made before the Medford City Council; on January 25, 2006 a presentation was made before the Joint Transportation Subcommittee; on February 26, 2007 the presentation was to the a joint meeting of the City of Medford Planning Commission and the Joint Transportation Subcommittee. Study sessions also were held with the City Council on September 13, 2007 and with the Planning Commission on September 24, 2007.

The IAMP Technical Advisory Committee (TAC), comprised of representatives from ODOT, Oregon Department of Land Conservation and Development (DLCD), the City of Medford, Rogue Valley Council of Governments (RVCOG), and Jackson County, met seven times.

(2) The Department shall provide a draft of the proposed facility plan to planning representatives of all affected cities, counties and metropolitan planning organization and shall request that they identify any specific plan requirements which apply, any general plan requirements which apply and whether the draft facility plan is compatible with the acknowledged comprehensive plan….

Finding: The IAMP TAC, comprised of representatives from ODOT, DLCD, the City of Medford, RVCOG, and Jackson County was instrumental in the development of the IAMP. TAC members received drafts of a series of technical reports and the SMI IAMP. The City of Medford issued a letter affirming consistency of the SMI IAMP with the City of Medford Transportation System Plan (TSP) and the Land Development Code (LDC), and supporting the OTC adoption of the SMI IAMP.

(3) If any statewide goal or comprehensive plan conflicts are identified, the Department shall meet with the local government planning representatives to discuss ways to resolve the conflicts.

Finding: No conflicts with statewide goals or comprehensive plans are identified.

(4) The Department shall evaluate and write draft findings of compatibility with acknowledged comprehensive plans of affected cities and counties, findings of compliance with any statewide planning goals which specifically apply as determined by Oregon Administration Rule (OAR) 660-030-0065(3)(d), and findings of compliance with all provisions of other statewide planning goals that can be clearly defined if the comprehensive plan of an affected city or county contains no conditions specifically applicable or any general provisions, purposes or objectives that would be substantially affected by the facility plan.

Finding: Findings of consistency are made for:

- Statewide Planning Goals 2 (Land Use Planning), 11 (Public Facilities and Services), 12 (including Oregon Administrative Rule 660 Division 12, the "Transportation Planning Rule"), and 14 (Urbanization);
- Oregon Transportation Plan (1992);
- Oregon Highway Plan;
- Oregon Administrative Rule 734-051 (Highway Approaches, Access Control, Spacing Standards and Medians);

- Rogue Valley Metropolitan Planning Organization 2005-2030 Regional Transportation Plan;
- Jackson County Comprehensive Plan (Adopted 1972, Amended 2004) and Transportation System Plan (Amended 2005);
- City of Medford Comprehensive Plan (1997), Transportation System Plan (2003), and Land Development Code (2001).

The SMI IAMP has been found to be consistent with all applicable state and local goals, plans, and regulations.

(5) The Department shall present to the Transportation Commission the draft plan, findings of compatibility with the acknowledged comprehensive plans of affecting cities and counties and findings of compliance with applicable statewide planning goals.

(6) The Transportation Commission shall adopt findings of compatibility with the acknowledged comprehensive plans of affected cities and counties and findings of compliance with applicable statewide planning goals when it adopts the final facility plan.

(7) The Department shall provide copies of the adopted final facility plan and findings to DLCD, to affected metropolitan planning organizations, cities, counties, state and federal agencies, special districts and to others who request to receive a copy.

Finding: This Attachment B: Findings of Compliance is part of the OTC SMI IAMP adoption package.

Statewide Planning Goal 2 (Land Use Planning); OAR 660, Division 4

Goal 2, Land Use Planning, requires planning coordination between those local governments and state agencies "which have programs, land ownerships, or responsibilities within the area included in the plan." In this case, Goal 2 requires that ODOT coordinate with the regional planning organization, Jackson County, and the City of Medford. Goal 2 requires that a land use planning process and policy framework be established as a basis for all decisions and actions relating to the use of land. Third, Goal 2 requires that city, county, state and federal agency and special district plans and actions related to land use be "consistent with the comprehensive plans of cities and counties and regional plans adopted under Oregon Revised Statutes (ORS) Chapter 268."

Finding: The majority of the study area is within the City of Medford UGB, which has planning authority over the area, although there are also some pockets of land within the study area that remain under Jackson County planning authority. The City of Medford recently annexed some of the county parcels within the study area. ODOT coordinated with the Rogue Valley Metropolitan Planning Organization (RVMPO), Jackson County, and the City of Medford throughout the IAMP planning process. Representatives from RVMPO, Jackson County, and the City of Medford served on the IAMP TAC, which met seven times. RVMPO, Jackson County, and the City of Medford provided input on the population and employment data used in the regional transportation forecasting model used for the IAMP traffic analysis. The IAMP preparation process, including the TAC meetings and public meeting, provided a forum for discussing issues related to land use. Based on the traffic operations analysis, the IAMP concluded that no land use actions were needed to protect the function of the interchange for the 20-year planning period.

This findings memorandum contains findings of consistency with Regional Transportation Plan (RTP), the comprehensive plans of Jackson County and the City of Medford, and the Medford TSP and Land Development Code. The City of Medford issued a letter ensuring that the IAMP is consistent with its comprehensive plan, as required by Goal 2. Based on the above findings, the IAMP is consistent with Goal 2.

Statewide Planning Goal 11 (Public Facilities and Services); OAR 660, Division 11

Statewide Planning Goal 11, Public Facilities and Services, requires cities and counties to plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development. The goal requires that urban and rural development be "guided and supported by types and levels of urban and rural public facilities and services appropriate for, but limited to, the needs and requirements of the urban, urbanizable and rural areas to be served."

Finding: The purpose of the South Medford Interchange Reconstruction Project is to reduce congestion while improving both the function and safety of the interchange. The goals of the IAMP are to "maintain the function of the interchange over the 20-year planning period to preserve the investment in the facility" and to "minimize the need for future major improvements to the interchange." The IAMP traffic analysis is based on the population and employment data used in the RTP update. The traffic analysis confirmed that the new Single Point Urban Interchange (SPUI) will meet ODOT mobility standards in 2030, using the RTP assumptions for population and employment growth. The IAMP is consistent with Goal 11.

Statewide Planning Goal 12 (Transportation); OAR 660, Division 12

Goal 12, Transportation, requires cities, counties, MPOs, and ODOT to provide and encourage a safe, convenient and economic transportation system. This is accomplished through development of TSPs based on inventories of local, regional and state transportation needs.

Goal 12 is implemented through OAR 660, Division 12, the Transportation Planning Rule (TPR). The TPR requires local governments to adopt land use regulations consistent with state and federal requirements "to protect transportation facilities, corridors and sites for their identified functions (OAR 660-012-0045(2))." A major purpose of the TPR is to promote more careful coordination of land use and transportation planning, to assure that planned land uses are supported by and consistent with planned transportation facilities and improvements.

OAR 660-012-0060, Plan and Land Use Regulation Amendments requires action by the local government when a plan amendment or land use regulation significantly affects a transportation facility. An amendment or regulation significantly affects if it "reduces the performance of an existing or planned transportation facility below the minimum acceptable performance standard identified in the TSP or comprehensive plan" (section (1)(c)(B)).

660-012-0060 (3) (d) does not allow a local government to approve an amendment for a property located in an interchange area that would significantly affect a facility without assuring that land uses are consistent with the facility standards. Section (4)(d) (C)(ii) defines an interchange area as designated in an adopted IAMP.

Finding: The TPR Plan and Land Use Regulation Amendments section (OAR 660-012-0060) provides permanent protection for the function of the SMI. The adopted Medford TSP, in Chapter 3 Existing Conditions, identifies the minimum acceptable performance

standard for I-5 as 0.80 volume-to-capacity (v/c). Upon OTC adoption of the SMI IAMP, the City of Medford will be required to implement one or more measures listed in section 660-012-0060 (2) if it approves a plan amendment or land use regulation that would reduce the performance of I-5 below 0.80 or the SMI ramps below 0.85 v/c. The five allowable measures are to demonstrate that land uses would be consistent with the facility, amend the TSP to provide improvements, alter land use regulations to reduce demand, amend the TSP to modify the facility standards, or require TSM or TDM measures or improvements (including timing) as a condition of development. These measures reflect the potential management actions listed in Section 7 of the SMI IAMP.

In addition, 660-012-0060 (4) requires local governments to coordinate with the affected transportation facility provider in making the determination of effect. Therefore, the City of Medford must coordinate with ODOT in determining whether a plan amendment or regulation would significantly affect I-5 or the SMI.

Using the forecast population and employment values from the RTP and the traffic volumes forecast using the regional traffic model, the operational analysis showed that the SPUI would meet ODOT mobility standards in year 2030 (20-year operational life). In addition, analysis also was conducted for an alternative development scenario that assumes more residential development and a higher trip generation from employment uses in the study area, than assumed in the updated regional transportation model. These two analyses ensured that the planned land uses assumed in the RTP and City of Medford comprehensive plan would be supported by and are consistent with the capacity of the new SPUI. The IAMP is consistent with Goal 12 and the TPR.

Statewide Planning Goal 14 (Urbanization); OAR 660, Div. 14 & 22

Goal 14, Urbanization, requires an orderly and efficient transition from rural to urban land use. This is accomplished through the establishment of urban growth boundaries (UGBs) and unincorporated communities. UGBs and unincorporated community boundaries separate urbanizable land from rural land. The compact development that Goal 14 fosters helps contain the costs of public facilities such as transportation by reducing the need for facilities further out and helping jurisdictions better anticipate where growth will occur.

Finding: The IAMP study area is entirely within the UGB. The study area includes parcels under Jackson County jurisdiction, some designated Exclusive Farm Use (EFU). The City of Medford recently annexed some of the parcels within the UGB and designated them SFR-00 and C-R. The IAMP traffic analysis uses the same land use assumptions about the parcels as the RTP, which RVMPO developed in agreement with Jackson County, the City of Medford, and ODOT. The IAMP is consistent with Goal 14.

Oregon Transportation Plan (1992)

The Oregon Transportation Plan (OTP) was adopted by the OTC in 1992 and is intended to meet the requirements of ORS 184.618(1), which requires the development of a state transportation policy and a comprehensive long-range plan for a multi-modal transportation system that addresses economic efficiency, orderly economic development, safety, and environmental quality. The OTP consists of two elements: the Policy Element defines goals, policies, and actions for the state over the next 40 years; the System Element identifies a coordinated multi-modal transportation system and a network of facilities and services for

different modes of transportation, that are to be developed over the next 20 years to implement the goals and policies of the OTP.

> ***Finding:*** Policy 4G, "to manage effectively existing transportation infrastructure and services before adding new facilities," has the most relevance to the IAMP because it identifies access management (Action 4G.2) as one of the management practices to be implemented. The IAMP assumes that the Access Management Strategy—South Medford Interchange Project (2003) developed during the project design phase will be implemented. The IAMP has been developed to be consistent with the OTP, specifically the Oregon Highway Plan, which is an element of the OTP (see next section).

Oregon Highway Plan

The Oregon Highway Plan (OHP), a modal element of the OTP, establishes policies and investment strategies for Oregon's state highway system over a 20-year period and refines the goals and policies found in the OTP. Policies in the OHP emphasize the efficient management of the highway system to increase safety and to extend highway capacity, partnerships with other agencies and local governments, and the use of new techniques to improve road safety and capacity. These policies also link land use and transportation, set standards for highway performance and access management, and emphasize the relationship between state highways and local roads, bicycle, pedestrian, transit, rail, and air systems.

Under Goal 1: System Definition, the following policies are applicable:

Policy 1A (State Highway Classification System), which establishes the classification system;

> ***Finding:*** The OHP classifies I-5 as an interstate highway. In 1995, the U.S. Congress established the National Highway System (NHS), which classifies the roadways in each state that are critical to the movement of interstate commerce. I-5 is part of the NHS system. The South Medford Interchange Reconstruction Project and the SMI IAMP support the interstate classification by meeting mobility standards.

Policy 1B (Land Use and Transportation), which recognizes the need for coordination between state and local jurisdictions;

> ***Finding:*** Coordination with local jurisdictions occurred throughout the preparation of the IAMP. A TAC directed the IAMP development process. Members included representatives from the Department of Transportation, the DLCD, RVMPO, and the City of Medford, and Jackson County.

Policy 1C (State Highway Freight System), which states the need to balance the movement of goods and services with other uses;

> ***Finding:*** The IAMP traffic operations analysis accounted for freight movement as well as passenger vehicle movement. I-5 is a designated freight route.

Policy 1F (Highway Mobility Standards), which sets mobility standards for ensuring a reliable and acceptable level of mobility on the highway system by identifying necessary improvements that would allow the interchange to function in a manner consistent with OHP mobility standards; and

> ***Finding:*** Using forecast population and employment values from the RTP and the traffic volumes forecast using the regional traffic forecasting model, the IAMP operational

analysis showed that the new SPUI would meet ODOT mobility standards in year 2030. The calculated volume-to-capacity (v/c) ratio for the interchange as a whole is 0.58 in year 2030. The ODOT mobility standard is 0.85. Operational analysis was also done for an alternative development scenario that used the same employment values from the RTP but with added trips, and also assumed more dwelling units would be added in the study area. The traffic analysis indicated that the v/c ratio for the interchange as a whole is 0.70 in year 2030.

Policy 1G (Major Improvements), which requires maintaining performance and improving safety by improving efficiency and management before adding capacity.

Finding: The new interchange replaces the existing interchange at Barnett Road. The existing on- and off-ramps at Barnett Road will be removed, leaving Barnett Road to serve as the main east-west arterial overpass in the study area. Completion of the new interchange will enable related improvements to the City's street system such as new limited-access local streets connecting the interchange with Oregon Route 99 and improvements to Barnett Road making it an enhanced east-west arterial.

Under Goal 2: System Management, the following policies are applicable:

Policy 2B (Off–System Improvements), which helps local jurisdictions adopt land use and access management policies;

Finding: The IAMP operational analysis evaluated whether the new SPUI would meet ODOT mobility standards in 2030 using forecast population and employment values from the RTP and the traffic volumes forecast using the regional traffic forecasting model, as well as an alternative development scenario that assumed more dwelling units would be added in the study area. The analysis showed that the new SPUI would meet ODOT mobility standards in both cases. The IAMP assumes that the Access Management Strategy—South Medford Interchange (2003) will be implemented. The IAMP concludes that the City of Medford and Jackson County do not need to amend existing land use and access management policies.

Policy 2D (Public Involvement), which ensures that citizens, local governments, state agencies, and organizations have input into decisions about the state highway system; and

Finding: The SMI IAMP was prepared with participation from the City of Medford, ODOT, and with input from a variety of stakeholders and the general public. A public meeting was held in the Medford City Hall on May 25, 2005 to introduce the concept of the IAMP and to enable comment. Five informational presentations were made before City of Medford bodies. On November 11, 2004 a presentation was made before the Medford City Council; on January 25, 2006 a presentation was made before the Joint Transportation Subcommittee; on the February 26, 2007 the presentation was to a joint meeting of the City of Medford Planning Commission and Joint Transportation Subcommittee. study sessions were held with the City Council on September 13, 2007 and with the Planning Commission on September 24, 2007. The IAMP TAC, comprised of representatives from ODOT, DLCD, the City of Medford, RVCOG, and Jackson County, met seven times.

Policy 2F (Traffic Safety), which improves the safety of the highway system.

> ***Finding:*** The Environmental Impact Statement (2001) prepared for the South Medford Interchange Reconstruction Project evaluated crash data at the existing interchange and safety at the existing interchange and new SPUI.

Under Goal 3: Access Management, the following policies are applicable:

Policy 3A: (Classification and Spacing Standards), which sets access spacing standards for driveways and approaches to the state highway system; and

Policy 3C (Interchange Access Management Areas), which sets policy for managing interchange areas by developing an IAMP that identifies and addresses current interchange deficiencies and short, medium and long term solutions.

> ***Finding:*** The IAMP assumes that the Access Management Strategy—South Medford Interchange (ODOT, 2003) will be implemented and does not feature any changes to it.

Oregon Administrative Rule Chapter 734, Division 51 (Highway Approaches, Access Control, Spacing Standards and Medians)

OAR 734-051 governs the permitting, management, and standards of approaches to state highways to ensure safe and efficient operation of the state highways.

Section 734-051-0125, Access Management Spacing Standards for Approaches in an Interchange Area establishes interchange management area access spacing standards.

> ***Finding:*** The IAMP assumes that the Access Management Strategy—South Medford Interchange Project (2003) developed during the project design phase will be implemented. ODOT developed the Access Management Strategy in accordance with OAR 734-051. The strategy includes an inventory of existing public and private approaches and findings for compliance with Division 51 standards. The IAMP is consistent with OAR 734-051.

Rogue Valley Metropolitan Planning Organization 2005-2030 Regional Transportation Plan (Amended 2005)

The RVMPO prepared the RTP as one of its transportation planning responsibilities. The RTP is a multi-modal transportation plan designed to meet the anticipated 25 year transportation needs within the MPO planning area boundary. The RTP serves as a guide for the management of existing transportation facilities and for the design and implementation of future transportation facilities through the year 2030. The RTP contains 12 elements.

The RVMPO developed the RTP's guiding principles (goals and policies) from the previous RTP, the Transportation Equity Act for the 21st Century's Planning Guidelines for MPOs, the TPR, and the local TSPs. There are 12 RTP goals, each with several associated objectives. Those relevant to IAMP consistency are:

Goal 1. Plan for, develop, and maintain a balanced multi-modal transportation system that will address existing and future needs for transportation of people and goods in the region.

Goal 2. Optimize safety and security on the transportation system.

Goal 3. Use transportation investments to foster compact, livable communities. Develop a plan that builds on the character of the community, is sensitive to the environment, and enhances quality of life.

> **Policy 3-2.** Local governments shall consider amending their Comprehensive Plans to promote mixed-use or higher density developments in urban areas that will lower the vehicular demand on the regional transportation system. These plans will facilitate transit-oriented development (TOD) in current and future RTP designated TOD areas.
>
> **Policy 3-5.** Prioritize investments to ensure existing transportation system preservation.

Goal 5. Maximize the efficient utilization of existing and future transportation infrastructure to facilitate smooth movement of people and motorized and non-motorized vehicles.

Goal 7. Provide an open, balanced, and credible process for planning and developing a transportation system that complies with state and federal regulations.

Policy 7-2. Coordinate the planning for existing and future land use and development with the planning of the transportation system.

> ***Findings:*** The IAMP goals parallel the RTP goals. The IAMP goals to "maintain the function of the interchange over the 20-year planning period to preserve the investment in the facility" and "minimize the need for future major improvements to the interchange" support RTP Goal 1 to maintain the system for existing and future needs and Goal 5 to maximize existing and future infrastructure.
>
> The IAMP operational analysis used the forecast population and employment values from the RTP and the traffic volumes forecast using the regional traffic forecasting model to demonstrate that the new SPUI would meet ODOT mobility standards in year 2030. The first management measure included in the IAMP is to implement the Access Management Strategy developed during the new interchange design process.
>
> The South Medford Interchange Reconstruction Project was initiated and designed to reduce congestion while improving the safety and function of the interchange, consistent with RTP goals 2 and 5. The RTP street system project list identifies construction of the new South Medford Interchange as a Short Range project (project number 900 in Figure 8-3) to be funded by ODOT and the City of Medford. Short-range projects are expected to be needed within five years of plan adoption.
>
> Policy 3-2 supports the development of TODs, all of which are outside the interchange management area. The purpose of the IAMP to protect the function of the interchange over time is consistent with Policy 3-2. Policy 3-5 reflects the IAMP goal "to preserve the investment in the facility." The IAMP is consistent with the RTP.

Jackson County Comprehensive Plan (Adopted 1972, Amended 2004) and Transportation System Plan (Amended 2005)

The Board of Commissioners approved amendments to the Jackson County Comprehensive Plan on January 12, 2004, which became effective March 12, 2004. The Jackson County Comprehensive Plan is the official long-range land use policy document for Jackson County. The plan sets forth general land use planning policies and allocates land uses to resource, residential, commercial and industrial categories. The plan serves as the basis for the

coordinated development of physical resources and the development or redevelopment of the county based on physical, social, economic and environmental factors.

The update of the Jackson County TSP was approved on March 15, 2005 and went into effect on May 15, 2005. The TSP has livability, modal components, and integration goals with associated policies and strategies to implement each goal. The livability goal is "to develop and maintain a safe and multi-modal transportation system capable of meeting the diverse transportation needs of Jackson County while minimizing adverse impacts to the environment and to the County's quality of life." There are no policies or strategies related to this goal specifically applicable to the interchange project. The TSP includes policies to support freight mobility and coordination between the County and ODOT. There are also bicycle and pedestrian-related policies applicable to the project area. Policy 4.2.4-A,d "Provide bicycle lanes in urban areas and adequate shoulders in rural areas, in addition to parallel bikeways, as part of arterial and collector roadway improvement projects."

> ***Findings:*** The portion of the IAMP study area outside of the Medford city limits but inside of the UGB is under Jackson County jurisdiction. The majority of these parcels are located between the railroad tracks and I-5, although there are two clusters of parcels just west of the railroad. All county parcels within the study area are located south of Barnett Road. Industrial commercial, agriculture, urban residential and rural residential (RR) land designations cover the study area, although the majority of county land is designated for industrial and agricultural uses.
>
> ODOT coordinated with Jackson County throughout the IAMP planning process. A representative from the Jackson County Roads Department served on the IAMP TAC, which met seven times. Jackson County provided input on the population and employment data used in the regional transportation forecasting model used for the IAMP traffic analysis. The IAMP preparation process, including the TAC meetings, provided a forum for discussing issues related to land use. Based on the traffic operations analysis, the IAMP concluded that no land use actions were needed to protect the function of the interchange for the 20-year planning period.
>
> The South Medford Interchange Reconstruction Project will address these TSP pedestrian and bicycle policies by including pedestrian and bicycle amenities on the cross road for the new interchange.

City of Medford Comprehensive Plan (1997) and Transportation System Plan (2003)

The land within the IAMP study area is within the jurisdiction of the City of Medford. The City of Medford Comprehensive Plan was adopted in 1975 and was last updated in 1997, with a planning period target date of 2010. The plan is divided into 10 functional elements: environment, population, economy, land use, housing, pubic facilities, goals, policies and implementation, general land use plan, and citizen involvement. The plan provides goals and policies for all but the citizen involvement and implementation elements.

There are seven transportation-related policies that refer to automobile, street hierarchy and development, public transportation, bicycle transportation, pedestrian access and coordination with the Medford Airport. Goal 1, "To provide a sound basis for integrated transportation planning in the Medford planning area, thereby assuring maximum mobility for all Medford residents in the most cost-efficient and environmentally sound manner possible" directly applies

to the proposed project. Goal 2 states "To facilitate the safe movement of inter-neighborhood vehicular traffic within and through the community, consistent with adjacent land use requirements, through the continuing development and implementation of an arterial streets system."

The Medford TSP establishes the City's short and long-term goals and objectives for meeting its existing transportation needs, but also addresses planning for future growth and improvements necessary for providing an effective multimodal transportation system. One of the fundamental strategies is to reduce reliance on the automobile by promoting changes in land use patterns and transportation systems that make it more convenient for people to walk, bicycle, use transit, and drive less to meet their daily needs.

The Medford TSP has eight goals with accompanying policies and implementation strategies. The IAMP includes the following goals, policies and implementation strategies to support protection of the interchange function:

Goal 1: To provide a multi-modal transportation system that supports the safe, efficient and accessible movement of all people and goods, and recognizes the area's role as the financial, medical, tourism and business hub of Southern Oregon and Northern California.

> **Policy 1-D:** The City of Medford's second priority for the use of transportation funds shall be to maximize efficient use of the existing transportation system through use of Transportation System Management (TSM) and Transportation Demand Management (TDM) measures prior to expending transportation funds on capacity improvements.

Goal 2: To provide a comprehensive street system that serves the mobility and multi-modal transportation needs of the Medford planning area.

> **Policy 2-G:** The City of Medford shall undertake efforts to reduce per capita vehicle miles traveled (VMT) and single-occupancy vehicle (SOV) demand through TDM strategies.
>
> **Policy 2-H:** The City of Medford shall manage and maintain the transportation system in an efficient, clean and safe manner.
>
> > **Implementation 2-H(1):** Require Traffic Impact Analysis (TIAs), as appropriate, in conjunction with development applications to assess impacts on the existing and planned transportation system, and require transportation system improvements that are identified through the TIA or by other Municipal Code requirements as a condition of approval of development permits and land use actions.
> >
> > **Implementation 2-H(2):** Utilize access management, including access location and spacing, to increase the capacity and safety of the transportation system. Incorporate access management techniques, such as raised medians, access management plans, driveway consolidation, driveway relocation, and closure of driveway access, into Arterial and Collector street design and development applications.
> >
> > **Implementation 2-H(3):** Continue to modernize the traffic signal system and improve its efficiency by ultimately connecting all signals to the centralized traffic control center. Employ traffic signal timing plans that maximize efficiency during different time periods. Provide a program to identify locations for new/modified signals.

Implementation 2-H(4): Utilize Intelligent Transportation Systems (ITS) such as real-time traffic monitoring cameras and management projects, that provide motorist information and incident response/clearance programs to alleviate traffic congestion.

Policy 2-L: The City of Medford shall require an appropriate supply and design of off-street parking to promote economic vitality, neighborhood livability, efficient use of urban space, reduced reliance on single occupancy vehicles and to make TODs more pedestrian friendly.

Implementation 2-L(1): Require a minimum and maximum of off-street parking spaces based on the typical daily needs of the specific land use type.

Policy 2-M: The City of Medford shall undertake efforts to contribute to a reduction in the regional per capita parking supply to promote the use of alternatives to the single occupancy motor vehicle.

Implementation 2-M(1): Every five years, estimate the parking supply in areas designated for commercial, industrial and institutional uses by the Medford Comprehensive Plan in order to monitor progress toward meeting the goal of reducing parking supply per capita by ten percent over the 20-year planning period.

Goal 3: To facilitate the increased use of public transportation in the Medford area as the adequacy of transit service is a measure of the quality of life in a community.

Policy 3-A: The City of Medford shall undertake efforts to increase the percentage of total daily trips taken in the Medford planning area by transit, consistent with the target benchmarks in the Alternative Measures of the RTP.

Policy 3-B: The City of Medford shall support the provision of convenient and accessible transit service to, from and within the Medford planning area, especially to higher density residential areas, employment centers and major commercial areas.

Policy 3-C: The City of Medford shall undertake efforts to increase the percentage of dwelling units in the Medford planning area located within ¼ mile walking distance of transit routes, consistent with the target benchmarks in the Alternative Measures of the RTP.

Goal 8: To maximize the efficiency of Medford's transportation system through effective land use planning.

Policy 8-B: The City of Medford shall undertake efforts to increase the percentage of dwelling units and employment located in Medford's adopted TODs, consistent with the targeted benchmarks in the Alternative Measures of the RTP.

Findings: The TSP identifies the South Medford interchange project as a short-term Tier One improvement (project number 3, Table 13-2). The TSP also states that a key element of the project is the development of an IAMP for the new interchange.

ODOT coordinated with the City of Medford throughout the IAMP planning process. Representatives from the City of Medford served on the IAMP TAC, which met seven times. The City of Medford provided input on the population and employment data used in the regional transportation forecasting model used for the IAMP traffic analysis. The IAMP preparation process, including the TAC meetings, provided a forum for discussing issues related to land use. Based on the traffic operations analysis, the IAMP concluded

that no land use actions were needed to protect the function of the interchange for the 20-year planning period.

The South Medford Interchange Reconstruction Project will address these TSP pedestrian and bicycle policies by including pedestrian and bicycle amenities on the cross road for the new interchange.

The City of Medford has issued a letter affirming consistency of the SMI IAMP with the City of Medford TSP and supporting the OTC adoption of the SMI IAMP.

The goals, policies and implementation strategies from the TSP that are cited above, support the IAMP management measures that can be used as tools to protect the function of the interchange.

City of Medford Land Developement Code (2001)

Land Development Code Sections 10.227 (Zone Change Criteria), Section 10.462 (Maintenance of level of Service D) and 10.744 (Joint Use of Parking Facilities) support management measures that will serve to protect the function of the new interchange to and beyond the planning period. These sections are as follows:

Section 10.227 Zone Change Criteria: Requires applicants to demonstrate that Category A urban services or facilities are available, or can and will be provided for the subject property. Streets and street capacity must be provided by either i) streets that presently exist and have adequate capacity, ii) existing streets that will either be improved or new streets constructed to provide adequate capacity, by the time of building permit issuance, iii) for streets that must be constructed or improved, the Planning Commission may find that the street to be adequate if improvements are fully funded, iv) for streets that need to be improved, specific improvements must be identified and demonstrated to result in street adequacy.

Section 10.462 Maintenance of Level of Service D: Whenever level of service is determined to be below level D for arterials or collectors, development is not permitted unless the developer makes the roadway or other improvements necessary to maintain level of service D respectively.

Section 10.744 - Joint Use of Parking Facilities: The off-street parking requirements of two or more uses may be satisfied by the same parking or loading space used jointly to the extent that it can be shown by the owners or operators of the uses that their operations and parking needs to not overlap in point of time.

Finding: These adequate facilities requirements assure the provision of a suitable local street network that will benefit the function of the interchange, particularly when these improvements occur in the interchange's management area. The requirement for the maintenance of Level of Service D will assure that the function of local streets is protected to enable them to serve as a viable alternative to state facilities. The joint use of parking facilities will foster an environment that will enable TDM strategies to work more successfully, and limit traffic growth that could affect interchange function.

The second and final management measure of the South Medford IAMP is to adopt the IAMP with the goals, policies and implementation strategies from the Medford TSP and ordinance language from the Medford Land Development Code that provide protection

for the function of the new interchange. City of Medford has issued a letter stating that the IAMP is consistent with the City's TSP and code, and that the City supports the OTC adoption of the SMI IAMP.

APPENDIX B

FUTURE TRAFFIC VOLUME FORECASTING AND TRAFFIC OPERATIONS ANALYSIS

Regional Traffic Forecasting Model

In support of the IAMP effort, ODOT's Transportation Planning and Analysis Unit (TPAU) used the regional traffic forecasting model to forecast year 2002, 2010 and 2030 traffic volumes. The regional forecasting model uses a variety of data to generate trips, predict travel patterns and assign traffic to a network representing the major streets and highways in the region. Information from travel behavior surveys of Medford area residents was used as the basis for much of the regional model. The traffic assignment and traffic volume information uses the EMME/2 package to simulate traffic volumes on the regional street network.

One of the important steps in modeling is the calibration process in which traffic volumes predicted by the model are checked against recent traffic counts for the street network. In support of the modeling for the RVMPO's Regional Transportation Plan and for the IAMP, year 2002 was used as the base year for the calibration process. TPAU and local agencies, including the RVMPO, invested considerable effort to calibrate the model to enhance its ability to simulate the current conditions. Efforts expended in calibration translate into a better, more useful model for evaluation of future conditions.

One of the greatest values of a traffic forecasting model is the ability to use it to test changes in the street network. Planned changes for the South Medford area include the relocation and reconfiguration of the interchange that is the subject of this IAMP.

In TPAU's year 2002 simulation, the model simulates the existing street network and connections between I-5 and Barnett Road. The model shows the ramps exactly as they exist today. For the year 2010 simulation, the Barnett Road ramps were deleted and were replaced by new ramps connecting with the new Garfield-Highland connector. The Garfield-Highland connector is also a new facility running from Barnett Road to OR 99.

The differences between the 2002 simulation and the 2010 simulation result in significant alterations of the traffic patterns in the study area, including a diversion of traffic from Barnett to the Highland-Garfield connector. The street network used for the 2010 simulation was also used for the year 2030.

Because a traffic forecasting model does not fully replicate the existing traffic patterns, the usual approach is to perform "post processing" of the model results. The recommended practice is found in National Cooperative Highway Research Planning (NCHRP) Report 255. The basic approach of this methodology assumes that a discrepancy between a base year count and a base year assignment from the model is likely to be of the same magnitude in the future.

Post processing using the difference method uses the following equation:

$$F_c = V_c + (F_m - V_m), \text{ where}$$

F_c = Future Traffic Volume V_c = Current Traffic Volume
F_m = Future Model Volume V_m = Current Model Volume

This equation, which is based on the assumption that there is a uniform numerical difference between the model volumes and counts, is most appropriate for intersections already in existence. New facilities, such as the SMI SPUI, do not have actual base year count data or identifiable travel patterns making the V_c and V_m terms in the above equation zero.

Lacking any base year traffic volumes, we had to rely more heavily on the direct outputs from the regional forecasting model. Before accepting these for direct application, we analyzed traffic patterns predicted by the model for both year 2002 and year 2010. Among other things, we analyzed the patterns of the traffic from the ramps. For these analyzes, we evaluated the "select link" outputs provided by TPAU. A select link output shows the routes of all traffic using the selected link as it traverses the entire roadway network. It is a valuable tool to help show the destinations of traffic using a particular street segment. Evaluating the traffic patterns by examining select link runs gave us greater confidence in the model and led us to accept the future volumes directly from the model for our traffic analysis.

When analyzing the future volumes at the SPUI and comparing the volumes from 2010 with 2030, most traffic volumes were forecast to increase. In a couple specific locations, traffic volumes predicted by the model show decreases during this twenty-year period. This result appears counterintuitive. It is natural to assume that traffic will increase in the future, especially when significant growth is planned in the SMI area.

There are several possible explanations for the predicted decrease in traffic volumes on individual ramps. First, the model predicts trip interchanges between potential origins and destinations based on the availability of all potential destinations and intervening opportunities of similar destinations. A shopping trip originally intended for a distant destination may be made to a nearer store if new stores are constructed. All of the new development, including commercial centers, planned throughout the region may have caused the model to predict different travel patterns and explain some of the traffic decreases. Second, the model is sensitive to congestion. More congestion anywhere along a motorist's route may cause a change in his/her travel pattern. A general increase in traffic in the south Medford area due to growth around the interchange might cause sufficient congestion to shift traffic patterns and cause a decrease in traffic on some facilities. Third, new facilities planned elsewhere may cause new travel patterns. Fourth, the planned increase in transit and other transportation demand management measures may reduce traffic in some areas. In consideration of these factors, modest decreases predicted by the model for particular movements at the SPUI are not considered significant and no actions were taken to override the volumes predicted by the application of the regional forecasting mode.

Evolution of SPUI Modeling Techniques

The City of Medford provided Synchro files for 2003 and 2023 that were created by JRH Transportation Engineering for use in the City of Medford Transportation Plan. These Synchro files were a refinement of those originally developed by JRH Transportation Engineering for the Draft Environment Impact Statement.

The JRH model was originally developed using a version of Synchro that has been upgraded at least twice. Several improvements have been made and the newest version, Synchro 7.0, has greater capabilities than it predecessors.

The JRH model analyzed the SPUI as three separate intersections: a central signalized intersection flanked by two unsignalized intersections. The function of the flanking intersections is to account for right-turn maneuvers to/from the I-5 ramps to the Garfield/Highland connector. In the years since the JRH model was created there have been updates to the Synchro/SimTraffic software package. These updates enable SPUIs to be modeled/operate as they are designed: a single signalized intersection. Trafficware, the developers of the Synchro/SimTraffic software package, believe that there is an appropriate template for modeling SPUI operations that utilizes the software updates and improvements. This template was provided to DEA and used for the SMI IAMP analysis. Results for the SPUI, utilizing the Trafficware template, are shown in the IAMP report.

Prior to receiving the new SPUI template from Trafficware, a preliminary analysis was conducted using the JRH SPUI model with updated 2030 volumes. The results of the initial 2030 SPUI analysis calculated that central, signalized portion of the intersection would operate acceptably, meeting the applicable ODOT mobility standards. However, viewed as an isolated, unsignalized intersection, the calculated volume-capacity (v/c) ratio of the right turn from the northbound off-ramp onto the Garfield-Highland Connector exceeded ODOT's mobility standard.

The high v/c ratio calculated by Synchro initially led to some concern, but after additional analysis, we concluded the intersection would operate acceptably. Treating the SPUI as three intersections is only necessary because of the limitations of the early version of Synchro. SimTraffic, which is a traffic simulation tool that accounts for the interaction of traffic at closely-spaced intersections, was also used to assess traffic operations of the SPUI using the "three intersection" configuration. The results of the SimTraffic analysis indicated adequate operation and queue storage distance for all movements at each of the 3 intersections (main signalized intersection and two flanking unsignalized intersections). The delay for traffic on the ramps was shown to be much less using SimTraffic than calculated by Synchro. SimTraffic reports include delay, but not a v/c ratio, so it cannot be used to directly assess an intersection's ability to meet OHP mobility standards.

The problems of calculating the v/c ratio for the SPUI was solved by replacing the earlier "three intersection" approach to modeling the SPUI used in the earlier version of Synchro with the latest version of the Synchro analysis package and the new template provided by Trafficware staff. When evaluated as a single intersection, the SMI SPUI is shown to meet applicable OHP v/c standards through year 2030.

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Appendix C

Traffic Operations Analysis Synchro and SimTraffic Files

2010 Base Year SPUI Operations and Queuing

2030 SPUI Operations and Queuing

2030 SPUI Operations and Queuing for Alternative Development Scenario

Movement	EBL	EBR2	WBL	WBR2	NEL	NET	NER2	SWL	SWT	SWR2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	0.97	1.00	0.97	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1583	3433	1583	3433	3539	1560	3433	3539	1560
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1583	3433	1583	3433	3539	1560	3433	3539	1560
Volume (vph)	245	440	55	520	485	485	60	515	350	250
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	272	489	61	578	539	539	67	572	389	278
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	272	489	61	578	539	539	67	572	389	278
Confl. Peds. (#/hr)	10		10		10		10	10		10
Turn Type	Prot	Free	Prot	Free	Prot		Free	Prot		Free
Protected Phases	7		3		5	2		1	6	
Permitted Phases		Free		Free			Free			Free
Actuated Green, G (s)	9.7	60.0	9.7	60.0	15.0	22.8	60.0	15.5	23.3	60.0
Effective Green, g (s)	6.7	60.0	6.7	60.0	12.0	19.8	60.0	12.5	20.3	60.0
Actuated g/C Ratio	0.11	1.00	0.11	1.00	0.20	0.33	1.00	0.21	0.34	1.00
Clearance Time (s)	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	383	1583	383	1583	687	1168	1560	715	1197	1560
v/s Ratio Prot	0.08		0.02		0.16	0.15		c0.17	0.11	
v/s Ratio Perm		0.31		c0.37			0.04			0.18
v/c Ratio	0.71	0.31	0.16	0.37	0.78	0.46	0.04	0.80	0.32	0.18
Uniform Delay, d1	25.7	0.0	24.1	0.0	22.8	15.9	0.0	22.6	14.8	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.1	0.5	0.2	0.7	5.9	1.3	0.1	6.4	0.7	0.3
Delay (s)	31.8	0.5	24.3	0.7	28.6	17.2	0.1	29.0	15.5	0.3
Level of Service	C	A	C	A	C	B	A	C	B	A
Approach Delay (s)						21.6			18.3	
Approach LOS						C			B	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 114: SB I-5 Off-Ramp & Garfield Street

Movement	EB	EB	EB	WB	WB	WB	NE	NE	NE	NE	NE	SW
Directions Served	L	L	>	L	L	>	L	L	T	T	>	L
Maximum Queue (ft)	114	107	86	58	29	150	207	221	167	201	45	174
Average Queue (ft)	64	53	11	26	10	63	87	101	77	85	2	90
95th Queue (ft)	102	93	55	51	29	125	155	168	139	156	33	155
Link Distance (ft)	1158	1158		1072	1072				757	757		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			200			200	300	300			200	300
Storage Blk Time (%)						0				0	0	
Queuing Penalty (veh)						0				0	0	

Intersection: 114: SB I-5 Off-Ramp & Garfield Street

Movement	SW	SW	SW	SW
Directions Served	L	T	T	>
Maximum Queue (ft)	206	131	131	87
Average Queue (ft)	108	63	58	3
95th Queue (ft)	177	115	106	37
Link Distance (ft)		484	484	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	300			200
Storage Blk Time (%)				
Queuing Penalty (veh)				

Movement	EBL	EBR2	WBL	WBR2	NEL	NET	NER2	SWL	SWT	SWR2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	0.97	1.00	0.97	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1560	3433	1560	3433	3539	1560	3433	3539	1560
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1560	3433	1560	3433	3539	1560	3433	3539	1560
Volume (vph)	160	490	70	650	530	645	65	620	455	195
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	178	544	78	722	589	717	72	689	506	217
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	178	544	78	722	589	717	72	689	506	217
Confl. Peds. (#/hr)	10	10	10	10	10		10	10		10
Turn Type	Prot	Free	Prot	Free	Prot		Free	Prot		Free
Protected Phases	4		8		5	2		1	6	
Permitted Phases		Free		Free			Free			Free
Actuated Green, G (s)	8.5	65.0	8.5	65.0	16.9	25.2	65.0	19.3	27.6	65.0
Effective Green, g (s)	5.5	65.0	5.5	65.0	13.9	22.2	65.0	16.3	24.6	65.0
Actuated g/C Ratio	0.08	1.00	0.08	1.00	0.21	0.34	1.00	0.25	0.38	1.00
Clearance Time (s)	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	1560	290	1560	734	1209	1560	861	1339	1560
v/s Ratio Prot	0.05		0.02		0.17	0.20		c0.20	0.14	
v/s Ratio Perm		0.35		c0.46			0.05			0.14
v/c Ratio	0.61	0.35	0.27	0.46	0.80	0.59	0.05	0.80	0.38	0.14
Uniform Delay, d1	28.7	0.0	27.9	0.0	24.2	17.7	0.0	22.8	14.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	0.6	0.5	1.0	6.3	2.1	0.1	5.4	0.8	0.2
Delay (s)	32.5	0.6	28.4	1.0	30.6	19.8	0.1	28.2	15.5	0.2
Level of Service	C	A	C	A	C	B	A	C	B	A
Approach Delay (s)						23.4			19.3	
Approach LOS						C			B	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 114: SB I-5 Off-Ramp & Garfield Street

Movement	EB	EB	EB	WB	WB	WB	NE	NE	NE	NE	NE	SW
Directions Served	L	L	>	L	L	>	L	L	T	T	>	L
Maximum Queue (ft)	97	95	92	74	169	229	231	243	225	246	177	227
Average Queue (ft)	47	41	5	34	29	118	108	123	106	115	6	131
95th Queue (ft)	82	76	48	62	143	225	184	199	184	208	67	206
Link Distance (ft)	1157	1157		1108	1108				764	764		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			200			200	300	300			200	300
Storage Blk Time (%)			0			2				1	0	
Queuing Penalty (veh)			0			1				1	0	

Intersection: 114: SB I-5 Off-Ramp & Garfield Street

Movement	SW	SW	SW
Directions Served	L	T	T
Maximum Queue (ft)	237	185	148
Average Queue (ft)	146	90	72
95th Queue (ft)	219	154	131
Link Distance (ft)		493	493
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 114: SB I-5 Off-Ramp & Garfield Street

Movement	EB	EB	EB	WB	WB	WB	NE	NE	NE	NE	NE	SW
Directions Served	L	L	>	L	L	>	L	L	T	T	>	L
Maximum Queue (ft)	90	91	216	247	462	233	196	220	247	276	89	212
Average Queue (ft)	47	37	23	48	77	130	89	106	136	155	3	126
95th Queue (ft)	78	70	121	169	360	234	159	174	206	232	47	198
Link Distance (ft)	1157	1157		1108	1108				764	764		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			200			200	300	300			200	300
Storage Blk Time (%)			0.00			0.06			0.00	0.02	0.00	
Queuing Penalty (veh)			0			3			0	2	0	

Intersection: 114: SB I-5 Off-Ramp & Garfield Street

Movement	SW	SW	SW	SW
Directions Served	L	T	T	>
Maximum Queue (ft)	229	206	186	25
Average Queue (ft)	141	114	97	2
95th Queue (ft)	209	175	159	24
Link Distance (ft)		493	493	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	300			200
Storage Blk Time (%)			0.00	
Queuing Penalty (veh)			0	

Movement	EBL	EBR2	WBL	WBR2	NEL	NET	NER2	SWL	SWT	SWR2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	0.97	1.00	0.97	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1560	3433	1560	3433	3539	1560	3433	3539	1560
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1560	3433	1560	3433	3539	1560	3433	3539	1560
Volume (vph)	160	600	90	655	635	780	85	620	575	200
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	178	667	100	728	706	867	94	689	639	222
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	178	667	100	728	706	867	94	689	639	222
Confl. Peds. (#/hr)	10	10	10	10	10		10	10		10
Turn Type	Prot	Free	Prot	Free	Prot		Free	Prot		Free
Protected Phases	4		8		5	2		1	6	
Permitted Phases		Free		Free			Free			Free
Actuated Green, G (s)	7.0	60.0	7.0	60.0	20.7	19.9	60.0	21.1	20.3	60.0
Effective Green, g (s)	4.0	60.0	4.0	60.0	17.7	16.9	60.0	18.1	17.3	60.0
Actuated g/C Ratio	0.07	1.00	0.07	1.00	0.30	0.28	1.00	0.30	0.29	1.00
Clearance Time (s)	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	229	1560	229	1560	1013	997	1560	1036	1020	1560
v/s Ratio Prot	0.05		0.03		c0.21	c0.24		0.20	0.18	
v/s Ratio Perm		0.43		c0.47			0.06			0.14
v/c Ratio	0.78	0.43	0.44	0.47	0.70	0.87	0.06	0.67	0.63	0.14
Uniform Delay, d1	27.6	0.0	26.9	0.0	18.8	20.5	0.0	18.3	18.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	0.83	1.43	1.00	0.89	1.41	1.00
Incremental Delay, d2	15.2	0.9	1.3	1.0	1.7	8.5	0.1	0.1	0.3	0.0
Delay (s)	42.8	0.9	28.3	1.0	17.3	37.9	0.1	16.4	26.4	0.0
Level of Service	D	A	C	A	B	D	A	B	C	A
Approach Delay (s)						27.0			18.2	
Approach LOS						C			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Appendix D

Trips and Traffic Volumes for the Alternative Development Scenario for the South Medford Interchange IAMP

This appendix describes the methodology used to develop year 2030 trip generation and traffic volumes associated with the Alternative Development Scenario.

The Alternative Development Scenario addresses the potential for additional traffic in the study area related to both employment growth and residential growth. The Alternative Development Scenario addresses the traffic impact resulting from employment with high traffic generation potential. In addition, it assesses the impact if there is more residential development in the study area than assumed in the regional traffic forecasting model.

It outlines our approach to the development of the trip generation rates and the calculation of the additional trips for Transportation Analysis Zones (TAZ) that would be significantly different than the regional model. It also discusses the assignment of the additional trips to the transportation network.

BACKGROUND

For all of the analyses performed to date, the Rogue Valley regional traffic forecasting model has been used to project future traffic volumes in the area surrounding the South Medford Interchange (SMI). The regional model provides traffic volumes that are based on planned dwelling units and planned employment throughout the study area. According to the procedures and methodologies in the regional model, the number of residences governs the total number of trips generated in the region. Employment sites attract trips according to algorithms that consider, among other things, the type of employment, the number of intervening opportunities, the travel time to the location, and congestion. The regional model is based upon a series of travel diaries and data on trip-making characteristics specific to the Medford region and validated by comparison with similar surveys elsewhere.

The regional model is based on a specific land use pattern with dwelling unit and employment values for a base year (2002) and a single future year (2030). Interim years are the result of interpolating between these dates. The regional model does not account for the possibility that development will be rapid and concentrated in certain areas and delayed in others.

The regional model uses several employment categories, such as industrial, retail and service employment, each of which has different trip characteristics. By necessity, the regional model's retail and service employment categories contain businesses with widely divergent trip generation characteristics. The broad retail category, for example, includes shopping centers, specialty retail, and some very high traffic generators such as convenience stores. The service category includes low traffic subcategories such as insurance or real estate offices and high-traffic uses such as banks and fast food restaurants. The use of broad employment categories is entirely appropriate for the regional model because of the large geographic area and the total number of residents and employees in the region.

ALTERNATIVE DEVELOPMENT SCENARIO METHODOLOGY

During the analysis of future traffic operations based on traffic volumes derived from the regional traffic forecasting model, there were discussions about the possibility of development in the area generating more traffic than forecast using the results from the regional model.

While the regional model is believed to produce valid results on a regional basis, there were concerns that future traffic in the study area might be underestimated because it is predominately a regional center with high growth predicted in the retail and service sectors. Stated another way, the issue became, "What if the development in the study area has a concentration of high-traffic generators, that are higher than the regional averages?"

To address this question, DEA staff created and evaluated an Alternative Development Scenario that was based on using trip generation rates derived from ITE's *Trip Generation.* The Alternative Development Scenario uses the same number of employees used in the RTP, but a mix of employment that was selected to generate more traffic than the traffic volumes from the regional model.

Recent activity in the study area, including large residential developments, led some members of the Technical Advisory Committee to question whether the assumptions in the RTP reflect a reasonable amount of future residential growth. To address this potential, the Alternative Development Scenario assumed an additional 820 dwelling units beyond the growth assumptions made in the RTP.

The methodology described in this appendix more closely parallels that commonly used in traffic impact studies. Traffic impact studies evaluate the impacts of a specific development on the surrounding street network and can be used to determine the improvements needed to accommodate the new development. Traffic volumes generated by a development are most often developed using trip rates from ITE's *Trip Generation* based on the specific attributes of the site, such as building size. Our approach was to apply this to the anticipated growth in most of the entire study area.

CALCULATION OF TRIPS ATTRIBUTABLE TO EMPLOYMENT GROWTH

A five-step process was used to calculate the additional trips related to employment growth that would result from the application of trip generation rates derived from ITE's *Trip Generation.* Developing additional trips in the SMI area followed five steps:

1. Determine average trip rates per employee for retail, service, industrial, and other land uses.
2. Adjust the average trip rates to account for pass-by trips.
3. Determine average trip rates by land use category.
4. Calculate the net change in employment between the year 2002 and 2030.
5. Calculate additional trips by TAZ based on the employment growth and the new rates.

Average values were calculated for a variety of retail, service, and industrial land uses in terms of PM peak hour trips per employee from ITE's *Trip Generation 7th Edition*. Some of the average rates were taken directly from the per employee rate in *Trip Generation*, while others are

derived from the trip rate per thousand square feet of building and an employee density rate borrowed from Metro's *1999 Employment Density Study*.

Trip generation rates are the total number of trips entering and exiting a driveway. The basic trip rate includes both the new traffic added to the street system and the pass-by trips drawn from traffic passing the site. Pass-by trips are trips already on the network that make an additional stop on their way from their origin to their destination without having to alter their route. While the driveway traffic volumes are critical to traffic operations analysis of individual sites, the use of the unadjusted rates would cause the impact on the major street network to be over-estimated. To limit our estimate to the amount of new traffic added to the network, a reduction in the average rate was made to account for pass-by trips. Once the average rates by land use type were reduced to account for pass-by trips, an average or composite rate was calculated for by employment category.

Retail Employment

For retail uses, we calculated a composite trip rate based on eight retail land uses. The Free-Standing Discount Store was the only land use containing a rate based on trips per employee. All other land uses were estimated based on employee density rates from Metro's study combined with trips per thousand square feet listed in *Trip Generation*. The pass-by percentages for retail uses are taken from the *Trip Generation Handbook.*

Table D-1 summarizes the individual rates and the weighted average based on an assumed proportion of the individual uses in the retail category.

Table D-1 Calculation of Composite PM Peak Hour Rate for Retail Employment

ITE Land Use Code	Description	Proportion %	PM Peak Hour Trips/Employee	Weekday PM Peak Avg. Pass-by %	Weekday PM Peak Hr. New Trips
813	Free-Standing Discount Superstore [1]	12.5	1.80	17%	1.49
815	Free-Standing Discount Store [2]	12.5	3.48	17%	2.89
820	Shopping Center [3]	12.5	1.75	34%	1.15
823	Factory Outlet Center [4]	12.5	1.07	34%	0.70
850	Supermarket [5]	12.5	6.55	36%	4.19
862	Home Improvement Superstore [6]	12.5	1.23	48%	0.64
863	Electronics Superstore [7]	12.5	2.25	33%	1.51
870	Apparel Store [8]	12.5	3.91	-	3.91
	Weighted Average	***100.00***	***2.8***		***2.1***

[1] Based on 3.87 trips per 1000 sq ft and 466 sq ft per employee. Pass-by percentage is from LU 815
[2] Uses per employee trip rate directly.
[3] Based on 3.75 trips per 1000 sq ft and 466 sq ft per employee.
[4] Based on 2.29 trips per 1000 sq ft and 466 sq ft per employee. Pass-by percentage is from LU 820
[5] Based on 10.45 trips per 1000 sq ft and 627 sq ft per employee.
[6] Based on 2.45 trips per 1000 sq ft and 500 sq ft per employee.
[7] Based 4.50 trips per 1000 sq ft and 500 sq ft per employee.
[8] Based on 4.20 trips per 1000 sq ft and 930 sq ft per employee.

After accounting for pass-by trips, the composite average for the retail employment sector was calculated to be 2.1 PM peak hour trips per employee.

Service Employment

For service related land uses, we calculated the composite average based on a combination of banks, restaurants, service station with convenience market and offices. Offices are an important component of the service industry and account for activities such as medical, dental services, finance, insurance and real estate.

Table D-2 Calculation of Composite PM Peak Hour Rate for Service Employment

ITE Land Use Code	Description	Proportion %	PM Peak Hour Trips/Employee	Weekday PM Peak Avg. Pass-by %	Weekday PM Peak Hr. New Trips
912	Drive-in Bank	7.50	8.65	47%	4.58
931	Quality Restaurant [1]	12.50	4.70	44%	2.63
932	High-Turnover (Sit Down) Restaurant [2]	12.50	6.85	43%	3.90
934	Fast-Food Restaurant with Drive-Through Window [3]	12.50	21.72	50%	10.86
945	Gasoline/Service Station with Convenience Market [4]	5.00	69.77	56%	30.70
710	General Office Building	12.50	0.46	-	0.46
720	Medical-Dental Office Building	12.50	1.06	-	1.06
750	Office Park	12.50	0.39	-	0.39
770	Business Park	12.50	0.39	-	0.39
	Weighted Average	***100.00***	***8.1***		***4.1***

[1] Based on 7.49 trips per 1000 sq ft and 627 sq ft per employee
[2] Based on 10.92 trips per 1000 sq ft and 627 sq ft per employee
[3] Based on 34.64 trips per 1000 sq ft and 627 sq ft per employee
[4] Based on 96.37 trips per 1000 sq ft and 724 sq ft per employee

After accounting for pass-by trips, the composite average for the service employment sector was calculated to be 4.1 PM peak hour trips per employee.

Industrial Employment

For industrial uses, we calculated a composite trip rate based on seven industrial land uses. There are no pass-by percentages for industrial uses in *Trip Generation.* All land uses had a rate based on trips per employee.

Table D-3 summarizes the individual rates and the weighted average based on an assumed proportion of the individual uses in the industrial category.

Table D-3 Calculation of Composite PM Peak Hour Rate for Industrial Employment

ITE Land Use Code	Description	Proportion %	PM Peak Hour Trips/Employee	Weekday PM Peak Avg. Pass-by %	Weekday PM Peak Hr. New Trips
110	General Light Industrial	14.29	0.42	-	0.42
120	General Heavy Industrial	14.29	0.88	-	0.88
130	Industrial Park	14.29	0.46	-	0.46
140	Manufacturing	14.29	0.36	-	0.36
150	Warehousing	14.29	0.47	-	0.47
152	High-Cube Warehouse	14.29	0.66	-	0.66
170	Utilities	14.29	0.76	-	0.76
	Weighted Average	***100.00***	***0.57***		***0.57***

The composite average for the industrial employment sector was calculated to be 0.57 PM peak hour trips per employee.

Other Employment

Other employment was considered to be a mix of different land uses of offices and business land uses. All land uses had a rate based on trips per employee.

Table D-4 Calculation of Composite PM Peak Hour Rate for Other Employment

ITE Land Use Code	Description	Proportion %	PM Peak Hour Trips/Employee	Weekday PM Peak Avg. Pass-by %	Weekday PM Peak Hr. New Trips
710	General Office Building	25.0	0.46	-	0.46
720	Medical-Dental Office Building	25.0	1.06	-	1.06
750	Office Park	25.0	0.39	-	0.39
770	Business Park	25.0	0.39	-	0.39
	Weighted Average	***100.00***	***0.58***		***0.58***

The composite average for the other employment sector was calculated to be 0.58 PM peak hour trips per employee.

Summary of Composite Rates

Table D-5 summarizes the composite trip rate for all four employment categories after the adjustment to subtract pass-by trips.

Table D-5: Composite PM Peak Hour Trip Rate by Employment Category after Pass-by Trip Adjustment

Retail	Service	Industrial	Other
2.1	4.1	0.57	0.58

The values in Table D-5 were applied to the net change in employment to assess the change in trips generated by the Alternative Development Scenario.

Calculation of the Net Change in Employment

For the Alternative Development Scenario, we did not change any assumptions about the total amount of employment or the employment sectors from those used for the regional model. As part of the process for development of long-range regional planning, RVCOG, the cities and Jackson County made employment allocations for each TAZ in the region based on zoning or comprehensive plan land uses and the amount of vacant or underutilized land.

Table D-6 below summarizes the net change in employment, aggregated into four employment categories, between the years 2002 and 2030. The same employment assumptions were used for both the regional model and the Alternative Development Scenario.

Table D-6: Net Change in Employment (2030-2002) by TAZ

TAZ	Retail	Service	Industrial	Other	Total
351	0	+20	+5	-95	-70
352	+10	+53	+4	0	+67
353	+1	+5	0	0	+6
354	+18	+11	0	0	+29
355	0	+3	0	0	+3
357	+1	+66	0	0	+67
362	+8	+20	+7	+2	+37
369	+58	+79	+268	-17	+388
370	+186	+195	+2	0	+383
371	+8	+89	+3	0	+100
372	0	+4	0	+10	+14
373	+23	+48	0	0	+71
380	+28	+138	+21	0	+187
382	+26	+132	+48	+19	+225
Study Area	+367	+863	+358	-81	+1,507

As shown in Table D-6, only five TAZs are estimated to have an increase of 100 or more employees between 2002 and 2030. These zones (TAZ 369, 370, 371, 380 and 382) were identified as the zones with the greatest potential for inclusion in the Alternative Development Scenario.

Zones that fell below the threshold were examined individually. Because of its proximity to the interchange and because it is adjacent to the zones already identified for inclusion, one additional zone (TAZ 352) was also added to the five already included in the Alternative Development Scenario. TAZ 357 and TAZ 373 were not added because they are at the far eastern end of the study area and had relatively little employment growth.

Calculation of Additional Trips from New Employment

Having identified the six zones for the Alternative Development Scenario, we performed calculations of trips resulting from anticipated growth and compared those with the trip calculations from the regional forecasting model.

The initial step in accounting for trips from new employment was evaluating the number of trips forecast for these six TAZs in the regional model for both year 2002 and year 2030 and calculating the difference. The first column in Table D-7 identifies the TAZ number. The second and third columns indicate the number of PM peak hour trips according to the regional model for years 2002 and 2030, respectively. The fourth column, labeled "Increase in Trips Due to Growth between 2002 and 2030," shows the difference and represents the increase in trips attributable to growth according to the regional model.

The trips generated using the alternative methodology are also presented in Table D-7. The new trips using the trip rates derived from ITE's *Trip Generation* were calculated separately for each TAZ. The average trip generation rates from Table D-5 were multiplied by the net change in employment by zone shown in Table D-6. The product of the trip rate and the employment is an estimate of the new trips resulting from employment growth between year 2002 and 2030 for each zone. This is presented in the fifth column in Table D-7.

The final column in Table D-7 summarizes the differences between the two methodologies. The difference between the two methodologies ranges from a decrease in PM peak hour trips in TAZ 369 to an increase of 828 PM peak hour trips in TAZ 370. Note the decrease in TAZ 369 is attributable to the lower rate for industrial employment. The total number of "extra" trips for these six TAZs is 2,053 PM peak hour trips. Excluding the possible decease in TAZ 369, the net increase is 2111 PM peak trips for the Alternative Development Scenario.

Table D-7: Comparison of PM Peak Hour Trips Attributed to New Employment by TAZ

	Trips Calculated by TAZ in Regional Transportation Forecasting Model			Trips Forecast Using Trip Generation Rates Specified in Table D-5	Difference Due to Alternative Development Scenario Trip Rates
TAZ	Year 2002	Year 2030	Increase in Trips Due to Growth between 2002 and 2030		
352	448	571	123	240	117
369	2,189	2,832	643	585	-58
370	169	523	354	1,182	828
371	427	567	140	382	242
380	363	576	213	634	421
382	76	205	129	632	503
Total			1,602	3,655	2,053

Trip generation associated with high trip generation rates for the Alternative Development Scenario results in 2,111 additional PM peak hour trips above that predicted from the trip generation methodology of the regional model. This difference is accounted for by trip generation rates. The total trips calculated by this alternative methodology is similar to PM peak hour trips that would be calculated from a series of traffic impact studies for new developments representing full development of the SMI area under current zoning.

CALCULATION OF TRIPS ATTRIBUTABLE TO RESIDENTIAL GROWTH

Recent development activity in the study area includes a proposal for a large residential project totaling more than 500 dwelling units in TAZ 382. This zone, according to the assumptions used in the RTP, was assumed to grow by only 64 dwelling units. To reflect this recent development pattern, the Alternative Development Scenario was adjusted to provide an additional 520 dwelling units by year 2030. TAZ 369 has also been suggested as a site that might have significant residential development. The RTP assumptions provided for residential growth of 63 dwelling units. The Alternative Development Scenario was adjusted to account for an additional 300 dwelling units by year 2030.

The PM peak hour trip generation for these potential residential developments was calculated using ITE's *Trip Generation* land use code 220 – Apartments. The PM peak hour trip generation rate is 0.62 trips per dwelling unit with 65 percent entering and 35 percent exiting. These rates were applied to the dwelling assumptions (520 for TAZ 382 and 300 for TAZ 369). Table D-8 summarizes the trips attributable to additional residential development assumed for the Alternative Development Scenario.

Table D-8: PM Peak Hour Trips Attributed to Additional Residential Development by TAZ

TAZ	Number of Additional Residential Units	Trip Rate	PM Peak Hour Exiting Trips	PM Peak Hour Entering Trips
369	300	0.62	65	121
382	520	0.62	113	210

TRIP ASSIGNMENT

Once the additional trips for each zone were calculated, they were assigned to the major street network of SMI study area. We used select zone runs provided by TPAU from the regional model to mimic the distribution pattern for these zones in the regional model. The increase in trips was assigned to the same routes as the original traffic distribution.

The proportion of new trips going through the SPUI and the turning movements at the SPUI were calculated for trips going to and coming from each of the six TAZs (352, 369, 370, 371, 380, and 382) that were part of the Alternative Development Scenario and where trip increases were calculated.

These additional trips were then added to the year 2030 volumes used in the original scenario. The new volumes accounted for the additional 2,619 PM peak hour trips resulting from the Alternative Development Scenario.

Figure 6 in the SMI IAMP shows PM peak hour traffic volumes at the SPUI developed by application of the methodology described in this appendix.

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APPENDIX E
City of Medford Letter of Consistency and Support