



Oregon Modeling Improvement Program STRATEGIC IMPLEMENTATION PLAN

A multi-year work program for ODOT's
Transportation Planning and Analysis Unit

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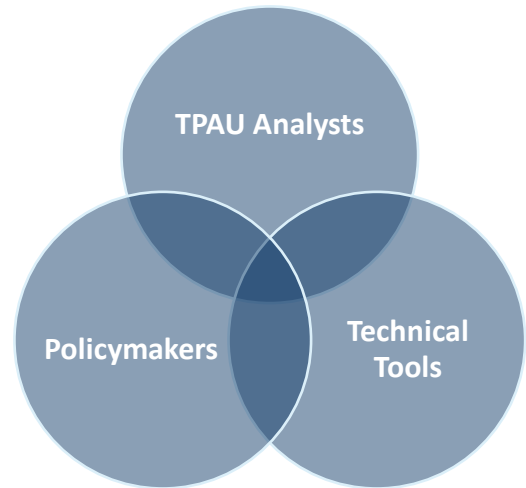
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1 INTRODUCTION

The Oregon Department of Transportation (ODOT) Transportation Planning and Analysis Unit (TPAU) analyzes the long-range effects of transportation decisions on travel behavior, transportation system performance, land use and the economy, to help customers make informed decisions and to maximize resources. TPAU plays a key role in furthering the ODOT's overall mission and goals, providing essential analysis and technical support for other divisions and units within ODOT, as well as external customers.

TPAU is in a unique and challenging position at ODOT. Its managers connect the world of transportation policymakers with technical people and tools that provide scientifically valid information needed for informed decisions. To be ready with tools and answers, questions and issues must often be anticipated well in advance. The unit must continually weigh the need for future analysis tools against a demanding current workload.

TPAU's Oregon Model Improvement Program (OMIP) and this Strategic Implementation Plan (SIP) set direction and priorities for TPAU's work, under the umbrella of ODOT's department-wide mission and goals.



TPAU links policymakers with analysts and technical tools needed for informed decisions.

1.1 ODOT Statewide Mission, Goals and Key Strategies

ODOT is currently updating its department-wide mission and goals, and a new department-wide strategic plan is anticipated sometime in 2018. This TPAU SIP update was developed based on ODOT's current strategic plan, which outlines the department's mission, values, goals and key strategies. These high-level doctrines provide the guiding principles under which TPAU operates.

ODOT's current department-wide mission is *"to provide a safe, efficient transportation system that supports economic opportunity and livable communities for Oregonians."*

ODOT's department-wide goals are to:

- Improve safety,
- Move people and goods efficiently, and
- Improve Oregon's livability and economic prosperity.

In working to achieve these goals, each ODOT division, section and unit is asked to embrace seven key strategies:

- Provide outstanding customer service,
- Use innovative program design and technologies to solve transportation problems,
- Improve the return on investment of our transportation funds,
- Attract, retain and develop an outstanding ODOT workforce,
- Engage the public, other state agencies, local governments, business and community leaders in solving transportation problems and planning for the future,
- Increase intermodal linkages to improve access for people and goods, and
- Communicate, educate and inform the public about transportation issues.

1.2 TPAU Goals



TPAU-specific goals (Table 1) directly support department-wide goals and strategies described above.

Goals are interconnected. For example, providing technical support could be defined as developing useful tools and methods in a timely manner. *Quality* technical support goes beyond this by providing effective and meaningful guidance in using the tools, employing creative problem solving and providing meaningful assistance to customers. Related goals to be agile, develop and leverage partnerships are crucial to providing quality technical support.

New technologies and innovation are affecting the current transportation planning environment, and TPAU recognizes the need to be agile in responding to changing travel paradigms. However, because resources are limited, it is important to balance the need for new tools and analyses needed for policymaking with the ongoing need for technical and professional services to support regulatory compliance and other planning activities. TPAU's goals for improving efficiency and leveraging partnerships are therefore essential to make the most of limited staff capacity and resources.

Communicating technical information is challenging for any discipline. Transportation modeling and analysis can be especially challenging given the academic diversity of participants in the public planning process. Effective communication requires active listening to understand the technical needs of customers. Written documentation of technical tool development, application methods and data must be complete and understandable. Complex analytical concepts must be explained clearly in a manner that caters to specific audiences across a range of customers served.

TABLE 1. TPAU GOALS FOR THE OREGON MODEL IMPROVEMENT PROGRAM

OREGON MODEL IMPROVEMENT PROGRAM GOALS			
GOAL			DESCRIPTION
A		Provide Quality Technical Support	Provide customers and partners with quality products and help them to use tools effectively.
B		Promote Technical and Professional Excellence	<p>Continue research and development of tools to address complex problems.</p> <p>Continuously work to improve the accuracy, efficiency and integrity of data and forecasting tools. Collaborate with partners on data collection.</p> <p>Work with partners to train and recruit qualified staff. Leverage consultant expertise to assist with new tools and innovation.</p>
C		Be Agile	Provide timely information to support policy and decision-making. Respond quickly to a diverse and changing range of customer/partner needs, and to address changing regulatory requirements.
D		Work Efficiently	Integrate processes and tools, standardize methods, use automation and leverage work by others to improve speed and reduce costs.
E		Develop and Leverage Partnerships	Maintain strong relationships with MPOs, ODOT Regions, universities and other partners. Work collaboratively to integrate programs and share resources (data and methods).
F		Communicate Effectively	Work collaboratively with customers and partners to define and address their needs. Clearly document tool development and work processes. Express complex concepts in terms that customers can easily understand.

1.3 Existing TPAU Services

As one of ODOT's principal "think tanks", TPAU provides many essential services for policymakers, other ODOT divisions and regions, and external customers. An overview of recent work areas is outlined below.

1.3.1 Informing Statewide Transportation Policy Development

TPAU is often asked to analyze the effects of potential statewide policy changes and investment options. In recent years, these services have included:

- Modeling and analysis to support development of the Oregon Transportation Plan, as well as individual mode and topic plans, such as the Freight Plan, Highway Plan, Rail Plan, Bike and Pedestrian Plan, Public Transit Plan and others.
- Evaluating statewide transportation strategies for reducing greenhouse gas (GHG) emissions.
- Modeling and analysis to support legislative programs and requests.
- Analyzing highway and bridge needs, mobility standards, transportation sector GHG mitigation, major projects, often resulting in statewide reports that are useful for policy-level decision making, such as the economic implications of deteriorating highway conditions and investing in seismic reinforcement of existing bridges in anticipation of a Cascadia Subduction zone event. Monitoring transportation system performance, such as reliability and other highway performance measures.

1.3.2 Supporting Metropolitan and Other Urban Area Transportation System Planning

A significant portion of TPAU's resources are used to assist small Metropolitan Planning Organizations (MPOs) and other urban areas in Oregon with system planning and analysis. This includes supporting development of federally-mandated regional transportation plans (RTPs) for MPO areas as well as state-mandated Transportation System Plans (TSPs) at regional and local levels. Recent examples include:

- Providing FHWA-approved regional travel demand models and analysis for MPOs in Bend, Corvallis, Albany, Rogue Valley, and Middle Rogue areas of Oregon.
- Assisting with MPO scenario planning activities such as the Corvallis Area MPO's strategic GHG assessment process and the Medford area regional problem-solving initiative.
- Modeling to support federally-required air quality conformity analysis in the Rogue Valley, Klamath Falls and La Grande areas.
- Modeling and analysis to support transportation system plan updates and Transportation Growth Management (TGM) projects in Deschutes County, Astoria and Roseburg.

While Oregon's large MPOs (Metro, Eugene/Springfield and Salem/Keizer) have their own in-house modeling programs, TPAU currently provides modeling tools for all other small MPOs in Oregon and collaborates closely with the larger MPOs. The importance of TPAU's work in this area cannot be understated. The Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and Environmental Protection Agency (EPA) require project modeling be carried out using techniques and modeling tools that meet certain guidelines. Failure to meet federal guidelines may result in project analysis conclusions that do not meet Federal approval and could lead to the withholding of federal aid funds.

To help ensure the sufficiency and promote the consistency of models used for metropolitan planning, TPAU has used a common modeling platform (Portland Metro's Joint Estimated Model in R

(JEMnR) template) for all small MPO models. This approach has streamlined model development and provides Oregon's small MPOs with sophisticated planning tools that out-perform those typically available to small MPOs, as well as larger MPOs in other areas of the country. Outside of metropolitan areas TPAU has used a similar approach to develop and apply models for planning, using a consistent Oregon Small Urban Model (OSUM) template.

TPAU uses the Statewide Integrated Model (SWIM) to feed travel information and forecasts for external areas to the MPO models. For GHG and strategic planning analyses, the GreenSTEP and Regional Strategic Planning Model (RSPM) have also provided information for metropolitan areas. In addition, TPAU led the data collection effort for areas outside of MPOs for the 2009-11 Oregon Household Activity Survey (OHAS), data used to develop urban models.

1.3.3 Supporting State and Local Transportation Facility Planning

For statewide, regional and local projects sponsored by ODOT, TPAU also plays an important supporting role. In recent years, TPAU has provided:

- Modeling and analysis to support project development and NEPA document preparation for projects such as the Crater Lake Highway, Newberg-Dundee Bypass, and US 97 Bend North Corridor improvements.
- Modeling and analysis to evaluate large land use developments, such as the Juniper Ridge development in Bend, Northgate Shopping Center in Medford, and interchange area management plans at Fern Valley, Central Point and Chemawa Road on I-5, and Murphy Road on US97.
- Modeling and analysis to support regional corridor studies and plans, such as the I-5 corridor study, OR99 corridor segment plan, and South US97 study.

1.3.4 Providing Coordination, Guidance and Training on Analysis and Modeling

TPAU staff members are part of Oregon's core group of transportation modeling experts, and are often called upon to help educate and train others. Key services in this area have included:

- Developing an Analysis Procedures Manual (APM), including facilitation of an APM User Group, and coordination with the American Council of Engineering Companies (ACEC).
- Traffic analysis and simulation software training (anticipating Mesoscopic protocol).
- Developing a Model Applications Guidelines, including coordination with MPOs, the Oregon Modeling Steering Committee, Oregon Modeling Collaborative, ACEC, and others.
- Providing a GHG Modeling Toolkit.

1.3.5 Current Tools Maintained by TPAU

Table 2 shows current modeling and analysis tools maintained by TPAU, along with the status of recent development or refinement efforts.

TABLE 2. EXISTING TPAU MODELS AND ANALYSIS TOOLS

Model/Tool	Model Application				Description	Recent / Current Refinements
	Strategic	Statewide	Regional	Community		
Statewide Integrated Model (SWIM)	√	√			Powerful, multi-component model used to examine broad statewide land use, transportation and economic interactions. Recently used to help policymakers understand the economic impacts of investing or not investing in bridges and pavements, freight planning, seismic event/lifeline access planning. Also used for regional and urban planning such as for examining bypass-induced demand, and intercity travel motivations.	Advanced select-link capabilities to tag individual users and observe altered routing due to network changes. Enhanced freight module, directly links to Federal Highway Administration (FHWA) Freight Analysis Framework (FAF) data to maintain current commodity flow information.
HERS-ST	√	√			Model developed for statewide use by the USDOT. Based on engineering standards, HERS-ST identifies highway deficiencies and applies economic criteria to select the most cost-effective mix of highway investment.	Developing post processor tool to evaluate reliability criteria using Strategic Highway Research Program (SHRP2) C11 methods for assessing wider economic benefits of transportation.

Model/Tool	Model Application				Description	Recent / Current Refinements
	Strategic	Statewide	Regional	Community		
VisionEval Suite of Models GreenSTEP RSPM	√	√	√		<p>The Regional Strategic Planning Model (RSPM) is a regional version of the statewide GreenSTEP model. Originally developed in response to an Oregon legislative requirement for GHG analysis tools, RSPM can analyze many other community sustainability and livability indicators in addition to GHG. These models are part of the VisionEval suite of models, a national initiative to develop an open source programming framework that is supported by a multi-agency partnership that includes ODOT.</p>	

Model Application					Description	Recent / Current Refinements
Model/Tool	Strategic	Statewide	Regional	Community		
JEMnR Models Corvallis-Albany-Lebanon Model (CALM) Bend Redmond Model (BRM) Rogue Valley Metropolitan Planning Organization (RVMPO) Model			√		<p>JEMnR stands for “Joint Estimation Model in R Code”, which is the framework used to develop regional travel demand models for the small MPO areas served by TPAU. Corvallis and Albany MPOs share the CALM model; Rogue Valley and Middle Rogue MPOs share the RVMPO model. The Bend MPO shares the BRM model with nearby City of Redmond. These travel demand models are used to analyze projects and programs for federally-mandated MPO transportation plans, as well as state-mandated transportation system plans for local agencies.</p>	<p>CALM model refinements have included a university model, population synthesizer and transit analysis features.</p> <p>Refinements to the RVMPO model are underway to improve commercial vehicle travel analyses, accounting for both long-haul freight and local delivery trucks</p>
Activity Based Model (ABM) Southern Oregon ABM			√		<p>A pilot project for ABM is underway for the Medford/Grants Pass area.</p>	

Model/Tool	Model Application				Description	Recent / Current Refinements
	Strategic	Statewide	Regional	Community		
Oregon Small Urban Models (OSUM)				√	Travel demand models using the OSUM framework have been developed for in Astoria/Warrenton, Coos Bay/North Bend, McMinnville, Newport, The Dalles, Pendleton, Klamath Falls, Brookings, Newberg, Prineville, Roseburg and Woodburn. These models have been used to help with analysis needed for state-mandated local transportation system plans.	
SUPPORTING TOOLS:						
All Streets Network		√	√	√	A GIS based tool for managing and inter-relating street network information with traffic count, Census and household travel survey data.	TPAU purchased a statewide routable all-streets network from NAVTEQ in 2010, to coincide with Oregon Household Travel Survey (OHAS) data collection at that time. A new routable network is anticipated to be needed circa the 2020 Census.

Model/Tool	Model Application				Description	Recent / Current Refinements
	Strategic	Statewide	Regional	Community		
Population Synthesizer		√	√	√	A universal tool to develop population distributions for multiple types of models, including urban and MPO models, SWIM, scenario planning tools and other research projects.	
Bike/Ped LTS			√	√	A tool to evaluate the “level of traffic stress”, or LTS, for non-motorized travelers. LTS is a measure of the network’s ability to provide safe and comfortable non-motorized travel for people of varying mobility and bicycling skill levels.	

1.4 Purpose of This Plan

Requests for TPAU assistance have grown as more accessible modeling and analysis tools are developed and customers understand the value of modeling and analysis in the transportation planning and policy decision-making process. Although efficiencies have been realized in the delivery of modeling and analysis services, TPAU resources have declined as requests for assistance have increased.

The SIP is intended to look comprehensively at the demands on staff and other resources; to evaluate those demands based on agency, division and customer priorities; and to define effective and efficient ways to provide modeling and analysis services.

This plan establishes a framework for achieving ODOT's key strategies and identifies TPAU work efforts and strategies to address customer demands.

2 LOOKING AHEAD: FUTURE AND ONGOING MODELING NEEDS

TPAU's modeling program needs can be classified into five areas:

- Application needs (how models will be used),
- Development needs (creation of new models or tools, or enhancements to existing tools needed to support desired applications),
- Data and input needs,
- Outreach and coordination needs, and
- Needs for additional resources and management support.

2.1 Model Application Needs

2.1.1 Emerging Model Application Topics

Looking forward, TPAU has identified several new areas for which analytic support will likely be needed within the next 10 years.

New Transportation Technologies. TPAU will likely be asked to provide information on the impacts and effects of many emerging travel technologies, including, but not limited to:

- Connected and autonomous vehicles
- Car sharing networks
- Electric and alternative fuel vehicles
- Personal electric vehicles

Consistent planning assumptions related to these topics is a top need for TPAU and other agency partners.

Increased Emphasis on Multi-Modal Approach. Oregon policymakers at the state level and in many communities around the state have embraced a multi-modal approach to transportation investment. As policies in this area evolve, models may be helpful to:

- Forecast the need for, and effects of investment in transit, non-motorized and other alternative modes
- Evaluate multi-modal connectivity and accessibility, especially for non-auto modes
- Examine the potential for, and economic impacts of, shifts in freight transport modes

Model Application is the use of travel models to produce quantitative estimates of travel characteristics for use in transportation, economic and policy analyses.

Understanding Community and Economic Factors. There is growing interest among state and local policy makers in the relationship between transportation investment and community economic and livability factors. Recent legislation related to value pricing indicates new analyses may be needed to understand the effectiveness of tolling and pricing as congestion management strategies. TPAU may also be called upon to forecast effects of transportation policies and projects on business and household travel costs, social equity, revenue, and other factors. Models may be used to help understand the community context, potential impacts and potential responses.

2.1.2 Supporting Ongoing Customer Needs

In the summer of 2016, TPAU held group interviews with representatives from the following agencies to help identify current and future modeling needs:

- Corvallis Area Metropolitan Planning Organization (CAMPO), City of Corvallis, and ODOT Region 2
- Bend Metropolitan Planning Organization (BMPO), City of Redmond and ODOT Region 4
- Rogue Valley Metropolitan Planning Organization (RVMPO), and ODOT Region 3
- Middle Rogue Metropolitan Planning Organization (MRMPO) and ODOT Region 3
- Albany Area Metropolitan Planning Organization (AAMPO), City of Albany and ODOT Region 2
- ODOT Highway Division, ODOT office of the Director, and ODOT Transportation Development Division

The interview team asked customers about the types of information they would need from TPAU to support future transportation decision-making.

Discussions centered around future model information needs related to policy analysis, strategic planning, regional and statewide scenario planning, economic impact analysis, investment analysis, legislative support, performance measurement, modal planning, freight analysis, and greenhouse gas analysis. Customers were asked to think about their ongoing and future needs related to model application, development and implementation; data and inputs; outreach; resources; and management support.

Customers provided insight into the types of activities for which they will need to use modeling tools in the future.

Continued Support for State-Level Policymakers and Statewide Initiatives. ODOT Management anticipates the primary use of statewide modeling tools will be to continue providing information to ODOT's director and managers, as well as the Oregon legislature as new statewide initiatives are developed.

Work is ongoing in several statewide policy areas, including the Rough Roads program, greenhouse gas (GHG) reduction and statewide congestion management. Models will also continue to be

needed to support statewide planning efforts, such as answering questions about inter-city passenger rail, analyzing freight bottlenecks, or performing scenario planning for the Oregon Highway Plan.

Investment Decision Support. Statewide models will continue to be needed to analyze current and future funding packages, including:

- Performing economic scenario analyses.
- Providing information on the consequences of failed funding packages.
- Providing information about return on investment for current and future funding packages.
- Providing better information to support project selection, such as benefit-cost ratios, GHG impacts and other tradeoffs.

MPO customers will continue to need models to help with investment decision-making in a variety of ways, including:

- Analyzing the regional effects of individual projects.
- Prioritizing projects for implementation. (This may involve benefit-cost analyses and/or evaluating the return on investment for different combinations of projects.)
- Evaluating transit investment alternatives.
- Evaluating multi-modal efficiency, to help strike the right balance between investments in different modes.

Complying with State and Federal Planning and Performance Management Rules. ODOT will need to use models to help set statewide performance targets, and prepare system performance reports required under the FAST Act.

ODOT's urban customers will continue to rely on TPAU's models in updating federally-mandated metropolitan transportation plans, and developing state-mandated transportation system plans. Interviewees advised that models will be needed to assist with:

- Scenario planning and policy analyses related to TPR, UGB, and GHG issues.
- Setting future performance targets and reporting on federally-mandated performance measures (e.g. safety, travel time reliability, mobile source emissions).
- Developing and evaluating region-specific performance factors (such as accessibility, bicycle or multi-modal level of stress, travel costs, sustainability and other regional indicators).

Localized Project Support. In urban areas, the ability to use models to identify improvements needed to support new land development will continue to be helpful. Models will also continue to be needed to help ODOT Regions evaluate the impact of major land development policies and proposals, assist with interchange area management plans, and support the NEPA process for ODOT projects.

2.2 Customer Model Development Needs

Many of the applications described above in Section 2.1 can be addressed with existing TPAU models and analysis tools. In some areas, however, model development is needed to support desired applications.

Model Development is the creation of new models and related tools, or major enhancements or improvements to existing models.

Sensitivity to Transportation Technologies. Both statewide and urban models will need increased capabilities for evaluating the effects of future technology shifts, specifically the ability to forecast the effects of connected and autonomous vehicle deployment on travel behavior and overall patterns.

Model Information Transferability. Methods for exchanging information between SWIM and Metro's SHRP2-C20 Freight Model are needed. Also, improved methods for using SWIM to provide external flow information to urban models are needed.

SWIM Improvements and Validation. SWIM enhancements will continue and require peer review, validation and systematic sensitivity testing.

Effects of Tolling and Pricing. Recent legislation related to value pricing in the Portland area (HB 2017) has elevated this model development need. It is most likely a suite of tools will be needed to evaluate pricing.

Improved Freight and Economic Modeling Capabilities. All MPOs interviewed for the SIP identified the need for models that can help to answer questions about freight mobility. A related need, support for economic policy analysis, was also identified by one MPO customer. The ability to forecast freight movements, identify commodity flows by region, estimate the impacts of congestion on freight operations, and analyze future year reliability at the regional level would require additional urban model development, as well as the SWIM.

Increased Detail in Urban Models. A variety of model application desires were expressed by urban model customers that would require additional model development to satisfy. These included:

- Increased urban model sensitivity to demographic changes, such as generational differences in travel behavior, or the effects of ethnicity on travel decisions.
- Ability to reflect seasonal variations in travel.
- Increased ability to model the effects of parking controls on Vehicle Miles Travelled (VMT).
- Ability to model the effects of incremental non-motorized improvements on VMT.
- Ability to model the effects of increased local street connectivity on VMT.
- Improved transit modeling, including ability to forecast the effects of transit travel time on air quality and mode choice.
- Ability to produce performance information to meet both federal requirements and locally-established performance metrics, such as household travel costs.

- Enhancements for GHG modeling in ODOT's Regional Strategic Planning Model (RSPM).

TPAU resource limitations may not be adequate to address this entire wish list. Also, adding bells and whistles to TPAU's existing urban models may not be advisable in all cases, because Oregon is at the verge of deploying the next generation of urban modeling tools -- activity based models (ABMs). Early experiences with ABMS in other parts of the country indicate the ABM framework provides greater accuracy, detail and analysis capabilities for urban areas than 4-step trip-based travel demand models. Over time, rather than investing significant resources in modifications and upgrades to existing models, it may be desirable to shift MPO models from the current traditional four-step travel demand framework to an ABM framework. However, TPAU first needs to complete a pilot ABM for the Medford/Grants Pass area to test and confirm the benefits of ABM. If successful, existing MPO models could eventually be phased out and transitioned to ABMs, likely beginning with the RVMPO model. In the meantime, the decision to continue enhancing existing urban models must be made on a case by case basis, in consultation with each individual MPO.

Model development work is also needed to complete standardization of all Oregon Small Urban Model (OSUM) code and procedures by incorporating improvements made to JEMnR MPO models. Researching and developing methods to improve model network speeds and assignment representation is also needed.

2.3 Model Data and Input Needs

TPAU updates existing travel models to a new baseline year at 10-year intervals, typically following each US Census or a major statewide household survey effort.

The upcoming 2020 Census provides an opportunity to collect additional data needed for modeling and analysis, within a parallel window of time. A data collection plan for other data sets used by TPAU and other ODOT sections is needed. For example, it would be advantageous to have traffic counts collected concurrent with the Census. TPAU intends to work with other ODOT Divisions and external partners to prepare a 3-year data plan, helping to synchronize and coordinate multiple data collection efforts. (This could include TPAU's current coordination with the OMSC to deploy household activity surveys circa 2020.)

Discussions with customers helped TPAU to identify the following additional data-related needs.

Improved Access to Available Data. Access to model data was identified as a need by most customers. Examples cited include a desired portal for sharing traffic count information, as well as more summary tables and better data access tools for Oregon Household Activity Survey data and other ODOT data.

Data for Federal Performance Reporting. Processes for collection and development of statewide data sets for federal performance measure reporting will be needed, with corresponding subsets for MPO areas.

Better Freight Data. Continued exploration of commercial data products and public-private partnerships to improve freight forecasting tools at both statewide and MPO levels is needed. Data on truck trip origins and destinations, and trips by vehicle type are needed to develop and improve commercial vehicle models.

Automation of Frequent Data Tasks. Improved data automation tools, especially tools for using Department of Motor Vehicles data to help correlate vehicle numbers and types by location. Tools to automate ODOT's data input to the Highway Economic Requirements System (HERS) is also needed.

Land Use Data. Improved land use input data and analysis tools are needed to help streamline model update processes. Customers expressed a desire to be able to use available GIS information at the parcel level rather than aggregate land use information by TAZ.

2.4 Customer Coordination and Outreach Needs

A top outreach need identified during the interviews was simply more interaction between MPOs and TPAU staff. MPO customers acknowledged the need to communicate and coordinate more frequently with TPAU, and felt that TPAU staff might benefit from increased awareness and understanding of the MPO policy environment. TPAU staff acknowledged their role in providing technical support and assistance, and expressed a need for forums to help facilitate greater interaction.

General outreach needs for TPAU include:

- Partnering with state and local agencies and consultants to provide a coordinated and consistent statewide modeling practices forum.
- Continuing to participate and support inter-agency collaboration through the Oregon Modeling Steering Committee (OMSC) and the Oregon Model Users Group (OMUG).
- Providing technical support and assistance to state, regional and local freight stakeholders through Oregon Freight Advisory Committee Collaboration.
- Participating in conferences and presenting findings from Oregon modeling analyses.
- Continuing to build university research and education linkages.
- Improving techniques for communicating technical information about models, analyses and findings to lay persons.
- Developing informational materials on freight flows at the region level.

Urban model customers are on the front line with respect to interaction with local elected officials, local agency staff and the public and expressed these specific outreach needs:

Consistent Planning Assumptions. Transportation technologies are changing rapidly, and in response, we can expect to see changes in the way people travel and use transportation services and facilities in the future. Forecasting future travel needs during times of significant change can be

challenging, since historic trends may not continue to be valid indicators of future travel behavior. Inter-agency collaboration is needed to address these uncertainties. By adopting consistent planning assumptions as existing models are updated, new models are developed, and planning processes are undertaken, local, regional and statewide plans can all work together from a common foundation.

Communicating Roles and Responsibilities. MPO customers identified a need for clear information about roles and responsibilities for TPAU, ODOT Regions and MPO staff.

“Modeling 101”. All MPO customers interviewed expressed the need for basic information, in lay terms, to explain how their models work, so that they can help to educate their stakeholders. Help with explaining the practical limitations of their models, for example the current limitations in analyzing alternative modes, is needed. Information on ABMs was also requested, and two MPO customers expressed a need for information about how travel models can work with other tools such as RSPM, or sketch planning tools.

Inventory of Available Tools. Several MPO customers expressed a need to know what models are available, and understand the capabilities and limitations of each tool (e.g. strengths, weaknesses, and appropriate uses).

Visual Displays. Visual aids, such as maps portraying model inputs and outputs, are needed when TPAU performs modeling work for MPO plans and projects. Examples included:

- Visualization of problems and impacts of improvements.
- Better understanding and representation of jobs-housing balance.

Elected Official Briefing Materials. MPO customers identified a need for outreach to elected officials on performance measures. A canned presentation on performance measures was suggested.

2.5 Customer Resources and Management Support Needs

MPO customers identified several areas where continued resources and management support from ODOT is needed:

- Assistance with long-range land use updates and long-range planning strategies.
- Continued TPAU staff assistance with model applications.
- Support for developing descriptive data, target setting, and performance metrics.
- Help determining what data really needs to be collected.
- Help determining what questions need to be asked for performance measures and decision-making.

Resources refers to funding and staff (agency, consultants, universities), as well as hardware, software and data.

Management Support includes broad support services, such as help with long-term visioning; strategic planning to identify needs and priorities; or identifying appropriate measures to address current policy questions.

- Help addressing new state requirements for GHG reduction.

Along with resources and management support needed to satisfy these external customer desires, TPAU also has many internal resource needs. Section 4 describes TPAU's currently resources, and an assessment of TPAU's capacity to deliver the work products identified in this SIP is provided in Section 5.2.1.

3 SIP OBJECTIVES AND STRATEGIES

Considering current customer needs and emerging analysis areas, six major objectives will guide TPAU's work over the next 10 years. These objectives, along with supporting strategies are summarized in Table 3 and briefly describe below.

Strategies listed in Table 3 represent example actions that TPAU may take to over the next 10 years to support each major objective; however, the list is not comprehensive and additional strategies may be identified over time.

Objective 1: Support Statewide Policy Development

TPAU's work is fundamental to statewide transportation decision-making and policy development, and the unit is often called upon to analyze critical questions in support of OTC deliberations as well as legislative proposals and mandates. Supporting statewide policy development is a core function for TPAU that will need to continue for the foreseeable future.

A key strategy under this objective includes working with other agencies represented on the OMSC to establish consistent planning assumptions for use across all agencies and all modeling tools. Doing this will help to promote analytic consistency across strategic (long-term), tactical (program), and operational (project) level studies. A consistent reference scenario that includes assumptions related to demographics, income levels, VMT growth, operating costs, connected/autonomous vehicles, alternative fuels, and other variables will help to establish a comparative baseline for future year models developed by ODOT and other OMSC member agencies.

Objective 2: Support Regulatory Compliance Activities

ODOT and MPOs are subject to federal requirements that require the use of transportation models for demand forecasting and assessment of transportation performance measures. In addition, ODOT, MPOs and local cities and counties must comply with state legislative requirements related to transportation planning and greenhouse gas analyses. TPAU's tools and analytic resources will continue to be needed for the foreseeable future, to support regulatory compliance activities at state, regional and local levels.

Objective 3: Support ODOT Facility and Network Planning

Performing analyses needed for statewide transportation studies is also part of TPAU's core purpose. Over the next 10 years, TPAU will likely be called upon to assist with multi-modal corridor studies, intercity transit and rail analyses, statewide freight mobility issues, and many similar statewide transportation topics.

Regional and local planning efforts that affect the state transportation system are often led by ODOT Region offices. TPAU will continue to support planning activities by ODOT Regions, such as

interchange area management plans, transit plans, studies at the project level that are needed for National Environmental Policy Act (NEPA) compliance, and other regional analysis needs.

Objective 4: Improve Data Quality

TPAU's work includes an ongoing quest for improved data quality. Looking forward, leveraging data from other agencies and commercial sources will help advance this objective in a cost-effective way. TPAU will also support OMSC efforts for collaborative data collection, including household travel survey data needed for model development around the time of the next U.S. Census in 2020. When feasible, TPAU will look for ways to make its data sets visible and accessible to other OMSC agencies.

TPAU will continue to automate frequent data processing tasks, to help reduce the amount of time spent in data handling, and reduce the potential for human error. Since data from local sources is needed for many models produced by TPAU, new processes to streamline how data is formatted and transferred between agencies will also be helpful.

Objective 5: Advance the State of the Practice

Oregon is at the forefront of transportation modeling nationally. TPAU has served as the proving ground for many tools that have subsequently been adopted by FHWA for broader use in other states. Oregon's position and reputation as an innovator and early adopter of state-of-the-art modeling tools has helped to attract high-caliber analysts to TPAU's team of in-house staff and external consultants. This contributes in no small way to the success of Oregon's modeling program and the preeminent quality of the tools developed by TPAU.

For example, ODOT is currently engaged in a partnership with FHWA, the American Association of State Highway Transportation Officials (AASHTO), and several other state departments of transportation for the development of a suite of strategic planning tools, known as the VisionEval framework. ODOT's GreenSTEP model provided the parent framework for this partnership. The VisionEval partnership subsequently led to the development of the RSPM model used for regional scenario analysis in Oregon, and two related models adapted from RSPM by FHWA for propagation to other states.

A hallmark of TPAU's approach to modeling is a vigorous vetting and peer review process of new models. This not only helps to confirm and provide confidence in model quality, but peer review also fosters the sharing of new modeling concepts between experts both within Oregon and on the national level.

Staying at the national forefront will require an ongoing commitment by ODOT to advance the state of the practice. Ongoing participation in the VisionEval pooled fund program is an important strategy to support this objective. Additionally, over the next 10 years, TPAU will be working to use existing tools in new ways, and to develop new tools to help policymakers wrestle with questions

about new and emerging technologies, travel behaviors, and transportation investment decisions. In the near-term, implementation of a new Activity Based Model (ABM) for the Grants Pass area in Southern Oregon will be a major investment area for TPAU. This first ABM is being developed with an eye toward ultimate transferability of the ABM framework to other Oregon MPOs.

Several additional activities are essential to advancing the state of the practice within Oregon. Preparing clear, thorough model documentation and user guides, and sharing technical knowledge are necessary to develop and expand the capabilities of Oregon's modeling professionals. Additional activities that integrate modeling process and improve the efficiency of the overall modeling program will also help to advance the state of the practice.

Objective 6: Develop and Sustain Relationships with Customers and Partners

TPAU has a broad customer base. Policy-level customers include the OTC, Oregon Legislature and ODOT's Director. Internal customers include managers and staff within other ODOT divisions, units and regions. External customers include MPOs, and local cities and counties for which TPAU provides modeling tools and other work products.

In addition to customers, TPAU also has numerous valuable partnerships with peer agencies who may provide data and information that is essential for TPAU's work, or who collaborate with TPAU to share resources or jointly develop tools of mutual interest.

These relationships have been beneficial to the overall efficiency and cost-effectiveness of TPAU's program. Looking ahead, the picture is one of tighter funding and greater demands on resources not only for TPAU, but also for their customers and partners. Continued work to sustain existing relationships and improve inter-agency collaboration has never been more important.

To continue developing and sustaining relationships with customers and partners, clear and continuous communication is essential. In addition to communicating regularly with customers on their needs and the status of TPAU work products, TPAU will also be working to promote customer understanding of modeling tools through informational materials and other outreach efforts. Continuing to build and support professional networks, such as the OMSC will also help to foster a closer rapport between TPAU staff, customers and partners.














Table 3 OBJECTIVES AND STRATEGIES	Cross References	
	Tied to other TPAU Strategies?	TPAU Goals supported
OBJECTIVE 1: SUPPORT STATEWIDE POLICY DEVELOPMENT		
STRATEGY 1A: PROMOTE CONSISTENT PLANNING ASSUMPTIONS FOR OREGON	6B,6C	  
Example Activities:		
1A-1 Work with the OMSC to establish statewide planning assumptions for autonomous and connected vehicles		
1A-2 Prepare consistent planning assumptions for electric/alternative fuel vehicles		
1A-3 Develop a standard future reference scenario for use across all models and agencies		
STRATEGY 1B: PROVIDE INFORMATION FOR STATEWIDE STRATEGIC PLANNING		 
1B-1 Perform strategic forecasting		
1B-2 Rough Roads analysis updates		
1B-3 Evaluate tolling/pricing strategies		
1B-4 Analyze scenarios and funding realities for policy-level plans (OTP, OHP, Mode and Topic Plans)		
1B-5 STS monitoring analysis and adoption support		
STRATEGY 1C: PROVIDE LEGISLATIVE SUPPORT		 
1C-1 Provide information on the potential effects of changes to statewide rules		
1C-2 Provide staff support for the Legislative OTC committee (HB2017)		
1C-3 Provide analysis methods and procedures to support benefit-cost analysis in HB 2017		
OBJECTIVE 2: SUPPORT REGULATORY COMPLIANCE ACTIVITIES		
STRATEGY 2A: PROVIDE INFORMATION FOR STATEWIDE PERFORMANCE PLANNING		 
2A-1 Forecast and report statewide mobility performance measures		
2A-2 Assist with target-setting		
2A-3 FAST Measures analysis method, reporting and target setting		
2A-4 Develop and implement ODOT's Key Performance Measure for Mobility		
STRATEGY 2B: HELP MPO'S AND LOCAL AGENCIES COMPLY WITH STATE AND FEDERAL PLANNING REQUIREMENTS	6B	   
2B-1 Support regional scenario planning activities		
2B-2 Forecast and report MPO performance measures		
2B-3 Perform regional travel analyses		
2B-4 Provide inputs for air quality models		
2B-5 Improve freight and economic forecasting capabilities for MPO areas		
2B-6 Provide RTP and RTSP support for MPO's		















Table 3 OBJECTIVES AND STRATEGIES		Cross References	
		Tied to other TPAU Strategies?	TPAU Goals supported
2B-7	Provide TSP support for cities and counties		
OBJECTIVE 3: SUPPORT ODOT FACILITY AND NETWORK PLANNING			
STRATEGY 3A: PERFORM ANALYSES FOR STATEWIDE STUDIES			  
3A-1	Provide information for statewide multi-modal corridor studies		
3A-2	Support Intercity Bus and Intercity Passenger Rail analyses		
3A-3	Provide information for TSMO Planning		
3A-4	Assist with analysis for 20 year project list required by HB 2017		
3A-5	Perform Value Pricing Analysis for I-5 and I-205 in Portland Metro region		
STRATEGY 3B: SUPPORT PLANNING ACTIVITIES BY ODOT REGIONS			  
3B-1	Interchange Area Management Plans		
3B-2	Corridor and/or route-level transit analyses		
3B-3	Park and ride analyses		
3B-4	Transit Plans		
3B-5	Transportation System Plans		
3B-6	NEPA support		
OBJECTIVE 4: IMPROVE DATA QUALITY			
STRATEGY 4A: LEVERAGE THE 2020 CENSUS			
4A-1	Establish a new 2020 data set for all models		
4A-2	Work with internal and external partners to prepare a 3-year data plan prior to the Census (including OHAS)		
4A-3	Work with the OMSC on household travel surveys		
STRATEGY 4B: LEVERAGE DATA FROM OTHER AGENCIES AND COMMERCIAL SOURCES			  
4B-1	Work with PSU on population projection scenarios		
4B-2	Work with partners in the freight industry and other agencies to obtain improved freight data		  
4B-3	Continue to implement and add capability to iPEMS		
4B-4	Help to define data provided by others (e.g. ITS before/after studies, DMV scripting, TransGIS, GIS parks layer, TSP e-data collection)		
4B-5	Develop Strava data		
4B-6	Develop TCI data		













Table 3 OBJECTIVES AND STRATEGIES	Cross References	
	Tied to other TPAU Strategies?	TPAU Goals supported
STRATEGY 4C: PROMOTE DATA CONSISTENCY AND QUALITY		
4C-1 Automate frequent data processing tasks		
4C-2 Develop a population synthesizer for use with multiple models and agencies		
4C-3 Develop tools to facilitate quality control and local agency review		
OBJECTIVE 5: ADVANCE THE STATE OF THE PRACTICE		
STRATEGY 5A: EVALUATE NEW AND EMERGING TECHNOLOGIES		  
5A-1 Develop tools to forecast future travel via new and emerging modes (e.g. autonomous and connected vehicles, electric vehicles, personal electric vehicles, electric bikes, car sharing)		
5A-2 Develop tools to understand the effects of new and emerging travel technologies		
STRATEGY 5B: IMPROVE MULTI-MODAL ANALYSIS CAPABILITIES		  
5B-1 Complete and implement ABM pilot project		
5B-2 Forecast need for, and effects of, investment in transit, non-motorized and other alternative modes		
5B-3 Evaluate multi-modal connectivity and accessibility (especially non-auto modes).		
5B-4 Examine the potential for, and impacts of, shifts in freight transport modes		
STRATEGY 5C: EVALUATE COMMUNITY AND ECONOMIC IMPACTS		
5C-1 Forecast the effects of land use and development patterns on the transportation system		
5C-2 Forecast the effects of transportation system investments on the community and economy		
5C-3 Evaluate transportation cost index and forecast household travel costs		
5C-4 Evaluate equity impacts		
5C-5 Evaluate revenue impacts		
5C-6 Evaluate impacts of policies (e.g. TDM, pricing, parking)		
5C-7 Perform freight economic analyses		
STRATEGY 5D: UNDERSTAND THE RESPONSE TO POTENTIAL IMPACTS		  
5D-1 Predict changes in travel behavior		
5D-2 Predict demographic changes		
STRATEGY 5E: CONTINUOUSLY IMPROVE MODEL ACCURACY AND INTEGRITY		 
5E-1 Convene peer panels		
5E-2 Develop and apply model sufficiency and validation guidelines		
5E-3 Create and maintain a model development/improvement plan for each MPO (including ABM transition plans)		










Table 3 OBJECTIVES AND STRATEGIES		Cross References	
		Tied to other TPAU Strategies?	TPAU Goals supported
STRATEGY 5F: DEVELOP AND TEST NEW TOOLS			 
5F-1	Support the VisionEval Pooled Fund		
5F-2	Develop a plan for continued improvement and application of RSPM		
5F-3	Southern Oregon Activity Based Model (SOABM)		
5F-4	Develop a joint 10-year ABM improvement plan with Metro		
STRATEGY 5G: INTEGRATE MODELING PROCESSES			  
5G-1	Multi-level tool integration (strategic > program > plan > feedback loop)		
5G-2	Provide external trip info for urban models		
5G-3	Leverage freight information from SWIM and FAF for MPO planning		
5G-4	Integrate Placetypes with urban models		
5G-5	Work with Metro on model info transferability between SWIM and Metro's C20 Freight Model		
5G-6	Provide consistent reference scenario(s) across tools	1A 6C	
STRATEGY 5H: IMPROVE EFFICIENCY			 
5-H1	Standardize reporting for TPAU tools		
5-H2	Work collaboratively with the OMSC to maximize resources		
5-H3	Leverage Oregon universities for research and development		
5-H4	Model standardization		
5-H5	Improve model network assignment and processing speed		
STRATEGY 5I: DOCUMENT MODEL DEVELOPMENT METHODS AND APPLICATION PROCEDURES			
5I-1	Prepare ABM development guide		
5I-2	Prepare ABM user/application guide		
5I-3	Complete JEMnR user guide		
5I-4	Provide documentation for all other TPAU models and tools		
STRATEGY 5J: CULTIVATE A KNOWLEDGEABLE AND TALENTED MODELING TEAM		6C	 
5-J1	Build data analytic skills in-house		
5-J2	Provide a statewide modeling practices forum		
5-J3	Participate in and/or host conferences to share and learn about model innovations		
5-J4	Develop and implement an internal training plan		
5-J5	Support ODOT Research technical advisory committees and other national and internal TACs		

Table 3 OBJECTIVES AND STRATEGIES	Cross References	
	Tied to other TPAU Strategies?	TPAU Goals supported
OBJECTIVE 6: DEVELOP AND SUSTAIN RELATIONSHIPS WITH CUSTOMERS AND PARTNERS		
STRATEGY 6A: KEEP CUSTOMERS UPDATED		
6A-1 Prepare and implement a communication plan for TPAU		
6A-2 Regularly report on OMIP progress and ODOT's State Planning and Research program		
6A-3 Participate in MPO TAC meetings		
6A-4 Use the web to provide ongoing information about TPAU activities		
6A-5 Communicate roles and responsibilities and keep contact information current		
STRATEGY 6B: PROMOTE CUSTOMER UNDERSTANDING OF MODELING TOOLS AND USE OF TOOLS TO THEIR GREATEST ADVANTAGE	2B	
6B-1 Develop and maintain a tools inventory		
6B-2 Display model input and output visually		
6B-3 Prepare model brochures, briefing materials and video clips		
6B-4 Convene a SWIM applications panel		
STRATEGY 6C: CONTINUE TO BUILD AND SUPPORT PROFESSIONAL NETWORKS	1A,7D,7E	
6C-1 Support the OMSC and OMUG		
6C-2 Support the Oregon Freight Advisory Committee		
6C-3 Support the Oregon Sustainable Transportation Initiative		
6C-4 Develop a close rapport between TPAU modelers and Metro technical staff		

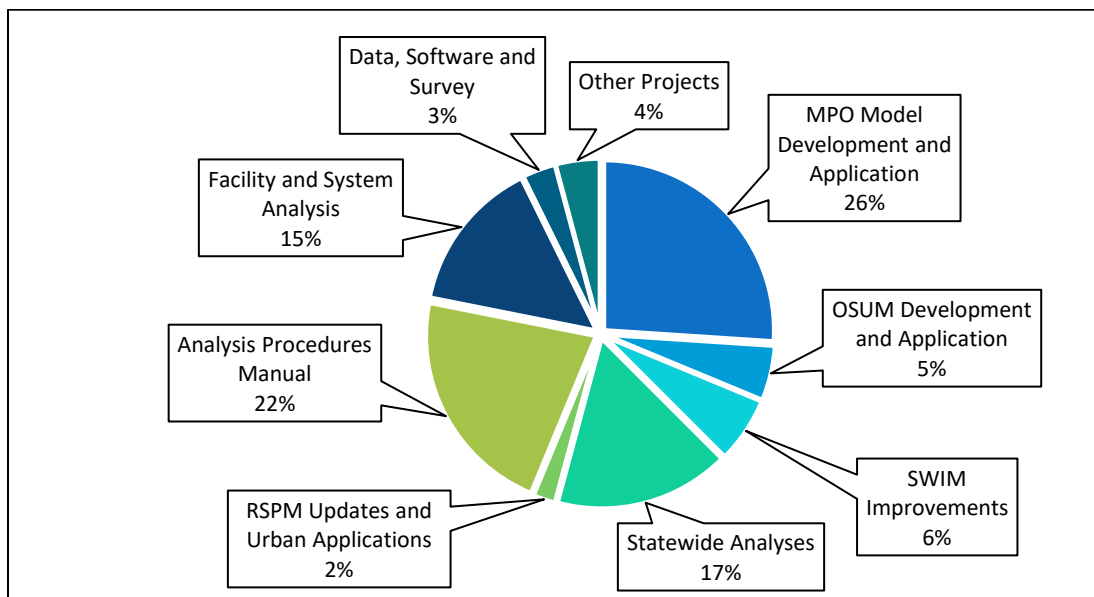
4 CURRENT RESOURCES

4.1 TPAU Internal Resources

TPAU's work is eminently human-powered, with 93% of the budget allocated to staff and consultants. Although models and tools are essential elements, the materials, hardware and data needed to operate the tools are a small fraction of TPAU's overall operating costs. This is an important point considering ODOT's recent emphasis on zero-based budgeting. Because personnel costs dominate the budget, TPAU's continual quest for cost savings relies on finding increased work efficiencies, seeking cost sharing opportunities with partners, or as a last resort, a reducing the services that TPAU provides.

TPAU currently has 17 full-time-equivalent (FTE) staff. For the current biennium, TPAU resources are roughly applied to the work areas as shown in Figure 1.

FIGURE 1. CURRENT WORK AREAS (FY17-18)



4.2 Other Resources within ODOT

4.2.1 Internal Partners

The following are important internal partners for TPAU, providing resources necessary for TPAU's work, and/or needing TPAU's assistance:

- ODOT Director's Office
- Planning Division
- Highway Division Traffic Unit

- ODOT Region offices
- Peer units to TPAU within the Transportation Development Division (TDD), including Research and Data.

Partnering with the ODOT Director's Office and the Highway Division is standard procedure and will continue to be necessary to accomplish specific work items in Section 5.

MPO plans and local Transportation System Plans (TSPs) are typically coordinated through the affected ODOT region office. ODOT Regions that rely on TPAU support for these and other project-level studies may be asked to provide budget and work authorization numbers for TPAU's use.

4.3 External Partners and Resources

4.3.1 Portland Metro

TPAU and Portland Metro have a unique relationship as the two largest transportation modeling agencies in the state. The size of their respective programs, and multiple areas of common interest justify a close working relationship.

In the past, an innovative partnership between TPAU and Portland Metro was the primary catalyst for the development of TPAU's urban program. As new metropolitan areas have been designated and the demand for travel models in small to mid-size metropolitan areas has increased through the years, TPAU realized that a consistent modeling framework would be needed to cost-effectively develop and manage multiple urban area models.

Working with Metro, TPAU created a universal urban transportation model framework for use in other MPO areas around the state. The basic framework, which is patterned on Metro's JEMnR travel demand model, is filled with local data and calibrated to match travel conditions in each unique location. This cost-effective approach has expedited the development of MPO models, providing Oregon's MPOs and other communities with sophisticated planning tools that outperform those used in comparable areas of the country.

A continued close partnership between TPAU and Metro will be key to accomplishing several new SIP objectives. At this time, several joint initiatives are underway or planned, such as:

- Value Pricing Study, including the use of Metro's Multi-Criteria Evaluation Tool for this study
- Freight commodity flow model for the Portland Metro area, including integration with ODOT's SWIM
- ABM development
- Additional OMSC initiatives led and/or sponsored by TPAU and Metro.

4.3.2 Other MPOs, Regional and Local Partners

Looking ahead, the largest pending partnering effort with other regional and local entities is the next OHAS. Individual MPO's will need to participate financially in the next OHAS effort, to collect region-specific data for their respective models. TPAU staff will need to provide recommendations on the number of household surveys needed for each MPO model managed by ODOT, and help with any customized survey questions that may be needed for specific models.

The MPOs will have a significant responsibility during the OHAS planning phase- not only to identify funding needed for survey activities within their metro areas, but also coordinating with their constituent cities, counties and other local partners that may desire to participate in the household survey.

4.3.3 Oregon Modeling Steering Committee (OMSC)

Since 1996, TPAU has collaborated with the OMSC, using this group as a sounding board as tools for analysis of statewide and regional systems were developed. The OMSC was instrumental during development of the first SWIM, helping to promote consistency between SWIM and other travel models managed by ODOT and Oregon's three largest metropolitan planning organizations. In 2016, the OMSC updated the group's mission and goals and developed a new work plan with a significant emphasis on inter-agency collaboration.

The OMSC can continue serve as a coordination forum for TPAU going forward, helping to identify work areas that TPAU has in common with other OMSC member agencies, and to collaborate in those common interest areas to share resources and save money. Looking ahead, specific areas for OMSC collaboration include:

- ABM development, peer review, implementation and promulgation to other MPO's.
- OHAS planning and implementation.
- Data and reporting for federal performance measures.
- Developing and agreeing on common planning assumptions, to establish a future reference scenario for transportation plans across Oregon.

4.3.4 University Transportation Centers

University Transportation Centers (UTCs), including PacTrans and TREC, will continue to be valuable resources for research and proof-of-concept-level tools over the next 10 years. TPAU will coordinate with the UTCs as research funding becomes available, to identify and encourage research studies that will benefit ODOT's modeling program.

4.3.5 Other State Agencies

The Oregon Department of Environmental Quality (DEQ) will continue to be a key partner for TPAU's work related to air quality and GHG analysis, and as future planning assumptions are developed for new fuel technologies and connected/autonomous vehicles.

The Office of Economic Analysis (OEA) under Oregon's Department of Administrative Services will also continue to be a key partner for TPAU. OEA is responsible for preparing the official state revenue forecast, used by TPAU and others to promote consistent modeling assumptions related to population and employment, as well as other key economic factors tied to the revenue forecast.

Oregon's Department of Land Conservation and Development (DLCD) plays a key role in developing land use and transportation planning regulations. Models developed by TPAU assist local agencies and MPO's with complying with state regulations promulgated by DLCD.

5 STRATEGIC IMPLEMENTATION PLAN

5.1 Action Plans by Geography

Figure 2 shows TPAU's overall approach to implementing the SIP.

The objectives and strategies in Section 3 provide the high-level direction for TPAU's work activities over the next 10 years.

TPAU's large work program has been broken into action plans by geographic region. This was done to help TPAU understand needs, priorities and timelines for multiple customers who may be using the same models, and to facilitate discussions with customers about regional priorities.

Action plans for specific geographies are provided below in Table 4 to Table 8. Estimated timelines (Figure 3 to Figure 7) follow each action plan.

FIGURE 2. SIP IMPLEMENTATION PROCESS

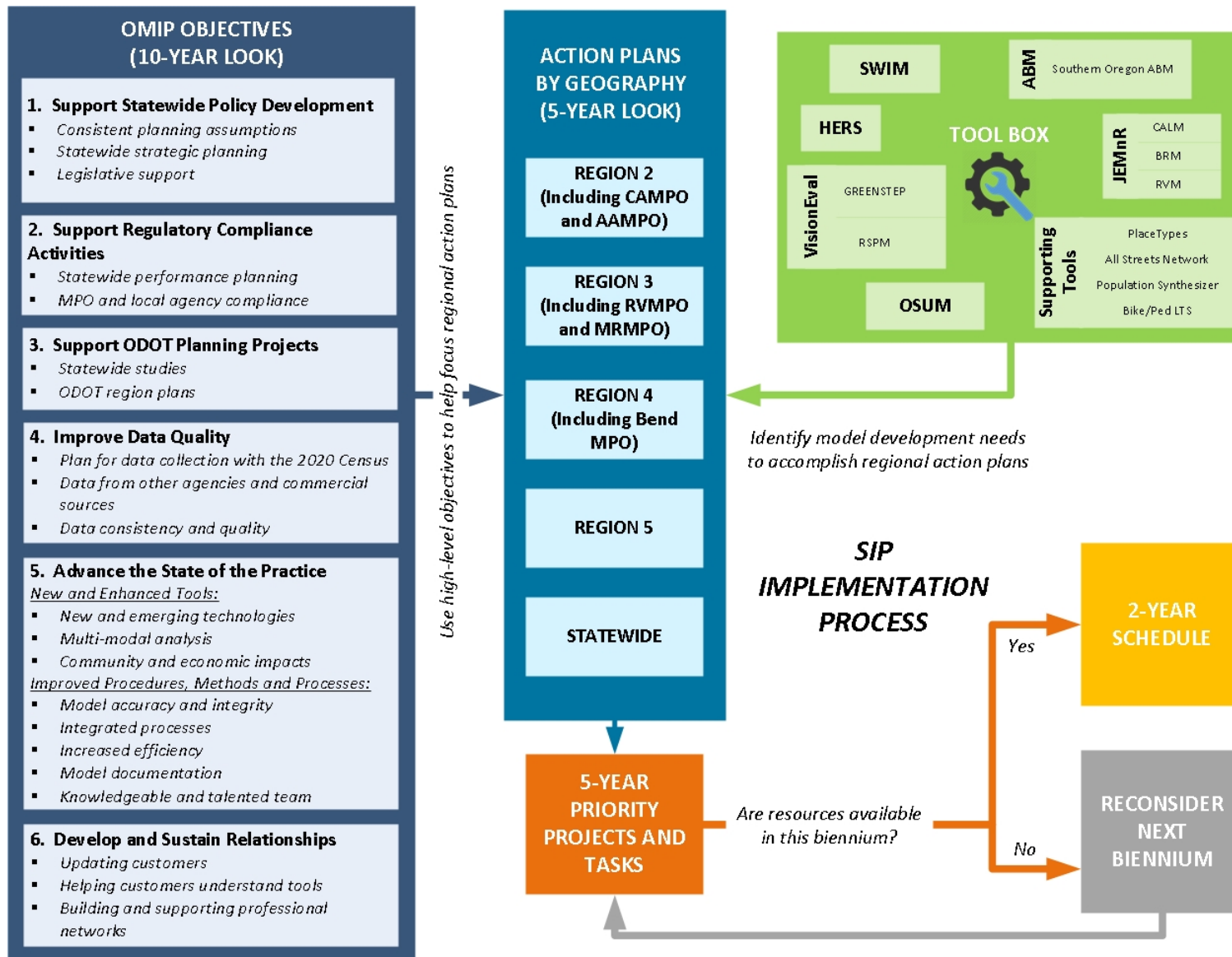


TABLE 4. REGION 2 ACTION PLAN

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Priority Levels	Resource Levels	Consultant Cost Levels (Per Biennium)
Critical = Necessary for ODOT or MPO regulatory compliance	High = A project that will require considerable TPAU staff resources to complete (>500 hours per year)	\$ = <\$50,000
Important = Needed for local agency regulatory compliance, or addresses a top issue for ODOT or regional policymakers	Med = A moderate level of effort required (200-500 hours)	\$\$ = \$50,000 - \$100,000
Desired = Addresses other significant issue in the region	Low = The work effort is modest (<200 hours)	\$\$\$ = >\$100,000

What are the top analysis needs in this region over the next five years?

Action Plan for Region 2								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Model Delivery						
						Calendar Year	Calendar Qtr	2018	2019	Years 3-5		
CAMPO/AMPO REGION												
2.1	CAMPO 2040 RTP/RTSP	Continue supporting plan development. CAMPO's RTP is largely complete. For the RTSP, TPAU may need to provide additional CALM and RSPM runs and analysis. RTSP work will begin after draft findings from the City of Corvallis TSP are available.	2. Support Regulatory Compliance Activities	Important	CALM and RSPM are currently suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
2.2	CAMPO 2045 RTP	CAMPO has a March 2022 federal deadline for its next RTP update. CALM model will need to be updated and ready for use in October 2019. TPAU staff may need to serve on RTP project teams and provide model runs and analysis for the planning effort.	2. Support Regulatory Compliance Activities	Critical	CALM last updated in 2016. Will need to be updated to reflect most recent land use data and move future year to 2045. To align with both CAMPO and AAMPO RTP schedules, updated CALM model will need to be ready for use in October 2019. RSPM updates will also be needed.	2019	Q3	High	High	High	N/A	
2.3	City of Corvallis TSP	Provide CALM runs and analysis for the planning effort.	2. Support Regulatory Compliance Activities	Important	Current model is suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
2.4	City of Philomath TSP	Provide CALM runs and analysis for the planning effort.	2. Support Regulatory Compliance Activities	Important	Current model is suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
2.5	Benton County TSP	Provide CALM runs and analysis for the planning effort.	2. Support Regulatory Compliance Activities	Important	Current model is suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
2.6	AAMPO 2040 RTP	Continue supporting plan development.	2. Support Regulatory Compliance Activities	Critical	CALM is currently suitable for this project.	N/A	N/A	Med	N/A	N/A	N/A	
2.7	AAMPO 2045 RTP	AAMPO has a 2022 federal deadline for its next RTP update. CALM model will need to be updated and ready for use In October, 2019. TPAU staff may need to serve on RTP project teams and provide model runs and analysis for the planning effort.	2. Support Regulatory Compliance Activities	Critical	CALM last updated in 2016. Will need to be updated to reflect most recent land use data and move future year to 2045. To align with both CAMPO and AAMPO RTP schedules, updated CALM model will need to be ready for use in October 2019.	2019	Q4	High	High	High	N/A	

Action Plan for Region 2								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Model Delivery						
						Calendar Year	Calendar Qtr					
2.8	CALM Development Plan	After the 2022 RTP's are completed for CAMPO and AAMPO, the next RTP updates will be due in 2027. A five-year plan for the CALM model is needed, to determine how a new baseline model will be developed after the 2020 census, and to identify CALM model enhancements needed and/or a potential timeline for transitioning to an ABM for the Corvallis/Albany region.	5. Advance the State of the Practice	Important	This is a TPAU internal planning task. No tool delivery anticipated.	N/A	N/A	N/A	N/A	N/A	N/A	
2.9	CALM Data Collection	Traffic data and household travel information should be collected circa the 2020 Census. TPAU staff time is needed to identify data needs and coordinate with CAMPO, AAMPO and the OMSC on the data collection process.	4. Improve Data Quality	Important	This is a data collection and coordination task only. No tool delivery anticipated.	N/A	N/A	Low	Med	Med	N/A	ODOT Traffic - Collect traffic counts CAMPO and AAMPO - participate in OMSC 2020 household travel survey.
2.10	CALM Documentation and Peer Review	Originally due in Q1 2017, extended to Q3 2017.	5. Advance the State of the Practice	Critical	This is a documentation task only. No tool delivery anticipated.	N/A	N/A	Low	N/A	N/A	N/A	
ELSEWHERE IN REGION 2												
2.11	City of Woodburn TSP	TPAU may need to serve on the TSP project team and/or provide model runs and analysis during the planning work.	2. Support Regulatory Compliance Activities	Important	Woodburn Interim Model	2019	Q1	Med	Low	N/A	N/A	
2.12	City of McMinnville Three Mile Lane Area Plan	This task intends to support analysis need along Hwy 18 for assessing the impacts of land use development abutting properties north and south of the corridor. Provide model runs and analysis during the planning work.	2. Support Regulatory Compliance Activities	Important	McMinnville Interim Model	2019	Q2	Med	Low	N/A	N/A	
2.13	SKATS Strategic Assessment / Scenario Planning Support	Provide model runs and analysis for the planning effort.	3. Support ODOT Facility and Network Planning	Important	Configure RSPM for Salem Metro Area	Horizon	N/A	N/A	N/A	N/A	N/A	
2.14	LCOG Strategic Assessment / Scenario Planning Support	Provide model runs and analysis for the planning effort.	3. Support ODOT Facility and Network Planning	Important	Configure RSPM for Eugene Metro Area	Horizon	N/A	N/A	N/A	N/A	N/A	
2.15	Newberg City Waterfront Plan	Provide model runs and anlaysis for the planning effort.	3. Support ODOT Facility and Network Planning	Desired	Newberg Interim Model	2018	Q2	Med	Low	N/A	N/A	

FIGURE 3. REGION 2 TIMELINE

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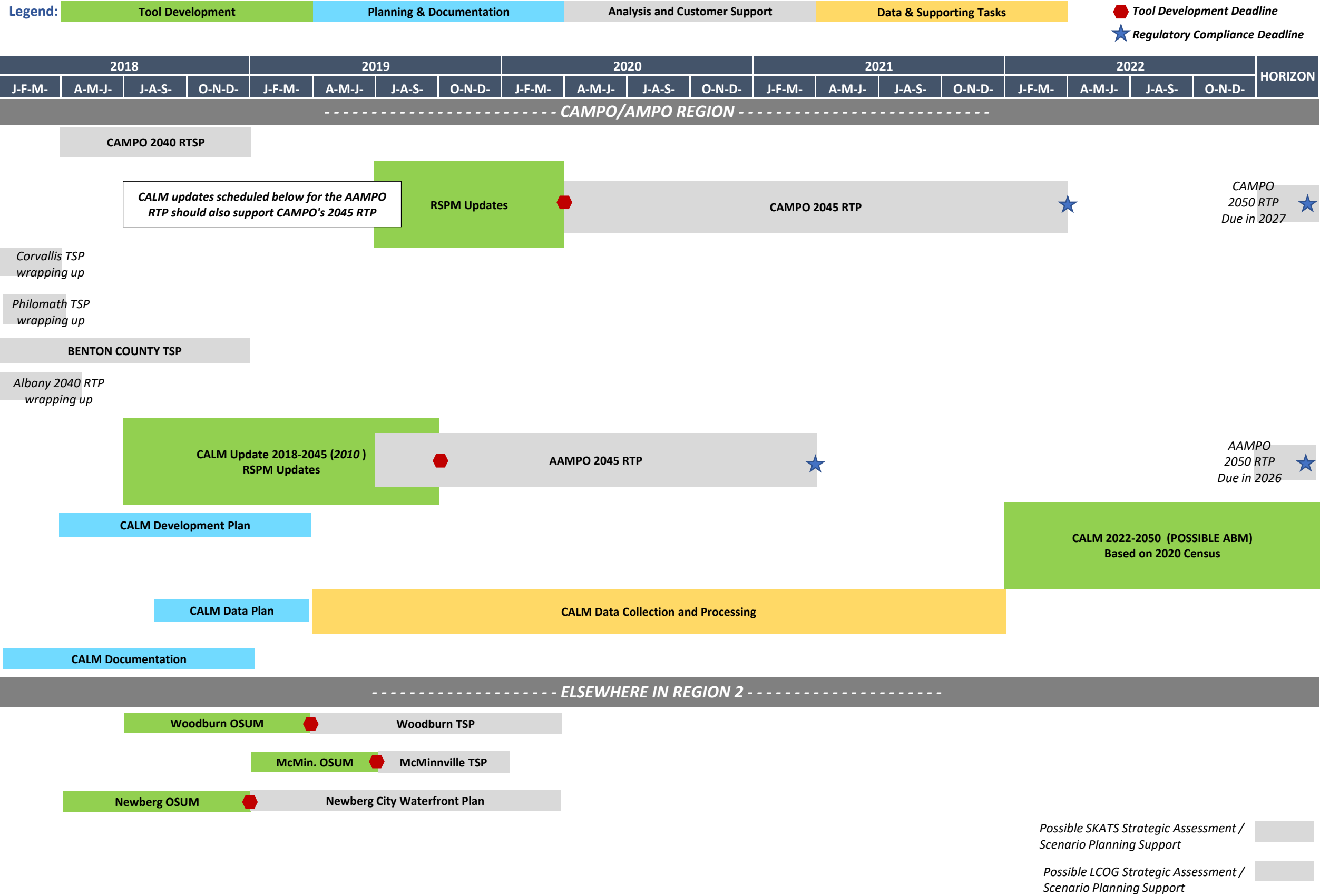


TABLE 5. REGION 3 ACTION PLAN

Priority Levels	Resource Levels	Consultant Cost Levels (Per Biennium)
Critical = Necessary for ODOT or MPO regulatory compliance	High = A project that will require considerable TPAU staff resources to complete (>500 hours per year)	\$ = <\$50,000
Important = Needed for local agency regulatory compliance, or addresses a top issue for ODOT or regional policymakers	Med = A moderate level of effort required (200-500 hours)	\$\$ = \$50,000 - \$100,000
Desired = Addresses other significant issue in the region	Low = The work effort is modest (<200 hours)	\$\$\$ = >\$100,000

What are the top analysis needs in this region over the next five years?

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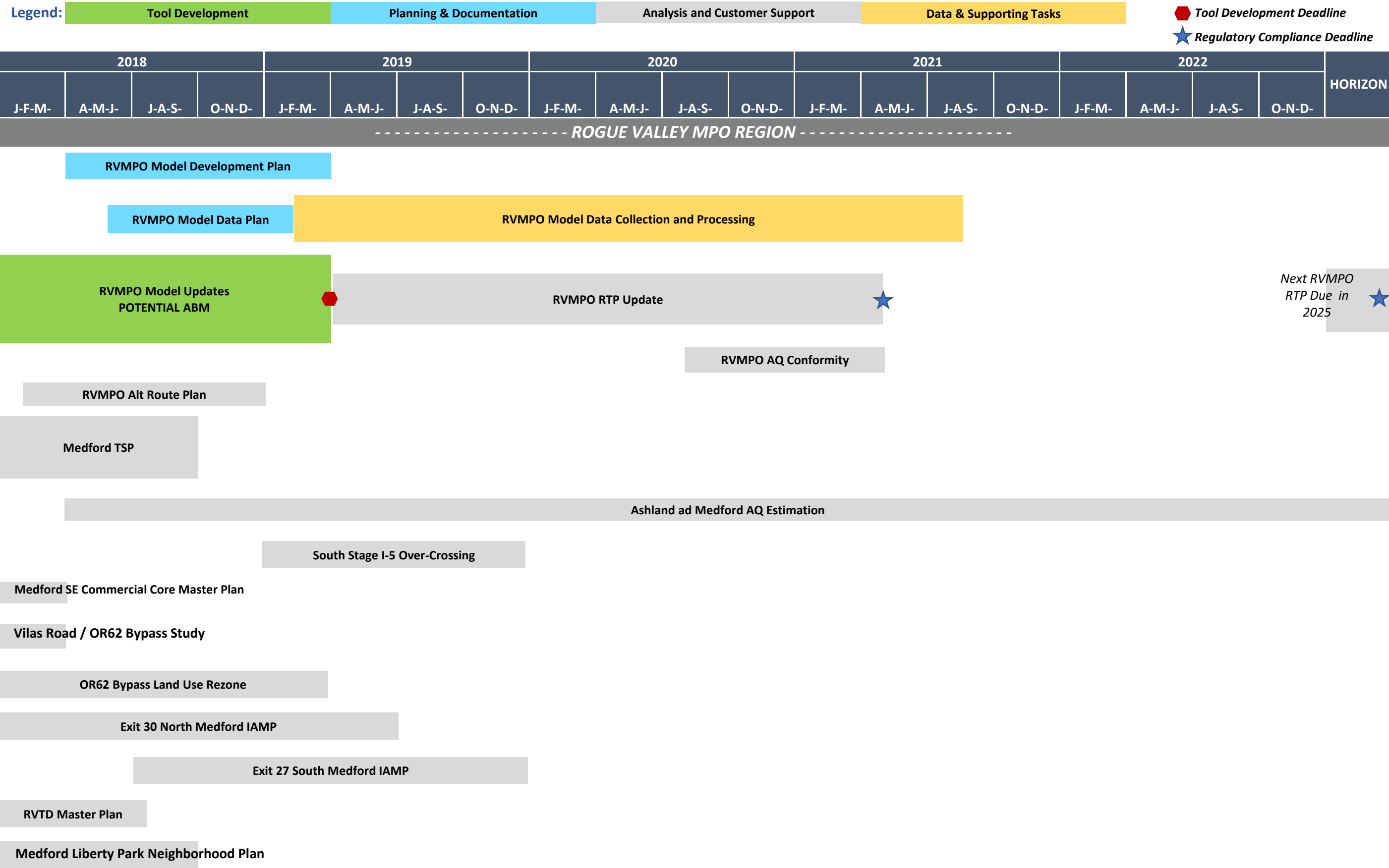
Action Plan for Region 3								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Model Delivery						
						Calendar Year	Calendar Qtr	2018	2019	Years 3-5		
ROGUE VALLEY MPO REGION												
3.1	Model Development Plan RVMPO.	A five-year plan for the RVMPO model is needed, to determine how a new baseline model will be developed after the 2020 census, and to identify model enhancements needed and/or a potential timeline for transitioning to an ABM.	5. Advance the State of the Practice	Important	This is a TPAU internal planning task. No tool delivery anticipated.	N/A	N/A	Low	N/A	N/A	N/A	
3.2	RVMPO Model Data Collection	Traffic data and household travel information should be collected circa the 2020 Census. TPAU staff time is needed to identify data needs and coordinate with CAMPO, AAMPO and the OMSC on the data collection process.	4. Improve Data Quality	Important	This is a data collection and coordination task only. No tool delivery anticipated.	N/A	N/A	Low	Med	Med	N/A	ODOT Traffic - Collect traffic counts RVMPO - participate in OMSC 2020 household travel survey.
3.3	RVMPO RTP Update	RVMPO's RTP Update has a federal deadline of 2021. To meet this deadline, work will need to begin in 2019. Provide RVMPO Model runs and analysis to support the planning effort	2. Support Regulatory Compliance Activities	Critical	Commercial vehicle features are being upgraded in the model. POTENTIAL TRANSITION TO ABM FRAMEWORK FOR THIS NEXT RTP.	2019	Q1	High	Med	Low	N/A	
3.4	RVMPO Air Quality and Conformity Determination	Provide RVMPO Model runs and analysis to support the planning effort	2. Support Regulatory Compliance Activities	Critical	Model used for the RVMPO RTP update will be suitable for this purpose.	N/A	N/A	N/A	N/A	Low	N/A	
3.5	RVMPO Alternative Route Plan	Provide RVMPO Model runs and analysis to support the planning effort. 2019 or Later.	3. Support ODOT Facility and Network Planning	Important	Model used for the RVMPO RTP update will be suitable for this purpose.	N/A	N/A	Low	N/A	N/A	N/A	
3.6	City of Medford TSP Update	Provide RVMPO Model runs and analysis to support the planning effort. May be more scenario work.	2. Support Regulatory Compliance Activities	Important	Current RVMPO and RSPM models are suitable for this project.	N/A	N/A	Med	Med	Low	N/A	
3.7	Ashland and Medford DEQ Estimation of Air Quality	Provide RVMPO Model runs and analysis to support the planning effort	2. Support Regulatory Compliance Activities	Important	Current RVMPO model is suitable for this project.	N/A	N/A	Low	Low	Low	N/A	Whenever there is an RTP update or amendment, Ashland and Medford AQ analyses are required, so this is an ongoing task.
3.8	South Stage I-5 Over-Crossing	Provide RVMPO runs and analysis to support the planning effort	3. Support ODOT Facility and Network Planning	Important	Current RVMPO model is suitable for this project.	N/A	N/A	N/A	Low	N/A	N/A	
3.9	Southeast Commercial Core Master Plan (Medford)	This is a planning project for the City of Medford. Provide RVMPO runs and analysis to support the planning effort	3. Support ODOT Facility and Network Planning	Desired	Current RVMPO model is suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
3.10	OR62/Vilas Road IAMP (Medford)	RVMPO Model runs and analysis for the future OR62 & Vilas Rd Interchange	3. Support ODOT Facility and Network Planning	Important	Current RVMPO model is suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
3.11	OR-62 By-Pass Land Use Rezoning (Medford)	RVMPO Model runs and analysis for a OR-62 bypass study in Jackson County.	3. Support ODOT Facility and Network Planning	Important	Current RVMPO model is suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	

Action Plan for Region 3								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Model Delivery		2018	2019	Years 3-5		
						Calendar Year	Calendar Qtr					
3.12	Exit 30 North Medford IAMP	Provide RVMPO Model runs and analysis to support the planning effort. Likely 2018/2019.	3. Support ODOT Facility and Network Planning	Important	Current RVMPO model is suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
3.13	Exit 27 South Medford TDM Plan	Provide RVMPO Model runs and analysis to support the planning effort. Likely 2018/2019.	3. Support ODOT Facility and Network Planning	Important	Current RVMPO model is suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
3.14	Rogue Valley Transit District Master Plan	Currently in progress; through 2018.		Desired	Current RVMPO model is suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
3.15	Medford Liberty Park Neighborhood Plan	Includes road diets and potential land use changes; 2018.		Desired	Current RVMPO model is suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
MIDDLE ROGUE REGION												
3.16	Southern Oregon Activity Based Model (SOABM) Implementation for Grants Pass Area (MRMPO)	Contract with RSG to develop a pilot ABM for the Grants Pass area. TPAU staff time will be needed for contract management and to provide technical support as the model is developed.	5. Advance the State of the Practice	Critical	SOABM development, calibration and implementation.	2019	Q1	High	High	N/A	N/A	
3.17	MRMPO RTP Update	MRMPO's RTP Update has a federal deadline of 2020. To meet this deadline, work will need to begin in 2018. Provide SOABM runs and analysis to support the planning effort.	2. Support Regulatory Compliance Activities	Critical	See SOABM development project listed above.	N/A	N/A	N/A	Med	Med	N/A	
3.18	MRMPO Air Quality and Conformity Determination	Provide MRMPO Model runs and analysis to support the planning effort.	2. Support Regulatory Compliance Activities	Critical	SOABM developed for the MRMPO RTP Update will be used for this project.	N/A	N/A	N/A	N/A	Low	N/A	
3.19	MRMPO Model Data Collection	Traffic data and household travel information should be collected circa the 2020 Census. TPAU staff time is needed to identify data needs and coordinate with CAMPO, AAMPO and the OMSC on the data collection process.	4. Improve Data Quality	Important	This is a data collection and coordination task only. No tool delivery anticipated.	N/A	N/A	Low	Med	Med	N/A	
3.20	MRMPO Alternative Route Plan	Likely beginning late 2017/early 2018.	3. Support ODOT Facility and Network Planning	Desired	Current MRMPO Model is suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
3.21	City of Grants Pass TSP Update	Provide MRMPO model runs and analysis to support the planning effort. Tentatively starts early 2018	2. Support Regulatory Compliance Activities	Important	Current MRMPO Model is suitable for this project.	N/A	N/A	Med	N/A	N/A	N/A	
3.22	Grants Pass Exit 55/58 IAMP	Profice MRMPO model runs and analysis to support the planning effort (combined effort with Grants Pass TSP update).	3. Support ODOT Facility and Network Planning	Important	Current MRMPO Model is suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
3.23	Josephine County TSP	Provide MRMPO Model runs and analysis to support the planning effort.	2. Support Regulatory Compliance Activities	Important	Current MRMPO Model is suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
ELSEWHERE IN REGION 3												
3.24	City of Roseburg TSP	Model update was completed in August 2017. TPAU staff may be needed to serve on the TSP project team, and provide model runs and anlysis for the planning effort.	2. Support Regulatory Compliance Activities	Important	Current Roseburg model is suitable for this project.	N/A	N/A	Low	N/A	N/A	N/A	
3.25	Roseburg IAMP 124-125	Provide Roseburg model runs and analysis to support the planning effort.	3. Support ODOT Facility and Network Planning	Important	Current Roseburg model is suitable for this project.	N/A	N/A	N/A	N/A	Low	N/A	
3.26	I-5 Corridor Bottleneck Plan (Roseburg Area)	Provide Roseburg model runs and analysis to support the planning effort.	3. Support ODOT Facility and Network Planning	Important	Current Roseburg model is suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	

Action Plan for Region 3								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Model Delivery						
						Calendar Year	Calendar Qtr					
3.27	Coos Bay/North Bend TSP and Coquille Indian Tribe Comp Plan	Provide OSUM runs and analysis to support the planning effort.	2. Support Regulatory Compliance Activities	Desired	Update OSUM for Coos Bay/North Bend	N/A	N/A	Low	N/A	N/A	N/A	

FIGURE 4. REGION 3 TIMELINE

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REGION 3 TIMELINE, CONT'D.

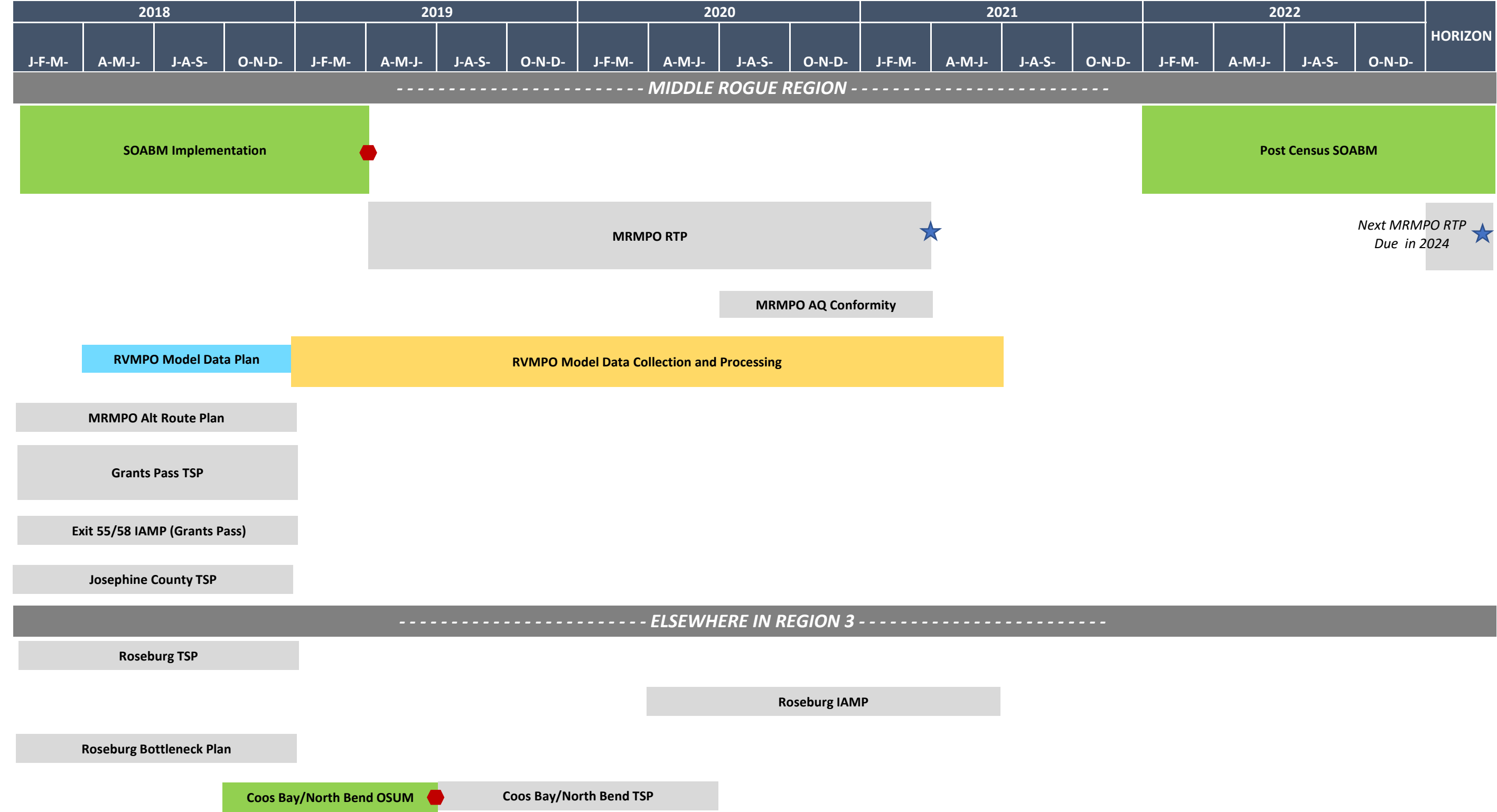


TABLE 6. REGION 4 ACTION PLAN

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Priority Levels	TPAU Resource Levels	Consultant Cost Levels (Per Biennium)
Critical = Necessary for ODOT or MPO regulatory compliance	High = A project that will require considerable TPAU staff resources to complete (>500 hours per year)	\$ = <\$50,000
Important = Needed for local agency regulatory compliance, or addresses a top issue for ODOT or regional policymakers	Med = A moderate level of effort required (200-500 hours)	\$\$ = \$50,000 - \$100,000
Desired = Addresses other significant issue in the region	Low = The work effort is modest (<200 hours)	\$\$\$ = >\$100,000

What are the top analysis needs in this region over the next five years?

Action Plan for Region 4								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Model Delivery						
						Calendar Year	Calendar Qtr	2018	2019	Years 3-5		
BEND/REDMOND REGION												
4.1	BRM Model Development Plan	After the 2019 RTP is complete, the next RTP update will be due in 2024. A five-year plan for the BRM model is needed, to determine how a new baseline model will be developed after the 2020 census, and to identify BRM model enhancements needed and/or a potential timeline for transitioning to an ABM for the Bend region.	5. Advance the State of the Practice	Important	This is a TPAU internal planning task. No tool delivery anticipated.	N/A	N/A	Low	N/A	N/A	N/A	Current RTP was adopted and completed in 2015. Next update to be completed by 2020
4.2	BRM Data Collection	Traffic data and household travel information should be collected circa the 2020 Census. TPAU staff time is needed to identify data needs and coordinate with CAMPO, AAMPO and the OMSC on the data collection process.	4. Improve Data Quality	Important	This is a data collection and coordination task only. No tool delivery anticipated.	N/A	N/A	Low	Med	Med	N/A	ODOT Traffic - Collect traffic counts Bend MPO - participate in OMSC 2020 household travel survey.
4.3	Bend MPO RTP Update	Bend MPO has a federal deadline of September 2019 for their next RTP update. Strategic assessment is planned. TPAU staff may need to serve on the RTP planning team and provide model runs and analysis for the planning effort.	2. Support Regulatory Compliance Activities	Critical	With recent transit and commercial vehicle upgrades to BRM, current model should be suitable for this project. RSPM will need to be configured for the Bend region.	2018	Q2	Med	Med	N/A	N/A	Confirm with Tyler that the next RTP is to be completed and adopted by 2020 .
4.4	UGB Analysis and City of Bend TSP Update	Provide model runs and analysis to support the planning effort.	2. Support Regulatory Compliance Activities	Important	Construct an Interim 2028 scenario in BRM Model	2018	N/A	High	Med	N/A	N/A	Work should start on this task in Q1 of 2018
4.5	Bend Parkway (US97) Facility Plan	Provide model runs and analysis to support the planning effort.	3. Support ODOT Facility and Network Planning	Important	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	N/A	Low	N/A	N/A	
4.6	Bend UGB Implementation	Support the City of Bend's efforts to develop area plans for 1 or 2 UGB expansion sites	3. Support ODOT Facility and Network Planning	Desired	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
4.7	West UGB (Bend) Expansion Area Master Plan	Support the City of Bend's efforts to develop an area plans for the western UGB expansion.	3. Support ODOT Facility and Network Planning	Desired	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
4.8	OSU Cascades Master Plan	Provide model runs and analysis to support the planning effort.	3. Support ODOT Facility and Network Planning	Desired	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
4.9	Westside (Bend) Large Rural Subdivision	Provide model runs and analysis to support the planning effort.	3. Support ODOT Facility and Network Planning	Desired	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	

Action Plan for Region 4								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Model Delivery						
						Calendar Year	Calendar Qtr	2018	2019	Years 3-5		
4.10	Redmond TSP Update	Provide model runs and analysis to support the planning effort.	2. Support Regulatory Compliance Activities	Important	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	Med	N/A	N/A	N/A	
4.11	US97 South Redmond Corridor	Provide model runs and analysis to support the planning effort.	3. Support ODOT Facility and Network Planning	Important	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
4.12	Waterpark/Hotel Development, South Redmond	Provide model runs and analysis to support the planning effort.	3. Support ODOT Facility and Network Planning	Desired	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
4.13	DSL Development Plan	Provide model runs and analysis to support the planning effort.	3. Support ODOT Facility and Network Planning	Desired	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	Low	Low	N/A	N/A	
4.14	Central Oregon Regional Transit Master Plan	Provide model runs and analysis to support the planning effort, later 2018-2019	3. Support ODOT Facility and Network Planning	Important	Model used for Bend MPO RTP Update should be suitable for this project.	N/A	N/A	Low	Med	N/A	N/A	
4.15	US 97 Freight Corridor Plan	Provide SWIM runs for commodity flows, traffic flows likely too	3. Support ODOT Facility and Network Planning	Important	SWIM 2.6 for this one	N/A	N/A	Med	Low	N/A	N/A	Becky added

FIGURE 5. REGION 4 TIMELINE

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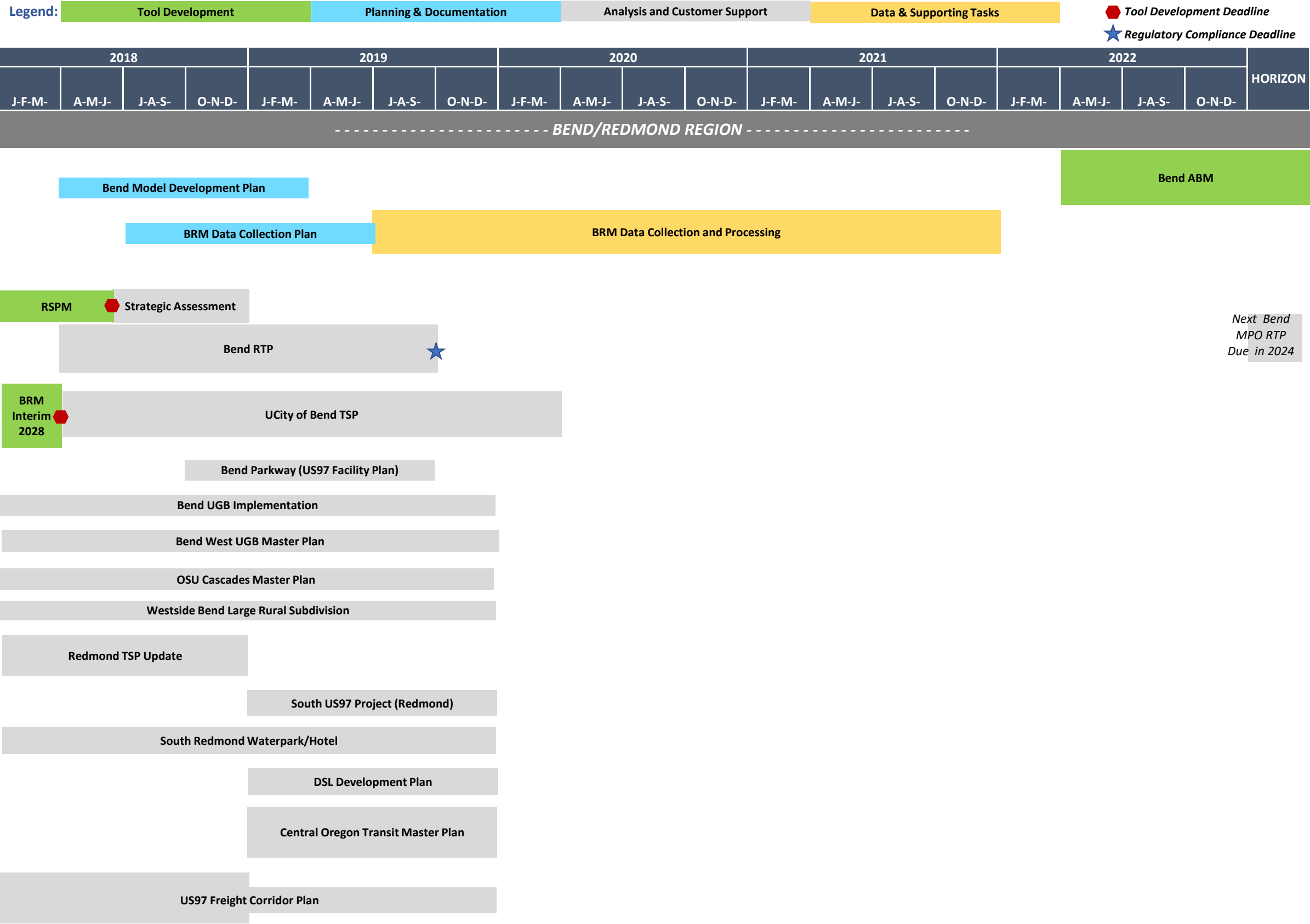


TABLE 7. REGION 5 ACTION PLAN

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Key to Priority Levels

Critical = Necessary for ODOT or MPO regulatory compliance

Important = Needed for local agency regulatory compliance, or addresses a top issue for ODOT or regional policymakers

Desired = Addresses other significant issue in the region

Key to TPAU Resource Levels

High = A project that will require considerable TPAU staff resources to complete (>500 hours per year)

Med = A moderate level of effort required (200-500 hours)

Low = The work effort is modest (<200 hours)

Consultant Cost Levels
(Per Biennium)

\$ = <\$50,000

\$\$ = \$50,000 - \$100,000

\$\$\$ = >\$100,000

What are the top analysis needs in this region over the next five years?

Action Plan for Region 5												
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Model Delivery		TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
						Calendar Year	Calendar Qtr	2018	2019	Years 3-5		
5.1	Exit 207 IAMP (Pendleton)	Provide model runs and analysis to support the planning effort, 2018	3. Support ODOT Facility and Network Planning	Important	Update Pendleton model to new 2015 interim year (in progress, should be complete by the end of 2017.)	Complete	N/A	Low	N/A	N/A	N/A	
5.2	Pendleton TSP	Provide model runs and analysis to support the planning effort, 2019	2. Support Regulatory Compliance Activities	Important	Update Pendleton model to new 2015 interim year (in progress, should be complete by the end of 2017.)	Complete	N/A	Low	N/A	N/A	N/A	

FIGURE 6. REGION 5 TIMELINE

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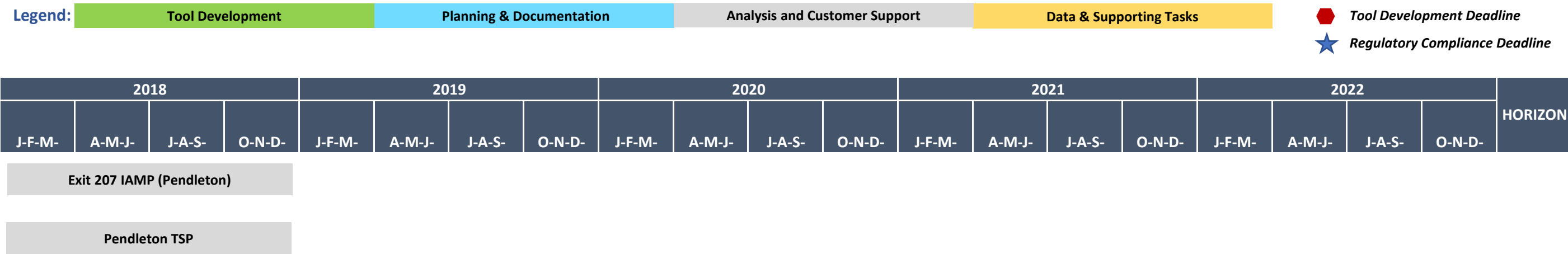


TABLE 8. ACTION PLAN FOR STATEWIDE MODELING AND PROGRAM SUPPORT

Priority Levels	TPAU Resource Levels	Consultant Cost Levels (Per Biennium)
Critical = Necessary for ODOT or MPO regulatory compliance	High = A project that will require considerable TPAU staff resources to complete (>500 hours per year)	\$ = <\$50,000
Important = Needed for local agency regulatory compliance, or addresses a top issue for ODOT or regional policymakers	Med = A moderate level of effort required (200-500 hours)	\$\$ = \$50,000 - \$100,000
Desired = Addresses other significant issue in the region	Low = The work effort is modest (<200 hours)	\$\$\$ = >\$100,000

What are the top statewide analysis and program support needs over the next five years?

DRAFT

Action Plan for Statewide Modeling and Program Support								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Tool Delivery		2018	2019	Years 3-5		
						Calendar Year	Calendar Qtr					
GENERAL												
G.1	Model Applications	Primary responsibility of TPAU	2. Support Regulatory Compliance Activities	Critical	See regional action plans and other applications listed below for the urban and statewide programs generally.	N/A	N/A					
G.2	Staff Training and Professional Development	Ongoing, low impact.	5. Advance the State of the Practice	Important	No model development associated with this project.	N/A	N/A	Low	Low	Low	\$	
G.3	OMSC Strategic Plan Update	The OMSC's next biennian work plan update will be due December, 2018.	6. Develop and Sustain Relationships with Customers and Partners	Important	No model development associated with this project.	N/A	N/A	Low	N/A	N/A	\$	
G.4	OMSC and Other Committee Participation and Support	Includes ongoing participation in OMSC Executive and Policy committees, leading and participating in subcommittee initiatives, and OMUG coordination.	6. Develop and Sustain Relationships with Customers and Partners	Important	No model development associated with this project.	N/A	N/A	Low	Low	Low	\$\$	
G.5	Scenario Planning Guidelines Support	Support the development of new ODOT scenario planning guidelines, linked with TSP guidelines & OSTI.	5. Advance the State of the Practice	Important	No model development associated with this project.	N/A	N/A	Low	N/A	N/A	N/A	
G.6	Web Materials	Need to develop and document materials to be posted online.	6. Develop and Sustain Relationships with Customers and Partners	Important	No model development associated with this project.	N/A	N/A	Low	Low	Low	N/A	
G.7	Outreach Tools	Develop brochures, fact sheets, website content and other materials to assist with customer understanding of models and modeling process.	6. Develop and Sustain Relationships with Customers and Partners	Important	No model development associated with this project.	N/A	N/A	Low	Low	Low	\$	
G.8	Visualization Tools	Display model input and output visually to assist with quality assurance and communicating model information to customers. (All models)	6. Develop and Sustain Relationships with Customers and Partners	Important		Ongoing	N/A	Low	Low	Low	N/A	
RESEARCH												
R.1	ODOT HERS-ST Sensitivity Testing	Develop scope of work for sensitivity test scenarios, run HERS, send output to Research (Tony K), evaluate and document results	5. Advance the State of the Practice	Desired				Low	Low	Low		
R.2	ODOT RSPM Mode Shift Research	Coordinate with ODOT Research Unit	5. Advance the State of the Practice	Important	No model development associated with this project.	N/A	N/A	Low	Low	Low	N/A	
URBAN MODELING PROGRAM												
U.1	JEMnR Final code / User Guide / Training	Needs to be made a high priority and completed (needs to included consistent DOPing of the three new JEMnR models).	5. Advance the State of the Practice	Critical	No model development associated with this project.	N/A	N/A	Med	Low	Low	N/A	

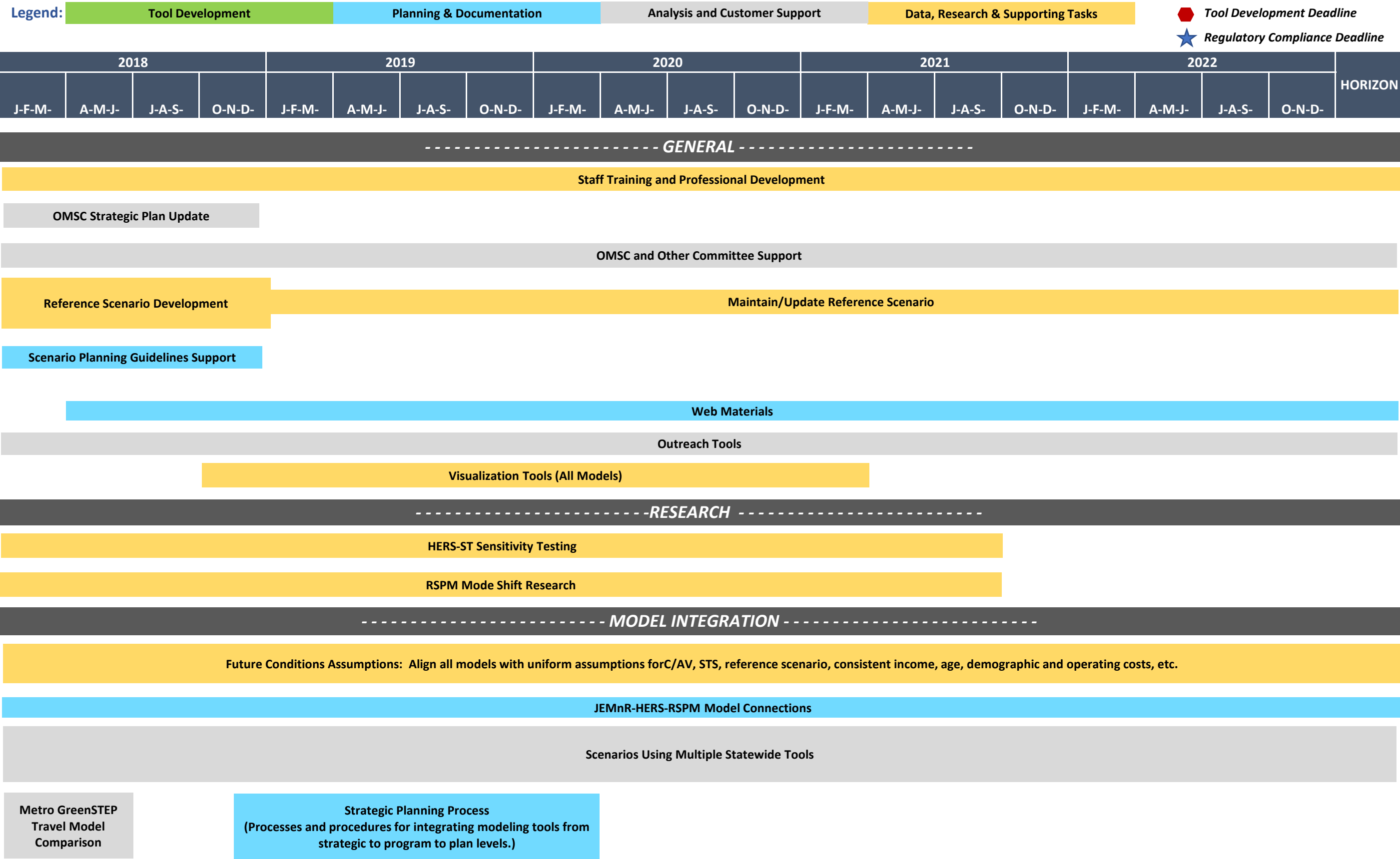
Action Plan for Statewide Modeling and Program Support								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Tool Delivery		2018	2019	Years 3-5		
						Calendar Year	Calendar Qtr					
U.2	MPO GHG Target Rule Changes	Need to determine TPAU's role following TPR RAC changes anticipated in the fall of 2017. Need to adjust vehicle & fuel inputs to match rule tables. Assessment/analysis work effort is currently unknown. If needed, will regional action plans will need to be amended to include those analysis needs.	2. Support Regulatory Compliance Activities	Important	Determine vehicle and fuel inputs needed to match rule tables (all models). Implement as model updates are made per regional action plans.	2018	Q3	Low	N/A	N/A		
STATEWIDE MODELING PROGRAM												
S.1	SWIM 2.6 Enhance SWIM network crosswalks: LRS & MP fields	Add LRS & MP information to the entire SWIM network.	5. Advance the State of the Practice	Critical	Enhance SWIM network	2018	Q2	Low	Low	Low	N/A	
S.2	Develop SWIM 2.6 release	Work expected to begin Nov 2017.	5. Advance the State of the Practice	Critical	SWIM 2.6 development	2019	Q1	High	Med	N/A	\$\$	
S.3	VisionEval Tools Updates and Pooled Fund Contribution.	Includes RSPM version testing, contributor review process (contract), GreenSTEP updates, and identifying documentation needs to satisfy lead adopter. Also need to update users guide.	5. Advance the State of the Practice	Critical	Will require TPAU staff at the PM level to administer consultant contract and provide technical guidance/support. Also requires ODOT financial contribution to the Pooled fund.	Ongoing	N/A	Low	Low	Low	\$	
S.4	GreenSTEP Statewide	GreenSTEP will be needed for the OPTP, VMT-Revised Forecasts, and other analyses.	5. Advance the State of the Practice	Important	GreenSTEP 3.6 upgrades and Reference Scenario	Immediate	N/A	Med	Med	Med	N/A	Notes by Tara: Multi-Agency 2015 update (vision & ref scenario?), VMT-Rev forecast applic, OGWC viewer? ?CMAQ Ref_NB & Ref_AP inputs from Metro/CLMPO/CAMPO/RVMPO Scen Planning & survey of Bend/SKATS/MR/AAMPOs?
S.5	GHG Perf Measures - FAST, State, Local, Project	Analysis and policy support for FAST target setting and performance monitoring, NEPA/CEQ (MOVES), KPMs, TargetRule/ScenPlg, RTP/TSPs, Eugene Ordinance	2. Support Regulatory Compliance Activities	Important	Current tools are expected to be suitable for these analyses in the near term.	N/A	N/A	Med	Med	Med		
S.6	Performance Measures - FAST	Transportation system performance measures for federal reporting	2. Support Regulatory Compliance Activities	Critical	Current tools are expected to be suitable for these analyses in the near term.	N/A	N/A	High	Med	Med		
S.7	Performance Measures - KPM	Transportation system performance measures for state reporting	2. Support Regulatory Compliance Activities	Critical	Current tools are expected to be suitable for these analyses in the near term.	N/A	N/A	High	Med	Med		
S.8	Mobility Report	Report focussed on mobility, linking system performance to liveabiliy and the economy;	3. Support ODOT Facility and Network Planning	Important	Current tools are expected to be suitable for these analyses in the near term.	N/A	N/A	High	Med	Med		
S.9	Freight Bottleneck Study	Bottleneck study is complete, but locations will be monitored and reported on in the future.	1. Support Statewide Policy Development	Critical	Current tools are expected to be suitable for these analyses in the near term.	N/A	N/A	Med	Med	Med		
S.10	Freight Analysis	US 97 Freight Corridor, may be some measures for reliability, measures related to FAST; commodity flow analysis for MPOs and freight bottleneck locations and landslide at-risk locations in state	3. Support ODOT Facility and Network Planning	Important	Current tools are expected to be suitable for these analyses in the near term. Potential development of new freight modeling tools based on OMSC Freight Subcommittee recommendations anticipated in 2019.	Horizon	N/A	Med	Med	Med		
S.11	STS Monitoring-Implementation		2. Support Regulatory Compliance Activities	Important	No model development associated with this project.	Immediate	N/A	Med	Low	Low	N/A	Planning Section Support

Action Plan for Statewide Modeling and Program Support								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Tool Delivery		2018	2019	Years 3-5		
						Calendar Year	Calendar Qtr					
MODEL INTEGRATION												
I.1	Reference Scenario Development	Develop standardized statewide scenarios with detailed documentation, to serve as a common background for other models using SWIM output.	5. Advance the State of the Practice	Important	Update the economic forecast inputs in SWIM	2018	Q4	Med	Low	Low	\$	
I.2	JEMnR - HERS - RSPM model connections	A plan is needed to establish how these models are different and how they should be used together. (Start with Metro/MOVES and CALM/CommViz. and Leg HERS consistency; STS RTP scenario? LU tool?)	5. Advance the State of the Practice	Desired	JEMnR - HERS - RSPM data and output connections.	Ongoing	N/A	Low	Low	Low	N/A	
I.3	Scenarios Using Multiple Statewide Tools (SWIM, HERS, GreenSTEP)	Each tool has different capabilities, strengths and weaknesses; this work would rely on the strengths of all the tools, linking them together to produce more informative results.	3. Support ODOT Facility and Network Planning	Desired	Minor changes to existing tools anticipated.	N/A	N/A	High	High	High		
I.4	Strategic Planning Processes (all tools)	Develop processes and procedures for integrating model applications from Strategic to Program to Plan level, with feedback loops.	5. Advance the State of the Practice	Important	This is a planning effort; no model development associated with this project.	2019	Q4	N/A	High	N/A	N/A	Brian will think about this one and add details
I.5	Metro GreenSTEP-Travel Model comparison	Post Metro RTP (Summer 2017)? If not for RTP, upgrade to new RSPM version to allow AV/cong pricing testing?	7. Other Supportive Task	Important	New RSPM Version	2018	Q4	High	N/A	N/A	N/A	
DATA AND SUPPLEMENTAL TOOLS												
D.1	Data Collection Plan	Develop data collection plan occurring around the Census 2020, which includes traffic counts, HH Survey, freight, speed, etc. Consolidate data plans for each model into a master plan to identify data needs across all models and coordinate data collection efforts with other ODOT divisions and OMSC partners.	4. Improve Data Quality	Important	This is a planning effort in support of model development.	2019-22	Q4	Low	Med	High	N/A	
D.2	New OHAS 2020	Major effort to design and implement next survey effort	4. Improve Data Quality	Important		N/A	N/A	Med	Med	Med	\$\$\$	OMSC Travel Survey Subcommittee
D.3	Ongoing Data Management and Data Support Requests	Ongoing, low impact.	4. Improve Data Quality	Important	No model development associated with this project.	N/A	N/A	Med	Med	Med	N/A	
D.4	Land Use Data Process Development	Develop process for Region planners and MPOs to follow when developing land use scenarios	5. Advance the State of the Practice	Important		N/A	N/A	Med	Med	Low	N/A	
D.5	All Streets Network (for TCI, Bike LTS, GTFS, intersection density, etc.)	Include this as part of the overall data collection plan effort that will be developed with TransData, TSM and others in early 2108 for implementation in 2019-2021.	5. Advance the State of the Practice	Important	No model development associated with this project.	N/A	N/A	Low	Med	Med	N/A	
D.6	Transportation Cost Index (TCI) - Implementation	A larger effort has been identified. If we want to make this work, we will need to bring in Gregor as an advisor of the work.	7. Other Supportive Task	Desired	TCI Estimation Tool	2019	Q1	Low	Low	N/A	\$	
D.7	Population Synthesizer Tool Development	A tool to help predict geographic distribution of future population for travel demand models. Tool is complete, and effort for TPAU in 2018 will be related to stakeholder communication on the use of the tool and its promulgation.	5. Advance the State of the Practice	Important	PopSim Tool	Complete	N/A	Low	N/A	N/A	N/A	
D.8	Network Capacities (PTV and DKS Contract)	With consultant – need to decide who should lead this effort for TPAU; Bob Schulte is the contractor.	7. Other Supportive Task	Desired		2018	Q2	Low	N/A	N/A	\$	
D.9	RSPM MPO Analysis - Strategic Assessment/Scenario Planning Requests	This task is not yet defined. TPAU may need to support potential future scenario planning analyses, possibly for SKATS, Bend, EugeneTSP, and others.	7. Other Supportive Task	Important	See regional action plans. Existing tools are suitable for these analyses.	N/A	N/A	N/A	N/A	N/A	N/A	

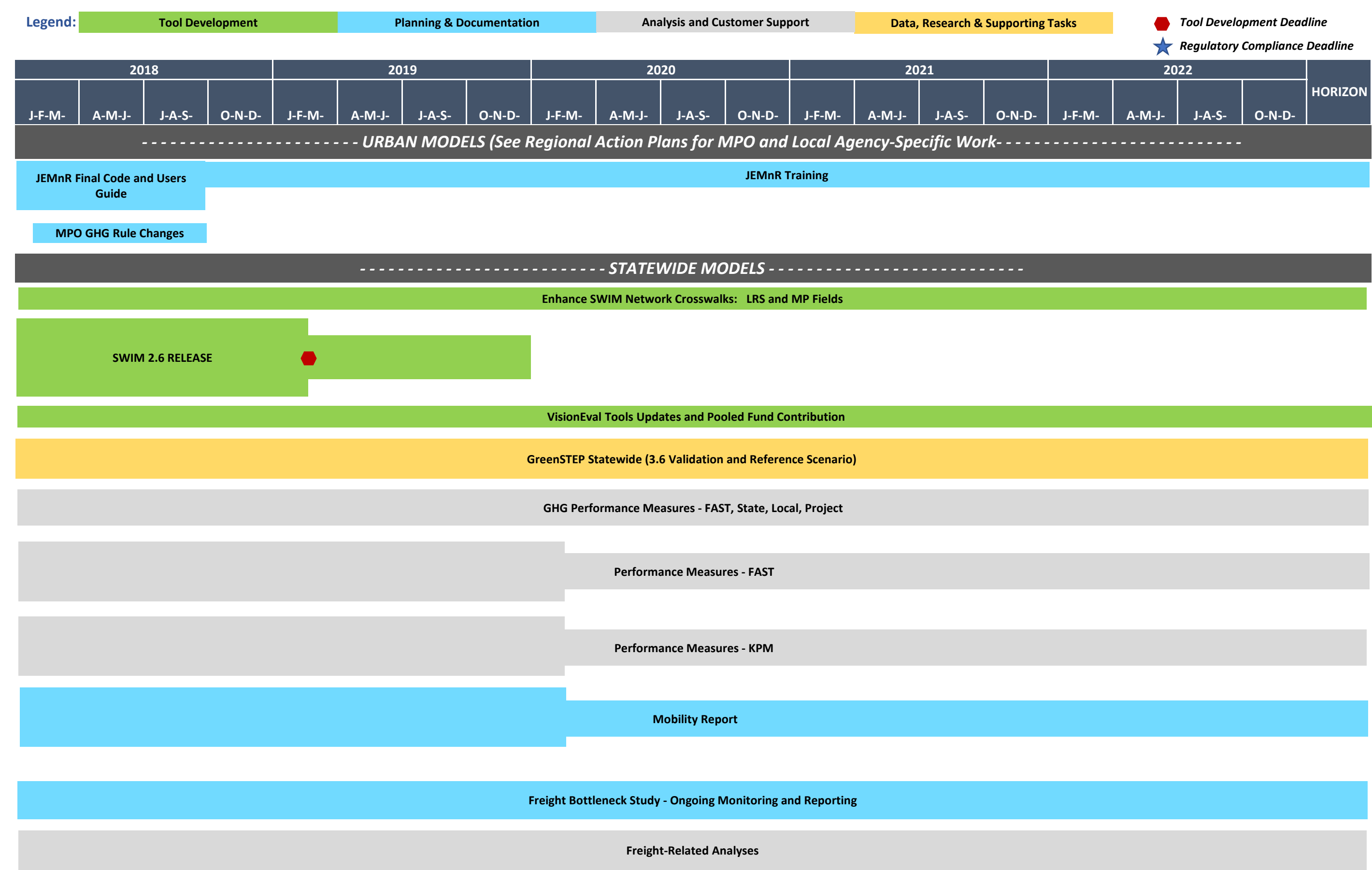
Action Plan for Statewide Modeling and Program Support								TPAU Resources Needed			Consultants (\$)	Notes and External Partner Responsibilities
Ref No.	Project	Description	Primary TPAU Objective	Priority	Model Update/Development Needs	Tool Delivery						
						Calendar Year	Calendar Qtr	2018	2019	Years 3-5		
D.10	Metro/LCOG/SKATS Model Support (mostly external information)	Provide SWIM Externals as needed for large MPOs and other OMSC member agencies.	6. Develop and Sustain Relationships with Customers and Partners	Important	Existing tools are suitable for these analyses in the near term.	N/A	N/A	Low	Low	Low	N/A	
D.11	Tolling/Value Pricing Support	Analyze scenarios, participate in technical support and review, and make connections to Metro tools	3. Support ODOT Facility and Network Planning	Critical	Metro Multi-Criteria Evaluation Tool propulgation	2018	Q3	Med	Med	Low	N/A	
D.12	Future Condition Assumptions	Align future assumptions (e.g. network condition, fuel costs, pricing, CA/V scenarios, STS scenario, reference scenario, demographics, operating cost, etc.) in all modeling tools.	7. Other Supportive Task	Desired	Work toward aligning future assumptions as model updates are made. See regional action plans for urban model update schedules.	Horizon	N/A	Low	Low	Low		
D.13	Routable Network Development	Develop routable network that represents conditions during the 2020 Census, to supplement OHAS data. The goal is to have a new routable network established sometime around 2021. This effort will impact all TPAU models in 2022-2032.	4. Improve Data Quality	Important		2018-19	Q4	Med	Med	Low	N/A	

FIGURE 7. TIMELINE FOR STATEWIDE MODELING AND OVERALL PROGRAM SUPPORT

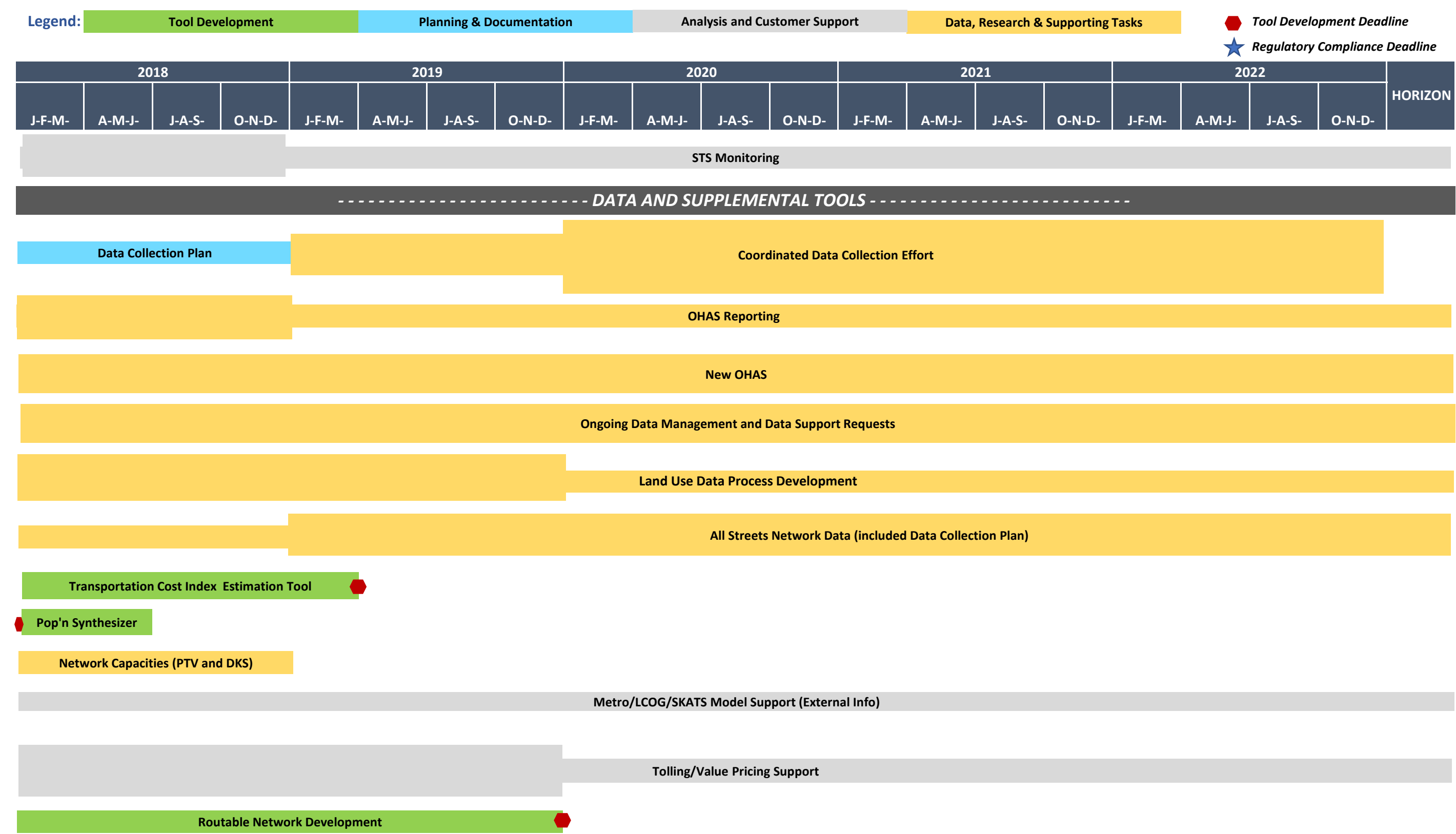
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TIMELINE FOR STATEWIDE MODELING AND OVERALL PROGRAM SUPPORT, CONT'D.



TIMELINE FOR STATEWIDE MODELING AND OVERALL PROGRAM SUPPORT, CONT'D.



5.2 Work Priorities and Delivery Strategies

5.2.1 Resources Needed to Accomplish the SIP

To gauge TPAU's capacity to deliver the program described in Section 5, the anticipated level of effort for work items listed in the regional action plans was estimated using the coarse scale shown in Table 9. The intent of this exercise was not to develop a detailed resource allocation plan for TPAU's day to day work, for which TPAU has more detailed management tools. Rather, at the SIP level, we are concerned with the overall magnitude of TPAU's modeling program compared to the total staff resources available within the unit.

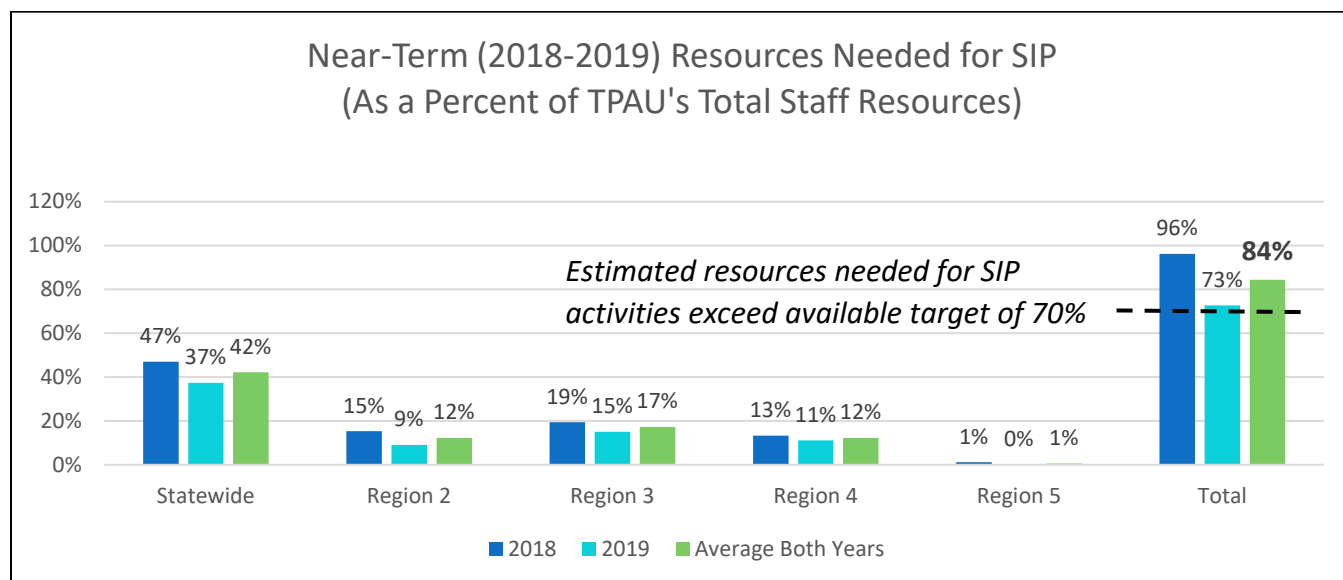
A cautionary note: This assessment is not fine-grained enough to account for different skill levels and talents on TPAU's team. Individual staff members and project teams are likely to have capacity issues from time to time even if a big picture assessment indicates most of the SIP work program is within reach. TPAU will need to continue to use MS Project and other in-house tools for allocating, assigning and balancing staff time across the projects in their work program.

TABLE 9. ESTIMATED LEVEL OF EFFORT FOR SIP PROJECTS

Resource Level	Description	Estimated Annual Effort
High	A project or initiative that will require considerable TPAU resources to complete.	>500 Hours (1,000 hours per year, or 0.5 FTE, was used as the average value for work items this category.)
Medium	A moderate level of effort is required.	200-500 hours (A conservative value of 500 hours per year, or 0.25 FTE was used to estimate the annual staff resources needed for this category.)
Low	A modest level of effort is needed.	Up to 200 hours (A conservative value of 200 hours per year, or 0.1 FTE was used to estimate the annual staff resources needed for this category.)

Looking at the next two years, the work items listed in Section 5.1 represent approximately 84% of TPAU's total staff capacity, as shown in Figure 8. This does not account for core functions such as managerial and administrative time, numerous smaller but essential technical , contract management and review duties; staff training and professional development activities; and other staff demands. Realistically these additional core functions could be expected to consume up to 30% of the unit's staff capacity, leaving about 70% of TPAU's total staff capacity for SIP work items. Therefore, the work effort represented in the SIP Action Plans (Section 5.1) may exceed TPAU's available resources.

FIGURE 8. STAFF RESOURCES NEEDED FOR SIP ACTION PLANS



Discussions with customers are planned in the Spring of 2018, to refine project needs and timeframes, and to explore additional partnering strategies that could help TPAU deal with potential resource shortages. The following sections outline the general priorities TPAU will use to deal with resource shortages as they occur.

5.2.2 Work Priorities

Work items listed in the Section 5.1 action plans were assigned a priority level using the approach shown in Table 10.

TABLE 10. TPAU WORK PRIORITY LEVELS

Priority Level	Description
Critical	Projects necessary for ODOT or MPO regulatory compliance, or special initiatives assigned by the ODOT Director's office.
Important	Projects that address top issues for ODOT or regional policymakers, or that are needed for regulatory compliance at the local city and county level.
Desired	Projects that address other significant regional or statewide issues.

If it becomes necessary to reduce or delay projects listed on the SIP action plans, TPAU will give priority to projects that are necessary for state and federal regulatory compliance, using regulatory deadlines to further prioritize as needed. Work products that are tied to federal performance planning regulations for ODOT and MPO's have strict fixed timeframes that must be met, and ODOT is often subject to specific deadlines and timeframes related to state legislation as well.

At the local level, cities and counties are also subject to Oregon's rules for Transportation System Plans (TSPs). However, state regulations do not specify fixed TSP delivery deadlines for the smaller entities that TPAU typically serves. Therefore, while TPAU recognizes the importance of supporting local TSPs and the need to be responsive to local timeframes, some flexibility in the delivery timeframes for local projects may be needed.

5.2.3 Other SIP Delivery Strategies

5.2.3.1 Purchased Data and Analysis Tools

TPAU is exploring third-party data and analysis tools which may improve efficiency by saving data collection, processing and analysis time. Some examples include:

- **EROAD Data** – A potential partnership with EROAD® is being explored for access to truck freight data. EROAD provides management tools for trucking companies, collecting weight-mile tax, and trip permit information, and other commercial vehicle data in the process. While some data is publicly available, additional tools and policy discussions would be needed for transfer of non-public data to ODOT.
- **HERE Data** – HERE Technologies® provides real-time traffic and mapping tools (including NAVTEQ network mapping), which are of interest to TPAU for their advanced routing technologies, analytics and predictive features.
- **iPeMS Data** – A Performance Measuring System designed by Iteris® provides historic and real-time speed data that can be used to help monitor and measure the performance of the transportation system.
- **Strava Data** – Strava® is a social network for athletes that records running and bicycling activity. This data may be useful for analyzing and forecasting non-motorized uses on the transportation network.
- **Synthetic travel behavior data sets** marketed by multiple private companies such as AirSage®, Sidewalk Labs®, Streetlight®, and others are being investigated to see if synthetic data could supplant more time-intensive household travel survey data work.

5.2.3.2 Partnering Initiatives

Planned and ongoing partnering strategies were described previously in Sections 4.2 and 4.3. These collaborative practices enhance and extend TPAU's in-house staff capacity. Their continuation will be essential to accomplishing SIP projects.

5.2.3.3 Outsourcing

Staff Supplementation. Expert consultants are currently used to supplement TPAU's in-house model development team and may continue to be needed when demands on TPAU exceed available internal resources.

Other Areas for Potential Outsourcing. For SIP projects with “critical” priority levels, maintaining in-house expertise and oversight is advisable, although staff supplementation may sometimes be needed to accomplish critical projects.

If growing needs for statewide policy analysis and regulatory compliance begin to significantly curtail TPAU’s capacity to address other “important” and “desirable” projects, outsourcing in select work areas may be necessary. For example, it may be possible to shift responsibility for operating, maintaining, and analyzing non-MPO models for TSPs and other localized planning studies to local agency sponsors (and their consultant teams). However, outsourcing small urban models for small cities with federal air quality implications, such as Klamath Falls and LaGrande is not recommended. Interagency coordination between ODOT, DEQ and the EPA is required to address federal air quality conformity issues in those areas, and outsourcing model work could complicate the coordination process.

5.2.3.4 Potential Reduced TPAU Work Scope

While not recommended, TPAU could further decrease or cease to provide analysis, review and input services for some current customers or work areas. The tradeoff is that TPAU often brings a valuable perspective on analysis best practices to planning and project development teams. Removing TPAU participation could lead to inconsistencies in how plans and projects are analyzed, potentially impacting the perceived integrity and validity of important findings.

ACRONYMS

AAMPO – Albany Area Metropolitan Planning Organization

ABM – Activity Based Model

BRM – Bend Redmond Model

CALM – Corvallis Albany Lebanon Model

CAMPO – Corvallis Area Metropolitan Planning Organization

C/AV – Connected/Autonomous Vehicles

DEQ – Oregon Department of Environmental Quality

DLCD – Oregon Department of Land Conservation and Development

EV – Electric Vehicle

FHWA – Federal Highway Administration

GHG – Greenhouse Gas

GreenSTEP – Greenhouse Gas Strategic Transportation Energy Planning Model

HERS – Highway Economic Requirements System

HERS-ST – Highway Economic Requirements System – State Version

iPeMS – Iteris Performance Measurement System

JEMnR – Portland Metro’s Joint Estimated Model in R

LCOG – Lane Council of Governments

MPO – Metropolitan Planning Organization

MRMPO – Middle Rogue Metropolitan Planning Organization

NEPA – National Environmental Policy Act

OEA – Oregon Office of Economic Analysis

OHAS – Oregon Household Activity Survey

OMIP – Oregon Modeling Improvement Program

OSUM – Oregon Small Urban Models

OTREC – Oregon Transportation Research and Education Consortium

PacTrans – Pacific Northwest Transportation Consortium (UTC that includes Oregon State University)

PEV – Personal Electric Vehicle

PSU – Portland State University

RSPM – Regional Strategic Planning Model for GHG

RVMPPO – Rogue Valley Metropolitan Planning Organization

SHRP2 – Strategic Highway Research Program

SIP – Strategic Implementation Plan

SKATS – Salem Keizer Area Transportation System

SOABM – Southern Oregon Activity Based Model

SWIM – Statewide Integrated Model

TDD – ODOT’s Transportation Development Division (TPAU’s parent division)

TPAU – ODOT’s Transportation Planning and Analysis Unit

TREC – Transportation Research and Education Center (at PSU)

TSP – Transportation System Plan

UTC – University Transportation Center