

DRAFT

OREGON DEPARTMENT OF TRANSPORTATION- REGION 1

Project-Level Traffic Management Plan (TMP)

I-405: Fremont Bridge-Marquam Bridge

Prepared by

DKS Associates
TRANSPORTATION SOLUTIONS

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1.0 Introduction

The purpose of this *Project-Level Traffic Management Plan (TMP)* is to provide the details behind the development of Traffic Control Plans (TCP) and other measures recommended for use during the construction phase of this project, to minimize disruptions and delays to travelers and freight without compromising public or worker safety, or the quality of the work being performed. The project is located on I-405 (Stadium Freeway) in Portland, Oregon. Since I-405 is major freeway located in a metropolitan area, some of the major obstacles are scheduling construction activities to avoid times of peak traffic and congestion, developing detour routes for the connecting on-ramps and interchanges during freeway and ramp closures, and minimizing the effect of construction-related travel time delay in the project vicinity.

Construction for this project will be broken down into individual lane closures, ramp closures and full highway closures while keeping at least one direction of travel on I-405 open at all times. These closures will be performed during nights and weekends to minimize the impact on weekday traffic. The measures included in the TCP and TMP will notify the travelers ahead of time in order to help with the flow of traffic while maintaining a safe work environment.

1.1 Project Area Boundaries

The project area extends along I-405 from approximately 750 feet north of the Glisan Street overpass to the I-5/Marquam Bridge interchange, from milepost (MP) 0.38 to 2.59 in Portland, Oregon as shown in Figure 1.

1.2 Proposed Improvements

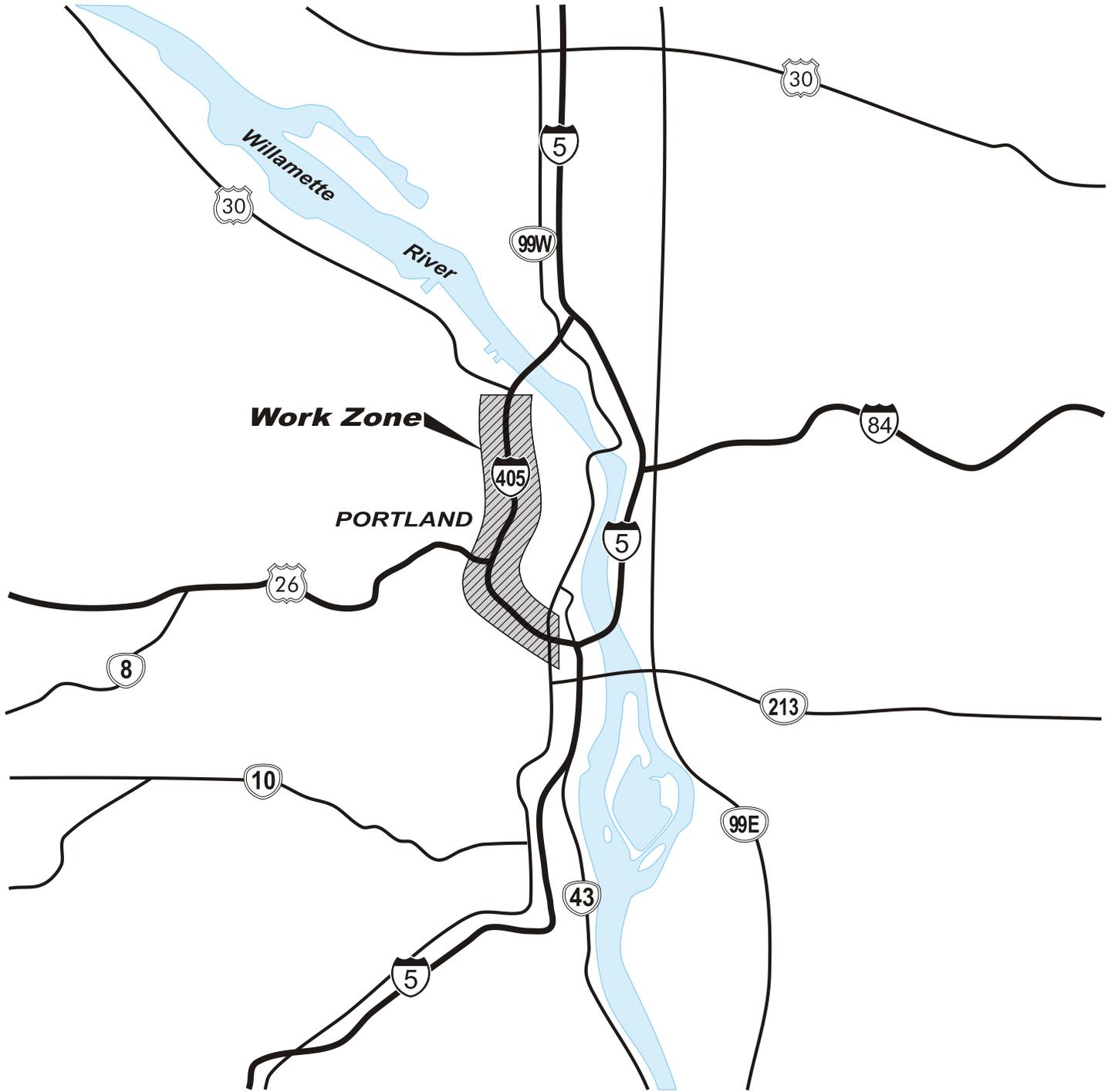
Pavement preservation is the primary purpose of the project. Other proposed improvements that will be constructed in conjunction with the pavement preservation include the following:

- Upgrading signing to current standards
- Striping
- Upgrading illumination systems in three tunnels
- Upgrading ramp meter loops upon completion of paving

There are seven on-ramp terminal intersections that require ramp meter relocation or replacement on the main line. Two of those on-ramp terminal intersections require tunnel illumination along with the ramp from US 26 eastbound to I-405 northbound. Table 1 lists the impacted ramps with a description of type of work that will be done at each location.

Table 1. List of Ramp Work

Location of Ramp	Direction	Type	Description of Work
NW Glisan St.	NB	On	Ramp meters
NW Couch St.	NB	On	Ramp meters
NW Everett St.	SB	On	Ramp meters, tunnel illumination
SW Broadway St.	SB	On	Ramp meters
SW Montgomery St.	SB	On	Ramp meters
SW Taylor St.	SB	On	Ramp meters, tunnel illumination
SW 5 th Ave.	SB	On	Ramp meters
US 26 EB to I-405 NB	NB	Interchange	Tunnel illumination



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NO SCALE

Figure 1

VICINITY MAP

1.3 TMP Goals

The primary purpose of the TMP is to address the construction-related traffic impacts of this project in a cost-effective and timely manner with minimal interference to the traveling public. Goals of this Project-Level TMP include the following:

- To describe the project construction footprint.
- To aid in creating a project development team and decision-making environment that looks at every option available to limit and mitigate anticipated construction impacts.
- To communicate what elements will be included in the project to mitigate for any anticipated disruptions to travelers and freight without compromising public or worker safety.

To accomplish these goals, the Project-Level TMP incorporates the following elements:

- Project area characteristics
- Factors impacting construction staging
- Potential mobility issues
- Traffic operation and mitigation measures
- Recommended course of action
- Incident management plan
- Public information and communication plan

2.0 Project Area Characteristics

This section includes a summary of existing transportation conditions in the project vicinity that are pertinent to this TMP, including a description of the project area and traffic characteristics.

2.1 Location

As shown in Figure 1, the project site is located along I-405 in downtown Portland, Oregon. The project covers a 2.21 mile section of I-405 from MP 0.38 to 2.59 that extends from approximately 750 feet north of the Glisan Street overpass to the beginning of the I-5/Marquam Bridge interchange. Land uses adjacent to the freeway are high-density mix of commercial and residential. Just north of the project limits, I-405 also connects to US 30, which serves many trucks traveling to and from the northwest industrial area.

2.2 Location of Other Construction Projects

To minimize the cumulative delay for traffic traveling through the project area on I-405, it is critical that this project be coordinated with other projects planned in the area. Opportunities should be explored to schedule projects during different time periods or stage them to avoid overlapping periods of high delays. The only known project at this time that might conflict with the I-405 project is the joint repair project on I-205. This project would require a two-lane closure and is scheduled for September 2009. ODOT staff plans to coordinate schedules for the I-405 and I-205 projects internally to avoid simultaneous freeway closures.

2.3 Traffic Characteristics

The average daily traffic (ADT) volumes in the project area are shown in Figure 2. The August 2008 ADT mainline and ramp volumes for I-405 were provided by ODOT. In 2008 the ADT on the mainline of I-405 ranged from approximately 21,000 to 61,000 vehicles (each-direction). The

on/off-ramp ADT is also specified in the Figure 2. Those values range from 1,800 on a local road on-ramp to 30,000 for the US 26 on-ramp.

2.4 Roadway Network

This subsection includes a summary of the functional classifications of the project area roadways, as well as a description of I-405 transportation characteristics.

I-405 is classified as an Interstate Highway¹ by ODOT. Within the project area, I-405 runs north-south and is primarily a four-lane facility running through northwest and southwest Portland. I-405 has major junctions with US 26, US 30 and I-5. Table 2 lists the functional classifications of the streets served by all I-405 on-ramps and off-ramps connecting to the project area. Because these on-ramps and off-ramps will be closed during some stages of construction, the traffic along these streets served by the ramps will be affected during those ramp closures.

Table 2. Project Area Roadway Functional Classification

	On-ramp	Off-Ramp	Name	Functional Classification ²
Northbound	✓		NW Glisan St.	Minor Arterial
	✓		NW Couch St	Local Road
		✓	NW Everett St.	Minor Arterial
	✓	✓	SW 6 th Ave.	Urban Collector
		✓	SW 4 th Ave.	Minor Arterial
		✓	SW 12 th Ave	Minor Arterial
		✓	SW Salmon St	Urban Collector
	✓		US 26 EB	U.S. Route
		✓	US 26 WB	U.S. Route
	✓		I-5 NB	Interstate Route
	✓		I-5 SB	Interstate Route
Southbound		✓	NW Glisan St.	Minor Arterial
		✓	NW Couch St	Local Road
	✓		NW Everett St.	Minor Arterial
	✓		SW Taylor St.	Urban Collector
	✓	✓	SW Broadway St	Minor Arterial
	✓		SW 5 th Ave	Minor Arterial
	✓		SW Montgomery St	Minor Arterial
		✓	US 26 WB	U.S. Route
	✓		US 26 EB	U.S. Route
		✓	I-5 NB	Interstate Route
		✓	I-5 SB	Interstate Route

¹ Oregon Department of Transportation, Transportation Development Division. *1999 Oregon Highway Plan, Including Amendments November 1999 through January 2006*. 2006.

² Oregon Department of Transportation. Oregon Transportation Map. *Portland Quad Area 2007*.

EXISTING (2008) TRAFFIC VOLUMES

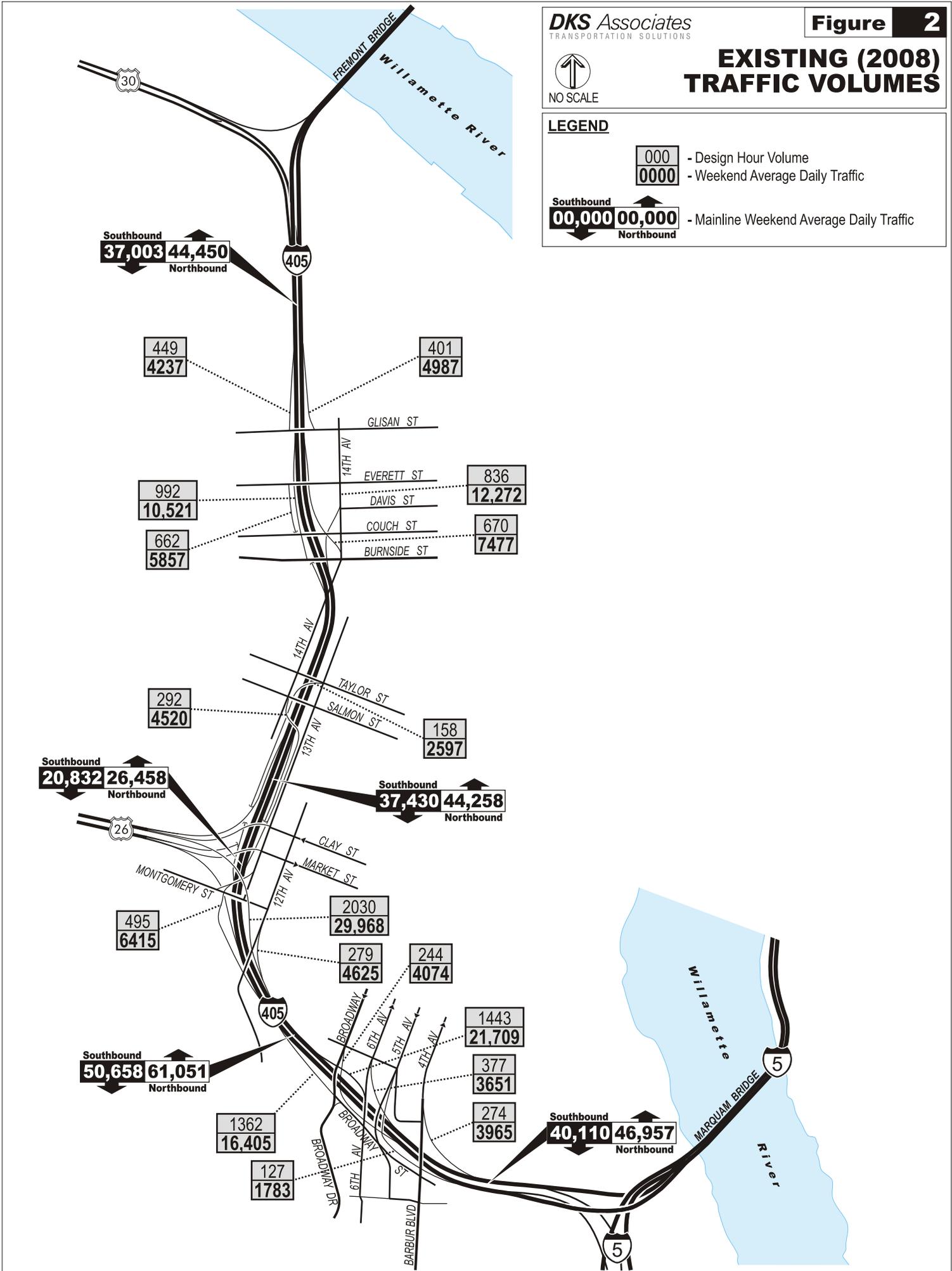


LEGEND

- 000 - Design Hour Volume
- 0000 - Weekend Average Daily Traffic

- Southbound
00,000

 Northbound
00,000
 - Mainline Weekend Average Daily Traffic



2.5 Project Stakeholders

During development of the construction documents as well as during construction, stakeholders can be a valuable source of information for the project regarding types of utilities present near the construction area, special events, other construction activities within the area, emergency services, freight movements, and general public sentiment concerning the proposed project, to name a few.

There may be times during project construction when it becomes necessary to contact stakeholders in the area to inform them of new developments such as schedule changes, traffic control changes, on-ramp & off-ramp closures, or major incidents. Table 3 includes a list of the primary stakeholders in the project area including major road authorities, emergency service providers, government contacts, local utilities, and others. Additional project stakeholders, such as neighborhood associations, business groups and elected officials, are included in Appendix G.

Table 3. Project Stakeholders

Agency/Organization	Name	Title	Phone #
Agency Representatives			
Oregon Department of Transportation (ODOT)	Robyn Bassett	Project Leader	(503) 731-8469
	Mike Mason	Community Affairs	(503)731-8246
	Motor Carrier Headquarters	-	(503) 378-5849
City of Portland	Greg Jones	Project Management Division Manager	(503) 823-5639
	Winston Sandino	Project Manager	(503) 823-5222
	Dave Hatch	Signal Operations Engineer	(503) 823-5174
TriMet	Public Relations	-	(503) 962-4910
Emergency Services			
Dispatch Phone for Emergency Response	Emergency Only	-	911
Oregon Emergency Management	Non-Emergency	-	(503) 378-2911
Multnomah County Office of Emergency Management	-	-	(503) 988-4233
Oregon State Police- Portland Area	Richard Evans	Lieutenant	(503) 731-3020
Multnomah County Sheriff's Office	Bernie Giusto	Sheriff	(503) 988-4300
Portland Police Bureau	-	-	(503) 823-0000
Portland Fire & Rescue: Station 4 – Northwest Station 1 – Downtown	-	-	(503) 823-3700
Schools			
Portland Public Schools			(503) 916-2000

Agency/Organization	Name	Title	Phone #
Hospitals			
Legacy Good Samaritan Hospital	-	-	(503) 415-5405
Legacy Emanuel Hospital & Health Center	-	-	(503) 413-2200
Doernbecher Children's Hospital	-	-	(503) 494-8811
Oregon Health & Science University (OHSU)	-	-	(503) 494-8311
Shriners Hospital for Children	-	-	(503)221-3423
Providence Portland Medical Center	-	-	(503) 215-1111
Utility Owners			
Oregon Utility Notification Center	-	-	(800) 332-2344
See Section 00150 of the Special Provisions for project-specific utility contacts.			
Local Event Venues			
PGE Park	Ken Puckett	Chief Event Coordinator	(503)553-5400
Oregon Convention Center	Mark Williams	Event Coordinator	(503)731-7890
Rose Garden & Memorial Coliseum	Justin Zelner	Parking Services Coordinator	(503)797-9922
Other			
Oregon Trucking Association	Bob Russell	President	(503) 513-0005
AAA Oregon	-	-	(503) 315-1411

3.0 Factors Impacting Construction Staging

This section includes an overview of the factors that impact construction staging: proposed improvements and impacts to traffic flow, existing vehicle restrictions, alternate routes, environmental issues, seasonal restrictions, and construction noise regulations.

3.1 Proposed Improvements and Potential Impacts to Traffic Flow

The proposed improvements for I-405 are pavement preservation, signing upgrades, striping, ramp meter upgrades, and tunnel illumination upgrades. The specific ramp work is further described in Table 1. Recommended construction strategies are summarized in Section 6.2.

With the proposed improvements in construction, the traffic flow on the main line of I-405 and will definitely be affected with a higher travel time delay and lower vehicle speeds for motorists. ODOT has specified to avoid construction during any peak hours, to minimize the amount of volumes on I-405, as described in Section 6.3. However since the project is located within a downtown area, the most effective form of closure for paving is during the weekends. Table 2 lists all of the on/off-ramps that will be affected during the weekend closures along with the functional classification.

3.2 Existing Vehicle Restrictions

There are no existing weight, height, or width restrictions for vehicles within the I-405 project limits.

3.3 Alternate Routes

As a result of the proposed closures along I-405, various alternative routes are identified for this project. The alternate routes or detours planned for this project are shown in the TCP in Appendix F. In addition to the planned routes, many alternative routes exist on local streets and highways. The ODOT Motor Carrier Transportation Division (MCTD) may need to identify alternate routes for oversize loads while detours are in place.

3.4 Environmental Issues

There are no known environmental issues in the subject project limits that would cause impacts to the construction staging or project schedule.

3.5 Seasonal Restrictions

There are two seasonal restrictions on construction activities along I-405 freeway. Some construction activities such as paving or pavement marking installation do require relatively dry and warmer conditions. Paving for this project must be completed by the end of September. Seasonal restrictions for striping vary by the manufacturer. The moisture level, temperature level and curing time restrictions should be verified with the paint manufacturer before the striping begins.

3.6 Construction Noise Regulations

The City of Portland permits a liberal construction noise standard (85 dBA at a 50-foot distance) from 7:00 am to 6:00 pm Monday through Saturday but only permits minimal noise outside of these hours. These noise restrictions would have the following impacts on the project:

- Pavement grinding will need to take place within the allowable construction noise hours. Additional daytime restrictions on these activities will apply during peak periods when all travel lanes must remain open.
- Flaggers and spotters will be required for backing vehicles at night since backup alarms may not be used outside of the allowable construction noise hours.

A noise variance permit for this project has been filed by ODOT with the City of Portland to allow construction during off-peak hours such as nighttime and weekend. Appendix A includes more information on the City's construction noise regulations.

3.7 Traffic Analysis

This section provides a summary of the HCM analysis at the two identified bottleneck locations for the northbound and southbound directions on I-5 using HCS software. The locations were identified based on field observations and existing traffic volumes. Freeway weaving was assessed along I-5 just north of the I-84 interchange in both the northbound and southbound directions, as well as the northbound direction on the Marquam Bridge. The southbound direction of the Marquam Bridge was assessed as a freeway. The HCS analysis was conducted at all of the identified bottleneck locations for the scenarios of without I-405 closures and with I-405 closures.

The Work Zone Traffic Analysis (WZTA) website³ was utilized to determine delay (veh/s) at the bottleneck locations before and after the closures on I-405. It is estimated that the closures on I-405 will cause approximately __ minutes of additional delay to motorist traveling on I-5.

The bottleneck locations were analyzed based upon HCM analysis procedures for weaving and freeway segments using HCS software. Weaving segments are classified as segments up to 2,500 feet in length where both merge and diverge movements interact. Basic freeway segments include the portions of freeway where flow is not influenced by the diverging, merging, or weaving associated with ramp/freeway connections. The HCS analysis provided the average speeds and lead to the volume to capacity ratios (V/C) for the bottleneck locations shown in Table 4.

Table 4. Bottleneck Locations and Speeds from HCS Analysis

Direction	Location	HCS Analysis Type	Speed (mph)		V/C	
			Without I-405 Closure	Without I-405 Closure	With I-405 Closure	With I-405 Closure
NB	Marquam Bridge	Weaving	39.6	34.9	0.85	1.14
	I-5, north of I-84	Weaving	33.1	32.4	1.24	1.47
SB	Marquam Bridge	Freeway	49.5	49.5	0.75	0.92
	I-5, north of I-84	Weaving	31.3	30.2	1.34	1.67

4.0 Potential Mobility Issues

This section includes a discussion of traffic mobility issues during construction, consideration of over-sized vehicles, input from the public and stakeholders, agency coordination, and holidays and special events.

4.1 Traffic Mobility Issues during Construction

The construction phase of the I-405 project consists of several types of closures ranging from single lane closures to full highway closures, meanwhile leaving at least one direction of travel open. Throughout the construction phase, traffic mobility will be impacted by delays incurred during the I-405 highway and lane closures. The duration of those closures will be minimized by scheduling construction activities outside of the peak hours, as described in Section 6.3.

Since I-405 is used as a freight corridor, special considerations will need to be given to the ability of the temporary traffic control and associated lane restrictions to accommodate oversized vehicles. The use of lane closures on this highway may impact the timely and dependable movement of goods through the region.

A minimum roadway width of 19 feet (during lane closures) and 32 feet (during normal operation) between positive barriers will be maintained at all times for each direction of traffic

³ Work Zone Traffic Analysis (WZTA) Website, <https://wzta.obdp.org>.

on I-405 during the construction phases, except during full closure. There will be no height or weight restrictions during construction other than those that may already exist on the detour routes.

ODOT Motor Carrier Transportation Division (MCTD) communication, coordination, and notification must be initiated early for a successful project.

4.2 Consideration of Over-Sized Vehicles

Since I-405 is designated as an ODOT freight route within the project limits, the vertical and horizontal clearance and maximum weight restrictions for the detour routes will have to meet the minimum requirements. Therefore at least 28 days before this work begins, the contractor must notify ODOT's Motor Carrier Transportation Division (MCTD) Technical Coordinator at 550 Capitol Street NE, Salem, OR 97301-2530, Fax: (503) 373-1940, and the Engineer, in writing using Form #734-2357. The notification should include weight restrictions, the reduced lane width or lowest dimension of vertical clearance for each stage and the anticipated duration of the reduction. The reduction will not be permitted until the Engineer approves it and the area is adequately signed. As soon as the restriction is lifted, notification must be sent to the same individuals on a revised copy of the original Form #734-2357, so this information can be relayed to all affected parties.

4.3 Input from the Public and Stakeholders

The primary goal of the communications effort for this project is to inform project stakeholders and highway users of scheduled construction activities and expected impacts. ODOT Community Affairs staff will continue to coordinate with the public and project stakeholders throughout the design and construction process.

4.4 Agency Coordination

Local agencies and other departments within ODOT should be contacted before beginning construction on this project to coordinate any issues that may not be included in this document. Communication protocols are described in Section 8.0 and other known construction projects in the area are described in Section 2.2.

4.5 Holidays and Special Events

Traffic on I-405 can be impacted by holidays and local special events. Weekend full closures of I-405 in either direction should be avoided during these times. Nighttime lane closures will not be allowed during holidays, but may be undertaken on special event days if construction traffic control is not in place at the same time as any temporary traffic control required for the event. Table 5 includes a list of holidays and local special events expected to occur during construction.

Table 5. Holidays and Special Events

Legal Holidays*	Date
Independence Day	July 4
Labor Day	September 7, 2009
Special Events	Date
Rose Festival Grand Floral Parade	June 6, 2009
Bridge Pedal	August 8, 2009
Hood to Coast	August 29, 2009
Race for the Cure	September 29, 2009

* When a legal holiday falls on Sunday, the following Monday shall be recognized as a legal holiday. When a holiday falls on Saturday, the preceding Friday shall be recognized as a legal holiday.

5.0 Traffic Operation & Mitigation Measures

To help meet the performance goals for congestion management and to promote work zone safety, a range of traffic management strategies were considered for implementation. Table 5 lists an array of common traffic management strategies and indicates the ones selected for consideration on this project. It should be recognized that before selecting a strategy for application, an evaluation of the benefits provided versus the cost to implement should be conducted. Project budgets may determine which strategies can be implemented. Any strategies that are cost-prohibitive at the project level may require funding from other sources if implementation is desired. The remainder of this section describes in more detail the strategies selected from Table 6.

Table 6. Traffic Management & Operation Strategies

Public Information and Outreach	Incident/Emergency Management
<ul style="list-style-type: none"> ✓ Press Releases ✓ Public Outreach 	<ul style="list-style-type: none"> Call Boxes ✓ Construction Zone Enforcement Program Dedicated Service Patrol Traffic Surveillance Stations (detection/CCTV) ✓ Cell Phones Traffic Control Officers ✓ Full-Time Traffic Control Supervisor Helicopter
Traveler Information/ITS	
<ul style="list-style-type: none"> ✓ Variable Message Signs (VMS) ✓ Ground-Mounted Signs Commercial Traffic Radio Highway Advisory Radio (fixed/mobile) ✓ TripCheck (www.tripcheck.com) ✓ 511 (Highway Advisory Telephone) Radar Speed Message Sign ✓ Portable Changeable Message Signs (PCMS) 	
Construction	N/A Demand Management
<ul style="list-style-type: none"> Incentive/Disincentive Provisions ✓ Ramp Metering Lane Rental ✓ Off-Peak/Night/Weekend Work Temporary Pavement (runaround) Temporary Pavement (widening) Temporary Traffic Signals Pilot Car ✓ Planned Lane/Ramp Closures ✓ Project Phasing Temporary Traffic Screens ✓ Total Facility Closure ✓ Truck Traffic/Permit Restrictions Reversible Lanes Extended Weekend Closures Reduced Speed Zones ✓ Coordination with Adjacent Construction Rolling Slowdown ✓ Full-Time Traffic Control Supervisor 	<ul style="list-style-type: none"> HOV Lanes/Ramps Park-and-Ride Lots Parking Management/Pricing Rideshare Incentives Rideshare Marketing Transit Incentives Transit Service Improvements Train or Light-Rail Incentives Variable Work Hours Telecommute Shuttle Service Incentives Temporary Lanes or Shoulder Use Freeway to Freeway Connector Closures
	N/A Alternate Route
	<ul style="list-style-type: none"> Ramp Closures Street Improvements Temporary Lanes or Shoulder Use

5.1 Public Information and Outreach Strategies

Public information and outreach is beneficial for maintaining public support for projects as well as for encouraging changes in travel behavior during construction. Making the public aware of the potential delays incurred while traveling through the project area or detour routes may encourage motorists to use alternate routes or plan trips to avoid peak construction activity times, which will help to manage congestion within the project area.

5.2 Traveler Information/ITS Strategies

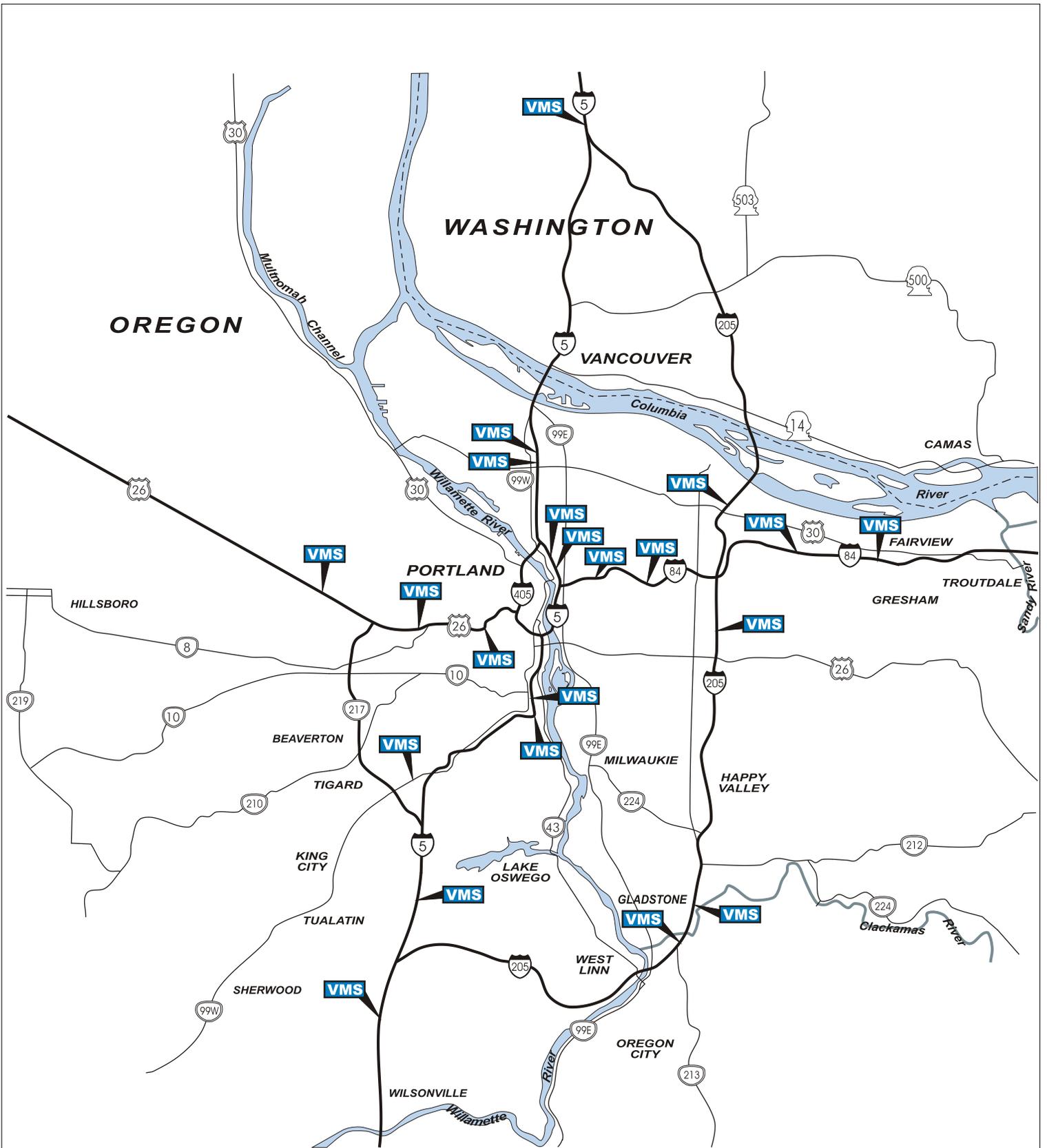
Existing Intelligent Transportation Systems (ITS) and other strategies may be used to provide traveler information in the following ways:

- **Variable Message Signs:** Variable Message Signs (VMS) along the connecting freeways can inform the motorists ahead of time about the construction activities and the possibility of delay. The agency project manager will notify ODOT TMOC when the construction schedule has been set by the contractor. See Figure 3 for approximate VMS locations.
- **Ground-Mounted Signs:** Ground-mounted signs should be installed in areas of temporary traffic control to inform motorists of construction activities and the possibility of delay.
- **TripCheck:** Including this project on TripCheck (www.tripcheck.com), ODOT's traveler information website, will help to inform users of construction activities. Increasing awareness may enhance work zone safety and provide motorists with the opportunity to choose alternate routes or to plan trips to avoid congestion.
- **511 (Highway Advisory Telephone):** Inclusion of this project on ODOT's statewide 511 highway advisory telephone system will help provide travelers with up-to-date information about construction activities and potential delays.

5.3 Construction Strategies

Construction strategies to consider for the subject project include the following:

- **Ramp Metering:** Existing ramp meters should be utilized during construction to monitor the flow of traffic on I-405 during construction.
- **Off-Peak/Night/Weekend/Off-Season Work:** As much as possible, temporary lane closures along I-405 should be undertaken during off-peak hours or at night to avoid excessive congestion. Lane closures should adhere to the applicable lane closure charts.
- **Planned Lane/Ramp Closures:** Lane closures will be utilized on I-405 to provide the necessary work areas for pavement rehabilitation activities. Signing and other traffic control devices will be used as appropriate during lane closures. Ramp closures will also be required while I-405 is fully closed.
- **Project Phasing:** Executing pavement rehabilitation work in phases creates less delay for drivers compared to a full road closure by maintaining at least one direction of travel for I-405.
- **Total Facility Closure:** I-405 will be closed one direction at a time. Details regarding the work schedule are included in Section 6.
- **Truck Traffic/Permit Restrictions:** The detour routes will allow trucks to continue traveling to their destinations. Oversize vehicles may be rerouted by ODOT MCTD.
- **Coordination with Adjacent Construction:** The coordination of this project with other projects in the area, as was previously discussed, will help to avoid unnecessarily compounding traveler delay.



LEGEND

VMS - Approximate Vehicle Message Sign Location

* This map is not for legal, engineering, surveying or construction purposes. The VMS locations are simply a general location.

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Figure 3

**APPROXIMATE
VEHICLE MESSAGE SIGN
LOCATIONS**

- **Full-Time Traffic Control Supervisor (TCS):** Having a full-time TCS on-site allows one person to be dedicated to traffic control and not be distracted by other construction activities. Benefits include the ability to make quick decisions on the spot and to implement contingency plans as needed.

5.4 Incident/Emergency Management Strategies

Incident and emergency management strategies include the following:

- **Construction Zone Enhanced Enforcement Program:** This strategy can improve work zone safety by ensuring vehicles travel below the posted speed through the project area. For this project, it is recommended that enhanced enforcement be provided if deemed necessary through the TMP monitoring and evaluation process. It is anticipated that the extent to which this strategy could be implemented would be determined by the project budget and availability of state and city police.
- **Cell Phones:** It is recommended that mobile phones be present on-site at all times to provide the ability to quickly report incidents within the work zone.
- **Full-Time Traffic Control Supervisor (TCS):** Response time to incidents is generally faster when there is a full-time traffic control supervisor (TCS) on-site to make quick decisions and implement contingency plans as necessary.

6.0 Recommended Course of Action

This section provides a summary of the project schedule, proposed construction staging, lane closure restrictions, restricted work times, vehicle access, and specifications that will be used to provide mobility and temporary traffic control during construction.

6.1 Project Schedule

The scheduled bid date for the project is April 2, 2009, with construction beginning shortly afterwards. Construction is required to take place within the 2009 construction season. A detailed construction staging schedule will be added to this document later in the design process. The entire project is expected to require two full closures (one in each direction) and about 80 nighttime lane closures. Two additional weekends will be scheduled for full closure in case of weather or other unforeseen complications. The duration of individual construction elements requiring lane closures or full facility closures have been estimated in Table 7.

Table 7. Construction Element & Estimated Duration

Construction Element	Type of Closure	Estimated Duration
Curb Replacement	Outside Lane	1 month of nighttime closures
Median Capping	Inside Lane (both directions)	3 weeks of nighttime closures
Barrier and/or Guardrail Replacement	Outside Lane	1 week of nighttime closures
Concrete Pavement Repair	Lane Closure	1 week of nighttime closures
Grinding	Lane Closure	1 night of nighttime closures
Loop Replacement	Lane Closure	3 nights of nighttime closures
Paving	Full Closure	2 full weekend closures
Striping	Lane Closure	2 weeks of nighttime closures
Signing	Lane Closure	2 weeks of nighttime closures
Tunnel Lighting	Ramp Closure	3 weeks of nighttime closures

6.2 Proposed Construction Staging

Table 8 includes a description of the proposed construction stages and associated temporary traffic control activities.

Table 8. Proposed Construction Staging

Stage	Construction Activity	Temporary Traffic Control
Pre-Stage I	Curb replacement, median capping, barrier and/or guardrail replacement, and concrete pavement repair.	<ul style="list-style-type: none"> ▪ Lane closures as needed for each element. Implement traffic control per the <i>Oregon Standard Drawings</i>.
I	Northbound on I-405: Grinding, paving, and loop replacement.	<ul style="list-style-type: none"> ▪ Full closure on I-405 in northbound direction. ▪ Maintain traffic flow in southbound direction on I-405. ▪ Implement full northbound closure and detour routes during the allowable times listed in Section 6.3 and use temporary traffic control devices per the project TCP and the <i>Oregon Standard Drawings</i>.
II	Southbound on I-405: Grinding, paving, and loop replacement.	<ul style="list-style-type: none"> ▪ Full closure on I-405 in southbound direction. ▪ Maintain traffic flow in northbound direction on I-405. ▪ Implement full southbound closure and detour routes during the allowable times listed in Section 6.3 and use temporary traffic control devices per the project TCP and the <i>Oregon Standard Drawings</i>.
Post-Stage II	Striping, signing and tunnel lighting.	<ul style="list-style-type: none"> ▪ Lane closures as needed for each element. ▪ Implement traffic control per the <i>Oregon Standard Drawings</i>.

6.3 Lane Closure Restrictions and Restricted Work Times

This section describes the lane restrictions that apply on a day-to-day basis as well as the restricted work times (e.g. holidays and special events). Lane closures will be required for a number of project construction activities related to pavement, ramp meters, tunnel lighting, signs, and permanent pavement markings. Due to the high traffic volumes on I-405, no lane closures will be allowed during the periods shown in Table 9. These lane restrictions are based on the traffic analysis described in Section 3.7.

Table 9. Closure Restrictions

Type of Work and Location	No Closures Allowed
Full Closure for Repaving	
Northbound I-405, along with all connecting interchange ramps, on-ramps and off ramps.	Monday 5:00 a.m. – Friday 10:00 p.m.
Southbound I-405, along with all connecting interchange ramps, on-ramps and off ramps.	Monday 5:00 a.m – Friday 10:00 p.m.
Lane Closure	
Northbound I-405, along with all connecting interchange ramps, on-ramps and off ramps.	Daily 5:00 a.m. – 10:00 p.m.
Southbound I-405, along with all connecting interchange ramps, on-ramps and off ramps.	Daily 6:00 a.m. – 11:00 p.m.

6.3.1 Restricted Work Times

Restricted work times for this project will be included in Special Provision Section 00220 as follows:

- **Holidays:** Do not close any traffic lanes between noon on the day preceding legal holidays or holiday weekends and midnight on legal holidays or the last day of holiday weekends, except for Thanksgiving, when no lanes may be closed between noon on Wednesday and midnight on the following Sunday.
- **Special Events:** Do not close any traffic lanes between midnight on the day preceding and midnight on the final day of special events.

See Section 4.5 for a list of holidays and events in the project area.

6.4 Vehicle Access

Appropriate management of access is not only necessary for maintaining access to roadway-adjacent properties, but can significantly improve roadway safety by minimizing disruptions in traffic flow, reducing the number of conflict points, and simplifying motorist decision-making. A number of key arterials are connected to I-405 along the project site. The contractor will coordinate with ODOT Region 1 staff so they can keep property owners, residents, and local agencies apprised of how construction activities may impact them. Refer to Section 8.0 for communication responsibilities.

6.5 Specifications

The following sections of the *Oregon Standard Specifications for Construction* and the associated Special Provisions will be included in the construction contract to ensure that mobility issues are addressed during construction:

- **00220 – Accommodations for Public Traffic** – Project-specific items to be addressed under this section by Special Provision include:
 - ▷ Notification to local agencies of road closures (see Section 8.0)
 - ▷ Notification to ODOT’s Motor Carrier Transportation Division of vertical and horizontal roadway restrictions (see Section 4.2)
 - ▷ Notification to ODOT’s TMOC for posting VMS messages (see Section 5.2)
 - ▷ Lane closure restrictions (see Section 6.3.1)
 - ▷ Emergency Communication Plan (see Section 7.1)
 - ▷ Contingency Plan (see Section 7.2)
 - ▷ Public Information and Communication Plan (see Section 8.0)
- **00225 – Work Zone Traffic Control** – Each project has specific items that are required for temporary work zone traffic control. Most items used by ODOT for temporary traffic control are listed in this section. Unless newly-approved traffic control devices are accepted for use on a project, this section will require minimal additions.

7.0 Incident Management Plan

Incident management is a planned and coordinated program that detects and removes incidents from the highway and restores traffic capacity as safely and quickly as possible. Some incident management strategies have already been identified for this project in Section 5.4. ODOT Region 1 has an incident management program in operation that is operated from the Region 1 Traffic Management and Operations Center (TMOC). Any incidents that impact traffic flow during construction should be coordinated with the TMOC. The Emergency Communication Plan and Contingency Plan are two important tools for incident management that are described in the following sections.

7.1 Emergency Communication Plan

The Emergency Communication Plan describes how communications will occur and lists important contact information for responding to an incident. Important elements include:

- Goals and objectives of the plan.
- Key contacts and their contact information.
- Emergency and essential services contacts.

- Definitions of emergencies and the appropriate response and communications for each type of emergency.
- Roles and responsibilities of the stakeholders who execute the plan.

Maintaining an updated list of emergency contacts for use in the event of an incident shall be the responsibility of the contractor. A template has been included in Appendix C to help guide the contractor in developing an Emergency Communication Plan.

7.2 Contingency Plan

As a part of an Incident Management Plan, the Contingency Plan includes both traffic and contractor contingency plans. The traffic Contingency Plan addresses specific actions that will be taken to restore or minimize effects on traffic when the congestion or delay exceeds original estimates due to unforeseen events such as work-zone accidents, higher than predicted traffic demand, or delayed lane closures. The contractor Contingency Plan addresses activities under the contractor’s control in the work zone. A guideline has been included in Appendix D to help guide the contractor (once under contract) in developing a Contingency Plan.

8.0 Public Information & Communication Plan

This section provides communication strategies for informing affected road users, the general public, and various project stakeholders about the project and changing work zone conditions. ODOT will be the public face of this construction project and all media releases must be coordinated with and reviewed by ODOT Region 1 staff. ODOT MCTD will handle communications with the freight industry. It is recommended that all other communications not described above be disseminated by ODOT Region 1 staff. Table 10 summarizes communication responsibilities.

Table 10. Communication Responsibilities

Responsible Party	Communication Target
Contractor	ODOT Region 1
ODOT Region 1 Staff	ODOT MCTD ODOT Region 1 TMOC ODOT District 2B Multnomah County City of Portland Media General public/road users Police Fire Emergency medical services Schools Other stakeholders not assigned to other parties
ODOT MCTD	Freight industry