



2022-2024 Regional Flexible Funds Project Application

Clackamas County: Clackamas County Regional Freight ITS Project – Phase 2B

Contact: *Bikram Raghubansh, PE, PTOE*
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APPLICANT INFORMATION

1. Jurisdiction name: *Clackamas County*
2. Contact info: Name, phone #, email:
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3. Funding category (check one): ☐ Active Transportation ☒ Freight ☐ Both
4. Project name: *Clackamas County Regional Freight ITS Project Phase 2B*
5. Describe the project purpose. What problems or issues is the project intended to address?

Clackamas County is home to many large warehousing and distribution centers due to its proximity to the I-5 corridor and central location in the Portland metropolitan area. The businesses that operate in these facilities generate significant amounts of freight trucking activity to distribute goods to businesses and residences of the region. In 2018, Clackamas County completed Phase 1 of Clackamas County Regional Freight ITS Project by completing County's first Freight ITS action plan to address improvements to travel time reliability and safety of the regional freight system by reducing freight vehicle delay in known congested areas in Clackamas County by focusing on smart intelligent transportation system (ITS) technology solutions. The planning phase (Phase 1) of this project considered two geographically study areas, the Clackamas Industrial Study Area (see figure 1) and the Wilsonville Industrial Study Area (see figure 2) and focused on the first and last mile arterial connections. This action plan incorporates input from agency and freight industry stakeholders to identify freight transportation needs and address them with cost-effective ITS strategies that align with Clackamas County and regional transportation goals. The Clackamas County Regional Freight ITS Project – Phase 2B is intended to complete the unfunded portion of existing County Freight ITS Action plan.

In the project evaluation and screening process, Clackamas County identified six (6) feasible ITS strategies with full implementation cost estimate of approximately \$4.27 million. The total estimate for full deployment exceeds the approximately \$2.3 million that is currently available for project design and construction of Phase 2A. With 2022-2024 RFFA funding, a request for \$1.97 million will be used to complete the unfunded portion Freight ITS strategies and corridors during Phase 2B of the project.

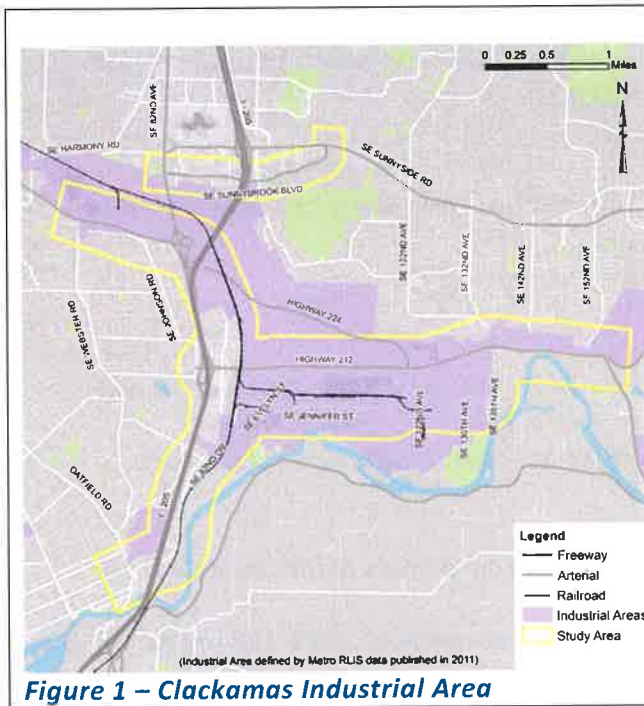


Figure 1 – Clackamas Industrial Area

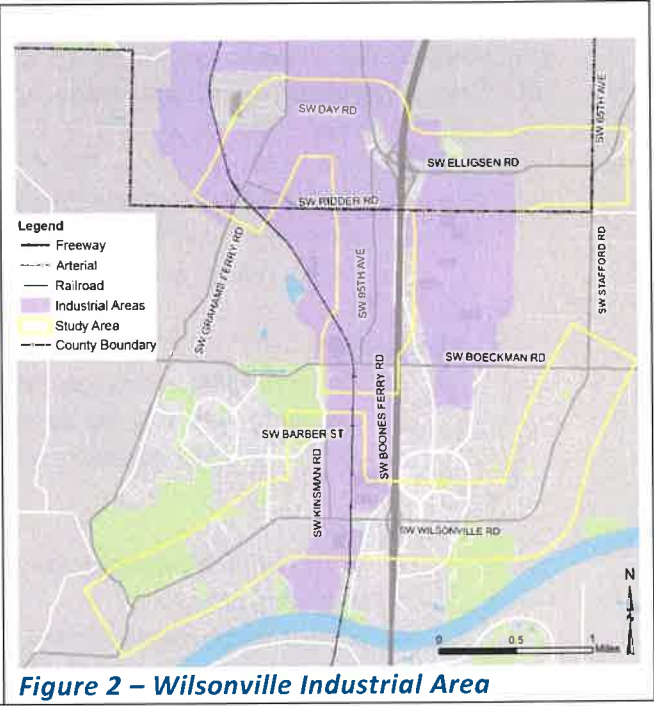


Figure 2 – Wilsonville Industrial Area

Clackamas Industrial Area - The Clackamas Industrial Area is defined by OR 224, OR 212, and SE 82nd Ave/Dr, as shown in Figure 1. The separated northern portion of this study area captures the employment and commercial activities along SE Sunnybrook Blvd. The Union Pacific railroad (UPRR) mainline travels through the area with a spur line providing rail access for industrial businesses adjacent to SE Jennifer St. While the UPRR mainline is grade separated through the Clackamas Industrial Area, there are several at-grade crossings of the spur line.

Identified Issues - Freight specific issues identified in the Clackamas industrial area are grouped into three categories; safety, operations, and congestion.

- **Safety**
 - *High crash rates identified at key intersections and along corridors (based on five-year crash data from 2011 through 2015).*
 - *Most crashes are turning movement collisions (34%)*
- **Operations**
 - *Signal timing currently does not favor freight traffic.*
 - *Truck queuing at OR 212/Fred Meyer driveway.*
 - *Power outages and dirty power conditions cause traffic signal down time and accelerate electronic component failure.*
- **Congestion**
 - *Areas of heavy congestion during specific time periods of the day negatively impact traffic.*

Wilsonville Industrial Area - The Wilsonville Industrial Study Area, as shown in Figure 2, is defined by SW Grahams Ferry Rd, SW Day Rd, and SW Boones Ferry Rd/SW Elligsen Rd in the north; the middle of the study area is defined by SW 95th Ave and SW Boeckman Rd; and the southern portion of the study area is defined by SW Wilsonville Rd and SW Kinsman Rd. The Portland and Western short line railroad and TriMet WES commuter rail pass through Wilsonville with at-grade crossings at SW Wilsonville Rd, SW Barber St, and SW Boeckman Rd.

Identified Issues - Freight specific issues identified in the Wilsonville industrial area are grouped into three categories; safety, operations, and congestion.

- **Safety**
 - High crash rates identified at key intersections and along corridors (based on five-year crash data from 2011 through 2015).
 - Most crashes are turning movement collisions (50%)
- **Operations**
 - Some freight drivers use SW Wilsonville Rd as a connection between I-5 and Newberg, which is not designed to handle the heavy vehicle traffic.
 - Power outages and dirty power conditions cause traffic signal down time.
- **Congestion**
 - Areas of heavy congestion during specific time periods of the day negatively impact traffic.
 - Traffic incidents on I-5 and/or I-205 create congestion on SW Elligsen Rd and the SW Wilsonville Rd/SW Stafford Rd corridor.

Proposed Freight ITS Strategies - The proposed freight ITS system will be comprised of strategies listed below.

- **Truck Signal Priority** – Install vehicle detection that can be used for dilemma zone protection and program the truck signal priority parameters in traffic signal controller. Traffic signal will likely require remote communications and have the ability to collect performance measure data. Truck signal priority is composed of a detector that detects heavy vehicles and sends the message to the traffic signal controller. The controller either extends the green when an oncoming truck is detected in the dilemma zone, or extends the all-red interval when a truck is detected entering the intersection late. Upgrades to the traffic signal controllers and signal timing parameters are needed where truck signal priority is used.

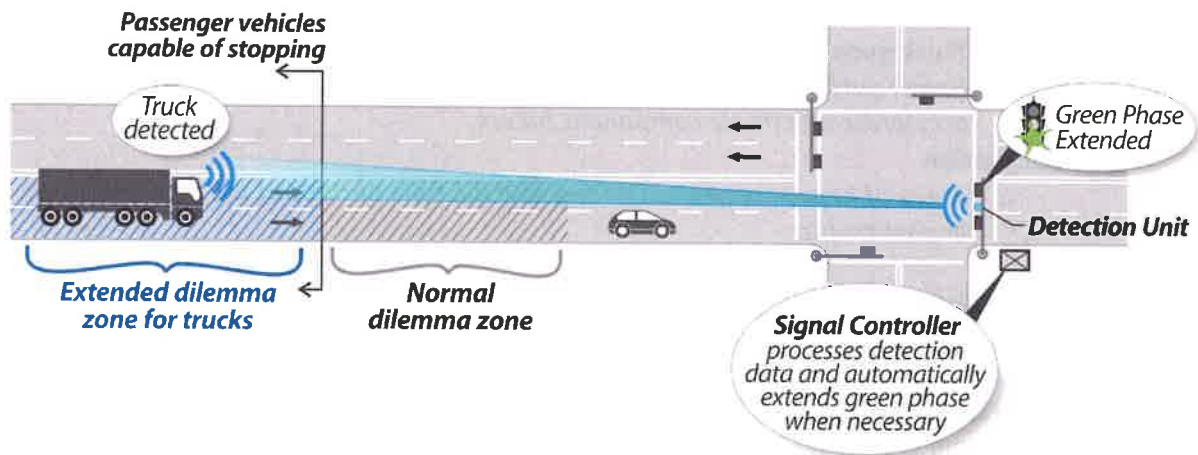


Figure 3 – Truck Signal Priority Concept

The following locations are where truck signal priority is planned to be installed in the Clackamas Industrial Area and the Wilsonville Industrial Area.

Clackamas Industrial Area

- OR 224
- OR 212
- SE 82nd Dr

Wilsonville Industrial Area

- SE 95th Ave at SE Ridder Rd
- SW Elligsen Rd at I-5 SB
- SW Wilsonville Rd

- **Traffic Signal Battery Backup** - Install uninterrupted power supply (UPS) battery backup systems at critical intersections. Traffic signals require continuous power to operate. Without power, traffic signals turn dark, which leads to an all-way stop condition. This can cause congestion, queuing and delay for travelers. It is also a safety issue as some drivers do not realize they need to stop when the traffic signal is dark.

With a UPS battery backup system in place, the traffic signal will continue to operate in the event of a power outage or dirty power. The power source seamlessly transitions over to the UPS battery backup, without a lapse in service. To prevent queues onto freeways, the most critical locations for battery backup systems are the traffic signals near the entrance and exit ramps. Queuing onto freeways is a key safety concern due to the higher travel speeds and more severe resulting crashes.

Additional locations that could benefit from a safety and operational perspective from UPS battery backup include traffic signals that are interconnected or close to railroad crossings.

The following locations are proposed to install UPS battery backup systems.



Clackamas Industrial Area

- SE 82nd Dr
- SE Jennifer St
- SE Sunnybrook Blvd
- OR 212
- OR 224

Wilsonville Industrial Area

- SW Wilsonville Rd (Note: at SW Wilsonville Rd/SW Stafford Rd/SW Boeckman Rd/SW Advance Rd)
- SW Elligsen Rd
- SW 95th Ave
- SW Kinsman Rd

- **Traffic Surveillance** - Install pan-tilt-zoom (PTZ) camera systems to monitor critical intersections. The traffic surveillance includes pan-tilt-zoom (PTZ) cameras for visual surveillance. The cameras send images back to the traffic operations center where operators can view real-time conditions and remotely control the cameras to view different angles and perspectives. Images from the cameras are also publically available via ODOT's TripCheck website.

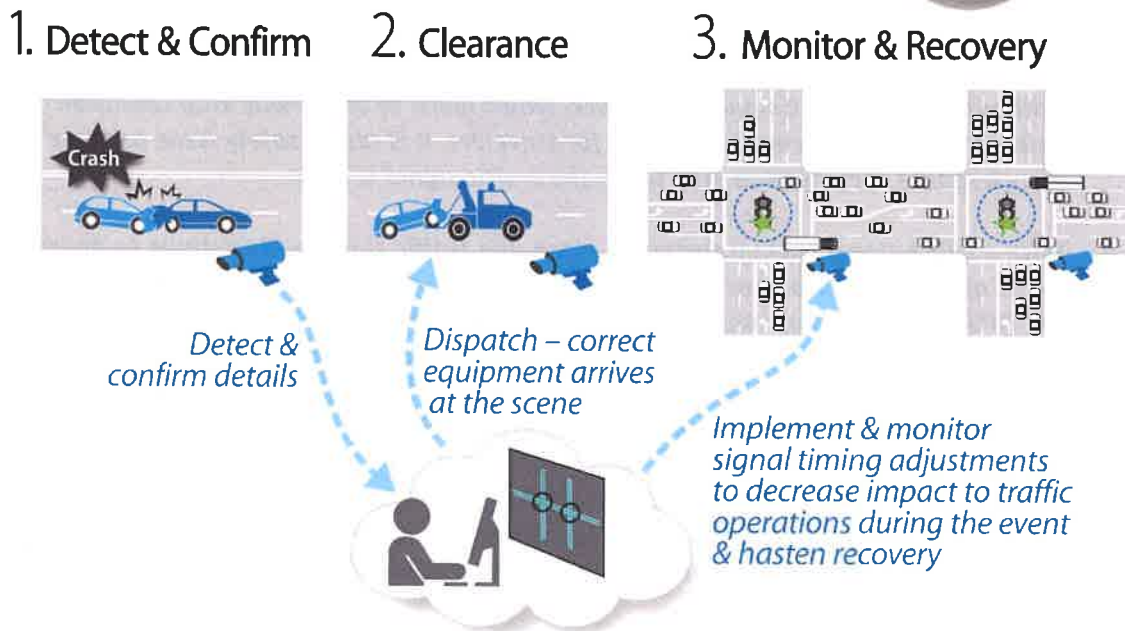


Figure 4 – Traffic Camera Concept

PTZ cameras are proposed at the critical intersection on these corridors:

Clackamas Industrial Area

- SE 82nd Dr
- SE Jennifer St
- SE Sunnybrook Blvd
- OR 212
- OR 224

Wilsonville Industrial Area

- SW Wilsonville Rd
- SW Elligsen Rd
- SW 95th Ave
- SW Kinsman Rd

- **Count Stations** - Install permanent traffic counting systems at key locations with remote communications. The count station includes permanent traffic counting devices for automatic data collection (vehicle volumes, bicycle volumes, vehicle classification, speed, and vehicle classification), communications for data transmission, and archiving system to store and manage data collected. The count stations are recommended at mid-block locations, and will likely pull power and communications from the nearest traffic signal. Count stations are proposed at the following locations:

Clackamas Industrial Area

- SE 82nd Dr
- SE Jennifer St
- SE Sunnybrook Blvd
- OR 212
- OR 224

Wilsonville Industrial Area

- SW Wilsonville Rd
- SW Elligsen Rd
- SW 95th Ave
- SW Kinsman Rd

- **Travel Time Measurement** - Install travel time monitoring sensors on key corridors with remote communications. Travel time measurement includes devices for travel time collection, communications for data transmission, and archiving system to store and manage data collected. Specific routes of travel time measurement can be configured with the proposed device locations and based on project needs.

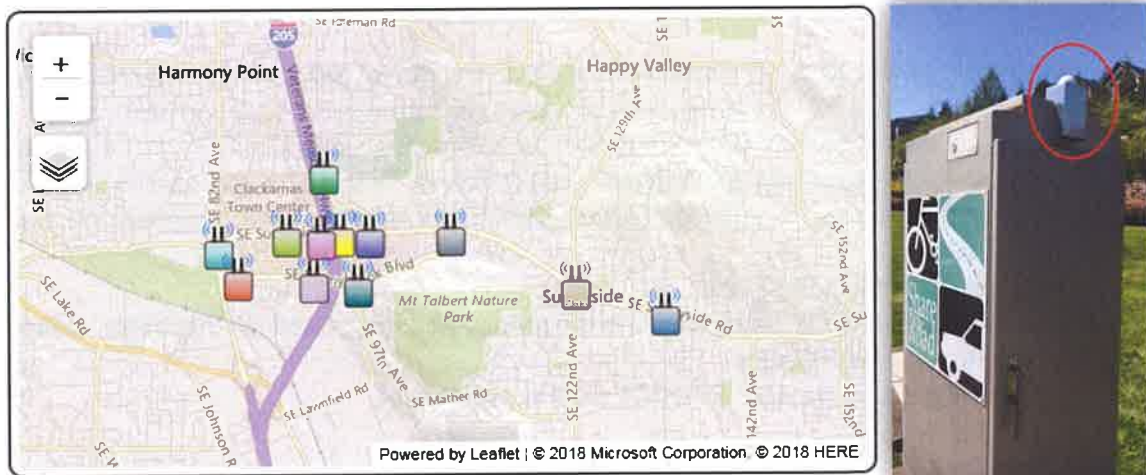


Figure 5 – Travel Time and Data Collection Concepts. Currently deployed at sixteen (16) locations within Clackamas Town Center and Happy Valley area.

Proposed locations for installing count stations include the following corridors:

Clackamas Industrial Area

- SE 82nd Dr
- SE Jennifer St
- SE Sunnybrook Blvd
- OR 212
- OR 224

Wilsonville Industrial Area

- SW Wilsonville Rd
- SW Elligsen Rd
- SW 95th Ave
- SW Kinsman Rd

- **Portable Monitoring Trailer** - Deploy a Portable Monitoring Trailer (see example photo) with radar detectors, cameras, and vehicle counters to monitor facilities. The portable monitoring trailer includes an easy-to-move trailer with equipment that can direct traffic and monitor facilities. The features of the portable trailer will include video recording, travel time measurement, traffic speed measurement, traffic volume measurement, and variable message sign. The trailer needs to connect to central systems via cellular communications.

Portable trailers can be used to monitor traffic, such as trucks that bypass Weigh in Motion stations. They can be moved easily to be deployed at work zones or temporary events.



PROJECT READINESS

The following questions intend to gather information about how developed the project is and the steps that will still be required to complete the project. This section will be used for screening project feasibility.

Project Detail

6. Is this project on the 2018 RTP Constrained list? ☐ Yes ☒ No *This project is not specifically identified in the 2018 RTP Constrained list as a stand alone project. However, the original Clackamas County Regional Freight ITS Project was identified in previous RTP list. This project is an extension of the previously RFFA funded project phases. In addition, most of the proposed Freight ITS strategies are identified in Metro's region-wide regional TSMO program investments for 2018-2027.*
7. What is the RTP Project ID #? *N/A*
8. In which RTP network and policy map(s) is the project included? Check all that apply, indicate specific functional classification.
 - ☐ High Injury Corridor (or ODOT ARTS Hotspot map)
 - ☐ Bicycle:
 - ☐ Pedestrian:
 - ☒ Freight: *Arterials*
 - ☐ Transit
9. List the project beginning and ending points. What specific streets/intersections are included in the project area?
Full implementation of Freight Action ITS Plan (separated by Phases 2A & 2B) is slated for the following corridors and intersections within Clackamas Industrial Area (See Table 1) and Wilsonville Industrial Area (See Table 2). Freight ITS Project - Phase 2B will only impact corridors and intersections with ITS items listed in phase 2B.

Table 1 - Summary of Strategy Locations and Quantities for Clackamas Industrial Area

| Corridor | Intersection | Project phases | Truck Priority | UPS Battery Backup | Traffic Surveillance | Count Station | Travel Time Measurement |
|--------------------|--|----------------|----------------|--------------------|----------------------|---------------|-------------------------|
| | | | 2A/2B | 2A/2B | 2A/2B | 2A/2B | 2A/2B |
| SE 82nd Dr | SE 82nd Dr @ SE Sunnybrook Blvd | | 0/3 | 0/1 | 0/1 | 0/0 | 0/0 |
| | SE 82nd Dr @ SE Tolbert St | | 0/2 | 0/1 | Ex | 1/0 | 0/1 |
| | SE 82nd Dr @ OR 212 | | 4/0 | 1/0 | 1/0 | 1/0 | 1/0 |
| | SE 82nd Dr @ Fred Meyer Driveway North | | 0/2 | 1/0 | 0/0 | 0/0 | 0/0 |
| | SE 82nd Dr @ Fred Meyer Driveway South | | 0/2 | 0/1 | 1/0 | 0/0 | 0/0 |
| | SE 82nd Dr @ SE Evelyn St | | 3/0 | 0/1 | 1/0 | 1/0 | 1/0 |
| | SE 82nd Dr @ I-205 NB Ramps | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | SE 82nd Dr @ I-205 SB Ramps | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | SE 82nd Dr @ Oatfield Rd | | 3/0 | 1/0 | 1/0 | 1/0 | 1/0 |
| SE Jennifer St | SE Jennifer @ SE Evelyn St | | 4/0 | 1/0 | Ex | 0/0 | 1/0 |
| OR 212 | OR 212 @ OR 224 | | 2/2 | 1/0 | Ex | 0/0 | 1/0 |
| | OR 212-224 @ SE 142nd Ave | | 2/2 | 0/1 | 1/0 | 0/1 | 0/0 |
| | OR 212-224 @ SE 135th Ave | | 2/2 | 0/1 | Ex | 0/0 | 1/0 |
| | OR 212-224 @ SE 130th Ave | | 2/2 | 0/1 | 0/0 | 0/0 | 0/0 |
| | OR 212 @ SE 122nd Ave | | 4/0 | 1/0 | Ex | 1/0 | 1/0 |
| | OR 212 @ Fred Meyer Access | | 2/0 | 0/1 | 0/1 | 0/0 | 0/0 |
| | OR 212 @ SE 102nd Ave / SE Evelyn St | | 4/0 | 1/0 | 0/1 | 0/1 | 1/0 |
| | OR 212 @ I-205 SB Ramps | | 0/0 | 1/0 | 0/0 | 0/0 | 1/0 |
| | OR 212 @ I-205 NB Ramps | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| OR 224 | OR 224 @ to I-205 NB Ramp | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | OR 224 @ I-205 SB Ramp / SE 82nd Ave NB Ramp | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | OR 224 @ SE 82nd Ave SB Ramp | | 0/4 | 1/0 | Ex | 0/0 | 1/0 |
| | OR 224 @ SE Johnson Rd | | 2/0 | 1/0 | Ex | 1/0 | 1/0 |
| | OR 224 @ SE Pheasant Ct | | 2/0 | 0/1 | 0/0 | 0/0 | 0/0 |
| | OR 224 @ SE Lake Rd | | 2/0 | 1/0 | Ex | 0/1 | 1/0 |
| SE Sunnybrook Blvd | SE Sunnybrook Blvd @ SE Sunnyside Rd | | 3/0 | 1/0 | 0/0 | 0/0 | 0/0 |
| | SE Sunnybrook Blvd @ SE 97th Ave | | 0/2 | 1/0 | 0/0 | 1/0 | 0/0 |
| | SE Sunnybrook Blvd @ I-205 NB Ramps | | 0/0 | 1/0 | 0/0 | 0/0 | 1/0 |
| | SE Sunnybrook Blvd @ I-205 SB Ramps | | 0/0 | 1/0 | 0/0 | 0/0 | 1/0 |
| | SE Sunnybrook Blvd @ SE 93rd Ave | | 0/2 | 1/0 | 0/0 | 0/0 | 0/1 |
| | SE Sunnybrook Blvd @ SE Oak Bluff Blvd | | 0/2 | 0/1 | 0/0 | 0/1 | 0/0 |
| | SE Sunnybrook Blvd @ Mall Entrance | | 0/0 | 0/1 | 0/0 | 0/0 | 0/0 |
| | SE Sunnybrook Blvd @ SE 84th Ave | | 0/2 | 0/1 | 0/0 | 0/0 | 0/1 |
| Total by phase | | | 40/29 | 21/12 | 5/3 | 6/5 | 19/3 |

Note: Phase 2A – Funded, Phase 2B – Not funded, Ex - Existing

Table 2 - Summary of Strategy Locations and Quantities for Wilsonville Industrial Area

| Corridor | Intersection | Project phases | Truck Priority | UPS Battery Backup | Traffic Surveillance | Count Station | Travel Time Measurement |
|-------------------|---|----------------|----------------|--------------------|----------------------|---------------|-------------------------|
| | | | 2A/2B | 2A/2B | 2A/2B | 2A/2B | 2A/2B |
| SW 95th Ave | SW 95th Ave @ SW SW Boones Ferry Rd | | 3/0 | 1/0 | 1/0 | 0/0 | 1/0 |
| | SW 95th Ave @ SW Commerce Cir | | 2/0 | 0/1 | 0/0 | 0/0 | 1/0 |
| | SW 95th Ave @ SW Ridder Rd | | 2/0 | 0/1 | 0/0 | 0/0 | 1/0 |
| | SW 95th Ave @ Boeckman Rd | | 2/0 | 0/1 | Ex | 0/0 | 1/0 |
| SW Elligsen Rd | SW Elligsen Rd @ I-5 SB Ramp | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | SW Elligsen Rd @ I-5 NB Ramp | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | SW Elligsen Rd @ SW Parkway Ave | | 2/0 | 1/0 | 1/0 | 0/0 | 0/1 |
| | SW Elligsen Rd @ Parkway Center Dr | | 2/0 | 0/1 | 0/0 | 1/0 | 1/0 |
| | SW Elligsen Rd @ Canyon Creek Rd N | | 0/0 | 0/1 | 0/0 | 0/0 | 0/1 |
| SW Kinsman Rd | SW Kinsman Rd @ SW Barber St | | 0/0 | 0/0 | Ex | 0/0 | 1/0 |
| SW Wilsonville Rd | SW Wilsonville Rd @ Willamette Way E | | 0/0 | 0/1 | 0/0 | 0/0 | 1/0 |
| | SW Wilsonville Rd @ SW Brown Rd | | 0/0 | 0/1 | 0/0 | 0/0 | 1/0 |
| | SW Wilsonville Rd @ SW Montebello Dr | | 0/0 | 0/1 | 0/0 | 0/0 | 0/1 |
| | SW Wilsonville Rd @ SW Kinsman Rd | | 0/2 | 0/1 | 0/0 | 0/0 | 1/0 |
| | SW Wilsonville Rd @ SW Boones Ferry Rd | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | SW Wilsonville Rd @ I-205 SB Ramps | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | SW Wilsonville Rd @ I-205 NB Ramps | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | SW Wilsonville Rd @ SW Town Center Lp W | | 0/0 | 1/0 | Ex | 0/0 | 1/0 |
| | SW Wilsonville Rd @ Rebekah St | | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| | SW Wilsonville Rd @ SW Town Center Lp E | | 0/0 | 0/1 | 0/0 | 0/0 | 1/0 |
| | SW Wilsonville Rd @ SW Meadows Loop | | 0/0 | 0/1 | 0/0 | 0/0 | 0/0 |
| | SW Wilsonville Rd @ SW Meadows Pkwy | | 0/0 | 0/1 | 0/0 | 0/0 | 1/0 |
| | SW Wilsonville Rd @ Stafford/Advance/Boeckman | | 0/0 | 0/1 | Ex | 0/0 | 1/0 |
| Total by phase | | | 13/2 | 8/13 | 2/0 | 1/0 | 17/3 |

Note: Phase 2A – Funded, Phase 2B – Not funded, Ex - Existing

10. Is the project included in an adopted local transportation safety plan or audit? ☐ Yes ☒ No
Please describe. *This project is identified in Clackamas County Freight ITS Action Plan. Which is a subset of Clackamas County overall ITS Plan.*
11. Describe the non-RFFA funding sources available and amounts necessary for the project to be completed. How secured is the funding for each funding source (Certain, Probable, or Competitive?)
In the previous RFFA funding through Metro, Clackamas County has been obligated approximately \$2.3 million (with local match) to complete Freight ITS Action Plan (Phase 1), design engineering and construction of approximately half of the high priority projects identified

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in Freight ITS Action plan in Phase 2A. Additional \$1.97 million will be necessary to complete the full implementation during Phase 2B. (See Table 3 below)

Table 3 – Project Phasing

| Project Phases | Cost Estimate | Funding |
|--|----------------------|---|
| Phase 1 – Planning (Freight ITS Plan, Systems Engineering/Concept of Operation) | \$200K | 2014-15 RFFA |
| Phase 2A – Engineering & Construction | \$2.1M | 2014-15/2016-18 RFFA |
| Phase 2B – Engineering & Construction | \$1.97M | 2022-2024 RFFA Request Unfunded (\$1.77M) Local Match (\$200K) |
| Total: | \$ 4.27M | |

12. Which Project Development Stages are to be considered for RFFA funding?

The project development stages proposed for RFFA funding are preliminary engineering, preparation of construction plans, bid letting and construction for phase 2B of Freight ITS project.

13. If your project is found to not be as far along as indicated or has specific challenges that need to be (re)addressed to improved technical feasibility, are you interested in RFFA funding for project development activities? ☐ Yes ☒ No

14. Attach or describe the project schedule and include information about important schedule considerations or drivers.

As described above, Clackamas County Freight ITS Action Plan was completed during Phase 1 of the project. Phase 2A, which involves design and construction of initial deployment plan, is scheduled to complete the design by December of 2020 and construction by July of 2022. Phase 2B (if funded through 2022-2024 RFFA grant), will start design around fall of 2022 and complete construction around summer of 2025. (See proposed Phase 2B project schedule below)

Clackamas County Regional Freight ITS Project

Phase 2B

Project Schedule

| Task Name | Duration | Start | Finish | Predecessors | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|-----------------------------|----------|--------------|--------------|--------------|------|------|------|------|------|------|
| 2022-2024 RFFA Award | 60 days | Wed 01/01/20 | Tue 03/24/20 | | Q1 | Q2 | Q3 | Q4 | | |
| IGA Process/Approval | 365 days | Wed 03/25/20 | Tue 08/17/21 | 1 | | | | | | |
| NTP | 30 days | Wed 08/18/21 | Tue 09/28/21 | 2 | | | | | | |
| Consultant RFP/Negotiations | 90 days | Wed 09/29/21 | Tue 02/01/22 | 3 | | | | | | |
| Survey | 45 days | Wed 02/02/22 | Tue 04/05/22 | 4 | | | | | | |
| Draft/Final DAP | 90 days | Wed 04/06/22 | Tue 08/09/22 | 5 | | | | | | |
| Preliminary Engineering | 90 days | Wed 08/10/22 | Tue 12/13/22 | 6 | | | | | | |
| Advance PS&E | 90 days | Wed 12/14/22 | Tue 04/18/23 | 7 | | | | | | |
| Final PS&E | 90 days | Wed 04/19/23 | Tue 08/22/23 | 8 | | | | | | |
| Ad, Bid, Award | 90 days | Wed 08/23/23 | Tue 12/26/23 | 9 | | | | | | |
| NTP | 30 days | Wed 12/27/23 | Tue 02/06/24 | 10 | | | | | | |
| Construction | 365 days | Wed 02/07/24 | Tue 07/01/25 | 11 | | | | | | |

Project Completeness

- 15.** At what stage of the project development process is the project, and what is the status of each project stage (refer to Defining Project Development Stages above)?

Clackamas County has completed the planning stage for this project by completing Freight ITS Action Plan during summer of 2018. This plan was completed through engagement with local stakeholders (County, ODOT, local cities, and freight community). Through the project screening process, list of ITS strategies and projects with the greatest potential to effectively address the County's goals and objectives were identified. During this process, ITS Systems Engineering Planning documents were developed along with ITS Architecture Compliance (Rule 940) ODOT Checklist. The project development stages proposed for RFFA funding are preliminary engineering, preparation of construction plans, bid letting and construction.

- 16.** Is right of way (ROW) acquisition likely? Will the project need any unique ROW requirements such as temporary easements, special coordination with other agencies? What is the status of the ROW acquisition task of the project?

Since the proposed ITS project strategies are low cost & low risk solutions, no additional right of way acquisition is anticipated on the project. All of ITS deployment will be on existing signal infrastructure.

- 17.** What project development (project study reports, transportation safety plan, safety audit, feasibility studies) has been completed? How recent are these reports or this project development, and are they still relevant? Are they in digital format for possible transfer?

In 2018, Clackamas County completed Clackamas County Regional Freight ITS Action Plan (see attached report). In addition, ITS Systems Engineering Planning documents, Needs Assessment, Concept of Operation, System Requirements, and ITS Architecture Compliance (Rule 940) ODOT Checklist has been developed. These reports are available in digital format.

- 18.** Does the project area intersect with Title 13 resource areas, wetlands, cemeteries, railroad tracks, Native American burial grounds, protected species habitat, or any other qualifiers that would require permitting?

No.

- 19.** To what extent has environmental permitting been scoped or completed?

No environmental permitting is anticipated with this project since most of the work will be on existing signal infrastructure.

Community Support

- 20.** What needs expressed by community members (e.g., unsafe crossing; egregiously long red lights) does the project address?

With outreach to Freight (Trucking) Association, members of the trucking association are concerned with long delays and reliability of travel time. They are also desiring wider level of deployment of travel time information via ODOT Tripcheck with travel delay, real-time travel time speeds, and traffic monitoring cameras along truck routes.

- 21.** Which community partners are involved?

The community partners involved in the Clackamas County Regional Freight ITS project are:

ODOT, City of Wilsonville (Transportation and Police), City of Gladstone, City of Milwaukie Public Works, Oregon Trucking Association, Metro, and Clackamas County Motor Carrier.

- 22.** Describe the agency and community support (and any opposition) for the project. Discuss the focus on equity and stakeholder engagement process.

During the planning process, there were outreach to all project stakeholders. During this process, project strategies were developed based on stakeholder involvement. Please refer to Freight ITS Action Plan.

Interagency Connections

- 23.** Are TriMet, SMART, or adjacent or overlapping jurisdictions (counties, cities) involved in and supportive of the project?

As described above, ODOT, City of Wilsonville, City of Gladstone, and City of Milwaukie were involved during the project planning process.

- 24.** Is the project on or does it connect with a separate agency facility? Indicate all potentially involved agencies' awareness of and cooperation with the project. Potential agencies include Oregon Department of Transportation (ODOT) (Highway, Rail divisions and others as required), railroads, utilities, Bonneville Power Administration, or Port of Portland.

Yes, this project during Phase 2B will deploy Freight ITS strategies (field devices) on County, ODOT, City of Wilsonville owned signal infrastructure. During the planning process, ODOT and local agencies were involved in development of County Regional Freight ITS Plan.

- 25.** Will utilities need to be relocated? Who owns the utilities and what is their level of awareness and support for the utility relocation?

No. Since most of the work will be on existing signal infrastructure, no utility relocation is anticipated with this project phase.

- 26.** Do you have design control consistently across the project area? If other agencies are affected by this project, do you have the necessary documentation of agreement regarding design elements reflected within this project? (Please obtain signatures as indicated on the Signature Page of this application.)

Clackamas County adheres to ODOT's design standards and specification. As for intergovernmental agreement with local agencies, County currently has maintenance agreement with both ODOT, and City of Wilsonville. These agreements can be amended to include new ITS deployment. Project level agreements will be completed during phase 2A of the project and continue into phase 2B of the project.

Project Risks

The following questions intend to identify potential risks to project completion.

- 27.** Has a person(s) with the proper authority reviewed and agreed to the project design, and signed off on this application? ☒ Yes ☐ No

- 28.** Are there any anticipated risks for the following:

a. Right of way (ROW)

- i. Are ROW acquisition costs included in the cost estimate?

No ROW will be needed with this project.

- ii. Were the federal Right of Way Uniform Act's acquisition and negotiation processes performed during the ROW acquisition stage or considered in the schedule and budget, for those projects which have not yet performed ROW acquisition?

N/A.

b. Utility Relocation

- i. Are utility relocation costs included in the cost estimate?

No utility relocation is anticipated with this project.

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c. Stormwater considerations

i. Water quantity

No water quantity impact is anticipated with this project.

ii. Water quality

No water quality impact is anticipated with this project.

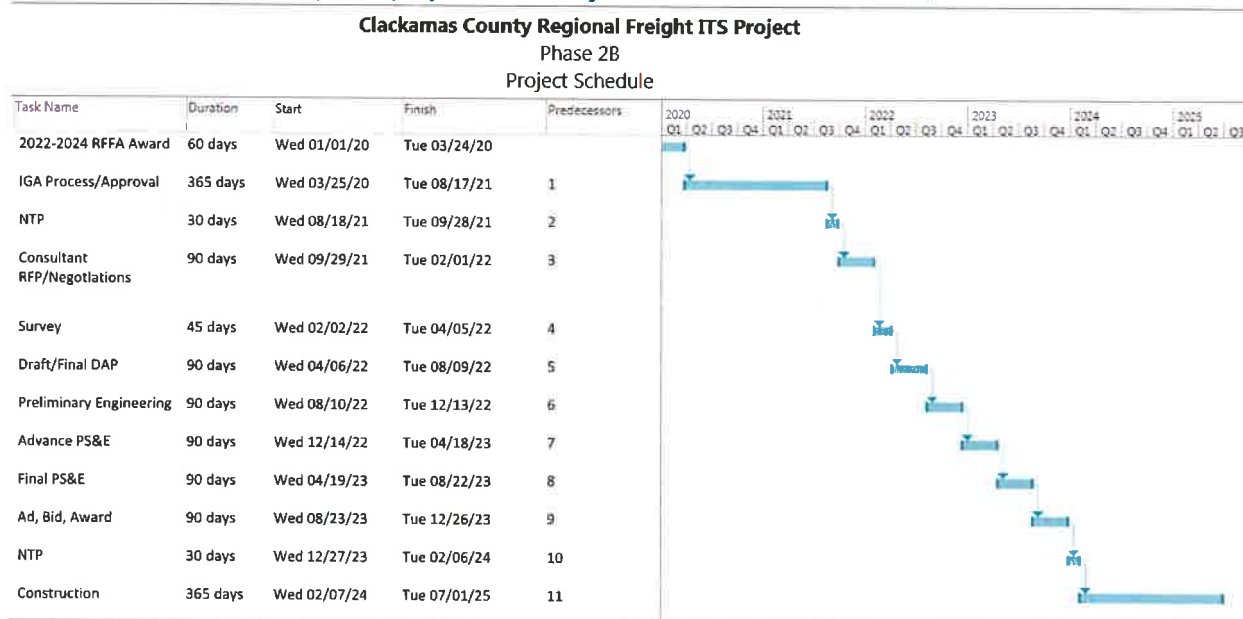
d. Environmental and Permitting

i. Have potential State environmental (SEPA)/ National Environmental Policy Act (NEPA) impacts been identified?

N/A.

e. Schedule

The anticipated project schedule for Phase 2B is shown below.



f. Budget *With previous round of RFFA grant allocation, planning phase of the project has been completed, and the remaining balance of \$2.1M is currently available to complete the Phase 2A of this project. With 2022-24 RFFA funding of \$1.97M, Phase 2B of this project will start after completion of Phase 2A.*

g. Staff availability

i. Does the agency have sufficient and qualified staffing resources to lead, manage, and deliver the project? Please describe. *Yes. Clackamas County is certified by ODOT to manage and design federally funded projects. County has trained transportation engineers (PE), certified professional traffic operations engineers (PTOE), ITS experts, and project managers qualified to complete this project.*

PROJECT DESIGN

Project designs will be scored on the level of safety and environmental improvements they can provide. A project that includes as many safety and environmental mitigation elements as feasible will more completely meet the criteria.

29. Describe the project elements and countermeasures that address safety.

Implement truck priority – Install truck signal dilemma zone protection/truck signal priority with remote communications and performance measure data collection. The technology detect

trucks and either extends green when an oncoming truck is detected in the dilemma zone, or extends the all red when a truck is detected entering the intersection late. Studies have found this technology can reduce angle crashes by 44% and all injury crashes by 11%.

Battery Backup System (BBS) at Signalized Intersection – Install uninterruptible power supply (UPS) battery backup system at critical intersections on arterials roads within the study area. Crash reduction may occur during power outages by reducing the frequency and length of signal downtime from power outages. In the event of catastrophic event, these critical signalized intersections with BBS can continue to operate if there is likelihood of interruption to power service.

- 30.** What countermeasures are included that reduce conflicts between modes (vehicles, pedestrians, bicycles, railroad crossings) and improve safety? (Use Appendix C design checklist, check all that apply) *Intelligent Transportation System (ITS) – Smart truck signal priority at signalized intersection.*
- 31.** What specific project design elements are aimed at reducing environmental impacts (street trees, bioswales, etc.)? *Intelligent Transportation System (ITS) – Smart truck signal priority at signalized intersection.*
- 32.** Are there additional design elements or countermeasures not on the checklist that are included in the project design that will improve safety and environmental outcomes? *Truck priority signal timing is expected to reduce number of run light running at signalized intersection and sudden stops. This will also help reduce stops and delay and in turn save fuel, reduce emissions, pavement wear, and tire and brake wear.*

Project Outcomes

Projects will be scored in terms of their ability to create positive outcomes that align with RFFA priorities and regional goals. The following questions aim to gather details directly related to those potential outcomes. Please provide all relevant data to support your response, using Metro-provided data or additional sources. Metro staff will provide data to the scoring committee to confirm

Affordability/Equity

- 33.** Is the project in an Equity Focus Area? ☒ Yes ☐ No Please indicate which Focus Area.

As noted, portions of this project will be in the Clackamas/Sunnyside area of Clackamas County unincorporated area and other portions will be in the City of Wilsonville. The majority of the Clackamas County project area, east of I-205 between OR 212 and Sunnyside Road is in the Equity Focus Areas. Census tracts 221.03 and 221.05 are in the "People of Color and/or Limited English Proficiency area." Census tract 221.07 is in the "People of Color and/or Limited English Proficiency and/or Low Income" Equity Focus Area.

- 34.** List the community placesⁱⁱ, affordable housing, and Title 1 schools within ¼ mile of project.

- *Title 1 School: There are no Title 1 schools within ¼ mile of either the Clackamas/Sunnyside portion of the project or the Wilsonville portion of the project.*
- *Community Places: This project will provide improvements in two large geographic areas. The Community Places in each of the two geographic areas are identified below:*

Clackamas/Sunnyside Area:

- *Medical: Kaiser Permanente Sunnyside Medical Center, and Kaiser Permanente Mt. Scott Medical Office*
- *Retail and Service Businesses: Clustered in the area of Sunnyside Rd / Steven's Rd, and along OR 212 between I-205 and 135th Ave, and along 82nd Dr from OR 224 to I-205.*

- *Affordable Housing:*
- *Parks and Natural Areas:* Mt. Talbert Nature Park, and Riverside Park are within ¼ mile of the project location. In addition the Sunrise Multiuse Path extends from SE 98th Court in the Clackamas Industrial Area to the intersection of OR 212 / 122nd Ave.

Wilsonville Area:

- *Medical:* Wilsonville Health Care, and Providence Medical Clinic – Wilsonville
 - *Retail and Service Businesses:* Many retail and service businesses are located within ¼ mile of the project on Wilsonville Rd and on Elligsen Rd.
 - *Affordable Housing:* Within Wilsonville there are many affordable housing units including 142 mobile home units, about 500 rental units for which occupants are paying 30% or less of their household income, and about 250 owner-occupied units for which occupants are paying 30% or less of their household income.
 - *Parks and Natural Areas:* Wilsonville Memorial Park, Town Center Park, Wilsonville Tranquil Nature Park, and Graham Oaks Nature Park.
-
- *Affordable Housing – The Clackamas/Sunnyside area has many affordable housing units within ¼ mile of the project including 830 mobile home units, over 1,000 rental units for which the occupants are paying 30% or less of their household income, and over 1,000 owner occupied units for which the occupants are paying 30% or less of their household income. Within ¼ mile of the Wilsonville portion of the project there are 142 mobile home units, about 500 rental units for which occupants are paying less than 30% of their household income and about 250 owner-occupied housing units for which the occupants are paying less than 30% of their household income.*

35. What are the estimated totals of low-income, low-English proficiency, non-white, seniors and youth, and persons with disabilities who will benefit from this project?

All of the improvements proposed as part of this project are intended to improve operational efficiency on major road corridors with the Clackamas/Sunnyside area and also in Wilsonville. These improvements will benefit all modes of transportation using those major road corridors, including freight, transit, bicyclists and pedestrians. The major road corridors improved in the Clackamas/Sunnyside area include Sunnyside Rd between I-205 and 152nd Ave, OR 212 between I-205 and 152nd Ave, and 82nd Dr between OR 224 and I-205. The census tracts served by those major roads include CT 215, CT 221.03, CT 221.05, CT 221.07 and CT 221.08. In Wilsonville the major road corridors are Wilsonville Rd, and also Elligsen Rd / Boones Ferry Road which are main east-west corridors and serve the entire population of Wilsonville.

- *The total estimated population of the Clackamas/Sunnyside Rd project area is 25,500 and the total number of households in the project area is 10,027. The total population of Wilsonville 22,789 and the total number of households is 9,090.*
- *The median household income for the Oregon portion of the Portland Urban Area is \$66,614. Of the households in the region 24.5% are very low income (below 50% of median household income) and 15.7% are low income (between 50% and 80% of median household income) for a total of 40.2% of regional households that are either low or very low income. Using regional median household income and most recent data, the Clackamas/Sunnyside project area was determined to have 2,096 very low income households below 50% of the regional*

median household income, and 2,077 low income households between 50% and 80% of the regional median household income for a total of 4,173 low or very low income households. Since there are 10,027 households in the Clackamas/Sunnyside project area this means that 20.9% of households in the project area are very low income, and 20.7% are low income, for a total of 41.6% very low or low income. In the Wilsonville project area there are 2,038 very low income households, and 1,661 low income households, for a total of 3,699 very low and low income households. The Wilsonville project has a total of 9,090 households meaning that the project area has 22.4% very low income households and 18.3% low income households meaning that the Wilsonville project area has 40.7% low or very low income households compared with 40.2% for the region. Combined both project areas have 7,872 households below 80% of the regional household income, or 41.2% of households below the regional median. This figure is slightly above the regional figure of 40.2% lower income households.

- The number of persons reporting that they spoke English “not-well” or “not at all” in the Clackamas/Sunnyside area is 559 or 2.3% of the project area population, and in the Wilsonville project area is 278 or 1.3% of the population. In both project areas a total of 837 people spoke English “not well” or “not at all” or 1.9% of the population 5 years of age or greater. This is a slightly lower share of the population than in the region where 3.9% of the Oregon portion of the Portland Urban Area reported that they spoke English “not well” or “not at all.”
- The non-white population (including non-white Latinos) is 16.4% of the Clackamas/Sunnyside project area population or 4,174 people and the non-white population of the Wilsonville project area is 3,673 people or 16.1% of the population. Overall, there are 7,847 individuals that are non-white in the two project areas making up 16.3% of the population. This is somewhat below the Portland Urbanized Area rate of 21.1% of people who are non-white.
- The youth (below 18 years) is 7,292 or 15.1% of the total population. This is below the regional figure of 21.5% below the age of 18 years.
- The senior population (65 or above) is 6,642 or 13.8% of the total population. This is slightly above regional figure of 12.7%.
- The number of persons with disabilities is 4,564 or 9.8% of the area population. This is slightly below the regional figure which is 10.3%.

The following table summarizes the equity analysis for the Freight ITS – Phase 2B project area:

| Equity Group | Portland Urbanized Area | Freight ITS Project Area |
|--------------------------|--------------------------------|---------------------------------|
| Low Income | 40.2% | 41.2% |
| Low English Proficiency | 3.9% | 1.9% |
| Non-white | 21.1% | 16.3% |
| Seniors | 12.7% | 13.8% |
| Youth | 21.5% | 15.1% |
| People with Disabilities | 10.3% | 9.8% |

36. What are the barriers faced by these communities that the project addresses or overcomes, and how will these populations benefit from this project?

All of the improvements proposed as part of this project are intended to improve operational efficiency on major road corridors with the Clackamas/Sunnyside area and also in Wilsonville. These improvements will benefit all modes of transportation using those major road corridors, including freight, transit, bicyclists and pedestrians.

- 37.** What contracting opportunities are available to Office for Business Inclusion and Diversity (COBID) firms through this project? What is your agency's policy, history, or removing of barriers to hire and advance COBID firms in infrastructure projects?

Clackamas County has been very active in providing opportunities for COBID firms in infrastructure projects. Clackamas County is an ODOT Local Certified Agency. As such Clackamas County is given targets by ODOT for inclusion and diversity among firms receiving contracts for both professional services and construction. Clackamas County has always been able to meet the targets given by ODOT. In addition, to encourage submittal of proposals and bids from inclusively from all types of businesses, Clackamas County distributes RFPs and bid materials not only to the typical clearinghouses but also for those that specifically encourage business diversity and inclusion such as ORPIN. Beyond infrastructure, the Clackamas County Procurement Office aggressively seeks proposals and bids from minority-owned, women-owned and service-disabled veteran-owned businesses for the materials and services required throughout the county government.

Safety

- 38.** How many fatal or serious injury crashes have occurred in the project area in the last 5 years (or most recent 5 years of available crash data)? *During the planning phase (see existing conditions memo), the following intersections within industrial areas were identified with various number of crashes and severity for 5 years spanning from 2011 to 2015.*

Table 4 - Clackamas Industrial Area Freight Needs (See figure 6)

| No. | Needs | Category |
|-----|--|----------|
| S-1 | <p><i>Need to reduce crashes at high frequency intersections and corridors, locations with eight or more crashes over study period, or a Fatal or Injury A crash (2011-2015):</i></p> <ul style="list-style-type: none"> <i>OR 212/I-205 interchange – 16 crashes, including 1 Injury A</i> <i>OR 224/SE Lake Road/SE Webster Road - 12 crashes</i> <i>OR 224/SE Pheasant Court – 1 Fatal crash, turning movement</i> <i>OR 224/Near SE Johnson Road – 8 crashes</i> | Safety |
| S-2 | <p><i>Need to reduce crashes at intersections and corridors, locations with three or more crashes over study period (2011-2015):</i></p> <ul style="list-style-type: none"> <i>OR 224/At ramp to SE 82nd Avenue, east side of SE 82nd Avenue – 4 crashes (two turning movement related)</i> <i>OR 212/SE 135th Avenue - 3 crashes</i> <i>OR 212/SE 114th Avenue - 4 crashes (all turning movement related)</i> <i>OR 212/130th Avenue - 3 crashes</i> <i>OR 212 – between SE 130th Avenue and SE 135th Avenue - 3 crashes</i> <i>I-205 NB at exit to 82nd Drive - 4 crashes (geometry issues with super-elevation)</i> <i>SE 82nd Drive near SE Herbert Court (east of I-205 and west of OR 224) – 3 crashes</i> <i>SE Jennifer Street/SE 122nd Avenue – 3 crashes, (all turn movement related)</i> | Safety |
| S-3 | <p><i>Need to reduce crashes at intersections with two crashes over study period (2011-2015):</i></p> <ul style="list-style-type: none"> <i>OR 212/SE 82nd Drive (all turning movement related)</i> <i>OR 212/SE 122nd Avenue</i> | Safety |

- OR 212/SE 152nd Avenue
- OR 212/OR 224 junction east of SE 152nd Avenue (all turning movement related)
- SE Jennifer Street/SE 120th Avenue
- SE Jennifer Street/SE Evelyn Street (all turning movement related)

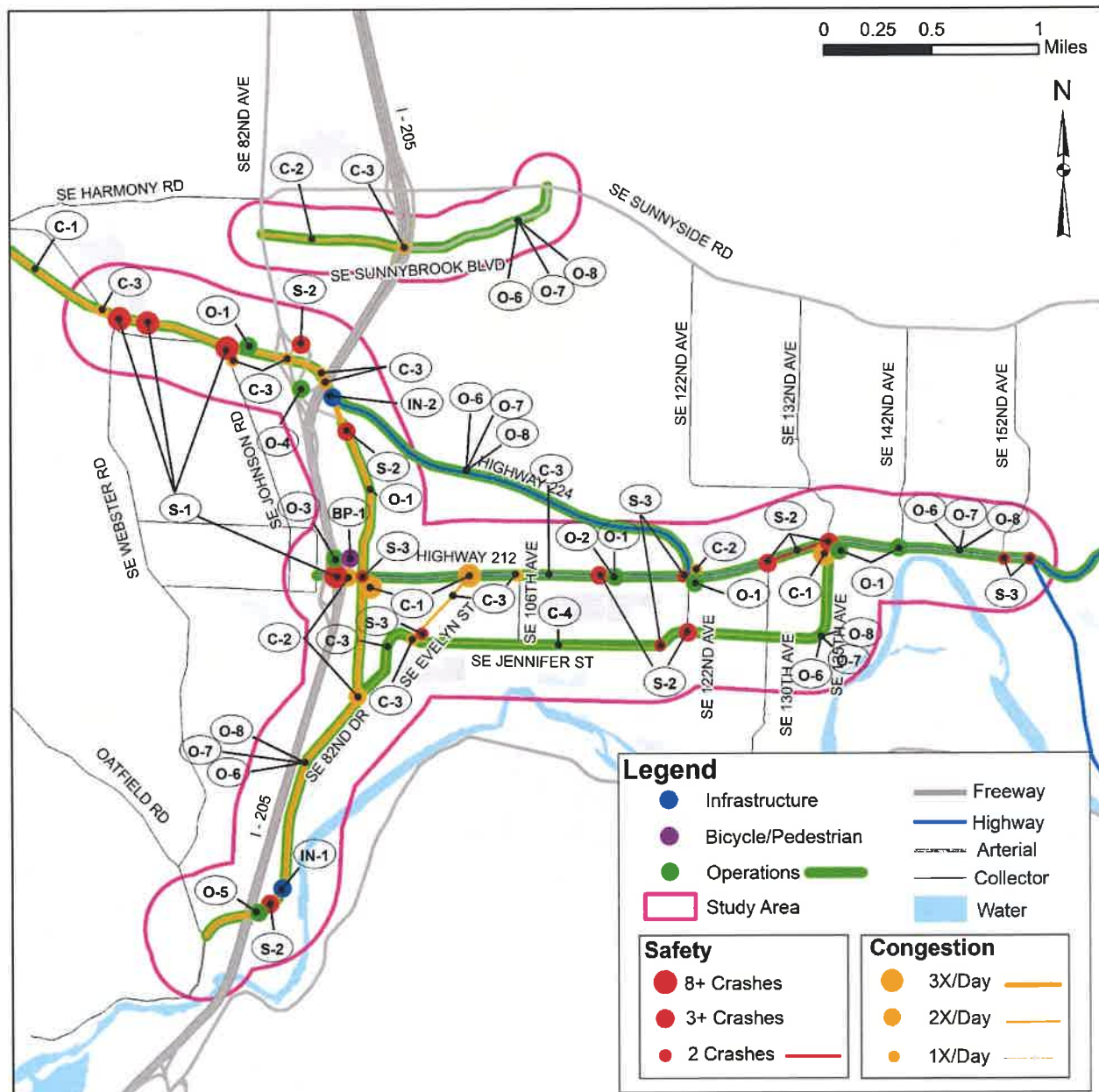


Figure 6 – Needs in the Clackamas Industrial Area

Table 5 - Wilsonville Industrial Area Freight Needs (See figure 7)

| No. | Needs | Category |
|-----|--|----------|
| S-1 | Need to reduce crashes at locations with three or more crashes over study period, or a Fatal or Injury A crash (2011-2015): <ul style="list-style-type: none"> • SW 95th Avenue and SW Ridder Road– 3 crashes, two turning movement related and one sideswipe | Safety |

| | | |
|-----|--|--------|
| S-2 | <p><i>Need to reduce crashes at locations with two crashes over study period (2011-2015):</i></p> <ul style="list-style-type: none"> • SW Elligsen Road/I-5 SB interchange • SW Wilsonville Road – SW Boones Ferry Road to I-205 NB ramps | Safety |
|-----|--|--------|

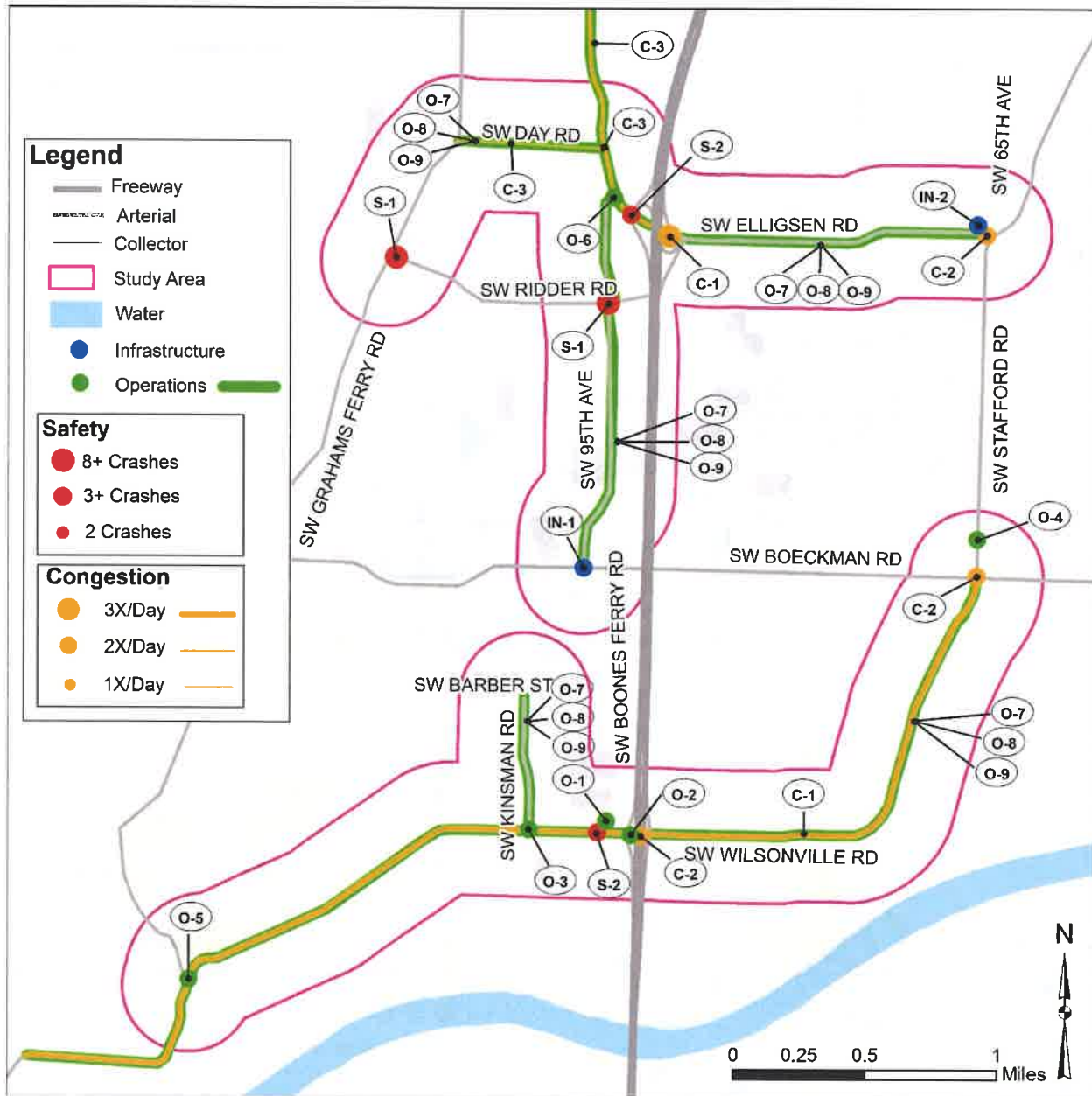


Figure 7 – Wilsonville Industrial Area Needs

39. How does the project aim to reduce the number of fatal or serious injury crashes?

Truck Signal Priority – Truck-related crashes were reduced by 0.5% in one study involving dilemma zone protection combined with an advanced warning (Appiah et al., 2011. CMF ID 4856). The same system also reduced angle crashes by 44% and all injury crashes by 11%. Another study found that dilemma zone detection (for all types of vehicles) based on connected vehicle data can reduce crashes by 20% with only a 2% decrease in efficiency.)

40. How does the project remove or mitigate conflicts, with (including) active transportation, railroad crossings, turning movements, and others? (Use Appendix C design checklist, indicate all that apply) *Intelligent Transportation System (ITS) elements – Truck Priority Signal Timing, Advanced Traffic Signal (ATC) Controllers.*

System Completion

41. What network gap(s) will be completed by this project? How will system connectivity or network deficiencies be improved? *No.*
42. How will access to active transportation be improved? What specific barriers in addition to the network gaps identified above will the project eliminate? *N/A.*

Multimodal Travel, Mode Share, and Congestion

43. How will the project reduce transit delay and improve transit reliability? *N/A.*
44. How does the project improve connections to transit and employment or residential sites/areas? *N/A.*
45. How will the project reduce vehicle trips or VMT (other than freight-related trips)? *N/A.*
46. How does the project reduce the need for throughway expansion?

Climate Change and Environmental Impact

47. Describe the measures included to specifically mitigate the project's greenhouse gas emissions and environmental impact. *Implementing truck signal priority at signalized intersection may also improve carbon emission and reduce pavement damage (reducing hard stop of heavy vehicles) by reducing total number of stop by 1% to 7% for all vehicle and 9% to 16% for trucks only at major truck moving direction.*
48. What specific project design elements are aimed at reducing environmental impacts (street trees, bioswales, etc.)?

Freight Related Impact

49. How does the project address freight travel time reliability and reoccurring or nonrecurring congestion affecting freight goods movement? *Yes, this project proposes to implement ITS strategies to improve freight operations and service reliability on corridors identified in the Clackamas and Wilsonville Industrial areas. According to PSU/PBOT's 2014 project report on Evaluation of Truck Signal Priority at N Columbia Blvd and Martin Luther King Jr. Blvd intersection, the following conclusions were drawn from the report:*
- "Priority may contribute to improved truck operations and its service reliability. When priority was provided, 13% to 21% improvements occurred in the travel delay and 20% to 32% improvements occurred in the stopped delay at major truck moving direction."*
 - "Priority may contribute to improved operations and service reliability for all vehicles in the major truck travel direction. When priority was provided, 0% to 8% improvements occurred in the travel delay and 2% to 9% improvements occurred in the stopped delay for all vehicles at major truck moving direction."*
 - "Provision of priority resulted in improved truck travel delay and reduced number of stops with little to no negative impacts on all traffic at the intersection."*
50. Is this project on a "Reduction Review Route" (defined and stipulated by statute; OAR 731-012 and ORS 366.215) and to what extent has coordination occurred with the freight industry? *Yes. During the planning phase of Freight ITS project, meeting was held with Oregon Trucking Association to discuss project goals and identify deficiencies related freight congestion, operation, and safety within the Clackamas and Wilsonville industrial area.*
51. If there is freight delay along the corridor, when does this delay occur, to what extent is there delay, and how does this project address that delay?

During the needs assessment, the following corridors within Clackamas and Wilsonville industrial area were identified as experiencing “near congestion” at various times of weekday periods (locations of “near congestion” are identified in tables 6 & 7 and figures 6 & 7 above).

Table 6 - Clackamas Industrial Area Freight Needs

| No. | Needs | Category |
|-----|---|------------|
| C-1 | <p>Need to reduce congestion at the following locations that experience “near congestion” during THREE time periods of the day (a.m., mid, p.m.):</p> <p>Segments:</p> <ul style="list-style-type: none"> OR 224, west of I-205 (a.m. and mid – EB and WB, p.m. – EB severe) SE 82nd Drive NB and SB (a.m., mid, p.m.) <p>Intersections:</p> <ul style="list-style-type: none"> OR 212/SE 82nd Drive (a.m., mid, p.m.) OR 212/SE Evelyn Street/SE 102nd Avenue (a.m., mid, p.m.) OR 212/SE 135th Avenue (a.m., mid, p.m.) | Congestion |
| C-2 | <p>Need to reduce congestion at the following locations that experience “near congestion” during TWO time periods of the day:</p> <p>Segments:</p> <ul style="list-style-type: none"> SE Sunnybrook Boulevard, west of I-205 EB and WB (mid, p.m.) <p>Intersections:</p> <ul style="list-style-type: none"> I-205/OR 212 (a.m., p.m.) SE 82nd Drive/SE Jennifer Street (mid, p.m.) OR 224/OR 212 (a.m., p.m.) | Congestion |
| C-3 | <p>Need to reduce congestion at the following locations that experience “near congestion” during ONE time period of the day:</p> <p>Segments:</p> <ul style="list-style-type: none"> SE Evelyn Street, between OR 212 and SE Jennifer Street NB and SB (mid) OR 212 between I-205 and OR 224 junction east of SE 152nd Avenue, EB and WB (p.m.) <p>Intersections:</p> <ul style="list-style-type: none"> I-205/OR 224 (p.m.) I-205/SE 82nd Drive Interchange (a.m.) I-205/SE Sunnybrook Boulevard interchange (p.m.) OR 224/SE 82nd Avenue (mid) OR 224/SE Johnson Road (a.m.) OR 224/SE Lake Road (p.m.) – also noted need during interview session and that Alder Creek Middle School is on the south side of this intersection. SE Evelyn Street and SE Jennifer Road (a.m.) | Congestion |
| C-4 | <p>Need to address growing congestion on SE Jennifer Street eastbound and westbound between OR 212 and SE 82nd Drive, which is used as an alternate route to avoid congestion on OR 212.</p> | Congestion |

Table 7 - Wilsonville Industrial Area Freight Needs

| No. | Needs | Category |
|------------|---|-----------------|
| C-1 | <p>Need to reduce congestion at the following locations that experience “near congestion” during THREE time periods of the day (a.m., mid, p.m.):</p> <p>Segments:</p> <ul style="list-style-type: none"> SW Wilsonville Road EB and WB (a.m. – east of I-5 Boeckman Road to Rose Lane and west of I-5 to Graham Oaks Nature Park, mid – Wilsonville Town Center to Brown Road, and p.m.- Wilsonville Town Center to Graham Oaks Nature Park) <p>Intersections:</p> <ul style="list-style-type: none"> I-5 and SW Elligsen Road Interchange (a.m., mid, p.m.) | Congestion |
| C-2 | <p>Need to reduce congestion at the following locations that experience “near congestion” during TWO time periods of the day:</p> <p>Intersections:</p> <ul style="list-style-type: none"> I-5 and SW Wilsonville Road Interchange (mid, p.m.) SW Wilsonville Road/Boeckman Road (a.m., mid) SW 65th Avenue/SW Elligsen Road/SW Stafford Road (a.m., p.m.) | Congestion |
| C-3 | <p>Need to reduce congestion at the following locations that experience “near congestion” during ONE time period of the day:</p> <p>Segments:</p> <ul style="list-style-type: none"> SW Day Road, EB (p.m.) SW Elligsen Road, west of I-5 NB(p.m.) <p>Intersections:</p> <ul style="list-style-type: none"> SW Day Road and SW Elligsen Road (p.m.) | Congestion |

The comprehensive “toolbox” of freight ITS treatments and Freight ITS Project Performance Measures will provide a variety of ITS system improvements that will help enhance travel time reliability and reduce freight traffic delay in the project area.

Employment/Economic Development

- 52.** Describe the employment area(s) served by this project. What is the number of current and projected jobs in traded sectors? *Clackamas County and Wilsonville industrial areas. Project corridors are adjacent to industrial land uses with businesses that generate significant truck activity.*
- 53.** Describe how the project supports and catalyzes low-carbon and resource efficient economic sectors. *This project proposes to improve travel the time reliability and safety of the regional freight system. Reduction in freight delays and stops at signalized intersection will likely result reduction in carbon emissions.*

Project Leverage

- 54.** How does this project leverage other funding sources? *County has been authorized to contribute local match of \$200K (10.27% match) from road funds for this project. In addition, this project will be re-utilizing the PS&E delivery, project intergovernmental agreements, and permitting process from Phase 2A of the Freight ITS project.*
- 55.** Will the receipt of RFFA funding position the region to take advantage of federal and state funding opportunities as they arise? If so, explain. *No.*
- 56.** Will this help advance any Transportation Systems Management and Operations (TSMO) goals and strategies? *Yes, this project addresses all four major goals (improve travel time reliability,*

improve safety, improve air quality, and provide traveler information) are identified in TSMO Plan.

57. Is this project on the Regional Emergency Transportation Network?ⁱⁱⁱ Will this project help improve resiliency of the transportation network? If so, describe how. *Yes, this project limits include corridors within the Regional Emergency Transportation Network. By improving truck detection at various signals, optimizing signal timing, deploying traffic monitoring cameras, posting traffic cameras on ODOT Tripcheck (traveler information) website, and installing battery backup system at critical signals improve resiliency of the transportation network.*

PROJECT COST ESTIMATE

58. What is the source of the project cost estimate?

☐ **Conceptual:** These cost estimates are used where a significant need has been identified but a detailed project scope has not been developed. These cost estimates have the potential to change significantly as the project scope becomes more defined.

☒ **Planning level:** These cost estimates are based on a generally defined scope. Cost estimates are usually based on limited field-work and general cost assumptions. No actual design work has been done prior to the development of these cost estimates. The cost estimate could still change significantly as design work begins, but the estimate is more reliable than the conceptual estimates. (e.g., comprehensive plan, TSP, Metro cost estimate worksheet, corridor plan).

☐ **Engineering level:** These cost estimates are based on actual preliminary design work. If done for all facets of the project and there are no further additions to the project scope, these estimates should represent a fairly accurate cost for the project. (e.g. detailed planning report, preliminary engineering, final design, NEPA documentation, etc.)

59. During what project development stage (refer to page 9 of the RFFA application guidebook) was the cost estimate created?

☐ Planning

☒ Alternatives Identification and Evaluation

☐ Preliminary Design

☐ Final Design

60. What year was the cost estimate created? Does it include any escalation factors and to what year? *Using project list from 2018 Freight ITS Plan, unit cost for ITS strategies were adjusted to 2019 average unit. Assuming project obligation will be funded in 2022, this cost estimate assumes project escalation of 3.5% (increase) per year from 2019 to 2022. (See cost estimate in Table 7 below)*

61. To what extent were the following considered during cost estimating?

a. Right of way (ROW) – *No impact.*

b. Utility relocation or underground – *No impact.*

c. Stormwater considerations – *No impact.*

d. Environmental mitigation strategies – *No impact.*

e. Bridge, railroad, or major facility impacts – *No impact.*

f. Retaining walls – *No impact.*

g. Clearing and grading – *No impact.*

h. Removal of current pavement or facilities – *No impact.*

i. Signing and pavement markings – *No impact.*

j. Sidewalk and street furniture – *No impact.*

k. Street trees, landscaping, irrigation – *No impact.*

l. Mobilization, staging, and traffic control - *Large project limits. Contractor will have to conduct rolling mobilization within the project area.*

m. Staff availability or need for outside services -

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62. Please attach your cost estimate. Verify that it includes the following items:

- Unit cost assumptions – *See Table 8 below.*
- Contingency assumptions – *Since this project proposes to primarily install ITS field devices on existing signal cabinets and signal poles, there is very low risk with this project. Project assumes 10% contingency.*

Table 7 – Phase 2B project cost estimate

| 2022-2024 RFFA - COST ESTIMATE - 2019 | | | | | |
|--|--|--------|------------|---------------|------------------------|
| Clackamas County | | | | | |
| HIGHWAY: | Clackamas County Regional Freight ITS Project - Phase 2B | | | COUNTY | |
| Various | | | | Clackamas | |
| PROJECT NUMBER | KIND OF WORK | LENGTH | DATE | PREPARED BY | |
| | Traffic Signal Modification and ITS | 0 | 06/19/2019 | Clackamas | |
| ITEM NUMBER | ITEM DESCRIPTION | UNIT | AMOUNT | UNIT COST | TOTAL |
| 0210-010000A | MOBILIZATION | LS | 1 | \$ 110,160.00 | \$ 110,160.00 |
| 0225-0101000A | TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE | LS | 1 | \$ 81,600.00 | \$ 81,600.00 |
| 0990-0102000A | SIGNAL MODIFICATION, SE 82nd Dr | LS | 1 | \$ 202,500.00 | \$ 202,500.00 |
| 0990-0102000A | SIGNAL MODIFICATION, OR 212 | LS | 1 | \$ 227,000.00 | \$ 227,000.00 |
| 0990-0102000A | SIGNAL MODIFICATION, OR 224 | LS | 1 | \$ 91,000.00 | \$ 91,000.00 |
| 0990-0102000A | SIGNAL MODIFICATION, SE Sunnybrook Blvd | LS | 1 | \$ 185,000.00 | \$ 185,000.00 |
| 0990-0102000A | SIGNAL MODIFICATION, SE 95th Ave | LS | 1 | \$ 61,000.00 | \$ 61,000.00 |
| 0990-0102000A | SIGNAL MODIFICATION, SW Elligsen Rd | LS | 1 | \$ 59,000.00 | \$ 59,000.00 |
| 0990-0102000A | SIGNAL MODIFICATION, SW Wilsonville Rd | LS | 1 | \$ 194,500.00 | \$ 194,500.00 |
| CONSTRUCTION SUBTOTAL | | | | | \$ 1,211,760.00 |
| | Preliminary Engineering (Consultant) | LS | 1 | \$ 100,000.00 | \$ 100,000.00 |
| | Construction Engineering (Consultant) | LS | 1 | \$ 45,000.00 | \$ 45,000.00 |
| | Clackamas County PE Costs | LS | 1 | \$ 45,000.00 | \$ 45,000.00 |
| | Clackamas County CE Costs | LS | 1 | \$ 75,000.00 | \$ 75,000.00 |
| | ODOT Admin Cost | LS | 1 | \$ 25,000.00 | \$ 25,000.00 |
| | Signal Timing with Before & After Report (including counts) (Consultant) | LS | 1 | \$ 150,000.00 | \$ 150,000.00 |
| | System Engineering/Other Phase | LS | 1 | \$ - | \$ - |
| | Escalation (3.5% increase per year from 2019 to 2022) | | 3.5% | | \$ 179,576.00 |
| AGENCY & CONSULTANT SERVICES SUBTOTAL | | | | | \$ 619,576.00 |
| | Construction and Risk Contingency | | 10% | | \$ 139,052.25 |
| TOTAL PROJECT COST - (2022 DOLLARS ROUNDED) | | | | | \$ 1,970,400.00 |
| | Local Match (10.27%) Rounded | | 10.27% | \$ - | \$ 202,361.00 |
| | 2022-2024 RFFA Grant | | 89.73% | \$ - | \$ 1,768,040.00 |

Table 8 – Cost breakdown by project corridor (Clackamas Industrial Area)

| 00990 | SIGNAL MODIFICATION, SE 82nd Dr | Item Description | Unit | Amount | Unit Cost | Total |
|-------|---|---|------|--------|-------------|---------------------|
| | | ATC CONTROLLER (WITH MAXVIEW LICENSE) | EA | 9 | \$4,000.00 | \$36,000.00 |
| | | Truck Priority Detection - Two radar system | EA | 3 | \$22,000.00 | \$66,000.00 |
| | | Truck Priority Detection - Three radar system | EA | 1 | \$29,500.00 | \$29,500.00 |
| | | Truck Priority Detection - Four radar system | EA | 0 | \$37,000.00 | \$0.00 |
| | | UPS Battery Backup | EA | 4 | \$15,000.00 | \$60,000.00 |
| | | Traffic Surveillance | EA | 1 | \$6,500.00 | \$6,500.00 |
| | | Count Station | EA | 0 | \$15,000.00 | \$0.00 |
| | | Travel Time Measurement | EA | 1 | \$4,500.00 | \$4,500.00 |
| | | | | | | \$202,500.00 |
| 00990 | SIGNAL MODIFICATION, OR 212 | Item Description | Unit | Amount | Unit Cost | Total |
| | | ATC CONTROLLER (WITH MAXVIEW LICENSE) | EA | 9 | \$4,000.00 | \$36,000.00 |
| | | Truck Priority Detection - Two radar system | EA | 4 | \$22,000.00 | \$88,000.00 |
| | | Truck Priority Detection - Three radar system | EA | 0 | \$29,500.00 | \$0.00 |
| | | Truck Priority Detection - Four radar system | EA | 0 | \$37,000.00 | \$0.00 |
| | | UPS Battery Backup | EA | 4 | \$15,000.00 | \$60,000.00 |
| | | Traffic Surveillance | EA | 2 | \$6,500.00 | \$13,000.00 |
| | | Count Station | EA | 2 | \$15,000.00 | \$30,000.00 |
| | | Travel Time Measurement | EA | 0 | \$4,500.00 | \$0.00 |
| | | | | | | \$227,000.00 |
| 00990 | SIGNAL MODIFICATION, OR 224 | Item Description | Unit | Amount | Unit Cost | Total |
| | | ATC CONTROLLER (WITH MAXVIEW LICENSE) | EA | 6 | \$4,000.00 | \$24,000.00 |
| | | Truck Priority Detection - Two radar system | EA | 0 | \$22,000.00 | \$0.00 |
| | | Truck Priority Detection - Three radar system | EA | 0 | \$29,500.00 | \$0.00 |
| | | Truck Priority Detection - Four radar system | EA | 1 | \$37,000.00 | \$37,000.00 |
| | | UPS Battery Backup | EA | 1 | \$15,000.00 | \$15,000.00 |
| | | Traffic Surveillance | EA | 0 | \$6,500.00 | \$0.00 |
| | | Count Station | EA | 1 | \$15,000.00 | \$15,000.00 |
| | | Travel Time Measurement | EA | 0 | \$4,500.00 | \$0.00 |
| | | | | | | \$91,000.00 |
| 00990 | SIGNAL MODIFICATION, SE Sunnybrook Blvd | Item Description | Unit | Amount | Unit Cost | Total |
| | | ATC CONTROLLER (WITH MAXVIEW LICENSE) | EA | 7 | \$4,000.00 | \$28,000.00 |
| | | Truck Priority Detection - Two radar system | EA | 4 | \$22,000.00 | \$88,000.00 |
| | | Truck Priority Detection - Three radar system | EA | 0 | \$29,500.00 | \$0.00 |
| | | Truck Priority Detection - Four radar system | EA | 0 | \$37,000.00 | \$0.00 |
| | | UPS Battery Backup | EA | 3 | \$15,000.00 | \$45,000.00 |
| | | Traffic Surveillance | EA | 0 | \$6,500.00 | \$0.00 |
| | | Count Station | EA | 1 | \$15,000.00 | \$15,000.00 |
| | | Travel Time Measurement | EA | 2 | \$4,500.00 | \$9,000.00 |
| | | | | | | \$185,000.00 |

Table 9 – Cost breakdown by project corridor (Wilsonville Industrial Area)

| 00990 | SIGNAL MODIFICATION, SE 95th Ave | Item Description | Unit | Amount | Unit Cost | Total |
|-------|--|---|------|--------|-------------|---------------------|
| | | ATC CONTROLLER (WITH MAXVIEW LICENSE) | EA | 4 | \$4,000.00 | \$16,000.00 |
| | | Truck Priority Detection - Two radar system | EA | 0 | \$22,000.00 | \$0.00 |
| | | Truck Priority Detection - Three radar system | EA | 0 | \$29,500.00 | \$0.00 |
| | | Truck Priority Detection - Four radar system | EA | 0 | \$37,000.00 | \$0.00 |
| | | UPS Battery Backup | EA | 3 | \$15,000.00 | \$45,000.00 |
| | | Traffic Surveillance | EA | 0 | \$6,500.00 | \$0.00 |
| | | Count Station | EA | 0 | \$15,000.00 | \$0.00 |
| | | Travel Time Measurement | EA | 0 | \$4,500.00 | \$0.00 |
| | | | | | | \$61,000.00 |
| 00990 | SIGNAL MODIFICATION, SW Elligsen Rd | Item Description | Unit | Amount | Unit Cost | Total |
| | | ATC CONTROLLER (WITH MAXVIEW LICENSE) | EA | 5 | \$4,000.00 | \$20,000.00 |
| | | Truck Priority Detection - Two radar system | EA | 0 | \$22,000.00 | \$0.00 |
| | | Truck Priority Detection - Three radar system | EA | 0 | \$29,500.00 | \$0.00 |
| | | Truck Priority Detection - Four radar system | EA | 0 | \$37,000.00 | \$0.00 |
| | | UPS Battery Backup | EA | 2 | \$15,000.00 | \$30,000.00 |
| | | Traffic Surveillance | EA | 0 | \$6,500.00 | \$0.00 |
| | | Count Station | EA | 0 | \$15,000.00 | \$0.00 |
| | | Travel Time Measurement | EA | 2 | \$4,500.00 | \$9,000.00 |
| | | | | | | \$59,000.00 |
| 00990 | SIGNAL MODIFICATION, SW Wilsonville Rd | Item Description | Unit | Amount | Unit Cost | Total |
| | | ATC CONTROLLER (WITH MAXVIEW LICENSE) | EA | 12 | \$4,000.00 | \$48,000.00 |
| | | Truck Priority Detection - Two radar system | EA | 1 | \$22,000.00 | \$22,000.00 |
| | | Truck Priority Detection - Three radar system | EA | 0 | \$29,500.00 | \$0.00 |
| | | Truck Priority Detection - Four radar system | EA | 0 | \$37,000.00 | \$0.00 |
| | | UPS Battery Backup | EA | 8 | \$15,000.00 | \$120,000.00 |
| | | Traffic Surveillance | EA | 0 | \$6,500.00 | \$0.00 |
| | | Count Station | EA | 0 | \$15,000.00 | \$0.00 |
| | | Travel Time Measurement | EA | 1 | \$4,500.00 | \$4,500.00 |
| | | | | | | \$194,500.00 |

2022-2024 RFFA Project Application

All relevant applicant agency and other agency staff with authority must attest to the design and cost estimates of the project, and that proper coordination and cooperation exists between all parties. Please attach additional signature pages as warranted.

Applicant agency staff signatures:

Project manager

J. S. Hunsbary

Engineering

J. S. Hunsbary

Right of Way

Sharon Hunsbary - SR/WA

Environmental

N/A

Other agency signatures (as required):

ODOT Highway

ODOT Rail

TriMet

SMART

Utilities

Railroads

Other (please indicate)

Ed Dancy, Jr. City Engineer
City of Wilsonville, OR. 6/20/19

¹ Available for download at: oregonmetro.gov/urban-growth-management-functional-plan

² Community places are defined as key local destinations such as schools, libraries, grocery stores, pharmacies, hospitals and other medical facilities, general stores, parks, greenspaces, and other places that provide key services and/or daily needs.

³ oregonmetro.gov/sites/default/files/2019/04/05/Regional_Emergency_Transportation_Routes_2006.pdf

2022-2024 RFFA Public Engagement and Non-Discrimination Certification

Submitting agency name: Clackamas County

Project name: Clackamas County Regional Freight ITS Project – Phase 2B

Background and purpose

Use of this checklist is intended to ensure project applicants have offered an adequate opportunity for public engagement, including identifying and engaging historically marginalized populations. Applications for project implementation (construction) are expected to have analyzed the distribution of benefits and burdens for people of color, people with limited English proficiency and people with low income compared to those for other residents. The checklist demonstrates:

- project sponsors have performed plan-level public engagement, including identifying and engaging historically marginalized communities, during development of local transportation system plans, subarea plans or strategies, topical plans or strategies (e.g., safety), modal plans or strategies (e.g., freight) and transit service plans from which the applicant project is drawn.
- if project development is completed, project sponsors have performed project-level public engagement, including identifying and engaging historically marginalized populations, and have analyzed potential inequitable impacts for people of color, people with limited English proficiency and people with low incomes compared to those for other residents.
- if project development is not completed, project sponsors attest the intent to perform project-level public engagement, including identifying and engaging historically marginalized populations, and to analyze potential inequitable impacts for people of color, people with limited English proficiency and people with low income compared to those for other residents.

Metro is required to comply with federal (US. Department of Transportation, Federal Highways Administration and Federal Transit Administration) and state (ODOT) guidance on public engagement and on Title VI of the Civil Rights Act and other civil rights requirements. Documentation of the local actions described below may be requested by regulators; if such a request is unable to be met, the allocation may be found to be out of compliance, requiring regional and local corrective action.

The completed checklist will aid Metro in its review and evaluation of projects for the 2022-2024 regional flexible funds allocation.

Instructions

Applicants must complete this certification, including a summary of non-discriminatory engagement (see Section 2) and certification statement (see Section 3), for projects submitted to Metro for consideration for 2022-2024 regional flexible funding.

Project sponsors should keep referenced records on file in case of a dispute. Retained records are not submitted to Metro unless requested.

A public engagement quick guide is available at oregonmetro.gov/rffa. Please forward questions regarding the public involvement checklist to regional flexible funds allocation project manager Dan Kaempff at daniel.kaempff@oregonmetro.gov or 503-813-7559.

1. Checklist

Transportation or service plan development (from which the applicant project was drawn)

- ☒ At the beginning of the agency's transportation system, topical modal, subarea or transit service plan, a public engagement plan was developed to encourage broad-based, early and continuing opportunity for public involvement.

Retained records: public engagement plan and/or procedures

- ☒ During the development of the agency's transportation system, topical, modal, subarea or transit service plan, a jurisdiction-wide demographic analysis was completed to understand the locations of communities of color, people with limited English proficiency, people with low income and, to the extent reasonably practicable, people with disabilities, older adults and youth in order to include them in engagement opportunities.

Retained records: summary of or maps illustrating jurisdiction-wide demographic analysis

- ☒ Public notices included a statement of non-discrimination (Metro can provide a sample).

Retained records: public engagement reports including/or dated copies of notices

- ☒ Throughout the process, timely and accessible forums for public input were provided.

Retained records: public engagement reports including/or descriptions of opportunities for ongoing engagement, descriptions of opportunities for input at key milestones, public meeting records, online or community survey results

- ☒ Throughout the process, appropriate interested and affected groups were identified and contact information was maintained in order to share project information, updates were provided for key decision points, and opportunities to engage and comment were provided.

Retained records: public engagement reports including/or list of interested and affected parties, dated copies of communications and notices sent, descriptions of efforts to engage the public, including strategies used to attract interest and obtain initial input, summary of key findings; for announcements sent by mail or email, documented number of persons/groups on mailing list

- ☒ Throughout the process, focused efforts were made to engage underrepresented populations such as communities of color, limited English proficient and low-income populations, disabled, seniors and youth. Meetings or events were held in accessible locations with access to transit. Language assistance was provided, as needed, which may include translation of key materials, using a telephone language line service to respond to questions or take input in different languages and providing interpretation at meetings or events.

Retained records: public engagement reports including/or list of community organizations and/or diverse community members with whom coordination occurred; description of language assistance resources and how they were used, dated copies of communications and notices, copies of translated materials, summary of key findings

☒ Public comments were considered throughout the process, and comments received on the staff recommendation were compiled, summarized and responded to, as appropriate.

Retained records: public engagement reports or staff reports including/or summary of comments, key findings and final staff recommendation, including changes made to reflect public comments

☒ Adequate notification was provided regarding final adoption of the plan or program, at least 15 days in advance of adoption, if feasible, and follow-up notice was distributed prior to the adoption to provide more detailed information. Notice included information and instructions for how to testify, if applicable.

Retained records: public engagement reports or final staff reports including/or dated copies of the notices; for announcements sent by mail or email document number of persons/groups on mailing list

Project development

This part of the checklist is provided in past tense for applications for project implementation (construction) funding where the project development has been completed. Parenthetical notes in future tense are provided for applicants that have not completed project development to attest to ongoing and future activities.

☒ At the beginning of project development, a public engagement plan was (shall be) developed to encourage broad-based, early and continuing opportunity for public involvement.

Retained records: public engagement plan and/or procedures

☒ During project development, a demographic analysis was (shall be) completed for the area potentially affected by the project to understand the locations of communities of color, people with limited English proficiency, people with low income and, to the extent reasonably practicable, people with disabilities, older adults and youth in order to include them in engagement opportunities.

Retained records: summary of or maps illustrating demographic analysis

☒ Throughout project development, public notices were (shall be) published and requests for input were (shall be) sent in advance of the project start, engagement activity or input opportunity.

Retained records: dated copies of notices (may be included in retained public engagement reports)

☒ Throughout project development, public documents included (shall include) a statement of non-discrimination (Metro can provide a sample).

Retained records: public documents, including meeting agendas and reports

☒ Throughout project development, timely and accessible forums for public input were (shall be) provided.

Retained records: descriptions of opportunities for ongoing engagement, descriptions of opportunities for input at key milestones, public meeting records, online or community survey results (may be included in retained public engagement reports)

☒ Throughout project development, appropriate interested and affected groups were (shall be) identified and contact information maintained in order to share project information, updates were (shall be) provided for key decision points, and opportunities to engage and comment were (shall be) provided.

Retained records: list of interested and affected parties, dated copies of communications and notices sent, descriptions of efforts to engage the public, including strategies used to attract interest and obtain initial input, summary of key findings; for announcements sent by mail or email, documented number of persons/groups on mailing list (may be included in retained public engagement reports)

☒ Throughout project development, focused efforts were made to engage historically marginalized populations, including people of color, people with limited English proficiency and people with low income, as well as people with disabilities, older adults and youth. Meetings or events were held in accessible locations with access to transit. Language assistance was provided, as needed, such as translation of key materials, use of a telephone language line service to respond to questions or take input in different languages, and interpretation at meetings or events.

Retained records: description of focused engagement efforts, list of community organizations and/or community members representing diverse populations with whom coordination or consultation occurred, description of language assistance resources and how they were used, dated copies of communications and notices, copies of translated materials, summaries of key findings (may be included in retained public engagement reports)

☒ Throughout – and with an analysis at the end of – project development, consideration was (shall be) given to potential inequitable impacts of the project for people of color, people with limited English proficiency and people with low income compared to those for other residents, as identified through engagement activities.

Retained records: description of identified populations and information about and analysis of potential inequitable impacts of the project for them in relation to other residents (may be included in retained public engagement reports)

☒ Public comments were (shall be) considered throughout project development, and comments received on the staff recommendation were (shall be) compiled, summarized and responded to, as appropriate.

Retained records: summary of comments, key findings and changes made to final staff recommendation or adopted plan to reflect public comments (may be included in retained public engagement reports or legislative staff reports)

☒ Adequate notification was (shall be) provided regarding final adoption of the plan, including how to obtain additional detailed information, at least 15 days in advance of adoption. Notice included (shall include) information on providing public testimony.

Retained records: dated copies of the notices; for announcements sent by mail or email, documentation of number of persons/groups on mailing list (may be included in retained public engagement reports or legislative staff reports)

2. Summary of non-discriminatory engagement

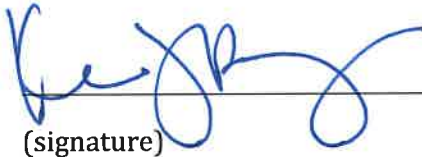
Attach a summary (1-2 pages) of the key elements of:

- if project development is completed, the public engagement process for this project, including outreach to communities of color, people with limited English proficiency and people with low income
- if project development is not completed, the public engagement plan for this project or agency public engagement practice, including outreach to communities of color, people with limited English proficiency and people with low income.

3. Certification statement

CLACKANAS COUNTY (agency) certifies the information provided on this checklist is accurate.

As attested by:


(signature)

Karen Buehrig
Long Range Planning Manager
(name and title)

6.20.19
(date)

Summary of Nondiscriminatory Engagement Plan

Clackamas County will conduct nondiscriminatory public engagement during the project development for the Regional Freight ITS Project – Phase 2B.

This project involves technical work and installation of elements in the existing right-of-way to increase the safety and reliability of freight travel. The project elements were developed with the expertise of our traffic engineers in consultation with traffic and freight experts and constituencies. Given the technical aspects of the project and the “invisible” nature of the project infrastructure, public engagement needs to be targeted. Information about the project, including the benefits to users and the general public, will be shared with appropriate stakeholders. The County will consider environmental justice issues – the fair treatment and meaningful involvement of all people regardless of race, color, national origin or income – in the development and final deployment of the Regional Freight ITS Project – Phase 2B.

The following section describes the aspects of the nondiscriminatory engagement and public outreach efforts of the project:

- A postcard in English and Spanish will be sent to any affected property owners, residents and businesses in the project area to inform them of the project and how it might impact them.
- Project staff members will meet as necessary with leadership from the freight community in both the Clackamas and Wilsonville industrial areas to gather input from these groups.
- Meetings will be held at locations accessible by transit in both project areas.
- Translation / interpretation will be provided upon request at meetings.
- Key community groups -- including Community Planning Organizations (CPOs) – will be kept informed of the project.
- A web site hosted on the Clackamas County site will be open throughout the project and will include background documents and project information.

FINAL ACTION PLAN **Clackamas County Freight ITS**

June 2018



DKS



ACKNOWLEDGMENTS

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Executive Summary

The Clackamas County Freight ITS plan intends to improve the reliability and safety of the regional freight system by reducing freight vehicle delay in known congested areas and to improve freight-related roadway design deficiencies within Clackamas County. The project considers two geographically distinct study areas, the Clackamas Industrial Study Area (shown in Figure 1) and the Wilsonville Industrial Study Area (shown in Figure 2). While I-205 and I-5 traverse the two study areas, respectively, this project focuses on the first and last mile arterial connections.

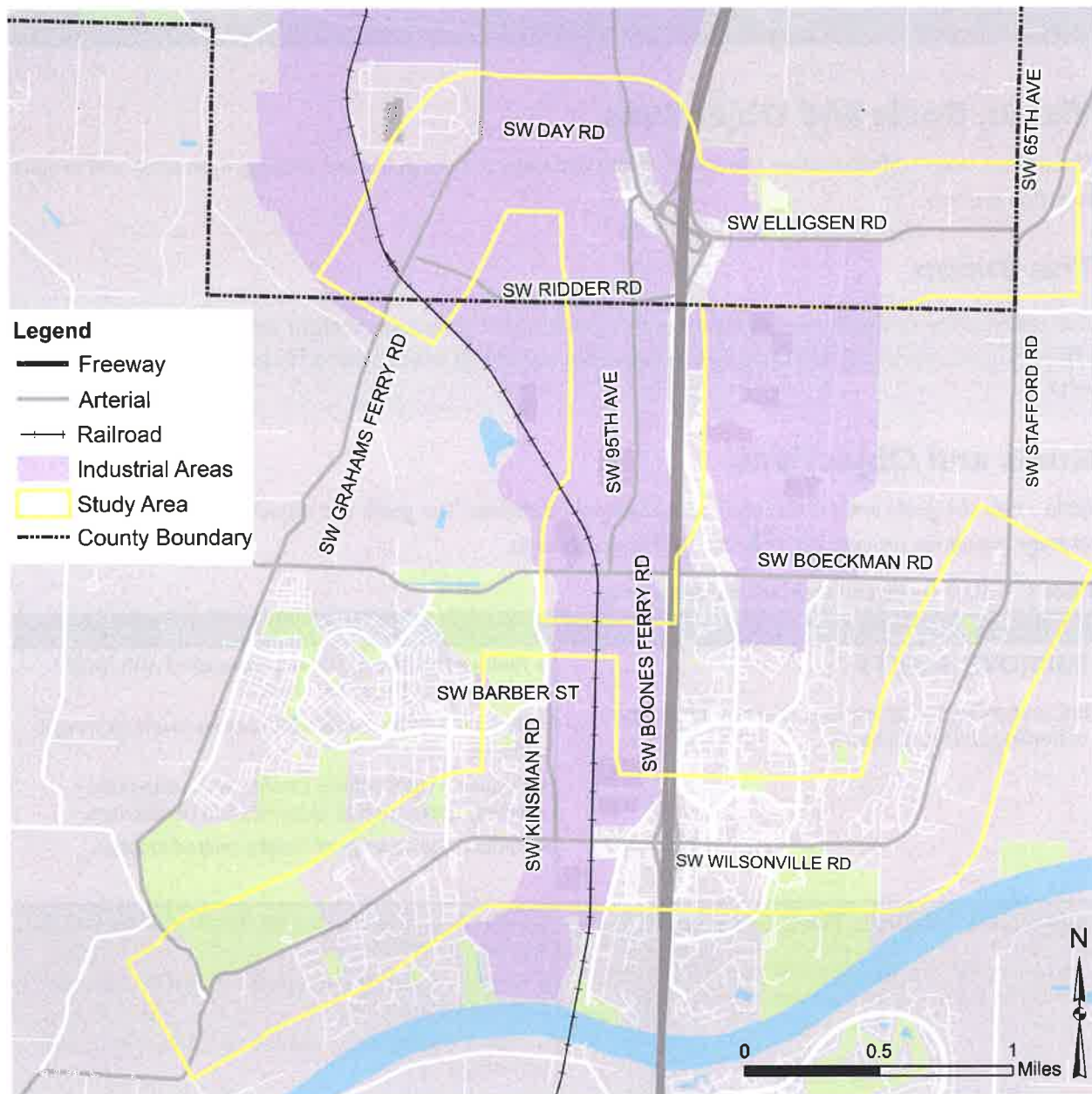
The Clackamas Industrial Study Area is defined by OR 224, OR 212, and SE 82nd Avenue/Drive. The separated northern portion of this study area captures the employment and commercial activities along SE Sunnybrook Boulevard. The Union Pacific (UP) railroad mainline travels through the area with a spur line providing rail access for industrial businesses adjacent to SE Jennifer. While the UPRR mainline is grade separated through the Clackamas industrial area, there are several at-grade crossings of the spur line.

The Wilsonville Industrial Study Area is defined by SW Grahams Ferry Road, SW Day Road, and SW Boones Ferry Road/SW Elligsen Road in the north; the middle of the study area is defined by SW 95th Avenue and SW Boeckman Road; and the southern portion of the study area is defined by SW Wilsonville Road and SW Kinsman Road. The Portland and Western short line railroad and WES commuter rail pass through Wilsonville with at-grade crossings of SW Wilsonville Road, SW Barber Street, and SW Boeckman Road. SW Grahams Ferry Road is height restricted due to a low railroad bridge structure.



[illegible]

Figure 2. Wilsonville Industrial Study Area



The Action Plan

In the following sections, the Action Plan provides an overview of the process that was used to identify and develop projects that will improve reliability and safety for freight. This process was completed through engagement with local stakeholders (County, ODOT, local cities, and freight community). Additional details regarding the interim analysis are captured in technical memoranda that were developed throughout the process.

Goals and Operational Objectives

Vision, Goals and Objectives

The project team crafted a vision statement, goals, and objectives to guide the strategy evaluation and project selection process.

The Vision

Use technology to implement cost-effective solutions that ensure freight vehicles can safely and efficiently access the Clackamas and Wilsonville industrial areas with a focus on first and last mile.

Goals and Objectives

Table 1 lists the goals and corresponding operational objectives. The goals and objectives were applied to the strategy evaluation process, described in following sections.

Table 1. Project Goals and Operational Objectives

| GOALS | OPERATIONAL OBJECTIVES |
|--|---|
| IMPROVE SAFETY Improve safety for all roadway users by advancing technology based solutions. | <ul style="list-style-type: none">● Reduce the rate of crashes associated with freight movements in the study areas.● Reduce turning movement crashes involving freight vehicles.● Reduce freight vehicle crashes with vulnerable roadway users such as bicyclists and pedestrians.● Reduce the severity of freight-related crashes. |
| IMPROVE TRAVEL TIME EFFICIENCY Improve travel time for “first and last mile” trips* within the study area through use of technology. | <ul style="list-style-type: none">● Reduce number of stops for freight vehicles during first and last mile trips.● Reduce average travel time for freight through the first and last mile trips.● Improve travel time reliability to aid on-time arrivals and deliveries.● Reduce the duration of vehicle idling time (which in turn reduces local exhaust emissions). |
| SUPPORT INDUSTRIAL LAND USE Improve connectivity to industrial land uses for the “first and last mile” trips* by advancing technology based solutions. | <ul style="list-style-type: none">● Improve public roadway access to/from industrial facilities.● Communicate permanent system physical/operational constraints, recurring issues, and unique incidents to reduce the out-of-direction travel for freight vehicles.● Entice industrial businesses to operate in the Clackamas and Wilsonville industrial areas. |

Note: * “first and last mile” trips intended to denote the surface-street travel occurring on arterial and local system connections between the trip origin/destination and the freeway system

Various regional initiatives and plans were reviewed and considered during the development of the goals and objectives. The Clackamas County Freight ITS Plan goals are consistent with:

- Metro Regional Freight Plan for 2035 (2010)
- Oregon Freight Plan (2011)
- Oregon Freight Advisory Committee Goals (2017)
- Clackamas County Transportation Safety Action Plan (2012)
- Clackamas County Transportation Plan (2013)



Screening Process

Through the screening process, the ITS strategies and projects with the greatest potential to effectively address the County's goals and objectives were identified. Summarize the screening process used to apply the goals and operation objectives to an initial set of ITS strategies, moving to a refined list of 15 and then to the 5 high-priority near-term projects. Include Strategy Toolbox table for High Level Screening and table for Refined Evaluation.

The proposed screening methodology uses a two-step process, illustrated in Figure 1:

1. Preliminary screening – ensuring the strategies match the needs and achieve the goals. The initial screening should narrow the full toolbox of strategies to about 15 strategies that advance to further screening.
2. Further screening – evaluating the strategies compared to feasibility factors, benefits, and other elements to help prioritize and narrow the selection of strategies.

Preliminary Sketch Level Screening

Using the sketch level screening the project team will narrow the selection of strategies to approximately 15 strategies to advance for further screening.

1. Does the strategy address a need? Yes or No (list which needs are addressed).
2. How well does the strategy achieve each of the project goals?

Compare each of the strategies to the goals and how well each of the strategies achieves the goals. The proposed scale ranges from -1 to +3, with the -1 representing a negative impact to the goal and a +3 representing strong compliance with the goals.

When presenting the information publicly, icons could be used in place of the numerical scoring, as shown in the table below.

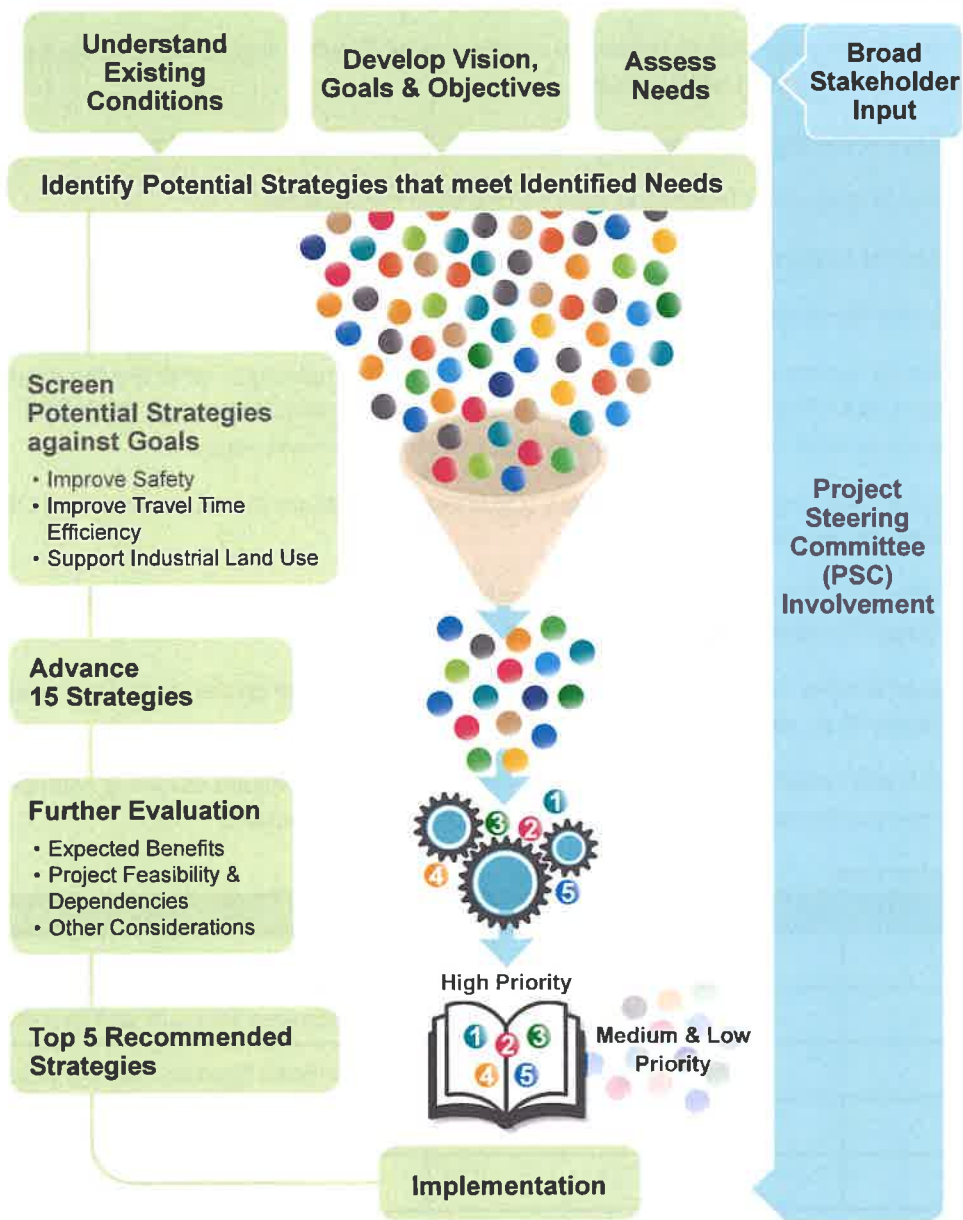
Table 2. Example scoring table.

| RANKING | OPTION TO SHOW AS AN ICON | MEANING |
|---------|---------------------------|---|
| 3 | ● | Significantly achieves the project goal |
| 2 | ◐ | Moderately achieves the project goal |
| 1 | ◑ | Minimally achieves the project goal |
| 0 | ◒ | No impact to project goal |
| -1 | ○ | Negatively impacts project goal |

Further Screening

Based on the results from this second screening process, a subset of five high priority near term projects will be selected. Screening will be location specific for this part of the project, and only evaluate the strategies that advance through the preliminary sketch level screening. Some of these criteria could be scored on the -1 to 3 scale as indicated in the previous section, and other criteria would be a yes or no response.

Figure 3. Clackamas County Freight ITS Plan Project Process



When determining screening criteria is it important to consider possible biases, and prevent double counting or applying too much weight to one criteria. For example, cost could be a separate category, however, it may be double counted if the feasibility criteria for physical and operational and maintenance factors are evaluated.

1. General considerations:

- a.** Location – Is the project located in Clackamas County?
- b.** Does the project address ITS projects identified by previous plans?
- c.** Does the project address both freight ITS needs and ITS needs for other modes of travel?
- d.** What type of facility is the project on? (county vs state or local)
- e.** ADA Improvements – Does the strategy trigger the need for ADA improvements?

2. Expected benefits:

- a.** Does the strategy reduce crashes or crash severity? To what degree? Specific studies or crash modification factors (CMFs) will be cited.
- b.** Does the strategy improve freight operations? To what degree? (qualitative)
- c.** What magnitude of freight travelers benefit from this strategy?
- d.** Does the project enhance performance monitoring capabilities?

3. How easily can the project be implemented? Project dependencies and feasibility considerations:

- a.** Physical factors (initial capital cost and construction complexity) – what are the expected initial capital costs for construction? Are any central system upgrades necessary? What field equipment needs to be installed? (see cost ranges and scoring on next page).
- b.** Operational and maintenance factors (O&M cost) – What are the expected annual O&M costs? Does the strategy require an additional FTE?
- c.** Institutional factors – Is there legal, organizational, policy, and intra- or inter-agency support for the strategy? To what degree? If not, what are the obstacles?
- d.** Dependencies – Does implementation of the strategy depend on the stage or progress of other strategies? If so, what?
- e.** ROW and Construction Considerations – Does the strategy require obtaining additional ROW? Does implementation require digging or disturbing current infrastructure?

Table 3. Initial Capital Cost











| RANKING | OPTION TO SHOW AS AN ICON | INITIAL CAPITAL COST RANGE |
|---------|---|-------------------------------------|
| 3 |  | Less than \$100,000 |
| 2 |  | Between \$100,001 and \$500,000 |
| 1 |  | Between \$500,001 and \$1,000,000 |
| 0 |  | Between \$1,000,001 and \$3,000,000 |
| -1 |  | Greater than \$3,000,001 |

Table 4. Annual Operations and Maintenance Costs

| RANKING | OPTION TO SHOW AS AN ICON | GREATER THAN \$150,000 |
|---------|---|--------------------------------|
| 3 |  | Less than \$5,000 |
| 2 |  | Between \$5,000 and \$25,000 |
| 1 |  | Between \$25,000 and \$75,000 |
| 0 |  | Between \$75,000 and \$150,000 |
| -1 |  | Greater than \$150,000 |

Solutions/Strategy Toolbox

The project team developed a toolbox of strategies to address the identified needs. The toolbox (developed in spreadsheet format) provided the basis for the strategy screening and evaluation. Table 5 lists the strategies developed for each need category.

Table 5. Strategy Toolbox - All Potential Strategies Evaluated

| NEED CATEGORY | STRATEGY |
|---|---|
| Safety | <ul style="list-style-type: none"> • Truck priority. Install truck signal dilemma zone protection/truck signal priority with remote communications and performance measure data collection* • Signal timing update. Update signal timing to increase initial green time for key side street phases. Option to use a sensor to determine truck presence and activate when necessary* • Upgrade overheight warning system. Provide more advanced and activated warning for low height bridges (Over height vehicle detection system)* • Queue warning system. Deploy arterial queue warning system with remote communications and performance measure data collection* • Install presence detection on far side of stop bar for all-red extension with remote communications and performance measure data collection • Conflict warning system. Install intersection conflict warning system (non-signalized intersections) with remote communications and performance measure data collection* |
| Operations and Congestion Management | <ul style="list-style-type: none"> • Provide signal control at uncontrolled locations • Reconfigure intersection • Restripe roadway and install dual right turn lanes • Manage freight parking • Restrict truck movementsInstall new roadway signing • Signal coordination (signal timing). Deploy or update coordinated signal timing with remote communications and performance measure data collection* • Signal modification (signal timing). Retime traffic signals and phasing including side street minimum green for trucks* • Adaptive signal. Deploy adaptive traffic signal control with remote communications and performance measure data collection* • Traveler information. Provide real-time roadway information to dispatchers and freight carriers* • Curve warning. Install activated curve speed warning* • Study traffic signal warrantsInstall automated freight restriction enforcement • Uninterrupted Power Supply (UPS) battery backup. Install battery backup systems at critical intersections* • Traffic surveillance. Install pan-tilt-zoom camera systems to monitor critical intersections* • Count station. Install permanent traffic counting systems at key locations with remote communications and performance measure collection* • Performance measurement. Install travel time monitoring systems on key corridors with remote communications and performance measure collection* • Portable Monitoring trailer. Deploy a Portable Monitoring Trailer with radar, cameras, and counters to monitor facilities* • Weight In Motion (WIM). Install a WIM station on arterial roadway* |

| NEED CATEGORY | STRATEGY |
|----------------------------|---|
| Pedestrian and Bike | <i>Note: Pedestrian and bicycle strategies were not developed as such needs were outside the scope of the project.</i> |
| Infrastructure | <ul style="list-style-type: none"> • Increase height of the RR crossing on SW Grahams Ferry south of SW Cutter Rd • Restripe intersections for freight trucksRe-grade roadway • Install mountable curbs • Provide a direct roadway connection |

Note: While strategies to address infrastructure needs were identified, these strategies dropped from future consideration due to inconsistency with the project goals.

Strategy Evaluation and Screening Process

The evaluation process included a high-level screening followed by a refined evaluation, as summarized in Figure 1 in a prior section.

High Level Screening Process

An initial high-level screening process was applied to each of the strategies in the toolbox. This preliminary screening consisted of a consideration for consistency with each of the project goals. The application of the high-level screening process resulted in the 16 strategies receiving the highest scores (reflecting consistency with the project goals) and advancing to further evaluation. These 16 strategies are denoted with bold in Table 2.

Advanced Screening

The refined screening evaluation was applied to the 16 strategies as described in the Draft Screening Criteria Memo2. While the high-level screening focused on consistency with the project goals, the advanced screening evaluated additional considerations:

- **General Considerations (Considered but not scored)**
 - Is the project in Clackamas County?
 - Are modes other than freight addressed?
 - Does the strategy trigger the need for ADA improvements?
- **Benefits (Scored criteria, related to goals and objectives)**
 - Crash reduction
 - Freight operations
- **Magnitude of freight travelers that benefit**
- **Performance monitoring capabilities**
- **Feasibility (Scored criteria)**
 - Physical factors (capital costs)
 - Annual operation and maintenance cost
 - Institutional factors
 - Dependencies
 - ROW and construction consideration

The project team evaluated the 16 strategies to determine how well they scored against the criteria listed above. The Benefits criteria and Feasibility criteria were evaluated separately, which allowed the team to identify strategies with high potential for benefit and were also highly feasible. Each strategy was rated on a scale of -1 to +3. A summary of the scoring and factors for each criterion (as applied to each strategy) are attached and the resulting scoring for each strategy is summarized in Table 3.

Table 6. Results of Refined Evaluation for Strategies

| REF | STRATEGY | BENEFITS SCORE | FEASIBILITY SCORE | OUTCOME |
|---------------|-------------------------------------|----------------|-------------------|--|
| SAF.1 | Truck Priority | 2.8 | 2.8 | Advance to Deployment Plan |
| SAF.2 | Signal Timing Update | 0.8 | 2.6 | Implement through regular O&M activities and budget |
| SAF.3 | Upgrade Overheight Warning System | 1.5 | 1.6 | Not Advanced – Project located outside of Clackamas County |
| SAF.4 | Queue Warning System | 1.8 | 2.2 | Not advanced at this time – limited benefit for freight. |
| SAF.6 | Conflict Warning System | 2.0 | 2.6 | Not advanced at this time – crashes at locations identified for this strategy tend to be low frequency and low severity. |
| OCM.3 | Signal Modification | 0.8 | 1.8 | Implement through regular O&M activities and budget |
| OCM.9 | Signal Coordination (Signal Timing) | 2.0 | 2.8 | Implement through regular O&M activities and budget |
| OCM.10 | Adaptive Signal | 2.3 | 2.4 | Not advanced at this time. Monitor Sunnyside implementation before expanding to other corridors |
| OCM.13 | Curve Warning | 1.3 | 1.4 | Not advanced at this time – location identified for this strategy may be addressed using a static sign or other “low-tech” solution. |
| OCM.16 | UPS Battery Backup | 2.0 | 3.0 | Advance to Deployment Plan |
| OCM.17 | Traffic Surveillance | 1.5 | 3.0 | Advance to Deployment Plan |
| OCM.18 | Count Station | 1.8 | 2.6 | Advance to Deployment Plan |
| OCM.19 | Performance Measurement | 1.5 | 2.8 | Advance to Deployment Plan |
| OCM.20 | Portable Monitoring Trailer | 1.5 | 2.4 | Advance to Deployment Plan |

| REF | STRATEGY | BENEFITS SCORE | FEASIBILITY SCORE | OUTCOME |
|--------|---|----------------|-------------------|---|
| OCM.21 | Weigh In Motion (WIM) Station on Arterial | 0.3 | 1.4 | Not advanced at this time – limited benefit for a WIM station on an arterial. |
| OCM.22 | Traveler Information – Comparison Travel Time Display | 1.0 | 0.8 | Not advanced at this time – would require VMS installation on the freeway. |

Deployment Plan

Six strategies were advanced to the Deployment Plan as listed in Table 4, based upon the ordination summarized in Table 6 (prior table).

Table 7. Phased Project List

| REF | PROJECT NAME | BENEFITS SCORE | FEASIBILITY SCORE | |
|--------|-----------------------------|----------------|-------------------|----------------------------|
| OCM.16 | UPS Battery Backup | 2.0 | 3.0 | Advance to Deployment Plan |
| OCM.17 | Traffic Surveillance | 1.5 | 3.0 | Advance to Deployment Plan |
| OCM.18 | Count Station | 1.8 | 2.6 | Advance to Deployment Plan |
| OCM.19 | Performance Measurement | 1.5 | 2.8 | Advance to Deployment Plan |
| OCM.20 | Portable Monitoring Trailer | 1.5 | 2.4 | Advance to Deployment Plan |
| SAF.1 | Truck Priority | 2.8 | 2.8 | Advance to Deployment Plan |

Summaries for each of the strategies are provided in cut sheets.

PROJECT 1: Truck Priority SAF.1

Description and Locations

Install truck signal dilemma zone protection/truck signal priority with communications and performance measure collection. The technology detects trucks and either extends green when an oncoming truck is detected in the dilemma zone, or extends the all red when a truck is detected entering the intersection late. Exact configuration can be decided during design stages.

Upgrading signal controllers and optimizing signal timing where truck priority is used, as needed.

Install at priority traffic signals along these routes:

| Clackamas Industrial Area | Wilsonville Industrial Area |
|---------------------------|-----------------------------|
| OR 224 | SE 95th Ave @ SE Ridder Rd |
| OR 212 | SW Elligsen Rd @ I-5 SB |
| 82nd Dr | SW Wilsonville Rd |



Benefits

Crash Reduction

Truck-related crashes were reduced by 0.5% in one study involving dilemma zone protection combined with an advanced warning (Appiah et al., 2011. CMF ID 4856). The same system also reduced angle crashes by 44% and all injury crashes by 11%. Another study found that dilemma zone detection (for all types of vehicles) based on connected vehicle data can reduce crashes by 20% with only a 2% decrease in efficiency.)

Feasibilities

Capital Costs

\$15k per intersection (source: ODOT Regional ATM project)

Operations and Maintenance Costs

\$500 per intersection (assumes 3% of capital cost)

Freight Operations

Reduced stopping and delay saves fuel, reduces emissions, pavement wear, and tire and brake wear.

Magnitude of Benefits to Freight

Portion of trucks that tend to benefit from signal priority ranges from 4% to 22%.

Performance Monitoring Capabilities

Documents activations. Monitor the number of activations and compare with crash data

Institutional Factors

Coordination with ODOT needed for signals along OR 224 and 212

Dependencies

Preceded by systems to store/manage data

Construction Considerations

No new ROW required. Minimal impact to existing infrastructure

PROJECT 2: Uninterruptible Power Supply Battery Backup OCM.16

Description and Locations

Install uninterruptible power supply (UPS) battery backup systems at critical intersections on these corridors:

| Clackamas Industrial Area | Wilsonville Industrial Area |
|---------------------------|--|
| SE 82nd Dr | SW Wilsonville Rd (Note: at Wilsonville/Stafford/Boeckman/ Advance battery back up is in progress) |
| SE Jennifer St | SW Elligsen Rd |
| SE Sunnybrook Blvd | SW 95th Ave (Note: at Elligsen/95th battery back up is in progress) |
| OR 212 | SW Kinsman Rd |
| OR 224 | SW Day Rd |



Benefits

Crash Reduction

May reduce crashes that could occur during power outages by reducing the frequency and length of signal downtime from power outages.

Freight Operations

Reduces delay and stops for freight during a power outage.

Magnitude of Benefits to Freight Travelers

Benefits all freight traffic during a power outage.

Performance Monitoring Capabilities

Monitor battery health, frequency of power outages, length of outages

Feasibilities

Capital Costs

Approx. \$15k per intersection (Source: Clackamas County)

Operations and Maintenance Costs

< \$1k. Should reduce O&M for existing signals. Anticipate maintenance will fall within existing traffic signal cabinet maintenance activity.

Institutional Factors

Support from Clackamas County operations.

Installation along OR 224 and OR 212 may require coordination with ODOT.

Dependencies

None

Construction Considerations

No new ROW required. Minimal impact to existing infrastructure

PROJECT 3: Traffic Surveillance OCM.17

Description and Locations

Install pan-tilt-zoom camera systems to monitor critical intersections on these corridors:

| Clackamas Industrial Area | Wilsonville Industrial Area |
|---------------------------|-----------------------------|
| SE 82nd Dr | SW Wilsonville Rd |
| SE Jennifer St | SW Elligsen Rd |
| SE Sunnybrook Blvd | SW 95th Ave |
| OR 212 | SW Kinsman Rd |
| OR 224 | SW Day Rd |



Benefits

Crash Reduction

Not expected to directly reduce crashes.

Freight Operations

Improves management of traffic signal system, providing indirect benefit to freight.

Magnitude of Benefits to Freight Travelers

Benefit to freight travelers over time through better operations management of system.

Performance Monitoring Capabilities

Not expected to directly provide performance measurement capabilities. Augments other performance measure strategies by providing visual check

Feasibilities

Capital Costs

Approx. \$5k to \$10k per intersection (Source: ODOT Regional ATM project)

Construction Considerations

No new ROW required. Minimal impact to existing infrastructure.

Operations and Maintenance Costs

< \$1k. Cleaning cameras, replacing faulty equipment.

Institutional Factors

Support from Clackamas County operations. No obstacles are anticipated. Could coordinate with ODOT to integrate new cameras into ODOT TripCheck.

Dependencies

Camera monitoring system (Note: already in place)

PROJECT 4: Count Stations OCM.18

Description and Locations

Install permanent traffic counting systems at key locations with communications and performance measure collection.

| Clackamas Industrial Area | Wilsonville Industrial Area |
|---------------------------|-----------------------------|
| SE 82nd Dr | SW Wilsonville Rd |
| SE Jennifer St | SW Elligsen Rd |
| SE Sunnybrook Blvd | SW 95th Ave |
| OR 212 | SW Kinsman Rd |
| OR 224 | SW Day Rd |



Benefits

Crash Reduction

Not expected to directly reduce crashes.

Freight Operations

Improves management of roadway system, providing indirect benefit to freight.

Magnitude of Benefits to Freight Travelers

Benefit to freight travelers over time through better operations management of system.

Performance Monitoring Capabilities

Measures speeds, volumes, and vehicle classifications.

Feasibilities

Capital Costs

Approx. \$5k to \$10k per location assuming power and comm are nearby. If placing mid-block and additional comm or power is needed, assume \$50/foot. (Source: DKS cost estimating tool)

Operations and Maintenance Costs

< \$1k per year

Institutional Factors

Support from Clackamas County operations. Should involve coordination with Clackamas County departments and staff who use traffic count data. Could

involve coordination with Portal for regional data archiving. Installation along OR 224 and OR 212 may require coordination with ODOT.

Dependencies

Should be preceded by systems to store and manage data collected

Construction Considerations

No new ROW required. Minimal to moderate impacts to existing infrastructure, depending on existing conduit availability

PROJECT 5: Performance Measurement OCM.19

Description and Locations

Install travel time monitoring systems on key corridors with communications and performance measure collection.

| Clackamas Industrial Area | Wilsonville Industrial Area |
|---------------------------|-----------------------------|
| SE 82nd Dr | SW Wilsonville Rd |
| SE Jennifer St | SW Elligsen Rd |
| SE Sunnybrook Blvd | SW 95th Ave |
| OR 212 | SW Kinsman Rd |
| OR 224 | SW Day Rd |



Benefits

Crash Reduction

Not expected to directly reduce crashes.

Freight Operations

Improves management of roadway system, providing indirect benefit to freight.

Magnitude of Benefits to Freight Travelers

Benefit to freight travelers over time through better operations management of system.

Performance Monitoring Capabilities

Measures speeds and travel times. Useful for before/after analyses.

Feasibilities

Capital Costs

\$2 to \$3k per unit

Operations and Maintenance Costs

< \$1k per unit

Institutional Factors

Support from Clackamas County operations. Could involve coordination with Portal for regional data archiving. Installation along OR 224 and OR 212 may require coordination with ODOT.

Dependencies

Needs to integrate with existing BlueMAC travel time monitoring system

Construction Considerations

No new ROW required. Minimal to moderate impacts to existing infrastructure.

PROJECT 6 Portable Monitoring Trailer OCM.20

Description and Locations

Deploy portable trailer with radar, cameras, and counters to monitor facilities.

Portable trailers can be used to monitor traffic, and in particular trucks that bypass WIM stations. They can be moved easily to be deployed at work zones or temporary events. There are options around the type of equipment to include on the trailer.



Benefits

Crash Reduction

Could reduce crashes if a speed feedback sign is included.

Freight Operations

Would improve understanding of volume, travel time, and vehicle classification. This information could inform operations and system management decisions.

Magnitude of Benefits to Freight Travelers

Small benefit to freight travelers over time through better operations management of system

Performance Monitoring Capabilities

Measures speeds, volumes, classifications, travel times.

Feasibilities

Capital Costs

Approx. \$30k to \$60k per trailer (Source: DKS cost estimating tool for individual components)

Operations and Maintenance Costs

Approx. \$5k for maintenance of moving parts and equipment. No need for additional staff. Likely move trailer to a location and collect data while unstaffed.

Institutional Factors

Support from Clackamas County operations. Coordination with construction and temporary events could increase effective use of trailers, but not required. No obstacles anticipated.

Dependencies

Should be preceded by systems to store and manage the data collected by trailer equipment

Construction Considerations

No new ROW required. No impact to existing infrastructure.

Cost Estimates

The project team developed cost estimates based on the assumptions shown for each strategy in Table 8.

Table 8. Planning Level Unit Costs for Deployment Plan Strategies

| ITEM | UNIT COST | ASSUMPTIONS |
|-----------------------------|-----------|---|
| Truck Priority | \$22,000 | Two radar detection units (for two directions), controller cabinet interface device, sensor cable, on-site training and set-up assistance |
| Truck Priority | \$29,500 | Three radar detection units (for three directions), controller cabinet interface device, sensor cable, on-site training and set-up assistance |
| Truck Priority | \$37,000 | Four radar detection units (for four directions), controller cabinet interface device, sensor cable, on-site training and set-up assistance |
| UPS Battery Backup | \$15,000 | Cost supplied by Clackamas County |
| Traffic Surveillance | \$6,500 | One PTZ camera, data cable, power supply, power conductors |
| Count Station | \$15,000 | One radar detection unit, data cable, and controller cabinet interface |
| Travel Time Measurement | \$2,200 | Bluetooth sensor, POE injector, data cable |
| Portable Monitoring Trailer | xx | Note: Cost to be developed through Concept of Operations |

Full deployment of all strategies across each of the key corridors would result in a total planning level cost of approximately \$3.9 million, which would not be inclusive of the portable monitoring trailer. These corridor costs considered deployment of most strategies at each traffic signal location, as well as some midblock count stations. The approximate cost breakdown by corridor is listed in Table 9.

Table 9. Planning Level Cost Estimates for Full Project Deployment by Corridor

| CORRIDOR | PLANNING LEVEL COST |
|------------------------------------|---------------------|
| SE 82nd Drive | \$388,300 |
| SE Jennifer Street | \$58,500 |
| OR 212 | \$433,300 |
| OR 224 | \$213,400 |
| SE Sunnybrook Boulevard | \$265,600 |
| SW 95th Avenue | \$132,400 |
| SW Day Road | \$97,000 |
| SW Elligsen Road | \$78,900 |
| SW Kinsman Road | \$15,000 |
| SW Wilsonville Road | \$422,500 |
| Corridors Subtotal | \$2,104,900 |
| PE/CE (County/ODOT/Consultant) 30% | \$631,470 |
| Const. Overhead & Profit 15% | \$315,735 |
| Mobilization 15% | \$210,490 |
| Contingencies 30% | \$631,470 |
| TOTAL COST | \$3,894,065 |

High-Priority Near-Term Projects

Depending on the total funding obtained, it may not be feasible to implement the strategies at all the initially indicated locations. This section provides a breakdown of a full implementation option and a partial implementation option.

Full Implementation

The total costs to deploy each of the strategies over the full extents of each corridor (\$3.9 million) and obtain a portable monitoring trailer (specific cost to be refined through concept of operations) would likely exceed \$4 million. This total for full deployment exceeds the approximately \$2.2 million that is currently available for project design and construction.

Partial Implementation

A focused near-term scenario was developed to generally limit the total cost to the highest priority locations that would be achievable with the existing funds. The prioritization process considered strategies and intersections based on the following criteria:

- Reduce traffic surveillance locations: eliminate overlapping camera views and prioritize higher truck volume locations
- Reduce truck priority locations: prioritize higher truck volume locations, de-prioritize locations where geometry would slow trucks down
- Reduce battery backup: prioritize locations near freeways and locations with other treatments
- Count stations: prioritize mid-points of corridors
- Travel time measurement: prioritize endpoints of corridor and locations with other treatments

The resulting cost of these locations (indicated in the attached matrix) is approximately \$2.26 million, which does not include the portable monitoring trailer.

The following locations for project deployment were selected based as listed in Tables 10 and 11, and show shown in figures 4 through 17. Additional locations from the full implementation list may be deployed as additional funds become available.

Table 10. Strategy Locations and Quantities for Clackamas Industrial Area

| CORRIDOR | INTERSECTION | TRUCK PRIORITY | UPS BATTERY BACKUP | TRAFFIC SURVEILLANCE | COUNT STATION | TRAVEL TIME MEASUREMENT |
|--------------------|--|----------------|--------------------|----------------------|---------------|-------------------------|
| SE 82nd Dr | SE 82nd Dr @ SE Sunnybrook Blvd | 0 | 0 | 0 | 0 | 0 |
| | SE 82nd Dr @ SE Tolbert St | 0 | 0 | 0 | 1 | 1 |
| | SE 82nd Dr @ OR 212 | 4 | 1 | 1 | 1 | 1 |
| | SE 82nd Dr @ Fred Meyer Driveway North | 0 | 1 | 0 | 0 | 0 |
| | SE 82nd Dr @ Fred Meyer Driveway South | 0 | 0 | 1 | 0 | 0 |
| | SE 82nd Dr @ SE Evelyn St | 2 | 0 | 1 | 1 | 1 |
| | SE 82nd Dr @ I-205 NB Ramps | 0 | 1 | Ex | 0 | 1 |
| | SE 82nd Dr @ I-205 SB Ramps | 0 | 1 | Ex | 0 | 1 |
| SE Jennifer St | SE Jennifer @ SE Evelyn St | 3 | 1 | 1 | 0 | 1 |
| | SE Jennifer @ SE Evelyn St | 4 | 1 | Ex | 0 | 1 |
| OR 212 | OR 212 @ OR 224 | 2 | 1 | Ex | 0 | 1 |
| | OR 212-224 @ SE 142nd Ave | 2 | 0 | 0 | 0 | 1 |
| | OR 212-224 @ SE 135th Ave | 2 | 0 | Ex | 0 | 1 |
| | OR 212-224 @ SE 130th Ave | 2 | 0 | 0 | 0 | 0 |
| | OR 212 @ SE 122nd Ave | 4 | 1 | Ex | 1 | 1 |
| | OR 212 @ Fred Meyer Access | 2 | 0 | 0 | 0 | 0 |
| | OR 212 @ SE 102nd Ave / SE Evelyn St | 2 | 1 | 0 | 0 | 1 |
| | OR 212 @ I-205 SB Ramps | 0 | 1 | 0 | 0 | 1 |
| OR 224 | OR 212 @ I-205 NB Ramps | 0 | 1 | Ex | 0 | 1 |
| | OR 224 @ to I-205 NB Ramp | 0 | 0 | Ex | 0 | 1 |
| | OR 224 @ I-205 SB Ramp / SE 82nd Ave NB Ramp | 0 | 1 | Ex | 0 | 1 |
| | OR 224 @ SE 82nd Ave SB Ramp | 0 | 1 | Ex | 0 | 1 |
| | OR 224 @ SE Johnson Rd | 2 | 1 | Ex | 1 | 1 |
| | OR 224 @ SE Pheasant Ct | 2 | 0 | 0 | 0 | 0 |
| SE Sunnybrook Blvd | OR 224 @ SE Lake Rd | 2 | 1 | Ex | 0 | 1 |
| | SE Sunnybrook Blvd @ SE Sunnyside Rd | 3 | 0 | 0 | 0 | 0 |
| | SE Sunnybrook Blvd @ SE 97th Ave | 0 | 1 | 0 | 1 | 0 |
| | SE Sunnybrook Blvd @ I-205 NB Ramps | 0 | 1 | 0 | 0 | 1 |
| | SE Sunnybrook Blvd @ I-205 SB Ramps | 0 | 1 | 0 | 0 | 1 |
| | SE Sunnybrook Blvd @ SE 93rd Ave | 0 | 1 | 0 | 0 | 0 |
| | SE Sunnybrook Blvd @ SE Oak Bluff Blvd | 0 | 0 | 0 | 0 | 0 |
| | SE Sunnybrook Blvd @ Mall Entrance | 0 | 0 | 0 | 0 | 0 |
| | SE Sunnybrook Blvd @ SE 84th Ave | 0 | 0 | 0 | 0 | 0 |

Table 11. Strategy Locations and Quantities for Wilsonville Industrial Area

| CORRIDOR | INTERSECTION | TRUCK PRIORITY | UPS BATTERY BACKUP | TRAFFIC SURVEILLANCE | COUNT STATION | TRAVEL TIME MEASUREMENT |
|-------------------|---|----------------|--------------------|----------------------|---------------|-------------------------|
| SW 95th Ave | SW 95th Ave @ SW Boones Ferry Rd | 2 | 1 | 1 | 0 | 1 |
| | SW 95th Ave @ SW Commerce Cir | 2 | 0 | 0 | 0 | 1 |
| | SW 95th Ave @ SW Ridder Rd | 2 | 0 | 0 | 0 | 1 |
| | SW 95th Ave @ Boeckman Rd | 2 | 0 | Ex | 0 | 1 |
| SW Day Rd | SW Day Rd @ SW Grahams Ferry Rd | 0 | 0 | 0 | 0 | 0 |
| | SW Day Rd @ SW Boones Ferry Rd | 0 | 0 | 0 | 0 | 0 |
| SW Elligsen Rd | SW Elligsen Rd @ I-5 SB Ramp | 0 | 1 | Ex | 0 | 1 |
| | SW Elligsen Rd @ I-5 NB Ramp | 0 | 1 | Ex | 0 | 1 |
| | SW Elligsen Rd @ SW Parkway Ave | 2 | 1 | 0 | 0 | 0 |
| | SW Elligsen Rd @ Parkway Center Dr | 2 | 0 | 1 | 1 | 1 |
| | SW Elligsen Rd @ Canyon Creek Rd N | 0 | 0 | 0 | 0 | 0 |
| SW Kinsman Rd | SW Kinsman Rd @ SW Barber St | 0 | 0 | Ex | 0 | 1 |
| SW Wilsonville Rd | SW Wilsonville Rd @ Willamette Way E | 0 | 0 | 0 | 0 | 1 |
| | SW Wilsonville Rd @ SW Brown Rd | 0 | 0 | 0 | 0 | 1 |
| | SW Wilsonville Rd @ SW Montebello Dr | 0 | 0 | 0 | 0 | 0 |
| | SW Wilsonville Rd @ SW Kinsman Rd | 0 | 0 | 0 | 0 | 1 |
| | SW Wilsonville Rd @ SW Boones Ferry Rd | 0 | 1 | Ex | 0 | 1 |
| | SW Wilsonville Rd @ I-205 SB Ramps | 0 | 1 | Ex | 0 | 1 |
| | SW Wilsonville Rd @ I-205 NB Ramps | 0 | 1 | Ex | 0 | 1 |
| | SW Wilsonville Rd @ SW Town Center Lp W | 0 | 1 | Ex | 0 | 1 |
| | SW Wilsonville Rd @ Rebekah St | 0 | 0 | 0 | 0 | 0 |
| | SW Wilsonville Rd @ SW Town Center Lp E | 0 | 0 | 0 | 0 | 1 |
| | SW Wilsonville Rd @ SW Meadows Loop | 0 | 0 | 0 | 0 | 0 |
| | SW Wilsonville Rd @ SW Meadows Pkwy | 0 | 0 | 0 | 0 | 1 |
| | SW Wilsonville Rd @ Stafford/Advance/Boeckman | 0 | 0 | Ex | 0 | 0 |

[illegible]

Legend

- CLACKAMAS COUNTY FREIGHT ITS ACTION PLAN

Figure 5. Wilsonville Industrial Area Existing ITS Devices

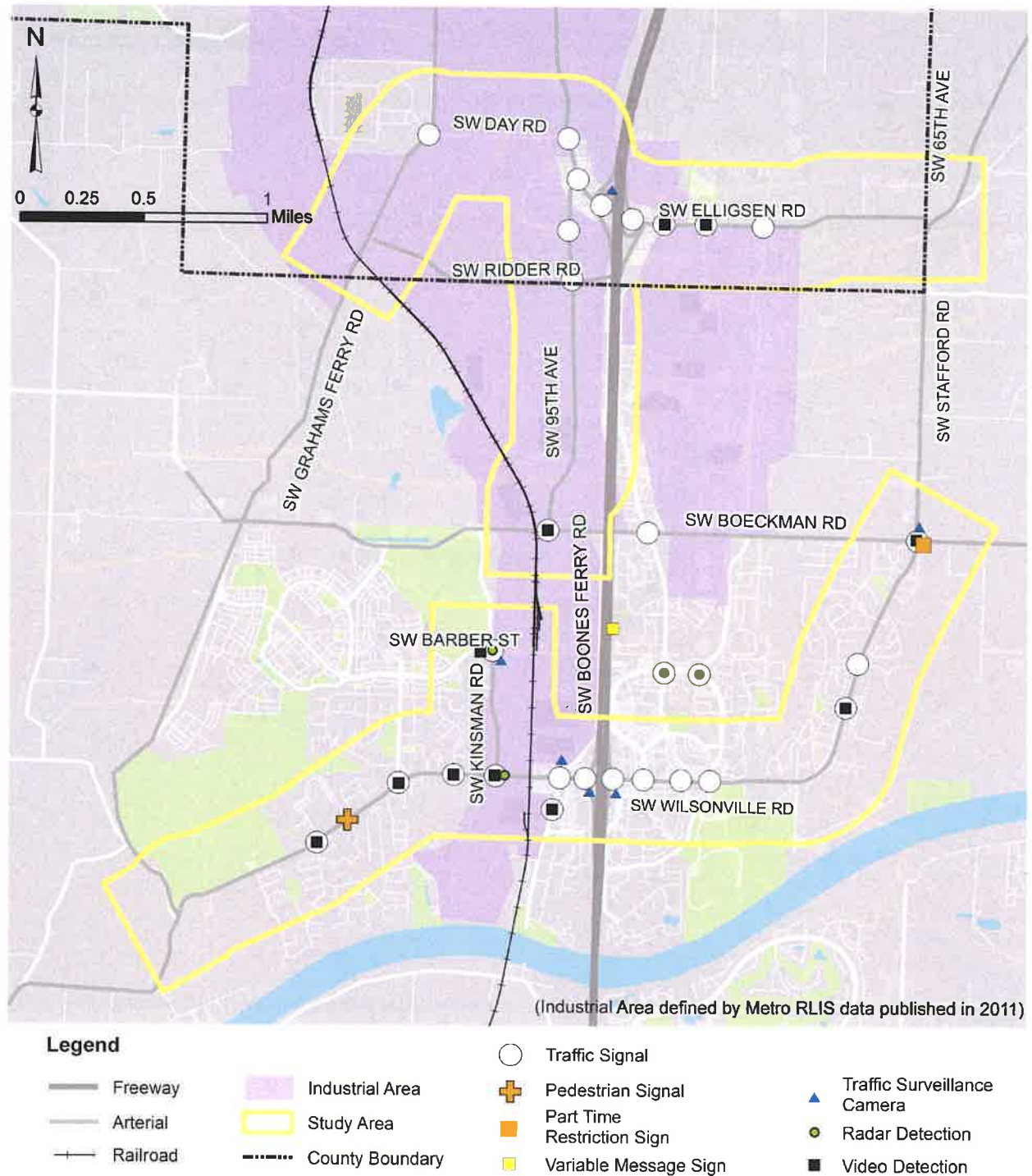


Figure 6. Clackamas Industrial Study Area Communications Network

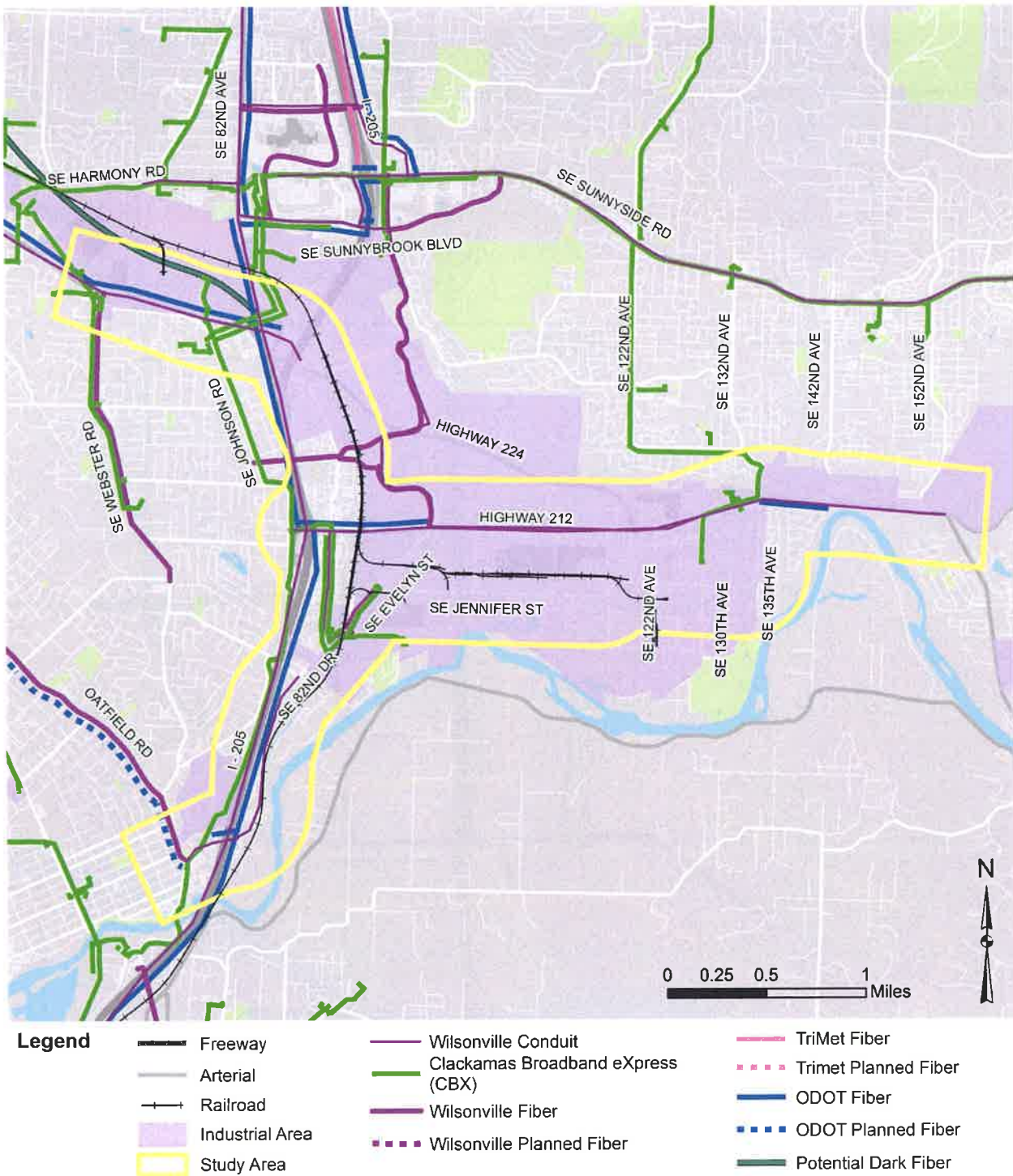


Figure 7. Wilsonville Industrial Study Area Communications Network

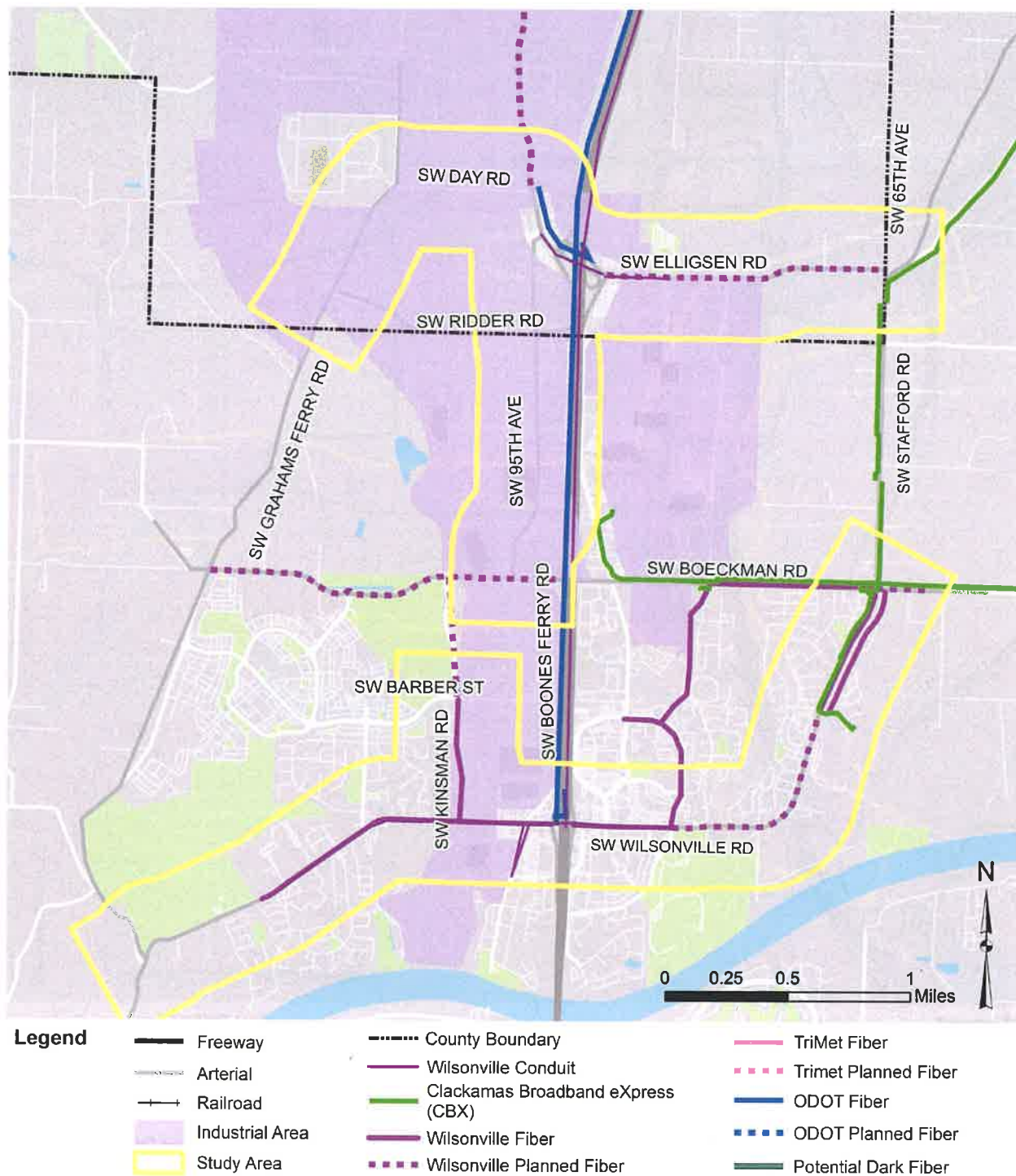


Figure 8. Proposed Locations of Truck Signal Priority in Clackamas Industrial Area

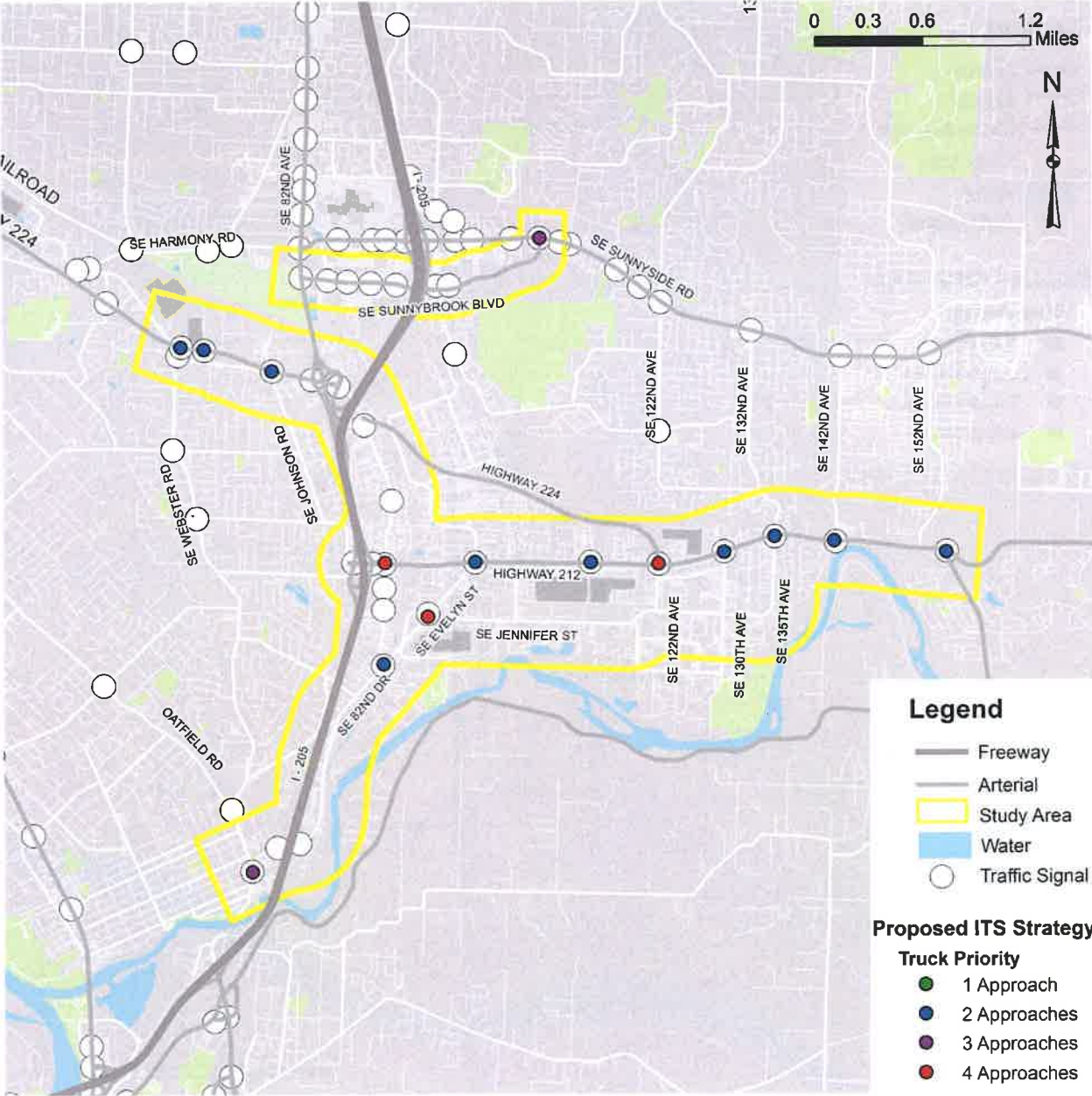
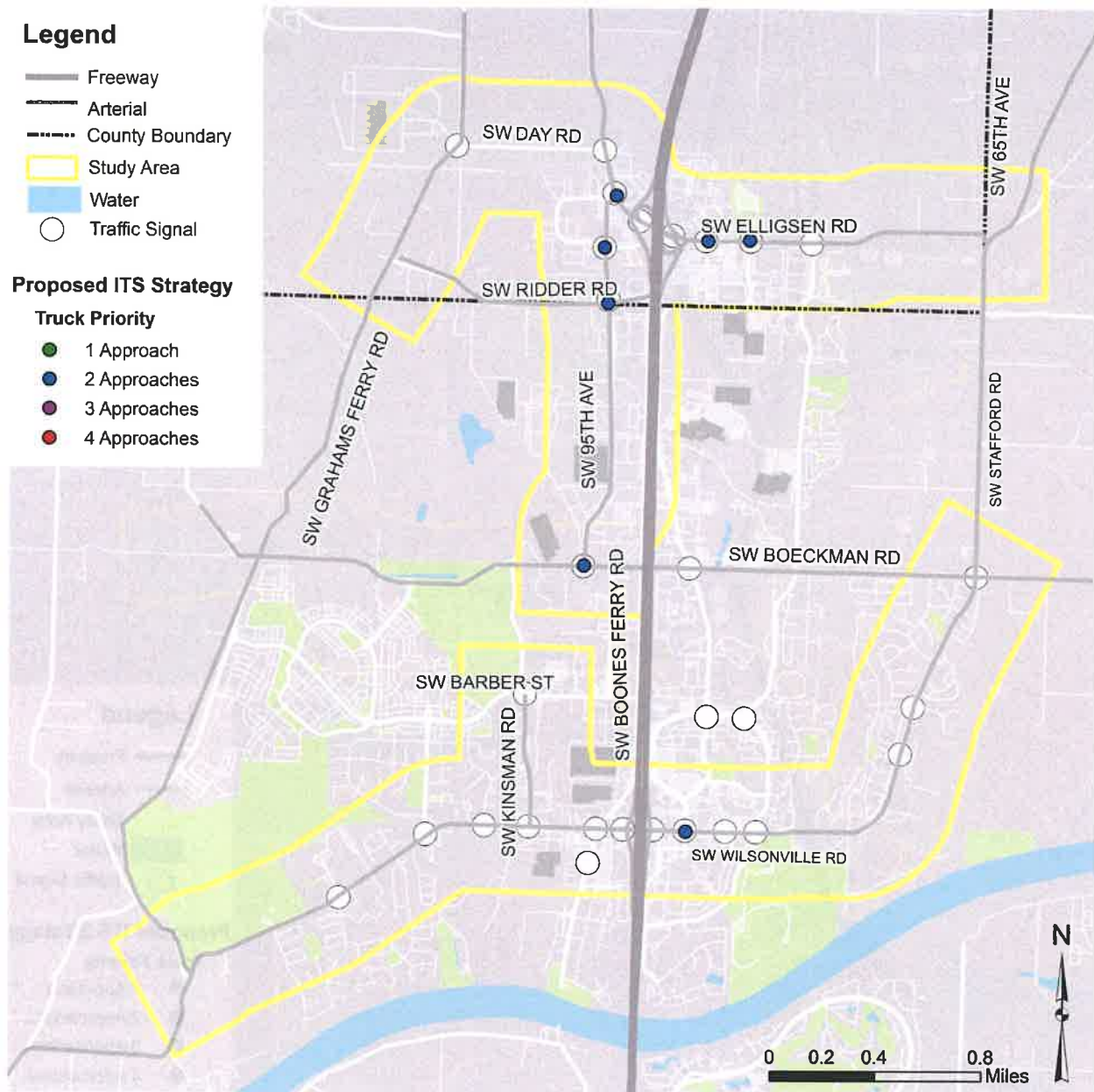
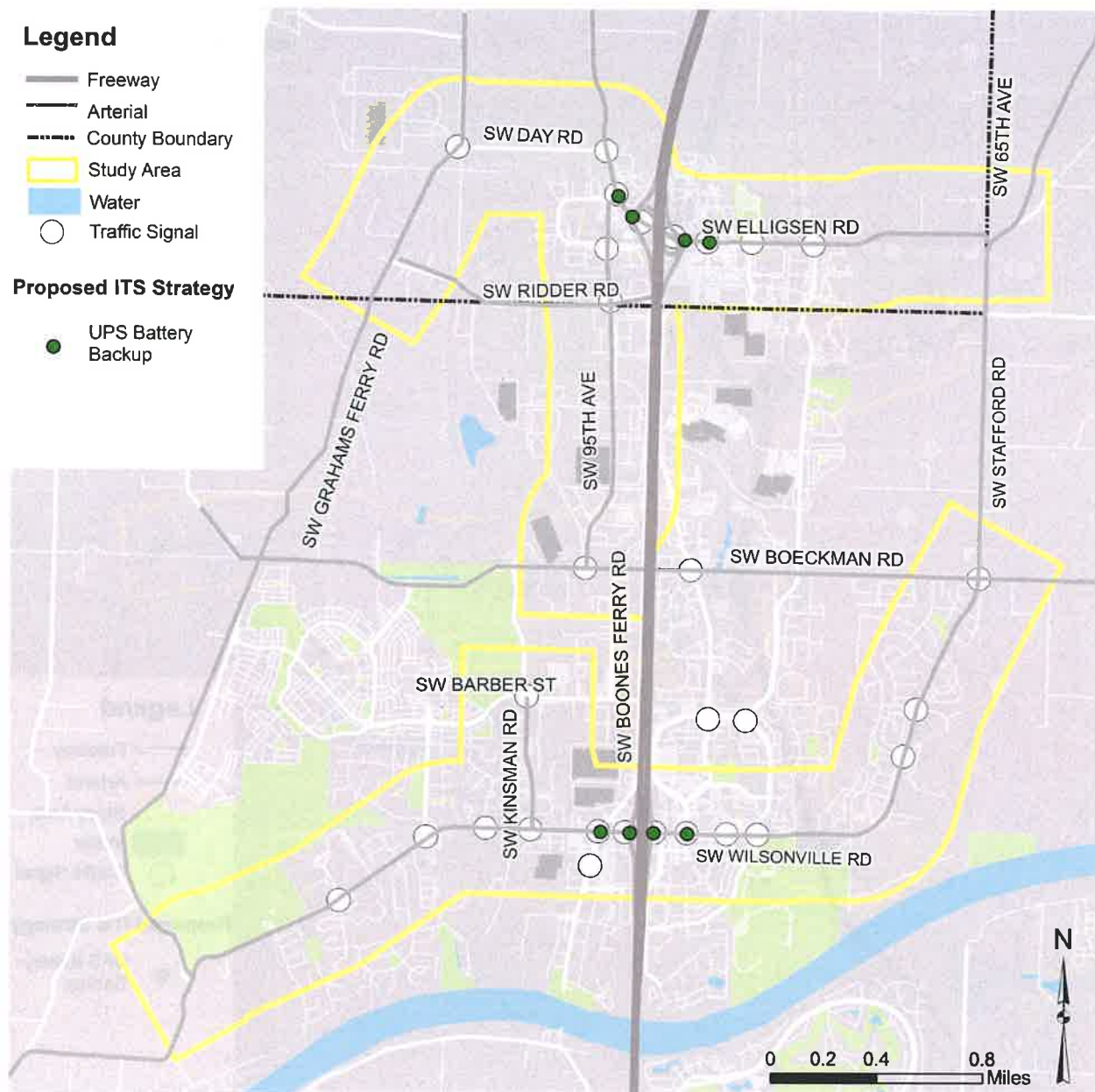


Figure 9. Proposed Locations of Truck Priority in Wilsonville Industrial Area



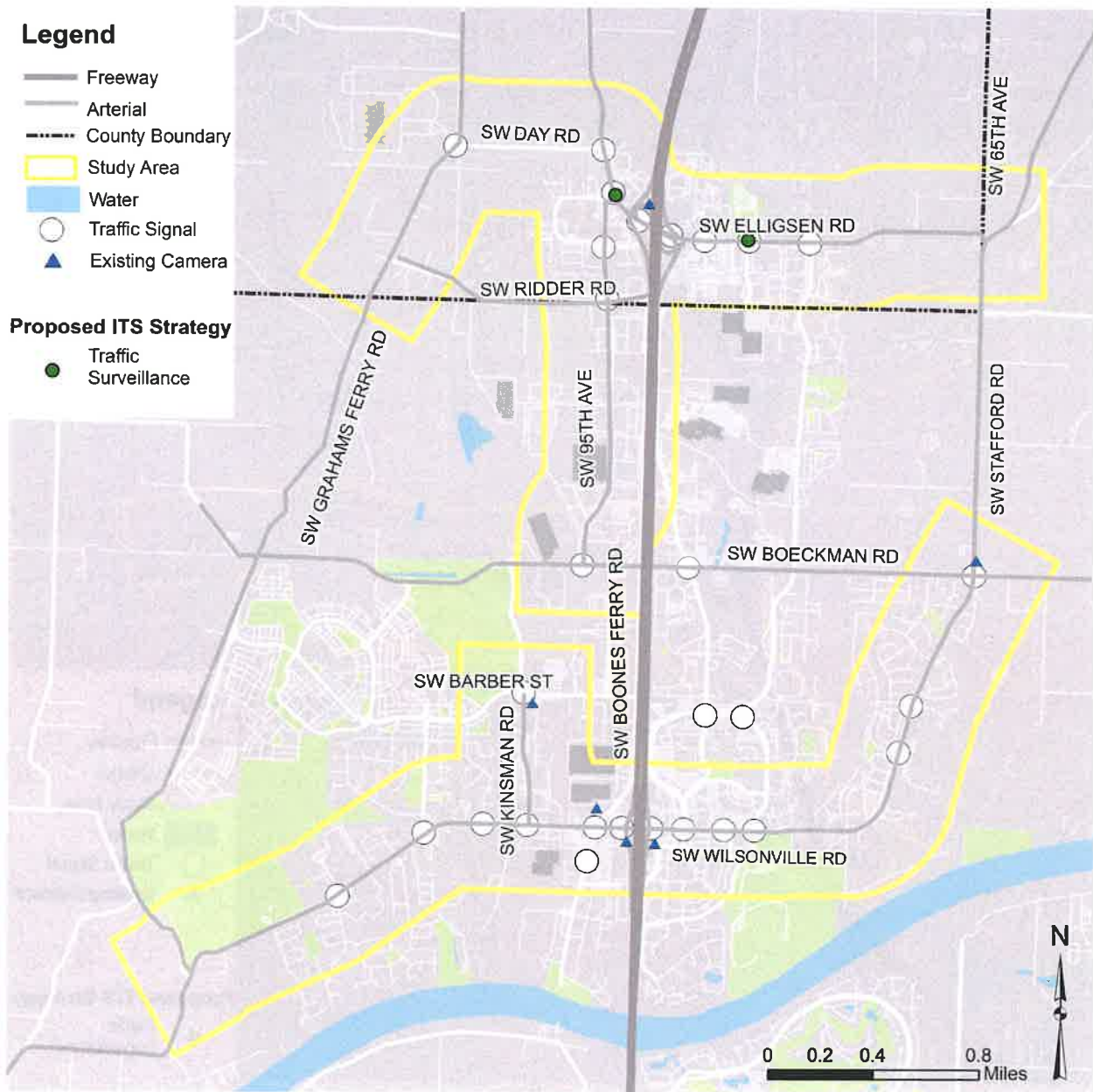
[illegible]

Figure 11. Proposed Locations of UPS Battery Backup in Wilsonville Industrial Area



[illegible]

Figure 13. Proposed Locations of Camera Surveillance in Wilsonville Industrial Area



[illegible]

Figure 15. Proposed Locations of Count Stations in Wilsonville Industrial Area

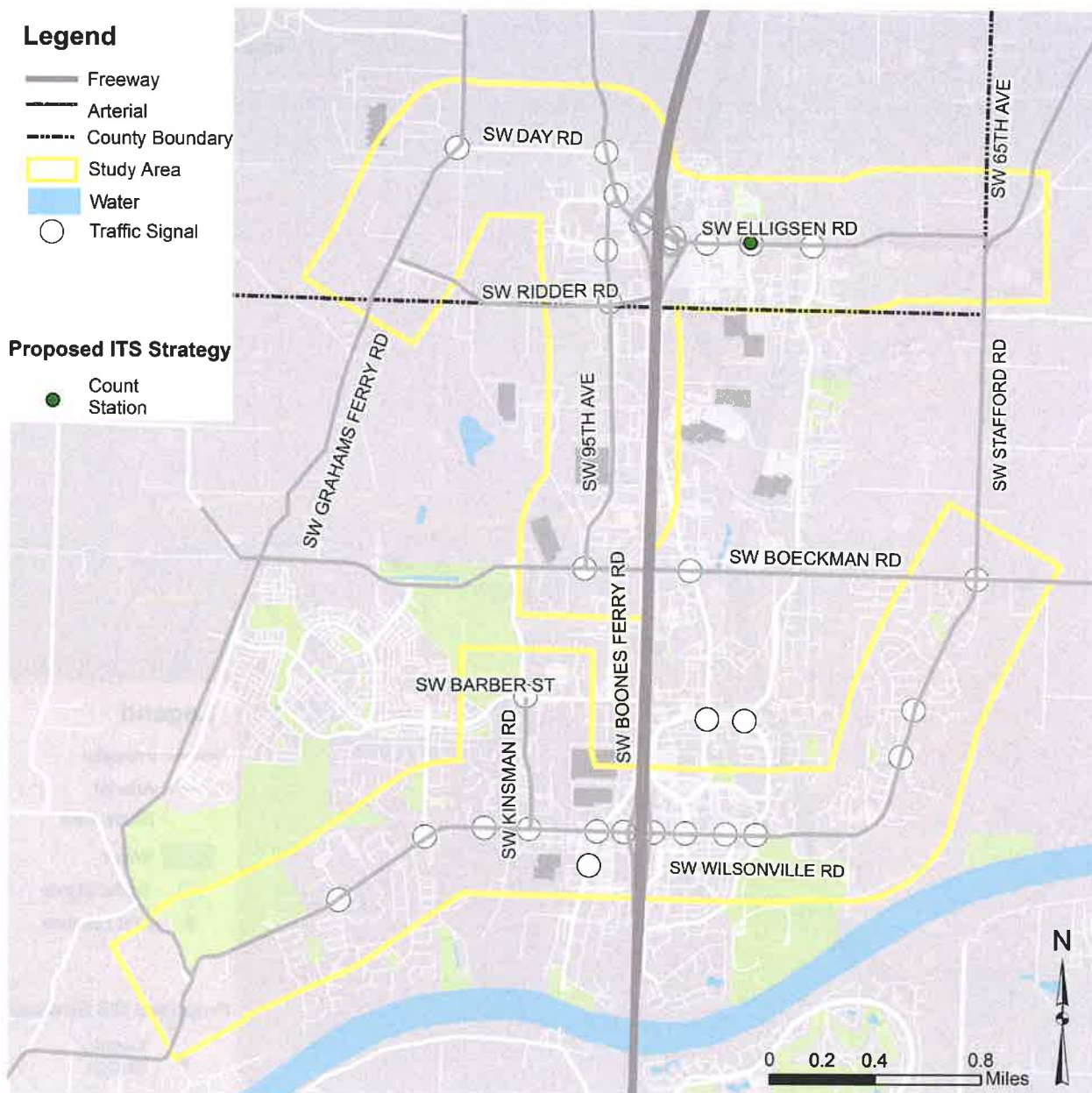


Figure 16. Proposed Locations of Travel Time Measurements in Clackamas Industrial Area

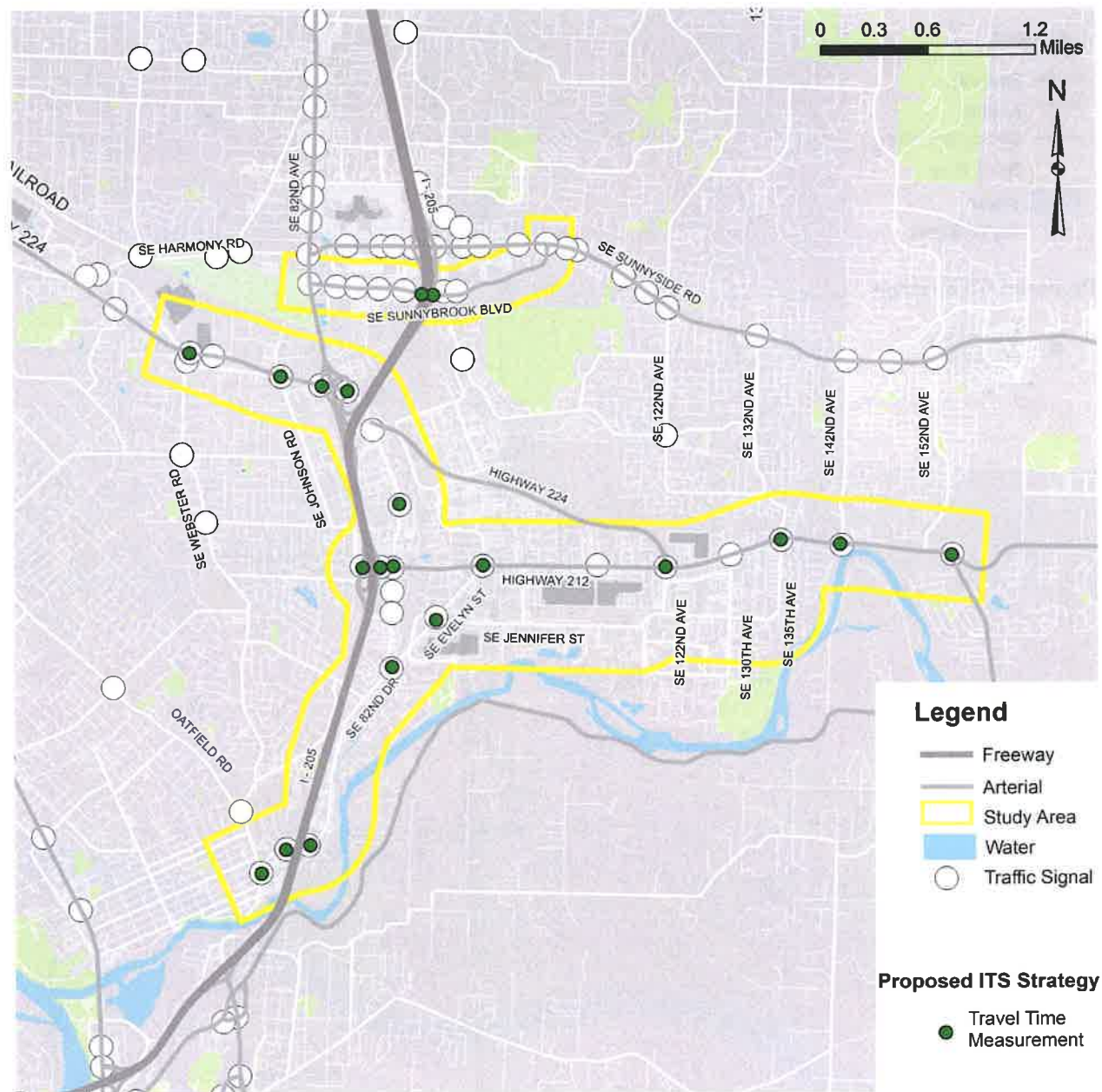


Figure 17. Proposed Locations of Travel Time Measurements in Wilsonville Industrial Area

