

# Clackamas County Regional Freight ITS Project

## Green Economy & Freight Initiatives Process

The Regional Freight Intelligent Transportation System Project, sponsored by Clackamas County, will improve freight mobility in congested subareas of the Clackamas Industrial Area with improved signal equipment, signal timing and minor roadway improvements. With the limited funds available, this project was the only freight project that was proposed in Clackamas County.

Both the Active Transportation projects and this project were reviewed in the same manner. Clackamas County created a website to provide information about the projects and contact information for comments. In addition, the public was notified about the projects and the public comment meeting through the following actions:

- A News Release was developed and sent to the media list
- Information was posted on Facebook and Twitter
- Notice was sent to the leaders of all Community Planning Organizations (CPOs), Villages and Hamlets in Clackamas County
- Local jurisdictions were provided information regarding the meeting at the Clackamas Transportation Advisory Committee Meeting
- Individual project sponsors were sent the information so that they could send it onto their own contact lists

## C4 Metro Subcommittee Meetings

On Thursday July 21, 2011, the Clackamas County Coordinating Committee (C4) Metro Subcommittee hosted a public comment meeting to gather input of the project proposals. Over 61 people were in attendance at the meeting and 95 comments were received either through email or at the meeting. A summary of the public comments are attached.

The C4 Metro Subcommittee met a second time, on Thursday August 4th, 2011, to discuss the projects and develop a recommendation for projects to be funded by the 2014-15 Regional Flexible Funds Allocation. A brief presentation on the recommendation from the Clackamas Transportation Advisory Committee (CTAC), a committee of public works directors, engineers, and transportation planners from jurisdictions throughout Clackamas County, was presented.

The C4 Metro Subcommittee recommended and all voted in favor for:

- I. The Clackamas County Regional Freight ITS project should be forwarded to JPACT for funding as the Freight project. The project, which will benefit several jurisdictions in Clackamas County, will reduce freight delay and improve reliability. It will also improve safety for bicycle and pedestrian travel along these freight routes by providing improved operations at the signals.
- II. Taking into consideration the various criteria and the opportunity to complete a facility that will impact users throughout Clackamas County, the 17th Ave Multi-use Regional Trail Connection project request for \$2.969 M of 2014-2015 regional Flexible Funds was recommended to be moved forward to JPACT for funding.
- III. The C4 Metro Subcommittee included the caveat that if there should be a surplus of money that it should be directed toward the Happy Valley Mt. Scott trail project development proposal.

The project proposal was discussed at the Regional Freight Committee. The County Safety Engineer is a member of Transport and the project was discussed with both Transport and ODOT ITS staff. Each of these groups supported the projects because it complimented work being done elsewhere in the region. The project was also discussed with the affected cities at CTAC. The project location was selected through known problem areas.

See attached list of comments received during the process.

## Project Location

The Freight ITS Project will focus upon the key freight routes and known freight system problems in the Clackamas Industrial Area, Milwaukie Expressway Industrial Area and the Wilsonville Industrial Area – see attached maps. The project study areas include portions of the cities of Wilsonville, Gladstone, Happy Valley, Damascus and possibly Milwaukie. The study areas also include freight route facilities that belong to ODOT and Washington County. The Freight ITS Project will be coordinated with all of these jurisdictions.

Specific freight routes that are expected to be included in the Freight ITS Plan include:

- Highway 224
- Highway 212/224
- Jennifer Street / Evelyn Street / 102<sup>nd</sup> Drive
- SE 82<sup>nd</sup> Drive
- Day Road / Elligsen Road
- Wilsonville Road

## Project definition

### RTP Project Numbers –

- The Freight ITS Project directly implements RTP Project # 10020 Clackamas ITS Plan.
- This project also indirectly helps to implement the following RTP projects: 10022, 10023, 10059, 10061, 10869, 10890, 10894, 11104, 11349 and 11350.

**Project Sponsor Agency:** Clackamas County Department of Transportation and Development, 150 Beaver Creek Road, Oregon City, Oregon 97045

### Contact Information:

- Application lead staff- Lawrence M Conrad, Principal Transportation Planner – 503 742 4539
- Project Manager – Joseph Marek, Traffic Engineering Supervisor - 503-742-4705
- Project Engineer - Bikram Raghubansh, Senior Civil Engineer, - 503-742-4706

### Project Description:

The Clackamas County Regional Freight ITS Project is a two part process. It includes the creation of a Freight ITS Plan in Phase 1 and the prioritized implementation of that plan in Phase 2. The Freight ITS Plan would become an amendment to the County ITS Plan. This study would be consistent with the regional ITS architecture and goals of the Metro TransPort Technical Advisory Committee.

## **Freight ITS Project, Phase 1 – Freight ITS Plan**

The Freight ITS Plan will prepare the way for targeted freight system improvements to accomplish the goals and objectives of the freight stakeholders and the jurisdictions in the study area. The Freight ITS plan will include technical analysis of existing and future conditions related to traffic safety and operations for all travel modes in the identified freight corridors and a stakeholder review process to insure the needs of all users of the freight corridors are considered during the planning process.

The Freight ITS Planning process will include the following major task:

- The Freight ITS Plan would begin with identifying and engaging a variety of project stakeholders such as the County, Cities, ODOT, and the freight community to understand desires, goals, barriers and opportunities related to freight mobility and safety within Clackamas County.
- The Freight ITS plan will review existing ITS or other relevant plans and policies to understand the framework available or needed to support freight ITS or low-cost projects.
- An existing conditions safety, operations, and land use/routing analysis and inventory will be conducted for each freight subarea from a freight perspective, including truck and rail connections. Information such as truck/rail crash history, auto and truck volumes, major truck routes, and key freight origins and destinations will be documented. Analysis of existing conditions will help identify areas of concern related to freight safety and mobility based upon empirical data.
- The Freight ITS plan will identify an ITS project “toolbox” of ITS or other low-cost capacity improvements that address existing (or future) safety and operations concerns. Some possible toolbox components are discussed in Phase 2 of this project narrative.
- The Freight ITS plan will review and as needed document any needed changes to architectures or ITS plans at the state, Metro (TransPort) and County levels.
- ITS project selection criteria will then be developed based on project need, cost and funding availability, etc. Individual projects will be selected and prioritized for adoption in this Clackamas County Freight ITS Plan. Future projects will also be identified for future implementation as additional funding becomes available.
- The Freight ITS Plan will include a set of project specifications or plans as needed. These plans or specifications will be the basis of the procurement process used to implement Phase 2 of the project.
- The Freight ITS plan is envisioned to be incorporated into the Clackamas County ITS Plan and Clackamas County Transportation System Plan, for which an update is currently in process.

## **Freight ITS Project, Phase 2 – Freight ITS Plan Implementation**

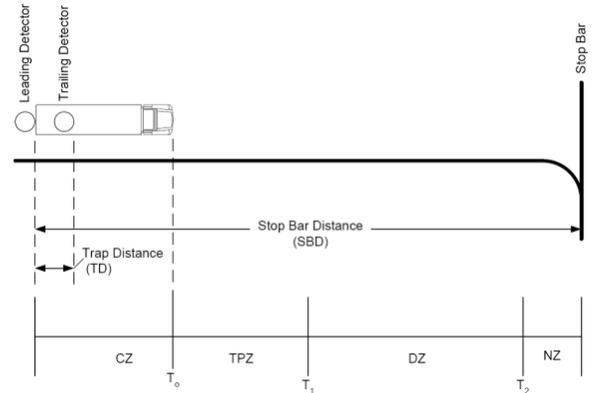
In the second phase of the project, the list of Freight ITS improvements would be prioritized and constructed. As many of the prioritized freight system management and priority projects along the freight routes would be constructed as funding allows. These system improvements will be coordinated with ODOT, TransPort, Washington County and the Cities.

## **Potential Freight ITS Implementation Strategies & Treatments**

While the Freight ITS plan will identify a more comprehensive “toolbox” of freight ITS treatments, certain potential freight ITS treatments are identified below based on a preliminary review of current Transportation System Management and Operations (TSMO) measures. Discussion of these freight ITS treatments provides a planning-level overview of the benefits achieved by these treatments, as well as the associated costs. This is helpful in gauging the cost-benefit ratio of implementing freight ITS treatments at this stage of project planning.

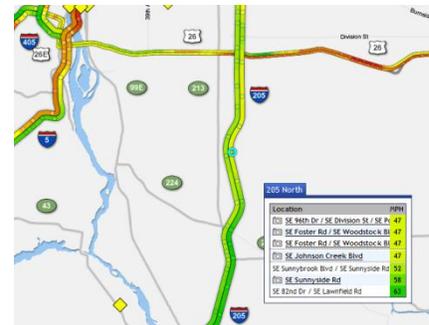
## Truck Signal Priority

**Description:** Truck signal priority is used to improve the operation of trucks passing through traffic signal controlled intersections, by extending green time to reduce truck stops and delay, potentially reduce truck red-light running, increase capacity through reduction of truck startup loss time, and provide safe phase termination for trucks. It also serves as a dilemma zone protection for trucks. This treatment is typically implemented on higher-speed approaches, by placing upstream vehicle detectors that would respond only to vehicles of a minimum length (trucks) and a minimum speed. Although truck signal priority requires green time from other intersection movements be shared with the “priority” approach to accommodate trucks, an overall gain in benefit is usually realized due to the high cost of truck stops and the large volumes typically on the truck route. Operational benefits are generally greater for uncoordinated (free) intersections or during off-peak and shoulder periods for coordinated signals.

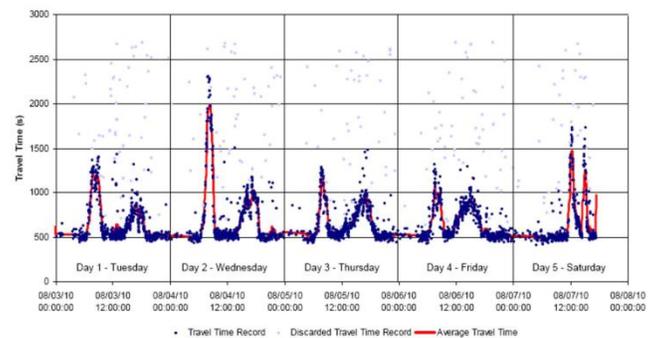


## Freight Traveler Information

**Description:** Advanced communications could be used to improve the dissemination of information to the freight community. Traveler information systems enables motorists to receive relevant information on location-specific traffic conditions in a number of ways, including roadside dynamic message signs (DMS), highway advisory radio (HAR), in-vehicle signing, specialized information transmitted to individual vehicles, private smartphone applications, ODOT TripCheck website, or via 511 systems.



Successful implementation of traveler information system requires extensive data collection and system monitoring on traffic volumes, speeds, travel times, origin-destination data, congestion and traffic incidents, etc. These data could be collected through a number of devices such as video surveillance, automated probe vehicle or roadway sensors, GPS AVL data, GPS cellular data, GPS in-vehicle navigation, roadside Bluetooth MAC readers, etc. Depending on the existing infrastructure, some of the traveler information systems could be quite capital-intensive. Therefore, outreach to the freight community would be essential to identify their issues and needs, and determine the most cost-effective and beneficial ITS solutions to improve their system mobility and access.



## Signal Optimization / Enhanced Signal Communications

**Description:** Signal retiming / optimization includes updating signal timing plans for prevailing traffic conditions, interconnecting signals, and potentially upgrading signal technology to meet timing objectives. Trucks as well as general traffic would benefit from improved progression and reduced stops along a corridor. With enhanced signal communication infrastructure in place, the County would have

centralized control to monitor and adjust timing plans in real-time, to improve traffic flows and address non-recurring events, such as crashes. Central video surveillance could be done through signal communication infrastructure, linking back to traveler information system (e.g. DMS signs, ODOT TripCheck website, etc.).

### *Railroad – Highway Safety Treatments*

**Description:** Safety at railroad-roadway at-grade crossing within the project area could be improved by providing smart railroad preemption strategy(s). 2070 Voyage controller provides smart pre-emption, in-preemption and post-preemption sequencing to potentially improve traffic safety and efficiency due to rail, emergency vehicle or other signal preemption. Efficient preemption recovery sequence improves operations of trucks and general traffic.



### *Minor Geometric Improvement and Traffic Signal Modifications*

**Description:** Minor geometric improvement at intersections and on roadways could be used to improve operations and safety of trucks, general traffic and alternative mode users. Geometric changes such as an additional turn lane, curb radius re-construction, truck apron installation, and striping/signing changes could be done to better accommodate truck turning movements, reducing their potential to encroach adjacent travel or bike lanes, and thus increasing safety of general traffic. Construction of bike lane, multi-use path, sidewalk and/or curb can improve traveler safety and protect alternative mode users such as pedestrians and bicycles from truck traffic. Minor traffic signal modifications could include installation of supplemental signal heads and/or adjustment of existing signal heads.

### *Example Possible Project Improvements*

Examples of opportunities within the Freight ITS Project Area include locations where there are planned projects which either include or could be supported through freight ITS or low-cost treatments are:

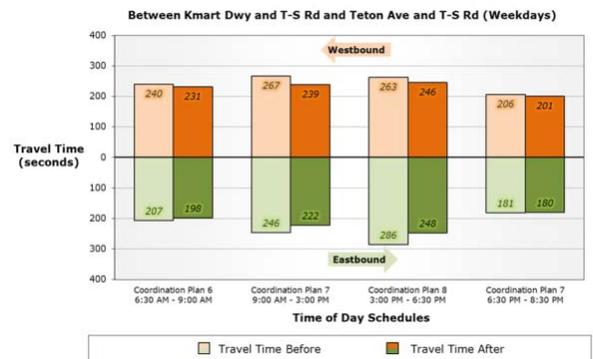
- Highway 224 / I-205 interchange capacity enhancements (or greater Sunrise Corridor Project)
- Signal System Upgrades
  - Signal System Central Control and Monitoring along 82<sup>nd</sup> Drive, Elligsen Road and Wilsonville Road
  - Adaptive or Traffic Responsive Signal Timing along Wilsonville Road
  - Transit Signal Priority along Highway 224
  - Model 2070 advanced traffic signal controllers using NWSVoyage (Voyage) signal system software along Highway 224 and Highway 212/224
- Variable Message Signs
  - Highway 99E at Highway 224
  - Highway 212
- Traffic Surveillance Cameras
  - Highway 224 at Harrison Street, Lake Road and Johnson Road
  - Highway 212/224 east of 135<sup>th</sup> Avenue and at Rock Creek Junction
  - Elligsen Road and Wilsonville Road near I-5
  - 82<sup>nd</sup> Drive from Highway 224 to Jennifer Street
- Road Weather Information Systems (RWIS)

- Automated Probe Vehicle Collection Systems
  - Fleet GPS Travel Time, Speed Data (Inrix)
  - Roadside Bluetooth MAC Travel Time, Speed Readers along Highway 224 and Highway 212
- Fiber Optics Communication System
  - Elligsen Road and Wilsonville Road
- Integrated Corridor Management
  - Highway 224
  - Highway 212, Sunrise Corridor and Sunnyside Road
  - I-5, I-205 and Stafford Road-Elligsen Road
- Enhance Clackamas County Traveler Information Website

## Freight ITS Project Performance Measures

Evaluation of the performance of each of the freight ITS treatments is an important component to validating the return on project investment. Operational evaluation can typically occur in a much quicker fashion, when compared to safety evaluations, which may require more time to determine the impact on crashes. Nevertheless, the following are examples of approaches and metrics for measuring performance of freight ITS projects that could be conducted:

- Crash records for change in safety performance
- Conduct a road safety audit along key freight routes
- 2070 Voyage controller logs for truck signal priority (frequency/duration to approximate # of truck stops avoided & impact to non-priority movements)
- Freight automatic vehicle location (AVL) data for travel time, speed and reliability measures
- Probe vehicle data (i.e. GPS, Bluetooth) for travel time, speed and reliability measures
- User feedback from freight community on frequency, ease and usefulness of the treatment



## Truck Signal Priority Benefits:

- Reduce traffic and truck delay, which is estimated to be approximately 2 minutes during each truck acceleration and deceleration (excluding delays caused by truck stops)<sup>1</sup>
- Reduce number of truck stops of between 2% and 5%, which is estimated to cost approximately \$3 per truck per stop<sup>2</sup>
- Reduce frequency of leading trucks stopping at intersections, thus reducing overall mainline delay<sup>2</sup>
- Reduce fuel consumption and emissions, which is estimated to consume approximately an additional 1/3 gallon of fuel per truck stop<sup>1</sup>
- Reduce truck red-light running by up to 80%<sup>3</sup>

<sup>1</sup> S. R. Sunkari, H. A. Charara, and T. Urbanik. Reducing Truck Stops at High-Speed Isolated Traffic Signals. September 2000.

<sup>2</sup> Minnesota Department of Transportation. *Truck Priority at Traffic Signals Final Report*. February 2001.

<sup>3</sup> Portland Metro. *Metropolitan Mobility: the Smart Way*. October 2006.

- Reduce pavement wear and pavement maintenance costs<sup>1</sup>
- Work with transit signal priority (extension-only) with additional investment in on-board transit signal priority equipment

#### **Freight Traveler Information Benefits:**

- Reduce delay by 1% to 22% and number of stops by 5% to 6%<sup>4</sup>
- Reduce gas emissions by 1% to over 20%<sup>4</sup>
- Improve on-time performance by 5% to 16%<sup>4</sup>

#### **Signal Optimization / Enhanced Signal Communications Benefits**

- Reduce travel time by 10% to 25%<sup>4</sup>
- Decrease fuel consumption
- High benefit-to-cost ratio which could range from 17:1 to as high as over 100:1<sup>4</sup>

#### **Railroad – Highway Safety Treatments Benefits**

- Improve safe vehicle stopping during preemption
- Improve operations

#### **Minor Geometric Improvement Benefits**

- Increase capacity, operations and safety for all travelers

#### **Estimated Project Cost**

Freight ITS Plan	\$75,000
Freight ITS Project Implementation	\$715,000

#### **Typical Truck Signal Priority Costs:**

- Truck detection units upstream of intersection: induction loops (\$1,000/ea.), video detectors (~\$5,000/ea.), magnetometers (~\$6,000-\$8,500/approach) or radar detectors (\$7,000/ea.)
- Conduit and interconnect (~\$25/ft.)
- 2070 Voyage controller upgrades (on-board truck signal priority software), as needed ~ \$4,000 per controller (assumes separate line item for NWS Voyage (currently though statewide license))

#### **Typical Freight Traveler Information Estimated Costs:**

- \$50,000 to \$100,000 per variable message signs depending on size
- Bluetooth MAC Travel Time, Speed Readers (~\$2,500-\$5,000 ea.)
- Magnetometer Travel Time Readers (~\$10,000/approach and up)
- \$50,000 to \$2,000,000 for annual operations and maintenance which varies among the scope of the information system

#### **Signal Optimization / Enhanced Signal Communications Estimated Costs:**

- Interconnect system: copper wire (~\$25/ft.) or wireless (~\$7,000/intersection).

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<sup>4</sup> USDOT Research and Innovative Technology Administration. *Benefits Database*: <http://www.itsbenefits.its.dot.gov/>

- 2070 Voyage controller and software upgrades, as needed (~\$4k 2070 controller hardware)
- ~\$3,000 to \$5,000 per intersection for optimized time-of-day coordinated timing plan development (includes data collection).
- ~\$30,000 to \$75,000 per intersection for adaptive traffic signal control

### Railroad – Highway Safety Treatments Estimate Costs:

- 2070 Voyage controller upgrade, as needed
- Advanced railroad detection system, as needed
- Preemption strategy development

### Minor Geometric Improvement Estimated Costs

- Cost varies depending on the scope of changes. Some examples with order of magnitude costs are provided below.
- ~\$300,000 for right-turn lane addition
- ~\$150,000 for new sidewalk
- ~\$500,000 for new signal with a widened approach

## Purpose and Need Statement

The purpose of the project is to improve the reliability of the regional freight system by reducing freight vehicle delay in known congested areas through a variety of ITS system enhancements.

The project would accomplish this by planning and implementing freight ITS improvements specifically focusing on providing truck priority enhancements in industrial and employment areas with a high level of existing recurring and non-recurring freight delays. This project will benefit all travel modes in this congested freight corridors with improved safety and traffic reliability.

The Freight ITS improvements are consistent with the regional ITS Plan currently planned as part of the TRANSPORT program. Improved freight travel reliability will help maintain effective freight access to Industrial lands, employment centers & local businesses and rail facilities in this portion of the region for all regional shippers.

The Freight ITS Plan will be developed in cooperation with ODOT, Clackamas County and the affected cities.

This project meets a freight system transportation need that has not been funded as part of the TRANSPORT program. There are no other identified sources of funding for these improvements.

## Highest Priority Criteria

**Describe how the project will reduce freight delay:** The comprehensive “toolbox” of freight ITS treatments and Freight ITS Project Performance Measures previously described in Phase 2 of this Project, will provide a variety of ITS system improvements that will help enhance travel time reliability and reduce freight traffic delay in the project area.

**Describe how the project increases freight access to industrial lands, employment centers & local businesses, and/or rail facilities for regional shippers:** The enhance travel time reliability and reduce freight traffic delay in the project area will improve the freight access for the Interstate Highway System to the existing industrial lands and employment centers located within the Project Area. These existing industrial lands and employment centers are identified as important employment area in the Regional 2040 Plan.

**Describe how the project contributes to “greening the economy” and how the project helps expand economic opportunities to Environmental Justice/underserved communities:** There are a limited (2) number of Environmental Justice communities within the Freight ITS Projects areas as identified by Metro in the demographic information prepared for this project. They are –

- A community that has a high proportion of multifamily housing and a higher than average concentration of low income and young residents along 82<sup>nd</sup> Drive on either side of Highway 212
- A community with a higher than average concentration of elderly residents south Highway 212 between 135<sup>th</sup> Avenue and 142<sup>nd</sup> Avenue – primarily in 3 mobile home parks.

As previously described in the Freight ITS Project Performance Measures, the Freight ITS project will improve freight system operations, reduce emission from freight traffic and enhanced freight corridor safety in the vicinity of these communities.

From a more regional perspective, a substantial portion of the food consumed in the region is shipped from a series of distribution centers along OR 212 and OR 224. Improved freight reliability in the project area will support the efficient and equitable distribution of food to all communities in the region.

## High Priority Criteria

**Describe any conflicts with freight/active transportation you’ve identified in your project area. How does the project design mitigate these conflicts?** The location of the Freight ITS Projects are highly congested arterial corridors that also have a high level of truck traffic. There are existing conflicts between the modes of traffic that use these freight corridors. The projects in the Freight ITS Plan will generally improve operations and safety in these congested corridors and reduce the level of conflict for the users of the corridor.

**Does the project help reduce air toxics or particulate matter?** Reduced level of congestion in these freight corridors will reduce the amount of vehicle idling time for all classes of vehicles which in turn reduces local vehicle exhaust emissions. This results in a localized decrease in vehicle related air toxics and particular matter.

**Does the project help reduce impacts, such as noise, land use conflicts, emissions, etc. to Environmental Justice communities?** The Freight ITS project will not significantly impact land uses in the project areas and, thus, will not significantly change any existing land use conflicts that may exist. This project should marginally reduce local emissions and noise level in the vicinity of the existing congested freight corridors. These improvements will benefit the existing EJ communities in the vicinity of Highway 212.

**Describe how the project increases freight reliability.** The Freight ITS project will reduce congestion and improve travel time reliability in the existing congested freight corridor which will in turn produce improve the reliability of the freight delivery system by improving moving the ability of freight vehicle to move from their existing distribution center to the Interstate Highway system. See previously discussed Freight ITS Project Performance Measures.

## Priority Criteria

**Is the project of an innovative or unique nature such that it is not eligible or typically funded with large, traditional transportation funding sources such as state trust fund pass through to local agencies, local bridge program, or large state funding programs (Modernization, Bridge, Preservation, etc.) or have any other significant sources of funds?** The region has an existing ITS program (TransPort) which is focused on improving general traffic flow along major highway corridors. The Freight ITS

project would be consistent with the regional ITS architecture and goals of the Metro TransPort Technical Advisory Committee. The Freight ITS Project would extend the regions ITS system by adding complimentary ITS improvements to the planned ITS system that would focus on improving freight operations in congested freight corridors. The Freight ITS improvements would supplement the overall ITS system and would be unique in the region.

Currently there no funding sources identified that focuses on this the planning and implementation of a Freight ITS system in the region.

**Will this nomination leverage other funds or prepare a project to compete for discretionary funding that may otherwise not come to the region?** The TransPort program has planned a number general ITS system improvements in the identified freight corridors. ODOT has also planned or is constructing a number of intersection specific improvements in the freight corridors covered by the Freight ITS Project. The Freight ITS project builds on the work planned or recently completed in these freight corridors to further enhance freight mobility operations on these facilities.

**Describe how the project may help reduce the need for highway expansion.** There are a number of road facility improvements planned or in process within the Freight ITS plan study area including improvements to the intersections of OR 224 and Webster Road, OR 212 and 135<sup>th</sup> Avenue, interchange improvements at I-5 and Wilsonville Road and the Sunrise JTA projects (between OR 224 and 122<sup>nd</sup> Avenue). These projects provide solutions to a number of traffic congestion problems in the congested freight corridor but they cannot solve the existing congestion problems. The purpose of Freight ITS Project is to use the existing and planned facilities within the identified freight corridors as efficiently as possible. The Freight ITS project will allow the existing and planned facilities to address congestion issues to the maximum extent feasible without additional facilities.

**Describe any multi-modal elements included in the design of your project.** While the Freight ITS Plan is not specifically a multimodal project – freight priority improvement will also support improved transit (bus) operations in the freight corridors by providing the buses with the same priority operational improvements that are available to large trucks. In addition, the safety improvement associated with these projects will be available to all modes of traffic.

## **Comment Summary**

A draft of this narrative was sent to the cities of Wilsonville, Happy Valley, and Damascus, Washington County and ODOT for review and comment prior to the final submittal to Metro. There were only a couple of responses which contained minor editorial comments which have been addressed in this narrative.

The public comment process generated a total of 63 comments on all of the Regional Flexible Fund project proposals- see attached. Only three of these comments address the Regional Freight ITS Project directly and no changes to the project were required to be made as a result of these comments.

- Clackamas County Fire District 1 supported this project.
- Dick VanIngen supported the project.
- Pat Russell stated that this project should be address through urban renewal funding and then went on to note that there is no urban renewal funding available in this area for this project.

