VAST: Orchards Traffic Signal Optimization (TSO)

Orchards Area – Various (Joint Clark County / WSDOT project)

Clark County

Project Goals:

- Improved safety
- Addition of flashing yellow arrow
- Signal integration, upgrade and communication
- Replace failed in-ground traffic detectors
- Data collection and traffic surveillance
- Reduce traffic congestion and delay
- Increase corridor capacity and efficiency

Project Outcomes:

- Safety has been improved
- Travel times have been reduced, improving county travel times
- Radar detection installed, reducing delay and improving corridor efficiency
- Data collection and traffic surveillance equipment has been installed, are active 24/7 and capture real time data

Project Information

Federal Funding Program: CMAQ Program

RTC Awarded Funding: $3,500,000

Total Project Cost: $4,772,000

Project Type: TSMO

Project Length: 11.75 miles

Function Classification: Various

Daily Traffic Volume: various - up to 15,560

Project Description

This project is a joint project between Clark County and WSDOT to modernize, upgrade and interconnect traffic signals in the Orchards area in east Clark County.

Coordinated signal operation to improve traffic flow. Repaired and upgraded traffic detection for vehicles and bicycles. Added pedestrian friendly flashing yellow arrows, ADA compliant pedestrian pushbuttons battery backup, video cameras and permanent count stations at key locations and connected signals to central county monitoring center.

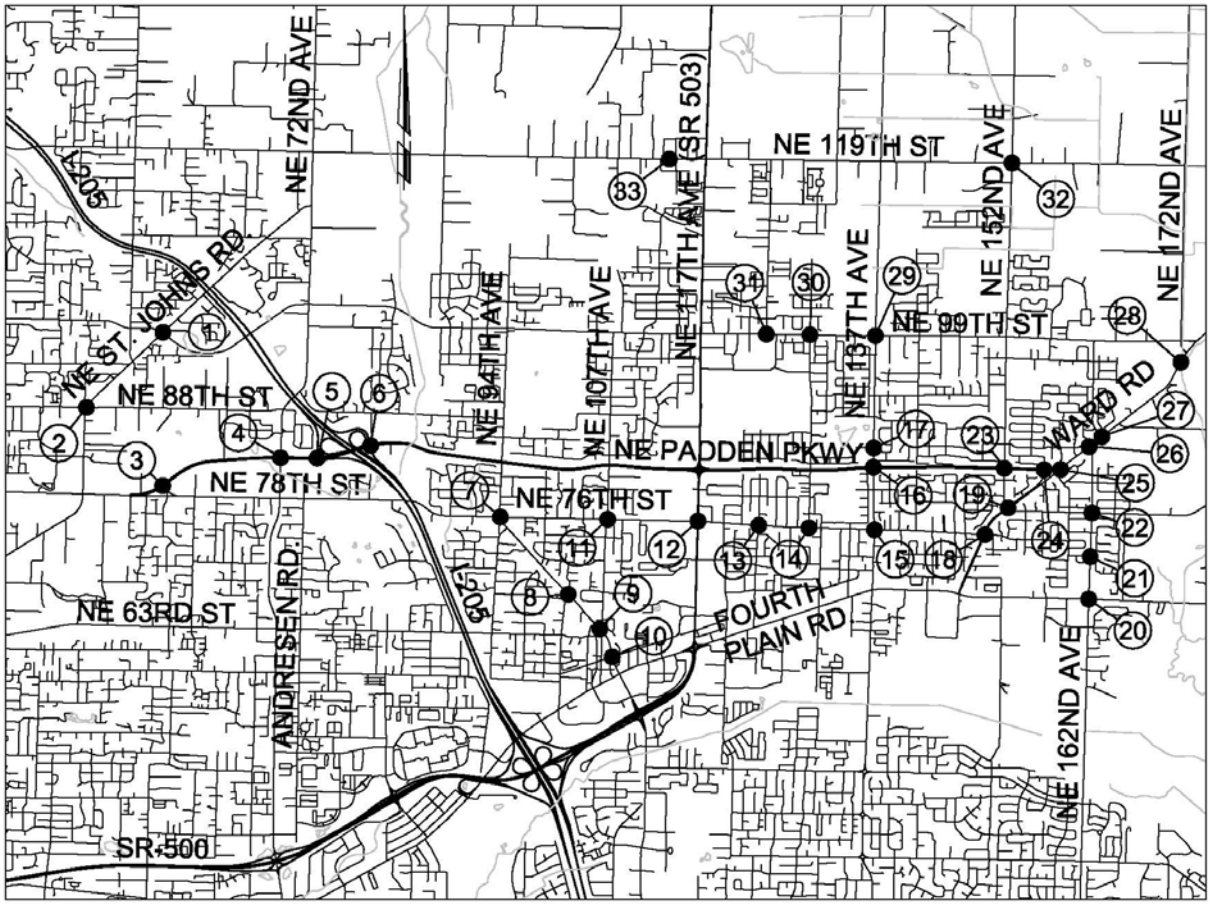
Project Funding

Phase	Year	Federal Funds	Other Funds	Total
PE	2013	$257,000	$0	$257,000
ROW	2013	$0	$72,000	$72,000
CN	2014	$3,243,000	$1,200,000	$4,443,000
Total		$3,500,000	$1,272,000	$4,772,000

Project Outcome Details

- **Improved county travel by reducing delay on county roads and state routes.**
- **Added pedestrian friendly left-turn flashing yellow arrows at select project intersections to reduce delay.**
- **Replaced failed in-ground loop detectors with radar detection.**
- **Radar detection "sees" motorcycles and bicycles in addition to vehicles.**
- **Have the ability to capture 24/7 real time traffic data.**
- **Added ADA compliant Accessible Pedestrian Signals (APS)**
- **Added battery backup**
- **Connected signals to central county monitoring center to allow remote operation.**

Vicinity Map / Locations of all upgraded existing signal



① NE LALONDE DR. AND NE ST JOHNS ROAD
② NE ST JOHNS ROAD AND NE 88TH STREET
③ NE PADDEN PARKWAY AND NE 55TH AVENUE
④ NE PADDEN PARKWAY AND NE ANDRESEN ROAD
⑤ I-205 SB RAMP
⑥ I-205 NB RAMP
⑦ NE 76TH STREET AND NE COVINGTON RD.
⑧ NE COVINGTON RD. AND NE 102ND AVE.
⑨ NE COVINGTON RD. AND NE 107TH AVE.
⑩ NE COVINGTON RD. AND NE ROSEWOOD AVE.
⑪ NE 76TH STREET AND NE 107TH AVE.
⑫ NE 76TH STREET AND NE 117TH AVE.
⑬ NE 76TH STREET AND NE 124TH AVE.
⑭ NE 76TH STREET AND NE 130TH AVE.
⑮ NE 76TH STREET AND NE 137TH AVE.
⑯ NE PADDEN PARKWAY AND NE 137TH AVE.
⑰ NE 137TH AVE. AND NE 84TH STREET
⑱ NE 76TH STREET AND NE WARD ROAD
⑲ NE 78TH STREET AND NE WARD ROAD
⑳ NE 162ND AVE. AND NE FOURTH PLAIN RD.
㉑ NE 162ND AVE. AND NE 73RD STREET
㉒ NE 162ND AVE. AND NE 78TH STREET
㉓ NE PADEN PARKWAY AND NE 152ND AVENUE
㉔ NE PADDEN PARKWAY AND NE WARD ROAD
㉕ NE WARD ROAD AND PED CROSSING
㉖ NE WARD ROAD AND NE 162ND AVE–WSDOT
㉗ NE WARD ROAD AND NE 162ND AVE–COUNTY
㉘ NE WARD ROAD AND NE 172ND AVENUE
㉘ NE 99TH STREET AND NE 137TH AVENUE
㉚ NE 99TH STREET AND NE 130TH AVENUE
㉛ NE 99TH STREET AND NE 124TH AVENUE
㉜ NE 119TH STREET AND NE 152ND AVENUE
㉝ NE 119TH STREET AND NE 112TH AVENUE

Travel times have been reduced, improving county and state travel.

The VAST: Orchards Traffic Signal Optimization (TSO) project replaced the failing copper communications cables connected to obsolete modems with new state of the art traffic signal controllers communicating to a central system via fiber optic Ethernet communications.

The old copper communication cables were unreliable at best. The on-street master controller had a bug which would randomly reset some of the signal controllers to a midnight function. Once reset, the signals on the corridor were unable to run in coordination, as the time clocks in the signals would be set to different times throughout the day. In many cases, a portion of the signals were running a completely different time of day/night plan based on the errors created by the outdated on-street master controller. Not being able to continuously coordinate the signals meant that vehicles had to stop at signals, instead of moving efficiently along the corridor. This stop and go created unnecessary delay and increased travel times across the county.

The signals on the system now communicate with the upgraded central server application once per second. The new server maintains effective and responsive signal coordination through central traffic responsive operation from the server. This means the signals on the project corridors are adjusting their timings throughout the day based on the actual traffic volumes on the corridor.

The VAST: Orchards TSO project also installed multiple pan / tilt / zoom cameras that allow the traffic engineers and signal technicians to remotely monitor the signal operation and to see the entire corridor. This remote operation allows the engineers and technicians to judge how the traffic is progressing and to modify the signal operations to improve the traffic flow without having to physically go out to the signal.

The elimination of the un-predictableness of the old system, coupled with the combination of the new reliable effective, responsive, real-time operations of the signal system and the ability to remotely adjust signal operations keeps vehicles moving efficiently along the project corridor. This project provides reduced vehicular and freight delay by not having to randomly stop at signals and decreases travel times across the county.

Radar detection installed, reducing delay.

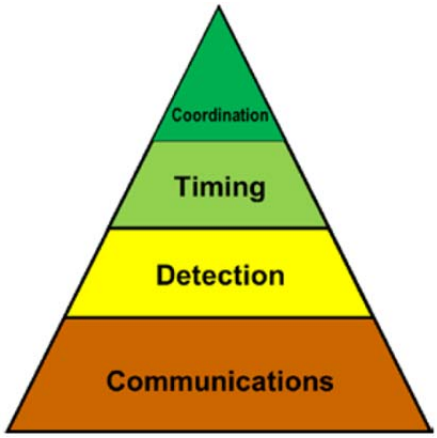
The VAST: Orchards TSO project replaced all failing in-ground vehicle detection with over-head radar detection systems. Prior to the project, the failed detection caused the signals to falsely “see” vehicles that did not exist for both left turns and side streets. The false calls caused traffic signals to provide a “green signal movement” that should have either been a shorter time or not at all during the signal cycle. The “false calls” create longer wait times, creating delay for vehicles during each signal cycle at multiple impacted intersections along the corridor.

Another challenge has been that Clark County Public Works has no way to maintain detection loops that are cut into the pavement. All work on the in-ground detection loops has to be contracted out. Also, the few detection loop contractors are exceptionally busy and the repair/replacement work is very weather dependent.

The new modern working detection systems allow the signals to work efficiently. The county has the equipment and capability to replace radar detection systems as needed. This means that the radar vehicle detection can be diagnosed and replaced / repaired without the use of contractor services. The radar detection systems are very flexible, which allows for easy changing of detection zones and inputs to the controller to accommodate the detection needs that have been required for projects following TSO, including Automated Traffic Signal Performance Measures and adaptive signal operation.

With the elimination of “false calls, the delay during signal cycles is reduced, not only for each individual signal, but at multiple signals along the project corridor.

The county is systematically moving toward a solid, highly effective and efficient county-wide signal system. The Traffic Signal Management Operations (TSMO) projects are building the firm footings of communications and detection needed for responsive, real-time, multi-jurisdictional signal systems timing and coordination as shown in the TSMO triangle.



Traffic Signal Management Operations (TSMO) Triangle

Locations of flashing yellow conversation locations – existing signals

- NE Covington Road / NE 94th Avenue / NE 76th Street – EB/WB on NE 76th Street
- NE Covington Road / NE 102th Avenue – NB on NE Covington Road
- NE Covington Road / NE 107th Avenue – NB/SB on NE Covington Road
- NE Covington Road / NE Rosewood Avenue – NB/SB on NE Covington Road
- NE 76th Street / NE 107th Avenue – EB/WB on NE 76th Street
- NE 76th Street / NE 124th Avenue – EB/WB on NE 76th Street
- NE 76th Street / NE 130th Avenue – EB on NE 76th Street
- NE 76th Street / NE 137th Avenue – all four directions
- NE 78th Street / NE 152nd Avenue / NE Ward Road – NB/SB on Ward Road
- NE 99th Street / NE 124th Avenue – EB on NE 99th Street
- NE 99th Street / NE 130th Avenue – EB/WB on NE 99th Street
- NE 99th Street / NE 137th Avenue – EB on NE 99th Street
- NE 119th Street / NE 112th Avenue – EB/WB on NE 119th Street
- NE 162nd Avenue / NE Ward Road – EB/WB on NE Ward Road
- NE Ward Road / NE 172nd Avenue – EB on NE Ward Road

The existing NE Ward Road pedestrian crossing was converted to a HAWK Beacon.