

Regional Planning for Operations in PA-Current and Future



Planning for Operations at Southwestern PA Commission

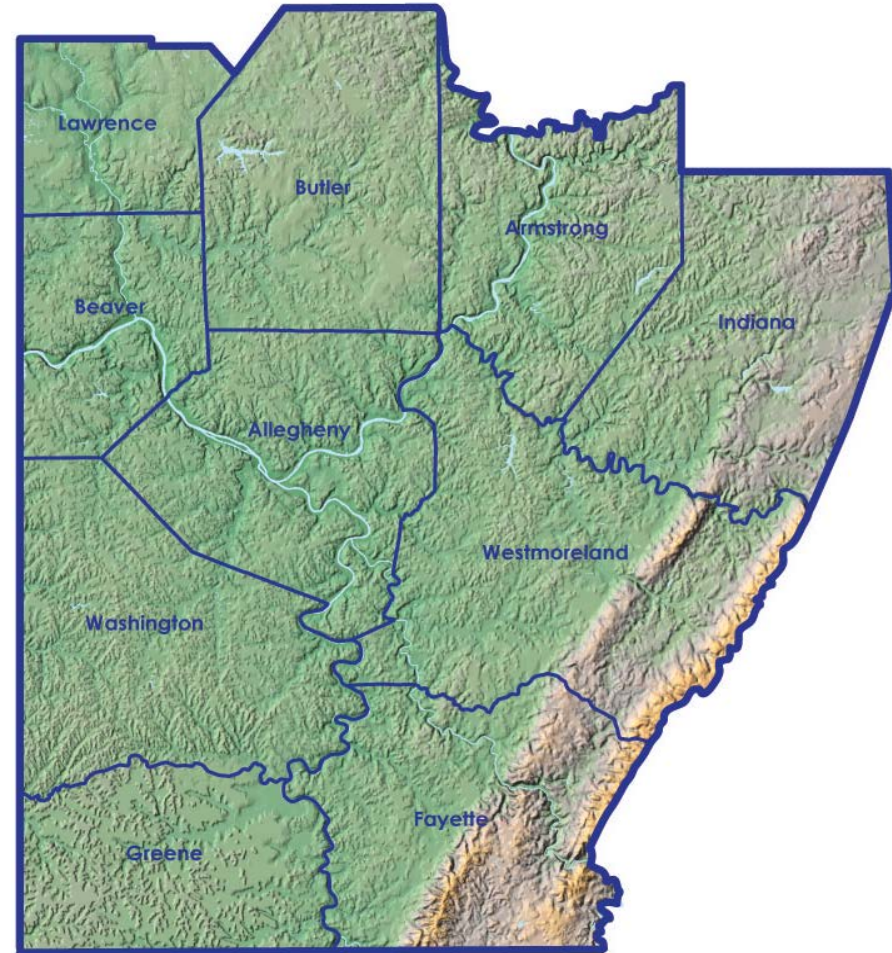


Transportation Engineering and Safety Conference-12/8/17

Southwestern Pennsylvania Commission



- 10 counties
- Over 7000 sq. miles
- 2.66 M residents
- 3 PennDOT Districts
- 555 munis
- 6,688 state/local bridges
- 25,162 linear miles of roadway
- 2,750 traffic signals (operated and maintained by 255 munis).



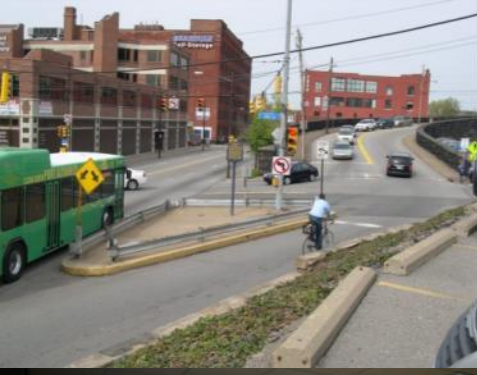


Transportation Ops and Safety Programs and Initiatives

- Transportation Operations & Congestion Management
 - Ops and Safety Forum
 - Regional Operations Plan/ITS Planning and Implementation
 - Congestion Management Process
 - Corridor Planning Studies
 - Regional Traffic Signal Program
 - Traffic Incident Management

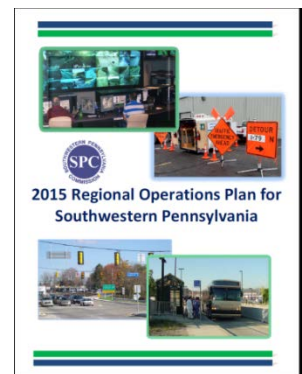
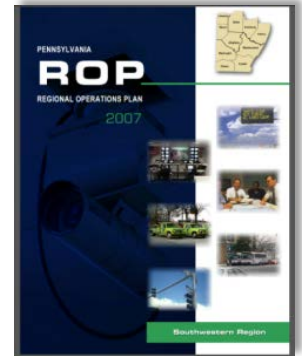
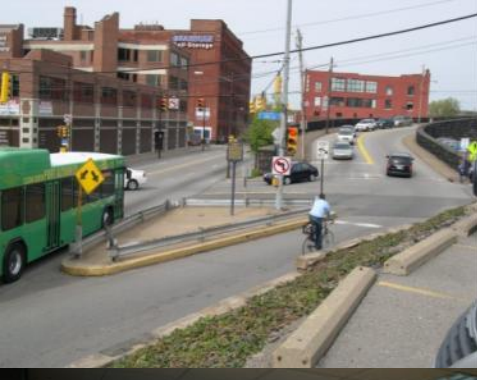
Transportation Ops & Safety Forum (TOSF)

- An open forum
- Participation from 3 PennDOT Districts, Central Office, county planners, consultants, transit agencies, TMAs, Pitt, CMU
- Meets 3-4 times per year
- Updates on regional programs, projects
- Presentations on innovative projects, new technology, etc.



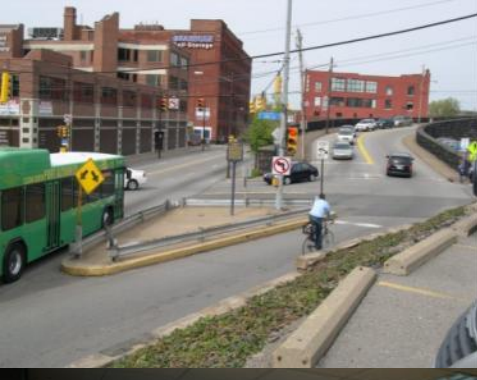
SWPA ROP History

- Sept 2005 – PennDOT Transportation Systems Operations Plan (TSOP)
- June 2007 – SWPA ROP established
- June 2011 – SWPA ROP Update 1
- June 2015 – SWPA ROP Update 2
- June 2019-Update 3 to begin soon



SWPA ROP Goals

- Mitigate Recurring Congestion
- Maintain Mobility During Planned Events
- Minimize the Impact of Unplanned Events
- Provide an Efficient Multimodal Transportation System





SWPA ROP Focus Areas

Focus Area	Operational Objective
Traffic Signals	Improve the operational efficiency and safety of traffic signals
Incident & Emergency Management	Manage and coordinate incident and emergency management activities
Traveler Information	Provide timely and reliable traveler information
Operational Teamwork	Promote institutional coordination to improve the efficiency of management and operations programs and initiatives
Intermodal Connectivity	Enhance intermodal integration
Freeway & Arterial Operations	Implement freeway and arterial operations initiatives in an integrated fashion
Freight Management	Improve the operational efficiency and safety of freight movement within the region

ITS Architecture

- Regional ITS Architecture adopted in 2004
- Started an update of the Regional ITS Architecture by meeting with 25 ITS stakeholders in 2015
- Completed an update of the ITS Architecture in 2016-all electronic



Southwestern PA Regional ITS Architecture

Welcome

This Regional ITS Architecture is a roadmap for transportation systems integration. The architecture was developed through a cooperative effort by the region's transportation agencies, covering all modes and all roads in the region. It represents a shared vision of how each agency's systems will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers in the region. The architecture provides an overarching framework that spans all of the region's transportation organizations and individual transportation projects. Using the architecture, each transportation project can be viewed as an element of the overall transportation system, providing visibility into the relationship between individual transportation projects and ways to cost-effectively build an integrated transportation system over time. The purpose of this regional ITS architecture web site is to encourage use of the regional ITS architecture and gather feedback so that the architecture is used and continues to reflect the intelligent transportation system vision for the region. The menu bar at left provides access to the stakeholders, the transportation systems in the region (the Inventory), the transportation-related functions that are envisioned, and the existing and planned integration opportunities in the region.

[Home](#)
[Scope](#)
[Planning](#)
[Stakeholders](#)
[Inventory](#)
 [By Entity](#)
 [By Stakeholder](#)
[Services](#)
[Ops Concept](#)
[Requirements](#)
[Interfaces](#)
[Standards](#)
[Agreements](#)

[Send Email Comments](#) Phone Comments: Josh Spano @ (412) 391-5590 x362 [Southwestern Pennsylvania Commission](#) 7/14/2016



ITS Planning and Implementation

Regional Cashless Tolling Study



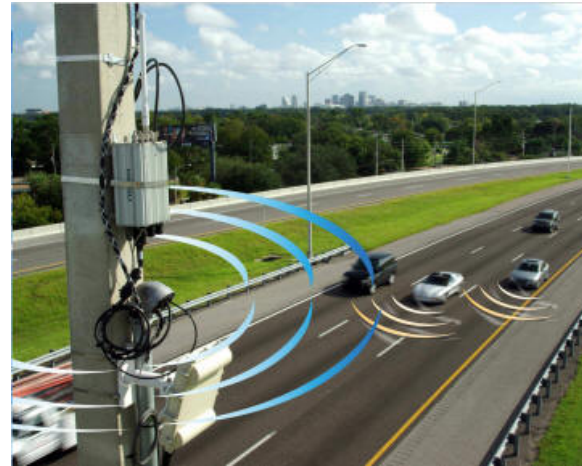
PTC is giving serious consideration to CT system-wide Study looks at:

- Given that the toll booths currently act as a control point for vehicles exiting the turnpike, will their removal result in:
 - any substantive impact at off-ramp locations?
 - any substantive impact at nearby signalized intersections?
 - feasibility of new access?



ITS Planning and Implementation

Baum/Centre SINC-UP CV Project



- Originally a \$750,000 SINC-UP Project that included significant upgrades
- Evolved into a \$1.7M public-private collaboration between FHWA, SPC PennDOT District 11-0, the City of Pgh, CMU Traffic-21,UPMC and private philanthropic organizations.
- Provides traffic signals along these parallel high growth corridors with upgrades such as new controllers, new communications, new radar vehicular detection and a new SURTRAC adaptive system. Also new dedicated short range communication (DSRC) was installed to facilitate a future connected vehicle project.

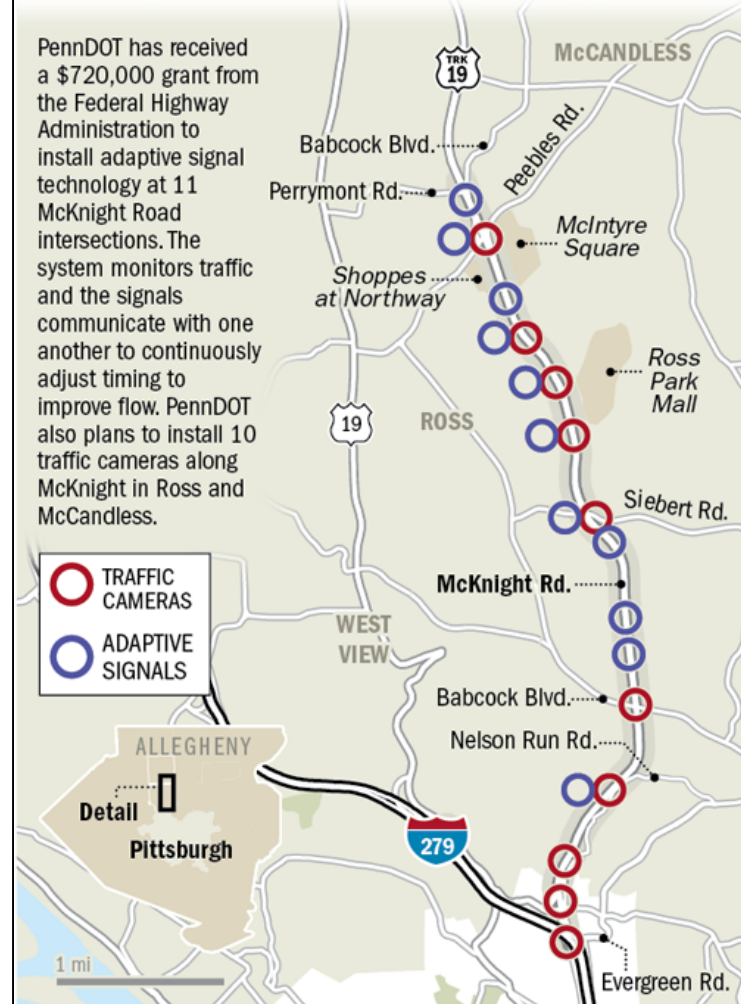
ITS Planning and Implementation



- For the first time, there will be a communication link between traffic signals and the Regional Traffic Management Center.

McKnight Road traffic signal upgrades

PennDOT has received a \$720,000 grant from the Federal Highway Administration to install adaptive signal technology at 11 McKnight Road intersections. The system monitors traffic and the signals communicate with one another to continuously adjust timing to improve flow. PennDOT also plans to install 10 traffic cameras along McKnight in Ross and McCandless.



ITS Planning and Implementation Emerging Areas

- Active monitoring of traffic signals on key corridors
- Expanded use of adaptive traffic signals
- Travel time information on key roadways
- Integrated Corridor Management
- Hard shoulder running
- Connected and autonomous vehicles
- Traffic Incident Management



Congestion Management Process

- 104 active CMP corridors
- 580 total miles
 - **Tier One**
 - Freeways and Expressways
 - INRIX data with Maryland CATT lab VPP Suite of analytical tools
 - **Tier Two**
 - Key regional arterials
 - Mini Blue Toad detection devices



Congestion Management Process

SOUTHWESTERN PENNSYLVANIA COMMISSION

[About Us](#) |
 [Publications](#) |
 [Regional Data Center](#) |
 [Planning & Development](#) |
 [Transportation](#) |
 [Our Region](#) |
 [Visitor Info](#)

[Home](#) |
 [Employment](#) |
 [RFPs/RFQs](#) |
 [SPC Staff Directory](#) |
 [Contact SPC](#) |
 [Site Index](#) |
 [Glossary](#) |
 [Links](#) |
 [Search](#)

[Transportation Home](#)

[Ops & Safety](#)

[Congestion Mgt](#)

[Glossary](#)

[System Definition](#)

[Performance Measures](#)

[Performance Monitoring/Data](#)

[Congestion Management Strategies](#)

[Strategy Implementation & Monitoring Effectiveness](#)

[Reports](#)

Department Director:
Doug Smith
 (412) 391-5590 x327

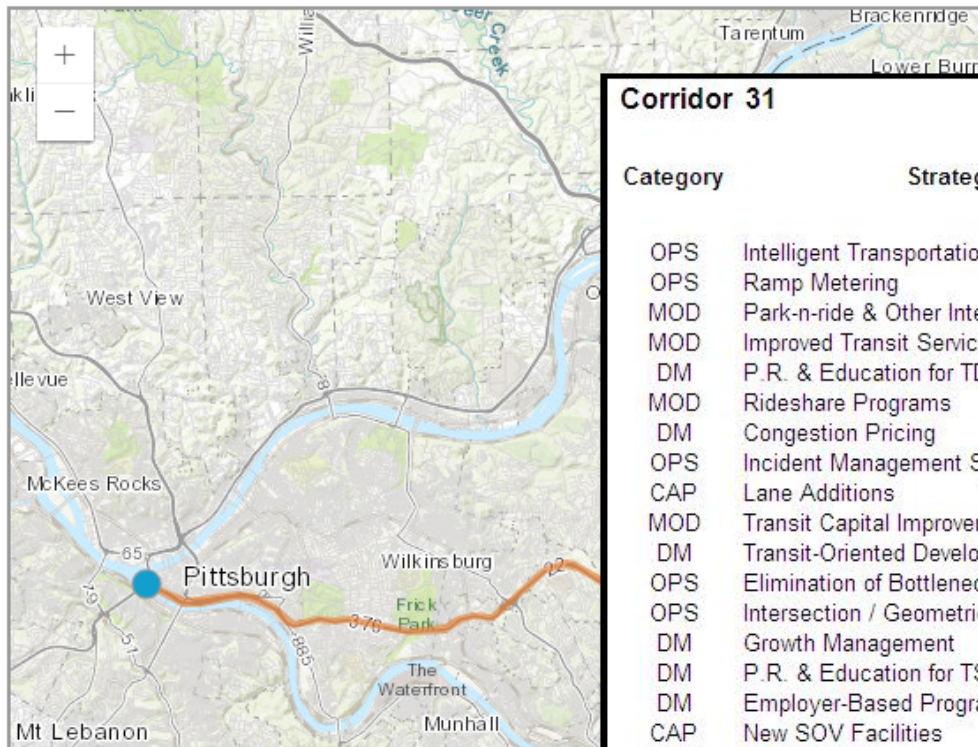
Transportation Operations & Safety Manager
Domenic D'Andrea
 (412) 391-5590 x341



Congestion Management Corridors: Allegheny County

Corridor 31: Interstate 376 (Parkway East)

[Return to the Congestion Management main page.](#)
[Return to your previous CMP page or web page.](#)



Corridor 31 Nodes

Category	Strategy	Baseline Prioritization*
OPS	Intelligent Transportation Systems	High
OPS	Ramp Metering	
MOD	Park-n-ride & Other Intermodal Facilities	Medium
MOD	Improved Transit Service	
DM	P.R. & Education for TDM	
MOD	Rideshare Programs	
DM	Congestion Pricing	
OPS	Incident Management Systems	
CAP	Lane Additions	
MOD	Transit Capital Improvements	
DM	Transit-Oriented Development Policies	
OPS	Elimination of Bottlenecks	
OPS	Intersection / Geometric Improvements	
DM	Growth Management	
DM	P.R. & Education for TSD	
DM	Employer-Based Programs	
CAP	New SOV Facilities	

Corridor



CMP:Map-21 Performance Measures

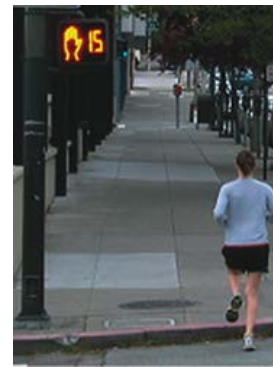
SPC plans to track the following performance measures by USDOT when they go into effect:

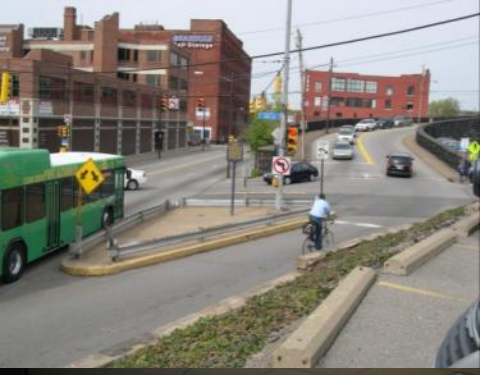


- Percent of the Person-Miles Traveled on the Interstate that are reliable (Interstate System)
- Percent of the Person-Miles Traveled on the Non-Interstate NHS that are reliable (Non-Interstate NHS)
- Percent Change in Tailpipe CO₂ Emissions on the NHS Compared to the Calendar Year 2017 Level (NHS)
- Truck Travel Time Reliability (TTTR) Index (Interstate System)
- Annual Hours of Peak Hour Excessive Delay Per Capita (NHS)
- Percent of Non-SOV Travel (NHS)
- Total Emissions Reduction (CMAQ eligible areas)

Corridor Planning Studies

- New type of study which focuses on operations and safety collectively
- Looks at how they impact one another, but also how existing and future land uses may impact both.
- Short term and long term suggestions that can be potentially incorporated into LRP, TIP, and partner maintenance and development activities
- Completed two to date at request of our county planning partners (SR 68/528 in Butler County, SR 18 in Lawrence County)





Transportation Ops and Safety Programs and Initiatives

Multimodal: SR 51 Transit Signal Priority Study

TSP saves southbound customers an average of 4.5 minutes from their afternoon commute:

	No TSP	TSP	PM Peak Hour Time Savings	% Savings
Southbound	32:11	27:35	04:36	14.3%
Northbound	27:54	25:33	02:21	8.4%

Summary of First Year Weekday Benefits

SR 51 Entire Corridor

2608



Reduced Transit hours of travel

Total Benefit*

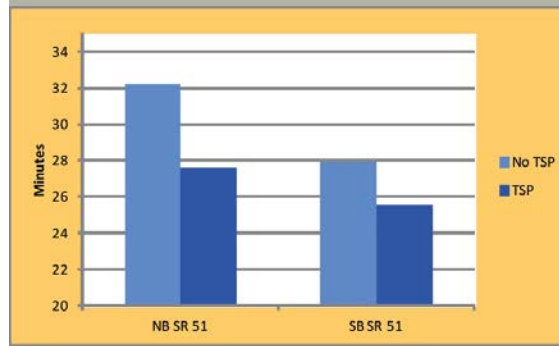
\$1,764,609

*reduced person-hour delay, stops, & transit operating time

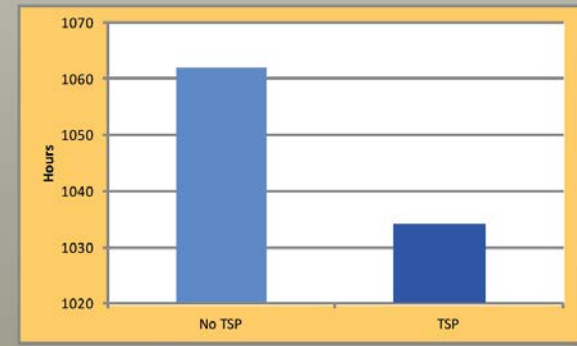
Benefit Cost Ratio:

7.4:1

Transit Travel Time (PM Peak)

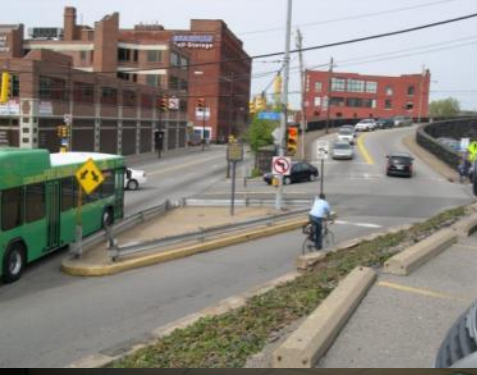


SR 51 Corridor: Daily PM Peak Hour Delay for All Travelers



Regional Traffic Signal Program

Program Functional Background



Data Collection



Signal Timing Analysis



Signal Design



Bid Documents

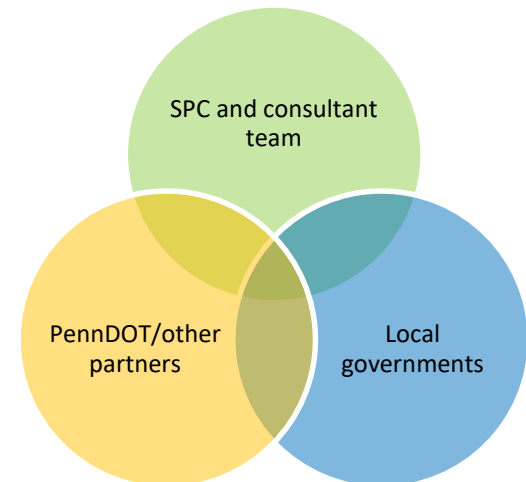


Construction



Signal Timing Implementation

- SPC is program administrator
- CMAQ funding (80/20)
- Municipalities apply to SPC for specific corridor funding
- SPC and partners selects corridors for program
- Two project types: SINC, SINC-UP

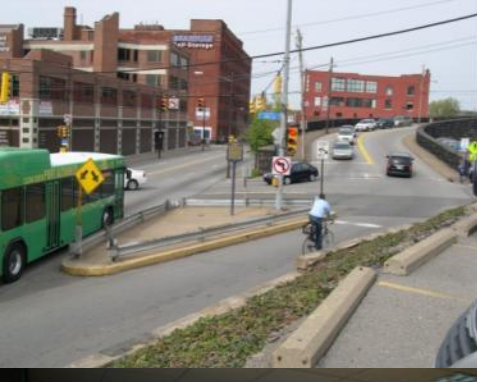


Regional Traffic Signal Program

Program's 1st Cycle completed in 2012

Program's 2nd Cycle completed in 2015

- 45 project locations
- 501 Signals
- 10 Counties
- 58 Municipalities
- \$7M CMAQ and 1.75M local



Regional Traffic Signal Program

Program's 2nd Cycle

OVERALL NEW EQUIPMENT

3 construction contracts (\$2.91 million)

- 23 traffic signal controllers
- 30 traffic signal controllers and cabinets
- 244 vehicular signal heads converted to LED
- 272 pedestrian countdown signals
- 140 pedestrian push buttons
- 112 vehicular radar detection units
- 78 GPS time reference units
- 45 Radio Spread Spectrum units
- 37 Software updates
- 16 Emergency Pre-emption units
- 5 battery back-up systems
- 18,805 LF pavement markings
- Some loop detection and signage
- Retiming/coordination implementation at 250 intersections
- One complete reconstructed intersection (Kittanning)
- Four complete signal removals (New Castle and Homer City)



Countdown ped signals













Controllers, cabinets



Ped push buttons

Overall Program Benefits-2nd Cycle

Retiming Benefits		First Year Operations Benefits	First Year Safety Benefits	Total First Year Benefits
	457,135 vehicles travel these corridors on an average day	<p>First Year Operations Benefit</p> <p>\$75,200,526</p> <p>Benefit Cost Ratio:</p> <p>46:1</p>	<p></p> <p>The safety benefits to pedestrians included bringing 158 intersections up to current standards by increasing the pedestrian intervals and installing 246 countdown pedestrian signals. This can help reduce in-vehicle pedestrian related crashes by 70% and provide a 99:1 benefit to cost for pedestrians. 16 Emergency Vehicle Preemption systems were also installed with this program, which helped reduce emergency response times by 14% to 23%.</p>	<p>Total First Year Benefit (Operations & Safety)</p> <p>\$87,358,793</p> <p>Benefit Cost Ratio:</p> <p>50:1</p>
	3,183,861 reduced vehicle hours of travel			
	3,595,069 gallons reduced fuel consumption			
	251,176 kg reduced total CO pollutant emissions			
	48,899 kg reduced total NO pollutant emissions			
	58,202 kg reduced total VOC pollutant emissions			
	\$38,738 LED upgrade savings (energy & maintenance)			
	140,370,208 reduced number of stops			
	\$1,618,312 total life cycle project cost			

Before

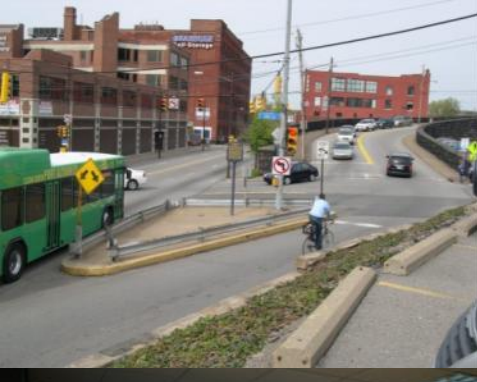


After



What is Traffic Incident Management (TIM)?

- TIM is a planned and coordinated, multidisciplinary approach to clearing traffic incidents as safely and efficiently as possible to minimize impacts to responders and motorists and restore traffic flow.



Why is TIM important?

Effective TIM

- Reduces secondary crashes in traffic backlogs, detours
- Makes efficient use of resources among all agencies
- Promotes responder safety, quick clearance, and prompt and reliable communication among all parties BEFORE the incident, DURING the incident, and AFTER the incident
- Identifies issues that need to be advanced to the next responsible party, legislative leadership, etc.



Local TIM Teams

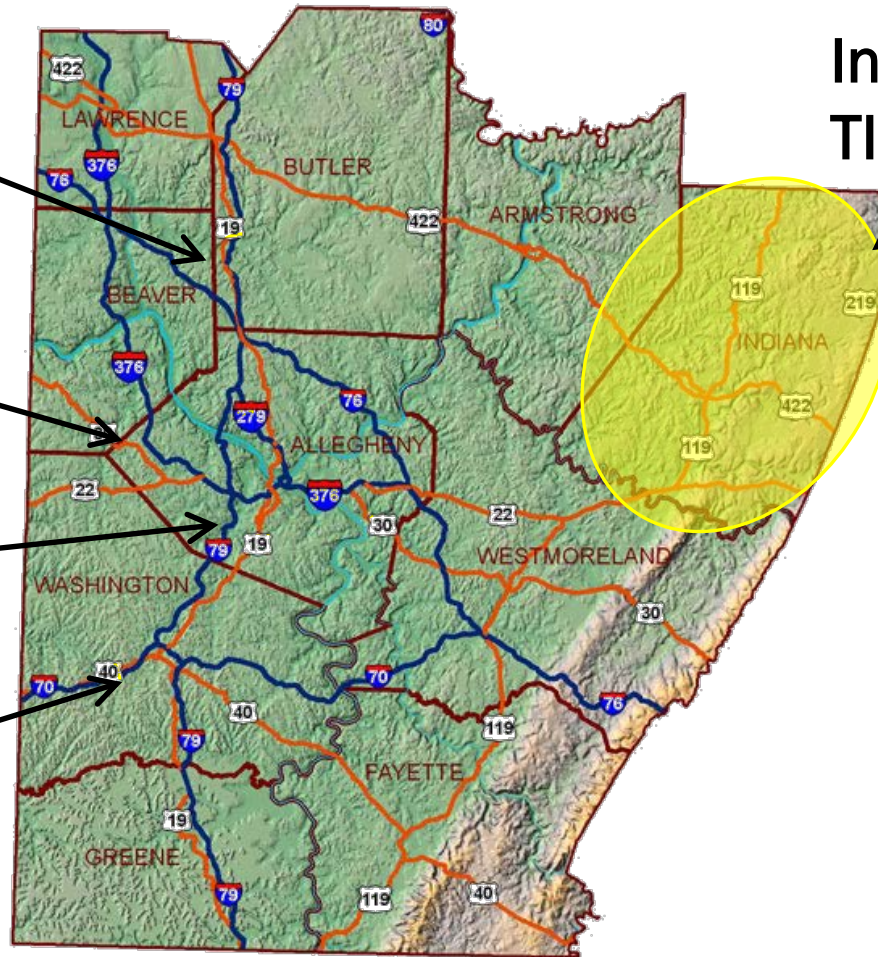
I-79 / I-76
Local TIM Team

Airport Corridor
Local TIM Team

Pittsburgh TIM
Team

I-70 / I-79
Local TIM Team

Indiana County
TIM Team



Local TIM Meetings

- Round table discussions
- PennDOT Information
- Municipal Information
- Training needs
- After Action Reviews





Traffic Control Training



HAZMAT / Tanker Response Training



Cable Median Barrier Training

Statewide TIM Summit, Aftermath



- Establish a PennTIME Program
- Establish a Statewide TIM Panel
- Establish a Joint Operational Policy
- Enhance and coordinate training
- Improve driver education



Domenic D'Andrea, P.E., PTOE
Manager, Operations and Safety Programs
ddandrea@spcregion.org

