



S.R. 0202, Section 7IT

InSync Adaptive Traffic Signal System

May 18th, 2011



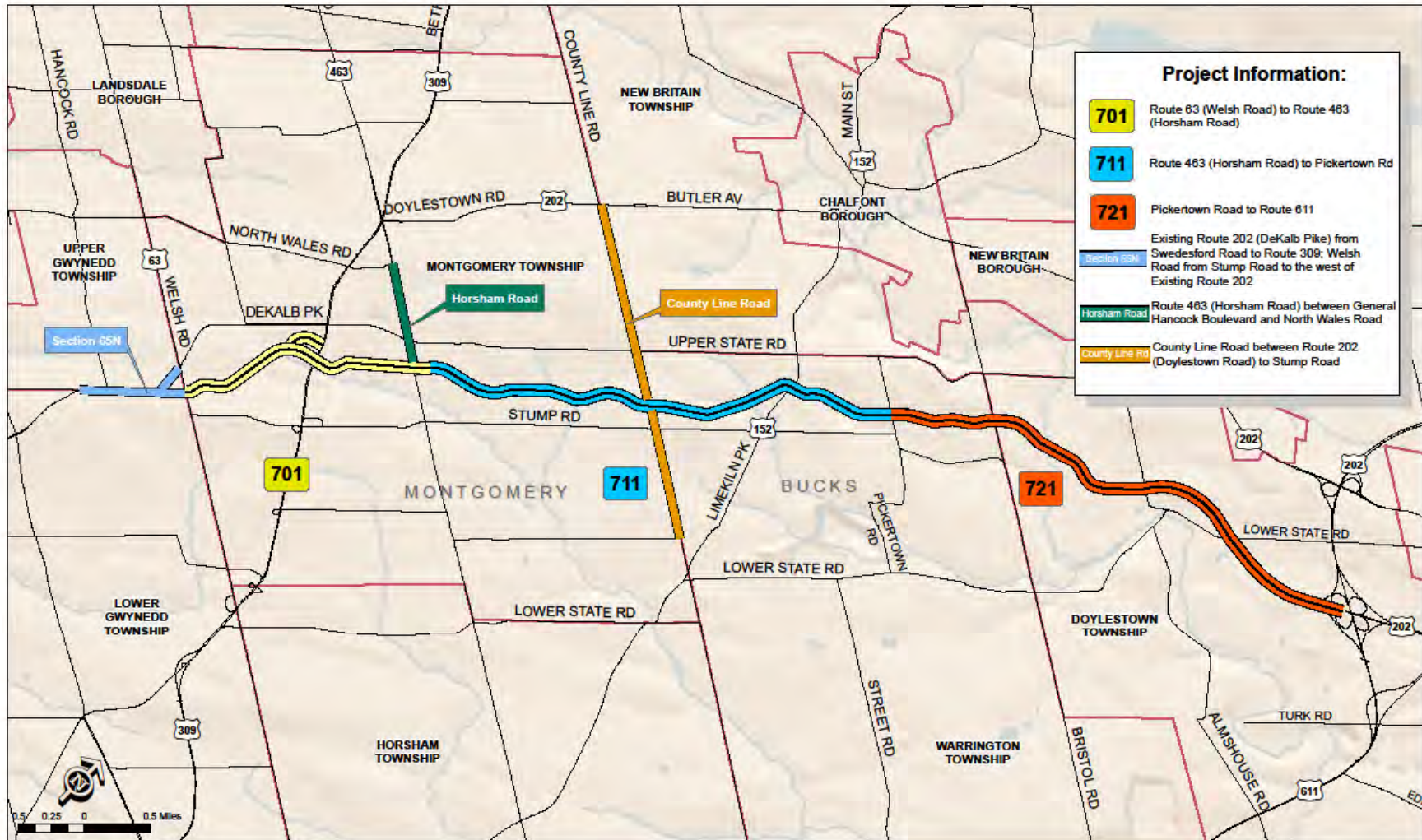


US 202 Parkway (202, Section 700)

- Open to Traffic – Summer/Fall, 2012
- New nine mile roadway in Bucks and Montgomery Counties
 - Welsh Road to PA 611 Interchange
- Two to four lanes wide
- Shared use path through entire length
- Five foot bicycle lanes through entire length
- Seven signalized intersections
- Additional upgrades to adjacent intersections and intersecting routes



ROUTE 202 - SECTION 700 PROJECT OVERVIEW MAP





US 202, Section 700 Construction Projects

- S.R. 0202, Section 701 – January, 2011
 - 1.8 Miles – Welsh Road to Horsham Road
 - Five signalized intersections
- S.R. 0202, Section 711 – *Mid 2012*
 - 3.3 Miles – Horsham Road to Pickertown Road
 - Two signalized intersections
- S.R. 0202, Section 721 – *Mid 2012*
 - 3.4 Miles- Pickertown Road to PA 611
 - Two signalized intersections
- S.R. 0202, Section 7IT – *2011-2012*
 - ITS deployment and signal upgrade/interconnection along US 202 parkway corridor



S.R. 0202, Section 7IT Project Background

- New Construction allows for fully integrated arterial corridor
- Combination of surveillance, traveler information, and signal control capabilities
 - Allows PennDOT to effectively respond to incidents, diversions and emergencies
- Furthers the goal of actively managing traffic on lower class facilities and detours
- Will be the most comprehensive TIMS deployment on a regional arterial in PA



S.R. 0202, Section 7IT Project Elements

- Intelligent Transportation System Deployment
 - Traffic Surveillance – 21 CCTV cameras
 - Traveler Information – 7 permanent, 2 semi-permanent DMS, 1 CMS, travel times
 - High-speed communications via fiber optic cable
 - Agency-to-Agency connections – video sharing
- Traffic signal interconnection and upgrades
 - Adaptive Traffic Signal Control



S.R. 0202, Section 7IT Project Elements

- Design-Build
- US 202 Parkway and parallel/intersecting routes
- Design/Build Project let May 12th, 2011
 - Bruce & Merrilees Electric (\$5,686,868) – Apparent Low
- All ITS systems required to be operating when 202 Parkway is opened to traffic



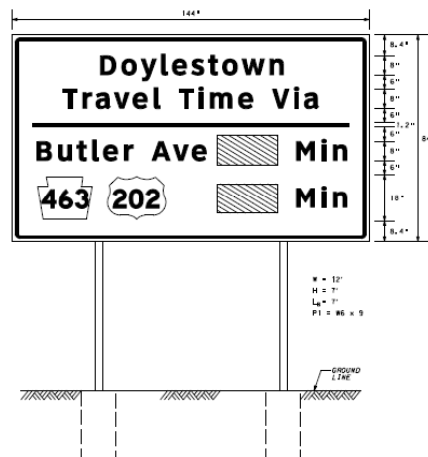
Project Stakeholders

- PennDOT Engineering District 6-0
- Federal Highway Administration
- Montgomery County Planning Commission
- Eight Local Municipalities
 - Chalfont Borough
 - Doylestown Township
 - Lower Gwynedd Township
 - Montgomery Township
 - New Britain Borough
 - New Britain Township
 - Upper Gwynedd Township
 - Warrington Township



ITS Project Highlights

- Bluetooth Travel Time System
 - Reads Bluetooth MAC addresses from on-board devices to track vehicles
 - First deployment in Pennsylvania
 - Small size and lower cost make for an effective arterial solution
 - 17 installations



- Changeable Message Sign System
 - For use providing travel times to destinations on arterial roadways
 - Static signs with changeable LED blocks
 - One location on PA 463



Signal Operations – Where Were We?

- Municipal Traffic Signal Permits
- Municipalities Own, Operate, and Maintain signal systems
- Limited ability for PennDOT to monitor or modify signal operations based on traffic demand – set it and forget it
- There has to be a better way!



Signal Operations – Where Are We?

- PennDOT began integrating traffic signal operations into the TMC beginning in 2009
 - SR 0023 Section ITC
 - SR 0095 Sections GR0 and CP1
- TMC has the ability to monitor and adjust ~200 traffic signals within the District
 - Operational adjustments due to non-recurring congestion

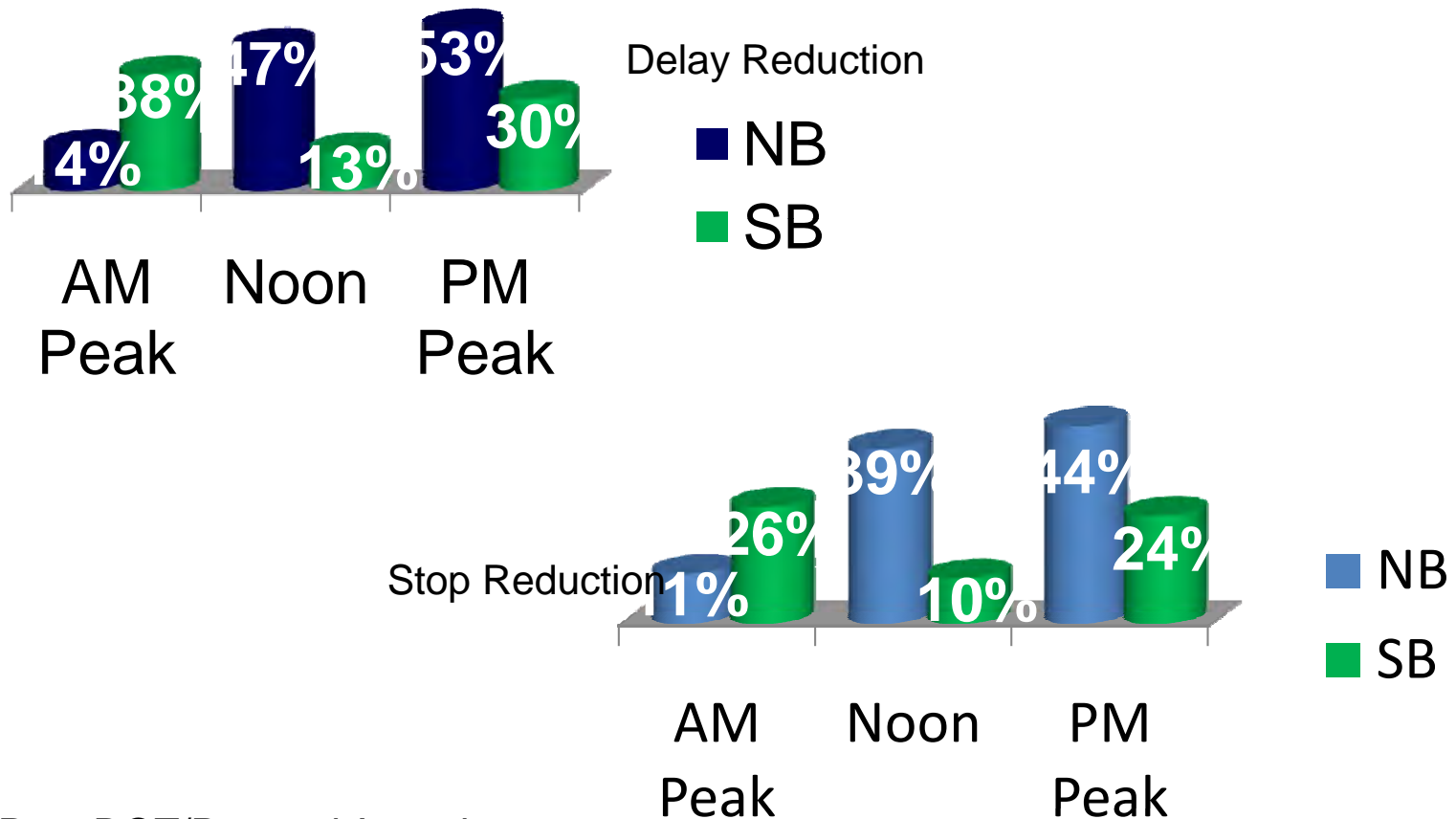


Signal Operations – Where Are We Going?

- Adaptive signal systems self-adjust to variations in traffic volumes
 - Rhythm Engineering's InSync Traffic Adaptive Signal System
- PennDOT conducted a test installation at two intersections
 - US 202 & Gulph Road
 - US 202 & Mall Boulevard



US 202/Gulph Road Installation Results



Source: PennDOT/Pennoni Associates



US 202/Gulph Road Installation Results

Queue clearing

US 202 and Gulph Road, PM Peak

	Closed Loop Cleared	InSync Cleared
Northbound Left	13%	100%
Southbound Left	33%	100%
Eastbound Approach	30%	70%

Source: PennDOT/Pennoni Associates



Implementation

- Local InSync Deployments
 - SR 0202, Section 65N – 10 intersections
 - SR 0202, 701/711/721 – 11 intersections
 - SR 0202, Section 7IT– 23 intersections
- Currently 60 intersections planned for installation in District 6-0



Traffic Signal System – SR 202, Sec. 7IT

- Upgrades at 23 intersections
 - PA 309 – 9 locations
 - US 202 – 12 locations
 - State Street – 2 locations
- Installation of Adaptive Traffic Signal Control System
- Controller upgrades at 4 locations
- Signal interconnection into coordinated systems via fiber
- Interconnection of signals installed by Parkway construction projects
- System connection to municipal buildings as well as PennDOT TMC Centrax Signal Server



Adaptive Traffic Signal Control

- Self-Optimizing traffic signal processors developed by Rhythm Engineering
- Processing unit is mounted into signal cabinet and communicates to existing controller
- IP digital cameras provide detection at all approaches
- Utilizes algorithms to maximize green time for heavy approaches in real-time





Adaptive Signal Control Features

- No set cycle lengths, splits, or offsets
- Continually re-allocates green time to the highest priority approach/movement
- Can be overridden by manual inputs, pedestrian calls, and emergency/transit pre-emption
- Has the ability to detect individual vehicles and record their wait time in the queue
- Communicates with upstream/downstream intersections to identify/anticipate approaching vehicles
- Considers platoon progression through corridor in allocation of green time



Adaptive Signal Control Features

- Studies conducted using the Rhythm System have shown the following:
 - Reduction in number of stops of over 60%
 - Reduction in travel time of up to 30% or more
 - Reduction in fuel consumption of 20%
 - Reduction in emissions of 30%
- Adaptive control negates the need for future traffic signal retiming
- Costs - \$40,000 - \$50,000 per intersection



Thank you!

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Additional InSync Info:



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