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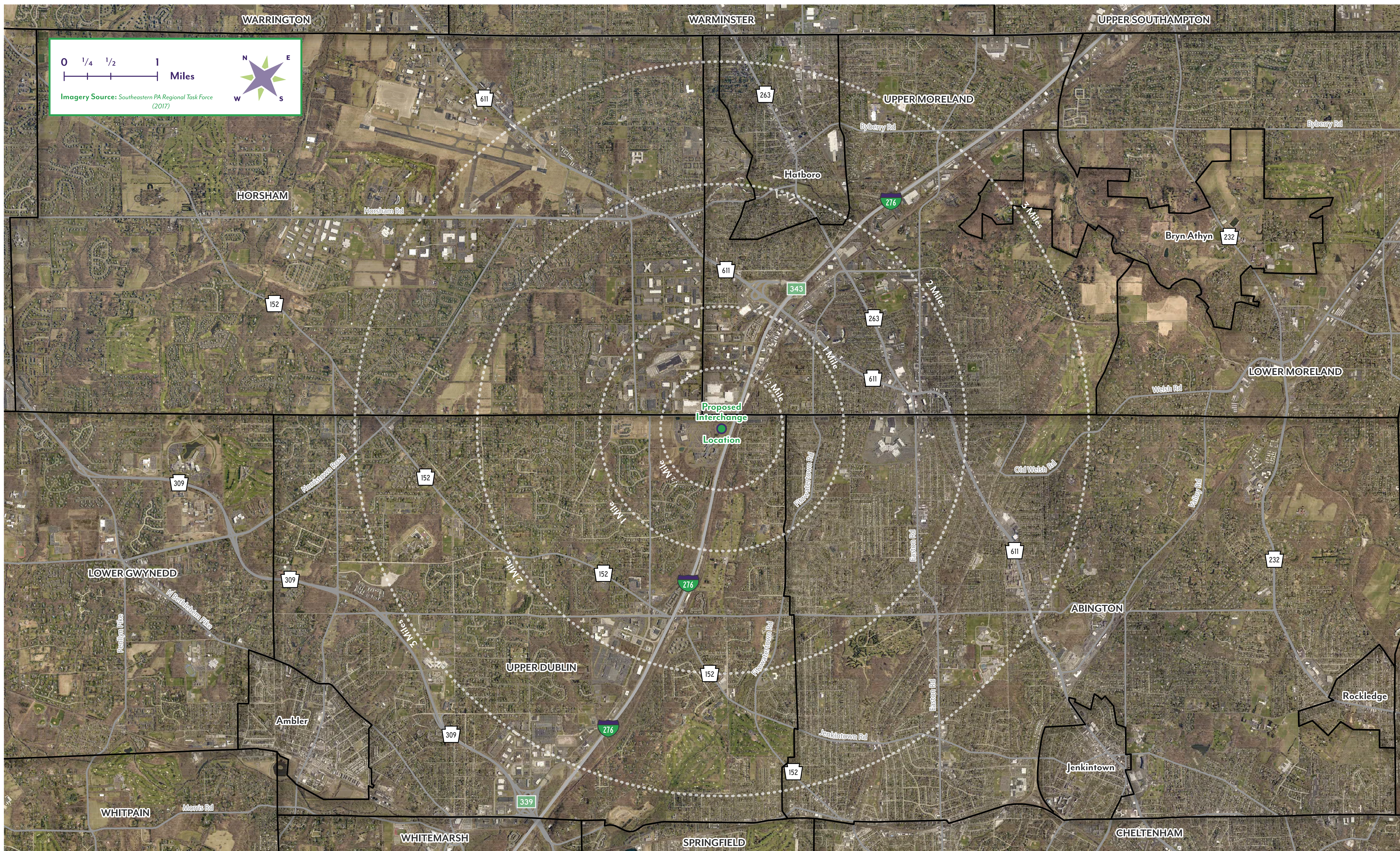
01

PA Turnpike Interchange Study at WELSH ROAD

# Where Do You Live, Work, or Play?



DELAWARE VALLEY  
**dvrpc**  
REGIONAL  
PLANNING COMMISSION





# STATION 02

## PA Turnpike Interchange Study at WELSH ROAD

# Project Background



### PROJECT OVERVIEW

As part of Montgomery County's 2015 *Turnpike Corridor Reinvestment Project*, the county identified a need for seven new or modified PA Turnpike (I-276) interchanges. **The construction of new interchanges at these locations would increase PA Turnpike access for many communities and support economic revitalization.**

Several municipalities have expressed support for these new interchanges, while also articulating concerns about potential traffic impacts. DVRPC is studying two of the proposed new interchanges at Welsh Road in Upper Dublin Township and Henderson Road in Upper Merion Township.

#### The purpose of the PA Turnpike Interchange Study is to:

- Identify the potential impacts of the proposed new interchange on local traffic;
- Identify areas where traffic congestion may increase as a result of the proposed new interchange; and
- Develop recommendations to ease traffic congestion on local roads.

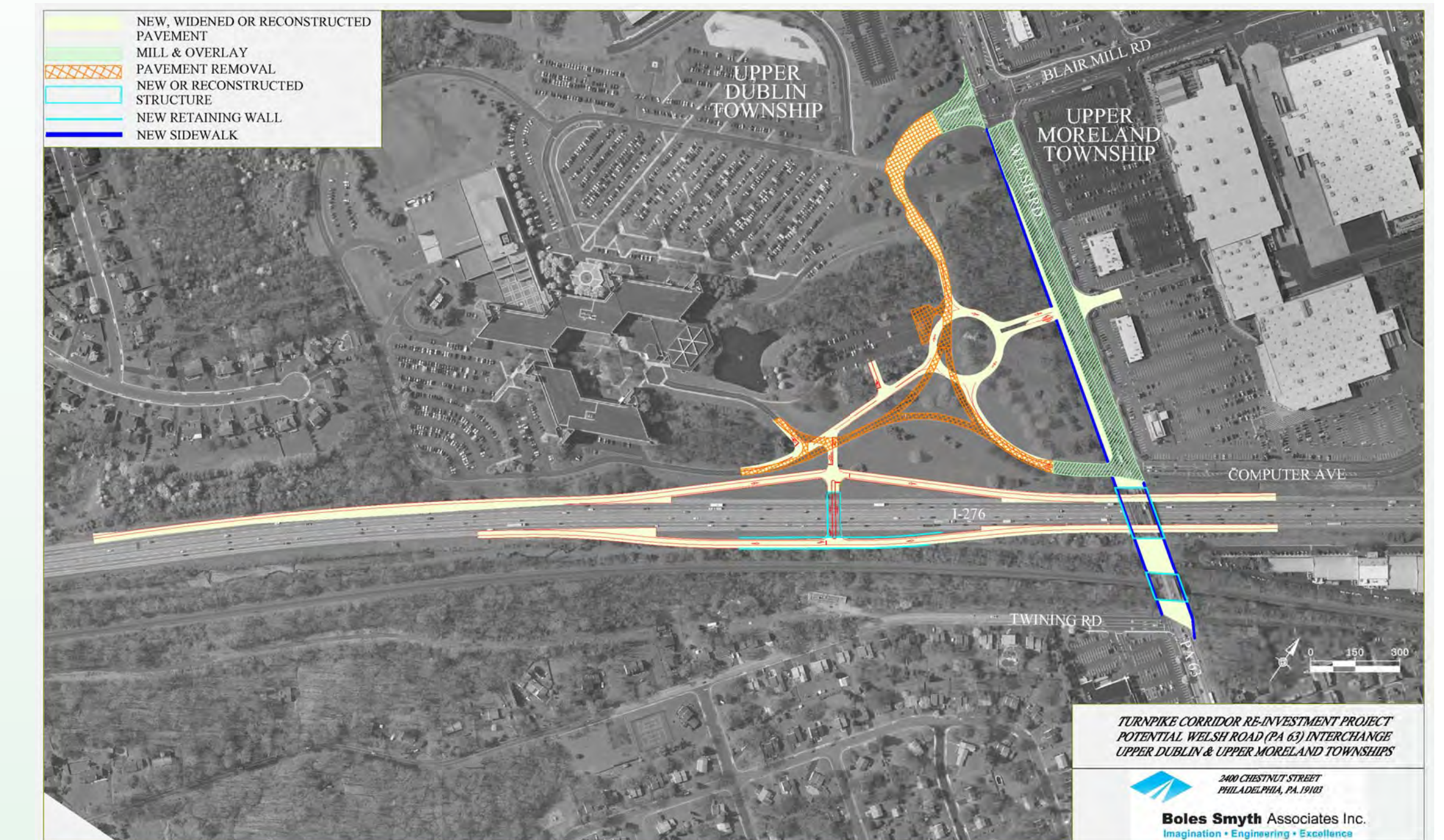
### PROJECT SCOPE

#### PHASE 1 (2017 - 2018)

A project steering committee was formed, traffic counts and field data were collected, and a base network of roads within the study area was prepared in traffic simulation software.

#### PHASE 2 (2018 - 2019)

Traffic operational modeling will be conducted, deficiencies in the transportation network will be identified and solutions modeled. Future scenarios will be shared with the steering committee and the public and finalized in a report.



### Pennsylvania Turnpike Corridor Reinvestment Project

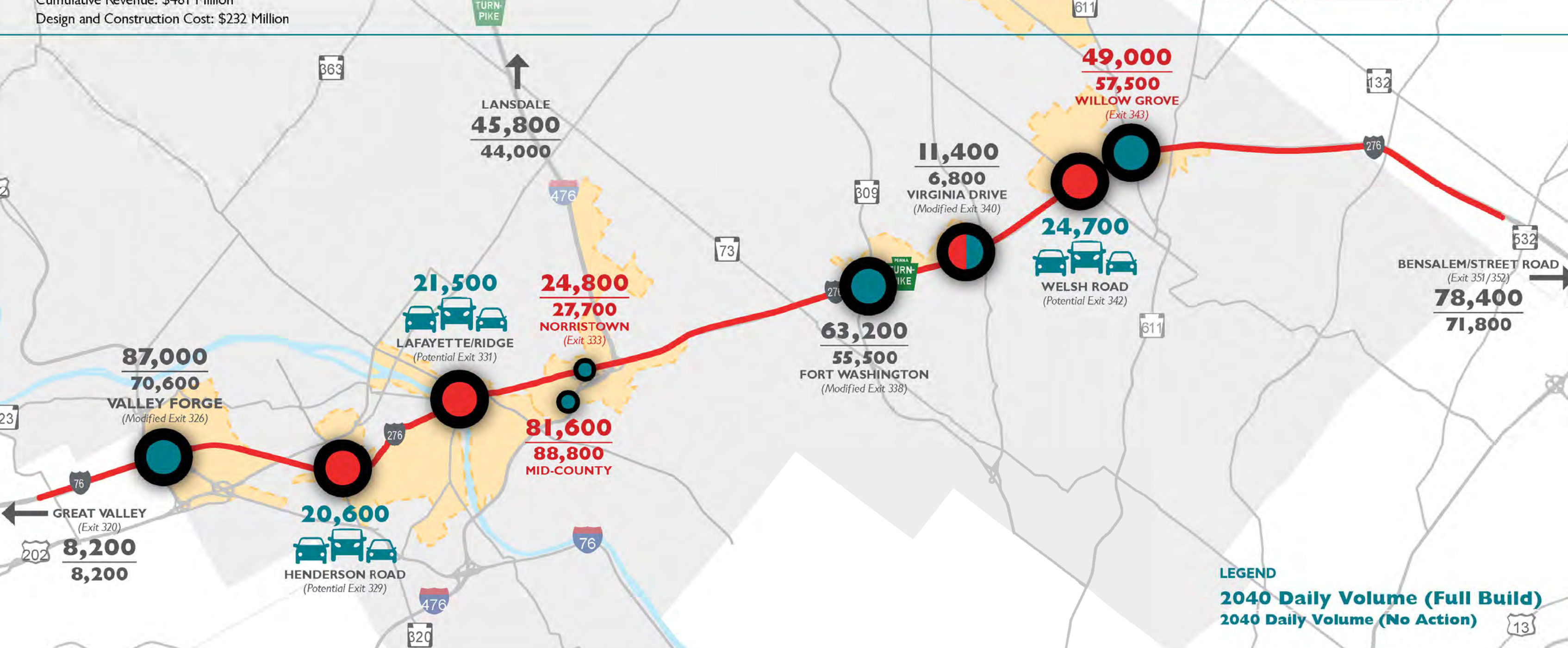


#### Full System Investment ("Full Build")

This scenario would provide three new interchanges at Henderson Road, Lafayette Street/Ridge Pike, and PA-63 Welsh Road; add east bound off and east bound on ramps at the current Virginia Drive interchange, and construct a new Commerce Drive connector ramp at the Fort Washington interchange. It would modernize the PA-611 Willow Grove interchange and the Valley Forge interchange by providing direct ramps to First Avenue in the King of Prussia Business Park both from the Turnpike and the Schuylkill Expressway.

Current Daily Volume = 389,300  
 2040 Volume (No Action) = 430,900 (+10.7% increase over Current)  
 2040 Volume (Full Build) = 516,200 (+19.8% increase over No Action)  
 2040 with Full Build  
 New Trips Each Day: 42,650  
 Cumulative Revenue: \$481 Million  
 Design and Construction Cost: \$232 Million

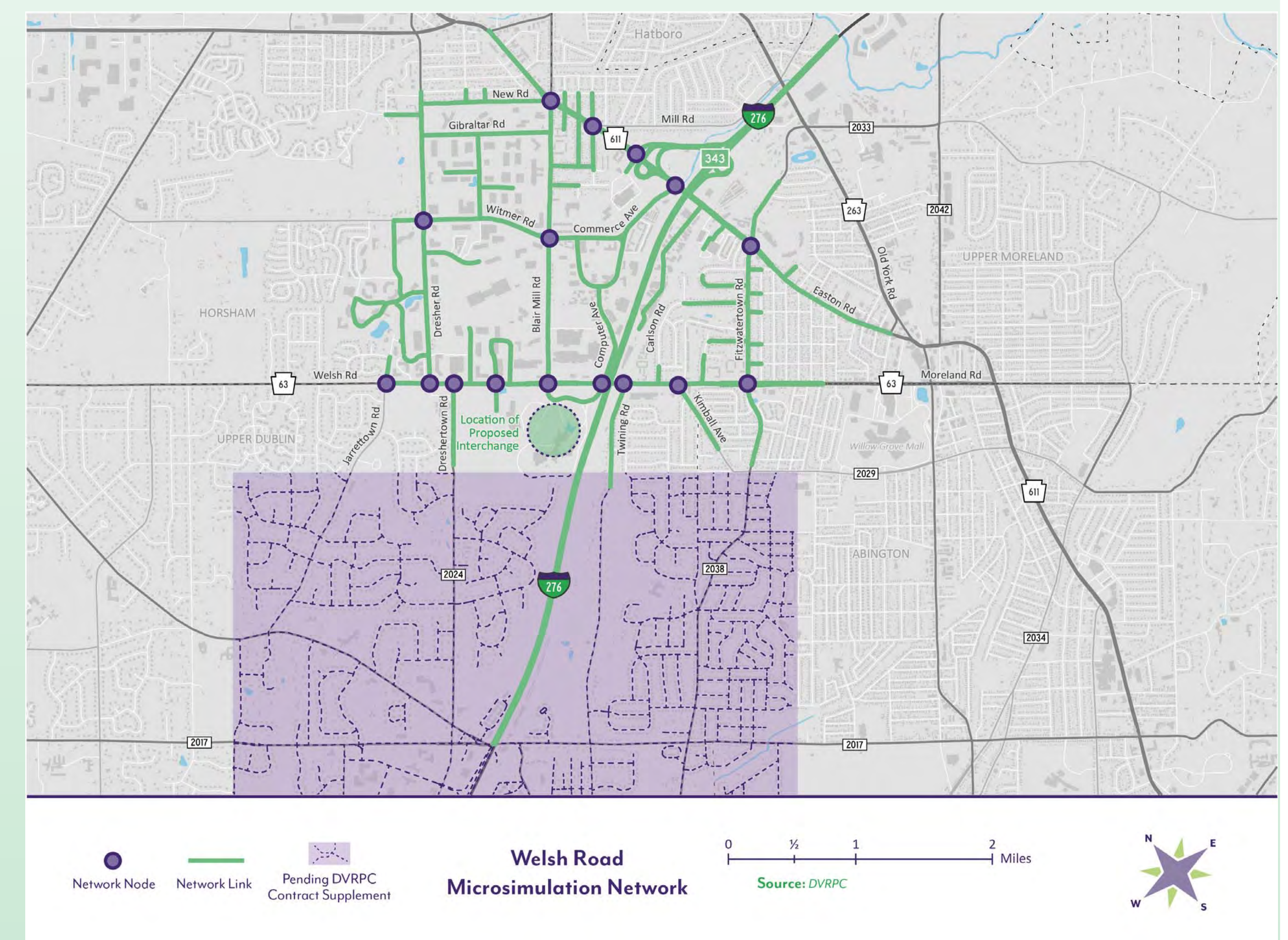
#### Southeastern Pennsylvania Interchanges



### STUDY AREA

The proposed new Welsh Road interchange will provide connections to I-276 from three points on Welsh Road, and from the Prudential business campus.

Several major roads and intersections connecting to Welsh Road will be evaluated for potential traffic impact. Due to time constraints, a number of major roads west of the interchange are recommended for future study as part of a supplemental project phase.

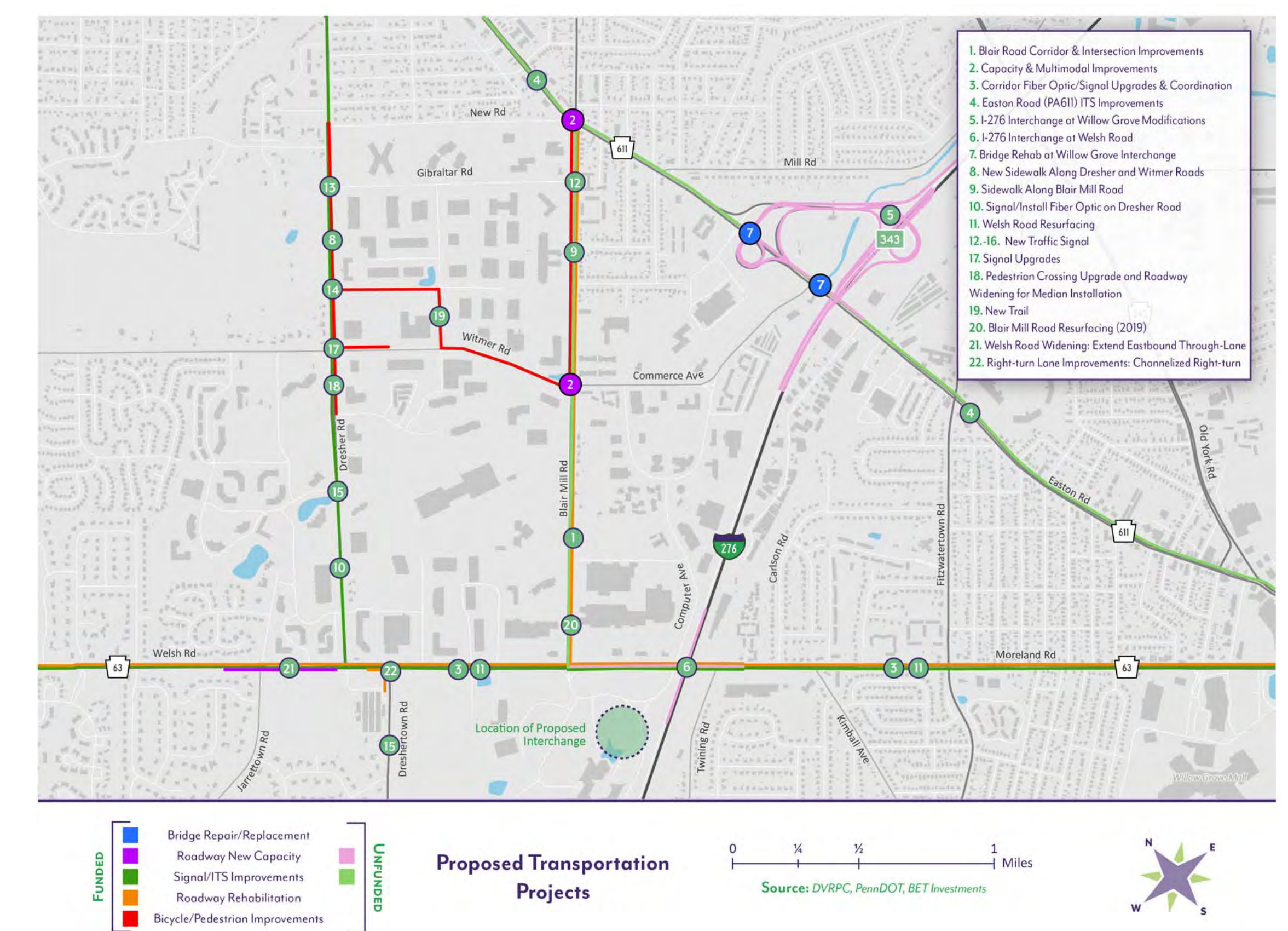
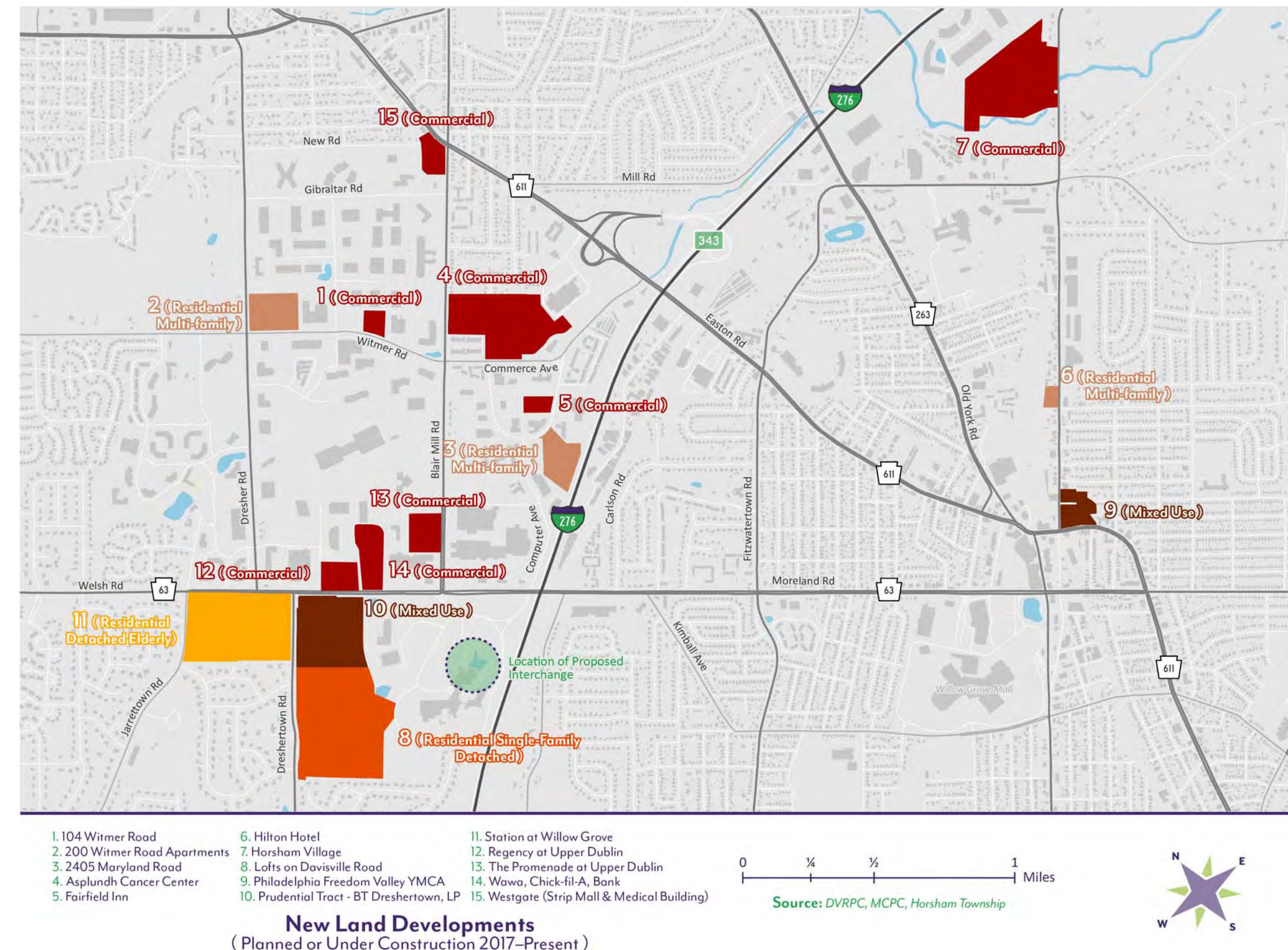
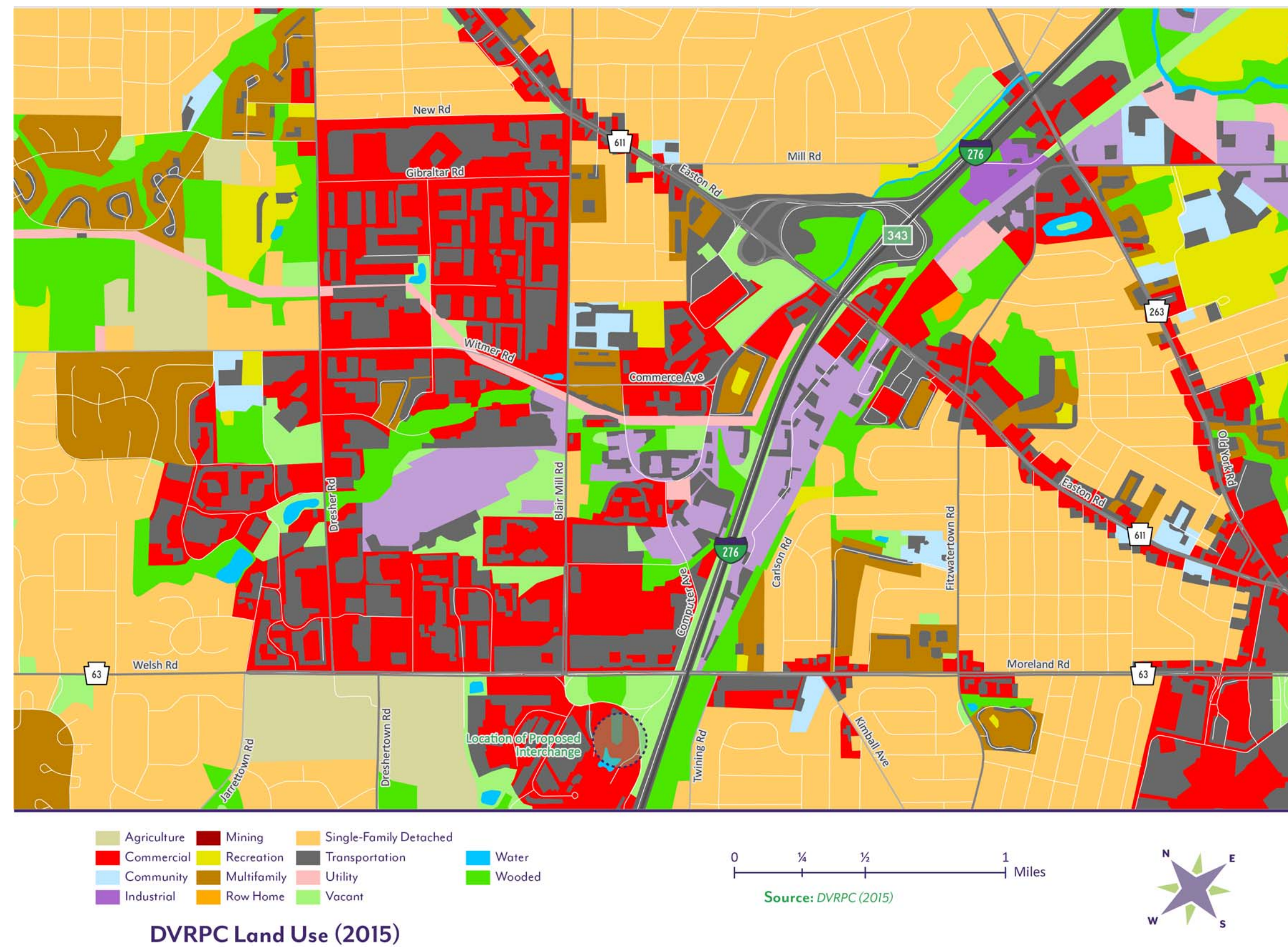




# STATION 03

## PA Turnpike Interchange Study at WELSH ROAD

# Study Area Description



## LAND USE

Land use surrounding the proposed new interchange is characterized by a mix of residential and commercial uses. South of I-276 and surrounding the commercial core, single-family homes are the most common use, with a number of multifamily developments near Welsh Road. North of I-276, commercial uses are more abundant, including several large employment and shopping centers. Industrial uses are also accessible from the existing Willow Grove interchange.

The proposed new interchange would provide a faster route to I-276 for residents. Additionally, it would provide more direct connections to employment and shopping centers for customers and employees, potentially reducing cut-through traffic on local residential streets.

Understanding land use is critical to modeling transportation behavior, as residential, commercial, and other uses generate different numbers and types of trips.

## DEVELOPMENT

A number of significant developments have been approved in recent years. This map shows recent and upcoming developments with at least 50 residential units, or at least 50,000 square feet of commercial space (office or retail), as well as some smaller developments. Two major developments line Welsh Road north of I-276 and would be directly accessible from the proposed interchange: The Promenade at Upper Dublin and Regency at Upper Dublin. Several additional developments will bring new residential units and commercial square footage to Dresher Road, Dreshertown Road, Blair Mill Road, and Commerce Avenue.

Future residents, employees, and customers traveling to and from these new developments would likely utilize the proposed new interchange, reducing the potential impact of the new developments on local streets.

The land use category and number of residential units and commercial square feet are used to determine how much new traffic will be added to local streets due to these new developments.

## NEARBY TRANSPORTATION PROJECTS

The Welsh Road interchange is one of many transportation improvements proposed for the study area to improve traffic flow, safety, and transportation choice. Resurfacing and signal operations are planned for Welsh Road. Modifications to the Willow Grove interchange, along with ITS improvements along the PA 611 corridor, will improve traffic operations and increase efficiency in the Willow Grove area. Intersection improvements and signal upgrades will improve travel and safety on Blair Mill Road and Dresher Road, and sidewalk and trail connections on Blair Mill and Dresher Road will improve pedestrian comfort and safety.

Together with the proposed new interchange, these transportation improvements will ensure safe and efficient travel for the surrounding communities.

Proposed transportation projects are added to the model along with new developments to better understand how traffic will operate in the future.



# STATION 04

PA Turnpike Interchange Study at WELSH ROAD

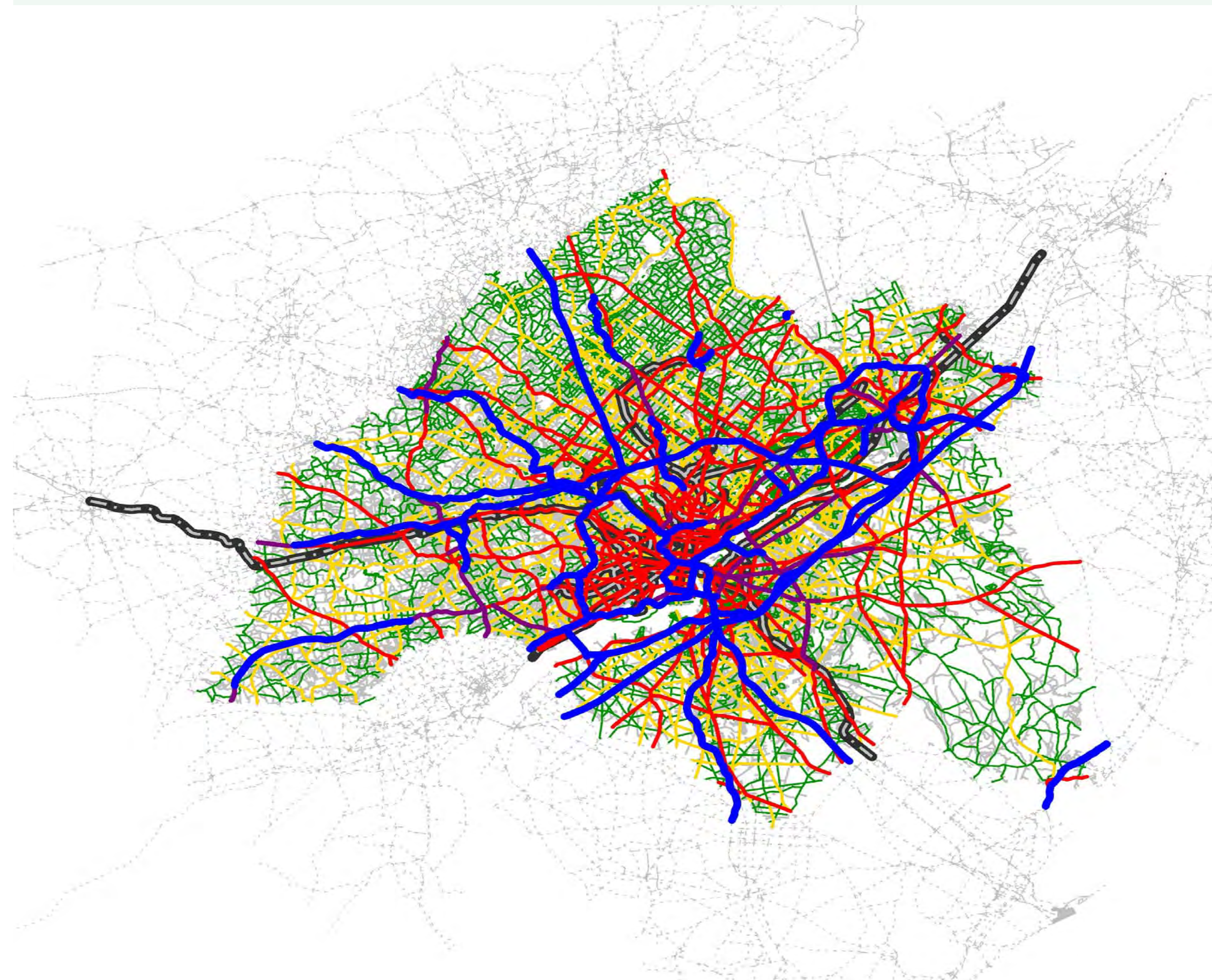
# Microsimulation Modeling



## DVRPC REGIONAL TRANSPORTATION MODEL

DVRPC uses a well-tested regional travel demand model to simulate the travel behavior of people in the 9-county region. This model is used to inform forecasts for future traffic patterns, long-range planning efforts, local traffic studies and other transportation planning work.

The model is guided by Federal Highway Administration guidelines and industry standards, and model forecasts are approved by the DVRPC Board.



## WHAT IS MICROSIMULATION MODELING?

Microsimulation is a method for evaluating the localized impacts of proposed improvements to the transportation system, such as the proposed new interchange at Welsh Road. Regional model outputs are calibrated using current local traffic counts. By modeling the future traffic in the study area with and without the proposed improvement, we can estimate how the improvement will affect traffic flow.

## IMPORTANCE OF LOCAL KNOWLEDGE

Input from members of the public, local officials, and other project stakeholders is crucial throughout the modeling process.

Feedback shared at public meetings and through project surveys helps DVRPC project teams better understand local issues and concerns, and ensure that traffic simulations realistically portray local conditions. DVRPC also partners with member governments and other stakeholders to continuously update and improve the regional and microsimulation models based on local growth and development projections.

## PERFORMANCE MEASURES

The microsimulation process produces a number of performance measures that help us understand traffic conditions.

**Volume** is the total number of vehicles approaching an intersection from a given street segment in a given time period.

**Delay** is the average amount of time, in seconds, that it takes a vehicle passing through an intersection beyond what would be experienced in a free-flow condition.

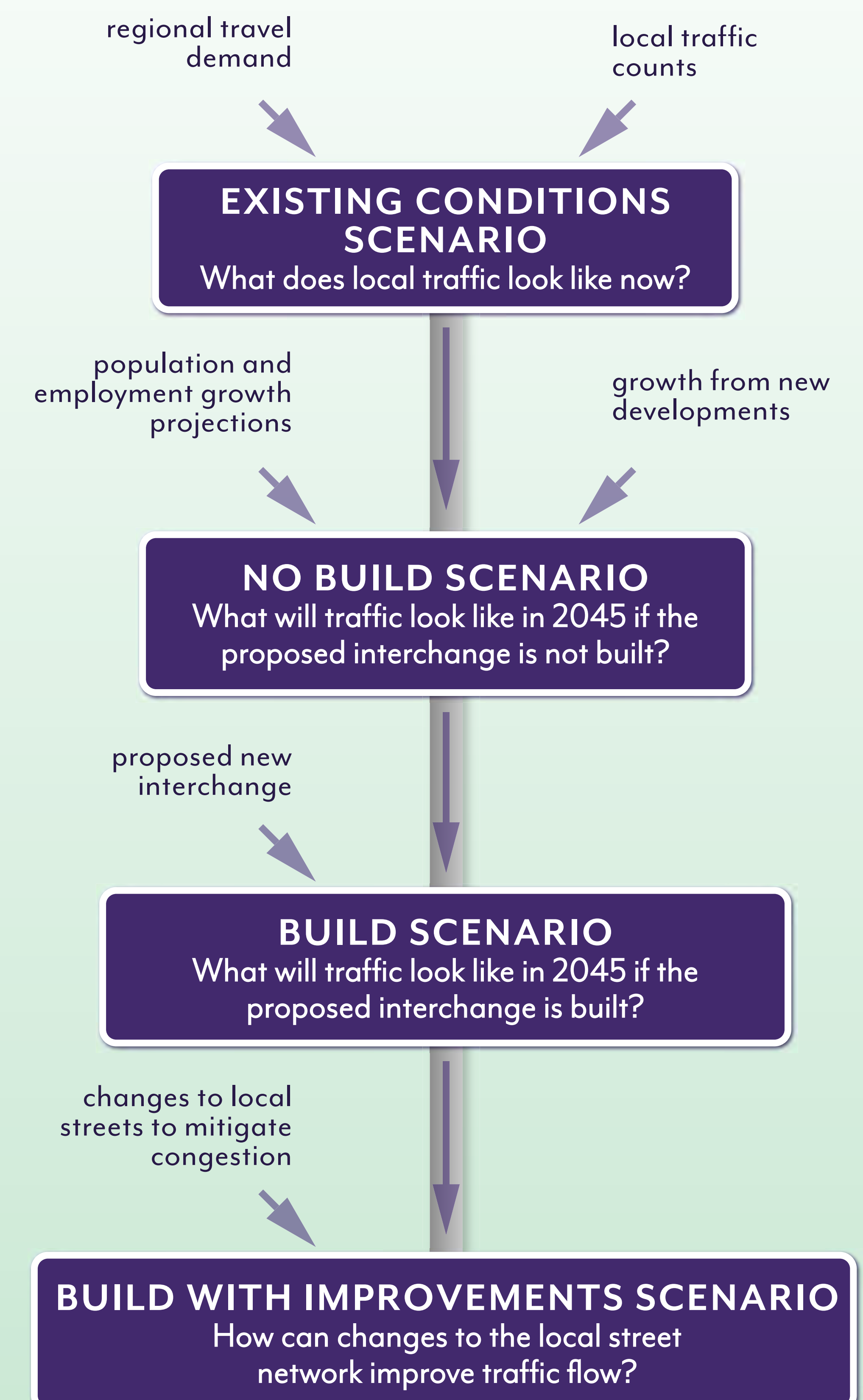
**Queue Length** describes the lineup of vehicles waiting to enter an intersection due to a red light, stop sign, or other obstruction. It is the distance between the intersection and the furthest vehicle waiting to enter.

**Level of Service (LOS)** values are letter grades assigned to various degrees of delay. An LOS of "A" corresponds with free-, or near free-flowing conditions, while an "F" score corresponds with a breakdown in traffic flow.

The goal in traffic operations is not to achieve an LOS of A, but to create conditions that maintain stable traffic flow that typically is achieved within the LOS range of A to C. If existing conditions are LOS D or lower the aim should be to improve conditions to achieve a C or better.

## SCENARIO DEVELOPMENT

Four scenarios will be modeled using microsimulation. Each scenario will be evaluated for LOS and other performance measures to determine the impact of the proposed new interchange, identify areas in need of improvements, and develop congestion mitigation strategies at key intersections.

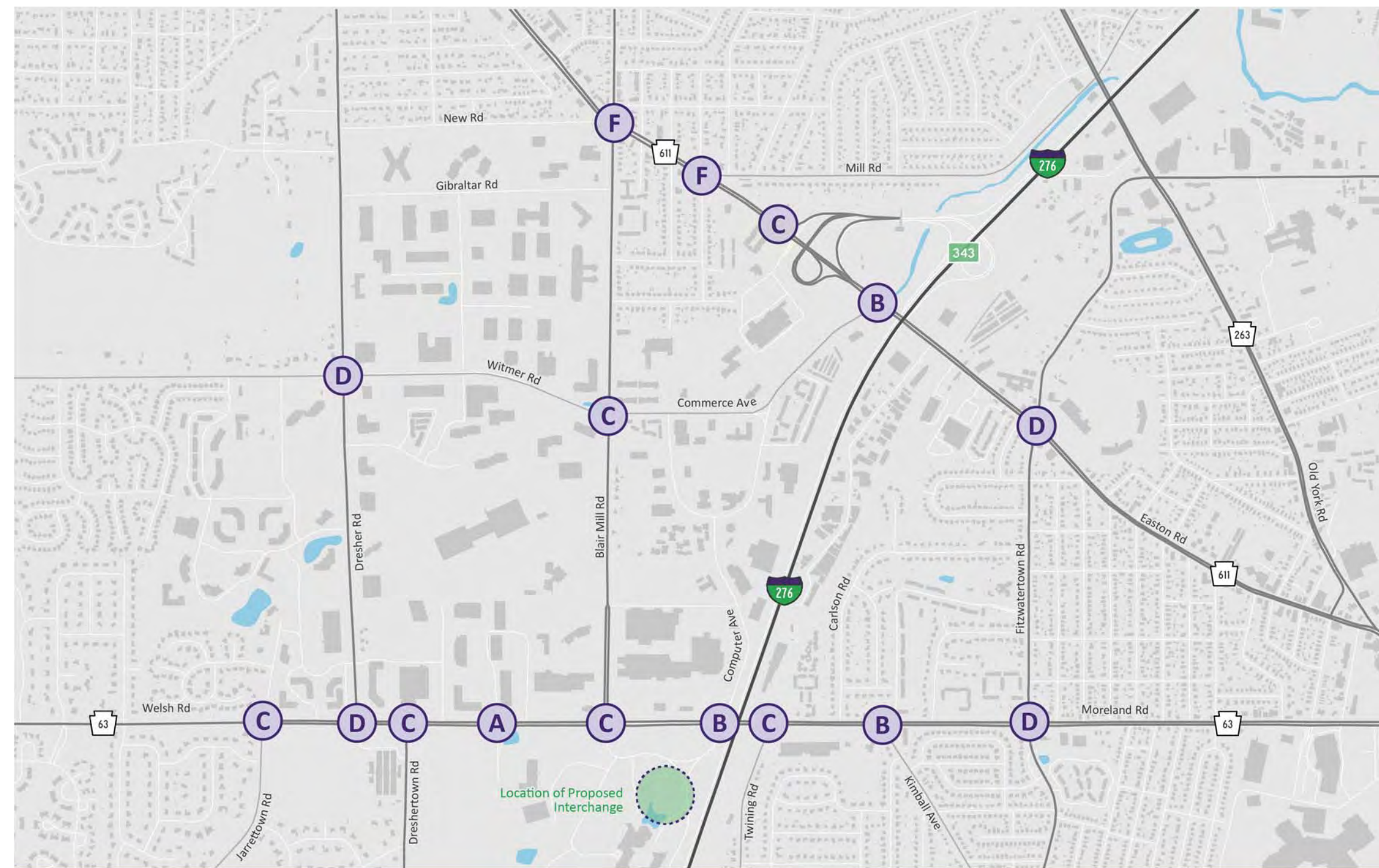




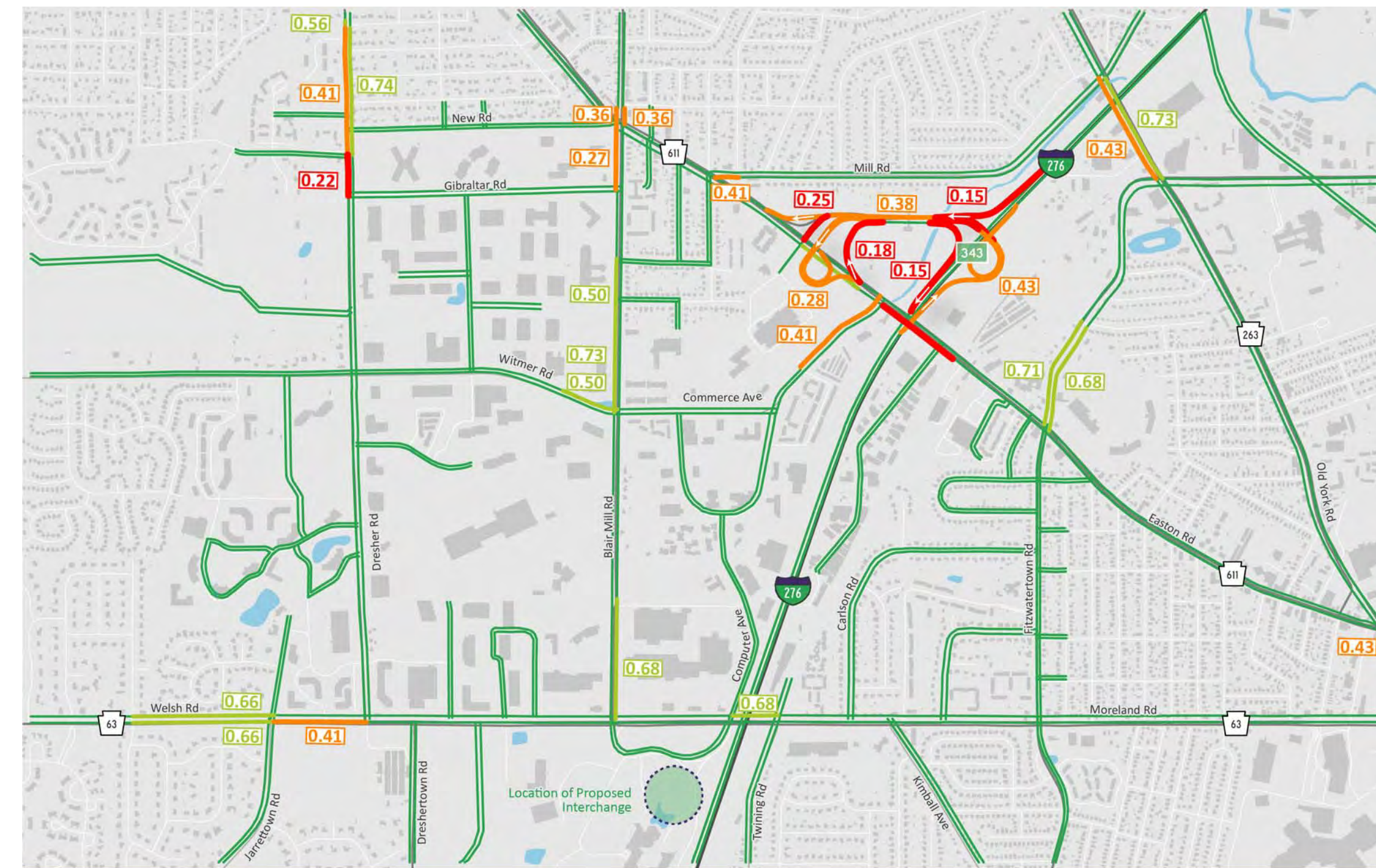
# STATION 05

## PA Turnpike Interchange Study at WELSH ROAD

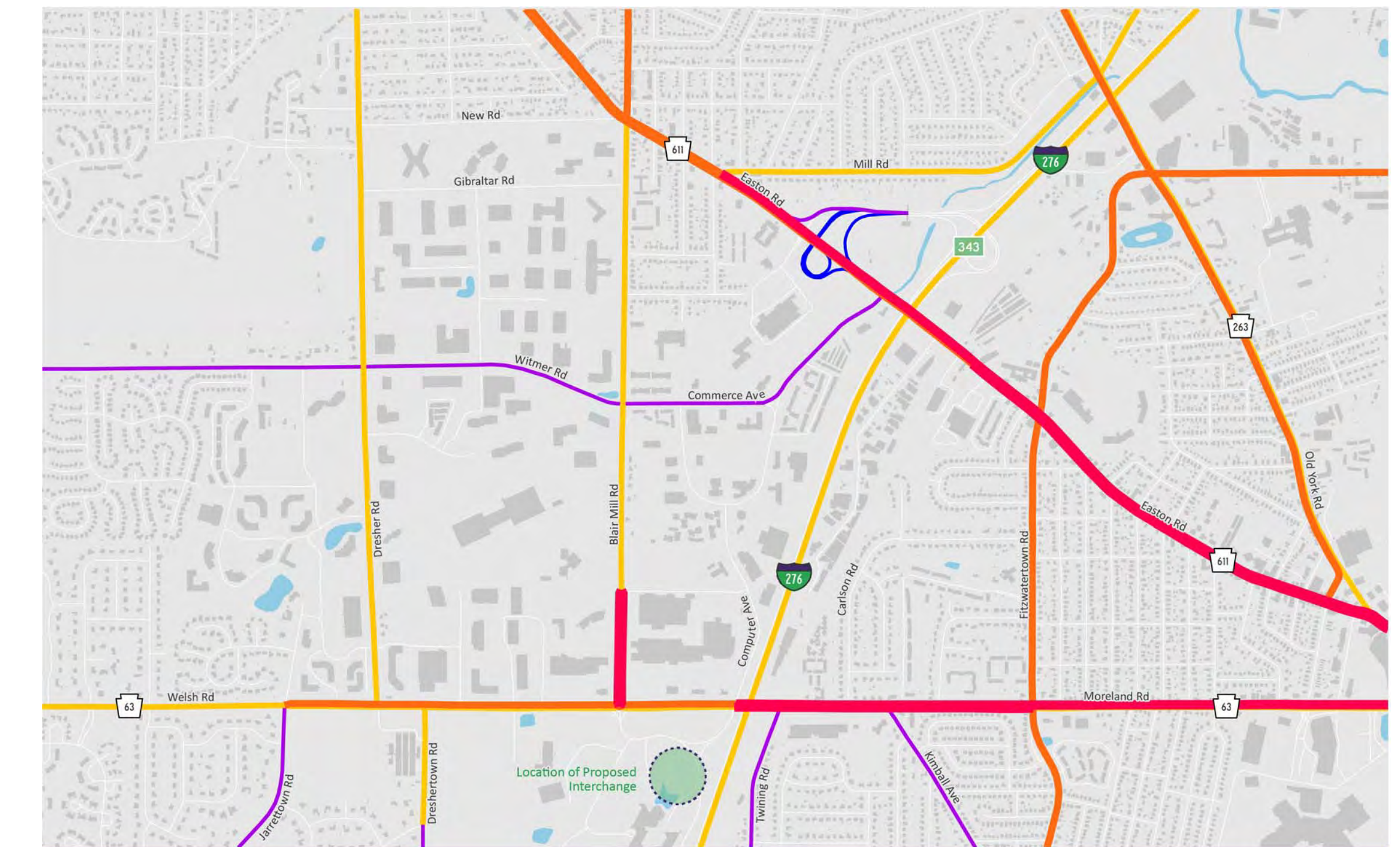
# Existing Conditions



**Morning (8-9AM) Intersection Level of Service**  
 Sources: DVRPC



**Morning Peak (6-10AM) Speed Ratio**  
 Sources: DVRPC



**Crash Rate by PennDOT RMS Segment**  
 Sources: PennDOT (2012-2017)

### LEVEL OF SERVICE

The above map shows intersection-level LOS during the morning peak (8-9 AM), on a typical congested weekday. Most intersections along Welsh Road operate at a stable and predictable level of service. The exceptions are Dresher Road and Fitzwatertown Road, which are approaching unstable. Two intersections along Easton Road currently operate at an unstable and unpredictable level of service.

As the future scenarios are developed, existing LOS provides a useful benchmark for understanding traffic operations.

LOS	DELAY (SECONDS PER VEHICLE)	DESCRIPTION OF TRAFFIC OPERATIONS
A B C	<10 >10-20 >20-30	STABLE AND PREDICTABLE
D	>35-55	PREDICTABLE, BUT APPROACHING UNSTABLE
E F	>55-80 >80	UNSTABLE AND UNPREDICTABLE

### SPEED RATIO

A street segment's AM peak speed ratio is the average speed of drivers during the morning peak compared to the observed speed on the same roadway during times with no traffic congestion.

A value of 1 means that drivers can drive at their desired speed and are not slowed down by other vehicles. A value of 0.75 means that drivers are traveling at 75% or less of their desired travel speed due to moderate traffic congestion. Values less than 0.5 mean that drivers are traveling less than half of their desired speed due to traffic congestion. The lower the speed ratio, the more significant the slowdown.

During morning peak hours, drivers currently experience the lowest speed ratios near the Willow Grove interchange. Moderate slowdowns also occur on Welsh Road southbound between Jarettown Road and Dresher Road, and east of Welsh Road on Dresher Road and Blair Mill Road.

By identifying existing traffic slowdowns, speed ratios help identify streets that may be sensitive to future traffic growth. Significant slowdowns in future scenarios can be addressed when developing recommended improvements.

### CRASH RATE

From 2012 to 2017, Moreland Road and Easton Road experienced the highest average annual crashes per mile, as well as the segment of Blair Mill Road approaching Welsh Road. Old York Road, Fitzwatertown Road, and a portion of Welsh Road also experienced a high number of crashes.

Recommendations for the study area will take crash rates and related safety issues into account.

### NEXT STEPS

- Complete Existing Conditions scenario (PM peak).
- Model No Build scenario.
- Model Build scenario.
- Identify areas with future congestion.
- Develop recommendations to mitigate future congestion.
- Share findings with public.
- Summarize findings in a written report (fall 2019).



**STATION**  
**06**

PA Turnpike Interchange Study at WELSH ROAD

# Feedback



How do you believe the proposed new interchange would impact your commute or daily travel?

What do you believe are the possible benefits of the proposed new interchange?

What concerns do you have about the proposed new interchange?

Do you have any remaining questions or comments about the PA Turnpike Interchange Study at Welsh Road?