

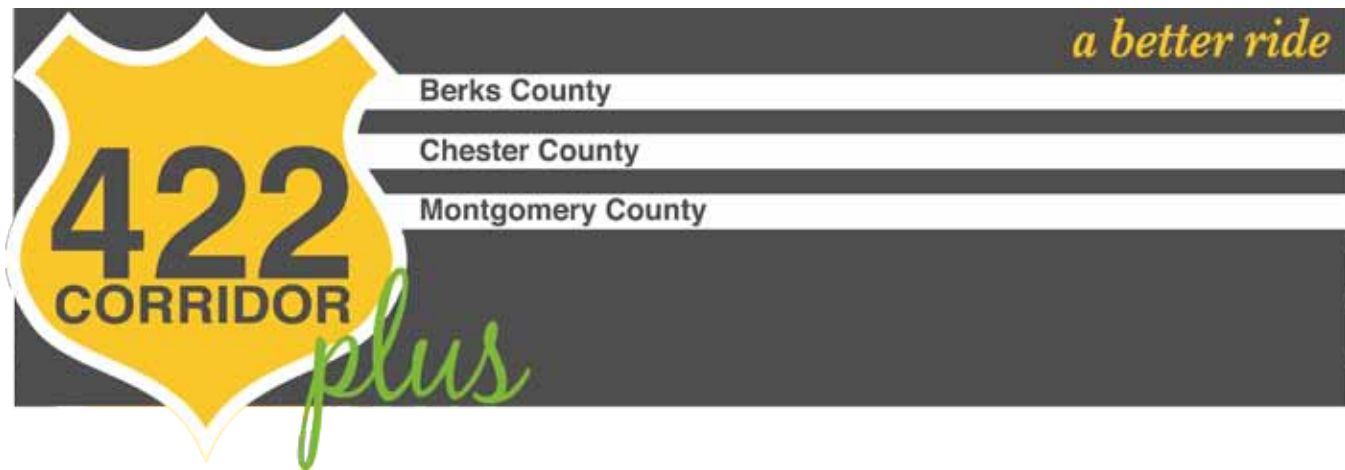


**Berks County**  
**Chester County**  
**Montgomery County**

*a better ride*



*September 2011*

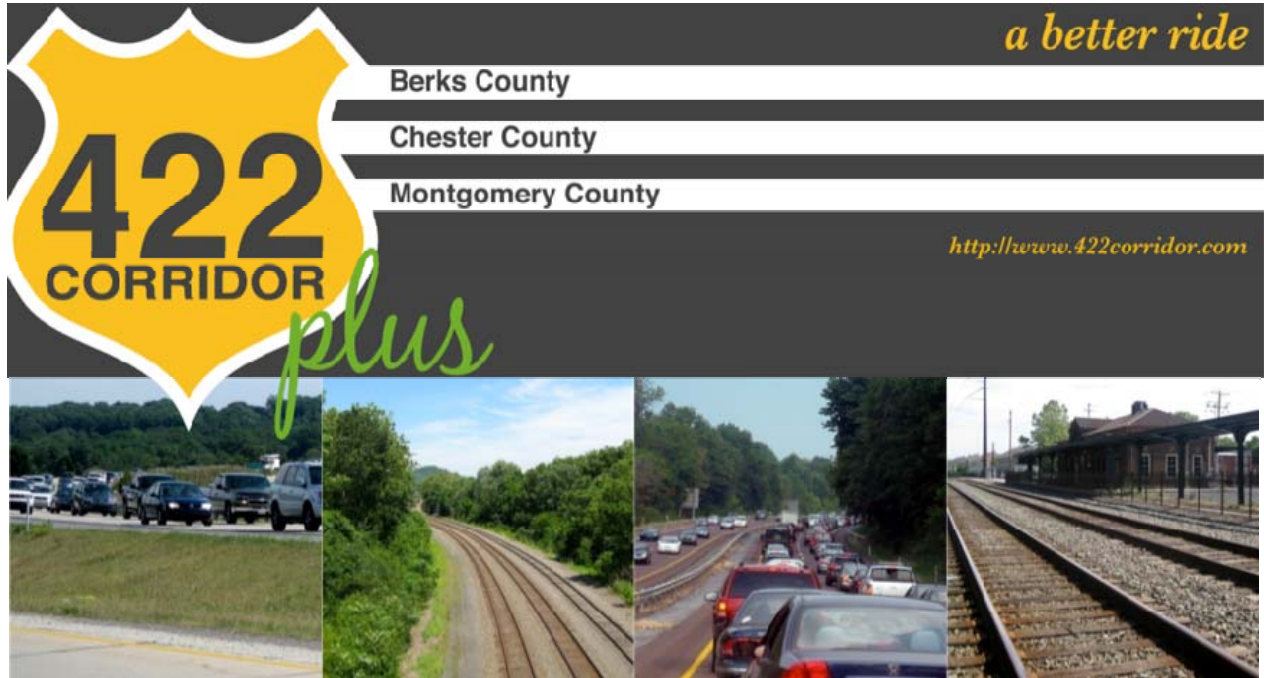


## Acknowledgements

The 422*plus* Project Final Report is comprised of a Synopsis and Findings drawn from a series of working papers and technical reports produced by Michael Baker Jr., Inc. in association with Boles-Smyth Associates, Econsult Corporation, Hurley~Franks & Associates, and STV Incorporated. Each consultant team member played a significant role in investigating and reporting on future improvements and costs for the US 422 roadway to meet growing traffic demand; the steps and investment necessary for re-establishing a viable passenger rail on an active freight line owned by Norfolk Southern between Norristown and Wyomissing and; whether and how tolling approximately 25 miles of US 422 between US 202 and just east of PA 662 could generate enough money to address the corridor's future mobility needs. However, the final product is a collaborative effort of many individuals and organizations including the Project Steering Committee and Communications Committee. For the hours and hours of time spent in review, discussion and direction we thank the representatives and staff from the:

- Delaware Valley Regional Planning Commission
- Berks County Planning Commission
- Chester County Planning Commission
- Montgomery County Planning Commission
- PennDOT District 6-0
- Southeastern Pennsylvania Transportation Authority (SEPTA)
- Berks Area Reading Transportation Authority (BARTA)
- Norfolk Southern Railroad
- Greater Valley Forge Transportation Management Association
- Select Greater Philadelphia/CEO Council for Growth





**SYNOPSIS AND FINDINGS**

September 2011

**Michael Baker Jr., Inc.** in association with

Boles, Smyth Associates, Inc. EConsult Corporation Hurley ~ Franks & Associates STV Incorporated



# Synopsis and Findings

of the 422*plus* Technical Reports and Working Papers

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# Synopsis and Findings

## of the 422plus Technical Reports and Working Papers

### Section A: BACKGROUND

US 422 reaches from Amity in Berks County to its confluence with I-76 near Norristown in Montgomery County. Its current configuration shrinks from a four lane limited access expressway in Montgomery and Chester Counties to a four lane, at grade, principle arterial in Berks County.

Today approximately 65,000 commuters drive each day between Royersford and Collegeville. By 2035, that number will soar to over 93,000; an estimated increase of 44%.

The US 422 corridor is currently plagued by congestion and has limited travel options including no train service to Philadelphia. Traffic volumes vary among segments of the corridor, but the outlook for increasing traffic volumes and growing congestion in the years ahead are predicted to impact every segment. In 2010, **congestion added 25 minutes** more to the average roundtrip commute between

Pottstown and King of Prussia during peak hours compared to the same trip only a few years ago. Compounded over the course of a year, this equates to about two weeks lost time for the average commuter.

Traffic congestion on US 422 costs time and money, and will only continue to grow as the population grows. As traffic volumes grow, it creates more wear and tear on the existing roads and bridges, meaning they will need increasingly expensive rebuilding and maintenance to stay in good shape. Designing and building improvements have historically relied on state and federal highway dollars for funding. Such improvements allow for the following:

- A reduction in roadway bottlenecks,
- Minimizing traffic disruptions from incidents, accidents and weather,
- Improving safety,
- Keeping users aware of current travel conditions so they can make informed transportation choices within the corridor

Pennsylvania, like many states, is facing staggering transportation investment needs, due to aging infrastructure and stagnant tax revenue growth. Along with hundreds of needed highway, bridge, transit, rail, and pedestrian transportation improvement projects across the Commonwealth, multiple improvement projects for the US 422 corridor have been identified in state and regional plans. As the Governor, the Pennsylvania Department of Transportation (PennDOT) and the General Assembly wrestle with how best to stretch the Commonwealth's limited federal and state tax dollars, with current state funding legislation generating significantly less than predicted five years ago, and with the benefit of one-time stimulus dollars winding down, it is clear that "new sources of revenue need to be identified..."

Past sources for transportation funding are shrinking at the same time that needs for funds are growing.

<sup>1</sup> Pennsylvania State Transportation Advisory Committee, Transportation Funding Study: Executive Summary, May 2010.





As every player of Monopoly knows there was a Reading Railroad. That 19th century railroad, whose Franklin Street Station is shown to the left, took its name from Reading, Pennsylvania, but the last time one could take a passenger train from Philadelphia to Reading was 1981. As the private **railroads failed economically** in the 1970s, public transit stepped into the breach left by the bankrupt railroads, with every level of government providing subsidies above passenger fares for both capital and operations. The Southeastern

Pennsylvania Transportation Authority (SEPTA) inherited a passenger rail system from the Reading and Pennsylvania Railroads that had been allowed to deteriorate under private control. As SEPTA learned the system it refocused its resources on those portions of the commuter network which were most efficient to operate. These were the segments with the highest ridership drawn from the most densely populated mobility corridors, and which provided the best returns on infrastructure investment. The segment of the Reading Lines that had historically been known as the Pottsville-Reading Philadelphia Line was not electrified beyond the Norristown Station requiring diesel equipment within a multi-county SEPTA system where the primary network of lines and services were electrified.

As population grew and traffic became increasingly congested along US 422 to King of Prussia and through the I-76 corridor to Philadelphia calls to reestablish a rail choice for travelers resulted in several related study efforts by local, regional and state public entities. Such efforts have yet to turn into action supported by public dollars. One reason has been the tough competition for increasingly scarce capital dollars at the federal and state level for new rail start-ups which can qualify for 80% federal capital dollars and, in Pennsylvania, a substantial contribution of state subsidy for operating deficits. Many of the new rail projects around the country that have succeeded provided substantial “local revenue contributions” to their efforts.

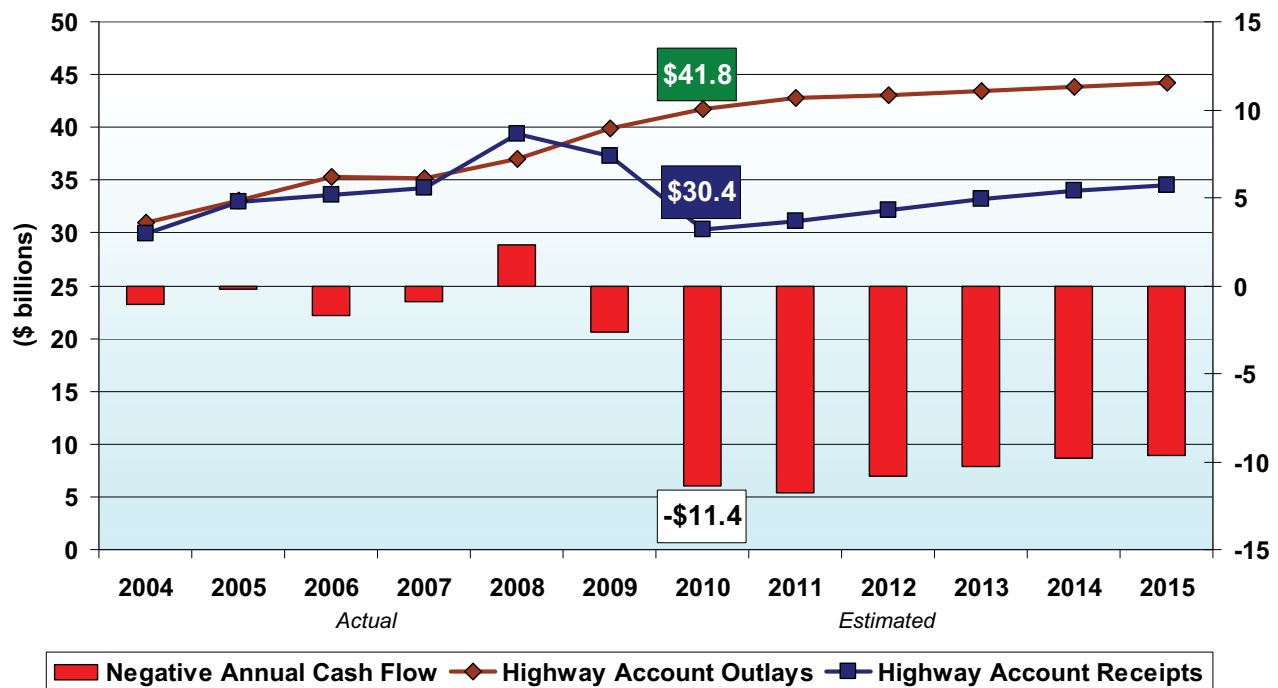
**The US 422 corridor has limited travel options with no train service connecting to Philadelphia.**

Until the start of the 20th century, roads were solely the responsibility of state and local government with rare exception. With the introduction of the low-priced Model T Ford in 1908 and the founding of



American Association of State Highway and Transportation Officials (AASHTO) in 1914, advocates for a national road improvement program began to request federal aid. President Eisenhower signed the Federal-Aid Highway Act of 1956, authorizing the National System of Interstate and Defense Highways and creating the Federal Highway Trust Fund (FHTF) to receive highway user taxes for construction and maintenance programs. Formulas were established to determine funding allocations to the states, based on highway distance, population, and land area. There is both a Highway Account and a Mass Transit Account of the FHTF. (Federal transit programs are also funded through the US government’s

## Highway Account of the Highway Trust Fund: Receipts and Outlay Discrepancy



\*Excludes \$8.017 billion transfer from General Fund to Highway Account of HTF in September 2008.  
\*\*Excludes \$7 billion transfer from General Fund to Highway Account of HTF in August 2009.

**Figure 1. Highway Account of the Highway Trust Fund:  
Receipts and Outlay Discrepancy<sup>2</sup>**

General Fund). The 18.4 cent federal gasoline tax which supports FHTF has not been increased since 1993. Currently the solvency of the Federal Highway Trust Fund is in doubt as Congress has delayed long term fixes with temporary General Fund transfers as revenues have not kept pace with outlays. Pennsylvania relies on federal dollars for a significant share of its yearly highway program and transit agencies with distribution of federal transit program grants. As shown in Figure 1, the amount in recent years has fluctuated widely with a downward trend reflecting the economy, swings in gas prices, decreased truck sales, construction costs, and diminishing fuel tax revenues with increased vehicle fuel economy.

Every state in the US has its own combination of taxes to fund its transportation projects and provide the necessary match to secure federal dollars. State highways comprise about 1/3 of the roads (but 76% of the daily miles traveled) in the Commonwealth. In Pennsylvania funding for highways and bridges is primarily derived from a mix of user-fees and other dedicated and non-dedicated general revenues. The **State Motor License Fund** is a dedicated transportation fund that collects a variety of revenue sources including gas tax, aviation fuel tax, diesel fuel tax, oil company franchise taxes and motor licenses and fees and, since 2007, contributions from the Pennsylvania Turnpike Commission. The Pennsylvania Constitution prohibits the use of fund revenues for any transit or

<sup>2</sup>Lee, Joung, H. January 20, 2010. "AASHTO Update on Funding and Authorization." Presentation given as part of the NARC Transportation Finance Subcommittee Webinar.

rail improvements. There is a Public Transportation Trust Fund which has been running well below expectations contained in the Commonwealth’s Act 44 passed by the state legislature in July 2007 which had anticipated toll revenues from I-80.

In 2010, the Pennsylvania State Transportation Advisory Committee (STAC) produced a report that quantified the state’s unfunded transportation needs at approximately \$3.5 billion. **The gap is growing and will reach an estimated \$7.2 billion in 10 years if we do not take action to address the transportation need.**<sup>3</sup> Two regionally initiated studies released in 2009, the *US 422 corridor Master Plan* and the *R6 Norristown Line Service Extension Study*, each sounded an alarm that increasing congestion and growing mobility needs along the US 422 corridor would not be adequately addressed in a timely manner if the region solely relied on traditional sources of state and federal funds. The STAC study listed potential additional revenue generators including raising, broadening application, and/or indexing to inflation state sales taxes, tolling more roads, fuel taxes and vehicle fees, or charging individuals fees based on vehicle miles traveled. If actions were taken on any of these options the revenue generated would not be exclusive to the US 422 corridor.

**Pennsylvania is facing a \$3.5 billion annual shortfall in public tax dollars for needed transportation infrastructure.**

As seen in Figure 2 fuel tax revenues will decline over the next 20 to 25 years while the trend line for needed transportation improvements creates a wider and wider gap with available funds, even if there is a change in heart at the federal level to permit tolling interstate highways, as was anticipated in the state’s current transportation funding bill Act 44.

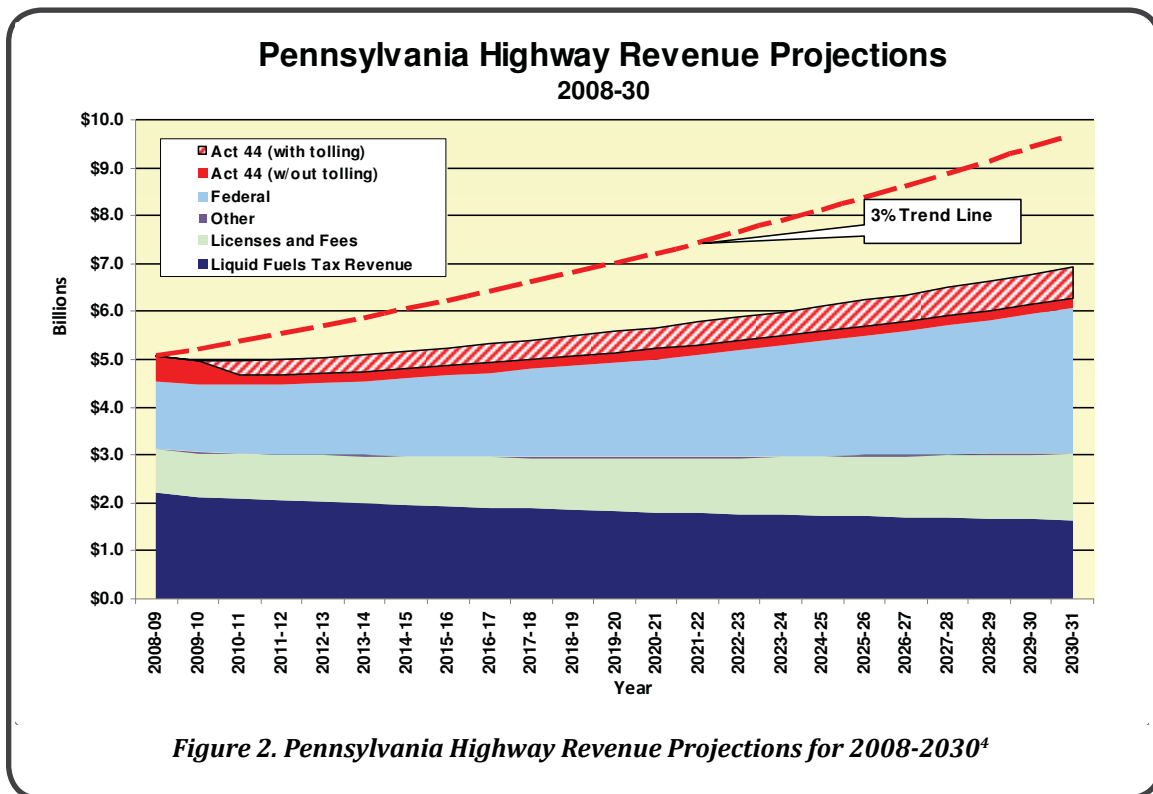


Figure 2. Pennsylvania Highway Revenue Projections for 2008-2030<sup>4</sup>

<sup>3</sup> Pennsylvania Governor’s Transportation Funding Advisory Commission, Transportation Funding Advisory Commission Report: Executive Summary, August 2011

<sup>4</sup> Pennsylvania State Transportation Advisory Committee. May 2010. Transportation Funding Study.





# Synopsis and Findings

## of the 422plus Technical Reports and Working Papers

### Section B: The Investigation

The challenge put before the 422plus project team was to study whether locally raised resources could fill the transportation funding gap. This synopsis of the technical reports and working papers generated to meet the challenge outlines the results of the investigation.

#### The 422plus Project Investigated:

Whether tolling approximately 25 miles of US 422 between US 202 and just east of PA 662 could generate enough money to improve the US 422 corridor;

#### PLUS, PAY FOR

Improvements to impacted local roads;

#### PLUS, PAY TOWARDS

Re-establishing passenger rail on an active freight line owned by Norfolk Southern between Norristown and Reading / Wyomissing.

If the US 422 region could pitch in locally generated dollars, then the needs – like more widening, more replacements, more rehabilitations, more resurfacing, more traffic information, and more mobility choices – could be met sooner than the current programmed schedule for highway and bridge improvements.

The specific transportation and infrastructure improvements needed to keep the corridor moving into the future have been well documented. This includes the Commonwealth's statewide 12-Year Transportation Program which allocates available resources expected to be available in a given year, project by project and step by step from planning through construction. There is also information

available about desired improvements whose costs so far exceed expected

funding, that they are not even scheduled for the next 12 years. The

Delaware Valley Regional Planning Commission (DVRPC) sponsored

the *US 422 Corridor Master Plan* following the Montgomery County

Planning Commission's *R6 Norristown Line Extension Study* which

identified a new rail alternative for the corridor. After assessing

available current and future capital and operating funding and

highlighting a shortfall of traditional public tax dollars to deliver

promised travel improvements, the potential for a new funding

option for the corridor, toll revenue, was raised. Further study and

investigation into whether and how this funding option could achieve

such potential was urged by the above studies.

**Toll revenue,  
locally generated  
from local roads,  
is a potential  
source of funding  
for unmet  
transportation  
needs.**

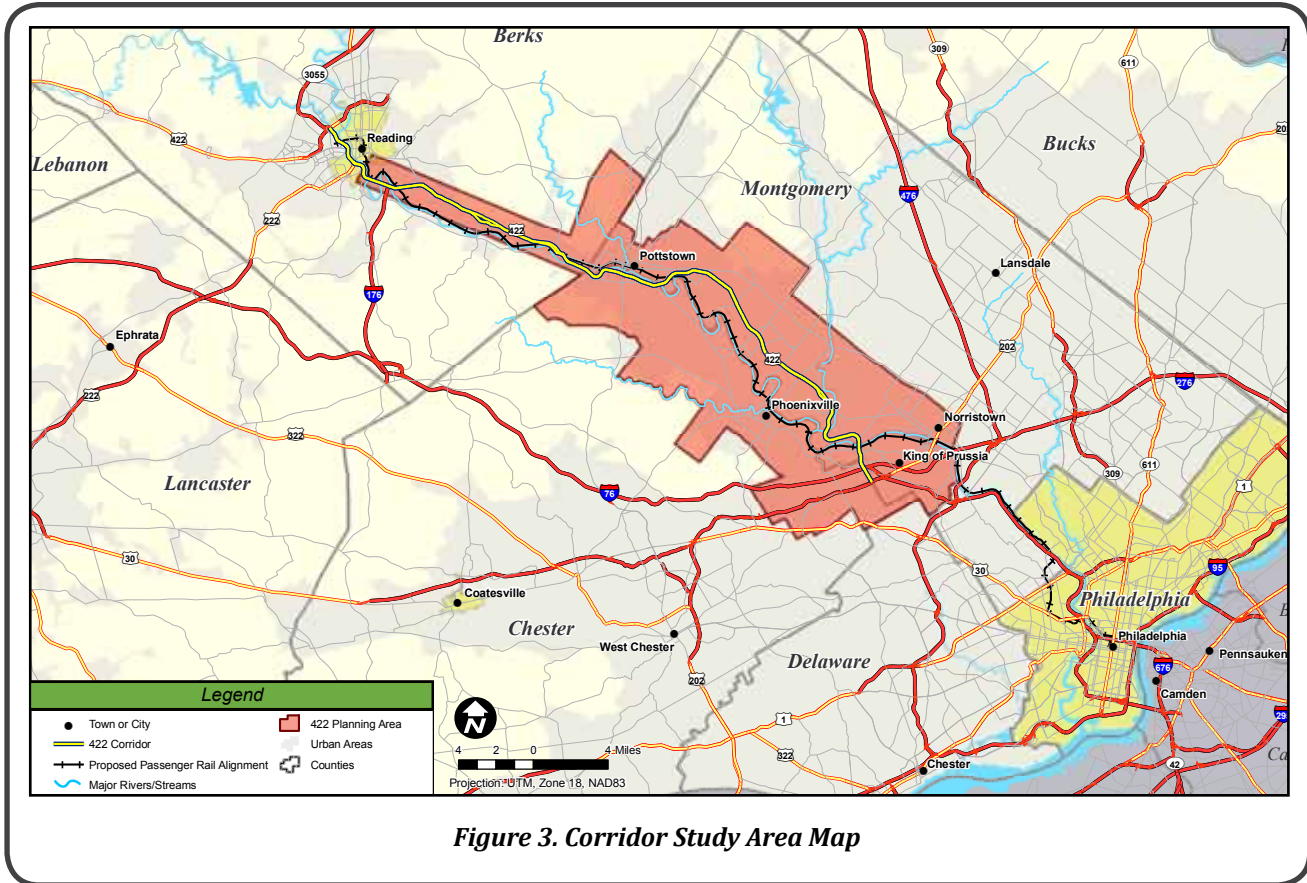


Figure 3. Corridor Study Area Map

The study looked into the future at three Traffic and Revenue Forecasts. To do that the investigators used the federally approved regional travel demand models, making the technical corrections necessary to link the models deployed in Southeastern Pennsylvania by the DVRPC and the Reading MPO in Berks County.

- **Forecast 1:** Year 2035: **No highway or transit improvements** beyond those currently funded by PennDOT and **No Tolls on US 422**
- **Forecast 2:** Year 2035: **No improvements with Tolls** on US 422
- **Forecast 3:** Year 2015 & 2035: **Improvements executed** according to needs-based recommended highway and rail transit programs **with Tolls**

Multiple variables were modeled to assess toll sensitivity, revenues, rail ridership, and traffic diversions.

# Synopsis and Findings

## of the 422plus Technical Reports and Working Papers

### Section C: The 422plus Project Process

In 2010, DVRPC hired a consultant to determine if tolling US 422 could finance the capital improvements needed on the expressway and the capital costs of the SEPTA Norristown Line extension to Reading / Wyomissing. The consultant team of Michael Baker Jr., Inc. in association with Boles-Smyth Associates, Econsult Corporation, Hurley~Franks & Associates, and STV Incorporated was selected to perform the study.

The project mobilized a Steering Committee and Communications Committee early in the process. Made up of representatives from government and transit agencies, along with advocacy organizations along the US 422 corridor, these committees provided critical technical and outreach guidance to the Consultant Team throughout the 422plus Project. The first meeting with steering committee stakeholders took place in March 2010; taking the critical first steps in developing the travel demand model with DVRPC that would be the platform for future analysis necessary to answer the questions posed.

Throughout the investigation feedback on concerns raised by the stakeholders, public, media, and interaction with the project website at [www.422corridor.com](http://www.422corridor.com), refined the study efforts as questions were raised and answered. To assure that the investigation adequately addressed the initial concerns of key stakeholders, briefings on preliminary findings were held with local county and state elected officials as well as with regional, state and federal transportation officials during late December 2010 through summer 2011.

The following sections summarize the key findings from the project in four areas: tolling, highway capital program, transit capital program, and financial plan. Technical reports have been prepared for each area and are provided as appendices. In addition, appendices have also been prepared to detail the public outreach process and summarize previous transportation studies in the US 422 corridor. For more information on any of these areas, please see the appropriate appendix available on the website at [www.422corridor.com](http://www.422corridor.com). A compilation of 422plus project exhibits and maps highlighting highway and transit improvements are contained in Appendix G, *Supplemental Exhibits*.

- Appendix A: Tolling US 422: Traffic and Revenue Forecasts
- Appendix B: Addressing US 422 User Needs: The Highway Component Report
- Appendix C: Transit Component Report
- Appendix D: Using Toll Revenue to Finance Highway and Transit Capital Improvements
- Appendix E: The 422plus Public Outreach Program
- Appendix F: Summary of Previous Transportation Studies
- Appendix G: Supplemental Exhibits

# Synopsis and Findings

## of the 422plus Technical Reports and Working Papers

### Section D: Key Findings

Key findings from the project fall within four areas: tolling, highway capital program, transit capital program, and financial plan. The ten findings listed below are discussed in detail in this section.

#### Tolling Program

- 1 Tolling US 422, at a rate comparable to the amount charged per mile on nearby sections of the Pennsylvania Turnpike, would provide funds to greatly accelerate the timeline for making improvements to the corridor, resulting in shorter travel times.
- 2 A locally based multi-county transportation authority serving as the overall manager would assure that toll revenue paid here, in the US 422 corridor, would stay in the corridor.
- 3 All-electronic tolling is the best tolling system for users, neighbors, cost containment and revenue generation.
- 4 Operation and maintenance of the US 422 corridor could be accomplished under a variety of contractual arrangements with public and private entities.

#### Highway Improvement Plan

- 5 If implemented, the Highway Improvement Program will reduce US 422 congestion, saving the average commuter \$7,350 in travel time value in the Year 2035. Without it, travelers on US 422 will continue to lose time and money.
- 6 Enhanced maintenance and improved safety is another PLUS of having available toll dollars, almost doubling spending from \$1.2 million to \$2 million in current dollars.
- 7 The 422plus Highway Improvement Program will triple the investment in highway improvements within the next 15 years, which could not happen by only relying on existing public dollars.

#### Transit Improvement Plan

- 8 New passenger rail service extending from Norristown to Reading / Wyomissing can be operational before 2020 with all the capital costs financed by toll revenue.
- 9 A one seat ride with seven (7) round trips daily into center city Philadelphia promises the highest estimated rail ridership.

#### Financial Plan

- 10 Tolls can pay for improvements, based on reasonable assumptions for the currently Planned Highway and Rail Improvements as well as the highway operating costs. Even if the assumptions are not met, improvements are likely to be affordable, but at a slower pace.



## Tolling Program

The Goal: Explore options to convert US 422 to a toll facility

**Key Finding 1: Tolling US 422, at a rate comparable to the amount charged per mile on nearby sections of the Pennsylvania Turnpike, would provide funds to greatly accelerate the timeline for making improvements to the corridor, resulting in shorter travel times.**

The new toll revenues added to the pot of traditional public funding could accelerate improvements to the US 422 corridor's transportation infrastructure. Such improvements would make travel times shorter than would be the case without tolls in the years to come.

An annual revenue schedule was established to determine how much money is anticipated to be generated by tolling US 422. US 422 tolling is anticipated to generate \$59 million in Year 2015 and grows to \$80 million in Year 2035 (2010 dollars) as traffic increases. Because it is important to maintain what you already have, the first cut of toll revenue dollars collected every year will go to the annual operations and maintenance for the roadway.

After annual expenses, this amount of annual revenue plus available state funding results in a 422 focused tolling authority having about \$1.1 billion (2010 dollars) to invest over a 15-year Capital Program, \$749 million and \$371 million on the Highway Capital Program and Transit Capital Programs, respectively. Currently, only \$243 million of the total highway capital program is funded by PennDOT leaving a funding gap of over \$500 million. Since certain projects need to be done before others and traffic needs to keep moving during construction, the overall total investment cost adjusts annually with inflation but matches up with toll collections and earnings on those dollars which are being saved for the year of expenditure. Unlike a brand new facility, traffic volumes on US 422 show us how many motorists will use the road and generate toll revenue. Securing infrastructure bonds by providing a reliable and consistent source of money to repay the bonds, allows for highway and transit improvements in the year when needed without competing for yearly federal and state transportation appropriations with other statewide improvement projects.

Deciding that tolling is the best way to make such changes happen requires several legal and procedural steps and some institutional challenges. Under current state law the only right to manage and operate a toll road rests with the Pennsylvania Turnpike Commission and several bi-state authorities with bridges over the Delaware River. Other states allow multiple legal public and private structures to own and operate toll facilities. The 422plus study investigated a range of management structures for US 422, if it were to become a toll facility.

## **Key Finding 2: A locally based multi-county transportation authority serving as the overall manager would assure that toll revenue paid here, in the US 422 corridor, would stay in the corridor.**

A number of options were explored to determine what existing or new entity would best serve as the owner/oversight manager of the converted toll facility. These governance options included: PennDOT, an existing Pennsylvania authority authorized to toll, an existing state transportation or economic development authority currently not authorized to toll, a new locally-focused multi-county transportation or mobility authority, and a new hybrid State-created authority. The pros and cons of each US 422 governance option were explored in detail. Input on the factors to weigh in evaluating the options was gathered from the Steering Committee, the Communications Committee, a thorough review of prior studies, and questions and comments posted on the project website. Local control over collection and expenditure of toll revenues was the most heavily weighted factor in identifying the recommended potential future US 422 Toll Authority (Authority). A local as opposed to statewide authority would underscore that control. Required would be a clear agreement set out in the lease terms and Section 129 Agreement between the Federal Highway Administration, PennDOT and the new authority over the control, disposition and use of the toll revenues generated by US 422.

It was recommended that a new multi-county transportation or mobility authority representing Berks, Chester and Montgomery counties would best serve as the operator of US 422 once converted to a toll highway. State legislative action would be necessary to enable a local authority such as this to manage a toll road. The Authority would lease the highway from PennDOT for a period of time – for example,

40 - 50 years – and be responsible for the financing of capital improvements within the corridor secured by collected toll revenues along with its maintenance and operation. Responsibilities of the Authority would be set forth under its authorizing language and by-laws to include the use of available toll revenue for the capital investments needed to extend rail service from Norristown to Reading / Wyomissing and contracting for a passenger rail service operator.

If US 422 converts to a toll road, it could be managed by a new multi-county transportation or mobility authority.

## **Key Finding 3: All-electronic tolling is the best tolling system for users, neighbors, cost containment and revenue generation.**

The goal to stem growing traffic congestion on US 422 while securing new revenues mandated that traffic should not be slowed to collect tolls. For many, turnpikes and toll systems conjure up old images of long lines waiting to squeeze past tollbooths and waiting for the car in front to toss the right change in the basket, or be handed change from the toll collector so you can merge back into traffic. Those images are ancient history. With electronic toll collection, revenue generation can be accomplished without any slowing of traffic or lane changing.

The region's drivers are familiar with the E-ZPass system and many already participate. To estimate potential revenues and traffic impacts, toll rates were selected for investigation by finding the right balance between: (1) keeping traffic moving on US 422, (2) gathering adequate revenue and (3) discouraging unnecessary traffic diversion to local roads. Setting the opening day toll rates consistent with the 2010 cost per mile along a nearby segment of the Pennsylvania Turnpike, which

was a rate of approximately \$0.11 per mile, strikes that balance for the purposes of this investigation.

Using a single rate set as a constant value is not how the majority of toll facilities in the United States actually operate. A more likely scenario is where there are variations by vehicle size and class, or time of day or day of week as a congestion management tool, or multi-use discounts. Decisions of this nature will ultimately reside in the hands of the governing tolling authority.

Spreading toll collection gantries throughout the expressway segment of the corridor is just one scenario for toll revenue collection. Other options are still being explored and the results will be posted at [www.422corridor.com](http://www.422corridor.com). These options answer the question “What If?” Examples include:

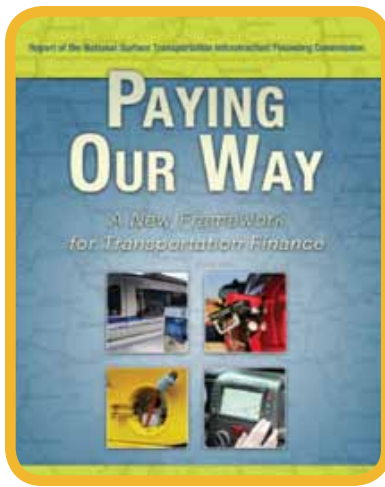


- “What if only a single location is tolled such as at the Schuylkill River Bridge?”
- “What if tolls are only collected in the peak rush hours so that local trips during the day, are not affected?”
- “What if you add new travel lanes and only those are tolled to pay for the new capacity?”
- “What if the state increases available dollars for US 422 improvements?”

For the purposes of the 422plus study’s base case scenario, the approach focused on mainline US 422 tolls combined with ramp tolls, located in proximity to the mainline gantries to minimize traffic diversion, resulted in tolls being collected at 4 locations for all movements through electronic toll collection. Users without E-ZPass tags would have bills sent to them based on photos taken of their license plates. Drivers who enter and exit US 422 without passing any of the four proposed tolling locations would not pay a toll. Table 1 below shows the proposed toll locations and projected opening day tolls at each location for the single rate/constant value scenarios discussed above.

Location	Projected Opening Day Tolls
Between Grosstown Road and PA 100	\$0.55
Between Sanatoga (Evergreen Road) and Limerick/ Linfield (Lewis Road)	\$0.80
Between PA 29 and Oaks Interchange (Egypt Road)	\$0.80
Schuylkill River Bridge	\$0.50

*Table 1. Projected Opening Day Tolls at Proposed Tolling Locations*



In 2009 a Congressional Report entitled “Paying Our Way: A Framework for Transportation Finance” noted the following: “In recent years, with the growing gap between highway investment needs and available revenues as well as the development of easy-to-use and relatively inexpensive automated toll collection technology, toll roads and toll lanes have once again become an important means for funding investment in new highway capacity—in the last decade about one-third of all new limited-access lane miles built in the United States were tolled; in states such as Texas and Florida, the share is even higher.” The Report highlighted that tolling can generate significant resources to build or rebuild and operate transportation infrastructure, with a caveat. The facility must have high enough traffic for it to be cost-effective. The Report defined tolling as an

effective strategy for revenue generation when targeted on specific roads or network of facilities in defined geographic areas. The US 422 corridor meets those parameters.

There are clear benefits to safety and air quality from all-electronic open road tolling technology. It allows non-stop collection of tolls while travel speeds and traffic flows are maintained along the corridor. With open road tolling there is no weaving of vehicles to get into and out of specified lanes or idling in a line of vehicles slowed by the need to wait for the green light or barrier arm to rise. There will be challenges as well. The new Authority will need to address processes for collection and consequences for non-payment by travelers without toll tags, or those with tags from other states, or “illegible” license plates.

#### **Key Finding 4: Operation and maintenance of the US 422 corridor could be accomplished under a variety of contractual arrangements with public and private entities.**

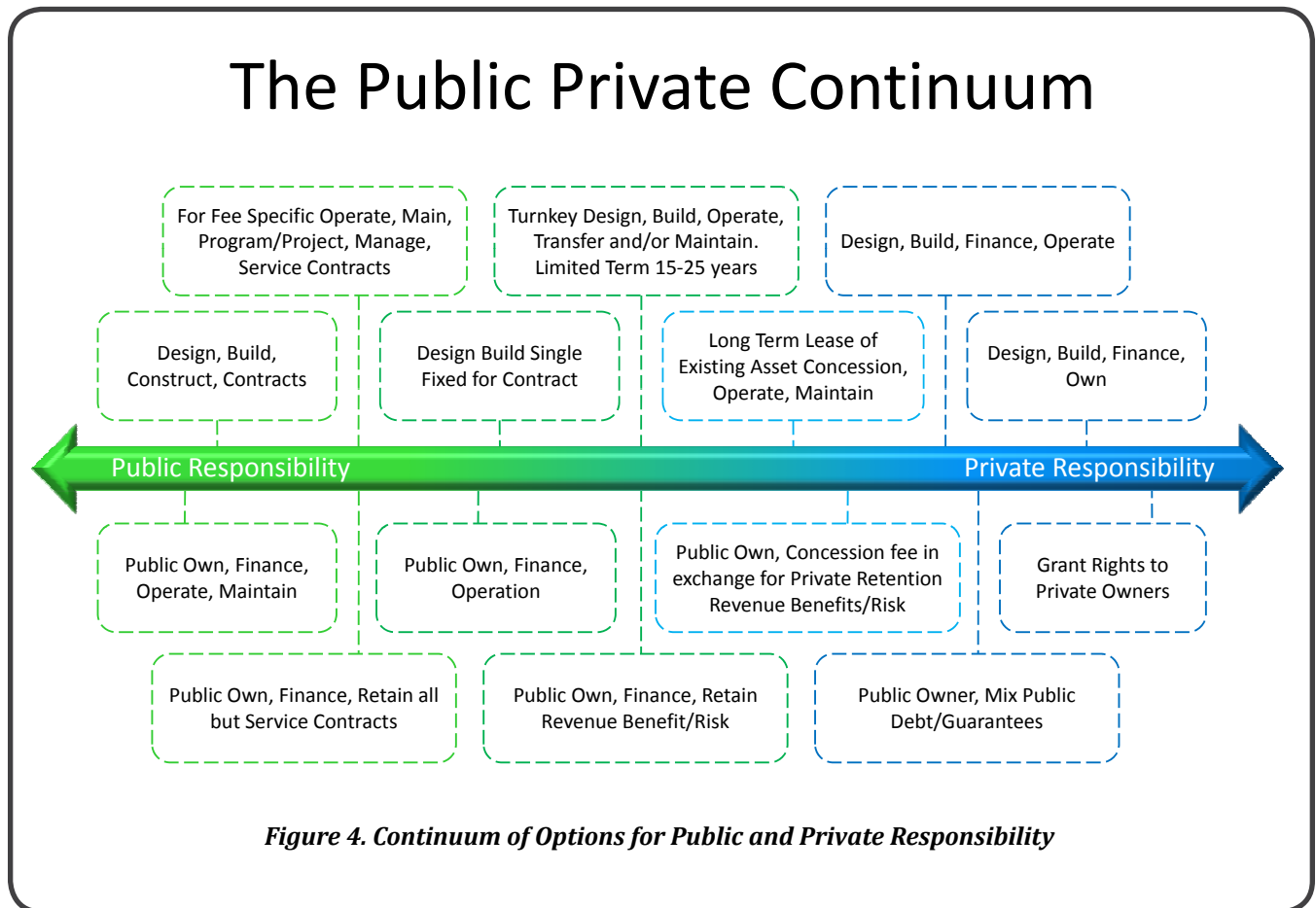
Creating a new Authority does not necessarily mean creating a new public bureaucracy comprised of managers and staff for collecting and accounting for revenues, enforcing traffic and toll collection regulations, planning, designing, maintaining, inspecting and constructing facilities. There are many different types of arrangements for the Authority Board to pursue with respect to overseeing and managing toll-funded facilities.

While current law in Pennsylvania generally does not allow an existing facility to be leased, operated or financed through a public-private partnership (PPPs) -- state action (currently being considered in Harrisburg) could enable an Authority Board to turn over all or part of the management and operations to a private sector third party. Otherwise, responsibility for operating and maintaining facilities could be contracted, for a fee, to existing public entities, with the Authority Board restricting its role to policy decisions and contract oversight. There are many gradients of transportation PPPs. These include: maintenance and operation fee service contracts, program management fee service contracts, design-build contracts, and build, operate and maintain among others.

How could some of these arrangements work? For example, all of the infrastructure necessary to convert the road into a toll facility could be designed, built, operated and maintained under one contract between the Authority and a single private sector business expert in providing such



services. Another possible arrangement is a public-public partnership. That would be the case where, for example, PennDOT or Pennsylvania Turnpike crews capitalizing on economies of scale and existing equipment and facilities already accessible to the corridor, could continue to maintain US 422 but in accordance with standards set by the Authority Board and for a fee. A private railroad or public transit operator could be retained for building and/or operating the rail service under terms and conditions agreed to with the Authority Board in return for a commitment of revenues to fund the work. Figure 4 illustrates the multiple options for arrangements along a continuum of public and private participation which could occur under the policy direction and oversight of the newly created toll authority.





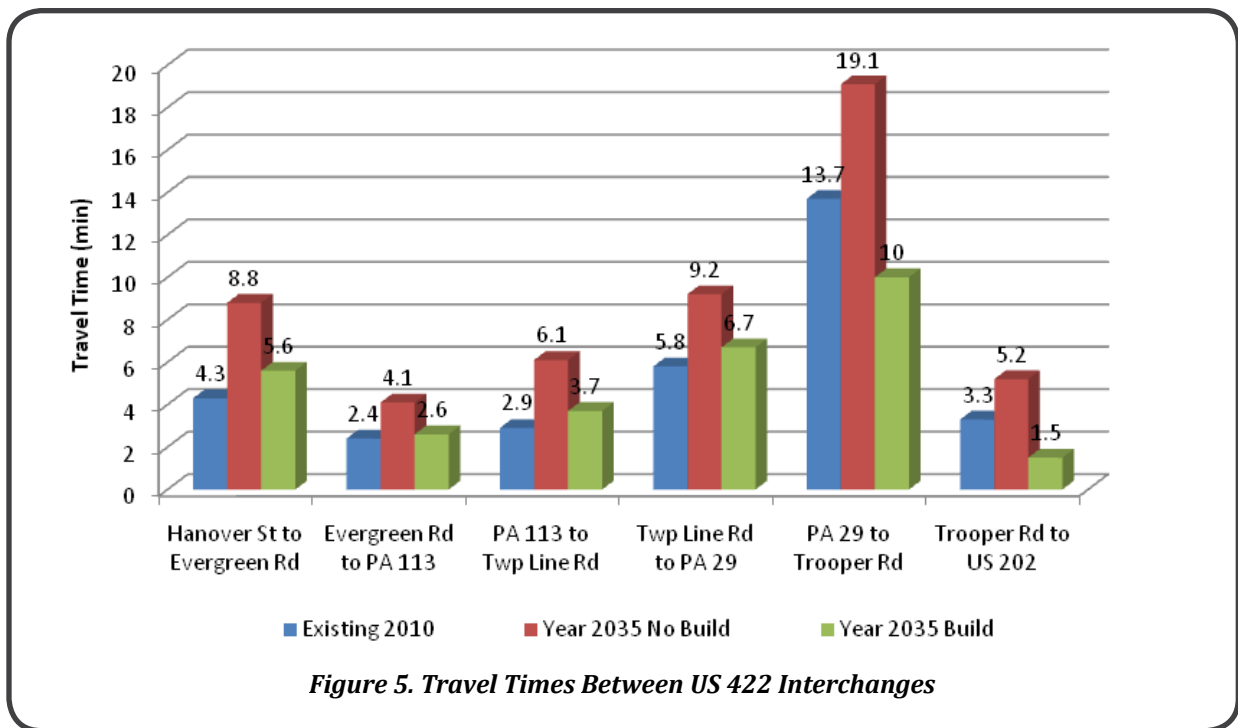
## Highway Improvement Program

The Goal: To better preserve, protect, enhance and manage the US 422 corridor and deliver improvements to the public as quickly as possible.

**Key Finding 5: If implemented, the Highway Improvement Program will reduce US 422 congestion, saving the average commuter \$7,350 in travel time value in the Year 2035. Without it, travelers on US 422 will continue to lose time and money.**

The rationale behind building US 422 was to reduce congestion along Ridge Pike and Germantown Pike between Pottstown and King of Prussia. Between 1965 and 1985 the expressway was constructed in sections, starting in King of Prussia, Montgomery County and extending to Douglassville, Berks County. In the 1990s, safety improvements were installed along the western section of the roadway near Pottstown. During the early 2000s, the interchange of US 422 and US 202 was rebuilt, and the approaching portion of US 422 was widened. Today, daily traffic reports on US 422 backups alone are evidence that much more needs to be done.

Several portions of the expressway are reaching maximum capacity. The bridge crossing the Schuylkill River just north of the interchange with PA 23 has high traffic volumes daily and is nearing capacity. Projected volumes show that US 422 from Township Line Road to the Schuylkill River Bridge will exceed practical capacity by 2035 without roadway improvements.



The Highway Improvement Program is an accelerated and integrated Operating and Capital Plan aimed at increasing safety and reducing congestion within the US 422 corridor; the program funds a higher level of daily maintenance of the roadway than has historically been the norm under limited public resources. With over \$700 million dollars worth of needed capital improvement projects identified, PennDOT can only reasonably be expected to fund \$243 million over the next eight years. Using toll revenue collected along US 422, the amount of money invested in the corridor from 2012 to 2022 **triples and the timing for accomplishing the needed investments accelerates**. This revenue can be used not only to fund the construction of infrastructure for the tolling itself, but also fund operations and maintenance costs for tolling and the roadway in general.



Every US 422 commuter has experienced sitting in traffic in the morning on the way to work. Without funding for improvements traffic will continue to increase every day all day long throughout the corridor. Figure 5 demonstrates the disparity between travel times between interchanges today, in the future with no toll improvements and in the future with capital improvements.

**Key Finding 6: Enhanced maintenance and improved safety is another PLUS of having available toll dollars, almost doubling spending from \$1.2 million to \$2 million in current dollars.**

Drawing from current PennDOT expenditures on US 422 in Montgomery and Chester Counties, roadway repairs and winter services in 2010 cost approximately \$1.2 million. With toll funding a premium roadway service maintenance will be available. The improvement program is based on a 67% increase in 2010 dollars. This amount is escalated by an anticipated inflation factor for succeeding years in calculating ongoing revenues needed to fund enhanced maintenance.



With an enhanced maintenance budget comes the opportunity to deploy more crews to clear ice and snow, or remove fallen rocks or branches—minimizing weather impacts on traffic. Having dollars to contract for dedicated road service personnel can help clear traffic incidents more quickly. Investing early on in traffic information systems for roadway users lets them make better decisions about travel times and modal choices, when planning trips around special events, weather issues, daily traffic fluctuations by time of day, and

construction activities. Operating and maintenance responsibilities which could be covered under one or multiple contracts include: snow removal, landscaping, crack sealing, pavement patching and repair, trash removal, toll collection and enforcement costs, and traffic and motorist assistance services.

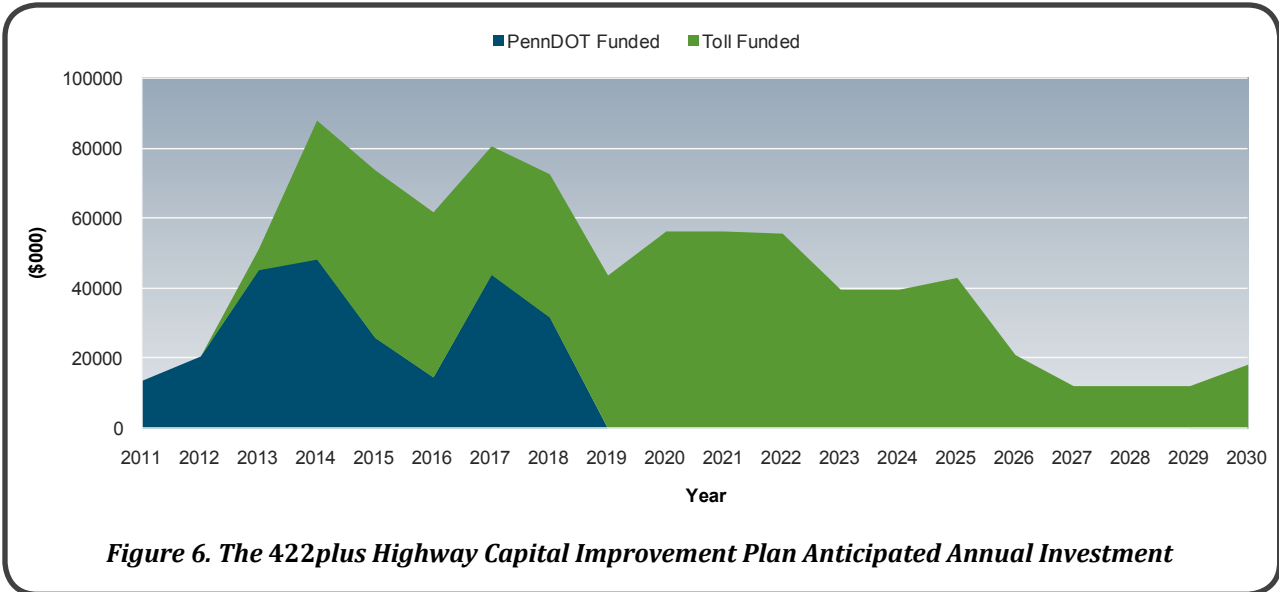
**Key Finding 7: The 422plus Highway Improvement Program will triple the investment in highway improvements within the next 15 years, which could not happen by only relying on existing public dollars.**

When local, state and federal governments recommend plans and programs for highway improvements, there are three major factors to balance when looking at needs statewide: (1) relative project priority, considering factors such as safety, congestion, highest return on investment, equity across infrastructure type or location; (2) available budget and (3) practical impacts of the amount of work that can be accomplished within a given period of time. The 422plus Highway Improvement Program did not have to balance its project priorities against any other corridor in the Commonwealth, or be constrained by existing state transportation budgets. However, the 422plus Highway Improvement Program is grounded in analysis from field inspections, document and data reviews, and endorsement of PennDOT’s professional assessment of unfunded program year priorities beyond the next eight years for US 422.

\$243 million in PennDOT funding programmed for US 422 over the next 8 years is not enough to get ahead of growing congestion.

Cost estimates of highway improvement projects were developed to determine the magnitude of need and to demonstrate what can be accomplished by tolling the roadway. Assumptions were made to approximate the cost of widening portions of the highway, replacing or rehabilitating bridge structures and improving interchanges along the corridor. Costs for engineering design, anticipated utility costs, and right of way were estimated along with construction items for both early action and long range projects. Aggressive but realistic schedules for getting all the work completed from design through construction, have been shown.

Given the high daily traffic volume, the projected future growth for the US 422 corridor and the importance of US 422 as a vital commuting artery, a new Authority should be able to **generate sufficient revenue** over time to pay for the proposed 422plus improvements and capacity additions as well as the capital costs of extending rail service from Norristown to Reading / Wyomissing.



Some improvements, valued in 2010 at \$36.6 million, will be put in place before the first penny of toll revenue is collected and other longer-term capital improvements will be underway. These include state-of the art real time traffic information, select widenings of on and off ramps, and upgrades to nearby traffic signals to help unclog access and egress from US 422. But the single most important improvement is certainty: certainty that the already strangling peak hour traffic crossing the bridge at the Schuylkill River will see two new bridge structures with four lanes of traffic in each direction.

These four lanes in each direction could replace the current three-lane east bound and two-lane westbound operation with authorization of a new Authority. With funding certainty, secured by toll revenue dedicated to the 422plus program highway maintenance needs and improved traffic information, a list of highway improvements could move from being on a wish list for US 422 users to reality.



#### **With \$500 million dollars more of toll funding:**

- US 422 eastbound and westbound will be widened from US 202 to PA 29 (Phoenixville-Collegeville Road)
- The entire River Crossing Complex can be constructed, including the New Schuylkill River Bridge currently without allocated funds
- Four (4) US 422 Reconstruction projects
- Three (3) Resurfacing projects
- Improvements to Sanatoga Interchange
- Intelligent Transportation Systems (ITS)
- Acceleration and deceleration lane improvements at four (4) locations
- Intersection improvements on routes parallel and perpendicular to US 422



## Transit Improvement Program

The Goal: Extend the Norristown train line to the Reading area with a one-seat ride to Center City Philadelphia.

### Key Finding 8: New passenger rail service extending from Norristown to Wyomissing can be operational before 2020 with all the capital costs financed by toll revenue.

The Transit Improvement Program aims to extend Norristown Line service to the Reading area to complement the improvements on US 422. Two alternatives for commuter rail service between Philadelphia and the Reading area were considered: one using coordinated transfers at Norristown to reach Philadelphia, and a second employing a one-seat ride into Center City. For each alternative, two levels of service were analyzed: start-up service of seven round trips a day and mature service of sixteen round trips per day. In each alternative and level of service, rail service would include seven new stations along the US 422 corridor at Valley Forge, Phoenixville, Royersford, Pottstown, Monocacy, Reading and potentially Wyomissing. Ridership for these scenarios was modeled using a combined DVRPC and Reading MPO travel demand model; the results provided a basis to estimate potential operations and maintenance costs and fare revenue. A capital improvement plan and cost estimate was also developed, which would upgrade the line to provide sufficient capacity for both freight and passenger service.

The preferred transit alternative boasts dual-power locomotive service with seven round trips a day from Reading / Wyomissing to Philadelphia using the existing SEPTA Norristown Line into Center City.

The results of the model show that both an improvement in service levels and a move from a transfer to a one-seat ride would increase ridership. However, eliminating the transfer at Norristown had a greater impact on ridership than increased levels of service. As a result, the recommended alternative is the one-seat ride with seven round trips per day.

### Key Finding 9: A one seat with seven (7) round trips daily ride into center city Philadelphia promises the highest estimated rail ridership.

This alternative strikes a balance between desired ridership and acceptable costs. As a result, the recommended alternative is the one-seat ride with seven round trips per day. In the previous efforts to study ways to reestablish passenger rail service to Reading, including the Schuylkill Valley Metro or Metrorail studies, the costs relative to potential ridership expectations resulted in findings that the effort was not sufficiently cost-effective to attract the necessary public dollars. Several factors now change this equation, including: full electrification of the line is not required with the use of dual-power locomotives; a new willingness by the freight rail owner (Norfolk Southern) to work on sharing its right of way with passenger services; a direct routing using the existing Norristown rail line and a newly identified funding source for the capital improvements—toll revenues.

In the preferred model scenario for Year 2015 and 7 round trips per day, an estimated 160,000 riders per year would use the new Valley Forge station.



Between	Norristown	Center City Philadelphia
Reading	55 mins	92 mins
Pottstown	32 mins	69 mins

*Table 2. Trip Times for the Preferred Alternative*

This recommended alternative boasts 3,272 daily riders in model year 2015 and 4,343 daily riders in 2035. Operations and maintenance costs are estimated at \$16.04 million, while total year of expenditure capital costs are estimated at \$371 million (2010 dollars). Fare revenues are expected to reach \$3.97 million in 2015 and \$4.99 million in 2035. In all scenarios, operating costs would exceed revenues, as they do on virtually all commuter rail lines throughout Pennsylvania, the nation and the world. As ridership growth increases, the farebox will capture an increasing share of the operating costs; however, some subsidy will be necessary. While under federal law, the capital costs can be underwritten in full by toll revenue, operating costs cannot be paid by dollars from tolls. The subsidy necessary to fund a transit service's operating deficit under current state law is provided by state and local funding at an 85%/15% split; it was assumed that the split remains operative for the Norristown extension. The formula on how the local share is to be distributed among the participating counties will ultimately be a decision by the Authority. As a guideline for this investigation, miles of track within each county was used to calculate shares. Of the 15% of the total anticipated deficits to be covered by local funding, Montgomery County would be responsible for roughly 48%, Berks 40% and Chester County 12%.

Overall, this Transit Capital Program would have sufficient funding for capital costs to jumpstart an extension of service on the Norristown Line to the Reading area with a one-seat ride to Center City Philadelphia. It is noted that there is some additional work to be done to refine the capital costs in today's dollars. For passenger trains to have access to an active freight corridor, a sharing agreement between

Past studies of restoring passenger rail service to Reading / Wyomissing had estimated capital improvements in excess of \$2 billion. This approach will cost less than one quarter of that.

Norfolk Southern, the freight rail owner, and the new Authority will be necessary to outline service levels, access and maintenance fees and necessary capital improvements. It is premature to initiate negotiations with key parties before there is direction to move ahead. A rail operations simulation must be designed and completed to finalize the capital improvements needed to maintain sufficient freight and passenger capacity, especially in and around bottleneck areas like Wyomissing Junction. Further refinement to the DVRPC and Reading MPO travel demand model will be required to ensure a greater level of certainty in toll and fare revenue forecasts if a decision is made to move forward with designing and constructing the entire line prior to the start of any passenger service from Norristown to Reading / Wyomissing. Even with these efforts outstanding, if the decision was made before the end of 2011 to move ahead with creating the Authority, entering into all necessary agreements with public and private stakeholders, and moving from design through construction, rail service could be operational within a decade.



## Financial Plan

The Goal: Assess whether toll revenue will exceed combined operating and maintenance expenses sufficient to fund desired US 422 corridor capital improvements.

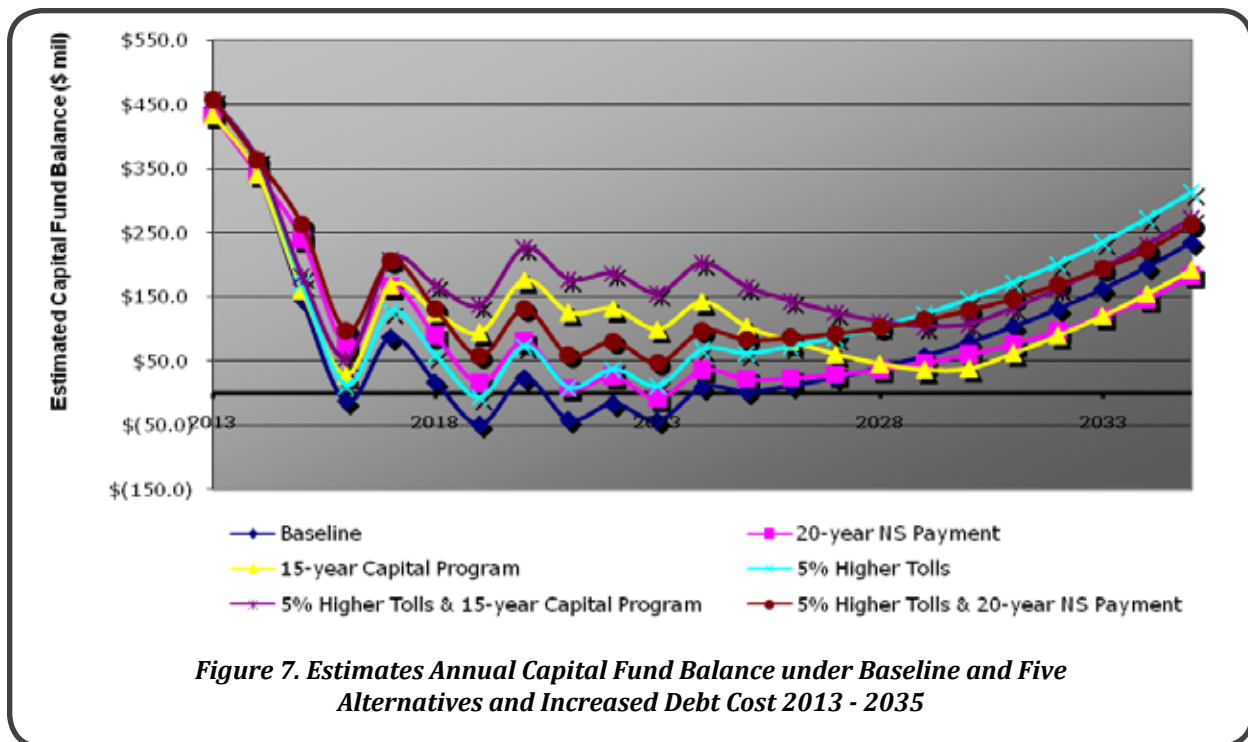
**Key Finding 10: Tolls can pay for improvements, based on reasonable assumptions for the currently Planned Highway and Rail Improvements as well as the highway operating costs. Even if the assumptions are not met, improvements are likely to be affordable, but at a slower pace.**

Estimates of annual toll revenue collections and toll road operating and maintenance costs were used to develop an estimate of annual net-revenue of the Authority between 2013 and 2055. While this date exceeds the horizon year for transportation improvements, long term debt instruments could have pay off expiration dates beyond 2035. Increases in both the number of drivers using US 422, and thus the number of toll transactions, as well as inflation adjusted increases in the dollar amount of each toll transaction each year **allows the revenue to exceed the combined operating and maintenance expenses** of the road. The net revenue after paying for operating and maintenance expenses will be available for the Authority to use to make capital improvements to US 422, such as replacement, reconstruction and widening. These capital improvements could either be paid for on a “pay-as-you-go” basis or financed through the issuance of revenue bonds. The use of bond financing to pay for the capital program will allow the Authority to complete the improvements on an accelerated timetable. A first round of bonds could be issued shortly after the Authority is formed and has the right to collect tolls.

The US 422 financial plan is based on the year 2013. Every few years there is enough available revenue accumulated from collecting highway tolls to allow the Authority to issue additional bonds to continue funding the highway and transit capital programs. The plan assumes bonds will be issued in 2013, 2017, 2020, 2022 and 2024. Under baseline assumptions used in the analysis, the five separate bond issues will allow the Authority to issue bonds worth \$1,075.6 million of which \$948.7 million is available for immediate spending on capital projects. The remaining money includes a deposit to the bond reserve fund (which is available for use to pay the last debt service payment for each bond issue) as well as costs associated with issuing the bonds. However, because the plan is looking into the future, there are a lot of necessary assumptions and variables used to develop the baseline analysis, but each is grounded in local and national experience in toll revenue collection, infrastructure capital costs and bond financing. But what if some of these assumptions are wrong?

The Financial Plan tested the sensitivity of variables both within and outside the control of the new Toll Authority. Figure 7 illustrates what would happen to the capital fund balance if debt costs are higher than the baseline assumption, and the lump sum payment allowing passenger service on the freight line is spread out over 20 years, or tolls are just 5% higher on opening day or the highway capital program is spread over 15 rather than 10 years. Each of these alternatives were evaluated from the 2013 baseline with toll rates increasing with inflation at 2.5% and operating and maintenance costs increasing at 3.5% a year.





Given the high daily traffic volume, the projected future growth for the US 422 corridor and the importance of US 422 as a vital commuting artery, the Authority should be able to generate sufficient revenue over time to pay for the proposed improvements and capacity additions to US 422 as well as the capital costs of extending transit service from Norristown to Reading / Wyomissing.

However, the funding margin for the currently planned schedule is thin in some years. If sufficient funds are not available, it may be necessary to delay construction of some elements. A ten-year toll-funded capital program may not be possible, but an extended 15 year capital program is. The exact timing of the subsequent phases depends on funding, which in turn depends on the realization of many unknowns. Further, the early years of a ten-year capital program and the fifteen-year capital program are the same, so the program can be initiated as if it will be completed in ten years, and extended as necessary to meet funding availability.

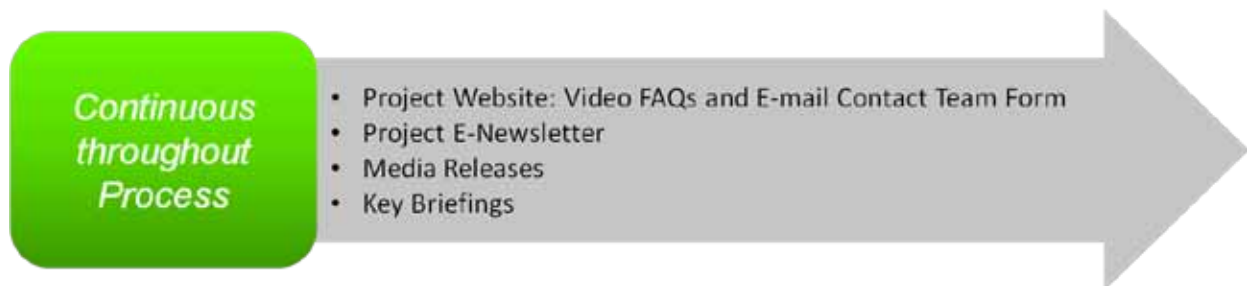
The project website, [www.422corridor.com](http://www.422corridor.com) provides answers to questions such as, "I'm worried that my toll money will go into the state's general fund and be wasted. How can I be sure that money for US 422 stays on US 422?"

# Synopsis and Findings

## of the 422plus Technical Reports and Working Papers

### Section E: PUBLIC OUTREACH

The approach to the public outreach for the 422plus Project was developed in coordination with the 422plus Project Steering and Communication committees. Their guidance shaped the outreach of the project. An existing website created by the Greater Valley Forge TMA was redesigned (<http://www.422corridor.com>) to create an efficient way to address questions about the 422plus Project. This site also provides an online comment form and team email address for the public to write questions or comments to the Project Team. In addition, project E-Newsletters were created and distributed as well as media releases. Regular briefings were held to keep key stakeholders updated about the progress of the project.



**Figure 8. Continuous Public Outreach Mechanisms**

In 2010, a series of stakeholder interviews were held to 1) build relationships with stakeholders, 2) collect information relevant for the analysis and planning, and 3) understand where the levers are related to the 422plus Project. Fifteen interviews were held with representatives of roadway users, advocacy organizations, and institutions along the US 422 corridor to get a “flavor” of daily experiences and concerns along the US 422 corridor.

Furthermore, as part of the effort to support public involvement in the 422plus Project, video FAQs were posted on the project website about the current situation on US 422.

Over the past four months, the draft results of the 422plus analysis were presented over two dozen times at key briefings along the corridor.

In addition to key briefings, DVRPC participated in a highly publicized and well-attended public forum on September 13, 2011. DVRPC presented a summary of findings to date from the 422plus Project and responded to questions and comments from the audience.



**Figure 9. 2010 Public Outreach Mechanisms**



**Figure 10. 2011 Public Outreach Mechanisms**

# Synopsis and Findings

## of the 422*plus* Technical Reports and Working Papers

### Section F: CONCLUSION AND NEXT STEPS

Using tolls, over one billion dollars could be raised over the next fifteen years to improve the US 422 highway, PLUS attack growing congestion, PLUS increase the standard of roadway maintenance, PLUS establish the infrastructure to support passenger rail service from Philadelphia to Reading / Wyomissing. That's the 422*plus*. However, new public and political commitments will be needed to support day-to-day rail service operations not covered by fares and enable the conversion of US 422 to a tolled facility with revenues raised locally to stay locally. Getting these commitments entails a number of actions at every level of government - local, state, and federal. These include:

- State legislation to enable local tolling authorities
- County ordinances to authorize establishment of multi-county toll authority
- Counties' financial guarantee backing toll authority
- Agreement between the state, the new authority and FHWA on managing and leasing the roadway
- Counties' agreement on local contributions for transit operating costs
- State appropriation for increased transit operating costs to future operator
- Agreements with railroads for usage, improvements and operations

In August 2011, the Governor's Transportation Funding Advisory Commission (TFAC) (see [www.tfac.pa.gov](http://www.tfac.pa.gov)) proposed a comprehensive package to increase funding for transportation infrastructure across Pennsylvania. Support and passage of this package will enable critical transportation improvements, including many of those identified for the 422 corridor, to proceed. The TFAC recommendations included the following:

- Increase the Oil Company Franchise Tax over 5 years, raising up to \$1.3 billion per year
- Increase vehicle and driver fees, such as registrations, inspections and licenses, raising up to \$574 million per year
- Move funding of the State Police to the General Fund, freeing up to \$300 million per year
- Dedicate 2% of the total state sales tax to transit, providing up to \$172 million per year.

If the Governor and Legislature advance this package, increased state funding would enable the highway improvements to proceed along 422, although funding for the rail line may still be a challenge. However, if such statewide funding does not advance, local officials may want to consider a locally-based solution such as tolling.