Cumberland, Dauphin and Perry Counties, PA

Congestion Management Process

2017

Harrisburg Area Transportation Study

Adopted June 23, 2017

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ABSTRACT:

This report documents the methodology and results of the 2017 HATS Congestion Management Process (CMP). The CMP is an on-going process that determines where congestion occurs and at what intensity, identifies priority congested locations, and presents strategies aimed at reducing traffic congestion and enhancing safety and mobility across the region. This update is the "third" to be categorized as a "process", rather than a "system", to reflect that congestion management is an important part of the transportation planning process, not just a stand-alone program. To provide a thorough assessment of the CMP network, this report incorporates GPS travel speed data to better capture traffic delay in the region. Both focus corridors and targeted intersections were ranked from high to low in in delay to prioritize congestion locations. Additionally, other factors were combined with the delay to add further prioritization capabilities such as a Level of Service (LOS) assessment, and comparisons to other travel speed data like INRIX and NPMRDS. Further review of congestion mitigation strategies and proposed improvements by corridor and intersection are recommended as part of this analysis.

ACKNOWLEDGMENTS:

The CMP report was prepared by the Harrisburg Area Transportation Study (HATS) in cooperation with other transportation agencies, including the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), the Pennsylvania Department of Transportation (USDOT), the local municipalities and transit agencies within the Harrisburg metropolitan planning area. Technical assistance was provided by Michael Baker International and York County MPO staff. The contents of the report reflect the views of the HATS metropolitan planning organization. HATS staff is responsible for the facts and accuracy of the data presented in this report. The contents do not necessarily reflect the views or policies of the FHWA, FTA, or PennDOT. This report is not considered a standard or regulation, and federal and state acceptance of this document as evidence of the objectives of this task does not constitute endorsement or approval of the need for any recommended improvements. Additional project level assessments and studies of alternatives may be necessary.

Executive Summary

The Congestion Management Process (CMP) for the Harrisburg Area Transportation Study (HATS) is an on-going process that determines where congestion exists on the regional network, identifies the causes of congestion, and develops transportation strategies to reduce traffic congestion, enhance safety, and allow for better mobility across the region. Under federal regulation, all Transportation Management Areas (TMAs), or urban areas with a population greater than 200,000, are required to create a CMP. These regulations also specify that CMPs be implemented as a continuous part of the regional metropolitan planning process, which includes the HATS Regional Transportation Plan (RTP), Transportation Improvement Program (TIP), and Unified Planning Work Program (UPWP).

For this CMP, six general goals were identified:

1) Manage congested areas through the congestion management process (CMP), safety and mobility plans, and application of technologies such as ITS and PA 511.
2) Facilitate multi-municipal efforts to coordinate traffic signals and traffic flow along all congested roads, specifically CMP focus and priority corridors and intersections.
3) Support access management efforts and promote better coordination of Highway Occupancy Permits between PennDOT and municipalities to reduce unnecessary access and potential conflict points.
4) Reduce single occupancy vehicles (SOVs) by offering safe alternative travel modes.
5) Discourage parking policies that contradict SOV reduction strategies and programs.
6) Evaluate the effectiveness of implemented strategies by comparing performance measures before and after improvements.

The CMP is the primary method for the HATS MPO to address congestion issues, as the process continually monitors how roadways are performing and develops implementable strategies to reduce congestion. It also identifies priority corridors and intersections based on specific performance measures to determine how limited transportation funding should be allocated. According to FHWA guidance, the CMP should be viewed as a "living" document, continually evolving to address the results of performance measures, concerns of the community, new objectives and goals of the MPO, and up-to-date information on congestion issues (Congestion Management Process: A Guidebook, April 2011).

Due to the levels of congestion on the region's roadways, performance measures were used to differentiate between moderately congested corridors and intersections and severely congested ones. Of the 100 focus corridors that comprise the CMP network, 17 were designated as priority congested corridors. Of the 90 intersections analyzed as congested, 16 were identified as priority ones. These priority corridors and intersections were analyzed in detail to determine possible causes of congestion, potential applications of CMP mitigation strategies, and any planned improvements already existing on the TIP or RTP.

Given the current disparity between available transportation funding and deficient roadway infrastructure, it is important that the most beneficial projects be selected for completion. HATS staff encourage local planners, engineers and elected officials to consider the CMP analysis results as they develop future projects in the region. Information from this CMP will be used in the forthcoming Regional Transportation Plan (RTP) update, and as one of the tools for ranking projects. The highest ranking projects identified in the RTP should be implemented through the Transportation Improvement Program (TIP).

HATS staff will continue to systematically monitor congestion on the CMP network and refine the process as needed as more current data becomes available. Important data such as GPS travel speed data, traffic volumes (passenger and truck) and crash rates will be updated on a 2-year cycle, with an overall CMP update to coincide with RTP updates. This information will be collected and analyzed in conjunction with freight plan considerations in that truck delays and volumes are major components of congestion. These efforts are necessary to understand how our transportation systems are functioning and how people and goods are moving within the HATS region. Evaluating the effectiveness of implemented strategies to reduce congestion will be conducted as data and staff time is available by comparing like performance measures before and after an improvement.

It should also be noted that the CMP furthers the growth management goals identified in the 2011 Regional Growth Management Plan (RGMP), specifically recommending congestion management strategies that align with current and future land uses. How the region develops directly influences how many vehicle miles of travel and how much congestion exists on the roadways. Our ability to support a complete range of transportation mobility options such as transit, bicycle and pedestrian is crucial. This linkage between transportation and land use is key for the vibrancy and resiliency of the region in the years to come.

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1. Introduction

The Congestion Management Process (CMP) for the Harrisburg Area Transportation Study (HATS) is an ongoing process that identifies congested locations, determines possible causes of congestion, prioritizes the most congested corridors and intersections, and develops strategies to reduce traffic congestion and increase regional mobility. Since traffic congestion is one of the major issues affecting the quality of life in the Tri-County region it is important to examine the existing roadway network and develop effective operational and travel demand management strategies. Additionally, decision-makers must be informed of the short and long-term strategies and their effectiveness in improving system performance. The CMP is intended to move regional congestion management strategies into the programming and funding stages of the transportation planning process.

On the one hand traffic congestion is a sign of a healthy and vibrant economy. Traffic is the flow of people and goods in the region and more traffic means more people, more jobs and prosperity. On the other hand, the cost of success is greater congestion with extensive impacts such as increased travel time, added fuel costs, and environmental emission impacts.

The following sections describe the CMP federal requirements and performance measures, traffic and regional trends, how the CMP is integrated into the planning process, a congestion profile and strategies to mitigate congestion.

1.1 Federal Requirements

Since the last HATS 2013 CMP update, the Fixing America's Surface Transportation (FAST) Act (Pub. L. No. 114-94) was signed into law on December 2015. This is the first federal law in a decade to provide long-term funding certainty for surface transportation infrastructure planning and investment. This legislation, like the previous ones, dictates how Metropolitan Planning Organizations (MPOs) like HATS should address congestion management. According to the FAST Act, MPO's that serve a transportation management area (TMA), or an area with a population in excess of 200,000 must maintain a CMP that provides for:

> *"safe and effective integrated management and operation of the multimodal transportation system, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities…through the use of travel demand reduction and operational management strategies."*

Congestion mitigation involves travel demand reduction such as decreasing the single occupancy vehicle (SOV), increasing transit ridership, and improving system management and operation. The CMP should result in a multimodal system with identified performance measures and strategies that can be utilized in the development of the HATS MPO long range transportation plan (RTP) and be incorporated into the Transportation Improvement Program (TIP).

1.2 Integrating the CMP into the Planning Process

Federal regulations require that CMPs be implemented as an ongoing part of the metropolitan planning process. Data is collected and analyzed against performance measures; corridors and intersections are prioritized, causes of congestion are reviewed, strategies are recommended to mitigate congestion and recommendations are made for implementation (See Figure 1). The CMP process is integrated into the RTP project priority rankings. Projects that exist in priority congested corridors and intersections are given high benefit and receive a higher point value. This system of ranking criteria allows projects to be prioritized based on quantitative factors, with the expectation that higher priority projects will generate the most benefit to the regional transportation network.

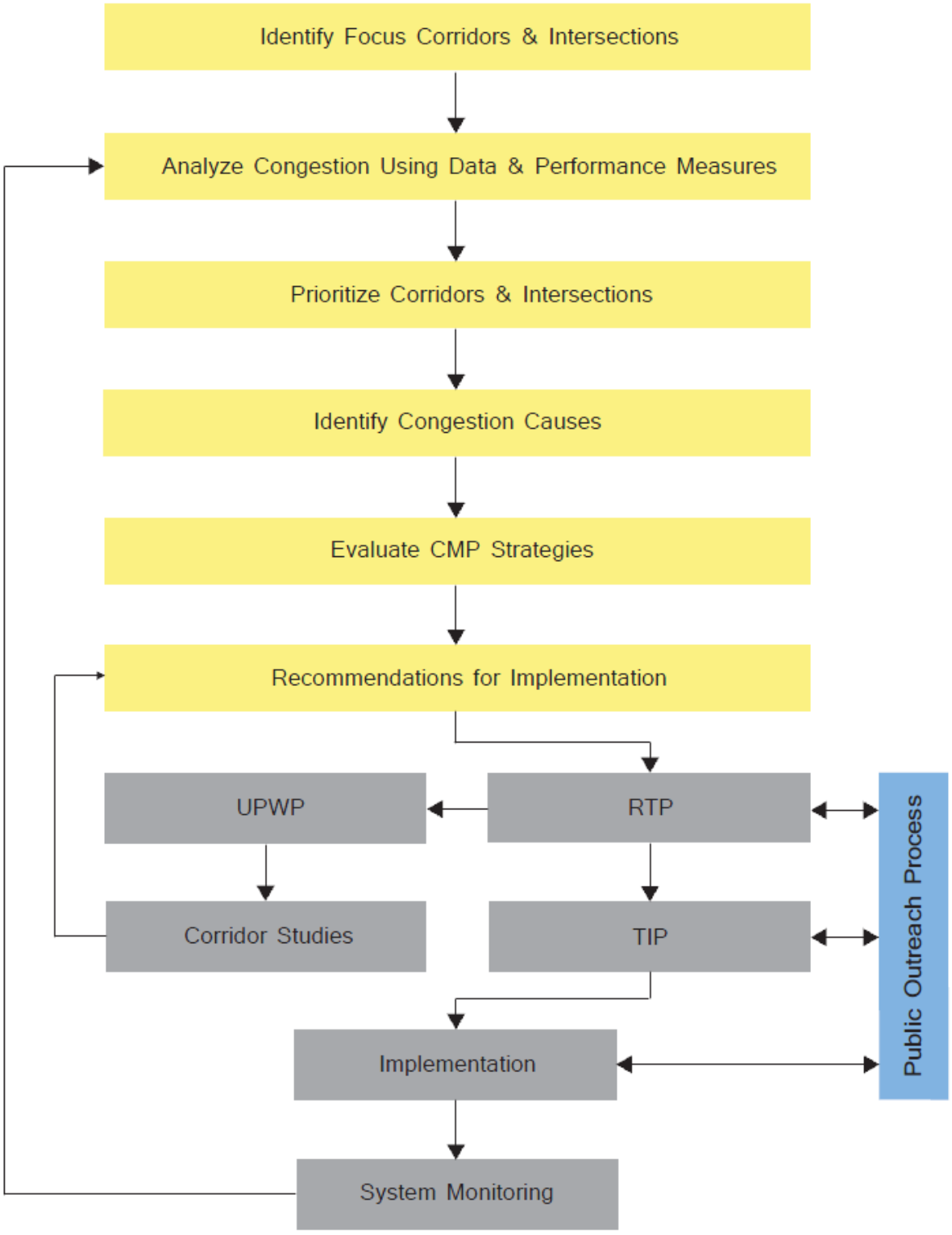
The CMP congested corridor and intersection information should be used by the HATS staff and other agencies as part of the Traffic Impact Statement (TIS) and HOP process with PennDOT to identify congested locations and make recommendations to mitigate. In addition, the CMP should be used as part of the TCRPC's Local Planning Assistance Program to make comments regarding transportation impacts as part of the land development review process.

The CMP furthers the growth management goals identified in the RTP and RGMP by recommending congestion management strategies that align with current and future land uses. For example, where multiple priority corridors exist in moderate to high density mixed use areas without much space available for roadway widening, it may be recommended that bus transit improvement studies be conducted. For corridors with many access points and smaller lots with mixed uses, perhaps access management and increased bicycle and pedestrian infrastructure investments should be proposed as future transportation alternatives to supplement the existing roadway network.

1.3 What is Congestion?

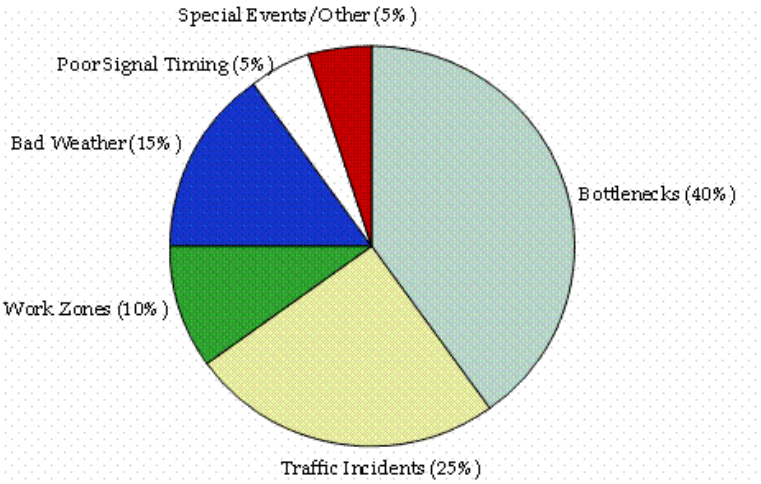
The U.S. Department of Transportation (DOT) defines congestion as **"the level at which transportation system performance is no longer acceptable due to traffic interference."** The level of acceptable system performance may vary by the type of transportation facility, location, or time of day. There are two primary types of congestion: recurring and nonrecurring. Recurring congestion tends to be concentrated into shorter time periods, such as rush hour, and is caused from excessive traffic volumes resulting in reduced speed and flow rate on the roadway system. Non-recurring congestion is caused from irregularly occurring incidents which affects driver behavior. The HATS congestion management process addresses both types of congestion together. The causes for recurring congestion include: daily peak period commuter traffic, insufficient capacity/excess volume, bottlenecks such as roadway geometry deficiencies, traffic signal timing/coordination issues, heavy truck volumes, seasonal activities and long-term construction. The causes of non-recurring congestion include: crashes, disabled vehicles, special events, weather and short-term construction.

Figure 1: Integrating the CMP into the Planning Process



National estimates of congestion by source provide a guide for emphasizing various congestion mitigation measures (see Figure 2).

Figure 2: Sources of Congestion National Summary



Source: FHWA

The variability of congestion, or travel time reliability, is an important traffic condition measure. The interaction between multiple sources of congestion may vary from day to day and may get frustrating for commuters. Furthermore, some events can cause other events to occur. For example, high congestion levels can lead to an increase in traffic incidents due to closer vehicle spacing, or bad weather can lead to crashes. Other transportation agencies have attempted to address the challenge of monitoring non-recurring congestion through crash and real-time traffic data.

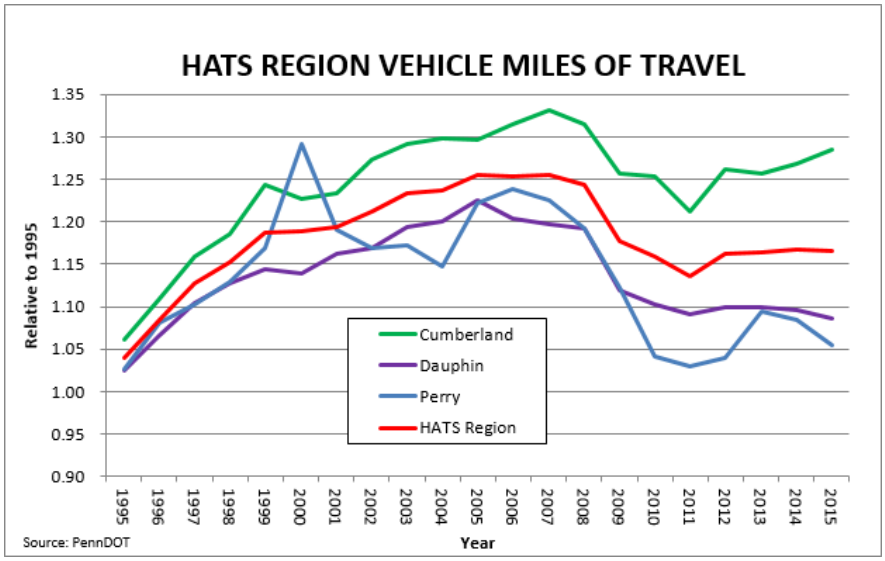
1.4 CMP Study Area

The Harrisburg Area Transportation Study (HATS) serves as the intergovernmental transportation planning agency for the 103 municipalities in Cumberland, Dauphin and Perry Counties (known as the Tri-County region). The area is home to 568,033 people according to the latest 2016 population estimates and employs approximately 284,000 people (by place of residence) according to the PA Department of Labor and Industry March 2017 estimates. The region lies within the Capital region of Pennsylvania, on the fringe of a major urban corridor along the US northeast coast, in the Appalachian Mountains and their foothills, and in the Susquehanna River Valley (See Map 1). Major Pennsylvania roadways that pass through the region include interstates I-76, I-83, and I-81. The beltway that surrounds the Harrisburg area, known as the "Capital Beltway", is comprised of I-81, I-83 and Route 581. Major U.S. Routes include Route 322, 422, 22, 11 and 15. Some locations in the region are experiencing significant growth, while others have remained unchanged. Given this variation, it is important that the CMP strategies reflect the challenges and opportunities that are unique to the area.

1.5 Regional Trends

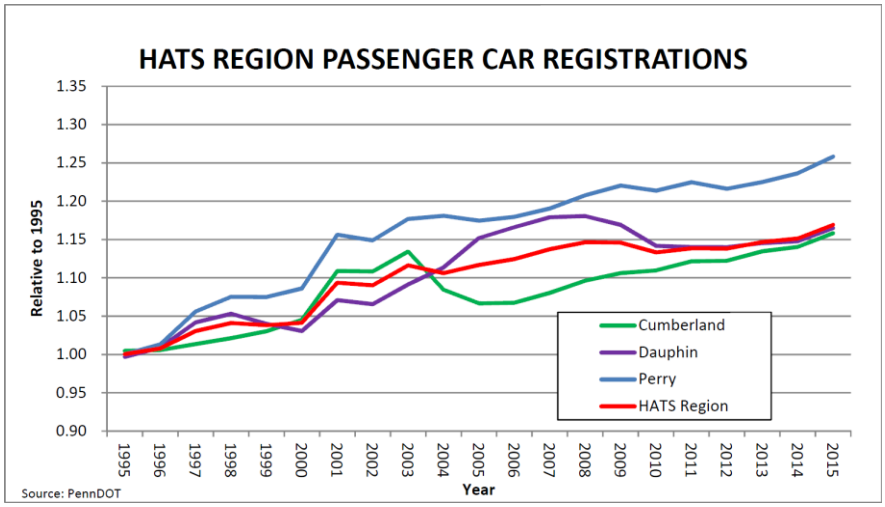
Vehicle miles of travel (VMT) is the Federal Highway Administration's (FHWA) primary measure of travel activity on the nation's roadways and is useful for analyzing travel trends over a period of time. In the case of the HATS region, it is measured as the daily vehicle miles of travel for all vehicles. More travel tends to increase the amount of congestion on the roadways without congestion mitigation measures. From 1995 to 2015 (20 years), VMT increased in the HATS region by 12% (see Figure 3), but there were variations during this time period. From 1995 to 2007 (12 years) VMT steadily increased in the HATS region by about 26%. However, over the following 5 years (2007 to 2012) VMT dropped by almost 8%. This coincided with rising gasoline prices and a weakened economy. This trend was similar statewide and nationally. From 2012 to 2015 travel started to increase again, but only by a small amount (0.3%). Cumberland County experienced greater gains during this same time period at 1.7%.

Figure 3.

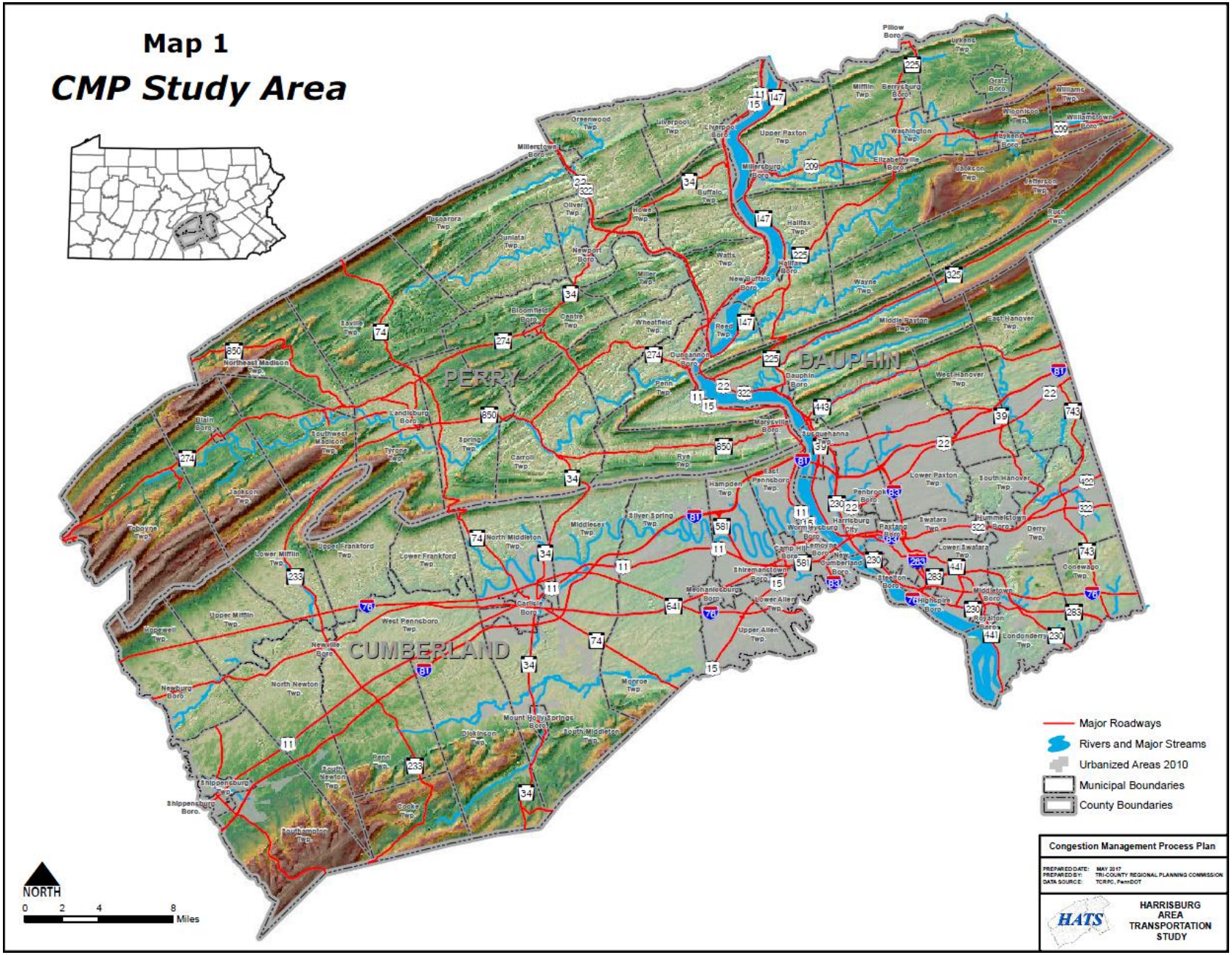


Passenger car registrations have generally increased year over year in the region from 1995 to 2015, overall about 17% (See Figure 4), despite a slight increase or stagnant VMT over the same time period. This indicates that some people are driving less for any number or reasons, including taking transit, carpooling, telecommuting or moving closer to work.

Figure 4.



Population in the region over the same time period has increased by about 15%. This increase is slightly more than VMT (12%), but less than car registrations (17%). Population is expected to increase by 77,994 (14.2%) from 2010 to 2040 and employment by 65,213 (20.8%) over the same time period according to TCRPC projections. There is also a growing warehousing and trucking influence in the region that will need to be managed as goods movement in the area and statewide increases. Absent countermeasures, and programs and policies to mitigate congestion, these trends will continue to result in increased levels of congestion.


Map 1
CMP Study Area
PERRY
DAUPHIN
CUMBERLAND
Major Roadways
Rivers and Major Streams
Urbanized Areas 2010
Municipal Boundaries
County Boundaries
NORTH
0 2 4 8
Miles
Congestion Management Process Plan
PREPARED DATE: MAY 2017
PREPARED BY: TRI-COUNTY REGIONAL PLANNING COMMISSION
DATA SOURCE: TCRPC, PennDOT
HATS
HARRISBURG AREA TRANSPORTATION STUDY

2. Regional Objectives for Congestion Management

Congestion management objectives should define what the HATS region wants to achieve regarding congestion in the context of livability, economic vitality, safety and multimodal access. The objectives should support ones in the HATS long range transportation plan in regards to performance and operation of the transportation system. The primary goal of this CMP is the same as the CMP goal in the Regional Transportation Plan (RTP) as "a safe, efficient, environmentally responsible, and seamless multi-modal transportation system integrated with sustainable land use patterns to serve the mobility and accessibility needs of our residents, businesses and through-travelers". In addition, the RTP contains guidance for identifying and prioritizing congestion problem areas. This includes:

1) Managing targeted areas through the congestion management process (CMP), safety and mobility plans, and application of technologies such as ITS and PA 511.
2) Facilitating multi-municipal efforts to coordinate traffic signals and traffic flow along all congested roads, specifically CMP focus and priority corridors.
3) Supporting access management efforts and promote better coordination of Highway Occupancy Permits between PennDOT and municipalities to reduce unnecessary access and potential conflict points.
4) Reducing single occupancy vehicles (SOVs) by offering safe alternative travel modes.
5) Discouraging parking policies that contradict SOV reduction strategies and programs.

3. Full Range of CMP Strategies

The goal of the CMP is to provide a mix of strategies to mitigate congestion that will increase the safety and mobility of persons and goods moving through the regional transportation system. These strategies include: transit improvements, ridesharing and carpooling programs, park-and-ride/carpool parking facilities, variable work hour programs and telecommuting, operational/ITS improvements, incident management, parking management, land use growth management, access management and autonomous/connected vehicles. Roadway capacity improvements should be a last resort and be targeted to critical corridors. A brief description of each of these strategies is as follows:

Transit

Transit plays an important role in reducing roadway congestion and serving those who have no other means of transportation. Transit is one of the most common travel demand management strategies available to mitigate congestion. An efficient transit system can attract Single Occupancy Vehicles (SOV) users to switch modes. Transit in the HATS region includes both commuter rail (Amtrak) and buses. Amtrak supports two stations; the Harrisburg station (HAR) located in the Harrisburg Transportation Center in downtown Harrisburg and the Middletown (MID) station located in Middleton Borough. The Harrisburg station had 508,865 on/offs in FY

2015 and is the western terminus of the Keystone service, which provides 13 daily runs to Philadelphia. This rail system supports commuters that would otherwise have to drive to downtown Harrisburg.

Capital Area Transit (CAT) is the main public transportation provider for the greater Harrisburg area and provides fixed route, commuter, and paratransit bus services. In 2016, CAT operated 39 fixed bus routes serving both Cumberland and Dauphin Counties and carried over 2,000,000 riders a year in the Capital region. Rabbittransit provides to a much lesser extent commuter services for some riders in the York and Cumberland County areas to downtown Harrisburg. Lebanon Transit provides commuter services for some riders in Lebanon County to Harrisburg.

CAT 2016 ridership data was used to analyze transit performance by bus route. Transit services should be operated efficiently, in terms of frequency (or headway) and availability of space to sit and stand. Performance can be measured in terms of congestion; usually a transit bus operating at maximum capacity is not desirable from a passenger standpoint. CAT's average bus capacity is 30 to 40 passengers. Transit level of service (LOS) is a performance measure, which identifies the congestion level based on the volume capacity ratio on a route. LOS is represented by the letters "A" through "F", with "A" being the least congested (most acceptable) and "F" the most congested (See Figure 5). Volume is the number of riders per route and capacity is the number of seats and acceptable standing positions available. Using CATs ridership data and trip information, this analysis shows that all CAT routes contain the highest acceptable LOS (A) in regards to capacity, except for 'Route W – Steelton" with LOS C (See Table 1). The routes closest to approaching a LOS B by volume/capacity ratio are 'Route C - Carlisle' and 'Route 23 - Millersville/Elizabethville' both at 0.45, followed by 'Route M – Mechanicsburg', 'Route 3 - Third Street', and 'Route 322 - Hershey/Hummelstown' all at 0.44. One limitation in this analysis is that capacity was calculated for the entire day, rather than reflecting passenger AM/PM peak periods. Data from CAT's new real-time passenger information system can be used in the future to better analyze peak congestion. Certainly, this analysis shows that there is underutilized capacity on CAT buses and more riders could be supported on routes.

Figure 5: Transit Level of Service

LOS	Volume/Capacity Ratio
A	0 – 0.50
B	0.51 to 0.75
C	0.76 to 1.00
D	1.01 to 1.25
E	1.26 to 1.50
F	> 1.50

Table 1: 2016 CAT Transit Level Of Service

Route	Description	Ridership		Average Daily Ridership		Trips		Riders / Trip		Average Bus Capacity	Riders / Bus		Level of Service	
		Wkday	Sat.	WkDay	Sat.	WkDay	Sat.	WkDay	Sat.		WkDay	Sat.	WkDay	Sat.
Route 1	Market Street	146,083	12,644	562	243	56	31	10.0	7.84	33.84	0.30	0.23	A	A
Route 2	Capital Complex/ROC	21,538		83		44		1.9		33.84	0.06		A	
Route 3	Third Street	218,624	18,980	841	365	57	27	14.8	13.52	33.84	0.44	0.40	A	A
3-6 Night Loop	Rts 3 & 6 Night Loop	3,166	393	12	8	13	8	0.9	0.94	33.84	0.03	0.03	A	A
Route 6	Sixth Street	175,646	10,634	676	205	51	24	13.2	8.52	33.84	0.39	0.25	A	A
Route 7	Middletown/HIA/PSU	145,426	7,914	559	152	42	12	13.3	12.68	33.84	0.39	0.37	A	A
Route 8	Derry Street	134,925	16,397	519	315	40	24	13.0	13.14	33.84	0.38	0.39	A	A
Route 9	HACC/City Island	57,368		221		32		6.9		33.84	0.20		A	
Route 12	Colonial Park/Linglestown	221,860	26,925	853	518	61	41	14.0	12.63	33.84	0.41	0.37	A	A
Route 13	Paxton Street	90,405	5,780	348	111	30	10	11.6	11.12	33.84	0.34	0.33	A	A
Route 14	Union Deposit - Four Season	16,134		62		7		8.9		33.84	0.26		A	
Route 16	Union Deposit - Pennswoods	17,365		67		8		8.3		33.84	0.25		A	
Route 17	Seventeenth Street	64,625	7,326	249	141	32	12	7.8	11.74	33.84	0.23	0.35	A	A
Route 18	Union Deposit - Rutherford Rd	18,064		69		24		2.9		33.84	0.09		A	
Route 19	Steelton	82,919	3,527	319	68	30	8	10.6	8.48	33.84	0.31	0.25	A	A
Route 20	High Point Commons	47,328	8,244	182	159	22	25	8.3	6.34	33.84	0.24	0.19	A	A
Route 23	Millersville/Elizabethville	23,536		91		6		15.1		33.84	0.45		A	
Route 24	Springford Apartments	21,535		83		12		6.9		33.84	0.20		A	
Route 27	Seventeenth & Sycamore	5,801		22		6		3.7		33.84	0.11		A	
Route 39	Blue Mountain Commons	42,609	2,187	164	42	20	39	8.2	1.08	33.84	0.24	0.03	A	A
Route 81	Shippensburg/Newville	20,954		81		7		11.5		33.84	0.34		A	
Route 82	Shippensburg/Newville NSA	14,049		54		4		13.5		33.84	0.40		A	
Route A	New Cumberland	28,766		111		22		5.0		33.84	0.15		A	
Route B	Highland Park	82,712		318		30		10.6		33.84	0.31		A	
W - Steelton	Allen Road/ Steelton	13,675		53		2		26.3		33.84	0.78		C	
Route C	Carlisle	86,906		334		22		15.2		33.84	0.45		A	
Route CX	Carlisle Express	5,172		20		6		3.3		33.84	0.10		A	
AB - Abacus	Abacus	3,719		14		2		7.2		33.84	0.21		A	
Route D	Capital City Mall	23,757	5,038	91	97	14	12	6.5	8.07	33.84	0.19	0.24	A	A
Route F	Enola	17,487		67		13		5.2		33.84	0.15		A	
Route K	Erford Road	16,092		62		11		5.6		33.84	0.17		A	
W-Enola	Allen Road/ Enola	1,062		4		4		1.0		33.84	0.03		A	
Route M	Mechanicsburg	81,029	4,678	312	90	21	12	14.8	7.50	33.84	0.44	0.22	A	A
Route MX	Mechanicsburg Express	2,024		8		2		3.9		33.84	0.12		A	
Route MA	Mechanicsburg/ Logistics	1,065		4		2		2.0		33.84	0.06		A	
Groc-E	Grocery Shopper	1,970		8		4		1.9		33.84	0.06		A	
Route 120X	Winding Hill	11,078		43		4		10.7		33.84	0.31		A	
Route 322	Hershey/Hummelstown	81,114	6,620	312	127	21	18	14.9	7.07	33.84	0.44	0.21	A	A
Carlisle Circ	Circulator Special	19,255	2,706	74	52	15	13	4.9	4.00	33.84	0.15	0.12	A	A
Total		**2,066,843**	**139,993**											
	Top 5 routes with least acceptable LOS													

Continual reinvestment in transit operations, facilities and intermodal projects is important for regional mobility. A bus stop optimization study is currently programmed on the 2017-20 TIP (MPMS #106549), and is planned for certain corridors in the City of Harrisburg. The intent is that CAT bus drivers will more efficiently be able pick-up/drop-off riders along routes. PennDOT is currently studying intermodal and transit-oriented design improvements in and around the Harrisburg Transportation Center in downtown Harrisburg, where CAT, Amtrak and private bus systems, such as Greyhound, provide transit services. CAT has also invested in a real-time passenger information system that provides capabilities for better monitoring bus dwell times, and tracking passenger loading with the intent of improving route placement and scheduling.

Ridesharing/Carpooling Programs

Commuter Services of Pennsylvania, a program of the non-profit Susquehanna Regional Transportation Partnership, provides many commuting programs including rideshares, that help commuters and employers in the Capital region find a better way to get to and from work. Commuter Services also provides emergency ride home services for people who register with their program for share-a-ride (carpool/vanpool) to work, use transit, walk or bike. According to Commuter Services, in 2016 the total number of miles taken off the roadway for people who previously drove, but switched to a commuter form of transit because of help from Commuter Services, was 44,977,788 round-trip miles/year. In addition to miles taken off the roadway, there is reduced emissions including Ozone reductions (tons/day) for VOC, NOx and CO, at 0.03, 0.05 and 0.46, respectively and reductions in PM2.5 (tons/day) at 0.49. Commuter Services is supported by HATS and other MPOs through Congestion Mitigation Air Quality (CMAQ) funding.

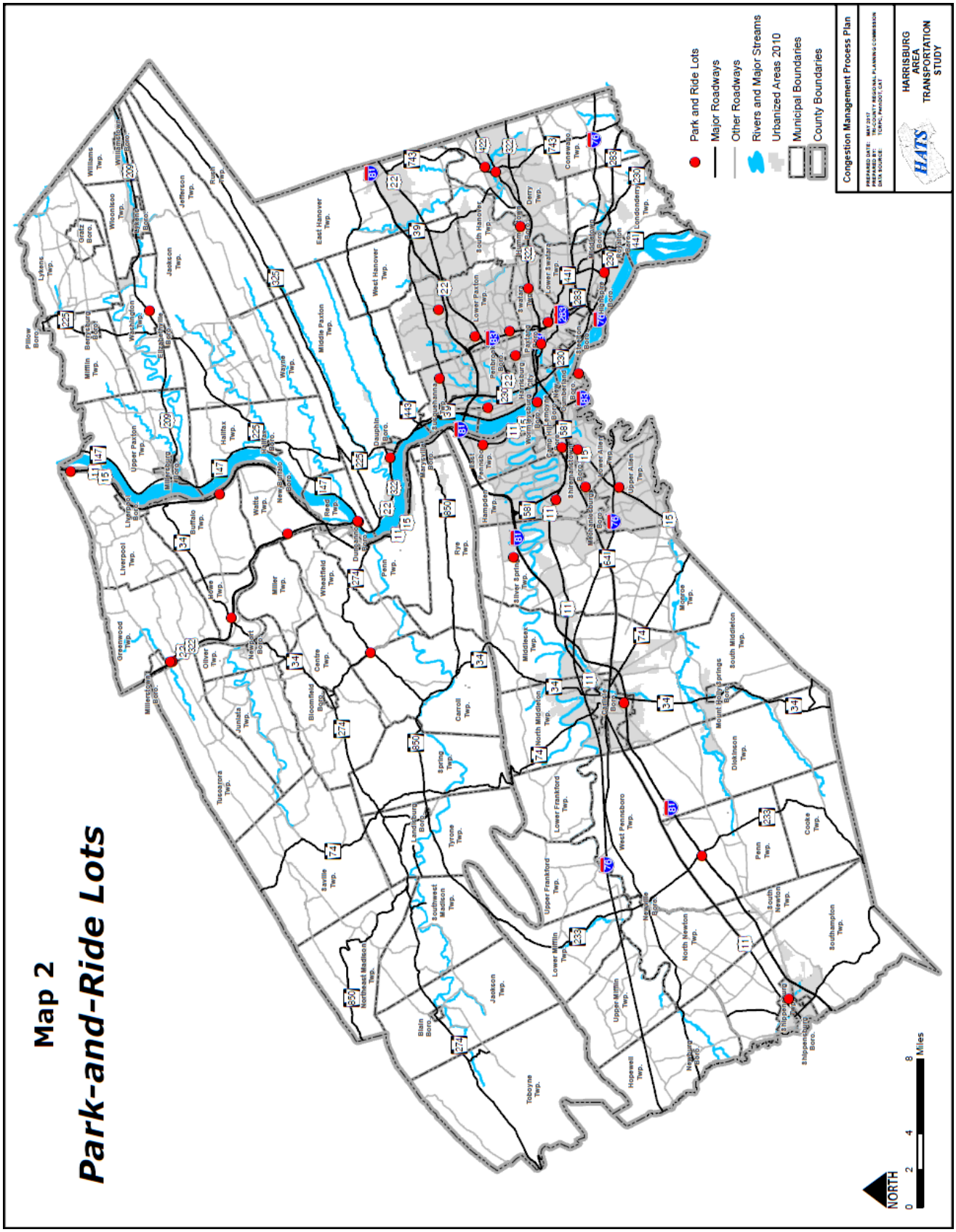
Park-and-Ride/Carpool Parking Facilities

A Park-and-Ride lot is a special parking area provided for bus, vanpool and carpool users to park their vehicles, and continue in a multi-occupant vehicle. Map 2 shows where Park-and-Ride lots are located throughout the HATS region. Some of these lots were constructed specifically for Park-and-Ride lots and are maintained by PennDOT, while others are established through agreements between CAT, retailers and shopping centers. Other lots are informal locations near transit stops. Not all Park-and-Ride lots are for transit use; locations outside of the CAT service area serve car and vanpool users. An on-going process of obtaining travel pattern information from employers and other sources should be implemented to identify potential future Park-and-Ride locations. Commuter Services of PA is strategically positioned to help monitor such patterns, since they are the first point of contact from the public regarding rideshare programs. They provide a link to a Park-and-Ride map on their website that shows parking facilities by type: carpool only, transit only, or both.

Variable Work Hour Programs and Telecommuting

There are several types of variable work hour programs: flexible working hours (or flex-time), compressed work weeks, and staggered work hours. These measures do not necessarily reduce SOV travel, but they can more evenly disperse commuter traffic during different time periods.

For flex-time, peak hours are spread out over a longer period. In a compressed work week plan, employees reduce their number of work trips by working four 10-hour days (or similar arrangement). This eliminates one round-trip a week and often places the home-to-work or work-to-home trip outside the peak hour. Staggered work hours allow employees to arrive and depart their place of employment at different times, again reducing peak period travel.


Map 2
Park-and-Ride Lots
Park and Ride Lots
Major Roadways
Other Roadways
Rivers and Major Streams
Urbanized Areas 2010
Municipal Boundaries
County Boundaries
Congestion Management Process Plan
HARRISBURG AREA TRANSPORTATION STUDY
HATS
NORTH
0 2 4 8 Miles

Telecommuting continues to be a trend nationwide and within the region. This allows employees to work at home perhaps two, or three days a week, instead of working with employees at an office, thereby eliminating some work trips. If implemented regionally, this strategy could significantly reduce the number of work trips.

Operational/ITS improvements

Operational strategies are based on getting the most out of the existing transportation infrastructure facilities. This includes for example converting streets from two-way to one-way operation, or converting signalized or all-way stop intersections to roundabouts. Many of these operations-based strategies are supported by enhanced technologies. Intelligent Transportation Systems (ITS) planning, is a CMP-related effort that addresses congestion and safety issues by using technologies to make the existing transportation infrastructure work more efficiently. These technologies are often very effective and an inexpensive way to reduce congestion, compared to roadway widening. HATS works with PennDOT to identify possible ITS improvements within the region as part of implementing an ITS Regional Operations Plan (ROP). The most recent plan update was published by PennDOT in 2007, titled "Pennsylvania ROP Regional Operations Plan 2007 – South Central Region". PennDOT is in the process of updating a statewide Transportation Systems Management and Operations (TSMO) program plan, which is scheduled for release in June 2017.

Roadway ITS improvements, such as adaptive traffic signals, integrated and coordinated traffic signal systems along corridors or within street grids, or ramp meters on limited access highway ramps, allow traffic to flow more efficiently by using the technology to better manage actual traffic conditions and patterns. The Route 22 (Jonestown Road/Walnut Street) corridor from 13th Street to Mountain Road in Dauphin County and the Carlisle Pike corridor from Conodoguinet Parkway/Hogestown Road to US 11/15 were recently installed in 2016 with adaptive technologies to mitigate congestion.

ITS technology can provide information to transportation system operators, such as PennDOT, the PA Turnpike Commission, incident management responders, and the general public that allow them to make more informed decisions about which facilities to use and increase the efficiency of the transportation system. These technologies include variable message signs (VMS), highway advisory radio (HAR) and closed circuit television cameras (CCTV). These services provide pre-trip information to travelers on current traffic conditions, weather, detours, constructions and delays. It is especially relevant during special events, for example like the ones held at the PA Farm Show Complex.

Other related technologies include using GPS transportation-related applications, such as Google Maps, Waze and INRIX, that tell drivers in advance the locations, types and durations of expected traffic delays.

Incident Management

Integrated with Operations/ITS improvements, incident management strategies help expedite clearing vehicles from the roadways as a result of vehicle breakdowns, crashes or like incidents. This helps to improve the safety and efficiency of the transportation system. Studies have shown that on heavily travelled roadways, such as interstates, if a roadway is blocked for only 5 minutes, a 20-minute backlog is created. Secondary incidents often occur due to backlogs, exasperating the safety and efficiency of the highway network.

District 8-0 maintains the Capital Beltway Service Patrol, which is designed to assist travelers who break down on the roadway as a result of a crash or other incident. This service helps reduce traffic delays and congestion, and mitigates safety issues. It is provided on I-81, I-83, I-283, Route 581 and most recently on sections of Route 322 north of I-81. It is operated by three vehicles that cover 45 miles of roadway during the peak hours.

Freight Management

The HATS region is currently in the process of updating a regional freight plan which includes an assessment of existing truck delays and forecasted truck volumes. Statewide forecasts estimate that freight tonnage moving through parts of Pennsylvania will double by 2040, so it's certainly safe to say that the Harrisburg region will be impacted by this growth. This could strain the capacity of multiple modes of travel unless technology and new capacity management methods are introduced. PA On Track, Pennsylvania's long range transportation plan, identified the top 100 truck bottleneck points in the state using statewide truck performance measures for the Interstate and National Highway system (NHS). The analysis incorporates average speeds along with an indicator of volume to generate a congestion index for over 6,000 Pennsylvania roadway segments. Within the HATS region, major truck bottlenecks are located on I-83 in its entirety, as well as segments on I-81 in Lower Paxton Township, and PA 581 between I-83 and US 15. Other freight related studies are being conducting by HATS to mitigate congestion and safety issues. They include ones at Newville in Cumberland County, Halifax in Dauphin County and New Bloomfield in Perry County.

Pedestrian/Bicycle Improvements

A successful pedestrian/bicycle program can help reduce congestion on the roadways by encouraging non-motorized travel. This can be achieved through a comprehensive transportation plan in which pedestrian and bicycle concerns are fully integrated into the transportation planning process.

HATS has assembled a Bicycle and Pedestrian Advisory Committee to provide technical expertise, public outreach support, review of regional bicycle and pedestrian planning, and assistance in the selection of bicycle and pedestrian projects funded by HATS. Some example

projects may include the construction of sidewalks, installation of ADA compliant curb ramps or pedestrian crosswalks, or construction of bicycle paths as part of new developments. Other 'bike-and-ride' programs include enabling bicyclists to carry a bicycle onto public transit, or have bicycle carriers provided on buses. Perhaps the construction of bicycle lanes on roadways or the installation of shared-lane markings (or sharrows) can be further encouraged to provide more non-motorized travel. The Capital Area Greenbelt, which is approximately a 20-mile loop path through and around the City that passes along the Susquehanna River, is a significant resource to build upon to encourage more non-motorized travel. The CAT bridge project on the TIP (MPMS #102785) is an example of pedestrian/bicycle improvement that should provide better non-motorized access between the East shore and West Shore. Funding for bicycle programs can come from a variety of funding sources, including NHS, STP, CMAQ and TAP.

Parking Management

The supply and cost of parking can be regulated to discourage SOV trips. The provision of parking is perceived by both firms and employees as part of an employee's pay and benefit. 'Cash-out' programs may be used to change employees' commuting behavior. In this program, employers pay employees the cash value of their parking space and employees may use the money to retain their parking space, or change their commuting patterns and keep the money. Perhaps employers can provide subsidies to employees to take mass transit (bus or rail), and incentivize workers to stop driving and parking. Priority parking can also be provided for carpoolers, such as reserving the first floor or a parking garage, or entire lots exclusively for carpool/vanpool use.

Linking Land Use and Transportation Planning

Linking land use and transportation planning has been a priority at the Tri-County Regional Planning Commission (TCRPC) for years and is reflected through its work on the Regional Growth Management Plan (RGMP). One of the goals of the RGMP is to encourage land developments that provide a mix of land uses in one area (housing, employment and shopping). This would provide opportunities to live closer to work and shorten or reduce the number of vehicle trips. This is an important consideration, and should be regarded as a strategy at the municipal, county and regional level.

Access Management Techniques

Best practices in implementing roadway access management controls can make a cost effective contribution to mitigating congestion. According to FHWA, this may include limiting the number of access points allowed onto already-congested streets, separating basic conflict areas; limiting deceleration requirements; and removing turning vehicles from through lanes. PennDOT, as part of its Highway Occupancy Permit (HOP) process, is substantively involved in access management techniques. PennDOT permits are required for the establishment or modification

of any access point onto a state route. Some access management techniques include reducing/combining driveways so that adjacent driveways are spaced at least 300' apart, or restricting left-turn movements from driveways and minor streets onto major streets.

Autonomous/Connected Vehicles

The time of autonomous/connected vehicles seems to be fast approaching, and PennDOT is leading efforts to be at the forefront of this technology by partnering with leaders within the industry such as Uber. This promises tremendous benefits for society, including improved transportation safety, increased mobility options and flexibility; more efficient operation of the limited infrastructure capacity and reductions in green-house gas and emissions pollution. PennDOT has established an Autonomous Vehicles Task Force that is charged with developing recommendations that will ensure public safety and encourage innovation. It is currently seeking a connected and automated vehicle support team for on-site and/or off-site assistance on assignments in any aspect of automated and connected vehicles.

Roadway Capacity Improvements

In growth corridors it may be reasonable to provide additional capacity to move people and freight more efficiently. Currently the HATS TIP (2017-20) includes programmed projects (MPMS #97828, #92931, #70024) for widening I-83 from I-81 to the Susquehanna River, and making targeted interchange improvements.

4. Develop Multi-Modal Congestion Measures

Congestion is a broad and subjective term that makes it challenging to measure. Transportation agencies are continually developing approaches that attempt to measure congestion using different types of performance measures that are available to systematically assess roadways. Collecting and monitoring many of these measures may be cumbersome and impractical, so HATS has established data collection parameters based on MPO staff time, overall cost, and their ability to partner with others. The main data used for this congestion analysis to determine performance measures originated from TomTom GPS travel speed data. The data was averaged over a 2-year period (2015-2016) for the weekday peak periods (7:00 – 9:00 am) and (4:00 – 6:00 pm) and was then used to calculate a Peak Vehicle Delay, Peak Volume Delay and Travel Time Index by roadway segment. These as well as other performance measures that were used as part of assessing congestion include:

1. **Peak Vehicle Delay** - is the difference between free flow (from the nighttime) and actual speeds for a given roadway segment averaged over the weekday peak periods (7:00 – 9:00 am) and (4:00 – 6:00 pm), measured in seconds. The greater the difference the greater the delay. This measure was derived from the TomTom travel speed data and used to analyze and rank peak vehicle delay for the 100 focus corridors and to identify and rank congested intersections. In the case of the focus corridors, the vehicle delay by corridor was divided by the corridor length, since length varied by corridor. This resulted in a performance measure of Vehicle Delay Per Mile of Roadway.

2. **Peak Volume Delay** - is the peak vehicle delay as a function of traffic volumes for the peak hour (8% of AADT for the AM, and 10% of AADT for the PM), measured in hours. Everything being equal the greater the traffic volume the greater the volume delay. This measure was derived from the TomTom travel speed data and used to analyze and rank peak volume delay for the 100 focus corridors and identify and rank congested intersections. In the case of the focus corridors, the volume delay by corridor was divided by the corridor length, since length varied by corridor. This resulted in a performance measure of Volume Delay Per Mile of Roadway.

3. **Travel Time Index (TTI)** - is the peak hour travel time divided by the free flow travel time (from the nighttime) for a given roadway segment. The larger the TTI value, the greater congestion. A TTI of 1.5 or greater was used as a criteria for identifying congested intersection segments. This measure was derived from TomTom travel speed data. For example, a TTI of 1.5 indicates a 20 minute free flow trip takes 30 minutes in the peak period.

4. **Annual Average Daily Traffic (AADT)** - is a measure of traffic volume by roadway segment that describes the average number of daily vehicles that traverse a roadway for all days in the week over a one year period. AADT is determined through continual and seasonal traffic

counts. For purposes of this CMP, PennDOT AADT was conflated to TomTom roadway segments using GIS tools, and then used to calculate peak volume delay. See Appendix (A-18) for mapping of roadway AADT.

5. **Level of Service (LOS) -** is a qualitative measure that describes operational conditions within a traffic stream, based on measures such as speed, travel time, freedom to maneuver, traffic interruptions, comfort and convenience. LOS ranges from A (free flow traffic conditions) to F (gridlock). The HATS travel demand model was used to identify roadways with a LOS of D or worse using 2040 demographic projections, and including any improvements programmed on the TIP 2017-20. See Appendix (A-12) for mapping of roadways with LOS D or worse and tables (A-1, A-2, A-7, A-8) indicating which 100 focus corridors and congested intersections contained roadways with LOS D or worse.

6. **Peak Volume Truck Delay -** is the peak vehicle truck delay as a function of truck volumes for the peak hour (5% of AADTT for the AM, and 6% of AADTT for the PM), measured in hours. Goods movement is a significant component of traffic in the HATS region. According to the 2006 South Central Pennsylvania Regional Goods Movement Study, 88% of the modal share of freight tonnage for the region is carried by trucks while the remaining 12% is carried by rail. Peak hour truck volume and delay were analyzed for each of the congested intersections using TomTom travel speed and PennDOT data (See Table 4).

7. **Crash Rate and Crash Severity -** are useful as one way to measure non-recurring congestion due to crash incidents. For purposes of the CMP, focus corridors and congested intersections were flagged if they overlaid with PennDOT high crash location corridors (2010-14) and TCRPC high priority crash corridors and intersections (2010-14). See Appendix (A-15, A-16) for mapping of crash corridors and tables (A-1, A-2, A-7, A-8) indicating which 100 focus corridors and congested intersections contained high crash incidents.

8. **National Performance Research Dataset (NPMRDS) and INRIX -** are travel speed databases that provides capabilities to measure congestion by roadway segment. For purposes of this CMP, roadways with a TTI >= 1.4 (averaged for all Friday's in 2016) were identified as congested. See Appendix (A-10, A-11) for mapping of congested NPMRDS and INRIX roadways and tables (A-1, A-2, A-7, A-8) indicating which 100 focus corridors and congested intersections are part of the NPMRDS and INRIX congested segments.

9. **Transit Level of Service -** is the measure of the number of bus riders relative to bus capacity. LOS is represented by the letters "A" through "F", with "A" being the least congested (most acceptable) and "F" the most congested (See Figure 4).

10. **CAT Transit Routes -** serve as an alternative to single occupancy vehicles. See Appendix (A-17) for mapping of the CAT fixed routes and tables (A-1, A-2, A-7, A-8) indicating which 100 focus corridors and congested intersections are part of the CAT fixed route system.

5. CMP Network

The components of the CMP network were developed using a two-part approach. The first resulted in 100 focus corridors based on a set of roadway criteria. This included:

- National Highway System (NHS) corridors located in the region
- Other arterial highways not included in the NHS
- All roads with Annual Average Daily Traffic (AADT) volumes greater than 20,000
- All roads with a Level of Service (LOS) rating greater than D in urban areas and greater than C in rural areas
- Other input and assessments from HATS staff and the CMP Planning Advisory Group

The second part involved analyzing TomTom travel speed data to identify the top congested intersections. These locations could exist anywhere on the transportation system network and resulted in 90 congested intersections. See Maps 3 & 4 for the locations of the focus corridors and congested intersections, respectively.

5.1 Selecting Priority Corridors

There were 100 focus corridors identified in the region for further congestion review. Both peak vehicle delay and peak volume delay measures were calculated from the TomTom travel speed data and were totaled separately for each corridor, divided by the corridor length, and then the corridors were ranked from most to least in delay for both measures. The delay was divided by corridor length since longer corridors would tend to over-represent delay. For example, the corridor I-81 from the Franklin County border to PA 465 (Allen Rd) is 36.5 miles, while the corridor Sporting Hill Rd from Carlisle Pike to PA 641 is only 1.59 miles. The top 10 corridors with the most delay for each measure (peak vehicle delay and volume delay) along with corridors where both delay measures were in the top 20, were identified as 'priority corridors' and are described in more detail in the next section (5.2 Priority Corridors) of this report.

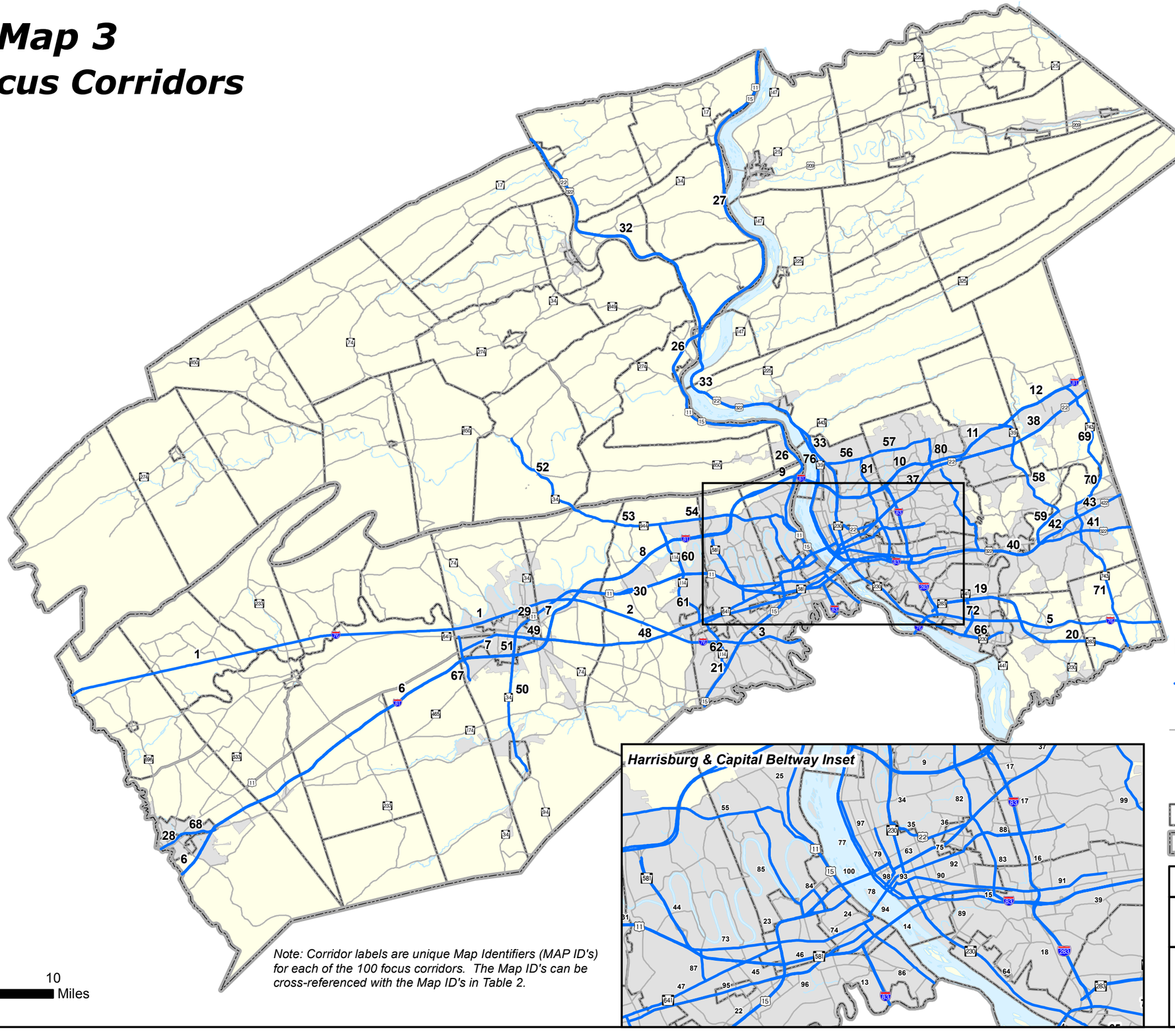
Table 2 includes a list of the 100 focus corridors ranked by both peak vehicle delay and peak volume delay, sorted by roadway name, with the priority corridors highlighted in gray. Peak vehicle delay and volume delay are measured in seconds and hours, respectively. While congestion measurement values are of primary importance, they are not the sole factors that may influence investment decisions. Additional factors to consider that may be associated with the corridors include:

- Is the corridor on a roadway that is part of the National Highway System (NHS)?
- Does the corridor exist on an INRIX congested corridor (TTI 1.4 or more)?
- Does the corridor exist on an NPMRDS congested corridor (TTI 1.4 or more)?

- Does the corridor have a Level of Service of D or worse in a future year of the HATS Travel Demand Model?
- Is the corridor part of a transportation improvement project on the TIP (2017-20)?
- Is the corridor part of a transportation long range plan project on the RTP (2040)?
- Does the corridor occur on a PennDOT high crash location corridor (2010-2014)?
- Does the corridor occur on a TCRPC High Priority crash corridor/intersection (2010-14)?
- Is the corridor part of a CAT transit fixed route?
- Is the corridor nearby a Park-and-Ride lot?
- How many stage 3 intersections, as part of the congestion intersection analysis, occur on the corridor?
- How many stage 2 segments, as part of the congestion intersection analysis, occur on the corridor?

See Appendix (A-1, A-2) for tables listing the 100 focus corridors ranked by peak vehicle delay and peak volume delay along with additional factor information. Also, see Appendix (A-3, A-4) for mapping of the 100 focus corridors by peak delay and volume delay.

Map 3
100 Focus Corridors



NORTH

0 2.5 5 10 Miles

Note: Corridor labels are unique Map Identifiers (MAP ID's) for each of the 100 focus corridors. The Map ID's can be cross-referenced with the Map ID's in Table 2.

Legend

- Focus Corridors
- PennDOT Roadways
- Rivers and Major Streams
- Urbanized Areas 2010
- Municipal Boundaries
- County Boundaries

Congestion Management Process Plan

PREPARED DATE: MAY 2017
PREPARED BY: TRI-COUNTY REGIONAL PLANNING COMMISSION
DATA SOURCE: Tomtom, PennDOT, MB, TCRPC

HATS

HARRISBURG AREA TRANSPORTATION STUDY

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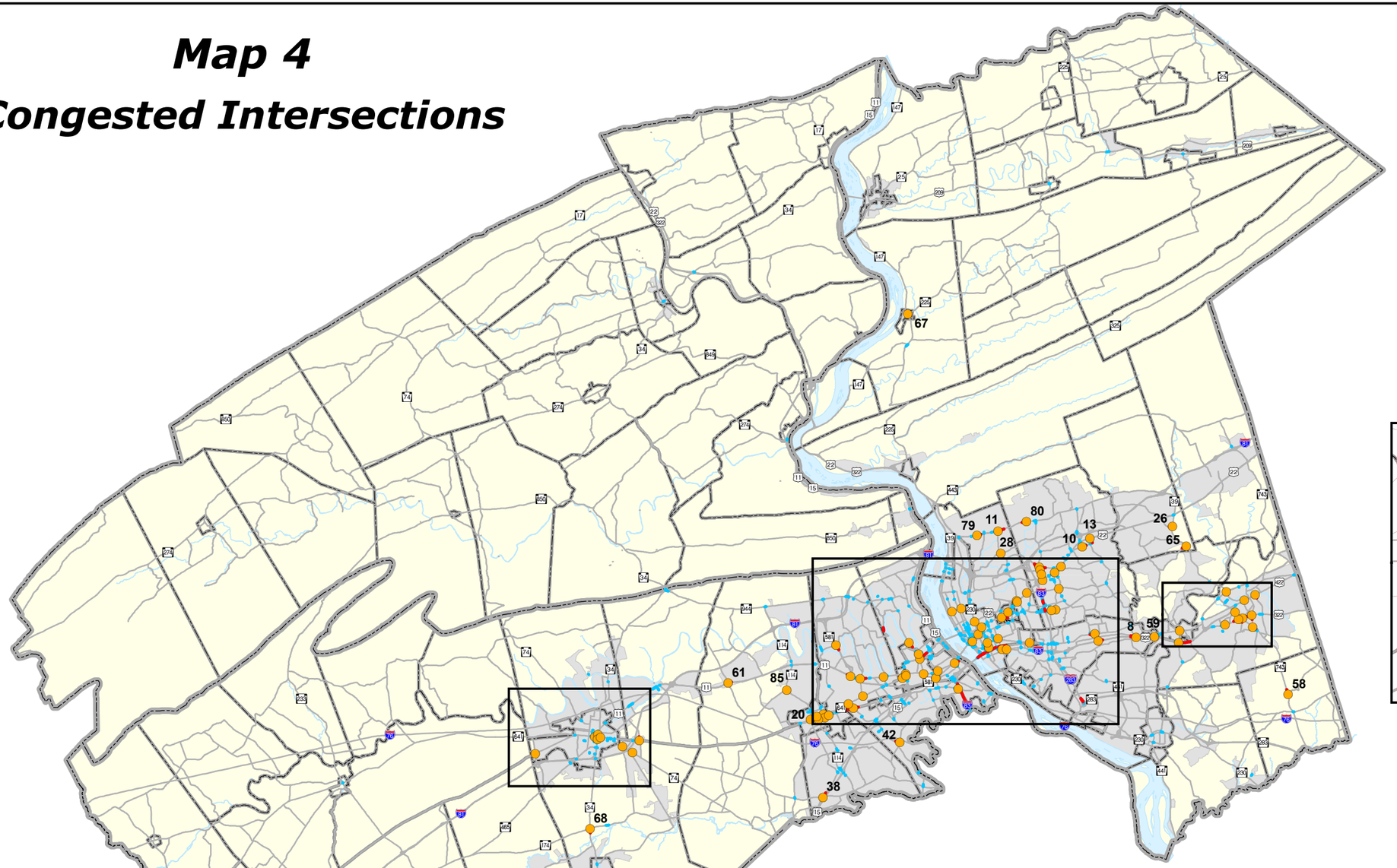
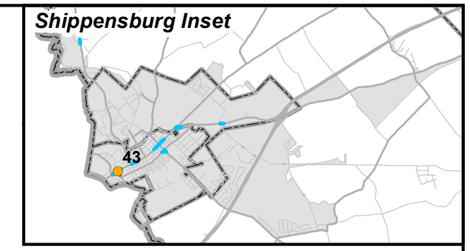
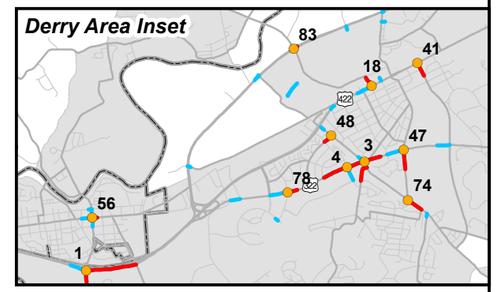
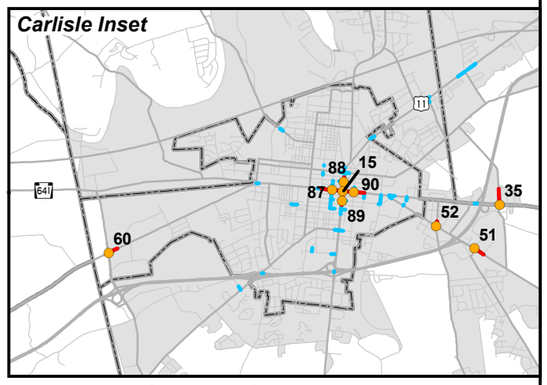
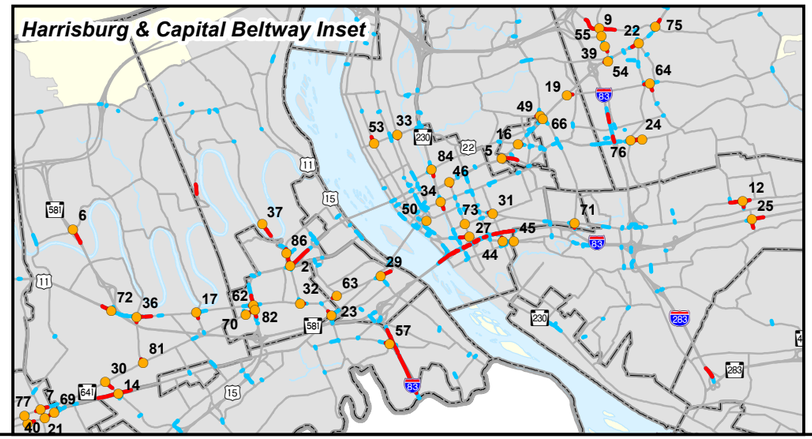
Map 4
Congested Intersections











Legend

- Stage 3 Congested Intersections
- Stage 2 Segments (Top Delay)
- Stage 1 Segments (TTI >=1.5)
- PennDOT Roadways
- Rivers and Major Streams
- Urbanized Areas 2010
- Municipal Boundaries
- County Boundaries

Congestion Management Process Plan

PREPARED DATE: MAY 2017
PREPARED BY: TRI-COUNTY REGIONAL PLANNING COMMISSION
DATA SOURCE: Tomtom, PennDOT, MB, TCRPC

HATS
HARRISBURG AREA TRANSPORTATION STUDY

NORTH
0 2.5 5 10 Miles

Note 1: Congested intersections are Stage 3 intersections, which were created based on Stage 2 road segments that make up the intersection as well as corresponding directional road segments that are part of the intersection.

Note 2: Intersection labels are unique Map Identifiers (MAP ID's) for each of the congested intersections. The Map ID's can be cross-referenced with the Map ID's in Table 4.

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Table 2

100 Focus Corridors - Peak Delay Per Mile of Roadway

Table 2 - Corridor Peak Delay Per Mile of Roadway By Roadway Name

Map ID	Roadway	From Limit	To Limit	Miles	Municipality	County	Peak Vehicle Delay					Peak Volume Delay			
							AM Peak Vehicle Delay (sec)	PM Peak Vehicle Delay (sec)	Time of Day with Highest Delay	Rank		Rank	AM Peak Volume Delay (Hr)	PM Peak Volume Delay (Hr)	Time of Day with Highest Delay
98	2nd St	I-83	Forster St	1.11	Harrisburg	Dauphin	33	24	AM	11		39	6:36:51	5:14:52	AM
97	2nd St	Forster St	Division St	1.98	Harrisburg	Dauphin	8	18	PM	54		76	1:06:23	3:03:10	PM
79	7th St	Division St	State St Bridge	1.91	Harrisburg	Dauphin	30	53	PM	16		37	5:14:06	11:47:42	PM
72	Airport Connector	PA 283	HIA	3.83	Lower Swatara Twp	Dauphin	1	1	AM	100		100	0:11:58	0:08:10	AM
86	Bridge/3rd St	Market St	York County Border	4.70	Lemoyne Borough, New Cumberland Borough	Cumberland	58	114	PM	25		19	17:44:23	43:09:57	PM
73	Carlisle Pike	PA 581	US11/15	4.76	Hampden Twp, Camp Hill Borough	Cumberland	49	175	PM	4		9	14:24:42	65:40:50	PM
85	Center St/East Penn Dr	PA 944	21st St	5.42	East Pennsboro Twp	Cumberland	27	73	PM	42		41	7:58:03	26:26:13	PM
90	Chestnut / Mulberry / Derry	Front St	29th St	4.77	Harrisburg	Dauphin	60	130	PM	17		29	10:58:38	34:11:19	PM
91	Derry St	29th St	63rd St	6.74	Paxtang Borough, Swatara Twp	Dauphin	35	158	PM	26		18	12:10:42	63:11:17	PM
100	Forster/HT Bridge	7th St	US11/15	5.85	various	Dauphin	38	145	PM	23		34	7:18:28	37:23:37	PM
78	Front St	Forster St	I-83	0.77	Harrisburg	Dauphin	4	42	PM	1		3	1:14:11	18:07:57	PM
77	Front St	I-81	Forster St	5.12	Harrisburg	Dauphin	11	27	PM	71		74	2:53:06	9:10:11	PM
76	Front St	US22/322	I-81	5.98	Susquehanna Twp, Middle Paxton Twp	Dauphin	13	18	PM	82		96	1:24:03	2:27:12	PM
96	Gettysburg Rd/Hummel Ave.	US 15	3rd St	5.03	Lower Allen Twp, Leymone Borough	Cumberland	49	55	PM	49		59	10:04:47	14:30:07	PM
18	I-283	I-83	I-76	5.67	Swatara Twp, Lower Swatara Twp	Dauphin	13	37	PM	66		43	8:28:06	27:20:35	PM
1	I-76	Franklin County Border	US11	47.23	various	Cumberland	115	86	AM	85		83	59:27:05	55:41:21	AM
2	I-76	US11	US15	19.27	various	Cumberland	40	40	AM	87		81	20:42:34	25:29:40	PM
3	I-76	US15	I-83	6.40	Upper Allen Twp, Lower Allen Twp	Cumberland	6	12	PM	88		77	4:04:51	9:17:51	PM
4	I-76	I-83	I-283	2.78	Steelton Borough, Lower Swatara Twp	Dauphin	2	4	PM	93		80	1:39:37	3:50:51	PM
5	I-76	I-283	Lebanon County Border	23.20	various	Dauphin	17	30	PM	96		91	10:25:44	23:19:57	PM
10	I-81	I-83	Mountain Rd	4.81	Lower Paxton Twp	Dauphin	7	38	PM	61		24	5:53:02	40:50:43	PM
9	I-81	PA 581	I-83	21.22	various	Cumberland/Dauphin	14	72	PM	79		50	11:35:27	80:52:15	PM
8	I-81	US 11	PA 581	14.74	various	Cumberland	23	46	PM	81		57	17:31:29	43:32:26	PM
7	I-81	PA 465	US 11	16.12	various	Cumberland	44	36	AM	83		72	30:37:57	30:52:27	PM
11	I-81	Mountain Rd	PA 39	9.26	Lower Paxton Twp, West Hanover Twp	Dauphin	8	23	PM	84		68	4:56:38	18:55:45	PM
12	I-81	PA 39	Lebanon County Border	8.82	East Hanover Twp, West Hanover Twp	Dauphin	4	13	PM	92		86	2:24:09	10:35:32	PM
6	I-81	Franklin County Border	PA 465	36.49	various	Cumberland	32	52	PM	94		92	15:35:02	31:28:06	PM
14	I-83	PA 581	19th St	5.43	Lemoyne Borough, Harrisburg	Cumberland/Dauphin	20	164	PM	9		1	21:10:45	222:53:23	PM
13	I-83	York County Border	PA 581	3.31	various	Cumberland	83	21	AM	21		4	57:35:25	18:13:58	AM
15	I-83	19th St	I-283	3.83	Harrisburg, Swatara Twp	Dauphin	19	78	PM	30		2	22:24:32	112:49:32	PM
16	I-83	I-283	Union Deposit Rd	4.22	Swatara Twp, Lower Paxton Twp	Dauphin	6	54	PM	44		5	6:01:20	71:03:26	PM
17	I-83	Union Deposit	I-81	5.46	Lower Paxton Twp	Dauphin	12	51	PM	53		15	10:19:16	58:29:29	PM
74	Market St	US 11/15	Market St Bridge	5.30	Lemoyne Borough, Camp Hill Borough	Cumberland	53	173	PM	6		17	11:55:43	50:10:31	PM
92	Market St	25th St	PA 230 (Cameron St)	3.17	Harrisburg	Dauphin	22	93	PM	12		25	4:55:32	26:28:46	PM
93	Market St	PA 230 (Cameron St)	Front St	0.98	Harrisburg	Dauphin	26	29	PM	13		31	4:52:12	6:39:51	PM
94	Market St Bridge	Front St	End of Bridge	1.45	Harrisburg	Dauphin	14	21	PM	40		62	2:04:26	3:58:44	PM
80	Mountain Rd	PA 39	US22	3.01	Lower Paxton Twp	Dauphin	18	47	PM	37		48	3:35:53	12:12:38	PM
99	Nyes Rd	Old Jonestown	US 322	10.02	Lower Paxton Twp, Swatara Twp	Dauphin	32	86	PM	60		60	8:33:56	28:37:29	PM
62	PA 114	PA 641	US 15	5.60	Mechanicsburg Borough, Upper Allen Twp	Cumberland	45	88	PM	38		42	12:07:16	27:12:44	PM
61	PA 114	US 11	PA 641	5.83	Silver Spring Twp, Mechanicsburg Borough	Cumberland	19	72	PM	45		46	5:21:17	24:55:57	PM
60	PA 114	PA 944	US 11	5.74	Silver Spring Twp	Cumberland	28	31	PM	70		73	7:23:32	10:24:35	PM
68	PA 174	US 11	I-81	3.71	Shippensburg Twp	Cumberland	8	40	PM	50		49	1:48:31	14:18:30	PM
63	PA 230 (Cameron St)	US 22	Paxton St	3.93	Harrisburg	Dauphin	36	103	PM	18		20	10:13:42	35:39:17	PM
66	PA 230	Airport Connector	Vine St	3.52	Lower Swatara Twp, Middletown Borough	Dauphin	20	42	PM	46		58	3:48:09	10:22:12	PM
64	PA 230	Paxton St	Eisenhower Blvd	10.40	Harrisburg, Steelton Borough	Dauphin	72	119	PM	48		51	16:36:11	37:44:49	PM
65	PA 230	Eisenhower Blvd	Airport Connector	4.49	Highspire Borough, Lower Swatara Twp	Dauphin	18	27	PM	67		71	4:51:11	8:42:42	PM
19	PA 283	Eisenhower Blvd	Vine St	7.88	Lower Swatara Twp, Londonderry Twp	Dauphin	30	13	AM	78		67	17:06:23	9:10:04	AM
20	PA 283	Vine St	Lancaster County Border	13.90	Londonderry Twp, Conewago Twp	Dauphin	5	4	AM	99		98	2:07:51	2:03:36	AM
51	PA 34	I-81	US 11	1.76	Carlisle Borough	Cumberland	11	73	PM	2		21	1:58:07	15:47:14	PM
50	PA 34	PA 94	I-81	12.32	various	Cumberland	62	111	PM	56		54	18:36:34	39:17:30	PM
52	PA 34/Sunnyside Dr	PA850/Landisburg Rd	PA944	12.64	Middlesex Twp, Carrol Twp	Cumberland/Perry	37	54	PM	75		84	9:31:49	15:54:24	PM
57	PA 39	Progress Ave	Mountain Rd	7.24	Susquehanna Twp, Lower Paxton Twp	Dauphin	37	140	PM	32		23	12:40:07	62:49:00	PM
56	PA 39	Front St	Progress Ave	4.53	Susquehanna Twp	Dauphin	31	87	PM	33		26	10:24:42	36:40:34	PM

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Table 2

100 Focus Corridors - Peak Delay Per Mile of Roadway

Table 2 - Corridor Peak Delay Per Mile of Roadway By Roadway Name

Map ID	Roadway	From Limit	To Limit	Miles	Municipality	County	Peak Vehicle Delay					Peak Volume Delay			
							AM Peak Vehicle Delay (sec)	PM Peak Vehicle Delay (sec)	Time of Day with Highest Delay	Rank		Rank	AM Peak Volume Delay (Hr)	PM Peak Volume Delay (Hr)	Time of Day with Highest Delay
58	PA 39	I-81	Hershey Park	12.10	various	Dauphin	36	94	PM	63		61	9:43:02	34:02:40	PM
59	PA 39	Hershey Park	US 322	4.29	Derry Twp	Dauphin	4	21	PM	72		79	1:00:45	6:01:57	PM
67	PA 465	PA641	Walnut Bottom Rd	4.61	Carlisle Borough, S Middletown Twp	Cumberland	39	47	PM	51		65	7:16:46	10:31:56	PM
46	PA 581	US11/15	I-83	4.10	various	Cumberland	10	24	PM	68		32	9:34:36	27:27:30	PM
45	PA 581	US11	US11/15	4.86	various	Cumberland	4	11	PM	86		70	2:31:50	9:36:24	PM
44	PA 581	I-81	US 11	5.10	Hampden Twp	Cumberland	8	8	PM	91		90	4:19:40	5:17:37	PM
47	PA 641	US 15	PA 114	9.16	Mechanicsburg Borough, Hampden Twp	Cumberland	78	294	PM	7		13	22:36:16	104:15:31	PM
49	PA 641	I-81	US 11	3.02	Carlisle Borough, S Middletown Twp	Cumberland	17	96	PM	8		7	6:13:25	43:16:47	PM
48	PA 641	PA 114	I-81	16.03	various	Cumberland	45	89	PM	69		82	9:05:53	21:05:28	PM
70	PA 743	Hershey Park Dr	US 322	4.76	Derry Twp	Dauphin	24	55	PM	47		56	4:33:33	14:28:10	PM
71	PA 743	US 322	Lancaster County Border	12.84	Derry Twp, Conewago Twp	Dauphin	48	86	PM	64		66	13:28:11	28:25:02	PM
69	PA 743	I81	Hershey Park	12.52	E Hanover Twp, Derry Twp	Dauphin	9	22	PM	90		95	2:27:56	7:03:31	PM
55	PA 944	I-81	US11/15	7.21	Hampden Twp, E Pennsboro Twp	Cumberland	60	65	PM	55		63	10:58:56	19:30:11	PM
54	PA 944	PA 114	I-81	6.98	Silver Spring Twp, Hampden Twp	Cumberland	44	46	PM	65		85	6:33:40	8:38:17	PM
53	PA 944	Sunnyside Dr	PA 114	7.41	Middlesex Twp, Silver Spring Twp	Cumberland	35	27	AM	73		89	7:57:30	7:00:21	AM
89	Paxton St	I-83/Front St	Eisenhower Blvd	6.33	Harrisburg, Swatara Twp	Dauphin	75	159	PM	22		28	18:46:59	50:17:58	PM
84	Poplar/Erford/21st St	US11/15 (21st St)	US 11/15 (Erford Rd)	2.88	East Pennsboro Twp	Cumberland	40	94	PM	5		10	11:05:29	35:09:04	PM
83	Progress Ave	US 22	Paxton St	4.52	various	Dauphin	29	99	PM	27		40	5:44:40	26:39:36	PM
82	Progress Ave	I-81	US 22	2.19	Susquehanna Twp	Dauphin	12	46	PM	29		27	3:32:16	17:30:35	PM
81	Progress Ave	PA 39	I-81	4.51	Susquehanna Twp	Dauphin	24	71	PM	36		45	5:37:23	21:13:18	PM
95	Simpson Ferry Rd	PA 114	US 15	8.22	various	Cumberland	48	168	PM	31		30	12:56:35	57:46:45	PM
87	Sporting Hill Rd	Carlisle Pike	PA 641	1.59	Hampden Twp	Cumberland	8	47	PM	10		8	3:01:25	22:38:50	PM
75	State St/Walnut St	US22	Front St	5.10	Harrisburg, PennBrook Borough	Dauphin	56	94	PM	34		53	6:33:17	17:00:11	PM
88	Union Deposit Rd	25th St	Rutherford Rd	5.59	various	Dauphin	49	145	PM	19		22	13:36:27	48:43:13	PM
28	US 11	Franklin County Border	PA 174	2.58	Shippensburg Borough	Cumberland	11	96	PM	3		6	3:43:35	40:06:46	PM
31	US 11 (Carlisle Pk)	PA 114	PA 581	5.22	Silver Spring Twp, Hampden Twp	Cumberland	26	128	PM	24		12	10:13:00	59:52:42	PM
29	US 11	PA 465	I-81	14.44	Carlisle Borough, Middlesex Twp	Cumberland	122	310	PM	28		33	29:04:32	94:41:56	PM
30	US 11	I-81	PA 114	11.07	Middlesex Twp, Silver Spring Twp	Cumberland	62	96	PM	58		69	11:04:41	22:35:05	PM
23	US 11/15	PA 581	21st St	4.26	Camp Hill Borough	Cumberland	37	110	PM	20		16	11:12:24	44:13:20	PM
24	US 11/15	21st St	Front St	1.83	Lemoyne, Wormleysburg Borough	Cumberland	20	23	PM	43		55	3:47:30	5:33:27	PM
25	US 11/15	Front St	I-81	9.52	East Pennsboro Twp, Wormleysburg Borough	Cumberland	39	75	PM	62		64	9:39:24	24:15:25	PM
26	US 11/15	I-81	US22/322	26.31	various	Cumberland/Perry	105	85	AM	77		88	25:01:33	29:07:29	PM
27	US 11/15	US22/322	Juniata County Border	33.55	various	Perry	17	20	PM	98		99	3:24:01	4:51:54	PM
22	US 15	I-76	PA 581	6.98	various	Cumberland	16	33	PM	74		52	9:27:48	24:21:19	PM
21	US 15	York County Border	I-76	7.31	Upper Allen Twp	Cumberland	7	10	PM	95		94	3:20:10	5:33:34	PM
37	US 22	I-83	Mountain Rd	5.28	Lower Paxton Twp	Dauphin	13	151	PM	14		14	4:07:12	58:54:17	PM
36	US 22	Herr St	I-83	4.91	various	Dauphin	22	86	PM	35		38	6:37:57	30:07:43	PM
34	US 22	I-81	PA 230	2.63	Harrisburg	Dauphin	31	36	PM	41		35	11:22:15	16:33:58	PM
35	US 22	PA 230 (Cameron St)	Herr St	2.17	Harrisburg, Susquehanna Twp	Dauphin	12	19	PM	59		78	1:42:31	3:03:10	PM
38	US 22	Mountain Rd	Lebanon County Border	17.85	various	Dauphin	51	76	PM	76		93	7:34:28	14:36:21	PM
33	US 22/322	US 11/15	I-81	26.62	various	Dauphin	47	48	PM	89		87	25:18:14	31:27:15	PM
32	US 22/322	Juniata County Border	US 11/15	29.71	various	Perry	23	27	PM	97		97	5:12:26	7:24:44	PM
41	US 322	US 422	Lebanon County Border	9.36	Derry Twp	Dauphin	100	264	PM	15		11	33:14:01	111:53:02	PM
39	US 322	I-83	Chambers Hill Rd	7.77	Swatara Twp	Dauphin	23	69	PM	57		44	10:01:02	36:36:29	PM
40	US 322	Chambers Hill Rd	US 422	6.44	various	Dauphin	5	21	PM	80		75	2:20:56	11:31:39	PM
42	US 422	US 322	PA 743	4.81	Derry Twp	Dauphin	18	75	PM	39		36	5:03:41	29:48:52	PM
43	US 422	PA 743	Lebanon County Border	4.77	Derry Twp	Dauphin	21	46	PM	52		47	6:20:02	20:22:39	PM
Total				**824.92**									**1018:56:20**	**3070:34:53**	

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5.2 Priority Corridors

There were 17 corridors selected as 'priority corridors' using both peak vehicle delay and peak volume delay performance measures as described in the previous section (5.1 Selecting Priority Corridors). These corridors are listed by roadway name in ascending order with the associated map number, from/to extent, and the municipality and county they are contained in as applicable (See Table 3). The number of priority corridors is limited due to project funding availability and the importance to target locations with the worst traffic congestion. Some of these areas are programmed on the TIP 2017-20 and others are on the RTP 2040 project program listings. Corridors not ranked as priority corridors should still be considered for potential improvements as funding is available.

Priority Corridor Summaries

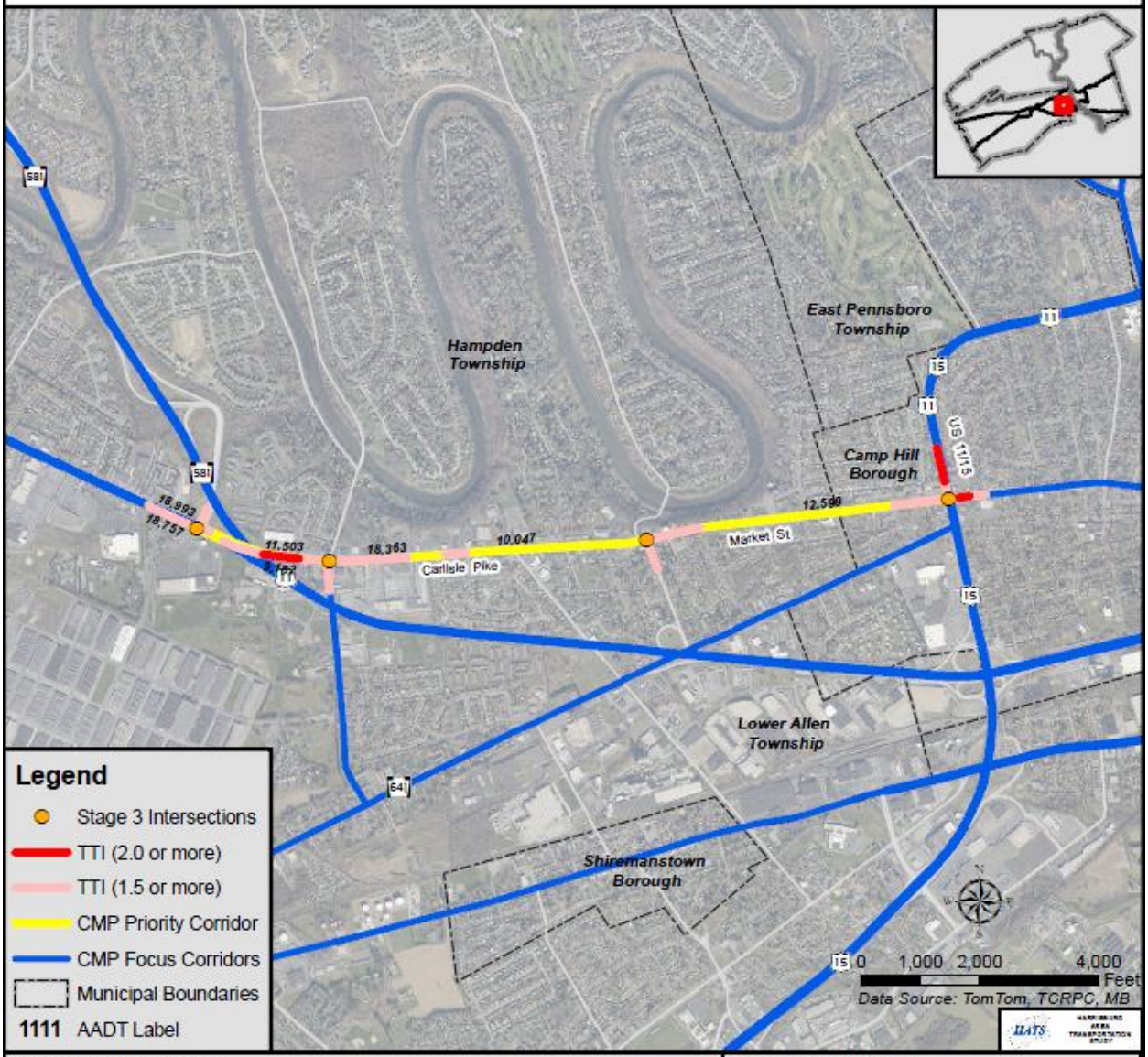
The following pages include a map and associated information for each of the priority corridors in the order as listed in Table 3. The map title indicates the corridor map number and name. Each summary page provides the following:

Main map – Shows the location of the priority corridor and the Annual Average Daily Traffic (AADT) for certain segments of the route. Roadway segments with a Travel Time Index (TTI) of 1.5 or greater are shown in light red and ones 2.0 or greater in dark red.
Summary of Conditions – provides a description of corridor characteristics based on important attributes that relate to congestion including vehicle delay and volume delay rankings.
Congestion Measures – Lists multiple congestion performance measures that exist on the corridor.
Planned Improvements on the RTP and TIP – Indicates existing projects that are on the RTP 2040 or programmed on the TIP 2017-20.
Recommendations – provides possible improvements and applicable CMP strategies.
Additional Factors – provides additional information about the corridor that may help influence investment decisions.

Table 3: HATS CMP Priority Corridors

Map #	Roadway	From	To	Municipality	County
73	Carlisle Pike	PA 581	US 11/15	Hampden Township	Cumberland
78	Front Street	Forster Street	I-83	City of Harrisburg	Dauphin
13	I-83	York County border	PA 581	various	Cumberland
14	I-83	PA 581	19th Street	Lemoyne, City of Harrisburg	Cumberland, Dauphin
15	I-83	19th Street	I-283	City of Harrisburg, Swatara Township	Dauphin
16	I-83	I-283	Union Deposit Road	Swatara Township, Lower Paxton Township	Dauphin
74	Market Street	US 11/15	Front Street	Camp Hill & Lemoyne	Cumberland
63	PA 230 (Cameron St)	US 22	Paxton Street	City of Harrisburg	Dauphin
51	PA 34 (S Hanover Street)	I-81	US 11 (High Street)	Carlisle	Cumberland
47	PA 641 (Trindle Road)	US 11/15	PA 114	Mechanicsburg, Camp Hill, Hampden Township	Cumberland
49	PA 641 (High Street)	US 11	I-81	Carlisle, South Middleton Township	Cumberland
84	Poplar Church Rd/21st St/Erford Rd	21st Street	Erford Road	East Pennsboro Township	Cumberland
87	Sporting Hill Road	Carlisle Pike	PA 641	Hampden Township	Cumberland
23	US 11/15	PA 581	21st Street	Camp Hill	Cumberland
28	US 11 (King Street)	Franklin County border	PA 174	Shippensburg	Cumberland
37	US 22 (Jonestown Rd)	I-83	Mountain Rd	Lower Paxton Township	Dauphin
41	US 322	US 422	Lebanon County border	Derry Township	Dauphin

Corridor 73: *Carlisle Pike from PA 581 to US 11/15*



Summary of Conditions

Carlisle Pike from PA 581 to US 11/15 in Hampden Township and Camp Hill Borough is ranked #4 in peak vehicle delay and #9 in peak volume delay per mile of roadway. The principal arterial roadway provides access to a mix of retail, commercial and residential uses, and the western and eastern parts serve major shopping areas. Generally the corridor contains one lane in each direction with a center turning lane. It was configured with adaptive signals as part of TIP project MPMS #89102 in 2016.

Congestion Measures

Peak Vehicle Delay Per Mile:	36.65
AM Peak Vehicle Delay (sec):	49
PM Peak Vehicle Delay (sec):	175
Corridor Miles:	4.76
AM Peak Vol. Delay (Hr):	14:24:42
PM Peak Vol. Delay (Hr):	65:40:50
LOS D or Worse:	Yes
Stage 3 Intersections:	4
Stage 2 Segments:	4

Planned Improvements on RTP & TIP

* RTP 2040 project Ranked #46 - Carlisle Pike Sporting Hill Rd intersection; CLASH #3
* RTP 2040 project Ranked #47- Carlisle Pike & St Johns Church intersection; CLASH #4
* RTP 2040 project Ranked #48- Carlisle Pike & Orr's Rd Bridge intersection; CLASH #5

Recommendations

* Explore access management improvements.
* Enhance bicycle and pedestrian infrastructure along corridor.

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	NA
INRIX:	NA

Corridor 78: *Front St from Forster St to I-83, City of Harrisburg*

Summary of Conditions

Front Street from Forster St to I-83 in the City of Harrisburg is ranked #1 in peak vehicle delay and #3 in peak volume delay per mile of roadway. Front Street is a 3 lane one-way southbound corridor that provides access from downtown Harrisburg and to I-83. There is significant commuter congestion during the weekday AM/PM peak hours, and especially during the PM hours when workers are exiting the City.

Congestion Measures

Peak Vehicle Delay Per Mile:	54.58
AM Peak Vehicle Delay (sec):	4
PM Peak Vehicle Delay (sec):	42
Corridor Miles:	0.77
AM Peak Vol. Delay (Hr):	1:14:11
PM Peak Vol. Delay (Hr):	18:07:57
LOS D or Worse:	Yes
Stage 3 Intersections:	0
Stage 2 Segments:	0

Planned Improvements on RTP & TIP

* MPMS #102785 - Build a bike/ped connection bridge/ramp between the CAT bridge and the Harrisburg Area Greenbelt along Front Street
* No RTP 2040 projects.

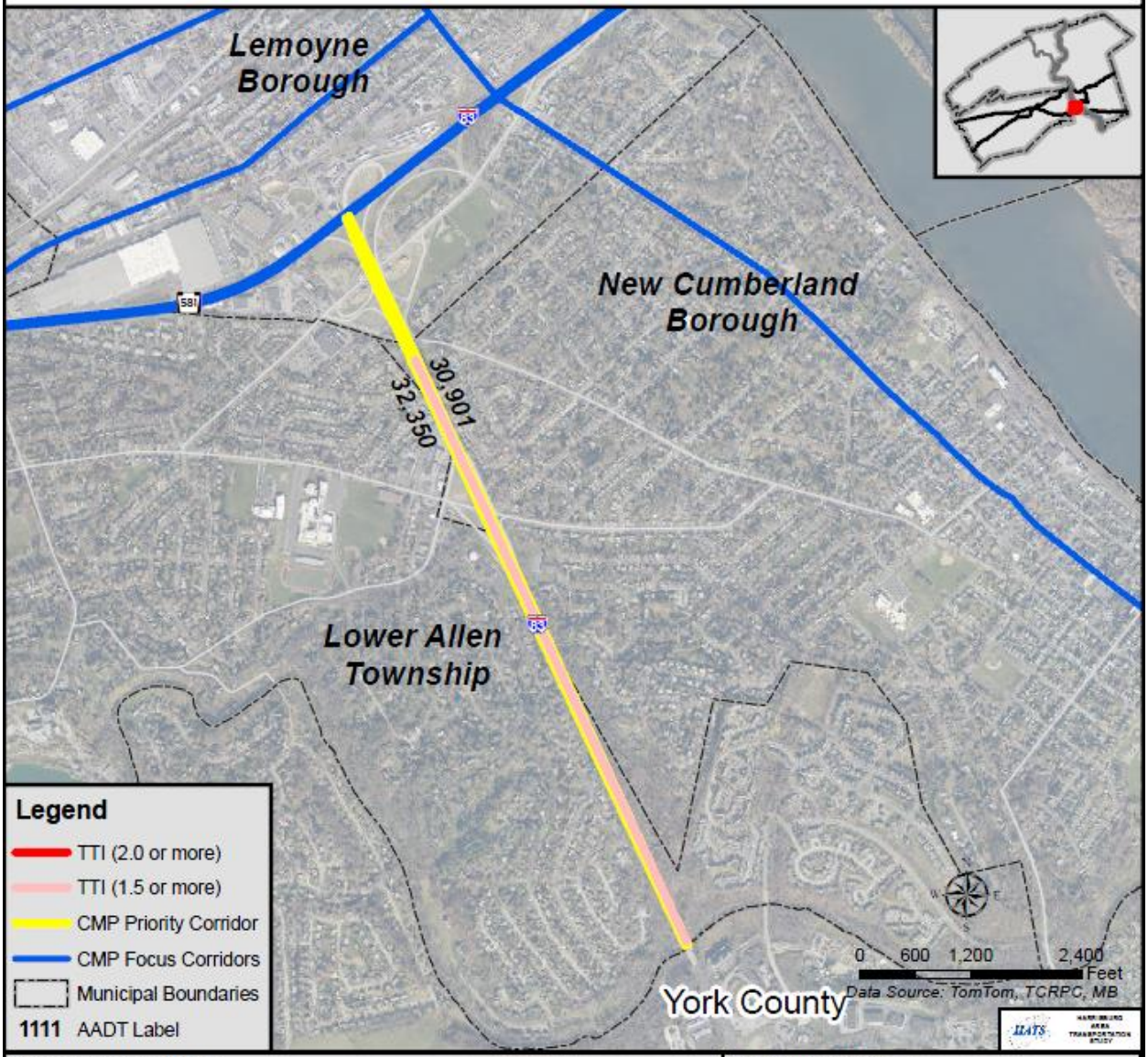
Recommendations

* Review parking strategies, increase transit ridership, increase auto occupancy.
* Review 3rd Street Connector Study.
* Enhance bicycle and pedestrian infrastructure along corridor.

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	NA
INRIX:	NA

Corridor 13: *I-83 from York County Border to PA 581, various municipalities*



Summary of Conditions

I-83 from the York County Border to PA 581 in Lower Allen Township, New Cumberland Borough and Lemoyne Borough is ranked #4 in peak volume delay and #21 in peak vehicle delay per mile of roadway. I-83 (also known as the Capital Beltway in the Harrisburg region) serves as the primary commuter route for people working in and around the downtown Harrisburg area, but also serves travelers passing through to other destinations. This part of I-83 is a divided roadway with 3 lanes in each direction north of the New Cumberland Exit (40B) and 2 lanes to the south . This section of roadway was improved as part of the I-83/PA 581 bottleneck interchange improvement project (MPMS #89177).

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects planned.

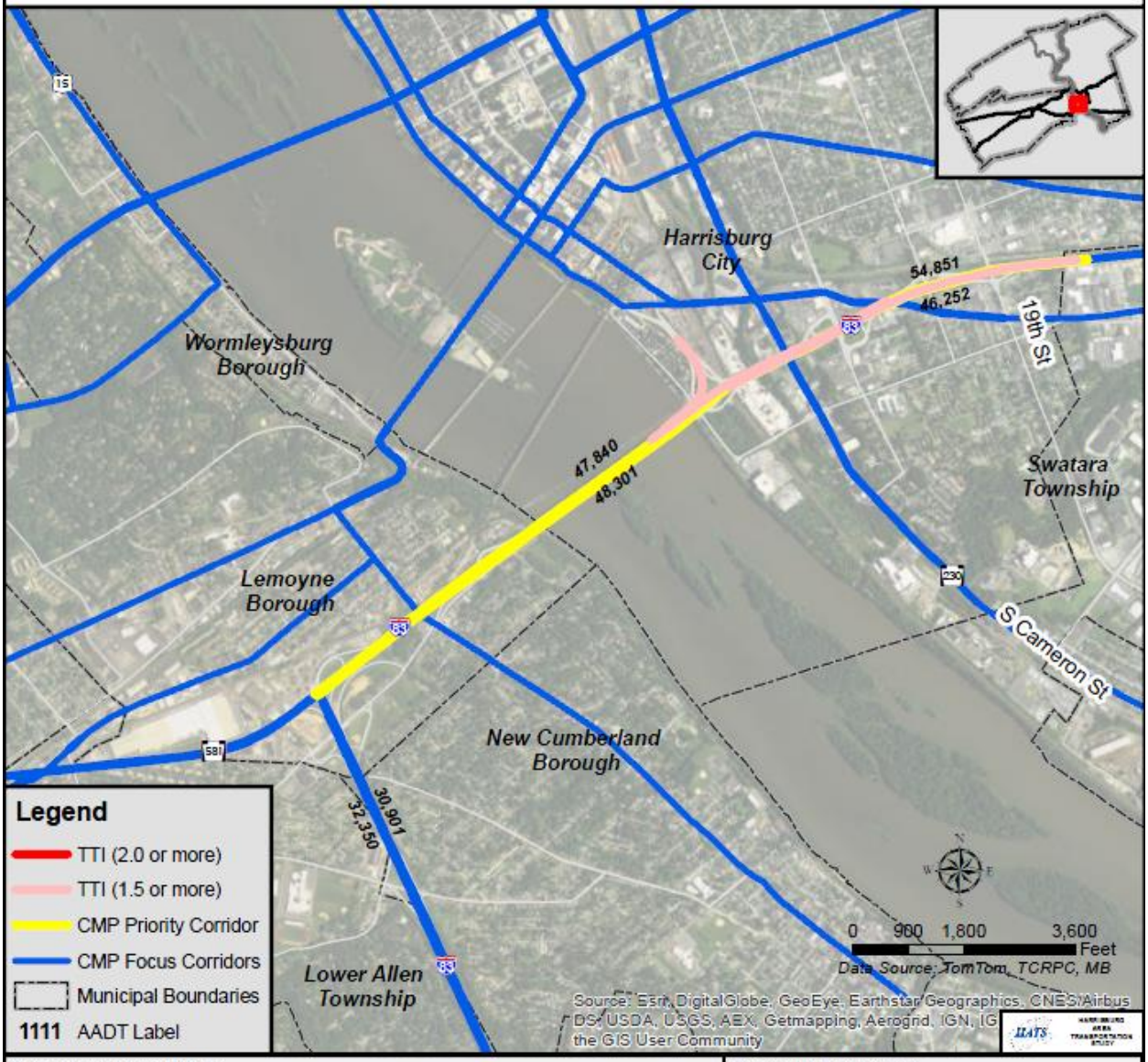
Recommendations

* Explore variable work hour and carpool programs.
* Explore expanding transit services.
* Explore expanding ITS strategies, such as variable message sign upgrades.

Congestion Measures	
Peak Vehicle Delay Per Mile:	62,583
AM Peak Vehicle Delay (sec):	83
PM Peak Vehicle Delay (sec):	21
Corridor Miles:	3.31
AM Peak Vol. Delay (Hr):	57:35:25
PM Peak Vol. Delay (Hr):	18:13:58
LOS D or Worse:	No
Stage 3 Intersections:	NA
Stage 2 Segments:	4

Additional Factors	
National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	No
Park N Ride:	No
NPMRDS:	Yes
INRIX:	Yes

Corridor 14: *I-83 from PA 581 to 19th St, Leymone Borough,City of Harrisburg*



Summary of Conditions

I-83 from PA 581 to 19th Street in Leymone Borough and the City of Harrisburg is ranked #9 in peak vehicle delay per mile of roadway and #1 in peak volume delay per mile of roadway. I-83 (also known as the Capital Beltway in the Harrisburg region) serves as the primary commuter route for people working in and around the downtown Harrisburg area, but also serves travelers passing through to other destinations. The portion of I-83 in Cumberland County was improved as part of the I-83/PA 581 bottleneck interchange improvement project (MPMS #89177). This includes a new northbound fourth lane over the John Harris bridge that was previously a shoulder. The new lane connects the New Cumberland on-ramp to the 2nd Street off-ramp.

Planned Improvements on RTP & TIP

* MPMS #97828 - I-83 East Shore Section 3 in Dauphin County (19th St to River)
* No RTP 2040 projects

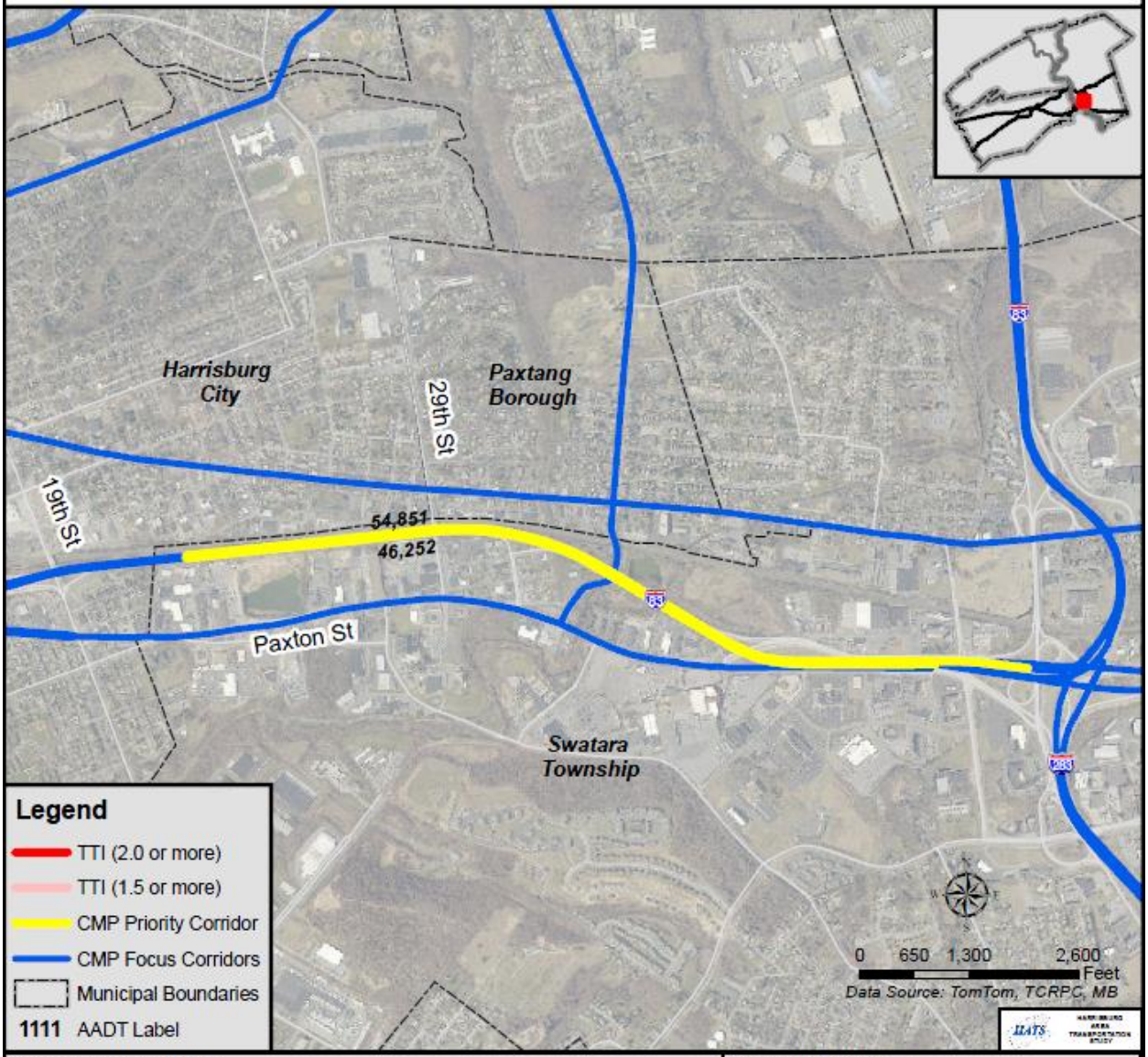
Recommendations

* Explore variable work hour and carpool programs.
* Explore expanding transit services.
* Explore expanding ITS strategies, such as variable message sign upgrades.

Congestion Measures	
Peak Vehicle Delay Per Mile:	30.28
AM Peak Vehicle Delay (sec):	20
PM Peak Vehicle Delay (sec):	164
Corridor Miles:	5.43
AM Peak Vol. Delay (Hr):	21:10:45
PM Peak Vol. Delay (Hr):	222:53:23
LOS D or Worse:	Yes
Stage 3 Intersections:	NA
Stage 2 Segments:	10

Additional Factors	
National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	Yes
INRIX:	Part

Corridor 15: *I-83 from 19th Street to I-283, City of Harrisburg ,Swatara Twp.*



Summary of Conditions

I-83 from I-283 and the Eisenhower interchange to 19th Street in the City of Harrisburg and Swatara Township is ranked #2 in peak volume delay and #30 in peak vehicle delay per mile of roadway. I-83 (also known as the Capital Beltway in the Harrisburg region) serves as the primary commuter route for people working in and around the downtown Harrisburg area, but also serves travelers passing through to other destinations. This part of I-83 is a divided roadway with 3 lanes in each direction. The roadway and associated interchanges are currently being studied as part of an expansion project including interchange reconstruction, lane additions, and bridge rehabilitations. Final roadway improvement designs are not known at this time.

Planned Improvements on RTP & TIP

* MPMS #92931 - Eisenhower Interchange: I-83, I-283 and US 322
* MPMS #97828 - I-83 East Shore Section 3: I-83 from Susquehanna River to SR 3013 (29th Street)

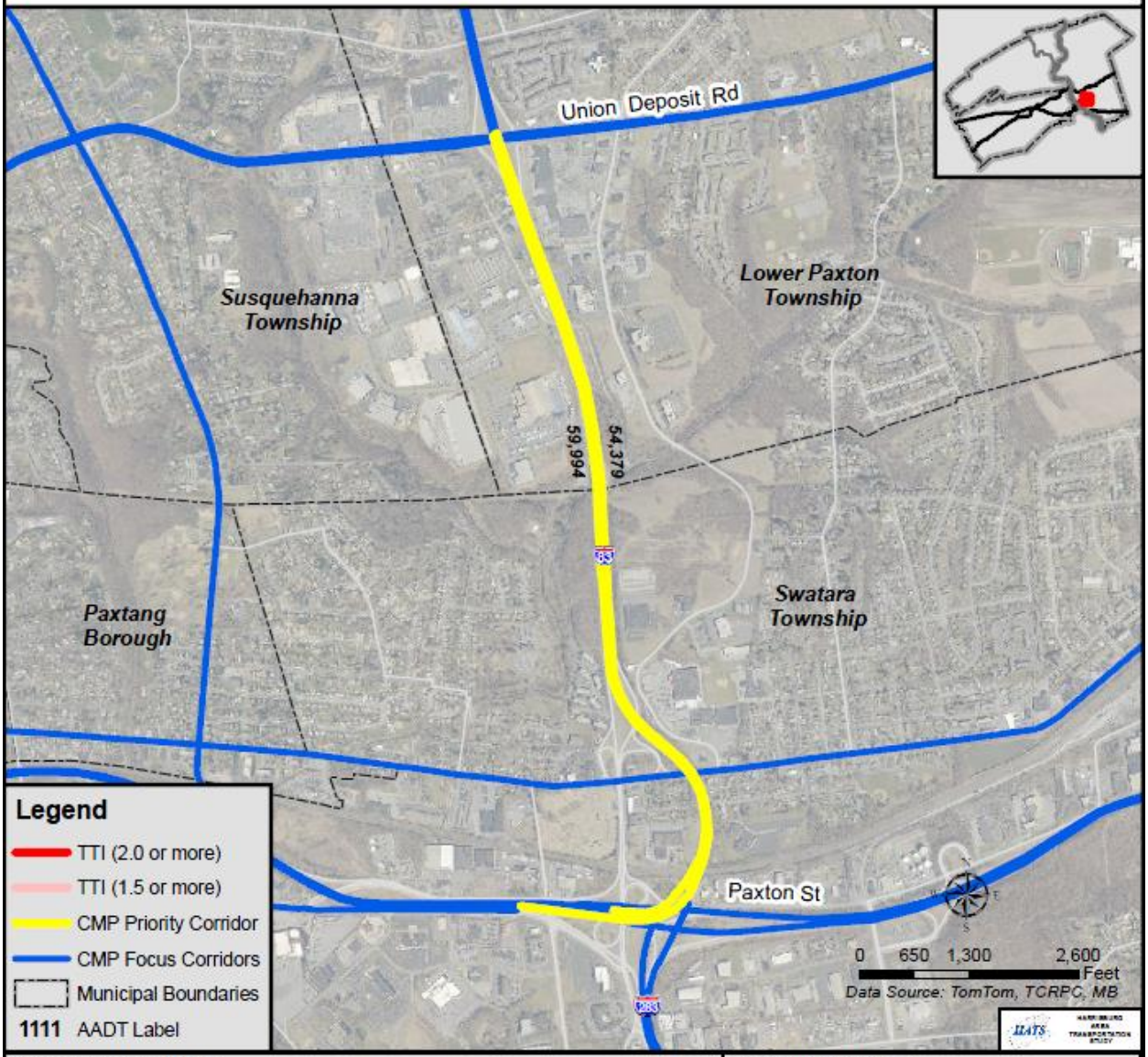
Recommendations

* Explore variable work hour and carpool programs.
* Explore expanding transit services.
* Explore expanding ITS strategies, such as variable message sign upgrades.

Congestion Measures	
Peak Vehicle Delay Per Mile:	105,932
AM Peak Vehicle Delay (sec):	19
PM Peak Vehicle Delay (sec):	78
Corridor Miles:	3.83
AM Peak Vol. Delay (Hr):	22:24:32
PM Peak Vol. Delay (Hr):	112:49:32
LOS D or Worse:	No
Stage 3 Intersections:	NA
Stage 2 Segments:	0

Additional Factors	
National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	Yes
INRIX:	Yes

Corridor 16: *I-83 from I-283 to Union Deposit Rd,Swatara Twp,Lower Swatara Twp*



Summary of Conditions

I-83 from I-283 and the Eisenhower interchange to Union Deposit Road in Swatara Township and Lower Paxton Township is ranked #5 in peak volume delay and #44 in peak vehicle delay per mile of roadway. I-83 (also known as the Capital Beltway in the Harrisburg region) serves as the primary commuter route for people working in and around the downtown Harrisburg area, but also serves travelers passing through to other destinations. This part of I-83 is a divided roadway with 3 lanes in each direction. The roadway and associated interchanges are currently being studied as part of an expansion project including interchange reconstruction, lane additions, and bridge rehabilitations. Final roadway improvement designs are not known at this time.

Planned Improvements on RTP & TIP

* MPMS #92931 - Eisenhower Interchange: I-83, I-283 and US 322
* MPMS #70024 - East Shore Section 1: I-81 to just south of SR 3020 (Union Deposit Road)

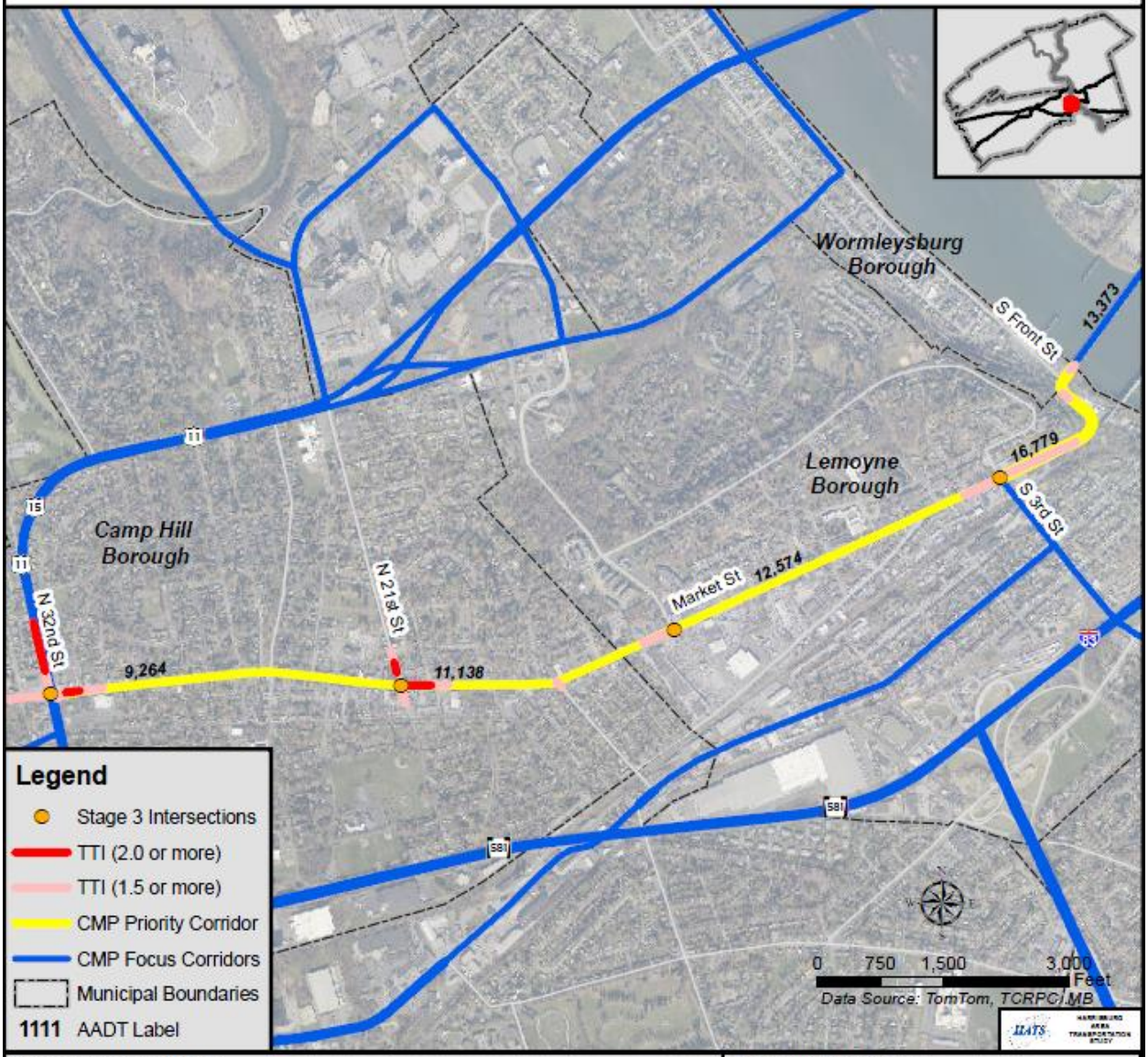
Recommendations

* Explore variable work hour and carpool programs.
* Explore expanding transit services.
* Explore expanding ITS strategies, such as variable message sign upgrades.

Congestion Measures	
Peak Vehicle Delay Per Mile:	60,652
AM Peak Vehicle Delay (sec):	6
PM Peak Vehicle Delay (sec):	54
Corridor Miles:	4.22
AM Peak Vol. Delay (Hr):	6:01:20
PM Peak Vol. Delay (Hr):	71:03:26
LOS D or Worse:	Yes
Stage 3 Intersections:	NA
Stage 2 Segments:	0

Additional Factors	
National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	Yes
Transit Route:	No
Park N Ride:	No
NPMRDS:	Yes
INRIX:	Yes

Corridor 74: *Market St from US 11/15 to Front St, Camp Hill, Leymone Boroughs*



Summary of Conditions

Market Street from US 11/15 to Front St at Market Street Bridge in Camp Hill Borough and Leymone Borough is ranked #6 in peak vehicle delay and #17 in peak volume delay per mile of roadway. This principal arterial roadway is generally 1 lane in each direction except between 3rd St and the Market Street Bridge, which is two lanes in each direction. The intersection of US 11/15 (32nd St) and Market Street was configured with adaptive signals as part of TIP project MPMS #89102 in 2016.

Congestion Measures

Peak Vehicle Delay Per Mile:	32.63
AM Peak Vehicle Delay (sec):	53
PM Peak Vehicle Delay (sec):	173
Corridor Miles:	5.3
AM Peak Vol. Delay (Hr):	11:55:43
PM Peak Vol. Delay (Hr):	50:10:31
LOS D or Worse:	Yes
Stage 3 Intersections:	4
Stage 2 Segments:	3

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects.

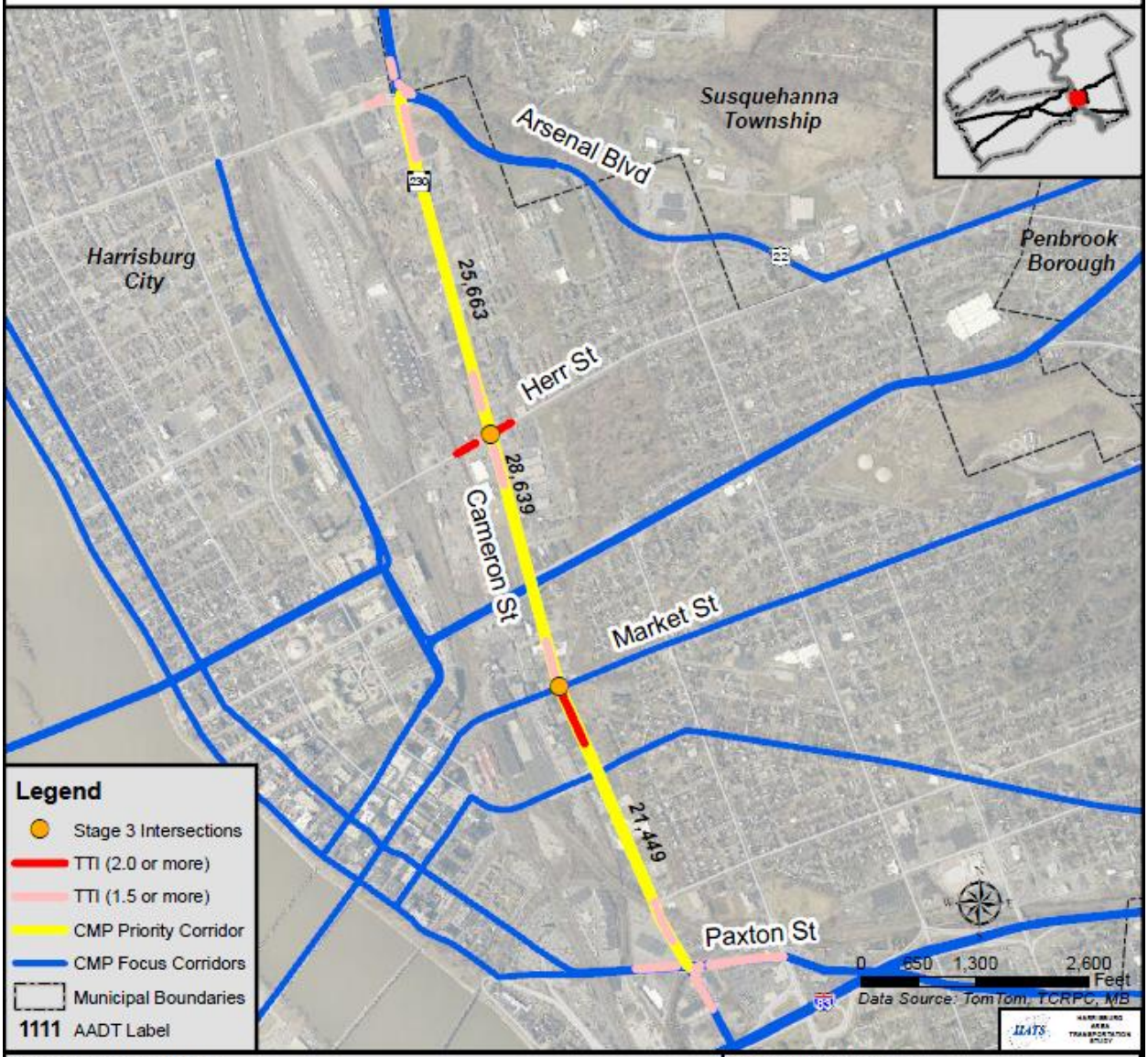
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle and pedestrian infrastructure along corridor.
* Explore access management improvements.

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	NA
INRIX:	NA

Corridor 63: *PA 230 (Cameron St) from US 22 to Paxton St,City of Harrisburg*



Summary of Conditions

Cameron Street from US 22 (Arsenal Blvd) to Paxton Street in the City of Harrisburg is ranked #18 in peak vehicle delay and #20 in peak volume delay per mile of roadway. Cameron Street is an undivided highway with 2 lanes in each direction and left turn lanes at major intersections at Paxton Street, Market Street, Herr Street and US 22 There is significant commuter congestion during the weekday AM/PM peak hours,and especially during the PM hours when workers are exiting the City.

Congestion Measures

Peak Vehicle Delay Per Mile:	26.28
AM Peak Vehicle Delay (sec):	36
PM Peak Vehicle Delay (sec):	103
Corridor Miles:	3.93
AM Peak Vol. Delay (Hr):	10:13:42
PM Peak Vol. Delay (Hr):	35:39:17
LOS D or Worse:	Yes
Stage 3 Intersections:	2
Stage 2 Segments:	2

Planned Improvements on RTP & TIP

* MPMS #92931 - Herr Street sidewalk improvements from Cameron St to 15th St.
* Improvements at Cameron St and Herr St as part of Capital View Commerce Center PennDOT HOP.

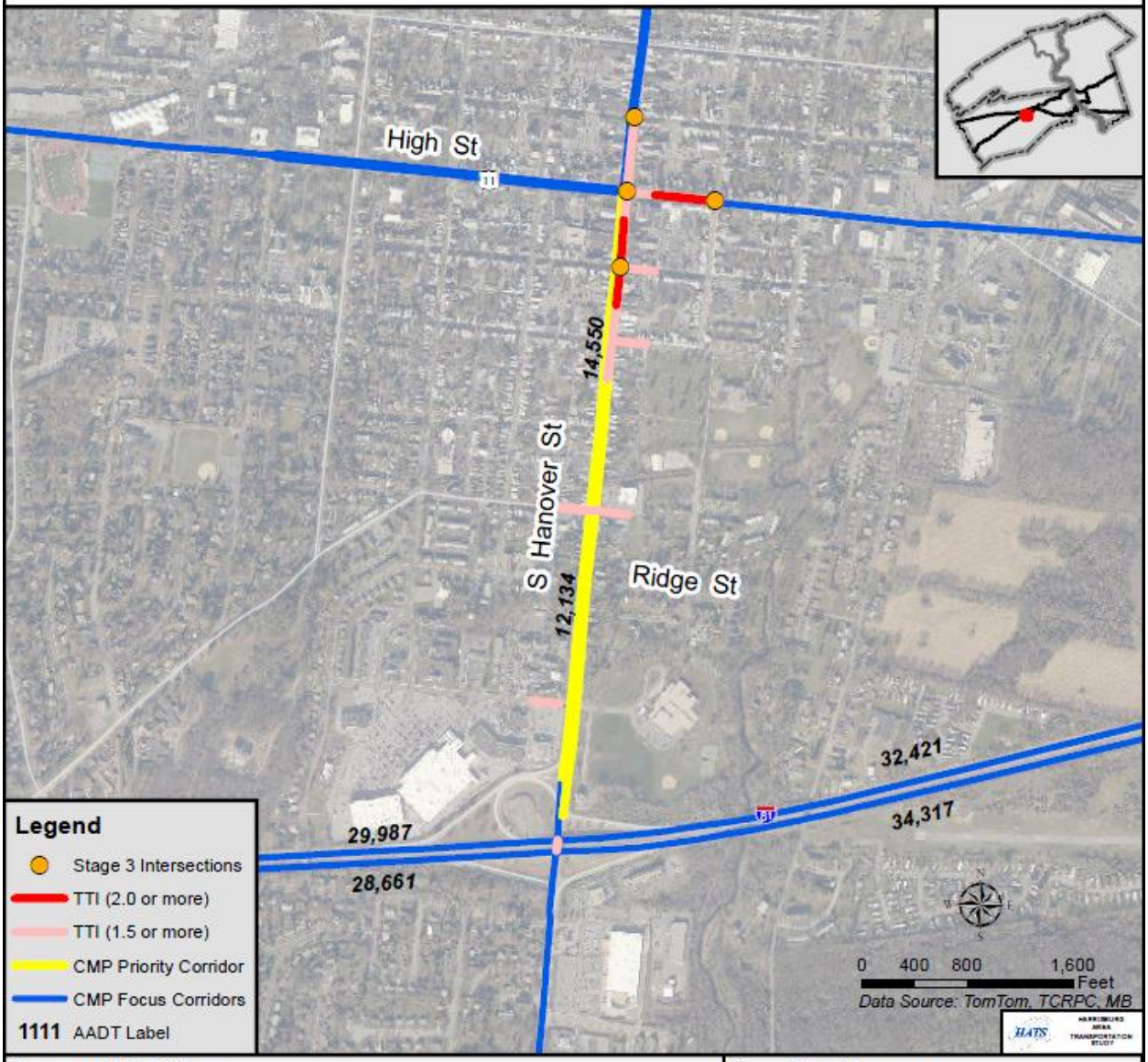
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle and pedestrian infrastructure along corridor.

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	Yes
INRIX:	Yes

Corridor 51: *PA 34 (S Hanover St) from I-81 to US 11 (High St)*



Summary of Conditions

PA 34 (S Hanover St) from US 11 (High St) to I-81 in Carlisle Borough is ranked #2 in peak vehicle delay and #21 in peak volume delay per mile of roadway. This corridor provides main access from downtown Carlisle to I-81 and contains a mix of uses. The Lamberton Middle School and the Carlisle Common Shopping area are located at the southern end of the corridor and the Carlisle Central Business District at the northern end of the intersection of High Street and Hanover Street. There is one lane in each direction from High Street to Ridge Street and two lanes from Ridge Street to I-81. The corridor from from High Street to Ridge Street was converted from 2 lanes to 1 lane in each direction as part of a roadway diet, including the installation of bicycle lanes.

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects planned.

Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Explore access management improvements.

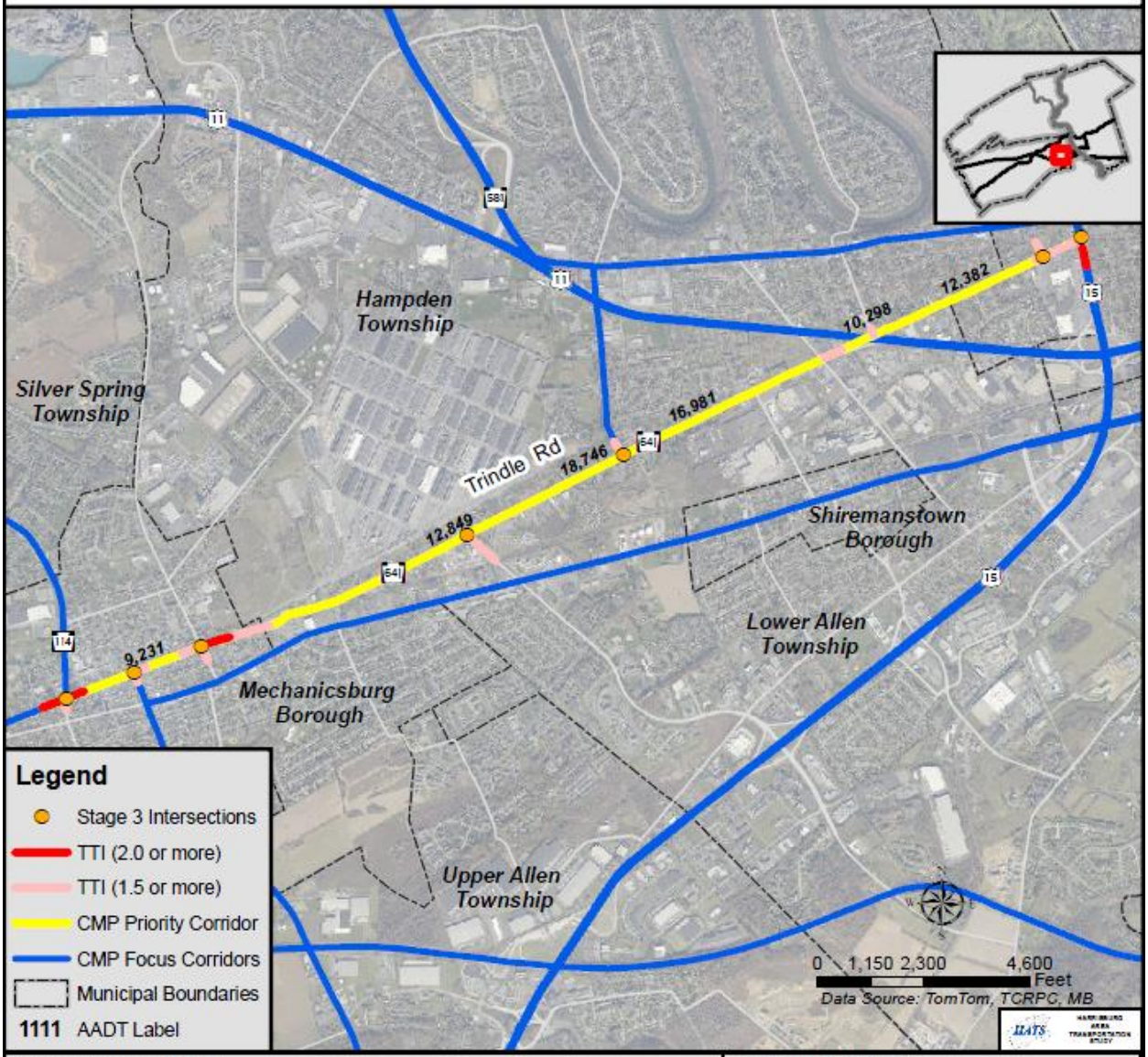
Congestion Measures

Peak Vehicle Delay Per Mile:	41.19
AM Peak Vehicle Delay (sec):	11
PM Peak Vehicle Delay (sec):	73
Corridor Miles:	1.76
AM Peak Vol. Delay (Hr):	1:58:07
PM Peak Vol. Delay (Hr):	15:47:14
LOS D or Worse:	Yes
Stage 3 Intersections:	2
Stage 2 Segments:	2

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	Yes
INRIX:	Yes

Corridor 47: *PA 641 from US 15 to PA 114,Mechanicsburg,Camp Hill,Hampden Twp.*



Summary of Conditions

PA 641 (Trindle Rd) from US 15 to to PA 114 in Mechanicsburg Borough, Hampden Township and Camp Hill is ranked #7 in peak vehicle delay and #13 in peak volume delay per mile of roadway. This principal arterial roadway is generally 1 lane in each direction with the exception of a center turning between 34th and 35th Streets.

Congestion Measures

Peak Vehicle Delay Per Mile:	32.16
AM Peak Vehicle Delay (sec):	78
PM Peak Vehicle Delay (sec):	294
Corridor Miles:	9.16
AM Peak Vol. Delay (Hr):	22:36:16
PM Peak Vol. Delay (Hr):	104:15:31
LOS D or Worse:	Yes
Stage 3 Intersections:	7
Stage 2 Segments:	5

Planned Improvements on RTP & TIP

* RTP 2040 project Ranked #54 - Trindle roadway widening

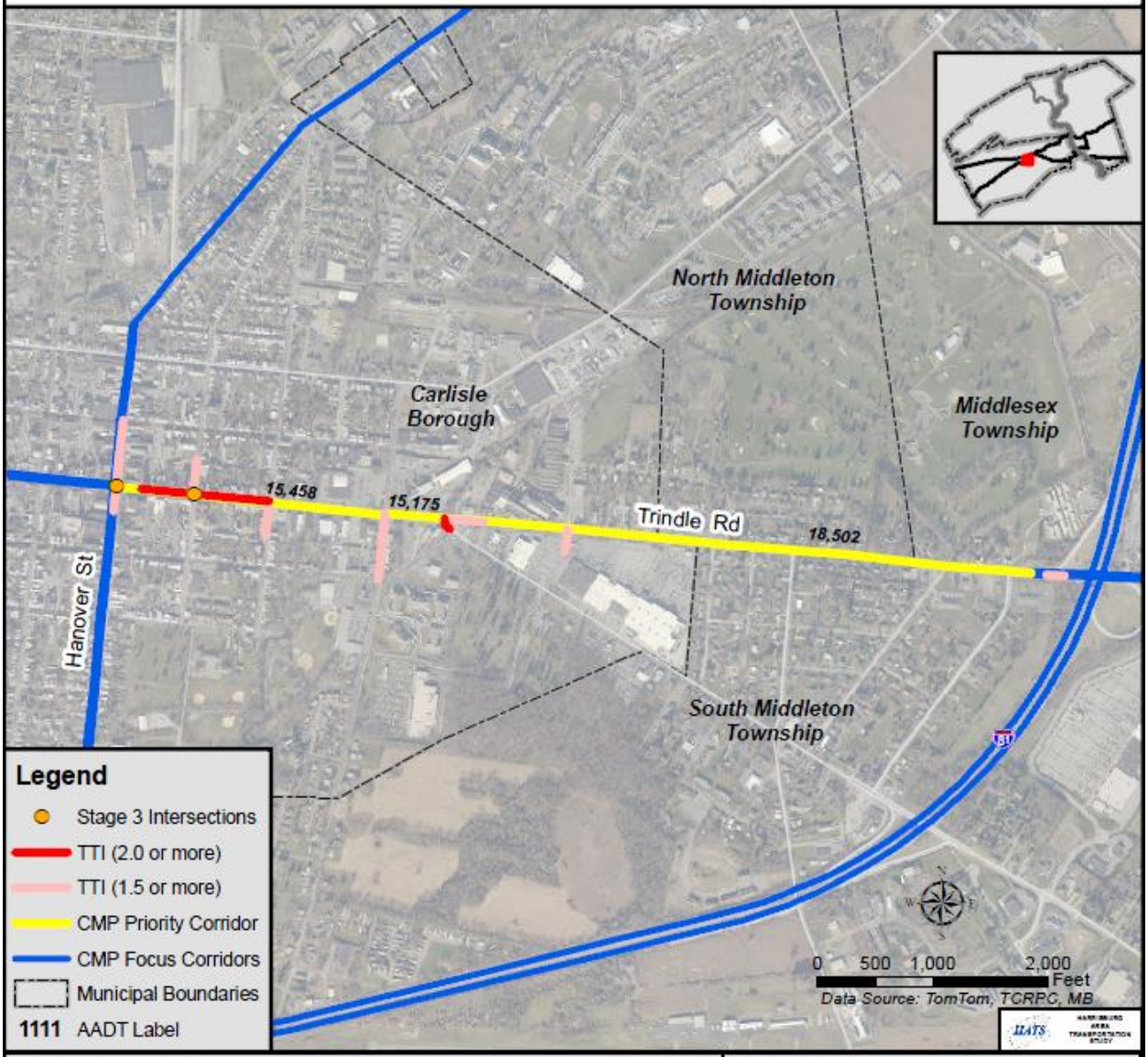
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle and pedestrian infrastructure along corridor.
* Explore access management improvements.

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	Part
INRIX:	Part

Corridor 49: *PA 641 from US 11 to I-81, Carlisle Borough & South Middleton Twp.*



Summary of Conditions

PA 641 (High St) from US 11 to I-81 passing through Carlisle Borough, North and South Middleton Townships and Middlesex Township is ranked #8 in peak vehicle delay and #7 in peak volume delay per mile of roadway. This corridor was part of roadway diet including the installation of bicycle lanes.

Congestion Measures

Peak Vehicle Delay Per Mile:	31.88
AM Peak Vehicle Delay (sec):	17
PM Peak Vehicle Delay (sec):	96
Corridor Miles:	30.2
AM Peak Vol. Delay (Hr):	6:13:25
PM Peak Vol. Delay (Hr):	43:16:47
LOS D or Worse:	Yes
Stage 3 Intersections:	2
Stage 2 Segments:	2

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects.

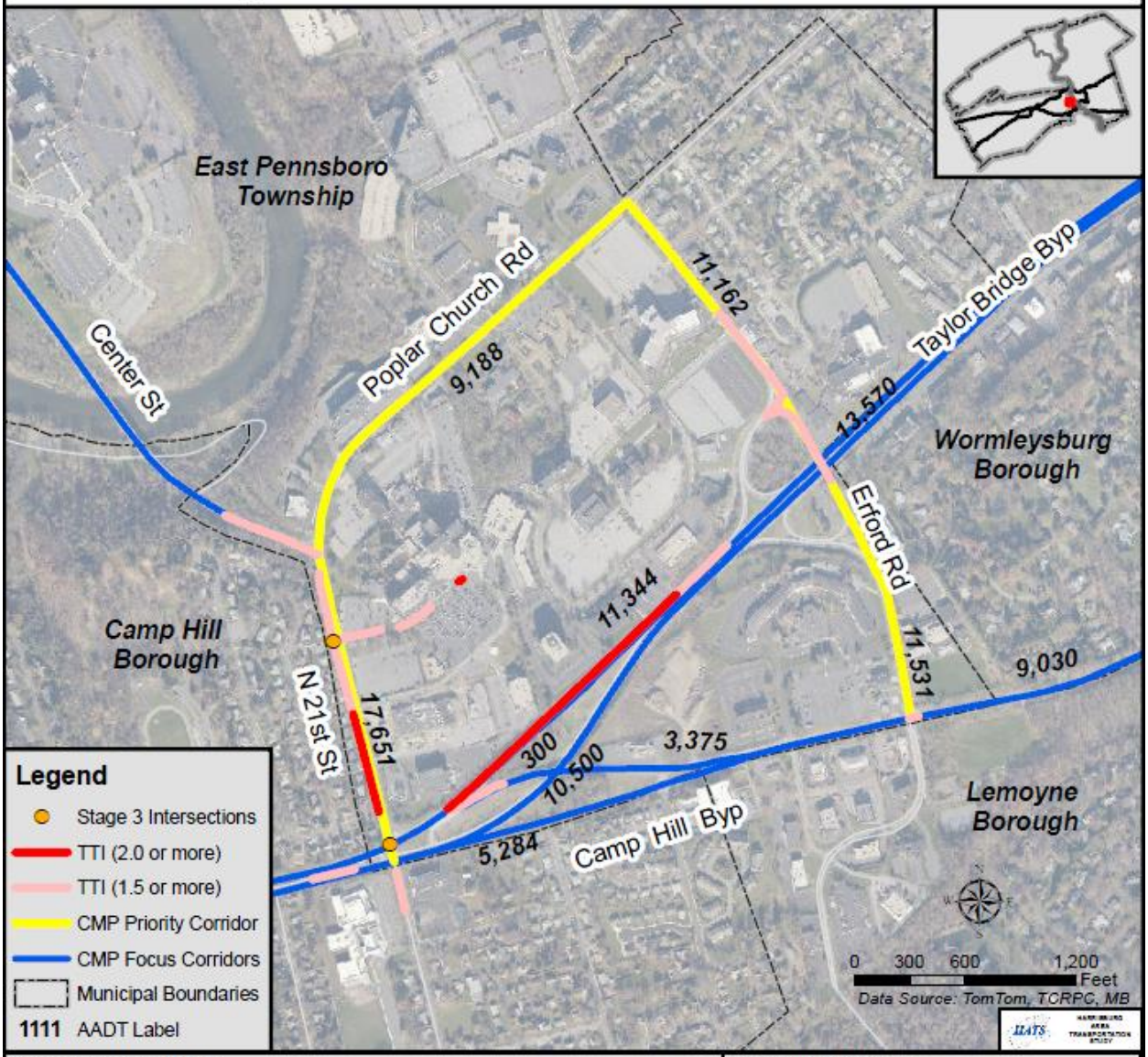
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Explore access management improvements.

Additional Factors

National Highway System:	Part
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	Part
INRIX:	Part

Corridor 84: *Poplar Church Rd/21st St/Erford Rd from 21st St to Erford Rd*



Summary of Conditions

Poplar Church Rd/21st St/Erford Rd from 21st St to Erford Rd in East Pennsboro Township Cumberland County is ranked #5 in peak vehicle delay and #10 in peak volume delay per mile of roadway. This corridor contains major employers such as Holy Spirit Hospital and Gannett Fleming. There is a new commerical and retail development to be constructed at the southwest corner of Poplar Church Rd and Erford Rd.

Congestion Measures

Peak Vehicle Delay Per Mile:	32.79
AM Peak Vehicle Delay (sec):	40
PM Peak Vehicle Delay (sec):	94
Corridor Miles:	2.88
AM Peak Vol. Delay (Hr):	11:05:29
PM Peak Vol. Delay (Hr):	35:09:04
LOS D or Worse:	Yes
Stage 3 Intersections:	2
Stage 2 Segments:	3

Planned Improvements on RTP & TIP

* MPMS #18477 - Erford Rd Bridge - add additional lanes as part of bridge rehabilitation.
* RTP 2040 project Ranked #30 - Poplar Church Rd/21st St/Center St realignment

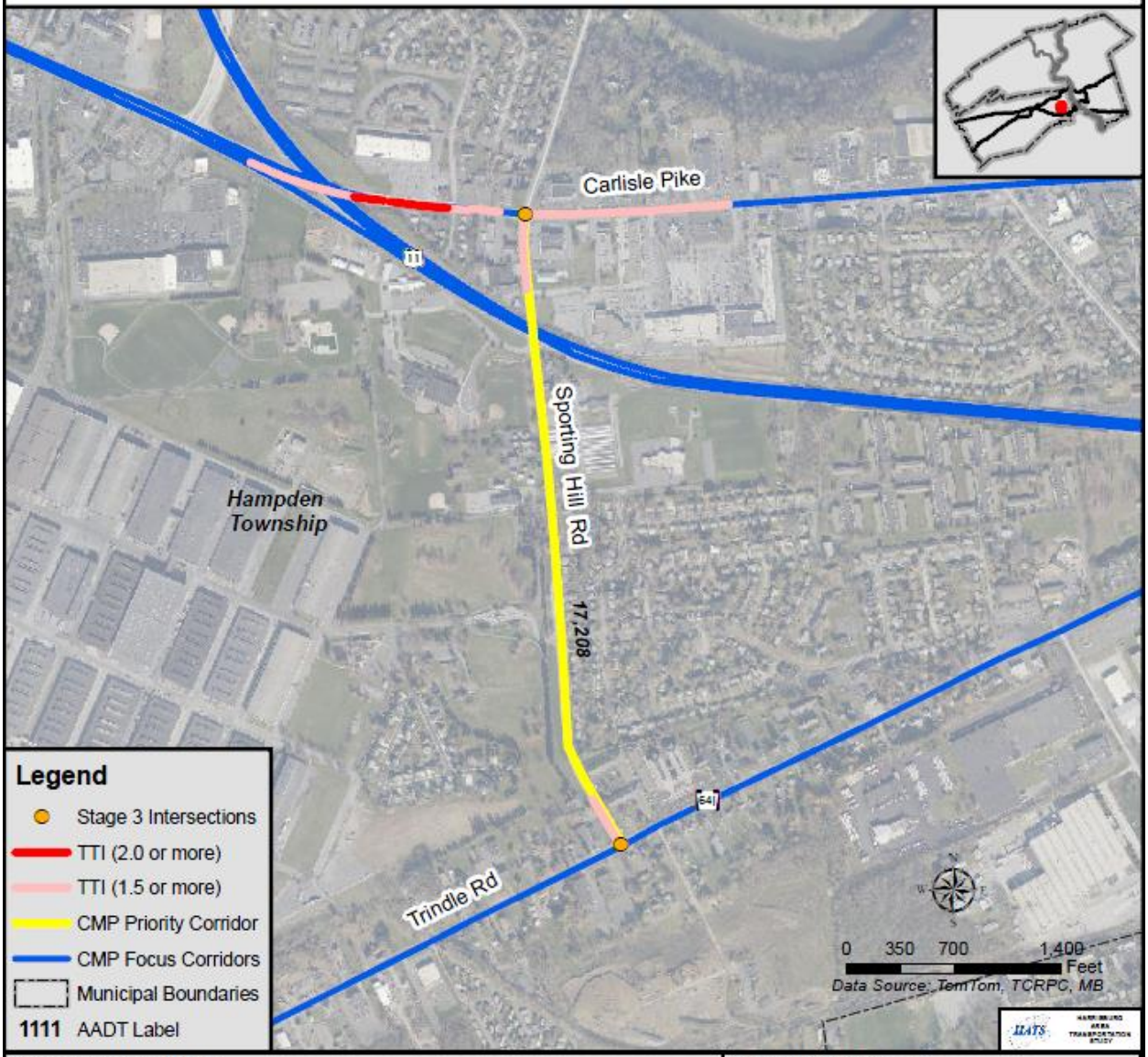
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Explore variable work hour and carpool programs

Additional Factors

National Highway System:	No
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	NA
INRIX:	NA

Corridor 87: *Sporting Hill Rd from Carlisle Pike to PA 641, Hampden Twp.*



Summary of Conditions

Sporting Hill Rd from Carlisle Pike to PA 641 (Trindle Rd) in Hampden Township is ranked #10 in peak vehicle delay per mile of roadway and #8 in peak volume delay per mile of roadway. Sporting Hill Road serves as a connector arterial to two major east-west arterials, Carlisle Pike and Trindle Road and contains one lane in each direction. The are two left-turn lanes on the northbound approach to the Carlisle Pike intersection.

Congestion Measures

Peak Vehicle Delay Per Mile:	29.76
AM Peak Vehicle Delay (sec):	8
PM Peak Vehicle Delay (sec):	47
Corridor Miles:	1.59
AM Peak Vol. Delay (Hr):	3:01:25
PM Peak Vol. Delay (Hr):	22:38:50
LOS D or Worse:	Yes
Stage 3 Intersections:	2
Stage 2 Segments:	2

Planned Improvements on RTP & TIP

* RTP 2040 Project Ranked #27; Sporting Hill Road Center Turning Lane
* RTP 2040 Project Ranked #46; CLASH #3 Sporting Hill Road & Carlisle Pike Intersection

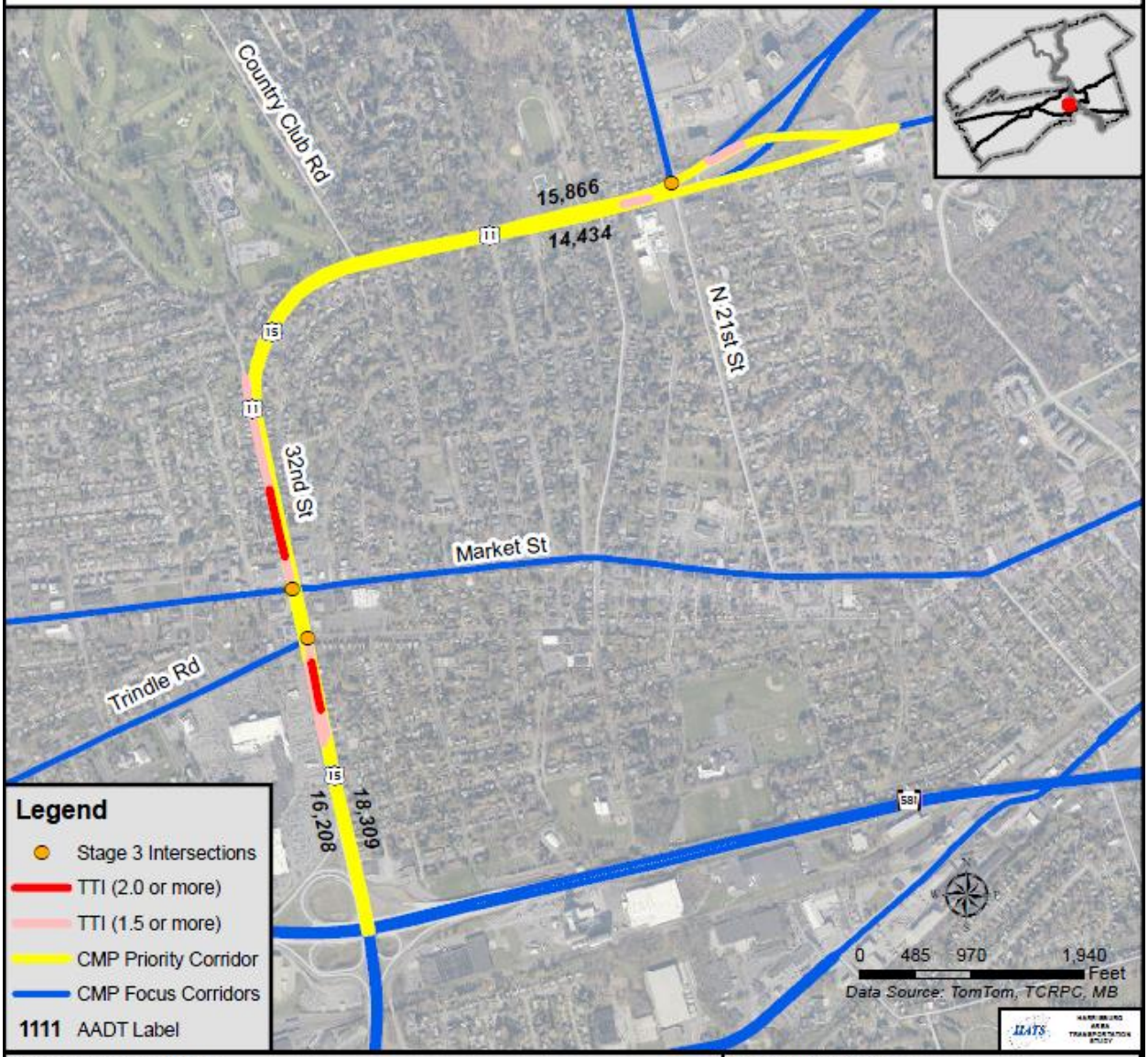
Additional Factors

National Highway System:	No
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	No
Transit Route:	Part
Park N Ride:	No
NPMRDS:	NA
INRIX:	NA

Recommendations

* Explore variable work hour and carpool programs at the Naval Support Activity military base.
* Enhance bicycle and pedestrian infrastructure along corridor.

Corridor 23: *US 11/15 from PA 581 to 21st Street, Camp Hill Borough*



Summary of Conditions

US 11/15 from PA 581 to 21st Street in Camp Hill Borough is ranked #16 in peak volume delay and #20 in peak vehicle delay per mile of roadway. This corridor is divided highway with two lanes in each direction. There are major employment centers at the northern portion of corridor such as Holy Spirit Hospital and Gannett Fleming, and major shopping areas at southern portion such as the Giant and Boscov's. The corridor was configured with adaptive signal technologies north to Country Club Road as part of project MPMS #89102 in 2016.

Congestion Measures

Peak Vehicle Delay Per Mile:	37,332
AM Peak Vehicle Delay (sec):	37
PM Peak Vehicle Delay (sec):	110
Corridor Miles:	4.26
AM Peak Vol. Delay (Hr):	11:12:24
PM Peak Vol. Delay (Hr):	44:13:20
LOS D or Worse:	Yes
Stage 3 Intersections:	3
Stage 2 Segments:	2

Planned Improvements on RTP & TIP

* No 2017-20 TIP or RTP 2040 projects in corridor.

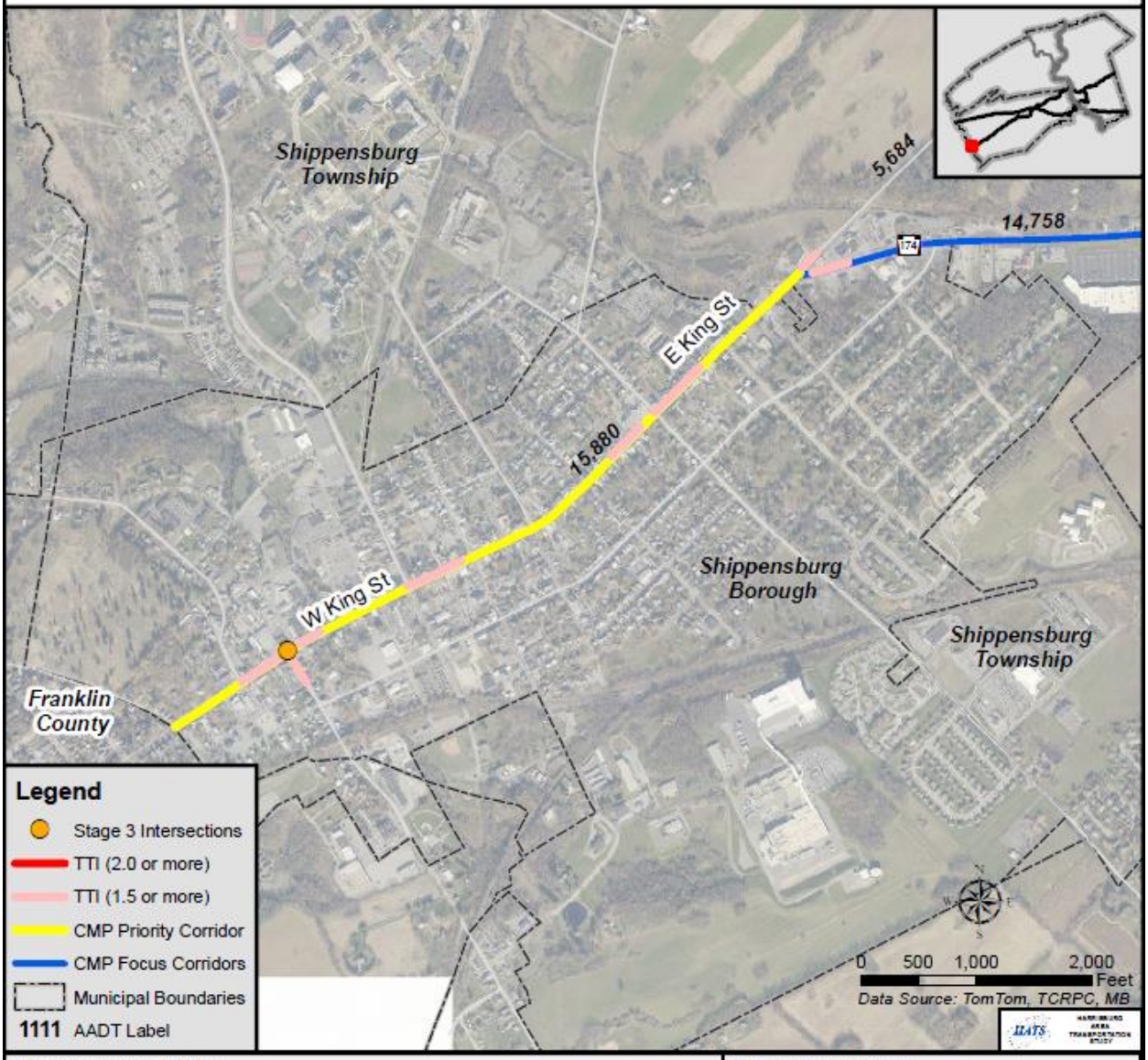
Recommendations

* Explore variable work hour and carpool programs.
* Explore expanding transit services.
* Explore access management improvements.

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Park N Ride:	Yes
NPMRDS:	Yes
INRIX:	Yes

Corridor 28: *US 11 (King St) from Franklin County Border to PA 174*



Summary of Conditions

US 11 (King St) from the Franklin County Border to PA 174 in Shippensburg Borough is ranked #3 in peak vehicle delay and #6 in peak volume delay per mile of roadway. The principal arterial roadway runs through the Borough's Central Business District and for the most part contains one lane in each direction. The corridor is a mix of retail, commercial and residential uses with the western portion of the corridor providing access to Shippensburg University and the eastern part to I-81.

Congestion Measures

Peak Vehicle Delay Per Mile:	37.25
AM Peak Vehicle Delay (sec):	11
PM Peak Vehicle Delay (sec):	96
Corridor Miles:	2.58
AM Peak Vol. Delay (Hr):	3:43:35
PM Peak Vol. Delay (Hr):	40:06:46
LOS D or Worse:	Yes
Stage 3 Intersections:	1
Stage 2 Segments:	0

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects.

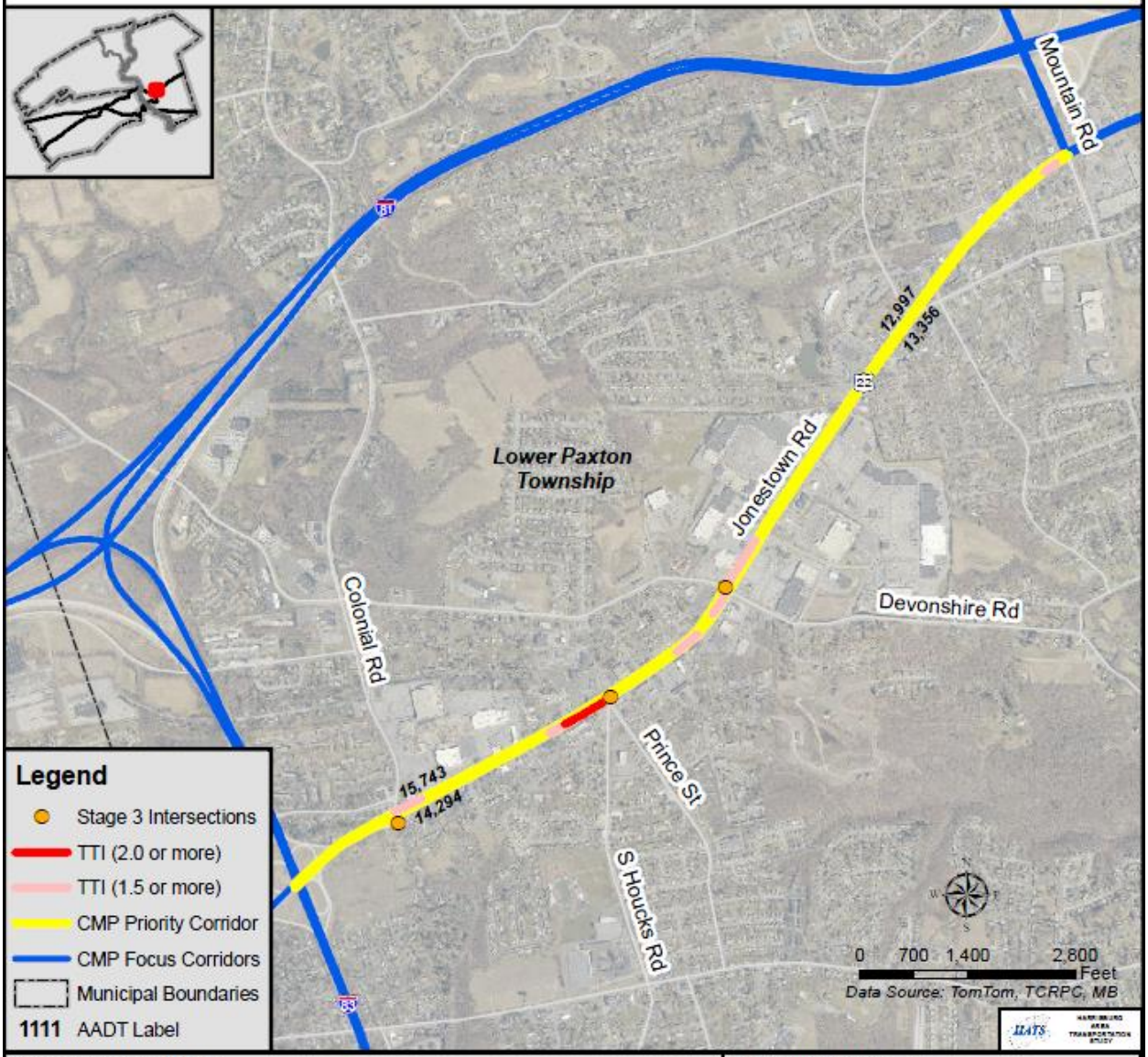
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle and pedestrian infrastructure along corridor.
* Explore access management improvements.

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	Yes
INRIX:	Yes

Corridor 37: *US 22 (Jonestown Rd) from I-83 to Mountain Road, Lower Paxton Twp*



Summary of Conditions

US 22 (Jonestown Rd) from I-83 to Mountain Road in Lower Paxton Township is ranked #14 in peak volume delay and #14 in peak vehicle delay per mile of roadway. This is divided arterial roadway with two lanes in each direction that connects the eastern portion of Dauphin County to I-83 and downtown Harrisburg . There is significant commuter-related congestion during the weekday AM/PM peak hours. Additionally, there is congestion on weekends due to the number of commercial and retail facilities along the corridor. The corridor was configured with adaptive signal technologies as part of TIP 2016-18 project (MPMS #89102) in 2016.

Planned Improvements on RTP & TIP

* MPMS #82356 - US 22 corridor and interchange improvements from I-83 to Colonial Road.
* No RTP 2040 projects in corridor.

Recommendations

* Explore variable work hour and carpool programs.
* Explore expanding transit services.
* Explore access management improvements.

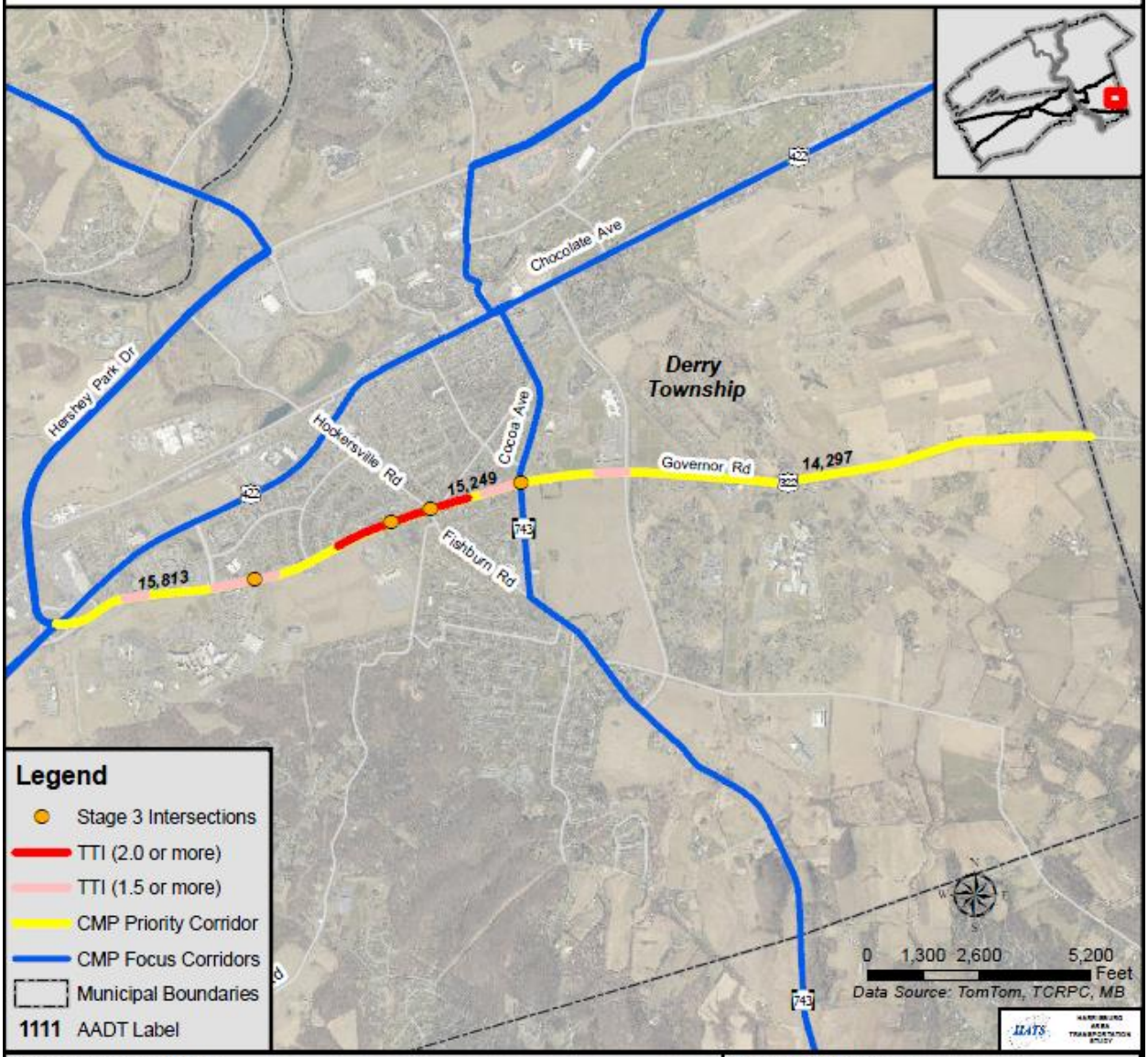
Congestion Measures

Peak Vehicle Delay Per Mile:	40,161
AM Peak Vehicle Delay (sec):	13
PM Peak Vehicle Delay (sec):	151
Corridor Miles:	5.28
AM Peak Vol. Delay (Hr):	4:07:12
PM Peak Vol. Delay (Hr):	58:54:17
LOS D or Worse:	Yes
Stage 3 Intersections:	3
Stage 2 Segments:	3

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Park N Ride:	No
NPMRDS:	Yes
INRIX:	Yes

Corridor 41: *US 322 from US 422 to Lebanon County Border, Derry Township*



Summary of Conditions

US 322 (Governor Rd) from US 422 to the Lebanon County border in Derry Township is ranked #11 in peak volume delay and #14 in peak vehicle delay per mile of roadway. This is a arterial roadway with two lanes in each direction and a center turning lane from US 422to University Drive and then becomes 1 lane in each direction to the Lebanon County border. There is significant congestion at some of the corridor intersections including Hockersville Road/Fishburn Road and Cherry Drive.

Congestion Measures

Peak Vehicle Delay Per Mile:	43,035
AM Peak Vehicle Delay (sec):	100
PM Peak Vehicle Delay (sec):	264
Corridor Miles:	9.36
AM Peak Vol. Delay (Hr):	33:14:01
PM Peak Vol. Delay (Hr):	111:53:02
LOS D or Worse:	Yes
Stage 3 Intersections:	4
Stage 2 Segments:	5

Planned Improvements on RTP & TIP

* RTP 2040 project Ranked #2: US 322 (Governor Road) from University Drive to Fishburn Road.
* RTP 2040 project Ranked #26: US 422, US 322 and PA 39 interchange.

Recommendations

* Operational and ITS improvements, such as signal timing should be considered.
* Explore access management improvements.
* Explore expanding transit services.

Additional Factors

National Highway System:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	No
Transit Route:	No
Park N Ride:	No
NPMRDS:	Yes
INRIX:	Part

5.3 Selecting Priority Intersections

Many corridors may not indicate significant levels of congestion, but one or two intersections along the corridor may experience congestion. The TomTom travel time/speed data allowed for a more granular analysis of congestion at this intersection level. The data was used to identify both congested and priority congested intersections, which was done in various steps (or stages) as outlined below.

The first stage in selecting priority intersections is to identify just the TomTom travel time segments that contain a travel time index (TTI) of 1.5 or higher. TTI is the ratio of the peak period travel time as compared to the free-flow travel time by roadway segment. Out of the 28,141 roadway segments, 881 were identified with a TTI of 1.5 or higher. All these roadway segments were considered congested roadways and identified as stage 1 segments. See Appendix (A-5) for stage 1 segment mapping.

The second stage involved ranking these stage 1 segments from most to least delay using the same vehicle delay and volume delay performance measures as for corridors. The top 100 roadway segments for each measure were grouped together as the stage 2 segments. Some of these segments were in the top 100 segments for both measures. From the 881 stage 1 segments, 139 were identified as stage 2 segments. See Appendix (A-6) for stage 2 segment mapping).

The third stage involved reviewing the stage 2 segments for directionality to identify ones with approaches to an intersection. These locations were designated as stage 3 intersections (See Map 4). A total of 90 stage 3 congested intersections were identified. Stage 2 segments that were located on limited access roadways such as I-83 were not included as part of the intersection analysis, but were included in the corridor analysis by indicating the count of stage 2 segments on focus corridors.

Stage four included analyzing the severity of congestion at intersections. This involved identifying the stage 2 segments as well as the other intersection approach roadway segments, and any other adjacent segments with a TTI of 1.4 or greater to include in the calculations for intersection peak vehicle delay and volume delay measures. Peak vehicle delay and volume delay were totaled separately for all applicable intersection segments by intersection, and then the intersections were ranked from most to least in delay for both measures.

The top 10 intersections with the most delay for each measure (peak vehicle delay and volume delay) along with the intersections where both delay measures were in the top 20, were identified as ‘priority intersections’ and are described in more detail in the next section (5.4 Priority Intersections) of this report.

Table 4 includes a list of the 90 intersections ranked by both peak vehicle delay and volume delay, sorted by intersection name, with the priority intersections highlighted in gray. Vehicle delay and volume delay are measured in seconds and hours, respectively. The percent of total delay on the leg with the most delay is listed for each intersection. The number of intersection legs included in the peak hour volume calculations is listed, since some intersection approaches did not contain traffic volumes and could result in under-representing congestion. Peak hour truck delay and volume delay were also calculated and ranked to help provide guidance on which intersections contain more congestion due to freight/truck movements.

All 90 identified congested intersections should be considered congestion issue areas and be included in land development plan or traffic impact study comments with associated congestion mitigation recommendations. These intersections, including the priority intersections, should be integrated into the RTP project priority rankings.

The fifth stage involved reviewing additional factors in making investment decisions. While congestion measurement values are of primary importance, they are not the sole factors that may influence investment decisions. Additional factors to consider that may be associated with the intersections include:

- Is the intersection on a roadway that is part of the National Highway System (NHS)?
- Does the intersection exist on an INRIX congested corridor (TTI 1.4 or more)?
- Does the intersection exist on an NPMRDS congested corridor (TTI 1.4 or more)?
- Does the intersection exist on a HATS Travel Demand Model roadway with Level of Service of D or worse in a future year?
- Is the intersection part of a transportation improvement project on the TIP (2017-20)?
- Is the intersection part of a transportation long range plan project on the RTP (2040)?
- Does the intersection occur on a PennDOT high crash location corridor (2010-2014)?
- Does the intersection occur on a TCRPC High Priority crash corridor/intersection (2010-14)?
- Is the intersection part of a CAT transit fixed route?
- Does the intersection contain a traffic signal, and if so is it part of a system or isolated?
- Is the intersection within a Growth Area designated in the TCRPRC Regional Growth Management Plan (2011)?
- What are the park hour truck volumes at the intersection?
- What are the peak hour delays at the intersection?

See Appendix (A-7, A-8) for tables listing the intersections ranked by both peak vehicle delay and peak volume delay along with additional factor information.

Table 4
Peak Intersection Delay

Table 4 - Peak Intersection Delay By Intersection Name

MAP ID	Intersection Name	Municipality	County	Peak Vehicle Delay					Peak Hour Volume Delay						Peak Hour Volume Truck Delay			
				AM Peak Vehicle Delay (sec)	PM Peak Vehicle Delay (sec)	Time of Day with Highest Delay	% of Total Delay on leg with most delay (High)	Rank	Rank	Intersection Legs included in Peak Hr Volume and Peak Period Delay	Peak Hour Volume	AM Peak Volume Delay (Hr)	PM Peak Volume Delay (Hr)	Time of Day with Highest Delay	Peak Hour Volume	Peak Volume Delay (Hr)	Time of Day with Highest Delay	Rank
86	21st St & Holy Spirit Hospital Dr	East Pennsboro Twp	Cumberland	10	24	PM	62%	56	71	3/3	1,765	0:23:38	2:16:20	PM	21	0:07:19	PM	67
73	Berryhill St & 13th St	City of Harrisburg	Dauphin	14	9	AM	85%	84	85	4/4	1,092	0:48:28	0:50:22	PM	32	0:02:28	PM	85
84	Cameron St & Herr St	City of Harrisburg	Dauphin	26	44	PM	51%	22	20	4/4	3,616	4:24:03	9:09:24	PM	139	0:44:07	PM	10
34	Cameron St & Market St	City of Harrisburg	Dauphin	8	32	PM	55%	43	21	4/4	3,055	1:47:36	8:12:36	PM	142	1:07:38	PM	4
2	Camp Hill Bypass, 21st St & Cumberland Blvd	East Pennsboro Twp & Camp Hill Borough	Cumberland	21	121	PM	69%	2	1	5/5	4,211	3:17:54	30:40:51	PM	43	0:19:34	PM	32
61	Carlisle Pk & Locust Point Rd	Silver Spring Twp	Cumberland	2	17	PM	71%	77	64	4/4	897	0:10:20	2:42:52	PM	111	0:27:10	PM	22
36	Carlisle Pk & Sporting Hill Rd	Hampden Twp	Cumberland	12	79	PM	42%	7	5	4/4	3,249	2:24:08	18:47:39	PM	80	0:04:19	PM	79
57	Carlisle Rd & Cedar Cliff Dr	New Cumberland Twp & Lower Allen Twp	Cumberland	9	25	PM	79%	54	54	4/4	1,677	1:02:14	3:20:01	PM	45	0:08:19	PM	64
37	Center St & Highmark Blue Local Driveway	East Pennsboro Twp	Cumberland	2	20	PM	73%	70	46	2/3	1,174	0:20:43	3:36:00	PM	8	0:03:35	PM	82
50	Chestnut St & 3rd St	City of Harrisburg	Dauphin	9	15	PM	69%	79	82	2/3	638	0:35:47	1:11:30	PM	27	0:11:14	PM	51
41	Chocolate Av & Homestead Rd	Derry Twp	Dauphin	8	20	PM	73%	69	66	3/3	1,563	0:54:44	2:26:34	PM	51	0:13:43	PM	45
18	Chocolate Av & Ridge Rd	Derry Township	Dauphin	5	46	PM	48%	19	23	3/4	2,247	0:43:02	7:25:28	PM	65	0:15:57	PM	39
74	Cocoa Av & Fishburn Rd	Derry Twp	Dauphin	5	19	PM	57%	73	55	3/3	1,854	0:38:52	3:16:13	PM	44	0:11:26	PM	49
39	Colonial Rd & King George Dr	Lower Paxton Twp	Dauphin	1	13	PM	84%	87	74	2/3	1,116	0:06:40	1:57:26	PM	13	0:03:57	PM	80
55	Colonial Rd & Valley Rd	Lower Paxton Twp	Dauphin	6	29	PM	49%	48	43	3/3	1,431	0:36:45	4:04:30	PM	15	0:08:16	PM	65
12	Derry St & 63rd St	Swatara Township	Dauphin	9	52	PM	54%	16	16	3/4	1,447	1:02:41	9:56:17	PM	25	1:01:42	PM	8
71	Derry St & Paxtang Ave	Paxtang Borough	Dauphin	10	28	PM	65%	50	51	4/4	2,007	0:55:07	3:23:18	PM	32	0:05:55	PM	74
31	Derry St/19th St & Berryhill St	City of Harrisburg	Dauphin	12	34	PM	79%	37	41	5/5	1,586	0:44:38	4:12:39	PM	26	0:05:59	PM	73
9	Devonshire Rd/Crums Mill Rd & Colonial Rd	Lower Paxton Twp	Dauphin	12	56	PM	48%	14	22	4/4	2,087	1:21:35	7:41:31	PM	43	0:39:10	PM	14
58	Elizabeth Rd & Schoolhouse Rd	Conewago Twp	Dauphin	8	15	PM	66%	81	69	3/4	1,364	1:05:39	2:19:01	PM	66	0:19:01	PM	33
38	Gettysburg Pk & Lisburn Rd	Upper Allen Twp	Cumberland	7	18	PM	84%	75	81	4/4	886	0:21:08	1:12:04	PM	20	0:02:42	PM	84
78	Governor Rd & Centerview Ln	Derry Twp	Dauphin	8	28	PM	51%	51	63	2/4	1,581	1:14:55	2:46:40	PM	57	0:19:51	PM	31
4	Governor Rd & Cherry Dr	Derry Twp	Dauphin	15	76	PM	78%	8	9	2/4	1,581	1:25:34	13:00:16	PM	57	1:04:55	PM	5
47	Governor Rd & Cocoa Av	Derry Twp	Dauphin	10	30	PM	47%	45	37	4/4	2,264	1:04:04	4:26:03	PM	59	0:14:39	PM	43
3	Governor Rd & Hockersville Rd/Fishburn Rd	Derry Twp	Dauphin	36	123	PM	65%	1	3	4/4	2,469	4:56:08	19:57:29	PM	63	1:21:22	PM	2
15	Hanover St & High St	Carlisle Borough	Cumberland	11	79	PM	31%	6	8	4/4	2,821	1:41:21	15:40:15	PM	117	1:34:20	PM	1
88	Hanover St & Louther St	Carlisle Borough	Cumberland	36	45	PM	33%	20	47	4/4	1,491	0:15:27	3:34:59	PM	58	0:30:02	PM	19
56	Hanover St & Main St	Hummelstown Borough	Dauphin	5	33	PM	40%	39	58	4/4	1,231	0:25:29	3:05:16	PM	29	0:10:07	PM	58
89	Hanover St & Pomfret St	Carlisle Borough	Cumberland	10	39	PM	38%	26	42	4/4	1,455	0:34:08	4:09:07	PM	39	0:28:49	PM	21
83	Hershey Park Dr & Park Blvd	Derry Twp	Dauphin	14	21	PM	48%	68	56	4/4	3,138	0:41:10	3:14:00	PM	107	0:16:59	PM	37
65	Hershey Rd & Redtop Rd	West Hanover Twp	Dauphin	2	13	PM	95%	86	87	3/3	1,446	0:03:49	0:20:36	PM	51	0:01:47	PM	89
90	High St & Bedford St	Carlisle Borough	Cumberland	9	35	PM	64%	35	31	2/4	1,546	0:28:31	5:16:10	PM	83	1:02:34	PM	7
87	High St & Pitt St	Carlisle Borough	Cumberland	19	35	PM	31%	34	68	4/4	1,150	0:08:36	2:21:43	PM	48	0:25:52	PM	24
48	Hockersville Rd & Areba Ave	Derry Twp	Dauphin	5	20	PM	74%	72	86	3/4	875	0:03:00	0:40:27	PM	16	0:01:54	PM	88
85	Hogestown Rd & Texaco Rd	Silver Spring Twp	Cumberland	7	10	PM	43%	89	80	3/3	1,421	0:26:12	1:23:47	PM	58	0:11:52	PM	48
68	Holly Pk & Old York Rd	South Middleton Twp	Cumberland	19	24	PM	58%	61	70	4/4	1,526	1:47:38	2:16:57	PM	78	0:13:37	PM	46
43	King St & Fayette St	Shippensburg Borough	Cumberland	12	24	PM	47%	59	45	3/3	1,518	1:02:25	3:39:20	PM	54	0:15:54	PM	40
79	Linglestown Rd & Deer Path Rd	Susquehanna Twp	Dauphin	2	12	PM	68%	88	48	2/4	2,051	0:30:02	3:31:05	PM	37	0:10:34	PM	54
80	Linglestown Rd & Forest Rd/Pheasant Rd	Lower Paxton Twp	Dauphin	3	13	PM	72%	85	61	2/4	1,755	0:32:23	2:54:45	PM	32	0:10:10	PM	57
11	Linglestown Rd & Progress Av	Susquehanna Twp	Dauphin	10	48	PM	60%	17	15	3/4	2,522	1:10:33	9:59:36	PM	45	0:31:50	PM	18
64	Locust Ln & Rutherford Rd	Lower Paxton Twp	Dauphin	6	21	PM	49%	66	67	3/4	1,137	0:27:49	2:22:52	PM	55	0:22:02	PM	27
53	Maclay St & 3rd St	City of Harrisburg	Dauphin	17	21	PM	61%	67	73	4/4	1,534	1:22:12	2:10:17	PM	32	0:09:22	PM	62
33	Maclay St & 7th St	City of Harrisburg	Dauphin	5	24	PM	47%	60	32	4/4	1,733	0:25:58	4:53:12	PM	32	0:25:06	PM	25
77	Main St & Market St	Mechanicsburg Borough	Cumberland	9	30	PM	33%	46	50	3/4	1,606	1:13:21	3:30:28	PM	37	0:12:10	PM	47
20	Main St & York St	Mechanicsburg Borough	Cumberland	17	40	PM	49%	24	38	4/4	1,733	1:22:39	4:21:40	PM	58	0:18:49	PM	34
7	Main St (PA 641) & Walnut St	Mechanicsburg Borough	Cumberland	14	95	PM	75%	3	7	4/4	2,637	1:58:21	17:09:57	PM	92	0:46:47	PM	9
26	Manor Dr & Hershey Rd	West Hanover Twp	Dauphin	20	4	AM	99%	71	89	3/3	1,133	0:10:27	0:19:07	PM	50	0:02:06	PM	87
63	Market St & 12th St	Lemoyne Borough	Cumberland	3	31	PM	37%	44	35	3/4	1,705	0:24:27	4:26:44	PM	25	0:09:52	PM	60
32	Market St & 21st St	Camp Hill Borough	Cumberland	10	38	PM	53%	27	40	3/4	1,033	0:29:48	4:14:13	PM	15	0:06:50	PM	69
62	Market St & 32nd St	Camp Hill Borough	Cumberland	28	67	PM	48%	10	4	4/4	4,511	4:15:50	19:56:02	PM	72	0:18:37	PM	35
29	Market St & 3rd St	Lemoyne Borough	Cumberland	2	33	PM	45%	41	25	4/4	2,411	0:21:23	7:06:23	PM	51	0:17:43	PM	36
67	Market St & 4th St	Halifax Borough	Dauphin	22	13	AM	96%	63	77	3/3	1,133	1:36:58	1:14:56	AM	47	0:05:27	AM	76
17	Market St & Central Blvd	Hampden Township	Cumberland	5	44	PM	55%	23	27	3/3	1,424	0:41:21	6:45:54	PM	37	0:20:03	PM	30
40	Market St & Simpson St	Mechanicsburg Borough	Cumberland	7	37	PM	40%	28	28	4/4	2,234	0:56:41	6:32:07	PM	79	0:25:56	PM	23
27	Paxton St & 13th St	City of Harrisburg	Dauphin	9	26	PM	70%	52	34	4/4	1,680	1:01:05	4:43:32	PM	66	0:20:35	PM	28
44	Paxton St & S 19th St	City of Harrisburg	Dauphin	6	36	PM	42%	31	24	4/4	2,567	0:53:26	7:20:42	PM	106	0:42:31	PM	13

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Table 4
Peak Intersection Delay

Table 4 - Peak Intersection Delay By Intersection Name

MAP ID	Intersection Name	Municipality	County	Peak Vehicle Delay					Peak Hour Volume Delay						Peak Hour Volume Truck Delay			
				AM Peak Vehicle Delay (sec)	PM Peak Vehicle Delay (sec)	Time of Day with Highest Delay	% of Total Delay on leg with most delay (High)	Rank	Rank	Intersection Legs included in Peak Hr Volume and Peak Period Delay	Peak Hour Volume	AM Peak Volume Delay (Hr)	PM Peak Volume Delay (Hr)	Time of Day with Highest Delay	Peak Hour Volume	Peak Volume Delay (Hr)	Time of Day with Highest Delay	Rank
59	Pleasant View Rd & Bridge Rd	Swatara Twp	Dauphin	2	15	PM	89%	80	84	3/3	885	0:06:48	0:55:20	PM	16	0:02:14	PM	86
49	Progress Av & Locust Ln	Susquehanna Twp	Dauphin	1	21	PM	55%	65	72	3/3	1,479	0:08:25	2:10:48	PM	20	0:06:00	PM	72
28	Progress Av & Paxton Church Rd	Susquehanna Twp	Dauphin	24	22	AM	81%	57	75	4/4	1,250	1:13:23	1:49:37	PM	25	0:04:23	PM	78
66	Progress Av & Walnut St	Susquehanna Twp	Dauphin	7	58	PM	38%	13	12	4/4	2,959	1:15:06	11:30:56	PM	51	0:32:43	PM	16
42	Rossmoyne Rd & Lisburn Rd	Lower Allen Twp	Dauphin	3	18	PM	80%	74	79	3/3	1,006	0:10:40	1:26:00	PM	29	0:05:42	PM	75
60	Route 11 (Ritner Hwy) & Allen Rd	Carlisle Borough	Cumberland	25	11	AM	62%	55	44	4/4	2,328	3:49:51	2:46:40	AM	97	0:14:06	AM	44
13	Route 22 (Allentown Blvd) & Blue Ribbon Av	Lower Paxton Twp	Dauphin	12	33	PM	58%	40	57	4/4	2,024	0:38:19	3:12:20	PM	53	0:15:08	PM	42
75	Route 22 (Jonestown Rd) & Devonshire Rd	Lower Paxton Twp	Dauphin	9	35	PM	33%	33	17	4/4	3,793	1:19:58	9:53:26	PM	106	0:22:06	PM	26
10	Route 22 (Jonestown Rd) & S Mountain Rd	Lower Paxton Twp	Dauphin	8	40	PM	80%	25	30	3/3	1,504	0:57:09	5:37:47	PM	27	0:10:18	PM	56
54	Route 22 (Jonestown Rd) Colonial Rd Exit & Strouse St	Lower Paxton Twp	Dauphin	13	33	PM	50%	38	29	4/4	3,353	0:51:28	6:31:03	PM	86	0:11:01	PM	53
22	Route 22 (Jonestown Rd)/Prince St & S Houcks Rd	Lower Paxton Twp	Dauphin	16	58	PM	49%	12	10	4/5	4,185	1:30:16	12:51:39	PM	85	0:20:04	PM	29
25	Route 322 & Mushroom Hill Rd	Swatara Twp	Dauphin	17	45	PM	55%	21	6	4/4	5,316	5:31:03	17:46:30	PM	182	0:43:40	PM	11
1	Route 322 Off Ramp (Hummelstown) & Middletown Rd	Derry Twp	Dauphin	19	87	PM	68%	4	11	4/4	2,370	2:21:30	12:14:35	PM	100	1:07:43	PM	3
8	Route 322/Chambers Hill Rd/Grayson Rd & 82nd St	Swatara Township	Dauphin	22	87	PM	79%	5	2	4/6	4,671	3:37:48	25:28:03	PM	131	1:02:52	PM	6
6	Route 581 Off Ramp (Exit 2) & Creekview Rd	Hampden Twp	Cumberland	1	48	PM	100%	18	90	3/3	1,073	0:00:44	0:04:49	PM	29	0:33:37	PM	15
72	Route 581 Off Ramp (Exit 3) & Carlisle Pk	Hampden Twp	Cumberland	9	14	PM	43%	83	18	3/4	3,922	2:19:19	9:43:47	PM	155	0:32:03	PM	17
14	Simpson Ferry Rd/Sheely Ln & Wesley Dr	Hampden Twp & Lower Allen Twp	Cumberland	20	59	PM	41%	11	19	4/4	2,560	2:20:03	9:19:02	PM	56	0:29:56	PM	20
21	Simpson St & Walnut St	Mechanicsburg Borough	Cumberland	8	36	PM	62%	29	26	3/3	2,042	1:10:47	6:49:03	PM	61	0:43:29	PM	12
69	Simpson St & Walnut St	Mechanicsburg Borough	Cumberland	11	22	PM	53%	64	53	3/3	1,366	0:13:48	3:20:48	PM	25	0:11:21	PM	50
46	State St & 13th St	City of Harrisburg	Dauphin	3	22	PM	66%	62	52	3/3	1,880	0:28:10	3:22:28	PM	32	0:09:12	PM	63
23	State St & 17th St	Lower Allen Twp	Cumberland	3	53	PM	45%	15	62	3/4	698	0:05:17	2:52:17	PM	13	0:06:34	PM	70
45	Sycamore St & S 19th St	City of Harrisburg	Dauphin	1	15	PM	75%	82	78	4/4	3,452	0:05:09	1:31:53	PM	56	0:09:52	PM	59
82	Trindle Rd & 32nd St	Camp Hill Borough	Cumberland	16	34	PM	52%	36	13	3/4	4,071	4:25:43	11:19:56	PM	96	0:16:20	PM	38
70	Trindle Rd & 34th St	Camp Hill Borough	Cumberland	5	29	PM	40%	47	60	2/3	1,238	0:22:52	2:59:01	PM	7	0:02:45	PM	83
35	Trindle Rd & Army Heritage Dr	Middlesex Twp & South Middleton Twp	Cumberland	5	28	PM	60%	49	59	4/4	1,468	0:31:38	3:03:33	PM	36	0:09:44	PM	61
30	Trindle Rd & Sheely Ln	Hampden Twp	Cumberland	14	32	PM	52%	42	33	3/3	1,455	1:30:02	4:44:28	PM	27	0:10:21	PM	55
81	Trindle Rd & Sporting Hill Rd	Hampden Twp	Cumberland	2	18	PM	45%	76	39	3/3	2,647	0:25:32	4:21:29	PM	42	0:11:10	PM	52
24	Union Deposit Rd & Michigan Dr	Lower Paxton Twp	Dauphin	11	16	PM	70%	78	36	2/3	1,233	0:32:38	4:26:41	PM	37	0:07:40	PM	66
76	Union Deposit Rd & Park Dr/Scenery Dr	Lower Paxton Twp	Dauphin	20	36	PM	37%	30	14	4/4	3,316	4:03:10	10:21:05	PM	69	0:15:16	PM	41
16	Walnut St & Canby St	Penbrook Borough	Dauphin	7	36	PM	79%	32	49	4/4	1,750	0:24:54	3:30:52	PM	20	0:05:25	PM	77
5	Walnut St & Hoffer St	Susquehanna Twp & Penbrook Borough	Dauphin	74	6	AM	98%	9	83	3/3	1,067	1:00:01	0:11:44	AM	16	0:03:49	AM	81
19	Walnut St & Locust Ln	Susquehanna Twp	Dauphin	5	24	PM	96%	58	65	3/3	2,163	0:28:14	2:32:01	PM	45	0:07:01	PM	68
52	York Rd & Petersburg/Carlton Rd	South Middleton Twp	Cumberland	6	7	PM	81%	90	88	4/4	1,700	0:05:12	0:19:44	PM	47	0:01:32	PM	90
51	York Rd & Westminster Dr	South Middleton Twp	Cumberland	8	26	PM	49%	53	76	4/4	1,214	0:38:46	1:48:39	PM	27	0:06:21	PM	71
Total												104:42:33	529:07:18			30:26:02		

Note: Table is sorted by Intersection name and delay is ranked from high to low with 1 being the mosted delayed (congested) and 90 the least.

Priority Intersections

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5.4 Priority Intersections

There were 16 intersections selected as 'priority intersections' using both peak delay and peak volume delay performance measures as described in the previous section (5.3 Selecting Priority Intersections). These intersections are listed by intersection name in ascending order with the associated map number and municipality and county they are contained in (See Table 5). Similar to priority corridors, the number of priority intersections are limited due to project funding availability and importance to target locations with the worst traffic congestion. Some of these areas are programmed on the TIP 2017-20 and others are on the RTP 2040 project program listings. Intersections not designated as priority intersections should still be considered for potential improvements as funding is available.

Priority Intersection Summaries

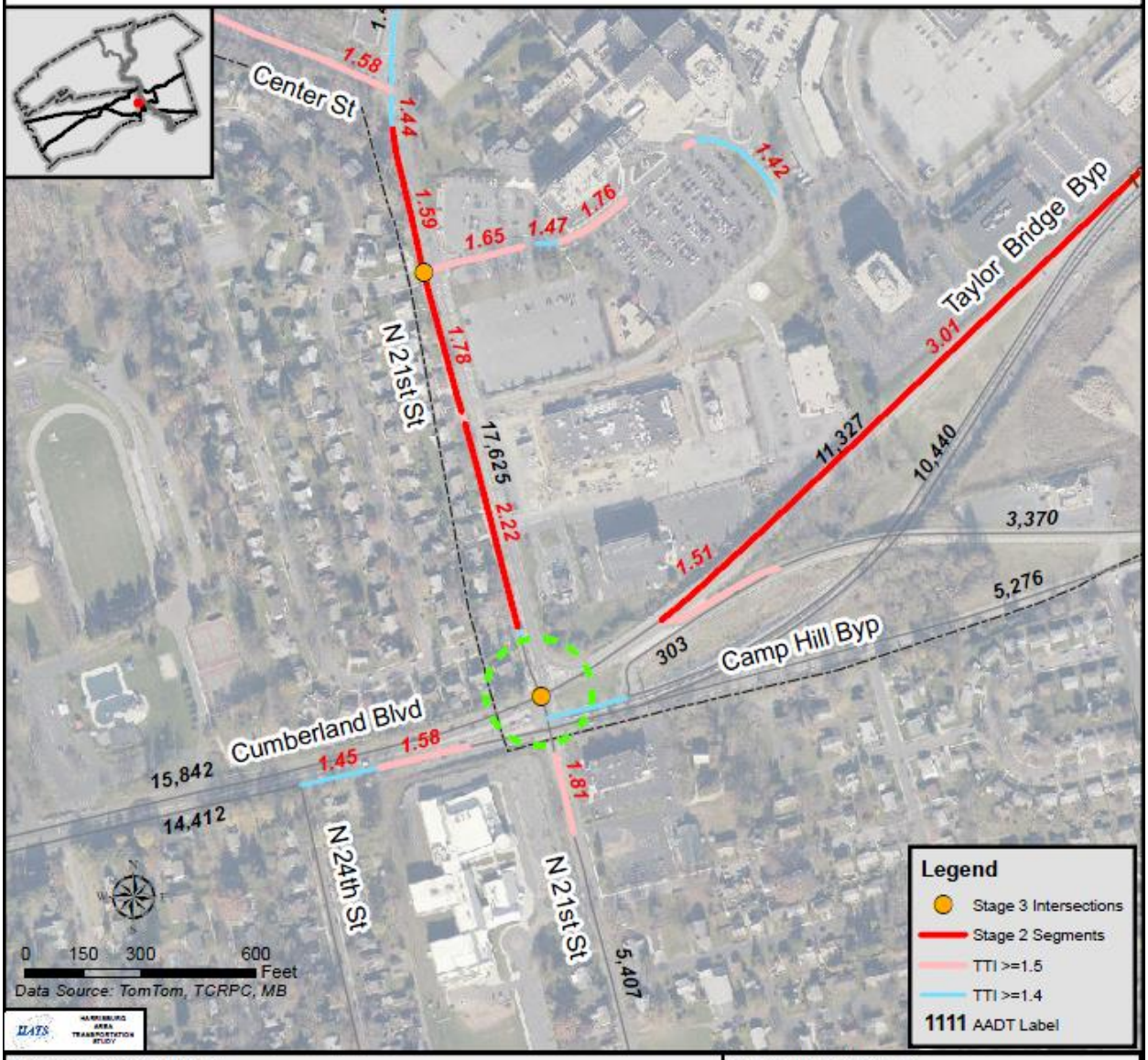
The following pages include a map and associated information for each of the priority intersections in the order as listed in Table 5. The map title indicates the intersection map number and name. Each summary page provides the following:

Main map – Shows the location of the priority intersection and the Annual Average Daily Traffic (AADT) of intersection approach legs as available. Roadway segments with a Travel Time Index (TTI) of 1.4 are shown in blue and 1.5 or greater in red along with their associated values. Stage 2 roadway segments are shown in dark red.
Summary of Conditions – provides a description of the intersection characteristics based on important attributes that relate to congestion including vehicle delay and volume delay rankings.
Congestion Measures – Lists multiple congestion performance measures that exist on the intersection.
Planned Improvements on the RTP and TIP – Indicates existing projects that are on the RTP 2040 or programmed on the TIP (2017-20).
Recommendations – provides possible improvements and applicable CMP strategies.
Additional Factors – provides additional information about the intersection that may help influence investment decisions.

Table 5: HATS CMP Priority Intersections

Map #	Intersection Name	Municipality	County
2	Camp Hill Bypass, 21st St & Cumberland Blvd	East Pennsboro Township	Cumberland
36	Carlisle Pike & Sporting Hill Road	Hampden Township	Cumberland
12	Derry Street & 63rd Street	Swatara Township	Dauphin
4	Governor Road & Cherry Drive	Derry Township	Dauphin
3	Governor Road & Hockersville Road/Fishburn Road	Derry Township	Dauphin
15	Hanover Street & High Street	Carlisle Borough	Cumberland
11	Linglestown Road & Progress Avenue	Susquehanna Township	Dauphin
7	Main Street (PA 641) & Walnut Street	Mechanicsburg Borough	Cumberland
10	Market Street & 32nd Street	Camp Hill Borough	Cumberland
66	Progress Avenue & Walnut Street	Susquehanna Township	Dauphin
22	Route 22 (Jonestown Rd)/Prince Street & S Houcks Road	Lower Paxton Township	Dauphin
8	Route 322/Chambers Hill Road/Grayson Road & 82nd Street	Swatara Township	Dauphin
25	Route 322 & Mushroom Hill Road	Swatara Township	Dauphin
1	Route 322 off ramp (Hummelstown) & Middletown Road	Derry Township	Dauphin
14	Simpson Ferry Road/Sheely Lane & Wesley Drive	Hampden Township	Cumberland
5	Walnut Street & Hoffer Street	Susquehanna Township, Penbrook Borough	Dauphin

Intersection 2: *Camp Hill Bypass, 21st St & Cumberland Blvd.,E. Pennsboro Twp*



Summary of Conditions

The intersection of the Camp Hill Bypass, 21st St & Cumberland Blvd in East Pennsboro Township is ranked #2 in peak vehicle delay and #1 in peak volume delay. The highest vehicle delay segment is on the North 21st Street southbound movement at 69%. This roadway provides access to many office/business uses. The Camp Hill Bypass/Cumberland Blvd roadway serves as principal arterial and 21st Street as a minor arterial.

Congestion Measures

AM Peak Delay Per Vehicle (sec):	21
PM Peak Delay Per Vehicle (sec):	121
% of Total Delay on Leg with most delay	69%
Peak Hour Volume:	4,211
AM Peak Vol. Delay (Hr):	3:17:54
PM Peak Vol. Delay (Hr):	6:40:51
Truck Peak Hour Volume:	43
Truck Peak Hour Vol. Delay (Hr)	0:19:34

Planned Improvements on RTP & TIP

* No 2017-20 TIP or RTP 2040 projects in corridor.

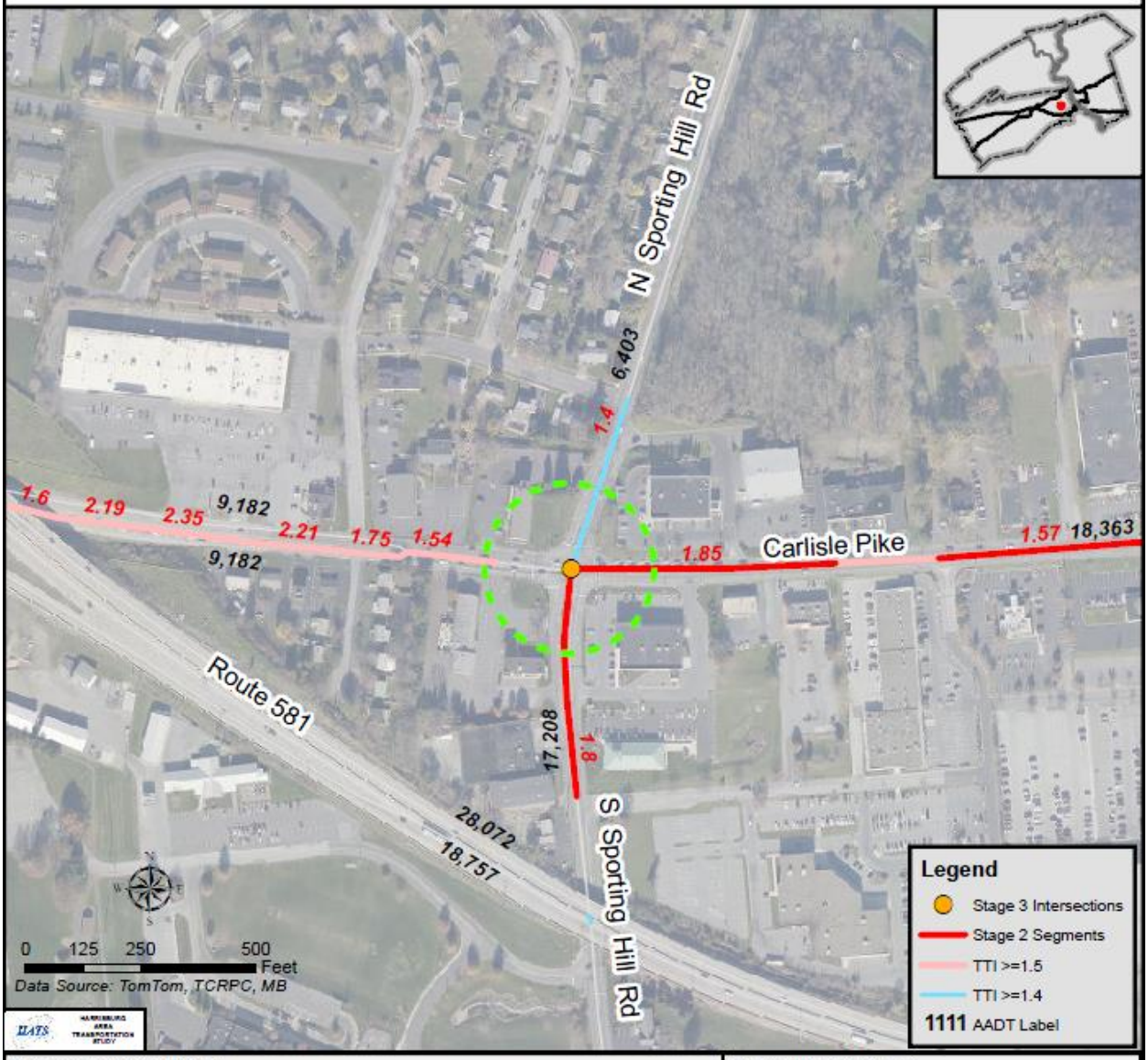
Recommendations

* Explore variable work hour and carpool programs.
* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle and pedestrian infrastructure along corridor.

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	System
NPMRDS:	Yes
INRIX:	Yes

Intersection 36: *Carlisle Pk & Sporting Hill Rd, Hampden Twp.*



Summary of Conditions

The intersection of Carlisle Pk and Sporting Hill Rd in Hampden Township is ranked #7 in peak vehicle delay and #5 in peak volume delay. Carlisle Pk is a main east/west corridor where major shopping centers exist just west of the intersection. The highest delay occurs on the Carlisle Pk westbound approach (42%). Carlisle Pk serves as a principal arterial, while northbound Sporting Hill Rd as a minor arterial and southbound as an urban collector. This intersection was recently updated with adaptive signals as part of MPMS #89102 in 2016. A restaurant has been approved at the southwest corner of intersection and access off Carlisle Pk will be reduced from two to one access point.

Planned Improvements on RTP & TIP

* RTP 2040 project Ranked #46 - Carlisle Pike Sporting Hill Rd intersection; CLASH #3
* No TIP 2017-20 projects.

Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Explore variable work hour and carpool programs at the Naval Support Activity military base.

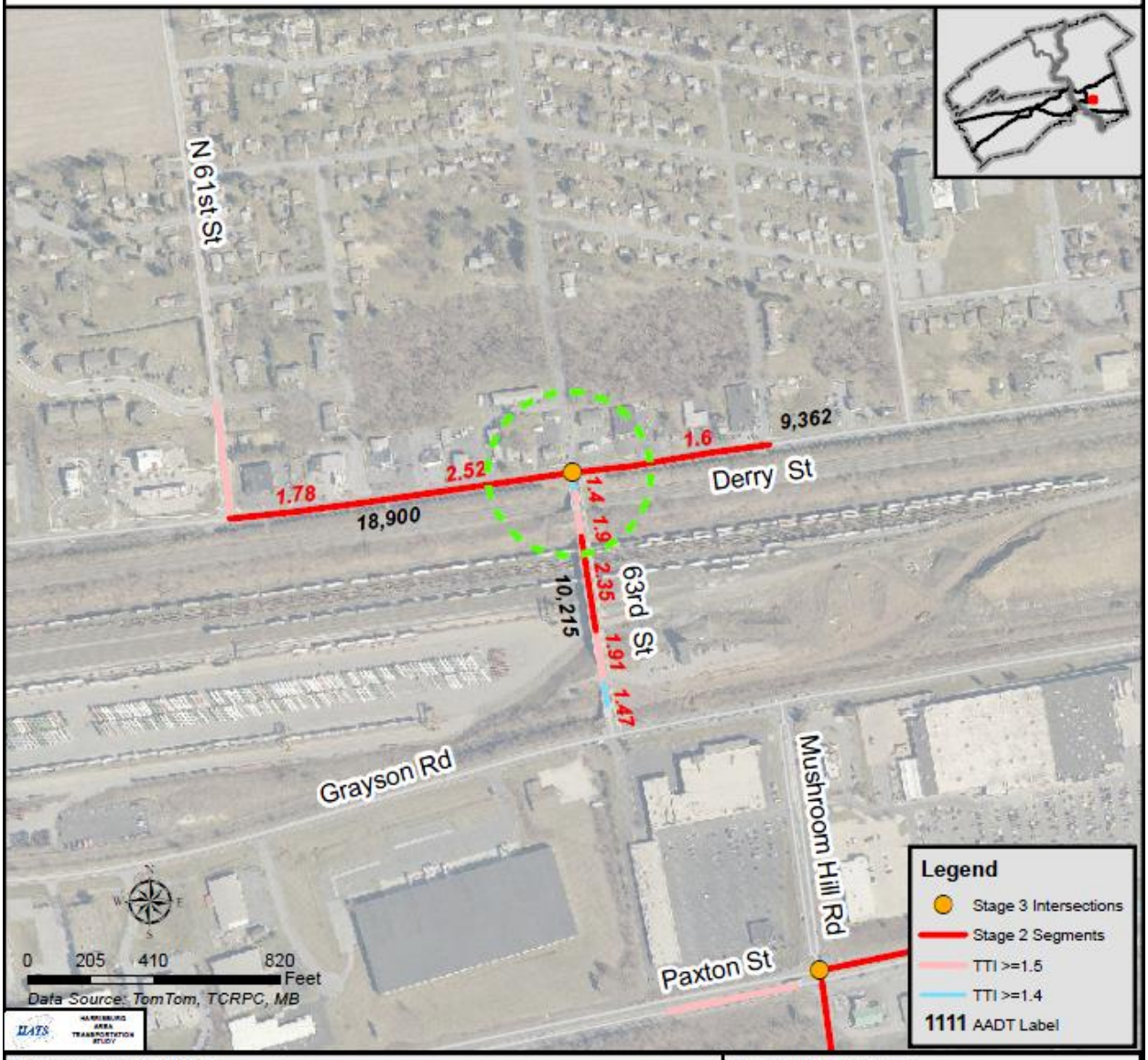
Congestion Measures

AM Peak Delay Per Vehicle (sec):	12
PM Peak Delay Per Vehicle (sec):	79
% of Total Delay on Leg with most delay	42%
Peak Hour Volume:	3,249
AM Peak Vol. Delay (Hr):	2:24:08
PM Peak Vol. Delay (Hr):	18:47:39
Truck Peak Hour Volume:	80
Truck Peak Hour Vol. Delay (Hr)	0:04:19

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	System
NPMRDS:	NA
INRIX:	NA

Intersection 12: *Derry St & 63rd St, Swatara Twp.*



Summary of Conditions

The intersection of Derry Street and 63rd Street in Swatara Township is ranked #16 in peak vehicle delay and #16 in peak volume delay. The highest delay occurs on the Derry Street eastbound approach (54%). Derry Street and the 63rd Street northbound approach serve as minor arterial roadways, and the 63rd Street southbound approach is a local roadway. There are left turn lanes on Derry Street eastbound and westbound approaches.

Congestion Measures

AM Peak Delay Per Vehicle (sec):	9
PM Peak Delay Per Vehicle (sec):	52
% of Total Delay on Leg with most delay	54%
Peak Hour Volume:	1,447
AM Peak Vol. Delay (Hr):	1:02:41
PM Peak Vol. Delay (Hr):	9:56:17
Truck Peak Hour Volume:	25
Truck Peak Hour Vol. Delay (Hr)	0:03:49

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects planned.

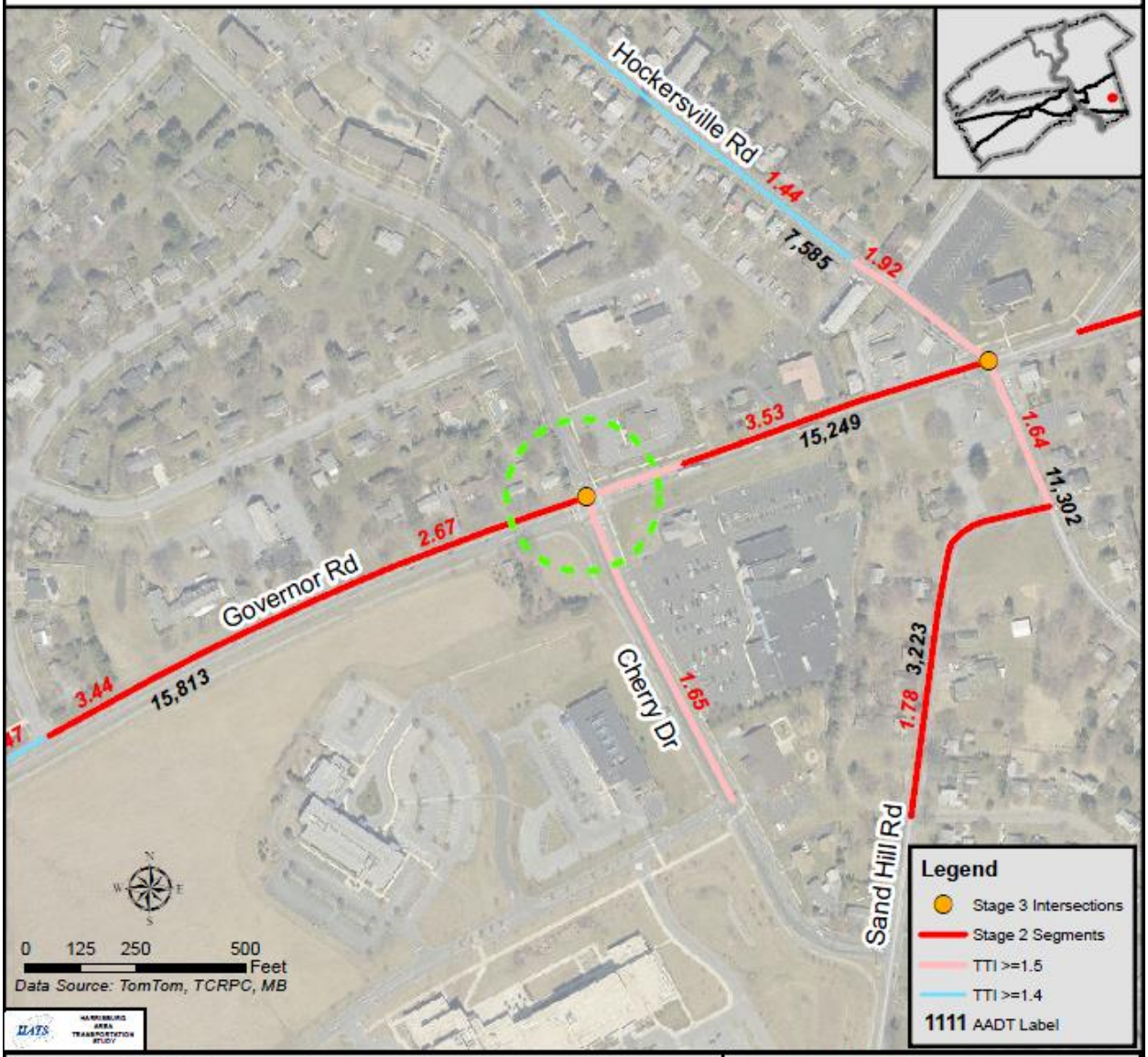
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Explore access management improvements.

Additional Factors

National Highway System:	No
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	Isolated
NPMRDS:	NA
INRIX:	NA

Intersection 4: *Governor Rd & Cherry Dr, Derry Twp.*



Summary of Conditions

The intersection of Governor Road and Cherry Drive in Derry Township is ranked #8 in peak vehicle delay and #9 in peak volume delay. Cherry Drive provides access to the Penn State Milton Hershey Medical Center on the southwest corner of the intersection, a large employer in the region. There is also a shopping area on the southeast corner that includes a Karns grocery store. The highest delay occurs on the Governor Rd eastbound approach (78%). Governor Road serves as a principal arterial, and Cherry Drive is a local road.

Congestion Measures

AM Peak Delay Per Vehicle (sec):	15
PM Peak Delay Per Vehicle (sec):	76
% of Total Delay on Leg with most delay	78%
Peak Hour Volume:	1,581
AM Peak Vol. Delay (Hr):	1:25:34
PM Peak Vol. Delay (Hr):	13:00:16
Truck Peak Hour Volume:	57
Truck Peak Hour Vol. Delay (Hr)	1:04:55

Planned Improvements on RTP & TIP

* RTP 2040 Project Ranked #2: US 322 Governor Road from University Drive to Fishburn Road.

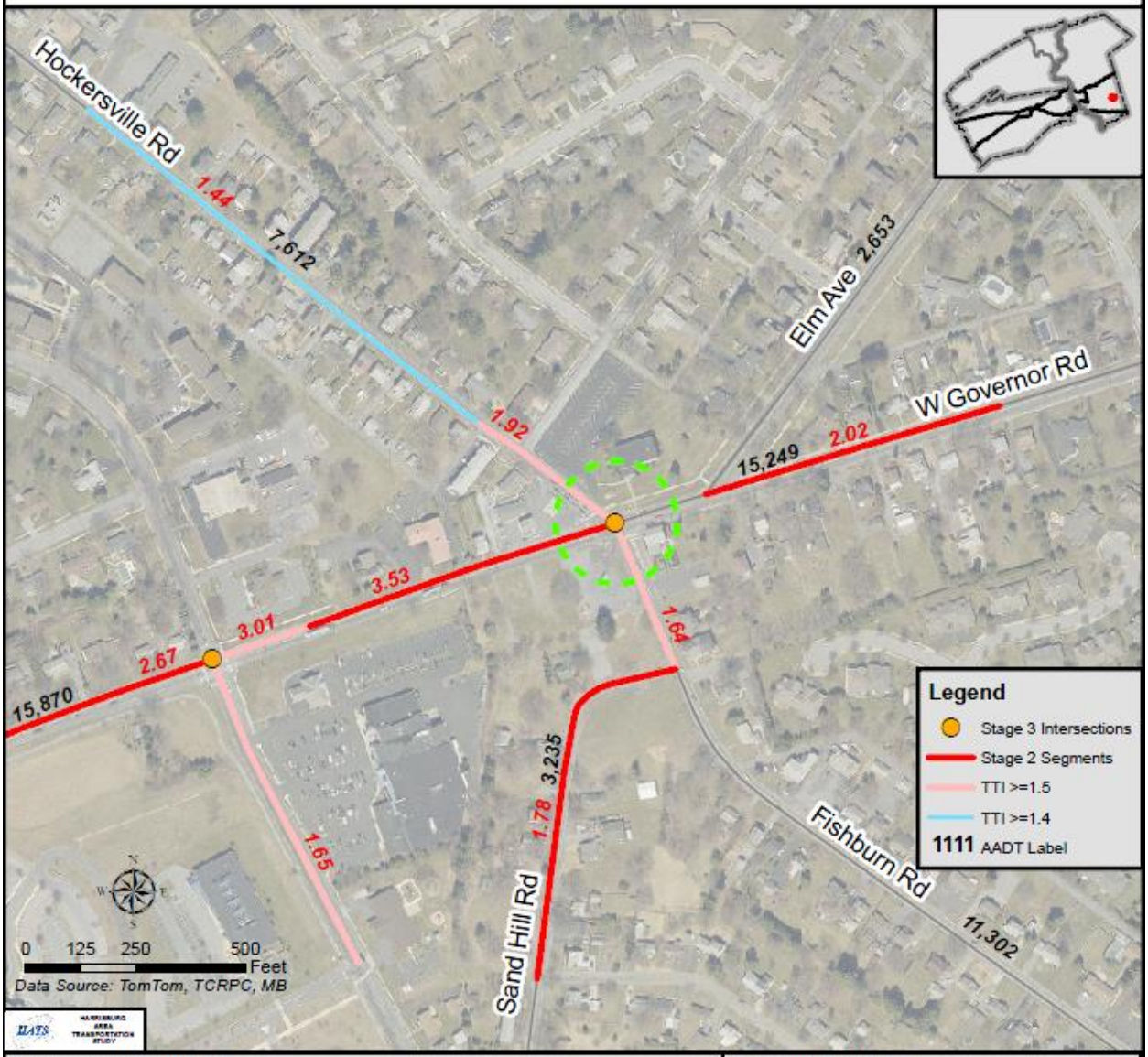
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle, pedestrian and transit infrastructure around intersection.

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	System
NPMRDS:	Yes
INRIX:	Yes

Intersection 3: *Governor Rd & Hockersville Rd/Fishburn Rd, Derry Twp.*



Summary of Conditions

The intersection of Route 322 (Governor Rd) and Hockersville Rd/Fishburn Road in Derry Township ranked #1 in peak vehicle delay and #3 in peak volume delay. The highest vehicle delay segment is on the Governor Road eastbound approach (65%). A mixed use retail and office development is proposed at the southwest corner of the intersection. Governor Rd is a major east/west corridor from Harrisburg to the Milton Hershey School and High School complex. Hockersville is major north/south corridor providing access to Hersheypark facilities.

Congestion Measure

AM Peak Delay Per Vehicle (sec):	36
PM Peak Delay Per Vehicle (sec):	123
% of Total Delay on Leg with most delay	65%
Peak Hour Volume:	2,469
AM Peak Vol. Delay (Hr):	4:56:08
PM Peak Vol. Delay (Hr):	19:57:29
Truck Peak Hour Volume:	63
Truck Peak Hour Vol. Delay (Hr)	1:21:22

Planned Improvements on RTP & TIP

* RTP 2040 Project Ranked #2: US 322 Governor Road from University Drive to Fishburn Road.

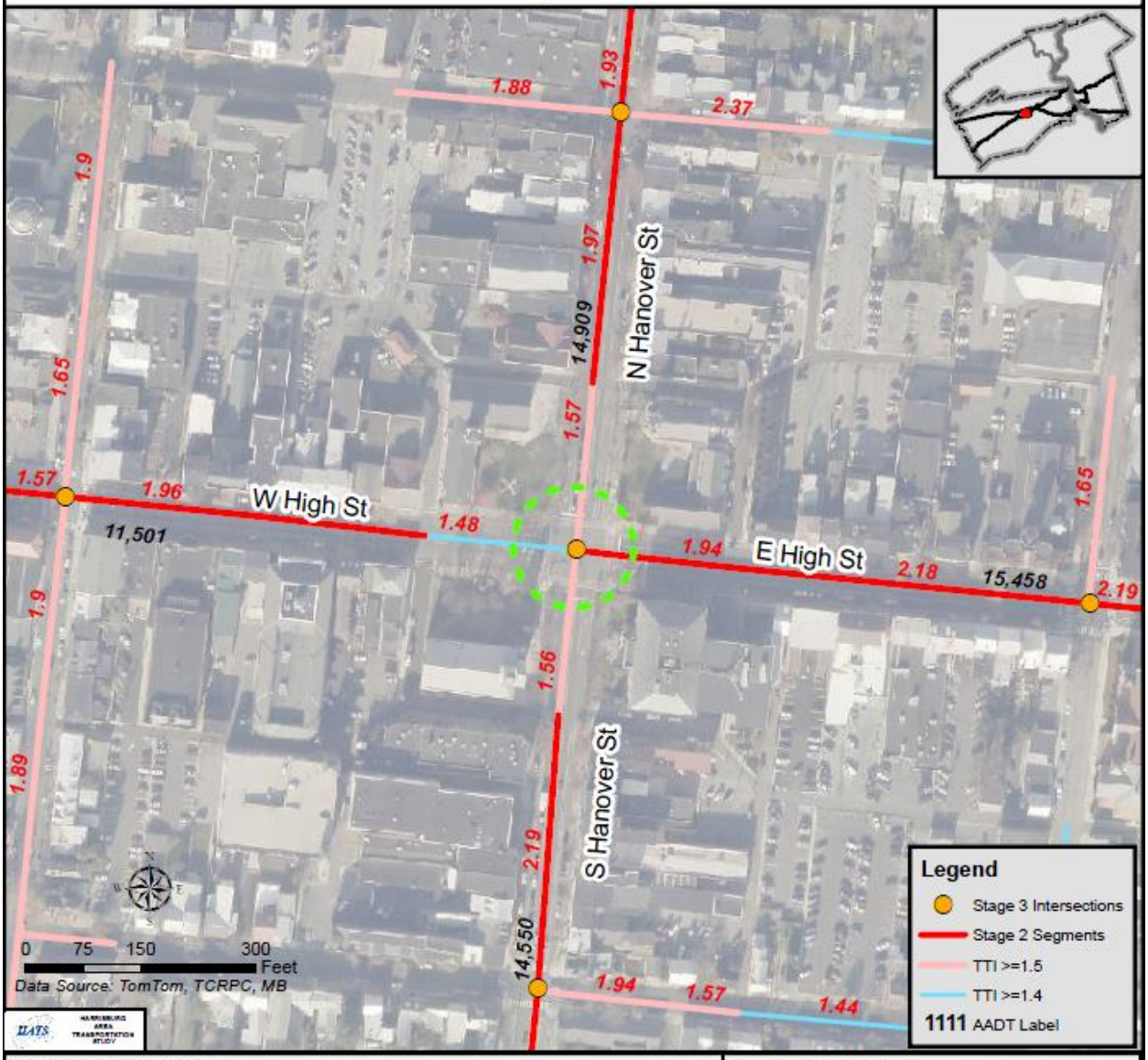
Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	System
NPMRDS:	Yes
INRIX:	Yes

Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle, pedestrian and transit infrastructure around intersection.
* Explore access management improvements.

Intersection 15: *Hanover St & High St, Carlise Borough*



Summary of Conditions

The intersection of High Street and Hanover Street in Carlisle Borough is ranked #6 in peak vehicle delay and #8 in peak volume delay. This intersection occurs at the heart of downtown Carlisle and serves as the main corridor through the Borough for both north/south and east/westbound movements. The highest delay occurs on the westbound approach (High St) at 31%. The County Court House and other government facilities are located at the intersection. Both High Street and Hanover Street serve as principal arterials. There is high pedestrian and bicycle activity in this area.

Congestion Measures

AM Peak Delay Per Vehicle (sec):	11
PM Peak Delay Per Vehicle (sec):	79
% of Total Delay on Leg with most delay	31%
Peak Hour Volume:	2,821
AM Peak Vol. Delay (Hr):	1:41:21
PM Peak Vol. Delay (Hr):	15:40:15
Truck Peak Hour Volume:	117
Truck Peak Hour Vol. Delay (Hr)	1:34:20

Planned Improvements on RTP & TIP

* Not TIP 2017-20 or RTP 2040 projects.

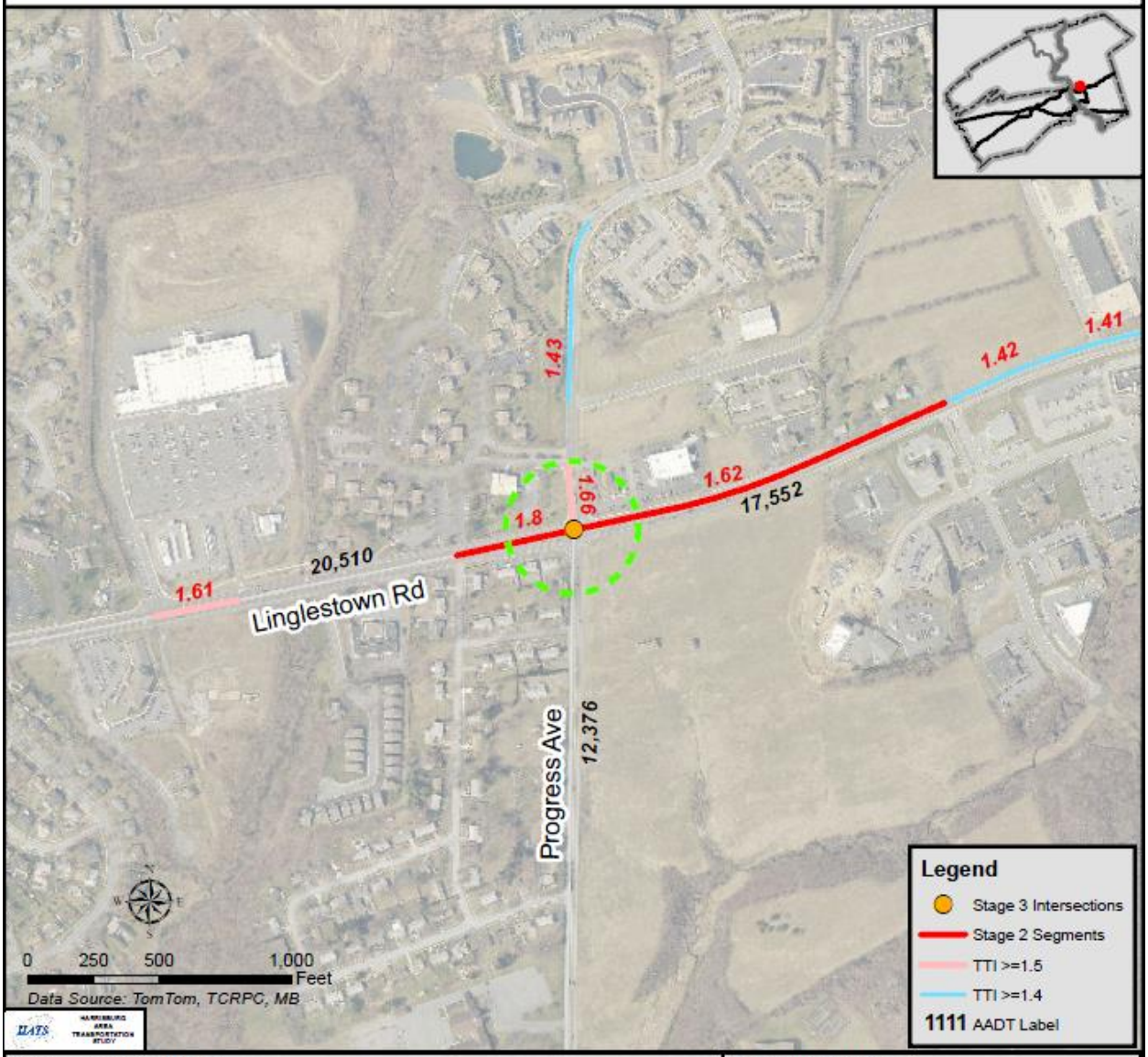
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Traffic Signal:	System
NPMRDS:	Yes
INRIX:	Yes

Intersection 11: *Linglestown Rd & Progress Ave, Susquehanna Twp.*



Summary of Conditions

The intersection of Linglestown Road and Progress Avenue in Susquehanna Township is ranked #15 in peak volume delay and #17 in peak vehicle delay. The highest delay occurs on the Linglestown westbound approach (60%). Linglestown Road is a minor arterial undivided road with 2 lanes in each direction including a left-turn lane at both intersection approaches. Progress Avenue is an undivided roadway with 1 lane in each direction including a left-turn lane at both intersection approaches. The northbound approach is a minor arterial roadway and the southbound a local road. The southeast corner of intersection is currently being proposed as a mixed use development.

Planned Improvements on RTP & TIP

* RTP 2040 Rank #32: Linglestown Rd and Progress Ave intersection improvements, including Progress Avenue northbound and southbound right-turn lanes.

Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle, pedestrian and transit infrastructure around intersection.

Congestion Measures

AM Peak Delay Per Vehicle (sec):	10
PM Peak Delay Per Vehicle (sec):	48
% of Total Delay on Leg with most delay	60%
Peak Hour Volume:	2,522
AM Peak Vol. Delay (Hr):	1:10:33
PM Peak Vol. Delay (Hr):	9:59:36
Truck Peak Hour Volume:	45
Truck Peak Hour Vol. Delay (Hr)	0:31:50

Additional Factors

National Highway System:	No
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	System
NPMRDS:	Yes
INRIX:	No

Intersection 7: *Main St (PA 641) & Walnut St, Mechanicsburg Borough*

Summary of Conditions

The intersection of Main St (PA 641) and Walnut St in Mechanicsburg Borough is ranked #3 in peak vehicle delay and #7 in peak volume delay. There is significant commercial development along all approaches to the intersection and Main Street serves as a major east/west corridor for pass through traffic. The highest vehicle delay segment is on Main Street westbound at 75%. There are prohibited left turns between 4:00 and 6:00 pm on weekdays on the northbound and westbound approaches to the intersection according to signage. PA 641 serves as principal arterial and Walnut Street as a urban collector.

Planned Improvements on RTP & TIP

* No 2017-20 TIP or RTP 2040 projects in corridor.

Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.

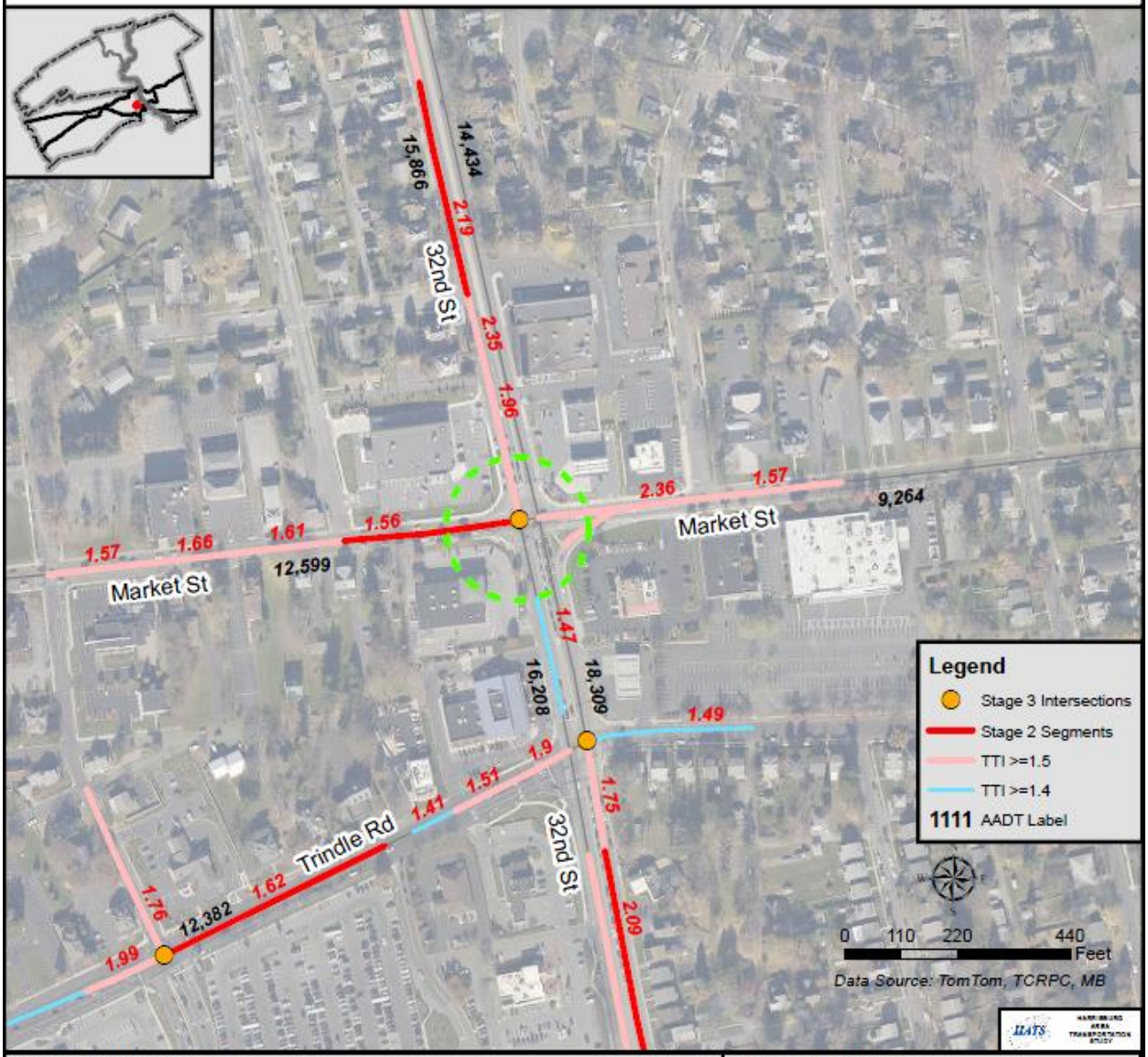
Congestion Measures

AM Peak Delay Per Vehicle (sec):	14
PM Peak Delay Per Vehicle (sec):	95
% of Total Delay on Leg with most delay	75%
Peak Hour Volume:	2,637
AM Peak Vol. Delay (Hr):	1:58:21
PM Peak Vol. Delay (Hr):	17:09:57
Truck Peak Hour Volume:	92
Truck Peak Hour Vol. Delay (Hr)	0:46:47

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	System
NPMRDS:	NA
INRIX:	NA

Intersection 10: *Market St & 32nd St. Camp Hill Borough*



Summary of Conditions

The intersection of Market Street and 32nd Street in Camp Hill Borough is ranked #10 in peak vehicle delay and #4 in peak volume delay. Market Street is a major east/west corridor providing access to a variety of residential and commercial uses. 32nd Street serves land uses farther north including employment around the Camp Hill Bypass area. The highest delay occurs on the 32nd St southbound approach (48%). Both Market Street and 32nd Street serve as a principal arterials. This intersection was configured with adaptive signals as part of TIP project MPMS #89102 in 2016.

Congestion Measures

AM Peak Delay Per Vehicle (sec):	28
PM Peak Delay Per Vehicle (sec):	67
% of Total Delay on Leg with most delay	48%
Peak Hour Volume:	4,511
AM Peak Vol. Delay (Hr):	4:15:50
PM Peak Vol. Delay (Hr):	19:56:02
Truck Peak Hour Volume:	72
Truck Peak Hour Vol. Delay (Hr)	0:18:37

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects planned.

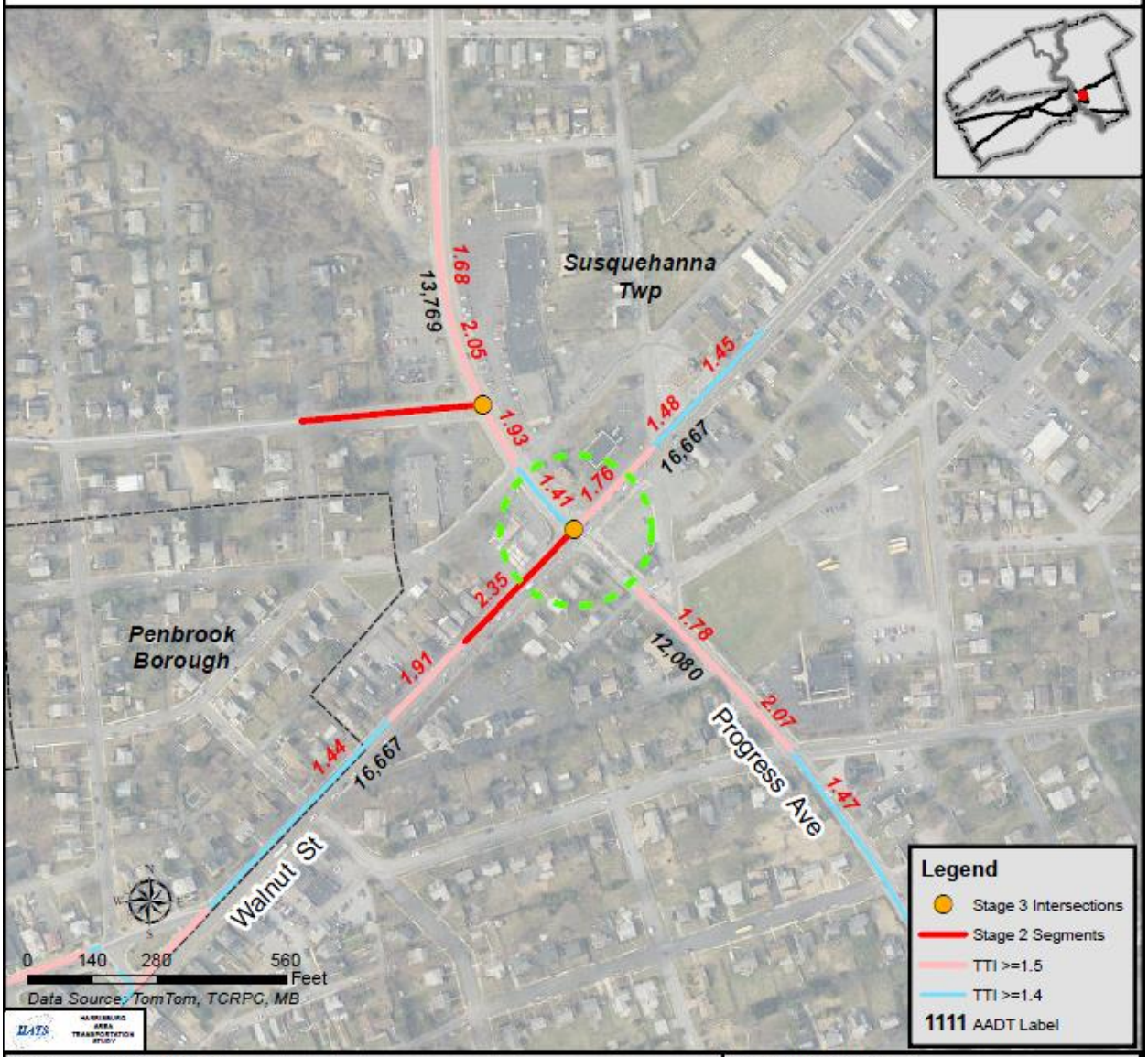
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	Isolated
NPMSRDS:	NA
INRIX:	NA

Intersection 66: *Progress Ave & Walnut St, Susquehanna Twp.*



Summary of Conditions

The intersection of Progress Avenue and Walnut Street in Susquehanna Township is ranked #12 in peak volume delay and #13 in peak vehicle delay. The highest delay occurs on the Walnut eastbound approach (38%). Walnut Street is a principal arterial undivided roadway with 2 lanes in each direction, but no left-turn lanes on intersection approaches. Progress Avenue is minor arterial undivided roadway with 1 lane in each direction including a left-turn lane at both intersection approaches.

Congestion Measures

AM Peak Delay Per Vehicle (sec):	7
PM Peak Delay Per Vehicle (sec):	58
% of Total Delay on Leg with most delay	38%
Peak Hour Volume:	2,959
AM Peak Vol. Delay (Hr):	1:15:06
PM Peak Vol. Delay (Hr):	11:30:56
Truck Peak Hour Volume:	51
Truck Peak Hour Vol. Delay (Hr)	0:32:43

Planned Improvements on RTP & TIP

* RTP 2040 Rank #22: Progress Ave and Walnut Street intersection improvements.

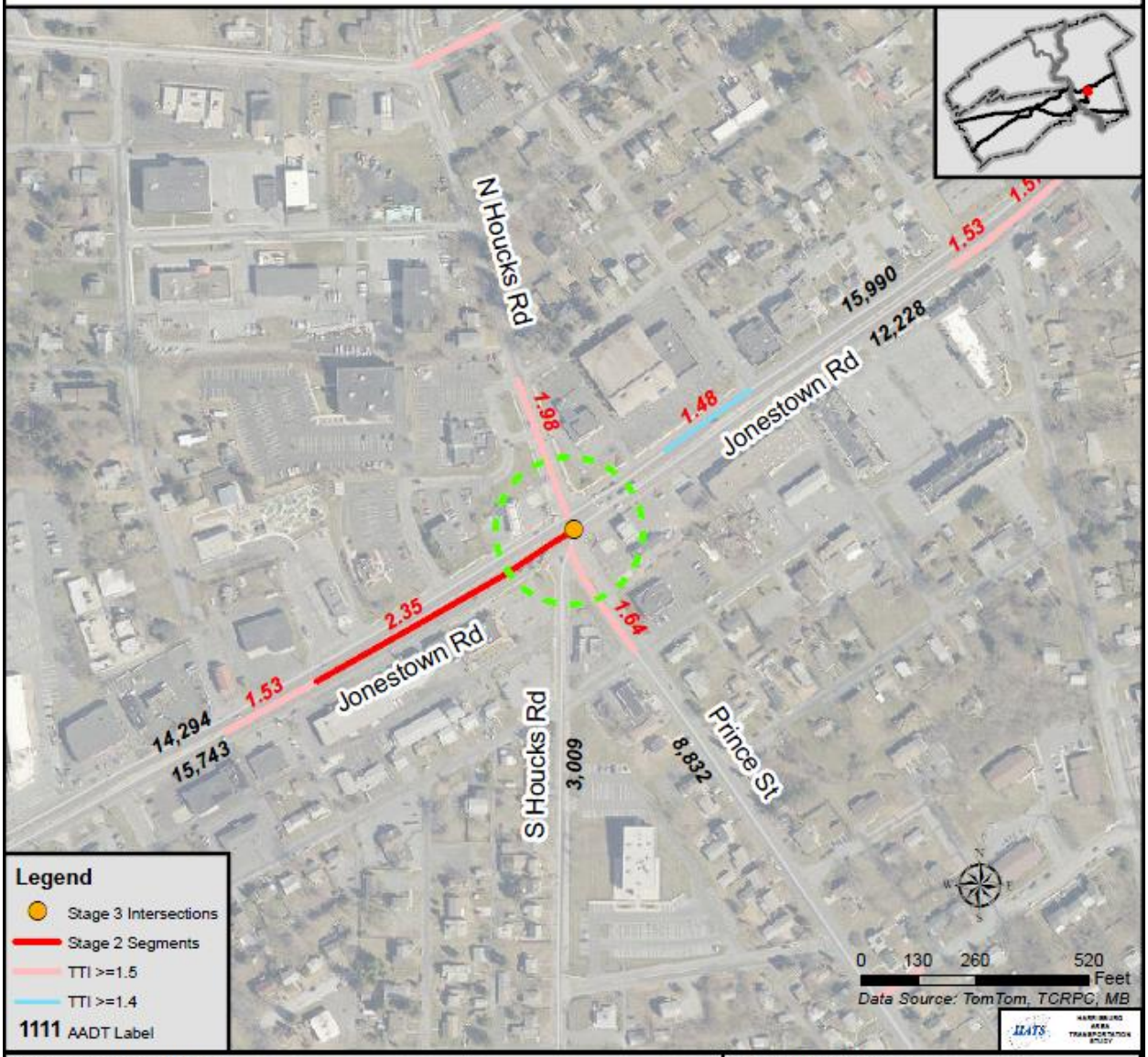
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle, pedestrian and transit infrastructure along corridor.

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	Yes
TCRPC Priority Crash Corridor:	Yes
Transit Route:	Yes
Traffic Signal:	System
NPMRDS:	Yes
INRIX:	Yes

Intersection 22: *Route 22 (Jonestown Rd)/Prince St & Houcks Rd, L Paxton Twp.*



Summary of Conditions

The intersection of Route 22 (Jonestown Rd)/Houcks Rd/Prince St in Lower Paxton Township is ranked #10 in peak volume delay and #12 in peak vehicle delay. Route 22 is a 2 lane divided highway in both directions and connects the eastern portion of Dauphin County to downtown Harrisburg. Houcks Rd runs north/south and is one-way southbound, south of the intersection. There is major traffic during the weekends due to the high number of commercial and retail uses. The highest delay occurs on Jonestown Rd eastbound (49%). This intersection was configured with adaptive signals for TIP project MPMS #89102 in 2016.

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects planned.

Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle, pedestrian and transit infrastructure along corridor.
* Explore access management improvements.

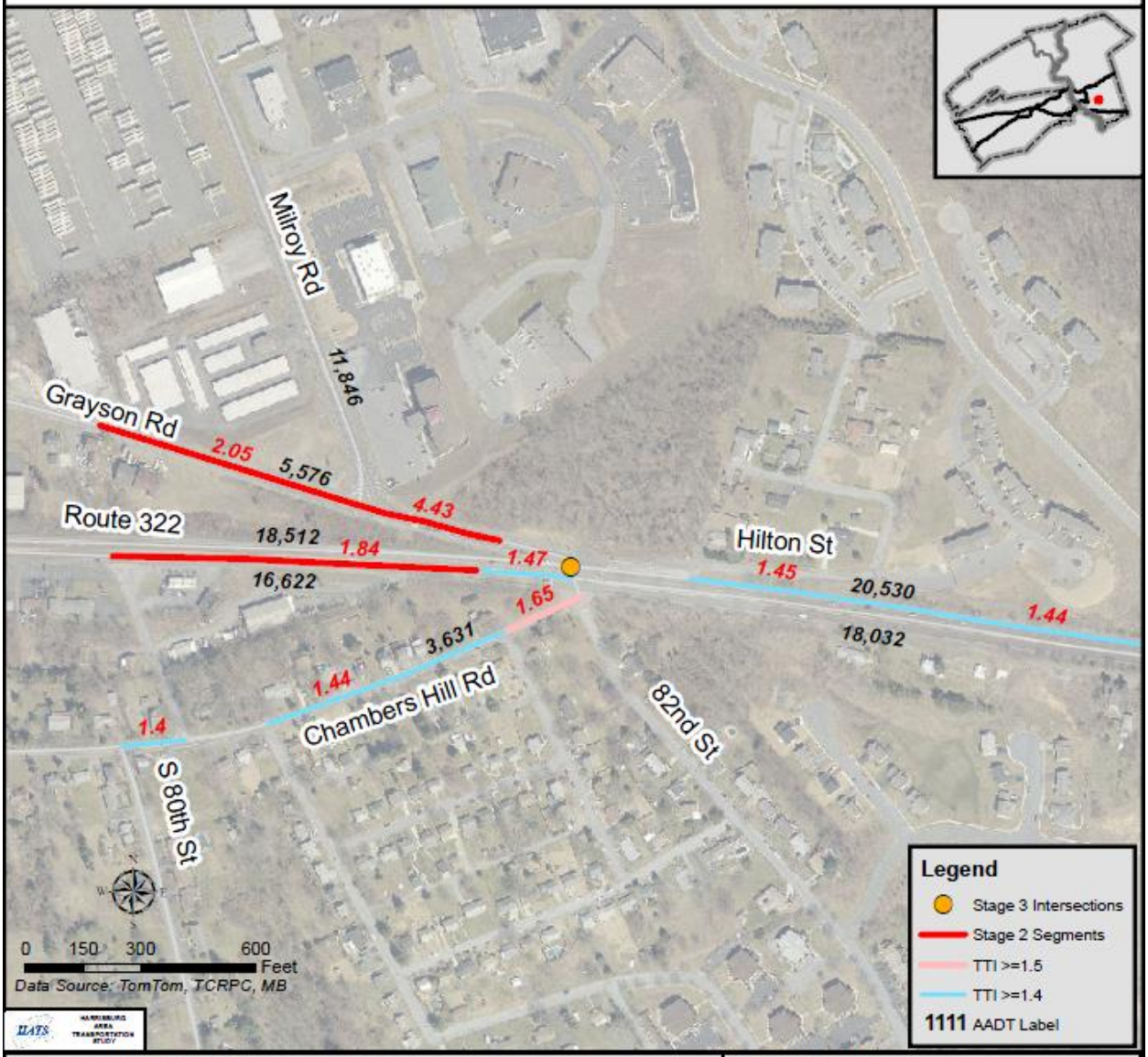
Congestion Measures

AM Peak Delay Per Vehicle (sec):	16
PM Peak Delay Per Vehicle (sec):	58
% of Total Delay on Leg with most delay	49%
Peak Hour Volume:	4,185
AM Peak Vol. Delay (Hr):	1:30:16
PM Peak Vol. Delay (Hr):	12:51:39
Truck Peak Hour Volume:	100
Truck Peak Hour Vol. Delay (Hr)	1:07:43

Additional Factors

National Highway System:	Yes
LOS D or Worse:	No
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	System
NPMRDS:	Yes
INRIX:	Yes

Intersection 8: *Route 322/Chambers Hill Rd/Grayson Rd & 82nd St, Swatara Twp*



Summary of Conditions

The intersection of Route 322/Chambers Hill Rd/Grayson Rd /82nd St and Hilton St in Swatara Township is ranked #5 in peak vehicle delay and #2 in peak volume delay. This is a 6 point skewed intersection that contains multiple signal phasing's. The highest delay occurs on the southeast approach (Grayson Rd) at 79%. The westbound/eastbound traffic is a major corridor between Hershey and the City of Harrisburg. Grayson Rd is intersected by Milroy Rd just north of the intersection that serves as a north/south corridor providing access to residential neighborhoods to the north.

Planned Improvements on RTP & TIP

* MPMS #92945 -Reconstruct and reduce number of intersection approaches and align at more of a 90 degree angle.
* No RTP 2040 projects

Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Reconstruct and reduce the number of intersection approaches and align at a 90 degree angle.

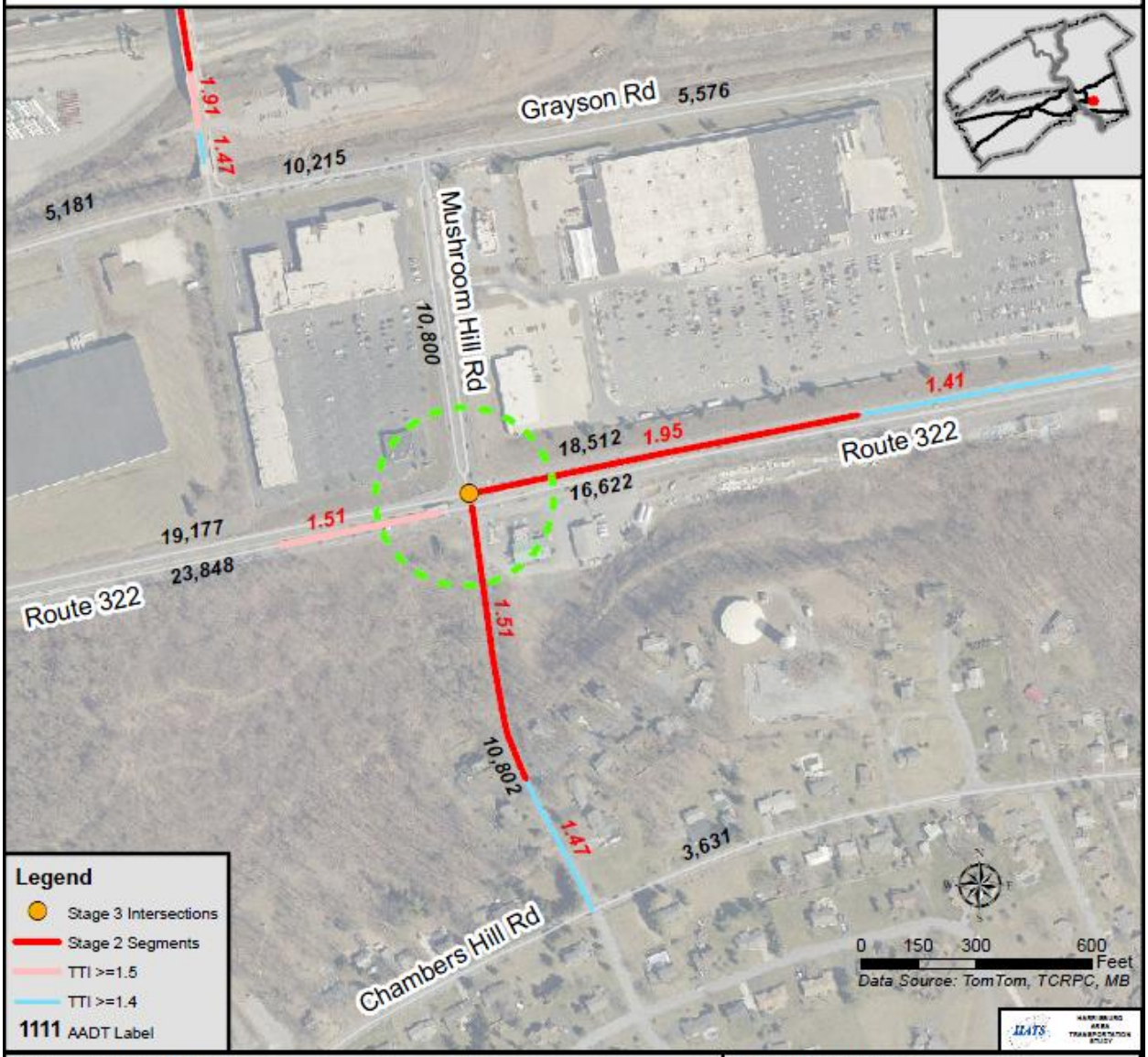
Congestion Measures

AM Peak Delay Per Vehicle (sec):	22
PM Peak Delay Per Vehicle (sec):	87
% of Total Delay on Leg with most delay	79%
Peak Hour Volume:	4,671
AM Peak Vol. Delay (Hr):	3:37:48
PM Peak Vol. Delay (Hr):	1:28:03
Truck Peak Hour Volume:	131
Truck Peak Hour Vol. Delay (Hr)	1:02:52

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	Isolated
NPMRDS:	Yes
INRIX:	Yes

Intersection 25: *Route 322 & Mushroom Hill Rd, Swatara Twp.*



Summary of Conditions

The intersection of Route 322 and Mushroom Hill Rd in Swatara Township is ranked #5 in peak volume delay and #21 in peak vehicle delay. Route 322 is a principal arterial roadway that carries significant traffic between Hershey with downtown Harrisburg. The Mushroom Hill Rd southbound approach is a minor arterial and provides access to the Swatara Square shopping center which includes a Walmart, Weis grocery store and other commercial and retail uses. The northbound approach is an urban collector and primarily serves residential uses. The highest traffic delay occurs on Route 322 westbound (55%).

Congestion Measures

AM Peak Delay Per Vehicle (sec):	17
PM Peak Delay Per Vehicle (sec):	45
% of Total Delay on Leg with most delay	55%
Peak Hour Volume:	5,316
AM Peak Vol. Delay (Hr):	5:31:03
PM Peak Vol. Delay (Hr):	17:46:30
Truck Peak Hour Volume:	182
Truck Peak Hour Vol. Delay (Hr)	0:43:40

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects planned.

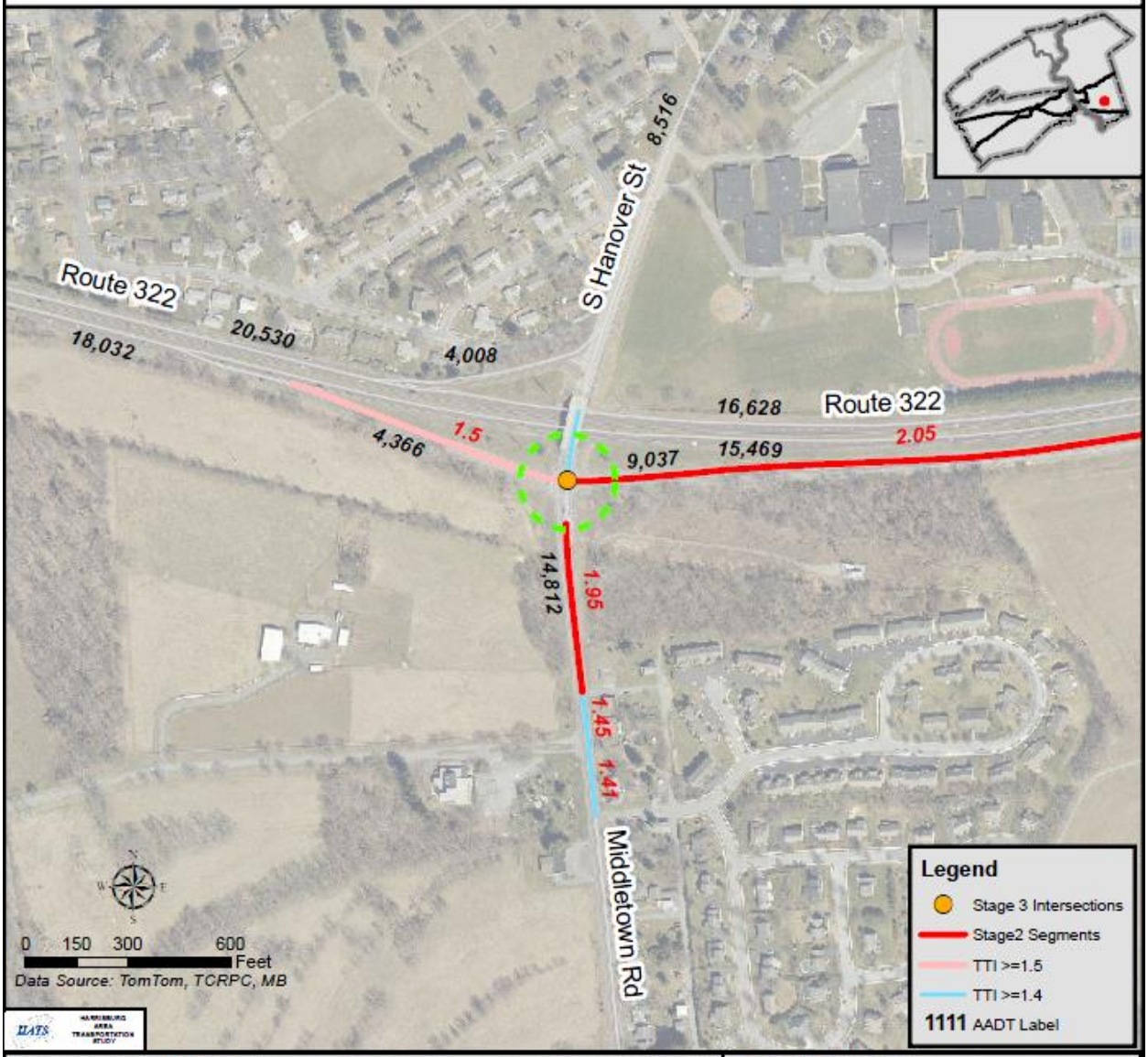
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	Isolated
NPMRDS:	Yes
INRIX:	Yes

Intersection 1: *Route 322 Off Ramp(Hummelstown) & Middletown Rd, Derry Twp.*



Summary of Conditions

The intersection of Route 322 Off ramp (Hummelstown exit)/Service Connector Rd and Middletown Rd/S Hanover St in Derry Township is ranked #4 in peak vehicle delay and #11 in peak volume delay. The highest traffic delay occurs on the westbound approach service connector (SR 2034) at 68%. There is also significant traffic on the northbound approach to access Route 322 as a result a mix of land uses on Middletown Road including warehouses and associated trucks farther south on PA 283.

Congestion Measures

AM Peak Delay Per Vehicle (sec):	19
PM Peak Delay Per Vehicle (sec):	87
% of Total Delay on Leg with most delay	68%
Peak Hour Volume:	2,370
AM Peak Vol. Delay (Hr):	2:21:30
PM Peak Vol. Delay (Hr):	12:14:35
Truck Peak Hour Volume:	100
Truck Peak Hour Vol. Delay (Hr)	1:07:43

Planned Improvements on RTP & TIP

* MPMS #85335 - Additional right turning lane on Middletown Road northbound approach.
* No RTP 2040 projects

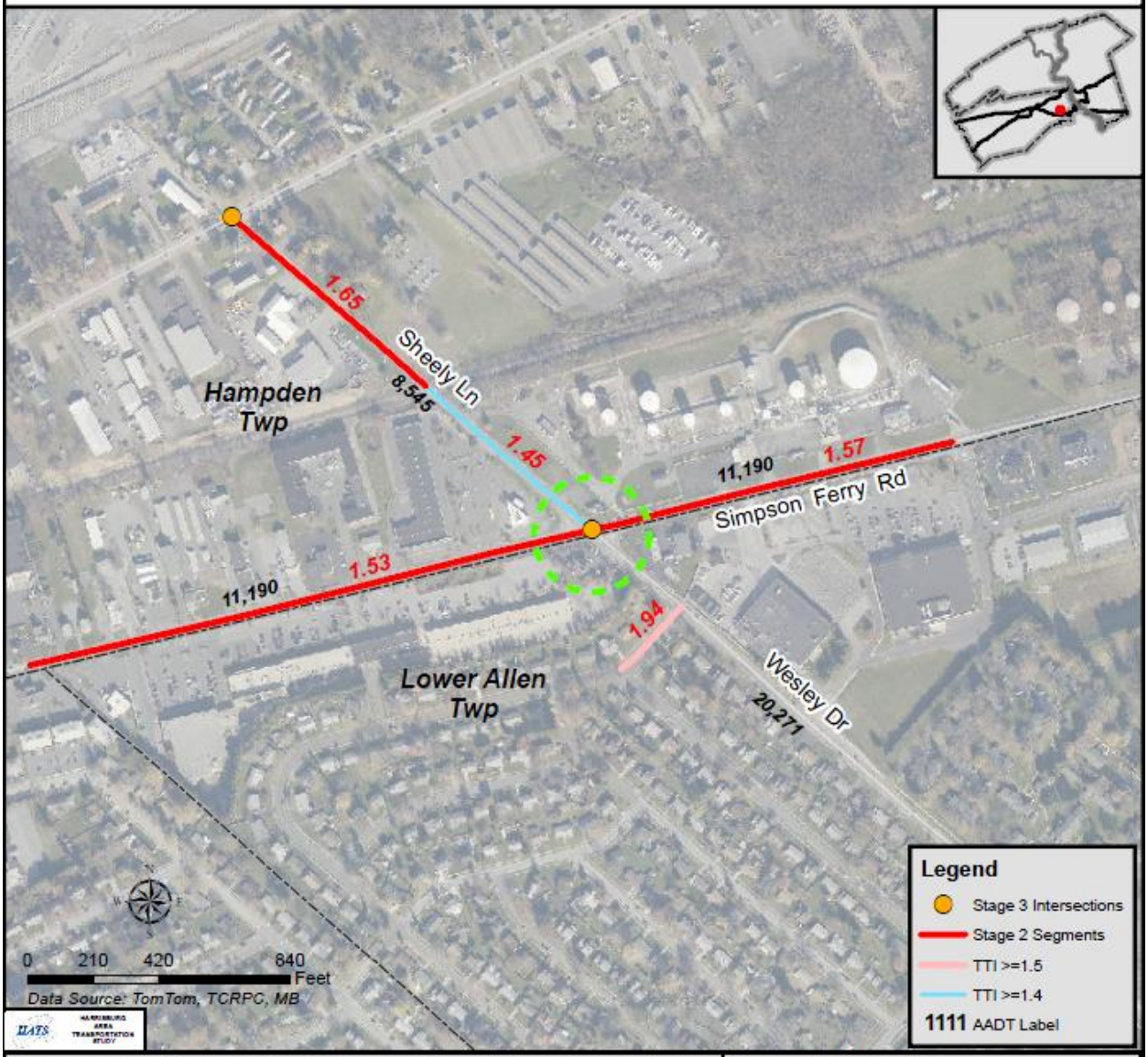
Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.

Additional Factors

National Highway System:	Yes
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	Isolated
NPMRDS:	Yes
INRIX:	No

Intersection 14: *Simpson Ferry Rd & Wesley Dr, Hampden Twp,L Allen Twp*



Summary of Conditions

The intersection of Simpson Ferry Road and Wesley Drive/Sheely Lane in Hampden Township and Lower Allen Township is ranked #11 in peak vehicle delay and #19 in peak volume delay. The highest delay occurs on the Simpson Ferry Road eastbound approach (41%). Simpson Ferry Road is a minor arterial roadway with 1 lane in each direction and a center turning lane, which provides for left-turning movements at intersection approaches. Wesley Drive/Sheely Lane is a minor arterial undivided roadway with 1 lane in each direction including a left-turn lane at both intersection approaches.

Planned Improvements on RTP & TIP

* RTP 2040 Rank #5: Simpson Ferry Rd (SR 2014) & Wesley Dr/Sheely Ln (SR 2021) intersection improvements, including pedestrian infrastructure.
* RTP 2040 Rank #37: Wesley Dr/Sheely Ln (SR 2021) corridor improvements.

Recommendations

* Operational and ITS improvements, specifically signal timing alterations should be considered.
* Enhance bicycle and pedestrian infrastructure along corridor.

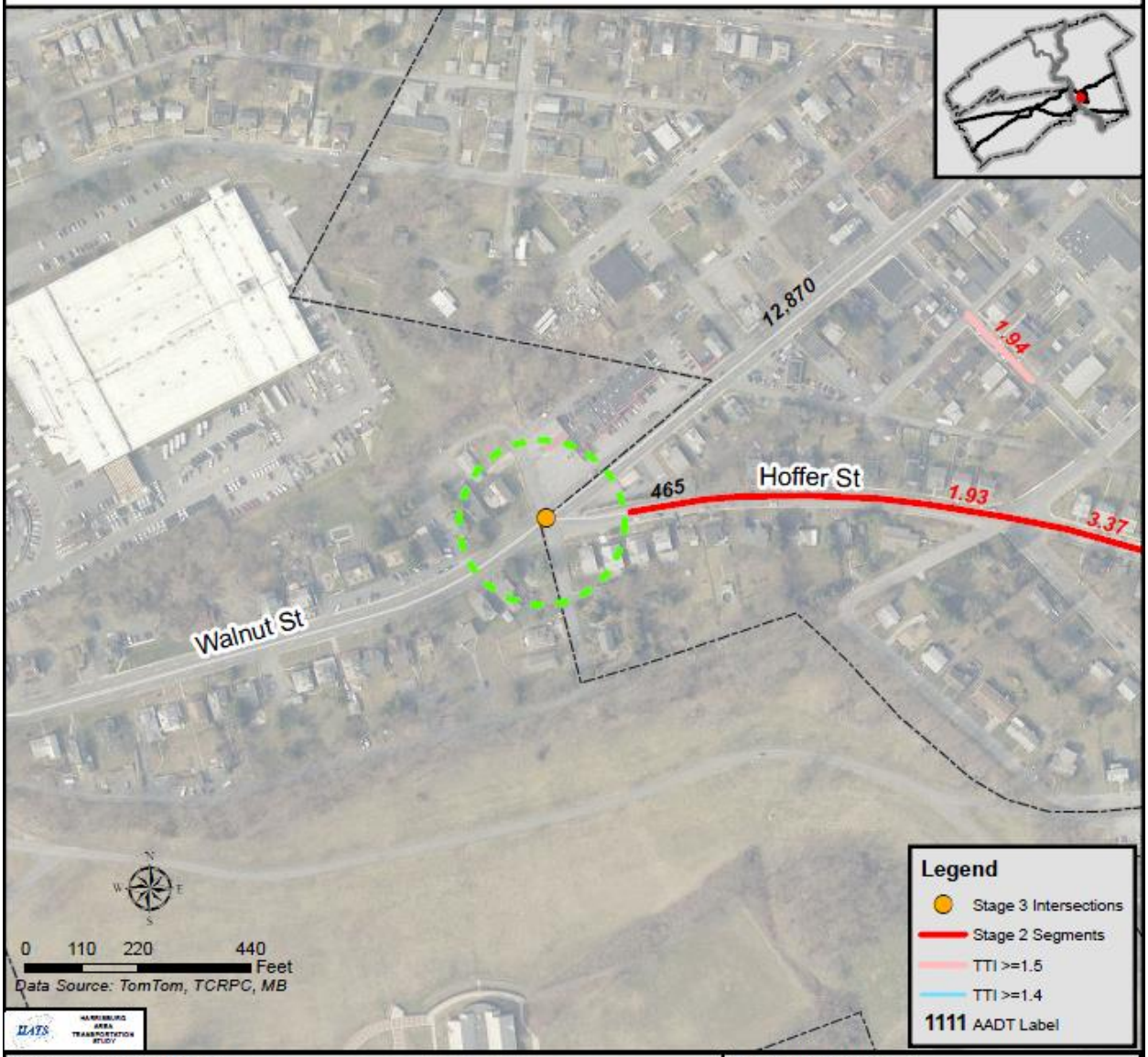
Congestion Measures

AM Peak Delay Per Vehicle (sec):	20
PM Peak Delay Per Vehicle (sec):	59
% of Total Delay on Leg with most delay	41%
Peak Hour Volume:	2,560
AM Peak Vol. Delay (Hr):	2:20:03
PM Peak Vol. Delay (Hr):	9:19:02
Truck Peak Hour Volume:	56
Truck Peak Hour Vol. Delay (Hr)	0:29:56

Additional Factors

National Highway System:	No
LOS D or Worse:	Yes
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	Isolated
NPMRDS:	NA
INRIX:	NA

Intersection 5: *Walnut St & Hoffer St Susquehanna Twp & Penbrook Borough*



Summary of Conditions

The intersection of Walnut Street and Hoffer Street in Susquehanna Township/PenBrook Borough is ranked #9 in peak vehicle delay and #83 in peak volume delay. Hoffer Street is one-way westbound and the highest delay occurs on this approach (98%). This intersection is nearby Harrisburg High School which is located several blocks east, and Hoffer Street provides major access from the High School to Walnut Street. Walnut Street serves as a principal arterial, and Hoffer Street as an urban collector.

Congestion Measures

AM Peak Delay Per Vehicle (sec):	74
PM Peak Delay Per Vehicle (sec):	6
% of Total Delay on Leg with most delay	98%
Peak Hour Volume:	1,067
AM Peak Vol. Delay (Hr):	1:00:01
PM Peak Vol. Delay (Hr):	0:11:44
Truck Peak Hour Volume:	16
Truck Peak Hour Vol. Delay (Hr)	0:03:49

Planned Improvements on RTP & TIP

* No TIP 2017-20 or RTP 2040 projects planned.

Recommendations

* Perform traffic study to determine if intersection warrants a traffic signal.

Additional Factors

National Highway System:	Yes
LOS D or Worse:	No
PennDOT HCL Corridor (2010-14):	No
TCRPC Priority Crash Corridor:	No
Transit Route:	Yes
Traffic Signal:	NA
NPMRDS:	NA
INRIX:	NA

6. Evaluate Effectiveness of Implemented Strategies

A process should be developed to consistently evaluate the performance of corridors and intersections and the effectiveness of any implemented strategies as applicable. Too often improvements are made to reduce congestion and a follow-up is not completed to determine whether congestion has been reduced, or not. Some of this has to do with the lack of staff time to perform a post analysis of congestion and compare the before and after results, some of it has to do with the inability to compare like data to make a sound planning and engineering judgment.

The CMP congestion measures used in the 2013 CMP Plan were developed on a corridor basis using mostly PennDOT roadway data to derive peak delays, unlike this CMP analysis that uses GPS travel speed data to derive peak delays, so it is difficult to make before and after comparisons using delay. However, in the last 2013 CMP the priority corridor summaries were mapped with GPS travel speed data using Travel Time Index (TTI) measures, the same types of measures used in this plan. The time period of the GPS travel speed data used for the prior CMP analysis was (2011 to 2012), and the current CMP is (2015 to 2016). The same priority corridors in the current and prior CMP were evaluated for differences in congestion using the TTI performance measure to determine the effectiveness of implemented strategies, if applicable. The following results include:

1. **Interstate 83 from PA 581 to 19th Street** – This roadway was improved in 2015 as part of the I-83/PA 581 bottleneck interchange improvement project that included a new northbound fourth lane over the I-83 John Harris Bridge that was previously a shoulder. The prior CMP analysis showed a portion of this roadway with a Travel Time Index (TTI) greater than 2.0, but in this analysis no roadways had a TTI greater than 2.0, suggesting congestion was reduced during CMP plan time periods.

2. **Sporting Hill Road from Carlisle Pike to PA 641** – The intersection of Carlisle Pike and Sporting Hill Road was improved as part of an adaptive signal corridor project on Carlisle Pike which was completed in early 2016, which falls between the most recent GPS travel speed data collection period (2015 to 2016), so it would be difficult to make any conclusions on strategy effectiveness. The current CMP analysis shows a TTI of 1.5 or more on Sporting Hill Road on the northbound approach to Carlisle Pike and the southbound approach to Trindle Road. The prior analysis had no roadway segments on Sporting Hill Road greater than 1.5, indicating this roadway congestion increased during CMP plan time periods.

3. **Carlisle Pike from PA 581 to US 11/15** – This corridor was improved as part of an adaptive signal project which was completed in early 2016, again the improvement falling between the most recent speed data collection period causing inconclusive

strategy effectiveness. The current CMP includes one (1) segment on Carlisle Pike just west of Sporting Hill road with a TTI 2.0 or more, and the prior CMP includes the same segment with a TTI of 2.0 or more as well as four other segments along the corridor. This indicates congestion was reduced in this corridor between CMP plan time periods.

4. **US 11/15 from PA 581 to 21st Street** – This corridor was partially improved as part of an adaptive signal project which was completed in early 2016, again the improvement falling between the travel speed data collection period causing inconclusive strategy effectiveness. The current CMP includes two (2) roadway segments with a TTI 2.0 or more; one just north of Market Street and the other just south of Trindle Road. The prior CMP includes just one small segment just north of Market Street. This indicates congestion increased in this corridor between CMP plan time periods.

5. **US 22 (Jonestown Rd) from I-83 to Mountain Road** – This corridor was improved as part of an adaptive signal project which was completed in early 2016, again the improvement falling between the travel speed data collection period causing inconclusive strategy effectiveness. The current CMP includes one roadway segment with a TTI 2.0 or more on US 22 just west of Prince Street. The prior CMP includes four (4) segments with a TTI 2.0 or more including the one at Prince Street. This indicates congestion was reduced in this corridor between CMP plan time periods.

6. **PA 641 from US 15 to PA 114** – This corridor contains no known improvements over the CMP time periods. The current CMP includes three (3) roadway segments with a TTI 2.0 or more. Two segments are on the eastbound and westbound approaches to PA 114 and the other is on the westbound approach to Walnut Street, all in Mechanicsburg Borough. The prior CMP includes four (4) roadway segment with a TTI > 2.0 or more at the same locations including an additional segment just west of the of the PA 581 interchange. This indicates congestion remained relatively the same over the CMP plan time periods.

7. Conclusions

The HATS CMP serves as an essential component within the overall transportation planning and programming process. It enables decision-makers to make their choices for transportation improvements with a clearer, and better understanding of congestion issues in the region. The CMP is objective-driven and performance based, and guidance regarding the development and implementation of this process is flexible and tailors to the region's specific needs and priorities. This flexibility is crucial, as the CMP is a living document and is meant to be continually modified based on congestion trends and newly available data. Transportation project selection is improved by this analysis because the CMP is one of the seventeen key criteria in ranking projects in the RTP.

7.1 Next Steps

In order to ensure that the HATS CMP is flexible and evolving to meet current conditions, it is suggested the some next steps be implemented. They include:

1. Review the priority congested corridors and intersections, and other congested intersections with planning partners to further prioritize and provide a more detailed assessment of congestion mitigation strategies. This would include making short and long-term recommended improvements, and proposing estimated costs.

2. Integrate the CMP priority corridors and intersections, and other congested intersections into the RTP project priority ranking process. Projects that exist in priority areas are given high benefit and receive a higher point value. This system of ranking criteria allows projects to be prioritized based on quantitative factors, with the expectation that high priority projects will generate the most benefit to the regional transportation network.

3. Integrate performance measures into the CMP as part of the May 2017 updated federal rulemaking (23 CFR Par 490 Subparts E, F, G, H) as required by the Moving Ahead for Progress in the 21st Century (MAP-21) Act and the Fixing America's Surface Transportation (FAST) Act. State DOTs along with MPOs are now required to establish congestion performance measures and set targets as part of the rulemaking. HATS will work with FHWA and PennDOT in establishing performance measures and associated targets through various means such as training and workshops.

4. Analyze congestion in more detail on the limited access roadways, including I-83, I-81, I-283 and PA 581 in the region. Analyze locations from interchange to interchange and between interchanges using peak travel delay and travel time index performance measures. In addition, review the most current crash frequency and severity information, and freeway incident clearance times to better understand non-recurring congestion on the roadways.

5. Perform additional multimodal and transit data analysis. Most CMPs rely heavily on roadway data and measure congestion based on this information. It is important to know how other modes of transportation are growing or declining. For example, data from CAT's new real-time passenger information system can be used to better analyze peak congestion ridership level of service (LOS) for certain parts of routes, rather than for the entire route.

Photo courtesy PennLive