

# TRAFFIC PLANNING

# AND DESIGN, INC.

Est. 1989



## Roadway Sufficiency Analysis

West Whiteland Township

*Chester County, PA*

July 17, 2015

TPD# WWT-00158



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## **INTRODUCTION**

Traffic Planning and Design, Inc. (TPD) has completed a Roadway Sufficiency Analysis Report for West Whiteland Township in compliance with the Pennsylvania Impact Fee Law as defined in sections 501-A through 506-A of the Municipalities Planning Code (MPC). Sections 501-A through 506-A of the MPC were added to the code on December 19, 1990, via Act 209 of 1990 and were amended via Act 68 of 2000. The MPC authorizes municipalities within the Commonwealth to enact, amend and repeal impact fee ordinances and to charge impact fees to cover the cost of off-site road improvements necessitated by new land development.

West Whiteland Township is located in Chester County. As shown in Figure 1, West Whiteland Township is bordered by Uwchlan and Charlestown Townships to the north, East Whiteland Township to the east, East and West Goshen Townships to the south, and East Caln and East Bradford Townships to the west.

The growth projections for the Township are documented in the June 17, 2015 Land Use Assumptions Report. The West Whiteland Township Board of Supervisors adopted the Land Use Assumptions Report, prepared by Theurkauf Design and Planning on June 17, 2015. The Roadway Sufficiency Analysis and eventual Capital Improvement Plan (CIP) have been completed to ensure that the Township is equipped to provide the necessary infrastructure to accommodate the expected growth as outlined in the Land Use Assumptions Report.

## **STUDY AREA**

### **Transportation Service Area (TSA)**

In compliance with the MPC (Section 504-A(b)(1)), West Whiteland Township established a Transportation Service Area (TSA) for the roadway sufficiency analysis. Section 501-A of the MPC stipulates that a TSA cannot exceed an area of seven square miles. The TSA for West Whiteland Township, as shown in Figure 2, is approximately 5.3 square miles in size.

Several areas were excluded from the TSA because these areas were already fully developed, or are not expected to be developed (i.e, parks, cemeteries, residential subdivisions.) Excluding these areas helped maximize the TSA and keep the TSA under the 7 square mile limit.

## **EXISTING CONDITIONS**

### **Existing Road Network**

A survey of the existing roadway system in the service area is as follows:

Lincoln Highway, Business Route 30 (SR 3070) is an urban, principal arterial roadway that runs in an east-west direction through West Whiteland Township. Lincoln Highway consists of two through lanes in each direction from the western Township line to just east of the Exton Square Parkway and from the eastern Township line to just west of Valley Creek Boulevard. A center left turn lane is provided along most of this section of roadway with right turn lanes provided at the major intersections. The section of Lincoln Highway located between the Exton Square Parkway and Valley Creek Boulevard consists of one through lane in each direction with a continuous, two-way, center turn lane and right turn lanes provided at the major intersections. Lincoln Highway has a posted speed of 45 mph. The average daily

traffic (ADT) varies along Lincoln Highway from approximately 21,000 vehicles per day (vpd) at the western end of the Township, approximately 9,100 vpd between Route 100 and Ship Road, and approximately 13,100 vpd at the eastern end of the Township.

U.S. Route 30, Exton By-Pass (SR 0030) is a limited-access, divided highway that runs east-west through West Whiteland Township. The By-Pass originates at the Route 202/Lincoln Highway interchange and extends west to Sadsbury Township where it terminates at the interchange with Lincoln Highway, east of Route 10. Two lanes are provided in each direction. The posted speed limit is 55 mph. The ADT on U.S. Route 30 is approximately 37,400 vpd.

U.S. Route 202 (SR 0202) is a limited-access, divided highway that runs north-south through the southeastern corner of West Whiteland Township. The posted speed limit is 55 mph on U.S. Route 202 through West Whiteland Township and the ADT is approximately 71,200 vpd.

Route 100 (SR 100) is an urban, principal arterial roadway that runs in a north-south direction through West Whiteland Township. Route 100 consists of three through lanes in each direction from the Route 30 By-Pass to the northern end of the Township and two lanes in each direction south of the Route 30 By-Pass. Auxiliary left and right turn lanes are provided at all major intersections. The posted speed limit on Route 100 is 45 mph. The ADT along Route 100 is approximately 38,000 vpd.

Whitford Road (SR 3069) is a two-lane, urban collector road that runs in a north-south direction through the Township. Whitford Road has a posted speed limit of 40 mph south of Lincoln Highway and 25 mph north of Lincoln Highway. Whitford Road has an ADT of approximately 8,800 vpd south of Lincoln Highway and 4,900 vpd north of Lincoln Highway.

Ship Road (SR 1001) is a two-lane urban collector road that generally runs north-south through West Whiteland Township. The posted speed limit on Ship Road is 35 mph south of Lincoln Highway and 40 mph north of Lincoln Highway. Ship Road has an ADT of approximately 9,100 vpd.

King Road (SR 2022) is a two-lane minor arterial roadway that runs east-west through West Whiteland Township. The posted speed limit is 35 mph. The ADT on King Road is approximately 6,000 vpd.

Phoenixville Pike (SR 2011) is a two-lane road that generally runs north-south through West Whiteland Township. It is classified as a local road north of King Road and as an urban collector road south of King Road. The intersection with King Road is offset with the overpass for Route 202 located between the intersections. The posted speed limit on Phoenixville Pike is 40 mph. The ADT on Phoenixville Pike is approximately 4,600 vpd.

Waterloo Boulevard (T-544) is a two-lane local road located north of Lincoln Highway that generally runs parallel to Lincoln Highway in an east-west direction between Route 100 and Whitford Road. The posted speed limit is 35 mph. Waterloo Boulevard has an ADT of approximately 6,400 vpd.

Commerce Drive (T-543) is a local Township road located south of Lincoln Highway that generally runs parallel to Lincoln Highway in an east-west direction between Route 100 and Whitford Road. The posted speed limit is 35 mph. Commerce Drive has an ADT of approximately 6,900 vpd.

Clover Mill Road (T401) is a two-lane local road located south of Lincoln Highway that generally runs parallel to Lincoln Highway in an east-west direction between Whitford Road and Boot Road in East Caln Township. The posted speed limit is 35 mph.

Springdale Drive (T548) is a two-lane local Township road that intersects both Ship Road and Lincoln Highway in the southeast quadrant of the intersection of these roads. Springdale Drive serves as an access road for the Whiteland Business Park.

Dunwoody Drive (T545) is a local Township road that intersects King Road opposite the intersection with the southern leg of Phoenixville Pike and crosses under U.S. Route 202 to intersect with the northern leg of Phoenixville Pike to the south of the railroad overpass. Dunwoody Drive serves as an access road for a future development.

**Transportation Service Area Intersections:**

*Signalized Intersections:*

- Ship Road and Lincoln Highway
- Whitford Road and Lincoln Highway
- Whitford Road and Clover Mill Road
- Whitford Road and Waterloo Boulevard
- Whitford Road and Commerce Drive
- Springdale Drive and Lincoln Highway

*Unsignalized Intersections:*

- Phoenixville Pike/Dunwoody Drive and King Road
- Phoenixville Pike and King Road

Existing lane configurations and intersection control within the service areas are shown in Figure 13.

**Existing Traffic Volumes**

Manual turning movement counts were either conducted by TPD or obtained from traffic studies that were completed for developments in the Township. The manual counts were conducted from 4:00 P.M. to 6:00 P.M., or what is commonly referred to as the afternoon peak travel time. A growth factor of 1.91% per year was applied to manual counts conducted prior to 2014 to account for growth that may have occurred from the time the counts were conducted until 2014. The growth factor was obtained from the PennDOT Bureau of Planning and Research. The manual traffic count sheets are included in Appendix A. Table 1 below lists the dates of the manual counts. The 2014 Existing Condition traffic volumes for the weekday P.M. Peak Hour are shown in Figure 3.

**TABLE 1  
MANUAL TRAFFIC COUNTS**

INTERSECTION	DATE OF P.M. COUNT
Whitford Road and Waterloo Boulevard	January 8, 2014
Whitford Road and Lincoln Highway	January 8, 2014
Whitford Road and Commerce Drive	November 20, 2014
Whitford Road and Clover Mill Road	November 14, 2012
Ship Road and Lincoln Highway	February 19, 2014
Springdale Drive and Lincoln Highway	September 10, 2014
Phoenixville Pike/Dunwoody Drive and King Road	October 16, 2014
Phoenixville Pike and King Road	November 20, 2014

## **PLANNED IMPROVEMENTS**

### **Planned Improvements on the PennDOT Twelve Year Transportation Program**

Based on a review of the Pennsylvania Transportation Improvement Program (TIP), there are no programmed roadway improvements within the West Whiteland Township transportation service area.

## **VOLUME DEVELOPMENT METHODOLOGY**

### **Study Year**

Section 504-A(c)(2)(ii) of the MPC stipulates that the Land Use Assumptions Report and Roadway Sufficiency Analysis report should analyze projected growth in the Township “over a period of at least the next five years”. In compliance with the legislation, a study year of 2025, the next 10 years, was selected.

### **Volume Development Overview**

As stipulated in the MPC, the calculation of a traffic impact fee for a municipality can only be based on improvements needed to accommodate future development in the TSA. This means that the costs associated with improvements which are necessary to remedy deficiencies due to the following traffic *cannot be included* in the calculation of the traffic impact fee:

- Existing traffic;
- Future growth due to increased traffic passing thru the municipality (pass-thru traffic);
- Traffic due to growth in the municipality that is not within the specific TSA being studied;
- Traffic due to developments that had preliminary or tentative applications for land development, subdivision or PRD with the municipality on or before the first publication of the municipality’s intention to adopt an impact fee ordinance (MPC Section 505-A(c)(2)).

In order to determine the improvements, which are necessary to remedy LOS deficiencies due to each scenario separately, it was necessary to develop volumes in the following order:

1. 2014 Existing Conditions;
2. 2025 Base Conditions which include the following:
  - Future growth due to increased traffic passing thru the municipality (pass-thru traffic);
  - Traffic due to growth in the municipality that is not within the TSA;
  - Traffic due to developments that had preliminary or tentative applications for land development, subdivision or PRD with the municipality on or before the first publication of the municipality’s intention to adopt an impact fee ordinance (MPC Section 505-A(c)(2));
3. 2025 Projected Conditions that are equal to the 2025 Base Conditions plus traffic from all “new” projected developments in the TSA.

## **2025 BASE CONDITIONS**

### **Pass Through Traffic**

A background growth factor for the roadways in the study area was developed based on growth factors for September 2012 to July 2013 obtained from the PennDOT Bureau of Planning and Research (BPR). The PennDOT BPR suggests using a background growth trend factor of 1.91% per year in Chester County for urban non-interstate roadways. Background growth rates account for growth in traffic passing thru an area plus growth due to nearby future developments. Since the Roadway Sufficiency Analysis includes traffic for anticipated development over the next 11 years, using a background growth rate of 1.91% per year would represent an over estimate of future traffic due to double counting. In addition, a comparison of recent traffic counts to historical traffic counts at four locations throughout the Township indicates a negative growth rate at three locations ranging from -0.85% to -1.70% per year and one location with a growth rate of 2.31% per year. Therefore, a background growth rate of 1.0% per year, compounded for 11 years, was used for pass-through traffic.

### **Base Development Trip Generation**

Developments that had preliminary or tentative applications for land development, subdivision or PRD with the municipality on or before the first publication of the municipality's intention to adopt an impact fee ordinance (MPC Section 505-A(c)(2)) are considered base developments. These developments, summarized in Table 2, were included in the Base Condition analysis.

Trip generation rates for these base developments were obtained from the traffic studies which were submitted for each of the developments and the manual Trip Generation, 9th Edition, 2012, an Institute of Transportation Engineers (ITE) Informational Report. The statistics in Trip Generation are empirical data based on more than 4,800 trip generation studies. The data are categorized by Land Use Codes, with total vehicular trips for a given land use estimated using an independent variable and statistically generated rates or equations. More detailed trip generation data is contained in Appendix C, which is available at the Township administration office.

**TABLE 2  
P.M. PEAK HOUR TRIP GENERATION  
BASE DEVELOPMENT**

DEVELOPMENT/LAND USE	TOTAL UNITS/SIZE	P.M. PEAK HOUR		
		ENTER	EXIT	TOTAL
<b>Clover Mill Industrial Development</b>				
Auto Repair Facility	20,168 sq. ft.			
Manufacturing	91,866 sq. ft.			
Warehouse	195,000 sq. ft.			
<i>Total New Trips</i>		<i>23</i>	<i>91</i>	<i>114</i>
<b>290 National Road</b>				
Office	32,000 sq. ft.			
Light Industrial	33,000 sq. ft.			
Warehouse	8,000 sq. ft.			
<i>Total New Trips</i>		<i>15</i>	<i>77</i>	<i>92</i>
<b>Movie Tavern</b>				
Movie Theater	1,196 seats			
<i>Total New Trips</i>		<i>187</i>	<i>172</i>	<i>359</i>
<b>Boy Scouts of America</b>				
Recreational Community Center	13,700 sq. ft.			
<i>Total New Trips</i>		<i>19</i>	<i>19</i>	<i>38</i>
<b>TOTAL BASE DEVELOPMENT NEW TRIPS</b>		<b>244</b>	<b>359</b>	<b>603</b>

**Base Development Trip Distribution**

Trips generated by the base developments were distributed based on a combination of the trip distribution presented in the traffic studies for the individual developments and according to the methodology described in the section “2025 Projected Development Trip Distribution”. The trip distributions for the base developments were entered into the volume development worksheets, which are included in Appendix D.

**2025 Base Condition Volume Development**

In order to develop 2025 Base Condition traffic volumes, the trips due to pass-thru traffic and the base developments were added to the 2015 Existing Condition traffic volumes. The 2025 Base Condition P.M. peak hour traffic volumes are shown in Figure 4, and the volume worksheets are included in Appendix D.

## 2025 PROJECTED CONDITIONS

### 2025 Projected Development Trip Generation

The projected development which is estimated to occur within the Transportation Service Area over the next ten years was obtained from the Land Use Assumptions Report (included in Appendix B.) These developments were included in the Projected Condition analyses.

Trip generation rates for these projected developments were obtained from the Trip Generation manual, 9th Edition, 2012, an Institute of Transportation Engineers (ITE) informational report. For the purposes of this study, only new trips were considered unless a proposed development that typically has pass-by trips is located on a corner of an intersection that is included in the study. Pass-by trips were included for the corner sites because pass-by trips can affect turning volumes at intersections by providing a means for vehicles to “cut-through” the site. Pass-by trips were not treated as new trips for sites located mid-block or at intersections that were not included in the study because volumes at the study intersections will not be affected by these trips. The trip generation assumptions for the projected development are summarized below in Table 3. More detailed trip generation is contained in Appendix C.

**TABLE 3  
P.M. PEAK HOUR TRIP GENERATION  
PROJECTED DEVELOPMENT**

Land Use Code	Land Use	Total Units/Size	P.M. Peak Hour Trips					
			Enter		Exit		Total	
			New	Pass-By	New	Pass-By	New	Pass-By
<b>Character Area 1</b>								
210	Residential – Single Family Detached (north side of Lincoln Highway)	36 D.U.	26	--	16	--	42	--
230	Residential – Townhouses (north side of Lincoln Highway)	72 D.U.	31		15		46	
710	Office (North side of Lincoln Highway)	200,000 sq. ft.	51	--	251	--	302	--
710	Office (South side of Lincoln Highway)	298,000 sq. ft.	70	--	342	--	412	--
230	Residential - Townhouses (southwest of Lincoln Highway and Ship Road)	28 D.U.	14	--	7	--	21	--
710	Flex Space – Office (southwest of Lincoln Highway and Ship Road)	142,800 sq. ft.	36		177		213	
110	Flex Space – Light Industrial (southwest of Lincoln Highway and Ship Road)	35,700 sq. ft.	4	--	31	--	35	--

**TABLE 3 (CONTINUED)  
P.M. PEAK HOUR TRIP GENERATION  
PROJECTED DEVELOPMENT**

Land Use Code	Land Use	Total Units/Size	P.M. Peak Hour Trips					
			Enter		Exit		Total	
			New	Pass-By	New	Pass-By	New	Pass-By
<b>Character Area 2</b>								
220	Apartments	410 D.U.	169	--	92	--	261	--
<b>Character Area 3</b>								
230	Residential - Townhouses (southwest of Whitford Road and Creamery Way)	32 D.U.	16	--	8	--	24	--
710	Office (southeast of Lincoln Highway and Oaklands Boulevard)	51,000 sq. ft.	13	--	63	--	76	--
710	Office (northeast of Campbell Boulevard and Creamery Way)	25,500 sq. ft.	6	--	32	--	38	--
710	Flex Space – Office (northwest of Whitford Road and Clover Mill Road)	40,800 sq. ft.	10	--	51	--	61	--
110	Flex Space – Light Industrial (northwest of Whitford Road and Clover Mill Road)	10,200 sq. ft.	1	--	9	--	10	--
710	Office (southwest of Lincoln Highway and Oaklands Boulevard)	34,000 sq. ft.	9	--	42	--	51	--
<b>Character Area 4</b>								
220	Apartments (between Lincoln Highway and Waterloo Boulevard)	100 D.U.	47	--	26	--	73	--
820	Retail (northeast of Lincoln Highway and Whitford Road)	17,000 sq. ft.	19	11	22	11	41	22
820	Retail Parcel (northwest of Lincoln Highway and Waterloo Boulevard Extension)	42,500 sq. ft.	49	27	55	27	104	54
710	Office (between Lincoln Highway and Waterloo Boulevard)	51,000 sq. ft.	13	--	63	--	76	--
710	Office (northwest of Lincoln Highway and Whitford Road)	8,500 sq. ft.	2	--	11	--	13	--

**TABLE 3 (CONTINUED)  
P.M. PEAK HOUR TRIP GENERATION  
PROJECTED DEVELOPMENT**

<b>Character Area 5</b>								
<b>Land Use Code</b>	<b>Land Use</b>	<b>Total Units/Size</b>	<b>P.M. Peak Hour Trips</b>					
			<b>Enter</b>		<b>Exit</b>		<b>Total</b>	
			<b>New</b>	<b>Pass-By</b>	<b>New</b>	<b>Pass-By</b>	<b>New</b>	<b>Pass-By</b>
230	Residential – Townhouses (northwest of Whitford Road and Waterloo Boulevard Extension)	86 D.U.	36	--	17	--	53	--
230	Residential - Townhouses (northwest of Lincoln Highway and Waterloo Boulevard Extension)	26 D.U.	13	--	7	--	20	--
230	Residential – Townhouses (northwest of Lincoln Highway and Fairway Lane/Arrandale Boulevard)	16 D.U.	9	--	4	--	13	--
<b>Outside Character Areas Development</b>								
710	Office (Swedesford Road and Valley Creek Parkway)	1,495,000 sq. ft.	298	--	1455	--	1753	--
230	Residential – Townhouses (Dunwoody Drive between Phoenixville Pike and King Road)	102 D.U.	41	--	20	--	61	--
710	Flex – Office (northeast of Phoenixville Pike and King Road)	100,000 sq. ft.	25	--	124	--	149	--
110	Flex – Light Industrial (northeast of Phoenixville Pike and King Road)	25,000 sq. ft.	3	--	21	--	24	--
230	Residential – Townhouses (southeast of Phoenixville Pike and King Road)	111 D.U.	44	--	21	--	65	--
230	Residential – Townhouses (southeast of Route 100 and Boot Road)	42 D.U.	20	--	10	--	30	--
210	Residential – Single Family Detached	7 D.U.	6	--	4	--	10	--
710	Oaklands (between Oaklands Boulevard, Thomas Jones Way, and Creamery Way)	68,000 sq. ft.	17	--	84	--	101	--
<b>Total Trips</b>			<b>1098</b>	<b>38</b>	<b>3080</b>	<b>38</b>	<b>4178</b>	<b>76</b>

## 2025 Projected Development Trip Distribution

The distribution of trips generated by each of the proposed developments was based on the existing traffic patterns on the local road network. Major traffic routes into and out of the Township were identified and each route was evaluated to determine the percentage of existing traffic utilizing that roadway. The result of this analysis was the directional distribution chart shown in Table 4, which was generally used for the distribution of primary trips to/from the future developments. The assignment of trips within the local roadway network was based upon the proposed use of the site, driveway locations, and engineering judgement. For example, the trip distribution for the Valley Creek Corporate Center was adjusted to account for its close proximity to regional highways relative to its size such as the Pennsylvania Turnpike, U.S. Route 30, and U.S. Route 202.

**TABLE 4  
PRIMARY TRIP DISTRIBUTION PERCENTAGES**

Direction To/From	Trip Distribution Percentages	
	Entering	Exiting
North via Route 100	25%	25%
North via Whitford Road	5%	5%
North via Ship Road	10%	10%
South via Route 100	25%	25%
South via Whitford Road	5%	5%
South via Ship Road	2%	2%
East via Lincoln Highway	10%	10%
East via King Road	3%	3%
West via Lincoln Highway	15%	15%
Total	100%	100%

The trip distributions for the projected developments were entered into the volume development worksheets, which are included in Appendix D.

## 2025 Projected Condition Volume Development

In order to develop 2025 Projected Condition traffic volumes, the trips generated by the projected developments were added to the 2025 Base Condition traffic volumes. The 2025 Projected Condition P.M. peak hour traffic volumes are shown in Figure 6 and the volume worksheets in Appendix D.

## LEVELS OF SERVICE (LOS) FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS criteria is stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in Table 5. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of traffic on the major

street and the driver’s discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

**TABLE 5  
LEVEL OF SERVICE CRITERIA  
UNSIGNALIZED AND SIGNALIZED INTERSECTIONS <sup>1</sup>**

Level of Service	Control Delay Per Vehicle (Seconds)	
	Signalized	Unsignalized
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80 or v/c > 1.0	> 50 or v/c > 1.0

<sup>1</sup> Obtained from Exhibits 18-4 and 19-1 of the Transportation Research Board’s *Highway Capacity Manual 2010*

It is important to understand that the level of service criteria outlined in Table 5 represent merely a guideline for quantifying the acceptability of delay to drivers, which is highly subjective and varies from region to region, usually according to the intensity of development in an area. A more universal measure of acceptability to drivers is the number of cycles (the time it takes for the signal to go through all of its phases one time) through which they must wait before proceeding through an intersection. In general, if a driver is able to proceed through a signalized intersection within one complete cycle of the signal, the delay experienced is usually considered acceptable.

**PREFERRED LEVEL OF SERVICE (LOS)**

The MPC requires that the Traffic Impact Fee Advisory Committee adopt a preferred level of service for the transportation service area. A preferred overall intersection LOS C and lane group LOS D was established for the West Whiteland Township TSA.

In each of the conditions (2014 Existing, 2025 Base, and 2025 Projected), each lane group and the overall intersection that is analyzed must operate at the preferred LOS or better. If a lane group or the overall intersection did not operate at the preferred LOS or better, improvements were identified in order to return the lane group or overall intersection to the preferred LOS. Improvements necessary to bring the Existing Conditions and 2025 Base Conditions to the preferred LOS are the responsibility of the Township. Impact fees in a TSA can be used only for improvements needed to accommodate the 2025 Projected Condition traffic volumes within the TSA.

**CAPACITY ANALYSIS METHODOLOGY**

The goal of the Roadway Sufficiency Analysis Report is to determine what roadway improvements will be needed in the next ten years in order to accommodate the level of growth that was projected in the Land Use Assumptions report. In order to determine the level of improvements due to “new” development, capacity analyses were conducted for the P.M. peak hour conditions at the study area intersections.

These analyses were conducted according to the methodologies contained in the 2010 *Highway Capacity Manual* (HCM) using *Synchro 8* software, a Trafficware product. The following conditions were analyzed, as applicable:

- Existing Conditions – Figure 7;
- Existing Conditions with improvements – Figure 8;
- 2025 Base Conditions – Figure 9;
- 2025 Base Conditions with improvements – Figure 10;
- 2025 Projected Conditions – Figure 11;
- 2025 Projected Conditions with improvements – Figure 12.

The capacity analysis worksheets are included in Appendix E.

## **CAPACITY ANALYSIS RESULTS**

### **Existing Condition**

The results of the Existing Condition capacity analyses are shown in Figure 7. As shown in Figure 7, several movements do not operate at the preferred level of service.

### **Existing Condition with Improvements**

A detailed description of the improvements needed to bring these deficient movements up to the preferred level of service or better are listed in Table 6. The new LOS with improvements are shown in Figure 8.

### **2025 Base Condition**

The results of the 2025 Base Condition capacity analyses are shown in Figure 9. Note that the improvements that were identified in the Existing Condition with improvements are assumed to be completed and are included in the 2025 Base Condition analyses. As shown in Figure 9, several movements and overall intersections do not operate at the preferred level of service.

### **2025 Base Condition w/ Improvements**

A detailed description of the improvements needed to bring these deficient movements up to the preferred level of service or better are listed in Table 6. The new LOS with improvements are shown in Figure 10.

### **2025 Projected Condition**

The results of the 2025 Projected Condition capacity analyses are shown in Figure 11. Note that the improvements that were identified in the 2025 Base Conditions with improvements are assumed to be completed and are included in the 2025 Projected Condition analyses. As shown in Figure 11, several movements and overall intersections do not operate at the preferred level of service.

### **2025 Projected Condition w/ Improvements**

A detailed description of the improvements needed to bring these deficient movements up to the preferred level of service or better are listed in Table 6. The new LOS with improvements are shown in Figure 12.

## **IMPROVEMENTS**

Based on the results of the Roadway Sufficiency Analysis, improvements have been identified as indicated in Table 6.

**TABLE 6  
REQUIRED IMPROVEMENTS TO ACHIEVE PREFERRED LOS**

Intersection	Condition		
	Existing Conditions	2025 Base Conditions	2025 Projected Conditions
Whitford Road and Waterloo Boulevard	<ul style="list-style-type: none"> <li>Optimize traffic signal timing</li> </ul>	<ul style="list-style-type: none"> <li>Construct northbound Whitford Road left turn lane</li> <li>Construct westbound Waterloo Boulevard separate right lane to provide separate left, thru, and right turn lanes</li> <li>Optimize traffic signal timing</li> </ul>	<ul style="list-style-type: none"> <li>Construct northbound Whitford Road right turn lane</li> <li>Optimize traffic signal timing</li> </ul>
Whitford Road and Lincoln Highway	<ul style="list-style-type: none"> <li>Optimize traffic signal timing</li> </ul>	<ul style="list-style-type: none"> <li>Construct Waterloo Boulevard Extension between Whitford Road and Lincoln Highway</li> <li>Optimize traffic signal timing</li> </ul>	<ul style="list-style-type: none"> <li>Construct additional northbound Whitford Road thru lane</li> <li>Construct additional southbound Whitford Road thru lane</li> <li>Optimize traffic signal timing</li> </ul>
Whitford Road and Commerce Drive			<ul style="list-style-type: none"> <li>Construct additional northbound Whitford Road thru lane</li> <li>Optimize traffic signal timing</li> </ul>
Whitford Road and Clover Mill Road			<ul style="list-style-type: none"> <li>Construct southbound Whitford Road right turn lane</li> <li>Optimize traffic signal timing</li> </ul>

**TABLE 6 (CONTINUED)  
REQUIRED IMPROVEMENTS TO ACHIEVE PREFERRED LOS**

Ship Road and Lincoln Highway			<ul style="list-style-type: none"> <li>• Construct new, one-way road for southbound Ship Road on north and south sides of Lincoln Highway*</li> <li>• Reconfigure northbound Ship Road to provide two thru lane with separate left and right turn lanes</li> <li>• Construct additional eastbound Lincoln Highway thru lane</li> <li>• Construct westbound Lincoln Highway thru lane</li> <li>• Construct westbound Lincoln Highway left turn lane</li> <li>• Install new signal equipment at new southbound Ship Road intersection and optimize traffic signal timing</li> </ul>
Springdale Drive and Lincoln Highway			<ul style="list-style-type: none"> <li>• Construct additional westbound Lincoln Highway thru lane</li> <li>• Reconfigure northbound Springdale Drive approach to provide separate left turn lane and shared thru/right turn lane</li> <li>• Provide an advance phase for northbound Springdale Drive</li> <li>• Optimize traffic signal timing</li> </ul>
Phoenixville Pike / Dunwoody Drive and King Road		<ul style="list-style-type: none"> <li>• No improvements – signal warrants not satisfied</li> </ul>	<ul style="list-style-type: none"> <li>• Signalize intersection</li> <li>• Coordinate with signal at Phoenixville Pike and King Road</li> </ul>
Phoenixville Pike and King Road	<ul style="list-style-type: none"> <li>• No improvements – signal warrants not satisfied</li> </ul>	<ul style="list-style-type: none"> <li>• No improvements – signal warrants not satisfied</li> </ul>	<ul style="list-style-type: none"> <li>• Signalize intersection</li> <li>• Coordinate with signal at Phoenixville Pike / Dunwoody Drive and King Road</li> </ul>

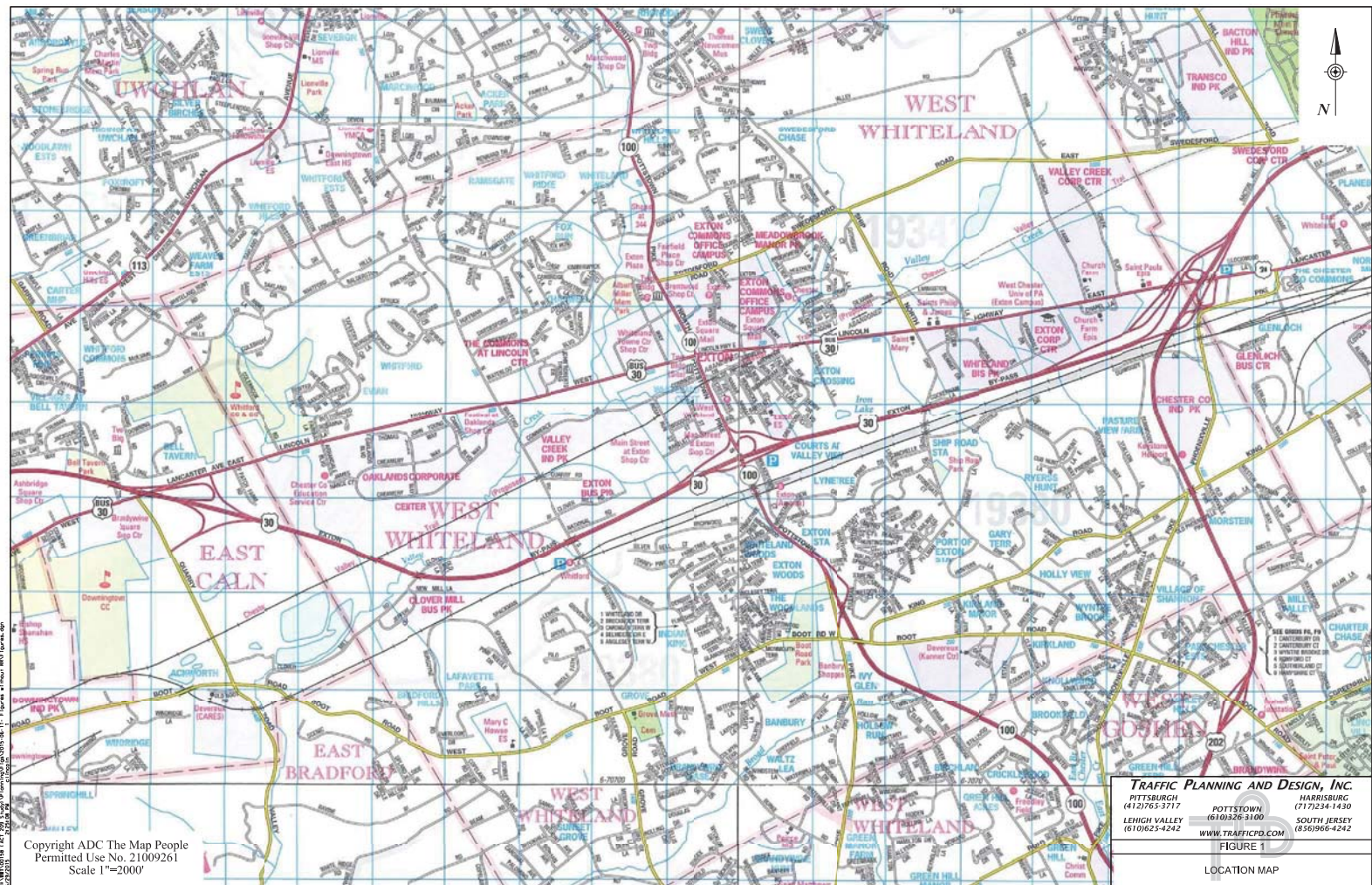
\*Historic structures are located in close proximity to Ship Road and Lincoln Highway which preclude widening to provide the necessary additional lanes in order to satisfy the preferred level of service. Therefore, a southbound Ship Road by-pass lane around the Ship Inn is provided because splitting the intersection into two intersections reduces turning conflicts, reduces the impacts to the adjacent historic structures, and significantly reduces the amount of widening required along Ship Road and Lincoln Highway.

The next step in adopting a traffic impact fee ordinance is to develop a Capital Improvement Plan (CIP), which will provide cost estimates and list the potential funding sources for the improvements identified in this roadway sufficiency analysis and provide a schedule of implementation.

The funding collected through traffic impact fees cannot be used to fund improvements that have been identified to maintain the preferred level of service for each lane group and the overall intersection for the Existing Conditions and for the 2025 Base Conditions. The fees will, however, be utilized to fund the improvements which are necessary to maintain the preferred level of service for the 2025 Projected Conditions, which includes the traffic that will be generated by “new” development within West Whiteland Township in the next ten years.

***The improvements that will be necessary to maintain the preferred LOS for Existing Conditions, 2025 Base Conditions, and 2025 Projected Conditions are listed in Table 6. Note that only the improvements needed for 2025 Projected Conditions can be funded by the traffic impact fees collected.***

***The next step that will be taken in order to adopt the traffic impact fee is the preparation of the CIP. Cost estimates, a list of recommended funding sources, and an implementation schedule will be provided in the CIP. The traffic impact fee to be collected for each new P.M. peak hour trip generated by new developments in the West Whiteland Township TSA will also be calculated in the CIP.***

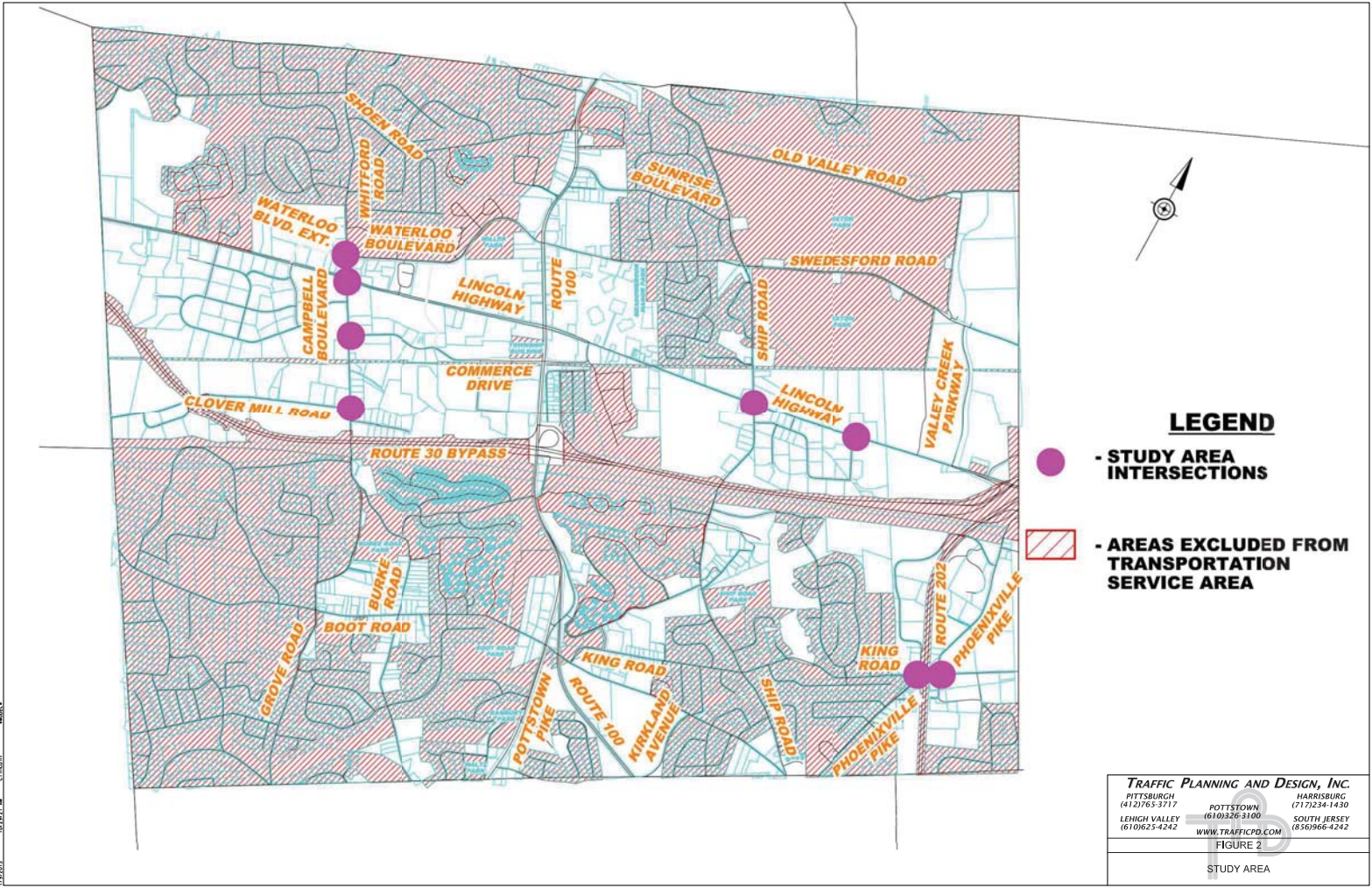


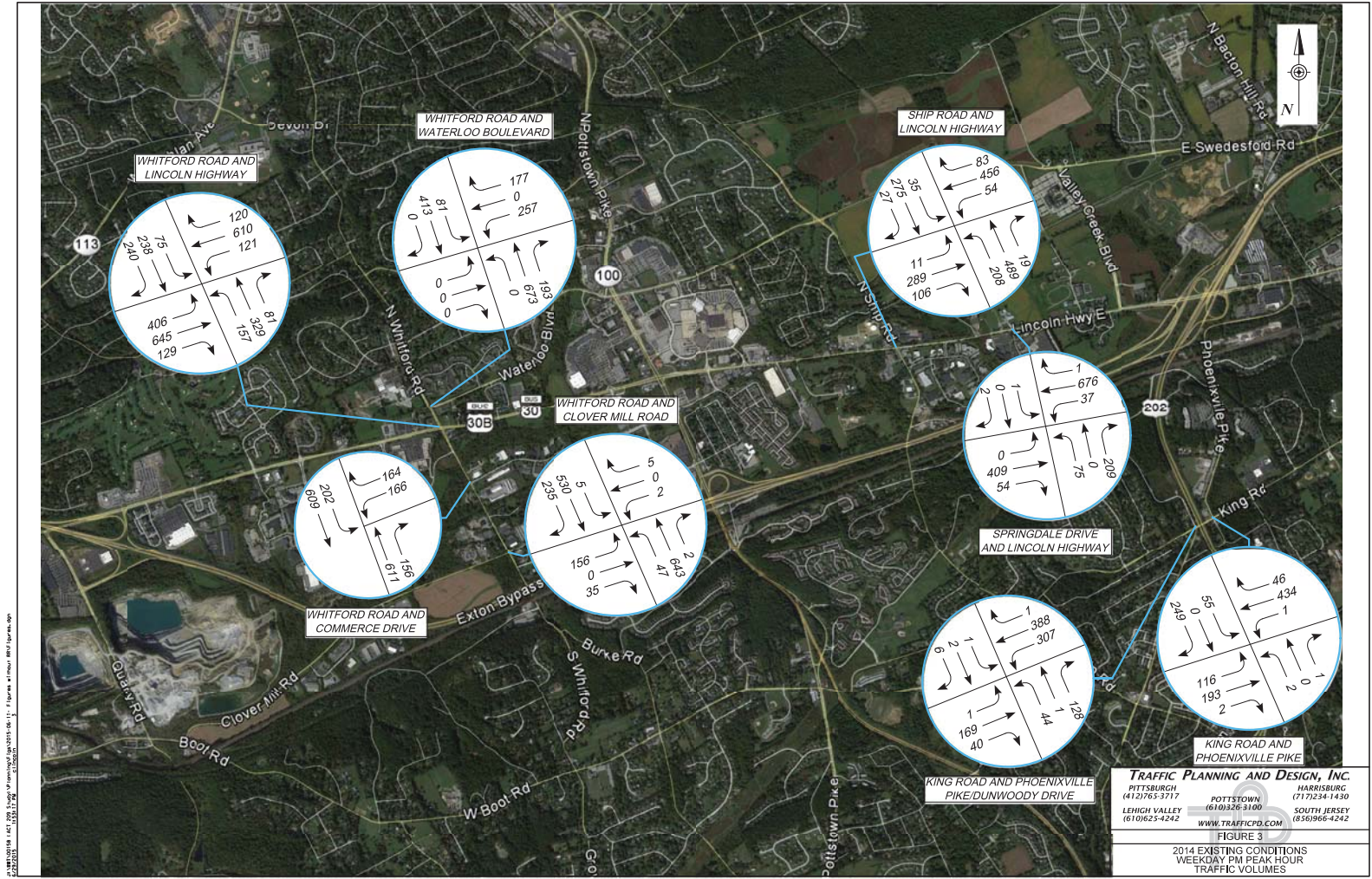
Copyright ADC The Map People  
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 Scale 1"=2000'

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FIGURE 1  
 LOCATION MAP

DATE: 01/14/14, 1:42:26 PM, W:\Projects\140115\_06\_11\_14\Map.mxd, without BDCI logo.mxd  
1/14/2014 1:42:26 PM





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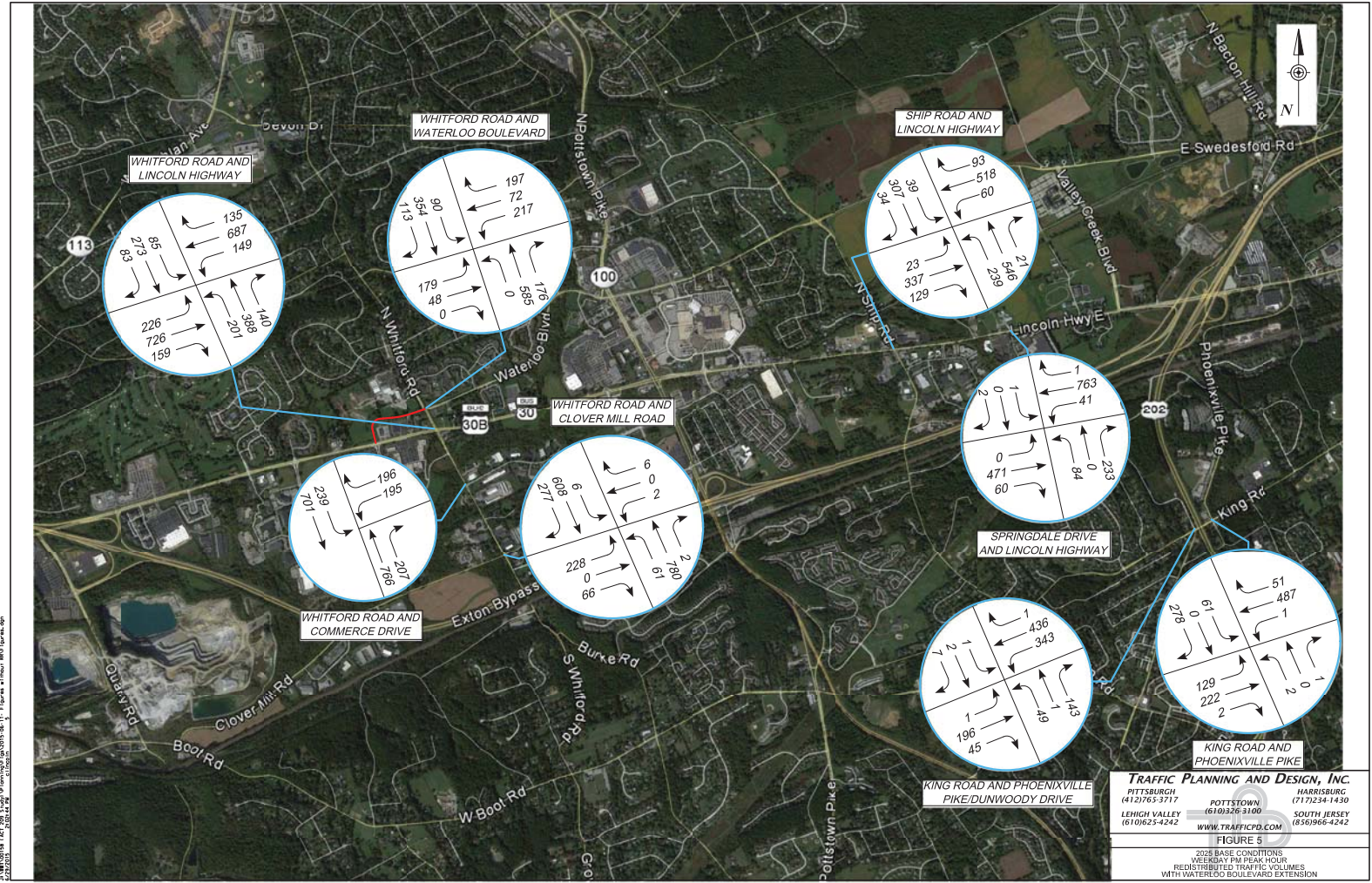
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FIGURE 3

2014 EXISTING CONDITIONS  
 WEEKDAY PM PEAK HOUR  
 TRAFFIC VOLUMES

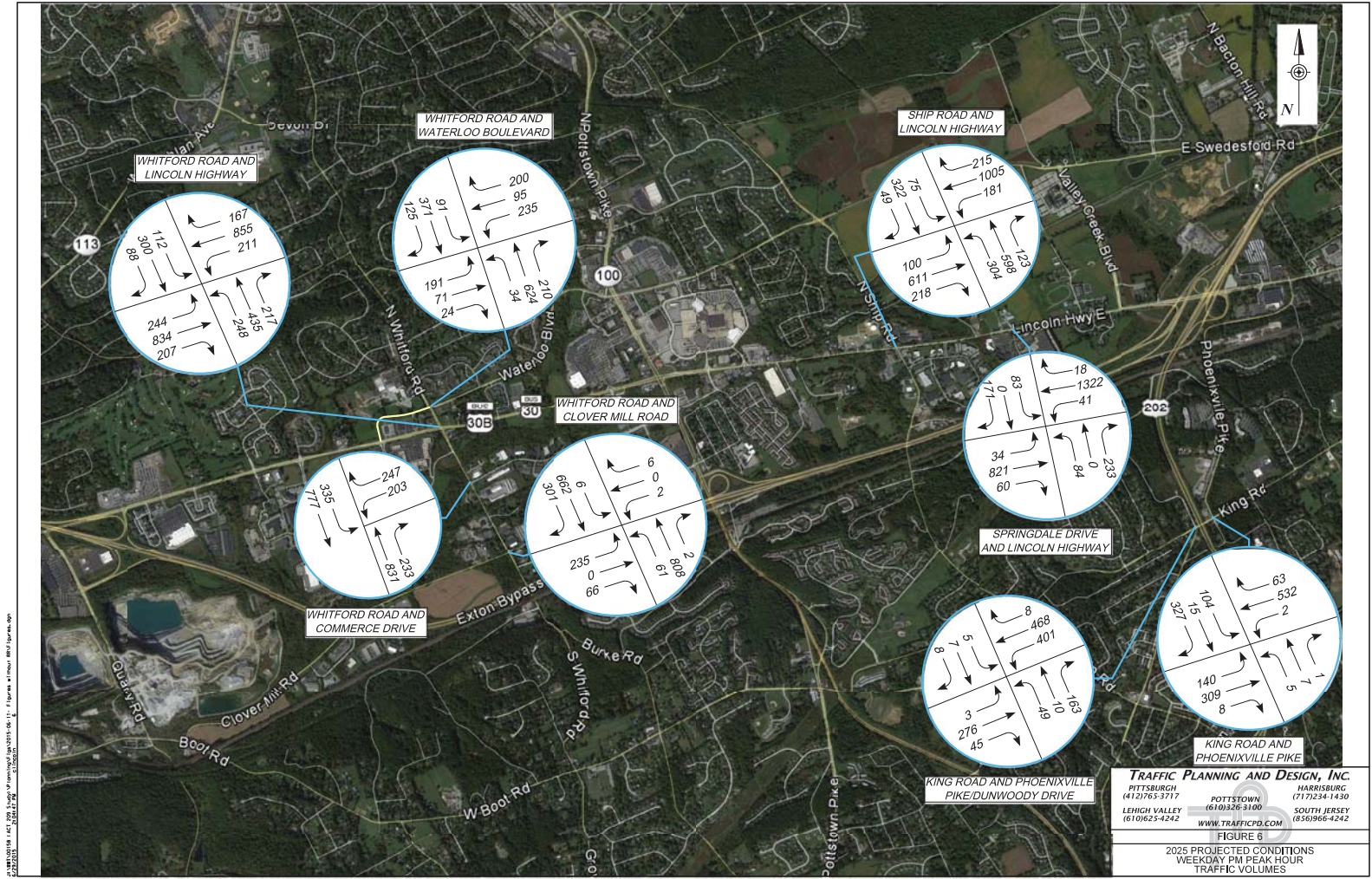
2014 EXISTING CONDITIONS WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES  
 DATE: 11/15/14  
 SCALE: 1"=100'  
 DRAWN BY: JLD  
 CHECKED BY: JLD  
 APPROVED BY: JLD





2025 BASE CONDITIONS  
 WEDNESDAY PM PEAK HOUR  
 REDISTRIBUTED TRAFFIC VOLUMES  
 WITH WATERLOO BOULEVARD EXTENSION  
 FIGURE 5

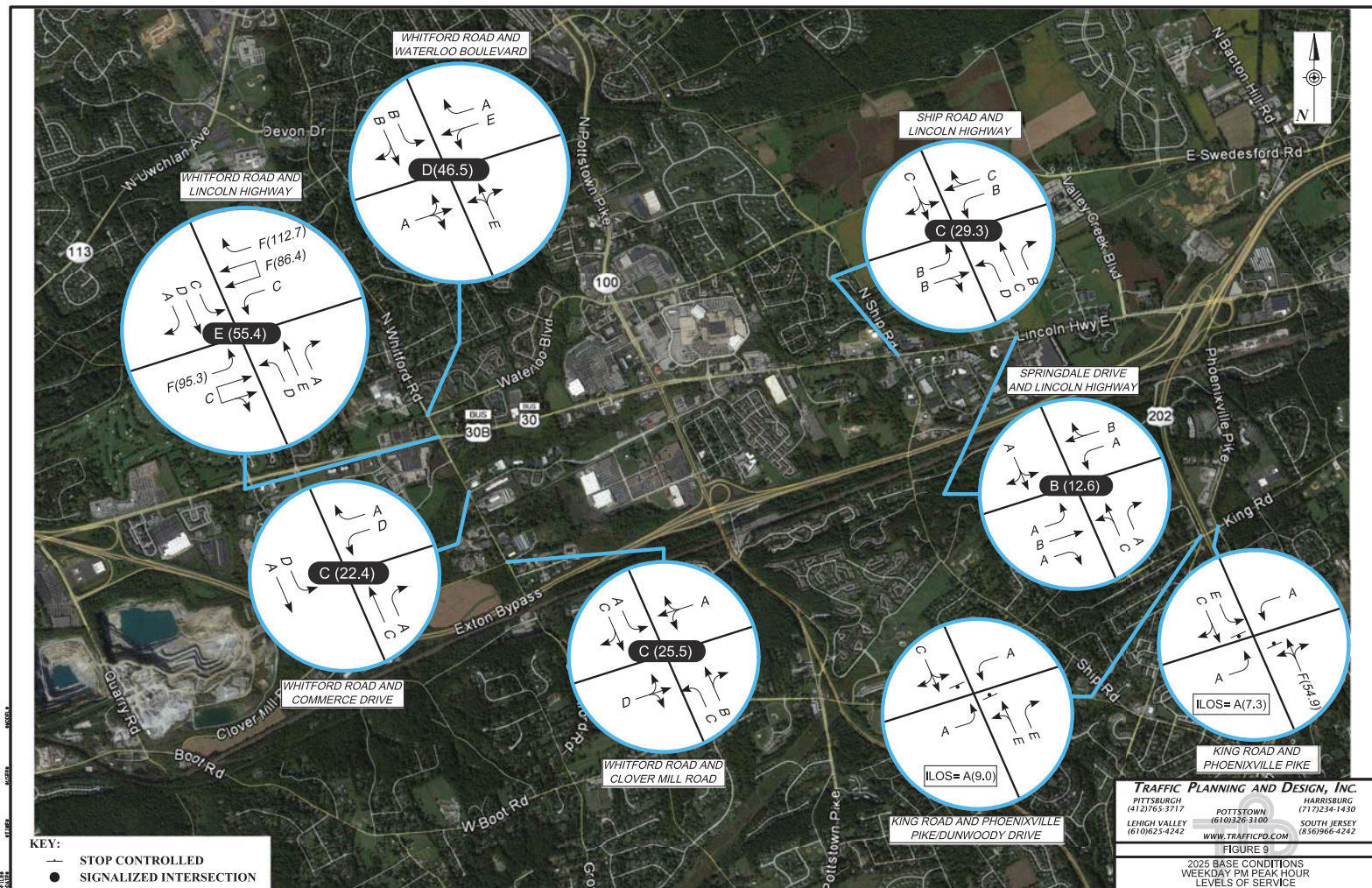
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 SOUTH JERSEY (856)966-4242  
**FIGURE 5**  
**FIGURE 5**  
**FIGURE 5**



2025 PROJECTED CONDITIONS WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES  
 DATE: 11/15/2023  
 TIME: 10:00 AM  
 PROJECT: WHITFORD ROAD AND LINCOLN HIGHWAY  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]







WHITFORD ROAD AND LINCOLN HIGHWAY  
 E (55.4)

WHITFORD ROAD AND WATERLOO BOULEVARD  
 D(46.5)

SHIP ROAD AND LINCOLN HIGHWAY  
 C(29.3)

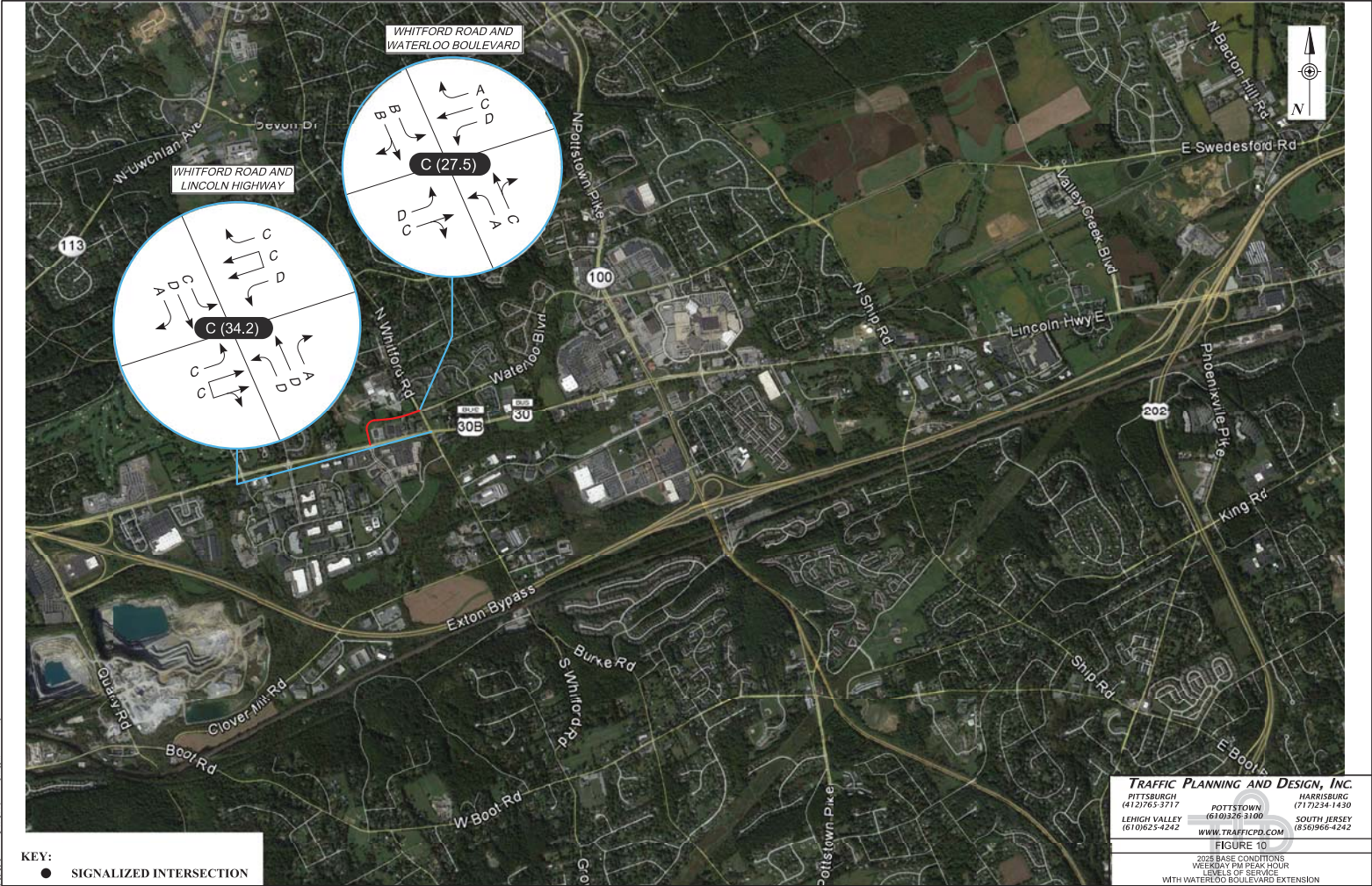
WHITFORD ROAD AND COMMERCE DRIVE  
 C(22.4)

WHITFORD ROAD AND CLOVER MILL ROAD  
 C(25.5)

SPRINGDALE DRIVE AND LINCOLN HIGHWAY  
 B(12.6)

KING ROAD AND PHOENIXVILLE PIKE/DUNWOODY DRIVE  
 ILOS= A(9.0)

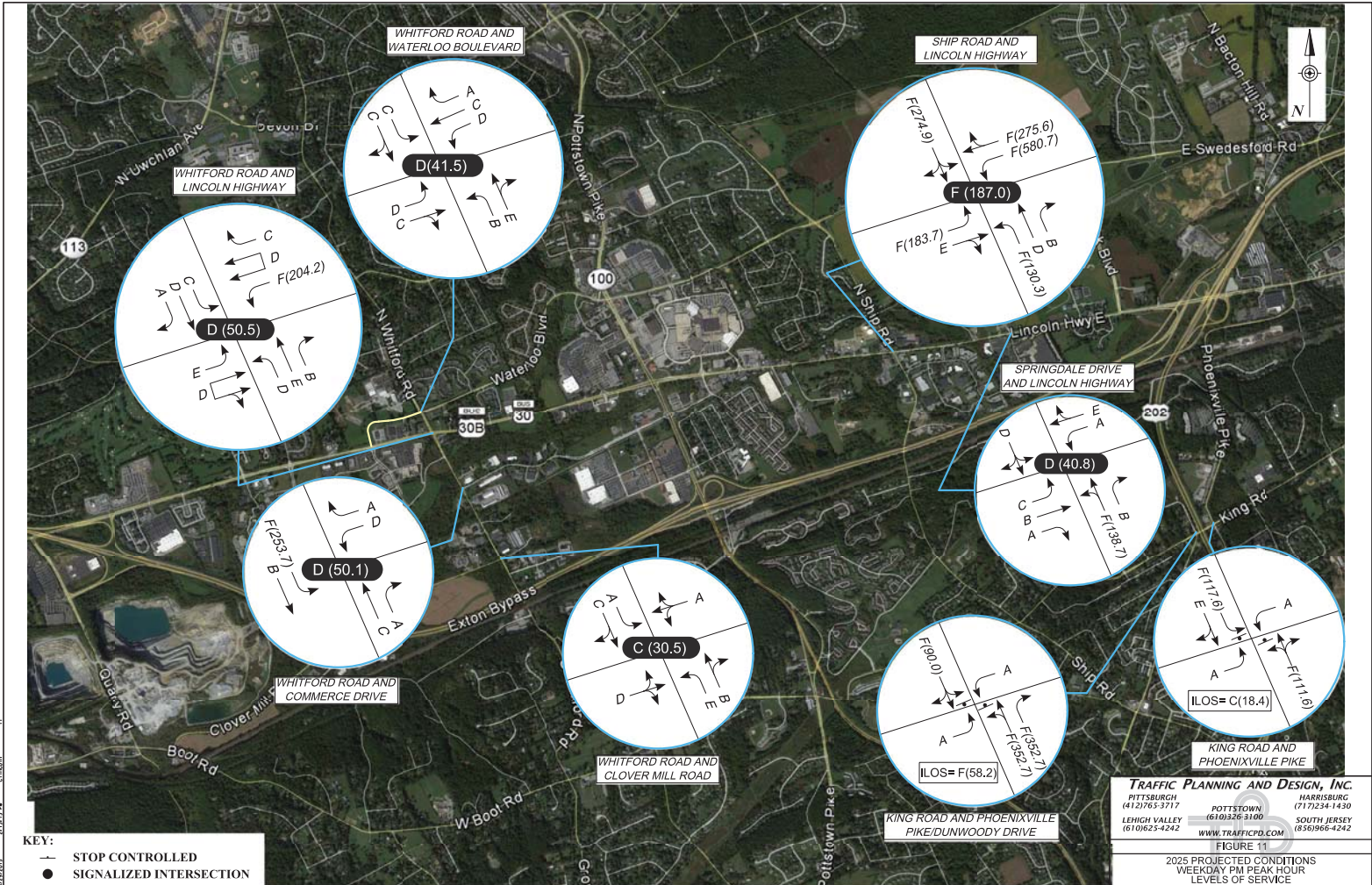
KING ROAD AND PHOENIXVILLE PIKE  
 ILOS= A(7.3)



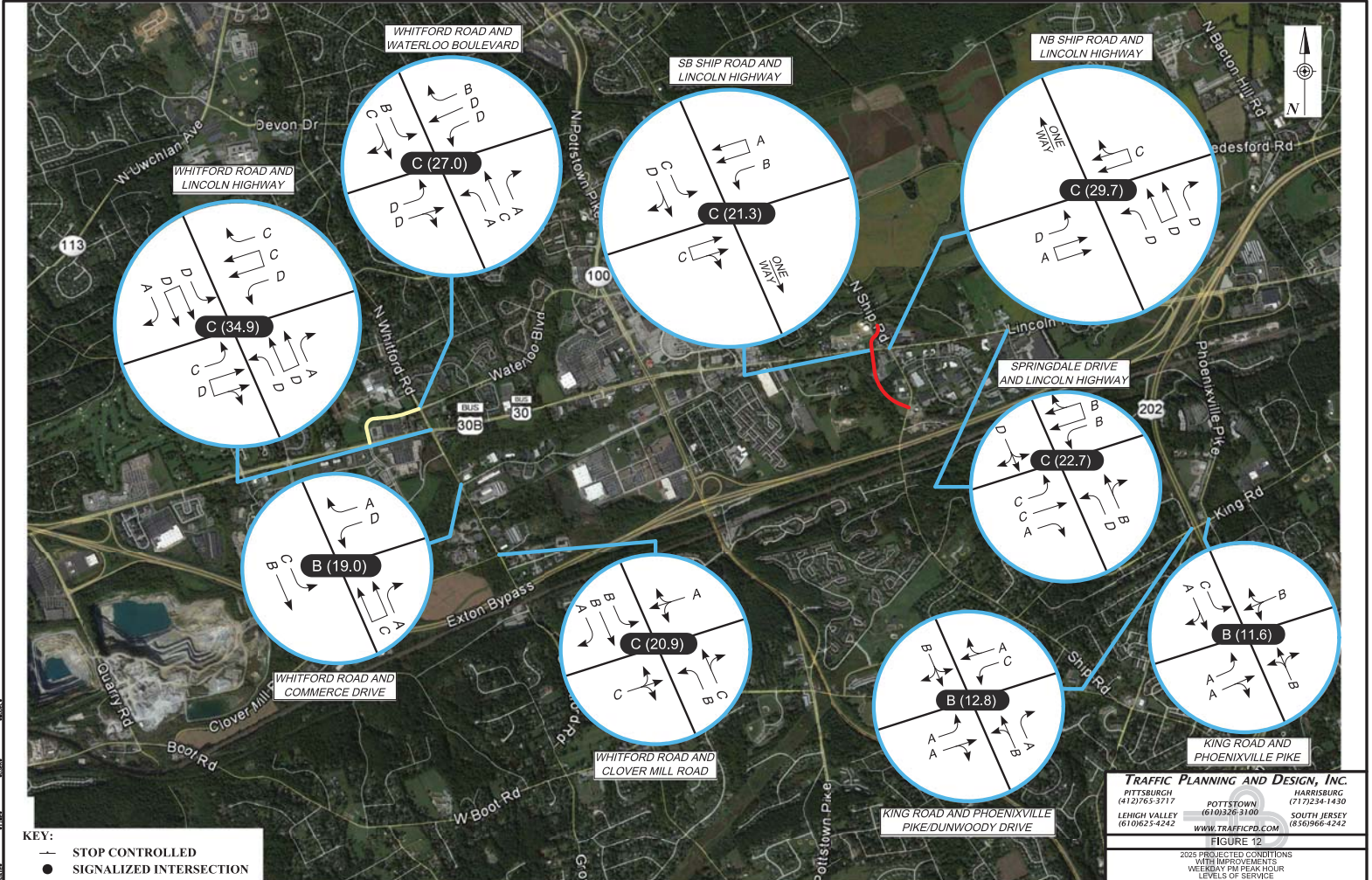
2025 Base Conditions  
 Weekday PM Peak Hour  
 Levels of Service  
 with Waterloo Boulevard Extension

**KEY:**  
 ● SIGNALIZED INTERSECTION

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**FIGURE 10**  
 2025 BASE CONDITIONS  
 WEEKDAY PM PEAK HOUR  
 LEVELS OF SERVICE  
 WITH WATERLOO BOULEVARD EXTENSION



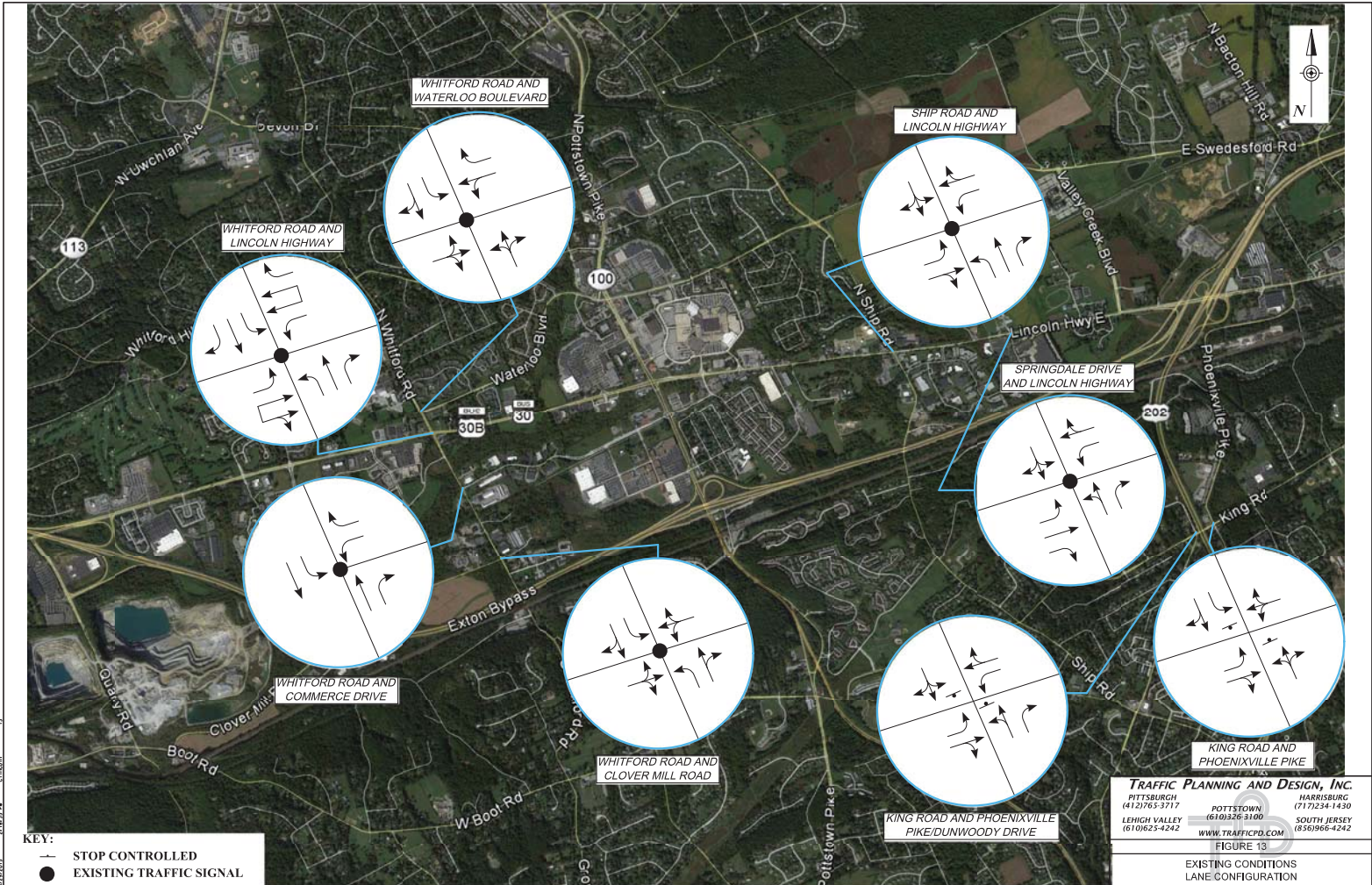
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 11/15/2024 1:42:25 PM  
 2025 PROJECTED CONDITIONS WEEKDAY PM PEAK HOUR LEVELS OF SERVICE  
 11/15/2024 1:42:25 PM



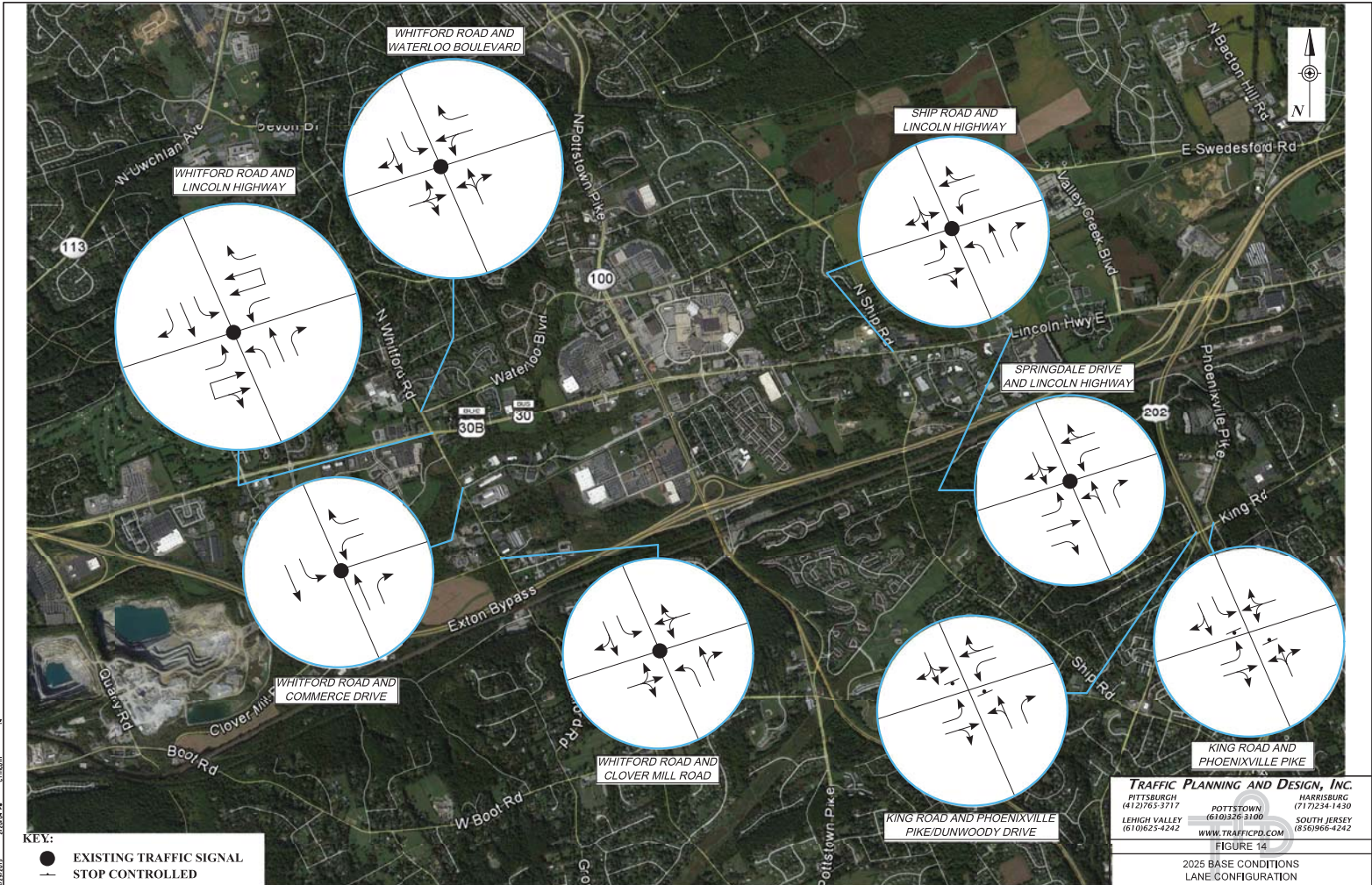
**KEY:**  
 — STOP CONTROLLED  
 ● SIGNALIZED INTERSECTION

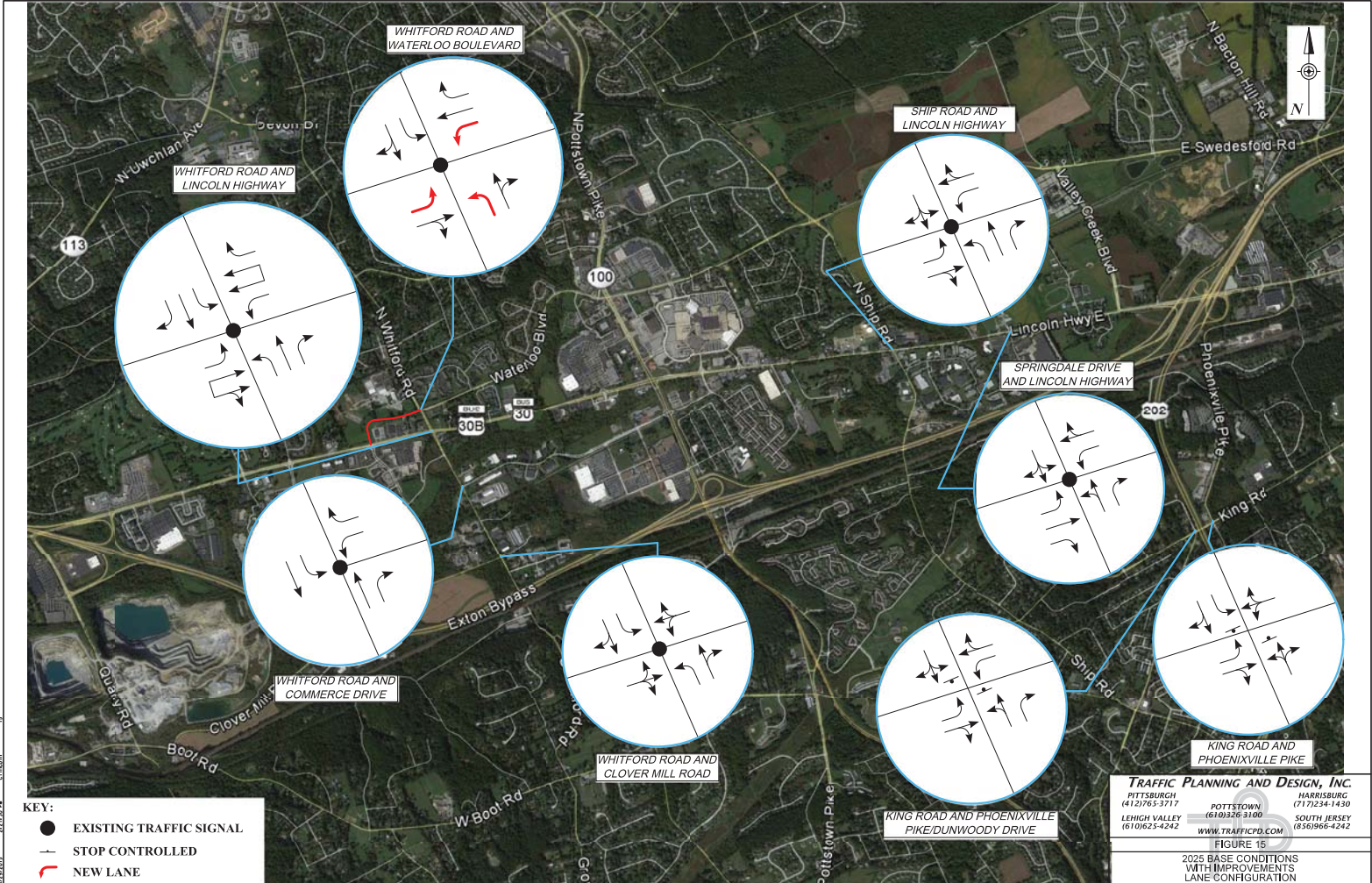
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**FIGURE 12**  
 2025 PROJECTED CONDITIONS  
 WITH IMPROVEMENTS  
 WEEKDAY PM PEAK HOUR  
 LEVELS OF SERVICE

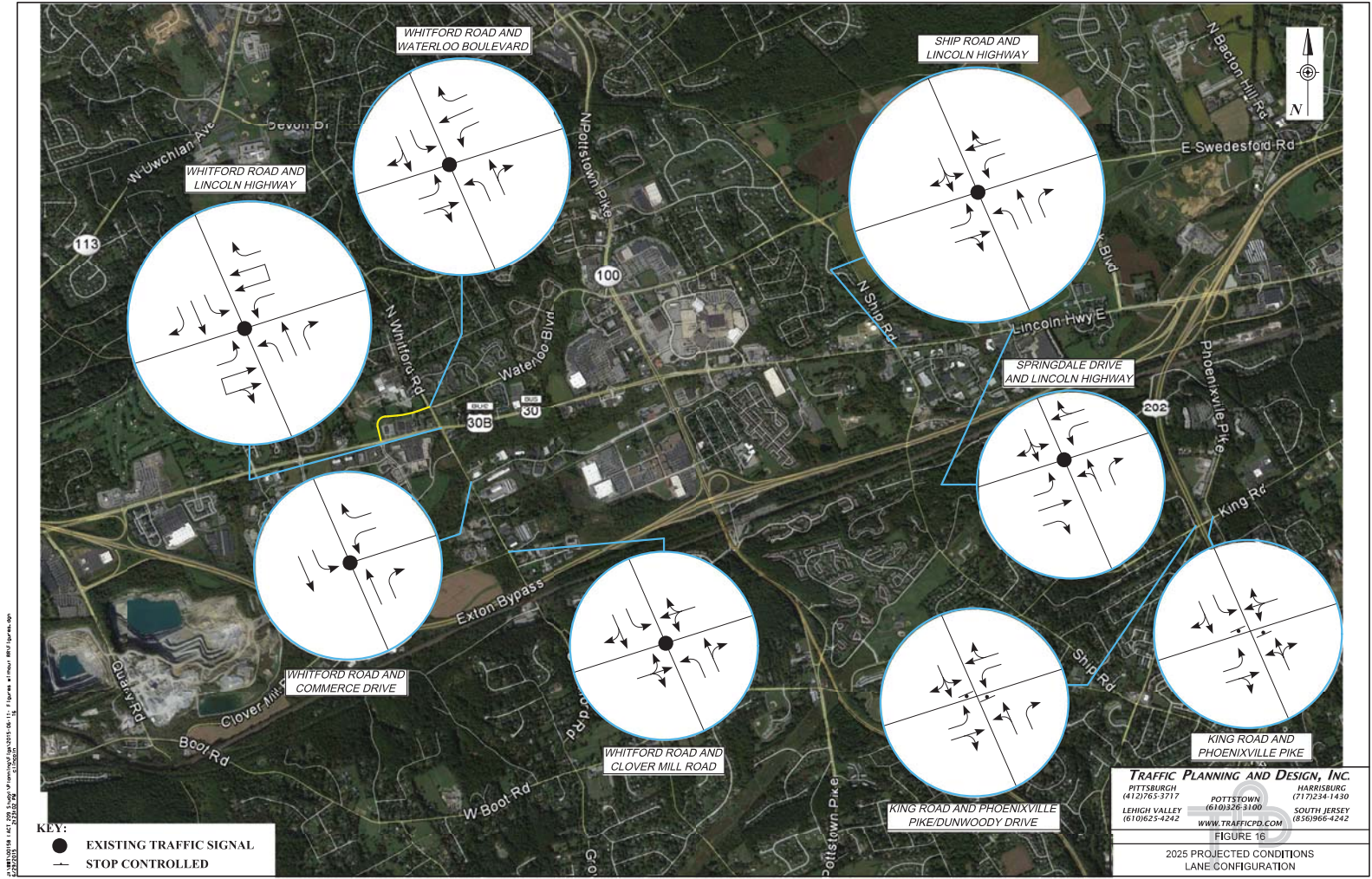


11/15/2018 1:42:28 PM C:\Users\jgallagher\OneDrive\Documents\113118\113118.dwg  
 11/15/2018 1:42:28 PM





2025 BASE CONDITIONS WITH IMPROVEMENTS LANE CONFIGURATION  
 DATE: 08/14/24  
 PROJECT: POTTSTOWN TOWNSHIP  
 DRAWN BY: [REDACTED]  
 CHECKED BY: [REDACTED]  
 SCALE: AS SHOWN  
 SHEET NO.: 15 OF 15

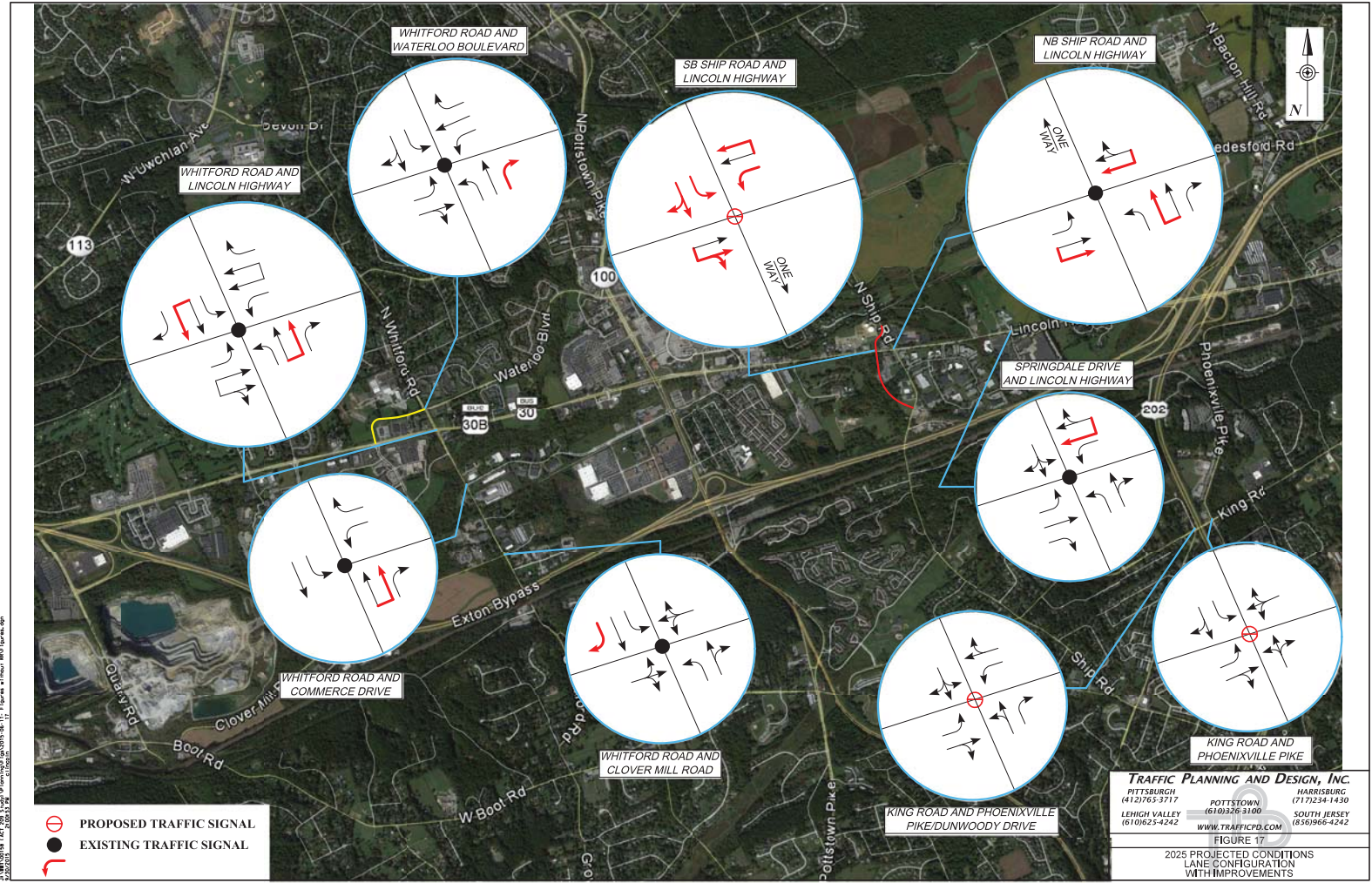


**KEY:**  
 ● EXISTING TRAFFIC SIGNAL  
 T STOP CONTROLLED

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 FIGURE 16

2025 PROJECTED CONDITIONS  
 LANE CONFIGURATION

2025 PROJECTED CONDITIONS LANE CONFIGURATION  
 DATE: 08/14/2024 11:52 AM  
 PROJECT: 2025 PROJECTED CONDITIONS LANE CONFIGURATION  
 DRAWN BY: [unreadable]  
 CHECKED BY: [unreadable]  
 APPROVED BY: [unreadable]



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 FIGURE 17  
 2025 PROJECTED CONDITIONS  
 LANE CONFIGURATION  
 WITH IMPROVEMENTS

2025 PROJECTED CONDITIONS LANE CONFIGURATION WITH IMPROVEMENTS  
 DATE: 08/14/24  
 SCALE: 1"=200'  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]

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Est. 1989



## Roadway Sufficiency Analysis - APPENDICES

West Whiteland Township  
*Chester County, PA*

July 17, 2015

TPD# WWT-00158



Adopted November 24, 2015  
Resolution No. 2015-49

2500 E. High Street

Suite 650

Pottstown, PA

19464

610.326.3100

TPD@TrafficPD.com



***APPENDIX A***  
***MANUAL TRAFFIC COUNT PRINTOUTS***



F. Tavani and Associates, Inc.

105 Kenilworth Street  
Philadelphia, PA 19147

intersection: Lincoln Highway  
Springdale Drive/Whiteland Valley  
Center  
counter: SC

File Name : 01\_30SPPM  
Site Code : 00000001  
Start Date : 9/10/2014  
Page No : 1

Groups Printed- cars - HV - school buses

Start Time	Whiteland Valley Center Southbound					Lincoln Highway Westbound					Springdale Drive Northbound					Lincoln Highway Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	0	0	3	116	0	0	119	19	0	44	0	63	0	106	4	0	110	292
04:15 PM	0	0	0	0	0	2	140	1	0	143	11	0	30	0	41	0	107	5	0	112	296
04:30 PM	0	0	1	0	1	6	141	0	0	147	16	0	60	0	76	0	101	5	0	106	330
04:45 PM	0	0	0	0	0	6	150	0	0	156	18	0	31	0	49	0	83	4	0	87	292
Total	0	0	1	0	1	17	547	1	0	565	64	0	165	0	229	0	397	18	0	415	1210
05:00 PM	1	0	0	0	1	5	168	0	0	173	30	0	76	0	106	0	118	5	0	123	403
05:15 PM	0	0	0	0	0	9	174	0	0	183	12	0	53	0	65	0	119	5	0	124	372
05:30 PM	0	0	1	0	1	11	177	1	0	189	21	0	48	0	69	0	74	13	0	87	346
05:45 PM	0	0	1	0	1	12	157	0	0	169	12	0	32	0	44	0	98	31	0	129	343
Total	1	0	2	0	3	37	676	1	0	714	75	0	209	0	284	0	409	54	0	463	1464
Grand Total	1	0	3	0	4	54	1223	2	0	1279	139	0	374	0	513	0	806	72	0	878	2674
Apprch %	25	0	75	0		4.2	95.6	0.2	0		27.1	0	72.9	0		0	91.8	8.2	0		
Total %	0	0	0.1	0	0.1	2	45.7	0.1	0	47.8	5.2	0	14	0	19.2	0	30.1	2.7	0	32.8	
cars	1	0	3	0	4	54	1194	2	0	1250	138	0	368	0	506	0	788	71	0	859	2619
% cars	100	0	100	0	100	100	97.6	100	0	97.7	99.3	0	98.4	0	98.6	0	97.8	98.6	0	97.8	97.9
HV	0	0	0	0	0	0	29	0	0	29	1	0	6	0	7	0	17	1	0	18	54
% HV	0	0	0	0	0	0	2.4	0	0	2.3	0.7	0	1.6	0	1.4	0	2.1	1.4	0	2.1	2
school buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% school buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0

Start Time	Whiteland Valley Center Southbound				Lincoln Highway Westbound				Springdale Drive Northbound				Lincoln Highway Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	1	0	0	1	5	168	0	173	30	0	76	106	0	118	5	123	403
05:15 PM	0	0	0	0	9	174	0	183	12	0	53	65	0	119	5	124	372
05:30 PM	0	0	1	1	11	177	1	189	21	0	48	69	0	74	13	87	346
05:45 PM	0	0	1	1	12	157	0	169	12	0	32	44	0	98	31	129	343
Total Volume	1	0	2	3	37	676	1	714	75	0	209	284	0	409	54	463	1464
% App. Total	33.3	0	66.7		5.2	94.7	0.1		26.4	0	73.6		0	88.3	11.7		
PHF	.250	.000	.500	.750	.771	.955	.250	.944	.625	.000	.688	.670	.000	.859	.435	.897	.908
cars	1	0	2	3	37	666	1	704	74	0	205	279	0	401	54	455	1441
% cars	100	0	100	100	100	98.5	100	98.6	98.7	0	98.1	98.2	0	98.0	100	98.3	98.4
HV	0	0	0	0	0	10	0	10	1	0	4	5	0	7	0	7	22
% HV	0	0	0	0	0	1.5	0	1.4	1.3	0	1.9	1.8	0	1.7	0	1.5	1.5
school buses	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% school buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0.2	0.1

F. Tavani and Associates, Inc.

105 Kenilworth Street  
Philadelphia, PA 19147

intersection: Lincoln Highway  
Springdale Drive/Whiteland Valley  
Center  
counter: SC

File Name : 01\_30SPPM  
Site Code : 00000001  
Start Date : 9/10/2014  
Page No : 1

Groups Printed- HV

Start Time	Whiteland Valley Center Southbound					Lincoln Highway Westbound					Springdale Drive Northbound					Lincoln Highway Eastbound					Int. Total
	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
04:00 PM	0	0	0	0	0	0	7	0	0	7	0	0	1	0	1	0	2	1	0	3	11
04:15 PM	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	4	0	0	4	10
04:30 PM	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	0	2	0	0	2	7
04:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	4
Total	0	0	0	0	0	0	19	0	0	19	0	0	2	0	2	0	10	1	0	11	32
05:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	2	0	2	0	2	0	0	2	5
05:15 PM	0	0	0	0	0	0	4	0	0	4	0	0	2	0	2	0	1	0	0	1	7
05:30 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	3	0	0	3	1	0	0	0	1	0	4	0	0	4	8
Total	0	0	0	0	0	0	10	0	0	10	1	0	4	0	5	0	7	0	0	7	22
Grand Total	0	0	0	0	0	0	29	0	0	29	1	0	6	0	7	0	17	1	0	18	54
Apprch %	0	0	0	0	0	0	100	0	0	100	14.3	0	85.7	0	14.3	0	94.4	5.6	0	100	
Total %	0	0	0	0	0	0	53.7	0	0	53.7	1.9	0	11.1	0	16.2	0	31.5	1.9	0	33.3	

Start Time	Whiteland Valley Center Southbound				Lincoln Highway Westbound				Springdale Drive Northbound				Lincoln Highway Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	1	0	1	0	0	2	2	0	2	0	2	5
05:15 PM	0	0	0	0	0	4	0	4	0	0	2	2	0	1	0	1	7
05:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	3	0	3	1	0	0	1	0	4	0	4	8
Total Volume	0	0	0	0	0	10	0	10	1	0	4	5	0	7	0	7	22
% App. Total	0	0	0	0	0	100	0	100	20	0	80	100	0	100	0	100	
PHF	.000	.000	.000	.000	.000	.625	.000	.625	.250	.000	.500	.625	.000	.438	.000	.438	.688

F. Tavani and Associates, Inc.

105 Kenilworth Street  
Philadelphia, PA 19147

intersection: Lincoln Highway  
Springdale Drive/Whiteland Valley  
Center  
counter: SC

File Name : 01\_30SPPM  
Site Code : 00000001  
Start Date : 9/10/2014  
Page No : 1

Groups Printed- school buses

Start Time	Whiteland Valley Center Southbound					Lincoln Highway Westbound					Springdale Drive Northbound					Lincoln Highway Eastbound					Int. Total
	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100	0

Start Time	Whiteland Valley Center Southbound				Lincoln Highway Westbound				Springdale Drive Northbound				Lincoln Highway Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250

DELAWARE VALLEY REGIONAL PLANNING COMMISSION  
OFFICE OF TRAVEL MONITORING

COUNTY: Chester  
MUNICIPALITY: West Whiteland  
INTERSECTION: North-South Street & East-West Street  
STREETS: Ship Rd Lincoln Hwy  
SR/SEG/OFF: 1001/0040/2434 3070/0402/0000

DATE: 2/19/14  
DAY: Wednesday  
WEATHER: FAIR

FILE NUMBER: PM

AM INTERVAL COUNTS

STARTING TIME	1-NORTHBOUND			Ship Rd			2-SOUTHBOUND			3-EASTBOUND			Lincoln Hwy			4-WESTBOUND			N-S			E-W				
	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R		
2:00 2:15	30	40	4	25	40	6	71	2	56	22	80	10	79	15	104	145	184	329								
2:15 2:30	37	52	6	18	23	1	42	3	60	16	79	9	82	14	105	137	184	321								
2:30 2:45	32	48	1	16	38	4	58	3	104	25	132	1	92	11	104	139	236	375								
2:45 3:00	25	67	6	23	40	5	68	10	97	23	130	6	115	20	141	166	271	437								
3:00 3:15	43	52	7	102	8	31	8	47	63	23	95	14	113	34	161	149	256	405								
3:15 3:30	42	93	4	139	19	55	8	82	4	88	21	113	15	106	23	144	221	257	478							
3:30 3:45	58	84	4	146	9	42	7	58	4	100	27	131	7	94	18	119	204	250	478							
3:45 4:00	44	77	1	122	14	56	10	80	6	70	20	96	8	115	19	142	202	238	454							
4:00 4:15	35	92	5	132	11	47	10	68	4	77	30	111	6	109	22	137	200	248	448							
4:15 4:30	49	93	4	146	10	73	5	88	6	54	32	92	12	83	15	110	234	202	436							
4:30 4:45	48	122	5	175	12	62	5	79	1	58	27	86	4	90	17	111	254	197	451							
4:45 5:00	57	112	4	173	7	56	8	71	1	73	26	100	10	101	21	132	244	232	476							
5:00 5:15	48	127	7	182	6	92	7	105	2	66	18	86	15	110	23	148	287	234	521							
5:15 5:30	62	144	1	207	9	64	9	82	4	69	30	103	18	119	16	153	289	256	545							
5:30 5:45	41	106	7	154	13	63	3	79	4	81	32	117	11	126	23	160	233	277	510							
5:45 6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
TOTALS	651	1309	66	2026	200	782	96	1078	63	1116	372	1551	146	1534	291	1971	3104	3522	6626							

P.H. am  
P.H. pm

HOURLY VOLUMES

STARTING TIME	1-NORTHBOUND			Ship Rd			2-SOUTHBOUND			3-EASTBOUND			Lincoln Hwy			4-WESTBOUND			N-S			E-W			
	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R	
2:00 3:00	124	207	17	348	82	141	16	239	18	317	86	421	26	368	60	454	587	875	1462						
3:00 4:00	187	306	16	509	50	184	33	267	23	321	91	435	44	428	94	566	776	1001	1777						
4:00 5:00	189	419	18	626	40	238	28	306	12	262	115	389	32	383	75	490	932	879	1811						
5:00 6:00	151	377	15	543	28	219	19	266	10	216	80	306	44	355	62	461	809	767	1576						
TOTALS	651	1309	66	2026	200	782	96	1078	63	1116	372	1551	146	1534	291	1971	3104	3522	6626						

DELAWARE VALLEY REGIONAL PLANNING COMMISSION  
OFFICE OF TRAVEL MONITORING

COUNTY: Chester  
MUNICIPALITY: West Whiteland

INTERSECTION: Ship Rd & Lincoln Hwy

DATE: 41689 OBSERVERS: xx  
DAY: Wednesday WEATHER: FAIR

AM INTERVAL PEDESTRIAN COUNTS

TIME PERIOD	NORTH CROSSWALK	SOUTH CROSSWALK	N & S TOTAL	EAST CROSSWALK	WEST CROSSWALK	E & W TOTAL	TOTAL N, S, E, & W
7:00 7:15	0	0	0	0	0	0	0
7:15 7:30	0	0	0	0	0	0	0
7:30 7:45	0	0	0	0	0	0	0
7:45 8:00	0	0	0	0	0	0	0
8:00 8:15	0	0	0	0	0	0	0
8:15 8:30	0	0	0	0	0	0	0
8:30 8:45	0	0	0	0	0	0	0
8:45 9:00	0	0	0	0	0	0	0
9:00 9:30	0	0	0	0	0	0	0
9:30 10:00	0	0	0	0	0	0	0
10:00 10:30	0	0	0	0	0	0	0
10:30 11:00	0	0	0	0	0	0	0
11:00 11:30	0	0	0	0	0	0	0
11:30-12:00	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TIME	_____	MAXIMUM HOUR CROSSING	NORTH CROSSWALK TOTAL	_____	0
			SOUTH CROSSWALK TOTAL	_____	0
TIME	_____	MAXIMUM HOUR CROSSING	EAST CROSSWALK TOTAL	_____	0
TIME	_____	MAXIMUM HOUR CROSSING	WEST CROSSWALK TOTAL	_____	0
			ALL CROSSWALKS	_____	0

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_

DELAWARE VALLEY REGIONAL PLANNING COMMISSION  
OFFICE OF TRAVEL MONITORING

COUNTY: Chester  
MUNICIPALITY: West Whiteland  
DATE: 2/19/14 PM  
INTERSECTION ANALYSIS  
MAIN ST: Lincoln Hwy  
CROSS ST: Ship Rd

<u>SPEED</u>	POSTED SPEED		AVG. SPEED	
Lincoln Hwy	45	40	TO	50
Ship Rd	35	30	TO	40

TYPE OF AREA

_____	RURAL	_____ X _____	BUSINESS	_____	INDUSTRIAL
_____	URBAN	_____	RESIDENTIAL	_____	

TRUCK MOVEMENTS

	LIGHT (LESS THAN 5%)	MODERATE (5% TO 10%)	HEAVY (GREATER THAN 10%)
Lincoln Hwy	X		
Ship Rd	X		

PEDESTRIAN MOVEMENTS

DO WIDTH OF ROADS PRESENT DIFFICULTY FOR PEDESTRIAN? \_\_\_\_\_ NO

ARE THERE SPECIAL MOVEMENTS OF AGED OR AFFLICTED PEOPLE? \_\_\_\_\_ NO

IS THIS A MAJOR SCHOOL CROSSING? \_\_\_\_\_ NO

CHILDREN ARE CONTROLLED BY \_\_\_\_\_

NAME OF SCHOOL \_\_\_\_\_

LOCATION OF SCHOOL \_\_\_\_\_

APPROXIMATE DISTANCE FROM INTERSECTION \_\_\_\_\_

NUMBER OF CHILDREN ATTENDING \_\_\_\_\_

SCHOOL BUSES

Lincoln Hwy \_\_\_\_\_

Ship Rd \_\_\_\_\_

GRADE CROSSING

NAME OF RAILROAD \_\_\_\_\_ BRANCH \_\_\_\_\_

LOCATION \_\_\_\_\_

TYPE OF CONTROL \_\_\_\_\_

TRAIN CROSSING/TIMES \_\_\_\_\_

AVERAGE CROSSING TIME \_\_\_\_\_

SIGNALS

NEAREST SIGNAL

	<u>U TURNS</u>	NUMBER AND DIRECTION
NORTH		_____
SOUTH		_____
EAST		

# McMahon Associates Inc.

425 Commerce Drive, Suite 200

Fort Washington, PA 19034

Municipality: West Whiteland Township

Location: Whitford Road &

Waterloo Boulevard

Counter/Board #: TD

File Name : whitford03w

Site Code : 81400002

Start Date : 1/8/2014

Page No : 1

## Groups Printed- Passenger Vehicles - Heavy Vehicles

Start Time	Whitford Rd Southbound		Waterloo Blvd Westbound			Whitford Rd Northbound			Int. Total
	Left	Thru	Left	ROR	Right	Thru	ROR	Right	
07:00	15	101	20	2	1	56	1	33	229
07:15	31	116	22	1	2	49	5	37	263
07:30	52	155	30	4	4	50	4	43	342
07:45	28	170	57	5	0	108	2	54	424
Total	126	542	129	12	7	263	12	167	1258
08:00	38	170	42	5	0	101	3	65	424
08:15	30	106	35	7	1	81	4	64	328
08:30	37	131	37	9	0	53	3	50	320
08:45	29	130	46	3	1	75	3	45	332
Total	134	537	160	24	2	310	13	224	1404
*** BREAK ***									
16:00	22	84	56	24	11	153	0	59	409
16:15	19	76	67	18	8	148	0	55	391
16:30	23	77	57	24	22	164	1	61	429
16:45	19	94	67	28	14	165	0	50	437
Total	83	331	247	94	55	630	1	225	1666
17:00	24	97	62	21	29	160	0	47	440
17:15	22	117	69	16	25	185	2	41	477
17:30	16	105	59	22	22	163	0	53	440
17:45	15	99	58	31	15	139	1	50	408
Total	77	418	248	90	91	647	3	191	1765
Grand Total	420	1828	784	220	155	1850	29	807	6093
Aprch %	18.7	81.3	67.6	19	13.4	68.9	1.1	30	
Total %	6.9	30	12.9	3.6	2.5	30.4	0.5	13.2	
Passenger Vehicles	417	1769	757	220	151	1791	29	782	5916
% Passenger Vehicles	99.3	96.8	96.6	100	97.4	96.8	100	96.9	97.1
Heavy Vehicles	3	59	27	0	4	59	0	25	177
% Heavy Vehicles	0.7	3.2	3.4	0	2.6	3.2	0	3.1	2.9

Zero Pedestrians were observed during this study.

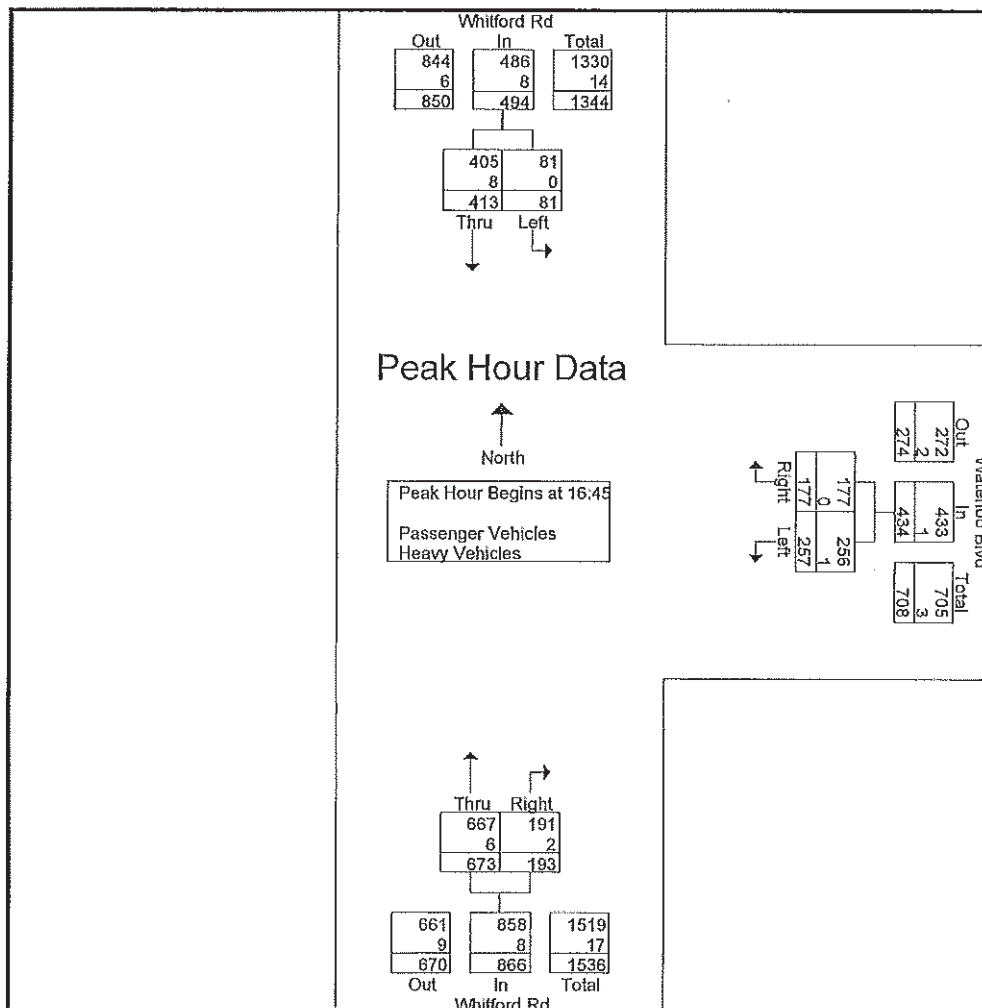
# McMahon Associates Inc.

425 Commerce Drive, Suite 200  
Fort Washington, PA 19034

Municipality: West Whiteland Township  
Location: Whitford Road &  
Waterloo Boulevard  
Counter/Board #: TD

File Name : whitford03w  
Site Code : 81400002  
Start Date : 1/8/2014  
Page No : 3

Start Time	Whitford Rd Southbound			Waterloo Blvd Westbound				Whitford Rd Northbound				Int. Total
	Left	Thru	App. Total	Left	ROR	Right	App. Total	Thru	ROR	Right	App. Total	
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 16:45												
16:45	19	94	113	67	28	14	109	165	0	50	215	437
17:00	24	97	121	62	21	29	112	160	0	47	207	440
17:15	22	117	139	69	16	25	110	185	2	41	228	477
17:30	16	105	121	59	22	22	103	163	0	53	216	440
Total Volume	81	413	494	257	87	90	434	673	2	191	866	1794
% App. Total	16.4	83.6		59.2	20	20.7		77.7	0.2	22.1		
PHF	.844	.882	.888	.931	.777	.776	.969	.909	.250	.901	.950	.940
Passenger Vehicles	81	405	486	256	87	90	433	667	2	189	858	1777
% Passenger Vehicles	100	98.1	98.4	99.6	100	100	99.8	99.1	100	99.0	99.1	99.1
Heavy Vehicles	0	8	8	1	0	0	1	6	0	2	8	17
% Heavy Vehicles	0	1.9	1.6	0.4	0	0	0.2	0.9	0	1.0	0.9	0.9



# McMahon Associates Inc.

425 Commerce Drive, Suite 200  
Fort Washington, PA 19034

Municipality: West Whiteland Township  
Location: Lincoln Highway (Bus. Rt 30) &  
Whitford Road  
Counter/Board #: BW

File Name : whitford01w  
Site Code : 81400001  
Start Date : 1/8/2014  
Page No : 1

### Groups Printed- Passenger Vehicles - Heavy Vehicles

Start Time	Whitford Rd Southbound				Bus. Rt 30 Westbound				Whitford Rd Northbound				Bus. Rt 30 Eastbound				Int. Total
	Left	Thru	ROR	Right	Left	Thru	ROR	Right	Left	Thru	ROR	Right	Left	Thru	ROR	Right	
07:00	28	50	17	19	12	56	1	10	10	40	7	14	37	73	4	23	401
07:15	20	52	21	15	25	80	0	7	19	36	20	4	44	102	0	18	463
07:30	42	70	22	30	24	77	0	10	17	38	15	7	56	115	4	17	544
07:45	24	72	48	51	35	118	0	11	36	64	8	15	80	125	0	18	705
<b>Total</b>	<b>114</b>	<b>244</b>	<b>108</b>	<b>115</b>	<b>96</b>	<b>331</b>	<b>1</b>	<b>38</b>	<b>82</b>	<b>178</b>	<b>50</b>	<b>40</b>	<b>217</b>	<b>415</b>	<b>8</b>	<b>76</b>	<b>2113</b>
08:00	33	84	24	56	21	82	0	6	33	69	13	11	93	137	0	14	676
08:15	15	49	22	34	27	70	0	6	22	41	14	19	86	147	1	25	578
08:30	31	75	25	33	9	82	0	6	31	49	15	10	53	99	1	15	534
08:45	20	57	27	27	23	89	0	12	25	55	15	14	60	100	2	25	551
<b>Total</b>	<b>99</b>	<b>265</b>	<b>98</b>	<b>150</b>	<b>80</b>	<b>323</b>	<b>0</b>	<b>30</b>	<b>111</b>	<b>214</b>	<b>57</b>	<b>54</b>	<b>292</b>	<b>483</b>	<b>4</b>	<b>79</b>	<b>2339</b>
*** BREAK ***																	
16:00	15	47	36	21	20	145	1	29	42	60	16	8	100	149	1	27	717
16:15	18	48	46	16	26	150	0	23	40	83	19	6	105	157	0	28	765
16:30	19	42	38	9	26	179	1	29	40	76	14	9	111	171	2	35	801
16:45	12	69	44	20	36	137	0	23	36	102	13	8	89	153	0	26	768
<b>Total</b>	<b>64</b>	<b>206</b>	<b>164</b>	<b>66</b>	<b>108</b>	<b>611</b>	<b>2</b>	<b>104</b>	<b>158</b>	<b>321</b>	<b>62</b>	<b>31</b>	<b>405</b>	<b>630</b>	<b>3</b>	<b>116</b>	<b>3051</b>
17:00	20	59	41	20	35	155	0	34	37	66	14	6	98	171	0	35	791
17:15	24	68	44	24	24	139	0	33	44	85	8	9	108	150	2	29	791
17:30	10	67	51	16	32	160	0	33	50	78	10	3	98	116	2	24	750
17:45	13	70	34	47	29	135	0	25	46	84	15	6	78	128	1	18	729
<b>Total</b>	<b>67</b>	<b>264</b>	<b>170</b>	<b>107</b>	<b>120</b>	<b>589</b>	<b>0</b>	<b>125</b>	<b>177</b>	<b>313</b>	<b>47</b>	<b>24</b>	<b>382</b>	<b>565</b>	<b>5</b>	<b>106</b>	<b>3061</b>
<b>Grand Total</b>	<b>344</b>	<b>979</b>	<b>540</b>	<b>438</b>	<b>404</b>	<b>1854</b>	<b>3</b>	<b>297</b>	<b>528</b>	<b>1026</b>	<b>216</b>	<b>149</b>	<b>1296</b>	<b>2093</b>	<b>20</b>	<b>377</b>	<b>10564</b>
<b>Apprch %</b>	<b>15</b>	<b>42.5</b>	<b>23.5</b>	<b>19</b>	<b>15.8</b>	<b>72.5</b>	<b>0.1</b>	<b>11.6</b>	<b>27.5</b>	<b>53.5</b>	<b>11.3</b>	<b>7.8</b>	<b>34.2</b>	<b>55.3</b>	<b>0.5</b>	<b>10</b>	
<b>Total %</b>	<b>3.3</b>	<b>9.3</b>	<b>5.1</b>	<b>4.1</b>	<b>3.8</b>	<b>17.6</b>	<b>0</b>	<b>2.8</b>	<b>5</b>	<b>9.7</b>	<b>2</b>	<b>1.4</b>	<b>12.3</b>	<b>19.8</b>	<b>0.2</b>	<b>3.6</b>	
<b>Passenger Vehicles</b>	<b>335</b>	<b>954</b>	<b>540</b>	<b>400</b>	<b>375</b>	<b>1817</b>	<b>3</b>	<b>289</b>	<b>505</b>	<b>1014</b>	<b>216</b>	<b>130</b>	<b>1249</b>	<b>2013</b>	<b>20</b>	<b>370</b>	<b>10230</b>
<b>% Passenger Vehicles</b>	<b>97.4</b>	<b>97.4</b>	<b>100</b>	<b>91.3</b>	<b>92.8</b>	<b>98</b>	<b>100</b>	<b>97.3</b>	<b>95.6</b>	<b>98.8</b>	<b>100</b>	<b>87.2</b>	<b>96.4</b>	<b>96.2</b>	<b>100</b>	<b>98.1</b>	<b>96.8</b>
<b>Heavy Vehicles</b>	<b>9</b>	<b>25</b>	<b>0</b>	<b>38</b>	<b>29</b>	<b>37</b>	<b>0</b>	<b>8</b>	<b>23</b>	<b>12</b>	<b>0</b>	<b>19</b>	<b>47</b>	<b>80</b>	<b>0</b>	<b>7</b>	<b>334</b>
<b>% Heavy Vehicles</b>	<b>2.6</b>	<b>2.6</b>	<b>0</b>	<b>8.7</b>	<b>7.2</b>	<b>2</b>	<b>0</b>	<b>2.7</b>	<b>4.4</b>	<b>1.2</b>	<b>0</b>	<b>12.8</b>	<b>3.6</b>	<b>3.8</b>	<b>0</b>	<b>1.9</b>	<b>3.2</b>

**Zero Pedestrians were observed during this study.**

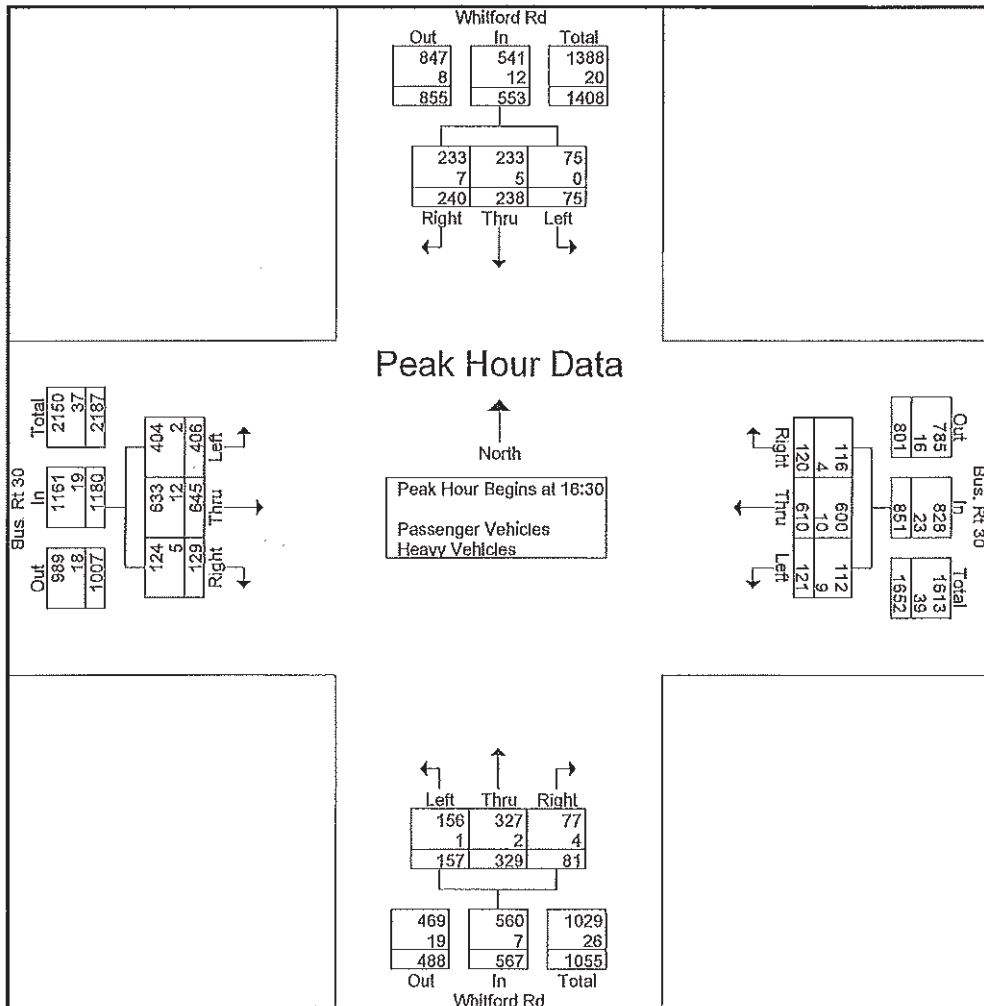
# McMahon Associates Inc.

425 Commerce Drive, Suite 200  
Fort Washington, PA 19034

Municipality: West Whiteland Township  
Location: Lincoln Highway (Bus. Rt 30) &  
Whitford Road  
Counter/Board #: BW

File Name : whitford01w  
Site Code : 81400001  
Start Date : 1/8/2014  
Page No : 3

Start Time	Whitford Rd Southbound					Bus. Rt 30 Westbound					Whitford Rd Northbound					Bus. Rt 30 Eastbound					Int. Total
	Left	Thru	ROR	Right	App. Total	Left	Thru	ROR	Right	App. Total	Left	Thru	ROR	Right	App. Total	Left	Thru	ROR	Right	App. Total	
Peak Hour Analysis From 12.00 to 17.45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	19	42	38	9	108	26	179	1	29	235	40	76	14	9	139	111	171	2	35	319	801
16:45	12	69	44	20	145	36	137	0	23	196	36	102	13	8	159	89	153	0	26	268	768
17:00	20	59	41	20	140	35	155	0	34	224	37	66	14	6	123	98	171	0	35	304	791
17:15	24	68	44	24	160	24	139	0	33	196	44	85	8	9	146	108	150	2	29	289	791
Total Volume	75	238	167	73	553	121	610	1	119	851	157	329	49	32	567	406	645	4	125	1180	3151
% App. Total	13.6	43	30.2	13.2		14.2	71.7	0.1	14		27.7	58	8.6	5.6		34.4	54.7	0.3	10.6		
PHF	.781	.862	.949	.760	.864	.840	.852	.250	.875	.905	.892	.806	.875	.889	.892	.914	.943	.500	.893	.925	.983
Passenger Vehicles																					
% Passenger Vehicles	100	97.9	100	90.4	97.8	92.6	98.4	100	96.6	97.3	99.4	99.4	100	87.5	98.8	99.5	98.1	100	96.0	98.4	98.1
Heavy Vehicles																					
% Heavy Vehicles	0	2.1	0	9.6	2.2	7.4	1.6	0	3.4	2.7	0.6	0.6	0	12.5	1.2	0.5	1.9	0	4.0	1.6	1.9



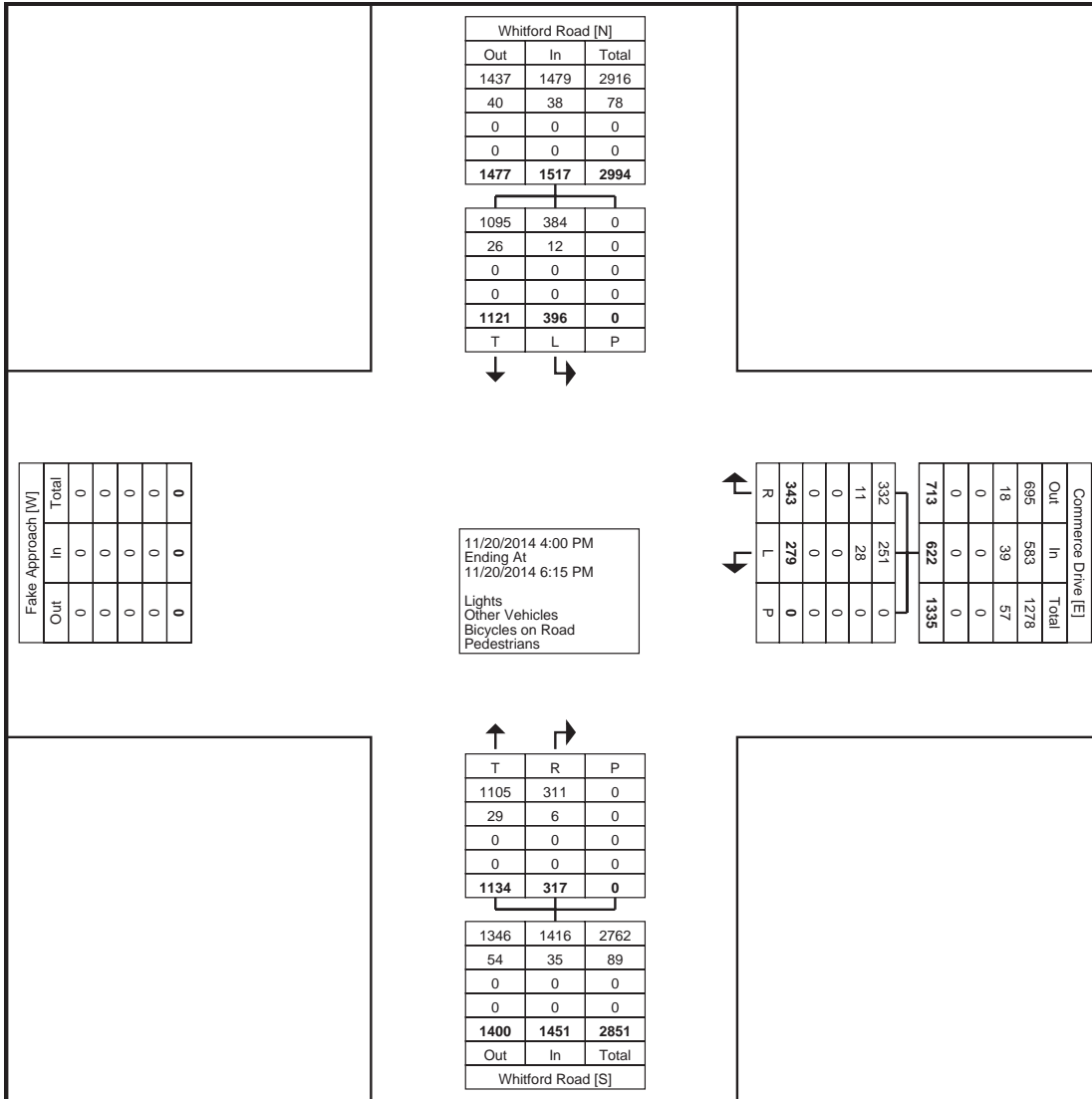




Traffic Planning and Design, Inc  
 2500 East High Street  
 Suite 650  
 Pottstown, Pennsylvania, United States 19464  
 610.326.3100 mbressler@trafficpd.com

Count Name: Whitford Road &  
 Commerce Drive - PM  
 Site Code:  
 Start Date: 11/20/2014  
 Page No: 2

Counter:: MIOVISION  
 Counted By:: JG  
 Weather:: Clear



Turning Movement Data Plot

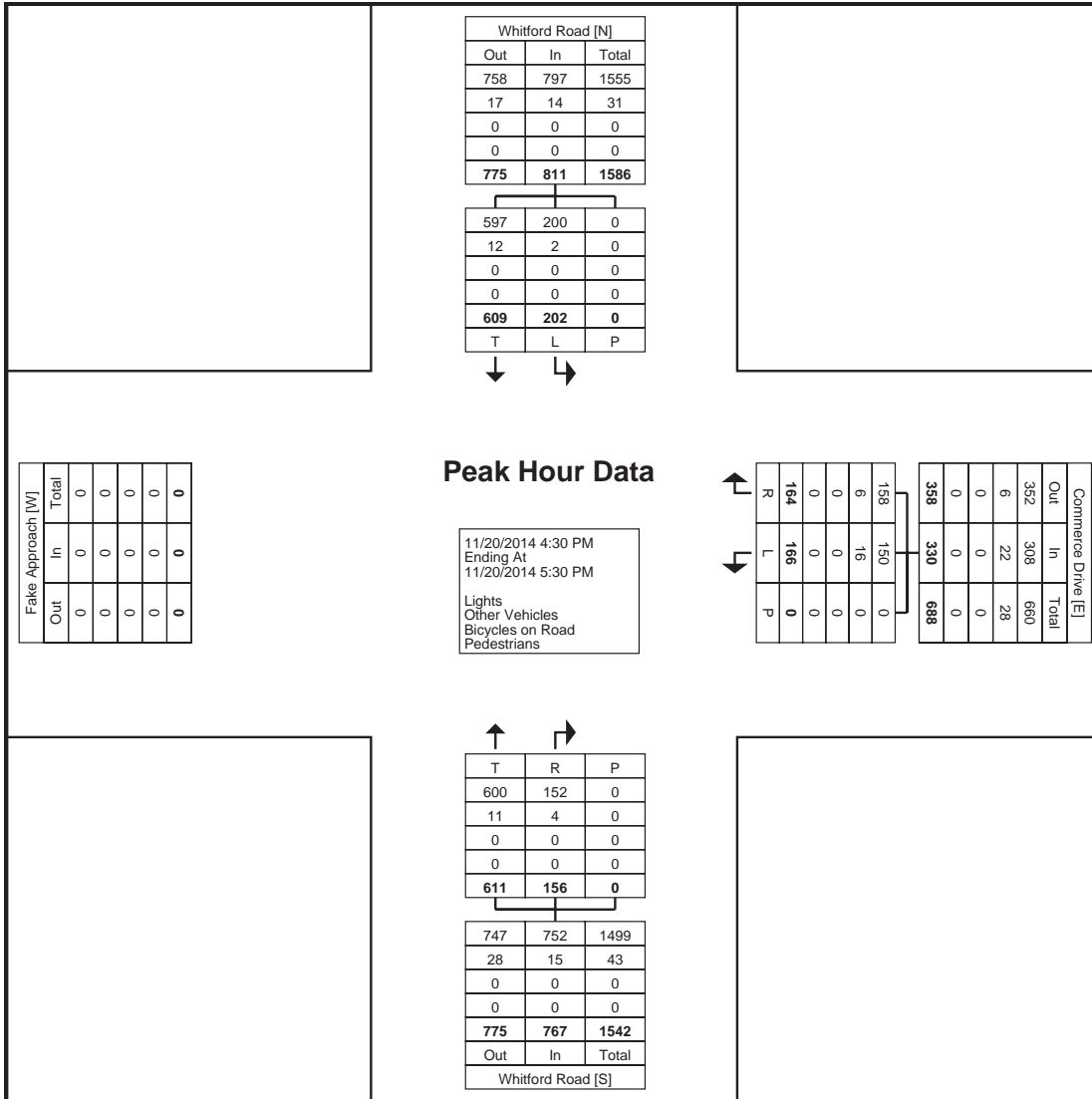




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 610.326.3100 mbressler@trafficpd.com

Count Name: Whitford Road &  
 Commerce Drive - PM  
 Site Code:  
 Start Date: 11/20/2014  
 Page No: 4

Counter:: MIOVISION  
 Counted By:: JG  
 Weather:: Clear



Turning Movement Peak Hour Data Plot (4:30 PM)



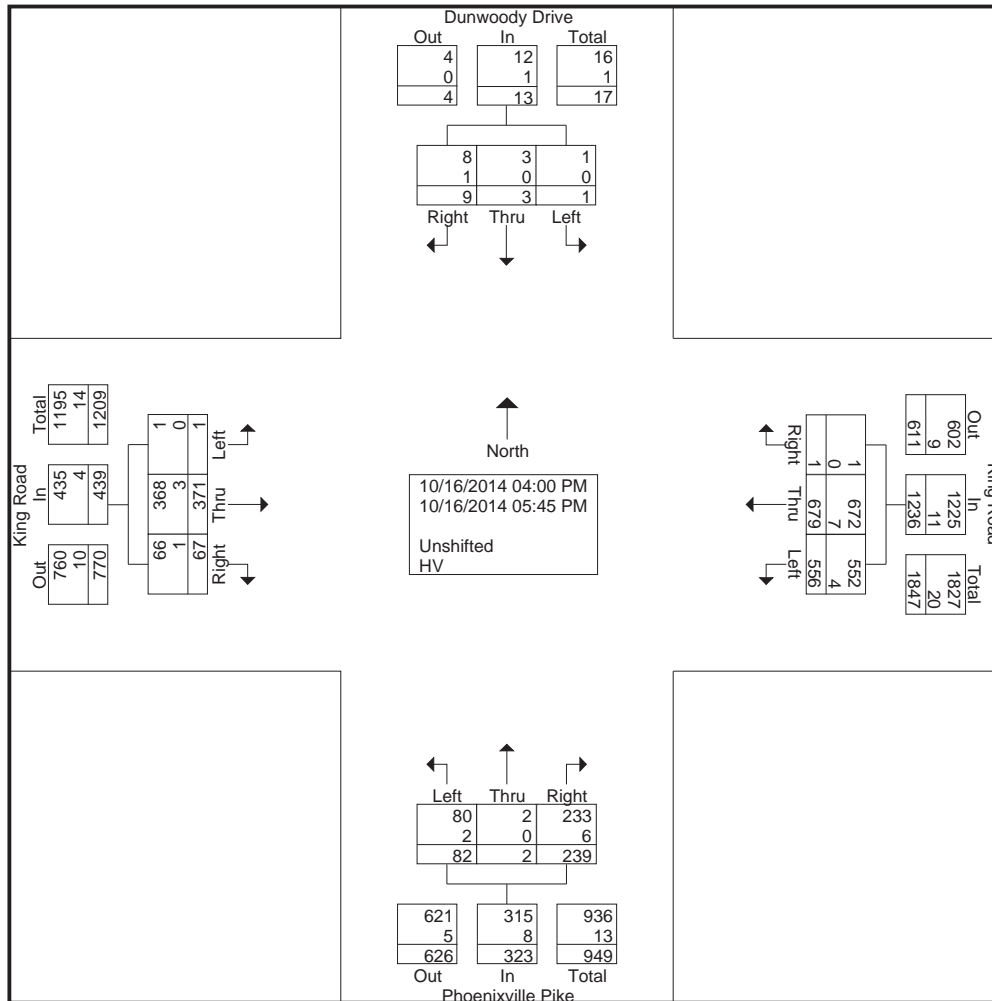
**Phoenixville Pike & King Road  
 West Whiteland Township, Chester County**

Counter: 14  
 Counted by: RK  
 Weather: Clear

File Name : 2014-10-16 PM Phoenixville King  
 Site Code : 00000000  
 Start Date : 10/16/2014  
 Page No : 1

**Groups Printed- Unshifted - HV**

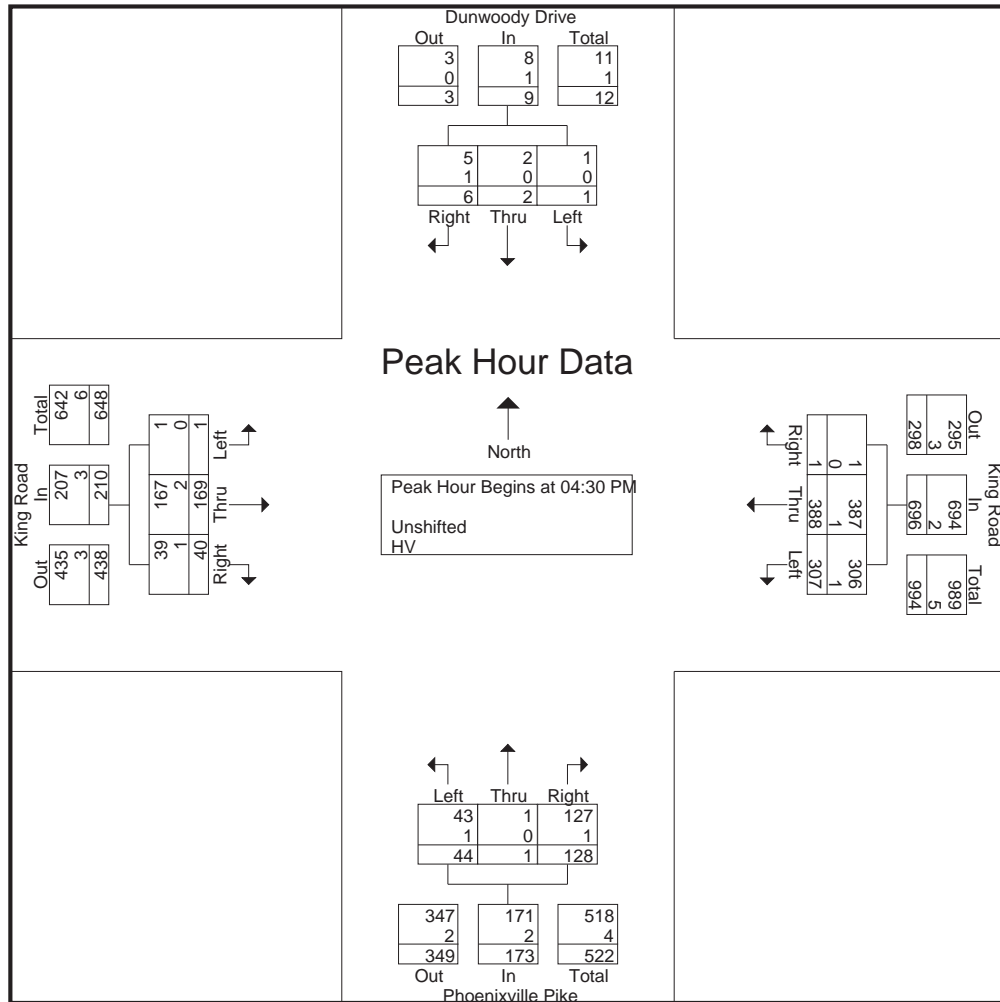
Start Time	King Road Eastbound					King Road Westbound					Phoenixville Pike Northbound					Dunwoody Drive Southbound					Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total			
04:00 PM	0	48	0	0	48	52	69	0	0	121	4	0	38	0	42	0	0	0	0	0	0	211	211
04:15 PM	0	59	0	0	59	55	64	0	0	119	13	0	21	0	34	0	0	0	0	0	0	212	212
04:30 PM	0	36	0	0	36	69	103	0	0	172	10	0	37	0	47	0	0	0	0	0	0	255	255
04:45 PM	0	42	16	0	58	69	88	0	0	157	11	1	29	0	41	0	0	0	0	0	0	256	256
<b>Total</b>	<b>0</b>	<b>185</b>	<b>16</b>	<b>0</b>	<b>201</b>	<b>245</b>	<b>324</b>	<b>0</b>	<b>0</b>	<b>569</b>	<b>38</b>	<b>1</b>	<b>125</b>	<b>0</b>	<b>164</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>934</b>	<b>934</b>
05:00 PM	0	39	11	0	50	97	105	1	0	203	8	0	35	0	43	0	0	2	0	2	0	298	298
05:15 PM	1	52	13	0	66	72	92	0	0	164	15	0	27	0	42	1	2	4	0	7	0	279	279
05:30 PM	0	46	11	0	57	75	90	0	0	165	9	0	20	0	29	0	1	1	0	2	0	253	253
05:45 PM	0	49	16	0	65	67	68	0	0	135	12	1	32	0	45	0	0	2	0	2	0	247	247
<b>Total</b>	<b>1</b>	<b>186</b>	<b>51</b>	<b>0</b>	<b>238</b>	<b>311</b>	<b>355</b>	<b>1</b>	<b>0</b>	<b>667</b>	<b>44</b>	<b>1</b>	<b>114</b>	<b>0</b>	<b>159</b>	<b>1</b>	<b>3</b>	<b>9</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>1077</b>	<b>1077</b>
Grand Total	1	371	67	0	439	556	679	1	0	1236	82	2	239	0	323	1	3	9	0	13	0	2011	2011
Apprch %	0.2	84.5	15.3			45	54.9	0.1			25.4	0.6	74			7.7	23.1	69.2					
Total %	0	18.4	3.3		21.8	27.6	33.8	0		61.5	4.1	0.1	11.9		16.1	0	0.1	0.4		0.6	0	100	
Unshifted	1	368	66		435	552	672	1		1225	80	2	233		315	1	3	8		12	0	0	1987
% Unshifted	100	99.2	98.5		99.1	99.3	99	100		99.1	97.6	100	97.5		97.5	100	100	88.9		92.3	0	0	98.8
HV	0	3	1		4	4	7	0		11	2	0	6		8	0	0	1		1	0	0	24
% HV	0	0.8	1.5		0.9	0.7	1	0		0.9	2.4	0	2.5		2.5	0	0	11.1		7.7	0	0	1.2



**Phoenixville Pike & King Road**  
**West Whiteland Township, Chester County**

File Name : 2014-10-16 PM Phoenixville King  
 Site Code : 00000000  
 Start Date : 10/16/2014  
 Page No : 2

Start Time	King Road Eastbound				King Road Westbound				Phoenixville Pike Northbound				Dunwoody Drive Southbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	36	0	36	69	103	0	172	10	0	37	47	0	0	0	0	255
04:45 PM	0	42	16	58	69	88	0	157	11	1	29	41	0	0	0	0	256
05:00 PM	0	39	11	50	97	105	1	203	8	0	35	43	0	0	2	2	298
05:15 PM	1	52	13	66	72	92	0	164	15	0	27	42	1	2	4	7	279
Total Volume	1	169	40	210	307	388	1	696	44	1	128	173	1	2	6	9	1088
% App. Total	0.5	80.5	19		44.1	55.7	0.1		25.4	0.6	74		11.1	22.2	66.7		
PHF	.250	.813	.625	.795	.791	.924	.250	.857	.733	.250	.865	.920	.250	.250	.375	.321	.913
Unshifted	1	167	39	207	306	387	1	694	43	1	127	171	1	2	5	8	1080
% Unshifted	100	98.8	97.5	98.6	99.7	99.7	100	99.7	97.7	100	99.2	98.8	100	100	83.3	88.9	99.3
HV	0	2	1	3	1	1	0	2	1	0	1	2	0	0	1	1	8
% HV	0	1.2	2.5	1.4	0.3	0.3	0	0.3	2.3	0	0.8	1.2	0	0	16.7	11.1	0.7



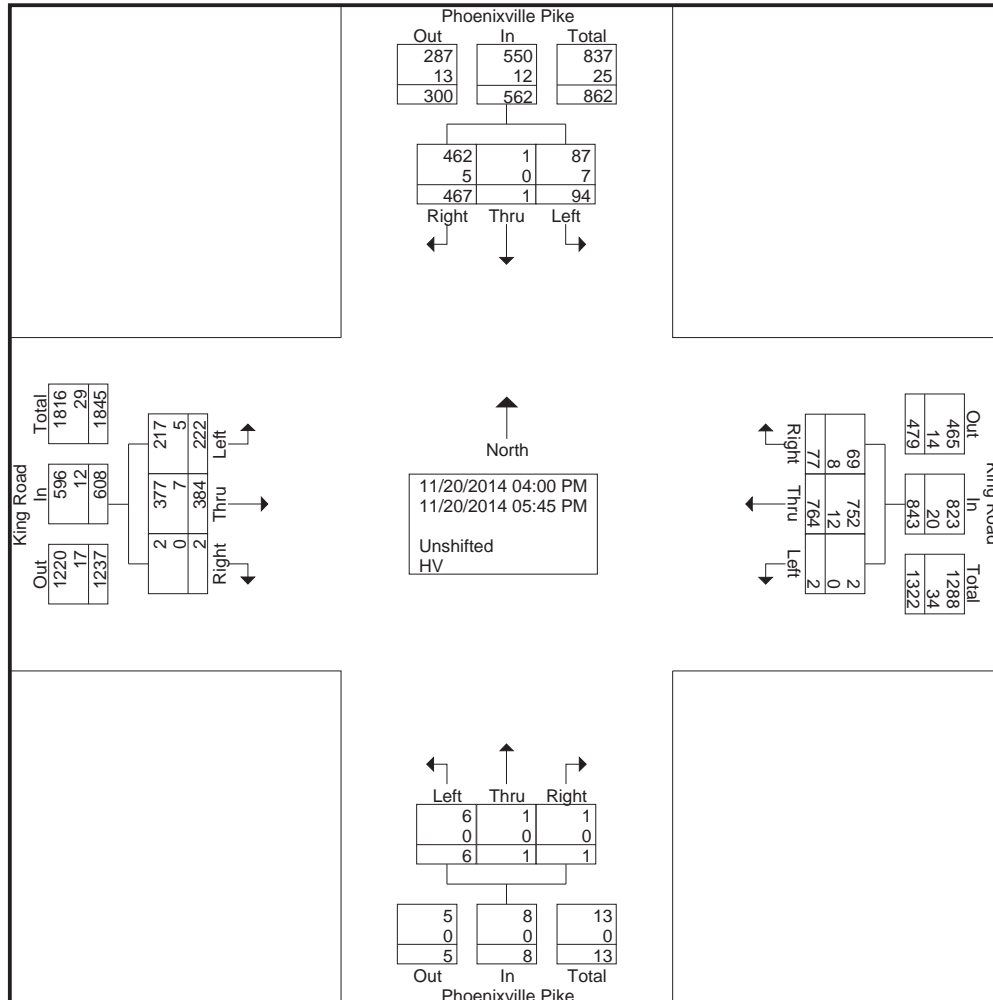
**King Road & Phoenixville Pike**  
**West Whiteland Township, Chester County**

Counter: 16  
 Counted by: J. Gable  
 Weather: Clear

File Name : 2014-11-20 PM King Road Phoenixville Pike  
 Site Code : 00000000  
 Start Date : 11/20/2014  
 Page No : 1

**Groups Printed- Unshifted - HV**

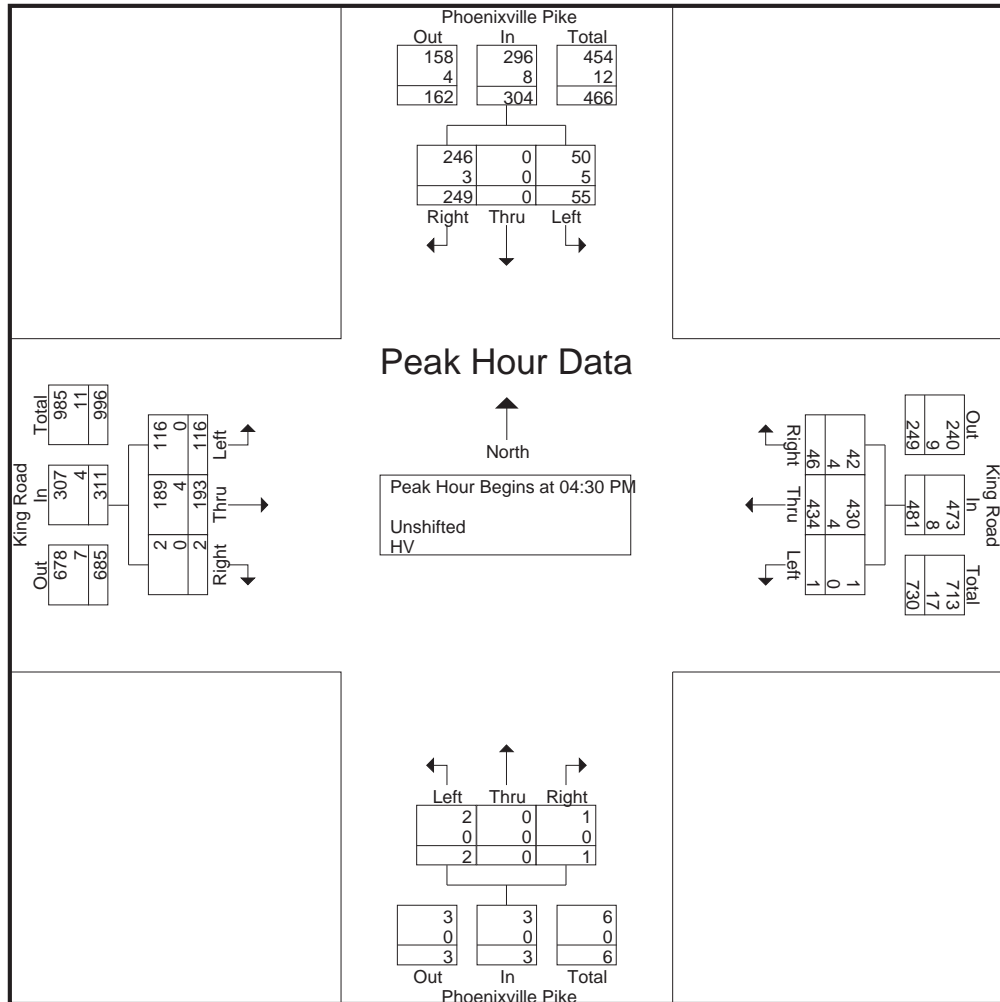
Start Time	King Road Eastbound					King Road Westbound					Phoenixville Pike Northbound					Phoenixville Pike Southbound					Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total			
04:00 PM	24	59	0	0	83	0	84	9	0	93	2	0	0	0	2	8	1	53	0	62	0	240	240
04:15 PM	23	43	0	0	66	0	59	9	0	68	1	0	0	0	1	7	0	47	0	54	0	189	189
04:30 PM	25	50	0	0	75	1	127	8	0	136	0	0	0	0	0	12	0	68	0	80	0	291	291
04:45 PM	24	53	1	0	78	0	99	15	0	114	0	0	0	0	0	18	0	52	0	70	0	262	262
<b>Total</b>	<b>96</b>	<b>205</b>	<b>1</b>	<b>0</b>	<b>302</b>	<b>1</b>	<b>369</b>	<b>41</b>	<b>0</b>	<b>411</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>45</b>	<b>1</b>	<b>220</b>	<b>0</b>	<b>266</b>	<b>0</b>	<b>982</b>	<b>982</b>
05:00 PM	39	44	1	0	84	0	97	12	0	109	1	0	1	0	2	21	0	70	0	91	0	286	286
05:15 PM	28	46	0	0	74	0	111	11	0	122	1	0	0	0	1	4	0	59	0	63	0	260	260
05:30 PM	39	52	0	0	91	1	108	7	0	116	1	0	0	0	1	12	0	60	0	72	0	280	280
05:45 PM	20	37	0	0	57	0	79	6	0	85	0	1	0	0	1	12	0	58	0	70	0	213	213
<b>Total</b>	<b>126</b>	<b>179</b>	<b>1</b>	<b>0</b>	<b>306</b>	<b>1</b>	<b>395</b>	<b>36</b>	<b>0</b>	<b>432</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>5</b>	<b>49</b>	<b>0</b>	<b>247</b>	<b>0</b>	<b>296</b>	<b>0</b>	<b>1039</b>	<b>1039</b>
<b>Grand Total</b>	<b>222</b>	<b>384</b>	<b>2</b>	<b>0</b>	<b>608</b>	<b>2</b>	<b>764</b>	<b>77</b>	<b>0</b>	<b>843</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>8</b>	<b>94</b>	<b>1</b>	<b>467</b>	<b>0</b>	<b>562</b>	<b>0</b>	<b>2021</b>	<b>2021</b>
Apprch %	36.5	63.2	0.3			0.2	90.6	9.1			75	12.5	12.5			16.7	0.2	83.1					
Total %	11	19	0.1		30.1	0.1	37.8	3.8		41.7	0.3	0	0		0.4	4.7	0	23.1		27.8		100	
Unshifted	217	377	2		596	2	752	69		823	6	1	1		8	87	1	462		550		0	1977
% Unshifted	97.7	98.2	100		98	100	98.4	89.6		97.6	100	100	100		100	92.6	100	98.9		97.9		0	97.8
HV	5	7	0		12	0	12	8		20	0	0	0		0	7	0	5		12		0	44
% HV	2.3	1.8	0		2	0	1.6	10.4		2.4	0	0	0		0	7.4	0	1.1		2.1		0	2.2



**King Road & Phoenixville Pike**  
**West Whiteland Township, Chester County**

File Name : 2014-11-20 PM King Road Phoenixville Pike  
 Site Code : 00000000  
 Start Date : 11/20/2014  
 Page No : 2

Start Time	King Road Eastbound				King Road Westbound				Phoenixville Pike Northbound				Phoenixville Pike Southbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	25	50	0	75	1	127	8	136	0	0	0	0	12	0	68	80	291
04:45 PM	24	53	1	78	0	99	15	114	0	0	0	0	18	0	52	70	262
05:00 PM	39	44	1	84	0	97	12	109	1	0	1	2	21	0	70	91	286
05:15 PM	28	46	0	74	0	111	11	122	1	0	0	1	4	0	59	63	260
Total Volume	116	193	2	311	1	434	46	481	2	0	1	3	55	0	249	304	1099
% App. Total	37.3	62.1	0.6		0.2	90.2	9.6		66.7	0	33.3		18.1	0	81.9		
PHF	.744	.910	.500	.926	.250	.854	.767	.884	.500	.000	.250	.375	.655	.000	.889	.835	.944
Unshifted	116	189	2	307	1	430	42	473	2	0	1	3	50	0	246	296	1079
% Unshifted	100	97.9	100	98.7	100	99.1	91.3	98.3	100	0	100	100	90.9	0	98.8	97.4	98.2
HV	0	4	0	4	0	4	4	8	0	0	0	0	5	0	3	8	20
% HV	0	2.1	0	1.3	0	0.9	8.7	1.7	0	0	0	0	9.1	0	1.2	2.6	1.8





***APPENDIX B***  
***LAND USE ASSUMPTIONS REPORT***



# LAND USE ASSUMPTIONS REPORT

## POTENTIAL FUTURE DEVELOPMENT

### WEST WHITELAND TOWNSHIP, CHESTER COUNTY, PA

Adopted June 17, 2015 by Township Resolution No. 2015-30

Prepared by Theurkauf Design & Planning, LLC  
Prepared for Traffic Planning and Design, Inc.



## **Introduction**

Theurkauf Design & Planning, LLC in conjunction with Traffic Planning and Design, Inc. has prepared the following Land Use Assumptions Report (LUAR) for West Whiteland Township in compliance with the Pennsylvania Transportation Impact Fee Law as defined in sections 501-A through 506-A of the Municipal Planning Code (MPC). The MPC authorizes municipalities within the Commonwealth to enact, amend, and repeal impact fee ordinances and to charge impact fees to cover the cost of off-site road improvements necessitated by new land development.

According to the MPC, as a prerequisite to the development of the transportation capital improvements plan (CIP), the Transportation Impact Fee Advisory Committee shall develop land use assumptions for the determination of future growth and development within the designated area or areas as described by the municipal resolution and recommend its findings to the governing body. This report addresses the necessary components of a LUAR as stipulated in the MPC, by which the LUAR shall:

- Describe the existing land uses within the designated area or areas and the highways, roads or streets incorporated therein. This aspect is summarized herein and covered in detail in the Lincoln Highway and Whitford Road Corridors Plan, the Township's Comprehensive Plan Update dated December 2014, which also defines a large part of the study area.
- To the extent possible, reflect projected changes in land uses, densities of residential development, intensities of nonresidential development, and population growth rates that may affect the level of traffic within the designated area or areas over a period of at least the next five years. These projections shall be based on an analysis of population growth rates, current zoning regulations, approved subdivision and land developments, and the future land use plan contained in the adopted municipal comprehensive plan. It may also refer to all professionally produced studies and reports pertaining to the municipality regarding such items as demographics, parks and recreation, economic development and any other study deemed appropriate by the municipality. For the purpose of this LUAR, we will examine a likely scenario for short-term to mid-term development of vacant and underutilized properties within the Township's core development area, based on the policies of the Lincoln Highway and Whitford Road Corridors Plan. In addition, we will examine potential development of specific properties outside of the Lincoln Highway and Whitford Road Corridors Plan area that are considered likely candidates for future changes in land use.

## **Overview and Background**

This Land Use Assumptions Report (LUAR) is based upon the land use and development intensity recommendations found in the Lincoln Highway and Whitford Road Corridors Plan (the Corridors Plan), which was adopted on March 31, 2015. In addition, consideration was given to properties beyond the Corridors Plan area, to constitute a total Transportation Service Area of approximately 3,400 acres (5.3 square miles), as represented by the non-hatched areas on the maps at the end of this report.

The Corridors Plan examined the history of growth and land use in the Township, especially in light of changing economic and demographic forces that are shaping future development pressures and land uses. These pressures are evidenced to the Township by continued interest on the part of developers that continued to some extent through the recent economic slump and has picked up markedly since. As much of the interest was for projects not fully consistent with existing zoning, West Whiteland wisely decided on a planned and integrated rather than piecemeal approach in responding to these pressures. Through the Corridors Plan, the Township has adopted policies to promote new development that is context appropriate and properly coordinated with the infrastructure on which it depends. The Corridors Plan supports the County's Landscapes2 plan with compact, mixed use development within West Whiteland's "Suburban Center" growth area as an alternative to uncoordinated sprawl. Thus, policies were developed to concentrate development, promote diversity of housing opportunities, create walkable and bicycle-friendly mixed use communities, and coordinate with trail, open space, and public transportation resources.

The LUAR uses these policies to create future development projections, which provide the basis of anticipated traffic demands and required improvements to accommodate those demands. Beyond the Corridors Plan area, we have also evaluated properties for likely or potential development and projected their impacts on the overall Transportation Service Area. Properties identified as having a likely development potential total 274 acres within the Corridors Plan area and 264 acres within the Transportation Service Area but outside of the Corridor. In developing the land use assumptions for particular properties, the following bases were considered:

- Land use mixes and intensity based on policies in the Corridors Plan and specific Character Areas
- Prior approvals that vest specific development rights
- Potential changes to zoning and other development regulations based on market conditions, neighborhood character, and where ownership interests and those of the Township may coincide

- Conditions impacting developability, such as environmental conditions and accessibility

### **Lincoln Highway and Whitford Road Corridors Plan Area** **Projected Future Conditions**

The Lincoln Highway and Whitford Road Corridors Plan (the Corridors Plan) forms the basis of future land use policy and growth conditions within this study area. The study area includes lands in the center of the Township along Lincoln Highway between Church Farm School and the western municipal boundary and along Whitford Road between the former Waterloo Gardens property and the Whitford Train Station. In accordance with the Corridors Plan, the study area is to have future development in accordance with use, design, and infrastructure policies established for five distinct Character Areas, which will be implemented through zoning and other regulatory changes as appropriate. Within each of the Character Areas, land uses will be generally mixed among major land use categories including residential, commercial, industrial, institutional, and open space. Developable lands are identified in the Corridors Plan and ascribed future land use classifications as follows:

- MU1 – Office and Residential
- MU2 – Office and Retail
- MU3 – Office, Retail, and Residential
- Residential

Lands that are constrained by easements, environmental factors, or poor accessibility are not considered as candidate areas for future development. In addition, presumed future development intensities are based on considerations of zoning, adjacent land uses, contemporary building trends, and established local development patterns. For these reasons, projected numbers in this LUAR of future residential units and non-residential floor area generally reflect lower intensities than those indicated in the buildout analyses contained in the Corridors Plan.

#### **CHARACTER AREA 1**

Character Area 1 comprises the eastern portion of the study area, extending along Lincoln Highway and adjacent lands between Church Farm School and Iron Lake Boulevard. It includes approximately 135 acres of developable land, all within the MU1 use category, which is Office and Residential. As described in the Corridors Plan, existing development includes the following:

<u>Existing Land Use</u>	<u>Existing Development</u>
Residential	405 DU, nearly all apartments

Non-residential 3,200,000 SF, office, flex, warehouse, some retail

In accordance with the land use policy of the Corridors Plan, we assume 50% of the developable land would be developed residentially and split between single family detached houses at 1.5 DU/acre and townhouses at 3.1 DU/acre. This assumes transitional residential densities that are between the Township’s neighboring R-1 residential district (1 DU/acre) and the higher intensity R-3 and R-4 multifamily districts (4 DU/acre). The presumed townhouse density is also higher than the 2.1 DU/acre found in R-2 carriage home townhouse developments found in exclusively residential parts of the Township and is more in keeping with nearby flex/office campus style development within Character Area 1.

The other 50% of land area would be developed in a mix of office and flex office/warehouse/light industrial buildings at 8,500 SF/acre based on adjacent development intensity. We assume future land development to occur as follows:

<u>Developable Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
24 acres	Single Family Res.	36 DU
32 acres	Townhouses	100 DU
58 acres	Office	498,000 SF
21 acres	Flex Office/Lt. Ind.	178,500 SF

**CHARACTER AREA 2**

Character Area 2 includes Exton Town Center between Swedesford Road and Main Street at Exton and along Lincoln Highway between Exton Square Mall and Whiteland Town Center. It includes 22 acres of developable property, all within the MU3 use category, which is Office, Retail, and Residential. As described in the Corridors Plan, existing development includes the following:

<u>Existing Land Use</u>	<u>Existing Development</u>
Non-residential	2,600,000 SF, mostly retail, some office and flex

Four 4 acres of the available lands will be developed for entertainment retail use in accordance with a plan for Movie Tavern, and we assume that the remaining area would be Residential Apartments in keeping with the Corridors Plan and recent proposals made by the developer. Development proposals presented to the Township (though not official plan submittals), show up to 410 apartment units on the approximately 17 developable acres. We assume future land development to occur as follows:

<u>Developable Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
17 acres	Apartments	400 DU
4 acres	Movie Tavern	43,000 SF

For the purposes of this Report, the Movie Tavern development will be regarded as base development rather than projected, since it has already received Final Plan Approval and its development is imminent.

**CHARACTER AREA 3**

Character Area 3 extends west from Exton Town Center along the south side of Lincoln Highway and south along Whitford Road to the Route 30 Bypass. It includes 35 acres of developable property, with MU2 Office and Retail along Lincoln Highway, and MU1 Office and Residential further south and closer to the Whitford Train Station. As described in the Corridors Plan, existing development includes the following:

<u>Existing Land Use</u>	<u>Existing Development</u>
Residential	6 DU, single family detached
Non-residential	1,000,000 SF, office, flex, warehouse, retail

We assume that future development of the Lincoln Highway frontage would be split between Office and Retail uses, and that the remaining area would have a mix of Residential and mixed nonresidential uses, in keeping with the Corridors Plan and compatible with surrounding uses. One of the vacant sites may be an expanded campus for a charter school. Based on zoning and the intensity of use in the area, we assume office, institutional, and flex buildings would be built at 8,500 SF/acre, and residential townhouses at 4 DU/acre. We assume future land development to occur as follows:

<u>Developable Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
8 acres	Townhouses	32 DU
9 acres	Office	76,500 SF
6 acres	Flex Office/Lt. Ind.	51,000 SF
4 acres	Institutional	34,000 SF

**CHARACTER AREA 4**

Character Area 4 includes properties along the north side of Lincoln Highway between Exton Town Center and Ball and Ball. It includes 24 acres of developable property, with 10 acres in MU3 Office/Commercial/Residential adjacent to Exton Town Center and 14 acres of MU2 Office/Retail use further west. As described in the Corridors Plan, existing development includes the following:

<u>Existing Land Use</u>	<u>Existing Development</u>
Residential	4 DU, single family detached
Non-residential	314,000 SF, office and retail

We assume the MU3 area will be rezoned into the Town Center district and will have future development consisting of Apartments at 10 DU/acre, and the MU2 area will be evenly split between Office and Retail, in keeping with the Corridors Plan and compatible with surrounding uses. Based on the intensity of use in the area, we assume office and retail buildings would be built at 8,500 SF/acre. We assume future land development to occur as follows:

<u>Developable Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
10 acres	Apartments	100 DU
7 acres	Retail	59,500 SF
7 acres	Office	59,500 SF

**CHARACTER AREA 5**

Character Area 5 includes lands along Waterloo Boulevard and the north side of Lincoln Highway, extending from the Chaddwell Apartments to the Township’s western boundary. It includes 49 acres of developable property within the Residential use category and zoned for carriage home townhouses. In addition, Character Area 5 includes the 12.6 acre Ball and Ball property, which is zoned OL Office Laboratory. As described in the Corridors Plan, existing development consists of the following:

<u>Existing Land Use</u>	<u>Existing Development</u>
Residential	342 DU, townhouses and apartments
Non-residential	132,000 SF, office and retail

We assume that future development will include 41 acres with 86 carriage home townhouses in accordance with a current application for the former Waterloo Gardens property. Based on the

existing R-3 zoning we assume the 4 developable acres adjacent to Whitford Country Club will be built in residential townhouses at 4 DU/acre. In addition, it is presumed that the Ball and Ball property would be rezoned and developed in carriage homes at 2.1 DU/acre consistent with adjacent developments on each side. We assume future land development to occur as follows:

<u>Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
58 acres	Townhouses	128 DU

**Beyond the Lincoln Highway and Whitford Road Corridors Plan Area  
Projections of Likely Future Development**

In addition to lands within the Lincoln Highway and Whitford Road Corridors study area, the Township has identified a number of other properties that are likely candidates for future development. In some cases, proposals for rezoning certain properties for alternative land uses viewed as more consistent with current market conditions and in context with adjacent neighborhoods may be considered. These properties are identified as follows, along with assumptions regarding future land uses:

**VALLEY CREEK CORPORATE CENTER**

This area consists of four parcels located on the east side of Valley Creek Boulevard, along the Township’s eastern boundary. It includes undeveloped lands within the Unified Development Area overlay, with approximately 90 developable acres north of Swedesford Road (Parcels D, E, and F), and 22 developable acres at Parcel B south of Swedesford Road. Parcels B, D, E, and F have all had previous plans for office development at an intensity of nearly 13,500 SF/acre, none of which have as yet been constructed. These properties still have potential as office developments, due to their close proximity to access ramps to US 30 and US 202. We assume future land development to occur as follows:

<u>Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
112 acres	Office	1,495,000 SF

**GLENLOCH II**

The property consists of several parcels totaling about 49 acres along Dunwoody Drive and Route 202 in the southeastern part of the Township. The site includes approximately 27 developable acres, for which there was a previously approved plan for office development that was never constructed. The owners seek a rezoning of the property to residential use, which

would likely be R-2 to accommodate Townhouses at 2.1 DU/acre. We project future land development to occur as follows:

<u>Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
49 acres	Townhouses	102 DU

**JOHNSON-MATTHEY**

This is a 15 acre wooded property at the intersection of Phoenixville Pike and King Road. If developed according to existing I-1 zoning, we would anticipate future land development to occur as follows:

<u>Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
15 acres	Flex Office/Lt. Ind.	125,000 SF

**WESTON SOLUTIONS**

Much of this 53-acre tract near the intersection of Phoenixville Pike and King Road is already developed for office and research uses. However, we are aware of interest in re-developing this site for residential use, although no definite plans have been submitted to date for Township review. Such development would require that this tract be re-zoned to a district that would allow residential use. For the purposes of this report, we have assumed that the new zoning would be R-2, which allows up to 2.1 DU/acre if developed under the “carriage home cluster” option. The site includes existing office buildings that we presume would be removed, and a historic mansion that could be adaptively re-used in accordance with the new zoning. We would anticipate future land development to occur as follows:

<u>Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
53 acres	Townhouses	111 DU

**WEST CHESTER GUN CLUB**

This is a 20 acre property on Boot Road just west of the Devereux campus. It is partially constrained by steep slopes and proximity to the Route 100 limited access spur. If developed according to existing R-2 zoning, we would anticipate future land development to occur as follows:

<u>Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
20 acres	Townhouses	42 DU

**DANTE’S RUN**

This 7 acre parcel is located On Burke road near the Township’s southern border and is the subject of a current sketch plan submission in accordance with existing R-2 zoning. We anticipate future land development to occur as follows:

<u>Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
7 acres	Single Family Res	7 DU

**OAKLANDS**

Beyond the Corridors study area, there are four undeveloped parcels totaling approximately 8 acres. It is assumed that the area would be developed in office consistent with existing zoning. Thus, we anticipate future land development to occur as follows:

<u>Land Area</u>	<u>Projected Use</u>	<u>Projected Yield</u>
8 acres	Office	68,000 SF

**Summary Findings of the Land Use Assumptions Report**

Plans describing the findings of the Land Use Assumptions Report are included on the following pages. The Report encompasses areas within the study area defined by the Lincoln Highway and Whitford Road Corridors Plan, as well as additional properties determined to be likely candidates for development within the next several years. Total future anticipated development by land use is as follows:

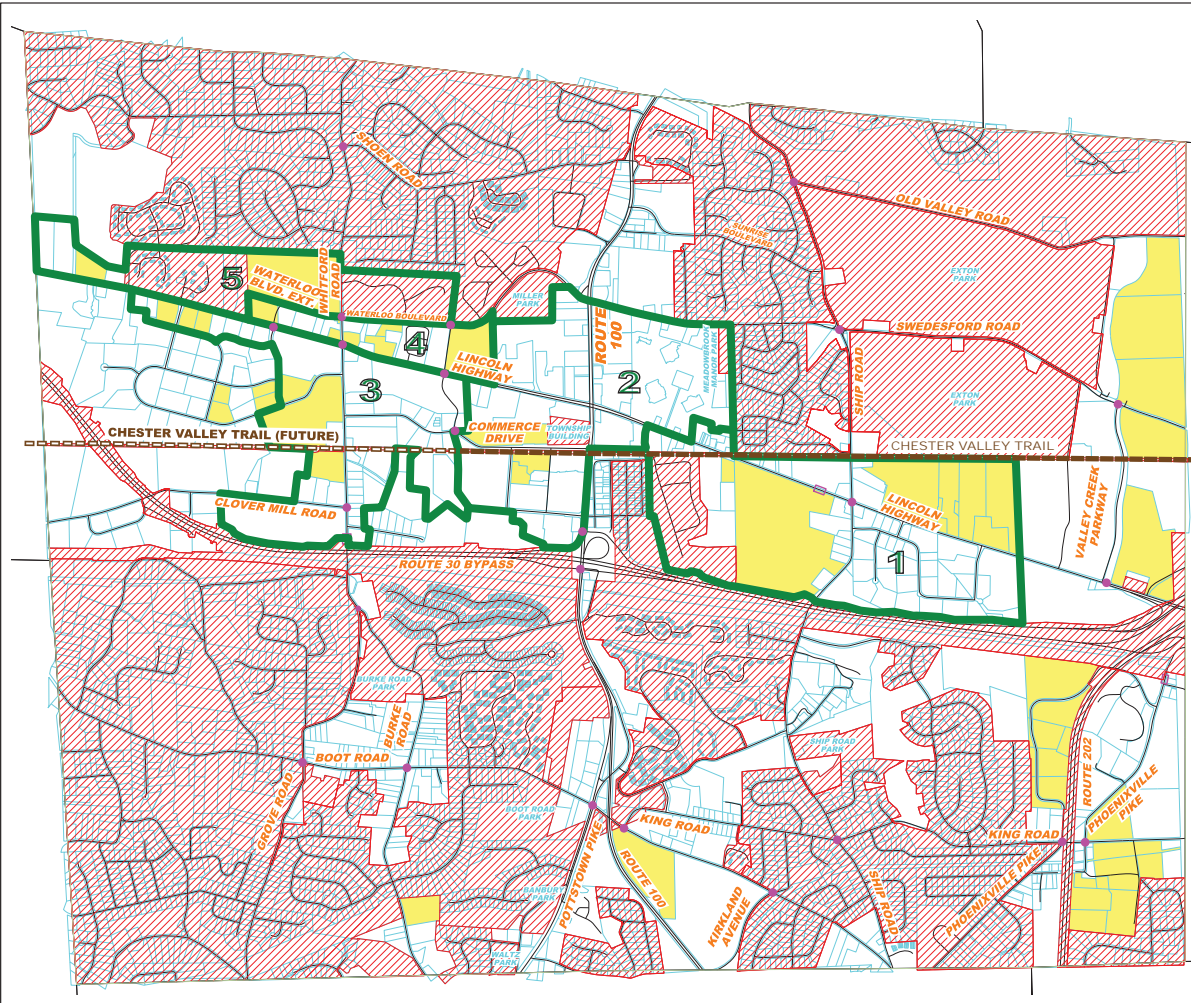
**Corridors Plan Area**

<u>Land Use Type</u>	<u>Projected Future Development</u>
Single Family Detached Residential	36 DU
Townhouses	260 DU
Apartments	500 DU
Office	634,000 SF
Flex - Office/Light Industrial/Warehouse	229,500 SF
Retail	59,500 SF
Institutional	34,000 SF




**Properties outside the Corridors Plan Area**


<u>Land Use Type</u>	<u>Projected Future Development</u>
Single Family Detached Residential	7 DU
Townhouses	255 DU
Apartments	0 DU
Office	1,563,000 SF
Flex - Office/Light Industrial/Warehouse	125,000 SF
Retail	0 SF





**LEGEND**

-  CHARACTER AREA BOUNDARIES
-  POTENTIAL FUTURE DEVELOPMENT PARCELS
-  AREAS EXCLUDED FROM TRANSPORTATION SERVICE AREA

 *Note: Base Plan prepared by Traffic Planning and Design, Inc.*

Lincoln/Whitford Corridors Plan - Character Areas  
**Land Use Assumptions Report**

West Whiteland Township  
 Chester County, Pennsylvania

Date: March 27, 2015

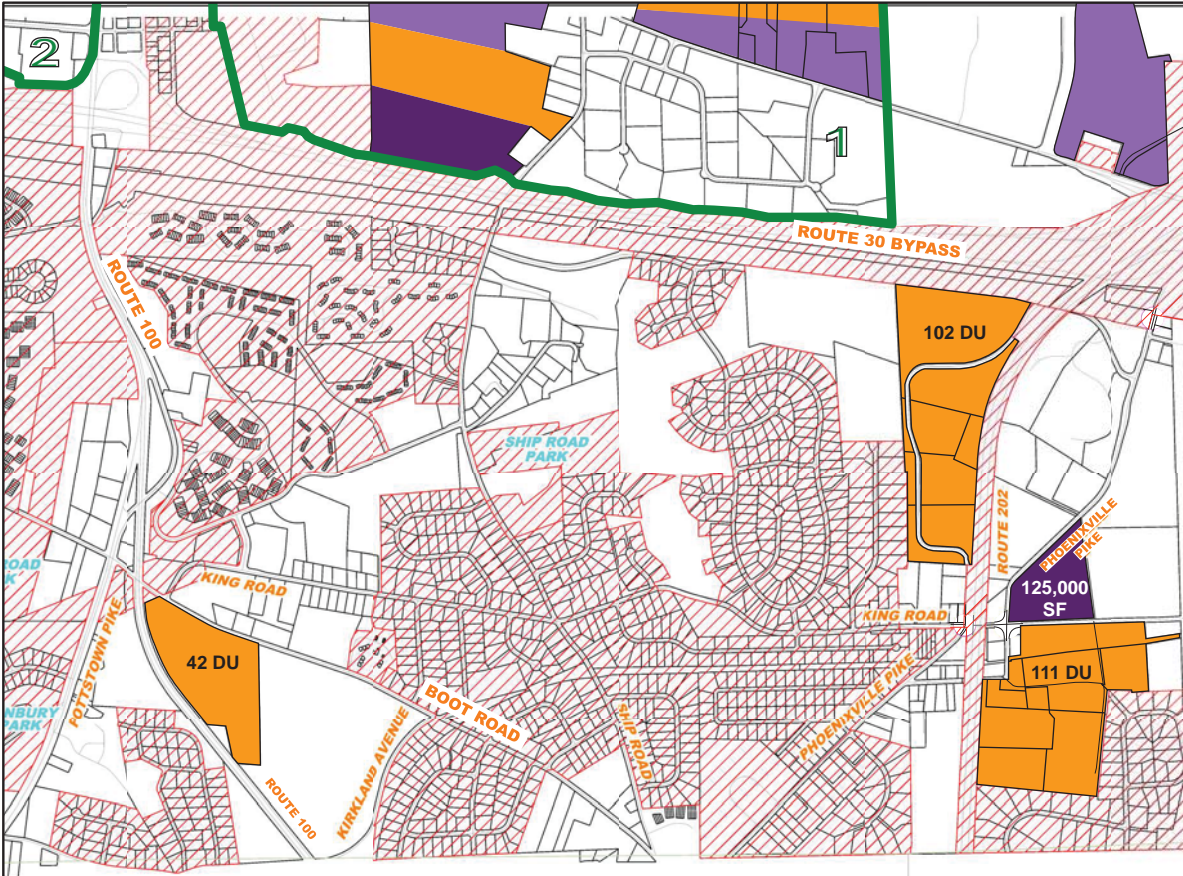
Prepared By:  
 Theurkauf Design & Planning, L.L.C.  
 1240 Elbow Lane  
 Chester Springs, PA 19425



















**LEGEND**

-  AREAS EXCLUDED FROM TRANSPORTATION SERVICE AREA
-  CHARACTER AREA BOUNDARIES
-  SINGLE FAMILY DETACHED RESIDENTIAL (DWELLING UNITS)
-  TOWNHOUSES (DWELLING UNITS)
-  APARTMENTS (DWELLING UNITS)
-  OFFICE (SQUARE FEET)
-  RETAIL (SQUARE FEET)
-  FLEX - OFFICE/LT. INDUSTRIAL/ WAREHOUSE (SQUARE FEET)
-  INSTITUTIONAL (SQUARE FEET)



Note: Base Plan prepared by Traffic Planning and Design, Inc.

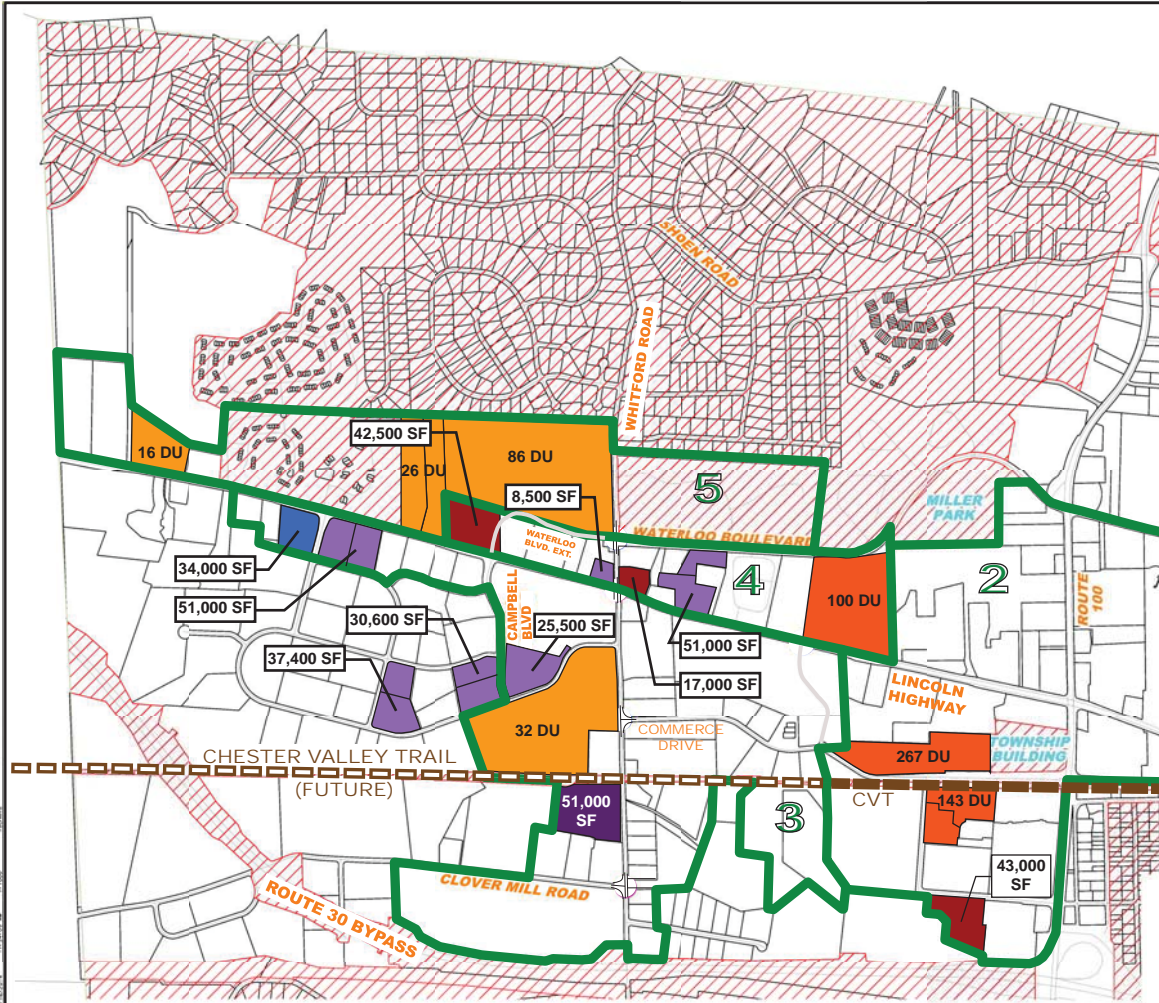
**Projected Future Development, SE Quadrant  
Land Use Assumptions Report**

West Whiteland Township Date: March 27, 2015  
Chester County, Pennsylvania

Prepared By:  
Theurkauf Design & Planning, L.L.C.  
1240 Elbow Lane  
Chester Springs, PA 19425







**LEGEND**

- AREAS EXCLUDED FROM TRANSPORTATION SERVICE AREA
- CHARACTER AREA BOUNDARIES
- SINGLE FAMILY DETACHED RESIDENTIAL (DWELLING UNITS)
- TOWNHOUSES (DWELLING UNITS)
- APARTMENTS (DWELLING UNITS)
- OFFICE (SQUARE FEET)
- RETAIL (SQUARE FEET)
- FLEX - OFFICE/LT. INDUSTRIAL/ WAREHOUSE (SQUARE FEET)
- INSTITUTIONAL (SQUARE FEET)

Note: Base Plan prepared by Traffic Planning and Design, Inc.

**Projected Future Development, NW Quadrant  
Land Use Assumptions Report**

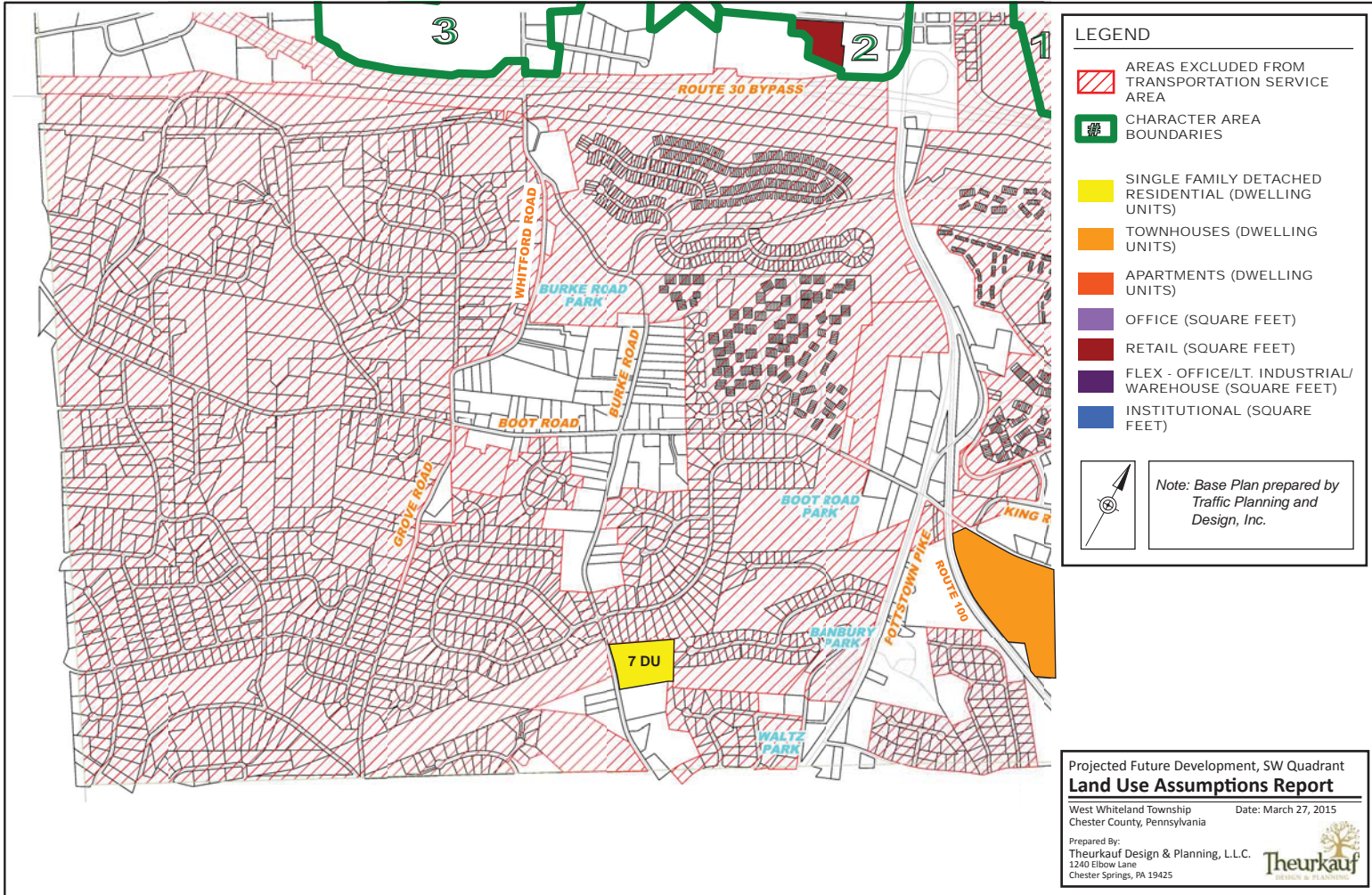
West Whiteland Township  
Chester County, Pennsylvania

Date: March 27, 2015










Prepared By:  
Theurkauf Design & Planning, L.L.C.  
1240 Elbow Lane  
Chester Springs, PA 19425

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**LEGEND**

-  AREAS EXCLUDED FROM TRANSPORTATION SERVICE AREA
-  CHARACTER AREA BOUNDARIES
-  SINGLE FAMILY DETACHED RESIDENTIAL (DWELLING UNITS)
-  TOWNHOUSES (DWELLING UNITS)
-  APARTMENTS (DWELLING UNITS)
-  OFFICE (SQUARE FEET)
-  RETAIL (SQUARE FEET)
-  FLEX - OFFICE/LT. INDUSTRIAL/ WAREHOUSE (SQUARE FEET)
-  INSTITUTIONAL (SQUARE FEET)



Note: Base Plan prepared by Traffic Planning and Design, Inc.

**Projected Future Development, SW Quadrant  
Land Use Assumptions Report**

West Whiteland Township  
Chester County, Pennsylvania  
Date: March 27, 2015  
Prepared By:  
Theurkauf Design & Planning, L.L.C.  
1240 Elbow Lane  
Chester Springs, PA 19425





***APPENDIX C***  
***TRIP GENERATION***



	Enter		Exit		Total	
	New	Pass-By	New	Pass-By	New	Pass-By
<b>Character Area 1</b>						
Residential (108 units) - N. Side of Lincoln Hwy	57	--	31	--	88	--
Office (200 ksf) - N. Side of Lincoln Hwy	51	--	251	--	302	--
Office (298 ksf) - S. Side of Lincoln Hwy	70	--	342	--	412	--
Residential (28 units) - S. Side of Lincoln Hwy (Ship Rd)	14	--	7	--	21	--
Flex Space (35.7 ksf Lt. Ind.; 142.8 ksf office)	40	--	208	--	248	--
<b>Character Area 2</b>						
Apartments (410 Units)	169	--	92	--	261	--
<b>Character Area 3</b>						
32 Unit Townhome Development	16	--	8	--	24	--
Office Parcel (51 ksf)	13	--	63	--	76	--
Office Parcel (25.5 ksf)	6	--	32	--	38	--
Flex Space (10.2 ksf Lt. Ind.; 40.8 ksf Office)	11	--	60	--	71	--
Office Parcel (Formerly Charter School [34 ksf])	9	--	42	--	51	--
<b>Character Area 4</b>						
Apartments (100 Units)	47	--	26	--	73	--
Retail Parcel (17 ksf)	19	11	22	11	41	22
Retail Parcel (42.5 ksf)	49	27	55	27	104	54
Office Parcel (51 ksf)	13	--	63	--	76	--
Office Parcel (8.5 ksf)	2	--	11	--	13	--
<b>Character Area 5</b>						
86 Unit Townhome Development	36	--	17	--	53	--
26 Unit Townhome Development	13	--	7	--	20	--
16 Unit Townhome Development	9	--	4	--	13	--
<b>Outside Character Areas Development</b>						
Valley Creek Corporate Center	298	--	1455	--	1753	--
Glenloch II	41	--	20	--	61	--
Johnson-Matthey Flex (25 ksf Lt. Ind; 100 ksf Office)	28	--	145	--	173	--
Weston Solutions	44	--	21	--	65	--
West Chester Gun Club	20	--	10	--	30	--
Dante's Run	6	--	4	--	10	--
Oaklands (68 ksf Office)	17	--	84	--	101	--
	1098	38	3080	38	4178	76
	<b>New</b>	<b>Pass-By</b>	<b>New</b>	<b>Pass-By</b>	<b>New</b>	<b>Pass-By</b>
	<b>Enter</b>		<b>Exit</b>		<b>Total</b>	



***APPENDIX D***  
***VOLUME DEVELOPMENT WORKSHEETS***



TPD# WWT.A.00158  
 9/14/2015  
 Traffic Volumes Worksheet  
 Intersection:  
 Synchro Node:

Ship Road & Lincoln Highway									
1	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
<b>2014 Existing Counts</b>	11	289	106	54	456	83	208	489	19	35	275	27	2052
Balancing													0
<b>Existing Volumes (Balanced)</b>	11	289	106	54	456	83	208	489	19	35	275	27	2052
Base growth (1.00% compounded for 11 yrs)	1	33	12	6	53	10	24	57	2	4	32	3	237
Movie Tavern	3	4	4		4		5					3	23
Boy Scouts of America		1			1								2
290 National Road	6	6	7		2		2					1	24
Clover Mill Industrial Park	2	4			2								8
<b>2025 Base Volumes</b>	23	337	129	60	518	93	239	546	21	39	307	34	2346
Waterloo Road Extension - Redistribution													0
<b>2025 Base Volumes</b>	23	337	129	60	518	93	239	546	21	39	307	34	2346

<b>Character Area 1</b>													
Residential (108 units) - N. Side of Lincoln Hwy		13		7	7	7				13	12		59
Office (200 ksf) - N. Side of Lincoln Hwy		12		56	57	56			11	11			203
Office (298 ksf) - S. Side of Lincoln Hwy	77	111	77		23		16					15	319
Residential (28 units) - S. Side of Lincoln Hwy (Ship Rd)			3	5			2	1	2		3		16
Flex Space (35.7 ksf Lt. Ind.; 142.8 ksf office)			9	13			47	46	68		9		192
<b>Character Area 2</b>													
Apartments (410 Units)		10			19								29
<b>Character Area 3</b>													
32 Unit Townhome Development		1			2								3
Office Parcel (51 ksf)		7			1								8
Office Parcel (25.5 ksf)		4			1								5
Flex Space (10.2 ksf Lt. Ind.; 40.8 ksf Office)		7			1								8
Office Parcel (Formerly Charter School [34 ksf])		5			1								6
<b>Character Area 4</b>													
Apartments (100 Units)		3			5								8
Retail Parcel (17 ksf)		2			2								4
Retail Parcel (42.5 ksf)		6			5								11
Office Parcel (51 ksf)		7			1								8
Office Parcel (8.5 ksf)													0
<b>Character Area 5</b>													
86 Unit Townhome Development		2			3								5
26 Unit Townhome Development		1			2								3
16 Unit Townhome Development		1			1								2
<b>Outside Character Areas Development</b>													
Valley Creek Corporate Center		73		40	354	56			8	11			542
Glenloch II								1		1	1		3
Johnson-Matthey Flex (25 ksf Lt. Ind; 100 ksf Office)						3		3			1		7
Weston Solutions								1		1	1		3
West Chester Gun Club													0
Dante's Run													0
Oaklands (68 ksf Office)		9			2								11
<b>Total Trip Distribution</b>	77	274	89	121	487	122	65	52	102	36	15	15	1455
<b>2025 Projected Volumes</b>	100	611	218	181	1005	215	304	598	123	75	322	49	3801

TPD# WWT.A.00158  
 9/14/2015  
 Traffic Volumes Worksheet  
 Intersection:  
 Synchro Node:

Whitford Road & Lincoln Highway									
2	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
<b>2014 Existing Counts</b>	<b>406</b>	<b>645</b>	<b>129</b>	<b>121</b>	<b>610</b>	<b>120</b>	<b>157</b>	<b>329</b>	<b>81</b>	<b>75</b>	<b>238</b>	<b>240</b>	<b>3151</b>
Balancing													0
<b>Existing Volumes (Balanced)</b>	<b>406</b>	<b>645</b>	<b>129</b>	<b>121</b>	<b>610</b>	<b>120</b>	<b>157</b>	<b>329</b>	<b>81</b>	<b>75</b>	<b>238</b>	<b>240</b>	<b>3151</b>
Base growth (1.00% compounded for 11 yrs)	47	75	15	14	71	14	18	38	9	9	28	28	366
Movie Tavern			11				10	3			3		27
Boy Scouts of America		6		3	6	1			2	1			19
290 National Road			1	6			6	7	30		2		52
Clover Mill Industrial Park			3	5			10	11	18		2		49
<b>2025 Base Volumes</b>	<b>453</b>	<b>726</b>	<b>159</b>	<b>149</b>	<b>687</b>	<b>135</b>	<b>201</b>	<b>388</b>	<b>140</b>	<b>85</b>	<b>273</b>	<b>268</b>	<b>3664</b>
Waterloo Road Extension - Redistribution	-227											-185	-412
<b>2025 Base Volumes</b>	<b>226</b>	<b>726</b>	<b>159</b>	<b>149</b>	<b>687</b>	<b>135</b>	<b>201</b>	<b>388</b>	<b>140</b>	<b>85</b>	<b>273</b>	<b>83</b>	<b>3252</b>

<b>Character Area 1</b>													
Residential (108 units) - N. Side of Lincoln Hwy		3			1								4
Office (200 ksf) - N. Side of Lincoln Hwy		2			11	2							15
Office (298 ksf) - S. Side of Lincoln Hwy		3			14	3							20
Residential (28 units) - S. Side of Lincoln Hwy (Ship Rd)		1											1
Flex Space (35.7 ksf Lt. Ind.; 142.8 ksf office)		2											2
<b>Character Area 2</b>													
Apartments (410 Units)			30				16	4			7		57
<b>Character Area 3</b>													
32 Unit Townhome Development			2	6			1	1	3		2		15
Office Parcel (51 ksf)	4	28			5							2	39
Office Parcel (25.5 ksf)			1	3			3	5	11		1		24
Flex Space (10.2 ksf Lt. Ind.; 40.8 ksf Office)			2	4			10	9	23		2		50
Office Parcel (Formerly Charter School [34 ksf])	4	18	3		4								29
<b>Character Area 4</b>													
Apartments (100 Units)	2	4		1	2			1	2	1	1	1	15
Retail Parcel (17 ksf)	7	9	1	5	4			4			-1	-1	28
Retail Parcel (42.5 ksf)		12	6		20		6	5		11	6		66
Office Parcel (51 ksf)	1	1		2	6	1			1		2	2	16
Office Parcel (8.5 ksf)					1					8	1		10
<b>Character Area 5</b>													
86 Unit Townhome Development		1	1		2	4	2	4		2	2		18
26 Unit Townhome Development		2	1		2		3						8
16 Unit Townhome Development		3			4		2					1	10
<b>Outside Character Areas Development</b>													
Valley Creek Corporate Center		19		35	92	22				7	5		180
Glenloch II													0
Johnson-Matthey Flex (25 ksf Lt. Ind; 100 ksf Office)													0
Weston Solutions													0
West Chester Gun Club													0
Dante's Run								1			1		2
Oaklands (68 ksf Office)			1	6			4	13	30		3		57
<b>Total Trip Distribution</b>	<b>18</b>	<b>108</b>	<b>48</b>	<b>62</b>	<b>168</b>	<b>32</b>	<b>47</b>	<b>47</b>	<b>77</b>	<b>27</b>	<b>27</b>	<b>5</b>	<b>666</b>
<b>2025 Projected Volumes</b>	<b>244</b>	<b>834</b>	<b>207</b>	<b>211</b>	<b>855</b>	<b>167</b>	<b>248</b>	<b>435</b>	<b>217</b>	<b>112</b>	<b>300</b>	<b>88</b>	<b>3918</b>

TPD# WWT.A.00158  
 9/14/2015  
 Traffic Volumes Worksheet  
 Intersection:  
 Synchro Node:

Whitford Road & Clover Mill Road									
3	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
<b>2012 Existing Counts</b>	150	0	34	2	0	5	45	619	2	5	510	226	1598
Adjustment to 2014 Volumes	6	0	1	0	0	0	2	24	0	0	20	9	62
<b>2014 Adjusted Existing Volumes</b>	156	0	35	2	0	5	47	643	2	5	530	235	1660
Base growth (1.00% compounded for 11 yrs)	18	0	4	0	0	1	5	74	0	1	61	27	191
Movie Tavern	1							4			3	1	9
Boy Scouts of America								2			2	1	5
290 National Road							2	57			12		71
Clover Mill Industrial Park	53		27				7					13	100
<b>2025 Base Volumes</b>	228	0	66	2	0	6	61	780	2	6	608	277	2036
Waterloo Road Extension - Redistribution													0
<b>2025 Base Volumes</b>	228	0	66	2	0	6	61	780	2	6	608	277	2036

<b>Character Area 1</b>													
Residential (108 units) - N. Side of Lincoln Hwy													0
Office (200 ksf) - N. Side of Lincoln Hwy													0
Office (298 ksf) - S. Side of Lincoln Hwy													0
Residential (28 units) - S. Side of Lincoln Hwy (Ship Rd)													0
Flex Space (35.7 ksf Lt. Ind.; 142.8 ksf office)													0
<b>Character Area 2</b>													
Apartments (410 Units)	4							8			4	2	18
<b>Character Area 3</b>													
32 Unit Townhome Development								1			1		2
Office Parcel (51 ksf)								1			3	2	6
Office Parcel (25.5 ksf)											1	1	2
Flex Space (10.2 ksf Lt. Ind.; 40.8 ksf Office)								1			3	1	5
Office Parcel (Formerly Charter School [34 ksf])								1			2	1	4
<b>Character Area 4</b>													
Apartments (100 Units)	1							2			1	1	5
Retail Parcel (17 ksf)								1			1	1	3
Retail Parcel (42.5 ksf)	1							3			3	1	8
Office Parcel (51 ksf)								1			3	1	5
Office Parcel (8.5 ksf)											1		1
<b>Character Area 5</b>													
86 Unit Townhome Development								1			1		2
26 Unit Townhome Development											1		1
16 Unit Townhome Development													0
<b>Outside Character Areas Development</b>													
Valley Creek Corporate Center	1							6			24	11	42
Glenloch II													0
Johnson-Matthey Flex (25 ksf Lt. Ind; 100 ksf Office)													0
Weston Solutions													0
West Chester Gun Club													0
Dante's Run								1			1		2
Oaklands (68 ksf Office)								1			4	2	7
<b>Total Trip Distribution</b>	7	0	0	0	0	0	0	28	0	0	54	24	113
<b>2025 Projected Volumes</b>	235	0	66	2	0	6	61	808	2	6	662	301	2149

TPD# WWT.A.00158  
 9/14/2015  
 Traffic Volumes Worksheet  
 Intersection:  
 Synchro Node:

Phoenixville Pike/Dunwoody Drive & King Road									
4	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
<b>2014 Existing Counts</b>	1	169	40	307	388	1	44	1	128	1	2	6	1088
Balancing													0
<b>Existing Volumes (Balanced)</b>	1	169	40	307	388	1	44	1	128	1	2	6	1088
Base growth (1.00% compounded for 11 yrs)	0	20	5	36	45	0	5	0	15	0	0	1	127
Movie Tavern		1			2								3
Boy Scouts of America													0
290 National Road		3			1								4
Clover Mill Industrial Park		3											3
<b>2025 Base Volumes</b>	1	196	45	343	436	1	49	1	143	1	2	7	1225
Waterloo Road Extension - Redistribution													0
<b>2025 Base Volumes</b>	1	196	45	343	436	1	49	1	143	1	2	7	1225

<b>Character Area 1</b>													
Residential (108 units) - N. Side of Lincoln Hwy		3			5								8
Office (200 ksf) - N. Side of Lincoln Hwy		22			4								26
Office (298 ksf) - S. Side of Lincoln Hwy		30			6								36
Residential (28 units) - S. Side of Lincoln Hwy (Ship Rd)		1			1								2
Flex Space (35.7 ksf Lt. Ind.; 142.8 ksf office)		18			4								22
<b>Character Area 2</b>													
Apartments (410 Units)													0
<b>Character Area 3</b>													
32 Unit Townhome Development													0
Office Parcel (51 ksf)													0
Office Parcel (25.5 ksf)													0
Flex Space (10.2 ksf Lt. Ind.; 40.8 ksf Office)													0
Office Parcel (Formerly Charter School [34 ksf])													0
<b>Character Area 4</b>													
Apartments (100 Units)													0
Retail Parcel (17 ksf)													0
Retail Parcel (42.5 ksf)													0
Office Parcel (51 ksf)													0
Office Parcel (8.5 ksf)													0
<b>Character Area 5</b>													
86 Unit Townhome Development													0
26 Unit Townhome Development													0
16 Unit Townhome Development													0
<b>Outside Character Areas Development</b>													
Valley Creek Corporate Center				21				4					25
Glenloch II	2					7		9		4	5	1	28
Johnson-Matthey Flex (25 ksf Lt. Ind; 100 ksf Office)		2		32	6				6				46
Weston Solutions		2		5	1				10				18
West Chester Gun Club		1			3								4
Dante's Run													0
Oaklands (68 ksf Office)		1			2								3
<b>Total Trip Distribution</b>	2	80	0	58	32	7	0	9	20	4	5	1	218
<b>2025 Projected Volumes</b>	3	276	45	401	468	8	49	10	163	5	7	8	1443

TPD# WWT.A.00158  
 9/14/2015  
 Traffic Volumes Worksheet  
 Intersection:  
 Synchro Node:

Commerce Drive & Whitford Road									
6	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
<b>2014 Existing Counts</b>	0	0	0	166	0	164	0	611	156	202	609	0	1908
Balancing													0
<b>Existing Volumes (Balanced)</b>	0	0	0	166	0	164	0	611	156	202	609	0	1908
Base growth (1.00% compounded for 11 yrs)	0	0	0	19	0	19	0	71	18	23	70	0	220
Movie Tavern				4		13			5	14			36
Boy Scouts of America								2			3		5
290 National Road				3				43	14		9		69
Clover Mill Industrial Park				3				39	14		10		66
<b>2025 Base Volumes</b>	0	0	0	195	0	196	0	766	207	239	701	0	2304
Waterloo Road Extension - Redistribution													0
<b>2025 Base Volumes</b>	0	0	0	195	0	196	0	766	207	239	701	0	2304

<b>Character Area 1</b>													
Residential (108 units) - N. Side of Lincoln Hwy													0
Office (200 ksf) - N. Side of Lincoln Hwy													0
Office (298 ksf) - S. Side of Lincoln Hwy													0
Residential (28 units) - S. Side of Lincoln Hwy (Ship Rd)													0
Flex Space (35.7 ksf Lt. Ind.; 142.8 ksf office)													0
<b>Character Area 2</b>													
Apartments (410 Units)				6		20			12	37			75
<b>Character Area 3</b>													
32 Unit Townhome Development						4		1		2	1		8
Office Parcel (51 ksf)						2		1		10	5		18
Office Parcel (25.5 ksf)						1				8	2		11
Flex Space (10.2 ksf Lt. Ind.; 40.8 ksf Office)				2				42	14		8		66
Office Parcel (Formerly Charter School [34 ksf])						1		1		6	3		11
<b>Character Area 4</b>													
Apartments (100 Units)								3			2		5
Retail Parcel (17 ksf)						3		1		3	2		9
Retail Parcel (42.5 ksf)						7		4		8	4		23
Office Parcel (51 ksf)								1			4		5
Office Parcel (8.5 ksf)											1		1
<b>Character Area 5</b>													
86 Unit Townhome Development						5		1		2	1		9
26 Unit Townhome Development						2		1			1		4
16 Unit Townhome Development						2							2
<b>Outside Character Areas Development</b>													
Valley Creek Corporate Center								7			35		42
Glenloch II													0
Johnson-Matthey Flex (25 ksf Lt. Ind; 100 ksf Office)													0
Weston Solutions													0
West Chester Gun Club													0
Dante's Run								1			1		2
Oaklands (68 ksf Office)						4		1		20	6		31
<b>Total Trip Distribution</b>	0	0	0	8	0	51	0	65	26	96	76	0	322
<b>2025 Projected Volumes</b>	0	0	0	203	0	247	0	831	233	335	777	0	2626

TPD# WWT.A.00158  
 9/14/2015  
 Traffic Volumes Worksheet  
 Intersection:  
 Synchro Node:

Springdale Drive & Lincoln Highway									
7	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
<b>2014 Existing Counts</b>	0	409	54	37	676	1	75	0	209	1	0	2	1464
Balancing													0
<b>Existing Volumes (Balanced)</b>	0	409	54	37	676	1	75	0	209	1	0	2	1464
Base growth (1.00% compounded for 11 yrs)	0	47	6	4	78	0	9	0	24	0	0	0	168
Movie Tavern		4			4								8
Boy Scouts of America		1			1								2
290 National Road		6			2								8
Clover Mill Industrial Park		4			2								6
<b>2025 Base Volumes</b>	0	471	60	41	763	1	84	0	233	1	0	2	1656
Waterloo Road Extension - Redistribution													0
<b>2025 Base Volumes</b>	0	471	60	41	763	1	84	0	233	1	0	2	1656

<b>Character Area 1</b>													
Residential (108 units) - N. Side of Lincoln Hwy		10			19								29
Office (200 ksf) - N. Side of Lincoln Hwy	34					17				82		169	302
Office (298 ksf) - S. Side of Lincoln Hwy		111			23								134
Residential (28 units) - S. Side of Lincoln Hwy (Ship Rd)		2			5								7
Flex Space (35.7 ksf Lt. Ind.; 142.8 ksf office)		68			13								81
<b>Character Area 2</b>													
Apartments (410 Units)		10			19								29
<b>Character Area 3</b>													
32 Unit Townhome Development		1			2								3
Office Parcel (51 ksf)		7			1								8
Office Parcel (25.5 ksf)		4			1								5
Flex Space (10.2 ksf Lt. Ind.; 40.8 ksf Office)		7			1								8
Office Parcel (Formerly Charter School [34 ksf])		5			1								6
<b>Character Area 4</b>													
Apartments (100 Units)		3			5								8
Retail Parcel (17 ksf)		2			2								4
Retail Parcel (42.5 ksf)		6			5								11
Office Parcel (51 ksf)		7			1								8
Office Parcel (8.5 ksf)													0
<b>Character Area 5</b>													
86 Unit Townhome Development		2			3								5
26 Unit Townhome Development		1			2								3
16 Unit Townhome Development		1			1								2
<b>Outside Character Areas Development</b>													
Valley Creek Corporate Center		92			450								542
Glenloch II		1											1
Johnson-Matthey Flex (25 ksf Lt. Ind; 100 ksf Office)					3								3
Weston Solutions		1											1
West Chester Gun Club													0
Dante's Run													0
Oaklands (68 ksf Office)		9			2								11
<b>Total Trip Distribution</b>	34	350	0	0	559	17	0	0	0	82	0	169	1211
<b>2025 Projected Volumes</b>	34	821	60	41	1322	18	84	0	233	83	0	171	2867

TPD# WWT.A.00158  
 9/14/2015  
 Traffic Volumes Worksheet  
 Intersection:  
 Synchro Node:

Waterloo Boulevard & Whitford Road									
8	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
<b>2014 Existing Counts</b>	0	0	0	257	0	177	0	673	193	81	413	0	1794
Balancing													0
<b>Existing Volumes (Balanced)</b>	0	0	0	257	0	177	0	673	193	81	413	0	1794
Base growth (1.00% compounded for 11 yrs)	0	0	0	30	0	20	0	78	22	9	48	0	207
Movie Tavern								3			3		6
Boy Scouts of America								1			1		2
290 National Road				1				3	4		1		9
Clover Mill Industrial Park				1				6	5		1		13
<b>2025 Base Volumes</b>	0	0	0	289	0	197	0	764	224	90	467	0	2031
Waterloo Road Extension - Redistribution	179	48		-72	72			-179	-48		-113	113	0
<b>2025 Base Volumes</b>	179	48	0	217	72	197	0	585	176	90	354	113	2031

<b>Character Area 1</b>													
Residential (108 units) - N. Side of Lincoln Hwy													0
Office (200 ksf) - N. Side of Lincoln Hwy								2			1		3
Office (298 ksf) - S. Side of Lincoln Hwy								3			1		4
Residential (28 units) - S. Side of Lincoln Hwy (Ship Rd)													0
Flex Space (35.7 ksf Lt. Ind.; 142.8 ksf office)								2					2
<b>Character Area 2</b>													
Apartments (410 Units)								4			7		11
<b>Character Area 3</b>													
32 Unit Townhome Development				2					1				3
Office Parcel (51 ksf)	1	4		1	1			1	3		1		12
Office Parcel (25.5 ksf)				1				1	4				6
Flex Space (10.2 ksf Lt. Ind.; 40.8 ksf Office)				1				2	7		1		11
Office Parcel (Formerly Charter School [34 ksf])	1	3			2			1	3				10
<b>Character Area 4</b>													
Apartments (100 Units)		2		2	1	1			3	1	1		11
Retail Parcel (17 ksf)				3			15	1	3		1		23
Retail Parcel (42.5 ksf)	7	10	20		7		11	-5	-1	-1	-3	6	51
Office Parcel (51 ksf)				4	3	2		1	1	1			12
Office Parcel (8.5 ksf)				1									1
<b>Character Area 5</b>													
86 Unit Townhome Development	2	3	4		6		8					5	28
26 Unit Townhome Development	1	1			3							1	6
16 Unit Townhome Development				1									1
<b>Outside Character Areas Development</b>													
Valley Creek Corporate Center								22			5		27
Glenloch II													0
Johnson-Matthey Flex (25 ksf Lt. Ind; 100 ksf Office)													0
Weston Solutions													0
West Chester Gun Club													0
Dante's Run								1			1		2
Oaklands (68 ksf Office)				2				3	10		1		16
<b>Total Trip Distribution</b>	12	23	24	18	23	3	34	39	34	1	17	12	240
<b>2025 Projected Volumes</b>	191	71	24	235	95	200	34	624	210	91	371	125	2271

TPD# WWT.A.00158  
 9/14/2015  
 Traffic Volumes Worksheet  
 Intersection:  
 Synchro Node:

King Road & Phoenixville Pike/Old Phoenixville Pike									
10	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
<b>2014 Existing Counts</b>	116	193	2	1	434	46	2	0	1	55	0	249	1099
Balancing													0
<b>Existing Volumes (Balanced)</b>	116	193	2	1	434	46	2	0	1	55	0	249	1099
Base growth (1.00% compounded for 11 yrs)	13	22	0	0	50	5	0	0	0	6	0	29	125
Movie Tavern		1			2								3
Boy Scouts of America													0
290 National Road		3			1								4
Clover Mill Industrial Park		3											3
<b>2025 Base Volumes</b>	129	222	2	1	487	51	2	0	1	61	0	278	1234
Waterloo Road Extension - Redistribution													0
<b>2025 Base Volumes</b>	129	222	2	1	487	51	2	0	1	61	0	278	1234

<b>Character Area 1</b>													
Residential (108 units) - N. Side of Lincoln Hwy		3			5								8
Office (200 ksf) - N. Side of Lincoln Hwy		22			4								26
Office (298 ksf) - S. Side of Lincoln Hwy		30			6								36
Residential (28 units) - S. Side of Lincoln Hwy (Ship Rd)		1			1								2
Flex Space (35.7 ksf Lt. Ind.; 142.8 ksf office)		18			4								22
<b>Character Area 2</b>													
Apartments (410 Units)													0
<b>Character Area 3</b>													
32 Unit Townhome Development													0
Office Parcel (51 ksf)													0
Office Parcel (25.5 ksf)													0
Flex Space (10.2 ksf Lt. Ind.; 40.8 ksf Office)													0
Office Parcel (Formerly Charter School [34 ksf])													0
<b>Character Area 4</b>													
Apartments (100 Units)													0
Retail Parcel (17 ksf)													0
Retail Parcel (42.5 ksf)													0
Office Parcel (51 ksf)													0
Office Parcel (8.5 ksf)													0
<b>Character Area 5</b>													
86 Unit Townhome Development													0
26 Unit Townhome Development													0
16 Unit Townhome Development													0
<b>Outside Character Areas Development</b>													
Valley Creek Corporate Center	4				5					26		21	56
Glenloch II	3	1			1							6	11
Johnson-Matthey Flex (25 ksf Lt. Ind; 100 ksf Office)	4	4			19					2		19	48
Weston Solutions		6	6	1	3	7	3	7		15	15		63
West Chester Gun Club		1			1							2	4
Dante's Run		1			1							1	3
Oaklands (68 ksf Office)													0
<b>Total Trip Distribution</b>	11	87	6	1	45	12	3	7	0	43	15	49	279
<b>2025 Projected Volumes</b>	140	309	8	2	532	63	5	7	1	104	15	327	1513

***APPENDIX E***  
***CAPACITY ANALYSES***



## ***EXISTING CONDITIONS***



1: Ship Road & Lincoln Highway

Existing Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	289	106	54	456	83	208	489	19	35	275	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12	10	10	14	12	14	12
Grade (%)		0%			0%			-2%			0%	
Storage Length (ft)	80		0	175		0	200		175	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	50			0			25			25		
Satd. Flow (prot)	1711	1788	0	1711	1820	0	1668	1756	1706	0	1955	0
Flt Permitted	0.296			0.438			0.470				0.752	
Satd. Flow (perm)	533	1788	0	789	1820	0	825	1756	1706	0	1478	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		658			2674			707			702	
Travel Time (s)		10.0			40.5			12.1			12.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	420	0	57	573	0	221	520	20	0	359	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Detector Phase	2	2		6	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	26.0	26.0		26.0	26.0		3.0	3.0	3.0	3.0	3.0	
Minimum Split (s)	32.0	32.0		32.0	32.0		8.0	8.0	8.0	8.0	8.0	
Total Split (s)	43.0	43.0		43.0	43.0		37.0	37.0	37.0	37.0	37.0	
Total Split (%)	53.8%	53.8%		53.8%	53.8%		46.3%	46.3%	46.3%	46.3%	46.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None	None	None	None	
Act Effct Green (s)	29.6	29.6		29.6	29.6		23.5	23.5	23.5	None	23.5	
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.36	0.36	0.36		0.36	
v/c Ratio	0.05	0.51		0.16	0.69		0.73	0.81	0.03		0.66	
Control Delay	12.5	16.2		13.4	20.1		34.4	29.9	13.7		24.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	12.5	16.2		13.4	20.1		34.4	29.9	13.7		24.2	
LOS	B	B		B	C		C	C	B		C	
Approach Delay		16.1			19.5			30.8			24.2	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	2	109		12	166		65	159	4		102	
Queue Length 95th (ft)	13	221		39	330		#192	336	19		228	
Internal Link Dist (ft)		578			2594			627			622	
Turn Bay Length (ft)	80			175			200		175			
Base Capacity (vph)	314	1055		465	1074		421	896	870		754	

# 1: Ship Road & Lincoln Highway

Existing Conditions

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.04	0.40		0.12	0.53		0.52	0.58	0.02		0.48	

## Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 64.4

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 23.5

Intersection LOS: C

Intersection Capacity Utilization 102.0%

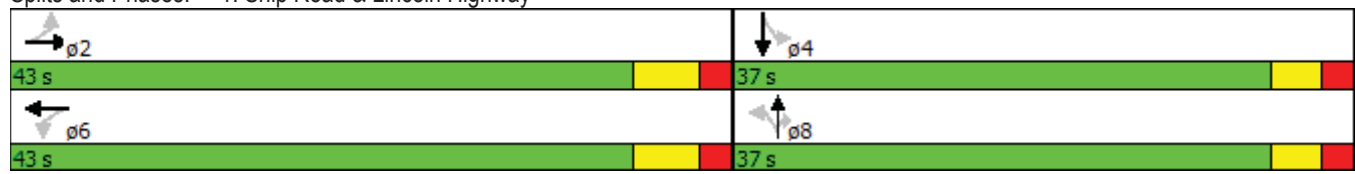
ICU Level of Service G

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

## Splits and Phases: 1: Ship Road & Lincoln Highway



2: S. Whitford Road/N. Whitford Road & Lincoln Highway

Existing Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	406	645	129	121	610	120	157	329	81	75	238	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	13	11	11	13	10	12	14	10	12	14
Grade (%)		-1%			1%			3%			2%	
Storage Length (ft)	775		0	350		200	300		150	200		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	75			75			75			75		
Satd. Flow (prot)	1676	3457	0	1623	3404	1612	1643	1853	1616	1668	1844	1656
Flt Permitted	0.292			0.320			0.236			0.304		
Satd. Flow (perm)	515	3457	0	547	3404	1612	408	1853	1616	534	1844	1656
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		26							218			245
Link Speed (mph)		45			45			40				40
Link Distance (ft)		1619			1597			896				555
Travel Time (s)		24.5			24.2			15.3				9.5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	1%	2%	4%	7%	2%	3%	1%	1%	5%	0%	2%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	414	790	0	123	622	122	160	336	83	77	243	245
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	3.0	15.0		3.0	15.0	15.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	10.0	22.0		10.0	22.0	22.0	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	22.0	62.0		14.0	54.0	54.0	19.0	31.0	31.0	13.0	25.0	25.0
Total Split (%)	18.3%	51.7%		11.7%	45.0%	45.0%	15.8%	25.8%	25.8%	10.8%	20.8%	20.8%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	70.4	56.5		55.4	48.4	48.4	36.4	26.2	26.2	25.3	18.4	18.4
Actuated g/C Ratio	0.59	0.47		0.46	0.40	0.40	0.30	0.22	0.22	0.21	0.15	0.15
v/c Ratio	0.93	0.48		0.39	0.45	0.19	0.65	0.83	0.16	0.44	0.86	0.53
Control Delay	45.5	22.5		16.7	27.8	24.8	44.4	63.8	0.7	34.4	70.5	16.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	22.5		16.7	27.8	24.8	44.4	63.8	0.7	34.4	70.5	16.0
LOS	D	C		B	C	C	D	E	A	C	E	B
Approach Delay		30.4			25.8			49.4			42.0	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	172	213		42	186	61	94	254	0	51	192	53
Queue Length 95th (ft)	#351	269		72	240	106	154	#416	0	m74	m233	m84
Internal Link Dist (ft)		1539			1517			816			475	
Turn Bay Length (ft)	775			350		200	300		150	200		

2: S. Whitford Road/N. Whitford Road & Lincoln Highway

Existing Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	447	1640		315	1373	650	257	404	523	179	294	470
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.48		0.39	0.45	0.19	0.62	0.83	0.16	0.43	0.83	0.52

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 14 (12%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.93  
 Intersection Signal Delay: 34.6  
 Intersection LOS: C  
 Intersection Capacity Utilization 82.5%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: S. Whitford Road/N. Whitford Road & Lincoln Highway



3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road

Existing Conditions

Timing Plan: PM Peak

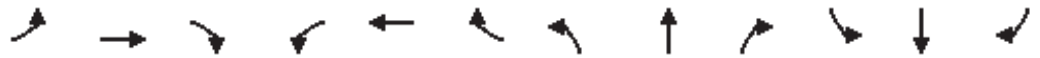


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	156	0	35	2	0	5	47	643	2	5	530	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	14	12	10	11	12	10	12	12
Grade (%)		0%			0%			-1%			2%	
Storage Length (ft)	0		0	0		0	115		0	150		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			75		
Satd. Flow (prot)	0	1796	0	0	1806	0	1693	1846	0	1619	1778	0
Flt Permitted		0.761			0.907		0.202			0.290		
Satd. Flow (perm)	0	1422	0	0	1662	0	360	1846	0	494	1778	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			39							48
Link Speed (mph)		35			25			40				40
Link Distance (ft)		750			406			850				1787
Travel Time (s)		14.6			11.1			14.5				30.5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	0%	0%	0%	0%	0%	0%	0%	3%	0%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	206	0	0	7	0	51	693	0	5	823	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6				2
Permitted Phases	8			4			6			2		
Detector Phase	8	8		4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		26.0	26.0		26.0	26.0	
Total Split (s)	27.0	27.0		27.0	27.0		57.0	57.0		57.0	57.0	
Total Split (%)	32.1%	32.1%		32.1%	32.1%		67.9%	67.9%		67.9%	67.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		13.1			13.1		35.1	35.1		35.1	35.1	
Actuated g/C Ratio		0.21			0.21		0.58	0.58		0.58	0.58	
v/c Ratio		0.61			0.02		0.25	0.65		0.02	0.79	
Control Delay		27.9			0.1		10.6	12.6		6.4	16.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		27.9			0.1		10.6	12.6		6.4	16.4	
LOS		C			A		B	B		A	B	
Approach Delay		27.9			0.1			12.4			16.4	
Approach LOS		C			A			B			B	
Queue Length 50th (ft)		54			0		8	145		1	185	
Queue Length 95th (ft)		145			0		32	314		5	422	
Internal Link Dist (ft)		670			326			770			1707	
Turn Bay Length (ft)							115			150		

3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road

Existing Conditions

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		545			633		301	1545		413	1496	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.38			0.01		0.17	0.45		0.01	0.55	

Intersection Summary

Area Type:	Other
Cycle Length:	84
Actuated Cycle Length:	61
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	16.0
Intersection LOS:	B
Intersection Capacity Utilization:	69.7%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road



4: Phoenixville Pike/Dunwoody Drive & King Road

Existing Conditions





















Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	169	40	307	388	1	44	1	128	1	2	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			-2%			0%			-6%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	186	44	337	426	1	48	1	141	1	2	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	427			230			1319	1312	208	1360	1334	427
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	427			230			1319	1312	208	1360	1334	427
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			75			54	99	83	99	98	99
cM capacity (veh/h)	1143			1344			105	120	835	85	117	597
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	1	230	337	427	190	10						
Volume Left	1	0	337	0	48	1						
Volume Right	0	44	0	1	141	7						
cSH	1143	1700	1344	1700	407	231						
Volume to Capacity	0.00	0.14	0.25	0.25	0.47	0.04						
Queue Length 95th (ft)	0	0	25	0	60	3						
Control Delay (s)	8.2	0.0	8.6	0.0	24.7	21.3						
Lane LOS	A		A		C	C						
Approach Delay (s)	0.0		3.8		24.7	21.3						
Approach LOS					C	C						
<b>Intersection Summary</b>												
Average Delay			6.5									
Intersection Capacity Utilization			47.5%		ICU Level of Service				A			
Analysis Period (min)			15									

4: Phoenixville Pike/Dunwoody Drive & King Road

Existing Conditions

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	169	40	307	388	1	44	1	128	1	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	11	11	12	12	11	10	12	16	12
Grade (%)		0%			-2%			0%				-6%
Storage Length (ft)	110		0	100		0	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	50			50			25			25		
Satd. Flow (prot)	1685	1820	0	1745	1837	0	0	1717	1492	0	1785	0
Flt Permitted	0.950			0.950				0.953			0.995	
Satd. Flow (perm)	1685	1820	0	1745	1837	0	0	1717	1492	0	1785	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		576			448			978			349	
Travel Time (s)		11.2			8.7			16.7			5.9	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	1%	3%	1%	1%	0%	2%	0%	1%	0%	0%	17%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	230	0	337	427	0	0	49	141	0	10	0
Sign Control		Free			Free			Stop			Stop	













Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.5%
ICU Level of Service	A
Analysis Period (min)	15

6: S. Whitford Road & Commerce Drive

Existing Conditions

Timing Plan: PM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	166	164	611	156	202	609
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	12	13	10	13
Grade (%)	-2%		-2%			-2%
Storage Length (ft)	150	150		165	225	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25				75	
Satd. Flow (prot)	1547	1636	1881	1636	1685	1944
Flt Permitted	0.950				0.193	
Satd. Flow (perm)	1547	1636	1881	1636	342	1944
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		167		159		
Link Speed (mph)	30		40			40
Link Distance (ft)	882		1787			468
Travel Time (s)	20.0		30.5			8.0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	10%	3%	2%	3%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	167	623	159	206	621
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	3.0	3.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.0	9.0	21.0	21.0	9.0	22.0
Total Split (s)	23.0	23.0	54.0	54.0	13.0	67.0
Total Split (%)	25.6%	25.6%	60.0%	60.0%	14.4%	74.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	14.1	14.1	31.6	31.6	45.0	45.0
Actuated g/C Ratio	0.20	0.20	0.44	0.44	0.63	0.63
v/c Ratio	0.55	0.37	0.75	0.20	0.59	0.51
Control Delay	35.6	7.7	22.8	2.7	12.8	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	7.7	22.8	2.7	12.8	9.0
LOS	D	A	C	A	B	A
Approach Delay	21.8		18.7			9.9
Approach LOS	C		B			A
Queue Length 50th (ft)	68	0	220	0	34	133
Queue Length 95th (ft)	148	50	348	28	64	216
Internal Link Dist (ft)	802		1707			388
Turn Bay Length (ft)	150	150		165	225	

6: S. Whitford Road & Commerce Drive

Existing Conditions

Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Base Capacity (vph)	378	526	1299	1179	350	1658
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.32	0.48	0.13	0.59	0.37

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	71.4
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	15.5
Intersection LOS:	B
Intersection Capacity Utilization	67.5%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 6: S. Whitford Road & Commerce Drive



7: Springdale Drive & Lincoln Highway

Existing Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	409	54	37	676	1	75	0	209	1	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	10	12	12	12	12	12	12	16	12
Grade (%)		1%			-1%			0%			0%	
Storage Length (ft)	125		200	150		0	0		125	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	50			50			25			25		
Satd. Flow (prot)	1827	1853	1607	1693	1872	0	0	1787	1583	0	1928	0
Flt Permitted				0.330				0.756			0.904	
Satd. Flow (perm)	1827	1853	1607	588	1872	0	0	1422	1583	0	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			106						230			120
Link Speed (mph)		45			45			25				25
Link Distance (ft)		2674			1145			679				258
Travel Time (s)		40.5			17.3			18.5				7.0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	2%	0%	0%	2%	0%	1%	0%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	449	59	41	744	0	0	82	230	0	3	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6		5	2			4				8
Permitted Phases	6		6	2			4		4	8		
Detector Phase	6	6	6	5	2		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	3.0	15.0		3.0	3.0	3.0	3.0	3.0	
Minimum Split (s)	21.0	21.0	21.0	9.0	21.0		8.0	8.0	8.0	8.0	8.0	
Total Split (s)	50.0	50.0	50.0	17.0	67.0		15.0	15.0	15.0	15.0	15.0	
Total Split (%)	61.0%	61.0%	61.0%	20.7%	81.7%		18.3%	18.3%	18.3%	18.3%	18.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	
Act Effct Green (s)		20.3	20.3	24.4	24.4			8.1	8.1			8.1
Actuated g/C Ratio		0.46	0.46	0.55	0.55			0.18	0.18			0.18
v/c Ratio		0.53	0.07	0.08	0.72			0.31	0.48			0.01
Control Delay		13.2	1.2	4.6	11.6			22.0	7.6			0.0
Queue Delay		0.0	0.0	0.0	0.0			0.0	0.0			0.0
Total Delay		13.2	1.2	4.6	11.6			22.0	7.6			0.0
LOS		B	A	A	B			C	A			A
Approach Delay		11.8			11.2			11.4				0.0
Approach LOS		B			B			B				A
Queue Length 50th (ft)		54	0	4	113			16	0			0
Queue Length 95th (ft)		196	7	12	218			60	50			0
Internal Link Dist (ft)		2594			1065			599				178
Turn Bay Length (ft)			200	150					125			

7: Springdale Drive & Lincoln Highway

Existing Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1701	1484	615	1872			338	552		513	
Starvation Cap Reductn		0	0	0	0			0	0		0	
Spillback Cap Reductn		0	0	0	0			0	0		0	
Storage Cap Reductn		0	0	0	0			0	0		0	
Reduced v/c Ratio		0.26	0.04	0.07	0.40			0.24	0.42		0.01	

Intersection Summary	
Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	44
Natural Cycle:	45
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	11.4
Intersection LOS:	B
Intersection Capacity Utilization	55.2%
ICU Level of Service	B
Analysis Period (min)	15



















Splits and Phases: 7: Springdale Drive & Lincoln Highway



8: N. Whitford Road & Private Drive/Waterloo Boulevard

Existing Conditions

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	257	0	177	0	673	193	81	413	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	12	12	10	12	12	14	12	10	12	12
Grade (%)		0%			2%			-1%			0%	
Storage Length (ft)	0		0	0		300	0		0	150		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Satd. Flow (prot)	0	1773	0	0	1668	1599	0	1956	0	1685	1863	0
Flt Permitted					0.757					0.151		
Satd. Flow (perm)	0	1773	0	0	1329	1599	0	1956	0	268	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						188		23				
Link Speed (mph)		25			35			30				30
Link Distance (ft)		252			1052			555				719
Travel Time (s)		6.9			20.5			12.6				16.3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	273	188	0	921	0	86	439	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4		4	6			2		
Detector Phase	8	8		4	4	4	6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0	3.0	20.0	20.0		3.0	20.0	
Minimum Split (s)	8.0	8.0		8.0	8.0	8.0	26.0	26.0		9.0	35.0	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	82.0	82.0		13.0	95.0	
Total Split (%)	20.8%	20.8%		20.8%	20.8%	20.8%	68.3%	68.3%		10.8%	79.2%	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0		6.0		6.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	
Act Effct Green (s)				20.0	20.0			78.6		89.0	89.0	
Actuated g/C Ratio				0.17	0.17			0.66		0.74	0.74	
v/c Ratio				1.24	0.44			0.71		0.31	0.32	
Control Delay				180.7	9.7			16.2		7.1	6.0	
Queue Delay				0.0	0.0			0.9		0.0	0.0	
Total Delay				180.7	9.7			17.1		7.1	6.0	
LOS				F	A			B		A	A	
Approach Delay				110.9				17.1			6.1	
Approach LOS				F				B			A	
Queue Length 50th (ft)				~262	0			353		16	100	
Queue Length 95th (ft)				#434	64			m407		29	141	
Internal Link Dist (ft)		172			972			475			639	
Turn Bay Length (ft)						300				150		

8: N. Whitford Road & Private Drive/Waterloo Boulevard

Existing Conditions

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)					221	423		1289		281	1381	
Starvation Cap Reductn					0	0		150		0	0	
Spillback Cap Reductn					0	0		0		0	0	
Storage Cap Reductn					0	0		0		0	0	
Reduced v/c Ratio					1.24	0.44		0.81		0.31	0.32	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	53 (44%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.24
Intersection Signal Delay:	36.8
Intersection LOS:	D
Intersection Capacity Utilization	90.7%
ICU Level of Service	E
Analysis Period (min)	15
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: N. Whitford Road & Private Drive/Waterloo Boulevard



10: Old Phoenixville Pike/Phoenixville Pike & King Road

Existing Conditions

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	116	193	2	1	434	46	2	0	1	55	0	249
Sign Control		Free			Free			Stop			Stop	
Grade		1%			-1%			0%			-1%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	123	205	2	1	462	49	2	0	1	59	0	265
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	511			207			1206	966	206	941	943	486
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	511			207			1206	966	206	941	943	486
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	88			100			97	100	100	73	100	55
cM capacity (veh/h)	1065			1376			80	227	839	215	234	583
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2						
Volume Total	123	207	512	3	59	265						
Volume Left	123	0	1	2	59	0						
Volume Right	0	2	49	1	0	265						
cSH	1065	1700	1376	115	215	583						
Volume to Capacity	0.12	0.12	0.00	0.03	0.27	0.45						
Queue Length 95th (ft)	10	0	0	2	27	59						
Control Delay (s)	8.8	0.0	0.0	37.2	27.9	16.2						
Lane LOS	A		A	E	D	C						
Approach Delay (s)	3.3		0.0	37.2	18.3							
Approach LOS				E	C							
<b>Intersection Summary</b>												
Average Delay			6.1									
Intersection Capacity Utilization			61.4%		ICU Level of Service				B			
Analysis Period (min)			15									

10: Old Phoenixville Pike/Phoenixville Pike & King Road

Existing Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	193	2	1	434	46	2	0	1	55	0	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	12	11	12	12	11	12	10	11	12
Grade (%)		1%			-1%			0%				-1%
Storage Length (ft)	110		0	0		0	0		0	110		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Satd. Flow (prot)	1676	1790	0	0	1790	0	0	1698	0	1553	1553	0
Flt Permitted	0.950							0.968		0.950		
Satd. Flow (perm)	1676	1790	0	0	1790	0	0	1698	0	1553	1553	0
Link Speed (mph)		35			35			25				40
Link Distance (ft)		448			248			953				864
Travel Time (s)		8.7			4.8			26.0				14.7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	0%	0%	1%	9%	0%	0%	0%	9%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	207	0	0	512	0	0	3	0	59	265	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.4%
ICU Level of Service	B
Analysis Period (min)	15

***EXISTING CONDITIONS  
WITH IMPROVEMENTS***



2: S. Whitford Road/N. Whitford Road & Lincoln Highway

Existing Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	406	645	129	121	610	120	157	329	81	75	238	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	13	11	11	13	10	12	14	10	12	14
Grade (%)		-1%			1%			3%			2%	
Storage Length (ft)	775		0	350		200	300		150	200		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	75			75			75			75		
Satd. Flow (prot)	1676	3457	0	1623	3404	1612	1643	1853	1616	1668	1844	1656
Flt Permitted	0.166			0.353			0.361			0.382		
Satd. Flow (perm)	293	3457	0	603	3404	1612	624	1853	1616	671	1844	1656
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		27							291			291
Link Speed (mph)		45			45			40				40
Link Distance (ft)		1619			1597			896				555
Travel Time (s)		24.5			24.2			15.3				9.5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	1%	2%	4%	7%	2%	3%	1%	1%	5%	0%	2%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	414	790	0	123	622	122	160	336	83	77	243	245
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	3.0	15.0		3.0	15.0	15.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	10.0	22.0		10.0	22.0	22.0	10.0	11.0	11.0	10.0	11.0	11.0
Total Split (s)	28.0	36.0		15.0	23.0	23.0	13.0	29.0	29.0	10.0	26.0	26.0
Total Split (%)	31.1%	40.0%		16.7%	25.6%	25.6%	14.4%	32.2%	32.2%	11.1%	28.9%	28.9%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	46.9	32.3		28.0	20.4	20.4	27.7	22.1	22.1	21.1	17.1	17.1
Actuated g/C Ratio	0.52	0.36		0.31	0.23	0.23	0.31	0.25	0.25	0.23	0.19	0.19
v/c Ratio	0.92	0.63		0.45	0.80	0.33	0.59	0.74	0.13	0.38	0.70	0.45
Control Delay	48.0	26.5		20.5	44.8	34.6	31.7	42.5	0.5	26.1	44.5	8.8
Queue Delay	1.8	0.0		0.0	0.0	0.7	0.0	1.0	0.0	0.0	0.0	0.0
Total Delay	49.7	26.5		20.5	44.8	35.3	31.7	43.5	0.5	26.1	44.5	8.8
LOS	D	C		C	D	D	C	D	A	C	D	A
Approach Delay		34.5			40.0			34.1			26.5	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	175	193		36	185	61	65	178	0	35	138	15
Queue Length 95th (ft)	#350	264		68	#308	116	111	#270	0	m55	m204	m70
Internal Link Dist (ft)		1539			1517			816			475	
Turn Bay Length (ft)	775			350		200	300		150	200		



8: N. Whitford Road & Private Drive/Waterloo Boulevard

Existing Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	257	0	177	0	673	193	81	413	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	12	12	10	12	12	14	12	10	12	12
Grade (%)		0%			2%			-1%			0%	
Storage Length (ft)	0		0	0		300	0		0	150		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Satd. Flow (prot)	0	1773	0	0	1668	1599	0	1956	0	1685	1863	0
Flt Permitted					0.757					0.078		
Satd. Flow (perm)	0	1773	0	0	1329	1599	0	1956	0	138	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						188		21				
Link Speed (mph)		25			35			30			30	
Link Distance (ft)		252			1052			555			719	
Travel Time (s)		6.9			20.5			12.6			16.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	273	188	0	921	0	86	439	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4		4	6			2		
Detector Phase	8	8		4	4	4	6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0	3.0	20.0	20.0		3.0	20.0	
Minimum Split (s)	8.0	8.0		8.0	8.0	8.0	26.0	26.0		9.0	35.0	
Total Split (s)	30.0	30.0		30.0	30.0	30.0	47.0	47.0		13.0	60.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%	33.3%	52.2%	52.2%		14.4%	66.7%	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0		6.0		6.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	
Act Effct Green (s)				22.0	22.0			46.6		57.0	57.0	
Actuated g/C Ratio				0.24	0.24			0.52		0.63	0.63	
v/c Ratio				0.84	0.35			0.90		0.43	0.37	
Control Delay				54.9	6.0			35.3		15.6	9.7	
Queue Delay				0.0	0.0			0.3		0.0	0.0	
Total Delay				54.9	6.0			35.6		15.6	9.7	
LOS				D	A			D		B	A	
Approach Delay				35.0				35.6			10.6	
Approach LOS				C				D			B	
Queue Length 50th (ft)				143	0			~430		18	116	
Queue Length 95th (ft)				#259	48			m#747		47	180	
Internal Link Dist (ft)		172			972			475			639	
Turn Bay Length (ft)						300				150		



***2025 BASE CONDITIONS***



1: Ship Road & Lincoln Highway

2025 Base Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	337	129	60	518	93	239	546	21	39	307	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12	10	10	14	12	14	12
Grade (%)		0%			0%			-2%				0%
Storage Length (ft)	80		0	175		0	200		175	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	50			0			25			25		
Satd. Flow (prot)	1711	1786	0	1711	1820	0	1668	1756	1706	0	1953	0
Flt Permitted	0.210			0.351			0.439				0.675	
Satd. Flow (perm)	378	1786	0	632	1820	0	771	1756	1706	0	1325	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			40				40
Link Distance (ft)		658			2674			707				702
Travel Time (s)		10.0			40.5			12.1				12.0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	496	0	64	650	0	254	581	22	0	404	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8		8	4		
Detector Phase	2	2		6	6		8	8	8	4		4
Switch Phase												
Minimum Initial (s)	26.0	26.0		26.0	26.0		3.0	3.0	3.0	3.0		3.0
Minimum Split (s)	32.0	32.0		32.0	32.0		8.0	8.0	8.0	8.0		8.0
Total Split (s)	43.0	43.0		43.0	43.0		37.0	37.0	37.0	37.0		37.0
Total Split (%)	53.8%	53.8%		53.8%	53.8%		46.3%	46.3%	46.3%	46.3%		46.3%
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0		3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	5.0	5.0	5.0		5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None	None	None		None
Act Effct Green (s)	31.6	31.6		31.6	31.6		27.4	27.4	27.4			27.4
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.39	0.39	0.39			0.39
v/c Ratio	0.14	0.62		0.23	0.79		0.85	0.85	0.03			0.78
Control Delay	15.2	19.6		15.6	26.1		47.6	33.8	14.4			32.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0			0.0
Total Delay	15.2	19.6		15.6	26.1		47.6	33.8	14.4			32.0
LOS	B	B		B	C		D	C	B			C
Approach Delay		19.4			25.2			37.4				32.0
Approach LOS		B			C			D				C
Queue Length 50th (ft)	7	177		18	260		98	225	6			150
Queue Length 95th (ft)	22	274		45	400		#246	#434	20			#315
Internal Link Dist (ft)		578			2594			627				622
Turn Bay Length (ft)	80			175			200		175			
Base Capacity (vph)	203	962		340	980		359	818	794			617

1: Ship Road & Lincoln Highway

2025 Base Conditions

Timing Plan: PM Peak

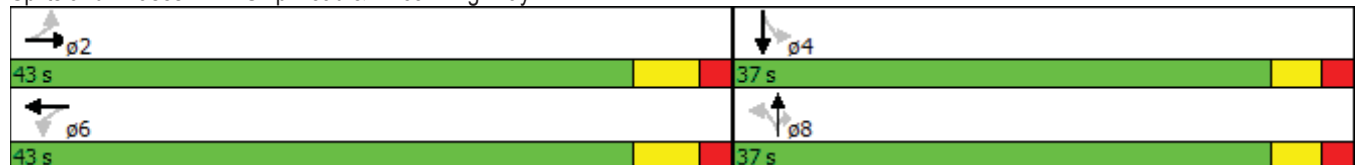


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.12	0.52		0.19	0.66		0.71	0.71	0.03		0.65	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	70.3
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	29.3
Intersection LOS:	C
Intersection Capacity Utilization	112.3%
ICU Level of Service	H
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 1: Ship Road & Lincoln Highway



2: S. Whitford Road/N. Whitford Road & Lincoln Highway

2025 Base Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	453	726	159	149	687	135	201	388	140	85	273	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	13	11	11	13	10	12	14	10	12	14
Grade (%)		-1%			1%			3%			2%	
Storage Length (ft)	775		0	350		200	300		150	200		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	75			75			75			75		
Satd. Flow (prot)	1676	3449	0	1623	3404	1612	1643	1853	1616	1668	1844	1656
Flt Permitted	0.170			0.288			0.317			0.284		
Satd. Flow (perm)	300	3449	0	492	3404	1612	548	1853	1616	499	1844	1656
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		31							291			291
Link Speed (mph)		45			45			40				40
Link Distance (ft)		1619			1597			896				555
Travel Time (s)		24.5			24.2			15.3				9.5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	1%	2%	4%	7%	2%	3%	1%	1%	5%	0%	2%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	462	903	0	152	701	138	205	396	143	87	279	273
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	3.0	15.0		3.0	15.0	15.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	10.0	22.0		10.0	22.0	22.0	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	28.0	36.0		15.0	23.0	23.0	13.0	29.0	29.0	10.0	26.0	26.0
Total Split (%)	31.1%	40.0%		16.7%	25.6%	25.6%	14.4%	32.2%	32.2%	11.1%	28.9%	28.9%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	45.7	30.8		25.5	17.7	17.7	28.9	23.3	23.3	22.3	18.3	18.3
Actuated g/C Ratio	0.51	0.34		0.28	0.20	0.20	0.32	0.26	0.26	0.25	0.20	0.20
v/c Ratio	0.98	0.75		0.64	1.05	0.44	0.79	0.82	0.23	0.49	0.74	0.48
Control Delay	60.8	30.6		30.6	86.4	37.9	46.0	47.8	0.8	29.5	44.8	9.8
Queue Delay	34.5	0.0		0.0	0.0	74.8	0.0	21.9	0.0	0.0	0.0	0.0
Total Delay	95.3	30.6		30.6	86.4	112.7	46.0	69.7	0.8	29.5	44.8	9.8
LOS	F	C		C	F	F	D	E	A	C	D	A
Approach Delay		52.5			81.5			49.9			27.8	
Approach LOS		D			F			D			C	
Queue Length 50th (ft)	213	236		47	~250	71	83	214	0	36	158	25
Queue Length 95th (ft)	#414	312		#107	#362	129	#176	#366	0	m58	m224	m79
Internal Link Dist (ft)		1539			1517			816			475	
Turn Bay Length (ft)	775			350		200	300		150	200		

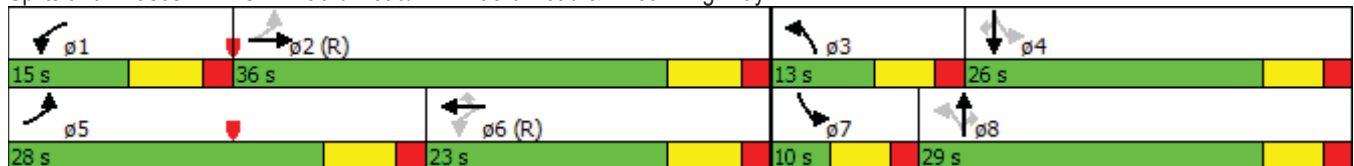


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	473	1202		240	668	316	261	483	636	176	409	594
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	49	0		0	0	203	0	90	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.75		0.63	1.05	1.22	0.79	1.01	0.22	0.49	0.68	0.46

**Intersection Summary**

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.05  
 Intersection Signal Delay: 55.4  
 Intersection LOS: E  
 Intersection Capacity Utilization 91.3%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.



















Splits and Phases: 2: S. Whitford Road/N. Whitford Road & Lincoln Highway



3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road

2025 Base Conditions

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	228	0	66	2	0	6	61	780	2	6	608	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	14	12	10	11	12	10	12	12
Grade (%)		0%			0%			-1%				2%
Storage Length (ft)	0		0	0		0	115		0	150		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			75		
Satd. Flow (prot)	0	1792	0	0	1800	0	1693	1846	0	1619	1776	0
Flt Permitted		0.769			0.919		0.113			0.185		
Satd. Flow (perm)	0	1431	0	0	1674	0	201	1846	0	315	1776	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			39							50
Link Speed (mph)		35			25			40				40
Link Distance (ft)		750			406			850				1787
Travel Time (s)		14.6			11.1			14.5				30.5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	0%	0%	0%	0%	0%	0%	0%	3%	0%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	316	0	0	8	0	66	841	0	6	952	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6				2
Permitted Phases	8			4			6			2		
Detector Phase	8	8		4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		26.0	26.0		26.0	26.0	
Total Split (s)	27.0	27.0		27.0	27.0		57.0	57.0		57.0	57.0	
Total Split (%)	32.1%	32.1%		32.1%	32.1%		67.9%	67.9%		67.9%	67.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		18.4			18.4		43.9	43.9		43.9	43.9	
Actuated g/C Ratio		0.25			0.25		0.59	0.59		0.59	0.59	
v/c Ratio		0.83			0.02		0.56	0.78		0.03	0.89	
Control Delay		44.8			0.1		32.4	17.9		7.3	25.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		44.8			0.1		32.4	17.9		7.3	25.6	
LOS		D			A		C	B		A	C	
Approach Delay		44.8			0.1			18.9			25.5	
Approach LOS		D			A			B			C	
Queue Length 50th (ft)		137			0		18	290		1	360	
Queue Length 95th (ft)		#277			0		#86	445		6	#665	
Internal Link Dist (ft)		670			326			770			1707	
Turn Bay Length (ft)							115			150		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		443			514		142	1303		222	1268	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.71			0.02		0.46	0.65		0.03	0.75	

**Intersection Summary**

Area Type: Other  
 Cycle Length: 84  
 Actuated Cycle Length: 74.7  
 Natural Cycle: 70  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 25.5  
 Intersection LOS: C  
 Intersection Capacity Utilization 84.0%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.






















Splits and Phases: 3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road



4: Phoenixville Pike/Dunwoody Drive & King Road

2025 Base Conditions





















Timing Plan: PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (veh/h)	1	196	45	343	436	1	49	1	143	1	2	7	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			-2%			0%			-6%		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Hourly flow rate (vph)	1	215	49	377	479	1	54	1	157	1	2	8	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)									3				
Median type		None			None								
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	480			265			1484	1476	240	1530	1501	480	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	480			265			1484	1476	240	1530	1501	480	
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.4	
tC, 2 stage (s)													
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5	
p0 queue free %	100			71			30	99	80	98	98	99	
cM capacity (veh/h)	1093			1305			77	91	801	60	88	557	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1							
Volume Total	1	265	377	480	212	11							
Volume Left	1	0	377	0	54	1							
Volume Right	0	49	0	1	157	8							
cSH	1093	1700	1305	1700	300	192							
Volume to Capacity	0.00	0.16	0.29	0.28	0.71	0.06							
Queue Length 95th (ft)	0	0	30	0	125	5							
Control Delay (s)	8.3	0.0	8.9	0.0	39.9	24.8							
Lane LOS	A		A		E	C							
Approach Delay (s)	0.0		3.9		39.9	24.8							
Approach LOS					E	C							
Intersection Summary													
Average Delay			9.0										
Intersection Capacity Utilization			51.5%		ICU Level of Service		A						
Analysis Period (min)			15										

4: Phoenixville Pike/Dunwoody Drive & King Road

2025 Base Conditions

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	196	45	343	436	1	49	1	143	1	2	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	11	11	12	12	11	10	12	16	12
Grade (%)		0%			-2%			0%				-6%
Storage Length (ft)	110		0	100		0	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	50			50			25			25		
Satd. Flow (prot)	1685	1822	0	1745	1837	0	0	1717	1492	0	1772	0
Flt Permitted	0.950			0.950				0.953			0.995	
Satd. Flow (perm)	1685	1822	0	1745	1837	0	0	1717	1492	0	1772	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		576			448			978			349	
Travel Time (s)		11.2			8.7			16.7			5.9	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	1%	3%	1%	1%	0%	2%	0%	1%	0%	0%	17%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	264	0	377	480	0	0	55	157	0	11	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.5%
ICU Level of Service	A
Analysis Period (min)	15

6: S. Whitford Road & Commerce Drive

2025 Base Conditions

Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	195	196	766	207	239	701
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	12	13	10	13
Grade (%)	-2%		-2%			-2%
Storage Length (ft)	150	150		165	225	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25				75	
Satd. Flow (prot)	1547	1636	1881	1636	1685	1944
Flt Permitted	0.950				0.117	
Satd. Flow (perm)	1547	1636	1881	1636	207	1944
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		200		176		
Link Speed (mph)	30		40			40
Link Distance (ft)	882		1787			468
Travel Time (s)	20.0		30.5			8.0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	10%	3%	2%	3%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	199	200	782	211	244	715
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	3.0	3.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.0	9.0	21.0	21.0	9.0	22.0
Total Split (s)	23.0	23.0	54.0	54.0	13.0	67.0
Total Split (%)	25.6%	25.6%	60.0%	60.0%	14.4%	74.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	15.4	15.4	39.5	39.5	52.7	52.7
Actuated g/C Ratio	0.19	0.19	0.49	0.49	0.66	0.66
v/c Ratio	0.67	0.42	0.85	0.24	0.91	0.56
Control Delay	44.6	8.0	27.6	3.5	53.7	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	8.0	27.6	3.5	53.7	9.5
LOS	D	A	C	A	D	A
Approach Delay	26.2		22.5			20.8
Approach LOS	C		C			C
Queue Length 50th (ft)	94	0	335	9	59	181
Queue Length 95th (ft)	#197	56	497	41	#145	265
Internal Link Dist (ft)	802		1707			388
Turn Bay Length (ft)	150	150		165	225	



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Base Capacity (vph)	333	509	1145	1064	267	1503
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.39	0.68	0.20	0.91	0.48

**Intersection Summary**

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 80.3  
 Natural Cycle: 70  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 22.4  
 Intersection LOS: C  
 Intersection Capacity Utilization 79.4%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.






















Splits and Phases: 6: S. Whitford Road & Commerce Drive



7: Springdale Drive & Lincoln Highway

2025 Base Conditions

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	471	60	41	763	1	84	0	233	1	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	10	12	12	12	12	12	12	16	12
Grade (%)		1%			-1%			0%			0%	
Storage Length (ft)	125		200	150		0	0		125	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	50			50			25			25		
Satd. Flow (prot)	1827	1853	1607	1693	1872	0	0	1787	1583	0	1928	0
Flt Permitted				0.289				0.756			0.904	
Satd. Flow (perm)	1827	1853	1607	515	1872	0	0	1422	1583	0	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			106						256			120
Link Speed (mph)		45			45			25				25
Link Distance (ft)		2674			1145			679				258
Travel Time (s)		40.5			17.3			18.5				7.0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	2%	0%	0%	2%	0%	1%	0%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	518	66	45	839	0	0	92	256	0	3	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6		5	2			4				8
Permitted Phases	6		6	2			4		4	8		
Detector Phase	6	6	6	5	2		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	3.0	15.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Split (s)	21.0	21.0	21.0	9.0	21.0		8.0	8.0	8.0	8.0	8.0	8.0
Total Split (s)	50.0	50.0	50.0	17.0	67.0		15.0	15.0	15.0	15.0	15.0	15.0
Total Split (%)	61.0%	61.0%	61.0%	20.7%	81.7%		18.3%	18.3%	18.3%	18.3%	18.3%	18.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0			0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0			5.0	5.0			5.0
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	None
Act Effct Green (s)		22.7	22.7	26.8	26.8			8.4	8.4			8.4
Actuated g/C Ratio		0.48	0.48	0.57	0.57			0.18	0.18			0.18
v/c Ratio		0.58	0.08	0.10	0.79			0.36	0.52			0.01
Control Delay		13.5	1.3	4.4	13.5			25.0	8.2			0.0
Queue Delay		0.0	0.0	0.0	0.0			0.0	0.0			0.0
Total Delay		13.5	1.3	4.4	13.5			25.0	8.2			0.0
LOS		B	A	A	B			C	A			A
Approach Delay		12.1			13.1			12.6				0.0
Approach LOS		B			B			B				A
Queue Length 50th (ft)		69	0	4	146			21	0			0
Queue Length 95th (ft)		231	9	13	266			72	56			0
Internal Link Dist (ft)		2594			1065			599				178
Turn Bay Length (ft)			200	150					125			

7: Springdale Drive & Lincoln Highway

2025 Base Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1649	1442	588	1858			322	557		494	
Starvation Cap Reductn		0	0	0	0			0	0		0	
Spillback Cap Reductn		0	0	0	0			0	0		0	
Storage Cap Reductn		0	0	0	0			0	0		0	
Reduced v/c Ratio		0.31	0.05	0.08	0.45			0.29	0.46		0.01	

Intersection Summary	
Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	46.9
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	12.6
Intersection LOS:	B
Intersection Capacity Utilization	60.7%
ICU Level of Service	B
Analysis Period (min)	15



















Splits and Phases: 7: Springdale Drive & Lincoln Highway



8: N. Whitford Road & Private Drive/Waterloo Boulevard

2025 Base Conditions

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	289	0	197	0	764	224	90	467	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	12	12	10	12	12	14	12	10	12	12
Grade (%)		0%			2%			-1%			0%	
Storage Length (ft)	0		0	0		300	0		0	150		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Satd. Flow (prot)	0	1773	0	0	1668	1599	0	1954	0	1685	1863	0
Flt Permitted					0.757					0.080		
Satd. Flow (perm)	0	1773	0	0	1329	1599	0	1954	0	142	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						210		22				
Link Speed (mph)		25			35			30			30	
Link Distance (ft)		252			1052			555			719	
Travel Time (s)		6.9			20.5			12.6			16.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	307	210	0	1051	0	96	497	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4		4	6			2		
Detector Phase	8	8		4	4	4	6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0	3.0	20.0	20.0		3.0	20.0	
Minimum Split (s)	8.0	8.0		8.0	8.0	8.0	26.0	26.0		9.0	35.0	
Total Split (s)	30.0	30.0		30.0	30.0	30.0	47.0	47.0		13.0	60.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%	33.3%	52.2%	52.2%		14.4%	66.7%	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0		6.0		6.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	
Act Effct Green (s)					23.4	23.4		45.2		55.6	55.6	
Actuated g/C Ratio					0.26	0.26		0.50		0.62	0.62	
v/c Ratio					0.89	0.37		1.06		0.47	0.43	
Control Delay					60.5	5.8		67.3		17.5	10.8	
Queue Delay					0.0	0.0		2.9		0.0	0.0	
Total Delay					60.5	5.8		70.2		17.5	10.8	
LOS					E	A		E		B	B	
Approach Delay					38.3			70.2			11.9	
Approach LOS					D			E			B	
Queue Length 50th (ft)					164	0		~693		21	141	
Queue Length 95th (ft)					#305	51		m#848		55	211	
Internal Link Dist (ft)		172			972			475			639	
Turn Bay Length (ft)						300				150		

8: N. Whitford Road & Private Drive/Waterloo Boulevard

2025 Base Conditions

Timing Plan: PM Peak

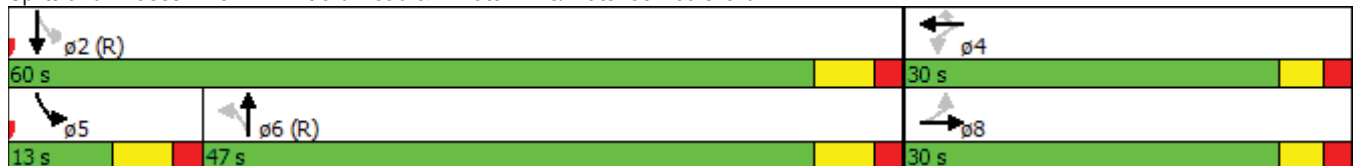


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)					369	595		993		207	1151	
Starvation Cap Reductn					0	0		7		0	0	
Spillback Cap Reductn					0	0		0		0	0	
Storage Cap Reductn					0	0		0		0	0	
Reduced v/c Ratio					0.83	0.35		1.07		0.46	0.43	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	15 (17%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.06
Intersection Signal Delay:	46.5
Intersection LOS:	D
Intersection Capacity Utilization	100.0%
ICU Level of Service	F
Analysis Period (min)	15
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: N. Whitford Road & Private Drive/Waterloo Boulevard



10: Old Phoenixville Pike/Phoenixville Pike & King Road

2025 Base Conditions



















Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	129	222	2	1	487	51	2	0	1	61	0	278
Sign Control		Free			Free			Stop			Stop	
Grade		1%			-1%			0%			-1%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	137	236	2	1	518	54	2	0	1	65	0	296
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	572			238			1355	1086	237	1059	1060	545
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	572			238			1355	1086	237	1059	1060	545
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	86			100			96	100	100	63	100	45
cM capacity (veh/h)	1010			1340			52	188	807	175	195	540
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>						
Volume Total	137	238	573	3	65	296						
Volume Left	137	0	1	2	65	0						
Volume Right	0	2	54	1	0	296						
cSH	1010	1700	1340	75	175	540						
Volume to Capacity	0.14	0.14	0.00	0.04	0.37	0.55						
Queue Length 95th (ft)	12	0	0	3	39	82						
Control Delay (s)	9.1	0.0	0.0	54.9	37.1	19.4						
Lane LOS	A		A	F	E	C						
Approach Delay (s)	3.3		0.0	54.9	22.6							
Approach LOS				F	C							
<b>Intersection Summary</b>												
Average Delay			7.3									
Intersection Capacity Utilization			67.8%		ICU Level of Service					C		
Analysis Period (min)			15									

10: Old Phoenixville Pike/Phoenixville Pike & King Road

2025 Base Conditions

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	129	222	2	1	487	51	2	0	1	61	0	278
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	12	11	12	12	11	12	10	11	12
Grade (%)		1%			-1%			0%			-1%	
Storage Length (ft)	110		0	0		0	0		0	110		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Satd. Flow (prot)	1676	1790	0	0	1790	0	0	1698	0	1553	1553	0
Flt Permitted	0.950							0.968		0.950		
Satd. Flow (perm)	1676	1790	0	0	1790	0	0	1698	0	1553	1553	0
Link Speed (mph)		35			35			25			40	
Link Distance (ft)		448			248			953			864	
Travel Time (s)		8.7			4.8			26.0			14.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	0%	0%	1%	9%	0%	0%	0%	9%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	238	0	0	573	0	0	3	0	65	296	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 67.8% ICU Level of Service C

Analysis Period (min) 15

***2025 BASE CONDITIONS  
WITH IMPROVEMENTS***



2: S. Whitford Road/N. Whitford Road & Lincoln Highway  
With Improvements

2025 Base Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	226	726	159	149	687	135	201	388	140	85	273	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	13	11	11	13	10	12	14	10	12	14
Grade (%)		-1%			1%			3%			2%	
Storage Length (ft)	775		0	350		200	300		150	200		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	75			75			75			75		
Satd. Flow (prot)	1588	3267	0	1537	3225	1527	1556	1755	1531	1580	1747	1569
Flt Permitted	0.239			0.218			0.334			0.243		
Satd. Flow (perm)	400	3267	0	353	3225	1527	547	1755	1531	404	1747	1569
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		24							155			155
Link Speed (mph)		45			45			40				40
Link Distance (ft)		1619			1597			896				555
Travel Time (s)		24.5			24.2			15.3				9.5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	1%	2%	4%	7%	2%	3%	1%	1%	5%	0%	2%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	231	903	0	152	701	138	205	396	143	87	279	85
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	15.0		3.0	15.0	15.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	10.0	22.0		10.0	22.0	22.0	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	13.0	47.0		13.0	47.0	47.0	16.0	47.0	47.0	13.0	44.0	44.0
Total Split (%)	10.8%	39.2%		10.8%	39.2%	39.2%	13.3%	39.2%	39.2%	10.8%	36.7%	36.7%
Yellow Time (s)	4.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	6.0		6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	62.5	49.6		51.0	44.0	44.0	44.4	33.4	33.4	38.3	30.4	30.4
Actuated g/C Ratio	0.52	0.41		0.42	0.37	0.37	0.37	0.28	0.28	0.32	0.25	0.25
v/c Ratio	0.67	0.66		0.69	0.59	0.25	0.69	0.81	0.27	0.42	0.63	0.17
Control Delay	31.2	31.8		38.2	34.1	29.2	38.7	53.3	4.8	24.7	41.6	1.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Total Delay	31.2	31.8		38.2	34.1	29.2	38.7	54.0	4.8	24.7	41.6	1.9
LOS	C	C		D	C	C	D	D	A	C	D	A
Approach Delay		31.6			34.1			40.4			30.9	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	95	286		61	238	77	110	285	0	41	210	2
Queue Length 95th (ft)	#253	406		#141	305	130	153	368	37	63	237	10
Internal Link Dist (ft)		1539			1517			816			475	
Turn Bay Length (ft)	775			350		200	300		150	200		

2: S. Whitford Road/N. Whitford Road & Lincoln Highway  
With Improvements

2025 Base Conditions  
Timing Plan: PM Peak

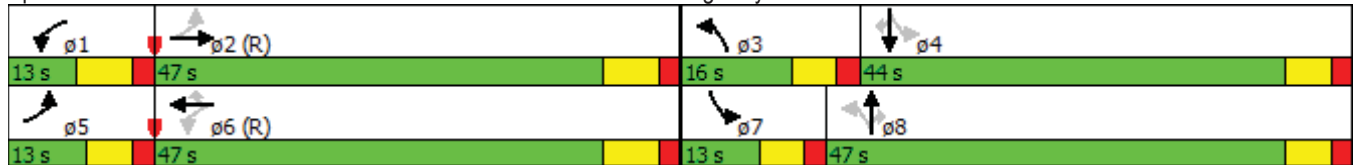


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	343	1365		219	1181	559	295	614	636	207	567	614
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	58	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.66		0.69	0.59	0.25	0.69	0.71	0.22	0.42	0.49	0.14

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 14 (12%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81  
 Intersection Signal Delay: 34.2  
 Intersection LOS: C  
 Intersection Capacity Utilization 80.5%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 2: S. Whitford Road/N. Whitford Road & Lincoln Highway



8: N. Whitford Road & Private Drive/Waterloo Boulevard  
With Improvements

2025 Base Conditions

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	48	0	217	72	197	0	585	176	90	354	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	11	12	11	12	12	12	10	10	12
Grade (%)		0%			2%			-1%			0%	
Storage Length (ft)	0		0	0		300	0		0	150		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			75		
Satd. Flow (prot)	1676	1765	0	1636	1747	1464	1774	1728	0	1596	1595	0
Flt Permitted	0.707			0.724						0.145		
Satd. Flow (perm)	1248	1765	0	1247	1747	1464	1774	1728	0	244	1595	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						210		13				14
Link Speed (mph)		25			35			30				30
Link Distance (ft)		252			1052			555				719
Travel Time (s)		6.9			20.5			12.6				16.3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	2%	1%	1%	0%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	190	51	0	231	77	210	0	809	0	96	497	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		4	6			2		
Detector Phase	8	8		4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0	3.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	11.0	26.0		11.0	35.0	
Total Split (s)	64.0	64.0		64.0	64.0	64.0	13.0	43.0		13.0	43.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%	53.3%	10.8%	35.8%		10.8%	35.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	30.0	30.0		30.0	30.0	30.0		67.2		80.0	80.0	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25		0.56		0.67	0.67	
v/c Ratio	0.61	0.12		0.74	0.18	0.40		0.83		0.38	0.47	
Control Delay	46.9	31.8		54.8	33.4	6.2		28.8		13.4	12.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0		1.9		0.0	0.0	
Total Delay	46.9	31.8		54.8	33.4	6.2		30.7		13.4	12.7	
LOS	D	C		D	C	A		C		B	B	
Approach Delay		43.7			32.0			30.7			12.8	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	131	31		166	47	0		250		24	164	
Queue Length 95th (ft)	184	55		226	76	52		#924		59	321	
Internal Link Dist (ft)		172			972			475			639	
Turn Bay Length (ft)						300				150		

8: N. Whitford Road & Private Drive/Waterloo Boulevard  
With Improvements

2025 Base Conditions

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	613	867		613	858	826		973		252	1067	
Starvation Cap Reductn	0	0		0	0	0		68		0	0	
Spillback Cap Reductn	0	0		0	0	0		0		0	0	
Storage Cap Reductn	0	0		0	0	0		0		0	0	
Reduced v/c Ratio	0.31	0.06		0.38	0.09	0.25		0.89		0.38	0.47	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 94 (78%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 27.5

Intersection LOS: C

Intersection Capacity Utilization 80.9%

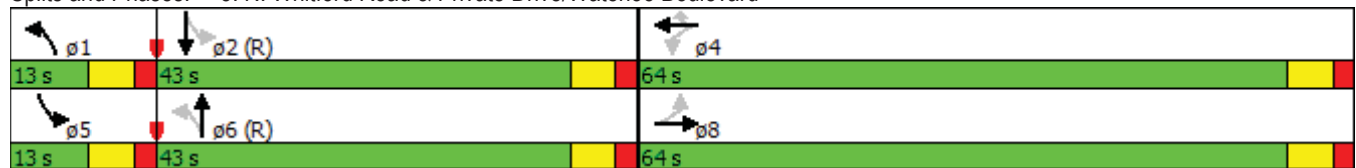
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: N. Whitford Road & Private Drive/Waterloo Boulevard



***2025 PROJECTED CONDITIONS***



1: Ship Road & Lincoln Highway

2025 Projected Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	611	218	181	1005	215	304	598	123	75	322	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12	10	10	14	12	14	12
Grade (%)		0%			0%			-2%			0%	
Storage Length (ft)	80		0	175		0	200		175	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	50			0			25			25		
Satd. Flow (prot)	1711	1790	0	1711	1814	0	1668	1756	1706	0	1941	0
Flt Permitted	0.108			0.108			0.398				0.399	
Satd. Flow (perm)	194	1790	0	194	1814	0	699	1756	1706	0	781	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		658			2674			707			702	
Travel Time (s)		10.0			40.5			12.1			12.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	882	0	193	1298	0	323	636	131	0	475	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Detector Phase	2	2		6	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	26.0	26.0		26.0	26.0		3.0	3.0	3.0	3.0	3.0	
Minimum Split (s)	32.0	32.0		32.0	32.0		8.0	8.0	8.0	8.0	8.0	
Total Split (s)	43.0	43.0		43.0	43.0		37.0	37.0	37.0	37.0	37.0	
Total Split (%)	53.8%	53.8%		53.8%	53.8%		46.3%	46.3%	46.3%	46.3%	46.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None	None	None	None	
Act Effct Green (s)	37.0	37.0		37.0	37.0		32.0	32.0	32.0		32.0	
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.40	0.40	0.40		0.40	
v/c Ratio	1.19	1.07		2.17	1.55		1.16	0.91	0.19		1.52	
Control Delay	183.7	74.3		580.7	275.6		130.3	41.9	16.6		274.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	183.7	74.3		580.7	275.6		130.3	41.9	16.6		274.9	
LOS	F	E		F	F		F	D	B		F	
Approach Delay		86.1			315.1			65.1			274.9	
Approach LOS		F			F			E			F	
Queue Length 50th (ft)	~65	~494		~156	~928		~194	291	41		~337	
Queue Length 95th (ft)	#120	#713		#243	#1169		#348	#498	78		#515	
Internal Link Dist (ft)		578			2594			627			622	
Turn Bay Length (ft)	80			175			200		175			
Base Capacity (vph)	89	827		89	838		279	702	682		312	

1: Ship Road & Lincoln Highway

2025 Projected Conditions

Timing Plan: PM Peak

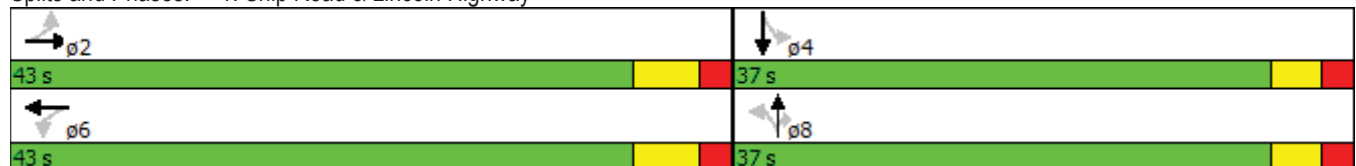


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	1.19	1.07		2.17	1.55		1.16	0.91	0.19		1.52	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	2.17
Intersection Signal Delay:	187.0
Intersection LOS:	F
Intersection Capacity Utilization	161.5%
ICU Level of Service	H
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 1: Ship Road & Lincoln Highway



2: S. Whitford Road/N. Whitford Road & Lincoln Highway

2025 Projected Conditions

Timing Plan: PM Peak

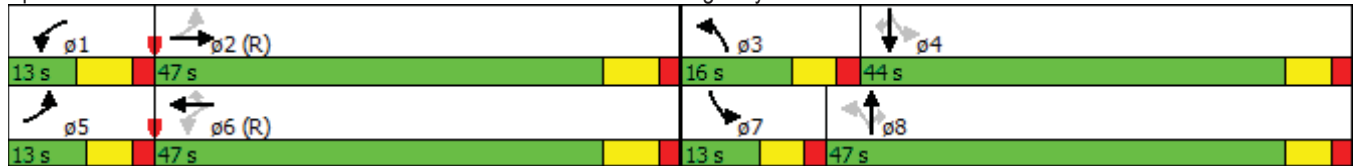
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	244	834	207	211	855	167	248	435	217	112	300	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	13	11	11	13	10	12	14	10	12	14
Grade (%)		-1%			1%			3%			2%	
Storage Length (ft)	775		0	350		200	300		150	200		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	75			75			75			75		
Satd. Flow (prot)	1588	3256	0	1537	3225	1527	1556	1755	1531	1580	1747	1569
Flt Permitted	0.141			0.133			0.321			0.205		
Satd. Flow (perm)	236	3256	0	215	3225	1527	526	1755	1531	341	1747	1569
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		28							161			155
Link Speed (mph)		45			45			40				40
Link Distance (ft)		1619			1597			896				555
Travel Time (s)		24.5			24.2			15.3				9.5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	1%	2%	4%	7%	2%	3%	1%	1%	5%	0%	2%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	249	1062	0	215	872	170	253	444	221	114	306	90
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	15.0		3.0	15.0	15.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	10.0	22.0		10.0	22.0	22.0	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	13.0	47.0		13.0	47.0	47.0	16.0	47.0	47.0	13.0	44.0	44.0
Total Split (%)	10.8%	39.2%		10.8%	39.2%	39.2%	13.3%	39.2%	39.2%	10.8%	36.7%	36.7%
Yellow Time (s)	4.0	5.0		5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	6.0		6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	59.3	47.1		48.0	41.0	41.0	46.9	35.9	35.9	40.9	32.9	32.9
Actuated g/C Ratio	0.49	0.39		0.40	0.34	0.34	0.39	0.30	0.30	0.34	0.27	0.27
v/c Ratio	0.91	0.82		1.32	0.79	0.33	0.85	0.85	0.39	0.57	0.64	0.17
Control Delay	61.7	39.2		204.2	42.0	31.5	51.6	54.4	11.0	32.8	42.3	3.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	5.6	0.0	0.0	0.0	0.0
Total Delay	61.7	39.2		204.2	42.0	31.5	51.6	59.9	11.0	32.8	42.3	3.4
LOS	E	D		F	D	C	D	E	B	C	D	A
Approach Delay		43.5			68.3			45.9				33.3
Approach LOS		D			E			D				C
Queue Length 50th (ft)	115	379		~155	318	97	135	319	33	54	177	3
Queue Length 95th (ft)	#351	#548		#314	400	157	#218	424	92	106	253	m17
Internal Link Dist (ft)		1539			1517			816				475
Turn Bay Length (ft)	775			350		200	300		150	200		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	275	1294		163	1101	521	299	614	640	199	567	614
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	117	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.82		1.32	0.79	0.33	0.85	0.89	0.35	0.57	0.54	0.15

**Intersection Summary**

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 14 (12%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.32  
 Intersection Signal Delay: 50.5 Intersection LOS: D  
 Intersection Capacity Utilization 93.2% ICU Level of Service F  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: S. Whitford Road/N. Whitford Road & Lincoln Highway



3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road

2025 Projected Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	0	66	2	0	6	61	808	2	6	662	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	14	12	10	11	12	10	12	12
Grade (%)		0%			0%			-1%				2%
Storage Length (ft)	0		0	0		0	115		0	150		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			75		
Satd. Flow (prot)	0	1790	0	0	1800	0	1693	1846	0	1619	1776	0
Flt Permitted		0.768			0.920		0.083			0.175		
Satd. Flow (perm)	0	1429	0	0	1676	0	148	1846	0	298	1776	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			39							50
Link Speed (mph)		35			25			40				40
Link Distance (ft)		750			406			850				1787
Travel Time (s)		14.6			11.1			14.5				30.5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	0%	0%	0%	0%	0%	0%	0%	3%	0%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	324	0	0	8	0	66	871	0	6	1036	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6				2
Permitted Phases	8			4			6			2		
Detector Phase	8	8		4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		26.0	26.0		26.0	26.0	
Total Split (s)	27.0	27.0		27.0	27.0		57.0	57.0		57.0	57.0	
Total Split (%)	32.1%	32.1%		32.1%	32.1%		67.9%	67.9%		67.9%	67.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		19.3			19.3		48.2	48.2		48.2	48.2	
Actuated g/C Ratio		0.24			0.24		0.60	0.60		0.60	0.60	
v/c Ratio		0.86			0.02		0.74	0.78		0.03	0.95	
Control Delay		50.1			0.1		63.9	18.2		7.3	33.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		50.1			0.1		63.9	18.2		7.3	33.0	
LOS		D			A		E	B		A	C	
Approach Delay		50.1			0.1			21.4			32.9	
Approach LOS		D			A			C			C	
Queue Length 50th (ft)		144			0		22	309		1	439	
Queue Length 95th (ft)		#288			0		#104	478		6	#766	
Internal Link Dist (ft)		670			326			770			1707	
Turn Bay Length (ft)							115			150		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		410			476		95	1196		192	1168	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.79			0.02		0.69	0.73		0.03	0.89	

**Intersection Summary**

Area Type:	Other
Cycle Length:	84
Actuated Cycle Length:	79.7
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.95
Intersection Signal Delay:	30.5
Intersection LOS:	C
Intersection Capacity Utilization	86.9%
ICU Level of Service	E
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road



4: Phoenixville Pike/Dunwoody Drive & King Road

2025 Projected Conditions





















Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	276	45	401	468	8	49	10	163	5	7	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			-2%			0%			-6%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	3	303	49	441	514	9	54	11	179	5	8	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	523			353			1743	1739	328	1805	1759	519
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	523			353			1743	1739	328	1805	1759	519
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			64			0	80	75	81	86	98
cM capacity (veh/h)	1054			1212			43	56	716	29	55	529
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>						
Volume Total	3	353	441	523	244	22						
Volume Left	3	0	441	0	54	5						
Volume Right	0	49	0	9	179	9						
cSH	1054	1700	1212	1700	152	63						
Volume to Capacity	0.00	0.21	0.36	0.31	1.60	0.35						
Queue Length 95th (ft)	0	0	42	0	422	32						
Control Delay (s)	8.4	0.0	9.7	0.0	352.7	90.0						
Lane LOS	A		A		F	F						
Approach Delay (s)	0.1		4.4		352.7	90.0						
Approach LOS					F	F						
<b>Intersection Summary</b>												
Average Delay			58.2									
Intersection Capacity Utilization			58.3%		ICU Level of Service				B			
Analysis Period (min)			15									

4: Phoenixville Pike/Dunwoody Drive & King Road













2025 Projected Conditions

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	276	45	401	468	8	49	10	163	5	7	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	11	11	12	12	11	10	12	16	12
Grade (%)		0%			-2%			0%			-6%	
Storage Length (ft)	110		0	100		0	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	50			50			25			25		
Satd. Flow (prot)	1685	1837	0	1745	1831	0	0	1734	1492	0	1938	0
Flt Permitted	0.950			0.950				0.960			0.989	
Satd. Flow (perm)	1685	1837	0	1745	1831	0	0	1734	1492	0	1938	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		576			448			978			349	
Travel Time (s)		11.2			8.7			16.7			5.9	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	1%	3%	1%	1%	0%	2%	0%	1%	0%	0%	17%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	352	0	441	523	0	0	65	179	0	22	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.3%
ICU Level of Service	B
Analysis Period (min)	15

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	203	247	831	233	335	777
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	12	13	10	13
Grade (%)	-2%		-2%			-2%
Storage Length (ft)	150	150		165	225	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25				75	
Satd. Flow (prot)	1547	1636	1881	1636	1685	1944
Flt Permitted	0.950				0.088	
Satd. Flow (perm)	1547	1636	1881	1636	156	1944
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		252		183		
Link Speed (mph)	30		40			40
Link Distance (ft)	882		1787			468
Travel Time (s)	20.0		30.5			8.0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	10%	3%	2%	3%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	207	252	848	238	342	793
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	3.0	3.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.0	9.0	21.0	21.0	9.0	22.0
Total Split (s)	23.0	23.0	54.0	54.0	13.0	67.0
Total Split (%)	25.6%	25.6%	60.0%	60.0%	14.4%	74.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	15.7	15.7	42.7	42.7	55.9	55.9
Actuated g/C Ratio	0.19	0.19	0.51	0.51	0.67	0.67
v/c Ratio	0.72	0.49	0.88	0.26	1.47	0.61
Control Delay	48.5	8.1	30.9	3.8	253.7	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.5	8.1	30.9	3.8	253.7	10.3
LOS	D	A	C	A	F	B
Approach Delay	26.3		25.0			83.7
Approach LOS	C		C			F
Queue Length 50th (ft)	111	0	386	14	~219	214
Queue Length 95th (ft)	#209	62	#639	49	#389	314
Internal Link Dist (ft)	802		1707			388
Turn Bay Length (ft)	150	150		165	225	

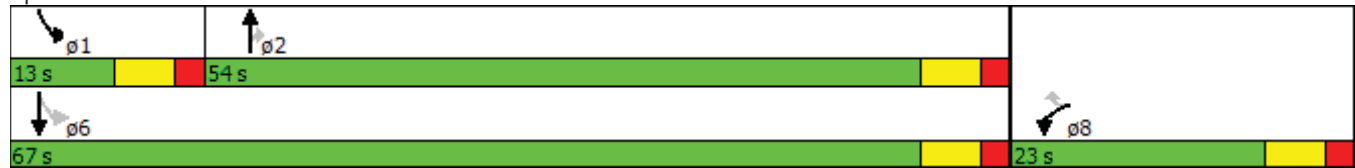


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Base Capacity (vph)	318	536	1092	1026	233	1434
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.47	0.78	0.23	1.47	0.55

**Intersection Summary**

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 83.7  
 Natural Cycle: 90  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 1.47  
 Intersection Signal Delay: 50.1  
 Intersection LOS: D  
 Intersection Capacity Utilization 88.5%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 6: S. Whitford Road & Commerce Drive



7: Springdale Drive & Lincoln Highway

2025 Projected Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	821	60	41	1322	18	84	0	233	83	0	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	10	12	12	12	12	12	12	16	12
Grade (%)		1%			-1%			0%			0%	
Storage Length (ft)	125		200	150		0	0		125	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	50			50			25			25		
Satd. Flow (prot)	1736	1853	1607	1693	1869	0	0	1787	1583	0	1926	0
Flt Permitted	0.075			0.159				0.400			0.856	
Satd. Flow (perm)	137	1853	1607	283	1869	0	0	752	1583	0	1676	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			106		2				256			120
Link Speed (mph)		45			45			25				25
Link Distance (ft)		2674			1145			679				258
Travel Time (s)		40.5			17.3			18.5				7.0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	2%	0%	0%	2%	0%	1%	0%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	902	66	45	1473	0	0	92	256	0	279	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6		5	2			4				8
Permitted Phases	6		6	2			4		4	8		
Detector Phase	6	6	6	5	2		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	3.0	15.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Split (s)	21.0	21.0	21.0	9.0	21.0		8.0	8.0	8.0	8.0	8.0	8.0
Total Split (s)	50.0	50.0	50.0	17.0	67.0		15.0	15.0	15.0	15.0	15.0	15.0
Total Split (%)	61.0%	61.0%	61.0%	20.7%	81.7%		18.3%	18.3%	18.3%	18.3%	18.3%	18.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	None
Act Effct Green (s)	53.6	53.6	53.6	61.0	61.0			10.0	10.0		10.0	
Actuated g/C Ratio	0.65	0.65	0.65	0.74	0.74			0.12	0.12		0.12	
v/c Ratio	0.42	0.75	0.06	0.14	1.06			1.01	0.61		0.90	
Control Delay	28.5	16.5	0.7	3.8	55.4			138.7	11.8		54.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	28.5	16.5	0.7	3.8	55.4			138.7	11.8		54.1	
LOS	C	B	A	A	E			F	B		D	
Approach Delay		15.9			53.8			45.3			54.1	
Approach LOS		B			D			D			D	
Queue Length 50th (ft)	10	330	0	5	~845			~48	0		81	
Queue Length 95th (ft)	#57	#552	7	12	#1099			#142	65		#225	
Internal Link Dist (ft)		2594			1065			599			178	
Turn Bay Length (ft)	125		200	150					125			

7: Springdale Drive & Lincoln Highway

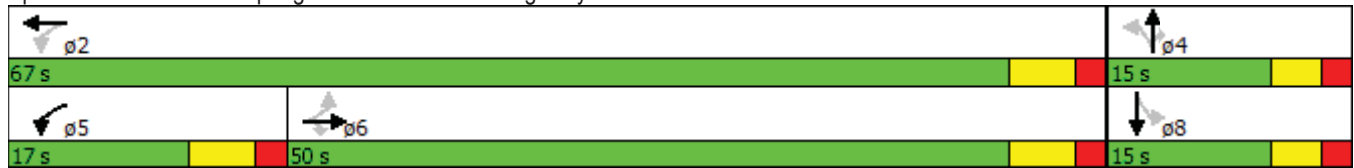
2025 Projected Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	89	1210	1086	399	1390			91	417		309	
Starvation Cap Reductn	0	0	0	0	0			0	0		0	
Spillback Cap Reductn	0	0	0	0	0			0	0		0	
Storage Cap Reductn	0	0	0	0	0			0	0		0	
Reduced v/c Ratio	0.42	0.75	0.06	0.11	1.06			1.01	0.61		0.90	

Intersection Summary	
Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	82
Natural Cycle:	120
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.06
Intersection Signal Delay:	40.8
Intersection LOS:	D
Intersection Capacity Utilization	101.6%
ICU Level of Service	G
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 7: Springdale Drive & Lincoln Highway



8: N. Whitford Road & Private Drive/Waterloo Boulevard

2025 Projected Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	191	71	24	235	95	200	34	624	210	91	371	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	11	12	11	12	12	12	10	10	12
Grade (%)		0%			2%			-1%			0%	
Storage Length (ft)	0		0	0		300	0		0	150		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			75		
Satd. Flow (prot)	1676	1706	0	1636	1747	1464	1685	1723	0	1596	1592	0
Flt Permitted	0.689			0.687			0.362			0.072		
Satd. Flow (perm)	1216	1706	0	1183	1747	1464	642	1723	0	121	1592	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20				213		15			15	
Link Speed (mph)		25			35			30			30	
Link Distance (ft)		252			1052			555			719	
Travel Time (s)		6.9			20.5			12.6			16.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	2%	1%	1%	0%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	203	102	0	250	101	213	36	887	0	97	528	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		4	6			2		
Detector Phase	8	8		4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0	3.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	11.0	26.0		11.0	35.0	
Total Split (s)	64.0	64.0		64.0	64.0	64.0	13.0	43.0		13.0	43.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%	53.3%	10.8%	35.8%		10.8%	35.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	33.3	33.3		33.3	33.3	33.3	71.2	63.8		73.8	69.0	
Actuated g/C Ratio	0.28	0.28		0.28	0.28	0.28	0.59	0.53		0.62	0.58	
v/c Ratio	0.60	0.21		0.76	0.21	0.38	0.08	0.96		0.57	0.57	
Control Delay	43.7	24.9		53.6	31.7	5.5	14.0	45.1		30.4	22.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	17.7		0.0	0.0	
Total Delay	43.7	24.9		53.6	31.7	5.5	14.0	62.9		30.4	22.7	
LOS	D	C		D	C	A	B	E		C	C	
Approach Delay		37.4			31.5			61.0			23.9	
Approach LOS		D			C			E			C	
Queue Length 50th (ft)	137	48		178	60	0	11	677		27	264	
Queue Length 95th (ft)	187	80		238	91	49	m21	m#1081		#99	482	
Internal Link Dist (ft)		172			972			475			639	
Turn Bay Length (ft)						300				150		

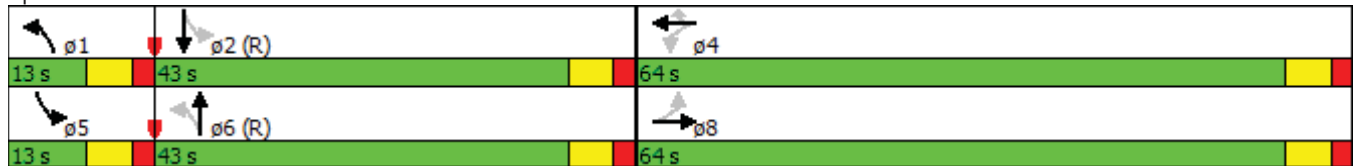


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	597	848		581	858	828	453	923		172	921	
Starvation Cap Reductn	0	0		0	0	0	0	67		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.34	0.12		0.43	0.12	0.26	0.08	1.04		0.56	0.57	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 94 (78%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.96  
 Intersection Signal Delay: 41.5  
 Intersection LOS: D  
 Intersection Capacity Utilization 86.4%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: N. Whitford Road & Private Drive/Waterloo Boulevard



10: Old Phoenixville Pike/Phoenixville Pike & King Road

2025 Projected Conditions



















Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	140	309	8	2	532	63	5	7	1	104	15	327
Sign Control		Free			Free			Stop			Stop	
Grade		1%			-1%			0%			-1%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	149	329	9	2	566	67	5	7	1	111	16	348
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	633			337			1590	1268	333	1235	1239	599
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	633			337			1590	1268	333	1235	1239	599
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	84			100			76	95	100	12	89	31
cM capacity (veh/h)	960			1233			22	143	713	125	149	503
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2						
Volume Total	149	337	635	14	111	364						
Volume Left	149	0	2	5	111	0						
Volume Right	0	9	67	1	0	348						
cSH	960	1700	1233	47	125	456						
Volume to Capacity	0.16	0.20	0.00	0.30	0.88	0.80						
Queue Length 95th (ft)	14	0	0	25	140	182						
Control Delay (s)	9.4	0.0	0.0	111.6	117.6	37.5						
Lane LOS	A		A	F	F	E						
Approach Delay (s)	2.9		0.0	111.6	56.2							
Approach LOS				F	F							
<b>Intersection Summary</b>												
Average Delay			18.4									
Intersection Capacity Utilization			79.7%		ICU Level of Service					D		
Analysis Period (min)			15									

10: Old Phoenixville Pike/Phoenixville Pike & King Road

2025 Projected Conditions

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	309	8	2	532	63	5	7	1	104	15	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	12	11	12	12	11	12	10	11	12
Grade (%)		1%			-1%			0%			-1%	
Storage Length (ft)	110		0	0		0	0		0	110		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Satd. Flow (prot)	1676	1785	0	0	1787	0	0	1784	0	1553	1567	0
Flt Permitted	0.950							0.981		0.950		
Satd. Flow (perm)	1676	1785	0	0	1787	0	0	1784	0	1553	1567	0
Link Speed (mph)		35			35			25			40	
Link Distance (ft)		448			248			953			864	
Travel Time (s)		8.7			4.8			26.0			14.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	0%	0%	1%	9%	0%	0%	0%	9%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	338	0	0	635	0	0	13	0	111	364	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 79.7% ICU Level of Service D

Analysis Period (min) 15

***2025 PROJECTED CONDITIONS  
WITH IMPROVEMENTS***



1: Ship Road & Lincoln Highway  
With Ship Road One-Way Couple

2025 Projected Conditions

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	611	0	0	1186	215	304	598	123	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12	10	10	14	12	14	12
Grade (%)		0%			0%			-2%			0%	
Storage Length (ft)	100		0	175		150	200		175	0		0
Storage Lanes	1		0	0		0	1		1	0		0
Taper Length (ft)	50			0			25		25			
Satd. Flow (prot)	1711	3539	0	0	3458	0	1668	3336	1706	0	0	0
Flt Permitted	0.069						0.950					
Satd. Flow (perm)	124	3539	0	0	3458	0	1668	3336	1706	0	0	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		461			2674			707			502	
Travel Time (s)		7.0			40.5			12.1			8.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	650	0	0	1491	0	323	636	131	0	0	0
Turn Type	pm+pt	NA			NA		Perm	NA	Perm			
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8			
Detector Phase	5	2			6		8	8	8			
Switch Phase												
Minimum Initial (s)	4.0	26.0			26.0		3.0	3.0	3.0			
Minimum Split (s)	13.0	32.0			32.0		8.0	8.0	8.0			
Total Split (s)	14.0	76.0			62.0		44.0	44.0	44.0			
Total Split (%)	11.7%	63.3%			51.7%		36.7%	36.7%	36.7%			
Yellow Time (s)	4.0	4.0			4.0		3.0	3.0	3.0			
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)	6.0	6.0			6.0		5.0	5.0	5.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Recall Mode	None	C-Max			C-Max		None	None	None			
Act Effct Green (s)	78.2	78.2			64.7		30.8	30.8	30.8			
Actuated g/C Ratio	0.65	0.65			0.54		0.26	0.26	0.26			
v/c Ratio	0.59	0.28			0.80		0.75	0.74	0.30			
Control Delay	49.5	2.3			27.9		52.1	46.1	36.3			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	49.5	2.3			27.9		52.1	46.1	36.3			
LOS	D	A			C		D	D	D			
Approach Delay		8.9			27.9			46.7				
Approach LOS		A			C			D				
Queue Length 50th (ft)	34	27			472		233	240	82			
Queue Length 95th (ft)	m77	35			#719		309	277	126			
Internal Link Dist (ft)		381			2594			627			422	
Turn Bay Length (ft)	100						200		175			
Base Capacity (vph)	186	2305			1863		542	1084	554			

1: Ship Road & Lincoln Highway  
With Ship Road One-Way Couple

2025 Projected Conditions

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	0.57	0.28			0.80		0.60	0.59	0.24			

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 29.7  
 Intersection LOS: C  
 Intersection Capacity Utilization 76.2%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Ship Road & Lincoln Highway



5: Lincoln Highway  
With Ship Road One-Way Couple

2025 Projected Conditions

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑					↖	↑	
Volume (vph)	0	711	218	181	1490	0	0	0	0	75	322	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	100		0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (ft)	25			75			25			75		
Satd. Flow (prot)	0	3415	0	1770	3539	0	0	0	0	1770	1825	0
Flt Permitted				0.167						0.950		
Satd. Flow (perm)	0	3415	0	311	3539	0	0	0	0	1770	1825	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43										6
Link Speed (mph)		45			30			30				30
Link Distance (ft)		882			461			1630				576
Travel Time (s)		13.4			10.5			37.0				13.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1010	0	197	1620	0	0	0	0	82	403	0
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		2		1	6							4
Permitted Phases				6						4		
Detector Phase		2		1	6					4		4
Switch Phase												
Minimum Initial (s)		4.0		4.0	4.0					4.0	4.0	
Minimum Split (s)		22.0		13.0	22.0					21.0	21.0	
Total Split (s)		57.0		26.0	83.0					37.0	37.0	
Total Split (%)		47.5%		21.7%	69.2%					30.8%	30.8%	
Yellow Time (s)		4.0		4.0	4.0					3.0	3.0	
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0	
Lost Time Adjust (s)		-1.0		-1.0	-1.0					-1.0	-1.0	
Total Lost Time (s)		5.0		5.0	5.0					4.0	4.0	
Lead/Lag		Lead		Lag								
Lead-Lag Optimize?		Yes		Yes								
Recall Mode		C-Max		None	C-Max					Max	Max	
Act Effct Green (s)		52.0		78.0	78.0					33.0	33.0	
Actuated g/C Ratio		0.43		0.65	0.65					0.28	0.28	
v/c Ratio		0.67		0.43	0.70					0.17	0.80	
Control Delay		28.6		13.5	8.7					34.3	52.8	
Queue Delay		0.0		0.0	0.5					0.0	0.0	
Total Delay		28.6		13.5	9.2					34.3	52.8	
LOS		C		B	A					C	D	
Approach Delay		28.6			9.7						49.7	
Approach LOS		C			A						D	
Queue Length 50th (ft)		310		38	174					48	286	
Queue Length 95th (ft)		385		m52	207					91	#437	
Internal Link Dist (ft)		802			381			1550			496	
Turn Bay Length (ft)				150						100		
Base Capacity (vph)		1504		457	2300					486	506	
Starvation Cap Reductn		0		0	283					0	0	
Spillback Cap Reductn		0		0	0					0	0	

5: Lincoln Highway  
With Ship Road One-Way Couple

2025 Projected Conditions  
Timing Plan: PM Peak

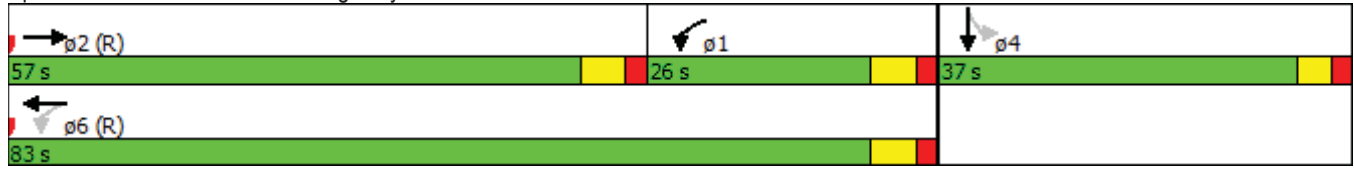


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0		0	0					0	0	
Reduced v/c Ratio		0.67		0.43	0.80					0.17	0.80	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 21.3  
 Intersection LOS: C  
 Intersection Capacity Utilization 76.2%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Lincoln Highway



2: S. Whitford Road/N. Whitford Road & Lincoln Highway  
With Improvements

2025 Projected Conditions  
Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	244	834	207	211	855	167	248	435	217	112	300	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	13	11	11	13	10	12	14	10	12	14
Grade (%)		-1%			1%			3%			2%	
Storage Length (ft)	775		0	350		200	300		150	200		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	75			75			75			75		
Satd. Flow (prot)	1588	3256	0	1537	3225	1527	1556	3335	1531	1580	3319	1569
Flt Permitted	0.233			0.124			0.311			0.486		
Satd. Flow (perm)	390	3256	0	201	3225	1527	510	3335	1531	808	3319	1569
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		29							221			255
Link Speed (mph)		45			45			40				40
Link Distance (ft)		1619			1597			1364				555
Travel Time (s)		24.5			24.2			23.3				9.5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	1%	2%	4%	7%	2%	3%	1%	1%	5%	0%	2%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	249	1062	0	215	872	170	253	444	221	114	306	90
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	15.0		3.0	15.0	15.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	10.0	22.0		10.0	22.0	22.0	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	13.0	50.0		21.0	58.0	58.0	22.0	36.0	36.0	13.0	27.0	27.0
Total Split (%)	10.8%	41.7%		17.5%	48.3%	48.3%	18.3%	30.0%	30.0%	10.8%	22.5%	22.5%
Yellow Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	6.0		5.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	63.0	49.8		68.2	52.7	52.7	39.1	26.1	26.1	25.4	17.4	17.4
Actuated g/C Ratio	0.52	0.42		0.57	0.44	0.44	0.33	0.22	0.22	0.21	0.14	0.14
v/c Ratio	0.76	0.78		0.76	0.62	0.25	0.81	0.61	0.44	0.51	0.64	0.20
Control Delay	34.0	35.1		37.5	28.4	22.8	53.6	45.9	7.6	37.8	54.4	0.9
Queue Delay	0.8	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	35.1		37.5	28.4	22.8	53.6	45.9	7.6	37.8	54.4	0.9
LOS	C	D		D	C	C	D	D	A	D	D	A
Approach Delay		35.1			29.2			38.8				41.3
Approach LOS		D			C			D				D
Queue Length 50th (ft)	89	365		84	271	82	157	164	0	57	128	0
Queue Length 95th (ft)	#240	484		#200	340	134	#248	210	61	m98	175	m0
Internal Link Dist (ft)		1539			1517			1284				475
Turn Bay Length (ft)	775			350		200	300		150	200		

2: S. Whitford Road/N. Whitford Road & Lincoln Highway  
With Improvements

2025 Projected Conditions

Timing Plan: PM Peak

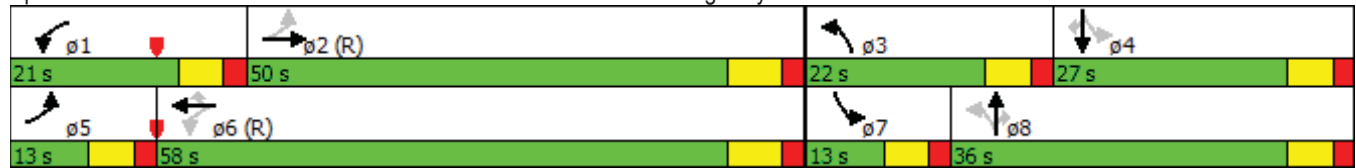


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	326	1369		293	1416	670	313	861	559	222	608	495
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	9	0		0	0	14	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.78		0.73	0.62	0.26	0.81	0.52	0.40	0.51	0.50	0.18

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 14 (12%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81  
 Intersection Signal Delay: 34.9  
 Intersection LOS: C  
 Intersection Capacity Utilization 84.4%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: S. Whitford Road/N. Whitford Road & Lincoln Highway



3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road  
With Improvements

2025 Projected Conditions  
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	↕
Volume (vph)	235	0	66	2	0	6	61	808	2	6	662	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	14	12	10	11	12	10	12	12
Grade (%)		0%			0%			-1%			2%	
Storage Length (ft)	0		0	0		0	115		0	150		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	25			25			75			75		
Satd. Flow (prot)	0	1790	0	0	1800	0	1693	1846	0	1619	1881	1552
Flt Permitted		0.768			0.926		0.244			0.132		
Satd. Flow (perm)	0	1429	0	0	1687	0	435	1846	0	225	1881	1552
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			36							324
Link Speed (mph)		35			25			40				40
Link Distance (ft)		750			406			850				1787
Travel Time (s)		14.6			11.1			14.5				30.5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	0%	0%	0%	0%	0%	0%	0%	3%	0%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	324	0	0	8	0	66	871	0	6	712	324
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		8			4			6				2
Permitted Phases	8			4			6			2		2
Detector Phase	8	8		4	4		6	6		2	2	2
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	9.0	9.0		9.0	9.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	37.0	37.0		37.0	37.0		53.0	53.0		53.0	53.0	53.0
Total Split (%)	41.1%	41.1%		41.1%	41.1%		58.9%	58.9%		58.9%	58.9%	58.9%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Act Effct Green (s)		21.0			21.0		40.8	40.8		40.8	40.8	40.8
Actuated g/C Ratio		0.28			0.28		0.55	0.55		0.55	0.55	0.55
v/c Ratio		0.76			0.02		0.28	0.86		0.05	0.69	0.32
Control Delay		34.4			0.0		14.4	26.2		11.0	17.5	2.3
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		34.4			0.0		14.4	26.2		11.0	17.5	2.3
LOS		C			A		B	C		B	B	A
Approach Delay		34.4			0.0			25.4			12.7	
Approach LOS		C			A			C			B	
Queue Length 50th (ft)		131			0		15	318		1	221	0
Queue Length 95th (ft)		228			0		51	#691		8	436	38
Internal Link Dist (ft)		670			326			770			1707	
Turn Bay Length (ft)							115			150		

3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road  
With Improvements

2025 Projected Conditions

Timing Plan: PM Peak

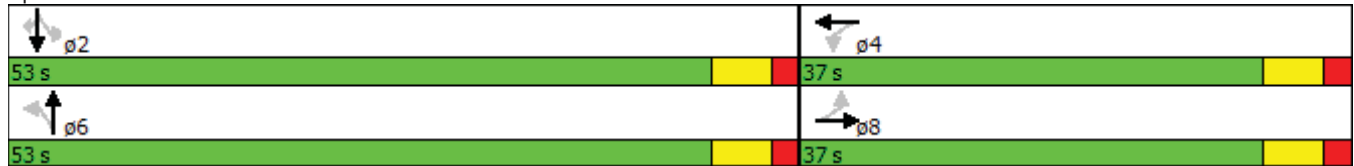


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		642			754		287	1218		148	1241	1134
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.50			0.01		0.23	0.72		0.04	0.57	0.29

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.3
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	20.9
Intersection LOS:	C
Intersection Capacity Utilization	84.4%
ICU Level of Service	E
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: S. Whitford Road & Clover Mill Road/E. Clover Mill Road



4: Phoenixville Pike/Dunwoody Drive & King Road  
With Improvements

2025 Projected Conditions  
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	276	45	401	468	8	49	10	163	5	7	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	11	11	12	12	11	10	12	16	12
Grade (%)		0%			-2%			0%				-6%
Storage Length (ft)	110		0	100		0	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	50			50			25			25		
Satd. Flow (prot)	1685	1837	0	1745	1831	0	0	1734	1492	0	1938	0
Flt Permitted	0.390			0.536				0.765			0.947	
Satd. Flow (perm)	692	1837	0	984	1831	0	0	1382	1492	0	1856	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			2				179			9
Link Speed (mph)		35			35			40				40
Link Distance (ft)		576			448			978				349
Travel Time (s)		11.2			8.7			16.7				5.9
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	1%	3%	1%	1%	0%	2%	0%	1%	0%	0%	17%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	352	0	441	523	0	0	65	179	0	22	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8		8	4		
Detector Phase	2	2		6	6		8	8	8	4		4
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0		4.0
Minimum Split (s)	22.0	22.0		22.0	22.0		22.0	22.0	22.0	22.0		22.0
Total Split (s)	38.0	38.0		38.0	38.0		22.0	22.0	22.0	22.0		22.0
Total Split (%)	63.3%	63.3%		63.3%	63.3%		36.7%	36.7%	36.7%	36.7%		36.7%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0			0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0			6.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max	Max	Max		Max
Act Effct Green (s)	32.0	32.0		32.0	32.0			16.0	16.0			16.0
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.27	0.27			0.27
v/c Ratio	0.01	0.36		0.84	0.54			0.18	0.34			0.04
Control Delay	6.7	8.8		23.5	8.2			18.5	5.4			13.0
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0			0.0
Total Delay	6.7	8.8		23.5	8.2			18.5	5.4			13.0
LOS	A	A		C	A			B	A			B
Approach Delay		8.8			15.2			8.9				13.0
Approach LOS		A			B			A				B
Queue Length 50th (ft)	1	62		64	70			18	0			4
Queue Length 95th (ft)	4	109		#288	132			45	39			18
Internal Link Dist (ft)		496			368			898				269
Turn Bay Length (ft)	110			100					80			

4: Phoenixville Pike/Dunwoody Drive & King Road  
With Improvements

2025 Projected Conditions  
Timing Plan: PM Peak

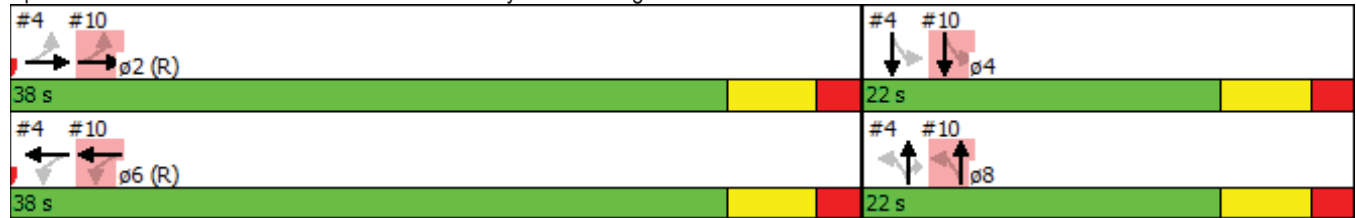


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	369	989		524	977			368	529		501	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.01	0.36		0.84	0.54			0.18	0.34		0.04	

Intersection Summary














Area Type: Other  
 Cycle Length: 60  
 Actuated Cycle Length: 60  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay: 12.8  
 Intersection LOS: B  
 Intersection Capacity Utilization 63.3%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 4: Phoenixville Pike/Dunwoody Drive & King Road



6: S. Whitford Road & Commerce Drive  
With Improvements

2025 Projected Conditions  
Timing Plan: PM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			
Volume (vph)	203	247	831	233	335	777
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	12	13	10	13
Grade (%)	-2%		-2%			-2%
Storage Length (ft)	150	150		165	225	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25				75	
Satd. Flow (prot)	1547	1636	3575	1636	1685	1944
Flt Permitted	0.950				0.163	
Satd. Flow (perm)	1547	1636	3575	1636	289	1944
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		252		238		
Link Speed (mph)	30		40			40
Link Distance (ft)	882		1787			1364
Travel Time (s)	20.0		30.5			23.3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	10%	3%	2%	3%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	207	252	848	238	342	793
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	3.0	3.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.0	9.0	21.0	21.0	9.0	22.0
Total Split (s)	26.0	26.0	36.0	36.0	28.0	64.0
Total Split (%)	28.9%	28.9%	40.0%	40.0%	31.1%	71.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	16.8	16.8	27.2	27.2	50.2	50.2
Actuated g/C Ratio	0.21	0.21	0.34	0.34	0.63	0.63
v/c Ratio	0.63	0.46	0.69	0.33	0.72	0.65
Control Delay	39.6	7.2	26.9	4.5	21.6	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.6	7.2	26.9	4.5	21.6	12.2
LOS	D	A	C	A	C	B
Approach Delay	21.8		22.0			15.1
Approach LOS	C		C			B
Queue Length 50th (ft)	99	0	198	0	92	234
Queue Length 95th (ft)	180	59	287	49	189	355
Internal Link Dist (ft)	802		1707			1284
Turn Bay Length (ft)	150	150		165	225	

6: S. Whitford Road & Commerce Drive  
With Improvements

2025 Projected Conditions  
Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Base Capacity (vph)	400	610	1387	780	580	1458
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.41	0.61	0.31	0.59	0.54

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	79.3
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	19.0
Intersection LOS:	B
Intersection Capacity Utilization	67.8%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 6: S. Whitford Road & Commerce Drive



8: N. Whitford Road & Private Drive/Waterloo Boulevard  
With Improvements

2025 Projected Conditions

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	191	71	24	235	95	200	34	624	210	91	371	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	11	12	11	12	12	12	10	10	12
Grade (%)		0%			2%			-1%			0%	
Storage Length (ft)	0		0	0		300	0		0	150		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			75		
Satd. Flow (prot)	1676	1706	0	1636	1747	1464	1685	1791	1522	1596	1592	0
Flt Permitted	0.692			0.517			0.350			0.219		
Satd. Flow (perm)	1221	1706	0	891	1747	1464	621	1791	1522	368	1592	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				213			205		19	
Link Speed (mph)		25			35			30			30	
Link Distance (ft)		252			1052			555			719	
Travel Time (s)		6.9			20.5			12.6			16.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	2%	1%	1%	0%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	203	102	0	250	101	213	36	664	223	97	528	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		
Detector Phase	3	8		7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	4.0	3.0		4.0	3.0	3.0	5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	13.0	11.0		13.0	11.0	11.0	11.0	26.0	26.0	11.0	35.0	
Total Split (s)	22.0	24.0		24.0	26.0	26.0	11.0	61.0	61.0	11.0	61.0	
Total Split (%)	18.3%	20.0%		20.0%	21.7%	21.7%	9.2%	50.8%	50.8%	9.2%	50.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	0.0	-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	6.0	5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	28.7	12.8		33.4	15.2	15.2	68.9	62.9	61.9	70.9	67.3	
Actuated g/C Ratio	0.24	0.11		0.28	0.13	0.13	0.57	0.52	0.52	0.59	0.56	
v/c Ratio	0.58	0.53		0.69	0.46	0.57	0.09	0.71	0.25	0.35	0.59	
Control Delay	39.8	54.0		44.8	54.7	12.5	6.4	24.2	4.9	14.1	22.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	
Total Delay	39.8	54.0		44.8	54.7	12.5	6.4	27.2	4.9	14.1	22.1	
LOS	D	D		D	D	B	A	C	A	B	C	
Approach Delay		44.5			34.4			21.0			20.8	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	124	67		158	74	0	3	418	60	29	273	
Queue Length 95th (ft)	182	120		226	126	69	m15	623	m92	59	432	
Internal Link Dist (ft)		172			972			475			639	
Turn Bay Length (ft)						300				150		

8: N. Whitford Road & Private Drive/Waterloo Boulevard  
With Improvements

2025 Projected Conditions

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	367	280		369	305	431	409	939	884	279	901	
Starvation Cap Reductn	0	0		0	0	0	0	175	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.55	0.36		0.68	0.33	0.49	0.09	0.87	0.25	0.35	0.59	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 27.0

Intersection LOS: C

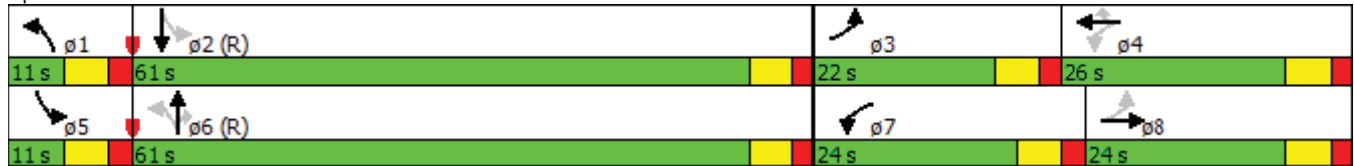
Intersection Capacity Utilization 72.9%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: N. Whitford Road & Private Drive/Waterloo Boulevard



10: Old Phoenixville Pike/Phoenixville Pike & King Road  
With Improvements

2025 Projected Conditions  
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	309	8	2	532	63	5	7	1	104	15	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	12	11	12	12	11	12	10	11	12
Grade (%)		1%			-1%			0%				-1%
Storage Length (ft)	110		0	0		0	0		0	110		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Satd. Flow (prot)	1676	1785	0	0	1787	0	0	1784	0	1553	1567	0
Flt Permitted	0.390				0.999			0.849		0.749		
Satd. Flow (perm)	688	1785	0	0	1785	0	0	1544	0	1225	1567	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			15			1				274
Link Speed (mph)		35			35			25				40
Link Distance (ft)		448			248			953				864
Travel Time (s)		8.7			4.8			26.0				14.7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	0%	0%	1%	9%	0%	0%	0%	9%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	338	0	0	635	0	0	13	0	111	364	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4		4
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
Minimum Split (s)	22.0	22.0		22.0	22.0		22.0	22.0		22.0		22.0
Total Split (s)	38.0	38.0		38.0	38.0		22.0	22.0		22.0		22.0
Total Split (%)	63.3%	63.3%		63.3%	63.3%		36.7%	36.7%		36.7%		36.7%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0			6.0			6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max		Max
Act Effct Green (s)	32.0	32.0			32.0			16.0		16.0		16.0
Actuated g/C Ratio	0.53	0.53			0.53			0.27		0.27		0.27
v/c Ratio	0.41	0.35			0.66			0.03		0.34		0.59
Control Delay	9.3	6.6			14.0			16.1		21.4		9.9
Queue Delay	0.0	0.0			0.0			0.0		0.0		0.0
Total Delay	9.3	6.6			14.0			16.1		21.4		9.9
LOS	A	A			B			B		C		A
Approach Delay		7.4			14.0			16.1				12.6
Approach LOS		A			B			B				B
Queue Length 50th (ft)	17	36			146			3		32		25
Queue Length 95th (ft)	43	76			248			14		71		93
Internal Link Dist (ft)		368			168			873				784
Turn Bay Length (ft)	110									110		

10: Old Phoenixville Pike/Phoenixville Pike & King Road  
With Improvements

2025 Projected Conditions  
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	366	953			959			412		326	618	
Starvation Cap Reductn	0	0			0			0		0	0	
Spillback Cap Reductn	0	0			0			0		0	0	
Storage Cap Reductn	0	0			0			0		0	0	
Reduced v/c Ratio	0.41	0.35			0.66			0.03		0.34	0.59	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	11.6
Intersection LOS:	B
Intersection Capacity Utilization	84.7%
ICU Level of Service	E
Analysis Period (min)	15

Splits and Phases: 10: Old Phoenixville Pike/Phoenixville Pike & King Road

