

Corridor Analysis

for

COUNTY LINE ROAD (S.R. 1001) CORRIDOR

located at

**Radnor Township & Lower Merion Township,
Delaware County & Montgomery County, PA**

File No. 16-11060-02

October 2018

Prepared For:

Radnor Township & Lower Merion Township

Prepared By:

Gilmore & Associates, Inc.

Engineers ♦ Land Surveyors ♦ Planners ♦ GIS Consultants

65 E. Butler Avenue

New Britain, PA 18901

215-345-4330



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES





TABLE OF CONTENTS

APPENDICES	ii
LIST OF FIGURES	ii
LIST OF TABLES	ii
EXECUTIVE SUMMARY	iii
<i>Corridor Improvements</i>	iii
<i>Intersection Improvements</i>	iii
I. INTRODUCTION AND BACKGROUND	1
<i>STUDY AREA</i>	1
II. EXISTING ROADWAY NETWORK	2
<i>FIELD OBSERVATIONS</i>	4
<i>SIGHT DISTANCE ANALYSIS</i>	4
<i>CRASH ANALYSIS</i>	5
III. EXISTING CONDITIONS	11
<i>LEVEL OF SERVICE ANALYSIS</i>	11
IV. PEDESTRIAN AND BICYCLE FACILITY EVALUATION	13
<i>PEDESTRIAN FACILITIES</i>	13
<i>BICYCLE FACILITIES</i>	15
V. RECOMMENDED IMPROVEMENTS	15



APPENDICES

Appendix A:	2018-08-23 Stakeholder's Meeting Minutes
Appendix B:	Sight Distance Evaluation
Appendix C:	Collision Diagrams
Appendix D:	Traffic Signal Warrant Analyses
Appendix E:	Existing Traffic Count Data
Appendix F:	Capacity Analysis Procedures
Appendix G:	Existing Traffic Signal Permit Plans
Appendix H:	Capacity Analysis Results
Appendix I:	Existing Level of Service and Delay
Appendix J:	Existing 95 th Percentile Queues
Appendix K:	Pedestrian and Vehicle Clearance Calculations
Appendix L:	PennDOT Traffic Information Repository Data

LIST OF FIGURES

Figure 1	Project Location Map
Figure 2A	Existing Conditions AM Peak Hour Traffic Volumes
Figure 2B	Existing Conditions PM Peak Hour Traffic Volumes
Figure 2C	Existing Conditions Saturday Midday Peak Hour Traffic Volumes
Figure 3A	Existing Conditions AM Peak Hour Levels of Service
Figure 3B	Existing Conditions PM Peak Hour Levels of Service
Figure 3C	Existing Conditions Midday Peak Hour Levels of Service
Figure 4A	Existing Conditions Conceptual Sketch
Figure 4B	Existing Conditions Conceptual Sketch
Figure 4C	Existing Conditions Conceptual Sketch
Figure 4D	Existing Conditions Conceptual Sketch
Figure 5A	Proposed Conceptual Sketch w/ Recommendations
Figure 5B	Proposed Conceptual Sketch w/ Recommendations
Figure 5C	Proposed Conceptual Sketch w/ Recommendations
Figure 5D	Proposed Conceptual Sketch w/ Recommendations
Figure 6A	AM Peak Hour Levels of Service w/ Improvements
Figure 6B	PM Peak Hour Levels of Service w/ Improvements
Figure 6C	Midday Peak Hour Levels of Service w/ Improvements

LIST OF TABLES

Table 1	Roadway Data Summary
Table 2	Crash Data
Table 3	Sight Distance
Table 4	Existing Roadway Deficiencies
Table 5	Level of Service Analysis w/ Implementation of Center Turn Lane
Table 6	95 th Percentile Queue Analysis w/ Implementation of Center Turn Lane
Table 7	Improvement Cost Summary



EXECUTIVE SUMMARY

Gilmore & Associates, Inc. (G&A) was retained by a cooperative effort between Radnor Township and Lower Merion Township to perform a transportation evaluation of traffic and pedestrian improvements along the County Line Road corridor from Lancaster Avenue (S.R. 0030) to Haverford Road (S.R. 1001) & County Line Road/ Landover Road (S.R. 1009). The County Line Road Corridor is a four-lane roadway that experiences heavy vehicular volumes as well as high pedestrian traffic due to the proximity of residential homes and apartments, the SEPTA Bryn Mawr Station, various restaurants and retail stores, the Bryn Mawr Hospital and the north/south movement of pedestrian traffic moving to and from the Lancaster Avenue (S.R. 0030) corridor. The report identifies improvements along the corridor to improve the traffic flow and overall safety for all roadway users. For purposes of this evaluation, County Line Road, Old Lancaster Road are considered north/south roadways and Lancaster Avenue, Conestoga Road and all other County Line Road cross-streets were considered east/west roadways. The posted 35 mile per hour speed limit compares favorably to the obtained 85th percentile speeds ranging from 33.6 to 42.7 miles per hour.

The following improvements were identified and recommended for the corridor study:

Corridor Improvements

- Provide speed limit signs at ½ mile increments along the corridor as required by Title 75 of the Pennsylvania Vehicle Code §3362(b)(1).
- Continue to restrict parking for a minimum of 50 feet in advance of all intersections.
- Provide upgraded pedestrian equipment at signalized intersections, as needed
- Implement a roadway diet and re-stripe the corridor between Arthur Road and Roberts Road from a four lane facility to three lane facility (two-way center left-turn lane with one (1) lane in each direction) with five foot bike lanes in both directions of travel
- Following implementation of a roadway diet from a four lane cross-section to a three lane cross-section, consider reducing the speed from 35 MPH to 25 MPH.
- Upgrade curb ramps at signalized and unsignalized intersections for ADA compliancy as needed
- Refresh pavement markings and pedestrian crossings throughout the corridor
- Construct a two-foot grass verge along the east side of County Line Road between Arthur Road and Montrose Avenue
- Upgrade pedestrian and vehicle clearance times at all signalized intersections as needed

Intersection Improvements

County Line Road and Lancaster Avenue

- Advanced warning signage for RED SIGNAL AHEAD



- Curve warning signage for both directions of travel near Arthur Road

County Line Road and Roberts Road

- Construct a traffic signal at the intersection of County Line Road and Roberts Road

County Line Road and Conestoga Road/Glenbrook Avenue

- Construct a dedicated left-turn lane along the westbound County Line Road approach at the intersection of Conestoga Road & Thomas Avenue/Glenbrook Avenue
- Implement signal timing adjustments at the intersection of County Line Road and Conestoga Road/Thomas Avenue/Glenbrook Avenue to improve the traffic flow on the major approaches

County Line Road and Old Lancaster Road

- Realign Old Lancaster Road between the northern and southern legs of the intersection to provide a safer through movement for vehicles

County Line Road and Bryn Mawr Avenue/Railroad Avenue

- Provide a dotted extension line between the northbound left-turn lane and the inside through lane
- Install a nearside traffic signal head for the northbound left turn lane

County Line Road and Landover Road/Haverford Road

- Provide advanced dilemma zone radar detection at the intersection of County Line Road/Haverford Road & Landover Road
- Provide an emergency pre-emption system

County Line Road and S. Warner Avenue/Old Lancaster Avenue

- Reduce the number of driveways servicing the shopping center opposite S. Warner Avenue and Old Lancaster Road

With the construction of the identified roadway improvements, it is anticipated the study corridor will experience a marked improvement in traffic flow and overall safety. In addition to the identified roadway improvements, areas to the north and south of the corridor were also studied for potential improvements and are noted in the report. Additional studies are required to further evaluate the issues encountered during this evaluation that were not included in this project scope and are as follows:

Lancaster Avenue and Montrose Avenue

- Install additional warning signage on Lancaster Avenue (both directions) in advance of the existing pedestrian crossing at Lancaster Avenue and Montrose Avenue

Conestoga Road and Montrose Avenue

- Construct missing sidewalk along the north side of Conestoga Road between Montrose Avenue and Roberts Road



- Install a crosswalk and pedestrian warning signs for pedestrians to cross Conestoga Road

DRAFT



I. INTRODUCTION AND BACKGROUND

A corridor analysis was performed along County Line Road (S.R. 1001) within Radnor and Lower Merion Townships in an effort to identify traffic and pedestrian improvements for providing a safer environment for both vehicular and pedestrian traffic. The 0.8 mile corridor lies along County Line Road (S.R. 1001) from the intersection of County Line Road (S.R. 1001) & Lancaster Avenue (S.R. 0030) to Haverford Road (S.R. 1001) & County Line Road/ Landover Road (S.R. 1009). For purposes of this evaluation, County Line Road was considered a north/south roadway and Lancaster Avenue, Montrose Avenue and all other County Line Road cross-streets were considered east/west roadways.

County Line Road (S.R. 1001) is a four-lane roadway that experiences heavy vehicular traffic. According to PennDOT's Traffic Information Repository (TIRe) system, the average daily traffic along the corridor varies from 19,260 near Mondella Avenue to 20,533 near County Line Road/Landover Road. Villanova University and access to I-476 via Lancaster Avenue (S.R. 0030) is within two miles of the study corridor. No significant development has occurred along the corridor; however, minor intersection improvements were implemented to mitigate traffic over the years. The report will identify potential improvements along the corridor to accommodate pedestrians and existing traffic volumes while considering stakeholders' concerns and known safety concerns. The report was conducted at a macro level; as such, improvements identified in this report have neither been designed nor fully engineered. Engineering, along with additional analyses, may be necessary prior to implementation of any subsequent improvements.

A meeting was scheduled on August 23, 2018 with Lower Merion Township and Radnor Township where all stakeholders were invited to voice their concerns for the area surrounding studied corridor. These concerns were taken into account throughout the course of this study and are summarized in **Appendix A**.

STUDY AREA

The following ten intersections were identified by Radnor and Lower Merion Townships for this comprehensive analysis:

1. County Line Road (S.R. 1001) & Lancaster Avenue (S.R. 0030)/ McDonalds Driveway
2. County Line Road (S.R. 1001) & Montrose Avenue
3. County Line Road (S.R. 1001) & Roberts Road
4. County Line Road (S.R. 1001) & Conestoga Road (S.R. 1019) & Thomas Avenue/ Glenbrook Avenue
5. County Line Road (S.R. 1001) & South Warner Avenue
6. County Line Road (S.R. 1001) & Old Lancaster Road
7. County Line Road (S.R. 1001) & Mondella Avenue
8. County Line Road (S.R. 1001) & Lindsay Avenue
9. County Line Road/ Haverford Road (S.R. 1001) & South Bryn Mawr Avenue (S.R. 1032/ S.R. 3038) & Railroad Avenue (S.R. 3047) & Glenbrook Avenue
10. County Line Road/ Haverford Road (S.R. 1001) & Landover Road (S.R. 1009)

A project location map is shown on **Figure 1**.



II. EXISTING ROADWAY NETWORK

County Line Road (S.R. 1001) is a four lane roadway with an approximate cartway width of 40 feet with four 10' travel lanes; two lanes in both directions, a right-of-way width that varies from 50-80 feet, and a posted speed limit of 35 miles per hour. Curb and pedestrian facilities exist along the entire corridor from Lancaster Avenue to Haverford Road/ Landover Road. A four foot sidewalk is provided along both sides of County Line Road. The corridor is approximately 0.8 miles with a mix of residential and commercial uses. A more detailed description of each study area intersection and existing pedestrian facilities is provided below. For purposes of this discussion, County Line Road is considered to run north/south.

Lancaster Avenue (S.R. 0030) & County Line Road (S.R. 1001)/ McDonald's Driveway

The intersection is signalized with a median island along the northbound County Line Road (S.R. 1001) approach. Lancaster Avenue (S.R. 0030) is a four lane roadway with 11 foot travel lanes and a posted speed limit of 25 miles per hour (MPH). Pedestrian facilities are provided for crossing all four legs of the intersection; however, the curb ramps do not appear to meet the latest ADA standards.

Montrose Avenue & County Line Road (S.R. 1001)

Montrose Avenue is stop controlled at County Line Road and provides access to an apartment complex, single family residential housing and commercial buildings. A varying cartway width of 21-28 feet is provided with sidewalk on both sides of Montrose Avenue with a posted speed limit of 25 mph. Curb ramps are provided to cross all legs of the intersection; however, the curb ramps do not appear to up to the latest ADA standards and no pedestrian crosswalks are present. Based on information from stakeholders, Montrose Avenue also serves as a connection between Conestoga Road and Lancaster Avenue with high volumes of cross traffic present at County Line Road. On-street parking is permitted on one side of the roadway.

S. Roberts Road & County Line Road (S.R. 1001)

S. Roberts Road is a two-lane roadway with a posted speed limit of 25 MPH that is stop controlled at County Line Road and provides access to single family residential homes. A cartway width of approximately 22 feet is provided with sidewalks along both sides of Roberts Road east of County Line Road. However, west of County Line Road, sidewalk is only provided on the north side. Pedestrian facilities are provided on all legs of the intersection with the exception of the southwest side of Roberts Road. No crosswalk pavement markings are present and all existing curb ramps do not appear to be up to the latest ADA standards.

Conestoga Road (S.R. 1019)/ Thomas Avenue/ Glenbrook Avenue & County Line Road (S.R. 1001) is a five-legged signalized intersection with ADA compliant pedestrian accommodations including push buttons, pedestrian countdown signals and curb ramps. Painted crosswalks are provided on all legs of the intersection with the exception of Conestoga Road west of Glenbrook Avenue where pedestrians are prohibited from crossing. Conestoga Road has a 26 foot cartway width and a posted speed limit of 35 miles per hour while Thomas Avenue and Glenbrook Avenue have a cartway width of 24 feet and a speed limit of 25 miles per hour. Glenbrook Avenue provides access to the Bryn Mawr SEPTA station and includes two directions of travel from County Line Road



to the SEPTA station where the road changes to one way northbound from County Line Road/S. Bryn Mawr Avenue intersection to the SEPTA station..

S. Warner Avenue & County Line Road (S.R. 1001)

S. Warner Avenue is a one-way roadway departing County Line Road in the eastbound direction towards Lancaster Avenue. The cartway width is 21 feet with a posted speed limit of 25 mph. Pedestrian facilities are provided on all legs of the intersection; however, the existing curb ramps appear to be non-compliant with current ADA standards and there are no marked pedestrian crosswalks.

Old Lancaster Road & County Line Road (S.R. 1001)

Old Lancaster Road is stop controlled at a skewed T-intersection with County Line Road. Old Lancaster Road has a posted speed limit of 30 MPH and provides a 28 foot cartway width with street parking on the south side of the roadway between County Line Road and Mondella Avenue. Sidewalks are provided on all legs of the intersection in addition it appears the curb ramps are non-compliant with current ADA standards for crossing Old Lancaster Road. Access to Bryn Mawr Hospital is provided from Old Lancaster Road.

Mondella Avenue & County Line Road (S.R. 1001)

Mondella Avenue intersects County Line Road at a stop-controlled T-intersection and provides a connection to Old Lancaster Road. The cartway width is 24 feet with street parking permitted on the southeast side of the street. Sidewalks are provided on all legs of the intersection and it appears the curb ramps are non-compliant with current ADA standards for crossing Mondella Avenue.

Lindsay Avenue & County Line Road (S.R. 1001)

Lindsay Avenue is a three-legged signalized intersection that provides access to Bryn Mawr Hospital. Pedestrians are currently only permitted to cross the northbound leg of County Line Road and the westbound leg of Lindsay Avenue via marked crosswalks, ADA compliant curb ramps, push buttons and pedestrian (hand/man) signals. The cartway width along Lindsay Avenue is 30 feet.

S. Bryn Mawr Avenue (S.R. 1032/ S.R. 3038)/ Haverford Road (S.R. 1001)/ W. Railroad Avenue (S.R. 3047)/ Glenbrook Avenue & County Line Road (S.R. 1001)

is a five-legged signalized intersection with ADA compliant pedestrian accommodations along all legs of the intersection. Railroad Avenue is a one-way road departing the intersection toward the southeast with a 24 foot cartway width and parking permitted on the southwest side of the street. Bryn Mawr Avenue is a two-lane road with a posted speed limit of 40 miles per hour to the west and 30 miles per hour to the east while County Line Road/Haverford Road has a posted speed limit of 35 miles per hour. The cartway width along Bryn Mawr Avenue varies from 28 feet to 47 feet. Glenbrook Avenue is a one-way road departing the intersection toward the northwest providing access to the Bryn Mawr SEPTA Station where the one-way road changes to two directions of travel and intersects County Line Road approximately 160 feet north of the S. Bryn Mawr Avenue/County Line Road intersection. The Glenbrook Avenue leg is incorporated in the signalized intersection. The cartway width along Glenbrook Avenue is 22 feet with parking permitted on the western side. Updated pedestrian accommodations are provided for crossing Glenbrook Avenue; however, pedestrians are restricted via signage from crossing County Line Road at this location.



Haverford Road & County Line Road/ Landover Road is a four-legged signalized intersection with ADA compliant curb ramps. However, updated pedestrian hand/man signals and push buttons are not currently provided at the intersection. Landover Road is a two lane road with a cartway width of 26 feet and a posted speed limit of 35 mph. Sidewalk is not present along Landover Road, and the sidewalk along the east side of County Line Road terminates just south of the intersection.

The existing roadway characteristics of the County Line Road corridor are summarized in **Table 1**. The posted 35 mile per hour speed limit compares favorably to the obtained 85th percentile speeds ranging from 33.6 to 42.7 miles per hour along the corridor.

Table 1 – Existing Roadway Summary

ROAD	CARTWAY WIDTH	RIGHT-OF-WAY WIDTH	POSTED SPEED	85 th PERCENTILE SPEED	AVERAGE DAILY TRAFFIC ³
County Line Rd between Montrose Ave and Roberts Rd	40'	50-60'	35 MPH	42.7 ¹ / 37.6 ²	8,165 ¹ / 7,547 ²
County Line Rd between Roberts Rd and Thomas Ave	40'	50-60'	35 MPH	42.2 ¹ / 33.6 ²	7,799 ¹ / 7,711 ²
County Line Rd between Thomas Ave and Mondella Ave	40'	50-54'	35 MPH	38 ¹ / 40 ²	9,475 ¹ / 10,138 ²

¹Southbound ²Northbound

³PennDOT Traffic Information Repository Data (**Appendix L**)

FIELD OBSERVATIONS

During our field investigation, we noted the following observations that should be resolved by Radnor Township and/or Lower Merion Township:

- Install R4-7 KEEP RIGHT and OM1-3 OBJECT MARKER signs at both ends of the median at Lancaster Avenue and County Line Road. The signs are noted on the signal permit plan and may have been knocked down.
- Eliminate the WAIT FOR GREEN BALL sign at the intersection of Conestoga Road & Glenbrook Avenue/Thomas Avenue. This sign is no longer supported by PennDOT and the sign is not included on the most current signal permit plan.
- For improved visibility, replace the faded R3-2 NO LEFT TURN signs at the intersection of Conestoga Road & Glenbrook Avenue/Thomas Avenue.
- Overhead Street Name (OSN) signs at: Lancaster Avenue & County Line Road; Conestoga Road & Glenbrook Avenue/Thomas Avenue; and Landover Road & Haverford Road should be replaced to meet current Manual of Uniform Traffic Control Devices (MUTCD) and PennDOT standards.

SIGHT DISTANCE ANALYSIS

Sight distance was measured at each of the unsignalized study intersections to identify potential issues. The sight distance evaluation was performed utilizing PennDOT standards with the sight line measured from a point 10 feet from the through travel lane of the main street from a position 3 ½ feet above the road to an object height of 3 ½ feet



above the pavement. As shown in **Table 2**, all of the unsignalized intersections meet the minimum sight distance criteria with the exception of northbound Montrose Avenue and Old Lancaster Road. However, appropriate sight distance can be achieved by trimming some of the adjacent vegetation. Calculations and photos at each of the studied intersections are provided in **Appendix B**.

Table 2 – Sight Distance Summary

Intersection Approach	Looking Left (in Feet)		Looking Right (in Feet)		Remarks
	Calculated ¹	Available/ Existing	Calculated ¹	Available/ Existing	
Southbound Montrose Ave	280	300+	374	400+	No deficiency
Northbound Montrose Ave	374	190	280	300+	Trim vegetation & re-evaluate periodically.
Northbound Roberts Ave	283	300+	378	400+	No deficiency
Southbound Roberts Ave	378	400+	283	300+	No deficiency
Old Lancaster Road	354	250	244	300+	Trim vegetation & re-evaluate periodically.
Mondella Ave	283	300+	366	400+	No deficiency

¹Based on PennDOT and AASHTO Minimum Stopping Sight Distance and the 85th Percentile speed of the roadway.

CRASH ANALYSIS

As part of the analysis, crash data was obtained from Radnor and Lower Merion Townships, as well as PennDOT, for each of the study intersections. Reportable and non-reportable crash information was reviewed for the most recent five-year period and is tabulated in **Table 3**. Reportable crashes are those in which either the vehicle sustained enough damage that it must be towed or there is any type of injury or death. Non-reportable crashes are all other incidents and are considered “fender benders”. During the most recent five years of data collected, no fatalities occurred along the corridor. Collision diagrams were prepared for each study intersection and are provided in **Appendix C**.

In accordance with MUTCD and PennDOT, the threshold to consider improvements at an intersection is the occurrence of 5 or more reported crashes within a continuous 12 month period. Therefore, each of the study area intersections warrant some mitigation to improve the safety of the corridor, with the exception of the Mondella Avenue, and Lindsay Avenue intersections. However, all locations were reviewed to identify even minor modifications that could improve the safety of the corridor.

Many of the crashes along County Line Road in the vicinity of Lancaster Avenue involved negotiating the curve near the intersection of County Line Road at Arthur Road. Additional signage along County Line could provide warning for drivers of the upcoming change in horizontal alignment such as W1-8 CHEVRON ALIGNMENT signs and W1-6 LARGE SINGLE ARROW signs. Another consideration could be the





implementation of a dynamic “RED SIGNAL AHEAD” sign for northbound County Line Road to alert drivers when the signal at the intersection is red for the northbound approach.

Table 3 – Crash Summary

LOCATION	Number of Crashes – Reportable and Non-Reportable				
	2013	2014	2015	2016	2017
County Line Road & Lancaster Ave	6	13	3	5	12
County Line Road & Montrose Ave	4	4	5	9	9
County Line Road & Roberts Ave	14	7	12	7	9
County Line Road & Thomas Ave/ Conestoga Road	7	4	5	5	5
County Line Road & South Warner Ave	1	2	5	3	--
County Line Road & Old Lancaster Road	1	2	4	6	4
County Line Road & Mondella Ave	0	2	0	4	2
County Line Road & Lindsay Ave	1	2	0	1	0
County Line Road & Bryn Mawr Ave/ Glenbrook Ave/ Railroad Ave	4	10	5	7	6
County Line Road & Haverford Road/ Landover Road	9	6	5	8	5

Between Arthur Road and Montrose Avenue, there were a number of crashes that involved improper entrances to County Line Road. This could be attributed to the high number of curb cuts along the northeast side of County Line Road associated with the many businesses along this stretch such as CVS Pharmacy, Sunoco and the Ferrari Dealership. In addition to the number of curb cuts, the sidewalk and driveway aprons blend together making it difficult to clearly identify the location of the driveways. Installing a separation material such as a two-foot grass verge between the roadway and the sidewalk could improve the visibility and better define the location of these driveways as indicated below. As an alternative, the Township may want to consider creating a continuous contrasting sidewalk through the driveways to more prominently note the presence of pedestrians.

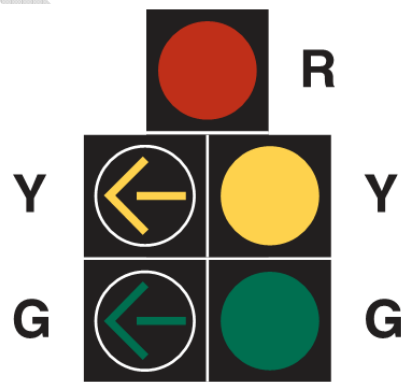
There were a high number of crashes (31) at the Montrose Avenue intersection which were attributable to motorists not stopping at the stop sign and/or turning without proper clearance, many of which were through movements from Montrose Avenue attempting to cross over County Line Road. Based on the results of the sight distance analysis, eastbound Montrose Avenue motorists looking left do not have adequate sight distance due to vegetation along the adjacent property frontage. A traffic signal warrant was reviewed to determine if a traffic signal could be installed at this location. The results of the analysis indicate that under existing conditions, a traffic signal is warranted based upon the Manual for Uniform Traffic Control Devices (MUTCD) Warrant 1-Eight-Hour Vehicular Volume. The signal warrant analysis can be found in **Appendix D**.

Similarly, there were a high number of crashes (49) at the Roberts Road intersection, most of which involved vehicles proceeding from the stop-controlled approaches of



Roberts Road without proper clearance along County Line Road. Most of the incidents involved vehicles from Roberts Road attempting to cross County Line Road, likely to access the traffic signal at Lancaster Avenue. Due to the right turn only at the Conestoga Road/County Line Road intersection, vehicles must cut through Roberts Road to gain access to Lancaster Avenue. Based on the number of incidents, a signal warrant was reviewed to determine if a traffic signal could be installed at this location to improve the safety of the intersection. The results of the analysis indicate that under existing conditions, a signal is warranted based upon the Manual for Uniform Traffic Control Devices (MUTCD) Warrant 1 Eight-Hour Vehicular Volume and Warrant 2 Four-Hour Vehicular Volume.

Review of the crash data at the Conestoga Road/Thomas Avenue/Glenbrook Avenue intersection did not reveal common patterns in crashes that could be mitigated with roadway improvements. However, there were some crashes involving northbound left-turning vehicles that may be reduced by updating the signal head to a traditional 5-section head rather than a 4-section head. The existing 4-section signal displays a green arrow during the protected phase that is extinguished after the phase is completed to allow the southbound movement. Additional crashes may be associated with vehicles accelerating to “beat the light”. Installing a 5-section signal would provide an additional clearance interval during the yellow arrow indication therefore warning drivers the opposing traffic will begin moving through the intersection.



The crash data revealed that the crashes in the vicinity of South Warner Avenue and Old Lancaster Road involved vehicles exiting the plaza on the west side of County Line Road. There are currently four access driveways within 200' to County Line Road from the plaza beginning from the northern limits of the shopping center as follows: a one-way entrance, a one-way exit and one full access driveway. Consolidating the driveways into one centrally located access may be effective in reducing the number of crashes. We recommend removing the one-way entrance and the one-way exit driveways at the plaza to reduce the number of turn conflicts in this 200' section of roadway. During the field investigation, it was noted that motorists traveled between County Line Road and Glenbrook Avenue through the narrow driveway running along the north side of the shopping center building in both directions; given the narrow width of the driveway (approximately 10' wide), we recommend either altering the driveway movement to one direction only or installing bollards to prohibit motorists from using this cut-through.



Old Lancaster Road intersects County Line Road at a skewed angle making turning movements from Old Lancaster Road awkward and difficult. Drivers must turn almost completely around to view oncoming vehicles and alternatively, vehicles traveling southbound along County Line Road only have to turn slightly to access Old Lancaster Road. The crash data shows that motorists from southbound County Line Road make careless turns in front of other vehicles while attempting to perform this turn maneuver.

Reconfiguring the alignment of Old Lancaster Road to a more perpendicular alignment with County Line Road and narrowing down the cartway width on Old Lancaster Road at County Line Road could reduce the crash incidents at this location. Intersection realignment would provide better sight lines for vehicles turning from Old Lancaster Road to County Line Road and would require southbound motorists to turn more slowly from County Line Road.





There were a total of four (4) crashes at Lindsay Avenue; this road provides access to Bryn Mawr Hospital. No clear patterns were observed and therefore, no improvements are recommended at this location.

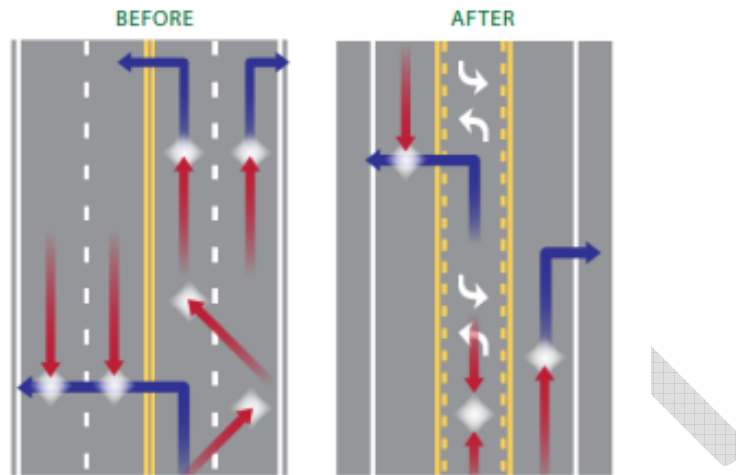
There were a total of eight (8) crashes, five (5) of which were attributed to southbound rear-end collisions at the intersection of County Line Road and Mondella Avenue. The collisions were mostly a result of collisions with southbound left-turning vehicles. The recommended mitigation at this location would be to provide a dedicated left-turn lane; however, this is not feasible due to the available cartway and right-of-way widths along County Line Road. An alternative would be to prohibit the left turn movement, however, it is unlikely motorists would

At the County Line Road & Bryn Mawr Avenue/Railroad Avenue intersection, there is a high number of crashes involving rear-end collisions on the northbound County Line Road movement. This is likely due to the inadequate left turn lane length, the absence of a shadow lane, the absence of a full-length/full-width taper, interjected with the left turns into the Wawa driveway. Motorists may be stopping quickly or prematurely to enter the Wawa driveway, thereby causing rear-end collisions with vehicles that are proceeding left through the intersection and are not anticipating the left turn into the Wawa driveway. Although extending the left-turn lane would be favorable; this is not feasible due to the available cartway and right-of-way width. Therefore, we recommend providing a dotted extension line at the beginning of the development of the left turn lane taper to clearly define the dedicated left turn lane from the inside through lane and install a nearside traffic signal head for the northbound left turn lane

The crash data indicates that more than half of the crashes at the County Line Road/Haverford Road & Landover Road intersection were caused by at least one vehicle running a red light. This could be alleviated by providing advanced dilemma zone detection via radar. Based on the speed of the approaching vehicle, the radar detector can extend the green interval if a vehicle is in the dilemma zone before displaying the yellow clearance interval. Vehicles are then able to travel through the dilemma zone or zone of indecision, without having to make the quick decision of whether to stop or proceed through the yellow indication. This has proven to significantly reduce the occurrence of crashes due to running red lights. The clearance intervals at this intersection were evaluated and found to be appropriate. Therefore, extending the yellow/red time is not recommended as a countermeasure.

Due to the high number of crashes specifically between Lancaster Avenue and Roberts Road, the benefits of a road diet were examined for entire length of the corridor. A road diet reduces the number of lanes on a roadway which can improve safety for motorists, bicyclists and pedestrians. According to the Federal Highway Administration (FHWA), reasons to consider converting from a four-lane roadway to a three-lane roadway with a center turn lane include a high crash rate involving left turn movements, sideswipes, rear-end collisions, and crossing traffic. Typically, a four lane roadway operates as a two travel lanes in either direction with two “defacto” left turn lanes as motorists “bob and weave” to avoid left turning vehicles. A roadway diet can reduce automobile crashes from 20% to 50% by reducing the number of conflict points in half and greatly reducing the number of left turning, rear-end, sideswipe and head-on collisions. Three-lane roads also reduce speeds which are a concern along this portion of the corridor. The

implementation of a three-lane roadway will greatly improve safety along the corridor and reduce the number of lanes a pedestrian must cross. An added benefit for the roadway diet is the center turn lane provides a refuge for left turning vehicles from County Line Road to the minor streets and also providing a two stage left turn refuge area for motorists turning left from the minor side streets to gain access to County Line Road.



III. EXISTING CONDITIONS

The study area intersections were analyzed during the AM peak, PM peak and Saturday Midday peak periods for the Existing (2018) conditions. The majority of existing traffic volume information for the AM and PM peak periods (7:00AM-9:00AM) and (4:00PM-6:00PM) was obtained from various traffic studies conducted along the corridor in recent years. Data was also collected during the Saturday Midday peak period (11:00AM-1:00PM) for all study intersections. The existing traffic count data is included in **Appendix E**. The yearly growth factor provided by PennDOT's Bureau of Planning and Research for Urban Non-Interstate roadways within Delaware County and Montgomery County for 2018/2019 is 0.00 and 0.34, respectively. To provide a more conservative analysis, the counts were factored to the existing analysis year (2018) utilizing a yearly growth factor of 0.34 per Montgomery County. The resultant current year traffic volumes are shown on **Figures 2A-2C** for the AM Peak Hour, PM Peak Hour, and Saturday Midday peak hour.

LEVEL OF SERVICE ANALYSIS

The volumes were subjected to a detailed Level of Service (LOS) analysis according to standard procedures found in *Highway Capacity Manual 2010 (HCM2010)* published by the Transportation Research Board, Washington DC and discussed in detail in **Appendix F**. At the signalized intersections, the analysis utilized the existing signal timings as identified on the signal permit plans provided by PennDOT and in **Appendix G**. The detailed analysis reports for the Existing conditions are provided in **Appendix H**. The LOS results are summarized on **Figures 3A-3C** for each of the analysis periods.

Typically, PennDOT considers LOS D to be an acceptable overall level of service for intersections within an urban area. As noted in **Appendix H**, all of the study intersections



meet this criteria. There are several movements throughout the corridor that operate at LOS E or F. These movements were examined to determine if improvements could be identified to achieve improved operation.

The eastbound and westbound stop-controlled approaches of Montrose Avenue operate at deficient levels for the AM and PM peak periods. At Roberts Road, the eastbound approach operates at a LOS F during the AM peak period. In addition, the following queues were noted. Along Lancaster Avenue, the eastbound queue extends beyond the adjacent intersection at County Line Road by approximately 160 feet during the PM peak period. At the intersection of Bryn Mawr Avenue and Haverford Road the northbound left queue extends beyond the available storage by less than a cars length during the AM and PM peak periods. At the intersection of Glenbrook Avenue the southbound queue extends beyond the adjacent intersection at Lindsay Avenue approximately 65 to 315 feet during the AM and PM peak periods. **Table 4** provides a summary of the deficient movements detailed above.

Table 4 – Existing Roadway Deficiencies

Intersection w/ County Line Road	Movement	Levels of Service (seconds)			95 th Percentile Queue (feet)		
		AM Peak Hour	PM Peak Hour	SAT Peak Hour LOS	AM Peak Hour	PM Peak Hour	SAT Peak Hour
Lancaster Ave	EB	-	-	-	-	497	-
Montrose Ave	EB	F (51.7)	F (88.1)	-	-	-	-
	WB	E (38.4)	F (62.0)	-	-	-	-
Roberts Road	EB	F (109.7)	-	-	-	-	-
Bryn Mawr Ave & Haverford Road	NBL	-	-	-	80	81	-
Glenbrook Ave	SB	-	-	-	299	550	-

A detailed Level of Service analysis was also analyzed along the corridor with the implementation of the noted improvements within this report. Apart from safety improvements and minor signal timing revisions, the impact of installing a center left turn lane can be seen in **Tables 5 and 6**. Although the levels of service and queues are expected to increase along the eastbound and westbound approaches to Montrose Avenue, it is important to note that many vehicles are anticipated to use the signal at Roberts Road to cross County Line Road, thereby lessening the impact on those approaches at Montrose Avenue. The analysis assumed no distribution and therefore provides the worst case scenario. A full summary of the level of service and 9^{5th} percentile queue results are provided in **Appendix I and J**, respectively. In addition, the LOS results with improvements are shown on **Figures 6A-6C** for each of the analysis periods.



Table 5 – Level of Service Analysis w/ Implementation of Center Left Turn

Intersection w/ County Line Road	Movement	Existing Conditions			Proposed w/ Improvements		
		AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)
Montrose Ave	NB	A (8.5)	A (9.6)	A (8.2)	A (8.5)	A (9.6)	A (8.0)
	SB	A (9.1)	A (8.4)	A (8.6)	A (9.1)	A (8.4)	A (8.4)
	EB	F (51.7)	F (88.1)	C (19.1)	F (78.5)	F (136.4)	C (22.0)
	WB	E (38.4)	F (62.0)	C (17.7)	E (45.3)	F (130.7)	C (20.1)
	Overall	B (7.8)	B (12.4)	A (2.7)	B (11.2)	C (20.5)	A (3.1)
Roberts Road	NB	A (8.5)	A (0.0)	A (8.2)	A (0.9)	A (0.0)	A (0.2)
	SB	A (8.8)	A (8.7)	A (8.6)	A (3.0)	A (1.3)	A (1.4)
	EB	F (109.7)	D (33.2)	C (19.2)	C (32.0)	D (37.6)	C (34.7)
	WB	D (27.3)	D (27.9)	C (20.4)	C (26.5)	D (35.6)	C (33.4)
	Overall	B (16.2)	A (3.4)	A (3.0)	A (7.9)	A (5.7)	A (6.2)

Table 6 – 95th Percentile Queue Analysis w/ Implementation of Center Left Turn

Intersection w/ County Line Road	Movement	Storage ¹ (feet)	Existing Conditions			Proposed w/ Improvements		
			AM Peak Hour Queue (feet)	PM Peak Hour Queue (feet)	SAT Peak Hour Queue (feet)	AM Peak Hour Queue (feet)	PM Peak Hour Queue (feet)	SAT Peak Hour Queue (feet)
Montrose Ave	NB	440	-	3	-	-	3	-
	SB	750	-	-	-	-	-	-
	EB	675	125	170	25	163	210	30
	WB	340	40	70	15	45	110	20
Roberts Road	NB	360	-	-	-	18	15	10
	SB	440	-	-	-	140	88	48
	EB	275	213	48	13	180	88	80
	WB	540	23	25	23	40	53	63

¹Denotes the distance to adjacent intersection

In general, the traffic signal operations of minor approaches will degrade slightly for the benefit of the major through movements along a major corridor to allow for optimum progression through the corridor. However, if desired, minor adjustments to the signal timings could be made at the signalized intersections to reduce the delay on the minor approaches. The level of service for County Line Road may be minimally impacted at these locations, but are still within industry standard acceptable levels.

IV. PEDESTRIAN AND BICYCLE FACILITY EVALUATION

PEDESTRIAN FACILITIES

There are existing pedestrian facilities along the entire length of the studied corridor from Lancaster Avenue to Landover Road. Four (4) foot sidewalks are provided on both the



east and west sides of County Line Road directly adjacent to the curb. Mostly all of the studied cross streets also provide sidewalk along both sides with the exception of Conestoga Road, Roberts Road and Haverford Road.

Conestoga Road does not provide sidewalk on the north side of the road and the only pedestrian crossings are provided at the intersection of Roberts Road and Glenbrook Avenue. Residents have raised concerns that due to the lack of sidewalk on the north side of the street, pedestrians are forced to cross Conestoga Road in order to reach the sidewalk on the southern side. This is particularly dangerous, specifically crossing at Montrose Avenue or Petrie Avenue, due to high traffic volumes, speeding vehicles and no marked crosswalks. To improve safety for pedestrians, we recommend providing a crosswalk across Conestoga Road along with W11-2 PEDESTRIAN signs and advanced warning signs along both approaches. In addition, we recommend construction of a sidewalk along the north side of Conestoga Road in order to provide a safe connection from Montrose Avenue to Roberts Road. Extending the sidewalk from Roberts Road to County Line Road in front of the Yangming parcel may be difficult due to the need for an extensive retaining wall and the mature trees along the north side of County Line Road. An additional study may need to be conducted at this location to investigate other potential safety improvements such as the installation of a Rectangular Rapid Flashing Beacon (RRFB).



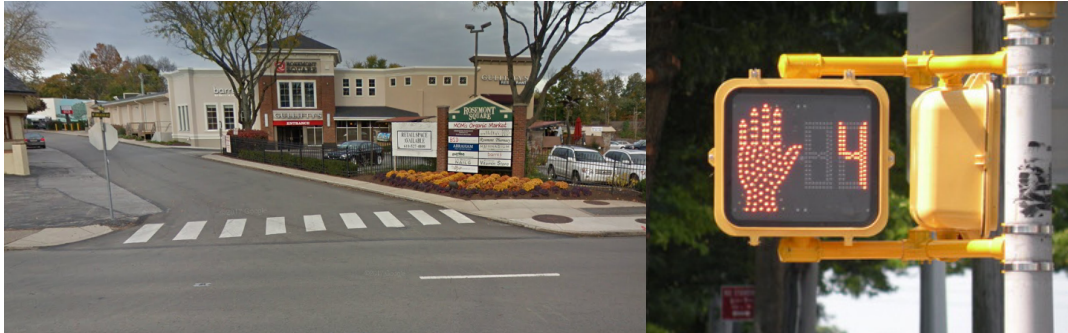
During this study it was also brought to our attention that vehicles often do not yield to pedestrians at the intersection of Lancaster Avenue and Montrose Avenue. There is a marked mid-block crosswalk for pedestrians to cross Lancaster Avenue, however no pedestrian signal is provided and only one W11-2 PEDESTRIAN sign is provided for the eastbound direction immediately adjacent to the existing crosswalk. To improve the safety for pedestrians, we recommend installing W11-2 PEDESTRIAN signs along both the eastbound and westbound approaches including advanced warning signs 100' in advance along Lancaster Avenue. An additional study could be initiated outside of this evaluation to investigate other potential safety improvements such as the installation of a Rectangular Rapid Flashing Beacon (RRFB).



In order to increase the safety of pedestrians at each of the intersections, continental crosswalks (piano keys) and pedestrian countdown timers should be installed where needed. The continental style crosswalk is more visible to approaching vehicles and alerts drivers to the potential for pedestrians within the intersection. The pedestrian countdown timers inform pedestrians how many seconds they have left to safely cross the road before the "DON'T WALK" symbol is displayed; this allows the pedestrian to make better decisions about whether to begin to cross the road. Both of these measures could improve the safety of the intersections for motorists and pedestrians alike.

The intersections of County Line Road & Landover Road as well as County Line Road & Lancaster Avenue should be upgraded with pedestrian countdown timers and pushbuttons. In addition, upgraded ADA accessible curb ramps should be constructed at

the intersections of County Line Road and: Lancaster Avenue; Montrose Avenue; Roberts Road; South Warner Avenue; Old Lancaster Road; and Mondella Avenue.



BICYCLE FACILITIES

There are currently no bicycle facilities located along the County Line Road corridor or on any surrounding roadways in the vicinity of the study area. The traffic counts obtained for the purposes of this analysis show that bicyclists do utilize the corridor. Local residents have expressed their concerns for the dangerous bike route. Reducing County Line Road to continue to include two 10' travel lanes with a shared 10' center left-turn lane would allow two 5 feet wide bicycle lanes on the north and southbound approaches of County Line Road between Arthur Road and Roberts Road. The bicycle lanes would provide the additional safety benefit for not only bicycle riders in a more protected environment, but also provide an additional 5 feet of buffer between pedestrians on the sidewalks and vehicles traveling on the roadway and improve the motorists' visibility of pedestrians crossing County Line Road from the various cross streets along this section of the corridor.

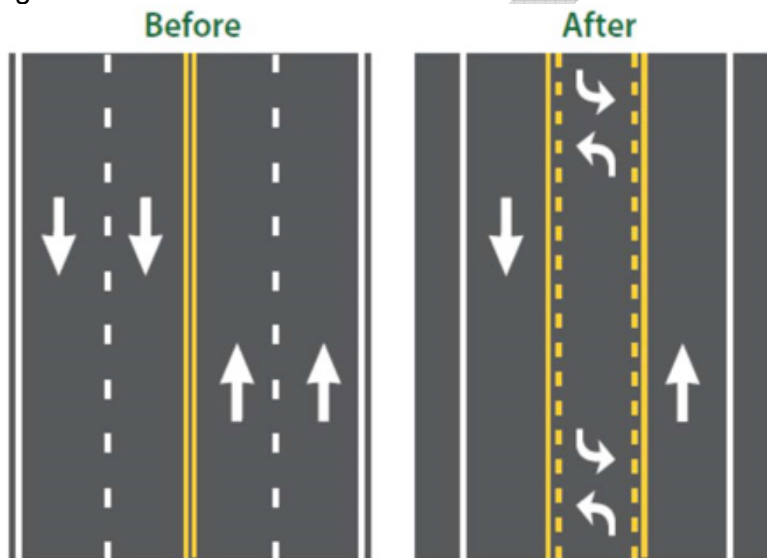


V. RECOMMENDED IMPROVEMENTS

Based on a review of the level of service results, the crash data and the sight distance analysis, there are some improvements that can be implemented to provide improved progression and a safer environment for both vehicular and pedestrian traffic. **Figure 5** provides a conceptual sketch of the recommended improvements.

As noted in the sight distance analysis summary table, the existing vegetation at the eastbound **Montrose Avenue** and westbound **Old Lancaster Rd** approaches to County Line Road impedes the line of sight for drivers at those locations. Therefore, it is recommended to trim the vegetation to provide adequate sight distance. The legal right-of-way would need to be identified in these areas to determine if a sight line easement or temporary easement is necessary to clear the vegetation. Once trimmed, another evaluation should be performed to ensure adequate sight distance is available. In addition, the vegetation should be monitored annually to maintain the necessary sight distance. The approximate cost of this improvement is \$5,000.

In an effort to provide traffic calming along **County Line Road between Lancaster Avenue and Conestoga Road**, we recommend re-striping County Line Road to provide a two-way center left turn lane with one lane in the northbound direction and one lane in the southbound direction. The three lane section would terminate at County Line Road and Conestoga Road and return to a four-lane roadway alignment. Installing a center left turn lane along the entire length of the corridor was investigated; however, the high volumes on southbound County Line Road and southeast Conestoga Road eliminate this possibility. The approximate cost to install these improvements is \$32,000. Due to the proposed changes including a center turn lane and bicycle lanes, the speed limit should be reduced from 35 MPH to 25 MPH on County Line Road throughout this corridor. This speed reduction could be discussed with PennDOT as part of the proposed changes to the entire corridor.



Between **Arthur Road** and **Montrose Avenue**, there were a number of crashes that involved improper entrances to County Line Road. This could be attributed to the high number of curb cuts along the northeast side of County Line Road associated with the many businesses along this stretch such as CVS Pharmacy, Sunoco and the Ferrari Dealership. We recommend additional right-of-way research to determine if improvements can be made to better define where the sidewalk ends and the driveways begin. Installing a two-foot grass verge or brick paver section between the roadway and the sidewalk could improve visibility. The approximate cost to install these improvements is \$115,000.

The traffic signal at **Lancaster Avenue** is not visible to drivers traveling northbound along County Line Rd due to the horizontal and vertical geometry of the roadway and surrounding parcels. Therefore, to improve the safety of the approach to the intersection, a dynamic “Red Signal Ahead” sign should be installed to warn motorists of the upcoming red signal indication. This could reduce the number of rear-end accidents approaching the intersection. Alternatively, additional warning signs should be installed along southbound County Line Rd to warn them of the horizontal curve in the vicinity of the intersection. This could include curve warning signs (W1-2) or several chevron signs (W1-8) along the curve. It was also noted that the pedestrian facilities at the intersection are not ADA-compliant and therefore, updated curb ramps, crosswalks, push buttons



and pedestrian countdown signal heads should be installed. The approximate cost of these improvements is \$88,000.

Montrose Avenue is an unsignalized intersection that provides access between Conestoga Road and Lancaster Avenue. Therefore a majority of the traffic is through traffic that must cross the four lanes of traffic. A signal warrant analysis was reviewed and determined that a traffic signal is warranted. Additionally, the existing vegetation should be cleared to allow for proper sight distance for the eastbound approach of Montrose Avenue. The curb ramps should also be upgraded to be ADA-compliant along with the installation of crosswalks crossing both legs of Montrose Avenue to provide safer crossings for pedestrians. The approximate cost to install these improvements is \$52,000.

A similar situation occurs at **Roberts Road** where the unsignalized intersection also provides access between Conestoga Rd and Lancaster Avenue and most of the minor street traffic is through traffic crossing over County Line Rd. With the number of incidents at the intersection, a signal warrant was conducted and determined that a traffic signal is also warranted at this location. Therefore, the townships should discuss with PennDOT whether the installation of a traffic signal at this location is appropriate. We would recommend coordinating the signal with the adjacent signalized intersections at County Line Road and Conestoga Road in addition to the signals at Roberts Road and Conestoga Road and Roberts Road and Lancaster Avenue. It was noted that the pedestrian accommodations are not ADA-compliant and should, therefore, be upgraded along with the installation of crosswalks crossing both legs of Roberts Rd. In the event that a signal is installed at this location, push buttons, pedestrian signal heads and crosswalks for all four crossings should be provided.

Although a traffic signal was warranted at both Montrose Avenue and Roberts Road, we recommend the signal be installed at the intersection of Roberts Road. Roberts Road is already signalized at the adjacent intersections of Lancaster Avenue to the east and Conestoga Road to the west. Installing the traffic signal at this location along County Line Road would allow for coordination with the adjacent signals as well as a protected movement for cross traffic of both vehicles and pedestrians. The approximate cost to signalize the intersection of Roberts Road is \$300,000.

A review of the crash data at the **County Line Rd & Conestoga Rd/Thomas Avenue/Glenbrook Avenue** intersection revealed that there were crashes involving northbound left-turning vehicles. Updating the signal head to a traditional 5-section signal head rather than a 4-section signal head may help reduce the occurrence of accidents. The existing 4-section signal displays a green arrow during the protected phase that is extinguished after the phase is complete to allow the southbound (green ball) movement. This may encourage motorists to accelerate to “beat the light”. Installing a 5-section signal would provide drivers with more warning that the opposite approach will be moving through the use of the yellow arrow indication. We also recommend the installation of a northbound County Line Road dedicated left turn lane in addition to some signal timings adjustments to provide more green time on Conestoga Road and County Line Road. A review of the vehicle clearance intervals revealed that adjustments should be made to increase the all red interval from 2 seconds to 3 seconds for the



major approaches. The calculations are provided in **Appendix K**. The approximate cost to install these improvements is \$10,000.

Due to the proximity to the existing park, the pedestrian ramps at **South Warner Avenue** should be upgraded to be ADA-compliant. Additionally, a crosswalk should be installed crossing South Warner Avenue to allow safer access to the park. The approximate cost of these improvements is \$12,500. Based on the analysis of the crash data, the incidents in the vicinity of the intersection appear to be related to the access driveways for the plaza opposite the intersection. There is an existing full access driveway as well as a one-way entrance and one-way exit driveway within the approximately 200' frontage. We recommend the elimination of both one-way driveways to reduce the number of conflict points while providing one full-access driveway. If the plaza is owned by more than one entity, this may require coordination with the property owners to initiate an access easement for the site. The approximate cost of these driveway improvements is \$30,000.

Old Lancaster Rd connects with County Line Rd at a skewed angle, which makes it difficult for exiting drivers to view oncoming vehicles. The driver has to turn almost completely around to see traffic on County Line Rd. Therefore, we recommend that Old Lancaster Rd be realigned to meet County Line Rd at more of a 90 degree angle and reduce the Old Lancaster Road width at County Line Road to improve the sight line of drivers and force motorists traveling southbound to make a more traditional 90° left-turn onto Old Lancaster Rd rather than the current slight turn in front of oncoming traffic. This improvement could be done within the existing right-of-way for the intersection. The approximate cost to realign Old Lancaster Avenue is \$195,000. Additionally, as noted in the sight distance analysis, the existing vegetation impedes the line of sight for drivers at this location. Therefore, it is recommended to trim the vegetation to provide adequate sight distance. Due to the proximity of the existing park, we also recommend that the pedestrian ramps be upgraded to comply with ADA requirements while also providing a crosswalk crossing Old Lancaster Rd. The approximate cost to install these improvements is \$16,500.

The unsignalized intersection of **Mondella Avenue** provides access between County Line Rd and Old Lancaster Rd. We recommend upgrading the pedestrian ramps to be ADA-compliant and installing a crosswalk crossing Mondella Avenue. The approximate cost of installing these improvements is \$12,500.

Lindsay Avenue provides access to Bryn Mawr Hospital, which is currently experiencing construction. The intersection is already equipped with compliant pedestrian facilities; however, we recommend the existing crosswalks be upgraded to continental style crosswalks. This intersection should be monitored post-construction to ensure proper operation of the traffic signal. The approximate cost to update the pavement markings is \$1,500.

At the **Bryn Mawr Avenue/Railroad Avenue/Glenbrook Avenue** intersection, we recommend providing a dotted white extension line to more fully separate the left turn lane from the inside northbound through lane along County Line Road and include a nearside traffic signal indication centered over the northbound left turn lane on the backside of the mast arm located in the southwest corner of County Line



Road/Haverford Road and Bryn Mawr Avenue intersection. We feel this may help to reduce some of the rear-end collisions occurring along this approach and provide advance notice of the impending left turn lane. In addition, we recommend upgrading the existing crosswalks with continental style crosswalks. The approximate cost to install these improvements is \$3,500.

Based on a review of the crash information, there were several instances of vehicles running the red light at the **County Line Rd/Landover Rd** intersection. Additionally, the pedestrian facilities at the intersection are not ADA-compliant. It appears that the ramps have been upgraded to current standards, but we recommend the installation of upgraded crosswalks, pedestrian push buttons and pedestrian signals with countdown timers to improve pedestrian access. It was also noted that this intersection is not equipped with emergency pre-emption. Due to the proximity to Bryn Mawr Hospital, we recommend that the signal be upgraded to include emergency pre-emption to allow emergency vehicles more efficient and safer access to the hospital. The approximate cost to install these improvements is \$78,000.

A review of signage along the corridor revealed that there is a lack of R2-1 35 MPH SPEED LIMIT signs along northbound County Line Road. We recommend additional signs be posted at half mile increments along the corridor between Roberts Road and Landover Road.

VI. CONCLUSIONS

As comprehensive as this study is, the noted improvements could be implemented over time with or without grant funding. Overall, including a roadway diet along the corridor to move from a four lane cartway to two lanes with a center turn lane and bicycle lanes with a reduced travel speed would likely provide the greatest safety improvement with the least amount of cost. PennDOT may be willing to install the recommended pavement markings on County Line Road from Arthur Road to Roberts Road and reduce the speed limit along the entire corridor from 35 MPH to 25 MPH based on information included in this study along with more detailed drawings noting the pavement marking: colors, tapers and dimensions and required sign locations.

Other improvements were noted for Lancaster Avenue and Conestoga Road that were apparent during the development of this study that should be reevaluated outside the report.

In all, this report provides a reference for implementing safety improvements along the County Line Road corridor to the benefit of all roadway users in both Radnor and Lower Merion Township.



Table 7 – Improvement Costs Summary

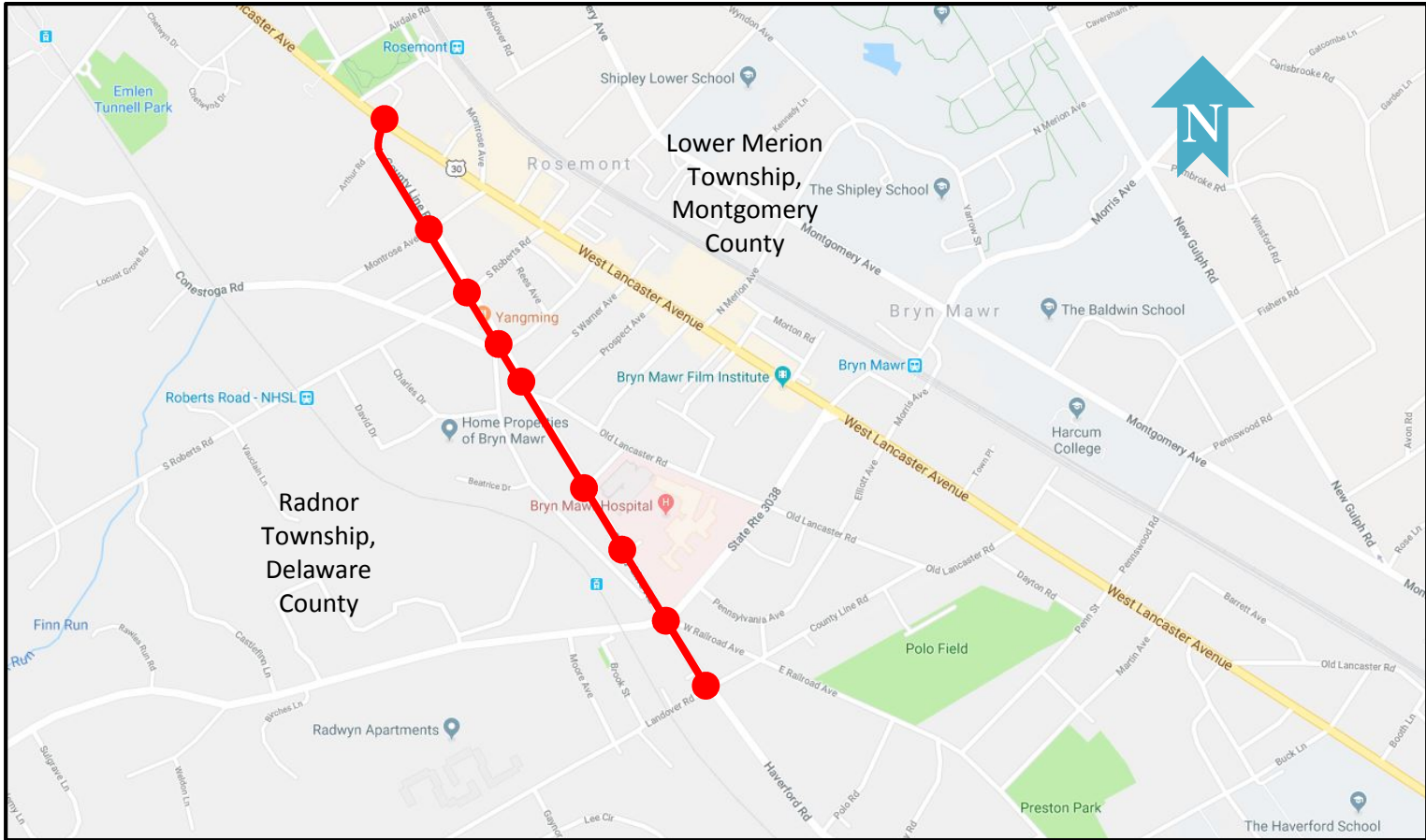
Improvement	Construction Cost	Responsibility	Grant
Center Turn Lane	\$ 32,000.00	Municipality/PennDOT	ARLE
Tree Trimming	\$ 5,000.00	Property Owner/ Municipality	ARLE
Grass Verge	\$ 115,000.00	Property Owner/ Municipality	MTF
Lancaster Avenue Intersection Improvements	\$ 88,000.00	Municipality	ARLE, GLG, MTF
Montrose Avenue Intersection Improvements	\$ 50,000.00	Municipality	MTF
Roberts Road Signalization	\$ 300,000.00	Municipality	GLG
Thomas Ave/ Glenbrook Ave Dedicated Left Turn Lane	\$ 10,000.00	Municipality	ARLE, GLG, MTF
S. Warner Ave Pedestrian Improvements	\$ 12,500.00	Municipality	MTF
S. Warner Ave Shopping Center Driveway Improvement	\$ 30,000.00	Property Owner/ Municipality	MTF
Old Lancaster Ave Pedestrian Improvements	\$ 16,500.00	Municipality	MTF
Old Lancaster Ave Realignment	\$ 195,000.00	Lower Merion Township	MTF
Modella Ave Intersection Improvements	\$ 12,500.00	Municipality	MTF
Lindsay Ave Intersection Improvements	\$ 1,500.00	Municipality	MTF
Bryn Mawr Ave Intersection Improvements	\$ 3,500.00	Municipality	MTF, GLG, ARLE
Landover Road Intersection Improvements	\$ 78,000.00	Municipality	GLG, ARLE, MTF
Montrose & Conestoga RRFB	\$ 16,000.00	Radnor Township	MTF
Montrose & Lancaster RRFB	\$ 16,000.00	Lower Merion Township	MTF
Conestoga Road Sidewalk	\$ 240,000.00	Radnor Township	MTF
All Corridor Related Improvements	\$ 1,220,500.00		TA Set Aside

¹Green Light Go (GLG)

²Transportation Alternatives Set-Aside

³Multimodal Transportation Fund (MTF)

⁴Automated Red Light Enforcement Program (ARLE)

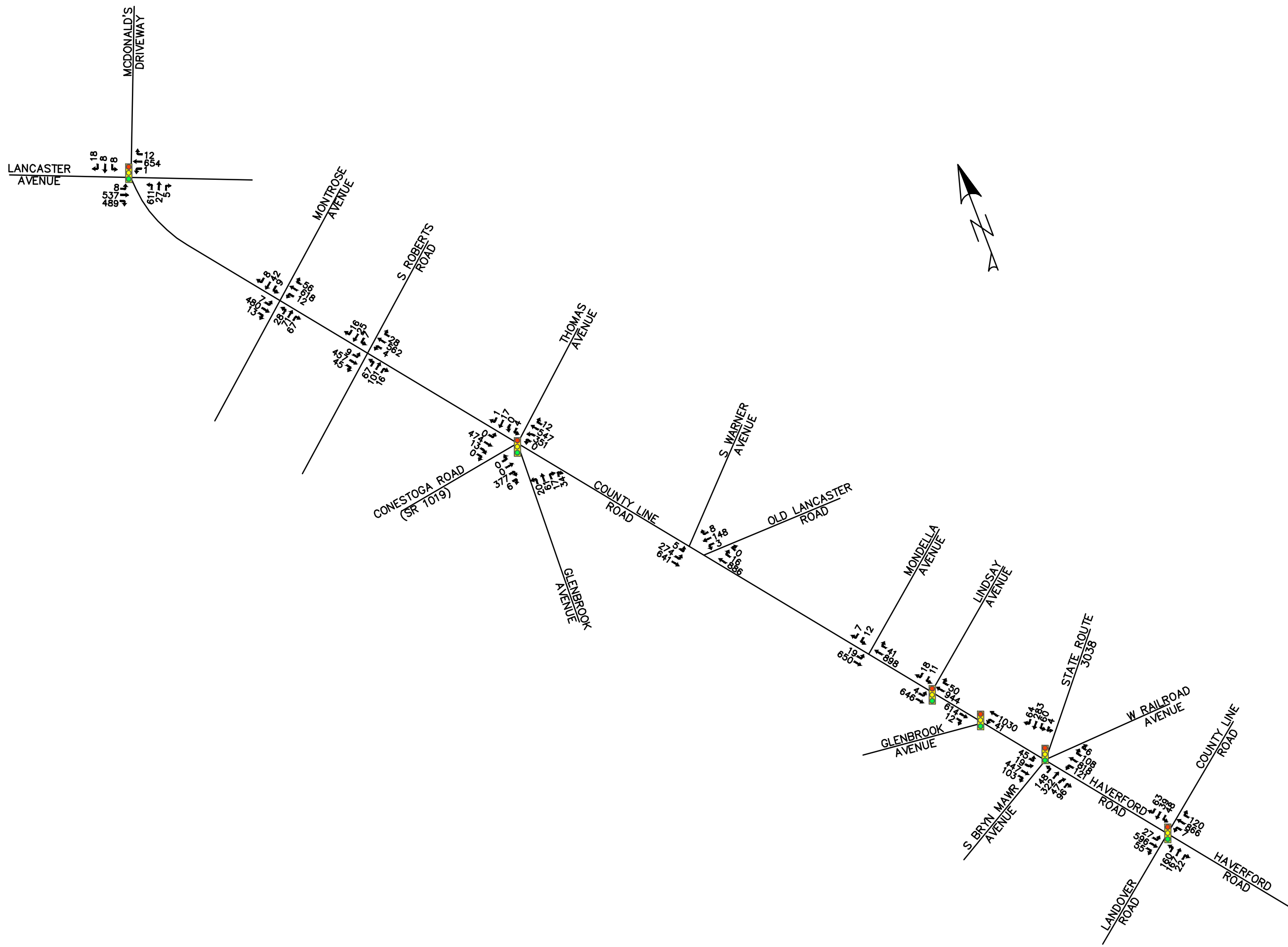


Corridor

Intersections Evaluated

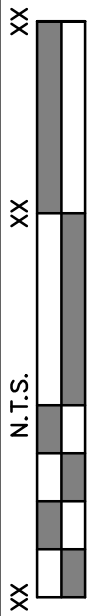


Figure 1
Project Location Map
 County Line Road Corridor Transportation Evaluation
 Radnor Township & Lower Merion Township
 Delaware County & Montgomery County, Pennsylvania
 October 2018



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY:
 LAS



CORRIDOR ANALYSIS

FIGURE 2A
EXISTING AM VOLUMES
COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:

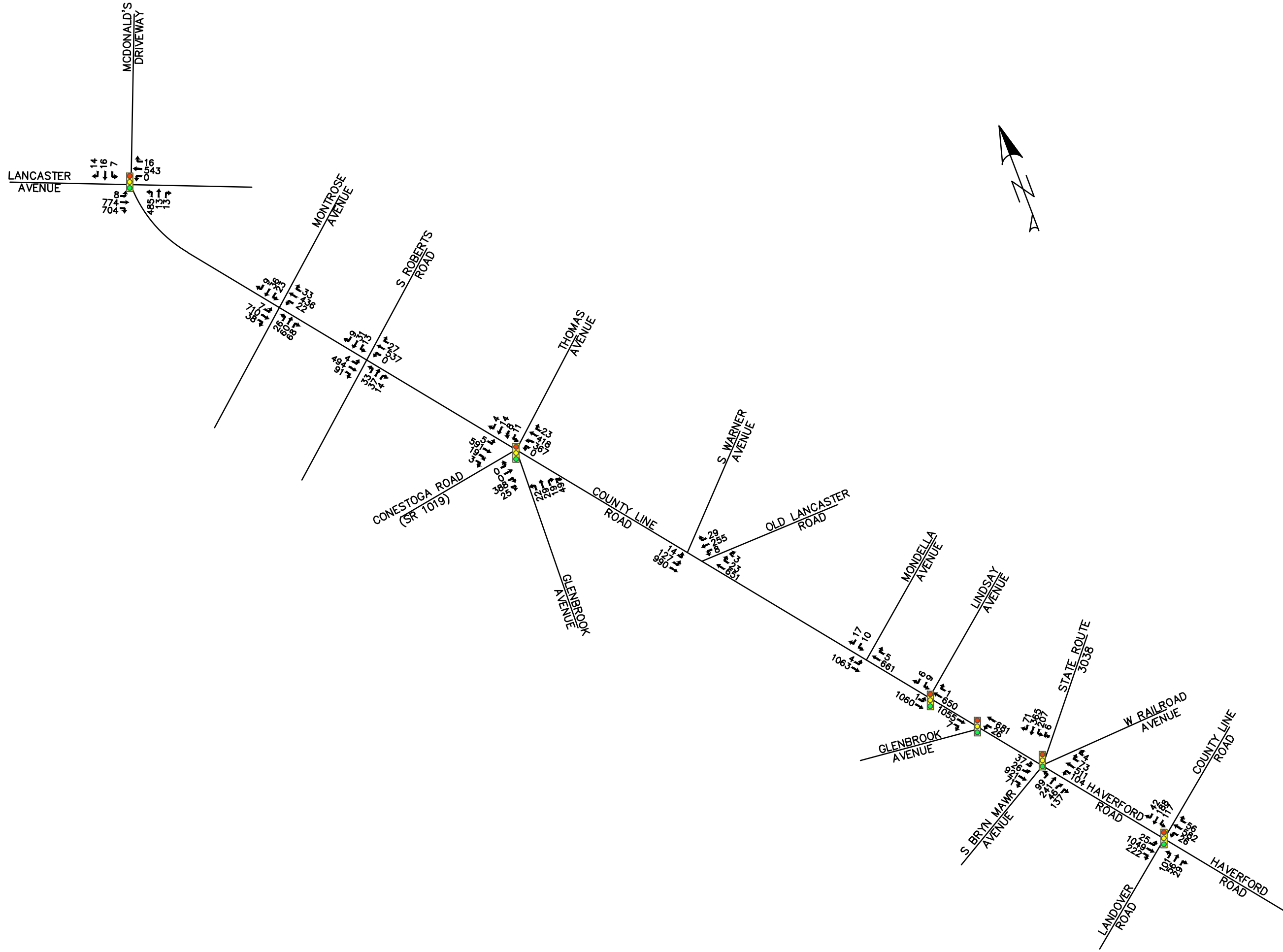
2016-11060-02

DATE:

OCTOBER, 2018

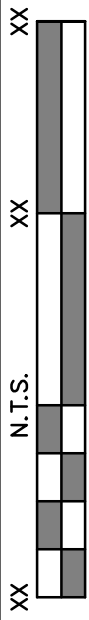
SCALE:

NOT TO SCALE



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY:
 LAS



CORRIDOR ANALYSIS

FIGURE 2B
EXISTING PM VOLUMES
COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:

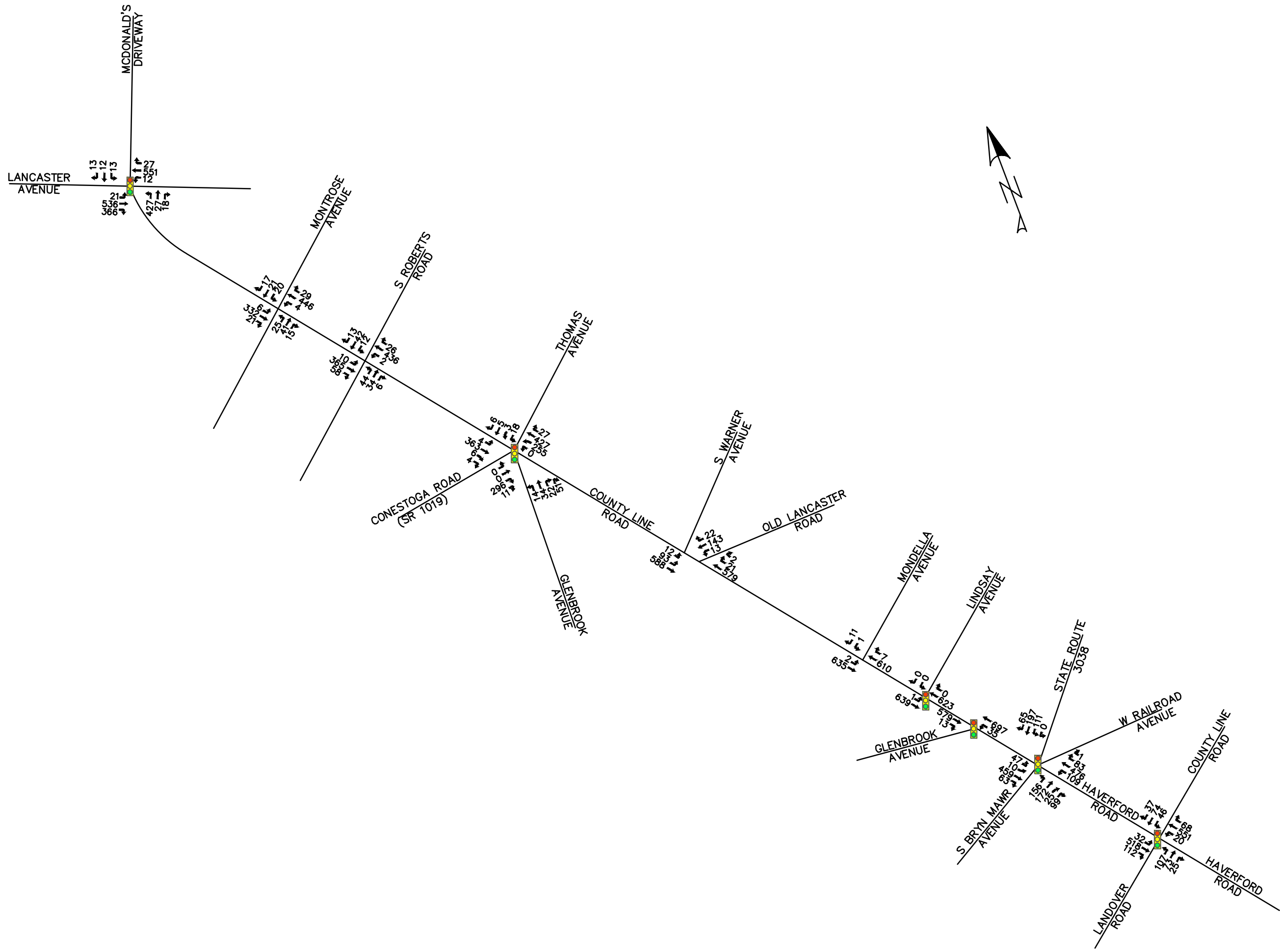
2016-11060-02

DATE:

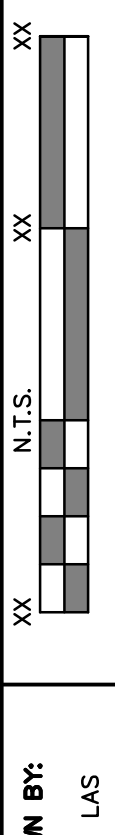
OCTOBER, 2018

SCALE:

NOT TO SCALE

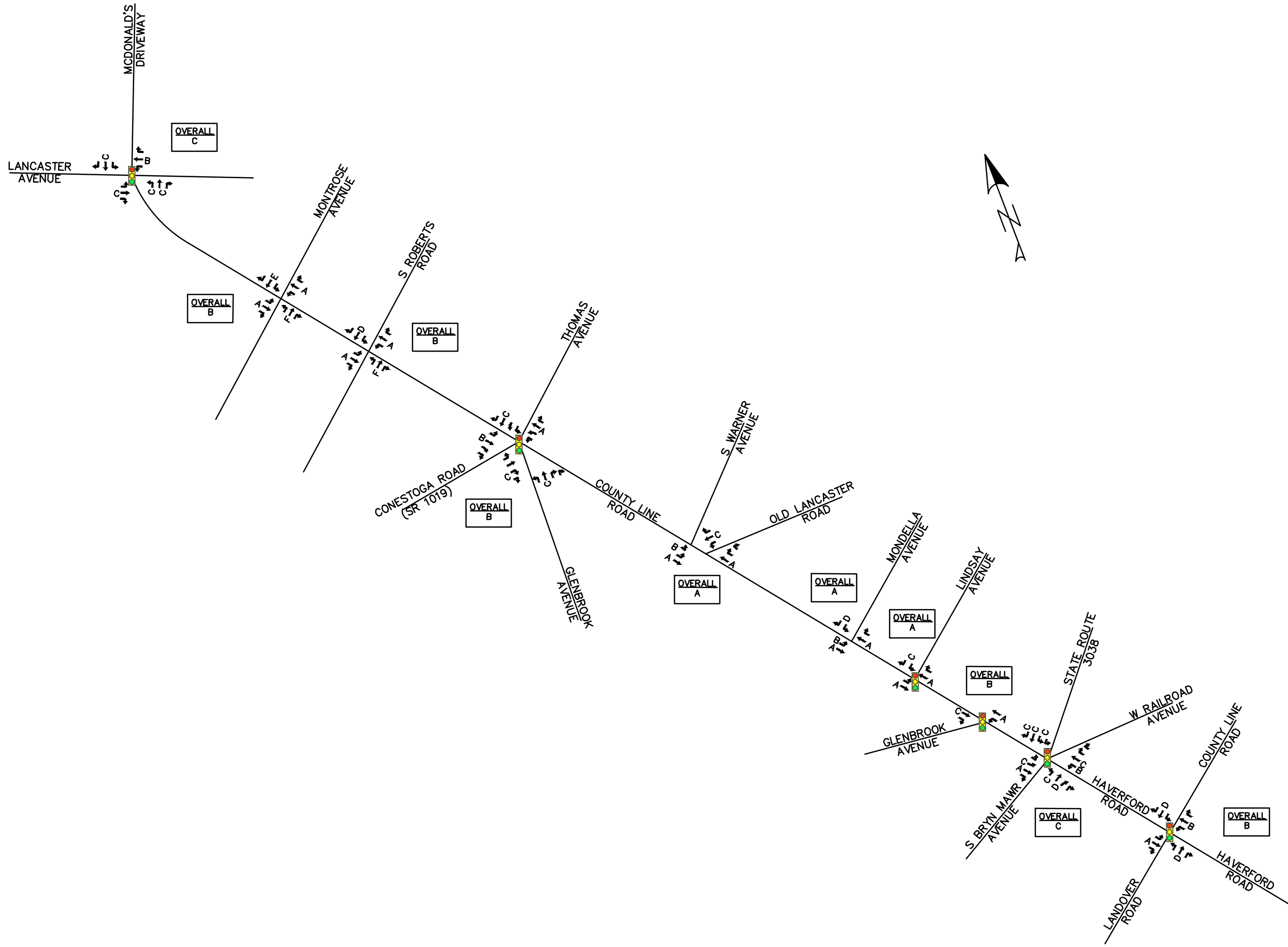


GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330



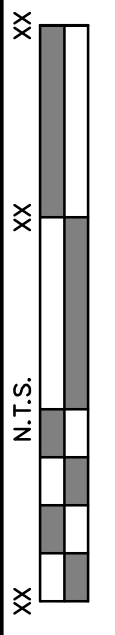
CORRIDOR ANALYSIS
FIGURE 2C
EXISTING SAT VOLUMES
COUNTY LINE ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.: 2016-11060-02
DATE: OCTOBER, 2018
SCALE: NOT TO SCALE



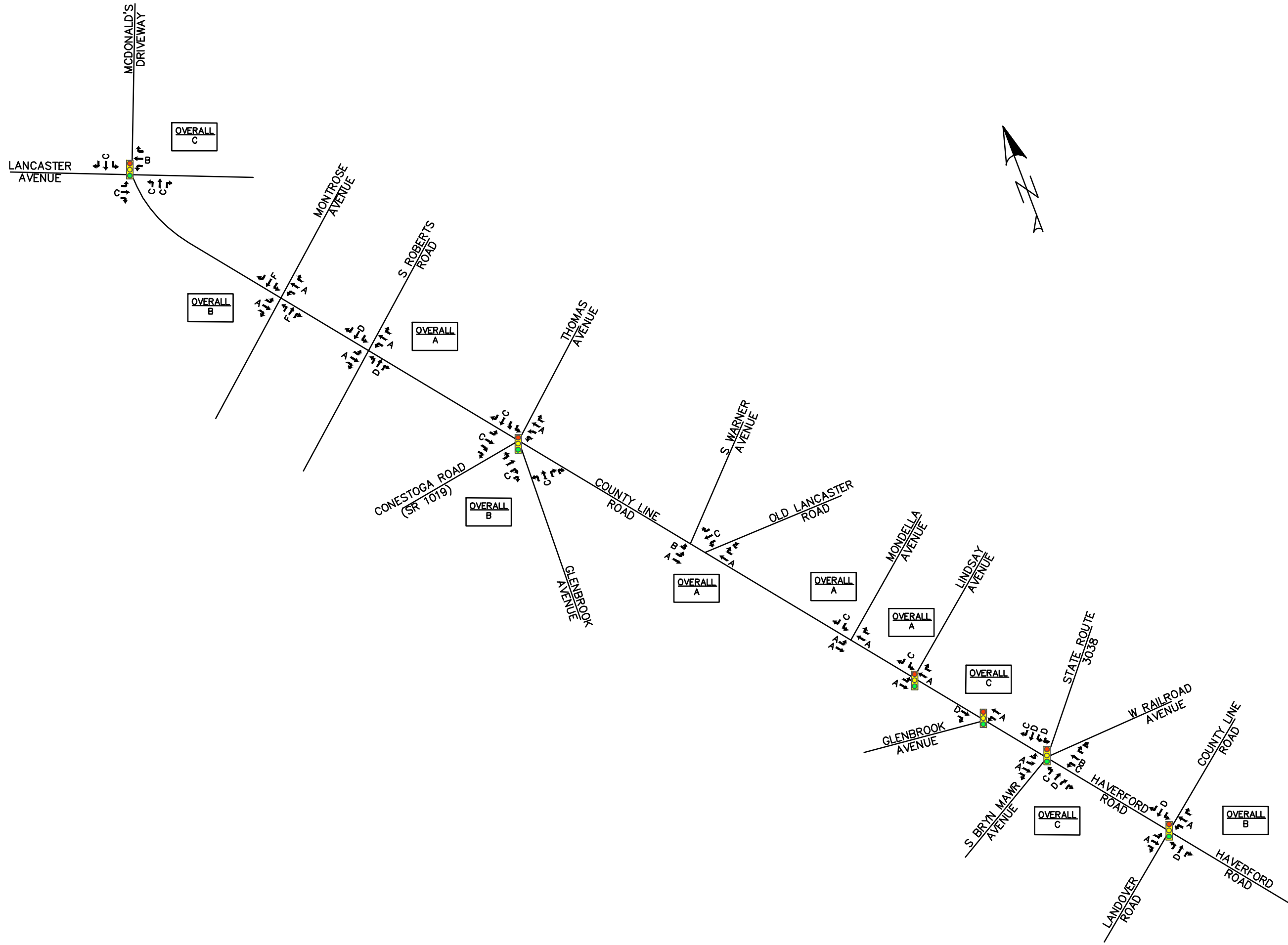
GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY:
 LAS



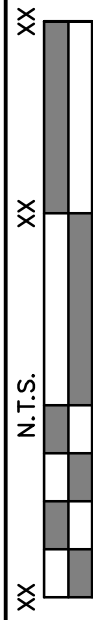
CORRIDOR ANALYSIS
FIGURE 3A
EXISTING AM LEVELS OF SERVICE
COUNTY LINE ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:
 2016-11060-02
DATE:
 OCTOBER, 2018
SCALE:
 NOT TO SCALE



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY:
 LAS



CORRIDOR ANALYSIS

FIGURE 3B
EXISTING PM LEVELS OF SERVICE
COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:

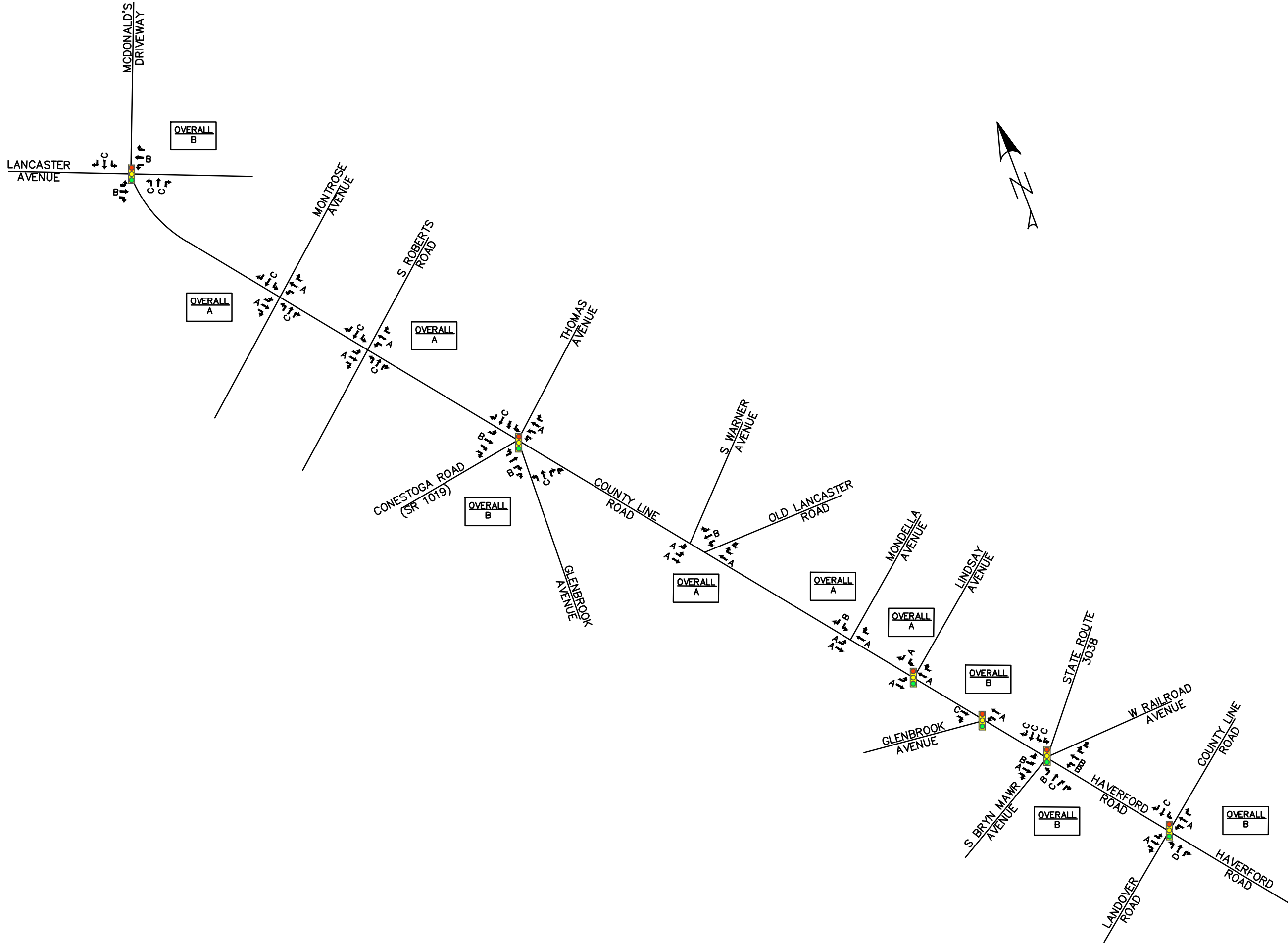
2016-11060-02

DATE:

OCTOBER, 2018

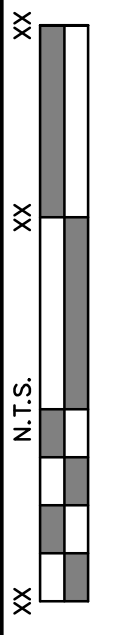
SCALE:

NOT TO SCALE



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY:
 LAS



CORRIDOR ANALYSIS
FIGURE 3C
EXISTING SAT LEVELS IF SERVICE
COUNTY LINE ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:
 2016-11060-02
DATE:
 OCTOBER, 2018
SCALE:
 NOT TO SCALE



JOB NO.: 2016-11060-02
DATE: OCTOBER, 2018
SCALE: 1"=100'

CORRIDOR ANALYSIS
FIGURE 4A: EXISTING CONDITIONS
COUNTY LINE ROAD
(S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY: LAS

SCALE
 100 0 100 200
 FEET
 IN



© 2018 DigitalGlobe

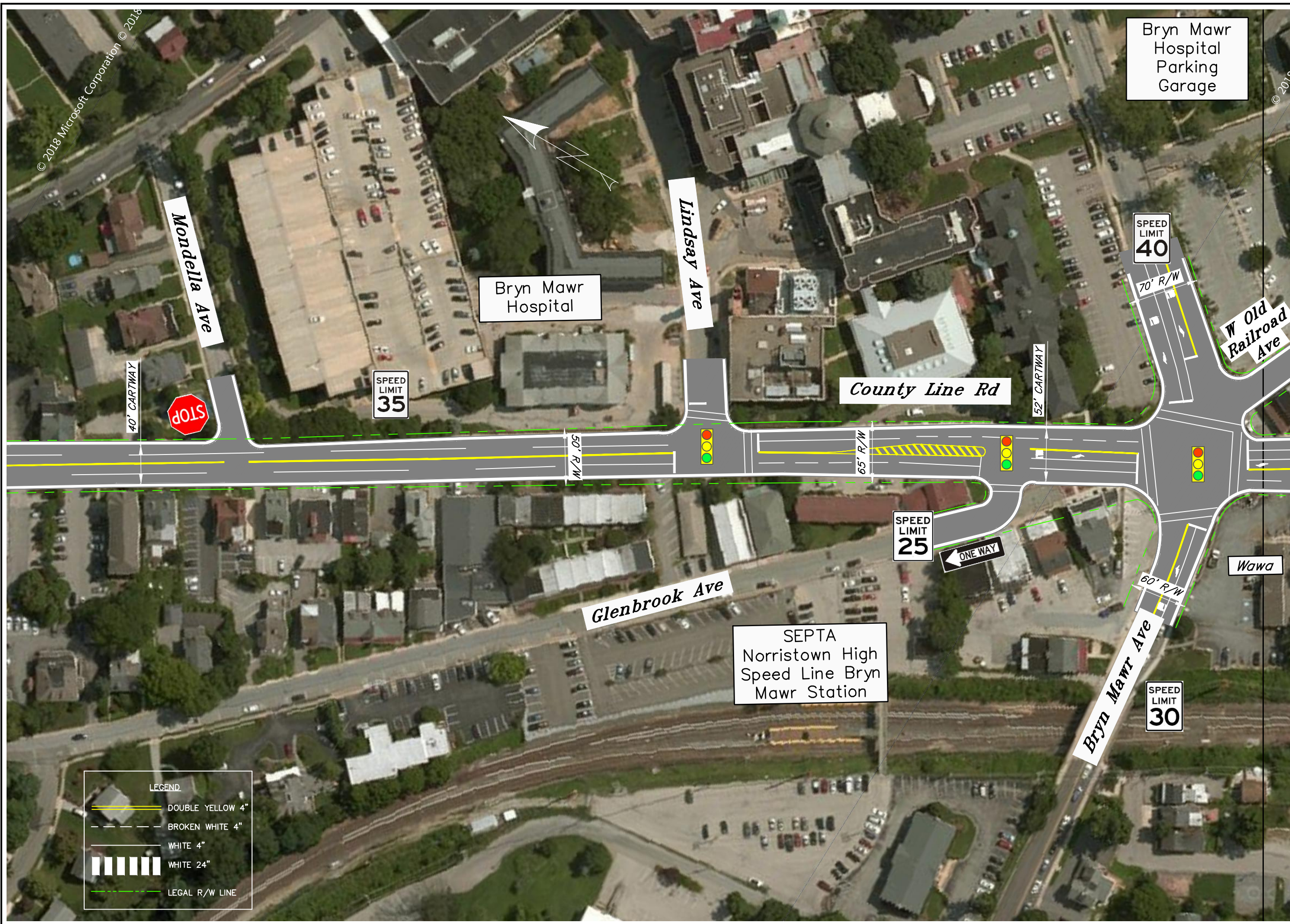
JOB NO.: 2016-11060-02
DATE: OCTOBER, 2018
SCALE: 1"=100'

CORRIDOR ANALYSIS
FIGURE 4B: EXISTING CONDITIONS
COUNTY LINE ROAD
(S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY: LAS

SCALE
 100 0 100 200
 FEET
 IN



LEGEND

	DOUBLE YELLOW 4"
	BROKEN WHITE 4"
	WHITE 4"
	WHITE 24"
	LEGAL R/W LINE

JOB NO.:	2016-11060-02
DATE:	OCTOBER, 2018
SCALE:	1"=100'

CORRIDOR ANALYSIS
FIGURE 4C: EXISTING CONDITIONS
COUNTY LINE ROAD
(S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

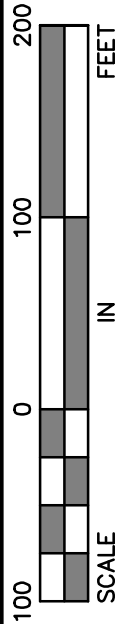
DRAWN BY: LAS

SCALE:
 100 0 100 200
 FEET
 IN



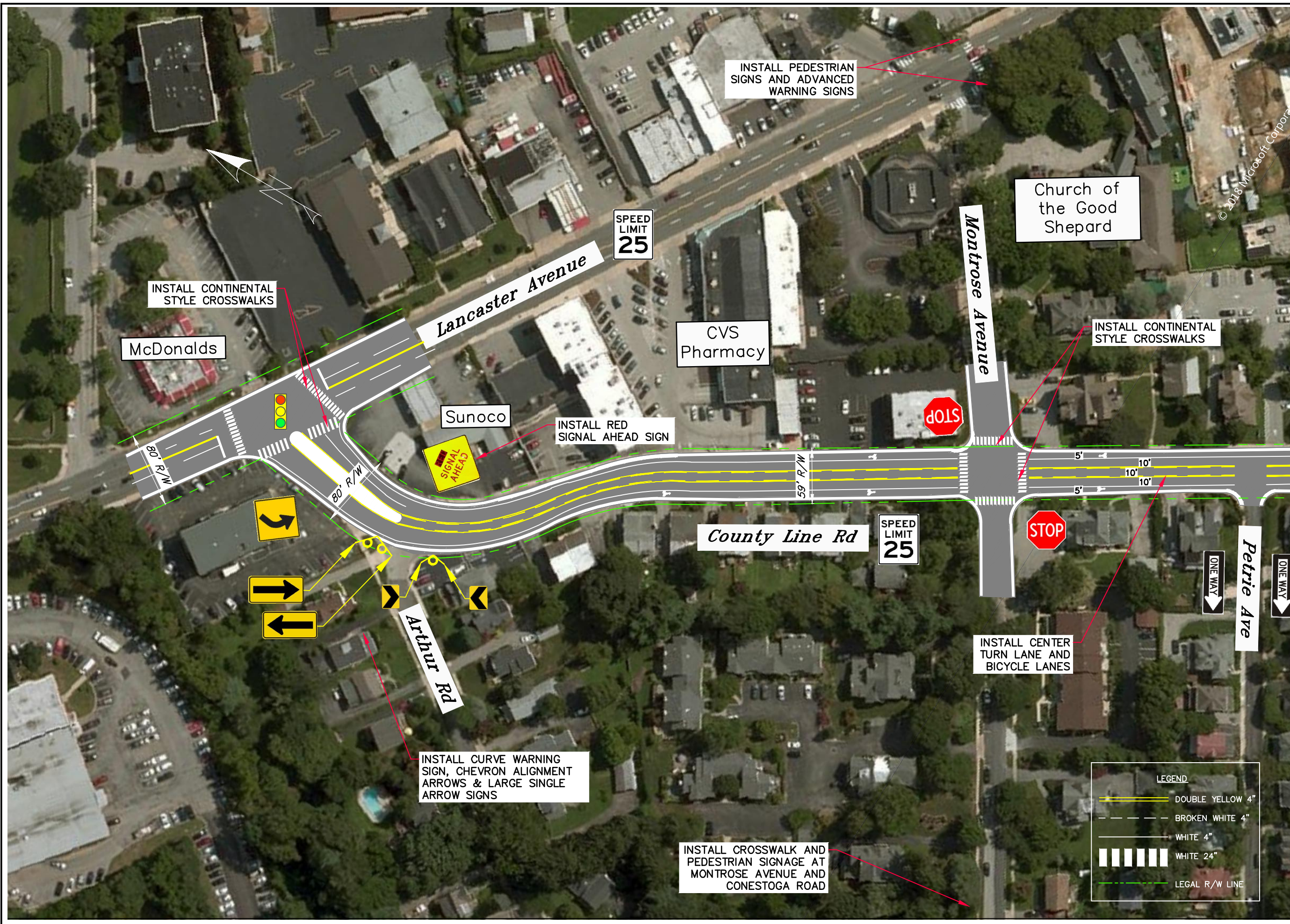
GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY: LAS



CORRIDOR ANALYSIS
FIGURE 4D: EXISTING CONDITIONS
COUNTY LINE ROAD
(S.R. 1001)
RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.: 2016-11060-02
DATE: OCTOBER, 2018
SCALE: 1"=100'



JOB NO.: 2016-11060-02
 DATE: OCTOBER, 2018
 SCALE: 1"=100'

CORRIDOR ANALYSIS
FIGURE 5A: RECOMMENDED IMPROVEMENTS
COUNTY LINE
ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

SCALE
 100 0 100 200
 FEET
 IN

DRAWN BY: LAS

LEGEND

	DOUBLE YELLOW 4"
	BROKEN WHITE 4"
	WHITE 4"
	WHITE 24"
	LEGAL R/W LINE



CORRIDOR ANALYSIS
FIGURE 5B: RECOMMENDED IMPROVEMENTS
COUNTY LINE ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

LEGEND

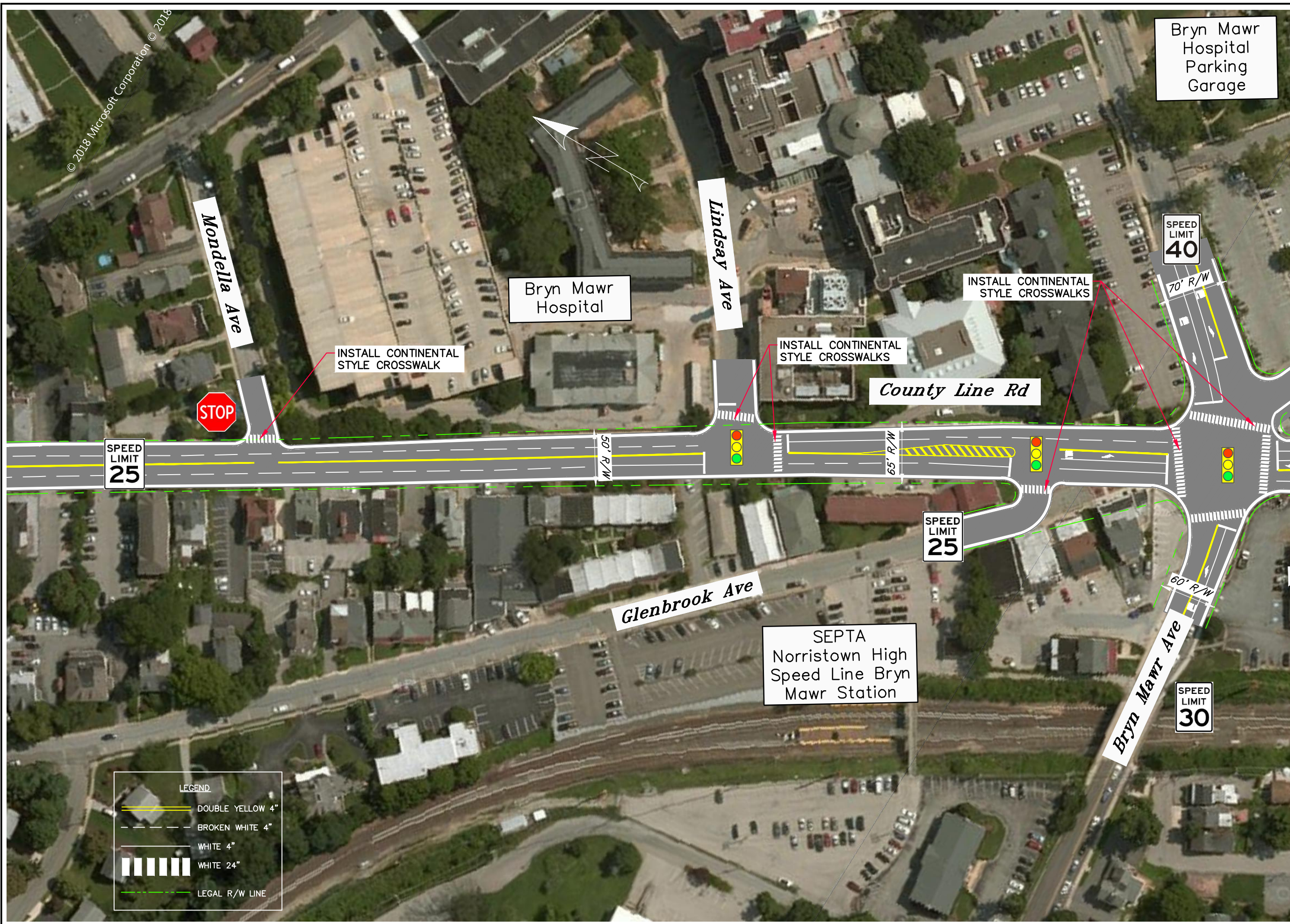
- DOUBLE YELLOW 4"
- BROKEN WHITE 4"
- WHITE 4"
- WHITE 24"
- LEGAL R/W LINE

SCALE

100 0 100 200
 FEET
 IN

DRAWN BY: LAS

JOB NO.: 2016-11060-02
DATE: OCTOBER, 2018
SCALE: 1"=100'



JOB NO.: 2016-11060-02
DATE: OCTOBER, 2018
SCALE: 1"=100'

CORRIDOR ANALYSIS
FIGURE 5C: RECOMMENDED IMPROVEMENTS
COUNTY LINE ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

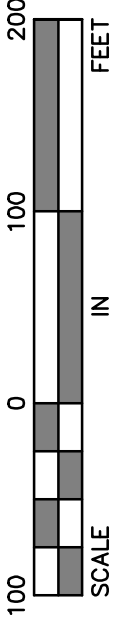
SCALE: 1"=100'

DRAWN BY: LAS



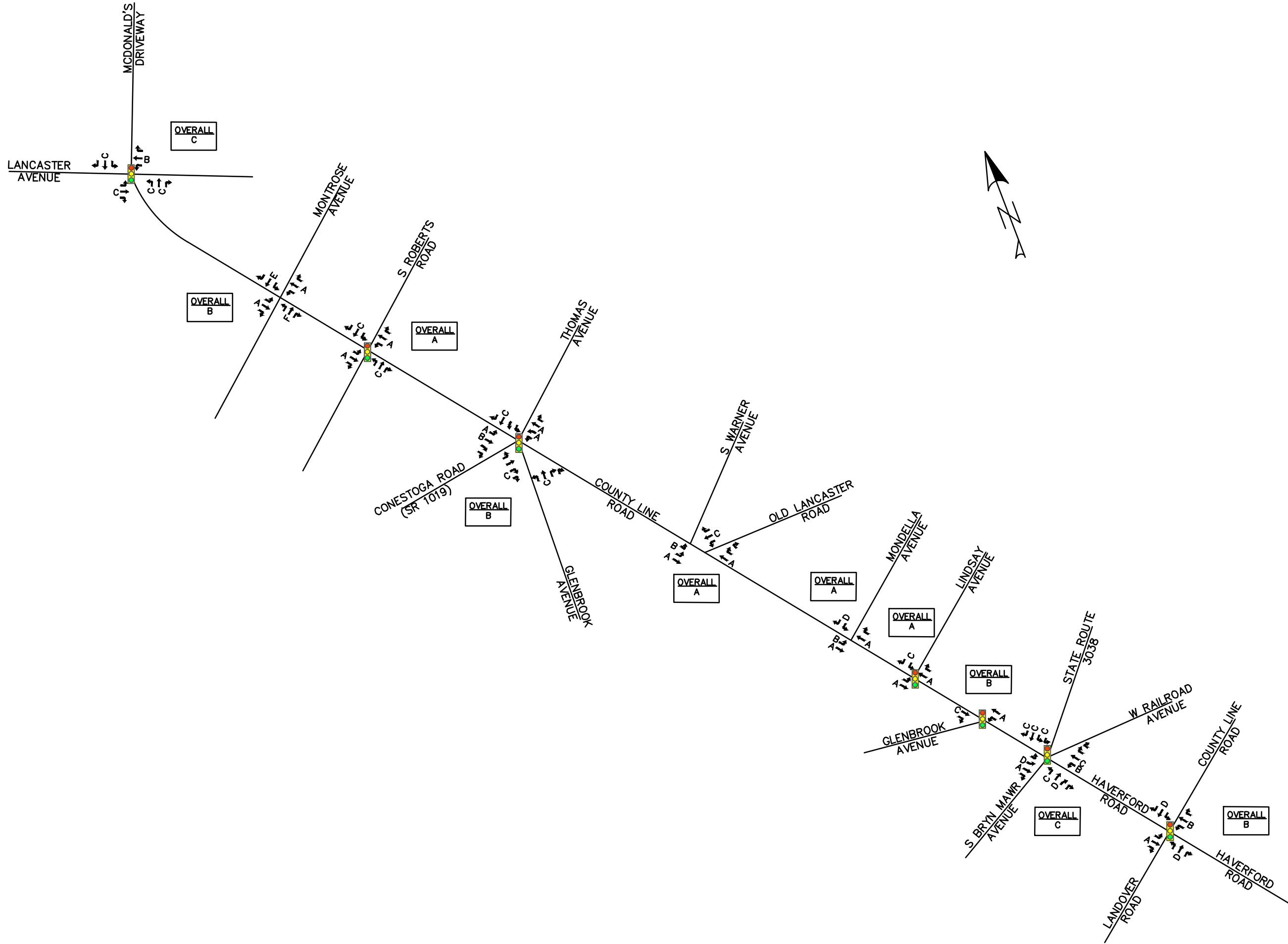
GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY:
 LAS



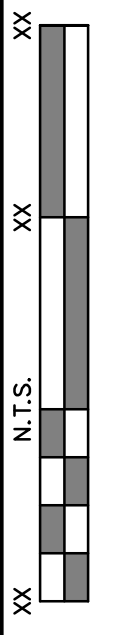
CORRIDOR ANALYSIS
FIGURE 5D: RECOMMENDED IMPROVEMENTS
COUNTY LINE
ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:
 2016-11060-02
DATE:
 OCTOBER, 2018
SCALE:
 1"=100'



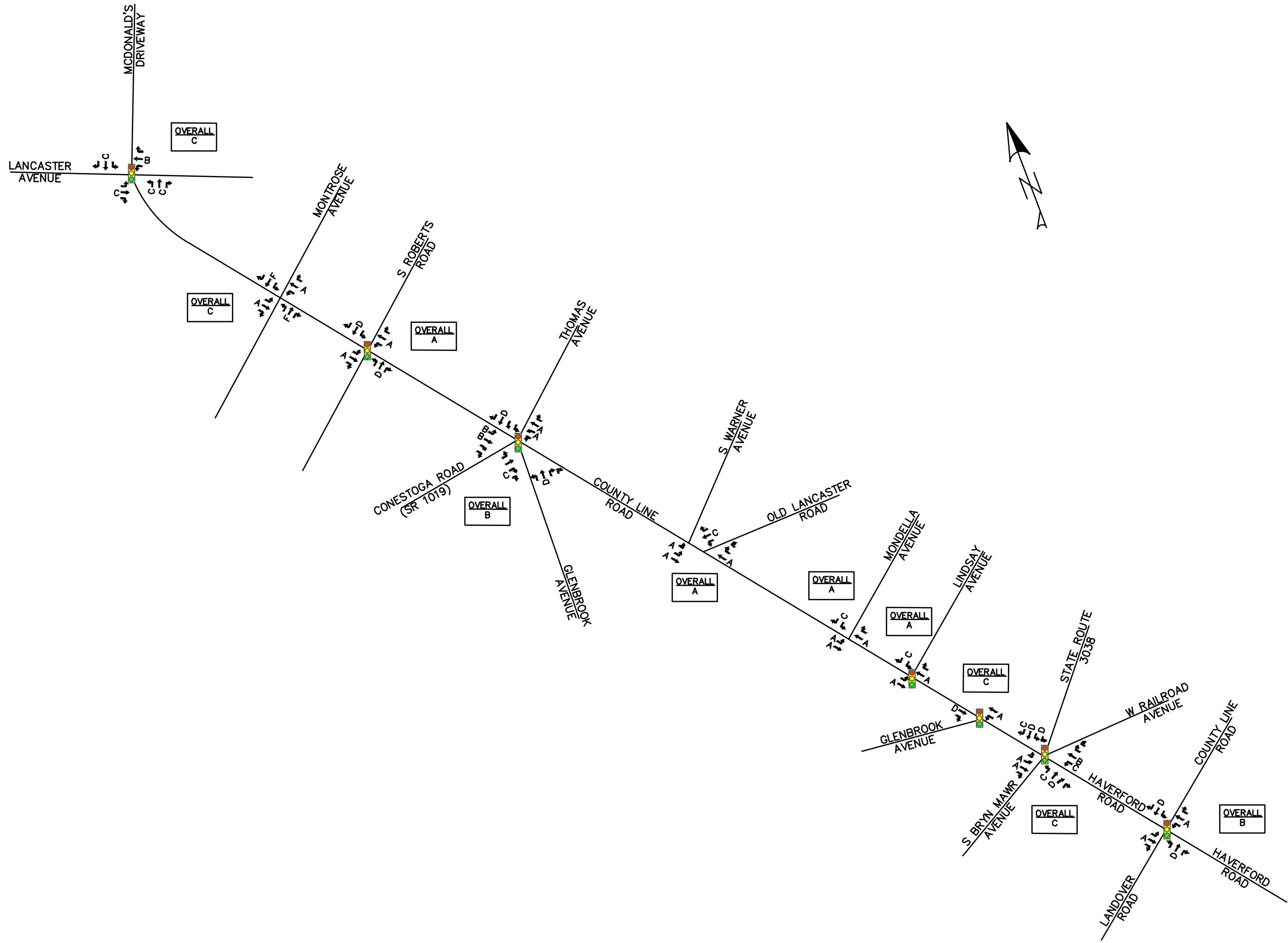
GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY:
 LAS



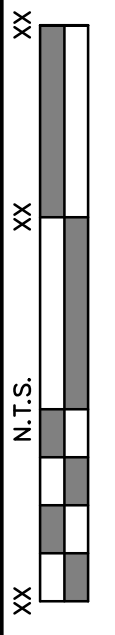
CORRIDOR ANALYSIS
FIGURE 6A – AM LEVELS OF SERVICE W/ IMPROVEMENTS
COUNTY LINE ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:
 2016-11060-02
DATE:
 OCTOBER, 2018
SCALE:
 NOT TO SCALE



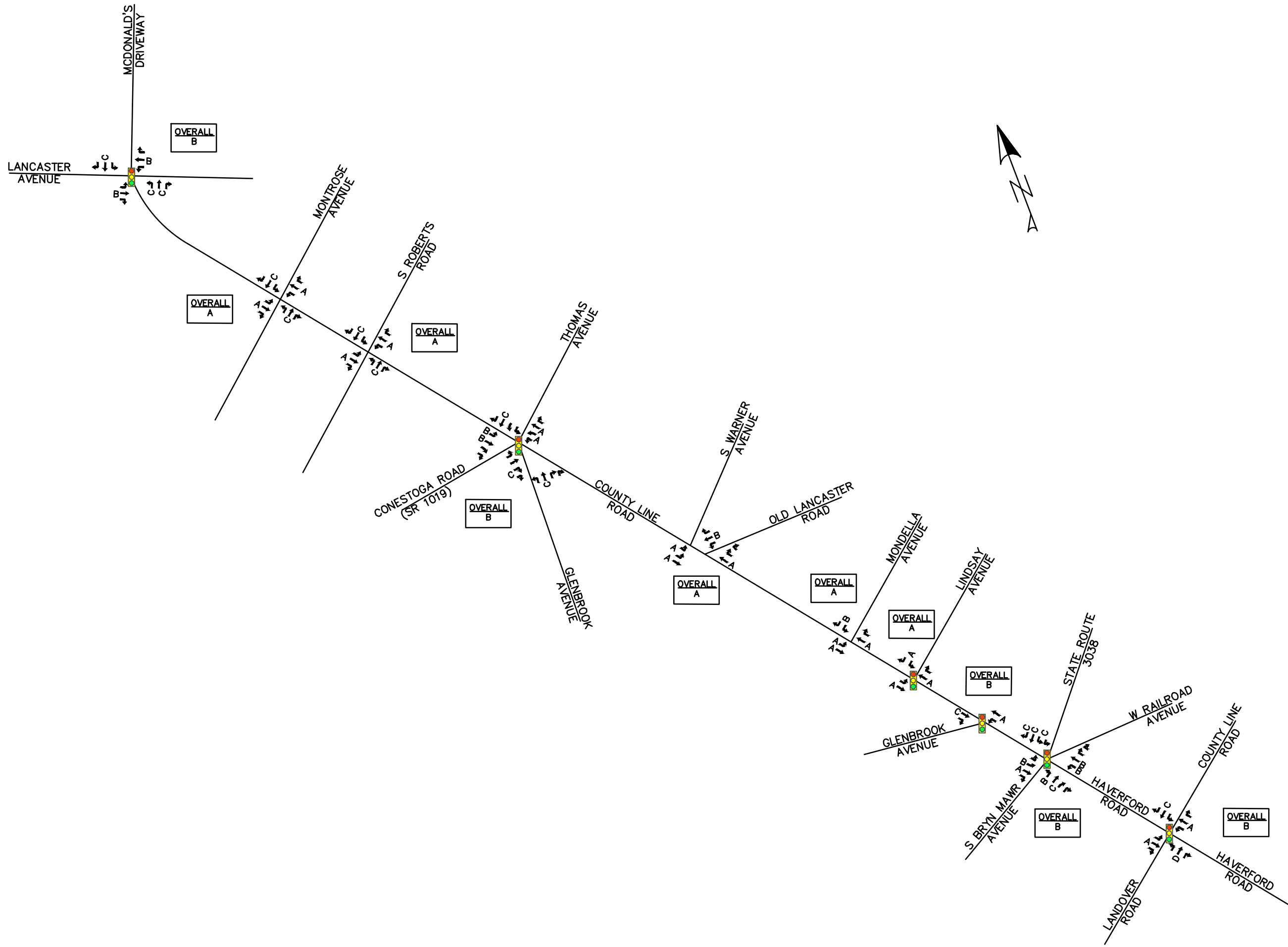
GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY:
 LAS



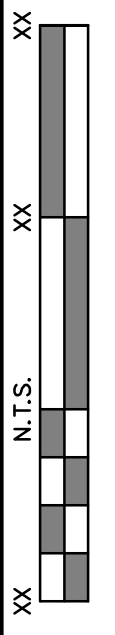
CORRIDOR ANALYSIS
FIGURE 6B - PM LEVELS OF SERVICE W/ IMPROVEMENTS
COUNTY LINE ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:
 2016-11060-02
DATE:
 OCTOBER, 2018
SCALE:
 NOT TO SCALE



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY:
 LAS



CORRIDOR ANALYSIS
FIGURE 6C - SAT LEVELS IF SERVICE W/ IMPROVEMENTS COUNTY LINE ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:
 2016-11060-02
DATE:
 OCTOBER, 2018
SCALE:
 NOT TO SCALE

APPENDIX A

2018-08-23 Stakeholder's Meeting Minutes





MEETING NOTES

Date of Meeting: August 23, 2018

Time of Meeting: 6:00 PM

Location: Church of the Good Shepard
1116 Lancaster Ave.
Bryn Mawr, PA

Project: County Line Road Corridor Study
County Line Road (S.R. 1001)
Radnor & Lower Merion Townships;
Delaware & Montgomery Counties
G&A Job #16-11060.02

Notes Prepared By: Amy Kaminski

Date Finalized: September 11, 2018

Attendees:

Commissioner John Nagle/W-5	RT Commissioner W-5	610-527-5913	jnagle@radnor.org
Superintendent Chris Flanagan	RTPD	610-688-5606 X108	cflanagan@radnor.org
Leslie Salsbury, E.I.T.	Gilmore & Assoc. Inc.	215-345-4330	lsalsbury@gilmore-assoc.com
Amy Kaminski, P.E., PTOE	Gilmore & Assoc. Inc.	267-337-6979	akaminski@gilmore-assoc.com

31 residents from Radnor and Lower Merion Township

A meeting was held to review the corridor project and obtain stakeholder input on noted problems and safety concerns along the corridor. The following summarizes the discussion:

1. Superintendent Flanagan opened the meeting with a brief discussion regarding the history of the project. He explained both Lower Merion Township and Radnor Township had safety concerns and discussed installing traffic signals at various intersections along County Line Road. Further discussions continued that led both Townships to consider a comprehensive corridor analysis to develop mitigation measures. S. Flanagan introduced Commissioner Nagel and apologized to attendees from Lower Merion Township because LMTPD had an emergency call that required all staff to address the call.
2. Amy Kaminski discussed the data collection process including traffic counts, speed data, traffic volume data and historical crash records along with field investigations which included: sidewalks, pavement markings, traffic control measures, pedestrian accommodations and sight distance evaluations.

3. The following comments were provided during the question and answer period of the meeting:
 - Consider installing a signal at Montrose & Lancaster
 - Sight lines are poor at Conestoga and Montrose; parked vehicles reduce visibility
 - Pedestrian crossing at Montrose and Lancaster is very difficult
 - PD should consider a patrol in the area to deter speeding particularly on Montrose
 - Motorists do not stop for school busses
 - There is a bottleneck at Montrose & County Line Road; consider peak hour parking prohibition
 - Provide a pedestrian crosswalk placard at Montrose and County Line Road
 - Consider traffic calming on County Line Road near this section and near railroad tracks
 - Montrose high pedestrian traffic to and from Conestoga
 - High pedestrian traffic to and from the train/trolley: Norristown High Speed Line (NHSL) at both S. Roberts Road and S. Bryn Mawr Ave/Glenbrook Ave:
 - Residents noted the disparity of 2 hr. parking (LMT) and 4 hr. parking (RT) on Montrose.
 - Residents have concerns with nearby apartments parking on Montrose
 - Residents questioned why Lancaster is posted at 25 MPH where Conestoga is posted at 35 MPH
 - Visibility on Montrose is poor due to grade differential (negative from Lancaster to County Line Road to Conestoga on average -4%)
 - Petrie Ave (1 way southwest bound) is narrower but appears to have higher speeds
 - No sidewalks along north side of Conestoga
 - Motorists do not stop for pedestrians at Montrose/Lancaster crosswalk (only one sign at the crosswalk on the eastbound, south side of crossing.) No advanced warning signs on both approaches of Lancaster Avenue.
 - Delay along both Conestoga Road and County Line Road encourages motorists to cut through on Montrose and Roberts Road.
4. Residents were provided a corridor plan set and were asked to provide their safety concerns on the plan with post it notes. Any repeats were to be check marked if others shared similar concerns.
5. Residents asked if there would be an email list prepared to keep stakeholders informed of the project progress.

APPENDIX B

Sight Distance Evaluation



Minimum Stopping Sight Distance

Job No. 16-11060
 County: Delaware County
 Municipality: Radnor Township
 Location: County Line Road & Montrose Avenue



PA Code Title 67; § 441
 SSD = $1.47VT + (V^2)/30(f \pm g)$

SSD = Stopping Sight Distance
 V = 85th Percentile Speed (miles per hour)
 T = Perception Time of Driver (2.5 seconds)
 f = Coefficient of Friction for Wet Pavements
 g = Percent of Grade of Roadway Divided by 100

Eastbound Exiting Motorist

LEFT- SSD			RIGHT-SSD		
	Minimum	Existing in Field		Minimum	Existing in Field
	Calc.			Calc.	Field
SSD =	280	190	SSD =	374	400+
V =	38		V =	43	
T =	2.5		T =	2.5	
f =	0.32		f =	0.31	
g =	2.3		g =	-2.5	

PennDOT Form M-950 "A"

Westbound Exiting Motorist

LEFT- SSD			RIGHT-SSD		
	Minimum	Existing in Field		Minimum	Existing in Field
	Calc.			Calc.	Field
SSD =	374	400+	SSD =	280	300+
V =	43		V =	38	
T =	2.5		T =	2.5	
f =	0.31		f =	0.32	
g =	-2.5		g =	2.3	

Minimum Stopping Sight Distance (feet)

85th Percentile Speed	Coefficient of Friction	Grade =				
		-10%	-5%	0%	5%	10%
25	0.38	166	155	147	140	135
30	0.35	230	210	196	185	177
35	0.34	299	269	249	233	221
40	0.32	389	345	314	291	274
45	0.31	487	425	383	353	330
50	0.3	600	517	462	422	392
55	0.3	706	605	538	490	454
60	0.29	852	721	634	573	528

Conclusion:

Eastbound left sight distance is deficient due to shrubs and vegetation along the adjacent property frontage. Consider trimming the vegetation to improve sight distance.

Date: 7/9/2018 Compiled by: LAS Checked by: ABK

Minimum Stopping Sight Distance

Job No. 16-11060
 County: Delaware County
 Municipality: Radnor Township
 Location: County Line Road & Roberts Road



PA Code Title 67; § 441
 SSD = $1.47VT + (V^2)/30(f \pm g)$

SSD = Stopping Sight Distance
 V = 85th Percentile Speed (miles per hour)
 T = Perception Time of Driver (2.5 seconds)
 f = Coefficient of Friction for Wet Pavements
 g = Percent of Grade of Roadway Divided by 100

Eastbound Exiting Motorist

LEFT- SSD			RIGHT-SSD		
	Minimum			Minimum	Existing in
	Calc.	Existing in Field		Calc.	Field
SSD =	283	300+	SSD =	378	400+
V =	38		V =	43	
T =	2.5		T =	2.5	
f =	0.32		f =	0.31	
g =	1.5		g =	-3.0	

PennDOT Form M-950 "A"

Westbound Exiting Motorist

LEFT- SSD			RIGHT-SSD		
	Minimum			Minimum	Existing in
	Calc.	Existing in Field		Calc.	Field
SSD =	378	400+	SSD =	283	300+
V =	43		V =	38	
T =	2.5		T =	2.5	
f =	0.31		f =	0.32	
g =	-3		g =	1.5	

Minimum Stopping Sight Distance (feet)

85th Percentile Speed	Coefficient of Friction	Grade =				
		-10%	-5%	0%	5%	10%
25	0.38	166	155	147	140	135
30	0.35	230	210	196	185	177
35	0.34	299	269	249	233	221
40	0.32	389	345	314	291	274
45	0.31	487	425	383	353	330
50	0.3	600	517	462	422	392
55	0.3	706	605	538	490	454
60	0.29	852	721	634	573	528

Conclusion:

No sight distance deficiencies noted.

Date: 7/9/2018 Compiled by: LAS Checked by: ABK

Minimum Stopping Sight Distance

Job No. 16-11060
 County: Delaware County
 Municipality: Radnor Township
 Location: County Line Road & Old Lancaster Road



PA Code Title 67; § 441
 SSD = $1.47VT + (V^2)/30(f \pm g)$

SSD = Stopping Sight Distance
 V = 85th Percentile Speed (miles per hour)
 T = Perception Time of Driver (2.5 seconds)
 f = Coefficient of Friction for Wet Pavements
 g = Percent of Grade of Roadway Divided by 100

Westbound Exiting Motorist

LEFT-SSD			RIGHT-SSD		
	Minimum Calc.	Existing in Field		Minimum Calc.	Existing in Field
SSD =	328	250	SSD =	288	300+
V =	40		V =	38	
T =	2.5		T =	2.5	
f =	0.32		f =	0.31	
g =	-2.5		g =	1.5	

PennDOT Form M-950 "A"

Minimum Stopping Sight Distance (feet)

85th Percentile Speed	Coefficient of Friction	Grade =				
		-10%	-5%	0%	5%	10%
25	0.38	166	155	147	140	135
30	0.35	230	210	196	185	177
35	0.34	299	269	249	233	221
40	0.32	389	345	314	291	274
45	0.31	487	425	383	353	330
50	0.3	600	517	462	422	392
55	0.3	706	605	538	490	454
60	0.29	852	721	634	573	528

Conclusion:

Westbound left sight distance is deficient due to existing vegetation along County Line Road. Consider trimming the vegetation to improve sight distance.

Date: 7/9/2018 Compiled by: LAS Checked by: ABK

Minimum Stopping Sight Distance

Job No. 16-11060
 County: Delaware County
 Municipality: Radnor Township
 Location: County Line Road & Modella Avenue



PA Code Title 67; § 441
 $SSD = 1.47VT + (V^2)/30(f \pm g)$

SSD = Stopping Sight Distance
 V = 85th Percentile Speed (miles per hour)
 T = Perception Time of Driver (2.5 seconds)
 f = Coefficient of Friction for Wet Pavements
 g = Percent of Grade of Roadway Divided by 100

Westbound Exiting Motorist

LEFT-SSD			RIGHT-SSD		
	Minimum Calc.	Existing in Field		Minimum Calc.	Existing in Field
SSD =	306	350+	SSD =	302	400+
V =	40		V =	38	
T =	2.5		T =	2.5	
f =	0.32		f =	0.31	
g =	1.6		g =	-1.3	

PennDOT Form M-950 "A"

Minimum Stopping Sight Distance (feet)

85th Percentile Speed	Coefficient of Friction	Grade =				
		-10%	-5%	0%	5%	10%
25	0.38	166	155	147	140	135
30	0.35	230	210	196	185	177
35	0.34	299	269	249	233	221
40	0.32	389	345	314	291	274
45	0.31	487	425	383	353	330
50	0.3	600	517	462	422	392
55	0.3	706	605	538	490	454
60	0.29	852	721	634	573	528

Conclusion:

No sight distance deficiencies noted.

Date: 7/9/2018 Compiled by: LAS Checked by: ABK

Project Photo Sheet

County: Delaware County
Municipality: Radnor Township
Intersection: County Line Road

Job Number: 16-11060-02



Photo 1: Eastbound Montrose Ave, looking left.



Photo 2: Eastbound Montrose Ave, looking right.



Photo 3: Westbound Montrose Ave, looking left.



Photo 4: Westbound Montrose Ave, looking right.



Photo 5: Eastbound Roberts Road, looking left.



Photo 6: Eastbound Roberts Road, looking right.

Project Photo Sheet

County: Delaware County
Municipality: Radnor Township
Intersection: County Line Road

Job Number: 16-11060-02



Photo 7: Westbound Roberts Road, looking left.



Photo 8: Westbound Roberts Road, looking right.



Photo 9: Westbound Old Lancaster Rd, looking left.



Photo 10: Westbound Old Lancaster Rd, looking right.



Photo 11: Westbound Mondella Ave, looking left.



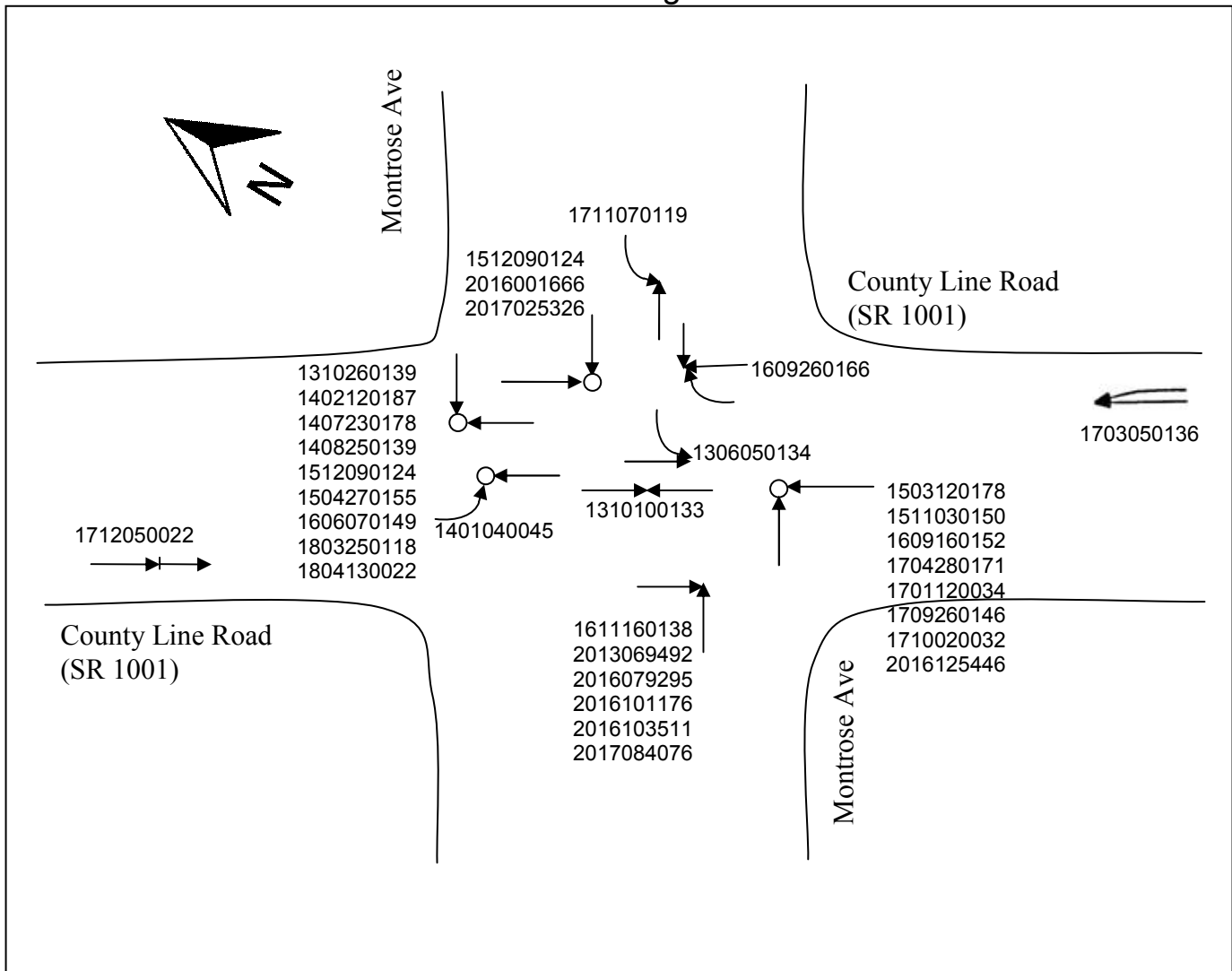
Photo 12: Westbound Mondella Ave, looking right.

APPENDIX C

Collision Diagrams

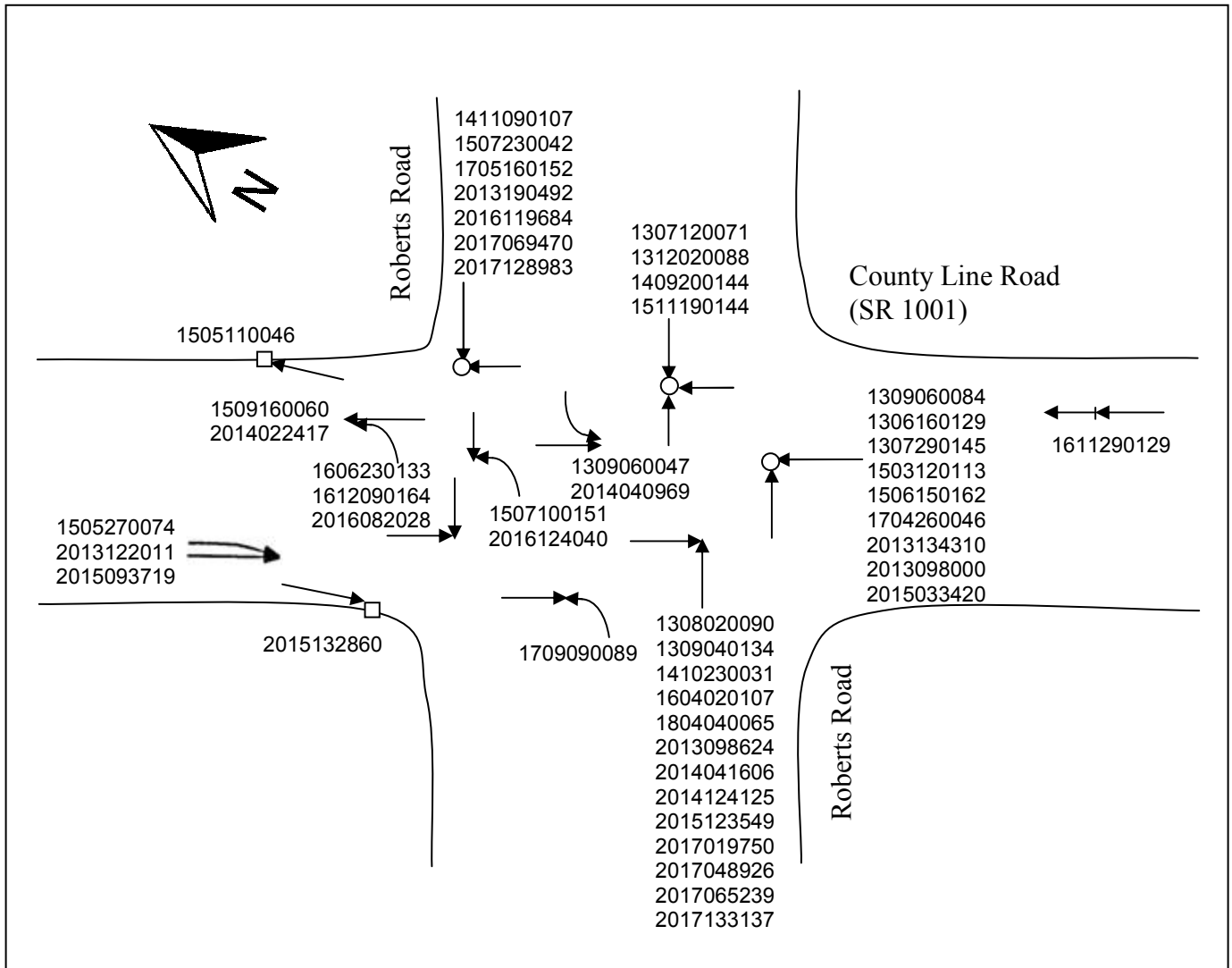


County Line Road (SR 1001) & Montrose Avenue Collision Diagram



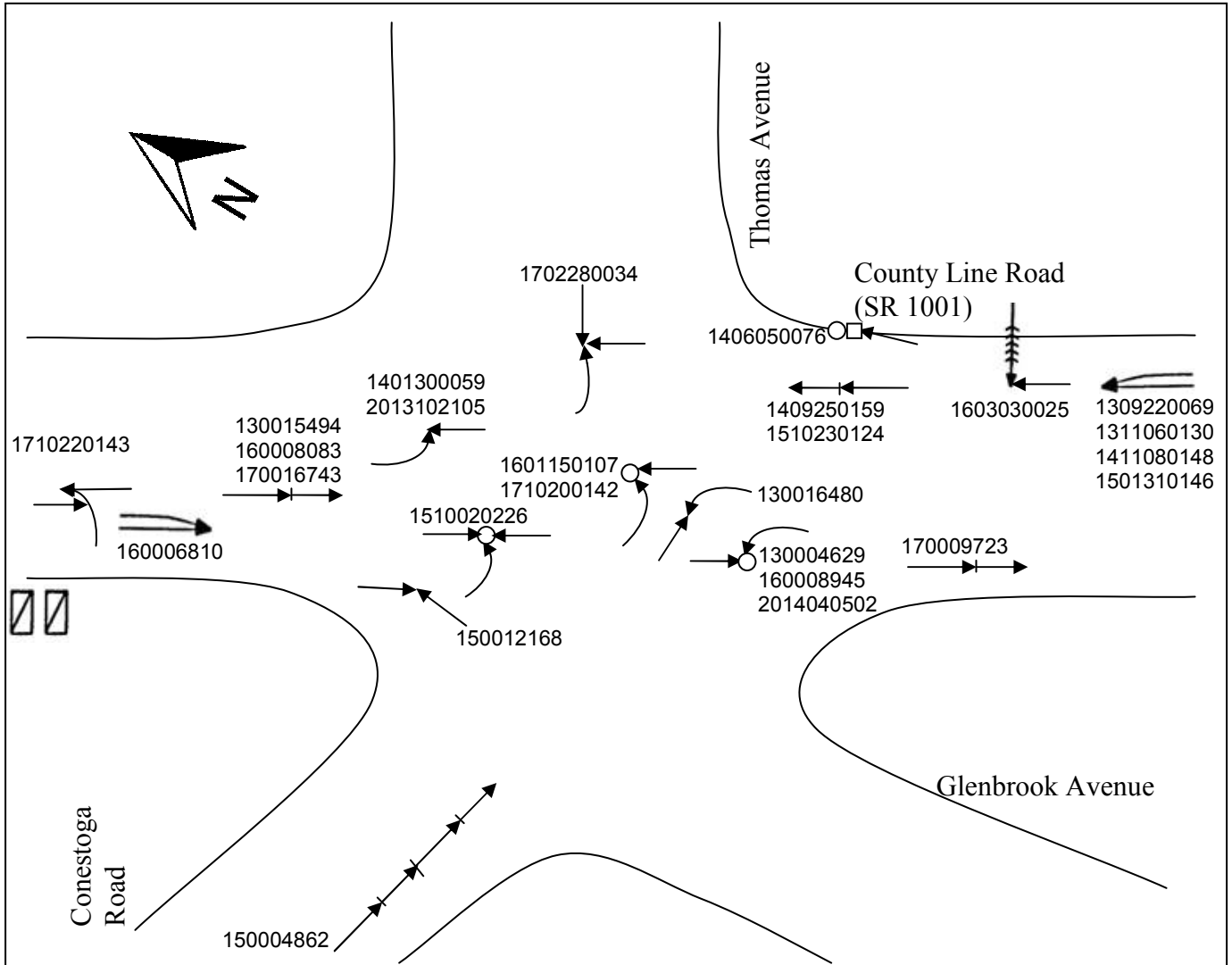
SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
Moving Vehicle Backing Vehicle Non-Involved Vehicle Pedestrian Parked Vehicle Fixed Object Fatal Accident Injury Accident	Rear-End Head On Side Swipe Out of Control Left Turn Right Angle	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)

County Line Road (SR 1001) & Roberts Road Collision Diagram



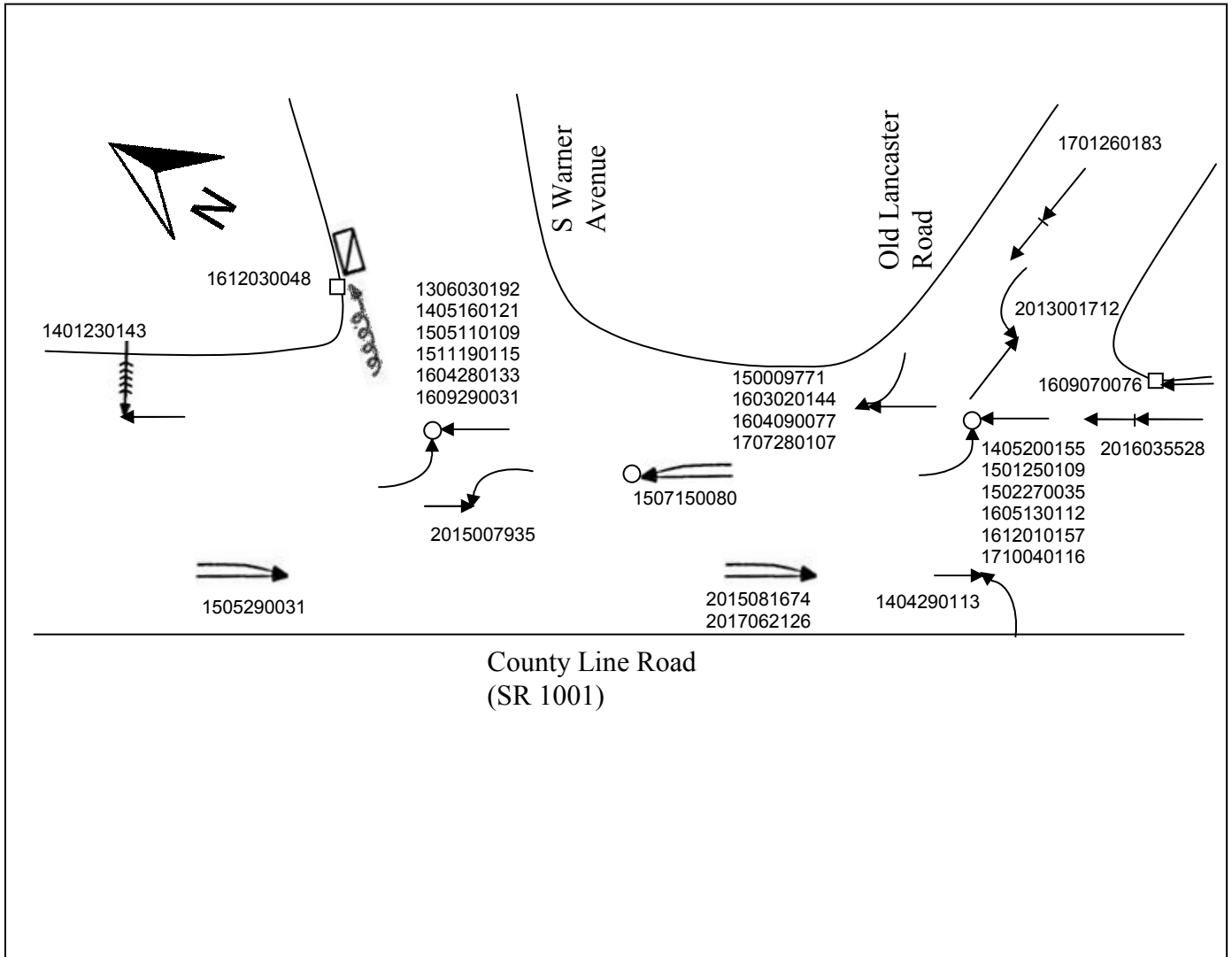
SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
← Moving Vehicle	←← Rear-End	1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)
←>>> Backing Vehicle	→→ Head On	
--- Non-Involved Vehicle	←→ Side Swipe	
X --- Pedestrian	←→ Out of Control	
▢ Parked Vehicle	←→ Left Turn	
□ Fixed Object	←→ Right Angle	
● Fatal Accident		
○ Injury Accident		

County Line Road (SR 1001) & Conestoga Road & Glenbrook Avenue & Thomas Avenue Collision Diagram



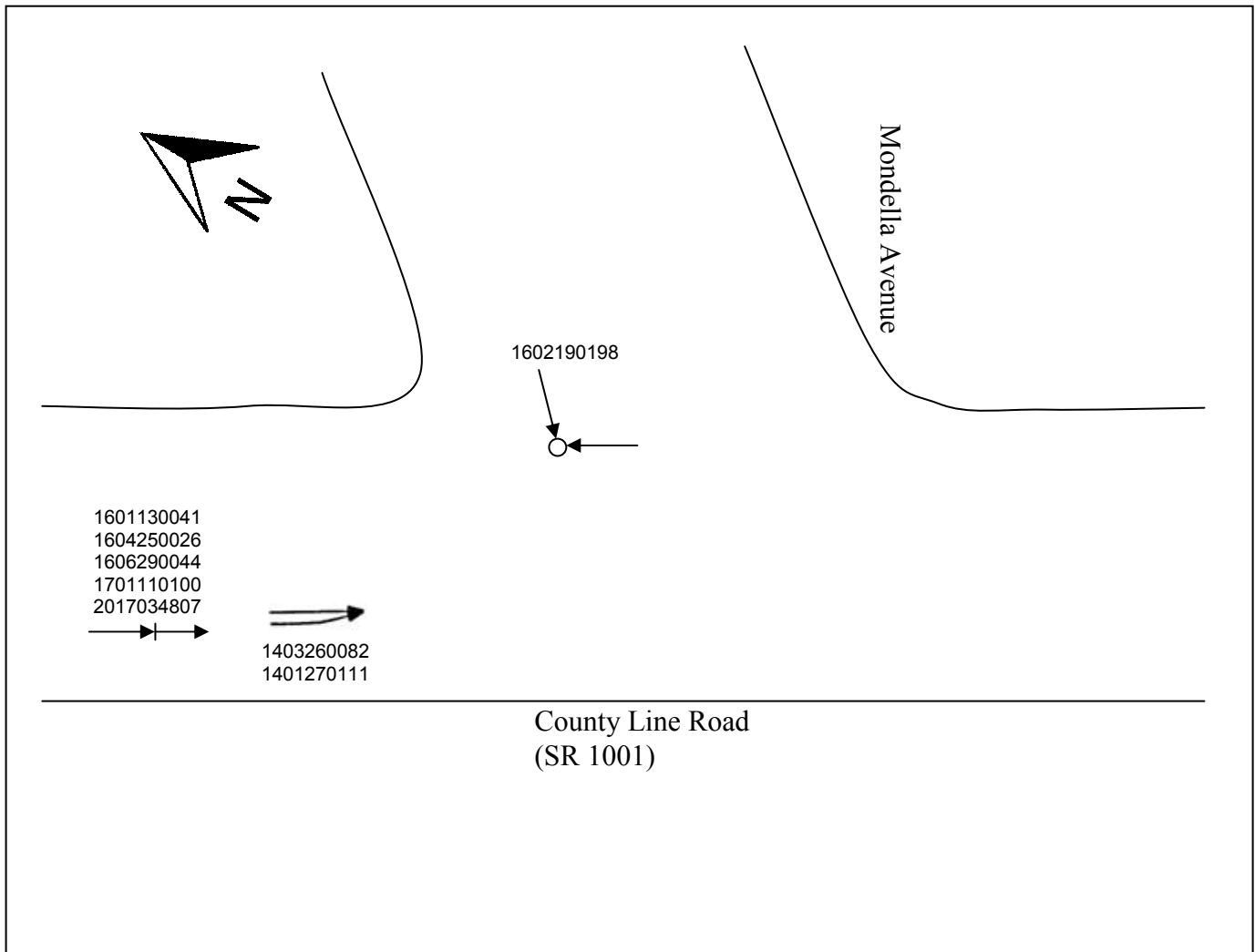
SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<ul style="list-style-type: none"> ← Moving Vehicle ←>>>> Backing Vehicle ← - - - Non-Involved Vehicle X - - - Pedestrian ▣ Parked Vehicle □ Fixed Object ● Fatal Accident ○ Injury Accident 	<ul style="list-style-type: none"> ←> Rear-End ←> Head On ←> Side Swipe ←> Out of Control ←> Left Turn ←> Right Angle 	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)

County Line Road (SR 1001) & S Warner Avenue & Old Lancaster Road Collision Diagram



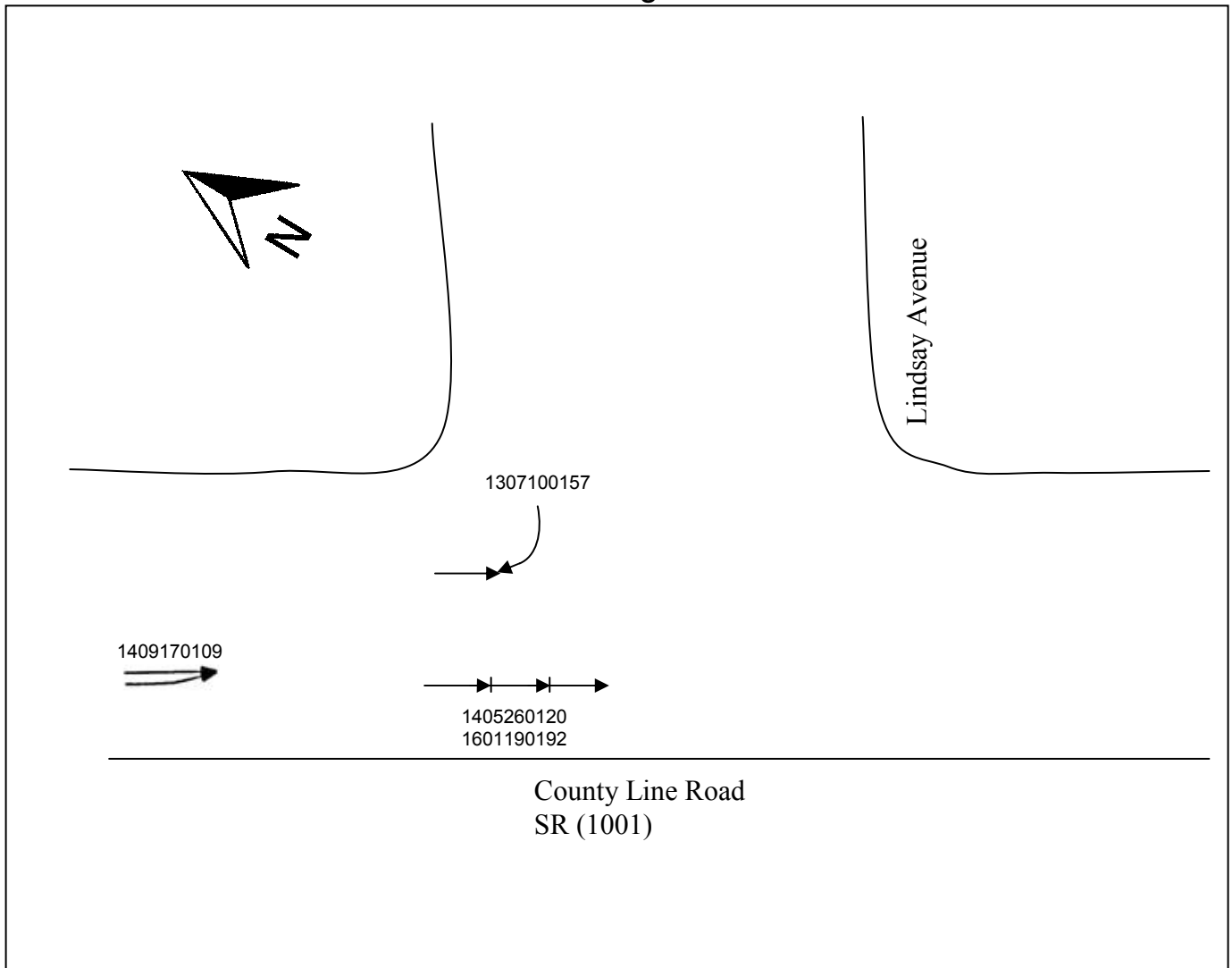
SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<ul style="list-style-type: none"> ← Moving Vehicle ← Backing Vehicle --- Non-Involved Vehicle X --- Pedestrian ▧ Parked Vehicle □ Fixed Object ● Fatal Accident ○ Injury Accident 	<ul style="list-style-type: none"> ← Rear-End ← Head On ← Side Swipe ← Out of Control ← Left Turn ← Right Angle 	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)

County Line Road (SR 1001) & Mondella Avenue Collision Diagram



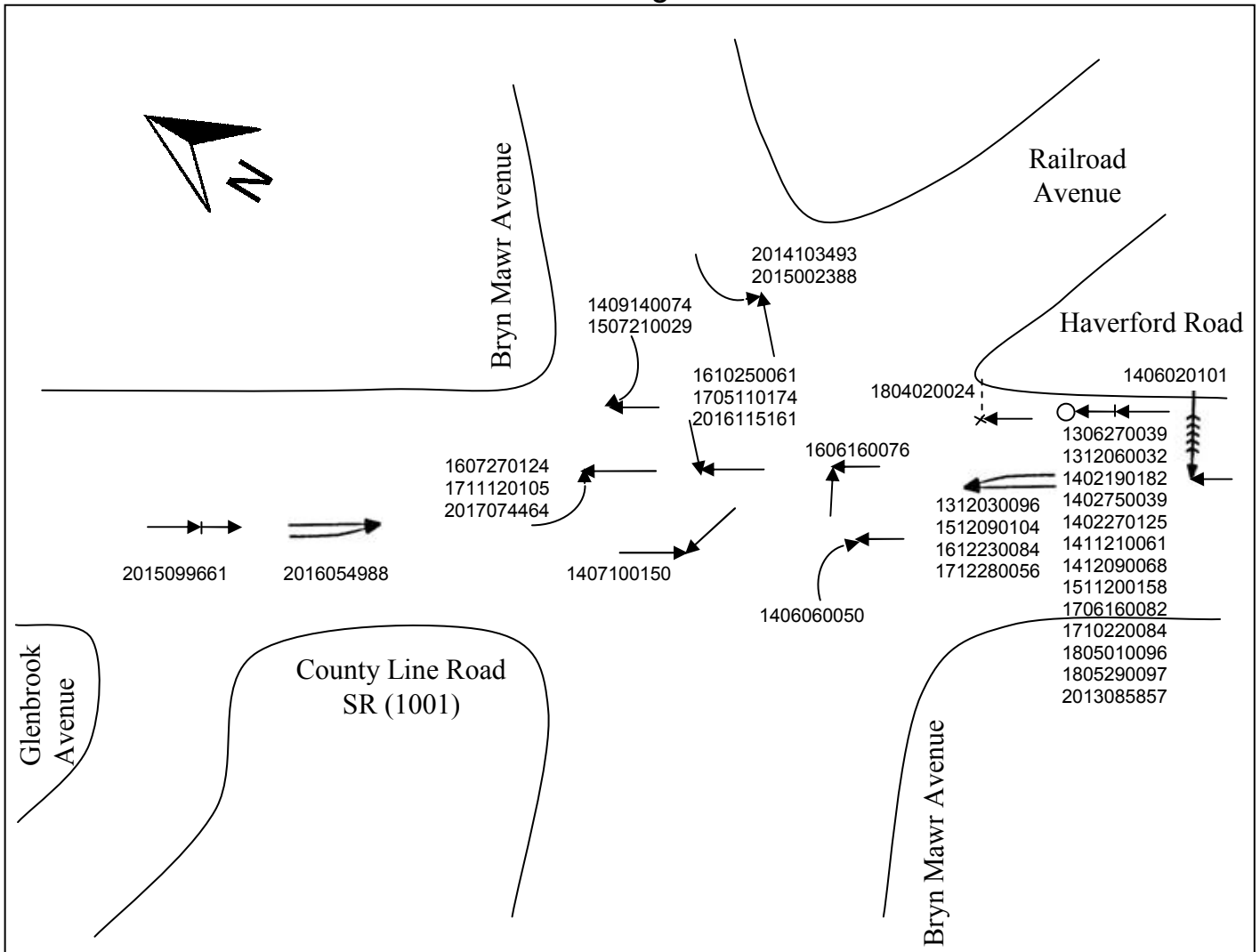
SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
Moving Vehicle Backing Vehicle Non-Involved Vehicle Pedestrian Parked Vehicle Fixed Object Fatal Accident Injury Accident	Rear-End Head On Side Swipe Out of Control Left Turn Right Angle	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)

County Line Road (SR 1001) & Lindsay Avenue Collision Diagram



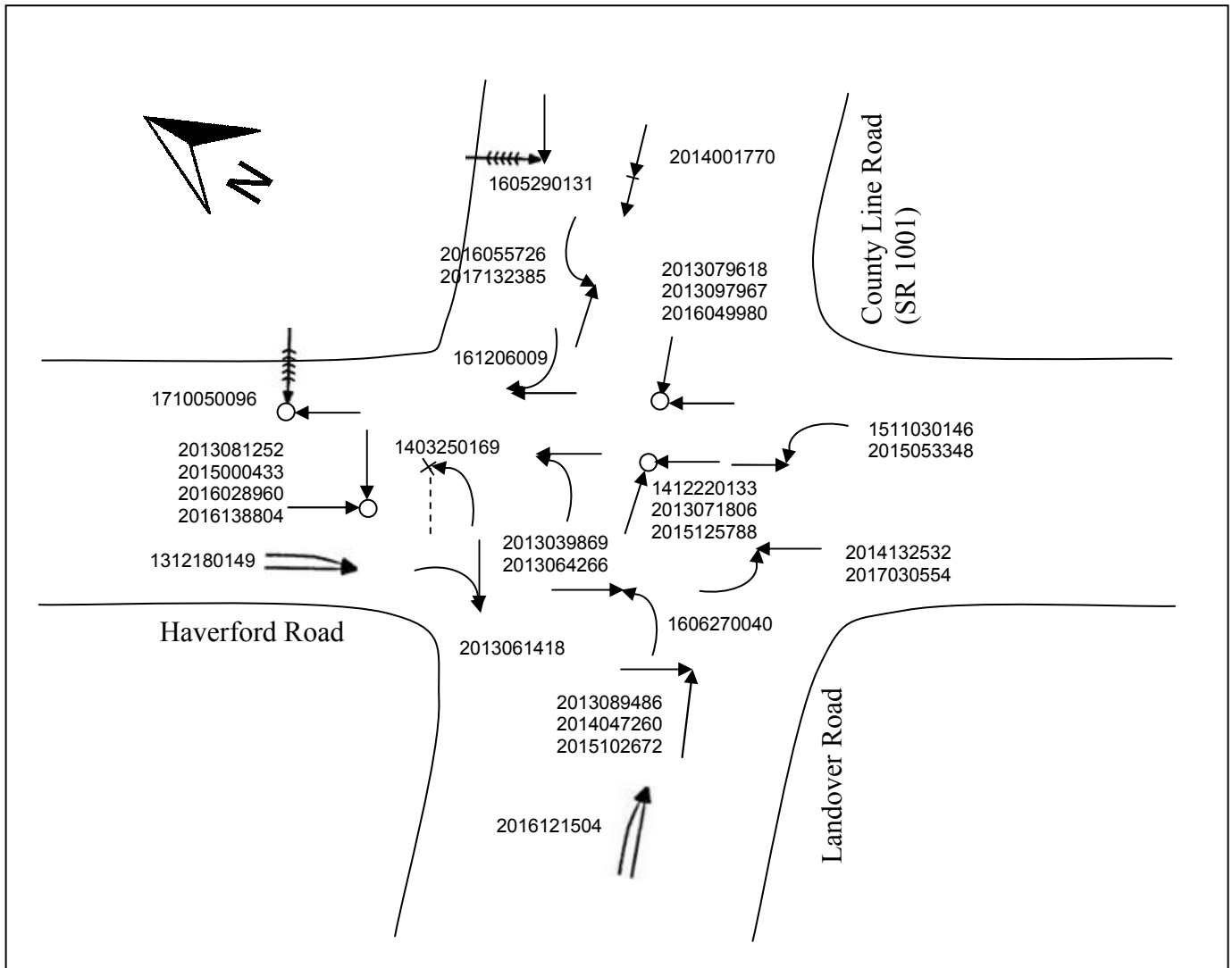
SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
Moving Vehicle Backing Vehicle Non-Involved Vehicle Pedestrian Parked Vehicle Fixed Object Fatal Accident Injury Accident	Rear-End Head On Side Swipe Out of Control Left Turn Right Angle	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)

County Line Road (SR 1001) & Bryn Mawr Avenue & Glenbrook Ave & Railroad Ave & Haverford Road Collision Diagram



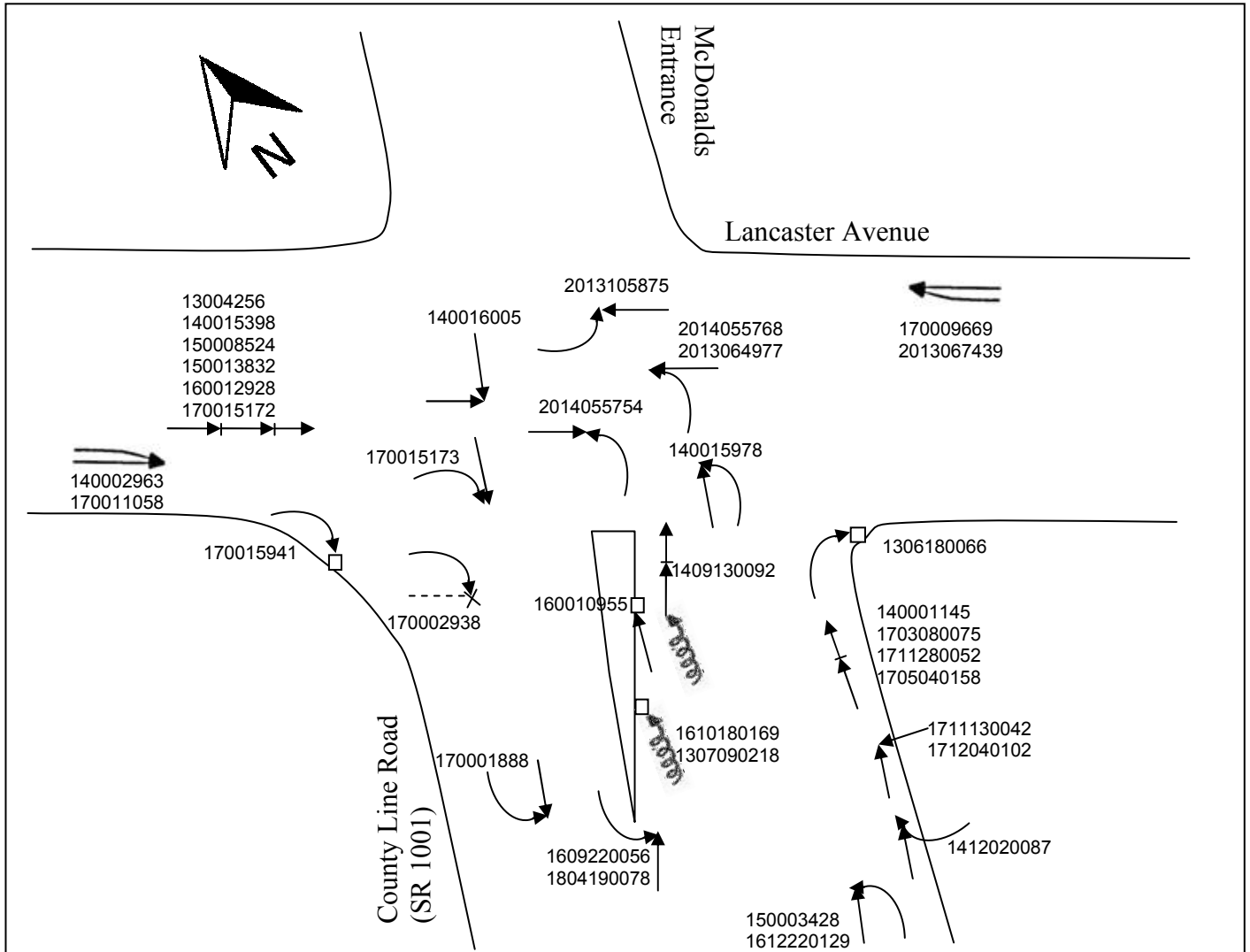
SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
Moving Vehicle Backing Vehicle Non-Involved Vehicle Pedestrian Parked Vehicle Fixed Object Fatal Accident Injury Accident	Rear-End Head On Side Swipe Out of Control Left Turn Right Angle	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)

County Line Road (SR 1001) & Haverford Road & Landover Road Collision Diagram



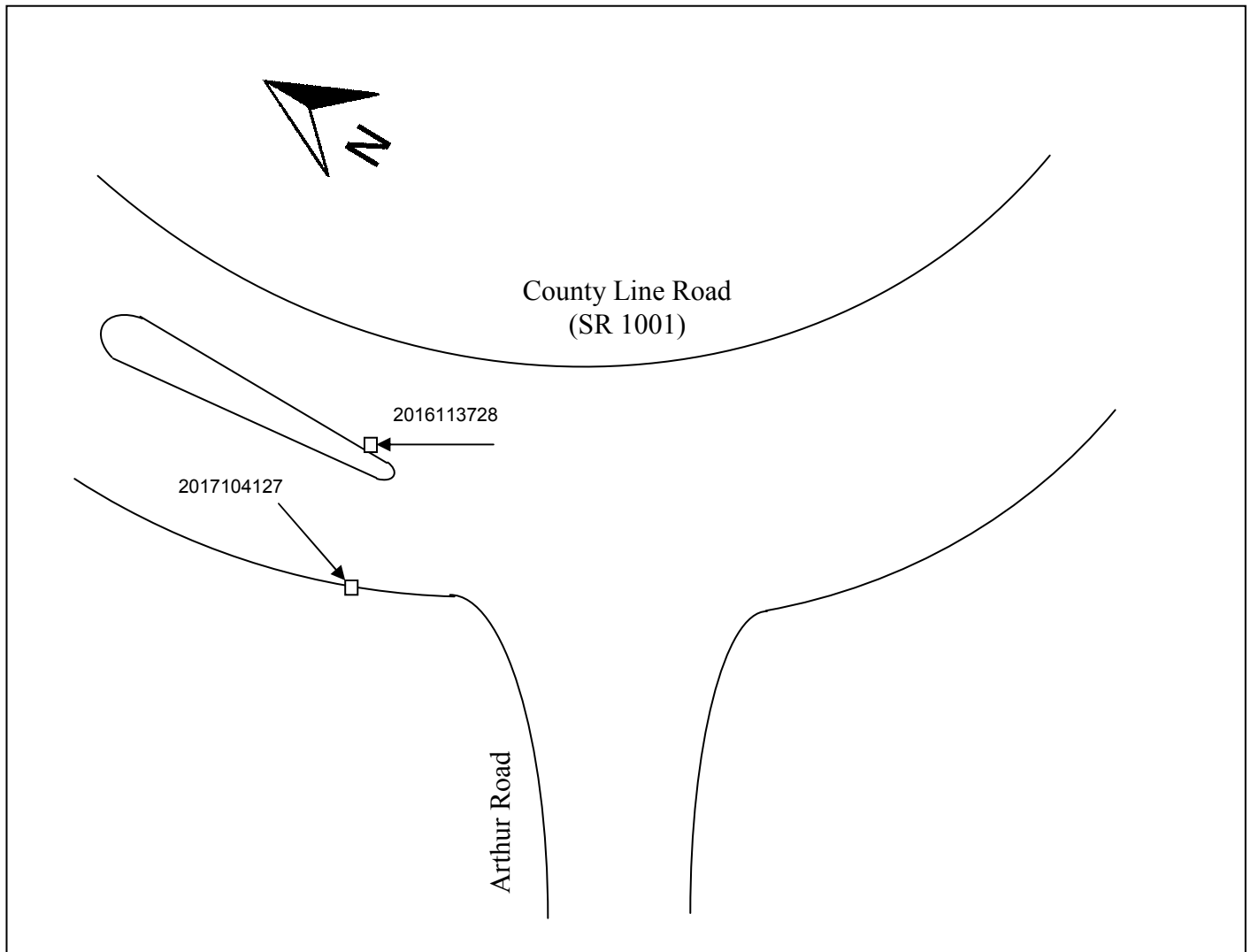
SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<ul style="list-style-type: none"> ← Moving Vehicle ← Backing Vehicle ← - - - Non-Involved Vehicle X - - - Pedestrian ▣ Parked Vehicle □ Fixed Object ● Fatal Accident ○ Injury Accident 	<ul style="list-style-type: none"> ← Rear-End ← Head On ← Side Swipe ← Out of Control ← Left Turn ← Right Angle 	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)

County Line Road (SR 1001) & Lancaster Avenue Collision Diagram



SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<ul style="list-style-type: none"> ← Moving Vehicle ←>>>> Backing Vehicle ← - - - Non-Involved Vehicle X - - - Pedestrian ▣ Parked Vehicle □ Fixed Object ● Fatal Accident ○ Injury Accident 	<ul style="list-style-type: none"> ← ← Rear-End ← → Head On ← ↘ Side Swipe ← ○○○○ Out of Control ← ↙ Left Turn ← ↘ Right Angle 	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)

County Line Road (SR 1001) & Arthur Avenue Collision Diagram



SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<ul style="list-style-type: none"> ← Moving Vehicle ←>>>> Backing Vehicle ← - - - Non-Involved Vehicle × - - - Pedestrian ▢ Parked Vehicle □ Fixed Object ● Fatal Accident ○ Injury Accident 	<ul style="list-style-type: none"> ← ← Rear-End ← → Head On ← ↘ Side Swipe ← ○○○○ Out of Control ← ↙ Left Turn ← ↘ Right Angle 	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of oil on road, ruts, etc.)

APPENDIX D

Traffic Signal Warrant Analyses



STUDY AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 8/27/2018
 Conducted By: LAS
 Agency/Company Name: G&A

Analysis Information

Data Collection Date: 12/1/2016
 Day of the Week: Tuesday

Is the intersection in a built-up area of an isolated community of <10,000 population? No

Major Street Information

Major Street Name and Route Number: County Line Road
 Major Street Approach #1 Direction: N-Bound
 Major Street Approach #2 Direction: S-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach: 2 LANE(S)
 Speed Limit or 85th Percentile Speed on the Major Street: 40.5 MPH

Minor Street Information

Minor Street Name and Route Number: Montrose Ave
 Minor Street Approach #1 Direction: E-Bound
 Minor Street Approach #2 Direction: W-Bound

Number of Lanes for Moving Traffic on Each Minor Street Approach: 1 LANE(S)

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	Yes	Yes
Warrant 2, Four-Hour Vehicular Volume	Yes	Yes
Warrant 3, Peak Hour	Yes	No
Warrant 4, Pedestrian Volume	Yes	No
Warrant 5, School Crossing	No	N/A
Warrant 6, Coordinated Signal System	No	N/A
Warrant 7, Crash Experience	Yes	No
Warrant 8, Roadway Network	No	N/A
Warrant 9, Intersection Near a Grade Crossing	No	N/A
Warrant PA-1, ADT Volume Warrant	No	N/A
Warrant PA-2, Midblock and Trail Crossings	No	N/A

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH						
Time Interval		Major Street Approach #1 (N-Bound)	Major Street Approach #2 (S-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 AM	12:14 AM			0		
12:15 AM	12:29 AM			0		
12:30 AM	12:44 AM			0		
12:45 AM	12:59 AM			0		
1:00 AM	1:14 AM			0		
1:15 AM	1:29 AM			0		
1:30 AM	1:44 AM			0		
1:45 AM	1:59 AM			0		
2:00 AM	2:14 AM			0		
2:15 AM	2:29 AM			0		
2:30 AM	2:44 AM			0		
2:45 AM	2:59 AM			0		
3:00 AM	3:14 AM			0		
3:15 AM	3:29 AM			0		
3:30 AM	3:44 AM			0		
3:45 AM	3:59 AM			0		
4:00 AM	4:14 AM			0		
4:15 AM	4:29 AM			0		
4:30 AM	4:44 AM			0		
4:45 AM	4:59 AM			0		
5:00 AM	5:14 AM			0		
5:15 AM	5:29 AM			0		
5:30 AM	5:44 AM			0		
5:45 AM	5:59 AM			0		
6:00 AM	6:14 AM	33	42	75	3	3
6:15 AM	6:29 AM	60	55	115	2	7
6:30 AM	6:44 AM	75	89	164	4	8
6:45 AM	6:59 AM	97	98	195	3	8
7:00 AM	7:14 AM	96	110	206	3	16
7:15 AM	7:29 AM	92	136	228	7	19
7:30 AM	7:44 AM	118	148	266	6	28
7:45 AM	7:59 AM	123	162	285	14	40
8:00 AM	8:14 AM	134	164	298	20	54
8:15 AM	8:29 AM	126	192	318	15	29
8:30 AM	8:44 AM	114	164	278	10	43
8:45 AM	8:59 AM	110	159	269	12	21
9:00 AM	9:14 AM	101	143	244	11	21
9:15 AM	9:29 AM	96	156	252	10	20
9:30 AM	9:44 AM	99	173	272	17	18
9:45 AM	9:59 AM	98	148	246	10	21
10:00 AM	10:14 AM	83	105	188	13	10
10:15 AM	10:29 AM	92	88	180	14	13
10:30 AM	10:44 AM	93	99	192	8	23
10:45 AM	10:59 AM	85	109	194	10	18
11:00 AM	11:14 AM	94	115	209	19	18
11:15 AM	11:29 AM	102	109	211	9	10
11:30 AM	11:44 AM	98	120	218	14	12
11:45 AM	11:59 AM	134	126	260	13	20

Traffic Signal Warrant Analysis Workbook

10/11/2018

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH						
Time Interval		Major Street Approach #1 (N-Bound)	Major Street Approach #2 (S-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 PM	12:14 PM	102	102	204	13	16
12:15 PM	12:29 PM	99	135	234	17	20
12:30 PM	12:44 PM	101	117	218	23	11
12:45 PM	12:59 PM	123	103	226	13	21
1:00 PM	1:14 PM	89	117	206	14	12
1:15 PM	1:29 PM	109	119	228	15	14
1:30 PM	1:44 PM	117	134	251	19	12
1:45 PM	1:59 PM	113	92	205	15	15
2:00 PM	2:14 PM	93	114	207	13	16
2:15 PM	2:29 PM	132	142	274	14	12
2:30 PM	2:44 PM	143	103	246	21	17
2:45 PM	2:59 PM	137	130	267	32	12
3:00 PM	3:14 PM	135	152	287	20	18
3:15 PM	3:29 PM	144	117	261	21	20
3:30 PM	3:44 PM	152	150	302	17	17
3:45 PM	3:59 PM	144	122	266	30	14
4:00 PM	4:14 PM	167	143	310	11	19
4:15 PM	4:29 PM	165	143	308	15	21
4:30 PM	4:44 PM	167	123	290	26	32
4:45 PM	4:59 PM	157	117	274	23	33
5:00 PM	5:14 PM	173	105	278	8	44
5:15 PM	5:29 PM	192	134	326	20	42
5:30 PM	5:44 PM	198	141	339	19	46
5:45 PM	5:59 PM	187	108	295	21	22
6:00 PM	6:14 PM	165	95	260	30	27
6:15 PM	6:29 PM	179	94	273	17	28
6:30 PM	6:44 PM	132	97	229	17	21
6:45 PM	6:59 PM	129	94	223	16	16
7:00 PM	7:14 PM			0		
7:15 PM	7:29 PM			0		
7:30 PM	7:44 PM			0		
7:45 PM	7:59 PM			0		
8:00 PM	8:14 PM			0		
8:15 PM	8:29 PM			0		
8:30 PM	8:44 PM			0		
8:45 PM	8:59 PM			0		
9:00 PM	9:14 PM			0		
9:15 PM	9:29 PM			0		
9:30 PM	9:44 PM			0		
9:45 PM	9:59 PM			0		
10:00 PM	10:14 PM			0		
10:15 PM	10:29 PM			0		
10:30 PM	10:44 PM			0		
10:45 PM	10:59 PM			0		
11:00 PM	11:14 PM			0		
11:15 PM	11:29 PM			0		
11:30 PM	11:44 PM			0		
11:45 PM	11:59 PM			0		
Approach Totals:		6297	6353	12650	767	1078

MUTCD WARRANT 1, EIGHT-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Combination of Conditions A and B Necessary?*: **No**

**Only applicable for Warrant 1 if after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems. See Section 4C.02 of the 2009 MUTCD for application.*

Condition A - Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or More	1	600	480	420	336	150	120	105	84
2 or More	2 or More	600	480	420	336	200	160	140	112
1	2 or More	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or More	1	900	720	630	504	75	60	53	42
2 or More	2 or More	900	720	630	504	100	80	70	56
1	2 or More	750	600	525	420	100	80	70	56

Condition A Evaluation

Number of Unique Hours Met: **4** Condition A Satisfied? **No**

Condition B Evaluation

Number of Unique Hours Met: **12** Condition B Satisfied? **Yes**

Combination of Condition A and Condition B Evaluation

Number of Unique Hours Met for Condition A: **N/A**

Number of Unique Hours Met for Condition B: **N/A**

Combination of Condition A and Condition B Satisfied? **N/A**

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
10

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	75	3	
5:30 AM	190	10	
5:45 AM	354	18	
6:00 AM	549	26	
6:15 AM	680	39	
6:30 AM	793	51	
6:45 AM	895	71	Met
7:00 AM	985	103	Met
7:15 AM	1077	141	Met
7:30 AM	1167	151	Met
7:45 AM	1179	166	Met
8:00 AM	1163	147	Met
8:15 AM	1109	114	Met
8:30 AM	1043	105	Met
8:45 AM	1037	80	Met
9:00 AM	1014	80	Met
9:15 AM	958	69	Met
9:30 AM	886	62	
9:45 AM	806	67	
10:00 AM	754	64	
10:15 AM	775	72	
10:30 AM	806	69	
10:45 AM	832	58	
11:00 AM	898	60	
11:15 AM	893	58	
11:30 AM	916	68	Met
11:45 AM	916	67	Met

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 PM	882	68	Met
12:15 PM	884	67	Met
12:30 PM	878	65	Met
12:45 PM	911	61	Met
1:00 PM	890	63	Met
1:15 PM	891	62	
1:30 PM	937	61	Met
1:45 PM	932	63	Met
2:00 PM	994	80	Met
2:15 PM	1074	87	Met
2:30 PM	1061	94	Met
2:45 PM	1117	90	Met
3:00 PM	1116	88	Met
3:15 PM	1139	79	Met
3:30 PM	1186	73	Met
3:45 PM	1174	86	Met
4:00 PM	1182	105	Met
4:15 PM	1150	130	Met
4:30 PM	1168	151	Met
4:45 PM	1217	165	Met
5:00 PM	1238	154	Met
5:15 PM	1220	137	Met
5:30 PM	1167	123	Met
5:45 PM	1057	98	Met
6:00 PM	985	92	Met
6:15 PM	725	65	
6:30 PM	452	37	
6:45 PM	223	16	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	No
---	----

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	N/A
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	N/A
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	N/A
<i>*If applicable, attach all supporting calculations and documentation.</i>	

Total Number of Unique Hours Met On Figure 4C-4
4

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	75	3	
5:30 AM	190	10	
5:45 AM	354	18	
6:00 AM	549	26	
6:15 AM	680	39	
6:30 AM	793	51	
6:45 AM	895	71	
7:00 AM	985	103	
7:15 AM	1077	141	Met
7:30 AM	1167	151	Met
7:45 AM	1179	166	Met
8:00 AM	1163	147	Met
8:15 AM	1109	114	Met

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
8:30 AM	1043	105	
8:45 AM	1037	80	
9:00 AM	1014	80	
9:15 AM	958	69	
9:30 AM	886	62	
9:45 AM	806	67	
10:00 AM	754	64	
10:15 AM	775	72	
10:30 AM	806	69	
10:45 AM	832	58	
11:00 AM	898	60	
11:15 AM	893	58	
11:30 AM	916	68	
11:45 AM	916	67	
12:00 PM	882	68	
12:15 PM	884	67	
12:30 PM	878	65	
12:45 PM	911	61	
1:00 PM	890	63	
1:15 PM	891	62	
1:30 PM	937	61	
1:45 PM	932	63	
2:00 PM	994	80	
2:15 PM	1074	87	
2:30 PM	1061	94	
2:45 PM	1117	90	
3:00 PM	1116	88	
3:15 PM	1139	79	
3:30 PM	1186	73	
3:45 PM	1174	86	Met
4:00 PM	1182	105	Met
4:15 PM	1150	130	Met
4:30 PM	1168	151	Met
4:45 PM	1217	165	Met
5:00 PM	1238	154	Met
5:15 PM	1220	137	Met
5:30 PM	1167	123	Met
5:45 PM	1057	98	
6:00 PM	985	92	
6:15 PM	725	65	
6:30 PM	452	37	
6:45 PM	223	16	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 4, PEDESTRIAN VOLUME

Built-up Isolated Community With Less Than 10,000 Population or Above 35 MPH on Major Street? Yes

15th Percentile Pedestrian Crossing Speed Less than 3.5 f/s?* No
**If applicable, attach all supporting calculations, documentation, and findings.*

Is the distance to the nearest traffic control signal or STOP sign controlling the major street that pedestrians desire to cross less than 300 feet? No

If the distance to the nearest traffic control signal or STOP sign controlling the major street that pedestrians desire to cross is less than 300 feet, will the proposed traffic control signal restrict the progressive movement of traffic?* No
**If applicable, attach supporting justification.*

Total Number of Unique Hours Met for Criterion A: 0

Total Number of Unique Hours Met for Criterion B: 0

Hourly Vehicular & Pedestrian Volume				
Hour Interval	Major Street Combined	Total of All Pedestrians Crossing Major Street	Criterion A: 4-Hour	Criterion B: 1-Hour
Beginning At	Vehicles Per Hour (VPH)	Pedestrians Per Hour (PPH)	Hour Met on Figure 4C-6?	Hour Met on Figure 4C-8?
12:00 AM	0			
12:15 AM	0			
12:30 AM	0			
12:45 AM	0			
1:00 AM	0			
1:15 AM	0			
1:30 AM	0			
1:45 AM	0			
2:00 AM	0			
2:15 AM	0			
2:30 AM	0			
2:45 AM	0			
3:00 AM	0			
3:15 AM	0			
3:30 AM	0			
3:45 AM	0			
4:00 AM	0			
4:15 AM	0			
4:30 AM	0			
4:45 AM	0			
5:00 AM	0			
5:15 AM	75			
5:30 AM	190			
5:45 AM	354			
6:00 AM	549			
6:15 AM	680			
6:30 AM	793			
6:45 AM	895			
7:00 AM	985	3		
7:15 AM	1077			
7:30 AM	1167			
7:45 AM	1179			
8:00 AM	1163	6		
8:15 AM	1109			
8:30 AM	1043			
8:45 AM	1037			
9:00 AM	1014	7		
9:15 AM	958			
9:30 AM	886			
9:45 AM	806			

Hourly Vehicular & Pedestrian Volume				
Hour Interval	Major Street Combined	Total of All Pedestrians Crossing Major Street	Criterion A: 4-Hour	Criterion B: 1-Hour
Beginning At	Vehicles Per Hour (VPH)	Pedestrians Per Hour (PPH)	Hour Met on Figure 4C-6?	Hour Met on Figure 4C-8?
10:00 AM	754	1		
10:15 AM	775			
10:30 AM	806			
10:45 AM	832			
11:00 AM	898	2		
11:15 AM	893			
11:30 AM	916			
11:45 AM	916			
12:00 PM	882	7		
12:15 PM	884			
12:30 PM	878			
12:45 PM	911			
1:00 PM	890	6		
1:15 PM	891			
1:30 PM	937			
1:45 PM	932			
2:00 PM	994	13		
2:15 PM	1074			
2:30 PM	1061			
2:45 PM	1117			
3:00 PM	1116	3		
3:15 PM	1139			
3:30 PM	1186			
3:45 PM	1174			
4:00 PM	1182	10		
4:15 PM	1150			
4:30 PM	1168			
4:45 PM	1217			
5:00 PM	1238	10		
5:15 PM	1220			
5:30 PM	1167			
5:45 PM	1057			
6:00 PM	985	3		
6:15 PM	725			
6:30 PM	452			
6:45 PM	223			
7:00 PM	0	7		
7:15 PM	0			
7:30 PM	0			
7:45 PM	0			
8:00 PM	0			
8:15 PM	0			
8:30 PM	0			
8:45 PM	0			
9:00 PM	0			
9:15 PM	0			
9:30 PM	0			
9:45 PM	0			
10:00 PM	0			
10:15 PM	0			
10:30 PM	0			
10:45 PM	0			
11:00 PM	0			

MUTCD WARRANT 7, CRASH EXPERIENCE

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Has adequate trial of alternatives with satisfactory observance and enforcement failed to reduce the crash frequency?

Five or more reportable and/or non-reportable crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period during the most recent 3 years of available crash data.*
**If applicable, attach a summary of the crash data analysis used for this criterion.*

For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition A in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection.

For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection.

The volume of pedestrian traffic is not less than 80% of the requirements specified in Warrant 4, the Pedestrian Volume warrant.*
**If applicable, attach all supporting calculations and documentation.*

MUTCD WARRANT 8, ROADWAY NETWORK*

Is the major street classified as an Urban Extension, Principal Arterial, or Minor Arterial that is a reasonable connection between two Principal Arterials and/or Urban Extensions as shown on the official Functional Classification Map?

Does the intersection have a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1,2, and 3 during an average weekday?

Does the intersection have a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday)?

Is the major street part of the street or highway system that serves as the principal roadway network for through traffic flow?

Does the major street include rural or suburban highways outside, entering, or traversing a city?

Does the major street appear as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study?

**Refer to Section 4.3 of PennDOT Publication 46 (Traffic Engineering Manual) for additional Department documentation requirements to justify the installation of a signal under Warrant 8. Attach all supplementary documentation and calculations, especially those relating to traffic volume projections and subsequent Warrant analyses.*

STUDY AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 8/27/2018
 Conducted By: LAS
 Agency/Company Name: G&A

Analysis Information

Data Collection Date: 1/31/2017
 Day of the Week: Thursday

Is the intersection in a built-up area of an isolated community of <10,000 population? No

Major Street Information

Major Street Name and Route Number: County Line Road
 Major Street Approach #1 Direction: N-Bound
 Major Street Approach #2 Direction: S-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach: 2 LANE(S)
 Speed Limit or 85th Percentile Speed on the Major Street: 40.5 MPH

Minor Street Information

Minor Street Name and Route Number: Roberts Road
 Minor Street Approach #1 Direction: E-Bound
 Minor Street Approach #2 Direction: W-Bound

Number of Lanes for Moving Traffic on Each Minor Street Approach: 1 LANE(S)

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	Yes	Yes
Warrant 2, Four-Hour Vehicular Volume	Yes	Yes
Warrant 3, Peak Hour	Yes	No
Warrant 4, Pedestrian Volume	Yes	No
Warrant 5, School Crossing	No	N/A
Warrant 6, Coordinated Signal System	No	N/A
Warrant 7, Crash Experience	Yes	No
Warrant 8, Roadway Network	No	N/A
Warrant 9, Intersection Near a Grade Crossing	No	N/A
Warrant PA-1, ADT Volume Warrant	No	N/A
Warrant PA-2, Midblock and Trail Crossings	No	N/A

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH						
Time Interval		Major Street Approach #1 (N-Bound)	Major Street Approach #2 (S-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 AM	12:14 AM			0		
12:15 AM	12:29 AM			0		
12:30 AM	12:44 AM			0		
12:45 AM	12:59 AM			0		
1:00 AM	1:14 AM			0		
1:15 AM	1:29 AM			0		
1:30 AM	1:44 AM			0		
1:45 AM	1:59 AM			0		
2:00 AM	2:14 AM			0		
2:15 AM	2:29 AM			0		
2:30 AM	2:44 AM			0		
2:45 AM	2:59 AM			0		
3:00 AM	3:14 AM			0		
3:15 AM	3:29 AM			0		
3:30 AM	3:44 AM			0		
3:45 AM	3:59 AM			0		
4:00 AM	4:14 AM			0		
4:15 AM	4:29 AM			0		
4:30 AM	4:44 AM			0		
4:45 AM	4:59 AM			0		
5:00 AM	5:14 AM			0		
5:15 AM	5:29 AM			0		
5:30 AM	5:44 AM			0		
5:45 AM	5:59 AM			0		
6:00 AM	6:14 AM	55	33	88	3	1
6:15 AM	6:29 AM	60	62	122	5	1
6:30 AM	6:44 AM	79	92	171	6	3
6:45 AM	6:59 AM	110	74	184	13	9
7:00 AM	7:14 AM	131	84	215	16	8
7:15 AM	7:29 AM	135	141	276	13	5
7:30 AM	7:44 AM	148	110	258	34	7
7:45 AM	7:59 AM	141	160	301	54	7
8:00 AM	8:14 AM	161	130	291	54	19
8:15 AM	8:29 AM	145	99	244	45	14
8:30 AM	8:44 AM	145	120	265	31	8
8:45 AM	8:59 AM	135	109	244	21	8
9:00 AM	9:14 AM	129	101	230	20	4
9:15 AM	9:29 AM	162	96	258	25	7
9:30 AM	9:44 AM	178	98	276	43	12
9:45 AM	9:59 AM	106	96	202	27	8
10:00 AM	10:14 AM	91	91	182	18	2
10:15 AM	10:29 AM	88	83	171	16	9
10:30 AM	10:44 AM	91	98	189	13	9
10:45 AM	10:59 AM	107	78	185	18	11
11:00 AM	11:14 AM	114	75	189	20	17
11:15 AM	11:29 AM	98	102	200	21	8
11:30 AM	11:44 AM	111	96	207	19	10
11:45 AM	11:59 AM	87	93	180	11	8

Traffic Signal Warrant Analysis Workbook

10/11/2018

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH						
Time Interval		Major Street Approach #1 (N-Bound)	Major Street Approach #2 (S-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 PM	12:14 PM	95	87	182	16	12
12:15 PM	12:29 PM	106	94	200	13	9
12:30 PM	12:44 PM	121	112	233	25	17
12:45 PM	12:59 PM	120	103	223	19	12
1:00 PM	1:14 PM	91	98	189	6	16
1:15 PM	1:29 PM	109	84	193	11	8
1:30 PM	1:44 PM	90	93	183	8	11
1:45 PM	1:59 PM	109	91	200	12	11
2:00 PM	2:14 PM	97	102	199	17	19
2:15 PM	2:29 PM	111	137	248	17	13
2:30 PM	2:44 PM	105	157	262	19	11
2:45 PM	2:59 PM	115	145	260	21	14
3:00 PM	3:14 PM	123	167	290	17	7
3:15 PM	3:29 PM	127	140	267	21	11
3:30 PM	3:44 PM	158	150	308	28	5
3:45 PM	3:59 PM	137	155	292	18	21
4:00 PM	4:14 PM	140	142	282	17	16
4:15 PM	4:29 PM	105	149	254	26	19
4:30 PM	4:44 PM	120	160	280	20	15
4:45 PM	4:59 PM	119	161	280	25	16
5:00 PM	5:14 PM	83	206	289	17	24
5:15 PM	5:29 PM	24	162	186	29	17
5:30 PM	5:44 PM	0	179	179	28	19
5:45 PM	5:59 PM	0	136	136	24	22
6:00 PM	6:14 PM			0		
6:15 PM	6:29 PM			0		
6:30 PM	6:44 PM			0		
6:45 PM	6:59 PM			0		
7:00 PM	7:14 PM			0		
7:15 PM	7:29 PM			0		
7:30 PM	7:44 PM			0		
7:45 PM	7:59 PM			0		
8:00 PM	8:14 PM			0		
8:15 PM	8:29 PM			0		
8:30 PM	8:44 PM			0		
8:45 PM	8:59 PM			0		
9:00 PM	9:14 PM			0		
9:15 PM	9:29 PM			0		
9:30 PM	9:44 PM			0		
9:45 PM	9:59 PM			0		
10:00 PM	10:14 PM			0		
10:15 PM	10:29 PM			0		
10:30 PM	10:44 PM			0		
10:45 PM	10:59 PM			0		
11:00 PM	11:14 PM			0		
11:15 PM	11:29 PM			0		
11:30 PM	11:44 PM			0		
11:45 PM	11:59 PM			0		
Approach Totals:		5212	5531	10743	1000	540

MUTCD WARRANT 1, EIGHT-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Combination of Conditions A and B Necessary?*: **No**

**Only applicable for Warrant 1 if after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems. See Section 4C.02 of the 2009 MUTCD for application.*

Condition A - Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or More	1	600	480	420	336	150	120	105	84
2 or More	2 or More	600	480	420	336	200	160	140	112
1	2 or More	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or More	1	900	720	630	504	75	60	53	42
2 or More	2 or More	900	720	630	504	100	80	70	56
1	2 or More	750	600	525	420	100	80	70	56

Condition A Evaluation

Number of Unique Hours Met: **3** Condition A Satisfied? **No**

Condition B Evaluation

Number of Unique Hours Met: **10** Condition B Satisfied? **Yes**

Combination of Condition A and Condition B Evaluation

Number of Unique Hours Met for Condition A: **N/A**

Number of Unique Hours Met for Condition B: **N/A**

Combination of Condition A and Condition B Satisfied? **N/A**

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
7

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	88	3	
5:30 AM	210	8	
5:45 AM	381	14	
6:00 AM	565	27	
6:15 AM	692	40	
6:30 AM	846	48	
6:45 AM	933	76	Met
7:00 AM	1050	117	Met
7:15 AM	1126	155	Met
7:30 AM	1094	187	Met
7:45 AM	1101	184	Met
8:00 AM	1044	151	Met
8:15 AM	983	117	Met
8:30 AM	997	97	Met
8:45 AM	1008	109	Met
9:00 AM	966	115	Met
9:15 AM	918	113	Met
9:30 AM	831	104	Met
9:45 AM	744	74	
10:00 AM	727	65	
10:15 AM	734	67	
10:30 AM	763	72	
10:45 AM	781	78	
11:00 AM	776	71	
11:15 AM	769	67	
11:30 AM	769	59	
11:45 AM	795	65	

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 PM	838	73	
12:15 PM	845	63	
12:30 PM	838	61	
12:45 PM	788	47	
1:00 PM	765	46	
1:15 PM	775	49	
1:30 PM	830	54	
1:45 PM	909	65	Met
2:00 PM	969	74	Met
2:15 PM	1060	74	Met
2:30 PM	1079	78	Met
2:45 PM	1125	87	Met
3:00 PM	1157	84	Met
3:15 PM	1149	84	Met
3:30 PM	1136	89	Met
3:45 PM	1108	81	Met
4:00 PM	1096	88	Met
4:15 PM	1103	88	Met
4:30 PM	1035	91	Met
4:45 PM	934	99	Met
5:00 PM	790	98	Met
5:15 PM	501	81	
5:30 PM	315	52	
5:45 PM	136	24	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	No
---	----

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	N/A
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	N/A
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	N/A
<i>*If applicable, attach all supporting calculations and documentation.</i>	

Total Number of Unique Hours Met On Figure 4C-4
3

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	88	3	
5:30 AM	210	8	
5:45 AM	381	14	
6:00 AM	565	27	
6:15 AM	692	40	
6:30 AM	846	48	
6:45 AM	933	76	
7:00 AM	1050	117	Met
7:15 AM	1126	155	Met
7:30 AM	1094	187	Met
7:45 AM	1101	184	Met
8:00 AM	1044	151	Met
8:15 AM	983	117	

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
8:30 AM	997	97	
8:45 AM	1008	109	
9:00 AM	966	115	
9:15 AM	918	113	
9:30 AM	831	104	
9:45 AM	744	74	
10:00 AM	727	65	
10:15 AM	734	67	
10:30 AM	763	72	
10:45 AM	781	78	
11:00 AM	776	71	
11:15 AM	769	67	
11:30 AM	769	59	
11:45 AM	795	65	
12:00 PM	838	73	
12:15 PM	845	63	
12:30 PM	838	61	
12:45 PM	788	47	
1:00 PM	765	46	
1:15 PM	775	49	
1:30 PM	830	54	
1:45 PM	909	65	
2:00 PM	969	74	
2:15 PM	1060	74	
2:30 PM	1079	78	
2:45 PM	1125	87	
3:00 PM	1157	84	Met
3:15 PM	1149	84	
3:30 PM	1136	89	Met
3:45 PM	1108	81	
4:00 PM	1096	88	
4:15 PM	1103	88	
4:30 PM	1035	91	
4:45 PM	934	99	
5:00 PM	790	98	
5:15 PM	501	81	
5:30 PM	315	52	
5:45 PM	136	24	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

APPENDIX E

Existing Traffic Count Data





TRAFFIC & DATA COLLECTION

Imperial County Collection
Imperial County

Cherry Hill
Imperial County
Imperial County

Imperial County Line
Imperial County
Imperial County
Imperial County
Imperial County

Imperial County Line
Imperial County
Imperial County
Imperial County
Imperial County

Imperial County Line

Start Date	Imperial County Line Inbound						Imperial County Line Outbound						Imperial County Line Inbound						Imperial County Line Outbound						Inbound						
	Turn	Left	Thru	Right	Red	Total	Turn	Left	Thru	Right	Red	Total	Turn	Left	Thru	Right	Red	Total	Turn	Left	Thru	Right	Red	Total							
10/01/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/02/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/03/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/04/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/05/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/06/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/07/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/08/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/09/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/11/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/12/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/13/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/15/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/16/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/17/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/31/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



TRAFFIC & DATA COLLECTION

Imperial County Collection

Imperial County

Imperial County

Cherry Hill, Cerrey, United, etc.

Imperial County

County Line

Imperial County

Site Code

Site Code

Site Code

County Line

Municipality

County

Metropolitan

Location

Burnin Morement Peak Hour

Table with columns for Start Date, Location (Inbound/Outbound), and various vehicle types (Total, Light, Medium, Articulated Truck, etc.).



TRAFFIC & DATA COLLECTION

Imperial County Collection

Imperial County

Imperial County

Cherry Hill, Berkeley, San Diego, San Marcos, San Ramon, Vista

Imperial County, Imperial Valley, San Diego, San Marcos, San Ramon, Vista

County Line Road Location

State Map/ID/Agency

Site Code

Start Date

End Date

Project County Line Road Location
Municipality/Donor Location
County
Setback
Location

Turning Movement Week Hour

Table with columns for Start Date, Location/Direction, and various traffic metrics (Turn, Left, Through, Right, Pedestrian, Total) for different road types and directions.

COUNTY LINE

Montgomery County
County Line of Montgomery
County
Location

County Line of Montgomery
County
Location

County Line of Montgomery
County
Location

Turn Movement Week Report

Report Date	County Line of Montgomery County - Outbound						Montgomery County - Inbound						County Line of Montgomery County - Outbound						Montgomery County - Inbound						Total Inbound						
	Right	Thru	Left	Turn	Red	Total	Right	Thru	Left	Turn	Red	Total	Right	Thru	Left	Turn	Red	Total	Right	Thru	Left	Turn	Red	Total							
01/01/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/02/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/03/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/04/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/05/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/06/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/07/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/08/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/09/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/10/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/11/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/12/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/13/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/14/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/15/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/16/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/17/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/18/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/19/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/20/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/21/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/22/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/23/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/24/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/25/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/26/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/27/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/28/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/29/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/30/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/31/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/01/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

County Line Rd/Roberts Road - TMC

Tue Jan 31, 2017

AM Peak (7:45AM - 8:45AM) - Overall Peak Hour

All Classes (Articulated Trucks and Single-Unit Trucks, Bicycles on Crosswalk, Buses, Lights, Pedestrians)

All Movements

ID: 380498, Location: 40.023344, -75.326278



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Roberts Road Southbound						County Line Road Westbound						Roberts Road Northbound						County Line Road Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2017-01-31 7:45AM	3	3	1	0	7	1	6	133	2	0	141	0	10	25	19	0	54	1	14	141	5	0	160	2	362
8:00AM	6	10	3	0	19	0	7	153	1	0	161	0	4	33	17	0	54	1	8	120	2	0	130	0	364
8:15AM	5	6	3	0	14	2	6	138	1	0	145	0	1	28	16	0	45	0	13	86	0	0	99	0	303
8:30AM	2	6	0	0	8	1	9	136	0	0	145	0	1	15	15	0	31	0	10	108	2	0	120	0	304
Total	16	25	7	0	48	4	28	560	4	0	592	0	16	101	67	0	184	2	45	455	9	0	509	2	1333
% Approach	33.3%	52.1%	14.6%	0%	-	-	4.7%	94.6%	0.7%	0%	-	-	8.7%	54.9%	36.4%	0%	-	-	8.8%	89.4%	1.8%	0%	-	-	-
% Total	1.2%	1.9%	0.5%	0%	3.6%	-	2.1%	42.0%	0.3%	0%	44.4%	-	1.2%	7.6%	5.0%	0%	13.8%	-	3.4%	34.1%	0.7%	0%	38.2%	-	-
PHF	0.667	0.625	0.583	-	0.632	-	0.778	0.915	0.500	-	0.919	-	0.400	0.765	0.882	-	0.852	-	0.804	0.807	0.450	-	0.795	-	0.916
Lights	16	25	7	0	48	-	27	549	4	0	580	-	16	99	61	0	176	-	45	436	9	0	490	-	1294
% Lights	100%	100%	100%	0%	100%	-	96.4%	98.0%	100%	0%	98.0%	-	100%	98.0%	91.0%	0%	95.7%	-	100%	95.8%	100%	0%	96.3%	-	97.1%
Articulated Trucks and Single-Unit Trucks	0	0	0	0	0	-	1	5	0	0	6	-	0	2	0	0	2	-	0	8	0	0	8	-	16
% Articulated Trucks and Single-Unit Trucks	0%	0%	0%	0%	0%	-	3.6%	0.9%	0%	0%	1.0%	-	0%	2.0%	0%	0%	1.1%	-	0%	1.8%	0%	0%	1.6%	-	1.2%
Buses	0	0	0	0	0	-	0	6	0	0	6	-	0	0	6	0	6	-	0	11	0	0	11	-	23
% Buses	0%	0%	0%	0%	0%	-	0%	1.1%	0%	0%	1.0%	-	0%	0%	9.0%	0%	3.3%	-	0%	2.4%	0%	0%	2.2%	-	1.7%
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	50.0%	-	-	-	-	-	100%	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	50.0%	-	-	-	-	-	0%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn.

County Line Rd/Roberts Road - TMC

Tue Jan 31, 2017

PM Peak (3:15PM - 4:15PM)

All Classes (Articulated Trucks and Single-Unit Trucks, Bicycles on Crosswalk, Buses, Lights, Pedestrians)

All Movements

ID: 380498, Location: 40.023344, -75.326278



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Roberts Road Southbound						County Line Road Westbound						Roberts Road Northbound						County Line Road Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2017-01-31 3:15PM	2	6	3	0	11	0	4	123	0	0	127	0	5	6	10	0	21	1	20	117	3	0	140	1	299
3:30PM	1	3	1	0	5	2	6	152	0	0	158	2	2	14	12	0	28	1	19	131	0	0	150	0	341
3:45PM	3	14	4	0	21	4	7	130	0	0	137	0	4	8	6	0	18	3	28	126	1	0	155	3	331
4:00PM	3	8	5	0	16	1	10	130	0	0	140	0	3	9	5	0	17	0	24	118	0	0	142	0	315
Total	9	31	13	0	53	7	27	535	0	0	562	2	14	37	33	0	84	5	91	492	4	0	587	4	1286
% Approach	17.0%	58.5%	24.5%	0%	-	-	4.8%	95.2%	0%	0%	-	-	16.7%	44.0%	39.3%	0%	-	-	15.5%	83.8%	0.7%	0%	-	-	-
% Total	0.7%	2.4%	1.0%	0%	4.1%	-	2.1%	41.6%	0%	0%	43.7%	-	1.1%	2.9%	2.6%	0%	6.5%	-	7.1%	38.3%	0.3%	0%	45.6%	-	-
PHF	0.750	0.554	0.650	-	0.631	-	0.675	0.880	-	-	0.889	-	0.700	0.661	0.688	-	0.750	-	0.813	0.939	0.333	-	0.947	-	0.943
Lights	9	31	13	0	53	-	27	516	0	0	543	-	13	37	29	0	79	-	87	480	4	0	571	-	1246
% Lights	100%	100%	100%	0%	100%	-	100%	96.4%	0%	0%	96.6%	-	92.9%	100%	87.9%	0%	94.0%	-	95.6%	97.6%	100%	0%	97.3%	-	96.9%
Articulated Trucks and Single-Unit Trucks	0	0	0	0	0	-	0	6	0	0	6	-	0	0	0	0	0	-	0	1	0	0	1	-	7
% Articulated Trucks and Single-Unit Trucks	0%	0%	0%	0%	0%	-	0%	1.1%	0%	0%	1.1%	-	0%	0%	0%	0%	0%	-	0%	0.2%	0%	0%	0.2%	-	0.5%
Buses	0	0	0	0	0	-	0	13	0	0	13	-	1	0	4	0	5	-	4	11	0	0	15	-	33
% Buses	0%	0%	0%	0%	0%	-	0%	2.4%	0%	0%	2.3%	-	7.1%	0%	12.1%	0%	6.0%	-	4.4%	2.2%	0%	0%	2.6%	-	2.6%
Pedestrians	-	-	-	-	-	7	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	4	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	60.0%	-	-	-	-	-	100%	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	40.0%	-	-	-	-	-	0%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn.



TRAFFIC & DATA COLLECTION

Imperial County Collection

Imperial County

Imperial County

Cherry Hill, Cerrey, United States

Imperial County

County Line Road Robert

Road

Site Code

Start Date

End Date

Project County Line Road
Municipality Sanborn
County
Route M
Location

Turnin Movement Week our 11 2018 M

Start Date	Robert Road Inbound						Robert Road Outbound						County Line Road Inbound						County Line Road Outbound						Intersect						
	Turn	Left	Thru	Right	Red	Total	Turn	Left	Thru	Right	Red	Total	Turn	Left	Thru	Right	Red	Total	Turn	Left	Thru	Right	Red	Total							
11/01/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/02/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/03/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/04/18	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0
11/05/18	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0
11/06/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/07/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/08/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/09/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/10/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/11/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/12/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/13/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/14/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/15/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/16/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/17/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/18/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/19/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/20/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/21/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/22/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/23/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/24/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/25/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/26/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/27/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/28/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/29/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/30/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

County Line Rd/Thomas Ave - TMC

Tue Jan 31, 2017

AM Peak (7:30AM - 8:30AM)

All Classes (Articulated Trucks and Single-Unit Trucks, Buses, Lights, Pedestrians)

All Movements

ID: 380500, Location: 40.022271, -75.325591



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Thomas Ave Southbound								County Line Road Westbound								Glenbrook Ave Northwestbound								
	R	T	BL	L	U	RR	App	Ped*	R	T	L	HL	U	RR	App	Ped*	HR	BR	BL	HL	U	HRR	BRR	App	Ped*
2017-01-31 7:30AM	0	4	0	1	0	0	5	0	4	154	93	0	0	0	251	0	4	3	7	4	0	0	0	18	0
7:45AM	0	3	0	0	0	0	3	1	2	122	87	0	0	0	211	0	5	5	11	5	0	0	0	26	0
8:00AM	0	6	0	2	0	0	8	0	1	144	98	0	0	0	243	2	15	7	23	4	0	0	0	49	0
8:15AM	1	4	0	1	0	0	6	0	5	125	72	0	0	1	203	2	10	2	20	7	0	1	0	40	0
Total	1	17	0	4	0	0	22	1	12	545	350	0	0	1	908	4	34	17	61	20	0	1	0	133	0
% Approach	4.5%	77.3%	0%	18.2%	0%	0%	-	-	1.3%	60.0%	38.5%	0%	0%	0.1%	-	-	25.6%	12.8%	45.9%	15.0%	0%	0.8%	0%	-	-
% Total	0.1%	0.9%	0%	0.2%	0%	0%	1.1%	-	0.6%	28.2%	18.1%	0%	0%	0.1%	47.0%	-	1.8%	0.9%	3.2%	1.0%	0%	0.1%	0%	6.9%	-
PHF	0.250	0.708	-	0.500	-	-	0.688	-	0.600	0.885	0.893	-	-	0.250	0.904	-	0.567	0.607	0.663	0.714	-	0.250	-	0.679	-
Lights	1	16	0	4	0	0	21	-	11	530	341	0	0	1	883	-	33	17	61	19	0	1	0	131	-
% Lights	100%	94.1%	0%	100%	0%	0%	95.5%	-	91.7%	97.2%	97.4%	0%	0%	100%	97.2%	-	97.1%	100%	100%	95.0%	0%	100%	0%	98.5%	-
Articulated Trucks and Single-Unit Trucks	0	0	0	0	0	0	0	-	1	9	7	0	0	0	17	-	0	0	0	0	0	0	0	0	-
% Articulated Trucks and Single-Unit Trucks	0%	0%	0%	0%	0%	0%	0%	-	8.3%	1.7%	2.0%	0%	0%	0%	1.9%	-	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	0	1	0	0	0	0	1	-	0	6	2	0	0	0	8	-	1	0	0	1	0	0	0	2	-
% Buses	0%	5.9%	0%	0%	0%	0%	4.5%	-	0%	1.1%	0.6%	0%	0%	0%	0.9%	-	2.9%	0%	0%	5.0%	0%	0%	0%	1.5%	-
Pedestrians	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, BRR: Bear right on red, HL: Hard left, HR: Hard right, HRR: Hard right on red, L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn.

County Line Rd/Thomas Ave - TMC

Tue Jan 31, 2017

AM Peak (7:30AM - 8:30AM)

All Classes (Articulated Trucks and Single-Unit Trucks, Buses, Lights, Pedestrians)

All Movements

ID: 380500, Location: 40.022271, -75.325591



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Conestoga Road Northbound										County Line Road Eastbound										Int
	HR	R	T	L	U	HRR	RR	App	Ped*	R	BR	T	L	U	RR	BRR	App	Ped*			
2017-01-31 7:30AM	1	89	0	0	0	0	0	90	2	0	6	111	0	0	0	0	117	0	481		
7:45AM	1	103	0	0	0	0	0	104	0	0	0	138	0	0	0	0	138	0	482		
8:00AM	2	102	0	0	0	0	0	104	0	0	4	126	0	0	0	0	130	0	534		
8:15AM	2	82	0	0	0	0	0	84	0	0	3	97	0	0	0	0	100	0	433		
Total	6	376	0	0	0	0	0	382	2	0	13	472	0	0	0	0	485	0	1930		
% Approach	1.6%	98.4%	0%	0%	0%	0%	0%	-	-	0%	2.7%	97.3%	0%	0%	0%	0%	-	-	-		
% Total	0.3%	19.5%	0%	0%	0%	0%	0%	19.8%	-	0%	0.7%	24.5%	0%	0%	0%	0%	25.1%	-	-		
PHF	0.750	0.913	-	-	-	-	-	0.918	-	-	0.542	0.855	-	-	-	-	0.879	-	0.904		
Lights	6	370	0	0	0	0	0	376	-	0	10	449	0	0	0	0	459	-	1870		
% Lights	100%	98.4%	0%	0%	0%	0%	0%	98.4%	-	0%	76.9%	95.1%	0%	0%	0%	0%	94.6%	-	96.9%		
Articulated Trucks and Single-Unit Trucks	0	2	0	0	0	0	0	2	-	0	0	10	0	0	0	0	10	-	29		
% Articulated Trucks and Single-Unit Trucks	0%	0.5%	0%	0%	0%	0%	0%	0.5%	-	0%	0%	2.1%	0%	0%	0%	0%	2.1%	-	1.5%		
Buses	0	4	0	0	0	0	0	4	-	0	3	13	0	0	0	0	16	-	31		
% Buses	0%	1.1%	0%	0%	0%	0%	0%	1.0%	-	0%	23.1%	2.8%	0%	0%	0%	0%	3.3%	-	1.6%		
Pedestrians	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	0		
% Pedestrians	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-		

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, BRR: Bear right on red, HL: Hard left, HR: Hard right, HRR: Hard right on red, L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn.

County Line Rd/Thomas Ave - TMC

Tue Jan 31, 2017

PM Peak (4:15PM - 5:15PM) - Overall Peak Hour

All Classes (Articulated Trucks and Single-Unit Trucks, Buses, Lights, Pedestrians)

All Movements

ID: 380500, Location: 40.022271, -75.325591



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Thomas Ave Southbound								County Line Road Westbound								Glenbrook Ave Northwestbound								
	R	T	BL	L	U	RR	App	Ped*	R	T	L	HL	U	RR	App	Ped*	HR	BR	BL	HL	U	HRR	BRR	App	Ped*
2017-01-31 4:15PM	1	0	2	3	0	0	6	3	5	93	95	0	0	0	193	4	14	6	4	4	0	0	0	28	1
4:30PM	0	6	1	1	0	0	8	4	3	121	88	0	0	0	212	3	14	3	9	5	0	0	0	31	3
4:45PM	2	3	0	0	0	0	5	3	8	99	79	0	0	0	186	2	5	3	6	7	0	0	0	21	0
5:00PM	1	5	5	7	0	0	18	0	7	104	104	0	0	1	216	2	16	7	10	6	0	0	0	39	0
Total	4	14	8	11	0	0	37	10	23	417	366	0	0	1	807	11	49	19	29	22	0	0	0	119	4
% Approach	10.8%	37.8%	21.6%	29.7%	0%	0%	-	-	2.9%	51.7%	45.4%	0%	0%	0.1%	-	-	41.2%	16.0%	24.4%	18.5%	0%	0%	0%	-	-
% Total	0.2%	0.7%	0.4%	0.6%	0%	0%	1.9%	-	1.2%	20.9%	18.4%	0%	0%	0.1%	40.5%	-	2.5%	1.0%	1.5%	1.1%	0%	0%	0%	6.0%	-
PHF	0.500	0.583	0.400	0.393	-	-	0.514	-	0.719	0.862	0.880	-	-	0.250	0.934	-	0.766	0.679	0.725	0.786	-	-	-	0.763	-
Lights	3	14	8	10	0	0	35	-	22	410	366	0	0	1	799	-	49	19	29	22	0	0	0	119	-
% Lights	75.0%	100%	100%	90.9%	0%	0%	94.6%	-	95.7%	98.3%	100%	0%	0%	100%	99.0%	-	100%	100%	100%	100%	0%	0%	0%	100%	-
Articulated Trucks and Single-Unit Trucks	0	0	0	1	0	0	1	-	0	3	0	0	0	0	3	-	0	0	0	0	0	0	0	0	-
% Articulated Trucks and Single-Unit Trucks	0%	0%	0%	9.1%	0%	0%	2.7%	-	0%	0.7%	0%	0%	0%	0%	0.4%	-	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	1	0	0	0	0	0	1	-	1	4	0	0	0	0	5	-	0	0	0	0	0	0	0	0	-
% Buses	25.0%	0%	0%	0%	0%	0%	2.7%	-	4.3%	1.0%	0%	0%	0%	0%	0.6%	-	0%	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-	4
% Pedestrians	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	100%

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, BRR: Bear right on red, HL: Hard left, HR: Hard right, HRR: Hard right on red, L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn.

County Line Rd/Thomas Ave - TMC

Tue Jan 31, 2017

PM Peak (4:15PM - 5:15PM) - Overall Peak Hour

All Classes (Articulated Trucks and Single-Unit Trucks, Buses, Lights, Pedestrians)

All Movements

ID: 380500, Location: 40.022271, -75.325591



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Conestoga Road Northbound										County Line Road Eastbound										Int
	HR	R	T	L	U	HRR	RR	App	Ped*	R	BR	T	L	U	RR	BRR	App	Ped*			
2017-01-31 4:15PM	10	94	0	0	0	0	0	104	1	1	3	141	2	0	0	0	147	0	478		
4:30PM	5	106	0	0	0	0	0	111	0	2	3	132	0	0	0	0	137	0	499		
4:45PM	6	97	0	0	0	0	0	103	0	0	6	165	1	0	0	0	172	0	487		
5:00PM	4	90	0	0	0	0	0	94	0	0	7	151	2	0	0	0	160	0	527		
Total	25	387	0	0	0	0	0	412	1	3	19	589	5	0	0	0	616	0	1991		
% Approach	6.1%	93.9%	0%	0%	0%	0%	0%	-	-	0.5%	3.1%	95.6%	0.8%	0%	0%	0%	-	-	-		
% Total	1.3%	19.4%	0%	0%	0%	0%	0%	20.7%	-	0.2%	1.0%	29.6%	0.3%	0%	0%	0%	30.9%	-	-		
PHF	0.625	0.913	-	-	-	-	-	0.928	-	0.375	0.679	0.892	0.625	-	-	-	0.895	-	0.944		
Lights	25	383	0	0	0	0	0	408	-	3	18	587	5	0	0	0	613	-	1974		
% Lights	100%	99.0%	0%	0%	0%	0%	0%	99.0%	-	100%	94.7%	99.7%	100%	0%	0%	0%	99.5%	-	99.1%		
Articulated Trucks and Single-Unit Trucks	0	2	0	0	0	0	0	2	-	0	0	1	0	0	0	0	1	-	7		
% Articulated Trucks and Single-Unit Trucks	0%	0.5%	0%	0%	0%	0%	0%	0.5%	-	0%	0%	0.2%	0%	0%	0%	0%	0.2%	-	0.4%		
Buses	0	2	0	0	0	0	0	2	-	0	1	1	0	0	0	0	2	-	10		
% Buses	0%	0.5%	0%	0%	0%	0%	0%	0.5%	-	0%	5.3%	0.2%	0%	0%	0%	0%	0.3%	-	0.5%		
Pedestrians	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0		
% Pedestrians	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-		

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, BRR: Bear right on red, HL: Hard left, HR: Hard right, HRR: Hard right on red, L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn.

4. County Line Road & Conestoga Road/Thomas Avenue/Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Sat Apr 28, 2018

Midday Peak (WKND), Forced Peak (11:45AM - 12:45PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians,

Bicycles on Crosswalk)

All Movements

ID: 519503, Location: 40.022288, -75.325567, Site Code: 4

Leg Direction	Thomas Avenue Westbound								County Line Road Northbound								County Line Road Southbound							
	L	BL	BR	R	U	App	Ped*	HL	BL	T	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*			
2018-04-28 11:45AM	4	0	0	0	0	4	2	0	65	116	4	0	185	2	1	78	3	0	0	82	2			
12:00PM	3	0	3	3	0	9	0	0	59	107	12	0	178	3	2	109	0	3	0	114	2			
12:15PM	6	1	1	2	0	10	1	0	67	106	4	0	177	10	1	74	0	1	0	76	1			
12:30PM	5	2	1	1	0	9	1	0	64	98	7	0	169	8	0	102	3	0	0	105	0			
Total	18	3	5	6	0	32	4	0	255	427	27	0	709	23	4	363	6	4	0	377	5			
% Approach	56.3%	9.4%	15.6%	18.8%	0%	-	-	0%	36.0%	60.2%	3.8%	0%	-	-	1.1%	96.3%	1.6%	1.1%	0%	-	-			
% Total	1.2%	0.2%	0.3%	0.4%	0%	2.1%	-	0%	16.5%	27.6%	1.7%	0%	45.9%	-	0.3%	23.5%	0.4%	0.3%	0%	24.4%	-			
PHF	0.750	0.375	0.417	0.500	-	0.800	-	-	0.951	0.920	0.563	-	0.958	-	0.500	0.833	0.500	0.333	-	0.827	-			
Lights	18	2	5	6	0	31	-	0	254	417	27	0	698	-	4	358	6	4	0	372	-			
% Lights	100%	66.7%	100%	100%	0%	96.9%	-	0%	99.6%	97.7%	100%	0%	98.4%	-	100%	98.6%	100%	100%	0%	98.7%	-			
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-			
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-			
Buses and Single-Unit Trucks	0	1	0	0	0	1	-	0	1	10	0	0	11	-	0	5	0	0	0	5	-			
% Buses and Single-Unit Trucks	0%	33.3%	0%	0%	0%	3.1%	-	0%	0.4%	2.3%	0%	0%	1.6%	-	0%	1.4%	0%	0%	0%	1.3%	-			
Pedestrians	-	-	-	-	-	-	4	-	-	-	-	-	-	23	-	-	-	-	-	-	5			
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%			
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0			
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%			

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

4. County Line Road & Conestoga Road/Thomas Avenue/Glenbrook

Provided by: Imperial Traffic & Data

Avenu - TMC

Collection

Sat Apr 28, 2018

27 Imperial Drive,

Midday Peak (WKND), Forced Peak (11:45AM - 12:45PM) - Overall Peak Hour

Cherry Hill, NJ, 08003, US

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians,

Bicycles on Crosswalk)

All Movements

ID: 519503, Location: 40.022288, -75.325567, Site Code: 4

Leg Direction	Conestoga Road Southeastbound								Glenbrook Avenue Northeastbound								Int
	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*			
2018-04-28 11:45AM	0	0	87	5	0	92	3	2	15	9	12	0	38	1	401		
12:00PM	0	0	67	3	0	70	1	4	7	3	12	0	26	2	397		
12:15PM	0	0	67	3	0	70	0	2	7	3	11	0	23	1	356		
12:30PM	0	0	75	0	0	75	0	6	5	7	16	0	34	0	392		
Total	0	0	296	11	0	307	4	14	34	22	51	0	121	4	1546		
% Approach	0%	0%	96.4%	3.6%	0%	-	-	11.6%	28.1%	18.2%	42.1%	0%	-	-	-		
% Total	0%	0%	19.1%	0.7%	0%	19.9%	-	0.9%	2.2%	1.4%	3.3%	0%	7.8%	-	-		
PHF	-	-	0.851	0.550	-	0.834	-	0.583	0.567	0.611	0.797	-	0.796	-	0.964		
Lights	0	0	296	11	0	307	-	14	34	22	50	0	120	-	1528		
% Lights	0%	0%	100%	100%	0%	100%	-	100%	100%	100%	98.0%	0%	99.2%	-	98.8%		
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0		
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-	0%		
Buses and Single-Unit Trucks	0	0	0	0	0	0	-	0	0	0	1	0	1	-	18		
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	2.0%	0%	0.8%	-	1.2%		
Pedestrians	-	-	-	-	-	-	4	-	-	-	-	-	-	-	4		
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	100%		
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	0%		

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

5/6. County Line Road & S. Warner Avenue & Old Lancaster Road - TMC

Tue May 1, 2018

AM Peak (May 01 2018 7:30AM - 8:30AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519507, Location: 40.021591, -75.32498, Site Code: 5, 6

Provided by: Imperial Traffic & Data

Collection

27 Imperial Drive,

Cherry Hill, NJ, 08003, US

Leg Direction	County Line Road Northbound						County Line Road Southbound						Old Lancaster Road Northwestbound						S. Warner Avenue Southwestbound		Int
	T	BR	HR	U	App	Ped*	HL	BL	T	U	App	Ped*	HL	BR	R	U	App	Ped*	App	Ped*	
2018-05-01 7:30AM	236	2	0	0	238	1	1	58	134	0	193	1	1	34	3	0	38	0	0	4	469
7:45AM	215	7	0	0	222	0	4	68	175	0	247	0	0	50	2	0	52	0	0	3	521
8:00AM	214	1	0	0	215	0	0	77	173	0	250	0	1	31	2	0	34	0	0	0	499
8:15AM	221	6	0	0	227	0	0	71	159	0	230	0	1	33	1	0	35	0	0	1	492
Total	886	16	0	0	902	1	5	274	641	0	920	1	3	148	8	0	159	0	0	8	1981
% Approach	98.2%	1.8%	0%	0%	-	-	0.5%	29.8%	69.7%	0%	-	-	1.9%	93.1%	5.0%	0%	-	-	-	-	-
% Total	44.7%	0.8%	0%	0%	45.5%	-	0.3%	13.8%	32.4%	0%	46.4%	-	0.2%	7.5%	0.4%	0%	8.0%	-	0%	-	-
PHF	0.939	0.571	-	-	0.947	-	0.313	0.890	0.916	-	0.920	-	0.750	0.740	0.667	-	0.764	-	-	-	0.951
Lights	858	14	0	0	872	-	5	272	613	0	890	-	2	145	7	0	154	-	0	-	1916
% Lights	96.8%	87.5%	0%	0%	96.7%	-	100%	99.3%	95.6%	0%	96.7%	-	66.7%	98.0%	87.5%	0%	96.9%	-	-	-	96.7%
Articulated Trucks	2	0	0	0	2	-	0	0	2	0	2	-	1	0	0	0	1	-	0	-	5
% Articulated Trucks	0.2%	0%	0%	0%	0.2%	-	0%	0%	0.3%	0%	0.2%	-	33.3%	0%	0%	0%	0.6%	-	-	-	0.3%
Buses and Single-Unit Trucks	26	2	0	0	28	-	0	2	26	0	28	-	0	3	1	0	4	-	0	-	60
% Buses and Single-Unit Trucks	2.9%	12.5%	0%	0%	3.1%	-	0%	0.7%	4.1%	0%	3.0%	-	0%	2.0%	12.5%	0%	2.5%	-	-	-	3.0%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	8
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	100%
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	0%

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, R: Right, T: Thru, U: U-Turn

5/6. County Line Road & S. Warner Avenue & Old Lancaster Road - TMC

Provided by: Imperial Traffic & Data

Tue May 1, 2018

Collection

PM Peak (May 01 2018 4:45PM - 5:45PM) - Overall Peak Hour

27 Imperial Drive,

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

Cherry Hill, NJ, 08003, US

All Movements

ID: 519507, Location: 40.021591, -75.32498, Site Code: 5, 6

Leg Direction	County Line Road Northbound						County Line Road Southbound						Old Lancaster Road Northwestbound						S. Warner Avenue Southwestbound		Int
	T	BR	HR	U	App	Ped*	HL	BL	T	U	App	Ped*	HL	BR	R	U	App	Ped*	App	Ped*	
2018-05-01 4:45PM	176	4	0	0	180	0	2	44	215	0	261	0	4	74	6	0	84	0	0	4	525
5:00PM	182	9	0	0	191	0	3	34	253	0	290	0	3	74	6	1	84	1	0	2	565
5:15PM	144	4	3	0	151	0	4	21	249	0	274	0	0	44	8	0	52	2	0	3	477
5:30PM	149	6	0	0	155	1	5	28	273	0	306	0	0	63	9	0	72	2	0	6	533
Total	651	23	3	0	677	1	14	127	990	0	1131	0	7	255	29	1	292	5	0	15	2100
% Approach	96.2%	3.4%	0.4%	0%	-	-	1.2%	11.2%	87.5%	0%	-	-	2.4%	87.3%	9.9%	0.3%	-	-	-	-	-
% Total	31.0%	1.1%	0.1%	0%	32.2%	-	0.7%	6.0%	47.1%	0%	53.9%	-	0.3%	12.1%	1.4%	0%	13.9%	-	0%	-	-
PHF	0.894	0.639	0.250	-	0.886	-	0.700	0.722	0.907	-	0.924	-	0.438	0.861	0.806	0.250	0.869	-	-	-	0.929
Lights	642	23	3	0	668	-	14	124	979	0	1117	-	7	253	28	1	289	-	0	-	2074
% Lights	98.6%	100%	100%	0%	98.7%	-	100%	97.6%	98.9%	0%	98.8%	-	100%	99.2%	96.6%	100%	99.0%	-	-	-	98.8%
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	-	0%
Buses and Single-Unit Trucks	9	0	0	0	9	-	0	3	11	0	14	-	0	2	1	0	3	-	0	-	26
% Buses and Single-Unit Trucks	1.4%	0%	0%	0%	1.3%	-	0%	2.4%	1.1%	0%	1.2%	-	0%	0.8%	3.4%	0%	1.0%	-	-	-	1.2%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	4	-	14	-
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	80.0%	-	93.3%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	1	-
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	20.0%	-	6.7%	-

* Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, R: Right, T: Thru, U: U-Turn

5/6. County Line Road & S. Warner Avenue & Old Lancaster Road - TMC

Provided by: Imperial Traffic & Data

Sat Apr 28, 2018

Collection

Midday Peak (WKND) (Apr 28 2018 11:45AM - 12:45PM)

27 Imperial Drive,

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

Cherry Hill, NJ, 08003, US

All Movements

ID: 519507, Location: 40.021591, -75.32498, Site Code: 5, 6

Leg Direction	County Line Road Northbound						County Line Road Southbound						Old Lancaster Road Northwestbound						S. Warner Avenue Southwestbound		Int
	T	BR	HR	U	App	Ped*	HL	BL	T	U	App	Ped*	HL	BR	R	U	App	Ped*	App	Ped*	
2018-04-28 11:45AM	145	6	2	0	153	0	1	25	143	0	169	0	5	36	6	0	47	1	0	5	369
12:00PM	145	6	0	0	151	0	7	26	153	0	186	0	1	40	5	0	46	0	0	0	383
12:15PM	160	2	0	0	162	3	1	24	124	1	150	1	2	20	6	0	28	1	0	3	340
12:30PM	129	7	0	0	136	2	2	18	168	0	188	0	5	47	5	0	57	0	0	1	381
Total	579	21	2	0	602	5	11	93	588	1	693	1	13	143	22	0	178	2	0	9	1473
% Approach	96.2%	3.5%	0.3%	0%	-	-	1.6%	13.4%	84.8%	0.1%	-	-	7.3%	80.3%	12.4%	0%	-	-	-	-	-
% Total	39.3%	1.4%	0.1%	0%	40.9%	-	0.7%	6.3%	39.9%	0.1%	47.0%	-	0.9%	9.7%	1.5%	0%	12.1%	-	0%	-	-
PHF	0.905	0.750	0.250	-	0.929	-	0.393	0.894	0.875	0.250	0.922	-	0.650	0.761	0.917	-	0.781	-	-	-	0.961
Lights	571	21	2	0	594	-	9	92	583	1	685	-	13	141	21	0	175	-	0	-	1454
% Lights	98.6%	100%	100%	0%	98.7%	-	81.8%	98.9%	99.1%	100%	98.8%	-	100%	98.6%	95.5%	0%	98.3%	-	-	-	98.7%
Articulated Trucks	0	0	0	0	0	-	1	0	0	0	1	-	0	0	0	0	0	-	0	-	1
% Articulated Trucks	0%	0%	0%	0%	0%	-	9.1%	0%	0%	0%	0.1%	-	0%	0%	0%	0%	0%	-	-	-	0.1%
Buses and Single-Unit Trucks	8	0	0	0	8	-	1	1	5	0	7	-	0	2	1	0	3	-	0	-	18
% Buses and Single-Unit Trucks	1.4%	0%	0%	0%	1.3%	-	9.1%	1.1%	0.9%	0%	1.0%	-	0%	1.4%	4.5%	0%	1.7%	-	-	-	1.2%
Pedestrians	-	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	1	-	9	-
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	50.0%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	50.0%	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, R: Right, T: Thru, U: U-Turn



TRAFFIC & DATA COLLECTION

Imperial County Traffic Collection

Imperial County

Imperial County

Cherry Hill, Cerrey, United, etc.

Imperial County

County Line, Mondell

Revenue

Site Code

Start Date

End Date

Project County Line, Municipality, County, Location

Imperial County Traffic Collection

Table with columns for Start Date, Mondell Revenue (Inbound, Outbound, Total), County Line Revenue (Inbound, Outbound, Total), and Int. Total. Rows include categories like Light, Medium, Articulated Truck, and City/Leisure Crossover.



TRAFFIC & DATA COLLECTION

Imperial County Collection

Imperial County

Imperial County

Cherry Hill, Cerrey, United, etc.

Imperial County

County Line, Mondell

Revenue

Site Code

Start Date

End Date

Project County Line, Municipality, County, Location

Burn More Rent Truck Hour

Table with columns for Start Date, Mondell Revenue (Inbound, Outbound), County Line Revenue (Inbound, Outbound), and Total. Rows include categories like Articulated Truck, City/Lease on Crosslink, and Bed-train.



TRAFFIC & DATA COLLECTION

Imperial County Collection

Imperial County

Imperial County

Cherry Hill, Cerrey, United State

Imperial County

County Line, Mondell

Revenue

Site Code

Start Date

End Date

Project County Line, Municipal Utility, County, Station

Turnin Movement Week our

Table with columns for Start Date, Mondell Revenue (Inbound, Outbound), County Line Revenue (Inbound, Outbound), and Int. Total. Rows include categories like Articulated Truck, City/Levon Cro, and Pedestrian.



TRAFFIC & DATA COLLECTION

Imperial County Traffic Collection

Imperial County

Imperial County

Cherry Hill, Cerrey, United, etc.

Imperial County

County Line

Revenue

Site Code

Start Date

End Date

County Line

Municipality

County

Metropolitan

Location

Turnin Movement Week our

Table with columns for Start Date, Lindero Revenue (inbound/outbound), County Line (inbound/outbound), and Total. Rows include categories like Light, Medium, Articulated Truck, and City/Levon Cro.

**9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/W. Railroad Avenue/
Glenbrook Avenue - TMC**

Provided by: Imperial Traffic &
Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Tue May 1, 2018

AM Peak (May 01 2018 7:30AM - 8:30AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on
Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	S. Bryn Mawr Avenue Eastbound								Haverford Road Northbound								County Line Road Southbound							
	L	BL	BR	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*	HL	BL	T	R	U	App	Ped*			
2018-05-01 7:30AM	36	95	11	19	0	161	4	30	225	19	1	0	275	7	10	0	100	23	0	133	5			
7:45AM	32	64	12	27	0	135	6	34	212	28	0	0	274	10	7	6	105	33	0	151	6			
8:00AM	47	93	11	26	0	177	8	34	185	25	3	0	247	6	16	6	112	35	0	169	9			
8:15AM	33	70	13	24	0	140	7	23	196	36	2	0	257	7	12	7	130	12	0	161	3			
Total	148	322	47	96	0	613	25	121	818	108	6	0	1053	30	45	19	447	103	0	614	23			
% Approach	24.1%	52.5%	7.7%	15.7%	0%	-	-	11.5%	77.7%	10.3%	0.6%	0%	-	-	7.3%	3.1%	72.8%	16.8%	0%	-	-			
% Total	5.5%	12.0%	1.7%	3.6%	0%	22.8%	-	4.5%	30.4%	4.0%	0.2%	0%	39.1%	-	1.7%	0.7%	16.6%	3.8%	0%	22.8%	-			
PHF	0.787	0.847	0.904	0.889	-	0.866	-	0.890	0.909	0.750	0.500	-	0.957	-	0.703	0.679	0.860	0.736	-	0.908	-			
Lights	139	315	47	94	0	595	-	115	803	108	6	0	1032	-	43	18	429	93	0	583	-			
% Lights	93.9%	97.8%	100%	97.9%	0%	97.1%	-	95.0%	98.2%	100%	100%	0%	98.0%	-	95.6%	94.7%	96.0%	90.3%	0%	95.0%	-			
Articulated Trucks	0	0	0	0	0	0	-	1	1	0	0	0	2	-	0	0	3	0	0	3	-			
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0.8%	0.1%	0%	0%	0%	0.2%	-	0%	0%	0.7%	0%	0%	0.5%	-			
Buses and Single-Unit Trucks	9	7	0	2	0	18	-	5	14	0	0	0	19	-	2	1	15	10	0	28	-			
% Buses and Single-Unit Trucks	6.1%	2.2%	0%	2.1%	0%	2.9%	-	4.1%	1.7%	0%	0%	0%	1.8%	-	4.4%	5.3%	3.4%	9.7%	0%	4.6%	-			
Pedestrians	-	-	-	-	-	-	24	-	-	-	-	-	-	30	-	-	-	-	-	-	23			
% Pedestrians	-	-	-	-	-	-	96.0%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%			
Bicycles on Crosswalk	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0			
% Bicycles on Crosswalk	-	-	-	-	-	-	4.0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%			

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/ W. Railroad Avenue/ Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Tue May 1, 2018

AM Peak (May 01 2018 7:30AM - 8:30AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	W. Old Railroad Avenue Northwestbound								S. Bryn Mawr Avenue Southwestbound						
Time	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*	Int
2018-05-01 7:30AM	0	0	0	0	0	0	7	1	16	51	18	0	86	2	655
7:45AM	0	0	0	0	0	0	7	1	19	80	12	0	112	1	672
8:00AM	0	0	0	0	0	0	7	0	8	93	15	0	116	2	709
8:15AM	0	0	0	0	0	0	6	2	17	59	19	0	97	0	655
Total	0	0	0	0	0	0	27	4	60	283	64	0	411	5	2691
% Approach	0%	0%	0%	0%	0%	-	-	1.0%	14.6%	68.9%	15.6%	0%	-	-	-
% Total	0%	0%	0%	0%	0%	0%	-	0.1%	2.2%	10.5%	2.4%	0%	15.3%	-	-
PHF	-	-	-	-	-	-	-	0.500	0.789	0.761	0.842	-	0.886	-	0.949
Lights	0	0	0	0	0	0	-	3	58	274	58	0	393	-	2603
% Lights	0%	0%	0%	0%	0%	-	-	75.0%	96.7%	96.8%	90.6%	0%	95.6%	-	96.7%
Articulated Trucks	0	0	0	0	0	0	-	0	0	1	1	0	2	-	7
% Articulated Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	0.4%	1.6%	0%	0.5%	-	0.3%
Buses and Single-Unit Trucks	0	0	0	0	0	0	-	1	2	8	5	0	16	-	81
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	-	25.0%	3.3%	2.8%	7.8%	0%	3.9%	-	3.0%
Pedestrians	-	-	-	-	-	-	26	-	-	-	-	-	-	-	5
% Pedestrians	-	-	-	-	-	-	96.3%	-	-	-	-	-	-	-	100%
Bicycles on Crosswalk	-	-	-	-	-	-	1	-	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	3.7%	-	-	-	-	-	-	-	0%

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/ W. Railroad Avenue/ Glenbrook Avenue - TMC

Tue May 1, 2018

PM Peak (May 01 2018 4:45PM - 5:45PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Leg Direction	S. Bryn Mawr Avenue Eastbound								Haverford Road Northbound								County Line Road Southbound							
	L	BL	BR	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*	HL	BL	T	R	U	App	Ped*			
2018-05-01 4:45PM	18	51	11	43	0	123	1	29	147	22	2	0	200	9	12	7	223	20	0	262	2			
5:00PM	30	65	6	28	0	129	13	25	132	20	2	0	179	5	10	7	222	21	0	260	12			
5:15PM	25	68	13	31	0	137	4	21	121	15	0	0	157	3	7	5	234	17	0	263	6			
5:30PM	26	57	16	35	0	134	10	29	111	16	0	0	156	6	8	7	242	13	0	270	6			
Total	99	241	46	137	0	523	28	104	511	73	4	0	692	23	37	26	921	71	0	1055	26			
% Approach	18.9%	46.1%	8.8%	26.2%	0%	-	-	15.0%	73.8%	10.5%	0.6%	0%	-	-	3.5%	2.5%	87.3%	6.7%	0%	-	-			
% Total	3.4%	8.3%	1.6%	4.7%	0%	17.9%	-	3.6%	17.5%	2.5%	0.1%	0%	23.7%	-	1.3%	0.9%	31.6%	2.4%	0%	36.1%	-			
PHF	0.825	0.886	0.719	0.797	-	0.954	-	0.897	0.869	0.830	0.500	-	0.865	-	0.771	0.929	0.951	0.845	-	0.977	-			
Lights	98	240	45	134	0	517	-	100	505	72	4	0	681	-	36	26	915	68	0	1045	-			
% Lights	99.0%	99.6%	97.8%	97.8%	0%	98.9%	-	96.2%	98.8%	98.6%	100%	0%	98.4%	-	97.3%	100%	99.3%	95.8%	0%	99.1%	-			
Articulated Trucks	0	0	0	0	0	0	-	0	1	0	0	0	1	-	0	0	0	0	0	0	-			
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0%	0.2%	0%	0%	0%	0.1%	-	0%	0%	0%	0%	0%	0%	-			
Buses and Single-Unit Trucks	1	1	1	3	0	6	-	4	5	1	0	0	10	-	1	0	6	3	0	10	-			
% Buses and Single-Unit Trucks	1.0%	0.4%	2.2%	2.2%	0%	1.1%	-	3.8%	1.0%	1.4%	0%	0%	1.4%	-	2.7%	0%	0.7%	4.2%	0%	0.9%	-			
Pedestrians	-	-	-	-	-	-	28	-	-	-	-	-	-	23	-	-	-	-	-	-	26			
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%			
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0			
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%			

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/ W. Railroad Avenue/ Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Tue May 1, 2018

PM Peak (May 01 2018 4:45PM - 5:45PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	W. Old Railroad Avenue Northwestbound								S. Bryn Mawr Avenue Southwestbound								Int
	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*			
2018-05-01 4:45PM	0	0	0	0	0	0	7	3	42	89	18	0	152	0	737		
5:00PM	0	0	0	0	0	0	3	1	61	88	22	0	172	2	740		
5:15PM	0	0	0	0	0	0	1	1	58	100	15	0	174	1	731		
5:30PM	0	0	0	0	0	0	7	1	46	88	16	0	151	3	711		
Total	0	0	0	0	0	0	18	6	207	365	71	0	649	6	2919		
% Approach	0%	0%	0%	0%	0%	-	-	0.9%	31.9%	56.2%	10.9%	0%	-	-	-		
% Total	0%	0%	0%	0%	0%	0%	-	0.2%	7.1%	12.5%	2.4%	0%	22.2%	-	-		
PHF	-	-	-	-	-	-	-	0.500	0.848	0.913	0.807	-	0.932	-	0.986		
Lights	0	0	0	0	0	0	-	6	207	363	70	0	646	-	2889		
% Lights	0%	0%	0%	0%	0%	-	-	100%	100%	99.5%	98.6%	0%	99.5%	-	99.0%		
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	1		
% Articulated Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	0%	-	0%		
Buses and Single-Unit Trucks	0	0	0	0	0	0	-	0	0	2	1	0	3	-	29		
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	0.5%	1.4%	0%	0.5%	-	1.0%		
Pedestrians	-	-	-	-	-	-	18	-	-	-	-	-	-	-	6		
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	100%		
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	0%		

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/W. Railroad Avenue / Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Sat Apr 28, 2018

Midday Peak (WKND) (Apr 28 2018 11:30AM - 12:30PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	S. Bryn Mawr Avenue Eastbound								Haverford Road Northbound								County Line Road Southbound							
	L	BL	BR	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*	HL	BL	T	R	U	App	Ped*			
2018-04-28 11:30AM	41	42	10	27	0	120	4	21	140	23	0	0	184	9	9	1	113	16	0	139	3			
11:45AM	41	48	5	18	0	112	29	33	117	21	1	0	172	11	15	2	118	19	0	154	7			
12:00PM	43	48	4	31	0	126	12	33	112	21	0	0	166	20	10	5	122	15	0	152	1			
12:15PM	31	34	6	23	0	94	6	22	107	18	0	0	147	9	13	2	106	13	0	134	1			
Total	156	172	25	99	0	452	51	109	476	83	1	0	669	49	47	10	459	63	0	579	12			
% Approach	34.5%	38.1%	5.5%	21.9%	0%	-	-	16.3%	71.2%	12.4%	0.1%	0%	-	-	8.1%	1.7%	79.3%	10.9%	0%	-	-			
% Total	7.5%	8.3%	1.2%	4.8%	0%	21.8%	-	5.3%	23.0%	4.0%	0%	0%	32.3%	-	2.3%	0.5%	22.1%	3.0%	0%	27.9%	-			
PHF	0.907	0.896	0.625	0.798	-	0.897	-	0.826	0.850	0.902	0.250	-	0.909	-	0.783	0.500	0.941	0.829	-	0.940	-			
Lights	154	172	25	99	0	450	-	107	473	80	1	0	661	-	46	10	456	62	0	574	-			
% Lights	98.7%	100%	100%	100%	0%	99.6%	-	98.2%	99.4%	96.4%	100%	0%	98.8%	-	97.9%	100%	99.3%	98.4%	0%	99.1%	-			
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-			
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-			
Buses and Single-Unit Trucks	2	0	0	0	0	2	-	2	3	3	0	0	8	-	1	0	3	1	0	5	-			
% Buses and Single-Unit Trucks	1.3%	0%	0%	0%	0%	0.4%	-	1.8%	0.6%	3.6%	0%	0%	1.2%	-	2.1%	0%	0.7%	1.6%	0%	0.9%	-			
Pedestrians	-	-	-	-	-	-	51	-	-	-	-	-	-	49	-	-	-	-	-	-	12			
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%			
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0			
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%			

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/ W. Railroad Avenue/ Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Sat Apr 28, 2018

Midday Peak (WKND) (Apr 28 2018 11:30AM - 12:30PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	W. Old Railroad Avenue Northwestbound								S. Bryn Mawr Avenue Southwestbound								Int
	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*			
2018-04-28 11:30AM	0	0	0	0	0	0	10	0	27	41	14	0	82	1	525		
11:45AM	0	0	0	0	0	0	7	0	29	52	17	0	98	1	536		
12:00PM	0	0	0	0	0	0	14	0	27	42	9	0	78	2	522		
12:15PM	0	0	0	0	0	0	9	0	28	62	25	0	115	1	490		
Total	0	0	0	0	0	0	40	0	111	197	65	0	373	5	2073		
% Approach	0%	0%	0%	0%	0%	-	-	0%	29.8%	52.8%	17.4%	0%	-	-	-		
% Total	0%	0%	0%	0%	0%	0%	-	0%	5.4%	9.5%	3.1%	0%	18.0%	-	-		
PHF	-	-	-	-	-	-	-	-	0.957	0.794	0.650	-	0.811	-	0.967		
Lights	0	0	0	0	0	0	-	0	111	193	65	0	369	-	2054		
% Lights	0%	0%	0%	0%	0%	-	-	0%	100%	98.0%	100%	0%	98.9%	-	99.1%		
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0		
% Articulated Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	0%	-	0%		
Buses and Single-Unit Trucks	0	0	0	0	0	0	-	0	0	4	0	0	4	-	19		
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	2.0%	0%	0%	1.1%	-	0.9%		
Pedestrians	-	-	-	-	-	-	40	-	-	-	-	-	-	-	5		
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	100%		
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	0%		

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn



TRAFFIC & DATA COLLECTION

Imperial County Collection

Imperial County

Imperial County

Cherry Hill, Calexico, Calexico, Calexico, Calexico

Imperial County, Imperial County, Imperial County

County Line, Imperial County, Imperial County

County Line, Imperial County, Imperial County

Site Code

Site Code

Site Code

Imperial County Line, Imperial County
Municipality, Imperial County, Imperial County
County
City, Imperial County
Location

Imperial County Traffic & Data Collection

Start Date	Imperial County						Imperial County						Imperial County						Total						
	Turn	Left	Thru	Right	Red	Total	Turn	Left	Thru	Right	Red	Total	Turn	Left	Thru	Right	Red	Total							
01/01/2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/02/2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/03/2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/04/2023	0	0	0	0	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	0	0	0	0
01/05/2023	0	0	0	0	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	0	0	0	0
01/06/2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Light	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Light	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Articulated Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Articulated Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
City/Levon Crook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
City/Levon Crook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX F

Capacity Analysis Procedures



LEVEL OF SERVICE METHODOLOGY

As defined, vehicle capacity means “the maximum number of vehicles that can pass a given point during a specified period under prevailing roadway, traffic and control conditions.” The level at which an intersection or section of a lane or roadway functions can be expressed in terms of level of service. Level of service is defined as “qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers.” Some measures that are included are “speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.”

The concept of stop-controlled or yield-controlled intersection analysis is based on the estimate of average total delay on minor streets. The methodology of the analysis relies on three elements: the distribution and size of gaps available in the major street traffic flow; the usefulness of these gaps to the minor stream drivers; and, the relative priority of the various traffic movements at the intersection. The results of the analysis provide an estimate of total average delay for the various critical movements at the unsignalized intersections. Correlation between average total delay and the respective levels of service are provided in **Table 1: Level of Service Criteria**.

Table 1: Level of Service Criteria

Level of Service	Unsignalized Intersections Control Delay per Vehicle (seconds)	Signalized Intersections Control Delay per Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

At signalized intersections, additional elements must be considered. These elements are green time allocations and volume/capacity relationships. Level of service is based primarily on the average control delay per vehicle for various movements within an intersection. Thus, both volume/capacity and delay are considered to evaluate the overall operation of a signalized intersection. Correlation between average delay per vehicle and the respective levels of service are provided for signalized intersections in **Table 1: Level of Service Criteria**.

APPENDIX G

Existing Traffic Signal Permit Plans



TRAFFIC VOLUMES

Time	Private Drive	County Line Rd	LANCASTER AVE
1. 7 AM TO 8 AM	1	1	1
2. 8 AM TO 9 AM	2	2	2
3. 9 AM TO 10 AM	3	3	3
4. 10 AM TO 11 AM	4	4	4
5. 11 AM TO 12 PM	5	5	5
6. 12 PM TO 1 PM	6	6	6
7. 1 PM TO 2 PM	7	7	7
8. 2 PM TO 3 PM	8	8	8
9. 3 PM TO 4 PM	9	9	9
10. 4 PM TO 5 PM	10	10	10
11. 5 PM TO 6 PM	11	11	11
12. 6 PM TO 7 PM	12	12	12
Totals	120	120	120

SIGN TABULATION

PLAN SYMBOL	SERIES	SIZE	MESSAGE
A	R10-11	24"x30"	NO TURN ON RED
B	R10-3	9"x12"	PUSH BUTTON FOR GREEN LIGHT ←
C	R10-3	9"x12"	PUSH BUTTON FOR GREEN LIGHT →
D	R3-8A	36"x30"	LANE USE CONTROL (L-LSR)
E	R4-7	24"x30"	KEEP RIGHT
F	OM1-3	18"x18"	OBJECT MARKER
G	R10-6AR	24"x30"	STOP HERE ON RED

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVENUE (S.R. 0030) AND THE NORTHBOUND APPROACH OF COUNTY LINE ROAD (SR 3057) WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH. LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY, THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW, ONLY PHASES NOT POSING A YELLOW TRAP MAY REMAIN GREEN (PHASE 8) WHEN GOVERNED BY APPROACHING EMERGENCY VEHICLE.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED DURING THE "MAN" PHASE, THE MAN PHASE SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "FLASHING HAND" INDICATION IN ITS ENTIRETY, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE PROCEEDING TO THE PRE-EMPTION PHASE.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION PHASE 2,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 1 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

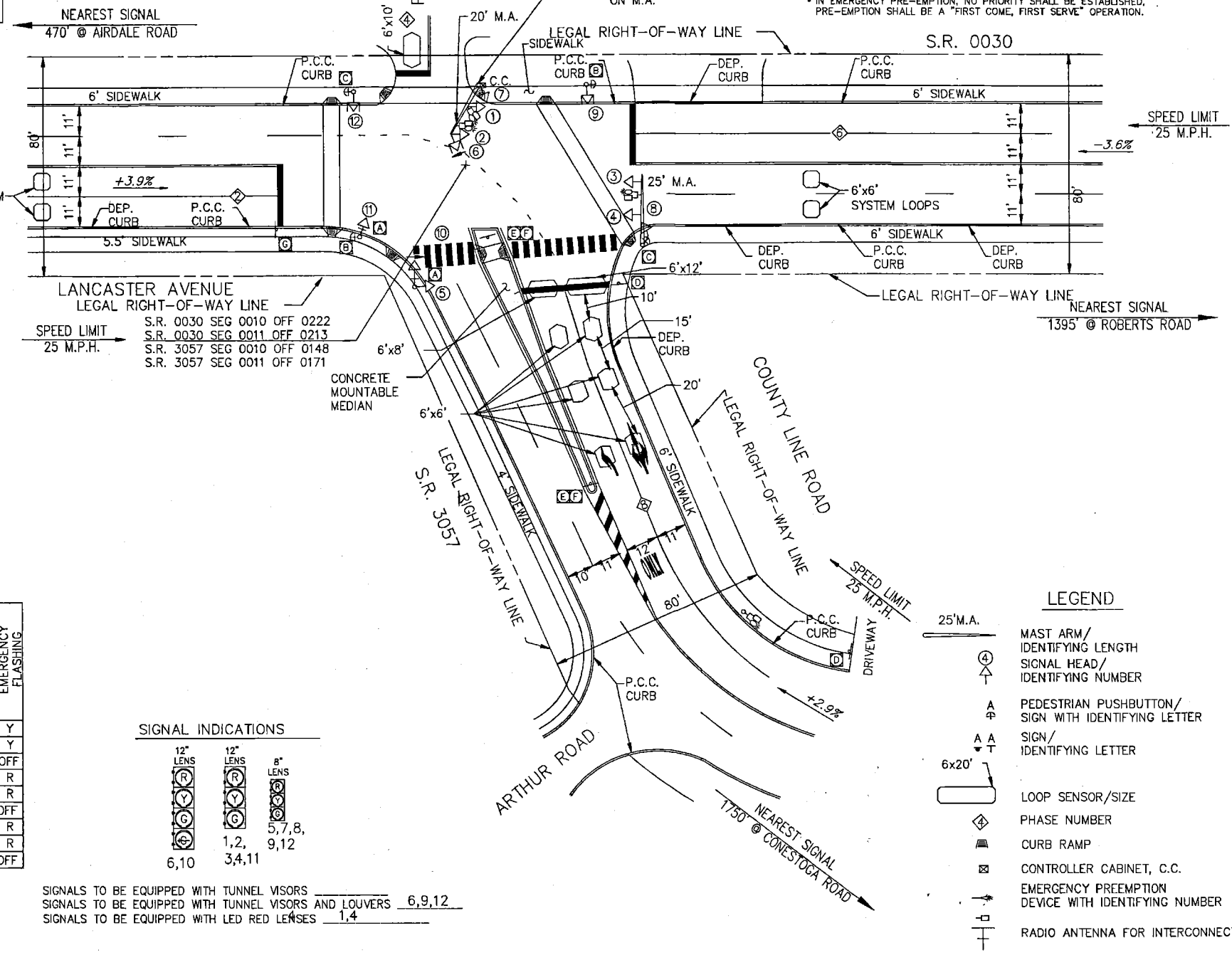
CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

PHASE	INTERVAL	10	11	12	13	14	15	16	17	18
1,2		R	R	R	G	Y	R	R	R	R
3,4		G	Y	R	R	R	R	R	R	R
5		R	R	R	R	R	R	R	R	R
6		R	R	R	R	R	R	R	R	R
7		R	R	R	R	R	R	R	R	R
8,9		R	R	R	R	R	R	R	R	R
10		R	R	R	R	R	R	R	R	R
11		R	R	R	R	R	R	R	R	R
12		R	R	R	R	R	R	R	R	R
FIXED		▲	3	3	▲	3	3	▲	3	3

▲ FOR DURATION OF PRE-EMPTION



PRE-EMPTION OPERATION NOTES

① SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION

MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

PHASE	INTERVAL	1	2	3	4	5	6	7	8	9	EMERGENCY FLASHING
1,2		G	Y	R	R	R	R	R	R	R	Y
3,4		G	Y	R	R	R	R	R	R	R	Y
5		G	Y	R	R	R	R	R	R	R	OFF
6		R	R	R	G	Y	R	R	R	R	R
7		R	R	R	R	G	Y	R	R	R	R
8,9		R	R	R	R	R	G	Y	R	R	OFF
10		R	R	R	R	R	R	R	G	Y	R
11		R	R	R	R	R	R	R	R	G	Y
12		R	R	R	R	R	R	R	R	G	Y

FIXED	3	3	3	3	3	2
MINIMUM	29		4		4	
PASSAGE			3		3	
MAXIMUM 1			20		16	
MAXIMUM 2			18		16	
PEDESTRIAN	①		18		16	
MEMORY		MN		NL		NL

NOTE: REFER TO SYSTEM PERMIT #0065 FOR PROGRAM TIMINGS & WEEKLY PROGRAM CHART.

SIGNAL INDICATIONS

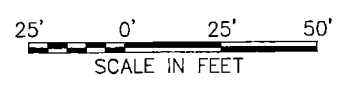
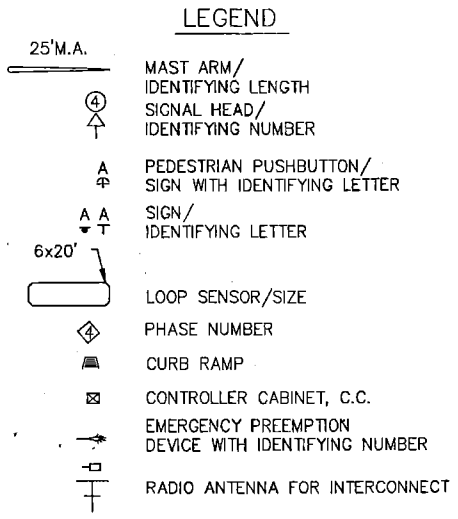
12" LENS	12" LENS	8" LENS
6,10	1,2, 3,4,11	5,7,8, 9,12

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS
 SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS AND LOUVERS 6,9,12
 SIGNALS TO BE EQUIPPED WITH LED RED LENSES 1,4

OPERATION NOTES

① UPON PEDESTRIAN ACTUATION ONLY

- CONTROLLER TO DWELL IN PHASE 2+6 UNTIL ACTUATED BY PHASE 8 OR PHASE 4



SYSTEM PERMIT # 1-0065

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY

MUNICIPALITY: LOWER MERION TOWNSHIP

INTERSECTION: LANCASTER AVENUE (S.R. 0030) & COUNTY LINE ROAD (S.R. 3057)

REVIEWED: _____ DATE _____

MUNICIPAL OFFICIAL _____ DATE _____

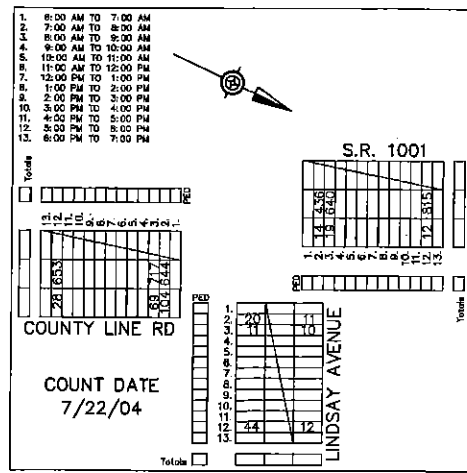
RECOMMENDED: W.J.EICHORN 7-5-85
DATE _____

STEPHEN B.LESTER 7-5-85
DATE _____

DISTRICT TRAFFIC ENGINEER

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	CONTROLLER, PRE-EMPTION, INTERCONNECT	TPD/KMS	2/25/2004	ABP	3/10/04	LRB	3/11/04
2	UPDATE PAVEMENT MARKINGS AND SIGNAGE	KPL	12/15/15	DLA	12/21/15	LRB	12/21/15
3	UPDATE PER EXISTING	KPL	1/13/16	[Signature]	[Signature]	[Signature]	2/1/16
4							
5							
6							
7							
8							

SHEET 2 OF 2 PERMIT # 64-0452 FILE # 0452



EMERGENCY PRE-EMPTION PHASING
MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

PHASE INTERVAL	9	10	11	12	13	14	15	16	17
1,2	R	R	R	G	Y	R	R	R	R
3,4	G	Y	R	R	R	R	R	R	R
5,6	R	R	R	R	R	R	G	Y	R
7,8	H	H	H	H	H	H	H	H	H
9,10	H	H	H	H	H	H	H	H	H
FIXED	4	2		4	2		3	2	

▲ FOR DURATION OF PRE-EMPTION
NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

EMERGENCY PRE-EMPTION OPERATION NOTES

- ⑥ SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND AND SOUTHBOUND APPROACHES OF COUNTY LINE ROAD (SR 1001) AND THE WESTBOUND APPROACH OF LINDSAY AVE WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTION PHASE SHALL FOLLOW. ONLY THOSE PHASES NOT POSING A YELLOW TRAP CONDITION MAY REMAIN GREEN (2 OR 4) WHEN GOVERNED BY APPROACHING EMERGENCY VEHICLE.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN "PED WALK" AND "PED CLEAR". THE "PED WALK" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "PED CLEAR" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE PROCEEDING TO THE PRE-EMPTION PHASE.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION PHASE 2,4 OR 6 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 1 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED. PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.
- LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
B	D3-4	96"x16"	STREET SIGN "County Line Rd"
C	D3-4	78"x16"	STREET SIGN "Lindsay Ave"
D	R9-3A	18"x18"	NO PEDESTRIAN CROSSING
E	R10-3E	9"x14"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.
ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE & MONTGOMERY
MUNICIPALITY: LOWER MERION & RADNOR TOWNSHIPS
INTERSECTION: COUNTY LINE ROAD (S.R. 1001)/ AND LINDSAY AVENUE

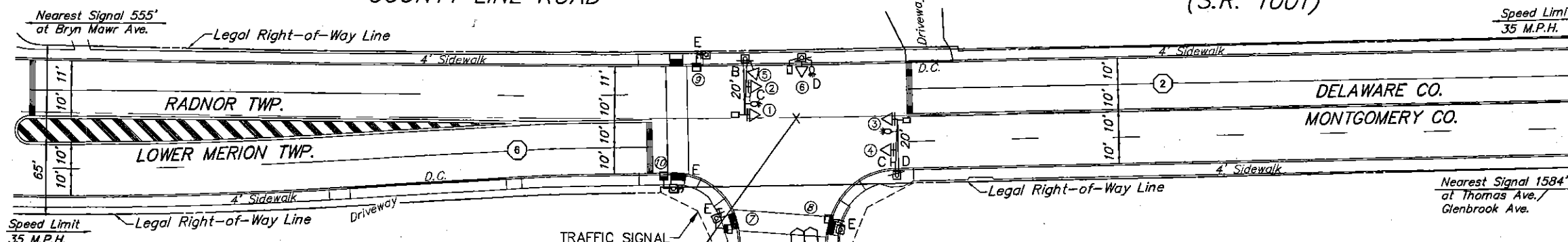
REVIEWED:
Stephen J. Plummer P.E. DATE 4/15/2013
MUNICIPAL OFFICIAL

RECOMMENDED:
Mark L. Kray DATE 5/18/94
Douglas May DATE 5/18/94
DISTRICT TRAFFIC ENGINEER

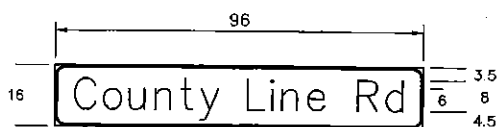
NO.	REVISION	DES./REV.	DATE	REV.	DATE	RECOM.	DATE
1	New Drawing	PAI	5/8/94	MLK	5/18/94	DWM	5/18/94
2	Relocate Stopbar	RFW	1/17/98	MLK	11/17/98	DWM	11/17/98
3	Change County Line Geometry, Retime, Add Curb Ramps	PAI	5/11/10	LUTZ	5/11/10	ABP	5/11/10
4	Revise Program Offsets	GAI	3/18/13	MLK	4/17/13	JOS	4/17/13
5							
6							
7							
8							

COUNTY LINE ROAD

(S.R. 1001)

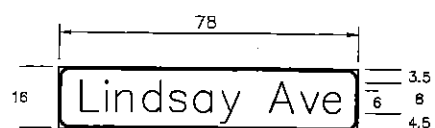


S.R. 1001 SEG. 0070 OFFSET 1059
S.R. 1001 SEG. 0071 OFFSET 1056
SIGN 'B'



CLEARVIEW HWY (10% REDUCTION)
8" U.C.
6" L.C.

SIGN 'C'



CLEARVIEW HWY
8" U.C.
6" L.C.

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE INTERVAL	2+6	4	FLASHING
SIGNALS	1 2 3 4 5 6 7 8		
1,2	G G Y R R R R R		Y
3,4	G G Y R R R R R		Y
5,6	R R R R G G Y R		R
7,8	M FH H H H H H H		OFF
9,10	H H H H M FH H H		OFF

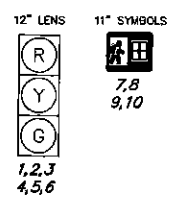
FIXED	MINIMUM	PASSAGE	MAX. 1	MAX. 2	PEDESTRIAN*	MEMORY
	15		30	30	7 12	MR
PROGRAM 1	39	4	2	10	3	2
PROGRAM 2	34	4	2	15	3	2

60 SECONDS
60 SECONDS

OPERATION NOTES:

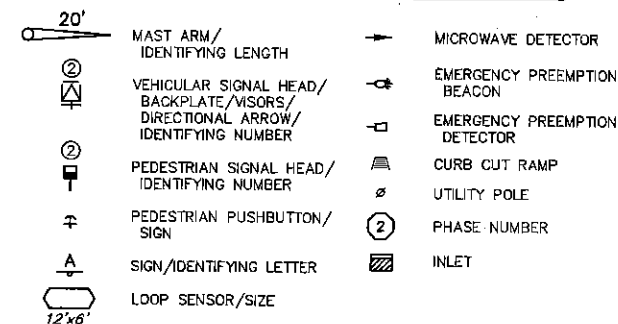
- PEDESTRIAN COUNTDOWN TIMER TO COUNTDOWN DURING FLASHING HAND INTERVAL.
- *MINIMUM GREEN TIME, ACTUAL GREEN TIME TO BE DETERMINED BY CYCLE LENGTH AND TBC.

SIGNAL INDICATIONS



SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS

LEGEND



* UPON PEDESTRIAN ACTUATION ONLY

SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R10-6AL	24"x30"	STOP HERE ON RED
B	R10-12	30"x36"	LEFT TURN YIELD ON GREEN
C	R6-1L	36"x12"	HORIZONTAL LEFT ONE-WAY
D	R6-1R	36"x12"	HORIZONTAL RIGHT ONE-WAY
E	R3-5L	30"x36"	LEFT TURN
F	R3-5S	30"x36"	STRAIGHT-THROUGH
G	R3-5R	30"x36"	RIGHT TURN
H	R3-6SR	30"x36"	OPTIONAL RIGHT TURN
J	R10-3E	9"x14"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER
K	R10-3E	9"x14"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER
L	D3-4	96"x16"	OVERHEAD STREET NAME
M	D3-5	96"x28"	OVERHEAD STREET NAME
N	D3-5	96"x28"	OVERHEAD STREET NAME
P	R3-8B	48"x30"	LANE USE CONTROL (L-S-SR)
R	R3-7L	30"x30"	LEFT LANE MUST TURN LEFT
S	D3-4	96"x16"	OVERHEAD STREET NAME
T	R9-3	18"x18"	NO PEDESTRIAN CROSSING

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

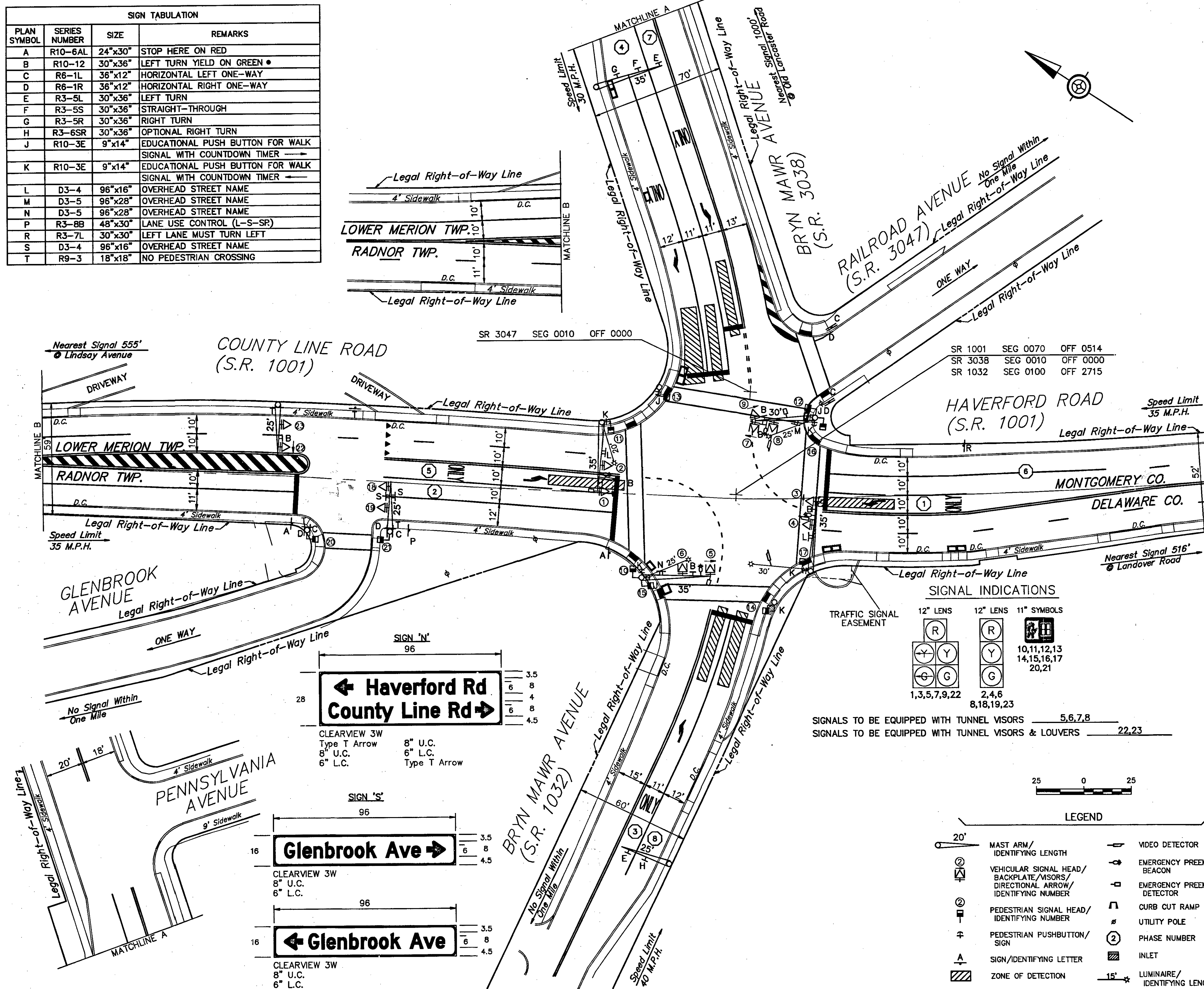
PENNSYLVANIA DEPARTMENT OF TRANSPORTATION ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE & MONTGOMERY
 MUNICIPALITY: LOWER MERION & RADNOR TOWNSHIPS
 INTERSECTION: COUNTY LINE ROAD (S.R. 1001)/
 HAVERFORD ROAD (S.R. 1001) & BRYN MAWR
 AVENUE (S.R. 1032 & 3038)

REVIEWED: _____ DATE _____
Stephen F. Norcini, P.E. 4/15/13
 MUNICIPAL OFFICIAL

RECOMMENDED: _____ DATE _____
Mark L. Kray 5/18/94
 DISTRICT TRAFFIC ENGINEER
Douglas May 5/18/94
 DISTRICT TRAFFIC ENGINEER

NO.	REVISION	DES./REV.	DATE	REV.	DATE	REC.	DATE
1	New Drawing/Added Left Lane	PAI	5/4/10	LUTZ	5/24/10	ABP	5/28/10
2	As-Built	PAI	1/10/11				
3	Revise Timings	GAI	1/8/13	LUTZ	4/17/13	LRB	4/18/13
4	ADD 25' MAST ARM, SIGNAL HEADS 22&23	GAI	3/07/14	MAY	3/11/14		3/11/14
5							
6							
7							
8							



SIGNAL INDICATIONS

TRAFFIC SIGNAL EASEMENT	12" LENS	12" LENS	11" SYMBOLS
(R)	(Y)	(G)	10,11,12,13
(Y)	(G)	(G)	14,15,16,17
(G)	(G)	(G)	20,21
	1,3,5,7,9,22	2,4,6	8,18,19,23

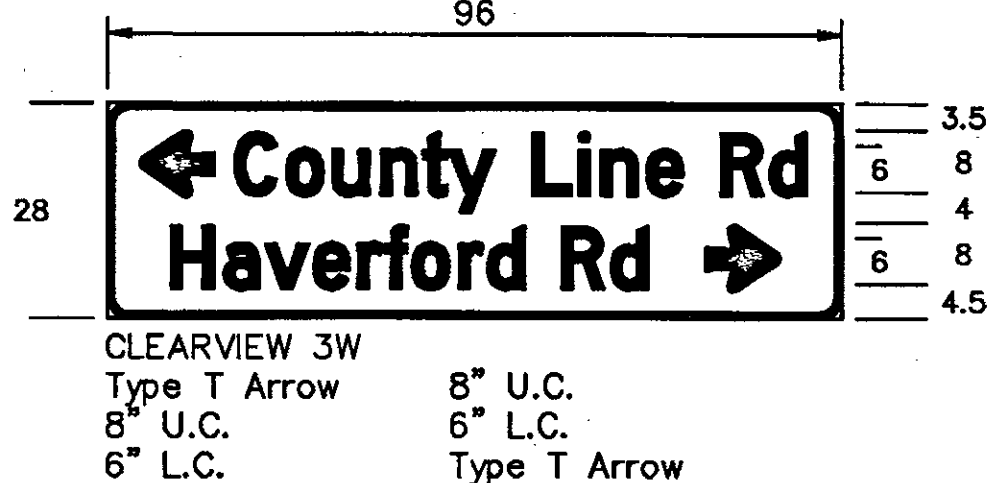
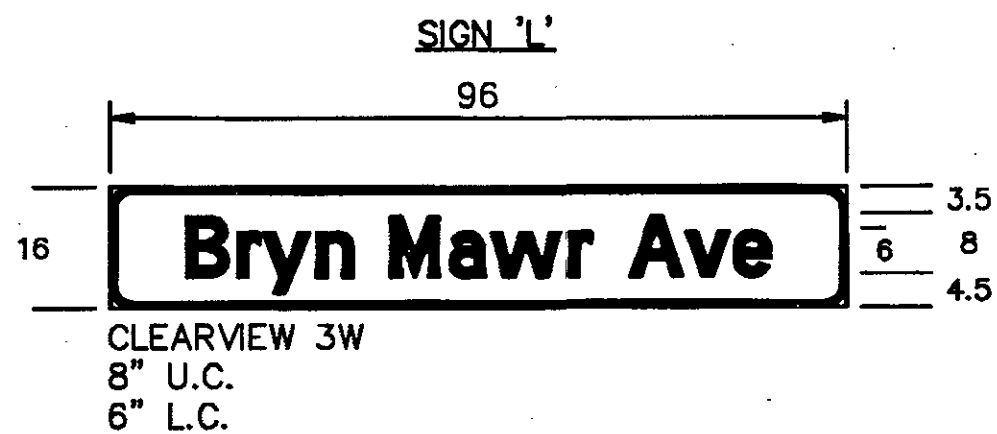
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS: 5,6,7,8
 SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS: 22,23

LEGEND

20'	MAST ARM/IDENTIFYING LENGTH	VIDEO DETECTOR
②	VEHICULAR SIGNAL HEAD/BACKPLATE/VISORS/DIRECTIONAL ARROW/IDENTIFYING NUMBER	EMERGENCY PREEMPTION BEACON
②	PEDESTRIAN SIGNAL HEAD/IDENTIFYING NUMBER	EMERGENCY PREEMPTION DETECTOR
+	PEDESTRIAN PUSHBUTTON/SIGN	CURB CUT RAMP
A	SIGN/IDENTIFYING LETTER	UTILITY POLE
▨	ZONE OF DETECTION	② PHASE NUMBER
		▨ INLET
		15' * LUMINAIRE/IDENTIFYING LENGTH

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE EASTBOUND & WESTBOUND APPROACHES OF COUNTY LINE ROAD/HAVERFORD ROAD (S.R. 1001), AND THE NORTHBOUND & SOUTHBOUND APPROACHES OF BRYN MAWR AVENUE (S.R. 1032/3038), WITH A FLASHING FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
- THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS ACCORDINGLY, FOLLOWED BY THE GREEN INTERVAL, WITH THE FOLLOWING EXCEPTIONS IN THE CASE OF A PRE-EMPT DURING PHASE 2+5 OR 2+6: INTERVAL 4 MUST BE FOLLOWED BY INTERVAL 6 IN ITS ENTIRETY BEFORE COMPLETING THE YELLOW AND RED CLEARANCE INTERVALS. INTERVAL 12 MUST BE FOLLOWED BY INTERVAL 13 IN ITS ENTIRETY BEFORE COMPLETING THE YELLOW AND RED CLEARANCE INTERVALS.
- IF THE SIGNALS ARE IN EITHER YELLOW OR RED CLEARANCE, THE CLEARANCE TIMES SHALL BE COMPLETED BEFORE THE GREEN INTERVAL OF THE PRE-EMPTION PHASE OCCURS.
- IF THE SIGNALS ARE FLASHING WHEN ACTIVATED BY AN EMERGENCY VEHICLE ALL SIGNALS SHALL REMAIN FLASHING.
- UPON COMPLETION OF PRE-EMPTION PHASE 2, 4, 6, OR 8, RETURN TO NORMAL OPERATION, PHASE 2+6, INTERVAL 14.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVED" OPERATION.
- THE FIELD LOCATIONS OF THE PRE-EMPTION DETECTORS MAY DIFFER FROM THE LOCATIONS DEPICTED ON THE CONDITION DIAGRAM, AS THE DETECTORS MAY NEED TO BE RELOCATED AND/OR ADJUSTED TO PROVIDE ACCEPTABLE OPERATION AS DEEMED APPROPRIATE BY DEPARTMENT PERSONNEL.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON, AND THE SIGNAL IS PRE-EMPTED, THE PED "WALK (MAN)" INTERVAL SHALL TERMINATE IMMEDIATELY AND THE PED "CLEAR (FLASHING HAND AND COUNTDOWN TIMER)" INTERVAL SHALL TIME OUT THIS INTERVAL FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES, BEFORE GOING INTO EMERGENCY PRE-EMPTION PHASE.



EMERGENCY PRE-EMPTION PHASING MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2	6	4	8
SIGNALS	31 32 33	34 35 36	37 38 39	40 41 42
1	R R R	G Y R	R R R	R R R
2	R R R	G Y R	R R R	R R R
3	G Y R	R R R	R R R	R R R
4	G Y R	R R R	R R R	R R R
6	R R R	R R R	G Y R	R R R
7	R R R	R R R	R R R	G Y R
8	R R R	R R R	R R R	G Y R
5,9	R R R	R R R	G Y R	R R R
10,11,16,17	H H H	H H H	H H H	H H H
12,13,14,15	H H H	H H H	H H H	H H H
18,19	G Y R	R R R	R R R	R R R
20,21	H H H	H H H	H H H	H H H
22	G G G	G G G	G G G	G G G
23	G G G	G G G	G G G	G G G
FIXED TIME	* 4 2	* 4 2	* 3 3	* 3 3

* FOR DURATION OF PRE-EMPTION

NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

- ⓐ SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION.
- ⓑ SIGNAL TO INDICATE G/Y WHEN RETURNING TO NORMAL OPERATION.

SIGN 1M

COUNT DATE 10/23/12

GENERAL NOTES

- NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.
- ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.
- ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.
- POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.
- SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.
- ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.
- THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.
- EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.
- CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.
- PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.
- THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.
- WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.
- PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.
- CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

WEEKLY PROGRAM CHART

EVENT	DAY*	TIME	CYCLE	OFFSET**	PROGRAM	REMARKS
1	1-5	0600	120	0	1	AM PEAK
2	1-5	0900	-	-	FREE	MAX 1
3	1-5	1500	120	0	2	PM PEAK
4	1-5	1800	-	-	FREE	MAX 1
5	6,7	0000	-	-	FREE	MAX 1

- * DAY 1 = MONDAY
- ** OFFSETS ARE REFERENCED TO THE BEGINNING YELLOW, INTERVAL 14

- SIGNAL TO BE COORDINATED WITH ADJACENT SIGNALS ALONG COUNTY LINE ROAD AT LINDSAY AVENUE (FILE 1030) AND LANDOVER ROAD (FILE 0557). COORDINATION TO BE ACCOMPLISHED BY TBC. THIS INTERSECTION TO BE EQUIPPED WITH GPS TIME CLOCK.

OPERATION NOTES:

- ① PHASE 2+6, 3+7, 3+8, 4+7 OR 4+8 SHALL FOLLOW
- ② G/Y IF FOLLOWED BY PHASE 3+7, 4+7, 3+8, OR 4+8
- ③ G/Y IF FOLLOWED BY PHASE 2+6
- ④ G IF FOLLOWED BY PHASE 2+6
- ⑤ G/Y IF FOLLOWED BY PHASE 3+8
- ⑥ G/Y IF FOLLOWED BY PHASE 4+7
- ⑦ G/Y IF FOLLOWED BY PHASE 4+8
- ⑧ G IF FOLLOWED BY PHASE 4+8
- ⑨ M IF FOLLOWED BY PHASE 2+6
- ⑩ M IF FOLLOWED BY PHASE 4+8
- ⑪ G/Y IF FOLLOWED BY PHASE 3+8, 4+7, OR 4+8
- ⑫ G/Y IF FOLLOWED BY PHASE 3+7, 4+7, 4+8, OR 1+6
- ⑬ G/Y IF FOLLOWED BY PHASE 3+7, 3+8, 4+8, OR 1+6
- ⑭ G/Y IF FOLLOWED BY PHASE 3+8, 4+7, 4+8, OR 1+6
- ⑮ G/Y IF FOLLOWED BY PHASE 1+6, 3+7, 3+8, OR 4+7
- ⑯ PEDESTRIAN TIME TO BE AS SHOWN IN PHASE 2+6. PED TIME MAY TIME OUT IN THIS PHASE OR MAY BE COMPLETED IN PHASE 2+6.
- ⑰ PEDESTRIAN TIME TO BE AS SHOWN IN PHASE 4+8. PED TIME MAY TIME OUT IN THIS PHASE OR MAY BE COMPLETED IN PHASE 4+8.
- PEDESTRIAN COUNTDOWN TIMER TO COUNTDOWN DURING FLASHING HAND INTERVAL.
- SIGNAL TO DWELL IN PHASE 2+6 UNTIL ACTUATED BY PHASE 3,4,7 OR 8.
- ≠ MINIMUM GREEN TIME, ACTUAL GREEN TIME TO BE DETERMINED BY CYCLE LENGTH AND TBC.

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

FIXED	4	2	4	4	2	4	4	2	3	3	3	3	3	3								
MINIMUM	3		3	3		10			3		3		3									
PASSAGE	3		3	3					3		3		3									
MAXIMUM 1	7		7	7		26			7		7		7									
MAXIMUM 2	7		7	7		26			7		7		7									
PEDESTRIAN			(A)	(A)		7	21		(B)		(B)		7	20								
MEMORY	NL		NL	NL		MR			NL		NL		NL									
PROGRAM 1	6	4	2	6	4	2	35	4	2	6	3	3	6	3	3	49	3	3	(120 SEC.)			
PROGRAM 2	6	4	2	6	4	2	41	4	2	8	3	3	11	3	3	8	3	3	41	3	3	(120 SEC.)

* UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE H AT ALL TIMES

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE & MONTGOMERY
 MUNICIPALITY: LOWER MERION & RADNOR TOWNSHIP
 INTERSECTION: COUNTY LINE ROAD (S.R. 1001)/
HAVERFORD ROAD (S.R. 1001) & BRYN MAWR
AVENUE (S.R. 1032 & 3038)

REVIEWED:
 DATE
Stephen F. Norcini, P.E. 4/15/13
 MUNICIPAL OFFICIAL DATE

RECOMMENDED:
 DATE
Mark L. Kray 5/18/94
 MUNICIPAL OFFICIAL DATE
Douglas May 5/18/94
 DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES/REV.	DATE	REV.	DATE	RECOM.	DATE
1	New Drawing/Added Left Lane	PAI	5/4/10	LUTZ	5/24/10	ABP	5/29/10
2	As-Built	PAI	1/10/11				
3	Revise Timings	GAI	1/8/13	LUTZ	4/17/13	LRB	4/19/13
4	ADD 25' MAST ARM, SIGNAL HEADS 22&23	GAI	3/07/14				
5							
6							
7							
8							

TIME	LANDOVER RD.	COUNTY LINE RD.	TOTALS
1. 7:00AM TO 8:00AM	62	35	97
2. 8:00AM TO 9:00AM	40	87	127
3. 9:00AM TO 10:00AM	35	77	112
4. 10:00AM TO 11:00AM	35	54	89
5. 11:00AM TO 12:00PM	30	62	92
6. 12:00PM TO 1:00PM	28	58	86
7. 1:00PM TO 2:00PM	28	69	97
8. 2:00PM TO 3:00PM	22	73	95
9. 3:00PM TO 4:00PM	25	76	101
10. 4:00PM TO 5:00PM	25	66	91
11. 5:00PM TO 6:00PM	20	107	127
12. 6:00PM TO 7:00PM	24	91	115
TOTALS	452	533	985

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
(A)	D3-4	96X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
(B)	D3-4	78X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
(C)	D3-4	84X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
(D)	D3-4	96X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)

EVENT	DAY*	TIME	CYCLE	OFFSET**	PROGRAM	REMARKS
1	1-7	0000	80	-	3	OFF PEAK
2	1-5	0600	120	18	1	AM PEAK
3	1-5	0900	80	-	3	OFF PEAK
4	1-5	1500	120	22	2	PM PEAK
5	1-5	1800	80	-	3	OFF PEAK

- * DAY 1 = MONDAY
- ** OFFSETS ARE REFERENCED TO THE BEGINNING YELLOW, INTERVAL 2
- SIGNAL TO BE COORDINATED WITH ADJACENT SIGNALS ALONG HAVERFORD ROAD AT BRYN MAWR AVENUE (FILE 0472) AND BUCKS LANE (FILE 0553). COORDINATION BY TBC. THIS INTERSECTION TO BE EQUIPPED WITH A GPS TIME CLOCK.

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 40B.

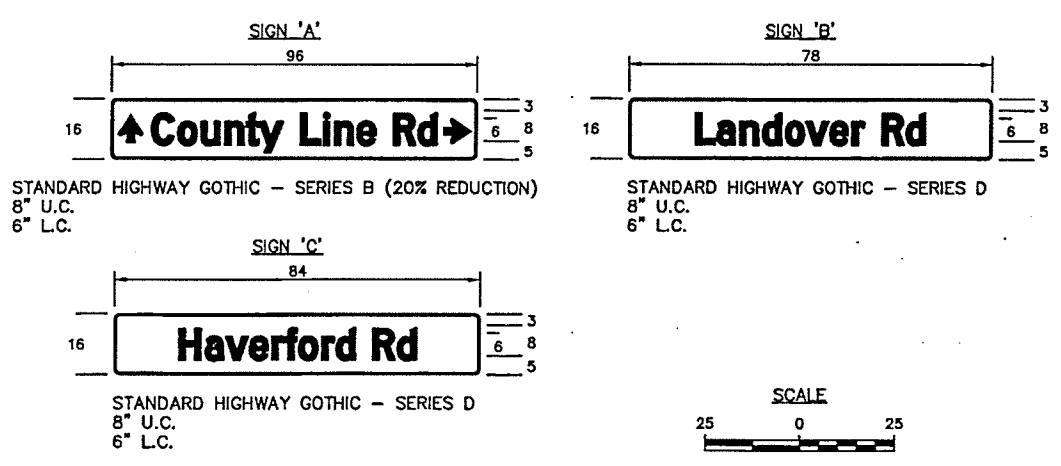
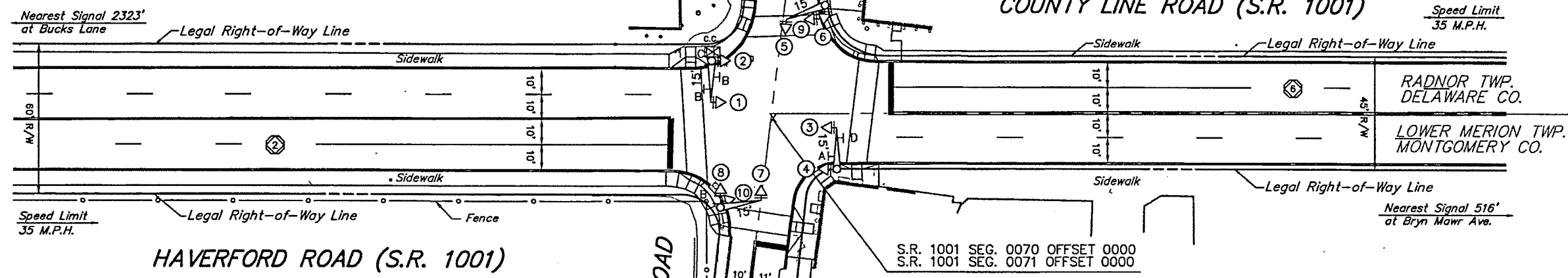
PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 40B AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

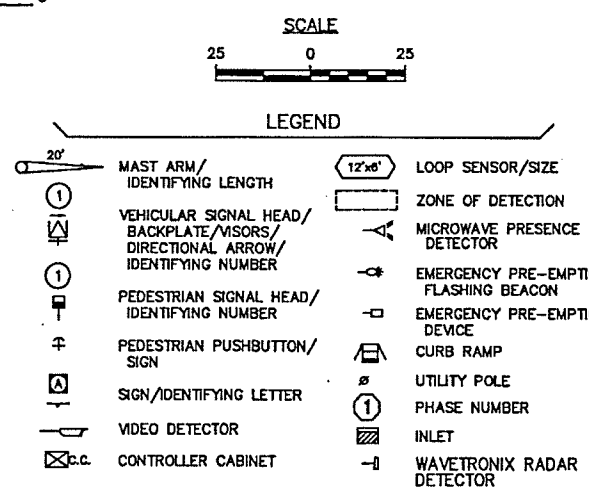
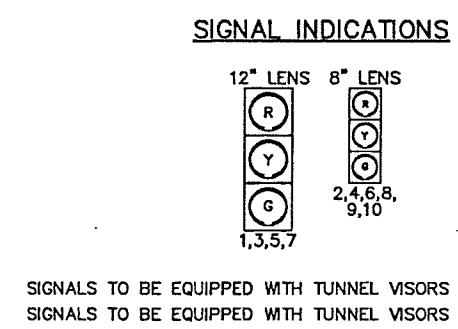
CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.



MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2+6	4+8	FLASHING
SIGNALS	1 2 3	4 5 6	
1,2,3,4	G Y R	R R R	Y
5,6,7,8	R R R	G Y R	R
9,10	G Y R	R R R	OFF

PROGRAM	1	2	3	4	5	6	(120 SEC.)
PROGRAM 1	75	3	2	35	3	2	(120 SEC.)
PROGRAM 2	75	3	2	35	3	2	(120 SEC.)
PROGRAM 3	55	3	2	15	3	2	(80 SEC.)



PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY/DELAWARE
MUNICIPALITY: LOWER MERION/RADNOR TWP. & HAVERFORD TOWNSHIP

INTERSECTION: HAVERFORD ROAD (S.R. 1001) & COUNTY LINE ROAD/LANDOVER ROAD (S.R. 1009)

REVIEWED: _____ DATE _____

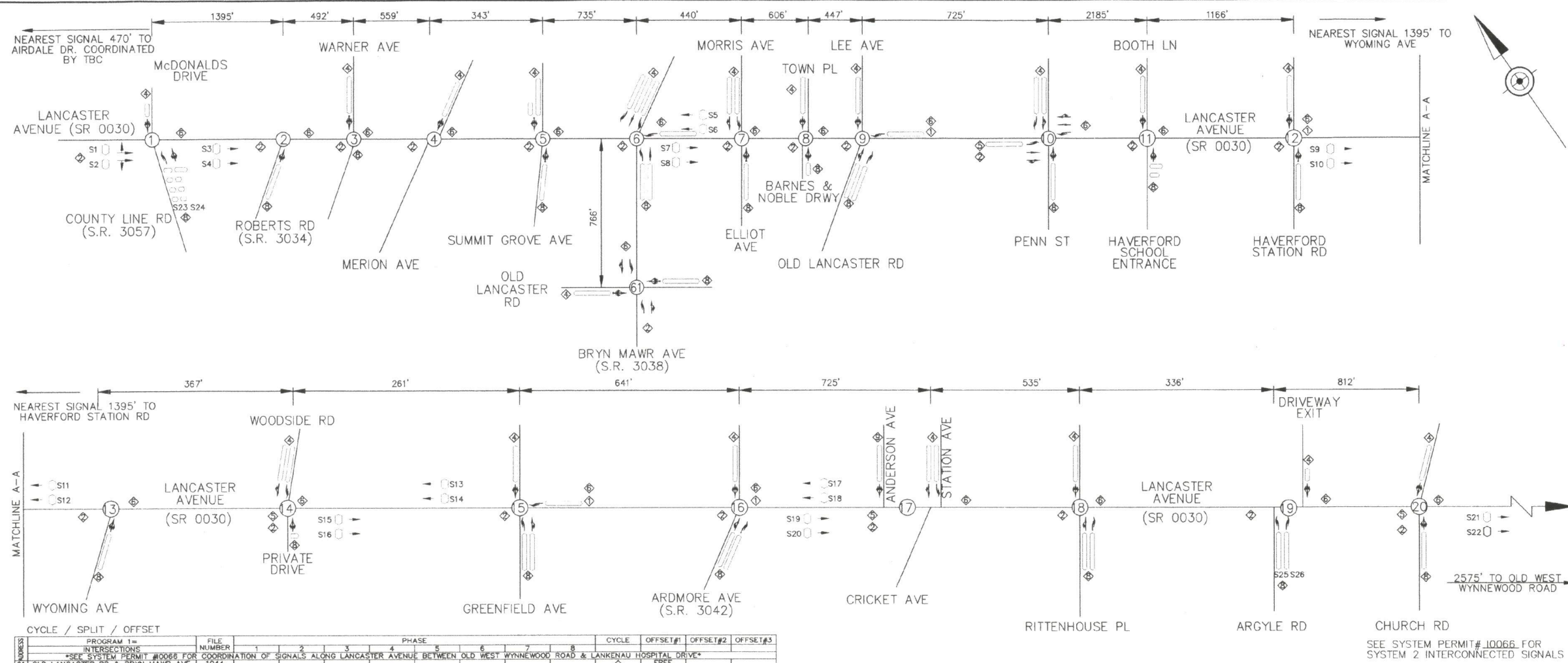
MUNICIPAL OFFICIAL _____ DATE _____

RECOMMENDED: MARK L. KRAY 5/18/94

DOUGLAS MAY 5/18/94
DISTRICT TRAFFIC ENGINEER

NO.	REVISION	DES./REV.	DATE	REV.	DATE	REC'D.	DATE
1	NEW DRAWING	J.J.L.	5/13/94	M.K.	5/18/94	D.W.M.	5/18/94
2	REVISE COORDINATION TIMING	PAI	11/16/10	PAL	11/23/10	ABP	11/23/10
3	REVISED CURB RAMPS	MCN	2/3/13	LUTZ	2/3/13	LRB	2/6/13
4	REVISE COORDINATION TIMING	GAI	2/15/13	LUTZ	4/17/13	LRB	4/19/13
5	REVISE SIGNS A & D	KPL	7/12/16	D.L.A.	7/30/16	dp/h	11/15/16
6							
7							
8							

SHEET 2 OF 2 PERMIT # 64-0557 FILE # 0557



GENERAL NOTES

- NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.
- REFER TO TRAFFIC SIGNAL PERMIT DRAWING FOR INDIVIDUAL INTERSECTION OPERATION, GEOMETRY, PHASING AND CRITICAL TIMES.
- FOR CONSTRUCTION AND INSPECTION THE SYSTEM PERMIT SHOULD ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.
- TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL, SUBSYSTEM LEVEL MASTER CONTROLLER LEVEL AND PERSONAL COMPUTER REMOTE DIAL UP LEVEL.
- GATHER THE SYSTEM FAILURE CRITICAL ALARMS REPORT AND ARCHIVE THEM WHERE APPLICABLE.
- SET UP PENNDOT DISTRICT 6-0 COMPUTER WITH THE SYSTEM DATABASE AND GRAPHICS. MODIFY THE DATABASE AND GRAPHICS FOR SYSTEMS REVISIONS.
- ASSIGN LOOP DETECTORS AND PROGRAM THE CONTROLLERS TO GATHER TRAFFIC VOLUMES IN 15 MINUTE INTERVAL, WHERE APPLICABLE.
- EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.
- OBTAIN POLE ATTACHMENT PERMIT FOR AERIAL FIBER OPTIC INSTALLATION.
- MAINTAIN MASTER CONTROLLER COMMUNICATION SUCH AS PHONE DROPS.
- PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.
- THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITEE COMPLES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287 PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.
- WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.
- PERMITEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.
- CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

NO.	PROGRAM 1 - INTERSECTIONS	FILE NUMBER	PHASE	PHASE	PHASE	PHASE	PHASE	PHASE	PHASE	CYCLE	OFFSET#1	OFFSET#2	OFFSET#3
20	OLD LANCASTER RD & BRYN MAWR AVE	0446	57	33	13 (LEAD)	44	33	90	10	FREE			
19	LANCASTER AVE & CHURCH RD	0468	48	39	13 (LEAD)	35	39	100	88	FREE			
18	LANCASTER AVE & ARGYLE RD/DRIVEWAY EXIT	0465	34	23(SPLIT)	34	23(SPLIT)	80	32	32				
17	LANCASTER AVE & RITTENHOUSE PLACE	0464	48	32	13 (LEAD)	48	32	90	48				
16	LANCASTER AVE & STATION AVE / CRICKET AVE	0463	61	29**	15 (LEAD)	46	29**	90	44				
15	LANCASTER AVE & ARDMORE AVE	0462	13 (LEAD)	35	21(SPLIT)	46	21(SPLIT)	90	48				
14	LANCASTER AVE & GREENFIELD AVE	0461	42	30	18 (LEAD)	42	30	90	87				
13	LANCASTER AVE & WYOMING AVE	0421	64	35	14 (LEAD)	64	35	100	81				
12	LANCASTER AVE & HAVERFORD STATION RD	0458	13 (LEAD)	35	12 (LEAD)	41	12 (LEAD)	90	14				
11	LANCASTER AVE & BOOTH LANE	0457	85	25	25	85	25	90	50				
10	LANCASTER AVE & PENN ST	0837	61	29	12 (LEAD)	49	29	90	4				
9	LANCASTER AVE & OLD LANCASTER AVE / LEE AVE	0829	13 (LEAD)	31	12 (LEAD)	49	31	90	0				
8	LANCASTER AVE & TOWN PL/BARNES & NOBLE DRWY	3342	46	22(SPLIT)	46	22(SPLIT)	90	42	22				
7	LANCASTER AVE & MORRIS AVE / ELLIOT AVE	0456	59	31	29	59	31	90	0				
6	LANCASTER AVE & BRYN MAWR AVE	0455	13 (LEAD)	26 (PED)	42	26	42	90	86				
5	LANCASTER AVE & SUMMIT GROVE AVE	0454	65	25	65	25	90	2	2				
4	LANCASTER AVE & MERION AVE	0453	35	31	35	31	90	75	75				
3	LANCASTER AVE & WARNER AVE	1507	34	25 (PED)	31	34	25	90	5				
2	LANCASTER AVE & ROBERTS RD	0318	82	25 (PED)	62	25	90	60	60				
1	LANCASTER AVE & COUNTY LINE RD	0452	42	21(SPLIT)	42	17(SPLIT)	80	0*	0*				

SYSTEM NOTES

- PROGRAM TO BE SELECTED BY CLOSED LOOP SYSTEM (TIME OF DAY) OR TBC BACKUP.
- OFFSETS ARE REFERENCED TO NEMA TS2 1ST GREEN, ON LANCASTER AVENUE.
- SYSTEM LIMITS:
LANCASTER AVENUE - FROM COUNTY LINE ROAD TO CHURCH ROAD,
BRYN MAWR AVENUE - FROM LANCASTER AVENUE TO OLD LANCASTER AVENUE.
MASTER CONTROLLER:
RADIO TOWER AT TOWNSHIP BUILDING NEAR LANCASTER AVENUE & ARGYLE ROAD.
- PRIMARY COORDINATION: CLOSED LOOP SYSTEM -
SPREAD SPECTRUM RADIO COMMUNICATION
SECONDARY COORDINATION: TBC (DEFAULT TO BACKUP TBC).
- SYSTEM IS DESIGNED FOR THE SYSTEM SOFTWARE: MARC NX.
- CYCLES, SPLITS & OFFSETS ARE IN SECONDS.

EVENT	Δ DAY	TIME	PROGRAM*	REMARKS
1	1-7	0000	---	FLASH
2	1-5	0600	1	AM PEAK
3	1-5	0900	2	MD PEAK
4	1-5	1500	3	PM PEAK
5	1-5	2000	---	FREE
6	6,7	0600	2	MD PEAK
7	6,7	1900	---	FREE

LEGEND

- (4) INTERSECTION ADDRESS
- S## () SYSTEM LOOP / IDENTIFYING NUMBER
- () LOOP SENSOR
- (4) PHASE NUMBER

NOT TO SCALE

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY

MUNICIPALITY: LOWER MERION TOWNSHIP

INTERSECTION: LANCASTER AVENUE (SR 0030) CORRIDOR
BETWEEN COUNTY LINE RD TO CHURCH RD

REVIEWED: _____ DATE _____

MUNICIPAL OFFICIAL: _____ DATE _____

RECOMMENDED: A B PATEL 03/05/04

L R BELMONTE 03/08/04

DISTRICT TRAFFIC ENGINEER _____ DATE _____

NO	REVISION	DES/REVW	DATE	REVW	DATE	RECOM	DATE
1	ADD OLD LANCASTER RD & OLD BRYN MAWR AVE	TPD		DLA	02/27/09	ABP	02/27/09
2	ADD RT LANE TO SB & ADD LT LANES TO EB & WB AT INT #10	TPD	04/14/11	LUTZ	04/14/11	ABP	04/14/11
3	REVISED INT. 3 TIMINGS, INT. 15 AND 16 OFFSETS	BJD	11/26/12	DLA	12/03/12	uphill	2/20/13
4							
5							
6							
7							
8							

SYSTEM PERMIT # L-0065

APPENDIX H

Capacity Analysis Results



Existing Analysis





Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1136	733	356	350	38
v/c Ratio	0.74	0.49	0.65	0.66	0.19
Control Delay	13.4	14.8	30.7	31.1	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	14.8	30.7	31.1	21.7
Queue Length 50th (ft)	144	121	128	126	8
Queue Length 95th (ft)	224	167	#325	#322	34
Internal Link Dist (ft)	417	551		90	80
Turn Bay Length (ft)					
Base Capacity (vph)	1540	1506	545	530	379
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.74	0.49	0.65	0.66	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

Existing AM Peak

1: Lancaster Ave

10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↕			↕	
Traffic Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Future Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5				2.5
Lane Util. Factor		0.95			0.95		0.95	0.95				1.00
Frt		0.93			1.00		1.00	1.00				0.93
Flt Protected		1.00			1.00		0.95	0.96				0.99
Satd. Flow (prot)		2854			3197		1561	1516				1573
Flt Permitted		0.95			0.95		0.95	0.96				0.99
Satd. Flow (perm)		2709			3050		1561	1516				1573
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	9	590	537	1	719	13	671	30	5	9	9	20
RTOR Reduction (vph)	0	213	0	0	2	0	0	1	0	0	18	0
Lane Group Flow (vph)	0	923	0	0	731	0	356	349	0	0	20	0
Heavy Vehicles (%)	0%	5%	6%	0%	5%	17%	3%	4%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		34.0			34.0		24.5	24.5				4.5
Effective Green, g (s)		37.5			37.5		28.0	28.0				7.0
Actuated g/C Ratio		0.47			0.47		0.35	0.35				0.09
Clearance Time (s)		6.0			6.0		6.0	6.0				5.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0				3.0
Lane Grp Cap (vph)		1269			1429		546	530				137
v/s Ratio Prot							0.23	c0.23				c0.01
v/s Ratio Perm		c0.34			0.24							
v/c Ratio		0.73			0.51		0.65	0.66				0.14
Uniform Delay, d1		17.1			14.9		21.9	22.0				33.7
Progression Factor		1.00			1.00		0.98	0.98				1.00
Incremental Delay, d2		3.7			0.3		2.5	2.6				0.5
Delay (s)		20.8			15.2		23.9	24.1				34.2
Level of Service		C			B		C	C				C
Approach Delay (s)		20.8			15.2			24.0				34.2
Approach LOS		C			B			C				C

Intersection Summary

HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection												
Int Delay, s/veh	7.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	28	71	67	9	42	8	12	618	56	7	480	13
Future Vol, veh/h	28	71	67	9	42	8	12	618	56	7	480	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	1	0	0	2	0	0	3	7	0	7	0
Mvmt Flow	30	76	71	10	45	9	13	657	60	7	511	14

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	909	1275	263	1021	1252	359	525	0	0	717	0	0
Stage 1	532	532	-	713	713	-	-	-	-	-	-	-
Stage 2	377	743	-	308	539	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.52	6.9	7.5	6.54	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.52	-	6.5	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.52	-	6.5	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.01	3.3	3.5	4.02	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	233	167	742	193	171	643	1052	-	-	893	-	-
Stage 1	504	526	-	394	434	-	-	-	-	-	-	-
Stage 2	622	422	-	683	520	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	178	162	742	108	166	643	1052	-	-	893	-	-
Mov Cap-2 Maneuver	178	162	-	108	166	-	-	-	-	-	-	-
Stage 1	493	520	-	386	425	-	-	-	-	-	-	-
Stage 2	538	413	-	522	514	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	51.7		38.4		0.2		0.1	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1052	-	-	242	169	893	-
HCM Lane V/C Ratio	0.012	-	-	0.73	0.371	0.008	-
HCM Control Delay (s)	8.5	0.1	-	51.7	38.4	9.1	0
HCM Lane LOS	A	A	-	F	E	A	A
HCM 95th %tile Q(veh)	0	-	-	5	1.6	0	-

Intersection												
Int Delay, s/veh	16.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	67	101	16	7	25	16	4	562	28	9	457	45
Future Vol, veh/h	67	101	16	7	25	16	4	562	28	9	457	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	9	2	0	0	0	0	0	2	4	0	4	0
Mvmt Flow	73	110	17	8	27	17	4	611	30	10	497	49

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	869	1191	273	958	1200	321	546	0	0	641	0	0
Stage 1	542	542	-	634	634	-	-	-	-	-	-	-
Stage 2	327	649	-	324	566	-	-	-	-	-	-	-
Critical Hdwy	7.68	6.54	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.68	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.68	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.02	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	235	186	731	215	187	681	1033	-	-	953	-	-
Stage 1	475	518	-	439	476	-	-	-	-	-	-	-
Stage 2	641	464	-	668	511	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	200	182	731	108	183	681	1033	-	-	953	-	-
Mov Cap-2 Maneuver	200	182	-	108	183	-	-	-	-	-	-	-
Stage 1	472	510	-	436	473	-	-	-	-	-	-	-
Stage 2	585	461	-	504	503	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	109.7		27.3		0.1		0.2	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1033	-	-	202	213	953	-
HCM Lane V/C Ratio	0.004	-	-	0.99	0.245	0.01	-
HCM Control Delay (s)	8.5	0	-	109.7	27.3	8.8	0.1
HCM Lane LOS	A	A	-	F	D	A	A
HCM 95th %tile Q(veh)	0	-	-	8.5	0.9	0	-



Lane Group	WBL	NBT	SBT	SER	NEL
Lane Group Flow (vph)	24	1000	535	421	145
v/c Ratio	0.08	0.66	0.56	0.70	0.42
Control Delay	24.0	7.9	17.0	30.7	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	7.9	17.0	30.7	30.3
Queue Length 50th (ft)	10	110	113	174	63
Queue Length 95th (ft)	27	202	136	#350	107
Internal Link Dist (ft)	270	237	338		313
Turn Bay Length (ft)					
Base Capacity (vph)	439	1504	956	598	481
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.66	0.56	0.70	0.30

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Glenbrook Ave & Thomas Ave & Conestoga Rd

Existing AM Peak
10/10/2018



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBT	SBR	SER	SER2	NEL2
Lane Configurations												
Traffic Volume (vph)	4	0	17	1	351	547	12	474	13	377	6	20
Future Volume (vph)	4	0	17	1	351	547	12	474	13	377	6	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	13	13	12
Grade (%)		2%				-1%		2%				
Total Lost time (s)		2.5				2.5		2.5		2.5		
Lane Util. Factor		1.00				*0.81		0.95		1.00		
Frt		0.89				1.00		1.00		0.86		
Flt Protected		0.99				0.98		1.00		1.00		
Satd. Flow (prot)		1497				2599		3002		1586		
Flt Permitted		0.99				0.56		1.00		1.00		
Satd. Flow (perm)		1497				1496		3002		1586		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	4	0	19	1	386	601	13	521	14	414	7	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	24	0	0	0	1000	0	535	0	421	0	0
Heavy Vehicles (%)	0%	0%	6%	0%	3%	3%	8%	5%	0%	2%	0%	5%
Parking (#/hr)												
Turn Type	Perm	Perm			pm+pt	NA		NA		Perm		Perm
Protected Phases					1	6		2				
Permitted Phases	8	8			6			2		1		4
Actuated Green, G (s)		12.3				54.7		22.0		26.7		
Effective Green, g (s)		16.8				58.2		25.5		30.2		
Actuated g/C Ratio		0.21				0.73		0.32		0.38		
Clearance Time (s)		7.0				6.0		6.0		6.0		
Vehicle Extension (s)		3.0				3.0		3.0		3.0		
Lane Grp Cap (vph)		314				1504		956		598		
v/s Ratio Prot						0.25		0.18				
v/s Ratio Perm		0.02				c0.23				c0.27		
v/c Ratio		0.08				0.66		0.56		0.70		
Uniform Delay, d1		25.4				5.8		22.6		21.1		
Progression Factor		1.00				1.00		0.65		1.00		
Incremental Delay, d2		0.1				2.3		1.9		6.8		
Delay (s)		25.5				8.1		16.7		27.9		
Level of Service		C				A		B		C		
Approach Delay (s)		25.5				8.1		16.7				
Approach LOS		C				A		B				
Intersection Summary												
HCM 2000 Control Delay			15.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			68.5%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd

Existing AM Peak
 10/10/2018



Movement	NEL	NER	NER2
Lane Configurations			
Traffic Volume (vph)	61	17	34
Future Volume (vph)	61	17	34
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	12	12	12
Grade (%)	-1%		
Total Lost time (s)	2.5		
Lane Util. Factor	1.00		
Frt	0.95		
Flt Protected	0.97		
Satd. Flow (prot)	1639		
Flt Permitted	0.97		
Satd. Flow (perm)	1639		
Peak-hour factor, PHF	0.91	0.91	0.91
Adj. Flow (vph)	67	19	37
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	145	0	0
Heavy Vehicles (%)	0%	0%	3%
Parking (#/hr)		0	
Turn Type	Perm		
Protected Phases			
Permitted Phases	4		
Actuated Green, G (s)	12.3		
Effective Green, g (s)	16.8		
Actuated g/C Ratio	0.21		
Clearance Time (s)	7.0		
Vehicle Extension (s)	3.0		
Lane Grp Cap (vph)	344		
v/s Ratio Prot			
v/s Ratio Perm	c0.09		
v/c Ratio	0.42		
Uniform Delay, d1	27.4		
Progression Factor	1.00		
Incremental Delay, d2	0.8		
Delay (s)	28.2		
Level of Service	C		
Approach Delay (s)	28.2		
Approach LOS	C		
Intersection Summary			

Intersection						
Int Delay, s/veh	4.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	148	886	0	274	641
Future Vol, veh/h	3	148	886	0	274	641
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	33	2	3	0	1	4
Mvmt Flow	3	156	933	0	288	675

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1847	467	0	0	933
Stage 1	933	-	-	-	-
Stage 2	914	-	-	-	-
Critical Hdwy	7.46	6.94	-	-	4.12
Critical Hdwy Stg 1	6.46	-	-	-	-
Critical Hdwy Stg 2	6.46	-	-	-	-
Follow-up Hdwy	3.83	3.32	-	-	2.21
Pot Cap-1 Maneuver	47	542	-	-	736
Stage 1	278	-	-	-	-
Stage 2	285	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	18	542	-	-	736
Mov Cap-2 Maneuver	18	-	-	-	-
Stage 1	104	-	-	-	-
Stage 2	285	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.2	0	5.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	343	736
HCM Lane V/C Ratio	-	-	0.463	0.392
HCM Control Delay (s)	-	-	24.2	13
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	2.4	1.9

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	12	7	898	41	19	650
Future Vol, veh/h	12	7	898	41	19	650
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	4
Mvmt Flow	13	7	945	43	20	684

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1349	494	0	0	988
Stage 1	967	-	-	-	-
Stage 2	382	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	144	526	-	-	708
Stage 1	334	-	-	-	-
Stage 2	665	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	137	526	-	-	708
Mov Cap-2 Maneuver	137	-	-	-	-
Stage 1	319	-	-	-	-
Stage 2	665	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.4	0	0.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	188	708
HCM Lane V/C Ratio	-	-	0.106	0.028
HCM Control Delay (s)	-	-	26.4	10.2
HCM Lane LOS	-	-	D	B
HCM 95th %tile Q(veh)	-	-	0.4	0.1



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	19	1035	677
v/c Ratio	0.09	0.35	0.24
Control Delay	18.0	1.4	1.0
Queue Delay	0.0	0.0	0.0
Total Delay	18.0	1.4	1.0
Queue Length 50th (ft)	4	0	0
Queue Length 95th (ft)	19	162	43
Internal Link Dist (ft)	231	260	414
Turn Bay Length (ft)			
Base Capacity (vph)	315	2926	2765
Starvation Cap Reductn	0	116	0
Spillback Cap Reductn	0	0	103
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.06	0.37	0.25
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
8: Lindsay Ave

Existing AM Peak
10/10/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	8	944	50	4	646
Future Volume (vph)	11	8	944	50	4	646
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	2.5		2.5			2.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.99			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1482		3080			3060
Flt Permitted	0.97		1.00			0.95
Satd. Flow (perm)	1482		3080			2911
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	8	983	52	4	673
RTOR Reduction (vph)	7	0	3	0	0	0
Lane Group Flow (vph)	12	0	1032	0	0	677
Heavy Vehicles (%)	27%	25%	3%	0%	50%	4%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		47.5			47.5
Effective Green, g (s)	4.0		51.0			51.0
Actuated g/C Ratio	0.07		0.85			0.85
Clearance Time (s)	5.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	98		2618			2474
v/s Ratio Prot	c0.01		c0.33			
v/s Ratio Perm						0.23
v/c Ratio	0.12		0.39			0.27
Uniform Delay, d1	26.3		1.0			0.9
Progression Factor	1.00		1.48			1.00
Incremental Delay, d2	0.5		0.4			0.3
Delay (s)	26.9		1.9			1.2
Level of Service	C		A			A
Approach Delay (s)	26.9		1.9			1.2
Approach LOS	C		A			A

Intersection Summary

HCM 2000 Control Delay	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	156	489	67	298	67	127	981	67	579
v/c Ratio	0.39	0.80	0.26	0.50	0.11	0.43	0.71	0.31	0.50
Control Delay	21.1	43.1	18.6	32.3	0.3	19.3	25.2	34.1	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1
Total Delay	21.1	43.1	18.6	32.3	0.3	19.3	25.4	34.4	2.9
Queue Length 50th (ft)	68	325	28	173	0	44	218	14	0
Queue Length 95th (ft)	96	416	47	230	0	m80	#500	m52	0
Internal Link Dist (ft)		467		428			446		118
Turn Bay Length (ft)	140		180		160	70			
Base Capacity (vph)	400	721	256	746	768	295	1379	213	1155
Starvation Cap Reductn	0	0	0	0	0	0	39	20	76
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	0.39	0.68	0.26	0.40	0.09	0.43	0.73	0.35	0.54

Intersection Summary






















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.

HCM Signalized Intersection Capacity Analysis
9: Railroad Ave & Bryn Mawr Ave

Existing AM Peak
10/10/2018

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Future Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5					2.5	2.5	2.5	2.5	-1.5	
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	0.95	
Fr _t	1.00	0.95					1.00	1.00	0.85	1.00	0.98	
Fl _t Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1775	1631					1653	1706	1581	1277	3041	
Fl _t Permitted	0.40	1.00					0.21	1.00	1.00	0.31	1.00	
Satd. Flow (perm)	738	1631					362	1706	1581	411	3041	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	156	339	49	101	4	63	298	67	127	861	114	6
RTOR Reduction (vph)	0	9	0	0	0	0	0	43	0	1	0	0
Lane Group Flow (vph)	156	480	0	0	0	67	298	24	127	980	0	0
Heavy Vehicles (%)	6%	2%	0%	2%	0%	0%	2%	0%	25%	3%	3%	9%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Actuated Green, G (s)	46.7	40.7				44.3	39.5	39.5	57.3	48.4		
Effective Green, g (s)	53.7	44.2				51.3	43.0	43.0	64.0	51.9		
Actuated g/C Ratio	0.45	0.37				0.43	0.36	0.36	0.53	0.43		
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0	2.0		
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	412	600				244	611	566	308	1315		
v/s Ratio Prot	c0.03	c0.29				0.02	0.17		c0.04	c0.32		
v/s Ratio Perm	0.14					0.10		0.02	0.18			
v/c Ratio	0.38	0.80				0.27	0.49	0.04	0.41	0.75		
Uniform Delay, d ₁	21.0	33.9				23.2	29.9	25.1	15.8	28.5		
Progression Factor	1.00	1.00				1.00	1.00	1.00	0.78	0.73		
Incremental Delay, d ₂	0.6	7.5				0.6	0.6	0.0	0.7	3.2		
Delay (s)	21.6	41.5				23.8	30.6	25.1	13.0	24.0		
Level of Service	C	D				C	C	C	B	C		
Approach Delay (s)		36.7					28.7			22.7		
Approach LOS		D					C			C		
Intersection Summary												
HCM 2000 Control Delay			23.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				13.5		
Intersection Capacity Utilization			75.6%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 9: Railroad Ave & Bryn Mawr Ave

Existing AM Peak
 10/10/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		↵	↕↗	
Traffic Volume (vph)	45	19	447	103
Future Volume (vph)	45	19	447	103
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	10
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	0.95	
Fr _t		1.00	0.97	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1530	2952	
Fl _t Permitted		0.12	1.00	
Satd. Flow (perm)		198	2952	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	20	471	108
RTOR Reduction (vph)	0	0	15	0
Lane Group Flow (vph)	0	67	564	0
Heavy Vehicles (%)	4%	5%	4%	10%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		47.7	41.6	
Effective Green, g (s)		54.7	45.1	
Actuated g/C Ratio		0.46	0.38	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		196	1109	
v/s Ratio Prot		0.03	0.19	
v/s Ratio Perm		0.13		
v/c Ratio		0.34	0.51	
Uniform Delay, d ₁		21.9	28.9	
Progression Factor		1.63	0.05	
Incremental Delay, d ₂		0.9	1.4	
Delay (s)		36.6	2.9	
Level of Service		D	A	
Approach Delay (s)			6.4	
Approach LOS			A	
Intersection Summary				

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	1127	659
v/c Ratio	0.38	0.56
Control Delay	0.3	32.6
Queue Delay	1.1	0.6
Total Delay	1.4	33.2
Queue Length 50th (ft)	0	227
Queue Length 95th (ft)	0	299
Internal Link Dist (ft)	118	260
Turn Bay Length (ft)		
Base Capacity (vph)	3004	1184
Starvation Cap Reductn	1528	214
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.76	0.68
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
11: Glenbrook Ave

Existing AM Peak
10/10/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Traffic Volume (vph)	0	0	41	1030	614	12
Future Volume (vph)	0	0	41	1030	614	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	11
Total Lost time (s)				-1.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3123	3061	
Fl _t Permitted				0.93	1.00	
Satd. Flow (perm)				2907	3061	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	43	1084	646	13
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	1127	658	0
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)				114.8	41.6	
Effective Green, g (s)				115.0	45.1	
Actuated g/C Ratio				0.96	0.38	
Clearance Time (s)				2.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2879	1150	
v/s Ratio Prot				c0.17	c0.21	
v/s Ratio Perm				c0.21		
v/c Ratio				0.39	0.57	
Uniform Delay, d ₁				0.2	29.8	
Progression Factor				1.00	0.98	
Incremental Delay, d ₂				0.1	2.0	
Delay (s)				0.2	31.3	
Level of Service				A	C	
Approach Delay (s)	0.0			0.2	31.3	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 10: Landover Rd/County Line Rd

Existing AM Peak
 10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	160	167	22	48	39	63	7	866	120	27	596	55
Future Volume (veh/h)	160	167	22	48	39	63	7	866	120	27	596	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1872	1872	1872	1800	1800	1800	1772	1772	1772	1744	1744	1744
Adj Flow Rate, veh/h	165	172	23	49	40	65	7	893	124	28	614	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	2	2	2	4	4	4
Cap, veh/h	232	205	27	143	121	164	35	1960	271	90	1868	172
Arrive On Green	0.26	0.28	0.26	0.26	0.28	0.28	0.66	0.68	0.68	1.00	1.00	1.00
Sat Flow, veh/h	669	727	95	366	431	583	7	2897	400	84	2761	254
Grp Volume(v), veh/h	360	0	0	154	0	0	547	0	477	353	0	346
Grp Sat Flow(s),veh/h/ln	1491	0	0	1380	0	0	1763	0	1540	1558	0	1541
Q Serve(g_s), s	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	28.4	0.0	0.0	10.3	0.0	0.0	17.6	0.0	17.4	0.0	0.0	0.0
Prop In Lane	0.46		0.06	0.32		0.42	0.01		0.26	0.08		0.16
Lane Grp Cap(c), veh/h	433	0	0	400	0	0	1187	0	1042	1054	0	1043
V/C Ratio(X)	0.83	0.00	0.00	0.39	0.00	0.00	0.46	0.00	0.46	0.33	0.00	0.33
Avail Cap(c_a), veh/h	481	0	0	445	0	0	1187	0	1042	1054	0	1043
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.88	0.00	0.88
Uniform Delay (d), s/veh	42.4	0.0	0.0	34.7	0.0	0.0	9.1	0.0	9.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	10.9	0.0	0.0	0.6	0.0	0.0	1.3	0.0	1.5	0.8	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.5	0.0	0.0	6.9	0.0	0.0	11.4	0.0	9.7	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	0.0	0.0	35.3	0.0	0.0	10.4	0.0	10.5	0.8	0.0	0.8
LnGrp LOS	D	A	A	D	A	A	B	A	B	A	A	A
Approach Vol, veh/h		360			154			1024				699
Approach Delay, s/veh		53.3			35.3			10.5				0.8
Approach LOS		D			D			B				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.7		36.3		83.7		36.3				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		75.0		35.0		75.0		35.0				
Max Q Clear Time (g_c+I1), s		19.6		30.4		2.0		12.3				
Green Ext Time (p_c), s		8.3		0.9		5.2		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				16.0								
HCM 6th LOS				B								

Lanes, Volumes, Timings
1: Lancaster Ave & County Line Road

Existing PM Peak
10/10/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↗	↕			↕	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35				35
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			3.3				3.1
Lane Group Flow (vph)	0	1564	0	0	605	0	271	268	0	0	39	0
v/c Ratio		0.88			0.39		0.61	0.62				0.19
Control Delay		20.6			11.9		32.1	32.3				24.3
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		20.6			11.9		32.1	32.3				24.3
Queue Length 50th (ft)		307			96		120	117				11
Queue Length 95th (ft)		#497			137		211	209				37
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1774			1565		442	430				383
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.88			0.39		0.61	0.62				0.10

Intersection Summary

Area Type: Other
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Lancaster Ave & County Line Road

Existing PM Peak
10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕			↕	
Traffic Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Future Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5			2.5	
Lane Util. Factor		0.95			0.95		0.95	0.95			1.00	
Frt		0.93			1.00		1.00	0.99			0.95	
Flt Protected		1.00			1.00		0.95	0.96			0.99	
Satd. Flow (prot)		2979			3292		1592	1540			1610	
Flt Permitted		0.95			0.84		0.95	0.96			0.99	
Satd. Flow (perm)		2837			2775		1592	1540			1610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	815	741	17	572	16	511	14	14	7	17	15
RTOR Reduction (vph)	0	185	0	0	2	0	0	2	0	0	14	0
Lane Group Flow (vph)	0	1379	0	0	603	0	271	266	0	0	25	0
Heavy Vehicles (%)	0%	1%	1%	0%	2%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		39.6			39.6		18.7	18.7			4.7	
Effective Green, g (s)		43.1			43.1		22.2	22.2			7.2	
Actuated g/C Ratio		0.54			0.54		0.28	0.28			0.09	
Clearance Time (s)		6.0			6.0		6.0	6.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		1528			1495		441	427			144	
v/s Ratio Prot							0.17	c0.17			c0.02	
v/s Ratio Perm		c0.49			0.22							
v/c Ratio		0.90			0.40		0.61	0.62			0.18	
Uniform Delay, d1		16.6			10.9		25.2	25.2			33.7	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		9.0			0.2		2.5	2.8			0.6	
Delay (s)		25.6			11.0		27.7	28.1			34.2	
Level of Service		C			B		C	C			C	
Approach Delay (s)		25.6			11.0		27.9	27.9			34.2	
Approach LOS		C			B		C	C			C	

Intersection Summary

HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection												
Int Delay, s/veh	12.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	26	60	68	23	36	9	22	436	33	7	710	38
Future Vol, veh/h	26	60	68	23	36	9	22	436	33	7	710	38
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	3	0	0	0	0	1	3	0	1	0
Mvmt Flow	29	67	76	26	40	10	24	484	37	8	789	42

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1136	1395	416	995	1398	261	831	0	0	521	0	0
Stage 1	826	826	-	551	551	-	-	-	-	-	-	-
Stage 2	310	569	-	444	847	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.56	6.96	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.56	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.56	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.03	3.33	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	159	139	583	202	142	744	810	-	-	1056	-	-
Stage 1	337	382	-	491	519	-	-	-	-	-	-	-
Stage 2	681	502	-	568	381	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	116	131	583	101	134	744	810	-	-	1056	-	-
Mov Cap-2 Maneuver	116	131	-	101	134	-	-	-	-	-	-	-
Stage 1	323	377	-	470	497	-	-	-	-	-	-	-
Stage 2	592	481	-	401	376	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	88.1		62		0.6		0.2	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	810	-	-	193	134	1056	-
HCM Lane V/C Ratio	0.03	-	-	0.887	0.564	0.007	-
HCM Control Delay (s)	9.6	0.2	-	88.1	62	8.4	0.1
HCM Lane LOS	A	A	-	F	F	A	A
HCM 95th %tile Q(veh)	0.1	-	-	6.8	2.8	0	-

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	33	37	14	13	31	9	0	537	27	4	494	91
Future Vol, veh/h	33	37	14	13	31	9	0	537	27	4	494	91
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	12	0	7	0	0	0	0	4	0	0	2	4
Mvmt Flow	35	39	15	14	33	10	0	571	29	4	526	97

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	885	1183	312	877	1217	300	623	0	0	600	0	0
Stage 1	583	583	-	586	586	-	-	-	-	-	-	-
Stage 2	302	600	-	291	631	-	-	-	-	-	-	-
Critical Hdwy	7.74	6.5	7.04	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.74	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.62	4	3.37	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	224	191	669	246	182	702	968	-	-	987	-	-
Stage 1	441	502	-	468	500	-	-	-	-	-	-	-
Stage 2	655	493	-	698	477	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	189	190	669	201	181	702	968	-	-	987	-	-
Mov Cap-2 Maneuver	189	190	-	201	181	-	-	-	-	-	-	-
Stage 1	441	499	-	468	500	-	-	-	-	-	-	-
Stage 2	603	493	-	625	474	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	33.2		27.9		0		0.1	
HCM LOS	D		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	968	-	-	215	213	987	-	-
HCM Lane V/C Ratio	-	-	-	0.416	0.265	0.004	-	-
HCM Control Delay (s)	0	-	-	33.2	27.9	8.7	0	-
HCM Lane LOS	A	-	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.9	1	0	-	-

Lanes, Volumes, Timings
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

Existing PM Peak
 10/10/2018



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Right Turn on Red				No			No				No	
Link Speed (mph)		25				35			35			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				6.2			8.1			
Lane Group Flow (vph)	0	116	0	0	0	859	0	0	657	0	0	440
v/c Ratio		0.39				0.57			0.60			0.78
Control Delay		32.9				6.1			26.2			35.6
Queue Delay		0.0				0.0			0.0			0.0
Total Delay		32.9				6.1			26.2			35.6
Queue Length 50th (ft)		55				83			153			198
Queue Length 95th (ft)		97				151			228			#347
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)												
Base Capacity (vph)		430				1498			1095			580
Starvation Cap Reductn		0				0			0			0
Spillback Cap Reductn		0				0			0			0
Storage Cap Reductn		0				0			0			0
Reduced v/c Ratio		0.27				0.57			0.60			0.76

Intersection Summary

Area Type: Other
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

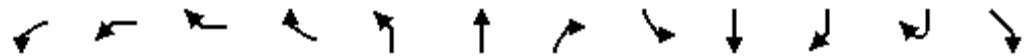
Existing PM Peak
 10/10/2018



Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
v/c Ratio			0.41		
Control Delay			33.1		
Queue Delay			0.0		
Total Delay			33.1		
Queue Length 50th (ft)			59		
Queue Length 95th (ft)			103		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			448		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		
Reduced v/c Ratio			0.28		
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

Existing PM Peak
 10/10/2018



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Future Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		2.5				2.5			2.5			2.5
Lane Util. Factor		1.00				*0.81			0.95			1.00
Frt		0.98				1.00			0.99			0.86
Flt Protected		0.96				0.98			1.00			1.00
Satd. Flow (prot)		1557				2633			3138			1602
Flt Permitted		0.96				0.54			0.95			1.00
Satd. Flow (perm)		1557				1445			2973			1602
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	85	12	15	4	390	445	24	5	629	20	3	413
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	116	0	0	0	859	0	0	657	0	0	440
Heavy Vehicles (%)	9%	0%	0%	25%	0%	2%	4%	0%	0%	5%	0%	1%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		11.9				60.1			27.8			26.3
Effective Green, g (s)		16.4				63.6			31.3			29.8
Actuated g/C Ratio		0.19				0.75			0.37			0.35
Clearance Time (s)		7.0				6.0			6.0			6.0
Vehicle Extension (s)		3.0				3.0			3.0			3.0
Lane Grp Cap (vph)		300				1497			1094			561
v/s Ratio Prot						0.20						
v/s Ratio Perm		0.07				c0.23			0.22			c0.27
v/c Ratio		0.39				0.57			0.60			0.78
Uniform Delay, d1		29.9				4.7			21.8			24.7
Progression Factor		1.00				1.00			1.00			1.00
Incremental Delay, d2		0.8				0.5			2.4			7.1
Delay (s)		30.7				5.3			24.2			31.8
Level of Service		C				A			C			C
Approach Delay (s)		30.7				5.3			24.2			
Approach LOS		C				A			C			

Intersection Summary

HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

Existing PM Peak
 10/10/2018



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	25	22	29	19	49
Future Volume (vph)	25	22	29	19	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			2.5		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1621		
Flt Permitted			0.98		
Satd. Flow (perm)			1621		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	27	23	31	20	52
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			11.9		
Effective Green, g (s)			16.4		
Actuated g/C Ratio			0.19		
Clearance Time (s)			7.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			312		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.40		
Uniform Delay, d1			30.0		
Progression Factor			1.00		
Incremental Delay, d2			0.9		
Delay (s)			30.9		
Level of Service			C		
Approach Delay (s)			30.9		
Approach LOS			C		
Intersection Summary					

Intersection						
Int Delay, s/veh	3.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↓			↔
Traffic Vol, veh/h	8	255	651	3	127	990
Future Vol, veh/h	8	255	651	3	127	990
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	1	0	2	1
Mvmt Flow	9	274	700	3	137	1065

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1509	352	0	0	703	0
Stage 1	702	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Critical Hdwy	6.8	6.92	-	-	4.14	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.31	-	-	2.22	-
Pot Cap-1 Maneuver	113	647	-	-	890	-
Stage 1	458	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	70	647	-	-	890	-
Mov Cap-2 Maneuver	70	-	-	-	-	-
Stage 1	285	-	-	-	-	-
Stage 2	404	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.1	0	2.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	517	890
HCM Lane V/C Ratio	-	-	0.547	0.153
HCM Control Delay (s)	-	-	20.1	9.8
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	3.3	0.5

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	TT		TT			TT
Traffic Vol, veh/h	10	17	661	5	4	1063
Future Vol, veh/h	10	17	661	5	4	1063
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	0	1	20	0	1
Mvmt Flow	11	18	696	5	4	1119

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1267	351	0	0	701
Stage 1	699	-	-	-	-
Stage 2	568	-	-	-	-
Critical Hdwy	7	6.9	-	-	4.1
Critical Hdwy Stg 1	6	-	-	-	-
Critical Hdwy Stg 2	6	-	-	-	-
Follow-up Hdwy	3.6	3.3	-	-	2.2
Pot Cap-1 Maneuver	150	651	-	-	905
Stage 1	434	-	-	-	-
Stage 2	509	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	148	651	-	-	905
Mov Cap-2 Maneuver	148	-	-	-	-
Stage 1	429	-	-	-	-
Stage 2	509	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.9	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	288	905
HCM Lane V/C Ratio	-	-	0.099	0.005
HCM Control Delay (s)	-	-	18.9	9
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.3	0

Lanes, Volumes, Timings
 8: Haverford Rd/County Line Rd & Lindsay Ave

Existing PM Peak
 10/10/2018



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		6.6			9.6
Lane Group Flow (vph)	15	0	685	0	0	1117
v/c Ratio	0.05		0.23			0.39
Control Delay	17.6		0.6			1.3
Queue Delay	0.0		0.0			0.2
Total Delay	17.6		0.6			1.4
Queue Length 50th (ft)	3		0			0
Queue Length 95th (ft)	16		40			79
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)						
Base Capacity (vph)	581		2980			2873
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			740
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.03		0.23			0.52

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
8: Haverford Rd/County Line Rd & Lindsay Ave

Existing PM Peak
10/10/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	6	650	1	1	1060
Future Volume (vph)	9	6	650	1	1	1060
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	1.5		2.5			2.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.95		1.00			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1874		3129			3160
Flt Permitted	0.97		1.00			0.95
Satd. Flow (perm)	1874		3129			3017
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	6	684	1	1	1116
RTOR Reduction (vph)	6	0	0	0	0	0
Lane Group Flow (vph)	9	0	685	0	0	1117
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.4		47.6			47.6
Effective Green, g (s)	4.9		51.1			51.1
Actuated g/C Ratio	0.08		0.85			0.85
Clearance Time (s)	5.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	153		2664			2569
v/s Ratio Prot	c0.01		0.22			
v/s Ratio Perm						c0.37
v/c Ratio	0.06		0.26			0.43
Uniform Delay, d1	25.4		0.8			1.0
Progression Factor	1.00		0.70			1.00
Incremental Delay, d2	0.2		0.2			0.5
Delay (s)	25.6		0.8			1.6
Level of Service	C		A			A
Approach Delay (s)	25.6		0.8			1.6
Approach LOS	C		A			A

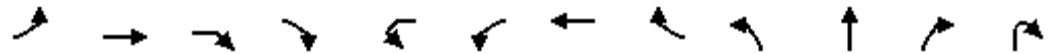
Intersection Summary

HCM 2000 Control Delay	1.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
 9: County Line Rd/Haverford Rd & Railroad Ave & Bryn Mawr Ave

Existing PM Peak
 10/10/2018



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	12	11	11	13	10	10	10	10
Storage Length (ft)	140		0			185		160	70			0
Storage Lanes	1		0			1		1	1			0
Taper Length (ft)	25					25			25			
Right Turn on Red					Yes			Yes				Yes
Link Speed (mph)		40					30			35		
Link Distance (ft)		547					508			526		
Travel Time (s)		9.3					11.5			10.2		
Lane Group Flow (vph)	100	427	0	0	0	215	369	72	105	594	0	0
v/c Ratio	0.29	0.81				0.79	0.66	0.12	0.45	0.41		
Control Delay	21.0	47.5				43.4	40.8	0.4	25.5	17.6		
Queue Delay	0.0	0.0				0.0	0.0	0.0	0.0	0.0		
Total Delay	21.0	47.5				43.4	40.8	0.4	25.5	17.6		
Queue Length 50th (ft)	45	284				104	243	0	33	117		
Queue Length 95th (ft)	73	387				#159	328	0	m81	m147		
Internal Link Dist (ft)		467					428			446		
Turn Bay Length (ft)	140					185		160	70			
Base Capacity (vph)	354	612				272	645	665	233	1456		
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	0.28	0.70				0.79	0.57	0.11	0.45	0.41		

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

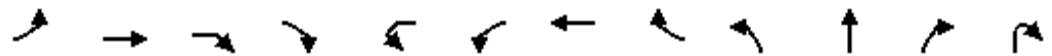
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10
Storage Length (ft)		0		0
Storage Lanes		1		0
Taper Length (ft)		25		
Right Turn on Red				Yes
Link Speed (mph)			35	
Link Distance (ft)			198	
Travel Time (s)			3.9	
Lane Group Flow (vph)	0	63	1002	0
v/c Ratio		0.18	0.78	
Control Delay		4.6	7.3	
Queue Delay		0.2	0.4	
Total Delay		4.9	7.7	
Queue Length 50th (ft)		2	0	
Queue Length 95th (ft)		m5	1	
Internal Link Dist (ft)			118	
Turn Bay Length (ft)				
Base Capacity (vph)		346	1285	
Starvation Cap Reductn		64	53	
Spillback Cap Reductn		0	27	
Storage Cap Reductn		0	0	
Reduced v/c Ratio		0.22	0.81	
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd/Haverford Rd & Railroad Ave & Bryn Mawr Ave

Existing PM Peak
 10/10/2018



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Future Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5					2.5	2.5	2.5	2.5	-1.5	
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	0.95	
Fr _t	1.00	0.94					1.00	1.00	0.85	1.00	0.98	
Fl _t Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1862	1614					1653	1740	1565	1535	3098	
Fl _t Permitted	0.28	1.00					0.20	1.00	1.00	0.14	1.00	
Satd. Flow (perm)	552	1614					355	1740	1565	222	3098	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	100	243	46	138	6	209	369	72	105	516	74	4
RTOR Reduction (vph)	0	16	0	0	0	0	0	49	0	1	0	0
Lane Group Flow (vph)	100	411	0	0	0	215	369	23	105	593	0	0
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%	0%	1%	4%	1%	1%	0%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1		6	
Permitted Phases	8	8			4	4	4	4	6		6	
Actuated Green, G (s)	42.5	34.7				42.9	34.9	34.9	59.2	51.7		
Effective Green, g (s)	49.5	38.2				49.9	38.4	38.4	66.2	55.2		
Actuated g/C Ratio	0.41	0.32				0.42	0.32	0.32	0.55	0.46		
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0	2.0		
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	351	513				272	556	500	242	1425		
v/s Ratio Prot	0.03	c0.25				c0.08	0.21		c0.04	0.19		
v/s Ratio Perm	0.09					0.25		0.01	0.20			
v/c Ratio	0.28	0.80				0.79	0.66	0.05	0.43	0.42		
Uniform Delay, d1	23.4	37.4				26.5	35.2	28.2	17.4	21.6		
Progression Factor	1.00	1.00				1.00	1.00	1.00	1.21	0.74		
Incremental Delay, d2	0.4	8.8				14.4	3.0	0.0	1.1	0.8		
Delay (s)	23.9	46.2				40.9	38.2	28.2	22.1	16.7		
Level of Service	C	D				D	D	C	C	B		
Approach Delay (s)		42.0					38.0			17.5		
Approach LOS		D					D			B		

Intersection Summary

HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd/Haverford Rd & Railroad Ave & Bryn Mawr Ave

Existing PM Peak
 10/10/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		↵	↕↵	
Traffic Volume (vph)	37	26	921	71
Future Volume (vph)	37	26	921	71
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	10
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	0.95	
Fr _t		1.00	0.99	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1568	3120	
Fl _t Permitted		0.31	1.00	
Satd. Flow (perm)		517	3120	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99
Adj. Flow (vph)	37	26	930	72
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	63	997	0
Heavy Vehicles (%)	3%	0%	1%	4%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		51.4	45.8	
Effective Green, g (s)		58.4	49.3	
Actuated g/C Ratio		0.49	0.41	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		331	1281	
v/s Ratio Prot		0.01	c0.32	
v/s Ratio Perm		0.08		
v/c Ratio		0.19	0.78	
Uniform Delay, d ₁		17.3	30.6	
Progression Factor		0.25	0.13	
Incremental Delay, d ₂		0.1	2.6	
Delay (s)		4.4	6.5	
Level of Service		A	A	
Approach Delay (s)			6.4	
Approach LOS			A	
Intersection Summary				



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	10	12	10	12
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	35	
Link Distance (ft)	228			198	340	
Travel Time (s)	4.4			3.9	6.6	
Lane Group Flow (vph)	0	0	0	714	1073	0
v/c Ratio				0.22	0.83	
Control Delay				0.2	38.4	
Queue Delay				0.4	4.0	
Total Delay				0.5	42.4	
Queue Length 50th (ft)				0	404	
Queue Length 95th (ft)				0	#550	
Internal Link Dist (ft)	148			118	260	
Turn Bay Length (ft)						
Base Capacity (vph)				3244	1297	
Starvation Cap Reductn				1871	154	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.52	0.94	

Intersection Summary

Area Type: Other

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 11: Haverford Rd & Glenbrook Ave

Existing PM Peak
 10/10/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Traffic Volume (vph)	0	0	26	681	1055	7
Future Volume (vph)	0	0	26	681	1055	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	12	10	12
Total Lost time (s)				-1.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3348	3157	
Fl _t Permitted				0.94	1.00	
Satd. Flow (perm)				3153	3157	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	0	26	688	1066	7
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	714	1072	0
Heavy Vehicles (%)	0%	0%	1%	2%	1%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7		
Actuated Green, G (s)				108.1	45.8	
Effective Green, g (s)				114.6	49.3	
Actuated g/C Ratio				0.95	0.41	
Clearance Time (s)				2.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3100	1297	
v/s Ratio Prot				c0.11	c0.34	
v/s Ratio Perm				c0.11		
v/c Ratio				0.23	0.83	
Uniform Delay, d1				0.2	31.5	
Progression Factor				1.00	0.98	
Incremental Delay, d2				0.0	5.8	
Delay (s)				0.2	36.7	
Level of Service				A	D	
Approach Delay (s)	0.0			0.2	36.7	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			22.1	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.55			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)	20.5	
Intersection Capacity Utilization			43.2%	ICU Level of Service	A	
Analysis Period (min)			15			

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 10: Haverford Rd & Landover Rd/County Line Rd


















Existing PM Peak
 10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	101	56	29	117	188	42	26	582	56	25	1049	222
Future Volume (veh/h)	101	56	29	117	188	42	26	582	56	25	1049	222
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1843	1843	1843	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	106	59	31	123	198	44	27	613	59	26	1104	234
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	0	0	0	1	1	1	1	1	1
Cap, veh/h	188	102	46	173	240	51	85	1856	177	55	1797	376
Arrive On Green	0.26	0.29	0.26	0.26	0.29	0.29	0.65	0.67	0.67	1.00	1.00	1.00
Sat Flow, veh/h	495	356	160	464	841	179	79	2759	263	35	2671	559
Grp Volume(v), veh/h	196	0	0	365	0	0	345	0	354	725	0	639
Grp Sat Flow(s),veh/h/ln	1012	0	0	1484	0	0	1523	0	1578	1740	0	1525
Q Serve(g_s), s	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	11.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	21.6	0.0	0.0	29.0	0.0	0.0	9.5	0.0	11.3	0.0	0.0	0.0
Prop In Lane	0.54		0.16	0.34		0.12	0.08		0.17	0.04		0.37
Lane Grp Cap(c), veh/h	314	0	0	433	0	0	1026	0	1062	1165	0	1026
V/C Ratio(X)	0.62	0.00	0.00	0.84	0.00	0.00	0.34	0.00	0.33	0.62	0.00	0.62
Avail Cap(c_a), veh/h	351	0	0	475	0	0	1026	0	1062	1165	0	1026
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.53	0.00	0.53
Uniform Delay (d), s/veh	38.5	0.0	0.0	41.5	0.0	0.0	8.0	0.0	8.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.9	0.0	0.0	12.1	0.0	0.0	0.9	0.0	0.8	1.3	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.5	0.0	0.0	17.8	0.0	0.0	7.0	0.0	6.9	0.8	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.4	0.0	0.0	53.6	0.0	0.0	8.9	0.0	9.1	1.3	0.0	1.5
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		196			365			699				1364
Approach Delay, s/veh		41.4			53.6			9.0				1.4
Approach LOS		D			D			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.2		36.8		83.2		36.8				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		75.0		35.0		75.0		35.0				
Max Q Clear Time (g_c+I1), s		13.3		23.6		2.0		31.0				
Green Ext Time (p_c), s		5.4		0.8		14.3		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				13.7								
HCM 6th LOS				B								

Lanes, Volumes, Timings
1: Lancaster Ave & County Line Road

Existing SAT Midday Peak
10/10/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%			3%	
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		497			631			170			160	
Travel Time (s)		13.6			17.2			3.3			3.1	
Lane Group Flow (vph)	0	981	0	0	628	0	250	252	0	0	41	0
v/c Ratio		0.55			0.35		0.61	0.62			0.20	
Control Delay		9.6			11.2		32.5	32.8			25.3	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		9.6			11.2		32.5	32.8			25.3	
Queue Length 50th (ft)		122			97		109	109			12	
Queue Length 95th (ft)		182			137		196	197			40	
Internal Link Dist (ft)		417			551			90			80	
Turn Bay Length (ft)												
Base Capacity (vph)		1776			1779		412	404			381	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.55			0.35		0.61	0.62			0.11	
Intersection Summary												
Area Type:	Other											

HCM Signalized Intersection Capacity Analysis
1: Lancaster Ave & County Line Road

Existing SAT Midday Peak
10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↕			↕	
Traffic Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Future Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%			3%	
Total Lost time (s)		1.5			2.5		2.5	2.5			2.5	
Lane Util. Factor		0.95			0.95		0.95	0.95			1.00	
Frt		0.94			0.99		1.00	0.99			0.95	
Flt Protected		1.00			1.00		0.95	0.96			0.98	
Satd. Flow (prot)		3042			3345		1532	1492			1602	
Flt Permitted		0.93			0.93		0.95	0.96			0.98	
Satd. Flow (perm)		2848			3116		1532	1492			1602	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	22	570	389	13	586	29	454	29	19	14	13	14
RTOR Reduction (vph)	0	123	0	0	4	0	0	3	0	0	13	0
Lane Group Flow (vph)	0	858	0	0	624	0	250	249	0	0	28	0
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	5%	1%	1%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		40.1			40.1		18.1	18.1			4.8	
Effective Green, g (s)		44.6			43.6		21.6	21.6			7.3	
Actuated g/C Ratio		0.56			0.55		0.27	0.27			0.09	
Clearance Time (s)		6.0			6.0		6.0	6.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		1587			1698		413	402			146	
v/s Ratio Prot							0.16	c0.17			c0.02	
v/s Ratio Perm		c0.30			0.20							
v/c Ratio		0.54			0.37		0.61	0.62			0.19	
Uniform Delay, d1		11.2			10.4		25.5	25.6			33.6	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.3			0.1		2.5	2.8			0.7	
Delay (s)		12.5			10.5		28.0	28.4			34.3	
Level of Service		B			B		C	C			C	
Approach Delay (s)		12.5			10.5		28.2	28.2			34.3	
Approach LOS		B			B		C	C			C	

Intersection Summary

HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	41	15	20	21	17	4	446	29	6	332	21
Future Vol, veh/h	25	41	15	20	21	17	4	446	29	6	332	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	3	0	1	0
Mvmt Flow	27	44	16	21	22	18	4	474	31	6	353	22

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	632	889	188	709	885	253	375	0	0	505	0	0
Stage 1	376	376	-	498	498	-	-	-	-	-	-	-
Stage 2	256	513	-	211	387	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	369	285	828	325	286	753	1195	-	-	1070	-	-
Stage 1	623	620	-	528	548	-	-	-	-	-	-	-
Stage 2	732	539	-	777	613	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	335	282	828	279	283	753	1195	-	-	1070	-	-
Mov Cap-2 Maneuver	335	282	-	279	283	-	-	-	-	-	-	-
Stage 1	620	616	-	525	545	-	-	-	-	-	-	-
Stage 2	682	536	-	703	609	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	19.1		17.7		0.1		0.1	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1195	-	-	340	344	1070	-
HCM Lane V/C Ratio	0.004	-	-	0.253	0.179	0.006	-
HCM Control Delay (s)	8	0	-	19.1	17.7	8.4	0
HCM Lane LOS	A	A	-	C	C	A	A
HCM 95th %tile Q(veh)	0	-	-	1	0.6	0	-

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	44	34	6	12	42	13	2	436	26	10	365	58
Future Vol, veh/h	44	34	6	12	42	13	2	436	26	10	365	58
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	8	10	1	0
Mvmt Flow	46	36	6	13	44	14	2	459	27	11	384	61

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	693	927	223	709	944	243	445	0	0	486	0	0
Stage 1	437	437	-	477	477	-	-	-	-	-	-	-
Stage 2	256	490	-	232	467	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.3	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.3	-	-
Pot Cap-1 Maneuver	334	270	787	325	264	764	1126	-	-	1019	-	-
Stage 1	574	583	-	543	559	-	-	-	-	-	-	-
Stage 2	732	552	-	756	565	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	282	266	787	286	260	764	1126	-	-	1019	-	-
Mov Cap-2 Maneuver	282	266	-	286	260	-	-	-	-	-	-	-
Stage 1	573	575	-	542	558	-	-	-	-	-	-	-
Stage 2	661	551	-	693	557	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.2	20.4	0	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1126	-	-	295	304	1019	-
HCM Lane V/C Ratio	0.002	-	-	0.143	0.232	0.01	-
HCM Control Delay (s)	8.2	0	-	19.2	20.4	8.6	0.1
HCM Lane LOS	A	A	-	C	C	A	A
HCM 95th %tile Q(veh)	0	-	-	0.5	0.9	0	-



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Right Turn on Red				No			No					No
Link Speed (mph)		25				35			35			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				6.2			8.1			
Lane Group Flow (vph)	0	33	0	0	0	739	0	0	392	0	0	319
v/c Ratio		0.10				0.46			0.31			0.62
Control Delay		24.8				5.0			18.6			28.9
Queue Delay		0.0				0.0			0.0			0.0
Total Delay		24.8				5.0			18.6			28.9
Queue Length 50th (ft)		13				66			68			136
Queue Length 95th (ft)		34				121			122			206
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)												
Base Capacity (vph)		495				1620			1246			511
Starvation Cap Reductn		0				0			0			0
Spillback Cap Reductn		0				0			0			0
Storage Cap Reductn		0				0			0			0
Reduced v/c Ratio		0.07				0.46			0.31			0.62

Intersection Summary

Area Type:	Other
------------	-------



Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
v/c Ratio			0.39		
Control Delay			30.0		
Queue Delay			0.0		
Total Delay			30.0		
Queue Length 50th (ft)			54		
Queue Length 95th (ft)			96		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			501		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		
Reduced v/c Ratio			0.25		
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

Existing SAT Midday Peak
 10/10/2018



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Future Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		2.5				2.5			2.5			2.5
Lane Util. Factor		1.00				*0.81			0.95			1.00
Frt		0.95				0.99			1.00			0.86
Flt Protected		0.97				0.98			1.00			1.00
Satd. Flow (prot)		1599				2640			3116			1617
Flt Permitted		0.97				0.64			0.95			1.00
Satd. Flow (perm)		1599				1731			2953			1617
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	3	5	6	266	445	28	4	378	6	4	308
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	33	0	0	0	739	0	0	392	0	0	319
Heavy Vehicles (%)	0%	33%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		10.0				56.0			28.5			21.5
Effective Green, g (s)		14.5				59.5			32.0			25.0
Actuated g/C Ratio		0.18				0.75			0.41			0.32
Clearance Time (s)		7.0				6.0			6.0			6.0
Vehicle Extension (s)		3.0				3.0			3.0			3.0
Lane Grp Cap (vph)		293				1591			1196			511
v/s Ratio Prot						0.15						
v/s Ratio Perm		0.02				c0.20			0.13			c0.20
v/c Ratio		0.11				0.46			0.33			0.62
Uniform Delay, d1		26.9				3.7			16.1			23.0
Progression Factor		1.00				1.00			1.00			1.00
Incremental Delay, d2		0.2				0.2			0.7			2.4
Delay (s)		27.1				3.9			16.9			25.4
Level of Service		C				A			B			C
Approach Delay (s)		27.1				3.9			16.9			
Approach LOS		C				A			B			

Intersection Summary

HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

Existing SAT Midday Peak
 10/10/2018



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	11	14	34	22	51
Future Volume (vph)	11	14	34	22	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			2.5		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1616		
Flt Permitted			0.98		
Satd. Flow (perm)			1616		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	15	35	23	53
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			10.0		
Effective Green, g (s)			14.5		
Actuated g/C Ratio			0.18		
Clearance Time (s)			7.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			296		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.43		
Uniform Delay, d1			28.6		
Progression Factor			1.00		
Incremental Delay, d2			1.0		
Delay (s)			29.6		
Level of Service			C		
Approach Delay (s)			29.6		
Approach LOS			C		
Intersection Summary					

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	TT		TT			TT
Traffic Vol, veh/h	13	143	579	2	93	588
Future Vol, veh/h	13	143	579	2	93	588
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	4	1	0	18	1
Mvmt Flow	14	149	603	2	97	613

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1105	303	0	0	605	0
Stage 1	604	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Critical Hdwy	6.82	6.98	-	-	4.46	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.34	-	-	2.38	-
Pot Cap-1 Maneuver	207	687	-	-	867	-
Stage 1	511	-	-	-	-	-
Stage 2	577	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	172	687	-	-	867	-
Mov Cap-2 Maneuver	172	-	-	-	-	-
Stage 1	424	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	1.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	550	867
HCM Lane V/C Ratio	-	-	0.295	0.112
HCM Control Delay (s)	-	-	14.3	9.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	1.2	0.4

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↓			↑↓
Traffic Vol, veh/h	1	11	610	7	2	635
Future Vol, veh/h	1	11	610	7	2	635
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	1	11	635	7	2	661

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	974	321	0	0	642	0
Stage 1	639	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	253	681	-	-	952	-
Stage 1	493	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	252	681	-	-	952	-
Mov Cap-2 Maneuver	252	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	702	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	596	952
HCM Lane V/C Ratio	-	-	0.021	0.002
HCM Control Delay (s)	-	-	11.2	8.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Lanes, Volumes, Timings
 8: Haverford Rd/County Line Rd & Lindsay Ave

Existing SAT Midday Peak
 10/10/2018



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		6.6			9.6
Lane Group Flow (vph)	0	0	656	0	0	674
v/c Ratio			0.21			0.22
Control Delay			0.1			0.2
Queue Delay			0.0			0.0
Total Delay			0.1			0.2
Queue Length 50th (ft)			0			0
Queue Length 95th (ft)			0			0
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)						
Base Capacity (vph)			3160			3018
Starvation Cap Reductn			0			0
Spillback Cap Reductn			0			0
Storage Cap Reductn			0			0
Reduced v/c Ratio			0.21			0.22

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
8: Haverford Rd/County Line Rd & Lindsay Ave

Existing SAT Midday Peak
10/10/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	623	0	1	639
Future Volume (vph)	0	0	623	0	1	639
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)			2.5			2.5
Lane Util. Factor			0.95			0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			3160			3160
Flt Permitted			1.00			0.95
Satd. Flow (perm)			3160			3018
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	656	0	1	673
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	656	0	0	674
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)			61.0			61.0
Effective Green, g (s)			61.0			61.0
Actuated g/C Ratio			1.00			1.00
Clearance Time (s)			6.0			6.0
Vehicle Extension (s)			3.0			3.0
Lane Grp Cap (vph)			3160			3018
v/s Ratio Prot			0.21			
v/s Ratio Perm						c0.22
v/c Ratio			0.21			0.22
Uniform Delay, d1			0.0			0.0
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			0.2
Delay (s)			0.1			0.2
Level of Service			A			A
Approach Delay (s)	0.0		0.1			0.2
Approach LOS	A		A			A

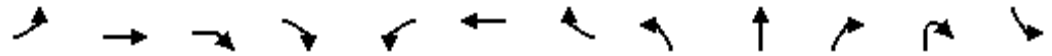
Intersection Summary

HCM 2000 Control Delay	0.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
 9: County Line Rd/Haverford Rd & Railroad Ave & Bryn Mawr Ave

Existing SAT Midday Peak
 10/10/2018



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	11	11	13	10	10	10	10	10
Storage Length (ft)	140		0		185		160	70		0		
Storage Lanes	1		0		1		1	1		0		
Taper Length (ft)	25				25			25				
Right Turn on Red				Yes			Yes				Yes	
Link Speed (mph)		40				30			35			
Link Distance (ft)		547				508			526			
Travel Time (s)		9.3				11.5			10.2			
Lane Group Flow (vph)	161	305	0	0	114	203	67	112	578	0	0	0
v/c Ratio	0.36	0.63			0.32	0.46	0.12	0.26	0.40			
Control Delay	18.6	31.7			18.1	30.2	0.5	13.6	19.1			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	18.6	31.7			18.1	30.2	0.5	13.6	19.1			
Queue Length 50th (ft)	57	139			39	95	0	31	119			
Queue Length 95th (ft)	89	211			67	147	0	66	180			
Internal Link Dist (ft)		467				428			446			
Turn Bay Length (ft)	140				185		160	70				
Base Capacity (vph)	451	545			359	559	640	431	1454			
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	0.36	0.56			0.32	0.36	0.10	0.26	0.40			

Intersection Summary

Area Type: Other

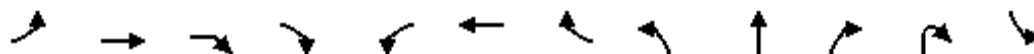
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	SBL	SBT	SBR
Lane Configurations			
Ideal Flow (vphpl)	1800	1800	1800
Lane Width (ft)	10	10	10
Storage Length (ft)	0		0
Storage Lanes	1		0
Taper Length (ft)	25		
Right Turn on Red			Yes
Link Speed (mph)		35	
Link Distance (ft)		198	
Travel Time (s)		3.9	
Lane Group Flow (vph)	58	538	0
v/c Ratio	0.27	0.42	
Control Delay	10.6	2.7	
Queue Delay	0.0	0.1	
Total Delay	10.6	2.8	
Queue Length 50th (ft)	4	0	
Queue Length 95th (ft)	m16	0	
Internal Link Dist (ft)		118	
Turn Bay Length (ft)			
Base Capacity (vph)	222	1270	
Starvation Cap Reductn	0	107	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.26	0.46	
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd/Haverford Rd & Railroad Ave & Bryn Mawr Ave

Existing SAT Midday Peak
 10/10/2018



Movement	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Future Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	11	11	13	10	10	10	10	10
Total Lost time (s)	2.5	3.0			2.5	2.5	2.5	2.5	-1.5			
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	0.95			
Frt	1.00	0.94			1.00	1.00	0.85	1.00	0.98			
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1862	1630			1653	1706	1581	1565	3115			
Flt Permitted	0.45	1.00			0.37	1.00	1.00	0.36	1.00			
Satd. Flow (perm)	884	1630			641	1706	1581	587	3115			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	161	177	26	102	114	203	67	112	491	86	1	48
RTOR Reduction (vph)	0	22	0	0	0	0	49	0	0	0	0	0
Lane Group Flow (vph)	161	283	0	0	114	203	18	112	578	0	0	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	2%	0%	2%	0%	1%	2%	2%
Turn Type	pm+pt	NA			pm+pt	NA	Perm	pm+pt	NA			pm+pt
Protected Phases	3	8			7	4		1	6			5
Permitted Phases	8	8			4	4	4	6				2
Actuated Green, G (s)	28.9	21.9			26.6	21.0	21.0	42.6	36.2			
Effective Green, g (s)	35.9	25.4			33.6	24.5	24.5	49.6	39.7			
Actuated g/C Ratio	0.40	0.28			0.37	0.27	0.27	0.55	0.44			
Clearance Time (s)	6.0	6.5			6.0	6.0	6.0	6.0	2.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	466	460			341	464	430	431	1374			
v/s Ratio Prot	c0.04	c0.17			0.03	0.12		c0.03	0.19			
v/s Ratio Perm	0.10				0.09		0.01	0.11				
v/c Ratio	0.35	0.62			0.33	0.44	0.04	0.26	0.42			
Uniform Delay, d1	18.1	28.1			19.5	27.1	24.1	10.2	17.3			
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.4	2.5			0.6	0.7	0.0	0.3	0.9			
Delay (s)	18.6	30.5			20.0	27.7	24.2	10.5	18.2			
Level of Service	B	C			C	C	C	B	B			
Approach Delay (s)		26.4				24.8			17.0			
Approach LOS		C				C			B			

Intersection Summary

HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	10	459	63
Future Volume (vph)	10	459	63
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	10	10	10
Total Lost time (s)	9.0	2.5	
Lane Util. Factor	1.00	0.95	
Fr _t	1.00	0.98	
Fl _t Protected	0.95	1.00	
Satd. Flow (prot)	1567	3028	
Fl _t Permitted	0.27	1.00	
Satd. Flow (perm)	438	3028	
Peak-hour factor, PHF	0.97	0.97	0.97
Adj. Flow (vph)	10	473	65
RTOR Reduction (vph)	0	11	0
Lane Group Flow (vph)	58	527	0
Heavy Vehicles (%)	1%	4%	0%
Turn Type	pm+pt	NA	
Protected Phases	5	2	
Permitted Phases	2		
Actuated Green, G (s)	37.4	31.6	
Effective Green, g (s)	31.4	35.1	
Actuated g/C Ratio	0.35	0.39	
Clearance Time (s)	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	187	1180	
v/s Ratio Prot	0.01	0.17	
v/s Ratio Perm	0.10		
v/c Ratio	0.31	0.45	
Uniform Delay, d ₁	20.6	20.3	
Progression Factor	0.48	0.09	
Incremental Delay, d ₂	0.8	1.1	
Delay (s)	10.6	2.9	
Level of Service	B	A	
Approach Delay (s)		3.6	
Approach LOS		A	
Intersection Summary			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	10	12	10	10
Right Turn on Red		Yes				Yes
Link Speed (mph)	25			35	35	
Link Distance (ft)	228			198	340	
Travel Time (s)	6.2			3.9	6.6	
Lane Group Flow (vph)	0	0	0	796	643	0
v/c Ratio				0.24	0.49	
Control Delay				0.2	23.4	
Queue Delay				0.4	0.3	
Total Delay				0.6	23.7	
Queue Length 50th (ft)				0	151	
Queue Length 95th (ft)				0	219	
Internal Link Dist (ft)	148			118	260	
Turn Bay Length (ft)						
Base Capacity (vph)				3249	1300	
Starvation Cap Reductn				1774	229	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.54	0.60	

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
 11: Haverford Rd & Glenbrook Ave

Existing SAT Midday Peak
 10/10/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕↕	↕↕	
Traffic Volume (vph)	0	0	35	697	579	13
Future Volume (vph)	0	0	35	697	579	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	12	10	10
Total Lost time (s)				-1.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3345	3119	
Fl _t Permitted				0.94	1.00	
Satd. Flow (perm)				3166	3119	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	38	758	629	14
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	796	641	0
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7		
Actuated Green, G (s)				82.6	31.6	
Effective Green, g (s)				83.1	35.1	
Actuated g/C Ratio				0.92	0.39	
Clearance Time (s)				2.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3002	1216	
v/s Ratio Prot				c0.12	c0.21	
v/s Ratio Perm				c0.13		
v/c Ratio				0.27	0.53	
Uniform Delay, d ₁				0.4	21.1	
Progression Factor				1.00	1.00	
Incremental Delay, d ₂				0.0	1.6	
Delay (s)				0.4	22.7	
Level of Service				A	C	
Approach Delay (s)	0.0			0.4	22.7	
Approach LOS	A			A	C	
Intersection Summary						
HCM 2000 Control Delay			10.4	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			90.0	Sum of lost time (s)		21.0
Intersection Capacity Utilization			45.4%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
 10: Haverford Rd & Landover Rd/County Line Rd

Existing SAT Midday Peak
 10/10/2018




















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	107	73	25	46	74	37	20	551	68	32	518	112
Future Volume (veh/h)	107	73	25	46	74	37	20	551	68	32	518	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1814	1814	1814	1800	1800	1800	1772	1772	1772	1800	1800	1800
Adj Flow Rate, veh/h	111	76	26	48	77	39	21	574	71	33	540	117
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	0	0	0	2	2	2	0	0	0
Cap, veh/h	208	118	36	126	177	76	87	2103	256	122	1895	403
Arrive On Green	0.17	0.20	0.17	0.17	0.20	0.17	0.71	0.74	0.71	0.71	0.74	0.71
Sat Flow, veh/h	697	588	179	338	884	381	54	2852	347	99	2569	546
Grp Volume(v), veh/h	213	0	0	164	0	0	349	0	317	360	0	330
Grp Sat Flow(s),veh/h/ln	1464	0	0	1603	0	0	1703	0	1550	1675	0	1540
Q Serve(g_s), s	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	5.9
Cycle Q Clear(g_c), s	11.3	0.0	0.0	7.3	0.0	0.0	5.2	0.0	5.5	5.4	0.0	5.9
Prop In Lane	0.52		0.12	0.29		0.24	0.06		0.22	0.09		0.35
Lane Grp Cap(c), veh/h	316	0	0	329	0	0	1250	0	1143	1232	0	1135
V/C Ratio(X)	0.67	0.00	0.00	0.50	0.00	0.00	0.28	0.00	0.28	0.29	0.00	0.29
Avail Cap(c_a), veh/h	343	0	0	358	0	0	1250	0	1143	1232	0	1135
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.92	0.00	0.92
Uniform Delay (d), s/veh	30.8	0.0	0.0	29.0	0.0	0.0	3.5	0.0	3.6	3.5	0.0	3.7
Incr Delay (d2), s/veh	4.6	0.0	0.0	1.2	0.0	0.0	0.6	0.0	0.6	0.6	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.8	0.0	0.0	5.4	0.0	0.0	3.1	0.0	2.4	3.2	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.5	0.0	0.0	30.2	0.0	0.0	4.0	0.0	4.2	4.1	0.0	4.3
LnGrp LOS	D	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		213			164			666				690
Approach Delay, s/veh		35.5			30.2			4.1				4.2
Approach LOS		D			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		61.5		18.5		61.5		18.5				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		55.0		15.0		55.0		15.0				
Max Q Clear Time (g_c+I1), s		7.5		13.3		7.9		9.3				
Green Ext Time (p_c), s		4.7		0.2		5.0		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				10.5								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												

Analysis w/ Improvements



Lanes, Volumes, Timings
1: Lancaster Ave

AM Peak w/ Improvements
10/10/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25				25
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			4.6				4.4
Lane Group Flow (vph)	0	1136	0	0	733	0	356	350	0	0	38	0
v/c Ratio		0.74			0.49		0.68	0.69				0.16
Control Delay		13.4			14.8		34.7	35.1				19.9
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		13.4			14.8		34.7	35.1				19.9
Queue Length 50th (ft)		144			121		131	129				8
Queue Length 95th (ft)		224			167		#349	#345				33
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1539			1506		522	507				379
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.74			0.49		0.68	0.69				0.10

Intersection Summary

Area Type: Other

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

AM Peak w/ Improvements

1: Lancaster Ave

10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↕			↕	
Traffic Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Future Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5				2.5
Lane Util. Factor		0.95			0.95		0.95	0.95				1.00
Frt		0.93			1.00		1.00	1.00				0.93
Flt Protected		1.00			1.00		0.95	0.96				0.99
Satd. Flow (prot)		2854			3197		1561	1516				1573
Flt Permitted		0.95			0.95		0.95	0.96				0.99
Satd. Flow (perm)		2707			3049		1561	1516				1573
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	9	590	537	1	719	13	671	30	5	9	9	20
RTOR Reduction (vph)	0	217	0	0	2	0	0	1	0	0	18	0
Lane Group Flow (vph)	0	919	0	0	731	0	356	349	0	0	20	0
Heavy Vehicles (%)	0%	5%	6%	0%	5%	17%	3%	4%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		32.2			32.2		22.3	22.3				4.5
Effective Green, g (s)		36.7			36.7		26.8	26.8				9.0
Actuated g/C Ratio		0.46			0.46		0.34	0.34				0.11
Clearance Time (s)		7.0			7.0		7.0	7.0				7.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0				3.0
Lane Grp Cap (vph)		1241			1398		522	507				176
v/s Ratio Prot							0.23	c0.23				c0.01
v/s Ratio Perm		c0.34			0.24							
v/c Ratio		0.74			0.52		0.68	0.69				0.12
Uniform Delay, d1		17.7			15.4		22.9	23.0				31.9
Progression Factor		1.00			1.00		1.03	1.03				1.00
Incremental Delay, d2		4.0			0.4		3.3	3.5				0.3
Delay (s)		21.7			15.8		26.9	27.1				32.2
Level of Service		C			B		C	C				C
Approach Delay (s)		21.7			15.8			27.0				32.2
Approach LOS		C			B			C				C

Intersection Summary

HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection												
Int Delay, s/veh	11.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	28	71	67	9	42	8	12	618	56	7	480	13
Future Vol, veh/h	28	71	67	9	42	8	12	618	56	7	480	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	1	0	0	2	0	0	3	7	0	7	0
Mvmt Flow	30	76	71	10	45	9	13	657	60	7	511	14

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1272	1275	518	1319	1252	687	525	0	0	717	0	0
Stage 1	532	532	-	713	713	-	-	-	-	-	-	-
Stage 2	740	743	-	606	539	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.51	6.2	7.1	6.52	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.51	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.51	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.009	3.3	3.5	4.018	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	146	168	562	135	172	450	1052	-	-	893	-	-
Stage 1	535	527	-	426	435	-	-	-	-	-	-	-
Stage 2	412	423	-	487	522	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	111	163	562	73	166	450	1052	-	-	893	-	-
Mov Cap-2 Maneuver	111	163	-	73	166	-	-	-	-	-	-	-
Stage 1	524	521	-	417	426	-	-	-	-	-	-	-
Stage 2	354	414	-	360	516	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	78.5		45.3		0.1		0.1	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1052	-	-	206	150	893	-
HCM Lane V/C Ratio	0.012	-	-	0.857	0.418	0.008	-
HCM Control Delay (s)	8.5	0	-	78.5	45.3	9.1	0
HCM Lane LOS	A	A	-	F	E	A	A
HCM 95th %tile Q(veh)	0	-	-	6.5	1.8	0	-

HCM 6th Signalized Intersection Summary
3: Roberts Rd

AM Peak w/ Improvements
10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	67	101	16	7	25	16	4	562	28	9	457	45
Future Volume (veh/h)	67	101	16	7	25	16	4	562	28	9	457	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1800	1800	1800	1800	1772	1772	1800	1744	1744
Adj Flow Rate, veh/h	73	110	17	8	27	17	4	611	30	10	497	49
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
Percent Heavy Veh, %	2	2	2	0	0	0	0	2	2	0	4	4
Cap, veh/h	164	202	28	75	214	115	617	1222	60	674	1140	112
Arrive On Green	0.15	0.21	0.21	0.15	0.21	0.21	1.00	1.00	1.00	0.73	0.73	0.69
Sat Flow, veh/h	492	975	136	110	1033	555	874	1675	82	801	1562	154
Grp Volume(v), veh/h	200	0	0	52	0	0	4	0	641	10	0	546
Grp Sat Flow(s),veh/h/ln	1604	0	0	1698	0	0	874	0	1757	801	0	1716
Q Serve(g_s), s	7.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0	10.2
Cycle Q Clear(g_c), s	9.5	0.0	0.0	2.0	0.0	0.0	10.3	0.0	0.0	0.3	0.0	10.2
Prop In Lane	0.36		0.08	0.15		0.33	1.00		0.05	1.00		0.09
Lane Grp Cap(c), veh/h	304	0	0	309	0	0	617	0	1282	674	0	1253
V/C Ratio(X)	0.66	0.00	0.00	0.17	0.00	0.00	0.01	0.00	0.50	0.01	0.00	0.44
Avail Cap(c_a), veh/h	440	0	0	447	0	0	617	0	1282	674	0	1253
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.78	0.00	0.78	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.6	0.0	0.0	26.2	0.0	0.0	0.9	0.0	0.0	3.0	0.0	4.4
Incr Delay (d2), s/veh	2.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.2	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.7	0.1	0.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.0	0.0	0.0	26.5	0.0	0.0	0.9	0.0	1.1	3.0	0.0	5.5
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		200			52			645				556
Approach Delay, s/veh		32.0			26.5			1.1				5.4
Approach LOS		C			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		60.9		19.1		60.9		19.1				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		48.0		19.0		48.0		19.0				
Max Q Clear Time (g_c+I1), s		12.3		11.5		12.2		4.0				
Green Ext Time (p_c), s		5.4		0.6		4.4		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				7.9								
HCM 6th LOS				A								

Lanes, Volumes, Timings
4: Glenbrook Ave & Thomas Ave & Conestoga Rd

AM Peak w/ Improvements
10/10/2018



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	13	13
Grade (%)		2%				-1%			2%			
Storage Length (ft)		0	0		0		0	75		0	0	
Storage Lanes		1	0		1		0	1		0	1	
Taper Length (ft)		25			25			25				
Right Turn on Red				No			No					No
Link Speed (mph)		25				25			25			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				8.6			11.4			
Lane Group Flow (vph)	0	24	0	0	386	614	0	0	535	0	421	0
v/c Ratio		0.10			0.45	0.60			0.56		0.63	
Control Delay		29.8			5.1	7.0			16.1		23.6	
Queue Delay		0.0			0.0	0.0			0.0		0.0	
Total Delay		29.8			5.1	7.0			16.1		23.6	
Queue Length 50th (ft)		10			44	123			92		162	
Queue Length 95th (ft)		31			87	216			119		259	
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)												
Base Capacity (vph)		243			849	1018			956		666	
Starvation Cap Reductn		0			0	0			0		0	
Spillback Cap Reductn		0			0	0			0		0	
Storage Cap Reductn		0			0	0			0		0	
Reduced v/c Ratio		0.10			0.45	0.60			0.56		0.63	

Intersection Summary

Area Type: Other



Lane Group	NEL2	NEL	NER	NER2
Lane Configurations				
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12
Grade (%)		-1%		
Storage Length (ft)		0	0	
Storage Lanes		1	0	
Taper Length (ft)		25		
Right Turn on Red				No
Link Speed (mph)		25		
Link Distance (ft)		393		
Travel Time (s)		10.7		
Lane Group Flow (vph)	0	145	0	0
v/c Ratio		0.55		
Control Delay		39.6		
Queue Delay		0.0		
Total Delay		39.6		
Queue Length 50th (ft)		67		
Queue Length 95th (ft)		125		
Internal Link Dist (ft)		313		
Turn Bay Length (ft)				
Base Capacity (vph)		266		
Starvation Cap Reductn		0		
Spillback Cap Reductn		0		
Storage Cap Reductn		0		
Reduced v/c Ratio		0.55		
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
4: Glenbrook Ave & Thomas Ave & Conestoga Rd

AM Peak w/ Improvements
10/10/2018



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SER	SER2	
Lane Configurations													
Traffic Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6	
Future Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Lane Width	12	12	12	12	11	10	10	10	10	10	13	13	
Grade (%)		2%				-1%			2%				
Total Lost time (s)		3.0			2.5	2.5			2.5		2.5		
Lane Util. Factor		1.00			1.00	*0.81			0.95		1.00		
Frt		0.89			1.00	1.00			1.00		0.86		
Flt Protected		0.99			0.95	1.00			1.00		1.00		
Satd. Flow (prot)		1497			1613	1322			3002		1586		
Flt Permitted		0.99			0.29	1.00			1.00		1.00		
Satd. Flow (perm)		1497			491	1322			3002		1586		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	4	0	19	1	386	601	13	0	521	14	414	7	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	24	0	0	386	614	0	0	535	0	421	0	
Heavy Vehicles (%)	0%	0%	6%	0%	3%	3%	8%	0%	5%	0%	2%	0%	
Parking (#/hr)													
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA		Perm		
Protected Phases					1	6			2				
Permitted Phases	8	8			6			2	2		1		
Actuated Green, G (s)		7.9			57.1	57.1			21.0		29.1		
Effective Green, g (s)		12.9			61.6	61.6			25.5		33.6		
Actuated g/C Ratio		0.16			0.77	0.77			0.32		0.42		
Clearance Time (s)		8.0			7.0	7.0			7.0		7.0		
Vehicle Extension (s)		3.0			3.0	3.0			3.0		3.0		
Lane Grp Cap (vph)		241			849	1017			956		666		
v/s Ratio Prot					0.19	c0.46			0.18				
v/s Ratio Perm		0.02			0.16						c0.27		
v/c Ratio		0.10			0.45	0.60			0.56		0.63		
Uniform Delay, d1		28.6			4.1	4.0			22.6		18.3		
Progression Factor		1.00			1.00	1.00			0.61		1.00		
Incremental Delay, d2		0.2			1.8	2.7			2.1		4.5		
Delay (s)		28.8			5.8	6.6			15.9		22.8		
Level of Service		C			A	A			B		C		
Approach Delay (s)		28.8				6.3			15.9				
Approach LOS		C				A			B				
Intersection Summary													
HCM 2000 Control Delay			14.1		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.67										
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					13.0			
Intersection Capacity Utilization			72.5%		ICU Level of Service					C			
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd

AM Peak w/ Improvements
 10/10/2018



Movement	NEL2	NEL	NER	NER2
Lane Configurations				
Traffic Volume (vph)	20	61	17	34
Future Volume (vph)	20	61	17	34
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	12	12	12	12
Grade (%)		-1%		
Total Lost time (s)		3.0		
Lane Util. Factor		1.00		
Frt		0.95		
Flt Protected		0.97		
Satd. Flow (prot)		1639		
Flt Permitted		0.97		
Satd. Flow (perm)		1639		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	67	19	37
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	0	145	0	0
Heavy Vehicles (%)	5%	0%	0%	3%
Parking (#/hr)			0	
Turn Type	Perm	Perm		
Protected Phases				
Permitted Phases	4	4		
Actuated Green, G (s)		7.9		
Effective Green, g (s)		12.9		
Actuated g/C Ratio		0.16		
Clearance Time (s)		8.0		
Vehicle Extension (s)		3.0		
Lane Grp Cap (vph)		264		
v/s Ratio Prot				
v/s Ratio Perm		c0.09		
v/c Ratio		0.55		
Uniform Delay, d1		30.9		
Progression Factor		1.00		
Incremental Delay, d2		2.3		
Delay (s)		33.2		
Level of Service		C		
Approach Delay (s)		33.2		
Approach LOS		C		
Intersection Summary				

Intersection						
Int Delay, s/veh	4.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↓			↑↓
Traffic Vol, veh/h	3	148	886	0	274	641
Future Vol, veh/h	3	148	886	0	274	641
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	33	2	3	0	1	4
Mvmt Flow	3	156	933	0	288	675

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1847	467	0	0	933
Stage 1	933	-	-	-	-
Stage 2	914	-	-	-	-
Critical Hdwy	7.46	6.94	-	-	4.12
Critical Hdwy Stg 1	6.46	-	-	-	-
Critical Hdwy Stg 2	6.46	-	-	-	-
Follow-up Hdwy	3.83	3.32	-	-	2.21
Pot Cap-1 Maneuver	47	542	-	-	736
Stage 1	278	-	-	-	-
Stage 2	285	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	18	542	-	-	736
Mov Cap-2 Maneuver	18	-	-	-	-
Stage 1	104	-	-	-	-
Stage 2	285	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.2	0	5.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	343	736
HCM Lane V/C Ratio	-	-	0.463	0.392
HCM Control Delay (s)	-	-	24.2	13
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	2.4	1.9

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↓			↑↓
Traffic Vol, veh/h	12	7	898	41	19	650
Future Vol, veh/h	12	7	898	41	19	650
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	4
Mvmt Flow	13	7	945	43	20	684

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1349	494	0	0	988
Stage 1	967	-	-	-	-
Stage 2	382	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	144	526	-	-	708
Stage 1	334	-	-	-	-
Stage 2	665	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	137	526	-	-	708
Mov Cap-2 Maneuver	137	-	-	-	-
Stage 1	319	-	-	-	-
Stage 2	665	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.4	0	0.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	188	708
HCM Lane V/C Ratio	-	-	0.106	0.028
HCM Control Delay (s)	-	-	26.4	10.2
HCM Lane LOS	-	-	D	B
HCM 95th %tile Q(veh)	-	-	0.4	0.1



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		9.3			13.5
Lane Group Flow (vph)	19	0	1035	0	0	677
v/c Ratio	0.08		0.36			0.25
Control Delay	17.2		1.8			1.2
Queue Delay	0.0		0.0			0.0
Total Delay	17.2		1.8			1.2
Queue Length 50th (ft)	3		0			0
Queue Length 95th (ft)	19		191			53
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)						
Base Capacity (vph)	290		2906			2746
Starvation Cap Reductn	0		106			0
Spillback Cap Reductn	0		0			87
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.07		0.37			0.25

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
8: Lindsay Ave

AM Peak w/ Improvements
10/10/2018



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	8	944	50	4	646
Future Volume (vph)	11	8	944	50	4	646
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	3.5		2.5			2.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.99			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1482		3080			3060
Flt Permitted	0.97		1.00			0.95
Satd. Flow (perm)	1482		3080			2910
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	8	983	52	4	673
RTOR Reduction (vph)	7	0	4	0	0	0
Lane Group Flow (vph)	12	0	1031	0	0	677
Heavy Vehicles (%)	27%	25%	3%	0%	50%	4%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		45.5			45.5
Effective Green, g (s)	5.0		49.0			49.0
Actuated g/C Ratio	0.08		0.82			0.82
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)			2515			2376
v/s Ratio Prot	c0.01		c0.33			
v/s Ratio Perm						0.23
v/c Ratio	0.09		0.41			0.28
Uniform Delay, d1	25.4		1.5			1.3
Progression Factor	1.00		1.53			1.00
Incremental Delay, d2	0.3		0.5			0.3
Delay (s)	25.7		2.8			1.6
Level of Service	C		A			A
Approach Delay (s)	25.7		2.8			1.6
Approach LOS	C		A			A

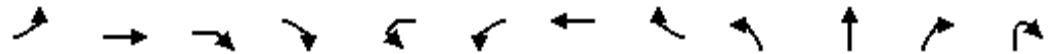
Intersection Summary

HCM 2000 Control Delay	2.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: Railroad Ave & Bryn Mawr Ave

AM Peak w/ Improvements
10/10/2018



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	12	11	11	13	10	10	10	10
Storage Length (ft)	140		0			180		160	70		0	
Storage Lanes	1		0			1		1	1		0	
Taper Length (ft)	25					25			25			
Right Turn on Red				Yes				Yes				Yes
Link Speed (mph)		40					30			25		
Link Distance (ft)		547					508			526		
Travel Time (s)		9.3					11.5			14.3		
Lane Group Flow (vph)	156	489	0	0	0	67	298	67	127	981	0	0
v/c Ratio	0.39	0.80				0.26	0.50	0.11	0.43	0.71		
Control Delay	21.1	43.1				18.6	32.3	0.3	20.7	25.5		
Queue Delay	0.0	0.0				0.0	0.0	0.0	0.0	0.1		
Total Delay	21.1	43.1				18.6	32.3	0.3	20.7	25.7		
Queue Length 50th (ft)	68	325				28	173	0	43	228		
Queue Length 95th (ft)	96	416				47	230	0	m88	#494		
Internal Link Dist (ft)		467					428			446		
Turn Bay Length (ft)	140					180		160	70			
Base Capacity (vph)	400	721				256	746	768	295	1379		
Starvation Cap Reductn	0	0				0	0	0	0	39		
Spillback Cap Reductn	0	0				0	0	0	0	0		
Storage Cap Reductn	0	0				0	0	0	0	0		
Reduced v/c Ratio	0.39	0.68				0.26	0.40	0.09	0.43	0.73		

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

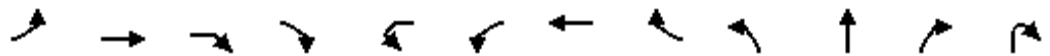
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10
Storage Length (ft)		0		0
Storage Lanes		1		0
Taper Length (ft)		25		
Right Turn on Red				Yes
Link Speed (mph)			25	
Link Distance (ft)			198	
Travel Time (s)			5.4	
Lane Group Flow (vph)	0	67	579	0
v/c Ratio		0.31	0.50	
Control Delay		35.2	3.7	
Queue Delay		0.3	0.1	
Total Delay		35.6	3.8	
Queue Length 50th (ft)		14	0	
Queue Length 95th (ft)		m54	0	
Internal Link Dist (ft)			118	
Turn Bay Length (ft)				
Base Capacity (vph)		213	1155	
Starvation Cap Reductn		20	75	
Spillback Cap Reductn		0	0	
Storage Cap Reductn		0	0	
Reduced v/c Ratio		0.35	0.54	
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
9: Railroad Ave & Bryn Mawr Ave

AM Peak w/ Improvements
10/10/2018



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Future Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5					2.5	2.5	2.5	2.5	-1.5	
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	0.95	
Fr _t	1.00	0.95					1.00	1.00	0.85	1.00	0.98	
Fl _t Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1775	1631					1653	1706	1581	1277	3041	
Fl _t Permitted	0.40	1.00					0.21	1.00	1.00	0.31	1.00	
Satd. Flow (perm)	738	1631					362	1706	1581	411	3041	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	156	339	49	101	4	63	298	67	127	861	114	6
RTOR Reduction (vph)	0	9	0	0	0	0	0	43	0	1	0	0
Lane Group Flow (vph)	156	480	0	0	0	67	298	24	127	980	0	0
Heavy Vehicles (%)	6%	2%	0%	2%	0%	0%	2%	0%	25%	3%	3%	9%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Actuated Green, G (s)	46.7	40.7				44.3	39.5	39.5	57.3	48.4		
Effective Green, g (s)	53.7	44.2				51.3	43.0	43.0	64.0	51.9		
Actuated g/C Ratio	0.45	0.37				0.43	0.36	0.36	0.53	0.43		
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0	2.0		
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	412	600				244	611	566	308	1315		
v/s Ratio Prot	c0.03	c0.29				0.02	0.17		c0.04	c0.32		
v/s Ratio Perm	0.14					0.10		0.02	0.18			
v/c Ratio	0.38	0.80				0.27	0.49	0.04	0.41	0.75		
Uniform Delay, d1	21.0	33.9				23.2	29.9	25.1	15.8	28.5		
Progression Factor	1.00	1.00				1.00	1.00	1.00	0.84	0.74		
Incremental Delay, d2	0.6	7.5				0.6	0.6	0.0	0.7	3.2		
Delay (s)	21.6	41.5				23.8	30.6	25.1	14.0	24.3		
Level of Service	C	D				C	C	C	B	C		
Approach Delay (s)		36.7					28.7			23.1		
Approach LOS		D					C			C		

Intersection Summary

HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: Railroad Ave & Bryn Mawr Ave

AM Peak w/ Improvements
 10/10/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		↵	↕↗	
Traffic Volume (vph)	45	19	447	103
Future Volume (vph)	45	19	447	103
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	10
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	0.95	
Fr _t		1.00	0.97	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1530	2952	
Fl _t Permitted		0.12	1.00	
Satd. Flow (perm)		198	2952	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	20	471	108
RTOR Reduction (vph)	0	0	15	0
Lane Group Flow (vph)	0	67	564	0
Heavy Vehicles (%)	4%	5%	4%	10%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		47.7	41.6	
Effective Green, g (s)		54.7	45.1	
Actuated g/C Ratio		0.46	0.38	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		196	1109	
v/s Ratio Prot		0.03	0.19	
v/s Ratio Perm		0.13		
v/c Ratio		0.34	0.51	
Uniform Delay, d ₁		21.9	28.9	
Progression Factor		1.69	0.08	
Incremental Delay, d ₂		0.9	1.4	
Delay (s)		38.0	3.7	
Level of Service		D	A	
Approach Delay (s)			7.3	
Approach LOS			A	
Intersection Summary				



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	10	10	10	12
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			25	25	
Link Distance (ft)	228			198	340	
Travel Time (s)	5.2			5.4	9.3	
Lane Group Flow (vph)	0	0	0	1127	659	0
v/c Ratio				0.38	0.56	
Control Delay				0.3	32.4	
Queue Delay				1.1	0.6	
Total Delay				1.4	33.0	
Queue Length 50th (ft)				0	227	
Queue Length 95th (ft)				0	300	
Internal Link Dist (ft)	148			118	260	
Turn Bay Length (ft)						
Base Capacity (vph)				3004	1184	
Starvation Cap Reductn				1528	211	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.76	0.68	

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
11: Glenbrook Ave

AM Peak w/ Improvements
10/10/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕↕	↕↕	
Traffic Volume (vph)	0	0	41	1030	614	12
Future Volume (vph)	0	0	41	1030	614	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	12
Total Lost time (s)				-1.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3123	3061	
Fl _t Permitted				0.93	1.00	
Satd. Flow (perm)				2907	3061	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	43	1084	646	13
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	1127	658	0
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)				114.8	41.6	
Effective Green, g (s)				115.0	45.1	
Actuated g/C Ratio				0.96	0.38	
Clearance Time (s)				2.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2879	1150	
v/s Ratio Prot				c0.17	c0.21	
v/s Ratio Perm				c0.21		
v/c Ratio				0.39	0.57	
Uniform Delay, d ₁				0.2	29.8	
Progression Factor				1.00	0.98	
Incremental Delay, d ₂				0.1	2.0	
Delay (s)				0.2	31.1	
Level of Service				A	C	
Approach Delay (s)	0.0			0.2	31.1	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 10: Landover Rd/County Line Rd

AM Peak w/ Improvements
 10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	160	167	22	48	39	63	7	866	120	27	596	55
Future Volume (veh/h)	160	167	22	48	39	63	7	866	120	27	596	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1872	1872	1872	1800	1800	1800	1772	1772	1772	1744	1744	1744
Adj Flow Rate, veh/h	165	172	23	49	40	65	7	893	124	28	614	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	2	2	2	4	4	4
Cap, veh/h	232	205	27	143	121	164	35	1960	271	90	1868	172
Arrive On Green	0.26	0.28	0.26	0.26	0.28	0.28	0.66	0.68	0.68	1.00	1.00	1.00
Sat Flow, veh/h	669	727	95	366	431	583	7	2897	400	84	2761	254
Grp Volume(v), veh/h	360	0	0	154	0	0	547	0	477	353	0	346
Grp Sat Flow(s),veh/h/ln	1491	0	0	1380	0	0	1763	0	1540	1558	0	1541
Q Serve(g_s), s	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	28.4	0.0	0.0	10.3	0.0	0.0	17.6	0.0	17.4	0.0	0.0	0.0
Prop In Lane	0.46		0.06	0.32		0.42	0.01		0.26	0.08		0.16
Lane Grp Cap(c), veh/h	433	0	0	400	0	0	1187	0	1042	1054	0	1043
V/C Ratio(X)	0.83	0.00	0.00	0.39	0.00	0.00	0.46	0.00	0.46	0.33	0.00	0.33
Avail Cap(c_a), veh/h	481	0	0	445	0	0	1187	0	1042	1054	0	1043
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.88	0.00	0.88
Uniform Delay (d), s/veh	42.4	0.0	0.0	34.7	0.0	0.0	9.1	0.0	9.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	10.9	0.0	0.0	0.6	0.0	0.0	1.3	0.0	1.5	0.8	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.5	0.0	0.0	6.9	0.0	0.0	11.9	0.0	10.1	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	0.0	0.0	35.3	0.0	0.0	10.4	0.0	10.5	0.8	0.0	0.8
LnGrp LOS	D	A	A	D	A	A	B	A	B	A	A	A
Approach Vol, veh/h		360			154			1024				699
Approach Delay, s/veh		53.3			35.3			10.5				0.8
Approach LOS		D			D			B				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.7		36.3		83.7		36.3				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		75.0		35.0		75.0		35.0				
Max Q Clear Time (g_c+I1), s		19.6		30.4		2.0		12.3				
Green Ext Time (p_c), s		9.5		0.9		5.9		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				16.0								
HCM 6th LOS				B								

Lanes, Volumes, Timings
1: Lancaster Ave & County Line Road

PM Peak w/ Improvements
10/10/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35				35
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			3.3				3.1
Lane Group Flow (vph)	0	1564	0	0	605	0	271	268	0	0	39	0
v/c Ratio		0.89			0.40		0.62	0.63				0.16
Control Delay		21.1			12.2		33.0	33.3				22.4
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		21.1			12.2		33.0	33.3				22.4
Queue Length 50th (ft)		307			97		122	120				11
Queue Length 95th (ft)		#497			138		#218	#229				36
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1762			1516		437	425				403
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.89			0.40		0.62	0.63				0.10

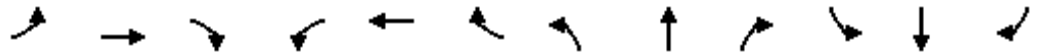
Intersection Summary

Area Type: Other
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Lancaster Ave & County Line Road

PM Peak w/ Improvements

10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕			↕	
Traffic Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Future Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5				1.5
Lane Util. Factor		0.95			0.95		0.95	0.95				1.00
Frt		0.93			1.00		1.00	0.99				0.95
Flt Protected		1.00			1.00		0.95	0.96				0.99
Satd. Flow (prot)		2979			3292		1592	1540				1610
Flt Permitted		0.95			0.82		0.95	0.96				0.99
Satd. Flow (perm)		2836			2711		1592	1540				1610
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	815	741	17	572	16	511	14	14	7	17	15
RTOR Reduction (vph)	0	189	0	0	2	0	0	2	0	0	13	0
Lane Group Flow (vph)	0	1375	0	0	603	0	271	266	0	0	26	0
Heavy Vehicles (%)	0%	1%	1%	0%	2%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		37.8			37.8		17.5	17.5				4.7
Effective Green, g (s)		42.3			42.3		22.0	22.0				9.2
Actuated g/C Ratio		0.53			0.53		0.28	0.28				0.11
Clearance Time (s)		7.0			7.0		7.0	7.0				6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0				3.0
Lane Grp Cap (vph)		1499			1433		437	423				185
v/s Ratio Prot							0.17	c0.17				c0.02
v/s Ratio Perm		c0.48			0.22							
v/c Ratio		0.92			0.42		0.62	0.63				0.14
Uniform Delay, d1		17.2			11.4		25.3	25.4				31.8
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		10.4			0.2		2.7	2.9				0.3
Delay (s)		27.6			11.6		28.1	28.3				32.2
Level of Service		C			B		C	C				C
Approach Delay (s)		27.6			11.6			28.2				32.2
Approach LOS		C			B			C				C

Intersection Summary		
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.78	C
Actuated Cycle Length (s)	80.0	Sum of lost time (s)
Intersection Capacity Utilization	81.1%	11.0
Analysis Period (min)	15	ICU Level of Service
		D
c	Critical Lane Group	

Intersection												
Int Delay, s/veh	20.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	26	60	68	23	36	9	22	436	33	7	710	38
Future Vol, veh/h	26	60	68	23	36	9	22	436	33	7	710	38
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	3	0	0	0	0	1	3	0	1	0
Mvmt Flow	29	67	76	26	40	10	24	484	37	8	789	42

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1402	1395	810	1449	1398	503	831	0	0	521	0	0
Stage 1	826	826	-	551	551	-	-	-	-	-	-	-
Stage 2	576	569	-	898	847	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.53	6.23	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.027	3.327	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	119	141	378	110	142	573	810	-	-	1056	-	-
Stage 1	369	385	-	522	519	-	-	-	-	-	-	-
Stage 2	506	504	-	337	381	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	86	133	378	51	134	573	810	-	-	1056	-	-
Mov Cap-2 Maneuver	86	133	-	51	134	-	-	-	-	-	-	-
Stage 1	354	380	-	500	497	-	-	-	-	-	-	-
Stage 2	438	483	-	219	376	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	136.4			130.7			0.4			0.1		
HCM LOS	F			F								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	810	-	-	165	92	1056	-	-
HCM Lane V/C Ratio	0.03	-	-	1.037	0.821	0.007	-	-
HCM Control Delay (s)	9.6	0	-	136.4	130.7	8.4	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	8.4	4.4	0	-	-

HCM 6th Signalized Intersection Summary
 3: County Line Rd & Roberts Rd

PM Peak w/ Improvements

10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	33	37	14	13	31	9	0	537	27	4	494	91
Future Volume (veh/h)	33	37	14	13	31	9	0	537	27	4	494	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1800	1744	1744	1800	1772	1772
Adj Flow Rate, veh/h	35	39	15	14	33	10	0	571	29	4	526	97
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
Percent Heavy Veh, %	0	0	0	0	0	0	0	4	4	0	2	2
Cap, veh/h	122	97	32	85	134	35	85	1356	69	770	1199	221
Arrive On Green	0.08	0.12	0.12	0.08	0.12	0.12	0.00	1.00	1.00	0.82	0.82	0.78
Sat Flow, veh/h	539	828	277	275	1140	301	814	1645	84	832	1455	268
Grp Volume(v), veh/h	89	0	0	57	0	0	0	0	600	4	0	623
Grp Sat Flow(s),veh/h/ln	1644	0	0	1716	0	0	814	0	1729	832	0	1724
Q Serve(g_s), s	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	8.7
Cycle Q Clear(g_c), s	4.4	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	8.7
Prop In Lane	0.39		0.17	0.25		0.18	1.00		0.05	1.00		0.16
Lane Grp Cap(c), veh/h	184	0	0	183	0	0	85	0	1424	770	0	1420
V/C Ratio(X)	0.48	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.42	0.01	0.00	0.44
Avail Cap(c_a), veh/h	452	0	0	461	0	0	85	0	1424	770	0	1420
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.88	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.6	0.0	0.0	34.7	0.0	0.0	0.0	0.0	0.0	1.3	0.0	2.2
Incr Delay (d2), s/veh	2.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.5	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.6	0.0	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.6	0.0	0.0	35.6	0.0	0.0	0.0	0.0	0.8	1.3	0.0	3.1
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		89			57			600				627
Approach Delay, s/veh		37.6			35.6			0.8				3.1
Approach LOS		D			D			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		72.5		12.5		72.5		12.5				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		52.0		21.0		52.0		21.0				
Max Q Clear Time (g_c+I1), s		2.0		6.4		10.7		4.6				
Green Ext Time (p_c), s		5.1		0.3		5.4		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				5.7								
HCM 6th LOS				A								



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Storage Length (ft)		0	0		0		0	75		0		0
Storage Lanes		1	0		1		0	1		0		1
Taper Length (ft)		25			25			25				
Right Turn on Red				No			No					No
Link Speed (mph)		25				25			25			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				8.6			11.4			
Lane Group Flow (vph)	0	116	0	0	390	469	0	5	652	0	0	440
v/c Ratio		0.58			0.48	0.44		0.02	0.51			0.75
Control Delay		47.3			4.8	3.9		18.0	18.4			32.0
Queue Delay		0.0			0.0	0.0		0.0	0.0			0.0
Total Delay		47.3			4.8	3.9		18.0	18.4			32.0
Queue Length 50th (ft)		59			37	65		1	124			195
Queue Length 95th (ft)		#121			79	108		m4	143			296
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)								75				
Base Capacity (vph)		201			820	1071		265	1288			650
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		0.58			0.48	0.44		0.02	0.51			0.68

Intersection Summary

Area Type: Other

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.



Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Storage Length (ft)			0	0	
Storage Lanes			1	0	
Taper Length (ft)			25		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
v/c Ratio			0.60		
Control Delay			48.3		
Queue Delay			0.0		
Total Delay			48.3		
Queue Length 50th (ft)			65		
Queue Length 95th (ft)			#131		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			209		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		
Reduced v/c Ratio			0.60		
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

PM Peak w/ Improvements

10/10/2018



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Future Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		3.0			2.5	2.5		7.0	2.5			2.5
Lane Util. Factor		1.00			1.00	*0.81		1.00	0.95			1.00
Frt		0.98			1.00	0.99		1.00	0.99			0.86
Flt Protected		0.96			0.95	1.00		0.95	1.00			1.00
Satd. Flow (prot)		1557			1661	1329		1580	3139			1602
Flt Permitted		0.96			0.28	1.00		0.45	1.00			1.00
Satd. Flow (perm)		1557			484	1329		742	3139			1602
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	85	12	15	4	390	445	24	5	629	20	3	413
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	116	0	0	390	469	0	5	652	0	0	440
Heavy Vehicles (%)	9%	0%	0%	25%	0%	2%	4%	0%	0%	5%	0%	1%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		6.0			64.0	64.0		30.4	30.4			26.6
Effective Green, g (s)		11.0			68.5	68.5		30.4	34.9			31.1
Actuated g/C Ratio		0.13			0.81	0.81		0.36	0.41			0.37
Clearance Time (s)		8.0			7.0	7.0		7.0	7.0			7.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			3.0
Lane Grp Cap (vph)		201			820	1071		265	1288			586
v/s Ratio Prot					0.17	0.35			0.21			
v/s Ratio Perm		0.07			c0.21			0.01				c0.27
v/c Ratio		0.58			0.48	0.44		0.02	0.51			0.75
Uniform Delay, d1		34.8			3.9	2.5		17.7	18.6			23.6
Progression Factor		1.00			1.00	1.00		0.89	0.86			1.00
Incremental Delay, d2		4.0			0.4	1.3		0.1	1.3			5.4
Delay (s)		38.8			4.4	3.8		15.8	17.4			29.0
Level of Service		D			A	A		B	B			C
Approach Delay (s)		38.8				4.0			17.4			
Approach LOS		D				A			B			

Intersection Summary

HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

PM Peak w/ Improvements

10/10/2018



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	25	22	29	19	49
Future Volume (vph)	25	22	29	19	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			3.0		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1621		
Flt Permitted			0.98		
Satd. Flow (perm)			1621		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	27	23	31	20	52
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			6.0		
Effective Green, g (s)			11.0		
Actuated g/C Ratio			0.13		
Clearance Time (s)			8.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			209		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.60		
Uniform Delay, d1			34.9		
Progression Factor			1.00		
Incremental Delay, d2			4.8		
Delay (s)			39.8		
Level of Service			D		
Approach Delay (s)			39.8		
Approach LOS			D		
Intersection Summary					

Intersection						
Int Delay, s/veh	3.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	255	651	3	127	990
Future Vol, veh/h	8	255	651	3	127	990
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	1	0	2	1
Mvmt Flow	9	274	700	3	137	1065

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1509	352	0	0	703	0
Stage 1	702	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Critical Hdwy	6.8	6.92	-	-	4.14	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.31	-	-	2.22	-
Pot Cap-1 Maneuver	113	647	-	-	890	-
Stage 1	458	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	70	647	-	-	890	-
Mov Cap-2 Maneuver	70	-	-	-	-	-
Stage 1	285	-	-	-	-	-
Stage 2	404	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.1	0	2.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	517	890
HCM Lane V/C Ratio	-	-	0.547	0.153
HCM Control Delay (s)	-	-	20.1	9.8
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	3.3	0.5

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	17	661	5	4	1063
Future Vol, veh/h	10	17	661	5	4	1063
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	0	1	20	0	1
Mvmt Flow	11	18	696	5	4	1119

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1267	351	0	0	701
Stage 1	699	-	-	-	-
Stage 2	568	-	-	-	-
Critical Hdwy	7	6.9	-	-	4.1
Critical Hdwy Stg 1	6	-	-	-	-
Critical Hdwy Stg 2	6	-	-	-	-
Follow-up Hdwy	3.6	3.3	-	-	2.2
Pot Cap-1 Maneuver	150	651	-	-	905
Stage 1	434	-	-	-	-
Stage 2	509	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	148	651	-	-	905
Mov Cap-2 Maneuver	148	-	-	-	-
Stage 1	429	-	-	-	-
Stage 2	509	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.9	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	288	905
HCM Lane V/C Ratio	-	-	0.099	0.005
HCM Control Delay (s)	-	-	18.9	9
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.3	0

Lanes, Volumes, Timings
 8: Haverford Rd/County Line Rd & Lindsay Ave

PM Peak w/ Improvements
 10/10/2018



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		9.3			13.5
Lane Group Flow (vph)	15	0	685	0	0	1117
v/c Ratio	0.05		0.23			0.39
Control Delay	17.6		1.0			1.4
Queue Delay	0.0		0.0			0.2
Total Delay	17.6		1.0			1.5
Queue Length 50th (ft)	3		0			0
Queue Length 95th (ft)	16		78			88
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)						
Base Capacity (vph)	550		2969			2863
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			728
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.03		0.23			0.52

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
8: Haverford Rd/County Line Rd & Lindsay Ave

PM Peak w/ Improvements
10/10/2018

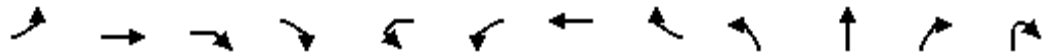


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	6	650	1	1	1060
Future Volume (vph)	9	6	650	1	1	1060
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	2.5		2.5			2.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.95		1.00			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1874		3129			3160
Flt Permitted	0.97		1.00			0.95
Satd. Flow (perm)	1874		3129			3017
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	6	684	1	1	1116
RTOR Reduction (vph)	6	0	0	0	0	0
Lane Group Flow (vph)	9	0	685	0	0	1117
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.4		46.6			46.6
Effective Green, g (s)	4.9		50.1			50.1
Actuated g/C Ratio	0.08		0.84			0.84
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	153		2612			2519
v/s Ratio Prot	c0.01		0.22			
v/s Ratio Perm						c0.37
v/c Ratio	0.06		0.26			0.44
Uniform Delay, d1	25.4		1.0			1.3
Progression Factor	1.00		1.12			1.00
Incremental Delay, d2	0.2		0.2			0.6
Delay (s)	25.6		1.4			1.9
Level of Service	C		A			A
Approach Delay (s)	25.6		1.4			1.9
Approach LOS	C		A			A

Intersection Summary

HCM 2000 Control Delay	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	12	11	11	13	10	10	10	10
Storage Length (ft)	140		0			185		160	70			0
Storage Lanes	1		0			1		1	1			0
Taper Length (ft)	25					25			25			
Right Turn on Red				Yes				Yes				Yes
Link Speed (mph)		40					30			25		
Link Distance (ft)		547					508			526		
Travel Time (s)		9.3					11.5			14.3		
Lane Group Flow (vph)	100	427	0	0	0	215	369	72	105	594	0	0
v/c Ratio	0.29	0.81				0.79	0.66	0.12	0.45	0.41		
Control Delay	21.0	47.5				43.4	40.8	0.4	26.0	17.7		
Queue Delay	0.0	0.0				0.0	0.0	0.0	0.0	0.0		
Total Delay	21.0	47.5				43.4	40.8	0.4	26.0	17.7		
Queue Length 50th (ft)	45	284				104	243	0	32	122		
Queue Length 95th (ft)	73	387				#159	328	0	m84	m153		
Internal Link Dist (ft)		467					428			446		
Turn Bay Length (ft)	140					185		160	70			
Base Capacity (vph)	354	612				272	645	665	233	1456		
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	0.28	0.70				0.79	0.57	0.11	0.45	0.41		

Intersection Summary

Area Type: Other

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.

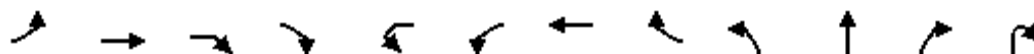


Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	10	10	10	12
Storage Length (ft)		0		0
Storage Lanes		1		0
Taper Length (ft)		25		
Right Turn on Red				Yes
Link Speed (mph)			25	
Link Distance (ft)			198	
Travel Time (s)			5.4	
Lane Group Flow (vph)	0	63	1002	0
v/c Ratio		0.18	0.78	
Control Delay		6.2	8.9	
Queue Delay		0.2	0.4	
Total Delay		6.5	9.3	
Queue Length 50th (ft)		2	0	
Queue Length 95th (ft)		m8	0	
Internal Link Dist (ft)			118	
Turn Bay Length (ft)				
Base Capacity (vph)		346	1285	
Starvation Cap Reductn		64	53	
Spillback Cap Reductn		0	0	
Storage Cap Reductn		0	0	
Reduced v/c Ratio		0.22	0.81	
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd/Haverford Rd & Railroad Ave & Bryn Mawr Ave

PM Peak w/ Improvements

10/10/2018



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Future Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5					2.5	2.5	2.5	2.5	-1.5	
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	0.95	
Fr _t	1.00	0.94					1.00	1.00	0.85	1.00	0.98	
Fl _t Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1862	1614					1653	1740	1565	1535	3098	
Fl _t Permitted	0.28	1.00					0.20	1.00	1.00	0.14	1.00	
Satd. Flow (perm)	552	1614					355	1740	1565	222	3098	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	100	243	46	138	6	209	369	72	105	516	74	4
RTOR Reduction (vph)	0	16	0	0	0	0	0	49	0	1	0	0
Lane Group Flow (vph)	100	411	0	0	0	215	369	23	105	593	0	0
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%	0%	1%	4%	1%	1%	0%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1		6	
Permitted Phases	8	8			4	4	4	4	6		6	
Actuated Green, G (s)	42.5	34.7				42.9	34.9	34.9	59.2	51.7		
Effective Green, g (s)	49.5	38.2				49.9	38.4	38.4	66.2	55.2		
Actuated g/C Ratio	0.41	0.32				0.42	0.32	0.32	0.55	0.46		
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0	2.0		
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	351	513				272	556	500	242	1425		
v/s Ratio Prot	0.03	c0.25				c0.08	0.21		c0.04	0.19		
v/s Ratio Perm	0.09					0.25		0.01	0.20			
v/c Ratio	0.28	0.80				0.79	0.66	0.05	0.43	0.42		
Uniform Delay, d1	23.4	37.4				26.5	35.2	28.2	17.4	21.6		
Progression Factor	1.00	1.00				1.00	1.00	1.00	1.24	0.74		
Incremental Delay, d2	0.4	8.8				14.4	3.0	0.0	1.1	0.8		
Delay (s)	23.9	46.2				40.9	38.2	28.2	22.7	16.8		
Level of Service	C	D				D	D	C	C	B		
Approach Delay (s)		42.0					38.0			17.7		
Approach LOS		D					D			B		

Intersection Summary

HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd/Haverford Rd & Railroad Ave & Bryn Mawr Ave

PM Peak w/ Improvements

10/10/2018



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		↵	↕↵	
Traffic Volume (vph)	37	26	921	71
Future Volume (vph)	37	26	921	71
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	12
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	0.95	
Fr _t		1.00	0.99	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1568	3120	
Fl _t Permitted		0.31	1.00	
Satd. Flow (perm)		517	3120	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99
Adj. Flow (vph)	37	26	930	72
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	63	997	0
Heavy Vehicles (%)	3%	0%	1%	4%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		51.4	45.8	
Effective Green, g (s)		58.4	49.3	
Actuated g/C Ratio		0.49	0.41	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		331	1281	
v/s Ratio Prot		0.01	c0.32	
v/s Ratio Perm		0.08		
v/c Ratio		0.19	0.78	
Uniform Delay, d ₁		17.3	30.6	
Progression Factor		0.34	0.18	
Incremental Delay, d ₂		0.1	2.6	
Delay (s)		6.1	8.0	
Level of Service		A	A	
Approach Delay (s)			7.9	
Approach LOS			A	
Intersection Summary				



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	10	10	10	11
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			25	25	
Link Distance (ft)	228			198	340	
Travel Time (s)	4.4			5.4	9.3	
Lane Group Flow (vph)	0	0	0	714	1073	0
v/c Ratio				0.24	0.83	
Control Delay				0.2	38.2	
Queue Delay				0.4	3.6	
Total Delay				0.6	41.8	
Queue Length 50th (ft)				0	404	
Queue Length 95th (ft)				0	#548	
Internal Link Dist (ft)	148			118	260	
Turn Bay Length (ft)						
Base Capacity (vph)				3028	1297	
Starvation Cap Reductn				1659	147	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.52	0.93	

Intersection Summary

Area Type: Other

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
11: Haverford Rd & Glenbrook Ave

PM Peak w/ Improvements
10/10/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Traffic Volume (vph)	0	0	26	681	1055	7
Future Volume (vph)	0	0	26	681	1055	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	11
Total Lost time (s)				-1.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3125	3157	
Fl _t Permitted				0.94	1.00	
Satd. Flow (perm)				2943	3157	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	0	26	688	1066	7
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	714	1072	0
Heavy Vehicles (%)	0%	0%	1%	2%	1%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)				108.1	45.8	
Effective Green, g (s)				114.6	49.3	
Actuated g/C Ratio				0.95	0.41	
Clearance Time (s)				2.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2894	1297	
v/s Ratio Prot				c0.11	c0.34	
v/s Ratio Perm				c0.12		
v/c Ratio				0.25	0.83	
Uniform Delay, d1				0.2	31.5	
Progression Factor				1.00	0.97	
Incremental Delay, d2				0.0	5.8	
Delay (s)				0.2	36.5	
Level of Service				A	D	
Approach Delay (s)	0.0			0.2	36.5	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			22.0	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		20.5
Intersection Capacity Utilization			43.2%	ICU Level of Service		A
Analysis Period (min)			15			

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 10: Haverford Rd & Landover Rd/County Line Rd

PM Peak w/ Improvements


















10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	101	56	29	117	188	42	26	582	56	25	1049	222
Future Volume (veh/h)	101	56	29	117	188	42	26	582	56	25	1049	222
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1843	1843	1843	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	106	59	31	123	198	44	27	613	59	26	1104	234
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	0	0	0	1	1	1	1	1	1
Cap, veh/h	191	104	47	176	246	52	84	1839	175	54	1778	372
Arrive On Green	0.26	0.29	0.26	0.26	0.29	0.28	0.64	0.67	0.66	1.00	1.00	1.00
Sat Flow, veh/h	494	356	160	464	841	179	78	2762	263	35	2671	559
Grp Volume(v), veh/h	196	0	0	365	0	0	346	0	353	725	0	639
Grp Sat Flow(s),veh/h/ln	1009	0	0	1483	0	0	1526	0	1578	1740	0	1525
Q Serve(g_s), s	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	21.7	0.0	0.0	29.0	0.0	0.0	9.8	0.0	11.6	0.0	0.0	0.0
Prop In Lane	0.54		0.16	0.34		0.12	0.08		0.17	0.04		0.37
Lane Grp Cap(c), veh/h	312	0	0	431	0	0	1003	0	1050	1138	0	1015
V/C Ratio(X)	0.63	0.00	0.00	0.85	0.00	0.00	0.34	0.00	0.34	0.64	0.00	0.63
Avail Cap(c_a), veh/h	340	0	0	462	0	0	1003	0	1050	1138	0	1015
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.53	0.00	0.53
Uniform Delay (d), s/veh	38.1	0.0	0.0	41.0	0.0	0.0	8.4	0.0	8.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.2	0.0	0.0	13.0	0.0	0.0	0.9	0.0	0.9	1.5	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.6	0.0	0.0	18.1	0.0	0.0	7.8	0.0	7.4	0.8	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.4	0.0	0.0	54.0	0.0	0.0	9.3	0.0	9.6	1.5	0.0	1.6
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		196			365			699				1364
Approach Delay, s/veh		41.4			54.0			9.4				1.5
Approach LOS		D			D			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		82.4		37.6		82.4		37.6				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		74.0		34.0		74.0		34.0				
Max Q Clear Time (g_c+I1), s		13.6		23.7		2.0		31.0				
Green Ext Time (p_c), s		6.0		0.8		16.5		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				13.9								
HCM 6th LOS				B								

Lanes, Volumes, Timings
1: Lancaster Ave & County Line Road

SAT Peak w/ Improvements
10/10/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35				35
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			3.3				3.1
Lane Group Flow (vph)	0	981	0	0	628	0	250	252	0	0	41	0
v/c Ratio		0.55			0.35		0.61	0.62				0.20
Control Delay		9.6			11.2		32.5	32.8				25.3
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		9.6			11.2		32.5	32.8				25.3
Queue Length 50th (ft)		122			97		109	109				12
Queue Length 95th (ft)		182			137		196	197				40
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1776			1779		412	404				381
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.55			0.35		0.61	0.62				0.11
Intersection Summary												
Area Type:	Other											

HCM Signalized Intersection Capacity Analysis
1: Lancaster Ave & County Line Road

SAT Peak w/ Improvements
10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↕			↕	
Traffic Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Future Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%			3%	
Total Lost time (s)		1.5			2.5		2.5	2.5			2.5	
Lane Util. Factor		0.95			0.95		0.95	0.95			1.00	
Frt		0.94			0.99		1.00	0.99			0.95	
Flt Protected		1.00			1.00		0.95	0.96			0.98	
Satd. Flow (prot)		3042			3345		1532	1492			1602	
Flt Permitted		0.93			0.93		0.95	0.96			0.98	
Satd. Flow (perm)		2848			3116		1532	1492			1602	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	22	570	389	13	586	29	454	29	19	14	13	14
RTOR Reduction (vph)	0	123	0	0	4	0	0	3	0	0	13	0
Lane Group Flow (vph)	0	858	0	0	624	0	250	249	0	0	28	0
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	5%	1%	1%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		40.1			40.1		18.1	18.1			4.8	
Effective Green, g (s)		44.6			43.6		21.6	21.6			7.3	
Actuated g/C Ratio		0.56			0.55		0.27	0.27			0.09	
Clearance Time (s)		6.0			6.0		6.0	6.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		1587			1698		413	402			146	
v/s Ratio Prot							0.16	c0.17			c0.02	
v/s Ratio Perm		c0.30			0.20							
v/c Ratio		0.54			0.37		0.61	0.62			0.19	
Uniform Delay, d1		11.2			10.4		25.5	25.6			33.6	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.3			0.1		2.5	2.8			0.7	
Delay (s)		12.5			10.5		28.0	28.4			34.3	
Level of Service		B			B		C	C			C	
Approach Delay (s)		12.5			10.5		28.2	28.2			34.3	
Approach LOS		B			B		C	C			C	

Intersection Summary

HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	41	15	20	21	17	4	446	29	6	332	21
Future Vol, veh/h	25	41	15	20	21	17	4	446	29	6	332	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	3	0	1	0
Mvmt Flow	27	44	16	21	22	18	4	474	31	6	353	22

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	894	889	364	904	885	490	375	0	0	505	0	0
Stage 1	376	376	-	498	498	-	-	-	-	-	-	-
Stage 2	518	513	-	406	387	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	264	285	685	260	286	582	1195	-	-	1070	-	-
Stage 1	649	620	-	558	548	-	-	-	-	-	-	-
Stage 2	544	539	-	626	613	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	238	282	685	222	283	582	1195	-	-	1070	-	-
Mov Cap-2 Maneuver	238	282	-	222	283	-	-	-	-	-	-	-
Stage 1	646	616	-	555	545	-	-	-	-	-	-	-
Stage 2	503	536	-	564	609	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22	20.1	0.1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1195	-	-	297	300	1070	-
HCM Lane V/C Ratio	0.004	-	-	0.29	0.206	0.006	-
HCM Control Delay (s)	8	0	-	22	20.1	8.4	0
HCM Lane LOS	A	A	-	C	C	A	A
HCM 95th %tile Q(veh)	0	-	-	1.2	0.8	0	-

HCM 6th Signalized Intersection Summary
3: County Line Rd & Roberts Rd

SAT Peak w/ Improvements
10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↶			↷		↶	↷		↶	↷	
Traffic Volume (veh/h)	44	34	6	12	42	13	2	436	26	10	365	58
Future Volume (veh/h)	44	34	6	12	42	13	2	436	26	10	365	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1800	1786	1786	1660	1786	1786
Adj Flow Rate, veh/h	46	36	6	13	44	14	2	459	27	11	384	61
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	1	1	10	1	1
Cap, veh/h	163	92	14	79	143	41	811	1362	80	786	1227	195
Arrive On Green	0.08	0.12	0.12	0.08	0.12	0.12	1.00	1.00	1.00	0.82	0.82	0.77
Sat Flow, veh/h	773	757	112	205	1177	339	960	1670	98	852	1504	239
Grp Volume(v), veh/h	88	0	0	71	0	0	2	0	486	11	0	445
Grp Sat Flow(s),veh/h/ln	1643	0	0	1721	0	0	960	0	1768	852	0	1743
Q Serve(g_s), s	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	5.1
Cycle Q Clear(g_c), s	3.9	0.0	0.0	3.0	0.0	0.0	5.2	0.0	0.0	0.2	0.0	5.1
Prop In Lane	0.52		0.07	0.18		0.20	1.00		0.06	1.00		0.14
Lane Grp Cap(c), veh/h	196	0	0	186	0	0	811	0	1442	786	0	1421
V/C Ratio(X)	0.45	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.34	0.01	0.00	0.31
Avail Cap(c_a), veh/h	484	0	0	498	0	0	811	0	1442	786	0	1421
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.90	0.00	0.90	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	0.0	32.1	0.0	0.0	0.2	0.0	0.0	1.4	0.0	1.9
Incr Delay (d2), s/veh	1.6	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.2	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.4	0.0	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.7	0.0	0.0	33.4	0.0	0.0	0.2	0.0	0.6	1.4	0.0	2.5
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		88			71			488				456
Approach Delay, s/veh		34.7			33.4			0.6				2.4
Approach LOS		C			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		66.9		12.1		66.9		12.1				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		46.0		21.0		46.0		21.0				
Max Q Clear Time (g_c+I1), s		7.2		5.9		7.1		5.0				
Green Ext Time (p_c), s		3.7		0.3		3.5		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				6.2								
HCM 6th LOS				A								



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Storage Length (ft)		0	0		0		0	75		0		0
Storage Lanes		1	0		1		0	1		0		1
Taper Length (ft)		25			25			25				
Right Turn on Red				No			No					No
Link Speed (mph)		25				25			25			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				8.6			11.4			
Lane Group Flow (vph)	0	33	0	0	266	473	0	4	388	0	0	319
v/c Ratio		0.13			0.29	0.44		0.01	0.28			0.60
Control Delay		29.2			3.2	4.5		15.0	13.9			27.1
Queue Delay		0.0			0.0	0.0		0.0	0.0			0.0
Total Delay		29.2			3.2	4.5		15.0	13.9			27.1
Queue Length 50th (ft)		14			28	79		1	67			132
Queue Length 95th (ft)		38			46	134		m3	96			202
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)								75				
Base Capacity (vph)		273			914	1080		285	1384			583
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		0.12			0.29	0.44		0.01	0.28			0.55

Intersection Summary

Area Type: Other

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



Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Storage Length (ft)			0	0	
Storage Lanes			1	0	
Taper Length (ft)			25		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
v/c Ratio			0.47		
Control Delay			36.1		
Queue Delay			0.0		
Total Delay			36.1		
Queue Length 50th (ft)			56		
Queue Length 95th (ft)			109		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			276		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		
Reduced v/c Ratio			0.46		
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

SAT Peak w/ Improvements
 10/10/2018



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Future Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		2.5			2.5	2.5		7.0	2.5			2.5
Lane Util. Factor		1.00			1.00	*0.81		1.00	0.95			1.00
Frt		0.95			1.00	0.99		1.00	1.00			0.86
Flt Protected		0.97			0.95	1.00		0.95	1.00			1.00
Satd. Flow (prot)		1599			1661	1330		1580	3117			1617
Flt Permitted		0.97			0.44	1.00		0.44	1.00			1.00
Satd. Flow (perm)		1599			767	1330		739	3117			1617
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	3	5	6	266	445	28	4	378	6	4	308
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	33	0	0	266	473	0	4	388	0	0	319
Heavy Vehicles (%)	0%	33%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		7.2			57.8	57.8		29.2	29.2			21.6
Effective Green, g (s)		11.7			62.3	62.3		29.2	33.7			26.1
Actuated g/C Ratio		0.15			0.79	0.79		0.37	0.43			0.33
Clearance Time (s)		7.0			7.0	7.0		7.0	7.0			7.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			3.0
Lane Grp Cap (vph)		236			900	1048		273	1329			534
v/s Ratio Prot					0.10	c0.36			0.12			
v/s Ratio Perm		0.02			0.14			0.01				c0.20
v/c Ratio		0.14			0.30	0.45		0.01	0.29			0.60
Uniform Delay, d1		29.3			2.4	2.7		15.8	14.8			22.1
Progression Factor		1.00			1.00	1.00		0.81	0.85			1.00
Incremental Delay, d2		0.3			0.2	1.4		0.1	0.5			1.8
Delay (s)		29.5			2.6	4.1		12.9	13.2			23.9
Level of Service		C			A	A		B	B			C
Approach Delay (s)		29.5				3.6			13.2			
Approach LOS		C				A			B			
Intersection Summary												
HCM 2000 Control Delay			12.8		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			79.0	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			66.3%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & Thomas Ave & Conestoga Rd & County Line Rd

SAT Peak w/ Improvements
 10/10/2018



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	11	14	34	22	51
Future Volume (vph)	11	14	34	22	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			2.5		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1616		
Flt Permitted			0.98		
Satd. Flow (perm)			1616		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	15	35	23	53
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			7.2		
Effective Green, g (s)			11.7		
Actuated g/C Ratio			0.15		
Clearance Time (s)			7.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			239		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.53		
Uniform Delay, d1			31.1		
Progression Factor			1.00		
Incremental Delay, d2			2.1		
Delay (s)			33.2		
Level of Service			C		
Approach Delay (s)			33.2		
Approach LOS			C		
Intersection Summary					

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	TT		TT			TT
Traffic Vol, veh/h	13	143	579	2	93	588
Future Vol, veh/h	13	143	579	2	93	588
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	4	1	0	18	1
Mvmt Flow	14	149	603	2	97	613

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1105	303	0	0	605
Stage 1	604	-	-	-	-
Stage 2	501	-	-	-	-
Critical Hdwy	6.82	6.98	-	-	4.46
Critical Hdwy Stg 1	5.82	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-
Follow-up Hdwy	3.51	3.34	-	-	2.38
Pot Cap-1 Maneuver	207	687	-	-	867
Stage 1	511	-	-	-	-
Stage 2	577	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	172	687	-	-	867
Mov Cap-2 Maneuver	172	-	-	-	-
Stage 1	424	-	-	-	-
Stage 2	577	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	1.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	550	867
HCM Lane V/C Ratio	-	-	0.295	0.112
HCM Control Delay (s)	-	-	14.3	9.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	1.2	0.4

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↓			↑↓
Traffic Vol, veh/h	1	11	610	7	2	635
Future Vol, veh/h	1	11	610	7	2	635
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	1	11	635	7	2	661

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	974	321	0	0	642	0
Stage 1	639	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	253	681	-	-	952	-
Stage 1	493	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	252	681	-	-	952	-
Mov Cap-2 Maneuver	252	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	702	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	596	952
HCM Lane V/C Ratio	-	-	0.021	0.002
HCM Control Delay (s)	-	-	11.2	8.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Lanes, Volumes, Timings
 8: Haverford Rd/County Line Rd & Lindsay Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		9.3			13.5
Lane Group Flow (vph)	0	0	656	0	0	674
v/c Ratio			0.21			0.22
Control Delay			0.1			0.2
Queue Delay			0.0			0.0
Total Delay			0.1			0.2
Queue Length 50th (ft)			0			0
Queue Length 95th (ft)			0			0
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)						
Base Capacity (vph)			3160			3018
Starvation Cap Reductn			0			0
Spillback Cap Reductn			0			0
Storage Cap Reductn			0			0
Reduced v/c Ratio			0.21			0.22

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
8: Haverford Rd/County Line Rd & Lindsay Ave

SAT Peak w/ Improvements
10/10/2018

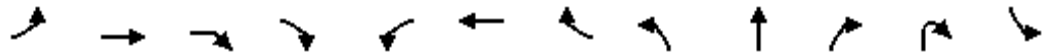


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	623	0	1	639
Future Volume (vph)	0	0	623	0	1	639
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)			2.5			2.5
Lane Util. Factor			0.95			0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			3160			3160
Flt Permitted			1.00			0.95
Satd. Flow (perm)			3160			3018
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	656	0	1	673
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	656	0	0	674
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)			61.0			61.0
Effective Green, g (s)			61.0			61.0
Actuated g/C Ratio			1.00			1.00
Clearance Time (s)			6.0			6.0
Vehicle Extension (s)			3.0			3.0
Lane Grp Cap (vph)			3160			3018
v/s Ratio Prot			0.21			
v/s Ratio Perm						c0.22
v/c Ratio			0.21			0.22
Uniform Delay, d1			0.0			0.0
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			0.2
Delay (s)			0.1			0.2
Level of Service			A			A
Approach Delay (s)	0.0		0.1			0.2
Approach LOS	A		A			A

Intersection Summary

HCM 2000 Control Delay	0.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	11	11	13	10	10	10	10	10
Storage Length (ft)	140		0		185		160	70		0		
Storage Lanes	1		0		1		1	1		0		
Taper Length (ft)	25				25			25				
Right Turn on Red				Yes			Yes				Yes	
Link Speed (mph)		40				30			25			
Link Distance (ft)		547				508			526			
Travel Time (s)		9.3				11.5			14.3			
Lane Group Flow (vph)	161	305	0	0	114	203	67	112	578	0	0	0
v/c Ratio	0.35	0.63			0.32	0.47	0.12	0.26	0.40			
Control Delay	18.4	31.6			18.1	30.8	0.5	13.6	19.1			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	18.4	31.6			18.1	30.8	0.5	13.6	19.1			
Queue Length 50th (ft)	57	139			39	96	0	31	119			
Queue Length 95th (ft)	89	211			67	148	0	66	180			
Internal Link Dist (ft)		467				428			446			
Turn Bay Length (ft)	140				185		160	70				
Base Capacity (vph)	458	545			358	549	632	429	1451			
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	0.35	0.56			0.32	0.37	0.11	0.26	0.40			

Intersection Summary

Area Type: Other

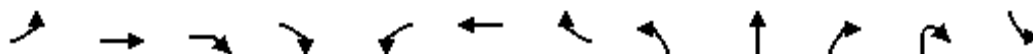
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	SBL	SBT	SBR
Lane Configurations			
Ideal Flow (vphpl)	1800	1800	1800
Lane Width (ft)	10	10	12
Storage Length (ft)	0		0
Storage Lanes	1		0
Taper Length (ft)	25		
Right Turn on Red			Yes
Link Speed (mph)		25	
Link Distance (ft)		198	
Travel Time (s)		5.4	
Lane Group Flow (vph)	58	538	0
v/c Ratio	0.27	0.42	
Control Delay	12.7	3.6	
Queue Delay	0.0	0.1	
Total Delay	12.7	3.7	
Queue Length 50th (ft)	5	0	
Queue Length 95th (ft)	m20	0	
Internal Link Dist (ft)		118	
Turn Bay Length (ft)			
Base Capacity (vph)	221	1267	
Starvation Cap Reductn	0	107	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.26	0.46	
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd/Haverford Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak w/ Improvements
 10/10/2018



Movement	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Future Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	11	11	13	10	10	10	10	10
Total Lost time (s)	2.5	3.0			2.5	3.0	3.0	2.5	-1.5			
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	0.95			
Frt	1.00	0.94			1.00	1.00	0.85	1.00	0.98			
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1862	1630			1653	1706	1581	1565	3115			
Flt Permitted	0.46	1.00			0.37	1.00	1.00	0.36	1.00			
Satd. Flow (perm)	907	1630			636	1706	1581	587	3115			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	161	177	26	102	114	203	67	112	491	86	1	48
RTOR Reduction (vph)	0	22	0	0	0	0	49	0	0	0	0	0
Lane Group Flow (vph)	161	284	0	0	114	203	18	112	578	0	0	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	2%	0%	2%	0%	1%	2%	2%
Turn Type	pm+pt	NA			pm+pt	NA	Perm	pm+pt	NA			pm+pt
Protected Phases	3	8			7	4		1	6			5
Permitted Phases	8	8			4	4	4	6	6			2
Actuated Green, G (s)	29.0	22.0			26.2	20.6	20.6	42.5	36.1			
Effective Green, g (s)	36.0	25.5			33.2	24.1	24.1	49.5	39.6			
Actuated g/C Ratio	0.40	0.28			0.37	0.27	0.27	0.55	0.44			
Clearance Time (s)	6.0	6.5			6.0	6.5	6.5	6.0	2.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	474	461			337	456	423	430	1370			
v/s Ratio Prot	c0.04	c0.17			0.03	0.12		c0.03	0.19			
v/s Ratio Perm	0.10				0.09		0.01	0.11				
v/c Ratio	0.34	0.61			0.34	0.45	0.04	0.26	0.42			
Uniform Delay, d1	18.0	28.0			19.7	27.4	24.4	10.3	17.3			
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.4	2.4			0.6	0.7	0.0	0.3	1.0			
Delay (s)	18.5	30.4			20.3	28.1	24.4	10.6	18.3			
Level of Service	B	C			C	C	C	B	B			
Approach Delay (s)		26.3				25.1			17.0			
Approach LOS		C				C			B			

Intersection Summary

HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd/Haverford Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak w/ Improvements
 10/10/2018



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	10	459	63
Future Volume (vph)	10	459	63
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	10	10	12
Total Lost time (s)	9.0	2.5	
Lane Util. Factor	1.00	0.95	
Fr _t	1.00	0.98	
Fl _t Protected	0.95	1.00	
Satd. Flow (prot)	1567	3028	
Fl _t Permitted	0.26	1.00	
Satd. Flow (perm)	436	3028	
Peak-hour factor, PHF	0.97	0.97	0.97
Adj. Flow (vph)	10	473	65
RTOR Reduction (vph)	0	11	0
Lane Group Flow (vph)	58	527	0
Heavy Vehicles (%)	1%	4%	0%
Turn Type	pm+pt	NA	
Protected Phases	5	2	
Permitted Phases	2	2	
Actuated Green, G (s)	37.3	31.5	
Effective Green, g (s)	31.3	35.0	
Actuated g/C Ratio	0.35	0.39	
Clearance Time (s)	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	186	1177	
v/s Ratio Prot	0.01	0.17	
v/s Ratio Perm	0.10		
v/c Ratio	0.31	0.45	
Uniform Delay, d ₁	20.6	20.3	
Progression Factor	0.60	0.13	
Incremental Delay, d ₂	0.8	1.1	
Delay (s)	13.2	3.7	
Level of Service	B	A	
Approach Delay (s)		4.6	
Approach LOS		A	
Intersection Summary			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	10	10	10	11
Right Turn on Red		Yes				Yes
Link Speed (mph)	25			25	25	
Link Distance (ft)	228			198	340	
Travel Time (s)	6.2			5.4	9.3	
Lane Group Flow (vph)	0	0	0	796	643	0
v/c Ratio				0.26	0.50	
Control Delay				0.2	23.4	
Queue Delay				0.4	0.4	
Total Delay				0.6	23.8	
Queue Length 50th (ft)				0	151	
Queue Length 95th (ft)				0	219	
Internal Link Dist (ft)	148			118	260	
Turn Bay Length (ft)						
Base Capacity (vph)				3034	1296	
Starvation Cap Reductn				1564	229	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.54	0.60	

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
 11: Haverford Rd & Glenbrook Ave

SAT Peak w/ Improvements
 10/10/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕↕	↕↕	
Traffic Volume (vph)	0	0	35	697	579	13
Future Volume (vph)	0	0	35	697	579	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	11
Total Lost time (s)				-1.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3122	3119	
Fl _t Permitted				0.94	1.00	
Satd. Flow (perm)				2957	3119	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	38	758	629	14
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	796	641	0
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)				82.6	31.5	
Effective Green, g (s)				82.6	35.0	
Actuated g/C Ratio				0.92	0.39	
Clearance Time (s)				2.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2786	1212	
v/s Ratio Prot				c0.13	c0.21	
v/s Ratio Perm				c0.14		
v/c Ratio				0.29	0.53	
Uniform Delay, d ₁				0.4	21.2	
Progression Factor				1.00	1.00	
Incremental Delay, d ₂				0.1	1.7	
Delay (s)				0.5	22.8	
Level of Service				A	C	
Approach Delay (s)	0.0			0.5	22.8	
Approach LOS	A			A	C	
Intersection Summary						
HCM 2000 Control Delay			10.5	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			90.0	Sum of lost time (s)		21.0
Intersection Capacity Utilization			45.4%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
 10: Haverford Rd & Landover Rd/County Line Rd

SAT Peak w/ Improvements
 10/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	107	73	25	46	74	37	20	551	68	32	518	112
Future Volume (veh/h)	107	73	25	46	74	37	20	551	68	32	518	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1814	1814	1814	1800	1800	1800	1772	1772	1772	1800	1800	1800
Adj Flow Rate, veh/h	111	76	26	48	77	39	21	574	71	33	540	117
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	0	0	0	2	2	2	0	0	0
Cap, veh/h	216	124	38	102	116	50	86	2070	252	120	1865	396
Arrive On Green	0.17	0.21	0.17	0.17	0.13	0.17	0.68	0.73	0.68	0.68	0.73	0.68
Sat Flow, veh/h	693	585	178	337	883	381	53	2854	347	98	2572	547
Grp Volume(v), veh/h	213	0	0	164	0	0	349	0	317	360	0	330
Grp Sat Flow(s),veh/h/ln	1455	0	0	1601	0	0	1704	0	1550	1677	0	1540
Q Serve(g_s), s	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0	0.0	6.3
Cycle Q Clear(g_c), s	11.4	0.0	0.0	7.5	0.0	0.0	5.5	0.0	5.8	5.7	0.0	6.3
Prop In Lane	0.52		0.12	0.29		0.24	0.06		0.22	0.09		0.36
Lane Grp Cap(c), veh/h	314	0	0	328	0	0	1209	0	1124	1192	0	1117
V/C Ratio(X)	0.68	0.00	0.00	0.50	0.00	0.00	0.29	0.00	0.28	0.30	0.00	0.30
Avail Cap(c_a), veh/h	323	0	0	338	0	0	1209	0	1124	1192	0	1117
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.92	0.00	0.92
Uniform Delay (d), s/veh	30.3	0.0	0.0	32.6	0.0	0.0	3.8	0.0	4.0	3.9	0.0	4.1
Incr Delay (d2), s/veh	5.4	0.0	0.0	1.2	0.0	0.0	0.6	0.0	0.6	0.6	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.9	0.0	0.0	5.2	0.0	0.0	3.8	0.0	2.9	4.0	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.8	0.0	0.0	33.8	0.0	0.0	4.4	0.0	4.6	4.5	0.0	4.7
LnGrp LOS	D	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		213			164			666				690
Approach Delay, s/veh		35.8			33.8			4.5				4.6
Approach LOS		D			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		60.5		19.5		60.5		19.5				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		54.0		14.0		54.0		14.0				
Max Q Clear Time (g_c+I1), s		7.8		13.4		8.3		9.5				
Green Ext Time (p_c), s		5.2		0.1		5.6		0.3				

Intersection Summary

HCM 6th Ctrl Delay	11.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

APPENDIX I

Existing Level of Service and Delay



Intersection	Existing LOS			Existing w/ Improvements LOS		
	AM Peak Hour LOS (Delay in seconds)	PM Peak Hour LOS (Delay in seconds)	SAT Peak Hour LOS (Delay in seconds)	AM Peak Hour LOS (Delay in seconds)	PM Peak Hour LOS (Delay in seconds)	SAT Peak Hour LOS (Delay in seconds)
Lancaster Avenue (S.R. 0030) ²	C (20.3)	C (23.0)	B (16.0)	C (21.6)	C (24.3)	B (16.0)
Eastbound Thru						
Eastbound Thru/Right	C (20.8)	C (25.6)	B (12.5)	C (21.7)	C (27.6)	B (12.5)
Westbound Left						
Westbound Thru/Right	B (15.2)	B (11.0)	B (10.5)	B (15.8)	B (11.6)	B (10.5)
Northbound Left	C (23.9)	C (27.7)	C (28.0)	C (26.9)	C (28.1)	C (28.0)
Northbound Left/Thru/Right	C (24.1)	C (28.1)	C (28.4)	C (27.1)	C (28.3)	C (28.4)
Southbound Left/Thru/Right	C (34.2)	C (34.2)	C (34.3)	C (32.2)	C (32.2)	C (34.3)
Montrose Avenue ¹	B (7.8)	B (12.4)	A (2.7)	B (11.2)	C (20.5)	A (3.1)
Eastbound Left/Thru/Right	F (51.7)	F (88.1)	C (19.1)	F (78.5)	F (136.4)	C (22.0)
Westbound Left/Thru/Right	E (38.4)	F (62.0)	C (17.7)	E (45.3)	F (130.7)	C (20.1)
Northbound Left/Thru	A (8.5)	A (9.6)	A (8.2)	A (8.5)	A (9.6)	A (8.0)
Northbound Thru/Right	A (0.1)	A (0.2)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Southbound Left/Thru	A (9.1)	A (8.4)	A (8.6)	A (9.1)	A (8.4)	A (8.4)
Southbound Thru/Right	A (0.1)	A (0.1)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
South Roberts Road ^{1/2}	B (16.2)	A (3.4)	A (3.0)	A (7.9)	A (5.7)	A (6.2)
Eastbound Left/Thru/Right	F (109.7)	D (33.2)	C (19.2)	C (32.0)	D (37.6)	C (34.7)
Westbound Left/Thru/Right	D (27.3)	D (27.9)	C (20.4)	C (26.5)	D (35.6)	C (33.4)
Northbound Left/Thru	A (8.5)	A (0.0)	A (8.2)	A (0.9)	A (0.0)	A (0.2)
Northbound Thru/Right	A (0.0)	A (0.0)	A (0.0)	A (1.1)	A (0.8)	A (0.6)
Southbound Left/Thru	A (8.8)	A (8.7)	A (8.6)	A (3.0)	A (1.3)	A (1.4)
Southbound Thru/Right	A (0.1)	A (0.0)	A (0.1)	A (5.5)	A (3.1)	A (2.5)
Conestoga Road (S.R. 1019) & Glenbrook Avenue & Thomas Avenue ²	B (15.8)	B (19.1)	B (13.8)	B (14.1)	B (16.9)	B (12.8)
Westbound Left/Thru/Right	C (25.5)	c (30.7)	C (27.1)	C (28.8)	D (38.8)	C (29.5)
Northeastbound Left/Thru/Right	C (28.2)	C (30.9)	C (29.6)	C (33.2)	D (39.8)	C (33.2)
Southeastbound Left/Thru/Right	C (27.9)	C (31.8)	B (25.4)	C (22.8)	C (29.0)	C (23.9)
Northbound Left/Thru				A (5.8)	A (4.4)	A (2.6)
Northbound Thru/Right	A (8.1)	A (5.3)	A (3.9)	A (6.6)	A (3.8)	A (4.1)
Southbound Left/Thru				A (0.0)	B (15.8)	B (12.9)
Southbound Thru/Right	B (16.7)	C (24.2)	B (16.9)	B (15.9)	B (17.4)	B (13.2)
South Warner Avenue ¹						
Northbound Thru						
Northbound Thru/Right						
Southbound Left/Thru						
Southbound Thru						
Old Lancaster Avenue ¹	A (4.4)	A (3.9)	A (2.4)	A (4.4)	A (3.9)	A (2.4)
Westbound Left/Thru/Right	C (24.2)	C (20.1)	B (14.3)	C (24.2)	C (20.1)	B (14.3)
Northbound Thru						
Northbound Thru/Right	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Southbound Left/Thru	B (13.0)	B (9.8)	A (9.7)	B (13.0)	A (9.8)	A (9.7)
Southbound Thru	A (2.2)	A (1.5)	A (0.6)	A (2.2)	A (1.5)	A (0.6)
Mondella Avenue ¹	A (0.5)	A (0.4)	A (0.1)	A (0.5)	A (0.4)	A (0.1)
Westbound Left/Thru/Right	D (26.4)	C (18.9)	B (11.2)	D (26.4)	C (18.9)	B (11.2)
Northbound Thru						
Northbound Thru/Right	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Southbound Left/Thru	B (10.2)	A (9.0)	A (8.8)	B (10.2)	A (9.0)	A (8.8)
Southbound Thru	A (0.2)	A (0.1)	A (0.0)	A (0.2)	A (0.1)	A (0.0)
Lindsay Avenue ²	A (1.9)	A (1.5)	A (0.2)	A (2.6)	A (1.9)	A (0.2)
Westbound Left/Thru/Right	C (26.9)	C (25.6)	A (0.0)	C (25.7)	C (25.6)	A (0.0)
Northbound Thru						
Northbound Thru/Right	A (1.9)	A (0.8)	A (0.1)	A (2.8)	A (1.4)	A (0.1)
Southbound Left/Thru						
Southbound Thru	A (1.2)	A (1.6)	A (0.2)	A (1.6)	A (1.9)	A (0.2)
S. Bryn Mawr Avenue (S.R.) & Haverford Road & W. Railroad Avenue & Glenbrook Avenue ²	C (23.1)	C (22.4)	B (16.7)	C (23.4)	C (23.0)	B (17.1)
Eastbound Left	C (21.6)	C (23.9)	B (18.6)	C (21.6)	C (23.9)	B (18.5)
Eastbound Thru/Right	D (41.5)	D (46.2)	C (30.5)	D (41.5)	D (46.2)	C (30.4)
Westbound Left	C (23.8)	D (40.9)	C (20.0)	C (23.8)	D (40.9)	C (20.3)
Westbound Thru	C (30.6)	D (38.2)	C (27.7)	C (30.6)	D (38.2)	C (28.1)
Westbound Right	C (25.1)	C (28.2)	C (24.2)	C (25.1)	C (28.2)	C (24.4)
Northbound Left	B (13.0)	C (22.1)	B (10.5)	B (14.0)	C (22.7)	B (10.6)
Northbound Thru						
Northbound Thru/Right	C (24.0)	B (16.7)	B (18.2)	C (24.3)	B (16.8)	B (18.3)
Southbound Left	C (36.6)	A (4.4)	B (10.6)	D (38.0)	A (6.1)	B (13.2)
Southbound Thru						
Southbound Thru/Right	A (2.9)	A (6.5)	A (2.9)	A (3.7)	A (8.0)	A (3.7)
Glenbrook Avenue ²	B (11.7)	C (22.1)	B (10.4)	B (11.6)	C (22.0)	B (10.5)
Northbound Left/Thru						
Northbound Thru/Right	A (0.2)	A (0.2)	A (0.4)	A (0.2)	A (0.2)	A (0.5)
Southbound Thru						
Southbound Thru/Right	C (31.3)	D (36.7)	C (22.7)	C (31.1)	D (36.5)	C (22.8)
Haverford Road (S.R.) & Landover Road ²	B (16.0)	B (13.7)	B (10.5)	B (16.0)	B (13.9)	B (11.1)
Eastbound Left/Thru/Right	D (53.5)	D (41.4)	D (35.5)	D (53.3)	D (41.4)	D (35.8)
Westbound Left/Thru/Right	D (35.3)	D (53.6)	C (30.2)	D (35.3)	D (54.0)	C (33.8)
Northbound Left/Thru	B (10.4)	A (8.9)	A (4.0)	B (10.4)	A (9.3)	A (4.4)
Northbound Thru/Right	B (10.5)	A (9.1)	A (4.2)	B (10.5)	A (9.6)	A (4.6)
Southbound Left/Thru	A (0.8)	A (1.3)	A (4.1)	A (0.8)	A (1.5)	A (4.5)
Southbound Thru/Right	A (0.8)	A (1.5)	A (4.3)	A (0.8)	A (1.6)	A (4.7)

¹ Analyzed as stop controlled ² Analyzed as signal

APPENDIX J

Existing 95th Percentile Queues



Intersection	Existing Storage Length (feet)	Existing Queues			Queues w/ Improvements		
		AM Peak Hour 95th Percentile Queue (feet)	PM Peak Hour 95th Percentile Queue (feet)	SAT Peak Hour 95th Percentile Queue (feet)	AM Peak Hour 95th Percentile Queue (feet)	PM Peak Hour 95th Percentile Queue (feet)	SAT Peak Hour 95th Percentile Queue (feet)
Lancaster Avenue (S.R. 0030)							
Eastbound Thru	*340	224	497	182	224	497	182
Eastbound Thru/Right							
Westbound Left		167	137	137	167	138	137
Westbound Thru/Right							
Northbound Left		325	211	196	349	218	196
Northbound Left/Thru/Right		322	209	197	345	229	197
Southbound Left/Thru/Right		34	37	40	33	36	40
Montrose Avenue							
Eastbound Left/Thru/Right	*675	125	170	25	163	210	30
Westbound Left/Thru/Right	*340	40	70	15	45	110	20
Northbound Left/Thru	*440	0	3	0	0	3	0
Northbound Thru/Right			0	0	0	0	0
Southbound Left/Thru	*750	0	0	0	0	0	0
Southbound Thru/Right			0	0	0	0	0
South Roberts Road							
Eastbound Left/Thru/Right	*275	213	48	13	180	88	80
Westbound Left/Thru/Right	*540	23	25	23	40	53	63
Northbound Left/Thru	(75)	0	0	0	0	0	0
Northbound Thru/Right	*360	0	0	0	18	15	10
Southbound Left/Thru	(75)	0	0	0	3	0	0
Southbound Thru/Right	*440	0	0	0	140	88	48
Conestoga Road (S.R. 1019) & Glenbrook Avenue & Thomas Avenue							
Westbound Left/Thru/Right		27	97	34	31	121	38
Northeastbound Left/Thru/Right		107	103	96	125	131	109
Southeastbound Left/Thru/Right	*430	350	347	206	259	296	202
Northbound Left/Thru	(170)				87	79	46
Northbound Thru/Right		202	151	121	216	108	134
Southbound Left/Thru	*360						
Southbound Thru/Right			136	228	122	0	4
South Warner Avenue							
Northbound Thru		0	0	0	0	0	0
Northbound Thru/Right		0	0	0	0	0	0
Southbound Left/Thru		0	0	0	0	0	0
Southbound Thru		0	0	0	0	0	0
Old Lancaster Avenue							
Westbound Left/Thru/Right		60	83	30	60	83	30
Northbound Thru		0	0	0	0	0	0
Northbound Thru/Right							
Southbound Left/Thru		48	13	10	48	13	10
Southbound Thru		0	0	0	0	0	0
Mondella Avenue							
Westbound Left/Thru/Right		10	8	3	10	8	3
Northbound Thru		0	0	0	0	0	0
Northbound Thru/Right							
Southbound Left/Thru		3	0	0	3	0	0
Southbound Thru		0	0	0	0	0	0
Lindsay Avenue							
Westbound Left/Thru/Right		19	16	0	19	16	0
Northbound Thru	*400						
Northbound Thru/Right			162	40	0	119	78
Southbound Left/Thru							
Southbound Thru		43	79	0	53	88	0
S. Bryn Mawr Avenue (S.R.) & Haverford Road & W. Railroad Avenue & Glenbrook Avenue							
Eastbound Left	140	96	73	89	96	73	89
Eastbound Thru/Right		416	387	211	416	387	211
Westbound Left	180	47	159	67	47	159	67
Westbound Thru		230	328	147	230	328	148
Westbound Right	160	0	0	0	0	0	0
Northbound Left	70	80	81	66	88	84	66
Northbound Thru							
Northbound Thru/Right		500	147	180	494	153	180
Southbound Left	120	52	5	16	54	8	20
Southbound Thru							
Southbound Thru/Right	*120	0	0	0	0	0	0
Glenbrook Avenue							
Northbound Left/Thru		0	0	0	0	0	0
Northbound Thru/Right							
Southbound Thru	*235						
Southbound Thru/Right			299	550	219	300	548
Haverford Road (S.R.) & Landover Road							
Eastbound Left/Thru/Right		438	238	195	438	240	198
Westbound Left/Thru/Right		173	445	135	173	453	130
Northbound Left/Thru		285	175	78	298	195	95
Northbound Thru/Right		243	173	60	253	185	73
Southbound Left/Thru		10	20	80	10	20	100
Southbound Thru/Right		10	20	63	10	20	78

*Denotes distance to adjacent intersection

APPENDIX K

Pedestrian and Vehicle Clearance Calculations



STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 9/12/2018
 Conducted By: LAS
 Checked By: DAD
 Agency/Company Name: Gilmore & Associates, Inc.

Intersection Description: County Line Road (SR 1001) & Conestoga Road (SR 1019) & Thomas Avenue & Glenbrook Avenue

VEHICLE AND PEDESTRIAN INTERVAL FINDINGS

Vehicle Change and Clearance Interval Findings

Approach Description	Direction	Calculated Yellow Change Interval, Y	User Defined Yellow Change Interval, Y	Calculated All-Red Clearance Interval, AR	User Defined All-Red Clearance Interval, AR	To Be Implemented	
						Y (s)	AR (s)
Conestoga Rd (SR 1019)	SEB	3.3	4	3.3	3	4	3
County Line Rd (SR 1001)	NB	3.8	4	2.6	3	4	3
County Line Rd (SR 1001)	SB	3.4	4	2.6	3	4	3
Thomas Ave	WB	2.7	3	4.7	5	5	3
Glenbrook Ave	NEB	2.9	3	4.1	5	5	3

Additional Comments/Justifications:

Thomas Avenue CCI is 7.4; use Y=5 and AR=3 to meet requirements.

Pedestrian Interval Findings

WITH PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Walk Interval, T _w	User Defined Walk Interval, T _w	Calculated Ped. Change Interval, T _{pc}	User Defined Ped. Change Interval, T _{pc}	Greater than (T _w +T _{pc}) _{min} ?	To Be Implemented	
							T _w (s)	T _{pc} (s)
	Crossing Thomas Ave	7.8	7	9.5	10	Yes	7	10
	Crossing NB County Line Rd	11	7	16	16	Yes	7	16
	Crossing Glenbrook Ave	9.5	7	12.9	13	Yes	7	13
	Crossing Conestoga Rd	10.9	7	15.8	16	Yes	7	16
	Crossing SB County Line Rd	9.5	7	12.9	13	Yes	7	13

WITHOUT PEDESTRIAN SIGNALS	Calculated Min. Green Interval, T _p
Description of Pedestrian Crossing	

Additional Comments/Justifications:

VEHICLE CHANGE AND CLEARANCE INTERVALS

Assumptions and Calibration Inputs

Change and Clearance Intervals (CCI, seconds)

$$CCI = Y + AR$$

Yellow Change Interval (Y, seconds)

$$Y = t + \frac{1.47V}{2a \pm 64.4(g/100)} \quad (\text{typ. 3-6 seconds})$$

- t = Perception-reaction time, s (1 second) ←
- V = Approach speed, MPH
- a = Deceleration rate (10 ft/s²) ←
- g = Grade of approach, %

All-Red Clearance Interval (AR, seconds)

$$AR = \frac{(W + L)}{1.47V}$$

- W = Width of the intersection, ft
(from the stop bar to the end of the farthest traveled lane)
- L = Length of Vehicle (20 ft) ←
- V = Approach speed, MPH

Calculations

Through Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments
Conestoga Rd (SR 1019)	SEB	35	5	145	3.3	3.3	6.6	
County Line Rd (SR 1001)	NB	35	-2.1	112	3.8	2.6	6.4	
County Line Rd (SR 1001)	SB	35	2.7	112	3.4	2.6	6.0	
Thomas Ave	WB	25	2.6	150	2.7	4.7	7.4	
Glenbrook Ave	NEB	25	-0.5	130	2.9	4.1	7.0	
Left-Turn Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments

PEDESTRIAN INTERVALS

Assumptions and Calibration Inputs

Walk Interval¹

(T_w , seconds)

$$T_w = \left(\frac{1}{2} L \right) \div S_w + 3$$

Pedestrian Change Interval

(T_{pc} , seconds)

$$T_{pc} = \frac{L}{S_w}$$

Minimum Duration

(($T_w + T_{pc}$)_{min}, seconds)

$$(T_w + T_{pc})_{min} = \frac{(L + 6)}{3}$$

1) The walk interval should be at least 7 seconds, but where justified, a minimum 4 second interval may be used.

Pedestrian Interval Variables

L = Pedestrian walking distance from the curb or edge of shoulder to the far edge of the traveled way, ft

S_w = Walking Speed, ft/s (3.5 ft/s)

3.5

Minimum Green Interval²

(T_p , seconds)

$$T_p = \frac{L}{S_w} + 3$$

2) Minimum green interval when no pedestrian signals are present or proposed

Calculations

Description of Pedestrian Crossing	Ped Signal	L	T _w	T _{pc}	(T _w +T _{pc}) _{min}		T _p		Comments
Crossing Thomas Ave	Yes	33	7.8	9.5	13.0		N/A		
Crossing NB County Line Rd	Yes	56	11	16	20.7		N/A		
Crossing Glenbrook Ave	Yes	45	9.5	12.9	17.0		N/A		
Crossing Conestoga Rd	Yes	55	10.9	15.8	20.4		N/A		
Crossing SB County Line Rd	Yes	45	9.5	12.9	17.0		N/A		

APPENDIX L

PennDOT Traffic Information Repository Data



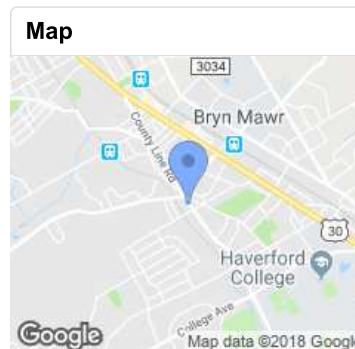


TMS Site 14624: Traffic Monitoring Report

Location Description: Between Landover Rd. and Bryn Mawr Ave.

Details	
Type of Count	MACHINE CLASS
Type of Site	Portable
Schedule	1 TIME/YR
Duration	24 HRS
Frequency Cycle	05
Cycle Year	03

Location	
County	DELAWARE (23)
Route	1001
Segment	0070
Offset	0254
Latitude	40.01676
Longitude	-75.32117



Traffic Data				
Date	Volume	Truck Volume	Truck %	Volume Graph
Nov 09, 2016	20,533	843	4.1	
Oct 27, 2011	21,986			
Oct 12, 2006	23,730			
Sep 03, 1997	29,434			



TMS Site 32949: Traffic Monitoring Report

Location Description: Between Lindsay Ave. and Old Lancaster Rd.

Details		Location		Map
Type of Count	VOLUME	County	DELAWARE (23)	
Type of Site	Portable	Route	1001	
Schedule	1 TIME/YR	Segment	0070	
Duration	24 HRS	Offset	1600	
Frequency Cycle	05	Latitude	40.01996	
Cycle Year	04	Longitude	-75.32364	

Traffic Data				
Date	Primary Volume	Secondary Volume	Volume	Volume Graph
Nov 01, 2017	9,105	10,155	19,260	
Oct 11, 2012	9,371	10,532	19,903	
Apr 11, 2007	9,636	11,106	20,742	
Oct 03, 2002	10,504	9,357	19,861	
Sep 03, 1997	10,234	11,596	21,830	

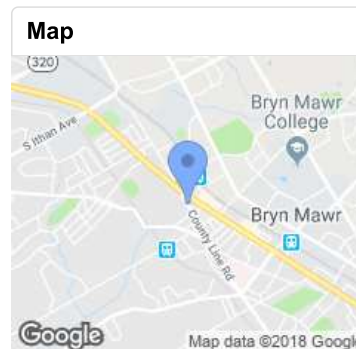


TMS Site 33092: Traffic Monitoring Report

Location Description: Btwn Authur Rd & Montrose Ave.

Details	
Type of Count	MACHINE CLASS
Type of Site	Portable
Schedule	1 TIME/YR
Duration	24 HRS
Frequency Cycle	05
Cycle Year	05

Location	
County	DELAWARE (23)
Route	1001
Segment	0080
Offset	1500
Latitude	40.02533
Longitude	-75.3278



Traffic Data				
Date	Primary Volume	Secondary Volume	Volume	Volume Graph
Nov 20, 2013	7,788	8,242	16,030	
Nov 05, 2008	7,733	7,752	15,485	
Dec 02, 2003	8,327	7,978	16,305	