

**BOARD OF COMMISSIONERS**

**REVISED AGENDA**

**As of May 12, 2018**

**Monday, May 14, 2018 - 6:30 PM**

Pledge of Allegiance

Notice of Executive Session on May 8, 2018 and preceding the Board of Commissioners meeting of May 14, 2018

1. Consent Agenda

- a) Disbursement Review and Approval 2018-04C, 2018-04D, 2018-05A
- b) Approval of the meeting minutes from the April 23, 2018 Board of Commissioner Meeting
- c) Acceptance of Staff Traffic Committee Meeting Minutes of April 18, 2018
- d) Resolution #2018-52 - Award the capital lease financing for one Public Works vehicle previously approved by the Board of Commissioners to Clayton Holdings, LLC at an interest rate of 3.378% for a term of five years
- e) Resolution #2018-50 - Authorizing the Clearance of Surplus Vehicles and Equipment

2. Resolution #2018-51 - Appointing the Superintendent of Police and Fixing the Compensation of the Superintendent
3. Swearing in the Police Superintendent
4. Appointments to Various Boards and Commissions
5. Public Participation - *Individual comment shall be limited to not more than five (5) minutes per Board policy*
6. Committee Reports

**PERSONNEL & ADMINISTRATION**

- A. Discussion regarding proposals received for Solicitor and possible appointment of Solicitor
- B. Discussion and Possible Motion to set the date for Sunshine Act and Open Records Training
- C. Ordinance #2018-05 – (**Adoption**) - Approving a Lease Agreement Between the Township of Radnor and Willows Park Preserve
- D. Discussion of the Cellular Communications Tower located at the Township Building

**PUBLIC WORKS & ENGINEERING**

- E. Motion for approval of grant application for South Wayne Avenue Green Measures (**Requested by Commissioner Clark**)
- F. Ordinance #2018-06 – (**Introduction**) - An Ordinance of Radnor Township, Delaware County, Pennsylvania, Amending Chapter 263, Trees, Section 263-9, Revising and Updating Appendix “A” for the Recommended Tree list for Radnor Township
- G. Ordinance #2018-07 – (**Introduction**) - An Ordinance of the Township of Radnor, Delaware County, Pennsylvania Providing for the Amendment of the Radnor Township Code of Ordinances by Amending Part 2, General Legislation Creating a New Chapter 224, Adopting

Regulations for the Planting, Controlling, and Removal of Bamboo, Including Penalties and other Remedies for Violations

- H. Request for Waiver of Land Development by Ardent Federal Credit Union
- I. Request for waiver of Land Development by First Resource Bank
- J. 145 King of Prussia Road - Penn Medicine – *Caucus* – Final Land Development Plan
- K. Resolution #2018-41 - Authorizing Meliora Design to Perform a Feasibility Study of Green Infrastructure Stormwater Management Projects Upstream of the North Wayne Field Basin
- L. Resolution #2018-40 - Authorizing Meliora Design to Provide Basin Retrofit Evaluations, as Part of the Township’s MS4 Pollution Reduction Plan
- M. 111 Walnut Avenue, GP 18-022, Requesting a Waiver of 245-22 of the Radnor Township Stormwater Management Ordinance
- N. Discussion and possible motion to have SWMAC deliberate modifications to the Banbury/Francis Stormwater Project with input from the neighbors in that area (***Requested by Commissioner Clark***)
- O. Discussion: Wayne Business District Cleaning
- P. Resolution #2018-58 - Rejecting the Sole Sealed Bid for the Wayne Business District Cleaning Contract
- Q. Resolution #2018-55 - Award of the Contract for the Skunk Hollow Bridge Repair
- R. Resolution #2018-56 - Authorizing Meliora Design to Provide Design, and Bidding Documents for the Harford Trail
- S. Resolution #2018-59 - Authorizing Gilmore & Associates to Perform the County Line Corridor Study, in Partnership with Lower Merion Township

***FINANCE & AUDIT***  
***PARKS & RECREATION***  
***COMMUNITY DEVELOPMENT***  
***PUBLIC SAFETY***  
***LIBRARY***  
***PUBLIC HEALTH***

Old Business

- Update on efforts to resolve the leaked document, referred to as Exhibit 6 in the Rice Report (***Requested by Commissioner Abel***)
- ~~Discussion regarding proposals received for Solicitor and scheduling of interviews (requested by Commissioner Borowski)~~

New Business

Public Participation

Adjournment

**RADNOR TOWNSHIP**  
**DISBURSEMENTS SUMMARY**  
**May 14, 2018**

---

The table below summarizes the amount of disbursements made since the last public meeting held on April 23, 2018. As approved by the Board, the Administration is now making weekly accounts payable disbursement batches and publishing those lists on the Township's web site at the following link. Please refer to those files for a detailed listing of the amounts paid by vendor by account code.

Link: <http://radnor.com/728/Disbursements-List>

Fund (Fund Number)	2018-4C April 20, 2018	2018-4D April 27, 2018	2018-5A May 4, 2018	Total
General Fund (01)	\$61,418.40	\$423,166.33	\$465,733.26	\$950,317.99
Sewer Fund (02)	973.53	12,514.84	31,565.34	45,053.71
Storm Sewer Management (04)	0.00	5,993.07	0.00	5,993.07
Capital Improvement Fund (05)	904.40	20,882.26	117,829.65	139,616.31
Police Pension Fund (07)	0.00	0.00	448.00	448.00
OPEB Fund (08)	0.00	130,217.04	0.00	130,217.04
Civilian Pension Fund (11)	0.00	0.00	448.00	448.00
\$8 Million Settlement Fund (18)	0.00	12,961.88	1,721.25	14,683.13
The Willows Fund (23)	0.00	3,506.92	0.00	3,506.92
Library Improvement Fund (500)	674.14	0.00	167,216.15	167,890.29
<b>Total Accounts Payable Disbursements</b>	<b>\$63,970.47</b>	<b>\$609,242.34</b>	<b>\$784,961.65</b>	<b>\$1,458,174.46</b>
<i>Electronic Disbursements</i>	n/a	n/a	n/a	508,000.00
<b>Grand Total</b>	<b>\$63,970.47</b>	<b>609,242.34</b>	<b>784,961.65</b>	<b>\$1,966,174.46</b>

In addition to the accounts payable checks, the Township also has various electronic payments including payroll, debt service, credit card purchases and fees as well as others from time to time. The attached table reflects all of the electronic payments made since the last public Board meeting as well as those anticipated prior to the next Board meeting.

The Administration has adopted various internal control and processing procedures to ensure that amounts obligated are within the budgetary limits established by the Board of Commissioners. Those procedures are monitored on a daily basis by members of the Finance Department and responsible employees of the various departments. The amounts included in the table above have been scrutinized as part of the internal control and processing procedures and have obtained the required approvals prior to disbursement.

If you should have any questions, please contact the Finance Department.

Respectfully Submitted,

  
 \_\_\_\_\_  
 William M. White  
 Finance Director

**ELECTRONICALLY PAID DISBURSEMENT LISTING**

Estimated Through May 21, 2018

Description	Account No.	Date	Purpose	Amount
Credit Card Revenue Fees - Estimated	Various Funds	5/10/2018	4/18 Credit Card Revenue Processing Fees	\$5,000.00 *
Payroll [Bi-Weekly] Transaction - Estimated	01-various	4/17/2018	Salaries and Payroll Taxes - General Fund	\$485,500.00
Payroll [Bi-Weekly] Transaction - Estimated	02-various	4/17/2018	Salaries and Payroll Taxes - Sewer Fund	\$17,500.00
<b>Period Total</b>				<b>\$508,000.00</b>

\* Credit card fees are charged to the Township's accounts on the tenth of the month

<u>Original Estimate</u>			<u>Actual Amount</u>
\$485,500.00	4/19/2018	Salaries and Payroll Taxes - General Fund	\$477,137.94
\$17,500.00	4/19/2018	Salaries and Payroll Taxes - Sewer Fund	\$16,563.86
<b>\$503,000.00</b>			<b>\$493,701.80</b>
\$485,500.00	5/3/2018	Salaries and Payroll Taxes - General Fund	\$435,948.17
\$17,500.00	5/3/2018	Salaries and Payroll Taxes - Sewer Fund	\$15,222.80
<b>\$503,000.00</b>			<b>\$451,170.97</b>
\$191,685.00	5/1/2018	Police Pension Payroll	\$193,157.63
\$138,383.00	5/1/2018	Civilian Pension Payroll	\$141,510.86
<b>\$330,068.00</b>			<b>\$334,668.49</b>

**TOWNSHIP OF RADNOR**  
**Minutes of the Meeting of April 23, 2018**

*The Radnor Township Board of Commissioners met at approximately 6:30 PM in the Radnorshire Room in the Radnor Township Municipal Building, 301 Iven Avenue, Wayne, PA 19087*

**Commissioners Present**

*Lisa Borowski, President      Luke Clark, Vice-President      Jake Abel      Richard Booker*  
*Sean Farhy      Matthew Marshall      John Nagle*

**Also Present:** *Robert A. Zienkowski, Township Manager; John Rice, Township Solicitor; William Colarulo, Superintendent of Police; Christopher B. Flanagan, Deputy Superintendent of Police; William White, Assistant Township Manager and Finance Director; Tammy Cohen, Director of Recreation and Community Programming; Stephen Norcini, P.E., Township Engineer; Steve McNelis, Interim Public Works Director; Shawn Dietrich, Police Lieutenant and Jennifer DeStefano, Executive Assistant to the Township Manager.*

*President Borowski called the meeting to order and led the assembly in the Pledge of Allegiance*

*Notice of Executive Session on April 23, 2018 preceding the Board of Commissioners meeting*

There was an Executive Session on April 23, 2018 where all Commissioners participated and matters of Litigation, Real Estate and Personnel were discussed.

*1. Consent Agenda*

- a) *Disbursement Review and Approval: 2018-04A, 2018-04B*
- b) *Acceptance of Department Monthly Reports*
- c) *Approval of the April 9, 2018 Board of Commissioner meeting minutes*
- d) ~~*Resolution #2018-43 Authorizing the execution of a grant application to the Department of Conservation and Natural Resources (DCNR) for the Radnor Trail Extension Project*~~
- e) *Resolution #2018-44 - Amending the 2018 Wage and Salary Schedule for the Part-Time Recreation Coordinator*
- f) ~~*111 Walnut Avenue, GP 18-022, Requesting a Waiver of 245-22 of the Radnor Township Stormwater Management Ordinance*~~
- g) *Resolution #2018-47 - Purchase and equip new Police Vehicles – 2018 Capital Budget*
- h) ~~*Resolution #2018-48 Authorizing the Purchase of a Comfort Station for Emlen Tunnell Park*~~

Commissioner Marshall requested for item f to be removed; Commissioner Nagle requested for item d to be removed; and Commissioner Farhy requested for item h to be removed.

Commissioner Clark made a motion to approve items a, b, c, e and g, seconded by Commissioner Farhy. Motion passed 7-0.

1. Recognition of Radnor Hotel for their Sponsorship Support of the 7<sup>th</sup> Annual Daddy-Daughter Dance

Tammy Cohen, Director of Recreation and Community Programming presented Radnor Hotel with a plaque to thank them for hosting the 7<sup>th</sup> Annual Daddy-Daughter Dance.

2. Police Commendations/Awards/Unit Citations

Superintendent Colarulo and Deputy Superintendent Flanagan presented members of Radnor Police, Delaware County CID and a resident with Commendation, Awards and Unit Citations.

3. Swearing in of Three (3) Radnor Township Police Officers

Superintendent Colarulo requested everyone to stand for the presentation of colors. The Honorable Ann Osborne administered the Oath to three Police Officers – Joshua McCann, Patrick Jennings and Caitlyn Carmolovich.

d) Resolution #2018-43 - Authorizing the execution of a grant application to the Department of Conservation and Natural Resources (DCNR) for the Radnor Trail Extension Project

Mr. Bob Thomas made a brief presentation regarding the trail extension project.

Commissioner Clark made a motion, seconded by Commissioner Nagle. There was a brief discussion amongst the Commissioners and staff regarding the above resolution. Motion passed 6-1 with Commissioner Booker opposed.

f) 111 Walnut Avenue, GP 18-022, Requesting a Waiver of 245-22 of the Radnor Township Stormwater Management Ordinance

There was a discussion regarding the above waiver and briefly discussed the need for revisions to the stormwater ordinance and would like to see the project above brought to the Commissioners before making a decision.

Commissioner Marshall made a motion to table, seconded by Commissioner Booker.

Public Comment

Leslie Morgan, Farm Road – She commented that maybe certain neighborhoods can't add on to their homes because of the stormwater problems.

Commissioner Borowski called the vote, motion passed 6-1 with Commissioner Nagle opposed.

e) Resolution #2018-48 - Authorizing the Purchase of a Comfort Station for Emlen Tunnell Park

Tammy Cohen, Director of Recreation and Community Programming briefly discussed the proposed project. There was a discussion amongst the Commissioners and Staff.

Commissioner Farhy made a motion to approve, seconded by Commissioner Clark.

Public Comment

Kim Crews-Englehardt, 70 Garrett Avenue – She commented not in favor of the comfort station.

Sara Pilling, Garrett Avenue – She commented against the size and location of the building.

Tom McWilliams, President of Radnor Wayne Little League – He commented on behalf of Radnor Wayne Little League and their support of the project.

Paige, Ward 7 – She is in support of the project.

Commissioner Nagle made a motion to table, seconded by Commissioner Booker. Motion passed 7-0.

4. Public Participation - Individual comment shall be limited to not more than five (5) minutes per Board policy

Michele and Dan Scolnick, Wayne – They announced the Carol H. Axelrod Blood Drive that will occur on May 8, 2018 at the Township Building.

Heather Gill, Wayne – She commented in behalf of the Stormwater Advisory Committee and would like to look to the Commissioners on how to move forward on stormwater projects as well as Banbury Road project.

Commissioner Clark commented that he would like to see the Banbury/Francis Road stormwater project be placed on the May 14<sup>th</sup> meeting agenda as proposed and designed.

Dan Sherry, Wayne – He commented regarding direction the Board gave the Solicitor to write a letter to Mr. McCone and Mr. Bowdre to appear before the Board as well as inquired if they have counsel.

Kelly Martin, Wayne – She commented regarding the appearance of Mr. McCone and Bowdre to appear in front of the Board as well as confidential documents being leaked and the need to determine who leaked them.

Kathy Bogosian – She commented regarding her opposition to the cleaning of just the WBOD area.

Leslie Morgan, Farm Road – She commented regarding the proposed cleaning of downtown Wayne.

5. Committee Reports

**PERSONNEL & ADMINISTRATION**

A. Discussion and Possible motion to reschedule the May 14<sup>th</sup> BOC meeting to May 7<sup>th</sup>

There was a brief discussion to reschedule the meeting to May 7<sup>th</sup> so there was a week in between the two May meetings. It was not a consensus of the Board to reschedule so the meetings in May will remain 14<sup>th</sup> and 21<sup>st</sup>.

B. Discussion regarding the Proposed Willows Lease

Representatives of the Willows Park Preserve briefly presented their plans for the revitalization of the Willows. There was a discussion amongst the Commissioners, Staff and representatives of the Willows Park Preserve. There was discussion amongst the Board of Commissioners inquiring possible Board

appointment of members to the WPP, brief items that need to be worked out on the budget for the Willows. Mr. Rice commented that the ordinance has been advertised once and pulled off the agenda for adoption, and the ordinance will be up for introduction at the next meeting then advertised for adoption at a meeting following introduction.

C. *Discussion of Bid Results & Funding of the Wayne Business District Sidewalk and Street Cleaning Proposal (Requested by Commissioner Marshall)*

Commissioner Marshall briefly spoke about the need to clean up the Wayne Business District. Several members of the Wayne Business District spoke regarding the same. Staff will review the needs for the Wayne Business District along with other business areas in the Township and bring an internal solution back to the Board.

D. *Motion to Approve Ethics Training by Pennsylvania State Ethics Committee be offered to Radnor Township Board of Commissioners, Radnor Township Employees, Members of Radnor Township Boards and Commissions, Interested Members of the Public (Requested by Commissioners Borowski & Clark)*

Commissioner Clark made a motion to approve, seconded by Commissioner Nagle.

Public Comment

Dan Sherry, Wayne – He commented regarding the Ethics Board, as well as inquired about a comment that Commissioner Borowski made referring to an envelope in the mailbox.

Kelly Martin, Ward 7 – She inquired with Commissioner Borowski if it was revealed to her that the envelope was found in the mailbox?

Commissioner Borowski called the vote, motion passed 6-1 with Commissioner Booker opposed.

E. *Resolution #2018-45 - Sunshine Act and Open Records Training (Requested by Commissioner Abel)*

Commissioner Abel made a motion to approve, seconded by Commissioner Booker. There was a brief discussion that the training will be recorded.

Commissioner Borowski called the vote, motion passed 7-0.

F. *Discussion of the Evaluation Process for Solicitations Received for Professional Services: Land Development, Traffic & Transportation, Solicitor, Labor Attorney and Inspections Services*

There was a discussion brief discussion amongst the Commissioners and staff regarding the agenda item. It was agreed that staff will provide an evaluation of the firms and present them to the Board for final approval.



***PARKS & RECREATION***

G. *Discussion: Parks & Rec Board Roles & Responsibilities*

H. *Discussion of Parks & Recreation Board involvement pertaining to the Willows*

There was a discussion amongst the Commissioners of the Roles & Responsibilities of the Parks and Rec Board. It was agreed that they would review the Fee schedules, park projects, Emlen Tunnell improvements, review the Willows and at least see the presentation from the Willows Park Preserve.

Public Comment

Claire Girton, Parks Board member – She commented that the Parks Board would like to be utilized more

I. *Resolution #2018-46 – Radnor Township bans the installation of commercial cell towers on township parkland (Requested by Commissioner Abel)*

Commissioner Abel made a motion to approve, seconded by Commissioner Booker.

There was an in-depth discussion amongst the Commissioners and staff regarding the above proposed resolution.

*Commissioner Clark made a motion to extend the meeting until 11:10, seconded by Commissioner Abel. Motion passed 4-3 with Commissioners Farhy, Booker and Nagle opposed.*

Commissioner Farhy made a motion to table, motion failed for lack of a second.

Public Comment

Jim Kernaghan, Tower Developer – He commented regarding other options available other than cell towers.

*Commissioner Clark made a motion to extend the meeting until 11:20, seconded by Commissioner Borowski. Motion passed 4-2 with Commissioners Farhy and Booker opposed and Commissioner Nagle out of the room.*

Jane Galli – She commented regarding stealth towers and there is more information needed to make a decision.

Kelly Martin, Ward 7 – She thanked Commissioner Abel for bringing the resolution forward.

Dan Sherry, Wayne – He commented regarding his support of the resolution.

Commissioner Borowski called the vote, motion passed 6-1 with Commissioner Nagle opposed.

***PUBLIC WORKS & ENGINEERING***

J. Resolution #2018-40 - Authorizing Meliora Design to Provide Basin Retrofit Evaluations, as Part of the Township's MS4 Pollution Reduction Plan

K. Resolution #2018-41 - Authorizing Meliora Design to Provide a Stormwater Analysis and Green Infrastructure Design for Projects Upstream of the North Wayne Field Basin

L. Ordinance #2018-06 – **(Introduction)** - An Ordinance of Radnor Township, Delaware County, Pennsylvania, Amending Chapter 263, Trees, Section 263-9, Revising and Updating Appendix “A” for the Recommended Tree list for Radnor Township

M. Ordinance #2018-07 – **(Introduction)** - An Ordinance of the Township of Radnor, Delaware County, Pennsylvania Providing for the Amendment of the Radnor Township Code of Ordinances by Amending Part 2, General Legislation Creating a New Chapter 224, Adopting Regulations for the Planting, Controlling, and Removal of Bamboo, Including Penalties and other Remedies for Violations

Commissioner Clark made a motion to table items J, K, L and M until next meeting, seconded by Commissioner Farhy. Motion passed 7-0

**COMMUNITY DEVELOPMENT - None**

**PUBLIC SAFETY - None**

**FINANCE & AUDIT - None**

**LIBRARY - None**

**PUBLIC HEALTH - None**

Old Business

Commissioner Marshall inquired if the Clean-up Day has been posted and if not if it could be. Mr. Zienkowski responded that it is on the website and has been sent to local large businesses as well as institutions.

New Business

Commissioner Abel inquired if at a near future meeting if we can add to the agenda the discussion of hanging wires as well as the poles that are remaining throughout the Township.

Public Participation

Roberta Winters – She commented her support of the training for Sunshine, Open Records and Ethics.

Dan Sherry, Wayne – He commented regarding the list of vacancies and in particular the vacancy on the Ethics Board not being announced.

There was a brief discussion that the Ethics Board discussion of abolishing the board will be discussed at the next meeting.

*There being no further business, the meeting adjourned on a motion duly made and seconded.*

*Respectfully submitted,*

*Jennifer DeStefano*

**RADNOR TOWNSHIP POLICE DEPARTMENT**  
**301 Iven Avenue**  
**Wayne, Pennsylvania 19087-5297**  
**(610) 688-0503 ☎ Fax (610) 688-1238**

**William A. Colarulo**  
**Police Superintendent**

**TO:** Radnor Township Commissioners; Robert A. Zienkowski, Township Manager; William M. White, Director of Finance; Stephen F. Norcini, Township Engineer; Steve McNelis, Co-Interim Public Works Director; Tammy Cohen, Director of Recreation and Community Programming; Kevin W. Kochanski, Director of Community Development; Bill Cassidy, Field Leader; Deputy Chief Chris Flanagan, Officer Alex Janoski; Officer Pat Lacey, Officer Ken Piree, Traffic Safety Unit; William Gallagher, Supervisor of Parking; Amy Kaminski, Traffic Engineer for Gilmore and Associates; Vera DiMaio and Lori DeNicola

**FR:** William A. Colarulo

**RE: STAFF TRAFFIC COMMITTEE MEETING HELD IN THE POLICE ROLL CALL ROOM, WEDNESDAY, APRIL 18, 2018, 10:00 AM.**

**NEW BUSINESS**

1. Hill Top Prep's Annual Thrill on the Hill 5K to be held on May 19th, 2018.

Staff Traffic Committee approves the Hill Top Prep's Thrill on the Hill 5K on May 19, 2018.

2. Folding Stop Signs – During power outages at traffic light controlled intersections

Steve Chanenson has suggested folding stop signs for power outages in the Township. Public Works Field Leader Bill Cassidy states that this request holds many liability issues with the Township. Staff Traffic Committee states that no other complaints regarding this issue has been received by them. The Township already has an emergency plan in effect if street lights go out as a result of a loss of power. The folding stop signs are not required by the MUTD.

3. Parking concerns with Bryn Mawr Trust office building on Pembroke Avenue and surrounding streets

Staff Traffic Committee states the Codes Department met with the Bryn Mawr Trust and determined overflow parking was a temporary issue. Radnor parking authority

has removed the temporary no parking signs and no new complaints have been received.

4. Saint Katherine of Siena School is requesting to hold their annual 5K event on May 12, 2018 from 9am to 10am.

Staff Traffic Committee approves the Annual 5K event on May 12, 2018.

5. Kathy Agnew requests permission to hold the Annual 2018 Porch Fest

The Annual 2018 Porch Fest will take place on Saturday, September 15, 2018 from 11:45am-5pm. Rain date will be Saturday, September 22, 2018. Kathy Agnew requests to extend the Porch Fest to include up to the 400 block of Midland Avenue. She requests barricades, police and police car presence, and citizens police academy members to help assist with traffic. Staff Traffic Committee approves the request and this will go to the Board of Commissioners for final approval.

6. Commissioner John Nagle - Concern for truck traffic and speeding on Moore Avenue

Staff Traffic Committee states data indicates no speed issue on Moore Avenue. Recent truck activity on Moore Avenue was commercial asphalt truck company hired by Radnor Township. Staff Traffic Committee states Highway Patrol will continue to monitor truck traffic. Radnor Township Public Works Department is installing better signage to assist resident concerns.

7. Grace Smith of 250 N Aberdeen Ave requests a handicap parking space.

Ms. Smith sent email to Deputy Superintendent Chris Flanagan requesting handicap space. Highway Patrol Officer Pat Lacey did a site visit at this location. All documents have been obtained. Staff Traffic Committee approves the request for a handicap space in front of 250 N Aberdeen Avenue. Staff Traffic Committee stated that Ms. Smith is aware that this handicap space is available to the public and not primarily for her use. This will go before the Board of Commissioners for final approval.

8. Wheels of Wayne Road Closure – April 29, 2018

Staff Traffic Committee states the Wheels of Wayne road closure granted by PennDot.

9. Petition for Speed Bumps – Midland Avenue

Staff Traffic Committee states that this will be continued and discussed at the next Staff Traffic Committee Meeting of May 16, 2018 so that residents may attend.

### **OLD BUSINESS**

See attached spreadsheet for pending issues



**RADNOR TOWNSHIP POLICE DEPARTMENT**  
301 Iven Ave., Wayne, PA 19087

**April 2018 Staff Traffic Status Report**

Project Name	Project Information	Status Update
Skunk Hollow Pedestrian Improvements	10/18/2016 G&A redesign for pedestrian access on Sawmill Lane to be incorporated into Darby Paoli Multi-use Trail Project	On hold until Park improvements occur. (Possible inclusion in Darby, Paoli, Multi-use trail)
Conestoga/S. Wayne/Brooke crosswalks and sidewalks	12/20/2017 Commissioner Clark is interested in pursuing pedestrian improvements near intersection  12/20/2017 Radnor Fire Company is interested in: <ul style="list-style-type: none"> <li>• Pursuing parking elimination along S. Wayne Avenue</li> <li>• Revising the intersection to reflect the most recent signed signal permit plan</li> <li>• Emergency pre-emption at the Fire Station on S. Wayne Avenue.</li> </ul>	No updates as of April 18, 2018  Continue discussion in 2018; intersection upgrades budgeted for 2018 April 18 <sup>th</sup> RPD – RT Engineer met with state to review options
S. Wayne Avenue	S. Wayne Avenue traffic speed and traffic marker island design	April 18, 2018, PennDot and police met on site to discuss township options to review with Manager
Kinterra Road & Church Rd Sight Distance Evaluation	<ul style="list-style-type: none"> <li>• 10/18/2017 Ms. Lemmon reported a line of sight issue for the intersection.</li> </ul>	Report provided on February 21, 2018 and has not come before Board yet; will follow up with Steve Norcini, Engineer

**Radnor Township Police Staff Traffic Monthly Status Report**

Sugartown Road and Morris Road	Painting of travel lanes to ensure organized travel as drivers approach Lancaster Avenue	PW will contact contractor to see when work can be completed
County Line Corridor Study (from Lancaster Avenue to Conestoga Road)	Staff Traffic Committee & Lower Merion Township discussions to expand study area to County Line Road corridor study	LMT is on board to help with this project; Proceed to move on agenda for BOC possibly in May
King of Prussia Bridge	Strike issues	April 10, 2018, manager held meeting and requested Ordinance be drafted; no one present to move forward
Sprout Road and Conestoga Road Left turn signal improvements	<ul style="list-style-type: none"> <li>RT 2017 Engineering Line Item Budget: \$300,000 to evaluate, design and construct signal improvements to include intersection left turn lanes</li> </ul>	Documents sent on April 17, 2018 to Steve Norcini, Engineer; Steve to assign Milars; bid packet ready for advertisement; Construction to begin this summer
N. Wayne Ave/Poplar Ave/West Avenue Pedestrian Improvement Signal project	<ul style="list-style-type: none"> <li>DCED MTF grant awarded; construct signal and pedestrian improvements at intersection</li> </ul>	In PennDot's hands; hoping for approval in a month
King of Prussia Rd & Eagle Rd intersection improvements	Submit joint application for DCED MTF grant with Cabrini & Eastern for left turn lanes on King of Prussia Road at Eagle Road/Pine Tree Rd	Grant submitted March 30, 2018
Eagle Rd & North Wayne Pedestrian Improvements DCED MTF	Prepare DCED MTF grant for sidewalk, signal and curb ramp improvements; grant submission due late July, 2017	Grant awarded, need follow up with Steve Norcini, Enggear.

**RESOLUTION NO. 2018-52**

**A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, APPROVING THE FIVE-YEAR CAPITAL LEASE AGREEMENT WITH CLAYTON HOLDINGS, LLC FOR THE FINANCING OF THE PURCHASED REFUSE TRUCK WITH PLOW**

*WHEREAS*, the Five Year Capital Program, incorporated into the 2018 Budget, included appropriations for the replacement of one (1) Public Works Sanitation “Refuse Truck” with the purchased 2019 7400 SBA 6x4 International Truck Chassis, Leach 25 Yard Refuse Body, and Good Roads Model 120M Snow Plow together the Public Works Sanitation “Refuse Truck with Plow”; and

*WHEREAS*, the Five Year Capital Program projected financing the replacement vehicle through a five year capital lease at the conclusion of which, the ownership of the vehicle will become the Township’s; and

*WHEREAS*, the Board of Commissioners authorized the purchase of the vehicle referenced herein at the February 12, 2018 via Resolution 2018-17; and

*NOW, THEREFORE*, be it hereby *RESOLVED* that the Radnor Township Board of Commissioners does hereby authorize the Township to enter into a five-year capital lease agreement with Clayton Holdings, LLC at an interest rate of 3.378% APY which results in an annual payment of approximately \$42,397.03, with the first lease payment due on or about January 31, 2019 and annually thereafter until the conclusion of the lease period, at which time the Township will own the equipment outright.

*SO RESOLVED* this 14<sup>th</sup> day of May, 2018.

RADNOR TOWNSHIP

By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

ATTEST: \_\_\_\_\_  
Robert A. Zienkowski  
Township Manager / Secretary

# Radnor Township



## PROPOSED LEGISLATION

**DATE:** May 4, 2018

**TO:** Board of Commissioners

**FROM:** William M. White, Director of Finance

A handwritten signature in black ink, appearing to read "W. White".

**LEGISLATION:** Resolution 2018-52, authorizing the financing of one Public Works vehicle:

- One (1) Public Works Sanitation "Refuse Truck with Plow"

### LEGISLATIVE HISTORY:

- (1) The Board of Commissioners authorized the purchase of this vehicle on February 12, 2018, Resolution 2018-17.
- (2) The Five Year Capital Program, incorporated into the 2018 Budget, included capital leases for this one public works vehicle ("Sanitation Packer"). The lease terms projected a five year payment period with a purchase option of \$1 at the end of the financing.

**PURPOSE AND EXPLANATION:** The purpose of this request is to allow the Administration to finance the one replacement Public Works vehicle approved earlier this year: (1) Public Works Sanitation "Refuse Truck with Plow" purchased under PA CoStars contracts with financing of a five year capital lease provided by Clayton Holdings, LLC.

The one Public Works vehicle will be purchase from the following vendors in accordance with the several PA Costars contracts and Resolutions 2018-17:

Refuse Truck with Plow			
Description	Vendor	Costars Contract	Price
2019 International Model 7400 SBA 6x4 cab and chassis	G. L. Sayre, Inc.	25-017	\$93,989.62
Leach 25 Yard Refuse Body	GranTurk Equipment Co., Inc.	25-046	\$87,450.44
Good Roads Model 120M Plow	H.A DeHart & Son	25-052	\$12,370.00
<b>Subtotal (for Refuse Truck with Plow)</b>			<b>\$193,810.06</b>
<b>Grand Total</b>			<b><u>\$193,810.06</u></b>



On May 3, 2018, the Administration received the following proposals from four (4) firms for a five year lease term with a purchase option of \$1 at the end of the financing. Please note that figures below are for *ONE* vehicle:

Firm	5 Year	Annual Payment	Total 5 Year
		(5 Years)	
Clayton Holdings, LLC	3.378%	\$42,397.03	\$ 211,985.15
Santander Bank	3.530%	42,534.55	\$ 212,672.75
TD Equipment Finance	3.507%	Not Provided in Proposal	Not Provided in Proposal
Trimarc Financial, Inc.	4.460%	\$ 42,854.34	\$214,271.70

**IMPLEMENTATION SCHEDULE:** With the Boards authorization, Township Administration will accept Clayton Holdings, LLC's five year lease proposal. The estimated delivery date of the one vehicle is November 2018. The first lease payment will be due on January 31, 2019 and annually thereafter for five years.

**FISCAL IMPACT:** The fiscal impact will be an annual obligation of \$42,397.03 to be paid from the Township's Capital Fund (#05) for years 2019 – 2023. The interest expense during the financing period (five years) is \$18,175.09. At the conclusion of the lease term, five years, ownership of the vehicle will be the Township's. If at any point during the lease term, the Board of Commissioners does not appropriate for that particular year's lease payment obligation, the lease contract will be voided with the equipment being forfeited to the financial institution (Non-appropriation Clause).

The Five Year Capital program estimated the aggregate payment for the one vehicle to be \$40,300.00 per year over the five-year term. The actual payments will be \$42,397.03.

Other financing options were considered during the analysis including:

Alternatives	Notes vs. Capital Lease
Operating Lease	More expensive and no ownership at the end of the term
Cash Purchase	Less expensive, but would require more cash than the capital fund has allotted to it for 2018

**RECOMMENDED ACTION:** The Administration respectfully recommends that the Board authorize the Township to accept Clayton Holdings, LLC's proposal to provide five-year capital lease financing for the purchase of the one Public Works vehicle.

**RESOLUTION NO. 2018-50**

**A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY,  
PENNSYLVANIA, AUTHORIZING THE CLEARANCE OF SURPLUS  
VEHICLES AND EQUIPMENT**

*WHEREAS*, the Public Works Department annually clears the fleet of vehicles and equipment that are being replaced through the capital equipment program

*WHEREAS*, the Public Works Department wishes to trade-in the vehicles and equipment outlined below:

Unit #77 – 2004 Chevrolet Pick-up, Vin #1GCHK24U54E312927, Trade-In Value \$4500

Unit #97 – 2001 Jeep Cherokee, Vin #1J4FF48S21L606609, Trade-In Value \$1500

Unit #48 – 1994 Chevrolet Utility Truck, Vin #1GBKC34FARJ109573, Trade-In Value \$1500

Unit #NH-1 – 2001 New Holland Tractor, Vin #1240058, Trade-In Value \$3000

*NOW, THEREFORE*, be it *RESOLVED* the Board of Commissioners of Radnor Township does hereby authorize the clearance of surplus vehicles and equipment, as outlined above

*SO RESOLVED* this 14th day of May, A.D., 2018

**RADNOR TOWNSHIP**

By: \_\_\_\_\_

Name: Lisa Borowski

Title: President

ATTEST: \_\_\_\_\_

Robert A. Zienkowski

Manager/Secretary

**Radnor Township**  
**PROPOSED LEGISLATION**

DATE: May 14, 2018

TO: Radnor Township Board of Commissioners

CC: Robert A. Zienkowski, Township Manager  
William R. White, Assistant Township Manager & Finance Director

FROM: Stephen McNelis, Interim Director of Public Works

LEGISLATION: Resolution 2018-50: Authorizing the Clearance of Surplus Vehicles and Equipment

---

LEGISLATIVE HISTORY: The Public Works Department annually clears the fleet of vehicles and equipment that are being replaced through the capital equipment program.

PURPOSE AND EXPLANATION: The Public Works Department is requesting to trade-in the vehicles and equipment outlined below.

<u>VEHICLE/EQUIPMENT</u>	<u>VIN#</u>	<u>TRADE-IN VALUE</u>
2004 Chevrolet Pick-Up	1GCHK24U54E312927	\$4500
2001 Jeep Cherokee	1J4FF48S21L606609	\$1500
1994 Chevrolet Utility	1GBKC34FARJ109573	\$1500
2001 New Holland Tractor	1240058	\$3000

IMPLEMENTATION SCHEDULE: The vehicles will be traded in during the capital vehicle acquisition process.

FISCAL IMPACT: The trade-in value will reduce the outlay of Capital funds on replacement vehicles.

RECOMMENDED ACTION: I respectfully request the Board of Commissioners to approve Resolution 2018 - 50: Clearance of Surplus Township Vehicles and Equipment.

MOVEMENT OF LEGISLATION: It is being requested that the Board of Commissioners approve the legislation for this project.

**RESOLUTION NO. 2018-51**  
**RESOLUTION OF THE BOARD OF COMMISSIONERS OF THE TOWNSHIP OF**  
**RADNOR, DELAWARE COUNTY, PENNSYLVANIA, APPOINTING A**  
**SUPERINTENDENT OF POLICE AND FIXING THE COMPENSATION OF THE**  
**SUPERINTENDENT PURSUANT TO ARTICLE VI, SECTION 6.03, OF THE HOME**  
**RULE CHARTER OF RADNOR TOWNSHIP**

*WHEREAS*, Article VI, Section 6.03, of the Home Rule Charter of Radnor Township, authorizes the appointment of department heads and administrative officers for Radnor Township, including the Superintendent of Police (“Superintendent”), by a majority vote of the total membership of the Board of Commissioners (“Board”) upon appointment by the Township Manager; and

*WHEREAS*, there will be a vacancy in the office of Superintendent of Police on May 25, 2018 and the Board of Commissioners has determined to fill the position of Superintendent; and

*WHEREAS*, the Board of Commissioners has performed a search for a Superintendent to fill the position meeting the qualifications for the Superintendent of Police; and

*WHEREAS*, the Radnor Township Board of Commissioners, upon recommendation of the Township Manager, has selected a qualified applicant to fill the office of Superintendent of Police for Radnor Township.

*NOW, THEREFORE*, be it hereby *RESOLVED*, that the Board of Commissioners does hereby select and appoint Christopher Flanagan to the office of Superintendent of Police effective May 26, 2018, in accordance with the Home Rule Charter and the Radnor Township Administrative Code, and the Board of Commissioners does further approve and adopt the Memorandum of Understanding between Radnor Township and Christopher Flanagan attached hereto and incorporated herein as **Exhibit “A.”**

*SO RESOLVED*, at a duly convened meeting of the Board of Commissioners this 14th day of May, 2018.

RADNOR TOWNSHIP  
BOARD OF COMMISSIONERS

By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

Attest: \_\_\_\_\_  
Name: Robert Zienkowski  
Title: Township Secretary

## MEMORANDUM OF UNDERSTANDING

THIS MEMORANDUM OF UNDERSTANDING is made by and between RADNOR TOWNSHIP, Pennsylvania ("Township") and Christopher Flanagan ("Superintendent Flanagan"). The Township and Superintendent Flanagan understand the terms of his employment as follows:

1. Duties and Responsibilities. Superintendent Flanagan shall be employed as the Township's Superintendent of Police effective May 26, 2018. He shall report to the Township Manager. Superintendent Flanagan shall devote his full professional time and efforts to the interests of the Township and the Township's Police Department, and shall perform all duties and responsibilities which may reasonably be assigned to him from time to time by the Township. His normal duty hours will generally be 8:30 A.M. through 4:30 P.M., Monday through Friday, but he shall be expected to perform his duties as needed for police or Township business and other assignments.

2. Compensation and Expenses.

(a) Salary. The Township shall pay Superintendent Flanagan a salary payable in accordance with the normal payroll procedures applicable to management employees of the Township. Superintendent Flanagan's salary shall be as follows:

\$159,000.00 for the first six (6) months or until November 26, 2018;

\$163,000.00 for the next six (6) months or until May 26, 2019;

\$167,000.00 after one (1) year or as of May 26, 2019.

Thereafter, Superintendent Flanagan shall be afforded an annual salary increase, which will be based on performance at the discretion of the Township Manager and approved by the Board of Commissioners, not less than the annual salary increase set forth in the collective bargaining agreement between the Township and Delaware County Lodge No. 27, Fraternal Order of Police for bargaining unit members. Attached to this Agreement is a copy of the Performance Evaluation Form.

(b) Car Allowance. During the term of his employment, Superintendent Flanagan shall be provided with a Township vehicle for his professional use which shall be maintained and insured by the Township. Use of the vehicle outside a fifty (50) mile radius of the Township shall require prior approval of the Township Manager.

(c) Professional Expenses. Subject to the prior approval of the Township Manager, Superintendent Flanagan shall be reimbursed for dues for membership in professional law enforcement organizations and for reasonable expenses incurred in attending professional conferences.

3. Vacation and Personal Days. Superintendent Flanagan shall be entitled to four (4) weeks of paid vacation and five (5) personal days for each calendar year. Except in the event of termination for cause or failure to provide notice under Paragraph 14. below, upon separation from employment, Superintendent Flanagan shall be paid for vacation days accrued but unused for the calendar year in which he separates from employment in addition to the provisions set forth in Paragraph 8. No carryover of vacation or personal days will be permitted.

4. Holidays. Superintendent Flanagan shall receive nine (9) paid holidays to be taken when the Township is ordinarily closed. Due to the nature of the Superintendent's

responsibilities, Superintendent Flanagan acknowledges that he may be required to work without additional compensation on a day the Township is closed for business.

5. Sick Days. Superintendent Flanagan shall be entitled to carryover his prior accrued, but unused sick time to be banked and available for his use or selling back at-retirement in the same manner as officers in the bargaining unit consistent with Paragraph 8 below. The carryover time will be frozen at the hourly rate effective on the day prior to the Effective Date and will be paid out at that frozen rate upon retirement. After his promotion, Superintendent Flanagan shall earn twenty (20) sick days each calendar year to a maximum accumulation of forty (40) days of post-promotion sick leave. At the time of separation for any reason, there will be no pay out of accrued unused post-promotion sick time.

6. Prior Accumulated Leave Time. All leave time accrued prior to the Effective Date of this Agreement will be frozen at the hourly rate in effect on the day prior to the Effective Date and paid to Superintendent Flanagan in a lump sum payment at the time of his separation from employment with the Township and included in his pension benefit calculation, in the same manner as police officers in the bargaining unit. The amount and value of such time is set forth in the chart which is attached as Exhibit A to this MOU.

7. Extra Duty Details. Superintendent Flanagan shall be eligible to work an extra duty detail in instances where such extra duty detail has not been fully staffed by other Township police officers.

8. Flex Time. Superintendent Flanagan shall be eligible to participate in the Township's Flex Time policy and program, copy of which is attached as Exhibit B to this MOU.

9. Health and Welfare Benefits. Superintendent Flanagan shall continue to participate in the Township's medical, disability, and life insurance programs on the same basis as the police officers in the Township Police Department, subject to the terms and conditions of those programs as they may be changed from time to time in the CBA.

10. Life Insurance. The Township shall provide Superintendent Flanagan with a life insurance policy in the amount of One Hundred and Fifty Thousand Dollars (\$150,000) for the duration of this Agreement.

11. Pension. Superintendent Flanagan shall continue to participate in the Township's Act 600 Police Pension Plan as it may be changed from time-to-time, and shall be entitled to such pension, retirement and post-retirement benefits to which he has become vested and/or entitled pursuant to the terms of the CBA applicable to the police officers in the Township Police Department bargaining unit, including retiree healthcare, and retiree life insurance.

12. Duration. Unless otherwise agreed to in writing by the Township or Superintendent Flanagan, the terms and conditions of this Agreement shall take effect May 26, 2018 and shall continue for a six (6) year period through May 26, 2024, unless modified in writing by mutual agreement of the parties. This Agreement may be terminated by either party with four (4) weeks prior written notice.

13. Suspension and/or Removal. Superintendent Flanagan will be appointed as Superintendent of Police as of May 26, 2018 by the Township's Board of Commissioners and was not selected through any civil service procedure. At any time, Superintendent Flanagan may be returned to his prior civil service rank of Deputy Superintendent with or without cause.



However, Superintendent Flanagan may be suspended and/or removed only for one or more of the following reasons:

- (a) Physical or mental disability affecting his ability to discharge his duties, in which he shall receive an honorable discharge from service.
- (b) Neglect or violation of any official duty.
- (c) Violation of any law of the Commonwealth which provides that such violation constitutes a misdemeanor or felony.
- (d) Inefficiency, neglect, intemperance, disobedience of orders or conduct unbecoming an officer.
- (e) Intoxication while on duty.
- (f) Engaging or participating in the conduct of any political or election campaign otherwise than to exercise his own right of suffrage, while on duty, or in uniform or while using Township property.

Suspension or termination procedures shall be conducted in accordance with the Township's Civil Service rules.

Notwithstanding the foregoing, Superintendent Flanagan retains his civil service rights in and to the position of Deputy Superintendent.

14. "Heart and Lung Act" Disputes. If any dispute arises between Superintendent Flanagan and the Township relating to Superintendent Flanagan's entitlement to benefits under



the Pennsylvania Heart and Lung Act, the duration of those benefits, and/or Superintendent Flanagan's Heart and Lung Act disability status, such dispute(s) shall be resolved pursuant to the procedures set forth in the Pennsylvania Workers' Compensation Act.

15. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

16. Governing Law. This Agreement shall be governed by, and constructed and interpreted in accordance with the laws of the Commonwealth of Pennsylvania. In the event any provision of this Agreement is deemed invalid or unenforceable, it shall not affect the validity or enforceability of any other provision of this Agreement, which shall remain in full force and effect.

*[Intentionally Blank]*

17. Entire Agreement. This Agreement contains the entire agreement between the Township and Superintendent Flanagan with respect to the terms and conditions of Superintendent Flanagan's employment and supersedes all previous agreements, whether written or oral, with respect to his employment as the Superintendent of Police. This Agreement may not be changed or modified except in writing and signed by both parties and approved by the Board of Commissioners.

RADNOR TOWNSHIP

---

By : Lisa Borowski  
Title: President, Board of Commissioners

---

By: Robert A. Zienkowski  
Title: Township Manager/Secretary



---

By: Christopher Flanagan  
Title: Superintendent of Police

# Swearing in the Police Superintendent

# Appointments to Various Boards and Commissions

Public Participation -  
*Individual comment shall be  
limited to not more than five (5)  
minutes per Board policy*

Discussion and Possible  
Motion to set the date for  
Sunshine Act and Open  
Records Training

May 29, 2018

May 31, 2018

June 5, 2018

June 7, 2018

**ORDINANCE NO. 2018-05**

**AN ORDINANCE OF RADNOR TOWNSHIP, DELAWARE COUNTY,  
PENNSYLVANIA, APPROVING A LEASE AGREEMENT BETWEEN THE  
TOWNSHIP OF RADNOR AND WILLOWS PARK PRESERVE**

*WHEREAS*, Radnor Township and Willows Park Preserve have negotiated and agreed upon a 20 year lease of the Willows Mansion building at 490 Darby-Paoli Road in the Township; and

*WHEREAS* § 3.01 of the Radnor Township Home Rule Charter permits the lease of real property by the Township for a term in excess of three years by ordinance.

*NOW, THEREFORE*, be it hereby *ENACTED* and *ORDAINED* that the Radnor Township Board of Commissioners hereby approves the Lease Agreement with Willows Park Preserve, a copy of which is attached hereto and incorporated herein as Exhibit "A".

*ENACTED AND ORDAINED* this \_\_\_\_\_ day of \_\_\_\_\_, 2018.

RADNOR TOWNSHIP

By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

ATTEST: \_\_\_\_\_  
Robert A. Zienkowski, Secretary



**LEASE AGREEMENT**

**BETWEEN**

**RADNOR TOWNSHIP**

**AND**

**WILLOWS PARK PRESERVE**



## LEASE AGREEMENT

**THIS LEASE AGREEMENT** made this \_\_\_\_\_ day of \_\_\_\_\_, 2018 by and between **RADNOR TOWNSHIP**, a municipal subdivision of the Commonwealth of Pennsylvania (hereinafter called "**Township**"), and **WILLOWS PARK PRESERVE** a Pennsylvania nonprofit corporation (hereinafter called "**WPP**").

### 1. DEFINED TERMS.

(a) "**Leased Premises**": shall mean the Willows Mansion building and patio, the rose garland garden, the fountain wall plaza and the wishing well courtyard more particularly described on the map attached hereto as Exhibit "A", located at 490 Darby-Paoli Road, Radnor Township, Pennsylvania, and known collectively hereinafter as "the Mansion".

(b) "**Park**": shall mean Willows Park a public park owned by the Township. The Leased Premises is located in the Park.

(c) "**Term**":

- (i) The Term of this Lease shall commence upon completion of all contingencies as set forth in paragraphs 1 and 2 of the Addendum ("Commencement Date") and shall expire 10 years from the date when a certificate of occupancy is issued for the Mansion after the construction is completed. Upon completion of all contingencies, the parties shall confirm in writing the Commencement Date.
- (ii) Upon completion of the initial 10 year Term, the Lease shall automatically renew for additional periods of 1 year each (each a "Renewal Term") unless either party gives notice to the other in writing at least six (6) months prior to the last day of any Renewal Term.
- (iii) Upon the execution of this Lease, WPP shall have early access to the Leased Premises and the Park in furtherance of the Permitted Uses.

2. **LEASED PREMISES.** Township, subject to the provisions and conditions hereof, leases to WPP and WPP accepts from Township, the Leased Premises. WPP shall not use or occupy, or permit or suffer to be used or occupied, the Leased Premises or any part thereof, other than for the Permitted Uses, as described below. WPP shall have a right of first offer with regard to any improvements to or use of the cottage located in the Park by a third party. This right will not apply to Township proposed improvements or uses.

3. **LEASE PURPOSE.** To restore the Mansion, and to maintain and operate programs from the Leased Premises, thereby alleviating the Township's burden of preserving the Leased Premises, to seek Arboretum status in the Park, and furthermore to provide innovative programs for all age groups and to make the Leased Premises available for community and fundraising events to support the preservation of the Leased Premises as a historic, community resource.

**4. PERMITTED USES.** WPP is a non-profit organization providing cultural, educational, recreational, historical, and community programs to the public. WPP shall be entitled to use the Leased Premises as its office and to conduct programs, classes and events in the Leased Premises in furtherance of the restoration and maintenance of the Mansion. WPP may make the Leased Premises available to other persons, groups and organizations for cultural, educational, recreational, historical or charitable events. WPP may use the Park for arboretum purposes, provided any such plan is approved by the Board of Commissioners. WPP shall procure and thereafter maintain any license or permit required for the proper and lawful conduct of WPP's business or other activity carried on in the Leased Premises. Subject to the approval of the Board of Commissioners, WPP may expand its holistic approach to other areas of the Park.

**5. USE OF PARK.** WPP shall have the non-exclusive use of the Park to seek an Arboretum status. WPP shall have the non-exclusive use of the parking areas in the Park, for the purpose of parking vehicles of WPP and its guests. WPP shall at all times have the right of access, ingress and egress to and from the Leased Premises by the roads, driveways and walkways existing in the Park, for itself and its guests, subject to such reasonable public safety restrictions as may be imposed by Township. WPP shall be entitled to post signs in front of the Leased Premises, in the adjacent parking area, and at other permissible locations, provided that the signs are pre-approved by the Township. WPP may use the grounds near the Leased Premises for its Permitted Use activities. WPP shall have use of the parking lot adjacent to the Leased Premises.

**6. RENT.** The Rent for the Term shall be One Dollar (\$1.00) per year, payable 10 years in advance, upon commencement of this Lease.

**7. UTILITIES AND SERVICES.** After the date when the certificate of occupancy is issued and subject to the WPP being Self-Sustaining (as that term is defined in Section 7 of the attached Addendum), WPP will be responsible, at its sole cost and expense, to pay for (a) all utilities (including, electricity, gas, water, and sewer,) that are furnished to or consumed within the Leased Premises. WPP shall be responsible for telephone, cable, and internet services.

**8. WPP RESPONSIBILITIES.**

(a) **MAINTENANCE/REPAIR.** WPP and the Township shall cooperate in maintaining and keeping the Leased Premises in good order and repair, for its intended use as a community resource once the construction and renovation has occurred as described in paragraph nine. If Township determines that maintenance and/or repairs are necessary to keep the Leased Premises in good order and repair, it shall be Township's obligation to perform such additional maintenance and repairs. All work performed by WPP or Township shall be done in a good and workmanlike manner in accordance with all applicable laws and ordinances.

(b) **ALTERATIONS/ADDITIONS.** WPP shall not make any alterations or additions to the Leased Premises without the prior written approval of Township, except for minor maintenance and repair work. All alterations or additions performed by WPP shall be done in a good and workmanlike manner in accordance with all applicable laws and township ordinances. Upon expiration or earlier termination of this Lease, all such alterations or additions

shall remain at the Leased Premises and shall become the property of Township without payment by Township.

(c) Any proposed resident caretaker shall be subject to a separate agreement between WPP and the Township.

(d) WPP shall comply at all times with any and all Federal, State and Township statutes, regulations, ordinances, or other requirements, including any insurers insuring the building relating to WPP's use, occupancy or alteration of the Leased Premises.

## **9. TOWNSHIP RESPONSIBILITIES.**

(a) Prior to the commencement and use of the Leased Premises by WPP, the Township shall initiate the bidding and construction process to implement improvements to the Mansion consistent with the goals of the WPP. The Township has budgeted \$1,816,660 in funding to make improvements to the Leased Premises and WPP has secured \$1,000,000 in donor funding pursuant to a Charitable Gift Agreement with Addendums. Attached hereto as **Exhibit "B"** is the Township's 2018 budget and attached as **Exhibit "C"** is the Charitable Gift Agreement with Addendum #1 and Addendum #2.

(b) Subject to the public bidding process, WPP shall have the right to review and provide input on the selection of the architect, designer, and contractor for the improvements and may attend all construction meetings. The Township will contract and pay all architects and construction vendors in accordance with public bidding requirements and township procedures. The Township shall be responsible for all aspects of constructing and paying for the improvements provided the improvements and costs are within budgeted funds. Budgeted funds include both the Township funds of \$1.8 million and Donor funds of \$1 million. WPP shall have no liability for or responsibility to complete the improvements.

(c) Township shall provide or cause to be provided the following services throughout the Term: (i) maintain the road, driveway, paths and parking areas in the Park in good condition and repair, and keep such areas free and clear of ice and snow; (ii) maintain all sewer and other utility lines; (iii) provide trash and recyclables removal from the Leased Premises in accordance with Township's general trash and recyclables removal policies; (iv) provide cleaning services, except for any WPP private events; (v) mow the grass, remove leaves and maintain the landscaping around the Leased Premises; (vi) provide building maintenance, repairs and replacements necessary for the intended uses, including, but not limited to HVAC services, roof, foundation, elevator, pest control and gutter cleaning; and (vii) provide all commercially reasonable fire protection and fire alerts and inspections and security alarm services.

**10. SUBLETTING AND ASSIGNING.** WPP shall not assign this Lease or sublet all or any portion of the Leased Premises without first obtaining Township's prior written consent, which shall not be unreasonably withheld, provided that any tenant/caretaker premises shall be code compliant.

## **11. TOWNSHIP'S INSURANCE.**

(a) Township shall carry all risk property insurance, premises liability insurance and any other insurance deemed appropriate by Township covering fire and extended coverage, vandalism and malicious mischief, and all other perils of direct physical loss or damage insuring the improvements and betterments located at the Leased Premises for one hundred percent (100%) of the replacement value thereof, together with all other coverages deemed appropriate by Township.

(b) If the Leased Premises is destroyed by fire or other casualty that, in Township's reasonable judgment requires substantial alteration or reconstruction of the building, or if the Leased Premises has been substantially damaged, and insurance proceeds are insufficient to repair the damage, Township may, at its option, terminate this Lease by notifying WPP in writing of such termination within sixty (60) days after the date of such casualty. Such termination shall be effective as of the date of fire or casualty with respect to any portion of the Leased Premises that was rendered to WPP and secondly, as of the effective date of termination specified in Township's notice with respect to any portion of the Leased Premises that remains WPP. If this Lease is not so terminated by Township, Township shall proceed with reasonable diligence to restore the Leased Premises.

**12. WPP INSURANCE.** WPP shall purchase and maintain throughout the term of this lease its own general liability and renters insurance, including other required insurance for its volunteers and employees. WPP insurance may be in the form of a rider to the Township's insurance policies if approved by the Township.

**13. INSOLVENCY.** Each of the following shall constitute a breach of this Lease by WPP: (a) The appointment of a receiver or trustee to take possession of all or a portion of the assets of WPP, or (b) an assignment by WPP for the benefit of creditors, or (c) the institution by or against WPP of any proceedings for bankruptcy or reorganization under any State or Federal law (unless in the case of involuntary proceedings, the same shall be dismissed within forty-five (45) days after institution), or (d) any execution issued against WPP which is not stayed or discharged within fifteen (15) days after issuance of any execution sale of the assets of WPP.

## **14. DEFAULT.**

(a) If (i) WPP sublets the Leased Premises or assigns this Lease in violation of the provisions of Section 10 hereof; or (ii) WPP fails to maintain the insurance required pursuant to Section 14 hereof; or (iii) WPP fails to perform or observe any of the other covenants, terms or conditions contained in this Lease and such failure continues for more than 30 days after written notice thereof from Township (or such longer period as is reasonably required to correct any such default, provided WPP promptly commences and diligently continues to effectuate a cure, but in any event within sixty (60) days after written notice thereof by Township); then and in any of said cases (notwithstanding any former breach of covenant or waiver thereof in a former instance), Township, in addition to all other rights and remedies available to it by law or equity or by any other provisions hereof, may at any time thereafter terminate this Lease upon written notice to WPP and, on the date specified in said notice, this Lease and the term hereby leased and all rights of WPP hereunder shall expire and terminate and WPP shall thereupon quit and surrender possession of the Leased Premises to Township in the

condition elsewhere herein required.

(b) Township acknowledges that WPP shall provide \$1,000,000 for improvements to the Leased Premises; and therefore, notwithstanding anything to the contrary herein, Township agrees that prior to initiating a default notice under this Section, Township and WPP shall negotiate in good faith for a period of 30 days after receipt of notice of a dispute from the other to resolve any issues or potential defaults before claiming a default under this Section.

(c) No waiver of any provision of this Lease shall be implied by any failure of Township to enforce any remedy allowed for the violation of such provision, even if such violation is continued or repeated, and no express waiver shall affect any provision other than the one(s) specified in such waiver and only for the time and in the manner specifically stated.

**15. WAIVER OF SUBROGATION.** WPP hereby waives any rights it may have against the Township on account of any loss or damage occasioned to WPP in or about the Leased Premises or its contents, arising from any risk covered by fire and extended coverage insurance. The parties hereto each, on behalf of their respective insurance companies insuring the property of the parties hereto against such loss, waives any right of subrogation that such insurers may have against the parties hereto.

**16. MUTUAL RELEASE.**

(a) WPP and its employees, officials, volunteers and agents shall be solely responsible for any loss or damage to the Leased Premises or the property of WPP or its invitees, employees, officials, volunteers, agents and representatives while such property is on the Leased Premises.

(b) Subject to the limits of WPP's liability insurance, WPP agrees to defend, indemnify and hold harmless Township from any suits, claims, damages and payment of monies, including any reasonable legal fees and costs arising from the gross negligence or willful misconduct of WPP in performing its obligations under the terms of this Lease.

(c) Only to the extent that the Township may otherwise be held directly liable under applicable law, including, but not limited to, 42 Pa.C.S.A. 8542, *et seq.*, (Pennsylvania Political Subdivision Tort Claim Act), Township hereby agrees to defend, indemnify and hold harmless WPP from any suits, claims, damages and payment of monies, including any reasonable legal fees and costs arising from the gross negligence or willful misconduct of Township relating to the performance of this Lease.

**17. ACCESS.** Township shall have the right to enter the Leased Premises at all times to inspect the Leased Premises, provided that Township shall avoid interference with the conduct of WPP's operations during leased events.

**18. EXPIRATION OR EARLIER TERMINATION; HOLDING-OVER.** WPP, upon sixty (60) days prior written notice to Township, may terminate this Lease at any time. Upon or prior to the expiration or earlier termination of this Lease, WPP shall vacate the Leased Premises and remove all possessions, leaving the Leased Premises in broom-clean condition.

19. **QUIET ENJOYMENT.** Township covenants and agrees that WPP, so long as it shall not be in material default hereunder, shall and may, at all times during the Term, peaceably and quietly have, hold, occupy and enjoy the Leased Premises pursuant to the terms of this Lease.

20. **WAIVER OF LIENS.** WPP agrees that in the event that the Township gives written approval and permits any alterations or repairs to be made to the Leased Premises, that before any work is started or performed, a waiver of liens shall be prepared by the Township and signed by the contractor and/or materialmen and the Township. Said waiver of liens shall be filed of record in accordance with the Mechanic's Lien Laws of the Commonwealth of Pennsylvania. The parties hereto agree that a waiver of liens will only be required where the improvements or repairs are in excess of Five Thousand Dollars (\$5,000).

21. **NOTICES.** All notices required to be given hereunder shall be sent by registered or certified mail, return receipt requested, by Federal Express or other overnight express delivery service, or by hand delivery against written receipt or signed proof of delivery, to the respective Notice Addresses set forth below, and to such other person and address as each party may from time-to-time designate in writing to the other. Notices shall be deemed to have been received on the date delivered when sent by hand delivery, the next day when sent by Federal Express or other overnight express delivery service and within two (2) business days when sent by registered or certified mail.

To Township: Township Manager, Radnor Township  
301 Iven Avenue, Radnor, PA 19087

To WPP: Willows Park Preserve  

---

Wayne, PA 19087

22. **MISCELLANEOUS**

(a) WPP represents and warrants to Township that WPP has dealt with no broker, agent or other intermediary in connection with this Lease.

(b) The covenants and agreements contained in this lease shall be binding on the parties hereto and on their respective successors and permitted assigns.

(c) If Township or WPP is delayed or prevented from performing any of their respective obligations under this Lease due to strikes, acts of God, shortages of labor or materials, war, civil disturbances or other causes beyond the reasonable control of the performing party ("**Force Majeure**"), the period of such delay or prevention shall be deemed added to the time herein provided for the performance of any such obligation by the performing party. Notwithstanding the foregoing, events of Force Majeure shall not extend any period of time for the payment of Rent or other sums payable by either party or any period of time for the written exercise of an option or right by either party.

(d) Any rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not apply to the interpretation of this Lease or any amendments or exhibits hereto.

(e) This Lease, the exhibits, and addendum attached hereto and forming a part hereof set forth all of the promises, agreements, conditions, warranties, representations, understandings and promises between Township and WPP relative to the Leased Premises and this leasehold and WPP expressly acknowledges that Township and Township's agents have made no representation, agreements, conditions, warranties, representations, understandings or promises, either oral or written, other than as herein set forth, with respect to the Leased Premises, this leasehold or otherwise. No alteration, amendment, modification, waiver, understanding or addition to this Lease shall be binding upon Township or WPP unless reduced to writing and signed by Township, or by a duly authorized agent of Township and by WPP.

(f) The captions of the paragraphs in this Lease are inserted and included solely for convenience and shall not be considered or given any effect in construing the provisions hereof.

(g) If any provision contained in this Lease shall, to any extent, be invalid or unenforceable, the remainder of this Lease (and the application of such provision to the persons or circumstances, if any, other than those as to which it is invalid or unenforceable) shall not be affected thereby, and each and every provision of this Lease shall be valid and enforceable to the fullest extent permitted by law.

(h) This Lease shall be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania.

(i) Notwithstanding any provision of this Lease to the contrary, no officer or director of WPP or Township shall have any personal liability with respect to any provisions of this Lease or the Leased Premises.

(j) Township and WPP each represents and warrants to the other that (a) the execution and delivery of this lease has been fully authorized by all necessary corporate or municipal action, as applicable; (b) each person signing this Lease has the requisite authority to do so and the authority and power to bind the party on whose behalf he/she has signed, and (c) to the best of its knowledge and belief, this Lease is valid, binding and legally enforceable in accordance with its terms.

(k) This Lease may be executed in two or more counterparts, each of which shall be deemed to be an original hereof, but all of which, taken together, shall constitute one and the same instrument.

**23. MEDIATION/ARBITRATION.** Any controversy or claim related to this Lease Agreement shall be submitted to a mutually agreed upon mediator within thirty (30) days of written notice by either party of a dispute. If there is no agreement or resolution within sixty (60) days after submission to a mediator or the appointment of a mediator, the parties shall submit to binding arbitration under the rules of the American Arbitration Association, and any decision rendered by an arbitrator shall be final and enforceable in any court of proper jurisdiction.



**TOWNSHIP:**

**RADNOR TOWNSHIP**

Attest: \_\_\_\_\_

By: \_\_\_\_\_

Name:

Title:

**WILLOWS PARK PRESERVE:**

**WILLOWS PARK PRESERVE**

Attest: \_\_\_\_\_

By: \_\_\_\_\_

Name:

Title:



“Leased Premises” Map

tabbles<sup>®</sup>  
**EXHIBIT**  
A  
to Lease

**Willows Mansion Operations  
Five Year Plan**

CONSTRUCTION	1ST FLOOR OPEN BY 2018	12 MONTHS ACTIVITY 2019	12 MONTHS ACTIVITY 2020	12 MONTHS ACTIVITY 2021	12 MONTHS ACTIVITY 2022
--------------	------------------------------	----------------------------------	----------------------------------	----------------------------------	----------------------------------

**Revenue LIMIT LARGE EVENTS TO 25 PER YEAR** \$ - \$ 75,000 \$ 150,000 \$ 225,000 \$ 302,000

**Expense Category**

**Willows Park Preserve Non-Profit Incremental Expense**

**Staff**

**Marketing/Scheduling/Facility Management Coordinator**

Salary	\$40,000	\$60,000	\$60,000	\$60,000	\$60,000
Fringes	\$16,000	\$24,000	\$24,000	\$24,000	\$24,000
Fill in Custodian/Day-Of Coordinating (Hourly)		\$13,000	\$13,000	\$13,000	\$13,000
Salary		\$28,000	\$28,000	\$28,000	\$28,000
Fringes		\$16,000	\$16,000	\$16,000	\$16,000

**Contracted Services**

Cleaning-- Large Events		\$7,000	\$14,000	\$14,000	\$14,000
Minor Repairs		\$5,000	\$9,000	\$9,000	\$9,000
Web Design and hosting	\$12,000	\$6,000	\$6,000	\$6,000	\$6,000

**Consultants:**

Grant writers/ Graphic Design/ Historical Designation	\$10,000	\$2,000	\$2,000	\$2,000	\$2,000
Event Contract Development	\$6,000				
Event Planning Consultation	\$9,000				
Computers/Printers/ Software/ Website	\$9,000	\$4,000	\$4,000	\$4,000	\$4,000
Office Supplies/ phone/internet	\$10,000	\$12,000	\$12,000	\$12,000	\$12,000
Event and Donor Literature	\$15,000	\$12,000	\$12,000	\$12,000	\$12,000

**Organizational Expenses**

Accounting Software & Audit	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
Legal	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
D & O Insurance	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500

**Total Non-Profit Expense** \$136,500 \$198,500 \$209,500 \$209,500 \$209,500

**RESERVES FOR FUTURE REPAIRS** \$0 \$50,000 \$50,000 \$50,000 \$50,000

**Total Non-Profit Expense with Reserves** \$136,500 \$248,500 \$259,500 \$259,500 \$259,500

**ANNUAL TOWNSHIP CONTRIBUTION** -\$136,500 -\$173,500 -\$109,500 -\$34,500 \$42,500

**\*\*\* Township continues to pay these annual expenses and provide these services**

- Property Insurance
- Trash Hauling
- Snow Removal
- Grounds Maintenance & Trees
- HVAC Maintenance
- Electricity
- Water
- Fire Protection Inspection
- Security Alarm Monitoring
- Pest Control
- Gutter Cleaning & Ornamental Planting Maintenance

**One Time Start up costs**

Furniture Tables and Chairs	\$ (50,000)
Outdoor Tables, planting, pots	\$ (40,000)
Kitchen equipment/APPLIANCES	\$ (40,000)
Start up Expense	\$ (130,000)



**CONFIDENTIAL**

ADDENDUM TO  
CHARITABLE GIFT  
AGREEMENT, DATED  
SEPTEMBER 10, 2017

THIS Addendum to the CHARITABLE GIFT AGREEMENT ("Agreement") dated September 10<sup>th</sup>, 2017 is made between an individual with an address at [REDACTED] (the "Donor") and Willows Park Preserve, a Pennsylvania nonprofit corporation (E.I.N. 82-2732470, Pennsylvania Business Entity Number 6603389), with a registered address at 234 Walnut Avenue, Wayne, PA 19087 (the "Donee") (each a "Party"; together the "Parties").

WITNESSETH:

WHEREAS, Donor is committed to providing funding toward the repair, renovation, restoration and construction of the Willows Mansion (the "Mansion") in Radnor Township (the "Township") for the public's use and enjoyment; and

WHEREAS, on September 10<sup>th</sup>, 2017, Donor and Donee entered into a Charitable Gift Agreement specifically for the purposes of maintaining the Mansion, and thereby alleviating the Township's burden of caring for and preserving this historic property, and Donee fulfills its mission by supporting the repair, renovation, restoration and construction of the Mansion, promoting the Mansion, making the Mansion open and available for public use and enjoyment, leading innovative programs for all ages in the Mansion, making the Mansion available for various events held by members of the community and fundraising to support the maintenance of the Mansion as a historic treasure and community resource (A signed copy of this Charitable Gift Agreement is attached hereto and incorporated by reference herein); and

WHEREAS, Donor intends to support the Township's repair, renovation, restoration and construction of the Mansion (the "Project") and Donor desires to support the Project by pledging One Million Dollars (\$1,000,000); and

WHEREAS, the payment terms of the One Million Dollar (\$1,000,000) donation specified in the Agreement caused an undue burden on the township; and

WHEREAS, in connection with its support of the Project, Donor wishes to modify and amend the schedule of the pledge (defined below) and replace in its entirety Paragraph 1 of the September 10, 2017 signed Agreement with the following:

1. Pledge of Funds. Donor irrevocably pledges to match any and all third-party donations made to the Donee, including, but not limited to, those made by the Township, that are intended to be used in furtherance of the renovation, restoration, repair and construction of the Mansion, in an amount not to exceed One Million Dollars (\$1,000,000) (the "Funds") payable on the following schedule:



Upon the full and complete expenditure of the Township's allocated budget of One Million, Eight Hundred Thousand (\$1,800,000.00), Donor will contribute Five Hundred Thousand (\$500,000) during the calendar year 2018; and contribute the remaining Five Hundred Thousand (\$500,000.00) in January, 2019.

Donor authorizes Donee to share a redacted copy of this document with the Township.

All other paragraphs and provisions of the Charitable Gift Agreement dated September 10, 2017 remain in full force and effect and are incorporated herein by reference as if reproduced in their entirety.

If to Donor:

[REDACTED]  
[REDACTED]  
[REDACTED]

With a copy to:

J. Stoddard Hayes, Jr., Esq.  
Gawthrop Greenwood, PC  
17 E. Gay St, Ste 100  
West Chester, PA 19380  
Email: [jhayes@gawthrop.com](mailto:jhayes@gawthrop.com)

Ronald Logue  
Wilmington Trust Company  
1100 N. Market St.  
Wilmington, DE 19899  
[rlogue@wilmingtontrust.com](mailto:rlogue@wilmingtontrust.com)

If to Donee:

Christina Perrone, Co-Founder  
234 Walnut Ave.  
Wayne, PA 19087

Tish Long, Co-Founder  
35 Aldwyn Lane  
Villanova, PA 19085

**ADDENDUM TO LEASE BETWEEN RADNOR TOWNSHIP AND  
WILLOWS PARK PRESERVE**

The parties have agreed to work together cooperatively to restore and maintain the Leased Premises and to insure that Willows Park Preserve ("WPP") can generate revenue from fundraising and public or private events to cover its operating costs and to establish a reasonable reserve to serve the mutual goal of making the operation self-sustaining. To that end the parties have agreed to the following parameters as to: 1) the financing and construction of the proposed improvements; and 2) the rental and programming activities of WPP.

1. The Township has budgeted and allocated \$1,816,660 in funds to renovate the property in accordance with an improvements plan agreed to by the parties and which is consistent with the goals of the WPP. The WPP contemplated scope of work includes two components: a) The Mansion Plan which includes exterior cleaning, repair work and painting; the complete renovation of the Mansion's first floor interior space and second floor amenity areas and patch and repair of any deteriorating areas such as the third floor; repairing the slate patio; removing the solarium and replacing it with a garden; furnishing and decorating the Mansion; and landscaping the Mansion's immediate exterior; and b) The Expansion Plan which includes building a 1,500 – 2,400 SF addition (Pond View Room) where the garden (former solarium) is located; repairing and renovating the Fountain Wall Plaza; repairing and renovating the Fountain Wall Plaza; repairing and renovating the Wishing Well Courtyard; and installing additional landscaping and paving to beautify the exterior of the Leased Premises.
  2. Upon the execution of this Lease, the Township will expend a portion of its allocated funds to hire an architect to prepare plans and construction documents. Upon lease execution, the Township will allow \$100,000.00 of such restricted funds to be used by WPP for pre-opening marketing costs and operating expenses. The release of the remaining Township funds shall be contingent upon: a) the approval of WPP as a 501(c) 3 tax exempt organization; and b) execution by the Township of a construction contract to improve the Mansion.
  3. WPP has secured a \$1,000,000 donation to be used to support the renovation of the leased premises and the mission of WPP. Additionally, pursuant to Addendum #2 of the Charitable Gift Agreement, Donor shall provide an additional \$100,000 for pre-opening marketing costs and operating expenses. Upon award of a successful bid and execution of a construction contract by the Township, Township funds and WPP donated funds (as per the terms of the Donor Agreement) shall be deposited in a separate account and held by the Township to administer the implementation and payment of the designated contractor and expenses of construction. Any surplus shall be returned to the WPP.
-

4. The proposed improvements shall be subject to public bidding by the Township in accordance with township, state and federal requirements. WPP shall have input throughout the construction process but all final decisions regarding the means and manner of constructing the improvements shall remain with the Township, including payment applications, change orders and construction management. The Township shall designate a representative who shall handle all correspondence and information related to the construction.
  5. In utilizing the renovated Mansion, all WPP employees and volunteers working on Township property shall be subject to such ongoing background checks as deemed reasonably necessary by the Township. Any caretaker/sub-tenants shall likewise be subject to the reasonable approval and clearance by the Township.
  6. WPP shall be responsible for set-up and janitorial services for all activities and events that it sponsors at the Leased Premises.
  7. The Township and WPP shall meet at least annually to discuss a budget for any required maintenance and repairs of the Mansion.
  8. WPP will make commercially reasonable efforts to be "self-sustaining". "Self-sustaining" means generating revenue from fundraising and events to cover its operating expenses, exclusive of expenses covered by the Township as outlined in this Lease, plus a reasonable reserve. The Township and WPP agree that once the apartment and Mansion meet code requirements, a caretaker or facility director may be permitted to rent the apartment, subject to further agreement with the Township. The Township may audit WPP on at least an annual basis and shall be entitled to all WPP financial records within 20 days of a request.
  9. The Township and WPP shall meet at least annually to establish a schedule of Mansion use for: a) major, private uses; and b) resident, community group use; and c) Township use. WPP will not schedule more than 25 major, private events per year, each with no more than 150 attendees at the event. WPP shall have priority to schedule its 25 major, private events in the Mansion. For each major event, WPP shall coordinate in advance with the Township to address hours of operation, parking and necessary security issues.
-

J. LAWRENCE GRIM, JR.  
MARY C. EBERLE  
JOHN B. RICE  
DIANNE C. MAGEE \*  
DALE EDWARD CAYA  
DAVID P. CARO ♦  
DANIEL J. PACI ♦ †  
JONATHAN J. REISS ◊  
GREGORY E. GRIM †  
PETER NELSON \*  
PATRICK M. ARMSTRONG  
SEAN M. GRESH  
KELLY L. EBERLE \*  
JOEL STEINMAN  
MATTHEW E. HOOVER  
COLBY S. GRIM  
MICHAEL K. MARTIN  
JULIANNE E. BATEMAN

\* ALSO ADMITTED IN NEW JERSEY  
◊ ALSO ADMITTED IN NEW YORK  
† MASTERS IN TAXATION  
♦ ALSO A CERTIFIED PUBLIC ACCOUNTANT

LAW OFFICES  
**GRIM, BIEHN & THATCHER**

A PROFESSIONAL CORPORATION  
SUCCESSOR TO  
GRIM & GRIM AND BIEHN & THATCHER  
ESTABLISHED 1895 AND 1956,  
RESPECTIVELY  
123RD ANNIVERSARY 1895-2018

[www.grimlaw.com](http://www.grimlaw.com)

John B. Rice  
e-mail: [jrice@grimlaw.com](mailto:jrice@grimlaw.com)

JOHN FREDERIC GRIM, OF COUNSEL

104 S. SIXTH STREET  
P.O. BOX 215  
PERKASIE, PA. 18944-0215  
(215) 257-6811  
FAX (215) 257-5374  
(215) 536-1200  
FAX (215) 538-9588  
(215) 348-2199  
FAX (215) 348-2520

May 1, 2018

Delaware County Law Library  
Delaware County Courthouse  
201 W. Front Street  
Media, PA 19063

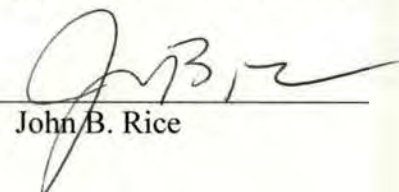
Re: Radnor Township- Willows Park Preserve Ordinance

Dear Sir/Madam:

Enclosed for filing with the Delaware County Law Library, please find a true and correct copy of a proposed Ordinance which the Radnor Township Board of Commissioners will consider for possible adoption after a public hearing on May 14, 2018. Please keep the enclosed Ordinance available for public inspection and/or photocopying through the hearing date.

Sincerely,

**GRIM, BIEHN & THATCHER**

By:   
John B. Rice

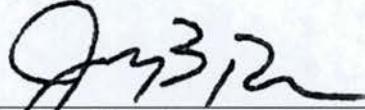
JBR/hlp  
Enclosure

cc: Jennifer DeStefano (w/encl.) – via email  
Robert A. Zienkowski (w/encl.) – via email



ATTEST:

I do hereby certify that this is a true and correct copy of the proposed Ordinance of Radnor Township, being advertised for possible adoption by the Radnor Township Board of Commissioners on May 14, 2018.

A handwritten signature in black ink, appearing to read "John B. Rice", written over a horizontal line.

John B. Rice, Esquire  
Grim, Biehn & Thatcher  
Township Solicitor

Upon recording return to:  
CTI Towers Assets I, LLC  
38 Pond Street  
Suite 305  
Franklin, MA 02038

---

The Above Space for Recorder's Use Only

### MEMORANDUM OF LEASE AGREEMENT

This MEMORANDUM OF LEASE AGREEMENT ("Memorandum") is entered into on this 27<sup>th</sup> day of October, 2014, by and between **Township of Radnor**, a municipal corporation incorporated under the laws of the Commonwealth of Pennsylvania, with an address of c/o Town Manager, 301 Iven Avenue, Radnor, PA 19087 (hereinafter referred to as "Lessor"), and **CTI Towers Assets I, LLC**, a Delaware limited liability company, with a mailing address of 38 Pond Street, Suite 305, Franklin, MA 02038 (hereinafter referred to as "Lessee").

**WHEREAS**, Lessor and Lessee, through its predecessor-in-interest Comcast of Pennsylvania, LLC, successor-in-interest to Storer Cable TV of Radnor, Inc., executed and entered into a Lease Agreement (the "Lease") dated September 16, 1980, as amended in 1986, and further amended by that Second Amendment to Lease Agreement dated August 18, 2014, for the purpose of constructing, maintaining, repairing and operating communication facilities and other improvements on the Premises (as hereinafter defined) located at 301 Iven Avenue, Township of Radnor, County of Delaware, Commonwealth of Pennsylvania.

**NOW, THEREFORE**, in consideration of the Lease and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Lessor and Lessee hereby agree as follows:

1. Pursuant to the Second Amendment, the term of the Lease is hereby extended for a term of ten (10) years commencing on July 1, 2014. Lessee shall be granted the option for one (1) additional renewal term of ten (10) years and a second renewal term of nine (9) years.
2. Subject to the terms of the Lease, as may be amended from time to time, Lessor has leased to Lessee the real property described on Exhibit "A" attached hereto (the "Premises").
3. All notices, requests, demands, and other communications to Lessor or Lessee shall be made at the addresses for each as set forth above, unless otherwise notified in writing.

4. The purpose of this Memorandum is to give record notice of the Lease and of the rights created thereby, all of which are hereby confirmed. This Memorandum is not intended to supersede, replace or release Lessee's or Lessor's rights under any prior recorded memorandum of the Lease.

5. In the event of a conflict between the terms of this Memorandum and the terms of the Lease, the terms of the Lease shall prevail.

6. Within sixty (60) days of the expiration or termination of the Lease, Lessee shall record, at Lessee's sole cost and expense, a release of this Memorandum. If Lessee fails to record such release, upon Lessor sending Lessee written notice thereof, Lessee hereby authorizes Lessor to unilaterally record such release on Lessee's behalf.

**IN WITNESS WHEREOF**, the parties hereto have set their hands and affixed their respective seals.

[SIGNATURES APPEAR ON NEXT PAGE]







Resolution #2018-46

WHEREAS, The Board of Commissioners' ambiguous policies and contradictory statements regarding commercial cell towers and emergency services antennas in Radnor Township Parks has created uncertainty for the public, cell service providers, emergency services, and administration;

WHEREAS, technology in the telecommunications industry continues to advance and the use of unobtrusive micro-cells has become increasingly popular in Radnor Township, and surrounding municipalities;

WHEREAS, Radnor Township seeks to resolve regulatory uncertainty and expand the capability of private companies to build infrastructure on private property to improve cellular communication in the township;

THEREFORE, BE IT RESOLVED, Radnor Township bans the installation of commercial cell towers on township parkland;


THEREFORE, BE IT FURTHER RESOLVED, Radnor Township will work with Delaware County Emergency Services to identify options - such as placing EMS antennas on public lands - to enhance first responder emergency communications in areas where there is deficient coverage.

SO, RESOLVED this 23 day of April, 2018.

RADNOR TOWNSHIP

By:   
Name: Lisa Borowski  
Title: President

ATTEST:

  
Robert A. Zienkowski, Secretary

Motion for approval of  
grant application for South  
Wayne Avenue Green  
Measures (*Requested by  
Commissioner Clark*)



**ORDINANCE NO. 2018-  
RADNOR TOWNSHIP**

**AN ORDINANCE OF RADNOR TOWNSHIP, DELAWARE COUNTY,  
PENNSYLVANIA, AMENDING CHAPTER 263, TREES, SECTION 263-9,  
REVISING AND UPDATING APPENDIX "A" FOR THE  
RECOMMENDED TREE LIST FOR RADNOR TOWNSHIP**

*Pursuant to recommendations of the Radnor Township Shade Tree Commission, the Radnor Township Board of Commissioners does hereby ENACT and ORDAIN, as follows:*

**SECTION I**

Chapter 263, Trees, Section 263-9.A. (2), is hereby revised and amended to read as follows:

263-9.A. (2).

The Shade Tree Commission encourages all residents to plant, maintain and assume stewardship for street trees within the Township.

Appropriate species and recommended sizes for new or replacement trees are listed on Appendix "A" of this Chapter and can be viewed on the Township's website. The Township reserves the right to amend and update Appendix "A" by separate resolution on an annual basis.

Careful attention should be given to encouraging proper planting, especially under utility wires, as to location, it is advisable to consult the Shade Tree Commission for appropriate locations for new street trees.

**SECTION II**

Appendix "A" to Chapter 263, Trees is hereby revised and updated to establish a new Appendix "A"; Recommended Trees for Radnor Township, a copy of which is attached to this ordinance as Exhibit "1".

**SECTION III Repealer.**

All ordinances or parts of ordinances which are inconsistent herewith are hereby repealed.

**SECTION IV Severability.**

If any section, paragraph, subsection, clause or provision of this Ordinance shall be declared invalid or unconstitutional by a court of competent jurisdiction, such decision shall not affect the validity of this Ordinance as a whole or any part thereof other than that portion specifically declared invalid.

**SECTION V      Effective Date.**

This Ordinance shall become effective in accordance with the Home Rule Charter of Radnor Township.

*ENACTED AND ORDAINED* this \_\_\_\_\_ day of \_\_\_\_\_, A.D., 2018.

**RADNOR TOWNSHIP  
BOARD OF COMMISSIONERS**


By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

ATTEST: \_\_\_\_\_  
Robert A. Zienkowski, Secretary

**Radnor Township**  
**PROPOSED LEGISLATION**

DATE: May 8, 2018

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer 

CC: Robert A. Zienkowski, Township Manager  
William M. White, Assistant Township Manager/Finance Director  
John Rice, Solicitor  
Radnor Township Shade Tree Commission

**LEGISLATION: *INTRODUCTION: ORDINANCE NO. 2018-06, RADNOR TOWNSHIP, AN ORDINANCE OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AMENDING CHAPTER 263, TREES, SECTION 263-9, REVISING AND UPDATING APPENDIX "A" FOR THE RECOMMENDED TREE LIST FOR RADNOR TOWNSHIP***

---

LEGISLATIVE HISTORY: This topic has not been before the Board of Commissioners previously.

PURPOSE AND EXPLANATION: The Shade Tree Commission has noted that the current tree list in the Shade Tree Ordinance contained trees that were no longer available, were prohibited from being planted, or were otherwise poor choices to be used as tree replacements. The Shade Tree Commission and arborist created the proposed Appendix "A".

The proposed Amendment serves two purposes: 1.) it updates the tree replacement list, and 2.) allows the list to be updated as needed, but via Resolution (instead of Ordinance Amendments).

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners approval, the proposed legislation will be back in front of the Commissioners at the regularly scheduled May 21st, 2018 Board of Commissioners meeting. If adopted, the Ordinance will take effect on June 21st, 2018.






FISCAL IMPACT: There is no fiscal impact to Township to adopt this Ordinance.







***Recommendation: The Shade Tree Commission and Staff respectfully request the Board of Commissioners move proposed Ordinance***







Enclosure: Ordinance 2018-06, Appendix A















Liquidambar styraciflua Rotundiloba		Excellent Fall color Prefer seedless cultivars Shallow roots	Frequently	"Rotundiloba", "Worplezdon" "Cherokee"	Native to North America. produces round spiky free seeds not for sidewalks
Lindodendron tulipifera		Orange/Green June flowers Among our tallest hardwoods	Moderately		Native to North America; Vulnerable to climate change; Needs large environment; aphid honeydew makes sooty mold
Molassecula glyptostrobodes		Pyramidal shape	Moderately		Ideal for gloves, stream sites Native of China; fast growing and pest free
Nyssa sylvatica		Nice red Fall color with shiny autumn leaves	Moderately	"Red Rage", "Forum"	Ideal for wet sites
Platanus x acerifolia		Ornamental bark; not a great street tree	Sparsely	"Bloodgood", "Columbia"	Native to Britain






Quercus icilissima	Sawtooth Oak		Wide spreading, clean loblapped	Moderately		Native to Japan, Korea, China
Quercus alba	White Oak		Ornamental bark	Sparingly		Native to North America Majestic in a large space, moderately vulnerable to climate change, great bird food tree
Quercus bicolor	Swamp White Oak		Ornamental flaking bark	Moderately		Native to North America; great bird food tree
Quercus prinus	Italian Oak		Glossy deep green leaves	Moderately	Forest Green*	Native to Southeastern Europe
Quercus imbricaria	Shingle Oak		Shingle-like leaf	Moderately		Works well in lawns and streets Native to North America, great bird food tree
Quercus macrocarpa	Bur Oak		Excellent pair tree	Moderately		Native to North America; great bird food tree






Quercus muehlenbergii	Chinkapin Oak		Also called Yellow Chestnut Oak. Quite attractive, especially in old age	Moderately			Native to North America. great bird food tree
Quercus phellos	Willow Oak		Blade-like leaf. best oak for overall texture and form	Moderately	"Hightower"		Native to North America. great bird food tree
Quercus prinus	Chestnut Oak		Tough landscape candidate	Sparingly			Native to North America. great bird food tree
Quercus robur	English Oak		Dark blue to dark green leaves	Moderately	"Fasigiata"		Native to Europe. exceptionally salt tolerant
Quercus shumardii	Shumard Oak		Easy to transplant	Moderately			Native to North America. great bird food tree
Quercus texana	Nuttall Oak			Moderately			Native to North America. great bird food tree









Quercus velutina	Black Oak				Sparingly				Native to North America Not important in commerce, great bird food tree
Styphnolobium japonicum	Japantase Pagoda Tree		White June flowers		Sparingly		"Princeton Upright", "Rejent"		Avoid planting near natural areas
Taxodium distichum	Bald Cypress		Strong pyramidal shape		Moderately				Ideal for wet sites, Native to North America, Adapted to colder climates
Tilia americana	American Linden		Red Winter twigs		Moderately		"Radmond", "McSentry"		Excellent in partial shade, Native to North America
Tilia cordata	Littleleaf Linden				Sparingly		"Glenlynn", "Shamrock"		Sensitive to excessive salt, Native to Europe
Tilia tomentosa	Silver Linden		Fragrant Spring flowers with Silver underside to leaves		Frequently		"Sterling", "Green Mountain"		Native to Southeastern Europe
Tilia x euchlora	Crimean Linden		Fragrant Spring flowers		Moderately		"Laurehurst"		Vigorous with straight trunk







<i>Ulmus americana</i>	American Elm				Spanningly	"Emerald Sunshiner", "Princeton", "Frontier", "New Harmony"	Native to North America
<i>Ulmus cultivars</i>	Elm hybrids				Spanningly	"Accolade", "New Horizon", "Princeton"	"Princeton" has demonstrated moderate resistance to Dutch Elm Disease
<i>Ulmus parvifolia</i>	Asian Elm				Spanningly	"Alice", "Dynasty"	
<i>Zelkova serrata</i>	Zelkova		Attractive bark in older trees	Moderately		"Musashino", "Green Vase"	Native to Japan. Korea, not a bird food source. Resistant to Dutch Elm Disease







Tree species	Common name	Shape	Visual interest	Frequency of planting	Preferred cultivars	Notes
Scientific name LARGE EVERGREEN TREES > 50 ft. <i>Abies concolor</i>	White Fir				"Candicans"	Native to North America; disease resistant
<i>Abies nordmanniana</i>	Nordmann Fir		Handsome, black green needles		"Pendula"	Native to Asia
<i>Cedrus atlantica</i>	Atlas Cedar		Bluish color; specimen use only		"Argentea", "Aurea"	Native to Algeria and Morocco
<i>Cryptomeria japonica</i>	Japanese Cedar		Use as specimen or for avenues		"Ben Franklin", "Black Dragon"	Native to China and Japan
<i>Picea abies</i>	Norway Spruce		Can lose form in old age		"Argenteospica"	Should be planted judiciously; Native to north and central Europe

Tree species	Scientific name	Common name	Shape	Visual interest	Frequency of planting	Preferred cultivars	Notes
<i>Picea orientalis</i>	Oriental Spruce			Graceful and attractive habit		"Aurovirens"	Native to Caucasus, Asia Minor
<i>Picea omorika</i>	Serbian Spruce			Excellent foliage, narrow growth		"Expansa", "Nana"	Native to Southeastern Europe
<i>Pinus flexilis</i>	Lumber Pine			Adaptable		"Columnaris", "Extra Blue"	Native to Western U.S.
<i>Aesculus x carnea</i>	Red Horsechestnut			Lustrous dark green leaves; Red lily flowers	Springly	"Fort McVear"	Native to North America
<i>Acer campestre</i>	Hedge Maple			Handsome dark green in summer	Springly	"Evelyn", "Metro Gold"	Native to Europe; ALB host









Amelanchier canadensis	Serviceberry		White Spring flowers; Excellent Fall color	Frequently	"Robin Hill", "Cumulus", "Spring Flurry"	Plant single stem only; Native to North America
Amelanchier arborea	Downy Serviceberry		Purified white flowers; superior clone in trade	Sparsely	"Autumn Brilliance", "Cole", "Bailemas"	Also called Shadbush; Native to North America
Amelanchier laevis	Allegheny Serviceberry		Bronze leaf color as they unfold	Sparsely		Native to North America
Alnus	Alders		Young bark often lustrous gray-green; Bears lute	Sparsely	"Aurea", "Pendula"	Native to Europe
Betula nida	Sweet Birch		Leaves color goes from dark green in summer to yellow in Fall	Sparsely		Native to North America
Betula nigra	River Birch		Exfoliating bark	Sparsely	"Dura-heat", "Heritage"	Good for large areas Native to North America

<i>Carpinus betulus</i>	European Hornbeam		Fine landscape tree; excellent screening tree	Moderately	"Fastigata"	Becomes wider with age; Native to Europe
<i>Carpinus caroliniana</i>	American Hornbeam		Best in naturalized situation; orange-red Fall color	Moderately	"Palisade", "Pyramidalis", "Wisconsin Red"	Native to North America
<i>Carpinus japonicum</i>	Japanese Hornbeam		Wide-spreading branches	Sparsely		Native to Japan
<i>Chamaecyparis nootkatensis</i>	Alaska Cedar		Attractive pendulous form	Sparsely	"Pendula"	Native to North America
<i>Chamaecyparis obtusa</i>	Hinoki False Cypress		Rock garden winner	Sparsely	"Crippsii", "Nana"	Native to Japan and Formosa
<i>Chionanthus retusus</i>	Fringe Tree		Slow white flowers	Moderately		Native to China, Korea and Japan; Pleasant single stem only; easy green







Cladrastis kentuckica	Yellowwood		Fragrant early summer flowers	Moderately	"Sweetshade", "Rosea"	Native to North America
Cornus kousa	Kousa Dogwood		Large summer flowers	Sparingly	"Summer Stars", "Milky Way", "Big Apple", "Greendolers"	Native to Himalayas, China and Japan
Cornus mas	Cornelian-Cherry Dogwood		Yellow flowers	Sparingly	"Spring Sun", "Flava"	First Spring flowering tree; Native to Central, Southern Europe; Western Asia
Crataegus cuneata	Cockspur Hawthorn		White Spring flowers	Moderately	"Hooks", "Splendens"	Thornless; Native to North America
Crataegus phaenopynum	Washington Hawthorn		Foliage goes from reddish purple to lustrous dark green	Sparingly	"Clark", "Princeton Sentry"	Native to North America
Crataegus punctata	Dotted Hawthorn		White flowers	Moderately	"Aurea"	Also known as Thicket Hawthorn; Native to North America




<i>Crataegus vridis</i>	Winter King Hawthorn		Medium green foliage changes to scarlet and purple	Moderately		Native to North America
<i>Halesia carolina</i>	Carolina Silverbell		White flowers; Leaves are dark yellowish green in summer		"Arnold Pink", "Rosae"	Great in shrub and woodland borders; Native to North America; Vigorous
<i>Ilex aquifolium</i>	English Holly		Lustrous dark green color		"Clara Major", "Sparkler"	Native to Europe, Northern Africa and W. Asia
<i>Ilex crenata</i>	Japanese Holly		Dense foundation planting		"Chesapeake"	Native to Japan, Korea
<i>Ilex x 'Nellie Stevens'</i>	hybrid		Vigorous and fast growing			
<i>Ilex x meserveae</i>	Meserve Hybrid Holly				"Dragon Lady", "China Girl"	Warmly embraced by Northern gardeners





<i>Prunus virginiana</i>	Common Chokeberry		Reddish purple			"Shubert", "Canada Red"	Fruit can be used in jams and jellies; Native to North America
<i>Prunus yedoensis</i>	Yoshino Cherry		Spring white-pink flowers	Sparingly		"Daybreak"	
<i>Stewartia koreana</i>	Korean Stewartia		Large white summer flowers	Sparingly			Native to Korea
<i>Stewartia pseudocamellia</i>	Japanese Stewartia		Outstanding bark				Among most desirable of landscape trees
<i>Syringa reticulata</i>	Tree Lilac		White May flowers	Frequently		"Ivory Silk", "China Gold"	Native to N. Japan; does not tolerate hot dry sites
<i>Syringa pekinensis</i>	Tree Lilac		White May flowers	Frequently		"China Snow"	Native to Northern China

	Green Giant		Useful for hedges	Frequently	Native to North America
<i>Thuja plicata</i>					
<b>Not Recommended</b>					
<b>Invasive or exotic species</b>					
<i>Acer platanoides</i>	Norway Maple				
<i>Acer pseudoplatanus</i>	Sycamore Maple				
<i>Acer saccharinum</i>	Silver Maple				
<i>Acer negundo</i>	Box Elder				
<i>Aralia elatior</i>	Tree of Heaven				
<i>Betula papyrifera</i>	Paper Birch				
<i>Betula pendula</i>	European Whitebark Birch				
<i>Brossonnetia papyrifera</i>	Paper Mulberry				
<i>Catalpa speciosa</i>	Catalpa				
<i>Cupressus x leylandii</i>	Leyland Cypress				
<i>Elaeagnus argentea</i>	Russian Olive				
<i>Fragaria</i>	Ash				
<i>Monus alba</i>	White Mulberry				
<i>Paulownia tomentosa</i>	Princess tree				
<i>Pellodendron amurense</i>	Amur Cork Tree				
<i>Pinaceae</i>	Larch				
<i>Pinus nigra</i>	Austrian Pine				
<i>Pinus sylvestris</i>	Scots Pine				
<i>Populus deltoides</i>	Cottonwood				
<i>Pinus calleryana</i>	Callery (Bradford) Pear				
<i>Quercus pallustris</i>	Pin Oak				
<i>Quercus boconia</i>	Scarlet Oak				
<i>Quercus rubra</i>	Red Oak				
<i>Robinia pseudoacacia</i>	Black Locust				
<i>Salicaceae</i>	Lombardy Poplar				
<i>Salix</i>	Willow				
<i>Sorbus aucuparia</i>	European Mountain Ash				
<i>Tsuga canadensis</i>	Canada Hemlock				
<i>Ulmus americana</i>	American Elm				
<i>Ulmus parvifolia</i>	Chinese Elm				
<i>Ulmus pumila</i>	Siberian Elm				

**TOWNSHIP OF RADNOR**  
**DELAWARE COUNTY, PENNSYLVANIA**

**ORDINANCE NO. 2018-07**

**AN ORDINANCE OF THE TOWNSHIP OF RADNOR, DELAWARE COUNTY, PENNSYLVANIA PROVIDING FOR THE AMENDMENT OF THE RADNOR TOWNSHIP CODE OF ORDINANCES BY AMENDING PART 2, GENERAL LEGISLATION CREATING A NEW CHAPTER 224, ADOPTING REGULATIONS FOR THE PLANTING, CONTROLLING, AND REMOVAL OF BAMBOO, INCLUDING PENALTIES AND OTHER REMEDIES FOR VIOLATIONS.**

**WHEREAS**, non-native plant species are damaging to indigenous plant material and the health, safety and welfare of the community; and

**WHEREAS**, the planting and cultivation of invasive bamboo grasses are damaging to both public and private property.

**NOW THEREFORE**, be it, and it is hereby ENACTED and ORDAINED by the Board of Commissioners of the Township of Radnor, Delaware County, Commonwealth of Pennsylvania, as follows:

**ARTICLE I.**

The Radnor Township Code is hereby amended by adding a new Chapter 224 to Part2, General Legislation which shall read as follows:

Chapter 224

**BAMBOO**

**§224.1 PURPOSE AND INTENT**

The purpose of this Chapter is to preserve and protect private and public property from the damaging spread of certain bamboo grasses, protect indigenous plant materials from the invasive spread of bamboo, and maintain the general welfare of residents of Radnor Township.

**§224.2 GENERAL PROVISIONS**

A. Definitions:

- (1) Bamboo – Any monopodial (running) tropical or semi-tropical grasses from the genera Phyllostachys or Pseudosasa, including, but not limited to,

*Phyllostachys aureosulcata* – Yellow Groove Bamboo. In addition, this definition includes Common Bamboo, Golden Bamboo and Arrow Bamboo.

- (2) Bamboo Owner – Any person who has planted and/or grows Bamboo on their property; who maintains Bamboo on their property; or who permits Bamboo to grow or remain on their property, even if the Bamboo has spread from an adjoining property.
- (3) Person – Any individual, corporation, partnership, joint venture, unincorporated association, municipal corporation or agency, other group acting as a unit, or combination thereof.
- (4) Township – The Township of Radnor, County of Delaware, Commonwealth of Pennsylvania.

B. Applicability. For purposes of this Part, Bamboo found growing upon a property shall constitute presumptive evidence that the Bamboo was planted and/or grown by and/or with the consent of the Bamboo Owner.

C. Prohibition. Upon the effective date of this Part, the planting or growing of Bamboo shall be prohibited within the Township. ~~unless:~~

- ~~(1) the root system of such bamboo plant is entirely contained within a planter, barrier, or other vessel, located entirely above ground level, and of such design, material, and location as to entirely prevent the spread/growth of the Bamboo's root system beyond the container in which it is planted; or~~
- ~~(2) The root system is contained within a barrier, constructed in accordance with the following specifications, and only after a permit is issued by the Township:
  - the barrier shall be composed of high density polypropylene or polyethylene, 40 mil or heavier;
  - portions or sheets of the barrier shall be secured or joined together by the use of stainless steel clamps or stainless steel closure strips designed for such barriers;
  - the entire perimeter of the barrier shall be more than 30 inches below ground level and more than 3 inches above ground level; and
  - when installed, the barrier shall slant outward from the bottom to the top.~~

Any person who hereafter plants or grows, or causes to be planted or grown, Bamboo within the Township, ~~except as under the conditions set forth in subparagraph (1) and (2) above,~~ shall be deemed to be in violation of this Part, and shall be subject to such penalties as are set forth herein.

D. Regulation.

- (1) Bamboo shall not be planted, maintained, or otherwise be permitted to exist within 40 feet of the edge of the pavement or traveled portion of any public roadway in the Township. Any Bamboo Owner whose property contains Bamboo shall remove and abate the growth of the Bamboo within 40 feet of edge of the pavement or traveled portion of a public road in the Township.
- (2) Whether planted or growing in a container or contained within a barrier, all bamboo plants shall be located, trimmed, and maintained so that no part of the plant (including stalks, branches, leaves, and/or roots) shall extend nearer than ten feet to any property line.
- (3) When removing and destroying Bamboo, all rhizome disposal must be by incineration only. No composting or trash disposal of rhizomes shall be allowed.

E. Pre-Existing Bamboo.

- (1) Any Bamboo that has been planted or otherwise permitted to grow on any property within the Township prior to the effective date of this Part may remain on such property, subject to compliance with this Part.
- (2) Each Bamboo Owner shall be responsible to ensure that the Bamboo planted or growing on the property prior to the effective date of this Section does not encroach or grow upon any adjoining or neighboring property, including all public property and right-of-ways. Such Bamboo Owners shall be required to take such measures as are reasonably expected to prevent such invasion or encroachment, including, but not be limited to, the installation of sheathing comprised of metal or other material impenetrable by Bamboo at a sufficient depth within the property line or lines where the Bamboo is planted or is growing to prevent the growth or encroachment upon adjoining or neighboring property by the Bamboo. Upon request by the Township, such Bamboo Owner shall provide written documentation of all bamboo remediation efforts and /or compliance with this ordinance to the satisfaction of the Township.
- (3) Replanting Prohibited. Any Bamboo existing on a property prior to the effective date of this Part may not be replanted or replaced in kind once such Bamboo is or has become, for any reason, dead, destroyed, uprooted,



or otherwise removed, except in compliance with the provisions of this Part.

F. Removal from Township Property.

- (1) Encroachment. In the event that Bamboo growing on a Bamboo Owner's property invades or grows onto Township property, including, but not limited to right-of-ways, the Township shall notify the Bamboo Owner in writing that Bamboo has invaded the Township property and that the Bamboo Owner is responsible for the removal of such Bamboo from the Township property. This Encroachment Notice shall be sent by certified mail, return receipt requested and by regular mail to the last known address of the Bamboo Owner, and a copy of the Notice shall also be posted in a conspicuous location on the Bamboo Owner's property.
- (2) In the event that the Bamboo Owner does not remove the Bamboo from the Township property, or does not make an arrangement with the Township for removal of such Bamboo within thirty (30) days from the date the Encroachment Notice, the Township, at its discretion, may remove such Bamboo from the Township property. The Bamboo Owner shall be liable and responsible to the Township for all costs incurred in removing the Bamboo from the Township property. Such costs may be assessed against the property of the Bamboo Owner, and in the event that the costs remain unpaid more than thirty (30) days after the demand of payment has been made by the Township on the Bamboo Owner, the Township may lien the property of the Bamboo Owner for these costs, plus interest, fees, and expenses, as allowed by law.
- (3) In the event that the Township is compelled to undertake the removal of Bamboo, as provided for above, neither the Township nor its employees, contractors, or agents shall have any liability to the Bamboo Owner for any damages or other claims arising out of the removal of such Bamboo. In the event such removal entails or causes damages to the property of any other person or entity other than the Bamboo Owner, the Bamboo Owner shall be responsible for such damages.

**§224-3 VIOLATIONS AND REMEDIES**

A. Notice of Violation

- (1) Each Bamboo Owner shall be responsible to ensure that any Bamboo on their property does not violate the provisions of this Part. In the event that there is any Bamboo growing in violation of the provisions of this Part, the Township shall notify the Bamboo Owner in writing of the existence of such violation. Said Notice of Violation shall be served by handing it

directly to the Bamboo Owner; by mailing it to the last known address of the Bamboo Owner; or by posting the property at a conspicuous location.

- (2) Any Bamboo Owner receiving a Notice of Violation shall bring their property into compliance with this Part within thirty (30) days of the Owner's receipt of said Notice. If the Bamboo Owner fails to bring their property into compliance with the Notice and this Part, then the Township may issue a non-traffic citation against the Bamboo Owner.
- (3) In addition, where a Bamboo Owner does not remedy and correct the violations set forth in any Notice of Violation issued to them, the Township may remove any Bamboo that is in violation of this Part located upon the Bamboo Owner's property; take all reasonable action to eradicate its re-growth; and/or restore any real property to its natural condition prior to such removal and eradication. Any costs incurred by the Township in removing any Bamboo and/or remedying any violation of this Ordinance shall be at the expense of the Bamboo Owner, and in the event that the costs remain unpaid more than thirty (30) days after the demand of payment has been made by the Township on the Bamboo Owner, the Township may lien the property of the Bamboo Owner for these costs, plus interest, fees, and expenses, as allowed by law.

**B. Violations, Penalties, and Remedies**

- (1) Upon summary conviction before any Magisterial District Judge, any person violating any of the provisions of this Part shall, in addition to the other charges hereinbefore provided for each offense, pay a fine not exceeding \$1,000.00, plus all court costs, including reasonable attorney's fees, incurred as a result of the prosecution. Each and every day in which a person shall be in violation of this Part shall constitute a separate offense.
- (2) In addition, the Township Board of Commissioners may institute suits, in equity or at law, to restrain, prevent, or abate a violation of this Part. Such proceedings may be initiated before any court of competent jurisdiction. The expense of such proceedings shall be recoverable from the violator in any manner as may now or hereafter be provided by law.

**ARTICLE III. Repealer**

All ordinances or parts of ordinances which are inconsistent herewith are hereby repealed.

**ARTICLE IV. Severability**

If any section, paragraph, subsection, clause or provision of this Ordinance shall be declared invalid or unconstitutional by a court of competent jurisdiction, such decision shall not affect the validity of this Ordinance as a whole or any part thereof other than that portion specifically declared invalid.

**ARTICLE V. Effective Date**

This Ordinance shall become effective in accordance with the Home Rule Charter of Radnor Township.

*ENACTED* and *ORDAINED* this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

**RADNOR TOWNSHIP  
BOARD OF COMMISSIONERS**


Attest: \_\_\_\_\_

\_\_\_\_\_  
Name:  
Title: President

**Radnor Township**  
**PROPOSED LEGISLATION**

DATE: May 8, 2018

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer 

CC: Robert A. Zienkowski, Township Manager  
William M. White, Assistant Township Manager/Finance Director  
John Rice, Solicitor  
Radnor Township Shade Tree Commission

**LEGISLATION: INTRODUCTION: ORDINANCE NO. 2018-07 AN ORDINANCE OF THE TOWNSHIP OF RADNOR, DELAWARE COUNTY, PENNSYLVANIA PROVIDING FOR THE AMENDMENT OF THE RADNOR TOWNSHIP CODE OF ORDINANCES BY AMENDING PART 2, GENERAL LEGISLATION CREATING A NEW CHAPTER 224, ADOPTING REGULATIONS FOR THE PLANTING, CONTROLLING, AND REMOVAL OF BAMBOO, INCLUDING PENALTIES AND OTHER REMEDIES FOR VIOLATIONS.**

---

LEGISLATIVE HISTORY: A draft bamboo ordinance was provided to the Board of Commissioners in 2017. At that time, the Commissioners sent the ordinance to the Shade Tree Committee for review and comment.

PURPOSE AND EXPLANATION: The Shade Tree Commission has provided what they wish to see as a Bamboo Ordinance, which was formatted by the Solicitor.

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners approval, the proposed legislation will be back in front of the Commissioners at the regularly scheduled May 21st, 2018 Board of Commissioners meeting. If adopted, the Ordinance will take effect on June 21st, 2018.

FISCAL IMPACT: There is no fiscal impact to Township to adopt this Ordinance.

**Recommendation: The Shade Tree Commission and Staff respectfully request the Board of Commissioners move proposed Ordinance.**

Enclosure: Ordinance 2018-07



# Gannett Fleming

Excellence Delivered *As Promised*

**Date:** May 2, 2018

**To:** Stephen Norcini, PE – Township Engineer

**From:** Roger Phillips, PE

**cc:** Robert Zienkowski – Township Manager  
Kevin W. Kochanski, RLA, CZO – Director of Community Development  
John Rice, Esq – Grim, Biehn, and Thatcher  
Amy Kaminski, PE – Gilmore and Assoc.

**RE:** Ardent Credit Union  
Waiver of Land Development

---

The applicant is requesting a waiver of the Township's Land Development process for the above referenced project located at 516 West Lancaster Avenue.

The applicant is proposing to demolish the existing 3,200 SF building and construct a 2,500 SF building in the same location. The previous use of the site was a restaurant and the proposed use is a bank. This project will reduce the total impervious coverage on the site from 88.9% to 63.0%. This project will remain subject to Zoning, Subdivision and Land Development, Stormwater Management, and other applicable codes of the Township of Radnor. The applicant is required to complete the grading permit process, which will include the review and approval of the required stormwater management system and subdivision and land development requirements. The plan as proposed is in conformance with all applicable Zoning requirements.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.

Roger A. Phillips, P.E.  
Senior Project Manager



**SAUL EWING**  
**ARNSTEIN**  
**& LEHR** <sup>LLP</sup>

David J. Falcone  
Phone: (610) 251-5752  
Fax: (610) 722-3270  
David.Falcone@saul.com  
www.saul.com

May 1, 2018

**VIA E-MAIL**

*(lborowski@radnor.org)*

Board of Commissioners  
Radnor Township  
301 Iven Avenue  
Wayne, PA 19087  
Attention: Ms. Lisa Borowski, President

**Re: *Ardent Federal Credit Union  
Request for Waiver of Land Development***

Dear Lisa:

This firm represents Ardent Federal Credit Union ("AFCU") with respect to AFCU's proposed development of the property located at 516 W. Lancaster Avenue (the "Property"). AFCU recently appeared before the Township's Planning Commission for a Sketch Plan review and has submitted application to the Township for Preliminary/Final Land Development for the Property.

Please accept this letter as a request for consideration by the Board of Commissioners for a waiver from the requirement to pursue formal land development approval.

Enclosed with this letter, please find a copy of the proposed site plan for the Property dated December 29, 2017 (last revised April 5, 2018), prepared by Barry Isett & Associates.

Should you have any questions, please don't hesitate to contact me.

Very truly yours,



David J. Falcone

Encl.

cc: Kevin Kochanski, Director of Community Development  
Steven Norcini, Township Engineer  
John Rice, Esquire

April 17, 2018

Page 2

Robert Zienkowski, Township Manager



# Gannett Fleming

*Excellence Delivered **As Promised***

**Date:** May 2, 2018

**To:** Stephen Norcini, P.E. – Township Engineer

**From:** Roger Phillips, PE

**cc:** Kevin W. Kochanski, RLA, CZO – Director of Community Development  
Peter Nelson, Esq. – Grim, Biehn, and Thatcher  
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.  
Patricia Sherwin – Radnor Township Engineering Department  
Andy Pencoast – Radnor Township Codes Official

**RE:** 516 W Lancaster Avenue – Preliminary/Final Plans  
Ardent Federal Credit Union – Applicant

Date Accepted: May 7, 2018  
60 Day Review: August 5, 2018

---

Gannett Fleming, Inc. has completed a review of the Preliminary/Final Plan for compliance with the Radnor Township Code. These Plans was reviewed for conformance with Zoning, Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The applicant is proposing to demolish the existing 3,200 SF building and construct a 2,500 SF building. This project is located in the C2 district of the Township.

Site Development – Preliminary/Final Plans

Plans Prepared By: Barry Isett & Associates, Inc.  
Dated: 12/29/2017, and last revised 04/05/2018

The applicant has indicated in an April 5, 2018 letter that they are requesting the following waivers:

1. §255-12.A – To submit preliminary and final plans submission concurrently.
2. §255-21.B(1)(n) – To not depict existing features within 500 feet of the site.
3. §255-27.C(1) – To not provide additional right-of-way and cartway along Lancaster Avenue.
4. §255-27.H(6) – To allow for a minimum driveway radius of 5 feet instead of 10 feet.
5. §255.27.I(2) – Access to parking areas on commercial, institutional, planned business and industrial sites shall be controlled and shall be so located to provide a minimum of 200 feet between points of access.
6. §255.27.I(5) – Private driveway shall not take access to an Arterial Road.





Zoning

1. The zoning table should be revised to indicate the zoning requirements and existing and proposed conditions. There appears to be a typo on the zoning table that indicates the existing parcel is 20,000 SF and the proposed parcel is 33,555 SF. The 20,000 SF is a requirement, not the actual existing condition.
2. §280-105.F – A portion of one of the parking spaces is less than 20 feet from the Lancaster Avenue right-of-way line. This is an existing non-conformity that the applicant wishes to continue.
3. §280-116 – All signs provided must be in accordance with this section.

Subdivision and Land Development

1. §255-12.A – To submit preliminary and final plans submission concurrently. The applicant has requested a waiver from this requirement.
2. §255.19.A(12) – Existing principal buildings and their respective uses, and driveways on the adjacent peripheral strip; sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site (this includes properties across streets). The applicant has requested a waiver from this requirement.
3. §255-27.C(1) – Lancaster Avenue is classified as an Arterial Street. The right-of-way and cartway as required to be recommended by PennDot. The applicant has requested a waiver from this requirement.
4. §255-27.H(6) – The minimum curb radii at street intersections shall be 25 feet for local streets, 30 feet for collectors; 35 feet for arterials; and 10 feet for driveways. The applicant has requested a waiver to allow for a minimum driveway radius of 5 feet instead of 10 feet.
5. §255.27.I(2) – Access to parking areas on commercial, institutional, planned business and industrial sites shall be controlled and shall be so located to provide a minimum of 200 feet between points of access. There is less than 200 feet existing between the access points along Lancaster Avenue. The applicant has requested a waiver from this requirement.
6. §255.27.I(5) – No private driveway shall have access to an arterial road. The existing non-conforming driveways are the only access to a public right-of-way. This must be provided or a waiver must be requested from this requirement. The applicant has requested a waiver from this requirement.



7. §255.29.A(13) – Tire bumpers shall be installed as to prevent vehicle overhang on any sidewalk area.
8. §255.41.B – Additional width of streets adjacent to areas proposed for nonresidential use may be required as deemed necessary by the Board of Commissioners to assure the free flow of through traffic from vehicles entering or leaving parking and loading areas.
9. §255.41.H – Outdoor collection stations shall be provided for garbage and trash removal when indoor collection is not provided. Collection stations shall be screened from view and landscaped. The applicant has indicated the collection station is screened from view by a fence, but there is no landscaping provided.

#### Stormwater Management

1. We note that SP-1 Site Development shows 5 future parking spaces at the southwest end of the parking lot. Please clarify if this future impervious is accounted for in the stormwater management system design.
2. §245-25(A)(1)(b) – Table 408.1 District A, the proposed condition 50-year design storm runoff rate must be reduced to the existing 50-year condition runoff rate. Pre- and post-development hydrographs for the 50-yr storm event must be provided.
3. §245-23(C) - To control postconstruction stormwater impacts from regulated earth disturbance activities, state water quality requirements can be met by BMPs, including site design, which provide for replication of preconstruction stormwater infiltration and runoff conditions so that postconstruction stormwater discharges do not degrade the physical, chemical, or biological characteristics of the receiving waters. As described in the DEP Comprehensive Stormwater Management Policy (No. 392-0300-002, September 28, 2002), this may be achieved by the following:
  - (1) Infiltration: replication of preconstruction stormwater infiltration conditions.
  - (2) Treatment: use of water quality treatment BMPs to ensure filtering out of the chemical and physical pollutants from the stormwater runoff.
  - (3) Streambank and streambed protection: management of volume and rate of postconstruction stormwater discharges to prevent physical degradation of receiving waters (e.g., from scouring).

The applicant must quantify the reduction in water quality volume from the pre-development to post-development condition to show that §245-23(D)(1) is met by site design under §245-23(C).

4. §245-22(A)(1)(a) – A minimum depth of 24 inches between the bottom of the BMP and the top of the limiting zone. Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans.



Steve Norcini, Township Engineer  
516 W. Lancaster Ave.  
May 2, 2018

5. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time.

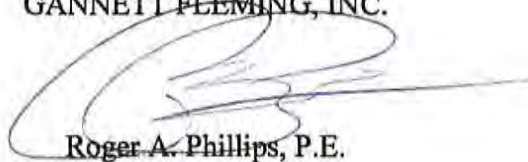
General

1. The applicant is proposing to re-use a portion of the existing sanitary sewer lateral. The condition must be verified and approval must be obtained from the Township Public Works Department to continue the use of the lateral.
2. General construction and grading note 16 refers to Whitemarsh Township. This must be revised.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.



Roger A. Phillips, P.E.  
Senior Project Manager





**MEMORANDUM**

---

**Date:** April 25, 2018

**To:** Steve Norcini, P.E. Radnor Township Engineer

**From:** Amy Kaminski, P.E., PTOE, Gilmore & Associates, Inc.  
Transportation Services Manager

**cc:** Roger Phillips, P.E., Gannett Fleming, Inc.  
Damon Drummond, P.E., PTOE, Gilmore & Associates, Inc.

**Reference:** Ardent Federal Credit Union- 516 W. Lancaster Avenue 2018-D-03  
Preliminary and Final Land Development Review 1  
Radnor Township, Delaware County, PA  
G&A 18-01157

---

Gilmore & Associates, Inc. (G&A) has completed a transportation review for the above referenced project and offers the following transportation comments for Radnor Township consideration:

**A. BACKGROUND**

The Applicant proposes demolishing an existing one-story 3,200 sf restaurant building located at 516 West Lancaster Avenue and construct a 2,327 sf drive-through bank utilizing the existing two access driveways to Lancaster Avenue with one-way onsite traffic circulation. The project is located in the C-2 General Commercial District.

**B. DOCUMENTS REVIEWED**

1. Preliminary and Final Land Development Plan (12 Sheets) for Ardent Credit Union, prepared by Barry Isett & Associates, Inc., dated December 29, 2017, last revised April 5, 2018.
2. Response Letter for Gilmore & Associates, Inc. dated April 5, 2018, prepared by Barry Isett & Associates, Inc.
3. Waiver Request Letter prepared for Ardent Credit Union, prepared by Barry Isett & Associates, Inc., dated April 5, 2018.

**C. REQUESTED WAIVERS**

1. §255-12.A – From submitting separate Preliminary plan and Final plan.

---

BUILDING ON A FOUNDATION OF EXCELLENCE

65 E. Butler Avenue | Suite 100 | New Britain, PA 18901  
Phone: 215-345-4330 | Fax: 215-345-8606

[www.gilmore-assoc.com](http://www.gilmore-assoc.com)

2. §255-21.B(1)(n) – From existing features within five-hundred (500) feet from the site.
3. §255-27.C(1) – From an eighty (80) foot right-of-way dedication and a forty-eight (48) foot cartway width along Lancaster Avenue.
4. §255-27.H(6) – From a minimum radius of ten (10) feet for driveways.
5. §255-27.I(2) – From a minimum separation of two-hundred (200) feet for points of access.

#### **D. ZONING COMMENTS**

1. §280-105.F – No parking, loading or service area shall be located within front yard setbacks except as is permitted in the case of PI, PA, PB and PLO Districts or unless authorized as a special exception by the Zoning Hearing Board in a Commercial or Commercial-Office District, provided that the restriction against such use is clearly impracticable. In no case, however, shall the distance between the street right-of-way line and the portion of a lot used for parking be less than 20 feet. We note the first two parking spaces proposed on both sides of the ingress from Lancaster Avenue are located less than 20 feet from the Lancaster Avenue right-of-way line. The two parking spaces should be eliminated as we anticipate the parking maneuvers will interfere with Lancaster Avenue street traffic.

#### **E. SUBDIVISION AND LAND DEVELOPMENT ORDINANCE COMMENTS**

1. §255-12.A – There are three stages in the procedure for approval of subdivision and land development plans. These stages are necessary to enable the Planning Commission and the Board of Commissioners to have an adequate opportunity to review the submission and to ensure that their formal recommendations are reflected in the final plans. The Applicant intends to seek a waiver from this requirement and provide one submission for both preliminary and final approval.
2. §255-21.B(1)(n) – The Applicant is required to provide existing features located within five-hundred (500) feet from the site. The Applicant intends to seek a waiver from this requirement.
3. §255-27.C(1) – The required right-of-way for Lancaster Avenue is 80 feet with a 48 foot cartway width; revise the plans to identify the required right-of-way and widen the cartway width to 48' or request a waiver from this section. The Applicant has requested a waiver from this requirement.
4. §255-27.A(8) – Any Applicant who encroaches within the legal right-of-way of a state highway is required to obtain a highway occupancy permit from the Pennsylvania Department of Transportation. Pennsylvania Code 67; Chapter 441 *Access to and Occupancy of Highways by Driveways and Local Roads* indicates all property owners must obtain a highway occupancy permit to gain access to and from a State road. The Response Letter for Gilmore & Associates, Inc. accompanying this submission notes the Applicant is applying for the Highway Occupancy Permit through PennDOT. We remind the Applicant to include the Township on all submissions and responses and ask the Applicant to include Gilmore & Associates, Inc. as an engineering firm (BPID 00288) on the application.

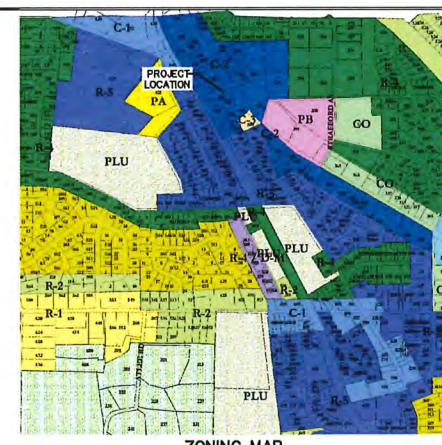
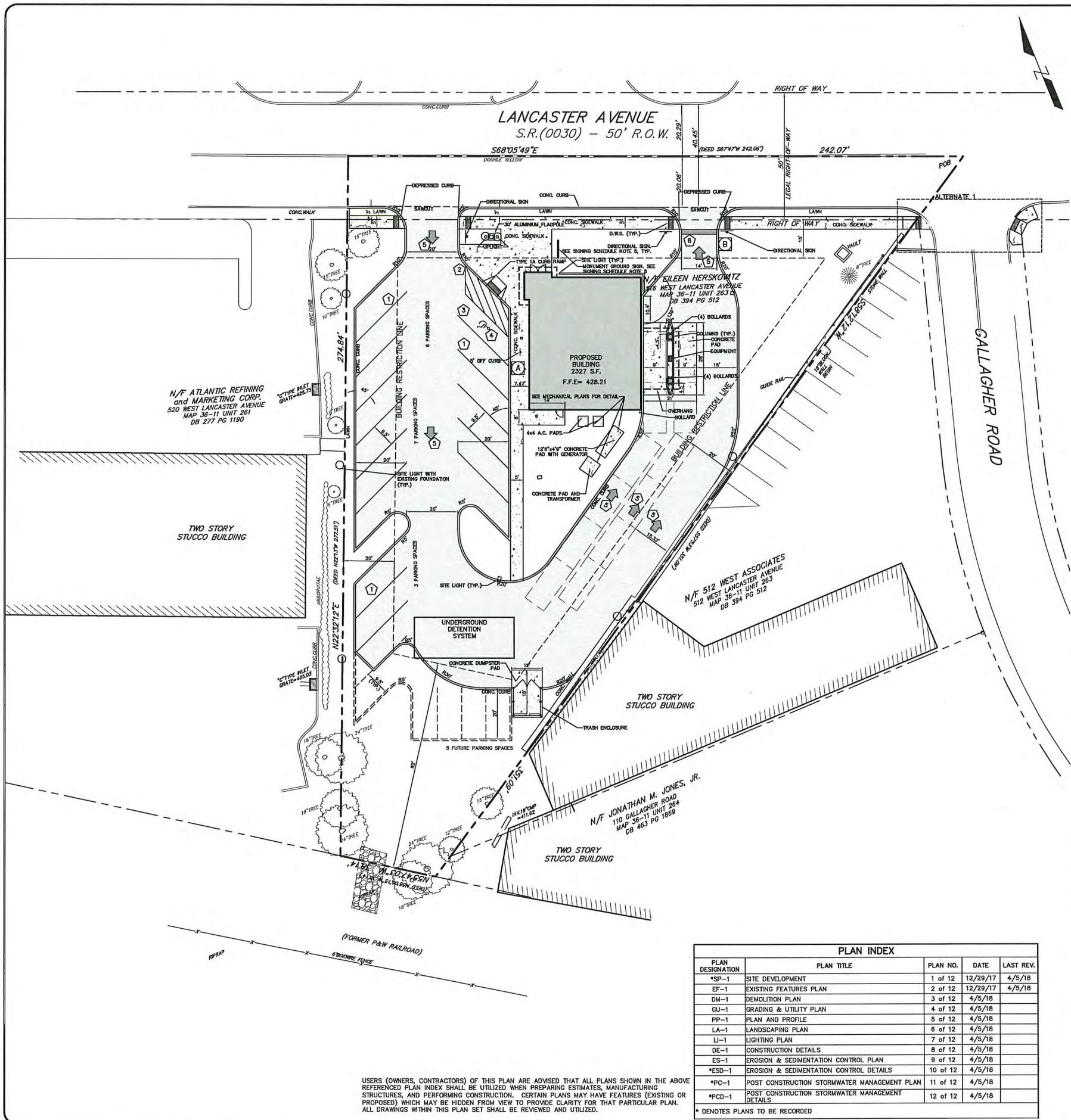
so the Township has immediate access to all submissions and PennDOT responses.

5. §255-27.H(6) – Minimum curb radii at street intersections shall be 25 feet for local streets; 30 feet for collectors; 35 feet for arterials; and 10 feet for driveways. The Applicant has requested a waiver from providing a minimum radius of ten (10) feet for the ingress eastern 5' curb radius.
6. §255-27.I(2)– Driveways shall be located as to provide a minimum of 200 feet between points of access. Verify the distance between the two driveway accesses is greater than 200 feet. The Applicant has requested a waiver from the requirement to allow less than 200 feet between points of access.
7. §255-29.A.(10) – Entrances and exits to and from off-street parking areas shall be located so as to minimize interference with street traffic. Alter the onsite circulation and reverse the ingress/egress driveways to provide an improved recirculation opportunity for patrons visiting the site and to minimize the interference with street traffic.
8. §255-29.A(13) – Tire bumpers shall be installed so as to prevent vehicle overhang on any sidewalk area. The six (6) parking spaces proposed along the sidewalk west of the proposed building require tire bumpers to eliminate vehicular overhang on the sidewalk.
9. §255-37.G & §255-37.H – Sidewalks and pedestrian paths shall be laterally pitched at a slope of not less than one-quarter inch per foot. Sidewalk and pedestrian paths shall not exceed a seven (7) percent grade. Where sidewalk grades exceed five (5) percent, a nonslip surface texture shall be used. The Applicant shall revise the plans to comply with this section.

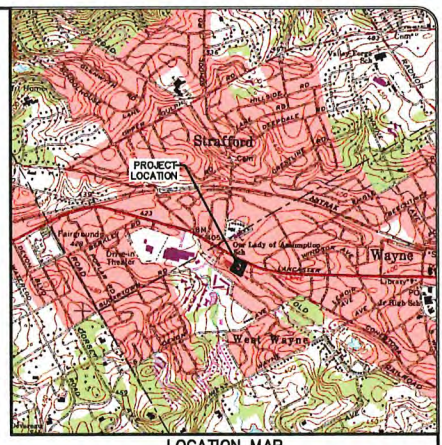
## **F. GENERAL COMMENTS**

1. Include in the next submission the Ardent Credit Union Proposed Signage Plan, prepared by Lamacchia Group, dated January 31, 2018.
2. The R1-1 STOP sign at the egress driveway should be rotated to face exiting motorists. Further sign comments will be withheld until the Proposed Signage Plan noted in F.1. is provided for review and comment.
3. Provide 4" inch white lane lines for the drive thru lanes.
4. Provide a 5' feet long straight arrow south of the site.
5. The Applicant should include truck-turning templates to ensure adequate turn radii to accommodate the largest anticipated tractor-trailers accessing the site; at a minimum, truck turning templates should be provided indicating adequate circulation for sanitation trucks servicing the onsite trash receptacle.

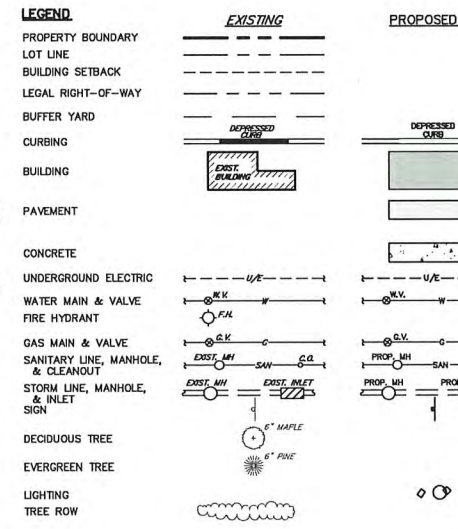
6. The Applicant should provide an ADA curb ramp south of the proposed concrete sidewalk and provide detailed grading for the proposed ADA curb ramps to include spot elevations, dimensions and proposed slopes on the Final plan submission. Refer to PennDOT RC-67M for design guidance. We recommend the Township retain this information in support of future ADA compliancy.



PLAN PREPARER: PAUL T. SCHMOLL, P.E.  
BARRY ISETT & ASSOCIATES  
85 SOUTH ROUTE 100  
ALLEN TOWNSHIP, PA 18106  
610-398-0904  
PSCHMOLL@BARRYISETT.COM



**SITE DATA:**  
CURRENT DEED OWNER: N/F EILEEN HERSHKOWITZ  
DEVELOPER/EQUITABLE OWNER: ARDENT FEDERAL CREDIT UNION  
1500 SPRING GARDEN ST, PHILADELPHIA, PA 19130  
SITE ADDRESS: 516 W. LANCASTER AVE.  
WAYNE, PA 19087  
DB 394, PG. 512  
MAP: 38-11, UNIT 263  
P/N:  
TOTAL AREA: GROSS AREA= 39,380.46 S.F.  
RIGHT OF WAY = 5,825.77 S.F.  
NET AREA = 33,554.69 S.F. / 0.77 ACRES  
EX. BLDG. COVERAGE: 9.6%  
EX. IMP. COVERAGE: 88.9%  
PROPOSED BLDG. COVERAGE: 8.9%  
PROPOSED IMP. COVERAGE: 63.0%  
SEWER: PUBLIC  
WATER: PUBLIC



**ZONING DATA:**  
DISTRICT: C-2 GENERAL COMMERCIAL  
USE: BANK OR FINANCIAL INSTITUTION

	EXISTING	PROPOSED
PROPERTY LOT SIZE:	20,000 S.F.	33,555 S.F.
MINIMUM LOT WIDTH: (Ø BLDG. LINE)	100 FT.	202 FT.
MINIMUM YARDS:		
FRONT:	15 FT.	15 FT.
SIDE:	20 FT.	20 FT.
REAR: (35' OR 35% OF TOTAL DEPTH)	98 FT.	82 FT.
MAXIMUM BUILDING HEIGHT:	35 FT.	<35 FT.
MAXIMUM BUILDING COVERAGE (30%):	9.6%	8.9%
MAXIMUM IMPERVIOUS COVERAGE (70%):	88.9%	63.0%

**PARKING REQUIREMENTS:**  
**REQUIRED PARKING:**  
1 SPACE PER 200 SQUARE FEET OF FLOOR AREA  
1 SPACE FOR EVERY 2 EMPLOYEES  
2500 SF/200 = 12.5 SPACES REQUIRED  
7 EMPLOYEES / 2 EMPLOYEES = 3.5 REQUIRED  
TOTAL SPACES REQUIRED = 16 SPACES  
**PROVIDED PARKING:**  
TOTAL PROVIDED SPACES = 16 SPACES

**DATUM:**  
THE VERTICAL DATUM IS NAVD88 AND HORIZONTAL DATUM IS NAD 83  
TAKEN FROM GPS OBSERVATION.

**REFERENCE PLAN:**  
SURVEY PLAN FOR 512 WEST LANCASTER AVENUE CONDOMINIUM  
PREPARED BY MEYNER ENGINEERS AND SURVEYORS AND DATED  
APRIL 21st, 1987.

- NOTES:**
- BOUNDARY & TOPOGRAPHIC INFORMATION OBTAINED FROM A FIELD SURVEY BY BARRY ISETT AND ASSOCIATES, INC., PERFORMED ON DECEMBER 18, 2017.
  - THESE DRAWINGS HAVE BEEN PREPARED BASED ON THE BEST AVAILABLE INFORMATION. THE LOCATION OF THE EXISTING ABOVE GROUND FIELD VISIBLE UTILITIES ARE FROM FIELD OBSERVATION. THE ENGINEER HAS NOT VERIFIED THE ACCURACY OF THE UNDERGROUND UTILITIES AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT. CONTRACTORS SHALL BE RESPONSIBLE FOR VERIFYING EXISTING CONDITIONS PRIOR TO ANY FUTURE CONSTRUCTION IN ACCORDANCE WITH PA ACT 187.
  - IF CONFLICTS WITH THIS PLAN ARE FOUND THE CONTRACTOR SHALL NOTIFY THE OWNER AND DESIGN ENGINEER FOR INSTRUCTION BEFORE PROCEEDING WITH WORK.
  - ALL TOWNSHIP PERMITS MUST BE OBTAINED PRIOR TO THE START OF CONSTRUCTION.
  - ALL SIGNS AND PAVEMENT MARKINGS ARE TO COMPLY WITH THE LATEST EDITION OF THE MUTCD.
  - SEE ARCHITECTURAL DRAWINGS FOR EXACT BUILDING DIMENSIONS AND FOR ADDITIONAL INFORMATION AND DETAILS.
  - OWNER/CONTRACTOR TO DETERMINE ANY ADDITIONAL DOOR LOCATIONS AS REQUIRED BY APPLICABLE CODES.

**SIGNING SCHEDULE**

SYMBOL	MUTCD / PENNDOT SERIES	SIZE	REMARKS
(A)	R7-B / R7-BP	12"x18"	RESERVED PARKING SIGN VAN ACCESSIBLE
(B)	R1-1	18"x18"	STOP SIGN

- NOTES:**
- ALL SIGNS ARE TO BE PLAT SHEET ALUMINUM.
  - REFERENCE TO PENNDOT 408 SECTION, LATEST EDITION.
  - ALL HANDICAP PARKING SIGNAGE SHALL COMPLY WITH SECTION 3354(d)(3)(i) OF 75 P.S. C.S. (THE VEHICLE CODE).
  - MOUNT SIGN IN ACCORDANCE WITH ALL ADA REQUIREMENTS.
  - REFER TO ARDENT CREDIT UNION PROPOSED SIGNAGE PLAN, DRAWN BY LAMACCHIA GROUP, DATED 1/31/18 FOR DIRECTIONAL SIGN AND MONUMENT SIGN.

**PAVEMENT MARKINGS**

LABEL	DESCRIPTION
(1)	4" SINGLE WHITE LINE
(2)	ADA GORE AREA (4" SINGLE BLUE OUTLINE WITH 4" BLUE LINES 30' C-C @ 45°)
(3)	4" SINGLE BLUE LINE
(4)	ACCESSIBILITY SYMBOL (WHITE SYMBOL ON 48"x48" BLUE BACKGROUND)
(5)	STRAIGHT ARROW (5' LONG, WHITE)
(6)	STOP BAR (WHITE)

**PLAN INDEX**

PLAN DESIGNATION	PLAN TITLE	PLAN NO.	DATE	LAST REV.
*SP-1	SITE DEVELOPMENT	1 of 12	12/29/17	4/5/18
EF-1	EXISTING FEATURES PLAN	2 of 12	12/29/17	4/5/18
DM-1	DEMOLITION PLAN	3 of 12	4/5/18	
GU-1	GRADING & UTILITY PLAN	4 of 12	4/5/18	
PP-1	PLAN AND PROFILE	5 of 12	4/5/18	
LA-1	LANDSCAPING PLAN	6 of 12	4/5/18	
LI-1	LIGHTING PLAN	7 of 12	4/5/18	
DE-1	CONSTRUCTION DETAILS	8 of 12	4/5/18	
ES-1	EROSION & SEDIMENTATION CONTROL PLAN	9 of 12	4/5/18	
*ESD-1	EROSION & SEDIMENTATION CONTROL DETAILS	10 of 12	4/5/18	
*PC-1	POST CONSTRUCTION STORMWATER MANAGEMENT PLAN	11 of 12	4/5/18	
*PCD-1	POST CONSTRUCTION STORMWATER MANAGEMENT DETAILS	12 of 12	4/5/18	

\* DENOTES PLANS TO BE RECORDED

USERS (OWNERS, CONTRACTORS) OF THIS PLAN ARE ADVISED THAT ALL PLANS SHOWN IN THE ABOVE REFERENCED PLAN INDEX SHALL BE UTILIZED WHEN PREPARING ESTIMATES, MANUFACTURING STRUCTURES, AND PERFORMING CONSTRUCTION. CERTAIN PLANS MAY HAVE FEATURES (EXISTING OR PROPOSED) WHICH MAY BE HIDDEN FROM VIEW TO PROVIDE CLARITY FOR THAT PARTICULAR PLAN. ALL DRAWINGS WITHIN THIS PLAN SET SHALL BE REVIEWED AND UTILIZED.

OUR BUSINESS IS BUILDING YOUR  
**LAMACCHIA GROUP**  
PLAN - DESIGN - BUILD - PEOPLE  
Mechanic, Wisconsin 53072  
T 414.223.4400 F 414.223.4408  
www.lamacchiagroup.com

REVISIONS	DATE	BY
1. LAMACCHIA COMMENTS	12/29/17	JAK
2. TWP COMMENTS	4/5/2018	GBC

610.398.0904  
barryisett.com  
**BARRY ISETT & ASSOCIATES**  
MULTI-DISCIPLINE ENGINEERS AND CONSULTANTS

**PRELIMINARY/FINAL PLANS**  
**SITE DEVELOPMENT**  
ARDENT FEDERAL CREDIT UNION  
LANCASTER AVENUE, RADNOR TOWNSHIP  
DELAWARE COUNTY, PENNSYLVANIA

DATE: 12/29/17 DSGN: KJL  
SCALE: 1"=20' CHK: ...  
DRAWN: GBC APPRD: ...  
JOB: 1066617.000 P MGR: PTS  
COPYRIGHT 2017  
SHEET: 1 OF 12  
**SP-1**

NOTE:  
VERTICAL TEXT INDICATES PROPOSED FEATURES  
SLANTED TEXT INDICATES EXISTING FEATURES

0 20' 40' 60'  
SCALE: 1"=20'





*Excellence Delivered **As Promised***

**Date:** May 2, 2018

**To:** Stephen Norcini, PE – Township Engineer

**From:** Roger Phillips, PE

**cc:** Robert Zienkowski – Township Manager  
Kevin W. Kochanski, RLA, CZO – Director of Community Development  
John Rice, Esq – Grim, Biehn, and Thatcher  
Amy Kaminski, PE – Gilmore and Assoc.

**RE:** First Resource Bank  
Waiver of Land Development

---

The applicant is requesting a waiver of the Township's Land Development process for the above referenced project located at 321 West Lancaster Avenue.

The applicant is proposing to convert a former medical office building to a bank branch for First Resource Bank. The bank will contain a drive through and an ATM. This project will remain subject to Zoning, Subdivision and Land Development, Stormwater Management, and other applicable codes of the Township of Radnor. The applicant is required to complete the grading permit process, which will include the review and approval of the required stormwater management system and subdivision and land development requirements. The plan as proposed is in conformance with all applicable Zoning requirements.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.

A handwritten signature in blue ink, appearing to read 'R. Phillips', written over a circular stamp or seal.

Roger A. Phillips, P.E.  
Senior Project Manager



DEBRA A. SHULSKI  
[Debbie@rrhc.com](mailto:Debbie@rrhc.com)  
Extension 210



May 2, 2018

Via Email and First Class Mail

Radnor Township Board of Commissioners  
c/o Robert A. Zienkowski, Township Manager  
301 Iven Avenue  
Wayne, PA 19087

RE: First Resource Bank/Radnor Township  
Waiver from Land Development Request  
Our File No.: 6854-02

Dear Board of Commissioners:

Please accept this letter on behalf of First Resource Bank as a request for a waiver from the land development process relevant to its proposal for property located at 321 West Lancaster Avenue in Radnor Township ("Property").

The Property contains an existing medical office building and associated parking. The proposal involves a redevelopment in which the medical office building is proposed to be demolished and converted into a bank with a drive-thru. The redevelopment results in an overall net reduction in the existing building coverage.

The Applicant is proposing stormwater management improvements in accordance with all applicable codes and ordinances whereas there is currently no stormwater management existing on the Property. The Applicant has also agreed to provide plant materials in accordance with the pending ordinance proposed to be adopted and has received a favorable recommendation from the Shade Tree Commission at a recent meeting attended on April 25, 2018.

The redevelopment involved approval from the Zoning Hearing Board to reduce the stacking associated with the drive-thru which was granted on February 15, 2018. As part of the Zoning Hearing Board process, the Applicant previously attended a Planning Commission meeting and re-designed the plan in accordance with comments and feedback received from the Planning Commission.

Radnor Township Board of Commissioners  
c/o Robert A. Zienkowski, Township Manager  
May 2, 2018  
Page 2 of 2

Although a waiver from the land development process is being requested, the Applicant is compliant with all applicable terms of the Subdivision and Land Development Ordinance and is not seeking any waivers other than from the land development process itself. The Applicant intends to comply with all applicable reviews received by the Township Engineer and Township staff and agrees to obtain all applicable stormwater/grading permits and all applicable third party permits.

It is my understanding that this matter will be placed on the upcoming Board of Commissioners' May 14<sup>th</sup> meeting. We look forward to being before the Commissioners at that time.

Very truly yours,

  
DEBRA A. SHULSKI

DAS/kch  
Enclosures

cc: Stephen F. Norcini, P.E. (via email only)  
Glenn Marshall (via email only)  
Charles Dobson, P.E. (via email only)



*Excellence Delivered **As Promised***

**Date:** May 2, 2018

**To:** Steve Norcini, PE Township Engineer

**From:** Roger Phillips, PE

**cc:** Kevin W. Kochanski, RLA, CZO – Director of Community Development  
Peter Nelson, Esq. – Grim, Biehn, and Thatcher  
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.  
Patricia Sherwin – Radnor Township Engineering Department  
Andy Pancoast – Radnor Township Code Official

**RE:** 321 West Lancaster Avenue  
First Resource Bank – Applicant

Date Accepted: May 7, 2018  
90 Day Review: August 5, 2018

---

Gannett Fleming, Inc. has completed a review of the First Resource Bank Preliminary/Final Land Development Plan for compliance with the Radnor Township Code. This Plan was reviewed for conformance with Zoning, Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The intent of the plan is to convert a former medical office building to a bank branch for First Resource Bank. The bank will contain a drive through and an ATM.

The applicant has received variances from §280-103.B(11) and §280-109. A copy of the Zoning Hearing Board decision is attached to this letter.

The applicant is requesting a waiver from §255-14 to allow the submission of the plan as preliminary/final.

Plans Prepared By: Inland Design  
Dated: 04/06/2018

### Zoning

1. §280-43.A(1) – Every lot on which a building is erected or used shall have a minimum lot area. The minimum lot area for a two-story building or less is 20,000 square feet. This an existing non-conformity that the applicant intends to continue.
2. §280-43.B(1) – Every lot shall have a width at the building setback line of not less than 100 feet. This is a non-conformity that the applicant intends to continue. We note that



there is a typo in the zoning table that indicates the existing lot width as 19.24 feet instead of 91.24 feet. This must be revised.

3. §280-43.D – No building shall be located less than 65 feet from a street right-of-way line, less than 20 feet from a side property line nor less than 25 feet from a rear property line. These are existing non-conformity's that the applicant intends to continue.
4. §280-44.B – Additional information must be provided on the detail on sheet 12 of 12 to indicate conformation with this section.
5. §280-105.E – The height of any luminary shall not exceed 25 feet. The height of the proposed luminaries must be noted on the plans.
6. §280-116 – Any proposed signs must be in conformance with this section.

#### Subdivision and Land Development

1. §255.21.B(1)(n) – Existing principal buildings and their respective uses, and driveways on the adjacent peripheral strip; sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site (this includes properties across streets). This must be provided or a waiver requested.
2. §255.27.C(2) – Additional right-of-way and/or cartway widths may be required by the Board of Commissioners in order to lessen traffic congestion, to secure safety from fire, panic and other dangers, to facilitate the adequate provision for transportation and other public requirements and to promote the general welfare.
3. §255.27.H(6) – The curb radii at the driveway and street intersection must be labeled on the plans.
4. §255.27.I(5) – In general, no private driveway shall take access to an arterial or major collector street. This is an existing condition and a waiver requested.
5. §255-29.A(1) – A two-way aisle width with 90° parking shall be a minimum of 22 feet. There is one location in the front of the building that this requirement is not met and only 20 feet is provided.
6. §255-29.A(18) – All common parking areas shall be adequately lighted during after-dark operating hours. All lighted standards shall be located on raised parking islands and not on the parking surface.

7. §255-29.B(1) – All parking areas shall have at least one tree 2 ½ minimum in caliper for every five parking spaces in single bays and one tree 2 ½ minimum in caliper for every parking space in double bays. These landscape requirements must be provided on the planting plan.
8. §255-38.B – Street trees 2 ½ inches ddb at intervals of not more than 30 feet along both sides of new streets and along one or both sides of an existing street within the proposed subdivision or land development. These landscape requirements must be provided on the planting plan.
9. §255-42.A – Buffer screens are required between subdivisions and land developments and along existing streets to soften visual impact, to screen glare, and to create a visual barrier between conflicting land uses. The plans indicate a 10' landscaping buffer will be provided. The type of buffer and planting calculations must be provided on the planting plan.

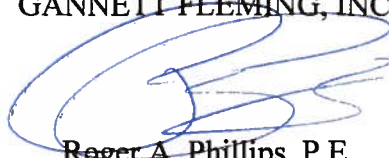
#### Stormwater

1. §245-23(D)(1) – The following calculation formula is to be used to determine the water quality storage volume ( $WQ_v$ ) in acre-feet of storage required by this chapter:  
 $WQ_v = [(P)(R_v)(A)]/12$ , where:  
 $WQ_v$  = Water quality volume (acre-feet)  
 $P$  = 1 inch  
 $A$  = Area of the project contributing to the water quality BMP (acres)  
 $R_v$  =  $0.05 + 0.009(I)$  where  $I$  is the percent of the area that is impervious surface  $[(\text{impervious area}/A) \times 100]$   
Calculations showing the water quality volume required must be provided.
2. §245-27(H) – Adequate erosion protection shall be provided along all open channels and at all points of discharge. The proposed discharge must be revised so as not to create a concentrated point of discharge. This can be accomplished with a level spreader.
3. All utilities crossing the storm system piping must be shown on the storm profiles.
4. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.



Roger A. Phillips, P.E.  
Senior Project Manager

**RADNOR TOWNSHIP ZONING HEARING BOARD**

**APPEAL NO. 3012**

**APPEAL OF FIRST RESOURCE BANK**, premises located at 321 East Lancaster Avenue and zoned CO. Appellant seeks: (i) a variance from Zoning Code Section 280-103.B(11) to allow a stacking length of less than twelve vehicles; (ii) a variance from Zoning Code Section 280-109.A to allow a fence height of greater than six feet (for purposes of providing a greater buffer to the properties abutting the rear of the subject premises); (iii) a variance from Zoning Code Section 280-122.C(2) to permit the proposed wall sign to exceed a sign height of fifteen feet above the existing grade; and (iv) any other variances and/or relief that the Zoning Hearing Board may deem necessary.

**DECISION OF THE ZONING HEARING BOARD**

Appellant has withdrawn the variance request from Zoning Code Section 280-122.C(2) for the wall sign of height in excess of fifteen feet above grade on the subject premises. Such request no longer is part of this Appeal, and any wall sign located on the subject premises shall be constructed in conformity with the requirements of the Zoning Code.

Variances from Zoning Code Sections 280-103.B(11) and 280-109.A are granted, the order of the Zoning Officer is reversed, and an appropriate permit is ordered to be issued to authorize the stacking of vehicles on the subject premises, and the construction of an eight foot high fence along the rear of the subject premises, all in the precise manner shown on that certain Proposed Layout Plan (the "Plan") dated January 8, 2018, as prepared by Inland Design, which Plan has been annotated by Appellant at the hearing on this Appeal, and, as annotated, has been entered into and made part of the record as Appellant's Exhibit "A-9", and otherwise in accordance with the other plans, evidence and testimony introduced by Appellant and made part of the record, to the extent consistent with the Plan. The relief granted herein is limited to relief from Zoning Code Section 280-103.B(11) and Zoning Code Section 280-109.A, and no relief is granted from any other provision of the Zoning Code, or with respect to any other Township Ordinances, including the Township's Subdivision and Land Development Ordinance.

**BY ORDER OF THE ZONING HEARING BOARD**

**/s/ WILLIAM MARTIN, CHAIRMAN**

**/s/ BRADLEY DELIZIA**

**/s/ JOHN REILLY**

**/s/ MATTHEW HOMYK**

**Board Vice Chairman George Nagle concurs in part and dissents in part.** While I concur with the grant of a variance from the vehicle stacking requirements of Zoning Code Section 290-103.B(11), I respectfully dissent from the granting of a variance from Zoning Code Section 280-109.A to authorize an eight foot high fence along the rear property line of the subject premises. I do not believe that the



Appellant has established any hardship peculiar to the subject premises to justify this variance, and I believe this variance will adversely impact properties to the rear of the subject premises.

DATED: February 15, 2018

MAILED: March 2, 2018

THIS DECISION WILL EXPIRE IF THE APPELLANTS FAIL TO OBTAIN A BUILDING PERMIT WITHIN SIX MONTHS OF THIS DATE: MARCH 2, 2018.



---

**MEMORANDUM**

---

**Date:** April 27, 2018

**To:** Stephen J. Norcini, P.E.  
Radnor Township Engineer

**From:** Amy B. Kaminski, P.E., PTOE, Gilmore & Associates, Inc.  
Township Traffic Engineer

**Cc:** Roger A. Phillips, P.E., Gannett Fleming, Inc., Senior Associate  
Township Engineer

Damon Drummond, P.E., PTOE, Gilmore & Associates, Inc.  
Senior Transportation Engineer

**Reference:** 321 West Lancaster Avenue First Resource Bank  
Preliminary as Final Land Development Review 2  
Radnor Township, Delaware County, PA  
G&A No. 18-01158

---

Gilmore & Associates, Inc. (G&A) has completed a transportation review for the above referenced project and offers the following transportation comments for Radnor Township consideration:

**A. BACKGROUND**

The Applicant proposes to renovate a 3-story medical office building located 321 West Lancaster Avenue on TMP 36-01-00289-00 to a 2,250 square foot First Resource Bank with a drive-thru. The parcel is located in the Commercial-Office CO Zoning District and access to the site will be provided via one (1) full access driveway.

**B. DOCUMENTS REVIEWED**

1. Preliminary/Final Land Development Plan for 321 West Lancaster Avenue, prepared by Inland Design, LLC, dated April 6, 2018.
2. Subdivision and Land Development Application
3. Waiver Request Letter prepared by Inland Design, LLC, dated April 6, 2018.

**C. APPROVED VARIANCES**

1. §280-103.B(11) – To allow a stacking length of less than twelve vehicles
2. §280-209.A. – To allow a fence height greater than six feet

**D. REQUESTED WAIVERS**

1. §255-14 – To allow submission of combined Preliminary/Final plans for this project.

---

BUILDING ON A FOUNDATION OF EXCELLENCE

65 E. Butler Avenue | Suite 100 | New Britain, PA 18901  
Phone: 215-345-4330 | Fax: 215-345-8606

[www.gilmore-assoc.com](http://www.gilmore-assoc.com)

---

## **E. SALDO COMMENTS**

The applicant is required to revise the preliminary as final plans to address non-compliance or request a waiver from each of the identified ordinances:

1. §255-27.A(8) – Any applicant who encroaches within the legal right-of-way of a state highway is required to obtain a highway occupancy permit from the Pennsylvania Department of Transportation. The Applicant shall copy the Township on all correspondence with PennDOT and extend an invitation to the Township for all meetings. Additionally, in order to facilitate the Township review of the HOP submission, the Applicant shall include Gilmore & Associates (Business Partner ID BPID 000288) as an “Engineering Firm” on the permit application within the PennDOT ePermitting System.
2. §255-27.H(6) – Minimum curb radii at street intersections shall be 10 feet for driveways.
3. §255-28.B – Lancaster Avenue is identified as a Major Arterial and therefore requires a stopping sight distance of 350 feet. Revise the plans to provide a minimum of 350 feet in both directions. In addition, the plans note the use of unmowed Fescue grass between the parking spaces and driveway aisle. Depending on the seed variety, the height of the unmowed grass may limit the visibility of pedestrians and motor vehicles alike.
4. §255-29.A(14) – No less than a five-foot radius of curvature shall be permitted for all curblines in parking areas. Sheet 3 of 13 notes a 5’ or greater radius for the areas adjacent to the parking spaces closest to the front and rear of the building; however, no curbs are provided to deter motorists from driving outside of the paved area and into the grass adjacent to parking stalls located near the building and along the aisle way.
5. §255-37.B – The minimum width of all sidewalks and pedestrian paths shall be four feet. Revise Sheet 3 to identify the proposed width of the sidewalk. Additionally, a two (2) foot grass strip should be provided between the sidewalk and the curblines containing the existing utility pole along Lancaster Avenue with transitions to meet the existing sidewalks on both adjacent parcels (TMPs 36-12-246 and 36-12-242).
6. §255-37.F – The Applicant shall revise the plans to provide ADA complaint curb ramps at the driveway. Detailed grading including elevations, slopes and dimensions should be included in order to verify constructability.
7. §255-37.G – Sidewalk and pedestrian paths shall be laterally pitched at a slope of not less than ¼ inch per foot to provide for adequate surface drainage.

## **F. GENERAL COMMENTS**

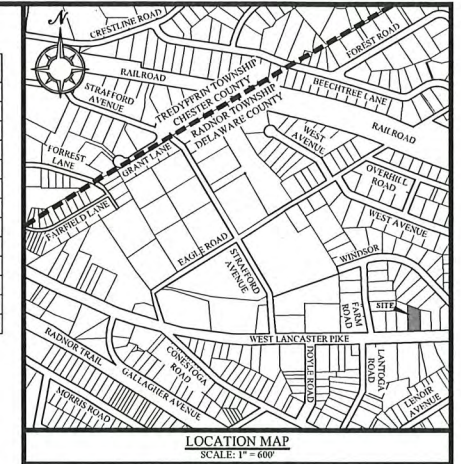
1. Provide a detectable warning surface across the entire length of the level landing area adjacent to the ADA accessible access aisle.
2. During construction, pedestrian accessible routes must be constantly be open to the general public and maintained or temporary facilities must be provided for all existing pedestrian routes along Lancaster Avenue (S.R. 30).

3. Revise Sheet 3 to include the color and size designation for all proposed pavement markings, including gore areas.
4. Provide an R1-1 STOP sign and stop bar at the driveway egress.
5. Provide R5-1 DO NOT ENTER signs, size 30"x30", at the following locations:
  - a. Between the front parking area and the one-way drive aisles along the west of the building.
  - b. To the rear of the site at the end of the one-way drive aisle to the east of the building.
6. The following details should be added to the plans:
  - a. Pavement marking and striping details (color, width, etc.) for parking stalls, striping and pavement arrows.
  - b. Proposed signage details.
  - c. Driveway apron details demonstrating ADA compliance. See PennDOT RC-67M for further guidance.
7. Verify the location of the handicapped parking space at the front of the site. It appears the symbol was mistakenly located in the wrong space. In addition, provide the appropriate handicapped parking signage.
8. We recommend providing bollards on the northwest, west and southwest sides of the building adjacent to the drive-through lane.
9. Revise Sheet 3 to identify the location of the existing utility poles.
10. Revise the typical sidewalk section to provide a six (6) inch aggregate subbase. See PennDOT RC-67M for further details.
11. Future plan submissions should be accompanied by a cover letter prepared by the Applicant and include a list of all outstanding comments along with detailed responses addressing each comment.

# PRELIMINARY/FINAL LAND DEVELOPMENT PLAN FOR FIRST RESOURCE BANK 321 WEST LANCASTER AVENUE RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA

### SHEET INDEX

SHEET NO.	SHEET DESCRIPTION
1	COVER SHEET
2	TITLE PLAN
3	LAYOUT & GEOMETRY PLAN
4	EXISTING RESOURCE & NATURAL RESOURCE PLAN
5	DEMOLITION PLAN
6	GRADING & UTILITIES PLAN
7	POST CONSTRUCTION STORMWATER MANAGEMENT PLAN & PROFILES
8	RECHARGE BED DETAILS
9	SEDIMENT & EROSION CONTROL PLAN
10	SEDIMENT & EROSION CONTROL DETAILS & NOTES
11	LIGHTING PLAN
12	CONSTRUCTION DETAILS
1.401	LANDSCAPING PLAN (BY OTHERS)



### GENERAL NOTES:

- THE PURPOSE OF THIS PLAN IS TO DEVELOP THE SITE AS A BANK, SHOW THE PROPOSED LAYOUT OF THE SITE BASED ON THE CONVERSION OF THE EXISTING BUILDING TO A BRANCH OF FIRST RESOURCE BANK.
- TOTAL TRACT AREA = 18,810 S.F.
- TAX PARCEL NUMBER: 36-12-243, FOLIO NUMBER: 36-01-00289-00.
- SOURCE OF TITLE: DEED BOOK, 1987, PAGE 1531.
- BOUNDARY INFORMATION SHOWN PER PHYSICAL FIELD SURVEY PERFORMED IN NOVEMBER, 2017 BY INLAND DESIGN, LLC, WEST CHESTER, PA.
- TOPOGRAPHIC INFORMATION AND IMPROVEMENTS SHOWN BY PHYSICAL FIELD SURVEY PERFORMED IN OCTOBER, 2017 BY INLAND DESIGN, LLC, WEST CHESTER, PA. CONTOUR INTERVAL = 2 FOOT. DATUM IS NAVD83.
- THE PROPERTY IS LOCATED WITHIN THE CO & R-4 ZONING DISTRICT. NO DEVELOPMENT IS PROPOSED WITHIN THE R-4 DISTRICT.
- THERE IS NO 100 YEAR FLOODPLAIN LINE SHOWN ON THE PLAN, WHICH WAS DETERMINED FROM THE REFERENCE FIRM PANELS, MAP NUMBER 42040010E, EFFECTIVE 11/18/2009.
- THERE ARE NO WETLAND AREAS LOCATED ON THIS SITE PER THE NATIONAL WETLANDS INVENTORY MAPS.
- SOILS INFORMATION TAKEN FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE.
- ACCORDING TO THE DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES OF PENNSYLVANIA, THE UNDERLYING GEOLOGIC FORMATION FOR THIS SITE IS MAPK (GNESS) (Gneiss).
- THE PROPERTY IS SERVICED BY PUBLIC SEWER AND PUBLIC WATER.
- THE NEAREST FIRE HYDRANTS ARE LOCATED 260 FEET TO THE WEST AT THE NORTHWEST CORNER OF THE INTERSECTION OF W. LANCASTER AVE. AND FARM ROAD, AND 300 FEET TO THE EAST AT THE NORTHWEST CORNER OF THE INTERSECTION OF W. LANCASTER AVE. AND BANBURY WAY.
- A PENNDOT HIGHWAY OCCUPANCY PERMIT IS REQUIRED FOR THE DRIVEWAY ACCESSING WEST LANCASTER AVENUE (S.R. 0950).
- THE SITE IS TRIBUTARY TO ITHAN CREEK, WHICH HAS A CHAPTER 93 DESIGNATION AS A COLD WATER FISHERY/MIGRATORY FISH (CWF/MF). ITHAN CREEK IS PART OF THE DARBY CREEK WATERSHED.
- COMPLETENESS OR ACCURACY OF LOCATION AND DEPTH OF UNDERGROUND UTILITIES AND FACILITIES CANNOT BE GUARANTEED. THE CONTRACTOR MUST VERIFY THE LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND/OR FACILITIES PRIOR TO BEGINNING ANY EARTH-MOVING ACTIVITIES.



### ZONING DATA CO COMMERCIAL-OFFICE DISTRICT

DESCRIPTION	REQUIREMENTS	EXISTING	PROPOSED
MINIMUM LOT AREA (3 STORIES OR MORE)	30,000 S.F.	18,810 S.F. (GROSS) <sup>1</sup>	18,810 S.F. (GROSS) <sup>1</sup>
MINIMUM LOT WIDTH @ BUILDING LINE	100 FEET	19.24 FEET <sup>1</sup>	91.24 FEET <sup>1</sup>
MAXIMUM BUILDING AREA	20%	7.32%	6.45%
BUILDING FLOOR AREA	SEE <sup>2</sup>	2,384 S.F. (80% OF 2,880)	1,800 S.F. (80% OF 2,250)
MINIMUM FRONT YARD SETBACK	65 FEET	60 FEET <sup>1</sup>	60 FEET <sup>1</sup>
MINIMUM SIDE YARD SETBACK	20 FEET	16.3 FEET <sup>1</sup>	24.9 FEET
MINIMUM REAR YARD SETBACK	25 FEET	79.18 FEET	79.18 FEET
MINIMUM GREEN AREA <sup>3</sup> IMPERVIOUS COVER	50%	55.4% 41.0% 8,398 S.F.	50.1% 49.9% 9,384 S.F.
MAX BUILDING HEIGHT	3 STORIES OR 35 FT.	EXISTING	EXISTING
FRONT YARD PARKING SETBACK	65 FEET	9.5' <sup>1</sup>	25.1' <sup>1</sup>

<sup>1</sup> EXISTING NON-CONFORMITY  
<sup>2</sup> GREEN AREA WAS CALCULATED BASED ON IMPERVIOUS COVERAGE OUTSIDE OF THE ULTIMATE RIGHT-OF-WAY  
<sup>3</sup> ZONING ANALYSIS WAS PERFORMED USING THE CO ZONING DISTRICT FOR THE ENTIRE LOT AREA. NO DEVELOPMENT IS PROPOSED WITHIN THE R-4 DISTRICT AREA.  
<sup>4</sup> BUILDING AREA, NOT MORE THAN 20% OF THE AREA OF EACH LOT MAY BE OCCUPIED BY BUILDINGS AND NOT LESS THAN 50% OF THE TOTAL LOT AREA, EXCLUSIVE OF THOSE AREAS WITHIN THE PUBLIC RIGHT-OF-WAY, SHALL BE DEVOTED TO LANDSCAPING AND PLANTED IN ACCORDANCE WITH CHAPTER 255, SUBDIVISION OF LAND.

### RADNOR TOWNSHIP ZONING HEARING BOARD

APPEAL NO. 2018  
 APPEAL OF FIRST RESOURCE BANK, premises located at 321 East Lancaster Avenue and zoned CO. Appellant seeks: (i) a variance from Zoning Code Section 280C103(B)(1) to allow a stacking length of less than twelve vehicles; (ii) a variance from Zoning Code Section 280C109.A to allow a fence height of greater than six feet (for purposes of providing a greater buffer to the properties abutting the rear of the subject premises); (iii) a variance from Zoning Code Section 280C122(C)(2) to permit the proposed wall sign to exceed a sign height of fifteen feet above the existing grade; and (iv) any other variances and/or relief that the Zoning Hearing Board may deem necessary.

### DECISION OF THE ZONING HEARING BOARD

Appellant has withdrawn the variance request from Zoning Code Section 280C122(C)(2) for the wall sign of height in excess of fifteen feet above grade on the subject premises. Such request no longer is part of this Appeal, and any wall sign located on the subject premises shall be constructed in conformity with the requirements of the Zoning Code.

Variances from Zoning Code Sections 280C103(B)(1) and 280C109.A are granted, the order of the Zoning Officer is reversed, and an appropriate permit is ordered to be issued to authorize the stacking of vehicles on the subject premises, and the construction of an eight foot high fence along the rear of the subject premises, all in the precise manner shown on that certain Proposed Layout Plan (the "Plan") dated January 8, 2018, as prepared by Inland Design, which Plan has been annotated by Appellant at the hearing on this Appeal, and, as annotated, has been entered into and made part of the record as Appellant's Exhibit "AC9", and otherwise in accordance with the other plans, evidence and testimony introduced by Appellant and made part of the record, to the extent consistent with the Plan. The relief granted herein is limited to relief from Zoning Code Section 280C103(B)(1) and Zoning Code Section 280C109.A, and no relief is granted from any other provision of the Zoning Code, or with respect to any other Township Ordinances, including the Township's Subdivision and Land Development Ordinance.

### BY ORDER OF THE ZONING HEARING BOARD

- /s/ WILLIAM MARTIN, CHAIRMAN
- /s/ BRADLEY DELIZIA
- /s/ JOHN REILLY
- /s/ MATTHEW HONIYK

Board Vice Chairman George Nagle concurs in part and dissents in part. While I concur with the grant of a variance from the vehicle stacking requirements of Zoning Code Section 280C103(B)(1), I respectfully dissent from the granting of a variance from Zoning Code Section 280C109.A to authorize an eight foot high fence along the rear property line of the subject premises. I do not believe that the

Appellant has established any hardship peculiar to the subject premises to justify this variance, and I believe this variance will adversely impact properties to the rear of the subject premises.

DATED: February 15, 2018

MAILED: March 2, 2018

THIS DECISION WILL EXPIRE IF THE APPELLANTS FAIL TO OBTAIN A BUILDING PERMIT WITHIN SIX MONTHS OF THIS DATE: MARCH 2, 2018.

### WAIVERS REQUESTED:

THE FOLLOWING WAIVERS ARE REQUESTED FROM THE RADNOR TOWNSHIP SUBDIVISION AND LAND DEVELOPMENT ORDINANCE:  
 § 225-14 - TO ALLOW SUBMISSION OF A COMBINED PRELIMINARY/FINAL APPLICATION.

NOTARY PUBLIC  
 COMMONWEALTH OF PENNSYLVANIA

SS: COUNTY OF \_\_\_\_\_

ON THIS, THE \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_, BEFORE ME A NOTARY PUBLIC, THE UNDERSIGNED OFFICER, PERSONALLY APPEARED \_\_\_\_\_ KNOWN TO ME (OR SATISFACTORY PROVEN) TO BE THE PERSON WHOSE NAME IS SUBSCRIBED HEREIN, AND WHO ACKNOWLEDGES THAT HE IS OWNER AND/OR JOINTABLE OWNER OF THE PROPERTY SHOWN ON THIS PLAN, AND THAT HE ACKNOWLEDGES THE SAME TO BE HIS ACT AND PLAN AND DESIRES THE SAME TO BE RECORDED AS SUCH ACCORDING TO LAW.

OWNER \_\_\_\_\_

IN WITNESS WHEREOF, I HEREUNTO SET MY HAND AND OFFICIAL SEAL.

NOTARY PUBLIC \_\_\_\_\_

### DELAWARE COUNTY PLANNING COMMISSION

PROCESSED AND REVIEWED. A REPORT HAS BEEN PREPARED BY THE DELAWARE COUNTY PLANNING COMMISSION IN ACCORDANCE WITH THE MUNICIPALITIES PLANNING CODE.

CERTIFIED THIS DATE \_\_\_\_\_

FOR THE DIRECTOR \_\_\_\_\_

RECORDED IN THE DELAWARE COUNTY COURTHOUSE THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2018, IN PLAN BOOK \_\_\_\_\_, PAGE \_\_\_\_\_.

### CERTIFICATE OF CONFORMANCE

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, THESE PLANS ARE IN CONFORMITY WITH ENGINEERING, ZONING, BUILDING, SANITATION AND OTHER APPLICABLE TOWNSHIP ORDINANCES AND REGULATIONS.

*Robert D. Comanda* 4/06/2018  
 ROBERT D. COMANDA (DATE)

### RADNOR TOWNSHIP DIRECTOR OF PUBLIC WORKS

I HEREBY CERTIFY THAT THE PLANS SHOWN HERETO WERE REVIEWED AND APPROVED BY THE RADNOR TOWNSHIP DIRECTOR OF PUBLIC WORKS.

RADNOR TOWNSHIP DIRECTOR OF PUBLIC WORKS \_\_\_\_\_ DATE \_\_\_\_\_

### RADNOR TOWNSHIP ZONING OFFICER

I HEREBY CERTIFY THAT THE PLANS SHOWN HERETO WERE REVIEWED AND APPROVED BY THE RADNOR TOWNSHIP ZONING OFFICER.

RADNOR TOWNSHIP ZONING OFFICER \_\_\_\_\_ DATE \_\_\_\_\_

### RADNOR TOWNSHIP ENGINEER

I HEREBY CERTIFY THAT THE PLANS SHOWN HERETO WERE REVIEWED AND APPROVED BY THE RADNOR TOWNSHIP ENGINEER.

RADNOR TOWNSHIP ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

### RADNOR TOWNSHIP BOARD OF COMMISSIONERS

I HEREBY CERTIFY THAT THE PLANS SHOWN HERETO WERE REVIEWED AND APPROVED BY THE RADNOR TOWNSHIP BOARD OF COMMISSIONERS.

PRESIDENT \_\_\_\_\_ DATE \_\_\_\_\_

SECRETARY \_\_\_\_\_ DATE \_\_\_\_\_

### EQUITABLE OWNER/

### APPLICANT:

FIRST RESOURCE BANK  
 1 EAST UWCHLAN AVE  
 EXTON, PA 19341  
 ATTN: GLENN MARSHALL

COVER SHEET  
 FOR

**FIRST RESOURCE BANK**  
**321 WEST LANCASTER AVENUE**  
**WAYNE, PA 19087**  
 RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA

SHEET  
**1**  
 OF 12

COPYRIGHT  
 Inland Design, LLC expressly reserves all copyright and all other proprietary rights in these plans. All drawings, specifications and copies thereof are and shall remain the property of Inland Design, LLC. They are to be used only in respect to this project and are neither to be used on any other project, nor they are to be assigned to any third party without first obtaining the expressed written permission and consent of Inland Design, LLC. Any reuse without written permission, verification, consent or adoption by Inland Design, LLC for the specific purpose intended, will be at the third party's sole risk and without liability or legal recourse to Inland Design, LLC. In the event of any such reuse, damages, losses, and expenses arising therefrom or resulting therefrom.  
 FOLIO #: 36-01-00289-00, TAX ID: 36-12-243

Pennsylvania One Call System  
 PA act 172 of 1986 requires  
 three working days notice  
 Social Numbers:  
 20173322013

PENNSYLVANIA ACT 187 REQUIREMENTS:  
 Inland Design, LLC does not guarantee the accuracy of the location for existing subsurface utility structures shown on the plans, nor does Inland Design, LLC guarantee that all subsurface structures are shown. The contractor shall verify the location and elevation of all underground utilities and structures before the start of work.

**INLAND DESIGN**  
 Civil Engineers, Surveyors & Land Development Consultants  
 16 Hagerly Blvd.  
 West Chester, PA 19382  
 www.InlandDesign.net

Phone: (484) 947-2928  
 Fax: (484) 947-2946  
 Info@InlandDesign.net

COMMONWEALTH OF PENNSYLVANIA  
 REGISTERED PROFESSIONAL ENGINEER  
 JOSE D. COMANDA  
 ENGINEER  
 PE070740

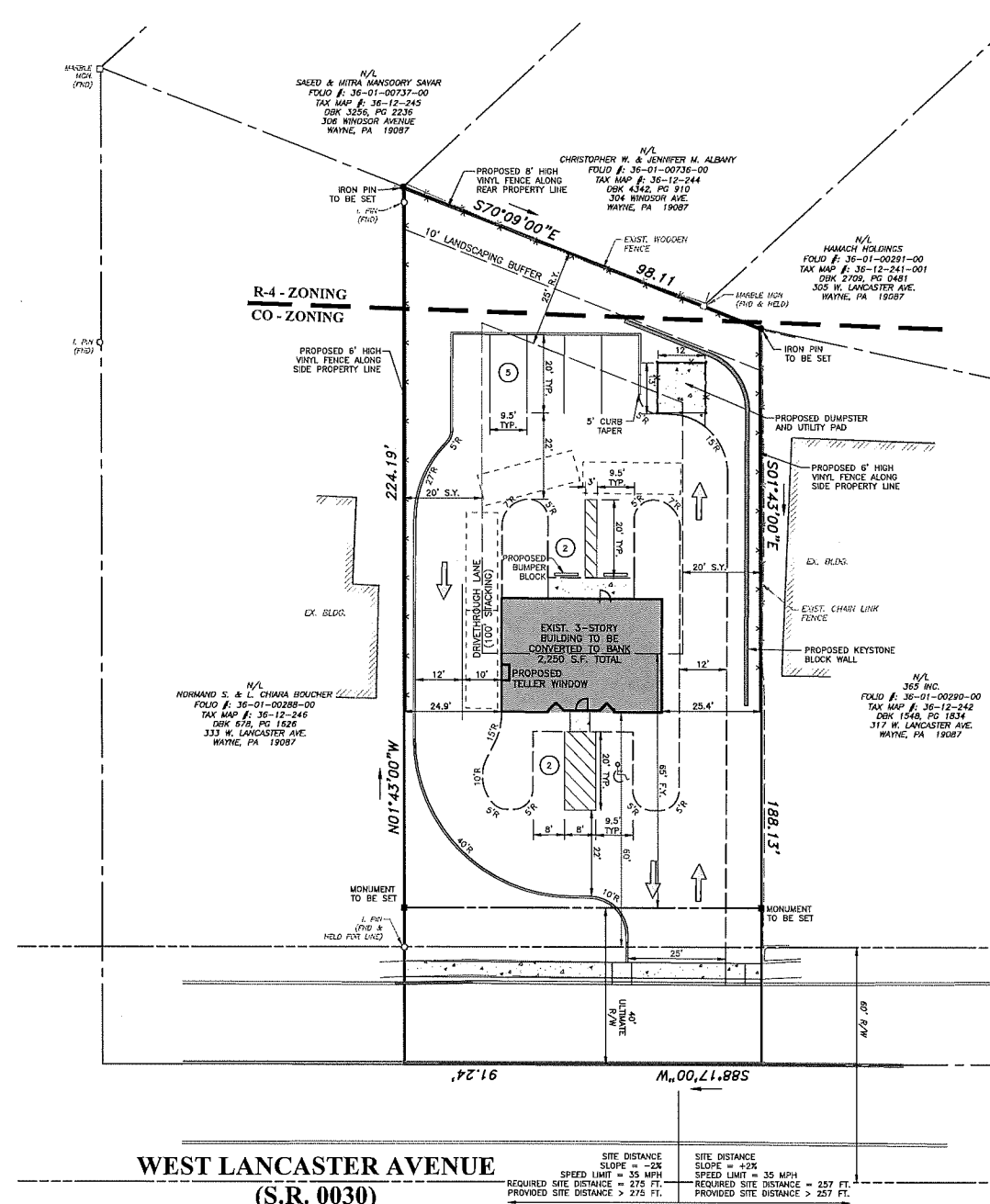
No.	Date:	Description:

PRELIMINARY/FINAL  
 LAND DEVELOPMENT PLAN

GRAPHIC SCALE  
 100 0 50 100 200 400  
 (IN FEET)  
 1 inch = 100'

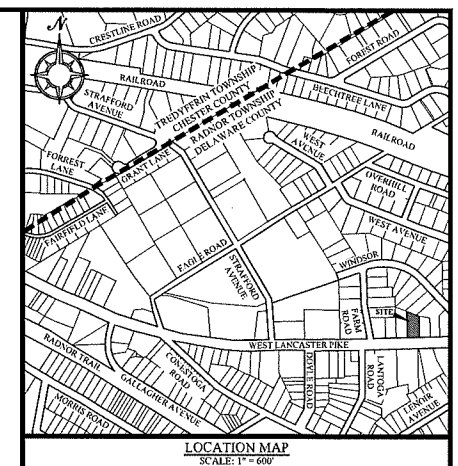
Date:  
 04/06/2018  
 Scale:  
 1" = 100'  
 Drawn by:  
 JDC  
 Checked by:  
 CAD  
 Project No.  
**11104**





**LEGEND**

	PROPERTY BOUNDARY
	ADJOINING PROPERTY LINE
	EXISTING RIGHT OF WAY LINE
	EXISTING LIGHT
	EXISTING UTILITY POLE
	EXISTING SIGN
	EXISTING FENCE LINE
	EXISTING ROAD CENTERLINE
	EXISTING CURB LINE
	EXISTING ROAD / PAVING
	EXISTING DRIVEWAY
	EXISTING STONE DRIVE
	EXISTING CONCRETE SIDEWALK
	EXISTING WALL
	PROPOSED RIGHT OF WAY LINE
	PROPOSED SIGN
	PROPOSED FENCE LINE
	PROPOSED ROAD / PAVING
	PROPOSED DRIVEWAY
	PROPOSED CONCRETE SIDEWALK
	PROPOSED CAR STACKING



**PARKING ANALYSIS**

DESCRIPTION	REQUIRED	PROPOSED
1 SPACE PER 200 S.F. FLOOR AREA (2,250 S.F. x 80% = 1,800 S.F.)	9	9
STACKING FOR DRIVE THROUGH	12	4*

\* FOUR STACKING SPACES AVAILABLE BEFORE INCOMING DRIVEWAY IS IMPACTED. ADDITIONAL STACKING SPACE IS AVAILABLE IN THE DRIVEWAY.

**PROPOSED IMPERVIOUS COVER**

DESCRIPTION	AREA
PROPOSED BUILDING	1,175 S.F.
PROPOSED DRIVEWAY	1,782 S.F.
PROPOSED CONCRETE	310 S.F.
PROPOSED WALL	117 S.F.
<b>TOTAL PROPOSED IMPERVIOUS</b>	<b>3,384 S.F.</b>

**WEST LANCASTER AVENUE (S.R. 0030)**

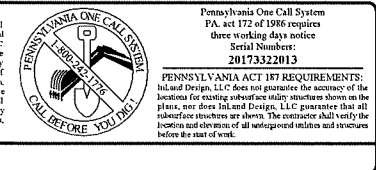
SITE DISTANCE SLOPE = -2% SPEED LIMIT = 35 MPH REQUIRED SITE DISTANCE = 275 FT. PROVIDED SITE DISTANCE > 275 FT.  
 SITE DISTANCE SLOPE = +2% SPEED LIMIT = 35 MPH REQUIRED SITE DISTANCE = 257 FT. PROVIDED SITE DISTANCE > 257 FT.

**COPYRIGHT**  
Inland Design, LLC expressly reserves its ownership and all other proprietary rights in these plans. All drawings, specifications and copies thereof are and shall remain the property of Inland Design, LLC. They are to be used only in respect to the project and are neither to be used on any other project, nor are they to be assigned to any third party without first obtaining the expressed written permission and consent of Inland Design, LLC. Any reuse without written permission, verification, consent or adaptation by Inland Design, LLC for the specific purpose intended, will be at the third party's sole risk and without liability or legal exposure to Inland Design, LLC. The third party shall further indemnify and hold harmless Inland Design, LLC from all claims, damages, losses, and expenses arising thereon or resulting therefrom.

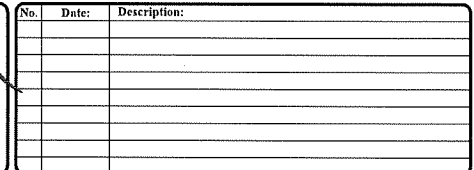
PA and 172 of 1986 requires three working days notice  
Serial Numbers:  
28153322813

**PENNSYLVANIA ACT 187 REQUIREMENTS:**  
Inland Design, LLC does not guarantee the accuracy of the information for existing subsurface utility structures shown on the plans, nor does Inland Design, LLC guarantee that all subsurface structures are shown. The contractor shall verify the location and elevation of all underground utilities and structures before the start of work.

**INLAND DESIGN**  
Civil Engineers, Surveyors & Land Development Consultants  
16 Hagerly Blvd.  
West Chester, PA 19382  
www.InLandDesign.net  
Phone: (484) 947-2928  
Fax: (484) 947-2946  
Info@InLandDesign.net



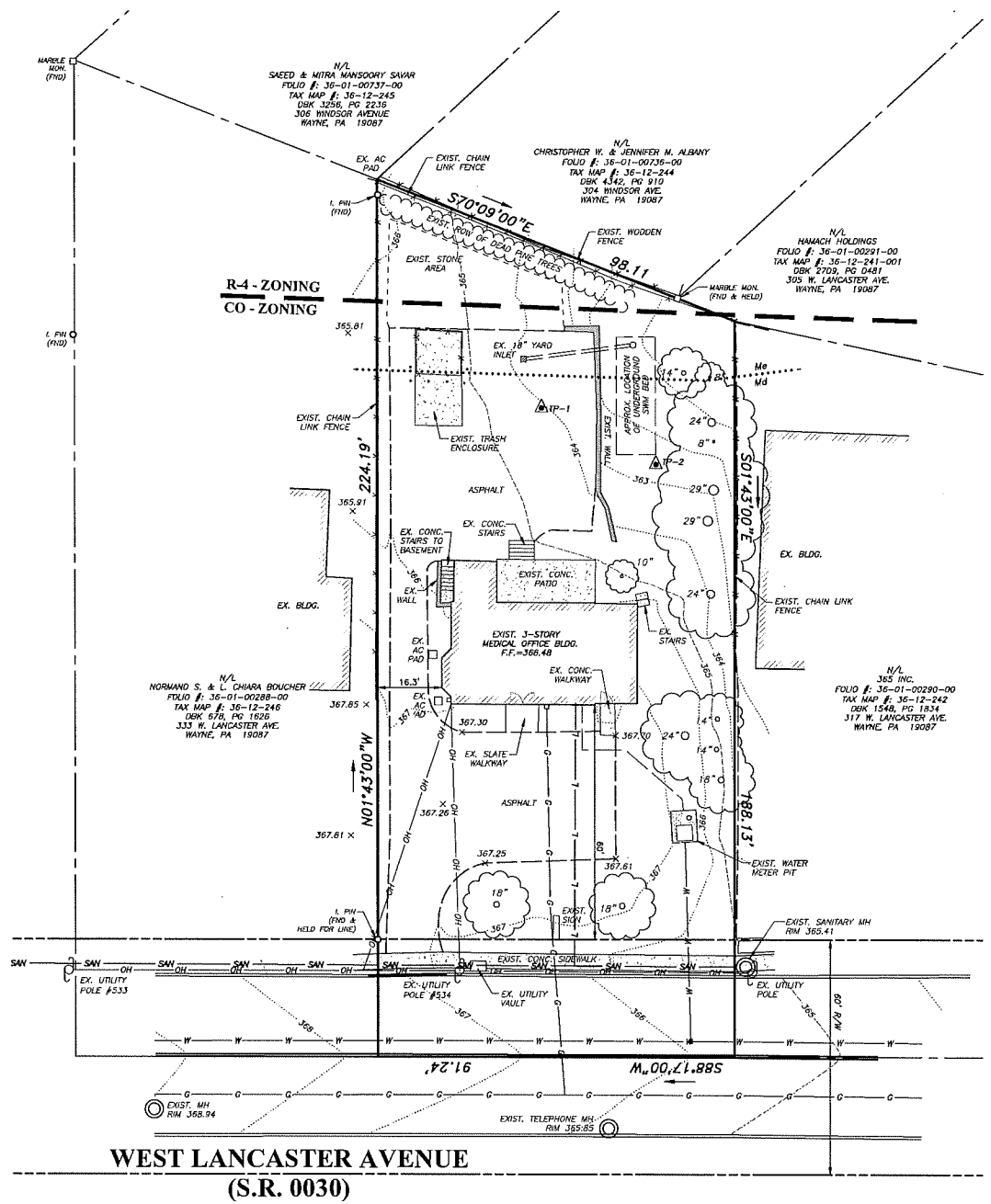
No.	Date:	Description:



Date: 04/06/2018  
Scale: 1" = 20'  
Drawn by: JDC  
Checked by: CAD  
Project No. 11104

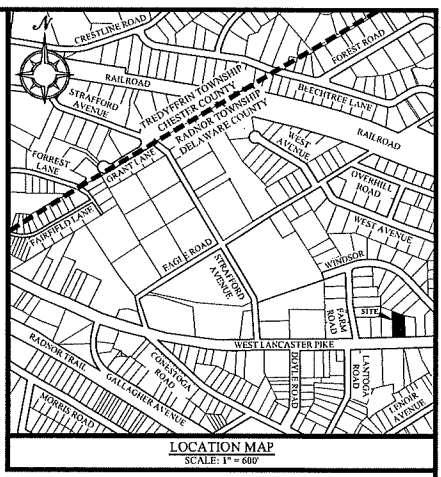
**LAYOUT & GEOMETRY PLAN FOR**  
**FIRST RESOURCE BANK**  
**321 WEST LANCASTER AVENUE**  
**WAYNE, PA 19087**  
RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA

**SHEET**  
**3**  
**OF 12**



**LEGEND**

	PROPERTY BOUNDARY
	ADJOINING PROPERTY LINE
	EXISTING RIGHT OF WAY LINE
	EXISTING EASEMENT LINE
	EXISTING Z CONTOUR
	EXISTING 10' CONTOUR
	EXISTING SPOT ELEVATION
	EXISTING TREELINE
	EXISTING TREE SYMBOLS
	EXISTING UTILITY POLE
	EXISTING WATER VALVE
	TEST PIT LOCATION
	EXISTING FENCE LINE
	SOILS LINE AND DESCRIPTION
	EXISTING STORM STRUCTURES & PIPE
	EXISTING SANITARY STRUCTURES & PIPE
	EXISTING MANHOLE
	EXISTING CURB LINE
	EXISTING DRIVEWAY
	EXISTING STONE DRIVE
	EXISTING CONCRETE
	EXISTING WALL
	EXISTING WATER LINE
	EXISTING GAS LINE
	EXISTING OVERHEAD ELECTRIC LINE
	APPROXIMATE LOCATION OF EXISTING SANITARY SEWER LATERAL



**SOILS DESCRIPTION**

SYMBOL	DESCRIPTION	SLOPE	AVAILABLE WATER CAPACITY	DRAINAGE CLASS	DEPTH TO S.L.W.T.	DEPTH TO BEDROCK	CAPABILITY UNIT	HYDROLOGIC SOIL GROUP
M <sub>1</sub>	MADE LAND, GABBRO AND DIABASE MATERIALS	0% - 8%	LOW (ABOUT 4.2 INCHES)	WELL DRAINED	MORE THAN 80 INCHES	MORE THAN 80 INCHES	6	C
M <sub>2</sub>	MADE LAND, SCHIST AND GNEISS MATERIALS	0% - 8%	HIGH (ABOUT 10.1 INCHES)	WELL DRAINED	ABOUT 60 INCHES	40 TO 72 INCHES	7	C

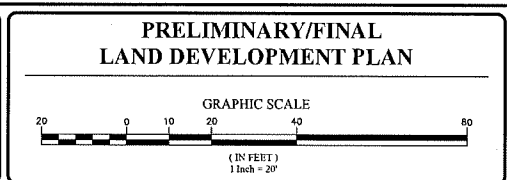
**EQUITABLE OWNER/APPLICANT:**  
 FIRST RESOURCE BANK  
 1 EAST WUCHLAN AVE  
 EXTON, PA 19341  
 ATTN: GLENN MARSHALL

**COPYRIGHT**  
 Inland Design, LLC copyright reserves all rights and all other proprietary rights in these plans. All drawings, specifications and reports thereof are and shall remain the property of Inland Design, LLC. They are to be used only in respect to this project and are neither to be used on any other project, nor are they to be assigned to any third party without first obtaining the expressed written permission and consent of Inland Design, LLC. Any reuse without written permission, confirmation, consent or adaptation by Inland Design, LLC for the specific purpose intended, will be at the third party's sole risk and without liability or legal recourse to Inland Design, LLC. The third party shall further indemnify and hold harmless Inland Design, LLC from all claims, damages, losses, and expenses arising therefrom or resulting therefrom.

FOLIO #36-01-00289-00, TAX ID: 36-12-243

**INLAND DESIGN**  
 Civil Engineers, Surveyors & Land Development Consultants  
 16 Hagerly Blvd.  
 West Chester, PA 19382  
 www.InlandDesign.net  
 Phone: (484) 947-2928  
 Fax: (484) 947-2948  
 Info@InlandDesign.net

No.	Date:	Description:

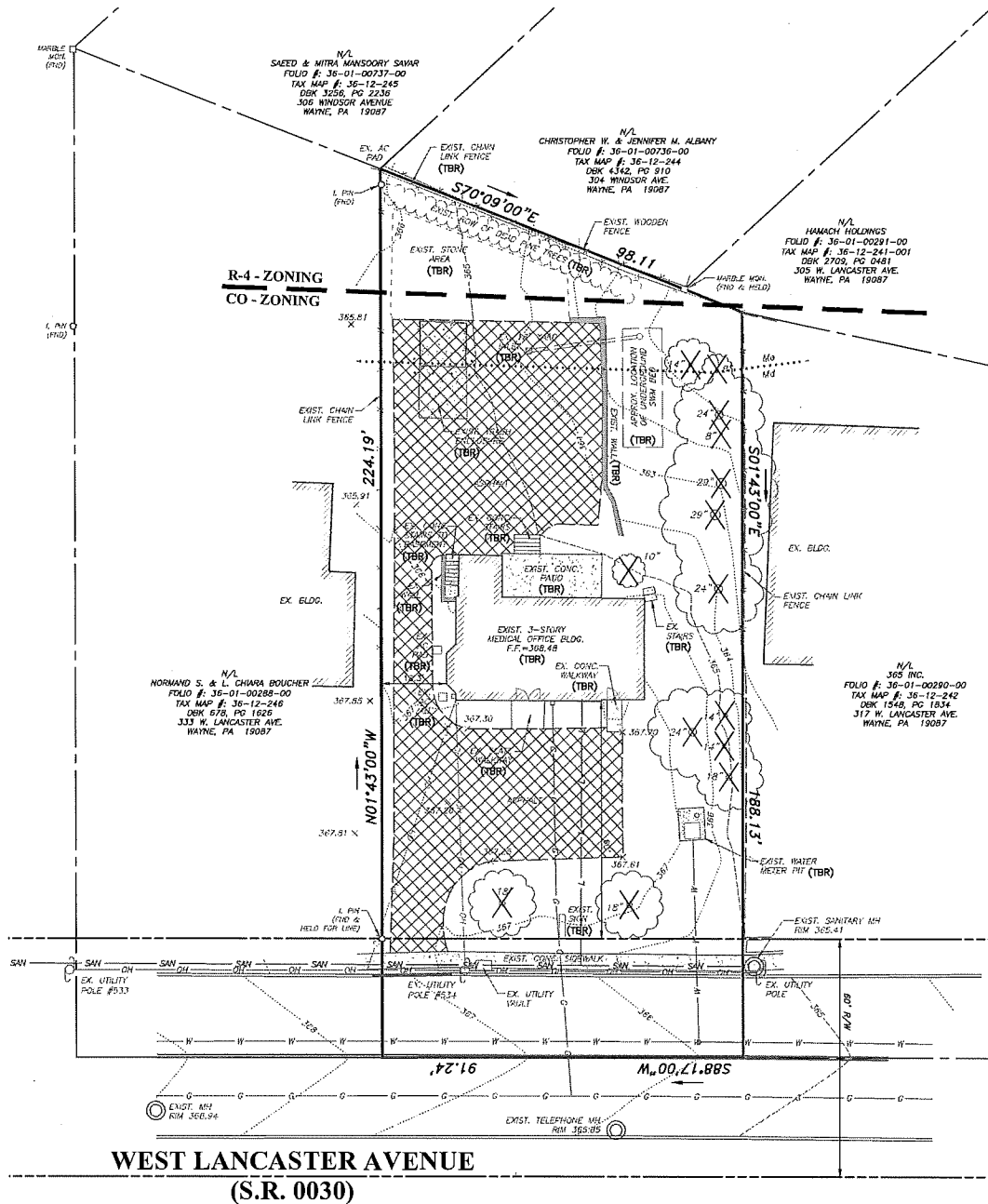


Date: 04/06/2018  
 Scale: 1" = 20'  
 Drawn by: JDC  
 Checked by: CAD  
 Project No: 11104

**EXISTING RESOURCE & NATURAL RESOURCE PLAN FOR**  
**FIRST RESOURCE BANK**  
**321 WEST LANCASTER AVENUE**  
**WAYNE, PA 19087**  
 RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA

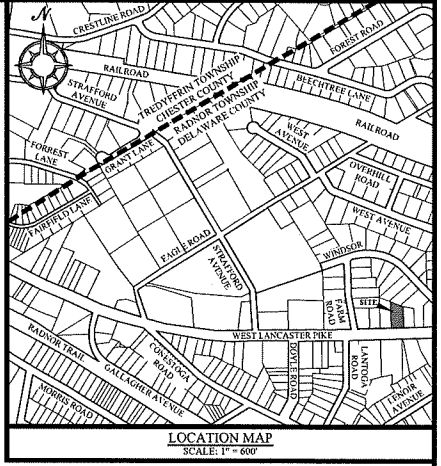
**SHEET**  
**4**  
**OF 12**





**LEGEND**

- PROPERTY BOUNDARY
- ADJOINING PROPERTY LINE
- EXISTING RIGHT OF WAY LINE
- EXISTING EASEMENT LINE
- EXISTING Z CONTOUR
- EXISTING 1% CONTOUR
- EXISTING SPOT ELEVATION
- EXISTING TREELINE
- EXISTING TREE SYMBOLS
- EXISTING UTILITY POLE
- EXISTING WATER VALVE
- △ TEST PIT LOCATION
- EXISTING FENCE LINE
- EXISTING SOILS LINE AND DESCRIPTION
- EXISTING STORM STRUCTURES & PIPE
- EXISTING SANITARY STRUCTURES & PIPE
- EXISTING MANHOLE
- EXISTING CURB LINE
- EXISTING DRIVEWAY
- EXISTING STONE DRIVE
- EXISTING CONCRETE
- EXISTING WALL
- EXISTING WATER LINE
- EXISTING GAS LINE
- EXISTING OVERHEAD ELECTRIC LINE
- APPROXIMATE LOCATION OF EXISTING SANITARY SEWER LATERAL TO BE REMOVED
- (TBR) EXISTING TREE TO BE REMOVED
- (TBR) EXISTING PAVING TO BE REMOVED



**TREE REPLACEMENT CALCULATIONS**

TREE SIZE TO BE REMOVED	TREES TO BE REMOVED	REPLACEMENT TREES REQUIRED
6"-18" DBH (1:1 REPLACEMENT)	9	9
19"-29" (3:1 REPLACEMENT - 2 CANOPY TREES)	5	15 (10 CANOPY)
30" OR GREATER (6:1 REPLACEMENT - 4 CANOPY TREES)	0	0
<b>TOTAL:</b>	<b>14</b>	<b>24 (10 CANOPY)</b>

**EXISTING IMPERVIOUS COVER**

DESCRIPTION	AREA
EXISTING BUILDING	1,576 S.F.
EXISTING DRIVEWAY	5,301 S.F.
EXISTING STONE	888 S.F.
EXISTING CONCRETE	736 S.F.
EXISTING WALLS	97 S.F.
<b>TOTAL EXISTING IMPERVIOUS</b>	<b>8,598 S.F.</b>

**SOILS DESCRIPTION**

SYMBOL	DESCRIPTION	SLOPE	AVAILABLE WATER CAPACITY	DRAINAGE CLASS	DEPTH TO S.H.W.T.	DEPTH TO BEDROCK	CAPABILITY UNIT	HYDROLOGIC SOIL GROUP
Md	MADE LAND, GABBRO AND DIABASE MATERIALS	0% - 8%	LOW (ABOUT 4.2 INCHES)	WELL DRAINED	MORE THAN 80 INCHES	MORE THAN 80 INCHES	6s	C
Me	MADE LAND, SCHIST AND GNEISS MATERIALS	0% - 8%	HIGH (ABOUT 10.1 INCHES)	WELL DRAINED	ABOUT 60 INCHES	40 TO 72 INCHES	7s	C

**EQUITABLE OWNER/APPLICANT:**  
 FIRST RESOURCE BANK  
 1 EAST WICHE AN AVE  
 EXTON, PA 19341  
 ATTN: GLENN MARSHALL

**COPYRIGHT**  
 Inland Design, LLC expressly reserves its common law copyright and all other proprietary rights in these plans. All drawings, specifications and copies thereof are and shall remain the property of Inland Design, LLC. They are to be used only in respect to the project and are not to be used on any other project, nor are they to be assigned to any third party without first obtaining the expressed written permission and consent of Inland Design, LLC. Any reuse without written permission, ventilation, consent or adaptation by Inland Design, LLC for the specific purpose intended, will be at the third party's sole risk and without liability or legal recourse to Inland Design, LLC. The third party shall further indemnify and hold harmless Inland Design, LLC from all claims, damages, losses, and expenses arising therefrom or resulting therefrom.

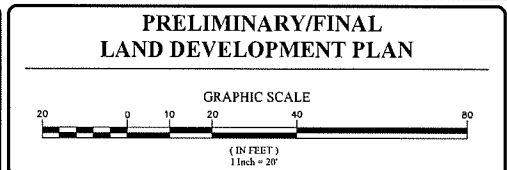
PA, act 172 of 1986 requires three working days notice  
 Serial Number: 2017322013

**PENNSYLVANIA ACT 187 REQUIREMENTS:**  
 Inland Design, LLC does not guarantee the accuracy of the information for existing subsurface utility structures shown on this plan, nor does Inland Design, LLC guarantee that all subsurface structures are shown. The contractor shall verify the location and elevation of all underground utilities and structures before the start of work.

**INLAND DESIGN**  
 Civil Engineers, Surveyors & Land Development Consultants  
 16 Hagerty Blvd. Phone: (484) 947-2929  
 West Chester, PA 19382 Fax: (484) 947-2940  
 www.InLandDesign.net info@InLandDesign.net

**JOEL D. COWANDA**  
 ENGINEER  
 (PROFESSIONAL)  
 PENNSYLVANIA

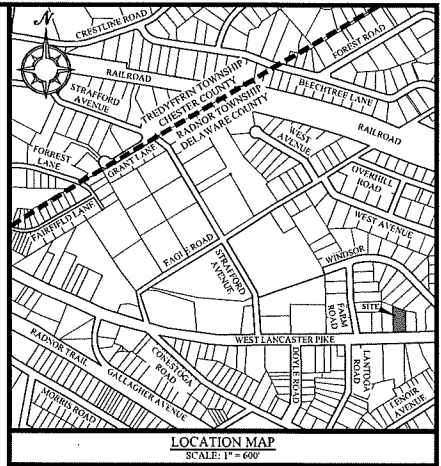
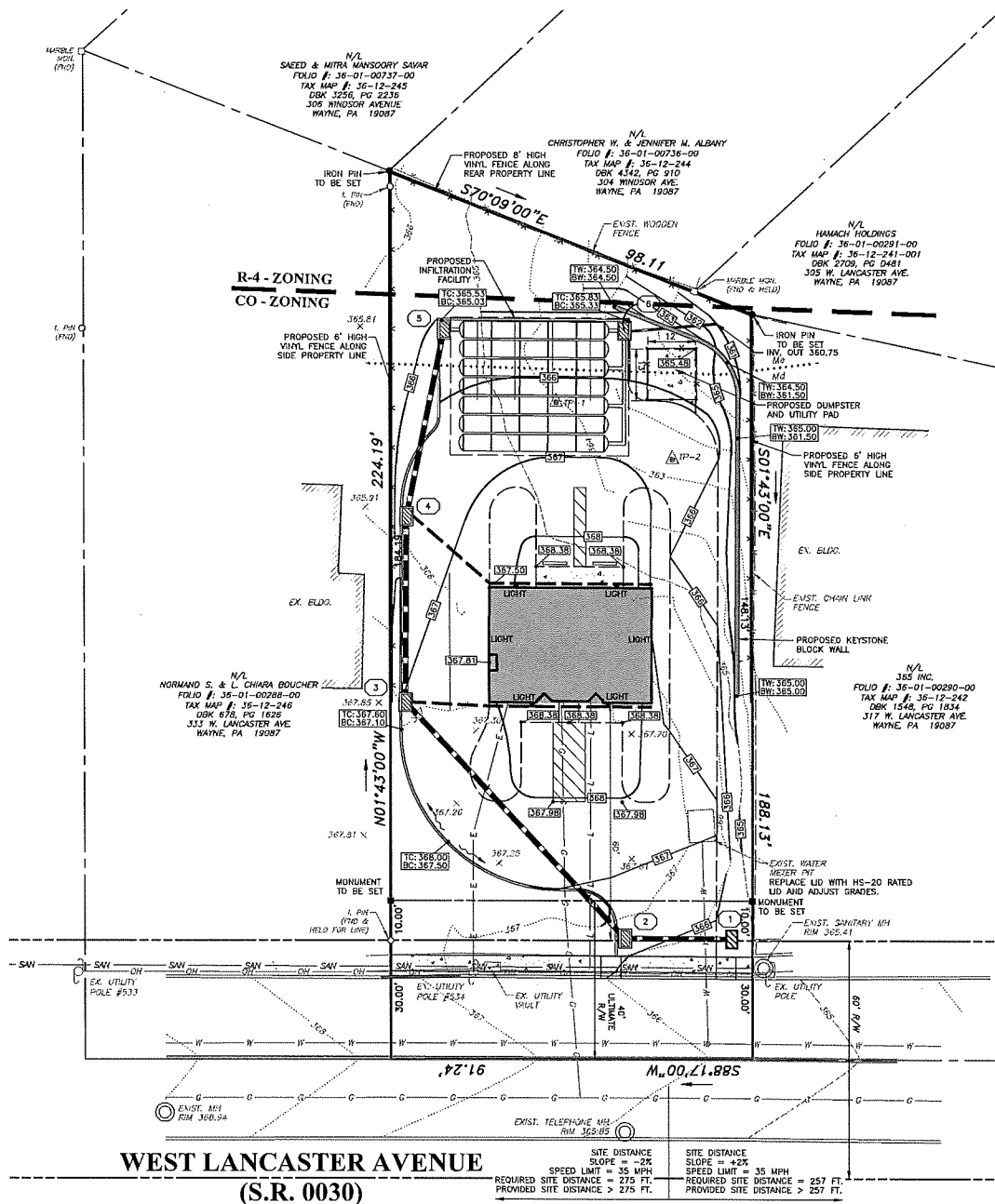
No.	Date:	Description:



Date: 04/05/2018  
 Scale: 1" = 20'  
 Drawn by: JDC  
 Checked by: CAD  
 Project No: 11104

**DEMOLITION PLAN FOR**  
**FIRST RESOURCE BANK**  
**321 WEST LANCASTER AVENUE**  
**WAYNE, PA 19087**  
 RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA

**SHEET**  
**5**  
**OF 12**



- CONSTRUCTION NOTES:**
1. ALL INLETS TO HAVE 5" DEEP HOLES DRILLED INTO BOTTOM OF STRUCTURE FOR THE PURPOSES OF THESE PLANS AND GENERAL NOTES. "SITE CONSTRUCTION" SHALL BE CONSTRUCTED TO MEAN STORMWATER MANAGEMENT FACILITIES, SITE IMPROVEMENTS AND RELATED CONSTRUCTION.
  2. ALL SITE CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE PDOT PUB. 408, 2000 E4 AND LATEST ADDENDUM THERETO. CONTRACTOR SHALL PROVIDE CERTIFICATION THAT ALL MATERIAL INCORPORATED INTO THE PROJECT MEET PDOT SPECIFICATIONS.
  3. CONTRACTOR SHALL COMPLY WITH ALL LAWS AND ORDINANCES APPLICABLE TO THIS TYPE OF CONSTRUCTION.
  4. CONTRACTOR IS RESPONSIBLE FOR CHECKING ALL DISTANCES, GRADES, QUANTITIES AND ELEVATIONS. POTENTIAL PROBLEMS WHICH MIGHT BE OBSERVED BY THE CONTRACTOR SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. WORK IN THE AREA SHALL CEASE UNTIL A RESOLUTION OF THE POTENTIAL PROBLEM HAS BEEN DETERMINED.
  5. ALL MATERIALS TO BE PROPERLY DISPOSED.
    - A) ALL CLEAN SOIL TO BE DEPOSITED ON SITE AS DIRECTED.
    - B) ALL OTHER MATERIAL TO BE REMOVED FROM SITE BY CONTRACTOR.
  6. CONTRACTOR SHALL PROVIDE ALL BORROW MATERIAL REQUIRED FOR CONSTRUCTION WHICH IS NOT AVAILABLE ON SITE.
  7. FILL MATERIAL SHALL BE COMPACTED TO NO LESS THAN 95% OF THE MAXIMUM DRY WEIGHT DENSITY (STANDARD PROCTER).
  8. ALL PAVEMENT JOINTS AND CURB-PAVEMENT JOINTS SHALL BE SEALED USING A "RUBBERIZED JOINT SEAL" AS PER PDOT PUBLICATION 408.
  9. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PAVEMENT MARKINGS, EROSION AND SEDIMENTATION CONTROL AND TRAFFIC MAINTENANCE AND PROTECTION IN ACCORDANCE WITH PDOT PUBLICATION 215.
  10. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND PAYING FOR THE REMOVAL AND/OR RELOCATION OF UTILITIES OR OTHER OBSTRUCTIONS IN ORDER TO COMPLETE THE SITE CONSTRUCTION.
  11. NO EXCAVATION OR FILL MATERIAL SHALL BE GRADED TO A SLOPE GREATER THAN 5:1.
  12. THERE SHALL BE NO BURYING OF TREES, STUMPS OR CONSTRUCTION MATERIALS. TREES AND STUMPS MAY BE CHIPPED OR GROUND AND DISPOSED OF IN OPEN SPACE AREAS. CONTRACTOR SHALL MAKE EVERY ATTEMPT TO RECYCLE CONSTRUCTION AND ORGANIC MATERIALS TO MINIMIZE WASTE.
  13. GRADING SHALL BE PERFORMED TO SECURE PROPER DRAINAGE AWAY FROM ALL BUILDINGS AND TO THE STORMWATER COLLECTION AND MANAGEMENT SYSTEM. ALL EXISTING POWER POLES, CURBS AND OTHER ABOVE GROUND PHYSICAL FEATURES WHICH WOULD INTERFERE WITH NORMAL USE OF PROPOSED CONSTRUCTION SHALL BE REMOVED AND RELOCATED AS REQUIRED.
  14. THE COVER OF THE EXISTING WATER FIT IS TO BE REMOVED, AND A LID INSTALLED THAT IS CERTIFIED FOR HS-20 TRAFFIC LOADING.
  15. THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITY SERVICE LINES IN THE FIELD PRIOR TO CONSTRUCTION AND ENSURE THAT ALL UTILITIES ARE RELOCATED OR PROTECTED DURING CONSTRUCTION.
  16. ALL WATERLINE INSTALLATION IS TO BE PERFORMED ACCORDING TO THE SPECIFICATIONS AND DIRECTIVES OF AQUA PA.
  17. ALL SIDEWALKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH TOWNSHIP SPECIFICATIONS.
  18. CURBS, WHERE REQUIRED, SHALL BE THE VERTICAL TYPE AND CONSTRUCTED IN ACCORDANCE WITH TOWNSHIP SPECIFICATIONS.

- LEGEND**
- PROPERTY BOUNDARY
  - ADJOINING PROPERTY LINE
  - EXISTING RIGHT OF WAY LINE
  - EXISTING EASEMENT LINE
  - EXISTING 2" CONTOUR
  - EXISTING 10' CONTOUR
  - EXISTING TREE SYMBOLS
  - EXISTING SPOT ELEVATION
  - EXISTING TREE LINE
  - EXISTING UTILITY POLE
  - EXISTING WATER VALVE
  - TEST PIT LOCATION
  - EXISTING FENCE LINE
  - SOILS LINE AND DESCRIPTION
  - EXISTING STORM STRUCTURES & PIPE
  - EXISTING SANITARY STRUCTURES & PIPE
  - EXISTING MANHOLE
  - EXISTING CURB LINE
  - EXISTING DRIVEWAY
  - EXISTING STONE DRIVE
  - EXISTING CONCRETE
  - EXISTING WALL
  - EXISTING WATER LINE
  - EXISTING GAS LINE
  - EXISTING OVERHEAD ELECTRIC LINE
  - APPROXIMATE LOCATION OF EXISTING SANITARY SEWER LATERAL
  - ULTIMATE RIGHT OF WAY LINE
  - PROPOSED EASEMENT LINE
  - PROPOSED 1" CONTOUR
  - PROPOSED 5' CONTOUR
  - PROPOSED SPOT ELEVATION
  - PROPOSED FENCE LINE
  - PROPOSED STORM STRUCTURES & PIPE
  - PROPOSED CURB LINE
  - PROPOSED CURB TAPER
  - PROPOSED ROAD / PAVING
  - PROPOSED WATER LATERAL
  - PROPOSED ELECTRIC LINE
  - PROPOSED SIDEWALK
  - PROPOSED WALL

**SOILS DESCRIPTION**

SYMBOL	DESCRIPTION	SLOPE	AVAILABLE WATER CAPACITY	DRAINAGE CLASS	DEPTH TO S.H.W.T.	DEPTH TO BEDROCK	CAPABILITY UNIT	HYDROLOGIC SOIL GROUP
Md	MADE LAND, GABBRO AND DIABASE MATERIALS	0% - 8%	LOW (ABOUT 4.2 INCHES)	WELL DRAINED	MORE THAN 80 INCHES	MORE THAN 80 INCHES	6s	C
Me	MADE LAND, SCHIST AND GNEISS MATERIALS	0% - 8%	HIGH (ABOUT 10.1 INCHES)	WELL DRAINED	ABOUT 60 INCHES	40 TO 72 INCHES	7s	C

**COPYRIGHT**  
Inland Design, LLC expressly reserves its copyright and all other proprietary rights in these plans. All drawings, specifications and copies thereof are and shall remain the property of Inland Design, LLC. They are to be used only in respect to this project and are not to be used on any other project, nor are they to be assigned to any third party without first obtaining the express written permission and consent of Inland Design, LLC. Any reuse without written permission, verification, consent or authorization by Inland Design, LLC for the specific purpose intended, will be at the user's sole risk and without liability or legal recourse to Inland Design, LLC. Inland Design, LLC guarantees that all information and data herein are true and correct to the best of its knowledge and belief. Inland Design, LLC shall not be held liable for any errors or omissions herein.

**PENNSYLVANIA ONE CALL SYSTEM**  
PA, and 172 of 1986 requires three working days notice  
Serial Numbers: 2017322013

**PENNSYLVANIA ACT 177 REQUIREMENTS:**  
Inland Design, LLC does not guarantee the accuracy of the location for existing subsurface utility structures shown on the plans, nor does Inland Design, LLC guarantee that all subsurface structures are shown. The contractor shall verify the location and existence of all underground utilities and structures before the start of work.

**INLAND DESIGN**  
Civil Engineers, Surveyors & Land Development Consultants  
16 Hagerly Blvd., West Chester, PA 19382  
Phone: (484) 947-2928  
Fax: (484) 947-2946  
Info@InLandDesign.net

**JOE D. COMANDA**  
ENGINEER  
PE070740  
PENNSYLVANIA

**FOLIO # 36-01-00289-00, TAX ID: 36-12-243**

**PRELIMINARY/FINAL LAND DEVELOPMENT PLAN**

**GRAPHIC SCALE**  
0 10 20 40 80  
(IN FEET)  
1 inch = 20'

Date: 04/06/2018  
Scale: 1" = 20'  
Drawn by: JDC  
Checked by: CAD  
Project No. 11104

No.	Date:	Description:

**GRADING & UTILITIES PLAN FOR**  
**FIRST RESOURCE BANK**  
**321 WEST LANCASTER AVENUE**  
**WAYNE, PA 19087**  
RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA

**SHEET**  
**6**  
**OF 12**

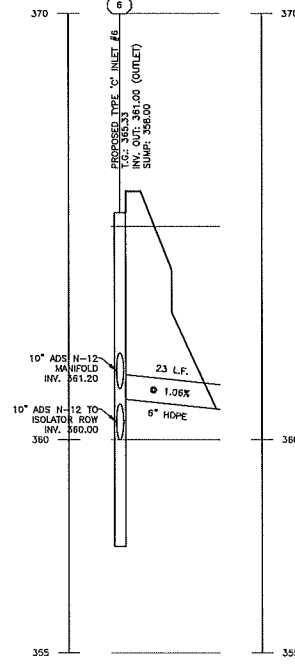
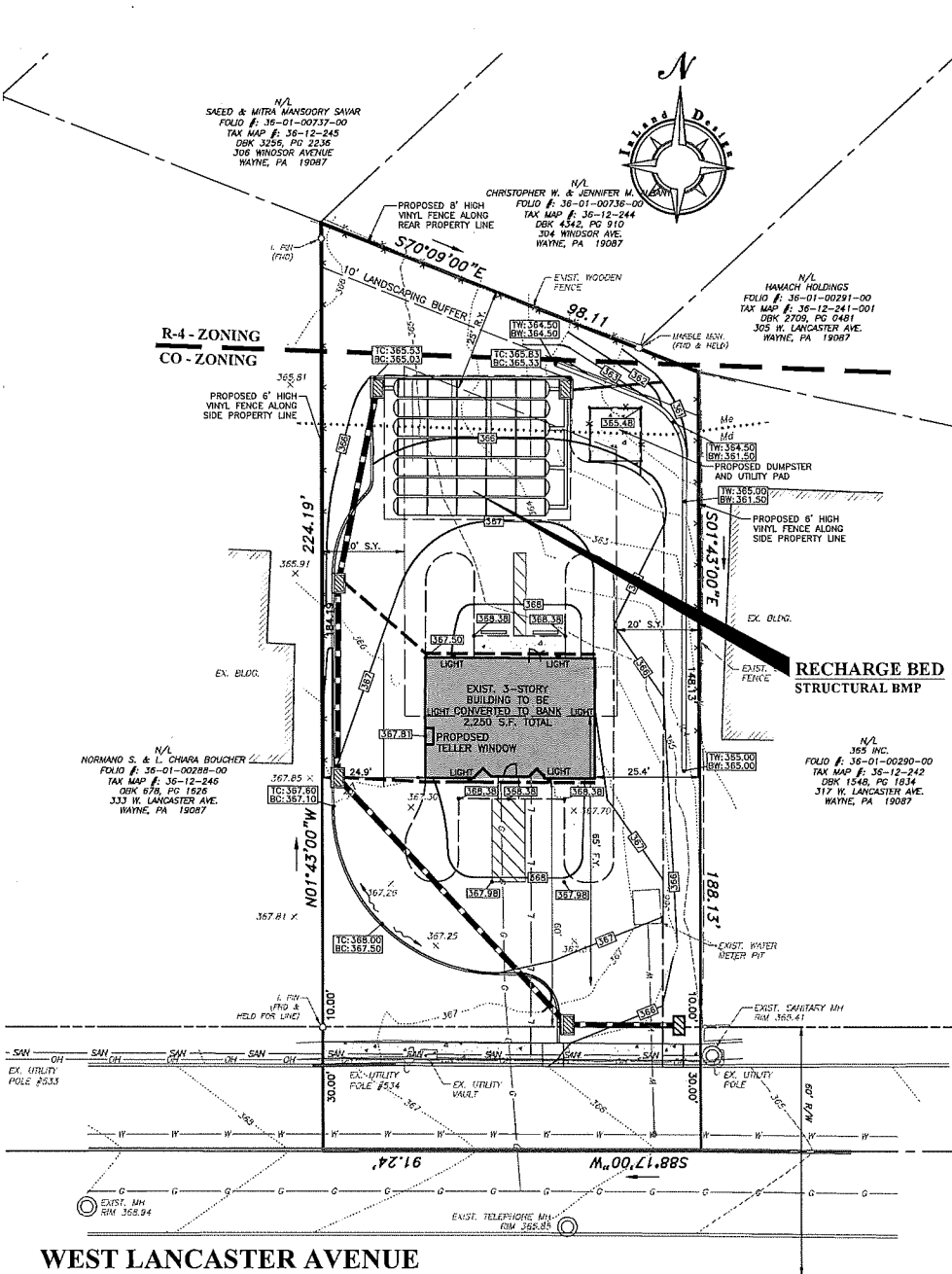
**RECHARGE BED CONSTRUCTION SEQUENCE (TYP.)**  
 THIS SEQUENCE IS INTENDED TO BE USED IN CONJUNCTION WITH THE OVERALL SEQUENCE OF CONSTRUCTION FOR THE ENTIRE PROJECT. CONSTRUCTION OF THE RECHARGE BED MUST NOT START UNTIL IT IS CALLED FOR IN THE OVERALL CONSTRUCTION SEQUENCE.  
 BEFORE THE RECHARGE BED CAN BE UTILIZED, ALL AREAS TRIBUTARY TO THE RECHARGE BED SHALL BE STABILIZED WITH GRASS (MIN 70% COVER) IN ACCORDANCE WITH THE PERMANENT SEEDING SPECIFICATIONS PROVIDED WITHIN THE PLAN SET.  
 THIS IS A CRITICAL STAGE OF CONSTRUCTION. THE PERMITTEE SHALL PROVIDE ENGINEERING CONSTRUCTION OVERSIGHT FOR THE PROPOSED STORMWATER BMP. ADDITIONAL SOILS TESTING MAY BE REQUIRED PRIOR TO THE INSTALLATION OF INFILTRATION BODIES TO ENSURE PROPER LOCATION AND PROTECTION. A LICENSED PROFESSIONAL KNOWLEDGEABLE IN THE DESIGN AND CONSTRUCTION OF STORMWATER BMP, PREFERABLY THE DESIGN ENGINEER, SHALL CONDUCT THE OVERSIGHT.

- REMOVE PROTECTIVE CONSTRUCTION FENCE FROM THE PERIMETER OF THE RECHARGE BED AREA. STRIP TOPSOIL FROM THE AREA AND STOCKPILE AS SHOWN ON THE PLAN AND ACCORDING TO THE DETAILS.
- EXCAVATE THE RECHARGE BED IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLAN. EXCAVATION OF THE RECHARGE BED SHALL BE COMPLETED USING AN EXCAVATOR (i.e. TRAC-HOE) THAT DOES NOT REQUIRE TRAVEL ACROSS THE BOTTOM OF THE FACILITY. ALL EXCAVATIONS SHALL BE MADE FROM THE EDGE OF THE RECHARGE BED TO AVOID COMPACTION OF THE BED.
- NOTE: SHOULD ANY UNFAVORABLE CONDITIONS BE ENCOUNTERED DURING EXCAVATION OF THE RECHARGE BED (i.e. BEDROCK OR HIGH GROUNDWATER) THE DESIGN ENGINEER MUST BE CONTACTED IMMEDIATELY AND ADDITIONAL TESTING AND DESIGN MUST BE COMPLETED PRIOR TO COMMENCING WITH ANY ADDITIONAL CONSTRUCTION. REMEDIAL MEASURE MAY INCLUDE BUT NOT BE LIMITED TO THE REDESIGN OF THE RECHARGE BED OR RELOCATION OF ENTIRE BED TO A MORE SUITABLE LOCATION. ALL DESIGN CHANGES MUST BE APPROVED BY THE TOWNSHIP AND THE COUNTY CONSERVATION DISTRICT.
- ONCE THE RECHARGE BED HAS BEEN EXCAVATED TO THE REQUIRED ELEVATION, INSTALL THE FABRIC, PIPING AND STONE AS SHOWN ON THE PLAN AND ACCORDING TO THE DETAIL. CARE MUST BE TAKEN TO AVOID COMPACTION OF THE RECHARGE BED BOTTOM. ANY AREAS THAT ARE INADVERTENTLY COMPACTED MUST BE SCARIFIED WITH A CHISEL FLOW OR SIMILAR NON-COMPACTING MEASURES.
- UPON COMPLETION OF THE FABRIC, PIPE AND STONE INSTALLATION, INSTALL INLET PIPING AND OUTLET PIPING. INSTALL INLET SEDIMENT FILTERS ON THE INLETS. THESE ITEMS ARE REQUIRED TO PREVENT SEDIMENT DEPOSITION IN THE INLETS AND RECHARGE BED.
- CHECK THE RECHARGE BED AFTER EACH STORM EVENT AND CLEAN OUT ANY ACCUMULATED SEDIMENT IMMEDIATELY. ACCUMULATIONS OF ANY SEDIMENT SHALL BE REMOVED BY HAND AND PLACED IN A STABILIZED AREA THAT DOES NOT FLOW INTO THE RECHARGE BED. THE INLETS SHALL BE KEPT FREE OF ANY AND ALL DEBRIS IN ACCORDANCE WITH THE LONG TERM OPERATIONS AND MAINTENANCE NOTES SHOWN ON THIS PLAN.

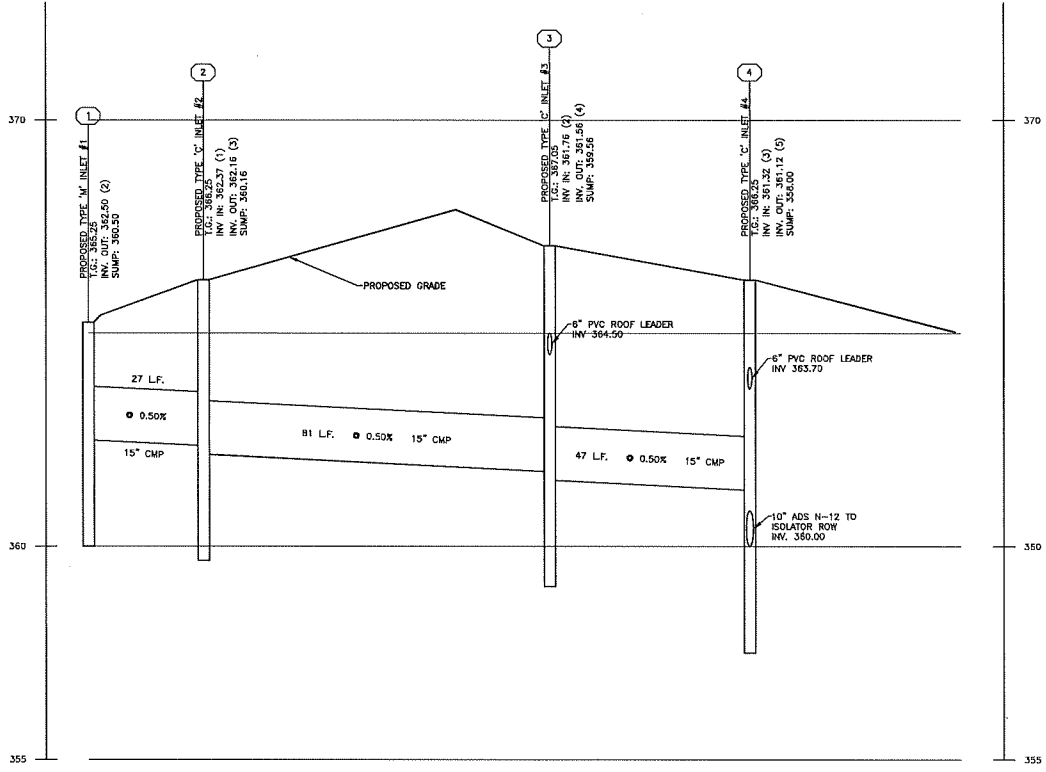
**BMP OPERATIONS AND MAINTENANCE PROCEDURES**

THE PERMITTEE SHALL BE RESPONSIBLE FOR THE PROPER CONSTRUCTION, OPERATION AND MAINTENANCE OF POST CONSTRUCTION STORMWATER MANAGEMENT BODIES IDENTIFIED ON THE APPROVED POST CONSTRUCTION STORMWATER MANAGEMENT (PCSWM) PLAN.  
 THE OPERATION AND MAINTENANCE REQUIREMENTS FOR THE PCSWM BODIES FOR THIS PROJECT INCLUDE THE FOLLOWING:  
 • INLET AND OUTLET POINTS INTO THE STORMWATER BODIES SHOULD BE KEPT CLEAR OF LEAVES AND OTHER DEBRIS. ANY LEAVES OR DEBRIS WILL NEGATIVELY IMPACT THE FUNCTION OF THESE SYSTEMS. ALL DOWNSPOUTS AND OVERFLOW PIPES SHALL BE KEPT IN GOOD WORKING ORDER.  
 • STORMWATER RECHARGE BED IS TO BE MAINTAINED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. (SEE BED DETAILS)  
 • INLET SUMPS ARE TO BE INSPECTED AND KEPT CLEAR OF ALL DEBRIS ON A QUARTERLY BASIS.  
 ALL INSPECTIONS OF THE POST CONSTRUCTION STORMWATER MANAGEMENT BODIES SHALL BE PERFORMED BY THE APPOINTED REPRESENTATIVE OF THE OWNER.  
 UNTIL THE SITE IS STABILIZED AND DURING CONSTRUCTION ACTIVITIES, ALL BMP'S MUST BE MAINTAINED PROPERLY BY THE CONTRACTOR. ALL PERMANENT MAINTENANCE PROCEDURES SHALL BE PERFORMED BY THE OWNER, HIS SUCCESSOR, OR ASSIGNS. THE OWNER IDENTITY & CONTACT INFORMATION CAN BE FOUND AT THE BOTTOM OF THIS SHEET.  
**PERMANENT BMP MAINTENANCE:**  
 RECHARGE BED - UNDERGROUND RECHARGE BED SHALL BE INSPECTED QUARTERLY AND AFTER EACH MAJOR EVENT TO ENSURE THAT THEY ARE WORKING PROPERLY AND THAT DEBRIS AND/OR SEDIMENT HAS NOT ENTERED THE SYSTEM. IF THE INSPECTION REVEALS THAT THE RECHARGE BED HAS BEEN CONTAMINATED WITH SILT, THE SYSTEM WILL BE REPAIRED. ACCUMULATED SILT AND DEBRIS THAT HAS DEPOSITED IN THE BOTTOM OF ALL INLETS AND MANHOLES UPSTREAM AND WITHIN THE SYSTEM WILL BE REMOVED ON A QUARTERLY BASIS. ALL DOWNSPOUTS AND OVERFLOW PIPES SHOULD BE KEPT IN GOOD WORKING ORDER.

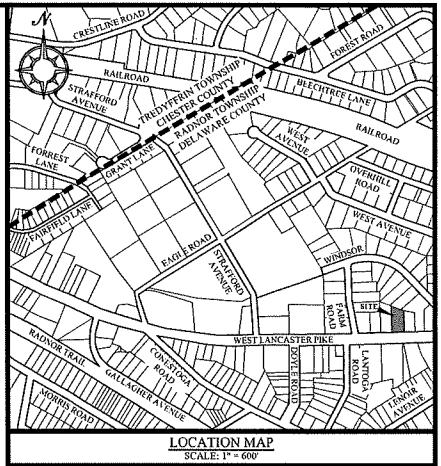
- LEGEND**
- PROPERTY BOUNDARY
  - ADJOINING PROPERTY LINE
  - EXISTING RIGHT OF WAY LINE
  - EXISTING EASEMENT LINE
  - EXISTING 2" CONTOUR
  - EXISTING 10" CONTOUR
  - EXISTING TREE SYMBOLS
  - EXISTING SPOT ELEVATION
  - EXISTING TREELINE
  - EXISTING UTILITY POLE
  - EXISTING WATER VALVE
  - TEST PIT LOCATION
  - EXISTING FENCE LINE
  - SOILS LINE AND DESCRIPTION
  - EXISTING STORM STRUCTURES & PIPE
  - EXISTING SANITARY STRUCTURES & PIPE
  - EXISTING MANHOLE
  - EXISTING CURB LINE
  - EXISTING DRIVEWAY
  - EXISTING STONE DRIVE
  - EXISTING CONCRETE
  - EXISTING WALL
  - EXISTING WATER LINE
  - EXISTING GAS LINE
  - EXISTING OVERHEAD ELECTRIC LINE
  - APPROXIMATE LOCATION OF EXISTING SANITARY SEWER LATERAL
  - ULTIMATE RIGHT OF WAY LINE
  - PROPOSED EASEMENT LINE
  - PROPOSED 2" CONTOUR
  - PROPOSED 10" CONTOUR
  - PROPOSED SPOT ELEVATION
  - PROPOSED FENCE LINE
  - PROPOSED STORM STRUCTURES & PIPE
  - PROPOSED CURB LINE
  - PROPOSED CURB TAPER
  - PROPOSED ROAD/PAVING
  - PROPOSED WATER LATERAL
  - PROPOSED ELECTRIC LINE
  - PROPOSED SIDEWALK
  - PROPOSED WALL



**INLET 6 TO DISCHARGE**  
 SCALE: (H) 1"=20' (V) 1"=2'



**STORM PROFILE INLET #1 TO INLET #5**  
 SCALE: (H) 1"=20' (V) 1"=2'



**OWNER STATEMENT**  
 I HEREBY ACKNOWLEDGE THAT ANY REVISION TO THE APPROVED DRAINAGE PLAN MUST BE APPROVED BY THE MUNICIPALITY.  
 OWNER: \_\_\_\_\_ (DATE) \_\_\_\_\_  
**DESIGN ENGINEER**  
 I, JOEL D. COMANDA, ON THIS DATE 4/6/2018, HEREBY CERTIFY THAT THE DRAINAGE PLAN MEETS ALL DESIGN STANDARDS AND CRITERIA OF THE RADNOR TOWNSHIP STORMWATER MANAGEMENT ORDINANCE.  
 JOEL D. COMANDA 4/6/2018 (DATE)

**SOILS DESCRIPTION**

SYMBOL	DESCRIPTION	SLOPE	AVAILABLE WATER CAPACITY	DRAINAGE CLASS	DEPTH TO S.H.W.T.	DEPTH TO BEDROCK	CAPABILITY UNIT	HYDROLOGIC SOIL GROUP
Md	MADE LAND, GABBRO AND DIABASE MATERIALS	0% - 8%	LOW (ABOUT 4.2 INCHES)	WELL DRAINED	MORE THAN 80 INCHES	MORE THAN 80 INCHES	6s	C
Me	MADE LAND, SCHIST AND GNEISS MATERIALS	0% - 8%	HIGH (ABOUT 10.1 INCHES)	WELL DRAINED	ABOUT 60 INCHES	40 TO 72 INCHES	7s	C

LIMIT OF DISTURBANCE BOUNDARY: 16,949 S.F. (0.39 AC.)

**INLAND DESIGN**  
 Civil Engineers, Surveyors & Land Development Consultants  
 16 Hagerty Blvd.  
 West Chester, PA 19382  
 www.InLandDesign.net  
 Phone: (484) 947-2928  
 Fax: (484) 947-2946  
 Info@InLandDesign.net

**JOEL D. COMANDA**  
 ENGINEER  
 PEO70740  
 PENNSYLVANIA

No.	Date:	Description:

**PRELIMINARY/FINAL LAND DEVELOPMENT PLAN**  
 GRAPHIC SCALE  
 0 10 20 30 40 50  
 (IN FEET)  
 1 Inch = 20'

Date: 04/06/2018  
 Scale: 1" = 20'  
 Drawn by: JDC  
 Checked by: CAD  
 Project No: 11104

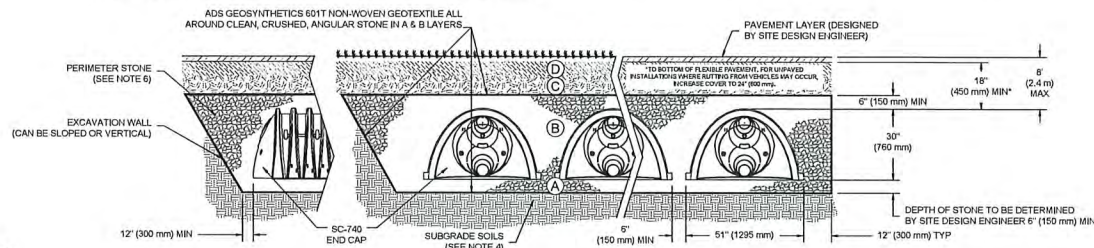
**POST CONSTRUCTION STORMWATER MANAGEMENT PLAN & PROFILES FOR**  
**FIRST RESOURCE BANK**  
 321 WEST LANCASTER AVENUE  
 WAYNE, PA 19087  
 RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA

**SHEET**  
**7**  
**OF 12**

**ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS**

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE (B LAYER) TO 18" (457 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M43* A-1, A-2, A-3 OR AASHTO M43* 3, 357, 4, 497, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (5.44 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	AASHTO M43* 3, 357, 4, 497, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	AASHTO M43* 3, 357, 4, 497, 5, 56, 57	FLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. **

PLEASE NOTE:  
 1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE."  
 2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.  
 3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGN, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



**NOTES:**

- SC-740 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS", OR ASTM F2922 "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- ONCE LAYER 'C' IS PLACED, ANY SOLI/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

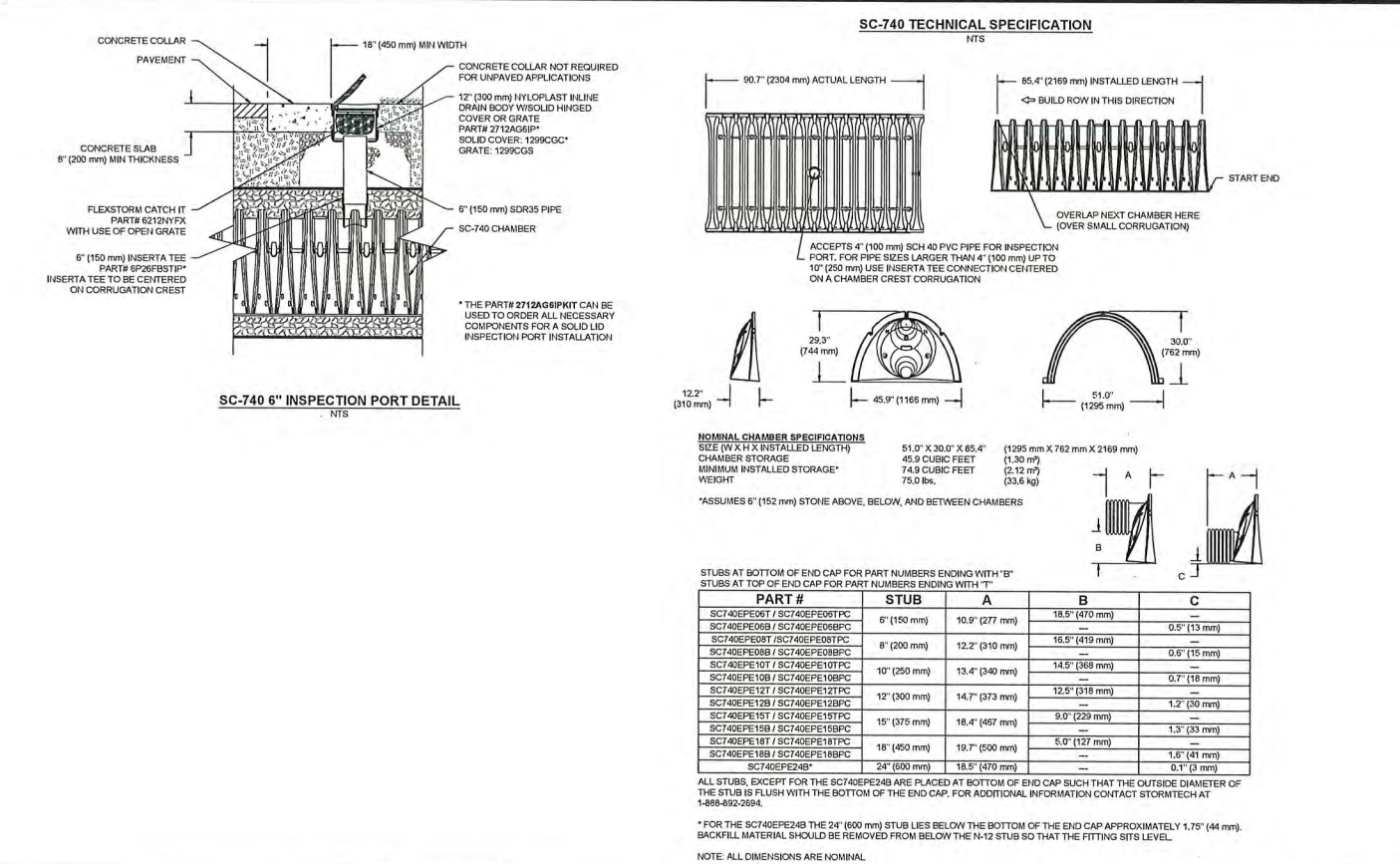
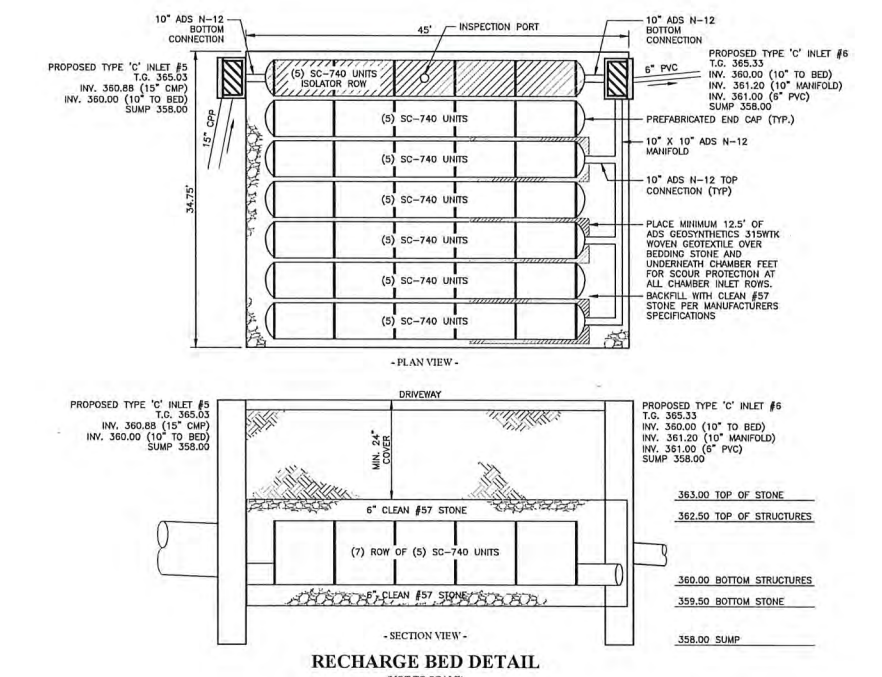
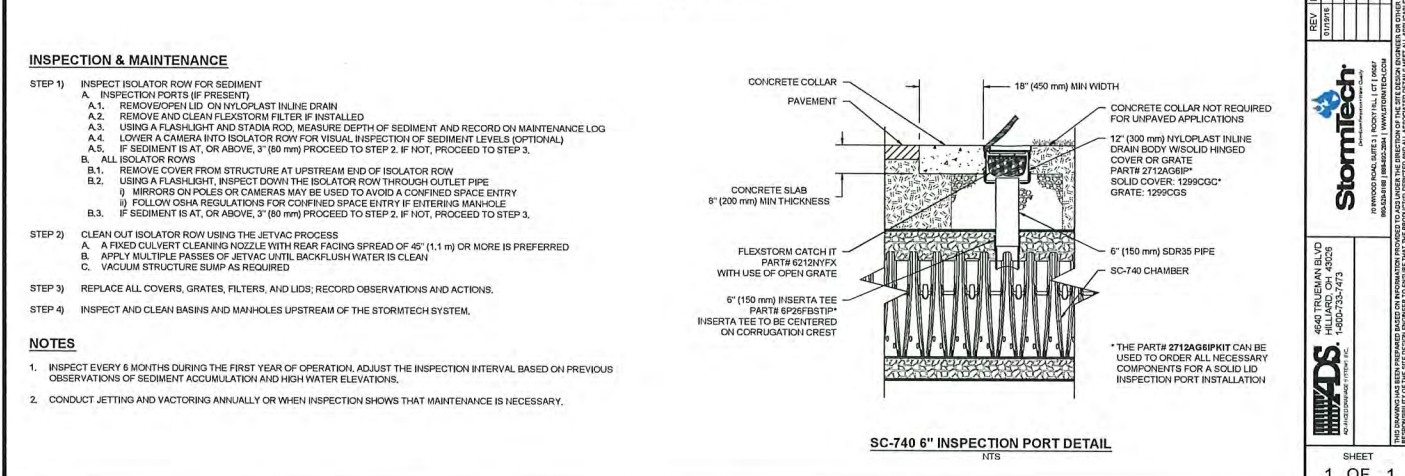
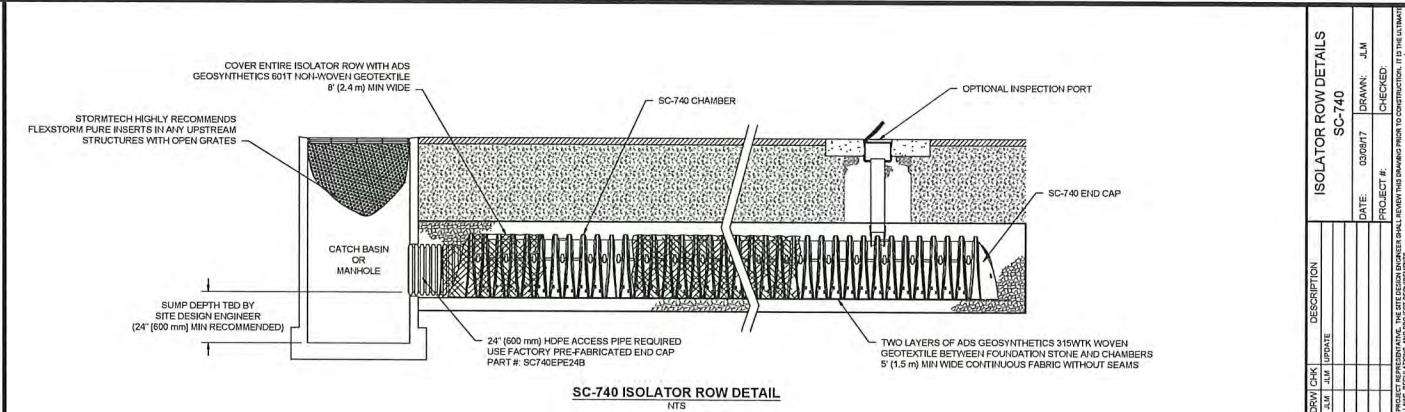
STANDARD CROSS SECTION  
 SC-740  
 DATE: 11/17/14  
 DRAWN: JLM  
 CHECKED: JLM  
 SHEET 1 OF 1

**INSPECTION & MAINTENANCE**

- STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT  
 A. INSPECTION PORTS (IF PRESENT)  
 A.1. REMOVE/OPEN LID ON NYLOPLAST IN-LINE DRAIN  
 A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED  
 A.3. USING A FLASHLIGHT AND STATION ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG  
 A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)  
 A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.  
 B. ALL ISOLATOR ROWS  
 B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW  
 B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE  
 i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY  
 ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE  
 B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW USING THE JET/VAC PROCESS  
 A. A FINED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED  
 B. APPLY MULTIPLE PASSES OF JET/VAC UNTIL BACKFLUSH WATER IS CLEAN  
 C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

**NOTES**

- INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
- CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

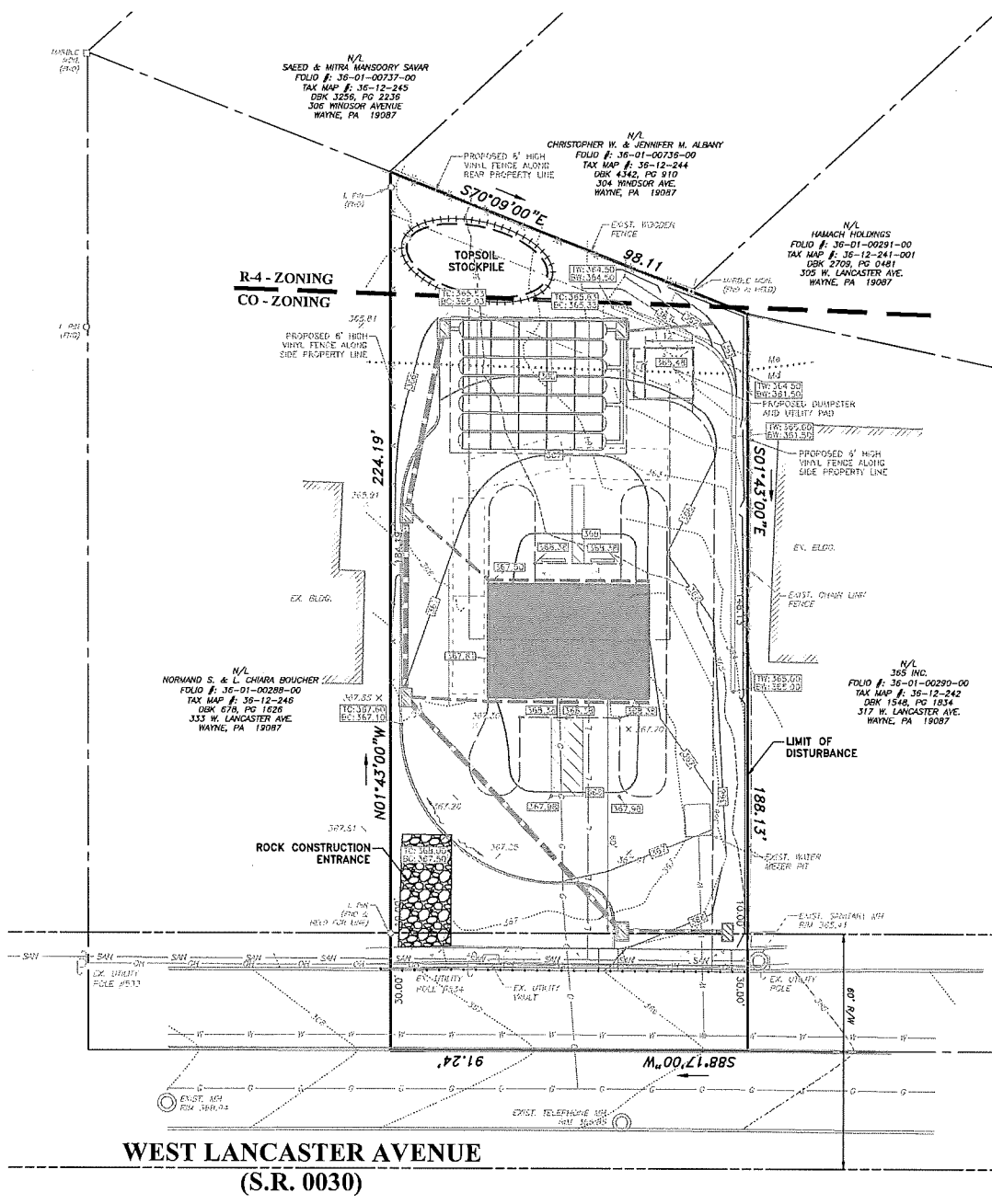
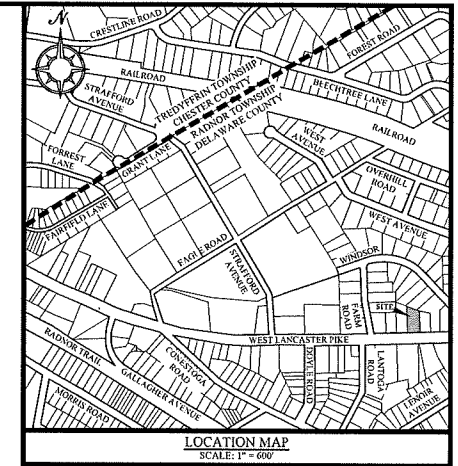


**INLAND DESIGN**  
 Civil Engineers, Surveyors & Land Development Consultants  
 16 Hagerly Blvd., West Chester, PA 19382  
 Phone: (484) 947-2929  
 Fax: (484) 947-2946  
 Info@InLandDesign.net  
 www.InLandDesign.net

**PRELIMINARY/FINAL LAND DEVELOPMENT PLAN**  
 GRAPHIC SCALE  
 1 inch = 20' (IN FEET)  
 Date: 04/06/2018  
 Scale: 1" = 20'  
 Drawn by: JDC  
 Checked by: CAD  
 Project No: 11104

**RECHARGE BED DETAILS FOR FIRST RESOURCE BANK**  
 321 WEST LANCASTER AVENUE  
 WAYNE, PA 19087  
 RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA

**SHEET 8 OF 12**



- SEQUENCE OF CONSTRUCTION:**
1. IDENTIFY THE LIMITS OF DISTURBANCE, INSTALL ROCK CONSTRUCTION ENTRANCE, SILT-FENCING, TREE PROTECTION AND ORANGE CONSTRUCTION SAFETY FENCING WHERE SHOWN, ESTABLISH TOP-SOIL STOCKPILE LOCATION WHERE SHOWN AND PROVIDE SILT-FENCING AS REQUIRED.
  2. ONCE ALL SEDIMENT AND EROSION CONTROLS ARE IN PLACE, BEGIN SITE DEMOLITION, REMOVE TREES TO BE REMOVED, EXISTING PAVING, AND PORTIONS OF EXISTING BUILDING TO BE REMOVED. DISPOSE OF ALL CONSTRUCTION WASTE PROPERLY. LOCATE AND PROTECT ALL UTILITIES TO BE MAINTAINED.
  3. STRIP TOPSOIL AND STOCKPILE IN DESIGNATED LOCATION.
  4. ROUGH GRADE SITE.
  5. INSTALL INFILTRATION FACILITY AND TRIBUTARY PIPES AND INLETS. IMMEDIATELY INSTALL INLET PROTECTION.
  6. INSTALL CURB AND STONE BASE IN PARKING AREAS.
  7. BEGIN BUILDING CONSTRUCTION.
  8. INSTALL ASSOCIATED UTILITIES, AS REQUIRED.
  9. INSTALL PARKING LOT PAVING AND CURB AND SIDEWALK.
  10. COMPLETE FINAL GRADING ADJACENT TO BUILDING AND IMMEDIATELY STABILIZE ALL SLOPES STEEPER THAN 3:1 WITH EROSION CONTROL BLANKETING.
  11. INSTALL PROPOSED LANDSCAPING.
  12. ONCE ALL AREAS ARE PERMANENTLY STABILIZED, REMOVE INLET PROTECTION, TREE PROTECTION FENCING, AND ALL REMAINING EROSION CONTROL MEASURES. IMMEDIATELY STABILIZE ANY AREAS DISTURBED BY THIS ACTIVITY.

**LEGEND**

	PROPERTY BOUNDARY
	ADJOINING PROPERTY LINE
	EXISTING RIGHT OF WAY LINE
	EXISTING EASEMENT LINE
	EXISTING 2' CONTOUR
	EXISTING 10' CONTOUR
	EXISTING TREE SYMBOLS
	EXISTING SPOT ELEVATION
	EXISTING TREELINE
	EXISTING UTILITY POLE
	EXISTING WATER VALVE
	TEST PIT LOCATION
	EXISTING FENCE LINE
	SOILS LINE AND DESCRIPTION
	EXISTING STORM STRUCTURES & PIPE
	EXISTING SANITARY STRUCTURES & PIPE
	EXISTING MANHOLE
	EXISTING CURB LINE
	EXISTING DRIVEWAY
	EXISTING STONE DRIVE
	EXISTING CONCRETE
	EXISTING WALL
	EXISTING WATER LINE
	EXISTING GAS LINE
	EXISTING OVERHEAD ELECTRIC LINE
	APPROXIMATE LOCATION OF EXISTING SANITARY SEWER LATERAL
	ULTIMATE RIGHT OF WAY LINE
	PROPOSED EASEMENT LINE
	PROPOSED 1' CONTOUR
	PROPOSED 5' CONTOUR
	PROPOSED SPOT ELEVATION
	PROPOSED FENCE LINE
	PROPOSED STORM STRUCTURES & PIPE
	PROPOSED CURB LINE
	PROPOSED CURB TAPER
	PROPOSED ROAD / PAVING
	PROPOSED WATER LATERAL
	PROPOSED ELECTRIC LINE
	PROPOSED SIDEWALK
	PROPOSED WALL
	COMPOST FILTER SOCK
	ORANGE CONSTRUCTION FENCE
	LIMIT OF DISTURBANCE / PIPES
	FENCE BOUNDARY
	ROCK CONSTRUCTION ENTRANCE
	EROSION CONTROL
	BLANKET FOR SLOPES
	INLET SEDIMENT FILTER

**WEST LANCASTER AVENUE**  
(S.R. 0030)

**SOILS DESCRIPTION**

LIMIT OF DISTURBANCE BOUNDARY: 16,949 S.F. (0.39 AC.)

SYMBOL	DESCRIPTION	SLOPE	AVAILABLE WATER CAPACITY	DRAINAGE CLASS	DEPTH TO S.H.W.T.	DEPTH TO BEDROCK	CAPABILITY UNIT	HYDROLOGIC SOIL GROUP
Md	MADE LAND, GABBRO AND DIABASE MATERIALS	0% - 8%	LOW (ABOUT 4.2 INCHES)	WELL DRAINED	MORE THAN 89 INCHES	MORE THAN 80 INCHES	6s	C
Mf	MADE LAND, SCHIST AND GNEISS MATERIALS	0% - 8%	HIGH (ABOUT 10.1 INCHES)	WELL DRAINED	ABOUT 60 INCHES	40 TO 72 INCHES	7s	C

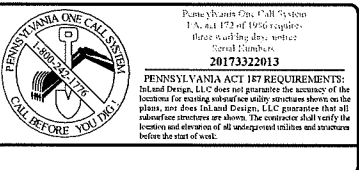
**COPYRIGHT**  
Inland Design, LLC expressly reserves all copyright and all other proprietary rights in these plans. All drawings, specifications and copies thereof are and shall remain the property of Inland Design, LLC. They are to be used only in respect to the project and are not to be used on any other project, nor are they to be assigned to any third party without the express written permission of Inland Design, LLC. Any reuse without written permission, verification, consent or authorization by Inland Design, LLC for the specific purpose intended, will be at the third party's sole risk and without liability or legal recourse to Inland Design, LLC. The third party shall further indemnify and hold harmless Inland Design, LLC from all claims, damages, losses, and expenses arising therefrom or resulting therefrom.

**PENNSYLVANIA ONE CALL 800-488-7827**

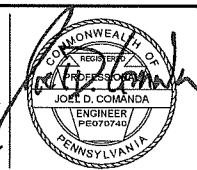
**PENNSYLVANIA ACT 187 REQUIREMENTS:**  
Inland Design, LLC does not guarantee the accuracy of the information for meeting subpart 187.1001 requirements shown on this plan. Inland Design, LLC guarantees that all information shown on this plan is true and correct. The contractor shall verify the location and accuracy of all underground utilities and structures before the start of work.

**20173322013**

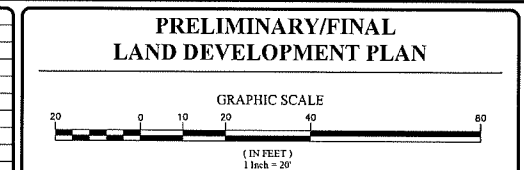
**FOLIO #36-01-00289-00, TAX ID: 36-12-243**



**INLAND DESIGN**  
Civil Engineers, Surveyors & Land Development Consultants  
16 Hagerty Blvd. Phone: (484) 947-2929  
West Chester, PA 19382 Fax: (484) 947-2946  
www.InlandDesign.net Info@InlandDesign.net



No.	Date:	Description:



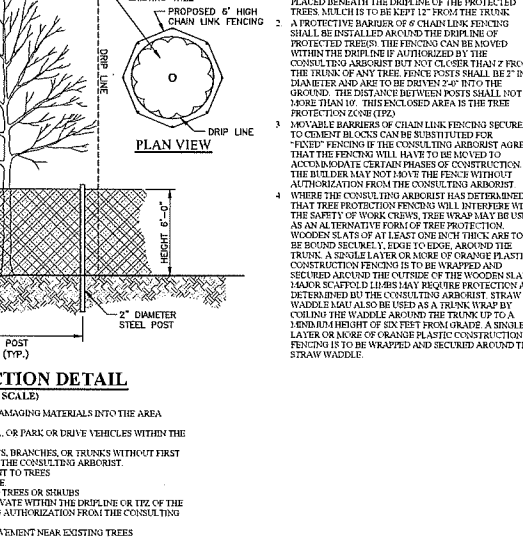
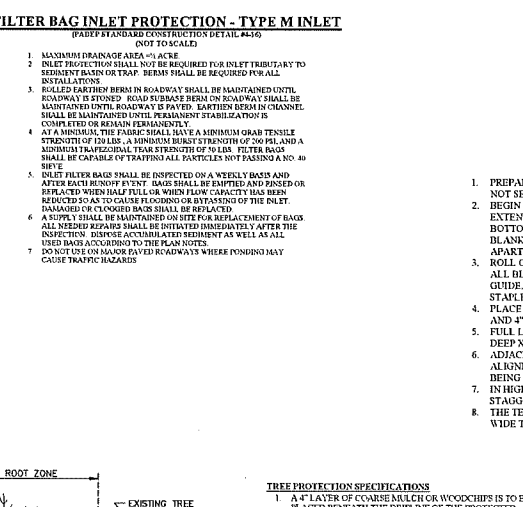
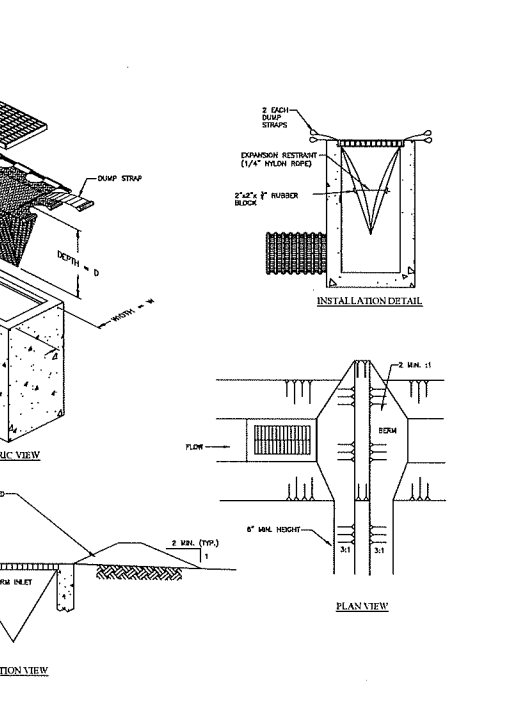
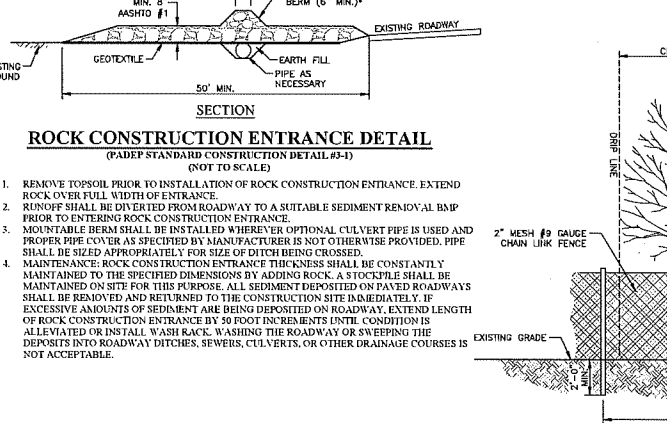
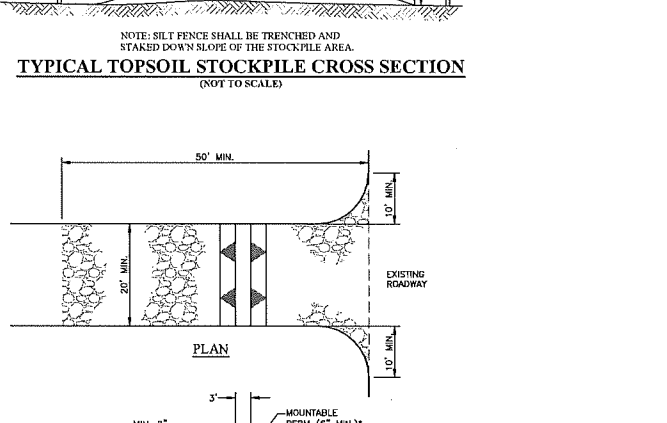
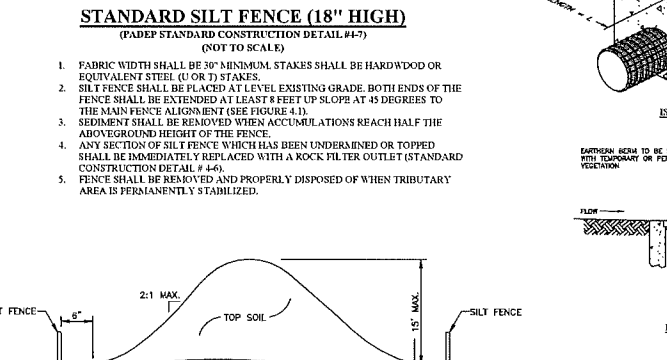
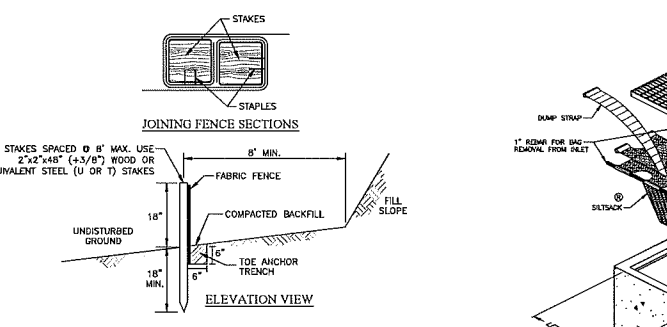
Date: 04/06/2018  
Scale: 1" = 20'  
Drawn by: JDC  
Checked by: CAD  
Project No: 11104

**SEDIMENT & EROSION CONTROL PLAN FOR**  
**FIRST RESOURCE BANK**  
**321 WEST LANCASTER AVENUE**  
**WAYNE, PA 19087**  
RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA

**SHEET**  
**9**  
**OF 12**

**STANDARD E&S PLAN NOTES**

- ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.
- AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARED, THE PCS&M PLAN PREPARED, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAKE INSTALLATION OF THE PCS&M PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON-SITE PRECONSTRUCTION MEETING.
- AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1-800-242-1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.
- ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT BEFORE THE IMPLEMENTATION.
- AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.
- CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPs DESCRIBED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS SPECIFIED IN THIS E&S PLAN.
- AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN STAKES. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.
- TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAP(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2:1V OR FLATTER.
- IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCRERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.
- ALL BUILDING MATERIAL AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271 L. AND 261 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE.
- ALL OFF-SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.
- THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORMAL FILL MUST BE STAMPED BY THE PROPERLY OWNED FORMAL FILL MATERIAL, AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.
- ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS.
- VEHICLES AND EQUIPMENT MAY NEVER ENTER DIRECTLY NOR EXIT DIRECTLY FROM LOTS (SPECIFY LOT NUMBERS) ONTO (SPECIFY ROAD NAMES).
- UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPs SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPs AFTER EACH RAINFALL EVENT ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RETENTION MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPs FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPs OR BMPs INSTALLED WILL BE RECORDED.
- A LOG SHOWING DATES THAT E&S BMPs WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.
- SEDIMENT TRAPPED ON ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEEP INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.
- ALL SEDIMENT REMOVED FROM BMPs SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS.
- AREAS WHICH SHALL BE DESCRIBED AS TO A MINIMUM DEPTH OF 3 TO 2 INCHES - 6 TO 12 INCHES ON COMPACTED SOILS - PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTLINES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.
- FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAZE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REGULATIONS OR CODES.
- ALL FORTIFIN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
- FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, STUMPS, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
- FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.
- FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
- SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
- ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES ON INCOMPETENT BEDROCK AND ROCK FILLS SHOD NOT BE VEGETATED. SEEDED AREAS WITHIN 6 MONTHS AFTER SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.
- IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE AND/or PROTECT AREAS DURING NON-EROSION PERIODS. ALL CUT OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
- PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON-VOLATILE COVERED EROSION, CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR OTHER MOVEMENTS.
- E&S BMPs SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.
- UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPs.
- AFTER FINAL SITE STABILIZATION IS ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPs MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPs. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPs SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.
- UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.
- FAILURE TO CORRECTLY INSTALL E&S BMPs, FAILURE TO PREVENT SEDIMENT-LOADED RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPs MAY RESULT IN CIVIL AND/OR CRIMINAL PENALTIES BEING IMPOSED BY THE DEPARTMENT. PENALTIES AS DEFINED IN SECTION 602 OF THE PENNSYLVANIA CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO \$10,000 PER DAY IN CIVIL PENALTIES, UP TO \$100,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO \$25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.



- TEMPORARY STABILIZATION AND PERMANENT STABILIZATION**
- HAY OR STRAW MULCH MUST BE APPLIED AT 30 TONS PER ACRE.
  - HYDRO-MULCH SHALL BE APPLIED AT A MINIMUM RATE OF 1 TON PER ACRE.
  - MULCH WITH MULCH CONTROL NETTING OR EROSION CONTROL BLANKETS MUST BE INSTALLED ON ALL SLOPES 3:1 AND STEEPER.
  - STRAW MULCH SHALL BE APPLIED IN LONG STRANDS, NOT CHOPPED OR FINELY BROKEN.
  - UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPs MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT CONTROL BMPs AFTER EACH RAINFALL EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING, AND RETENTION, MUST BE PERFORMED IMMEDIATELY. IF EROSION AND SEDIMENT CONTROL BMPs FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPs OR MODIFICATIONS TO THOSE INSTALLED WILL BE REQUIRED.
  - SEDIMENT REMOVED FROM BMPs SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.

**INLAND DESIGN**

Civil Engineers, Surveyors & Land Development Consultants

16 Hugerty Blvd., West Chester, PA 19382

www.InLandDesign.net

JOE D. COMANDA  
ENGINEER  
11170

© COPYRIGHT  
Inland Design, LLC expressly reserves all copyright and other proprietary rights in these plans. All drawings, specifications and notes hereon are and shall remain the property of Inland Design, LLC. No part of these plans may be reproduced, stored in a retrieval system, or used in any manner without the prior written permission of Inland Design, LLC. Any reproduction without the prior written permission of Inland Design, LLC may result in criminal and civil penalties. Inland Design, LLC does not warrant the accuracy of the information contained herein. The user assumes all liability for any errors, omissions, or inaccuracies in these plans. The user acknowledges that all drawings and specifications are subject to change without notice. Inland Design, LLC reserves the right to modify these plans at any time without notice.

PROJECT NO. 131322113  
PENNSYLVANIA ACT 187 REQUIREMENTS: Inland Design, LLC does not guarantee the accuracy of the information contained herein. The user assumes all liability for any errors, omissions, or inaccuracies in these plans. The user acknowledges that all drawings and specifications are subject to change without notice. Inland Design, LLC reserves the right to modify these plans at any time without notice.

No.	Date:	Description:

**PRELIMINARY/FINAL LAND DEVELOPMENT PLAN**

GRAPHIC SCALE  
1 inch = 20'

Date: 04/06/2018  
Scale: 1" = 20'  
Drawn by: JDC  
Checked by: CAD  
Project No: 11104

**SEDIMENT & EROSION CONTROL DETAILS & NOTES FOR FIRST RESOURCE BANK**

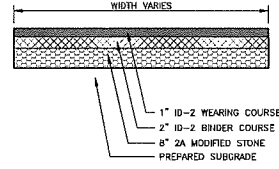
**321 WEST LANCASTER AVENUE WAYNE, PA 19087**

**RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA**

**SHEET 10 OF 12**

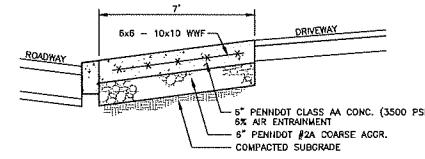
NA110011642g40Shriw111 SEDIMENT & EROSION CONTROL DETAILS & NOTES.dwg



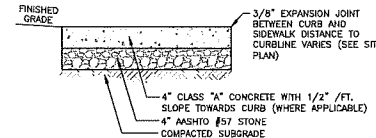


NOTE: PREPARED SUBGRADE SHALL BE PROOFROLLED TO VERIFY SUITABLE COMPACTION

**PARKING LOT CROSS SECTION**  
(NOT TO SCALE)



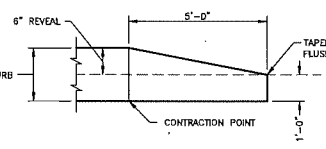
**CONCRETE DRIVEWAY APRON CROSS SECTION**  
(NOT TO SCALE)



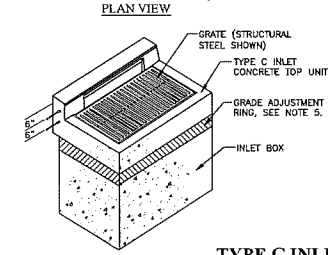
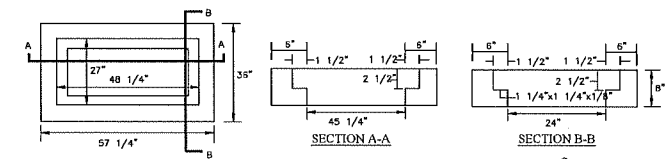
**TYPICAL SIDEWALK SECTION**  
(NOT TO SCALE)

**STRAIGHT CONCRETE CURB DETAIL**  
(NOT TO SCALE)

NOTES:  
1. CONCRETE TO BE CLASS A 3500 PSI 28-DAY STRENGTH AIR ENTRAINED.  
2. SLOPE TOP SURFACE OF CURB BACK TO FRONT AT 1/4\"/>



**CURB END TREATMENT DETAIL**  
(NOT TO SCALE)

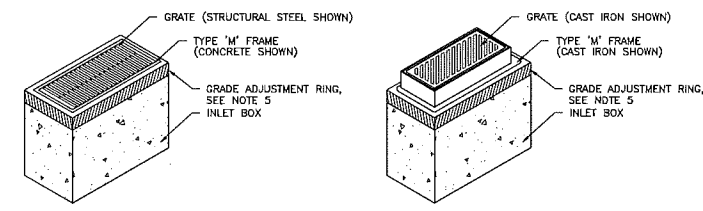


**TYPE C INLET DETAIL**  
(NOT TO SCALE)

**NOTES**

- CONSTRUCTION REQUIREMENTS:  
A. CONSTRUCT IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SPECIFICATIONS, SECTIONS 605, 606, 714, AND AS MODIFIED HEREIN.  
B. MINIMUM CONCRETE CLASS: CAST-IN-PLACE CLASS A PRECAST CLASS AA  
C. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE WITH SEC. 709. PROVIDE MINIMUM YIELD STRENGTH OF 60,000 PSI.  
D. CLEAR COVER FOR STEEL:  
CAST-IN-PLACE 2"  
PRECAST 1 1/2"  
FOOTINGS: CAST-IN-PLACE 2 1/2" (TOP BARS) 3" (BOTTOM BARS)  
PRECAST 2" (SIDE COVER) 1 1/2" (BOTTOM BARS) 1 1/2" (SIDE COVER)  
SLABS: CAST-IN-PLACE 2" (TOP AND BOTTOM BARS)

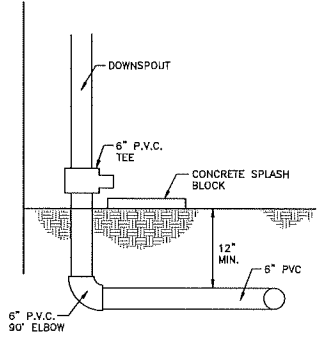
- THIS SHEET DEPICTS THE VARIOUS COMPONENTS REQUIRED FOR COMPLETE INLET ASSEMBLIES. FOR INDIVIDUAL COMPONENTS AND OTHER SPECIAL DETAILS, SEE THE FOLLOWING:  
\* "TOPRAISE" DRAWING FOR CONCRETE TOP UNITS  
\* "GRATES" DRAWING FOR GRATES \* "TOPRAISE" DRAWING FOR FRAMES  
\* "INPLA BOX" DRAWING FOR STANDARD INLET BOXES (CAST-IN-PLACE)  
\* "PRECAST" DRAWING FOR STANDARD INLET BOXES AND GRADE ADJUSTMENT RINGS (PRECAST)  
\* "STANDARD" DRAWING FOR MODIFIED INLET BOXES (CAST-IN-PLACE) AND PRECAST  
\* "STANDARD" DRAWING FOR TYPE D-H INLET
- EACH TYPE OF INLET SHOWN IS SUITED FOR A PARTICULAR SITUATION AS FOLLOWS:  
\* TYPE C INLET IS DESIGNATED FOR INSTALLATION WITH NON-MOUNTABLE CURBS.  
\* TYPE M INLET IS DESIGNATED FOR INSTALLATION IN MEDIAN AREAS AND MOUNTABLE CURBS.  
\* TYPE S INLET IS DESIGNATED FOR INSTALLATION IN SHOULDER SWALE AREAS.
- THE SELECTION OF COMPONENTS TO ACHIEVE A SPECIFIED INLET ASSEMBLY IS THE CONTRACTOR'S RESPONSIBILITY.
- USE PRECAST CONCRETE OR STEEL GRADE ADJUSTMENT RINGS WHEN REQUIRED.
- FOR FOOTING REINFORCEMENT, TOP AND BOTTOM, USE #4 BARS AT 12" CENTERS EACH WAY OR 0.20 IN. 2 FT. W.W.F. (6" MAX. SPACING).



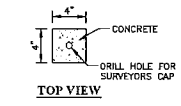
**TYPE M INLET DETAIL**  
(NOT TO SCALE)

**NOTES**

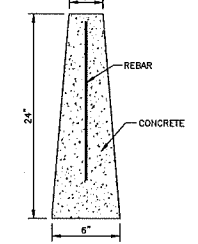
- CONSTRUCTION REQUIREMENTS:  
A. CONSTRUCT IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SPECIFICATIONS, SECTIONS 605, 606, 714, AND AS MODIFIED HEREIN.  
B. MINIMUM CONCRETE CLASS: CAST-IN-PLACE CLASS A PRECAST CLASS AA  
C. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE WITH SEC. 709. PROVIDE MINIMUM YIELD STRENGTH OF 60,000 PSI.  
D. CLEAR COVER FOR STEEL:  
CAST-IN-PLACE 2"  
PRECAST 1 1/2"  
FOOTINGS: CAST-IN-PLACE 2 1/2" (TOP BARS) 3" (BOTTOM BARS)  
PRECAST 2" (SIDE COVER) 1 1/2" (BOTTOM BARS) 1 1/2" (SIDE COVER)  
SLABS: CAST-IN-PLACE 2" (TOP AND BOTTOM BARS)
- THIS SHEET DEPICTS THE VARIOUS COMPONENTS REQUIRED FOR COMPLETE INLET ASSEMBLIES. FOR INDIVIDUAL COMPONENTS AND OTHER SPECIAL DETAILS, SEE THE FOLLOWING RC-341 DRAWINGS:  
\* SHEET 2 OF 10 FOR CONCRETE TOP UNITS  
\* SHEET 3, 4 & 5 OF 10 FOR GRATES AND GRADE ADJUSTMENT RINGS  
\* SHEET 6 OF 10 FOR FRAMES  
\* SHEET 7 OF 10 FOR STANDARD INLET BOXES (CAST-IN-PLACE)  
\* SHEET 8 OF 10 FOR STANDARD INLET BOXES (PRECAST)  
\* SHEET 9 OF 10 FOR MODIFIED INLET BOXES (CAST-IN-PLACE AND PRECAST)  
\* SHEET 10 OF 10 FOR TYPE D-H INLET
- EACH TYPE OF INLET SHOWN IS SUITED FOR A PARTICULAR SITUATION AS FOLLOWS:  
\* TYPE C INLET IS DESIGNATED FOR INSTALLATION WITH NON-MOUNTABLE CURBS.  
\* TYPE M INLET IS DESIGNATED FOR INSTALLATION IN MEDIAN AREAS AND MOUNTABLE CURBS.  
\* TYPE S INLET IS DESIGNATED FOR INSTALLATION IN SHOULDER SWALE AREAS.
- THE SELECTION OF COMPONENTS TO ACHIEVE A SPECIFIED INLET ASSEMBLY IS THE CONTRACTOR'S RESPONSIBILITY.
- USE PRECAST CONCRETE OR STEEL GRADE ADJUSTMENT RINGS WHEN REQUIRED.
- FOR WALL REINFORCEMENT, BOTH DIRECTIONS, USE 10" MIN. EACH WAY, EACH FACE 6" MAX. SPACING.
- FOR FOOTING REINFORCEMENT, TOP AND BOTTOM, USE #4 BARS AT 12" CENTERS EACH WAY OR 0.20 IN. 2 FT. W.W.F. (6" MAX. SPACING).
- PROVIDE WEEP HOLES ON INLET BOXES WHEN REQUIRED.
- PIPES MAY BE CONNECTED TO DRAINAGE STRUCTURES WITH NEOTAR OR WATER-TIGHT RUBBER FLEXIBLE CONNECTIONS.



**DOWNSPOUT OVERFLOW**  
(NOT TO SCALE)



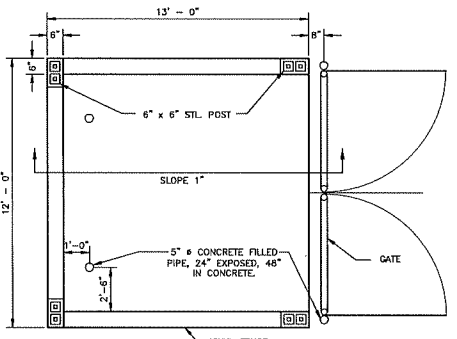
**TOP VIEW**



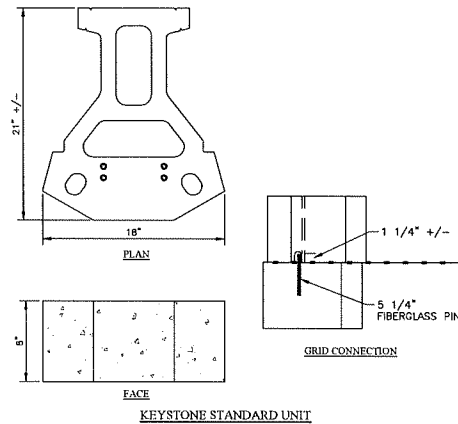
**SIDE VIEW**

**CONCRETE MONUMENT DETAIL**  
(NOT TO SCALE)

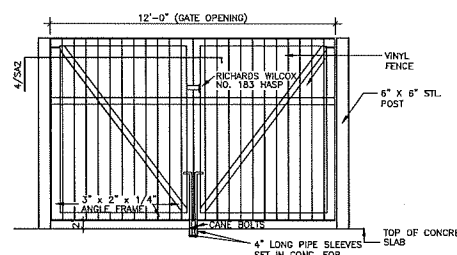
- PERMANENT STONE OR CONCRETE MONUMENTS SHALL BE ACCURATELY PLACED AT THE INTERSECTION OF ALL LINES FORMING ANGLES AND AT CHANGES IN DIRECTIONS OF LINES IN THE BOUNDARY (PERIMETER) OF THE PROPERTY BEING SUBDIVIDED. EXISTING PERMANENT MONUMENTATION OF A BOUNDARY SHALL NOT BE DISTURBED. EXISTING MONUMENTATION IS ACCEPTABLE IF IN THE FORM OF PIPES, PINS, STONES OR OTHER PERMANENT MARKERS.
- ALL MONUMENTS SHALL BE PLACED BY A REGISTERED SURVEYOR SO THAT THE SPORED POINT CREATED BY AN INDENTED CROSS OR DRILL HOLE IN THE TOP OF THE MONUMENT SHALL COINCIDE EXACTLY WITH THE POINT OF INTERSECTION OF THE LINES BEING MONUMENTED.
- MONUMENTS ALONG STREETS SHALL BE SET WITH THE TOP LEVEL WITH THE FINISHED GRADE OF THE SURROUNDING GROUND.
- DRILL HOLES MAY BE USED IN LIEU OF MONUMENTS WHERE MARKERS ARE REQUIRED IN CONCRETE.



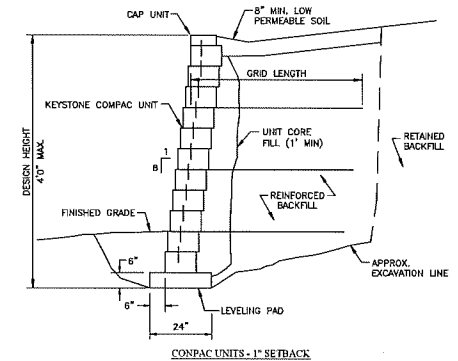
**DUMPSTER VINYL FENCE**  
(NOT TO SCALE)



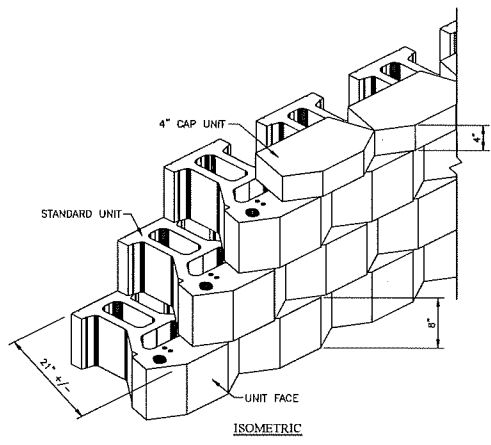
**KEYSTONE STANDARD UNIT**



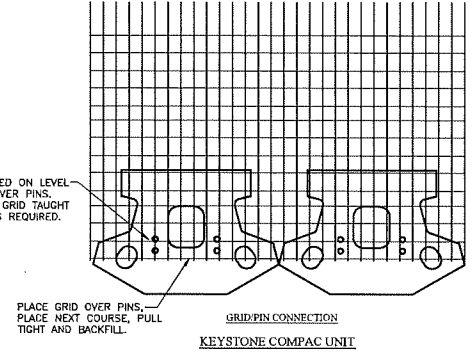
**GATE ELEVATION AT DUMPSTER ENCLOSURE**  
(NOT TO SCALE)



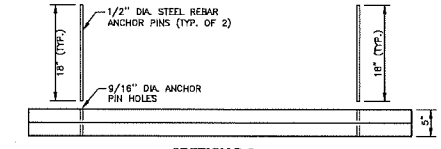
**TYPICAL REINFORCED SECTION**



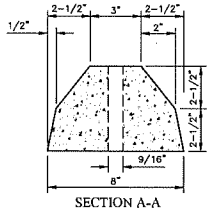
**KEYSTONE STANDARD WALL DETAILS**  
(NOT TO SCALE)



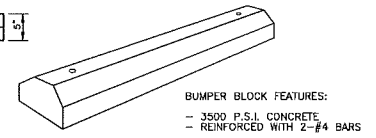
**GRID/PIN CONNECTION**



**SECTION B-B**



**SECTION A-A**



**BUMPER BLOCK DETAIL**  
(NOT TO SCALE)

**CONSTRUCTION DETAILS**  
**FOR**  
**FIRST RESOURCE BANK**  
**321 WEST LANCASTER AVENUE**  
**WAYNE, PA 19087**  
**RADNOR TOWNSHIP • DELAWARE COUNTY • PENNSYLVANIA**

**SHEET**  
**12**  
**OF 12**

**COPYRIGHT**  
Inland Design, LLC expressly reserves its common law copyright and all other proprietary rights in these plans. All drawings, specifications and copies thereof are and shall remain the property of Inland Design, LLC. They are to be used only in respect to this project and are not to be used on any other project, nor are they to be assigned to any third party without the express written permission and consent of Inland Design, LLC. Any reuse without written permission, verification, consent or assignment by Inland Design, LLC for the specific purpose intended, will be at the third party's sole risk and without liability to Inland Design, LLC. The third party shall obtain indemnification and hold harmless Inland Design, LLC from all claims, damages, losses, and expenses arising from its reuse of these drawings.

**PA. and 173 of 1986 requires three working days notice**  
Serial Number: 20173222113  
PENNSYLVANIA ACT 187 REQUIREMENTS:  
Inland Design, LLC does not guarantee the accuracy of the information for existing subsurface utility structures shown on the plans, nor does Inland Design, LLC guarantee that all subsurface structures are shown. The contractor shall verify the location and elevation of all underground utilities and structures before the start of work.

**INLAND DESIGN**  
Civil Engineers, Surveyors & Land Development Consultants  
16 Hagerly Blvd.  
West Chester, PA 19382  
www.InLandDesign.net  
Phone: (484) 947-2928  
Fax: (484) 947-2946  
Info@InLandDesign.net

**JOEL D. COMANDA**  
ENGINEER  
PE070740  
PENNSYLVANIA

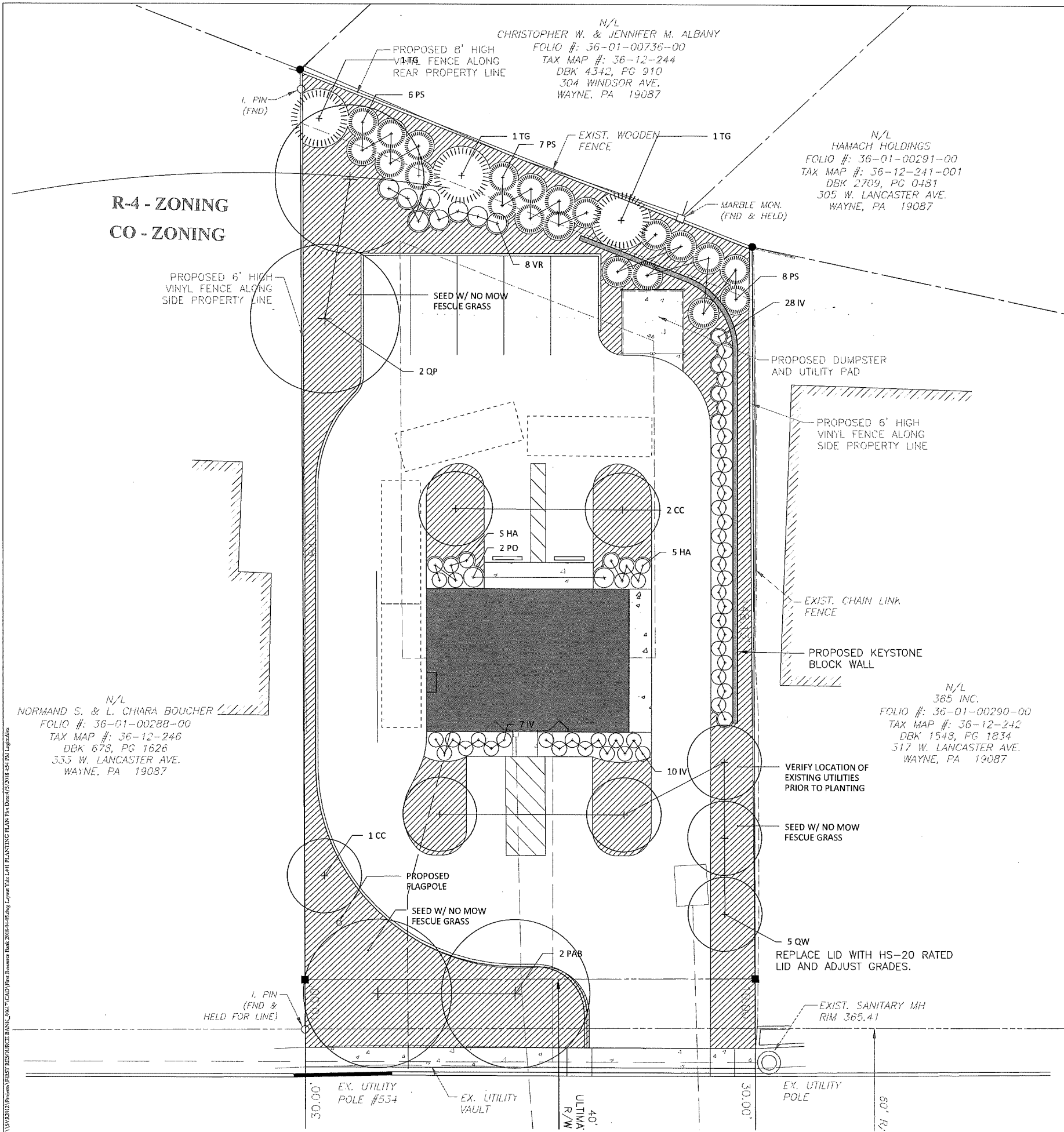
No.	Date	Description

**PRELIMINARY/FINAL**  
**LAND DEVELOPMENT PLAN**

**GRAPHIC SCALE**  
(IN FEET)  
1 inch = 20'

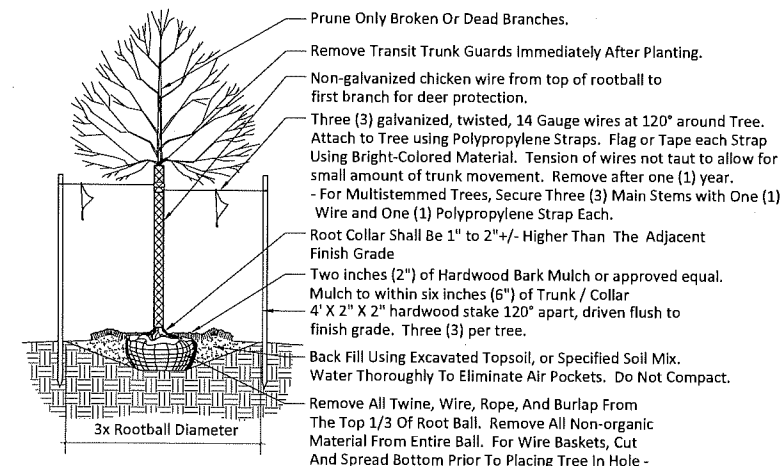
Date: 04/06/2018  
Scale: 1" = 20'  
Drawn by: JDC  
Checked by: CAD  
Project No: 11104





ID	#	BOTANICAL NAME	COMMON NAME	SIZE	COND.
<b>BATHON PLANT SCHEDULE</b>					
Trees, Shrubs and Vines					
CC	3	<i>Cercis canadensis</i>	Redbud	10-12'	B&B
HA	10	<i>Hydrangea arborescens</i> 'Annabelle'	Smooth Hydrangea	#5	cont.
IV	45	<i>Itea virginica</i>	Virginia Sweetspire	#5	cont.
PAB	2	<i>Platanus acerifolia</i> 'Bloodgood'	American Planetree	2.5"-3" cal.	B&B
PO	2	<i>Physocarpus opulifolius</i>	Ninebark 'Summer Wine'	#5	cont.
PS	21	<i>Prunus laurocerasus</i> 'Schipkaensis'	Skip Laurel	#7	cont.
QP	2	<i>Quercus phellos</i>	Willow Oak	2.5"-3" cal.	B&B
QW	5	<i>Quercus warei</i> 'Long' Regal Prince	Regal Prince Oak	2.5"-3" cal.	B&B
TG	3	<i>Thuja</i> 'Green Giant'	Green Giant Arborvitae	10-12'	B&B
VR	8	<i>Viburnum rhytidophyllum</i>	Leatherleaf viburnum	#7	cont.
Perennials, Grasses, Bulbs					
4580 SF		No Mow Fescue	Fescue Grass		

TREE SIZE TO BE REMOVED	TREES TO BE REMOVED	REPLACEMENT TREES REQUIRED	Proposed Quantity
6"-18" DBH (1:1 REPLACEMENT)	9	9	
19"-29" (3:1 REPLACEMENT - 2 CANOPY TREES)	5	15(10 CANOPY)	
30" OR GREATER (6:1 REPLACEMENT - 4 CANOPY TREES)	0	0	
<b>TOTAL:</b>	<b>14</b>	<b>24(10 CANOPY)</b>	<b>15</b>



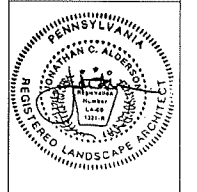
Deciduous Tree w/ Deer Protection NTS

NOTES:  
 THE DRAWINGS TO ILLUSTRATE THE WORK TO BE DONE.  
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES AND THE MAIN, METEOROLOGICAL, SOILS, AND OTHER RELEVANT AGENCIES.  
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES AND THE MAIN, METEOROLOGICAL, SOILS, AND OTHER RELEVANT AGENCIES.  
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES AND THE MAIN, METEOROLOGICAL, SOILS, AND OTHER RELEVANT AGENCIES.

**JONATHAN LANDSCAPE ARCHITECTS, PC**  
 Post Office Box 661, Wayne, Pennsylvania 19087-0661  
 (610) 341-9925 Fax (610) 341-9926  
 e-mail: information@jonathanderson.com

**FIRST RESOURCE BANK**  
 321 WEST LANCASTER AVE  
 WAYNE, PA 19087

ISSUED:  
 Revision 1 2018/01/25  
 Revision 2 2018/04/05



DATE: 2018-01-25  
 CHECKED BY: JA  
 DRAWN BY: AH  
 PROJECT #: 00617  
 SHEET: 1 OF 1

**L401**  
**Planting Plan**

SCALE: 1" = 10'

BASE INFORMATION TAKEN FROM:  
 INLAND DESIGN  
 16 HAGERTY BOULEVARD, WEST CHESTER, PA 19382  
 TEL: 484.947.5528  
 PLAN REVISION DATE: 01/08/2018 PROJECT #: 11104

CALL BEFORE YOU DIG!  
 PA ONE-CALL 1.800.242.1776  
 www.paonecall.org  
**NOT FOR CONSTRUCTION**



# Gannett Fleming

*Excellence Delivered **As Promised***

**Date:** May 4, 2018

**To:** Steve Norcini, PE Township Engineer

**From:** Roger Phillips, PE

**cc:** Kevin W. Kochanski, RLA, CZO – Director of Community Development  
Peter Nelson, Esq. – Grim, Biehn, and Thatcher  
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.  
Patricia Sherwin – Radnor Township Engineering Department  
Andy Pancoast – Radnor Township Codes Official

**RE:** 145 King of Prussia Road – Final Land Development Plan  
Penn Medicine – Applicant

Date Accepted: March 5, 2018

90 Day Review: June 3, 2018

---

Gannett Fleming, Inc. has completed a review of the Final Land Development Plans. We have reviewed the plans based on the contents of ordinance No. 2016-13 amending Chapter 280 Zoning, Article XV, PLO Planned Laboratory District Sections 280-62, 280-63 and 280-64. These Plans were also reviewed for conformance with Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The applicant is proposing to construct three new buildings and two parking structures for mixed use medical facility, hotel and office.

The applicant has indicated that a waiver will be requested from the following requirement:

1. §255-21.A(6) – A waiver is requested for the maximum plan sheet size of 24 inches by 34 inches. The plans will be reduced for recording purposes.
2. §255-38.H(1) – A waiver is requested for the tree species requirement.

## Penn Medicine at Radnor

Plans Prepared By: Pennoni Associates, Inc.

Dated: 09/29/2017, and last revised 05/02/2018



**Sewage Facilities Planning**

1. Final plan approval will not be granted until Planning Approval is received from the PA DEP.

**Subdivision and Land Development**

1. §255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.
2. §255-38.B – All tree species provided must be in conformance with §255-38.H(1). The applicant has requested a waiver from this requirement.
3. §255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be \$3,307 per 4,000 square feet of building area. The applicant has acknowledged they will submit the required fee upon Final Land Development approval.
4. §255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided. We note that the applicant is working with the Township Engineer and Township Fire Marshall and will incorporate their input as applicable.

**Stormwater**

1. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time.

**General**

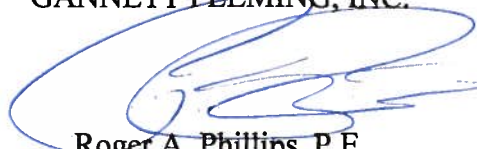
1. New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots.
2. Information regarding the proposed retaining walls must be provided including proposed height and structural calculations if required.

The applicant appeared before the Planning Commission on April 11, 2018. The Planning Commission recommended approval conditioned on the applicant complying with Township Consultant and Fire Marshall review letters and granting the requested waiver.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.



Roger A. Phillips, P.E.  
Senior Project Manager



## MEMORANDUM

---

**Date:** May 4, 2018

**To:** Steve Norcini, P.E., Radnor Township Engineer

**From:** Amy Kaminski, P.E., PTOE, Gilmore & Associates, Inc.

**cc:** Kevin Kochanski, RLA, CZO – Radnor Township Director of Community Development  
Patricia Sherwin, Radnor Township Engineering Department  
John Rice, Esq. – Grim, Biehn & Thatcher  
Peter Nelson, Esq. – Grim, Biehn & Thatcher  
Roger Phillips, P.E. – Gannett Fleming, Inc.  
Damon Drummond, P.E., PTOE – Gilmore & Associates, Inc.

**Reference:** 145 King of Prussia Road – The University of Pennsylvania Health Systems  
Radnor Township No. 2016-D-04  
Final Land Development Review 2  
Radnor Township, Delaware County, PA  
G&A # 15-12020

---

Gilmore & Associates, Inc. (G&A) has completed a transportation review for the above referenced project and offers the following transportation comments for Radnor Township consideration:

### I. BACKGROUND

The University of Pennsylvania Health Systems is proposing the re-development of a 26 acre parcel, located at 145 King of Prussia Road, in Radnor Township, Delaware County. The project includes a total proposed gross floor area of 475,000 sf. The proposed development will consist of a 250,000 square foot Mixed Medical Use building with two parking structures (996 and 831 spaces), a four-story 150,000 square foot general office building, a four-story 75,000 square foot (120 room) hotel and an associated 831 space parking garage. The site is expected to generate a total of 731 AM peak hour trips, 583 PM peak hour trips, and 7,518 weekday trips without any trip reductions for internal or transit trips. The Average Daily Traffic in both directions of travel along King of Prussia Road is 10,283 vehicles.

### II. DOCUMENTS REVIEWED

- A. Final Land Development Plans for Penn Medicine at Radnor consisting of 34 sheets, prepared for the University of Pennsylvania Health Systems, prepared by Pennoni Associates, Inc., dated September 29, 2017, last revised May 2, 2018.
- B. Architectural Plans for the Northern and Southern Parking Garages consisting of 5 sheets, prepared for the University of Pennsylvania Health Systems, prepared by Ballinger. The plan sheet is undated.

### III. IDENTIFIED IMPROVEMENTS

- A. A bus shelter will be constructed on King of Prussia Road southeast of the SEPTA Access/Northern Site Access to the extent that it is approved by SEPTA.
- B. Traffic Signal Timing Optimization at the following intersections:
  - 1. King of Prussia Road and Matson Ford Road/Park Driveway.
  - 2. King of Prussia Road and Radnor-Chester Road.
  - 3. Lancaster Avenue and I-476 SB Off-Ramp.
  - 4. Lancaster Avenue and Radnor-Chester Road.
  - 5. Lancaster Avenue and I-476 NB On-Ramp/Hillside Circle.
- C. King of Prussia Road and SEPTA Station Driveway:
  - 1. Restripe southbound King of Prussia Road to provide a dedicated left turn lane.
  - 2. Coordinate with SEPTA to construct bus shelter.
- D. King of Prussia Road and Raider Road/Site Driveway:
  - 1. Construct a new traffic signal.
  - 2. Provide left turn lanes on both approaches of King of Prussia Road.
  - 3. Widen east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at Main Site Driveway/Raider Road.
- E. King of Prussia Road and Southern Site Driveway:
  - 1. Restripe northbound King of Prussia Road to provide a shared through/right turn lane.
  - 2. Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to Main Site Driveway/Raider Road, with a transition into a dedicated right turn lane.
- F. King of Prussia Road and Lancaster Avenue (U.S. Lancaster Avenue (S.R. 30))/NB Off-Ramp:  
Restripe the northbound I-476 off-ramp at Lancaster Avenue to provide a shared through/right turn lane.
- G. Partnership with Radnor Township to install a Traffic Adaptive Signal System at the following intersections:
  - 1. Lancaster Avenue (S.R. 30) & I-476 Northbound On Ramps
  - 2. Lancaster Avenue (S.R. 30) & I-476 Off Ramps /King of Prussia Road
  - 3. Lancaster Avenue (S.R. 30) & I-476 Southbound Ramps
  - 4. Lancaster Avenue (S.R. 30) & Radnor-Chester Road
  - 5. Lancaster Avenue (S.R. 30) & Radnor Financial Center Eastern Driveway
  - 6. Lancaster Avenue (S.R. 30) & Radnor Financial Center Western Driveway
  - 7. King of Prussia Road & Radnor-Chester Road
  - 8. King of Prussia Road & Matson Ford Road
  - 9. Matson Ford Road & South Centennial Drive
  - 10. Matson Ford Road & North Centennial Drive
  - 11. King of Prussia Road & Raider Road
  - 12. Radnor-Chester Road & Raider Road
  - 13. Radnor-Chester Road & Radnor Financial Center

**IV. APPROVED WAIVERS**

§255-21.A(6) – The Applicant received a waiver from providing the maximum plan sheet size of 24 inches by 34 inches during the conditions of approval during the Preliminary Plan Development phase.

**V. REVIEW COMMENTS**

The Land Development plan design is adequate as presented; the Applicant has satisfied all transportation comments directly related to the land development submission.

We note the offsite transportation improvements are being reviewed concomitant with PennDOT's review of the Applicant's PennDOT Highway Occupancy Permit application and Traffic Signal Design for the intersection of King of Prussia Road and Raider Road/Site Access and we recommend the Township include in the Final Land Development Agreement the following condition of approval: "The applicant shall obtain a PennDOT Highway Occupancy Permit (HOP) for offsite improvements subject to PennDOT and Radnor Township approval, and final approval of the Radnor Township Occupancy Permit application for improvements on King of Prussia Road."

If you have any questions regarding the above, please contact this office.

ABK:DAD:las

ELAINE P. SCHAEFER  
*President*

JAMES C. HIGGINS  
*Vice-President*

WILLIAM A. SPINGLER

DONALD E. CURLEY

JOHN FISHER

KEVIN HIGGINS

JOHN NAGLE



**RADNOR TOWNSHIP**  
301 IVEN AVENUE  
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600  
Fax (610) 971-0450  
www.radnor.com

ROBERT A. ZIENKOWSKI  
*Township Manager*  
*Township Secretary*

JOHN B. RICE, ESQ.  
*Solicitor*

JOHN E. OSBORNE  
*Treasurer*

October 4, 2013

D. Alexander Tweedie, PE  
357 South Gulph Road, Suite 300  
King of Prussia, PA 19406

**SUBJECT: ZONING DETERMINATION  
145 KING OF PRUSSIA ROAD**

Mr. Tweedie,

I have received and reviewed your letter dated September 26, 2013 requesting a zoning determination for 145 King of Prussia Road that the site can be utilized as 100% office use. You are also requesting a determination regarding steep slopes on the subject site. Upon reviewing the submitted documentation and Township files, I offer the following:

1. The subject property is located in the PLO District.
2. Office Use is a Use permitted By-Right in the PLO District.
3. The property received final plan approval per Resolution 2009-06, dated February 23, 2009.
4. The locations of the buildings on the submitted plan are in the same location as the buildings shown on the approved land development plans.
5. The square footage of the building on the submitted plan is the same as was shown on the approved land development plans (475,088 sf).
6. 475,088 sf of floor area for an office use would require 1,351 off-street parking spaces. The plans indicate 1,377 parking spaces are proposed.
7. The site contains slopes in excess of 14%.
8. Slopes in excess of 20% are considered steep slopes and are regulated by Zoning Ordinance Section 280-112.
9. Note #12 on the Sheet 2 of the approved land development plans indicates "All steep slopes within the property limits are man-made and excluded per Zoning Ordinance 280-112.J".



It is my determination that the conversion of the buildings on the site (475,088 sf) with the improvements as shown on the plan to 100% office is permissible in accordance with our Zoning Ordinance regulations and previous plan approvals. Further, I have confirmed through the Township Solicitor that the disturbance of any steep slopes necessary to construct these improvements would be permitted as this disturbance was contemplated and noted on the approved land development plans.

If you have any questions regarding this opinion, please contact me.

Sincerely,

A handwritten signature in black ink, consisting of a stylized 'K' followed by a horizontal line and a second 'K' followed by another horizontal line.

Kevin W. Kochanski, RLA, CZO  
Director of Community Development



DELAWARE COUNTY PLANNING COMMISSION

COURT HOUSE/GOVERNMENT CENTER
201 W. Front St. Media, PA 19063

Office Location: Toal Building, 2nd & Orange Sts., Media, PA 19063
Phone: (610) 891-5200 FAX: (610) 891-5203
E-mail: planning\_department@co.delaware.pa.us

LINDA F. HILL
DIRECTOR

COUNCIL

JOHN P. McBLAIN
CHAIRMAN

COLLEEN P. MORRONE
VICE CHAIRMAN

MICHAEL F. CULP
KEVIN M. MADDEN
BRIAN P. ZIDEK

April 19, 2018

Mr. Robert A. Zienkowski
Radnor Township
301 Iven Avenue
Wayne, PA 19087-5297

RE: Name of Dev't: Penn Medicine at Radnor
DCPD File No.: 34-845-78-92-08-14-17-18
Developer: The Trustees of the University of
Pennsylvania
Location: East side of King of Prussia Road,
approximately 400' north of Lancaster
Avenue
Recv'd in DCPD: March 8, 2018

Dear Mr. Zienkowski:

In accordance with the provisions of Section 502 of the
Pennsylvania Municipalities Planning Code, the above described
proposal has been sent to the Delaware County Planning Commission
for review. At a meeting held on April 19, 2018, the Commission
took action as shown in the recommendation of the attached review.

Please refer to the DCPD file number shown above in any future
communications related to this application.

Very truly yours,

[Handwritten signature of Linda F. Hill]

Linda F. Hill
Director

cc: The Trustees of the University of Pennsylvania
Pennoni Associates, Inc.



Court House/ Government Center , 201 W. Front St., Media, PA 19063  
Office Location: Toal Building, 2nd & Orange Sts., Media, PA 19063  
Phone: (610) 891-5200 FAX: (610) 891-5203  
E-mail: [planning\\_department@co.delaware.pa.us](mailto:planning_department@co.delaware.pa.us)

Date: April 19, 2018

File No.: 34-845-78-92-08-14-17-18

PLAN TITLE: Penn Medicine at Radnor

DATE OF PLAN: September 29, 2017

OWNER OR AGENT: The Trustees of the University of Pennsylvania

LOCATION: East side of King of Prussia Road, approximately 400' north of Lancaster Avenue

MUNICIPALITY: Radnor Township

TYPE OF REVIEW: Subdivision and land development

ZONING DISTRICT: PLO

SUBDIVISION ORDINANCE: Local

PROPOSAL: Subdivision: Incorporate two lots totaling 18.71 acres into one lot  
Land development: Develop 475,000 sq. ft. of mixed-use development

UTILITIES: Public

RECOMMENDATIONS: Subdivision: Approval  
Land development: Approval, with consideration given to staff comments

STAFF REVIEW BY: Michael A. Leventry



Date: April 19, 2018  
File No.: 34-845-78-92-08-14-17-18

REMARKS:

**PREVIOUS ACTION**

This redevelopment plan was seen previously by the Planning Commission and most recently reviewed on November 16, 2017. The Planning Commission recommended approval, with consideration given to staff comments.

**CURRENT PROPOSAL**

The applicant proposes to demolish the buildings that exist on the site and redevelop with a 475,000 sq. ft. mixed-use development that is to include office, medical offices, hotel, ambulatory care, and parking.

**SITE CHARACTERISTICS**

The site currently contains a mix of uses that primarily include office and institutional.

**APPLICABLE ZONING**

The proposal is located within the PLO district and is subject to applicable regulations set forth in the Township zoning code.

**COMPLIANCE**

The proposal appears to comply with the PLO district provisions.

**SEWAGE FACILITIES**

The developer should contact the Pennsylvania Department of Environmental Protection regarding the need for sewage facilities planning approval.

Date: April 19, 2018  
File No.: 34-845-78-92-08-14-17-18

REMARKS (continued):

The Township should confirm receipt of any necessary Pennsylvania Department of Environmental Protection planning approval prior to final approval.

**STORMWATER MANAGEMENT**

The Township Engineer must verify the adequacy of all proposed stormwater management facilities.

**PEDESTRIAN CONNECTIVITY**

The pedestrian trail network should be laid out more efficiently to deliver users to and from the site and adjacent destinations in a more direct fashion. Winding pedestrian trails are characteristically unpopular and often lead to the emergence of more direct "goat paths" through grassy areas.

**TRANSPORTATION COMMENTS**

The applicant should work with Delaware County Transportation Management Association and the Township to install a bus stop for the Route 106 bus at the proposed entrance to the property opposite Raider Road. The nearest bus stop is at the entrance to SEPTA's Radnor station of the Norristown High Speed Line, which is at the far end of the development. The applicant and the Township should install a passenger shelter at this new bus stop, which would provide weather protection and security for riders and advertising revenue for the Township. A short section of new sidewalk should be constructed to connect the bus stop with the sidewalk leading to the proposed mixed medical facility.

Date: April 19, 2018  
File No.: 34-845-78-92-08-14-17-18

REMARKS (continued):

The applicant should install bicycle parking at the entrances to the proposed buildings or inside the proposed parking garages. The Township will be constructing a multi-use trail along the west side of King of Prussia Road as an extension of the Radnor Trail. Township residents will be able to bicycle to work at the proposed development. The bicycle parking, such as inverted "U" bike docks, should secure bicycles by their frames, rather than only by their wheels.

The proposed number of parking spaces is excessive for this development. 1,880 spaces are proposed; 1,541 spaces are required by the Township's ordinance. The applicant should reduce the number of spaces to the number required by the ordinance.

The Township should consider requiring fewer spaces than required by the ordinance to account for the ability of employees to take transit and bicycle to work. Bus route 106 serves the site on King of Prussia Road, the Radnor station of the Norristown High Speed Line is adjacent to the development, and the Radnor regional rail station is less than one-half mile away. The Township will be constructing a multi-use trail along the west side of King of Prussia Road as an extension of the Radnor Trail to allow employees who live along the trail to bicycle to work. The applicant and employers can provide financial incentives to employees to take transit, car pool, or bicycle to work as a way to reduce the number of parking spaces needed, save garage construction and maintenance costs, and reduce traffic congestion.

**RECORDING**

In accordance with Section 513(a) of the Pennsylvania Municipalities Planning Code (MPC), final plans must be recorded within ninety (90) days of municipal approval.



April 13, 2018

UPHS1504

Radnor Township  
Attn: Mr. Robert Zienkowski  
301 Iven Ave.  
Wayne, PA19087

**RE: FINAL LAND DEVELOPMENT APPLICATION  
PENN MEDICINE AT RADNOR  
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA**

Dear Mr. Zienkowski:

On behalf of the Trustees of the University of Pennsylvania Health Systems, Pennoni is submitting the attached plans and documents for consideration of Final Land Development approval. As you are aware, The Trustees of the University of Pennsylvania Health Systems are proposing the re-development of 145 King of Prussia Road. The development will involve the demolition of existing buildings and construction of a mixed-use facility including a mixed medical use facility, office and hotel. Two parking garages are proposed in conjunction with a surface parking lot.

We are in receipt of the Township's consultants review letters, including Gilmore & Associates, Inc letter dated March 26, 2018, Gannett Fleming's letter dated March 22, 2018, and Ray Daly's Memorandum dated March 23, 2018. Below is a summary of the Township's consultants' comments in *italics* with our responses in **bold**. Please note that we will submit revised plans based on these comments as part of the Final Land Development process.

**Comments from Gannett Fleming Letter dated March 26, 2018**

Sewage Facilities Planning

1. *Final plan approval will not be granted until Planning Approval is received from the PA DEP.*

**Pennoni Response: We are in the process of obtaining all necessary signatures and approval by PA DEP, we will provide DEP approval upon receipt.**

Zoning

1. *§280-63.D(5) – Parking structures may be located wholly or partly within the principal building, attached to and made part of the principal building, or constructed as a detached accessory structure. Parking spaces within structures may be reduced to not less than nine feet in width by 19 feet in depth, exclusive of aisles, for each motor vehicle. Sheet PG-A0.3 indicates that the parking spaces will be 9' x 18'.*

**Pennoni Response: The parking garage plans have been revised to provide 9-ft wide by 19-ft deep parking spaces.**

- 2. §280-64.G(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. The applicant has provided architectural renderings and building elevations of the mixed use medical facility. Additional information will be provided for the office and hotel building in a future submission.*

**Pennoni Response: Additional architectural information will be provided during Final Land Development applications for the office and hotel.**

- 3. §280-105.E – The height of any luminary shall not exceed 25 feet. The parking lot light detail on sheet CS6001 indicates that the height will match the existing lights. This must be revised to indicate the actual height.*

**Pennoni Response: The light detail has been updated to reflect the 25-ft max. height. Please refer to sheet CS6001.**

- 4. A table must be provided that clearly indicates the breakdown of impervious coverage.*

**Pennoni Response: An impervious coverage table has been added to sheet CS1001.**

#### Subdivision and Land Development

- 1. §255.21.A(3) – Each plan sheet shall be numbered and shall show its relationship to the total number of sheets. Sheets L100, L44, PG-A0.3, PG-A1.1, PG-A1.2 and PG-A1.3 must be incorporated to be numbered as part of the plan set and all sheets must be listed in the sheet list on sheet CS0002.*

**Pennoni Response: The plan sheets have been revised to be numbered as part of the overall plan set and all sheets are listed in the plan index on sheet CS0002.**

- 2. §255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.*

**Pennoni Response: The waiver request is located on sheet CS1001.**

- 3. §255-29.A(1) – The aisle width in the parking garage must be dimensioned on the plans.*

**Pennoni Response: The parking garage plans have been revised to show the dimension of the aisles.**

- 4. §255-29.B(1) – Calculations for the parking lot landscaping must be provided for conformance with this section.*

**Pennoni Response: The landscaping plans have been revised to show the required calculation.**

- 5. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. The applicant has updated the lighting plan to show lighting along the sidewalk and pedestrian paths. Photometrics must be submitted for the revised lighting plans.*



**Pennoni Response: The lighting plans have been updated to provide photometric calculations for the sidewalk lighting. Please refer to sheet CS2201.**

6. *§255-38.B – Calculations for the shade trees provided must be shown on sheet L400. All tree species provided must be in conformance with §255-38.H(1).*

**Pennoni Response: The landscaping plans have been revised to show the required calculation. The plans do specify three trees that are not listed in the approved planting list for the Township; however, these trees were reviewed and approved by the Shade Tree Commission and Township Arborist. The plant schedule does list these trees with alternative plantings that would comply with the Townships approved planting list.**

7. *§255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be \$3,307 per 4,000 square feet of building area. The applicant has acknowledged they will submit the required fee upon Final Land Development approval.*

**Pennoni Response: The required fee will be provided prior to plan recording.**

8. *§255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided. We note that the applicant is working with the Township Engineer and Township Fire Marshall.*

**Pennoni Response: We have met with the Township Fire Marshall and the plans have been revised based on the meeting. Please refer to the comments below in regard to Ray Daly's review letter.**

### Stormwater

1. *It appears that on the Post Development Drainage Area Map DA-2 the proposed bio-retention basins for PDRA 2C and PDRA 2B are named incorrectly. Following the stormwater report, PDRA 2C drains to Bio-Retention Basin 2 and PDRA 2D drains to Bio Retention Basin 3. This inconsistency must be revised.*

**Pennoni Response: The Post Development Drainage Area Map DA-2 has been revised to correctly label the drainage areas.**

2. *The drainage area for the infiltration trench to be counted for water quality volume needs to be shown on the Post Development Drainage Area Map DA-2.*

**Pennoni Response: The drainage area for the infiltration trench treating the water quality volume has been added to the Post Development Drainage Area Map DA-2.**

3. *The two-year storm event for Bio-Retention Basin 1A shows a greater outflow (0.18 cfs) than inflow (0.15 cfs). This discrepancy must be revised (see Appendix B-69).*

**Pennoni Response: Bio-Retention Basin 1A has been revised and the calculations have been**

**updated to correct for the greater outflow than inflow from the basin. The calculations have been revised in Appendix B.**

- 4. The five-year storm event for Bio-Retention Basin 1A shows a greater outflow (0.26 cfs) than inflow (0.22 cfs). This discrepancy must be revised (see Appendix B-107).*

**Pennoni Response: Bio-Retention Basin 1A has been revised and the calculations have been updated to correct for the greater outflow than inflow from the basin. The calculations have been revised in Appendix B.**

- 5. The ten-year storm event for Bio-Retention Basin 1A shows a greater outflow (0.31 cfs) than inflow (0.29 cfs). This discrepancy must be revised (see Appendix B-145).*

**Pennoni Response: Bio-Retention Basin 1A has been revised and the calculations have been updated to correct for the greater outflow than inflow from the basin. The calculations have been revised in Appendix B.**

- 6. The areas listed in the dead storage volume for Bio-Retention Basin 1D does not appear to match the contour areas shown on the plan (see Appendix C-8). This discrepancy must be revised.*

**Pennoni Response: The dead storage volume for Bio-Retention Basin 1D has been revised for consistency between the plans, rate calculations in Appendix B, and volume calculations in Appendix D.**

- 7. Manufacturer data for the chambers must be provided to show the storage capacity of the chambers.*

**Pennoni Response: The chambers for the subsurface basins are shown on drawings CS9503-CS9504. We have provided the manufacturer's volume calculation chart in Appendix C, which shows the volume storage capacities for the basin. Additionally, attached is the manufacturer's information sheet which provides additional detail.**

- 8. Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans.*

**Pennoni Response: Infiltration testing results have been provided in the Post-Construction Stormwater Management Report, Appendix E. A table has also been provided on the Post-Construction Stormwater Management Plan, sheet CS9001.**

- 9. Infiltration volume credits for water quality volume cannot be approved at this time as an infiltration test has not been completed.*

**Pennoni Response: Infiltration testing results have been provided in the Post-Construction Stormwater Management Report, Appendix E.**

- 10. The Subsurface Infiltration Trench Detail on Sheet CS9503 needs to show the overflow from the trench to MH-2.01 and in the overflow elevation.*

**Pennoni Response: An overflow structure detail has been added to sheet CS9503, showing the overflow structure for the subsurface infiltration trench used for a component of the water quality volume.**

11. *Please provide supporting calculations showing the water quality volume storage provided for each basin.*

**Pennoni Response:** The water quality volumes are given in Table 10 of the Post Construction Stormwater Management Report. The supporting calculations for the storage provided has been added to Appendix C.

12. *Please provide permeability/infiltration rates for the permeable pavers and permeable pavement.*

**Pennoni Response:** As part of our infiltration testing, we tested at several locations for the proposed permeable pavers and porous asphalt. Results of the infiltration testing are provided in the Post-Construction Stormwater Management Report, Appendix E. Although the permeable paver materials have not been determined at this point, we have provided manufacturer information for several of the options being considered.

13. *The following profiles must be revised to show all crossings:*

- a. *Missing a water, sewer, and fire service crossing between I-1.01 and MH-1.01 (CS4001).*
- b. *Missing two (2) existing underground communication crossings between MH-3.02 and MH-3.01 (CS4003).*
- c. *Missing a water crossing between MH-1.13 and MH-1.12 (CS4004).*
- d. *Missing a fire service crossing between MH-1.12 and I-1.32 (CS4004).*
- e. *Missing water, sewer, and fire service crossing between I-1.32 and EW-1.02 (CS4004).*
- f. *Missing fire service and duct bank crossing between I-1.35 and MH-1.12 (CS4004).*
- g. *No walls or gas line are shown on Utility Plan, missing communication crossing between SMH-2 and SMH-4 (CS4501).*
- h. *Missing second fire service line between SMH-4 and SMH-5 (CS4501).*

**Pennoni Response:** All profiles have been revised to provide all crossing utilities as required.

14. *Label the following on the Utility Plan: MH-1.06 and MH-1.09.*

**Pennoni Response:** MH-1.06 and MH-1.09 as well as any revised inlets and manholes have been labeled. For clarity, the sanitary manholes are shown on the CS1701 and the storm inlets and manholes are labeled on the CS9001.

15. *Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time.*

**Pennoni Response:** Acknowledged, a grading permit will be provided prior to commencement of earth moving activities.

#### *Sanitary Sewer*

1. *A minimum of 5 foot of coverage must be provided for all sanitary sewers.*

**Pennoni Response:** The sanitary sewer systems have been revised to provide a minimum of 5-ft of cover, please refer to sheet CS1701 and CS4501-4502.

- 2. The rim elevations must be labeled as such on the sanitary sewer profiles on sheet CS4501.*

**Pennoni Response:** The rim elevations have been added for the sanitary sewers, please refer to sheet CS1701 and CS4501-4502.

- 3. If the hotel will include a restaurant or food preparation area, a grease trap must be provided.*

**Pennoni Response:** At this time the hotel is only proposed to contain a small warming kitchen and therefore a grease trap is not necessary.

- 4. An explanation must be provided as to why there are two sanitary sewer connections to the parking garage connected to the mixed medical facility.*

**Pennoni Response:** The sanitary sewer connection at the south side of the garage in the loading area is to provide drainage for elevator pits from the garage and plumbing fixtures in a portion of the garage near the loading dock area. The second connection, previously shown on the northwest side of the garage has been removed from the plans.

- 5. All manholes not located in the paved areas must be equipped with watertight frames and covers to prevent the inflow of surface waters into the sanitary sewer.*

**Pennoni Response:** Sanitary Sewer Note #9 has been added to sheet CS0002 in regard to the watertight frames and covers for manholes located in vegetated areas.

- 6. There shall be no lateral connections into sanitary sewer manholes.*

**Pennoni Response:** The laterals have been revised so that they do not connect to sewer manholes as shown on sheet CS1701. Additionally, Sanitary Sewer Note #10 has been added to sheet CS0002.

- 7. A minimum 10-foot horizontal and 18-inch vertical separation must be maintained between the sanitary sewer and the water and storm sewer lines.*

**Pennoni Response:** The plans have been revised to provide a minimum of 10-ft horizontal and 18-in vertical separation between sanitary sewers, storm sewers and water lines.

- 8. The attached frame and cover detail must be used on the plans*

**Pennoni Response:** The frame and cover detail has been added to sheet CS6501.

- 9. It appears that there be a retaining wall crossing the sanitary sewer. All retaining walls must be shown on the utility plans. Details of the retaining walls must be provided to ensure adequate clearance with the sanitary sewer.*

**Pennoni Response:** The retaining walls will be designed, and a separate building permit application will be provided for the retaining walls. As part of the design additional detail will be provided in regard to the sanitary sewers.

*General*

1. *New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots.*

**Pennoni Response: Deeds will be provided under separate cover for the consolidation of the lots.**

2. *The applicant has provided detailed parking structure plans for the structure with 850 proposed spaces as sheets PG-A0.3, PG-A1.1, PG-A1.2 and PG-A1.3. Detailed plans must be provided for all parking structures.*

**Pennoni Response: Plans have been provided to demonstrate the layout of the parking spaces for each parking structure. Additional building permit plans will be provided for the parking structures which will provide full detail of the garages.**

3. *The plan located on the top right of sheet PG-A0.3 does not appear to be the current plan. That plan indicates 857 parking spaces and a garage height of 53.4". This must be revised to be consistent.*

**Pennoni Response: The plans have been updated to reflect the proposed height of the parking garage. Please refer to sheet CS1001.**

4. *Information regarding the proposed retaining walls must be provided including proposed height and structural calculations if required.*

**Pennoni Response: The retaining walls will be designed, and a separate building permit application will be provided for the retaining walls.**

**Comments from Gilmore & Associates, Inc. Letter dated March 22, 2017**

*Zoning Comments*

*§280-63.D(5) – Revise the Parking Garage stall size to provide a minimum stall not less than nine feet in width by 19 feet in depth, exclusive of the aisles, for each motor vehicle. The comment must be addressed or a variance requested.*

**Pennoni Response: The parking garage plans have been revised to provide 9-ft wide by 19-ft deep parking spaces.**

*Subdivision and Land Development Ordinance:*

- A. *§255-20.B(5) – The Applicant is required to provide a comprehensive Final Transportation Impact Study to the Township incorporating all sections provided during preliminary land development. Additional documents were provided to the Township separate from the Transportation Impact Study (TIS) must be a complete standalone document.*

**Pennoni Response: A revised Transportation Impact Study has been provided with this submission. Additionally, a copy was provided to PennDOT on 4/10/2018.**

- B. *§255-21 – The Applicant is responsible for providing roadway improvement plans including the following documents prior to Final Land Development approval:*

1. *Construction details related to ADA curb ramps, including spot elevations, dimensions and slopes; including ADA complaint curb ramps on all corners of Raider Road and King of Prussia Road at the proposed traffic signal.*

**Pennoni Response: The curb ramp designs are included in the Street Occupancy Permit Plans.**

2. *Traffic Signal Construction Plans, new and modified Traffic Signal Permit Plans, Traffic Signal System Plans, AutoCAD files of As-Built Plans, and a Traffic Signal Design Report must be provided to the Township and PennDOT for review and approval.*

**Pennoni Response: The following items relating to the traffic signal design are included in this submission to the Township:**

- **King of Prussia Road and Raider Road intersection Traffic Signal Permit Plan**
- **King of Prussia Road and Raider Road intersection Traffic Signal Construction Plan**
- **King of Prussia Road and Raider Road intersection Curb Ramp Plans**
- **Lancaster Avenue (SR 30) and I-476 Northbound Offramp / King of Prussia Road intersection Traffic Signal Permit Plan**
- **Traffic Signal System Permit Plan I-0010**
- **Traffic Signal Design Report**

**The following items relating to the traffic signal design were submitted to PennDOT on 4/10/2018:**

- **King of Prussia Road and Raider Road intersection Traffic Signal Permit Plan**
- **King of Prussia Road and Raider Road intersection Curb Ramp Plans**
- **Lancaster Avenue (SR 30) and I-476 Northbound Offramp / King of Prussia Road intersection Traffic Signal Permit Plan**
- **Traffic Signal System Permit Plan I-0010**
- **Traffic Signal Design Report**

3. *All new or modified signal permit plans and system plans require a completed PennDOT Traffic Engineering Form 160 (TE-160) Application for Traffic Signal Approval and resolution.*

**Pennoni Response: The draft TE-160 form is included in this submission. This draft was also included in the PennDOT submission on 4/10/2018.**

4. *Include a separate Pavement Marking and Signing Plan in the plan set:*
  - i. *Provide traffic control signage including existing, removed and proposed; we note that no signs were included in this plan set for the new auxiliary turn lanes on King of Prussia Road or the accesses to King of Prussia Road.*
  - ii. *Provide the geometry of the proposed (final) traffic lane patterns including the location and color of all pavement markings, the lane assignment and proposed signage.*
  - iii. *Eliminate from the Pavement Marking and Signing Plan any existing pavement markings that are to be removed.*
  - iv. *Include a key identifying line geometry, color indication and dimensions or if clarity permits, the line color and geometry may be identified on the Pavement Marking and Signing Plan.*
  - v. *Dimension all lane widths and lane and bay taper lengths along with crosswalks and stop bars.*

**Pennoni Response: Separate Pavement Marking and Signing Plans are included in the Street Occupancy Permit Plans.**

5. *Provide plans for the timber bridge and supporting documentation.*

**Pennoni Response: Details for the timber bridge have been provided on sheet CS6002.**

6. *Note 8 under GENERAL CONSTRUCTION AND GRADING NOTES does not adequately address the required Maintenance and Protection of Traffic plans for work along King of Prussia Road. It must be stated on the plan that "Maintenance and Protection of Traffic during construction shall be in accordance in PennDOT Publication 213, "Work Zone Traffic Control Guidelines", amended June 6, 2014, and Title 67 PA Code, Chapter 212, "Official Traffic Control Devices", dated February 4, 2006 or most current." A sequence of construction narrative must be added to the plans. Reference the appropriate MPT figures accordingly. If long-term traffic control is required, the narrative must also address the construction staging and differentiate between the use of short term and long term traffic control patterns.*

**Pennoni Response: Separate Maintenance and Protection of Traffic Plans are included in the Street Occupancy Permit Plans and they satisfy these requirements.**

- C. *§255-21B.(1)(I) – Sheet CS0901, identify the owner of the property between the two Legal Right-of-Way Lines at the southern property line and SR 0476. Clearly label which parcel is APN 36-02-01234-00 Block 16; it is currently shown within the SR 0476 right-of-way.*

**Pennoni Response: The label for parcel APN 36-02-01234-00 Block 16 has been updated accordingly on sheet CS0901.**

- D. *§255-29(C)5) – Revise the Parking Garage Plans to identify the proposed aisle widths for all levels of the Parking Garage Plans.*

**Pennoni Response: The parking garage plans have been revised to include the aisle widths.**

- E. *§255-30.A – Identify the area adjacent to the parking garage that is west of the loading area wall and is approximately 10'x 60'. If this area is intended for loading, it must meet the requirements for this section.*

**Pennoni Response: The loading area has been updated in accordance with §255-30.A.**

- F. *§255-37 – Sidewalks and pedestrians paths. Provide spot elevations, widths and slopes to show the connection from the proposed on-site sidewalk to the existing SEPTA facilities is ADA accessible. Provide ADA facilities for the trail crossing at the southern driveway.*

**Pennoni Response: Spot elevations, widths and slopes have been added to the sidewalks and pedestrian paths to show conformance with ADA accessibility. Please refer to sheets CS1001 and CS1501.**

- G. *§255-37.C – Provide an easement for the proposed pedestrian trail from driveway opposite of Raider Road to the southern property line.*

**Pennoni Response:** An easement has been added for the pedestrian trail as required. Please refer to sheet CS1001.

H. §255-37.D - Provide curb cuts at the southern driveway at King of Prussia Road.

**Pennoni Response:** Will Comply. Upon discussion with the Township Traffic Engineer, we are providing the handicap ramps where the sidewalk/trail intersect the driveway, rather than at the intersection of the driveway with King of Prussia Rd.

I. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. Revise the lighting plan for consistency between the proposed lights and illumination levels shown on Sheet CS2201.

**Pennoni Response:** The lighting plans have been updated to provide photometric calculations for the sidewalk lighting. Please refer to sheet CS2201.

J. §255-37.H – Where sidewalk grades exceed 5%, a nonslip surface texture shall be used. The Final Land Development plans should provide additional details regarding any proposed walking paths or sidewalks to ensure compliance with this section. Verify that the sidewalk connection at the rear of the site to the SEPTA station does not exceed a slope of 5% and does not require pedestrians to cross into parking stalls.

**Pennoni Response:** We have provided additional detail on the plans to demonstrate that proposed walkways do not exceed 5%. Please refer to the grading plan, sheet CS1501.

## General Comments

A. *Truck Turning Templates:*

1. *The Applicant has demonstrated a WB-40 truck can adequately navigate turns into and out of the Northern/SEPTA driveway; however, the Applicant must verify the WB-40 truck is the largest truck anticipated to utilize this access and include a note and appropriate truck restriction signage restricting this driveway for vehicles no larger than a WB-40.*

**Pennoni Response:** The appropriate truck restriction signage is shown on the Pavement Marking and Signing plans that are included in the Street Occupancy Permit plans.

2. *Sheet CS9801 (Sheet 33): Provide WB-67 exit movements (left and right turns) and southbound left turns into the Southern Site Driveway at King of Prussia Road.*

**Pennoni Response:** The truck turning plan, sheet CS9801, has been revised to show the requested truck turning movements.

3. *The Applicant did not include a truck turning template for the intersection of King of Prussia Road and the proposed Center Driveway/Raider Road.*

- a. *If no trucks will be utilizing the Center Driveway, truck restriction signage must be provided.*
- b. *Minimally, bus turning templates must be provided for the Raider Road access to King of Prussia Road to ensure busses can enter and exit Raider Road without encroaching into opposing traffic lanes. Stop bars may need to be staggered on both Raider Road and King of Prussia Road to ensure maneuvers can be safely accommodated.*



**Pennoni Response: The vehicle turning templates for the intersection of King of Prussia Road and Raider Road / Main Site Access have been included in this submission. Refer to sheet CS9801.**

- B. *Show the location of the proposed bus shelter provided on King of Prussia Road southeast of the SEPTA Access/Northern Site Access. ADA accommodations must also be provided for access to the bus stop.*

**Pennoni Response: The bus shelter location has been added to sheet CS1001. It is anticipated that the bus can pull to the curb and “kneel” to provide ADA accessibility.**

- C. *Show the full extent of the proposed dedicated left turn lane on King of Prussia Road at the Northern Access/SEPTA Station Driveway. If necessary, provide a match line similar to the one included on Sheet CS1701 (sheet 11).*

**Pennoni Response: The full extent of the dedicated left turn lane is shown on the Roadway Plans.**

- D. *Sheet CS0002: Under GENERAL CONSTRUCTION AND GRADING NOTES; verify and update as need all dates and references included in note number 2.*

**Pennoni Response: The dates and references for Note #2 of the General Construction and Grading Notes has been updated accordingly on sheet CS0002.**

- E. *The following signage and striping revisions should be provided on the parking garages plans:*
- 1. Provide ONE WAY and/or DO NOT ENTER signs at the locations where appropriate.*
  - 2. Provide traffic flow left-turn or right-turn arrows where traffic must turn in only one direction.*
  - 3. Provide clearance height signs where appropriate.*
  - 4. Provide wayfinding guidance including additional parking signs along with exit signs were appropriate.*

**Pennoni Response: Additional detail in regard to garage signage will be provided at a later date.**

- F. *For consistency, verify the number of parking spaces available in both garages. The Northern Garage (Sheet PG-AO.3) indicates 857 spaces in the top right diagram while the chart on the same sheet indicates 850 spaces. The Southern Garage (Sheet PG-A1.1) indicates 955 spaces and Sheet CS1001 of the land development plan set indicates 1,000 spaces. The number of parking spaces must be consistent.*

**Pennoni Response: The plans have been revised to provide the correct number of parking spaces and for consistency between the parking garage plans and the site plan.**

- G. *Per PennDOT Publication 111 Traffic Control – Pavement Markings and Signing Standards TC-8600 and TC8700 Series, the following signage and striping revisions must be verified or updated in future submissions:*
- 1. Include a detail for the “ARROW/ONLY” pavement marking legend indicating the top of the arrow 60’ (20’ minimum) from the stop bar/stop location and the top of the “ONLY” spaced 32’ from the bottom of the arrow. A note must also be added indicating that the dimensions may be modified slightly in order to meet field conditions.*
  - 2. All stopbars are to be located a minimum 4 feet offset from crosswalks.*
  - 3. All crosswalks are to be a minimum width of 6’ feet. The crosswalks near the northern garage appear to be less than 6’ wide.*

**Pennoni Response: The detail is shown on the Pavement Marking and Signing plans that are included in the Street Occupancy Permit Plans.**

- H. *Include R7-302 NO PARKING SYMBOL/ARROW signs along the north side of the Northern/SEPTA driveway. Parking should not be permitted along this driveway.*

**Pennoni Response: The required no parking signs have been added to the northern driveway, please refer to sheet CS1001.**

- I. *Relocate the sign tabulation included on Sheet CS0002 to the required Pavement Marking and Signage sheet discussed above; exclude any unused signs from the sign tabulation set.*

**Pennoni Response: A sign table is located on sheet CS1001.**

- J. *The trail indicates a permeable walkway. If the trail is intended for ADA use, the applicant should verify and note the surface will be ADA compliant.*

**Pennoni Response: Our intention is for the proposed trail to be constructed using porous asphalt, a detail of the asphalt is located on sheet CS9503 and the site plan has been revised to reflect this.**

- K. *Prior to Final Approval, the Applicant is required to coordinate with Radnor Township School District to eliminate parking along the south side of Raider Road near King of Prussia Road. The onstreet parking along the south side of Raider Road will conflict with stacked vehicles awaiting a green traffic signal and this area must remain free of parked vehicles for a minimum of 150 feet unless additional information is provided to support a reduced parking prohibition.*

**Pennoni Response: We are actively working with Radnor School District in regard to this comment.**

- L. *All turn lanes should be revised and designed to meet whichever is the greater of the Turn Lane Warrant analysis or the 95<sup>th</sup> percentile queues.*

**Pennoni Response: The turn lanes have been revised to accommodate the greater of the Turn Lane Warrant Analysis or the 95<sup>th</sup> Percentile Queuing Analysis**

- M. *To assist the contractor during construction, modify the plan to include stationing on King of Prussia Road*

**Pennoni Response: A construction baseline is provided on the Street Occupancy Permit Plans.**

- N. *Revise the proposed 25 foot bay tapers to 75 foot minimum bay tapers.*

**Pennoni Response: The bay tapers / opening transitions from two-way left turn lane to dedicated left turn lane are provided at 75 feet, as requested.**

- O. *Provide spot elevations at the bottom of curb, top of curb, edge of pavement, and grade break locations at minimum 50' intervals along areas of widening, new curbing and at minimum 10' intervals along radius returns.*

**Pennoni Response: Bottom of curb (gutter) elevations have been added to the plan at 50-foot intervals along the proposed roadway widening and at 10-foot intervals along proposed curb radii.**

**Please note that top of curb elevations are not shown since the proposed curb is to have a uniform 8" height. (PennDOT Publication 72M, RC-64M)**

- P. *Given the extent of the roadway modifications and pavement marking revisions, the Township may want to request the Applicant provide a mill and overlay along the entire site frontage of King of Prussia Road.*

**Pennoni Response: A mill and overlay is shown on the Street Occupancy Permit Plans along the entire site frontage of King of Prussia Road.**

**Ray Daly's Memorandum dated March 23, 2018**

*The main drive at the front of the Hospital building, by the canopy is a concern. The island configuration will not allow Radnor's ladder truck to make the left turn. The island restricts the turning radius as shown because it has the truck hugging the curb to complete the swing (turn). The overhang of the ladder will hit the canopy as the turn is being made. The island needs to be narrower and shorter in length to help facilitate the turn. If possible there should be mountable curbs on the island. The ladder truck cannot hug the curb to make turns, as the overhang is too great as it follows through. The turning radius for the ladder is 72' outside and 36' inside minimum, bumper to bumper, no overhang for the ladder.*

**In a meeting with Township Staff, including the Radnor Fire Department Chief we discussed the turning movements. Based on this meeting it was determined that the ladder truck does not necessarily need to complete the turn movement near the Medical Office Building drop-off area; however, we are now proposing an additional plaza area with mountable curb that would allow for the truck to maneuver in this area. Please refer to sheet CS9802 for truck turning movement.**

*The permeable asphalt drive/walk along the side of the main Hospital parking structure is too narrow for the ladder truck to use. The drive/walk width looks to be approximately 20' in width. The ladder truck is 10' wide and the out riggers extend 8'. So, when the truck is in service the minimum width required is 18'. With a 20' road width the Fire Company needs to be dead center of the road, that leaves 12" to spare. It also does not allow foot access around the truck. Please consider widening the road width to 25' minimum. Also, there should be a requirement that the drive/walk be plowed to allow access all year round, should it be needed.*

**The sidewalk in this area has been revised to 25-ft width.**

*The access entrance to the permeable drive/walk, at the end of the main road by the canopy is a concern. The left jog, into the access drive/walk is too tight for the truck to make. Also, there appears to be an ADA depressed sidewalk and curb, and what looks to be concrete sidewalk with curbs, all of which the truck will need to drive over. This needs to be reworked to make the jog flow more smoothly. Please remember the ladder truck length is approximately 41' and its wheel base is 21'. And the ladder will need to backup out of the space when finished, not an easy task with this configuration.*

**This area has been revised to incorporate an additional plaza area with mountable curb that would ease the truck maneuvering in this area. Please refer to sheet CS9802 for truck turning movement.**

*The projection at the corner of the hotel and parking lot exit drive. The ladder truck will not be able to make the corner to either enter or exit the front of the hotel. I do see an ADA depression for the walkway leading to the new parking garage at the location. The sidewalk should be reconfigured by adding a larger turning radius and the projection removed. Please consider mountable curbs in the parking area in front of the hotel to facilitate better maneuvering with any Fire equipment.*

**The plans have been revised to include mountable curb in this area. Also, the truck turning movement has been updated in this area, please refer to sheet CS9802.**

*What is the height of the Hospital parking structure inside, or at the basement level? I know the plans shows ambulances parking below and the deck is showing at 14'. Are there any projections lower than 14'? This should also include any piping or lighting. The new ambulances are measuring just 10' in height.*

***The first level of the parking garage will be 11-ft clear, the ground level will be 13-ft clear.***

*The last item, I have not been able to discern the new locations of the fire hydrants on the plan. I also have not been on site to see what hydrants will be remaining. May I request, if any additional hydrants need to be added, the site developer would consider placing them at the request of the Fire Marshal?*

***At the meeting with Township staff, hydrant locations were discussed. The plans have been revised to show the locations discussed with the Fire Chief.***

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2457 or [mkissinger@pennoni.com](mailto:mkissinger@pennoni.com).

Sincerely,

**PENNONI ASSOCIATES INC.**



Michael Kissinger, PE  
Land Development Division Manager

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems  
David Falcone, Saul Ewing Arnstein & Lehr LLP

April 13, 2018

Steve Norcini, PE  
Radnor Township Engineer  
Township of Radnor  
301 Iven Avenue  
Wayne, PA 19087-5297

RE: 145 King of Prussia Road – Final Land Development Plan - Comment  
Penn Medicine - Applicant

Dear Mr. Norcini:

This email pertains to the Township of Radnor – Final comments that were received in regards to the Final Land Development Plan Application for Penn Medicine project at 145 King of Prussia Road.

Our firm, Timothy Haahs and Associates is currently serving as parking planner and designer for the UPHS Radnor Parking Garage Design. Our primary business focus and expertise is the design of multi-level parking structures on a national basis and currently work with Penn Medicine not only on the UPHS Radnor project but other campuses as well.

The purpose of this email is to address and acknowledge the parking geometrics for the UPHS Radnor Parking Garage as its related to the Zoning Section, line item 1, 280-63.D(5) on your comments in regards to the Final Land Development Plan Application, in particular the parking spaces dimensions of 9'-0" x 19'-0" and associated drive aisles.

To accommodate your request the parking spaces for the 75 degree angled parking and 90 degree parking will be modified to provide 9'-0 x 19'-0" parking spaces, which meets the Radnor Ordinance and aligns with the Parking Industry Standards. These modifications will be reflected on the UPHS Radnor Parking Garage Design.

Sincerely,



Todd Helmer, PE,  
Reginal Vice President  
(484) 342-0200

CC: Matthew Carpenter, Assoc. AIA, Project Manager, Timothy Haahs & Associates  
Mike Kissinger, Senior Engineer, Pennoni, Chris Potterjoy, PE, ENV SP, Pennoni  
Mike Euker, AIA, NCARB, Ballinger



*Excellence Delivered **As Promised***

**Date:** March 26, 2018

**To:** Steve Norcini, PE Township Engineer

**From:** Roger Phillips, PE

**cc:** Kevin W. Kochanski, RLA, CZO – Director of Community Development  
Peter Nelson, Esq. – Grim, Biehn, and Thatcher  
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.  
Patricia Sherwin – Radnor Township Engineering Department  
Ray Daly – Radnor Township Codes Official

**RE:** 145 King of Prussia Road – Final Land Development Plan  
Penn Medicine – Applicant

Date Accepted: March 5, 2018

90 Day Review: June 3, 2018

---

Gannett Fleming, Inc. has completed a review of the Final Land Development Plans. We have reviewed the plans based on the contents of ordinance No. 2016-13 amending Chapter 280 Zoning, Article XV, PLO Planned Laboratory District Sections 280-62, 280-63 and 280-64. These Plans were also reviewed for conformance with Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The applicant is proposing to construct three new buildings and two parking structures for mixed use medical facility, hotel and office.

The applicant has indicated that a waiver will be requested from the following requirement:

1. §255-21.A(6) – A waiver is requested for the maximum plan sheet size of 24 inches by 34 inches. The plans will be reduced for recording purposes.

Penn Medicine at Radnor

Plans Prepared By: Pennoni Associates, Inc.

Dated: 09/29/2017, and last revised 03/02/2018

Sewage Facilities Planning

1. Final plan approval will not be granted until Planning Approval is received from the PA DEP.



## Zoning

1. §280-63.D(5) – Parking structures may be located wholly or partly within the principal building, attached to and made part of the principal building, or constructed as a detached accessory structure. Parking spaces within structures may be reduced to not less than nine feet in width by 19 feet in depth, exclusive of aisles, for each motor vehicle. Sheet PG-A0.3 indicates that the parking spaces will be 9' x 18'.
2. §280-64.G(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. The applicant has provided architectural renderings and building elevations of the mixed use medical facility. Additional information will be provided for the office and hotel building in a future submission.
3. §280-105.E – The height of any luminary shall not exceed 25 feet. The parking lot light detail on sheet CS6001 indicates that the height will match the existing lights. This must be revised to indicate the actual height.
4. A table must be provided that clearly indicates the breakdown of impervious coverage.

## Subdivision and Land Development

1. §255.21.A(3) – Each plan sheet shall be numbered and shall show its relationship to the total number of sheets. Sheets L100, L44, PG-A0.3, PG-A1.1, PG-A1.2 and PG-A1.3 must be incorporated to be numbered as part of the plan set and all sheets must be listed in the sheet list on sheet CS0002.
2. §255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.
3. §255-29.A(1) – The aisle width in the parking garage must be dimensioned on the plans.
4. §255-29.B(1) – Calculations for the parking lot landscaping must be provided for conformance with this section.
5. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. The applicant has updated the lighting plan to show lighting

along the sidewalk and pedestrian paths. Photometrics must be submitted for the revised lighting plans.

6. §255-38.B – Calculations for the shade trees provided must be shown on sheet L400. All tree species provided must be in conformance with §255-38.H(1).
7. §255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be \$3,307 per 4,000 square feet of building area. The applicant has acknowledged they will submit the required fee upon Final Land Development approval.
8. §255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided. We note that the applicant is working with the Township Engineer and Township Fire Marshall.

#### Stormwater

1. It appears that on the Post Development Drainage Area Map DA-2 the proposed bio-retention basins for PDRA 2C and PDRA 2B are named incorrectly. Following the stormwater report, PDRA 2C drains to Bio-Retention Basin 2 and PDRA 2D drains to Bio Retention Basin 3. This inconsistency must be revised.
2. The drainage area for the infiltration trench to be counted for water quality volume needs to be shown on the Post Development Drainage Area Map DA-2.
3. The two-year storm event for Bio-Retention Basin 1A shows a greater outflow (0.18 cfs) than inflow (0.15 cfs). This discrepancy must be revised (see Appendix B-69).
4. The five-year storm event for Bio-Retention Basin 1A shows a greater outflow (0.26 cfs) than inflow (0.22 cfs). This discrepancy must be revised (see Appendix B-107).
5. The ten-year storm event for Bio-Retention Basin 1A shows a greater outflow (0.31 cfs) than inflow (0.29 cfs). This discrepancy must be revised (see Appendix B-145).
6. The areas listed in the dead storage volume for Bio-Retention Basin 1D does not appear to match the contour areas shown on the plan (see Appendix C-8). This discrepancy must be revised.



7. Manufacturer data for the chambers must be provided to show the storage capacity of the chambers.
8. Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans.
9. Infiltration volume credits for water quality volume cannot be approved at this time as an infiltration test has not been completed.
10. The Subsurface Infiltration Trench Detail on Sheet CS9503 needs to show the overflow from the trench to MH-2.01 and in the overflow elevation.
11. Please provide supporting calculations showing the water quality volume storage provided for each basin.
12. Please provide permeability/infiltration rates for the permeable pavers and permeable pavement.
13. The following profiles must be revised to show all crossings:
  - a. Missing a water, sewer, and fire service crossing between I-1.01 and MH-1.01 (CS4001).
  - b. Missing two (2) existing underground communication crossings between MH-3.02 and MH-3.01 (CS4003).
  - c. Missing a water crossing between MH-1.13 and MH-1.12 (CS4004).
  - d. Missing a fire service crossing between MH-1.12 and I-1.32 (CS4004).
  - e. Missing water, sewer, and fire service crossing between I-1.32 and EW-1.02 (CS4004).
  - f. Missing fire service and duct bank crossing between I-1.35 and MH-1.12 (CS4004).
  - g. No walls or gas line are shown on Utility Plan, missing communication crossing between SMH-2 and SMH-4 (CS4501).
  - h. Missing second fire service line between SMH-4 and SMH-5 (CS4501).
14. Label the following on the Utility Plan: MH-1.06 and MH-1.09.
15. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time.

**Sanitary Sewer**

1. A minimum of 5 foot of coverage must be provided for all sanitary sewers.
2. The rim elevations must be labeled as such on the sanitary sewer profiles on sheet CS4501.
3. If the hotel will include a restaurant or food preparation area, a grease trap must be provided.
4. An explanation must be provided as to why there are two sanitary sewer connections to the parking garage connected to the mixed medical facility.
5. All manholes not located in the paved areas must be equipped with watertight frames and covers to prevent the inflow of surface waters into the sanitary sewer.
6. There shall be no lateral connections into sanitary sewer manholes
7. A minimum 10-foot horizontal and 18-inch vertical separation must be maintained between the sanitary sewer and the water and storm sewer lines.
8. The attached frame and cover detail must be used on the plans
9. It appears that there be a retaining wall crossing the sanitary sewer. All retaining walls must be shown on the utility plans. Details of the retaining walls must be provided to ensure adequate clearance with the sanitary sewer.

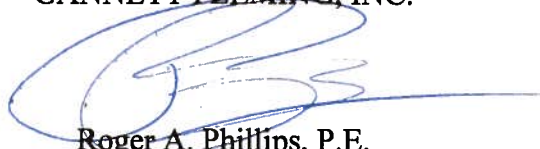
**General**

1. New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots.
2. The applicant has provided detailed parking structure plans for the structure with 850 proposed spaces as sheets PG-A0.3, PG-A1.1, PG-A1.2 and PG-A1.3. Detailed plans must be provided for all parking structures.
3. The plan located on the top right of sheet PG-A0.3 does not appear to be the current plan. That plan indicates 857 parking spaces and a garage height of 53.4". This must be revised to be consistent.
4. Information regarding the proposed retaining walls must be provided including proposed height and structural calculations if required.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.



Roger A. Phillips, P.E.  
Senior Project Manager



## MEMORANDUM

---

**Date:** March 22, 2018

**To:** Steve Norcini, P.E., Radnor Township Engineer

**From:** Amy Kaminski, P.E., PTOE, Gilmore & Associates, Inc.

**cc:** Kevin Kochanski, RLA, CZO – Radnor Township Director of Community Development  
Ray Daly, Radnor Township Codes Official  
Patricia Sherwin, Radnor Township Engineering Department  
John Rice, Esq. – Grim, Biehn & Thatcher  
Peter Nelson, Esq. – Grim, Biehn & Thatcher  
Roger Phillips, P.E. – Gannett Fleming, Inc.  
Damon Drummond, P.E., PTOE – Gilmore & Associates, Inc.

**Reference:** 145 King of Prussia Road – The University of Pennsylvania Health Systems  
Radnor Township No. 2016-D-04  
Final Land Development Review 1  
Radnor Township, Delaware County, PA  
G&A # 15-12020

---

Gilmore & Associates, Inc. (G&A) has completed a transportation review for the above referenced project and offers the following transportation comments for Radnor Township consideration:

### I. BACKGROUND

The University of Pennsylvania Health Systems is proposing the re-development of a 26 acre parcel, located at 145 King of Prussia Road, in Radnor Township, Delaware County. The project includes a total proposed gross floor area of 475,000 sf. The proposed development will consist of a 250,000 square foot Mixed Medical Use building with two parking structures (1,000 and 850 spaces), a four-story 150,000 square foot general office building, a four-story 75,000 square foot (120 room) hotel and an associated 850 space parking garage. The site is expected to generate a total of 731 AM peak hour trips, 583 PM peak hour trips, and 7,518 weekday trips without any trip reductions for internal or transit trips. The Average Daily Traffic in both directions of travel along King of Prussia Road is 10,283 vehicles.

### II. DOCUMENTS REVIEWED

- A. Final Land Development Plans for Penn Medicine at Radnor consisting of 34 sheets, prepared for the University of Pennsylvania Health Systems, prepared by Pennoni Associates, Inc., dated September 29, 2017, last revised March 2, 2018.
- B. Code Analysis Life Safety plans (Garage Plans) consisting of 1 sheet (PG-A0.3), prepared for the University of Pennsylvania Health Systems, prepared by Ballinger. The plan sheet is undated.

- C. Ground Tier Architectural Plans consisting of 1 sheet (PG-A1.1), prepared for the University of Pennsylvania Health Systems, prepared by Ballinger. The plan sheet is undated.

### III. IDENTIFIED IMPROVEMENTS

- A. A bus shelter will be constructed on King of Prussia Road southeast of the SEPTA Access/Northern Site Access to the extent that it is approved by SEPTA.
- B. Traffic Signal Timing Optimization at the following intersections:
  - 1. King of Prussia Road and Matson Ford Road/Park Driveway.
  - 2. King of Prussia Road and Radnor-Chester Road.
  - 3. Lancaster Avenue and I-476 SB Off-Ramp.
  - 4. Lancaster Avenue and Radnor-Chester Road.
  - 5. Lancaster Avenue and I-476 NB On-Ramp/Hillside Circle.
- C. King of Prussia Road and SEPTA Station Driveway:
  - 1. Restripe southbound King of Prussia Road to provide a dedicated left turn lane.
  - 2. Coordinate with SEPTA to construct bus shelter.
- D. King of Prussia Road and Raider Road/Site Driveway:
  - 1. Construct a new traffic signal.
  - 2. Provide left turn lanes on both approaches of King of Prussia Road.
  - 3. Widen east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at Main Site Driveway/Raider Road.
- E. King of Prussia Road and Southern Site Driveway:
  - 1. Restripe northbound King of Prussia Road to provide a shared through/right turn lane.
  - 2. Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to Main Site Driveway/Raider Road, with a transition into a dedicated right turn lane.
- F. King of Prussia Road and Lancaster Avenue (U.S. Lancaster Avenue (S.R. 30))/NB Off-Ramp:  
Restripe the northbound I-476 off-ramp at Lancaster Avenue to provide a shared through/right turn lane.
- G. Partnership with Radnor Township to install a Traffic Adaptive Signal System at the following intersections:
  - 1. Lancaster Avenue (S.R. 30) & I-476 Northbound On Ramps
  - 2. Lancaster Avenue (S.R. 30) & I-476 Off Ramps /King of Prussia Road
  - 3. Lancaster Avenue (S.R. 30) & I-476 Southbound Ramps
  - 4. Lancaster Avenue (S.R. 30) & Radnor-Chester Road
  - 5. Lancaster Avenue (S.R. 30) & Radnor Financial Center Eastern Driveway
  - 6. Lancaster Avenue (S.R. 30) & Radnor Financial Center Western Driveway
  - 7. King of Prussia Road & Radnor-Chester Road
  - 8. King of Prussia Road & Matson Ford Road
  - 9. Matson Ford Road & South Centennial Drive
  - 10. Matson Ford Road & North Centennial Drive

11. King of Prussia Road & Raider Road
12. Radnor-Chester Road & Raider Road
13. Radnor-Chester Road & Radnor Financial Center

**IV. APPROVED WAIVERS**

§255-21.A(6) – The Applicant received a waiver from providing the maximum plan sheet size of 24 inches by 34 inches during the conditions of approval during the Preliminary Plan Development phase.

**V. ZONING COMMENTS**

§280-63.D(5) – Revise the Parking Garage stall size to provide a minimum stall not less than nine feet in width by 19 feet in depth, exclusive of the aisles, for each motor vehicle. The comment must be addressed or a variance requested.

**VI. SUBDIVISION AND LAND DEVELOPMENT ORDINANCE**

The following comments must be addressed or a waiver requested:

- A. §255-20.B(5) – The Applicant is required to provide a comprehensive Final Transportation Impact Study to the Township incorporating all sections provided during preliminary land development. Additional documents were provided to the Township separate from the Transportation Impact Study (TIS) must be a complete standalone document.
- B. §255-21 – The Applicant is responsible for providing roadway improvement plans including the following documents prior to Final Land Development approval:
  1. Construction details related to ADA curb ramps, including spot elevations, dimensions and slopes; including ADA complaint curb ramps on all corners of Raider Road and King of Prussia Road at the proposed traffic signal.
  2. Traffic Signal Construction Plans, new and modified Traffic Signal Permit Plans, Traffic Signal System Plans, AutoCAD files of As-Built Plans, and a Traffic Signal Design Report must be provided to the Township and PennDOT for review and approval.
  3. All new or modified signal permit plans and system plans require a completed PennDOT Traffic Engineering Form 160 (TE-160) *Application for Traffic Signal Approval* and resolution.
  4. Include a separate Pavement Marking and Signing Plan in the plan set:
    - i. Provide traffic control signage including existing, removed and proposed; we note that no signs were included in this plan set for the new auxiliary turn lanes on King of Prussia Road or the accesses to King of Prussia Road.
    - ii. Provide the geometry of the proposed (final) traffic lane patterns including the location and color of all pavement markings, the lane assignment and proposed signage.
    - iii. Eliminate from the Pavement Marking and Signing Plan any existing pavement markings that are to be removed.
    - iv. Include a key identifying line geometry, color indication and dimensions or if clarity permits, the line color and geometry may be identified on the Pavement Marking and Signing Plan.

- v. Dimension all lane widths and lane and bay taper lengths along with crosswalks and stop bars.
5. Provide plans for the timber bridge and supporting documentation.
  6. Note 8 under GENERAL CONSTRUCTION AND GRADING NOTES does not adequately address the required Maintenance and Protection of Traffic plans for work along King of Prussia Road. It must be stated on the plan that "Maintenance and Protection of Traffic during construction shall be in accordance in PennDOT Publication 213, "Work Zone Traffic Control Guidelines", amended June 6, 2014, and Title 67 PA Code, Chapter 212, "Official Traffic Control Devices", dated February 4, 2006 or most current." A sequence of construction narrative must be added to the plans. Reference the appropriate MPT figures accordingly. If long-term traffic control is required, the narrative must also address the construction staging and differentiate between the use of short term and long term traffic control patterns.
- C. §255-21B.(1)(I) – Sheet CS0901, identify the owner of the property between the two Legal Right-of-Way Lines at the southern property line and SR 0476. Clearly label which parcel is APN 36-02-01234-00 Block 16; it is currently shown within the SR 0476 right-of-way.
  - D. §255-29(C)5) – Revise the Parking Garage Plans to identify the proposed aisle widths for all levels of the Parking Garage Plans.
  - E. §255-30.A – Identify the area adjacent to the parking garage that is west of the loading area wall and is approximately 10'x 60'. If this area is intended for loading, it must meet the requirements for this section.
  - F. §255-37 – Sidewalks and pedestrians paths. Provide spot elevations, widths and slopes to show the connection from the proposed on-site sidewalk to the existing SEPTA facilities is ADA accessible. Provide ADA facilities for the trail crossing at the southern driveway.
  - G. §255-37.C – Provide an easement for the proposed pedestrian trail from driveway opposite of Raider Road to the southern property line.
  - H. §255-37.D - Provide curb cuts at the southern driveway at King of Prussia Road.
  - I. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. Revise the lighting plan for consistency between the proposed lights and illumination levels shown on Sheet CS2201.
  - J. §255-37.H – Where sidewalk grades exceed 5%, a nonslip surface texture shall be used. The Final Land Development plans should provide additional details regarding any proposed walking paths or sidewalks to ensure compliance with this section. Verify that the sidewalk connection at the rear of the site to the SEPTA station does not exceed a slope of 5% and does not require pedestrians to cross into parking stalls.

## VII. GENERAL COMMENTS

- A. Truck Turning Templates:
1. The Applicant has demonstrated a WB-40 truck can adequately navigate turns into and out of the Northern/SEPTA driveway; however, the Applicant must verify the WB-40 truck is the largest truck anticipated to utilize this access and include a note and appropriate truck restriction signage restricting this driveway for vehicles no larger than a WB-40.
  2. Sheet CS9801 (Sheet 33): Provide WB-67 exit movements (left and right turns) and southbound left turns into the Southern Site Driveway at King of Prussia Road.
  3. The Applicant did not include a truck turning template for the intersection of King of Prussia Road and the proposed Center Driveway/Raider Road.
    - a. If no trucks will be utilizing the Center Driveway, truck restriction signage must be provided.
    - b. Minimally, bus turning templates must be provided for the Raider Road access to King of Prussia Road to ensure busses can enter and exit Raider Road without encroaching into opposing traffic lanes. Stop bars may need to be staggered on both Raider Road and King of Prussia Road to ensure maneuvers can be safely accommodated.
- B. Show the location of the proposed bus shelter provided on King of Prussia Road southeast of the SEPTA Access/Northern Site Access. ADA accommodations must also be provided for access to the bus stop.
- C. Show the full extent of the proposed dedicated left turn lane on King of Prussia Road at the Northern Access/SEPTA Station Driveway. If necessary, provide a match line similar to the one included on Sheet CS1701 (sheet 11).
- D. Sheet CS0002: Under GENERAL CONSTRUCTION AND GRADING NOTES; verify and update as need all dates and references included in note number 2.
- E. The following signage and striping revisions should be provided on the parking garages plans:
1. Provide ONE WAY and/or DO NOT ENTER signs at the locations where appropriate.
  2. Provide traffic flow left-turn or right-turn arrows where traffic must turn in only one direction.
  3. Provide clearance height signs where appropriate.
  4. Provide wayfinding guidance including additional parking signs along with exit signs where appropriate.
- F. For consistency, verify the number of parking spaces available in both garages. The Northern Garage (Sheet PG-AO.3) indicates 857 spaces in the top right diagram while the chart on the same sheet indicates 850 spaces. The Southern Garage (Sheet PG-A1.1) indicates 955 spaces and Sheet CS1001 of the land development plan set indicates 1,000 spaces. The number of parking spaces must be consistent.



- G. Per *PennDOT Publication 111 Traffic Control – Pavement Markings and Signing Standards TC-8600 and TC8700 Series*, the following signage and striping revisions must be verified or updated in future submissions:
1. Include a detail for the “ARROW/ONLY” pavement marking legend indicating the top of the arrow 60’ (20’ minimum) from the stop bar/stop location and the top of the “ONLY” spaced 32’ from the bottom of the arrow. A note must also be added indicating that the dimensions may be modified slightly in order to meet field conditions.
  2. All stopbars are to be located a minimum 4 feet offset from crosswalks.
  3. All crosswalks are to be a minimum width of 6’ feet. The crosswalks near the northern garage appear to be less than 6’ wide.
- H. Include R7-302 NO PARKING SYMBOL/ARROW signs along the north side of the Northern/SEPTA driveway. Parking should not be permitted along this driveway.
- I. Relocate the sign tabulation included on Sheet CS0002 to the required *Pavement Marking and Signage* sheet discussed above; exclude any unused signs from the sign tabulation set.
- J. The trail indicates a permeable walkway. If the trail is intended for ADA use, the applicant should verify and note the surface will be ADA compliant.
- K. Prior to Final Approval, the Applicant is required to coordinate with Radnor Township School District to eliminate parking along the south side of Raider Road near King of Prussia Road. The onstreet parking along the south side of Raider Road will conflict with stacked vehicles awaiting a green traffic signal and this area must remain free of parked vehicles for a minimum of 150 feet unless additional information is provided to support a reduced parking prohibition.
- L. All turn lanes should be revised and designed to meet whichever is the greater of the Turn Lane Warrant analysis or the 95<sup>th</sup> percentile queues.
- M. To assist the contractor during construction, modify the plan to include stationing on King of Prussia Road
- N. Revise the proposed 25 foot bay tapers to 75 foot minimum bay tapers.
- O. Provide spot elevations at the bottom of curb, top of curb, edge of pavement, and grade break locations at minimum 50’ intervals along areas of widening, new curbing and at minimum 10’ intervals along radius returns.
- P. Given the extent of the roadway modifications and pavement marking revisions, the Township may want to request the Applicant provide a mill and overlay along the entire site frontage of King of Prussia Road.

If you have any questions regarding the above, please contact this office.



## RADNOR TOWNSHIP

### MEMORANDUM

---

---

**TO:** MR. STEVE NORCINI  
**FROM:** RAY DALY  
**SUBJECT:** 145 KING OF PRUSSIA (PENN MEDICINE)  
**DATE:** MARCH 23, 2018  
**CC:** MR. PHILLIPS

---

Mr. Norcini:

The main drive at the front of the Hospital building, by the canopy is a concern. The island configuration will not allow Radnor's ladder truck to make the left turn. The island restricts the turning radius as shown because it has the truck hugging the curb to complete the swing (turn). The overhang of the ladder will hit the canopy as the turn is being made. The island needs to be narrower and shorter in length to help facilitate the turn. If possible there should be mountable curbs on the island. The ladder truck cannot hug the curb to make turns, as the overhang is too great as it follows through. The turning radius for the ladder is 72' outside and 36' inside minimum, bumper to bumper, no overhang for the ladder.

The permeable asphalt drive/walk along the side of the main Hospital parking structure is too narrow for the ladder truck to use. The drive/walk width looks to be approximately 20' in width. The ladder truck is 10' wide and the out riggers extend 8'. So, when the truck is in service the minimum width required is 18'. With a 20' road width the Fire Company needs to be dead center of the road, that leaves 12" to spare. It also does not allow foot access around the truck. Please consider widening the road width to 25' minimum. Also, there should be a requirement that the drive/walk be plowed to allow access all year round, should it be needed.

The access entrance to the permeable drive/walk, at the end of the main road by the canopy is a concern. The left jog, into the access drive/walk is too tight for the truck to make. Also, there appears to be an ADA depressed sidewalk and curb, and what looks to be concrete sidewalk with curbs, all of which the truck will need to drive over. This needs to be reworked to make the jog flow more smoothly. Please remember the ladder truck length is approximately 41' and its wheel base is 21'. And the ladder will need to backup out of the space when finished, not an easy task with this configuration.

The projection at the corner of the hotel and parking lot exit drive. The ladder truck will not be able to make the corner to either enter or exit the front of the hotel. I do see an ADA depression for the walkway leading to the new parking garage at the location. The sidewalk should be reconfigured by adding a larger turning radius and the projection removed. Please consider mountable curbs in the parking area in front of the hotel to facilitate better maneuvering with any Fire equipment.

What is the height of the Hospital parking structure inside, or at the basement level? I know the plans shows ambulances parking below and the deck is showing at 14'. Are there any projections lower than 14'? This should also include any piping or lighting. The new ambulances are measuring just 10' in height.

The last item, I have not been able to discern the new locations of the fire hydrants on the plan. I also have not been on site to see what hydrants will be remaining. May I request, if any additional hydrants need to be added, the site developer would consider placing them at the request of the Fire Marshal?

Thank you for your time and consideration addressing these issues.

Respectfully,

Raymond W. Daly

Building Codes/Fire Codes Official

**LISA BOROWSKI**  
*President*

**LUCAS A. CLARK, ESQ.**  
*Vice President*

**JAKE ABEL**

**RICHARD F. BOOKER, ESQ.**

**SEAN FARHY**

**JOHN NAGLE**

**MATTHEW MARSHALL**



**RADNOR TOWNSHIP**  
301 IVEN AVENUE  
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600  
Fax (610) 971-0450  
www.radnor.com

**ROBERT A. ZIENKOWSKI**  
*Township Manager*  
*Township Secretary*

**JOHN B. RICE, ESQ.**  
*Solicitor*

**KATHRYN GARTLAND**  
*Treasurer*

March 26, 2018

Ms. Stefanie Rittenhouse  
Sewage Planning Specialist  
Pennsylvania Department of Environmental Protection  
Southeast Regional Office  
2 East Main Street  
Norristown, PA 19401

**RE: 145 King of Prussia Road, Radnor Township, Delaware County,  
Pennsylvania Penn Medicine at Radnor, Sewage Facilities Planning Module  
Application Mailer**

Dear Ms. Rittenhouse:

The Township and its consultant have reviewed the methodology to determine the above referenced project's estimated flows of 53,630 gallons per day. The flows put forth, 53,630 gpd are less than the previous flows, causing a net decrease in flow. There is adequate capacity to receive and convey the estimated flow of 53,630 gallons per day, and the waste load from the project will not create a hydraulic overload, organic overload, or a five-year projected overload.

The sanitary sewer flow reserved for Bio-Med has not been re-allocated; the flow is allocated to Penn Medicine, 145 King of Prussia Road.

Sincerely,

Robert A Zienkowski  
Township Manager/Secretary

cc: Stephen F Norcini, PE, Township Engineer  
Roger Phillips, PE Gannett Fleming, Incorporated  
Michael Kissinger, PE, Pennoni Associates, Inc.

**LISA BOROWSKI**  
*President*

**LUCAS A. CLARK, ESQ.**  
*Vice President*

**JAKE ABEL**

**RICHARD F. BOOKER, ESQ.**

**SEAN FARHY**

**JOHN NAGLE**

**MATTHEW MARSHALL**



**RADNOR TOWNSHIP**  
301 IVEN AVENUE  
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600  
Fax (610) 971-0450  
www.radnor.com

**ROBERT A. ZIENKOWSKI**  
*Township Manager*  
*Township Secretary*

**JOHN B. RICE, ESQ.**  
*Solicitor*

**KATHRYN GARTLAND**  
*Treasurer*

March 8, 2018

Patrick Doris  
C/O Trustees of the Univ. of Penn Health Systems  
3400 Spruce Street  
Philadelphia, PA 19104

**RE: Final Land Development Application #2016-D-04  
Penn Medicine at Radnor – 145 King of Prussia Road**

Dear Mr. Doris:

In accordance with Section 255-18 of the Subdivision of Land Code of the Township of Radnor, we have reviewed your final land development application to construct three new buildings and two parking structures for mixed uses including a mixed use medical facility, hotel and office, and have found it complete. Therefore, I have accepted the application for final land development for review by the Township Staff, Shade Tree Commission, Planning Commission, and Board of Commissioners.

These plans are available for public viewing in the Engineering Department. These plans will be reviewed by the Planning Commission at their meeting on **Monday April 2, 2018**. Planning Commission meetings begin at **7:00 P.M.** These meetings will be held in the Radnor Township Municipal Building, 301 Iven Ave., Wayne, Pa 19087.

Sincerely,

Stephen F. Norcini, PE  
Township Engineer



March 2, 2018

UPHS1504

Radnor Township  
Attn: Mr. Robert Zienkowski  
301 Iven Ave.  
Wayne, PA19087

**RE: FINAL LAND DEVELOPMENT APPLICATION  
PENN MEDICINE AT RADNOR  
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA**

Dear Mr. Zienkowski:

On behalf of the Trustees of the University of Pennsylvania Health Systems, Pennoni is submitting the attached plans and documents for consideration of Final Land Development approval. As you are aware, The Trustees of the University of Pennsylvania Health Systems are proposing the re-development of 145 King of Prussia Road. The development will involve the demolition of existing buildings and construction of a mixed-use facility including a mixed medical use facility, office and hotel. Two parking garages are proposed in conjunction with a surface parking lot.

We are in receipt of the Township's consultants review letters, including Gilmore & Associates, Inc letter dated February 6, 2018 and Gannett Fleming's letter dated February 5, 2018. Below is a summary of the Township's consultants' comments in *italics* with our responses in **bold**. Please note that we will submit revised plans based on these comments as part of the Final Land Development process.

**Comments from Gannett Fleming Letter dated February 5, 2018**

*Sewage Facilities Planning*

1. *Final plan approval will not be granted until Planning Approval is received from the PA DEP.*

**Pennoni Response: We are in the process of obtaining all necessary signatures and approval by PA DEP, we will provide DEP approval upon receipt.**

*Zoning*

1. *§280-64.G.(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. The applicant will coordinate with the Township consultants and provide additional detail as part of Final Land Development.*

**Pennoni Response: We have provided architectural renderings and building elevations of the mixed medical facility building. Additional detail will be provided for the office and hotel buildings as needed with future submissions.**

Subdivision and Land Development

1. *§255-21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.*

**Pennoni Response: A waiver request has been added to sheet CS1001.**

2. *§255-37.E. – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. The applicant has indicated this is under discussion with the Board of Commissioners.*

**Pennoni Response: We have revised the lighting plan to depict lighting along the sidewalks and pedestrian pathways. At this time the photometrics have not been updated for this new lighting; however, we will coordinate with Township staff on the lighting design as part of the review process.**

3. *§255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be \$3,307 per 4,000 square feet of building area. The applicant has acknowledged they will submit the required fee upon Final Land Development approval.*

**Pennoni Response: The required fee will be paid upon Final Land Development Approval.**

4. *§255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided.*

**Pennoni Response: Water lines and fire hydrants have been depicted on the Utility Plan. We will work with the Township Engineer and Fire Marshall as needed.**

Sanitary Sewer

1. *A profile of the proposed sanitary sewer must be provided. The sizes of all proposed sanitary sewer must be shown on the profile. All utilities crossing the sanitary sewer must be shown on the profile to ensure adequate clearance. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.*

**Pennoni Response: The Utility Plan, sheet CS1701, has been updated to depict the sanitary sewer location, size and type. In addition, sanitary sewer profiles have been added to sheets CS4501.**

Stormwater

1. *The Subsurface Infiltration Basin #1 detail calls out the chamber length as 172.50 LF whereas the basin volume credit lists the length as 166.5 LF. This discrepancy must be revised. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission.*

**Pennoni Response: The detail and calculations have been updated for consistency.**

- 2. The Bio-Retention Basin #2 detail shows the chamber length as 124 LF whereas the basin volume credit lists the length as 120 LF. This discrepancy must be revised. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission.*

**Pennoni Response: The detail and calculations have been updated for consistency.**

- 3. The basin volume credit for Bio-Retention Basin 3 lists the areas for elevation 386 and 386.50 as 6,000 SF and 6,770 SF respectively. The contours on the plans show approximately 4,550 SF and 6,150 SF. This results in a difference of 527 CF of dead storage volume. This discrepancy must be revised. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission.*

**Pennoni Response: The calculations have been updated for consistency with the plan.**

- 4. The basin volume credit lists the length of infiltration trench pipe as 75 LF; however, sheets CS1501 and CS1701 call out the infiltration trench as 100 LF. This discrepancy must be revised. In addition, the Subsurface Infiltration Trench Detail shall show an overflow outlet. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission.*

**Pennoni Response: The calculations have been updated for consistency with the plan. An overflow outlet has been added to the plans.**

- 5. The basin volume credit for Surface Detention Basin 1 lists the areas for elevation 360, 361, 361.15 as 6,985 SF, 8,117 SF and 8,250 SF respectively. The contours on the plans show approximately 6,280 SF, 7,290 SF, and 7,415 SF. This results in a difference of 880 CF of dead storage volume. Please revise this discrepancy. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission.*

**Pennoni Response: The calculations have been updated for consistency with the plan.**

- 6. Infiltration volume credits for water quality volume cannot be approved at this time as infiltration test has not been completed at this time due to weather conditions. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.*

**Pennoni Response: Infiltration testing is scheduled for the upcoming weeks. We will provide results with upcoming submissions.**

- 7. Please provide permeability/infiltration rates for the permeable pavers and permeable pavement. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.*

**Pennoni Response: Infiltration testing is scheduled for the upcoming weeks. We will provide results with upcoming submissions.**

- 8. Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.*



**Pennoni Response: Infiltration testing is scheduled for the upcoming weeks. We will provide results with upcoming submissions.**

9. *A profile of the storm sewer must be provided. The sizes of all proposed storm sewer must be shown on the profile. All utility crossing the storm sewer must be shown on the profile to ensure adequate clearances. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.*

**Pennoni Response: Storm sewer profiles have been added as sheets CS4001-CS4004.**

10. *Stormwater calculations demonstrating that the requirements of the stormwater ordinance are met must be submitted as part of the Final Plan submission. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.*

**Pennoni Response: Storm sewer calculations have been provided and can be found in Appendix D of the Post-Construction Stormwater Management Report.**

#### General

1. *New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots. The applicant will provide and record deeds as part of the Final Land Development process.*

**Pennoni Response: New deeds will be prepared and recorded as part of the Final Land Development Plan process.**

2. *Detailed parking structure plans must be provided for review. The applicant will provide parking structure details as part of the Final Land Development Submission.*

**Pennoni Response: Parking structure plans have been included with this submission.**

#### **Comments from Gilmore & Associates, Inc. Letter dated November 29, 2017:**

##### Land Development Plan Review

###### *A. Subdivision and Land Development Ordinance (SALDO) comments:*

1. *§255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners.*

**Pennoni Response:**

2. *§255-37.H – Where sidewalk grades exceed 5%, a nonslip surface texture shall be used. The Final Land Development plans should provide additional details regarding any proposed walking paths or sidewalks to ensure compliance with this section.*

**Pennoni Response: All sidewalks are under 5%.**

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2457 or [mkissinger@pennoni.com](mailto:mkissinger@pennoni.com).

Sincerely,

**PENNONI ASSOCIATES INC.**

A handwritten signature in blue ink that reads "Michael Kissinger". The signature is fluid and cursive, with a long horizontal stroke at the end.

Michael Kissinger, PE  
Land Development Division Manager

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems  
David Falcone, Saul Ewing Arnstein & Lehr LLP

# LETTER OF TRANSMITTAL



**PENNOMI ASSOCIATES**

One South Church Street

2<sup>nd</sup> Floor

West Chester, PA 19382

Tel: 610 - 429 - 8907

Fax: 610 - 429 - 8918

<b>TO:</b> Radnor Township 301 Iven Avenue Wayne, PA 19087
--

<b>DATE</b>	03/02/18	<b>JOB NO.</b>	UPHS1504
<b>ATTENTION</b>	Mr. Steve Norcini		
<b>RE:</b>	Penn Medicine at Radnor		

**WE ARE SENDING YOU**  Attached  Under separate cover via Hand delivered the following items:

Shop Drawings     Prints     Plans     Samples     Specifications  
 Copy of Letter     Change Order     \_\_\_\_\_

<b>LIST OF ITEMS TRANSMITTED</b>			
<b>COPIES</b>	<b>DATE</b>	<b>NO:</b>	<b>DESCRIPTION</b>
1	03/02/18	-	Cover Letter
1	03/01/18	-	Radnor Township Application
1	03/01/18	-	Act 247 Review Application
2	-	-	Checks for application fees
8	03/02/18	1	Signed/Notarized Site Plan (full size)
26	03/02/18	38	Final Land Development Plans (full size)
7	03/02/18	38	Final Land Development Plans (half size)
2	03/02/18	-	PCSM Report
2	03/02/18	-	ESPC Report
26	03/02/18	3	Exterior Elevations (full size)
7	03/02/18	3	Exterior Elevations (half size)
26	03/02/18	4	Site renderings (11x17)
10	-	-	Flash drives with electronic files

**THESE ARE TRANSMITTED** as checked below:

For approval     Approved as submitted     Resubmit \_\_\_\_\_ copies for approval  
 For your use     Approved as noted     Submit \_\_\_\_\_ copies for distribution  
 As requested     Returned for corrections     Return \_\_\_\_\_ corrected prints  
 For review and comment     \_\_\_\_\_  
 FOR BIDS DUE \_\_\_\_\_     PRINTS RETURNED AFTER LOAN TO US

**REMARKS**

COPY TO file

**SIGNED:** Christopher Poterjoy, PE

*If enclosures are not as noted, kindly notify us at once.*

**DELAWARE COUNTY PLANNING COMMISSION**

**APPLICATION FOR ACT 247 REVIEW**

**Incomplete applications will be returned and will not be considered "received" until all required information is provided.**

Please type or print legibly

**DEVELOPER/APPLICANT**

Name The Trustees of the University of Pennsylvania; Attn: Pat Dorris E-mail \_\_\_\_\_

Address 3400 Spruce Street; Philadelphia, PA 19104 Phone \_\_\_\_\_

Name of Development Penn Medicine at Radnor

Municipality Radnor Township

**ARCHITECT, ENGINEER, OR SURVEYOR**

Name of Firm Pennoni Associates Inc. Phone 610-422-2459

Address One South Church St.; 2nd Floor; West Chester, PA 19382

Contact Christopher Paterjoy E-mail cpaterjoy@pennoni.com

Type of Review	Plan Status	Utilities		Environmental Characteristics
		Existing	Proposed	
<input type="checkbox"/> Zoning Change	<input type="checkbox"/> Sketch	<input checked="" type="checkbox"/> Public Sewerage	<input type="checkbox"/> Public Sewerage	
<input checked="" type="checkbox"/> Land Development	<input type="checkbox"/> Preliminary	<input type="checkbox"/> Private Sewerage	<input type="checkbox"/> Private Sewerage	<input type="checkbox"/> Wetlands
<input type="checkbox"/> Subdivision	<input checked="" type="checkbox"/> Final	<input checked="" type="checkbox"/> Public Water	<input type="checkbox"/> Public Water	<input type="checkbox"/> Floodplain
<input type="checkbox"/> PRD	<input type="checkbox"/> Tentative	<input type="checkbox"/> Private Water	<input type="checkbox"/> Private Water	<input type="checkbox"/> Steep Slopes

Zoning District PL0

Tax Map #  / /

Tax Folio # 36 / 02 / 01234 / 00

**STATEMENT OF INTENT**  
WRITING "SEE ATTACHED PLAN" IS NOT ACCEPTABLE.

**Existing and/or Proposed Use of Site/Buildings:**

The site contains 3 existing buildings which will be demolished

3 new buildings and 2 new parking structures proposed. A total of 475,000-sf of gross floor area between the 3 buildings. The site is a mixed use with uses including

a Mixed Use Medical Facility, Hotel, and Office.

Total Site Area	18.71	Acres
Size of All Existing Buildings	120,355 (footprint)	Square Feet
Size of All Proposed Buildings	118,728(footprint)	Square Feet
Size of Buildings to be Demolished	120,355 (footprint)	Square Feet

Patrick Dorris

Print Developer's Name

  
Developer's Signature

**MUNICIPAL SECTION**

ALL APPLICATIONS AND THEIR CONTENT ARE A MUNICIPAL RESPONSIBILITY.

Local Planning Commission Regular Meeting \_\_\_\_\_

Local Governing Body Regular Meeting \_\_\_\_\_

Municipal request for DCPD staff comments prior to DCPC meeting, to meet municipal meeting date:

Actual Date Needed \_\_\_\_\_

IMPORTANT: If previously submitted, show assigned DCPD File # \_\_\_\_\_

Print Name and Title of Designated Municipal Official \_\_\_\_\_

Phone Number \_\_\_\_\_

Official's Signature \_\_\_\_\_

Date \_\_\_\_\_

**FOR DCPD USE ONLY**

Review Fee: Check # \_\_\_\_\_ Amount \$ \_\_\_\_\_ Date Received \_\_\_\_\_

**Applications with original signatures must be submitted to DCPD.**

**RADNOR TOWNSHIP**  
301 IVEN AVE  
WAYNE PA 19087  
P) 610 688-5600  
F) 610 971-0450  
WWW.RADNOR.COM

**SUBDIVISION ~~ LAND DEVELOPMENT**

Location of Property 145 King of Prussia Road

Zoning District PLO - Planned Laboratory - Application No. \_\_\_\_\_  
Office District (Twp. Use)

Fee \$5,150.00 Ward No. 2 Is property in HARB District no

Applicant: (Choose one) Owner x Equitable Owner \_\_\_\_\_

Name Trustees of the University of Pennsylvania Health Systems; Attn: Pat Dorris

Address 3400 Spruce Street; Philadelphia, PA 19104

Telephone \_\_\_\_\_ Fax \_\_\_\_\_ Cell \_\_\_\_\_

Email \_\_\_\_\_

Designer: (Choose one) Engineer x Surveyor \_\_\_\_\_

Name Pennoni Associates Inc.; Michael Kissinger

Address One South Church St.; 2nd Floor; West Chester, PA 19382

Telephone (610) 422-2459 Fax (610) 429-8918

Email mkissinger@pennoni.com

Area of property 18.71 Area of disturbance 18.71

Number of proposed buildings 5 Proposed use of property Mixed Use

Number of proposed lots 1

Plan Status: Sketch Plan \_\_\_\_\_ Preliminary \_\_\_\_\_ Final x Revised \_\_\_\_\_  
Are there any requirements of Chapter 255 (SALDO) that are not in compliance with?

Are there any requirements of Chapter 255 (SALDO) not being adhered to?  
Explain the reason for noncompliance.

**Section 255-21.A(6) Plan size to allow for site to fit on one sheet.**

---

---

---

Are there any infringements of Chapter 280 (Zoning), and if so what and why?  
**N/A**

---

---

---

Individual/Corporation/Partnership Name

---

I do hereby certify that I am the owner, equitable owner or authorized representative of the property which is the subject of this application.

**Signature**



Print Name **Patrick Dorris**

---

By filing this application, you are hereby granting permission to Township officials to visit the site for review purposes.

NOTE: All requirements of Chapter 255 (Subdivision of Lane) of the Code of the Township of Radnor must be complied with whether or not indicated in this application.

**RESOLUTION NO. 2018-22  
RADNOR TOWNSHIP**

**A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY,  
PENNSYLVANIA, APPROVING THE PRELIMINARY PLAN OF  
TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA HEALTH  
SYSTEM FOR PROPERTY LOCATED AT 145 KING OF PRUSSIA  
ROAD IDENTIFIED AS FOLIO #36-02-01234-00**

*WHEREAS*, the Trustees of the University of Pennsylvania Health Systems (“Applicant”) submitted a Preliminary Land Development Plan to demolish three existing buildings on the site, and construct three new buildings and two parking structures for mixed uses which include a mixed use medical facility, hotel, and office within the Township’s PLO Zoning District (“Property”); and

*WHEREAS*, the Radnor Township Planning Commission and the Delaware County Planning Commission have reviewed the Applicant’s Preliminary Plan submission; and

*NOW, THEREFORE*, be it hereby *RESOLVED* that the Radnor Township Board of Commissioners does hereby approve the Penn Medicine at Radnor Preliminary Land Development Plans prepared by Pennoni Associates, Inc., consisting of twenty-six (26) sheets and dated September 29, 2017, last revised January 16, 2018 (“Plan”), subject to the following Preliminary Plan Approval conditions:

1. Compliance with the correspondence of Gannett Fleming dated February 5, 2018, a copy of which is attached hereto and incorporated herein as *Exhibit “A”*.
2. Compliance with the correspondence of Gilmore & Associates dated February 6, 2018, a copy of which is attached hereto and incorporated herein as *Exhibit “B”*.
3. Applicant shall construct all road improvements as set forth on *Exhibit “C”*. The improvements set forth on *Exhibit “C”* are a revision to the list of improvements attached to the Agreement to Accept Conditions executed by the Applicant, and *Exhibit “D”* to this resolution.
4. The Applicant shall obtain all required approvals from various agencies having jurisdiction over the Project, including, but not limited to, the Pennsylvania Department of Environmental Protection, the Delaware County Conservation District, and the Pennsylvania Department of Transportation.
5. The Applicant shall execute Development, and Financial Security Agreements and Documents (including all necessary agreements, easements, deeds, and declarations), all in a form and manner established and approved by the Township Solicitor and shall post sufficient financial security in a form acceptable to the Township.



6. Applicant shall submit to the Township Engineer for review all necessary legal descriptions and construction cost estimates of the site improvements.

7. Prior to the recording of the Plan, the Applicant shall have paid, in full, all appropriate fees applicable to this project including all outstanding legal, engineering and administrative fees, as well as any other outstanding bills from the Township's professional consultants.

8. The Applicant shall comply with all other applicable Township Ordinances with respect to sewage, stormwater management, zoning, and building codes, as well as comply with all other applicable Township, County, Commonwealth, and Federal rules, regulations, codes, ordinances, and statutes.

9. Applicant shall comply with the Agreement to Accept Conditions attached hereto and incorporated herein as *Exhibit "D"*, except as modified by this preliminary plan approval resolution with respect to required road improvements.

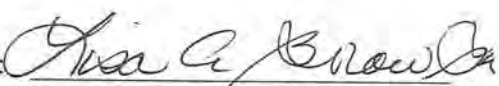
10. Separate land development plans shall be submitted for the proposed four-story hotel, four-story office building or 47,478 square foot parking garage as shown on the plan, attached hereto and incorporated herein as *Exhibit "E"*, to ensure compliance with the overall preliminary plan approval and conditions set forth in this resolution.

*IN ADDITION* to the foregoing conditions of preliminary plan approval, the Board does hereby approve the following waiver request:

1. SALDO §255-21.A(6) - The Applicant requests a waiver from the requirement that final plans be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches.

**SO RESOLVED**, at a duly convened meeting of the Board of Commissioners of Radnor Township conducted on this 12<sup>th</sup> day of February, 2018.

**RADNOR TOWNSHIP**

By:   
Name: Lisa Borowski  
Title: President

ATTEST: 



*Excellence Delivered As Promised*

**Date:** February 5, 2018

**To:** Steve Norcini, PE Township Engineer

**From:** Roger Phillips, PE

**cc:** Kevin W. Kochanski, RLA, CZO – Director of Community Development  
Peter Nelson, Esq. – Grim, Biehn, and Thatcher  
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.  
Patricia Sherwin – Radnor Township Engineering Department  
Ray Daly – Radnor Township Codes Official

**RE:** 145 King of Prussia Road – Preliminary Land Development Plan  
Penn Medicine – Applicant

Date Accepted: October 2, 2017

90 Day Review: December 31, 2017, extended to February 13, 2018

---

Gannett Fleming, Inc. has completed a review of the Preliminary Land Development Plans. We have reviewed the plans based on the contents of ordinance No. 2016-13 amending Chapter 280 Zoning, Article XV, PLO Planned Laboratory District Sections 280-62, 280-63 and 280-64. These Plans were also reviewed for conformance with Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The applicant is proposing to demolish the three existing buildings on the site, and construct three new buildings and two parking structures for mixed use medical facility, hotel and office.

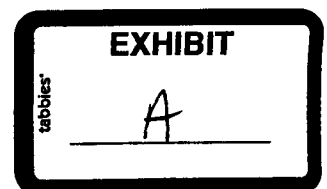
The applicant has indicated that a waiver will be requested from the following requirement:

1. §255-21.A(6) – A waiver is requested for the maximum plan sheet size of 24 inches by 34 inches. The plans will be reduced for recording purposes.

Penn Medicine at Radnor

Plans Prepared By: Pennoni Associates, Inc.

Dated: 09/29/2017, revised 01/16/2018, sheets CS001, CS0002, CS0200, CS1001, CS1501, CS 1701, CS 9502, CS9503, CS 9504, L100 and L400 revised 02/05/2018.



**Sewage Facilities Planning**

1. Final plan approval will not be granted until Planning Approval is received from the PA DEP.

**Zoning**

1. §280-64.G(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. The applicant will coordinate with the Township consultants and provide additional detail as part of the Final Land Development.

**Subdivision and Land Development**

1. §255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.
2. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. The applicant has indicated this is under discussion with the Board of Commissioners.
3. §255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be \$3,307 per 4,000 square feet of building area. The applicant has acknowledged they will submit the required fee upon Final Land Development approval.
4. §255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided. We note that the applicant is working with the Township Engineer and Township Fire Marshall.



Sanitary Sewer

1. A profile of the proposed sanitary sewer must be provided. The sizes of all proposed sanitary sewer must be shown on the profile. All utilities crossing the sanitary sewer must be shown on the profile to ensure adequate clearance. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.

Stormwater

1. The Subsurface Infiltration Basin #1 detail calls out the chamber length as 172.50 LF whereas the basin volume credit lists the length as 166.5 LF. This discrepancy must be revised. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission.
2. The Bio-Retention Basin #2 detail shows the chamber length as 124 LF whereas the basin volume credit lists the length as 120 LF. This discrepancy must be revised. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission
3. The basin volume credit for Bio-Retention Basin 3 lists the areas for elevation 386 and 386.50 as 6,000 SF and 6,770 SF respectively. The contours on the plans show approximately 4,550 SF and 6,150 SF. This results in a difference of 527 CF of dead storage volume. This discrepancy must be revised. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission
4. The basin volume credit lists the length of infiltration trench pipe as 75 LF; however, sheets CS1501 and CS1701 call out the infiltration trench as 100 LF. This discrepancy must be revised. In addition, the Subsurface Infiltration Trench Detail shall show an overflow outlet. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission
5. The basin volume credit for Surface Detention Basin 1 lists the areas for elevation 360, 361, and 361.15 as 6,985 SF, 8,117 SF, and 8,250 SF respectively. The contours on the plans show approximately 6,280 SF, 7,290 SF, and 7,415 SF. This results in a difference of 880 CF of dead storage volume. Please revise this discrepancy. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission
6. Infiltration volume credits for water quality volume cannot be approved at this time as infiltration test has not been completed at this time due to weather conditions. This is a



requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.

7. Please provide permeability/infiltration rates for the permeable pavers and permeable pavement. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.
8. Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.
9. A profile of the proposed storm sewer must be provided. The sizes of all proposed storm sewer must be shown on the profile. All utilities crossing the storm sewer must be shown on the profile to ensure adequate clearance. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.
10. Stormwater calculations demonstrating that the requirements of the stormwater ordinance are met must be submitted as part of the Final Plan submission. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.

**General**

1. New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots. The applicant will provide and record deeds as part of the Final Land Development.
2. Detailed parking structure plans must be provided for review. The applicant will provide parking structure details as part of the Final Land Development submission.

The applicant appeared before the Planning Commission on January 9, 2018. The Planning Commission recommended approval of the preliminary land development plans and waivers noting a level of service C is recommended in conjunction with other improvements as discussed with staff.



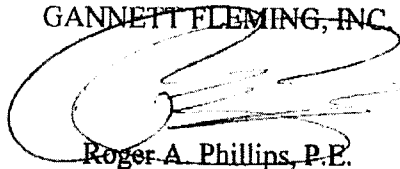
**Gannett Fleming**

S. Norcini  
Penn Medicine at Radnor  
February 5, 2018

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC



Roger A. Phillips, P.E.  
Senior Project Manager





**MEMORANDUM**

**Date:** February 6, 2018

**To:** Steve Norcini, P.E.,  
Radnor Township Engineer

**From:** Amy Kaminski, P.E., PTOE,  
Gilmore & Associates, Inc.

**cc:** Kevin Kochanski, RLA, CZO –Director of Community Development  
Ray Daly, Radnor Township Codes Official  
Patricia Sherwin, Radnor Township Engineering Department  
John Rice, Esq. – Grim, Biehn & Thatcher  
Peter Nelson, Esq. – Grim, Biehn & Thatcher  
Roger Phillips, P.E. – Gannett Fleming, Inc.  
Damon Drummond, P.E., PTOE – Gilmore & Associates, Inc.

**Reference:** 145 King of Prussia Road – The University of Pennsylvania Health Systems  
Radnor Township No. 2016-D-04  
Preliminary Land Development Review 3  
Transportation Impact Study Review 3  
Radnor Township, Delaware County, PA  
G&A # 15-12020

Gilmore & Associates, Inc. (G&A) has completed a transportation review for the above referenced project and offers the following transportation comments for Radnor Township consideration:

**I. BACKGROUND**

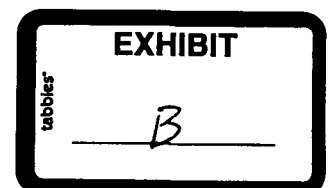
The University of Pennsylvania Health Systems is proposing the re-development of a 26 acre parcel, located at 145 King of Prussia Road, in Radnor Township, Delaware County. The project includes a total proposed gross floor area of 475,000 sf. The proposed development will consist of a 250,000 square foot Mixed Medical Use building with two parking structures (1,000 and 850 spaces), a four-story 150,000 square foot general office building, a four-story 75,000 square foot (120 room) hotel and an associated 850 space parking garage. The site is expected to generate a total of 731 AM peak hour trips, 583 PM peak hour trips, and 7,518 weekday trips without any trip reductions for internal or transit trips. The Average Daily Traffic in both directions of travel along King of Prussia Road is 10,283 vehicles.

**II. DOCUMENTS REVIEWED**

A. Preliminary Land Development Plans for Penn Medicine at Radnor, prepared for the University of Pennsylvania Health Systems, prepared by Pennoni Associates, Inc., dated September 29, 2017, last revised January 16, 2018 along with revised sheets dated February 5, 2018 as follows: CS0001 (Cover Sheet), CS0002 (Note Sheet), CS0200 (Existing Conditions Plan), CS1001 (Site Plan), CS1501 (Grading Plan), and CS1701 (Utility Plan), CS9502, CS9503, and CS9504 (Post-Construction Stormation Management Details; L100 (Tree Removals Plan) and L400 (Tree Replacement Plan).

65 East Butler Avenue | Suite 100 | New Britain, PA 18901 | Phone: 215-345-4330 | Fax: 215-345-8606

Gilmore & Associates, Inc.  
Building on a Foundation of Excellence  
www.gilmore-assoc.com



- B. Traffic Impact Study for Mixed Medical Facility 145 King of Prussia Road, prepared for the University of Pennsylvania Health System, prepared by Pennoni Associates, Inc., dated September 2017, last revised January 2018 along with the Level of Service C Improvements Letter addressed to Mr. Robert Zienkowski, dated February 1, 2018, revised February 6, 2018; Response letter dated January 17, 2018 prepared by Pennoni Associates, Inc.
- C. Waiver Request Letter for Penn Medicine at Radnor, prepared for Radnor Township, prepared by Pennoni Associates, Inc., dated January 17, 2018.

### III. IDENTIFIED IMPROVEMENTS

- A. A bus shelter will be provided on King of Prussia Road southeast of the SEPTA Access/Northern Site Access to the extent that it is approved by SEPTA.
- B. Traffic Signal Timing Optimization at the following intersections:
  - 1. King of Prussia Road and Matson Ford Road/Park Driveway.
  - 2. King of Prussia Road and Radnor-Chester Road.
  - 3. Lancaster Avenue and I-476 SB Off-Ramp.
  - 4. Lancaster Avenue and Radnor-Chester Road.
  - 5. Lancaster Avenue and I-476 NB On-Ramp/Hillside Circle.
- C. King of Prussia Road and SEPTA Station Driveway:
  - 1. Restripe southbound King of Prussia Road to provide a dedicated left turn lane.
  - 2. Coordinate with SEPTA to construct bus shelter.
- D. King of Prussia Road and Raider Road/Site Driveway:
  - 1. Construct a new traffic signal.
  - 2. Provide left turn lanes on both approaches of King of Prussia Road.
  - 3. Widen east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at Main Site Driveway/Raider Road.
- E. King of Prussia Road and Southern Site Driveway:
  - 1. Restripe northbound King of Prussia Road to provide a shared through/right turn lane.
  - 2. Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to Main Site Driveway/Raider Road, with a transition into a dedicated right turn lane.
- F. King of Prussia Road and Lancaster Avenue (U.S. Lancaster Avenue (S.R. 30))/NB Off-Ramp:
  - Restripe the northbound I-476 off-ramp at Lancaster Avenue to provide a shared through/right turn lane.
- G. Partner with Radnor Township to install Traffic Adaptive Signal System at the following intersections:
  - 1. Lancaster Avenue (S.R. 30) & I-476 Northbound On Ramps
  - 2. Lancaster Avenue (S.R. 30) & I-476 Off Ramps /King of Prussia Road
  - 3. Lancaster Avenue (S.R. 30) & I-476 Southbound Ramps
  - 4. Lancaster Avenue (S.R. 30) & Radnor-Chester Road
  - 5. Lancaster Avenue (S.R. 30) & Radnor Financial Center Eastern Driveway



6. Lancaster Avenue (S.R. 30) & Radnor Financial Center Western Driveway
7. King of Prussia Road & Radnor-Chester Road
8. King of Prussia Road & Matson Ford Road
9. Matson Ford Road & South Centennial Drive
10. Matson Ford Road & North Centennial Drive
11. King of Prussia Road & Raider Road
12. Radnor-Chester Road & Raider Road
13. Radnor-Chester Road & Radnor Financial Center

#### **IV. REQUESTED WAIVERS**

1. §255-20.B(1)(n) – To allow an aerial photograph demonstrating existing conditions within 500 feet of the site; the applicant has subsequently withdrawn this request for a waiver and provided the required information in Sheet CS0200 *Existing Conditions Plan*.
2. §255-21.A(6) – The Applicant has requested a waiver from providing the maximum plan sheet size of 24 inches by 34 inches; the plans will be reduced for recording purposes.
3. §255-20.B(5)(d)[6][a] – A waiver is requested for the requirement that streets or intersections showing Level of Service below C shall be considered deficient and specific recommendations for elimination of these problems shall be listed. The applicant has subsequently withdrawn this request for a waiver and provided the required information in the updated February 6, 2018 letter to Mr. Robert Zienkowski. The Applicant is required to provide this in the Final Traffic Impact Study.

#### **V. LAND DEVELOPMENT PLAN REVIEW**

Subdivision and Land Development Ordinance (SALDO) comments:

1. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners.
2. §255-37.H – Where sidewalk grades exceed 5%, a nonslip surface texture shall be used. The Final Land Development plans should provide additional details regarding any proposed walking paths or sidewalks to ensure compliance with this section.

#### **VI. TRAFFIC IMPACT STUDY (TIS) REVIEW**

We have no additional comments on the TIS.

The current preliminary plan submission is adequately completed to support preliminary approval; we recommend resolving the above comments during the Final Land Development phase of the project.

If you have any questions regarding the above, please contact this office.

ABK:DAD:kmn

## PENN MEDICINE ROAD IMPROVEMENTS

- A. King of Prussia Rd & Lancaster Ave/I-476 NB Off-ramps (Improvements subject to PennDOT review and approval)
  - 1. Re-stripe northbound I-476 Offramps to provide dual left-turn lanes, dual through lanes and a dedicated right-turn lane.
  
- B. King of Prussia Rd & Raider Rd:
  - 1. Construct a new traffic signal at intersection
  - 2. Construct a minimum of 150' left turn lanes on both approaches of King of Prussia Rd
  - 3. Provide two northbound lanes on the northbound approach with a transition to a northbound through lane and a dedicated right turn lane at the Main Site Driveway (lane drop at Raider Road intersection)
  
- C. King of Prussia Rd Frontage
  - 1. Construct five (5) foot wide sidewalks along the entire property frontage on King of Prussia Road
  
- D. King of Prussia Road and Southern Site Access-
  - 1. Restripe and/or widen northbound King of Prussia Road to provide two northbound through lanes on the northbound departure of the intersection.
  - 2. Construct minimum 45-foot curb radii for the anticipated delivery traffic.
  
- E. King of Prussia Road and SEPTA Access/Northern Site Access-
  - 1. Construct a southbound King of Prussia Road left turn lane into the Northern Site Access.
  - 2. Construct a bus shelter on King of Prussia Road southeast of the SEPTA Access/Northern Site Access, to the extent that it is approved by SEPTA.
  - 3. Construct sidewalks from the site to the R-100 Station at the rear of the property.
  
- F. Partner with Radnor Township to install Traffic Adaptive Signal System at the following intersections, subject to PennDOT review and approval.
  - 1. Lancaster Ave & I-476 Northbound Ramps
  - 2. Lancaster Ave & I-476/King of Prussia Rd
  - 3. Lancaster Ave & I-476 Southbound ramps
  - 4. Lancaster Ave & Radnor-Chester Rd
  - 5. Lancaster Ave & Radnor Financial Center Eastern Driveway
  - 6. Lancaster Ave & Radnor Financial Center Western Driveway
  - 7. King of Prussia Road & Northern Driveway (if signalized).
  - 8. King of Prussia Rd & Radnor-Chester Rd
  - 9. King of Prussia Rd & Matson Ford Rd
  - 10. Matson Ford Rd & S. Centennial Dr
  - 11. Matson Ford Rd & N. Centennial Dr
  - 12. King of Prussia Rd & Raider Rd
  - 13. Radnor Chester Rd & Raider Rd.
  - 14. Radnor Chester Rd & Radnor Financial Center

- G. Construct a trail extension from the Southern Driveway through the existing PennDOT Right-of-Way, southeast of the site with connections to the existing Route 30 sidewalks. The location, width and composition of the path materials shall be approved by the Radnor Township Engineer.

**AGREEMENT TO ACCEPT CONDITIONS**  
**Penn Medicine at Radnor**

This Agreement to Accept Conditions (“Agreement”) is made on the \_\_\_\_\_ day of \_\_\_\_\_, 2017 by and between **THE TOWNSHIP OF RADNOR**, a Home Rule municipality, with offices located at 301 Iven Avenue, Wayne, PA 19087 (hereinafter the “Township”) and the **TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, through its operating division, the UNIVERSITY OF PENNSYLVANIA HEALTH SYSTEM**, 3400 Civic Center Boulevard, Philadelphia, PA 19104, legal owner of Folio No. 36-02-01234-00 (hereinafter the “Applicant”).

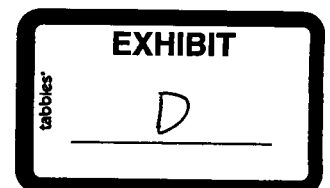
**BACKGROUND OF AGREEMENT**

**A.** The Applicant is the legal owner of a certain parcel of land known as Delaware County Folio No. 36-02-01234-00 (hereinafter referred to as “Property”); and

**B.** The Applicant has requested preliminary/final approval of a Land Development Plan for the Property, as shown on the Plan entitled “**Penn Medicine at Radnor**”, prepared by Pennoni Associates, Inc., dated September 29, 2017, consisting of sheets 1 to 26 (the “Plan”); and

**C.** The Plan and Application are being reviewed by the Township Engineer the Township Planning Commission and the Delaware County Planning Commission pursuant to the Pa. Municipalities Planning Code.

**D.** On December 4, 2017, the Applicant appeared before the Township Planning Commission regarding the Plan and agreed to certain conditions of land development approval relating to such Plan, including but not limited to, conditions pertaining to taxes and road improvements.



**NOW THEREFORE**, for good and valuable consideration, receipt of which is acknowledged, and in consideration of the mutual promises contained herein, and intending to be legally bound, the parties agree as follows:

1. The Applicant agrees that, upon preliminary land development approval the Applicant will agree as a condition of that approval that the Property will be subject to the payment of real estate taxes and business/privilege taxes imposed by Radnor Township, the Radnor Township School District, and Delaware County as long as the Applicant or any related entity operates a mixed medical/ambulatory care facility on the Property.
2. Notwithstanding any right to do so, Applicant agrees it will not seek a tax exemption from the Delaware County Board of Assessment as long as the Applicant or any related entity operates a medical facility on the Property. The foregoing covenant does not prohibit Applicant from seeking an assessment reduction based on fair market value under applicable law.
3. The Applicant agrees that as a condition of its preliminary land development plan submission it will include those traffic improvements, set forth on *Exhibit "A"*, as a condition of preliminary land development approval, provided that the same shall be subject to modification and amendment as approved by the Board of Commissioners during the land development process.
4. Applicant further agrees that if the Plan as described above is withdrawn and/or revised in the future that the terms and conditions of this Agreement to Accept Conditions will be applicable to any future revised

or new land development plans for the Property so long as Applicant or any related entity operates a mixed medical/ambulatory care facility on the Property. This agreement will not apply to the pending land development plan for office building and laboratory uses prepared by Nave Newell, Inc., dated September 3, 2014, last revised March 17, 2015 (the "2015 Plan"), nor to any other land development plan proposed under the same ordinances as the 2015 Plan.

5. Notwithstanding anything contained to the contrary herein, the parties hereby agree and acknowledge that the Township shall be under no obligation to grant any variance nor adopt any zoning amendment or modification as a result of this Agreement.

[signatures on following page]

IN WITNESS WHEREOF, the parties have hereunto caused the execution of  
this Agreement this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

ATTEST:

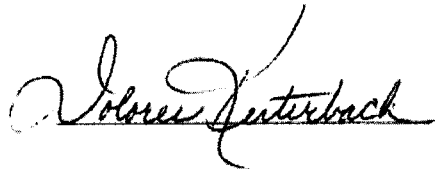
RADNOR TOWNSHIP

\_\_\_\_\_ By: \_\_\_\_\_


Legal Owner:

ATTEST:

TRUSTEES OF THE UNIVERSITY  
OF PENNSYLVANIA HEALTH  
SYSTEMS



By:

  
Name: KEVIN B. MAHONEY  
Title: BYP

ACKNOWLEDGMENT

By Developer

COMMONWEALTH OF PENNSYLVANIA :  
:SS  
COUNTY OF Philadelphia :

On this 11<sup>th</sup> day of December, 2017, before me a Notary Public, personally appeared Jacob M. Mahoney, of *Trustees of The University of Pennsylvania Health System*, and acknowledged that the instrument to which this Acknowledgement is attached is his/her act and deed and that he/she desires the same might be recorded as such.

IN WITNESS WHEREOF, I have hereunto set my official hand and seal.

Jane A. Gallen  
Notary Public

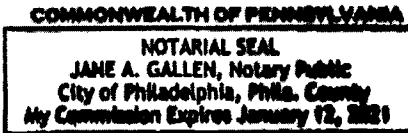






EXHIBIT "A"

PENN MEDICINE ROAD IMPROVEMENTS

- A. King of Prussia Road and Lancaster Avenue (U.S. Route 30)/I-476 NB Off-Ramp-
  - i. Restripe northbound I-476 off-ramp for a shared through/right-turn lane.
- B. King of Prussia Road and Raider Road-
  - i. Construct a new traffic signal.
  - ii. Construct left turn lanes on both approaches of King of Prussia Road
- C. King of Prussia Road and Southern Site Access-
  - i. Restripe northbound King of Prussia Road to provide a shared through/ right lane
  - ii. Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
  - iii. Provide 45-foot curb radii (at minimum), or larger if necessary for the anticipated delivery traffic.
- D. King of Prussia Road and SEPTA Access/Northern Site Access-
  - i. Widen the roadway to 25 feet.
  - ii. Construct a southbound King of Prussia Road left turn lane into the Northern Site Access.
  - iii. Construct a bus shelter on King of Prussia Road southeast of the SEPTA Access/Northern Site Access, to the extent that it is approved by SEPTA.
  - iv. Construct sidewalks from the site to the R-100 Station at the rear of the property.
- E. King of Prussia Road-
  - i. Provide a four-lane cross section along the property's site frontage along King of Prussia Road (between the Southern Access and the Main Site Driveway/ Raider Road).
  - ii. Construct 5 foot wide sidewalks along the entire property frontage on King of Prussia Road.

F. Partner with the Township to install Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review and approval:

- i. Route 30 & I-476 Northbound Ramps
- ii. Route 30 & I-476/King of Prussia Road.
- iii. Route 30 & I-476 Southbound Ramps.
- iv. Route 30 & Radnor-Chester Road.
- v. Route 30 & Radnor Financial Center Eastern Driveway
- vi. Route 30 & Radnor Financial Center Western Driveway
- vii. King of Prussia Road & Radnor-Chester Road.
- viii. King of Prussia Road & Matsonford Road.
- ix. Matsonford Road & South Centennial Drive.
- x. Matsonford Road & North Centennial Drive.
- xi. King of Prussia Road & Raider Road.
- xii. King of Prussia Road & Northern Driveway (if signalized).
- xiii. Radnor Chester and Raider Road
- xiv. Radnor Chester and Radnor Financial Center

G. Construct a trail extension from the Southern Driveway through the existing PennDOT Right-of-Way, southeast of the site with connections to the existing Route 30 sidewalks. The location, width and composition of the path materials shall be approved by the Radnor Township Engineer.



---

# RADNOR TOWNSHIP

## ENGINEERING DEPARTMENT



---

### Memorandum

To: Radnor Township Board of Commissioners

From: Stephen F. Norcini, PE, Township Engineer *SFN*

CC: Robert A. Zienkowski, Township Manager  
William M. White, Assistant Manager/Director of Finance

Date: February 6, 2018

---

**Re: Resolution #2018-22, SALDO Application #2016-D-04 – Final;  
Preliminary Land Development - 145 King of Prussia Road, Penn Medicine**

---

This application has been before the Board of Commissioners at Caucus and at the Sub-Committee meeting.

The applicant is proposing to construct three buildings and two structured parking garages for mixed use of hotel, office, and a medical facility.

The plans before the Board of Commissioners are recently revised based on the Caucus and Sub-Committee Meeting. Following this memorandum, the documents are broken down as follows:

- Review Letters
- Penn Medicine Road Improvements
- Sanitary Sewer
- Traffic
- Plans

The applicant is before the Board of Commissioners seeking Final Preliminary Land Development approval.

# Review Letters



# Gannett Fleming

*Excellence Delivered **As Promised***

**Date:** February 5, 2018

**To:** Steve Norcini, PE Township Engineer

**From:** Roger Phillips, PE

**cc:** Kevin W. Kochanski, RLA, CZO – Director of Community Development  
Peter Nelson, Esq. – Grim, Biehn, and Thatcher  
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.  
Patricia Sherwin – Radnor Township Engineering Department  
Ray Daly – Radnor Township Codes Official

**RE:** 145 King of Prussia Road – Preliminary Land Development Plan  
Penn Medicine – Applicant

Date Accepted: October 2, 2017

90 Day Review: December 31, 2017, extended to February 13, 2018

---

Gannett Fleming, Inc. has completed a review of the Preliminary Land Development Plans. We have reviewed the plans based on the contents of ordinance No. 2016-13 amending Chapter 280 Zoning, Article XV, PLO Planned Laboratory District Sections 280-62, 280-63 and 280-64. These Plans were also reviewed for conformance with Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The applicant is proposing to demolish the three existing buildings on the site, and construct three new buildings and two parking structures for mixed use medical facility, hotel and office.

The applicant has indicated that a waiver will be requested from the following requirement:

1. §255-21.A(6) – A waiver is requested for the maximum plan sheet size of 24 inches by 34 inches. The plans will be reduced for recording purposes.

## Penn Medicine at Radnor

Plans Prepared By: Pennoni Associates, Inc.

Dated: 09/29/2017, revised 01/16/2018, sheets CS001, CS0002, CS0200, CS1001, CS1501, CS 1701, CS 9502, CS9503, CS 9504, L100 and L400 revised 02/05/2018.



Sewage Facilities Planning

1. Final plan approval will not be granted until Planning Approval is received from the PA DEP.

Zoning

1. §280-64.G(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. The applicant will coordinate with the Township consultants and provide additional detail as part of the Final Land Development.

Subdivision and Land Development

1. §255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.
2. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. The applicant has indicated this is under discussion with the Board of Commissioners.
3. §255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be \$3,307 per 4,000 square feet of building area. The applicant has acknowledged they will submit the required fee upon Final Land Development approval.
4. §255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided. We note that the applicant is working with the Township Engineer and Township Fire Marshall.



Sanitary Sewer

1. A profile of the proposed sanitary sewer must be provided. The sizes of all proposed sanitary sewer must be shown on the profile. All utilities crossing the sanitary sewer must be shown on the profile to ensure adequate clearance. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.

Stormwater

1. The Subsurface Infiltration Basin #1 detail calls out the chamber length as 172.50 LF whereas the basin volume credit lists the length as 166.5 LF. This discrepancy must be revised. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission.
2. The Bio-Retention Basin #2 detail shows the chamber length as 124 LF whereas the basin volume credit lists the length as 120 LF. This discrepancy must be revised. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission
3. The basin volume credit for Bio-Retention Basin 3 lists the areas for elevation 386 and 386.50 as 6,000 SF and 6,770 SF respectively. The contours on the plans show approximately 4,550 SF and 6,150 SF. This results in a difference of 527 CF of dead storage volume. This discrepancy must be revised. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission
4. The basin volume credit lists the length of infiltration trench pipe as 75 LF; however, sheets CS1501 and CS1701 call out the infiltration trench as 100 LF. This discrepancy must be revised. In addition, the Subsurface Infiltration Trench Detail shall show an overflow outlet. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission
5. The basin volume credit for Surface Detention Basin 1 lists the areas for elevation 360, 361, and 361.15 as 6,985 SF, 8,117 SF, and 8,250 SF respectively. The contours on the plans show approximately 6,280 SF, 7,290 SF, and 7,415 SF. This results in a difference of 880 CF of dead storage volume. Please revise this discrepancy. This is a requirement of the Final Land Development plan and will be addressed as part of the Final Land Development submission
6. Infiltration volume credits for water quality volume cannot be approved at this time as infiltration test has not been completed at this time due to weather conditions. This is a



requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.

7. Please provide permeability/infiltration rates for the permeable pavers and permeable pavement. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.
8. Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.
9. A profile of the proposed storm sewer must be provided. The sizes of all proposed storm sewer must be shown on the profile. All utilities crossing the storm sewer must be shown on the profile to ensure adequate clearance. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.
10. Stormwater calculations demonstrating that the requirements of the stormwater ordinance are met must be submitted as part of the Final Plan submission. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time. This is a requirement of the Final Land Development plan and the applicant has indicated that this will be provided as part of the Final Land Development submission.

#### General

1. New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots. The applicant will provide and record deeds as part of the Final Land Development.
2. Detailed parking structure plans must be provided for review. The applicant will provide parking structure details as part of the Final Land Development submission.

The applicant appeared before the Planning Commission on January 9, 2018. The Planning Commission recommended approval of the preliminary land development plans and waivers noting a level of service C is recommended in conjunction with other improvements as discussed with staff.



**Gannett Fleming**

S. Norcini  
Penn Medicine at Radnor  
February 5, 2018

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.

A handwritten signature in blue ink, appearing to read 'Roger A. Phillips', is written over the company name.

Roger A. Phillips, P.E.  
Senior Project Manager





## MEMORANDUM

---

**Date:** February 6, 2018

**To:** Steve Norcini, P.E.,  
Radnor Township Engineer

**From:** Amy Kaminski, P.E., PTOE,  
Gilmore & Associates, Inc.

**cc:** Kevin Kochanski, RLA, CZO –Director of Community Development  
Ray Daly, Radnor Township Codes Official  
Patricia Sherwin, Radnor Township Engineering Department  
John Rice, Esq. – Grim, Biehn & Thatcher  
Peter Nelson, Esq. – Grim, Biehn & Thatcher  
Roger Phillips, P.E. – Gannett Fleming, Inc.  
Damon Drummond, P.E., PTOE – Gilmore & Associates, Inc.

**Reference:** 145 King of Prussia Road – The University of Pennsylvania Health Systems  
Radnor Township No. 2016-D-04  
Preliminary Land Development Review 3  
Transportation Impact Study Review 3  
Radnor Township, Delaware County, PA  
G&A # 15-12020

---

Gilmore & Associates, Inc. (G&A) has completed a transportation review for the above referenced project and offers the following transportation comments for Radnor Township consideration:

### I. BACKGROUND

The University of Pennsylvania Health Systems is proposing the re-development of a 26 acre parcel, located at 145 King of Prussia Road, in Radnor Township, Delaware County. The project includes a total proposed gross floor area of 475,000 sf. The proposed development will consist of a 250,000 square foot Mixed Medical Use building with two parking structures (1,000 and 850 spaces), a four-story 150,000 square foot general office building, a four-story 75,000 square foot (120 room) hotel and an associated 850 space parking garage. The site is expected to generate a total of 731 AM peak hour trips, 583 PM peak hour trips, and 7,518 weekday trips without any trip reductions for internal or transit trips. The Average Daily Traffic in both directions of travel along King of Prussia Road is 10,283 vehicles.

### II. DOCUMENTS REVIEWED

A. Preliminary Land Development Plans for Penn Medicine at Radnor, prepared for the University of Pennsylvania Health Systems, prepared by Pennoni Associates, Inc., dated September 29, 2017, last revised January 16, 2018 along with revised sheets dated February 5, 2018 as follows: CS0001 (Cover Sheet), CS0002 (Note Sheet), CS0200 (Existing Conditions Plan), CS1001 (Site Plan), CS1501 (Grading Plan), and CS1701 (Utility Plan), CS9502, CS9503, and CS9504 (Post-Construction Stormation Management Details; L100 (Tree Removals Plan) and L400 (Tree Replacement Plan).

---

65 East Butler Avenue | Suite 100 | New Britain, PA 18901 | Phone: 215-345-4330 | Fax: 215-345-8606

- B. Traffic Impact Study for Mixed Medical Facility 145 King of Prussia Road, prepared for the University of Pennsylvania Health System, prepared by Pennoni Associates, Inc., dated September 2017, last revised January 2018 along with the Level of Service C Improvements Letter addressed to Mr. Robert Zienkowski, dated February 1, 2018, revised February 6, 2018; Response letter dated January 17, 2018 prepared by Pennoni Associates, Inc.
- C. Waiver Request Letter for Penn Medicine at Radnor, prepared for Radnor Township, prepared by Pennoni Associates, Inc., dated January 17, 2018.

### III. IDENTIFIED IMPROVEMENTS

- A. A bus shelter will be provided on King of Prussia Road southeast of the SEPTA Access/Northern Site Access to the extent that it is approved by SEPTA.
- B. Traffic Signal Timing Optimization at the following intersections:
  - 1. King of Prussia Road and Matson Ford Road/Park Driveway.
  - 2. King of Prussia Road and Radnor-Chester Road.
  - 3. Lancaster Avenue and I-476 SB Off-Ramp.
  - 4. Lancaster Avenue and Radnor-Chester Road.
  - 5. Lancaster Avenue and I-476 NB On-Ramp/Hillside Circle.
- C. King of Prussia Road and SEPTA Station Driveway:
  - 1. Restripe southbound King of Prussia Road to provide a dedicated left turn lane.
  - 2. Coordinate with SEPTA to construct bus shelter.
- D. King of Prussia Road and Raider Road/Site Driveway:
  - 1. Construct a new traffic signal.
  - 2. Provide left turn lanes on both approaches of King of Prussia Road.
  - 3. Widen east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at Main Site Driveway/Raider Road.
- E. King of Prussia Road and Southern Site Driveway:
  - 1. Restripe northbound King of Prussia Road to provide a shared through/right turn lane.
  - 2. Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to Main Site Driveway/Raider Road, with a transition into a dedicated right turn lane.
- F. King of Prussia Road and Lancaster Avenue (U.S. Lancaster Avenue (S.R. 30))/NB Off-Ramp:
  - Restripe the northbound I-476 off-ramp at Lancaster Avenue to provide a shared through/right turn lane.
- G. Partner with Radnor Township to install Traffic Adaptive Signal System at the following intersections:
  - 1. Lancaster Avenue (S.R. 30) & I-476 Northbound On Ramps
  - 2. Lancaster Avenue (S.R. 30) & I-476 Off Ramps /King of Prussia Road
  - 3. Lancaster Avenue (S.R. 30) & I-476 Southbound Ramps
  - 4. Lancaster Avenue (S.R. 30) & Radnor-Chester Road
  - 5. Lancaster Avenue (S.R. 30) & Radnor Financial Center Eastern Driveway

6. Lancaster Avenue (S.R. 30) & Radnor Financial Center Western Driveway
7. King of Prussia Road & Radnor-Chester Road
8. King of Prussia Road & Matson Ford Road
9. Matson Ford Road & South Centennial Drive
10. Matson Ford Road & North Centennial Drive
11. King of Prussia Road & Raider Road
12. Radnor-Chester Road & Raider Road
13. Radnor-Chester Road & Radnor Financial Center

**IV. REQUESTED WAIVERS**

1. §255-20.B(1)(n) – To allow an aerial photograph demonstrating existing conditions within 500 feet of the site; the applicant has subsequently withdrawn this request for a waiver and provided the required information in Sheet CS0200 *Existing Conditions Plan*.
2. §255-21.A(6) – The Applicant has requested a waiver from providing the maximum plan sheet size of 24 inches by 34 inches; the plans will be reduced for recording purposes.
3. §255-20.B(5)(d)[6][a] – A waiver is requested for the requirement that streets or intersections showing Level of Service below C shall be considered deficient and specific recommendations for elimination of these problems shall be listed. The applicant has subsequently withdrawn this request for a waiver and provided the required information in the updated February 6, 2018 letter to Mr. Robert Zienkowski. The Applicant is required to provide this in the Final Traffic Impact Study.

**V. LAND DEVELOPMENT PLAN REVIEW**

Subdivision and Land Development Ordinance (SALDO) comments:

1. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners.
2. §255-37.H – Where sidewalk grades exceed 5%, a nonslip surface texture shall be used. The Final Land Development plans should provide additional details regarding any proposed walking paths or sidewalks to ensure compliance with this section.

**VI. TRAFFIC IMPACT STUDY (TIS) REVIEW**

We have no additional comments on the TIS.

The current preliminary plan submission is adequately completed to support preliminary approval; we recommend resolving the above comments during the Final Land Development phase of the project.

If you have any questions regarding the above, please contact this office.

ABK:DAD:kmn

---

# RADNOR TOWNSHIP

## ENGINEERING DEPARTMENT



### Memorandum

To: Radnor Township Board of Commissioners

From: Stephen F. Norcini, PE, Township Engineer *SFN*

CC: Robert A. Zienkowski, Township Manager  
William M. White, Assistant Manager/Director of Finance

Date: January 17, 2018

---

**Re: SALDO Application #2016-D-04 – Caucus; Preliminary Land Development - 145 King of Prussia Road, Penn Medicine**

---

Before the Board of Commissioners will be representatives of Penn Medicine, to present plans for Preliminary Land Development, at caucus.

The applicant is proposing to construct three buildings and two structured parking garages for mixed use of hotel, office, and a medical facility. A grading permit has been issued for demolition site work, and it is anticipated that the actual demolition permit from codes will be issued soon.

The plans before the Board of Commissioners are recently revised, and have not been fully reviewed by staff and the consultants (please note the review letters in the packet are from the previous plan set). That being said, staff and the consultants have met with the applicant to discuss the revisions on the plans before the Commissioners. The Board of Commissioners and our residents will be able to read review letters from our consultants based on the revised plans prior to the applicant's attendance at the meeting requesting final Preliminary Land Development approval.

Please find attached "Penn Medicine Road Improvements", which outlines the traffic improvements the applicant has agreed to construct.

Enclosures: Penn Medicine Road Improvements  
Previous Plan Reviews & Documentation  
Revised Plan Set

## PENN MEDICINE ROAD IMPROVEMENTS

- A. King of Prussia Road and Lancaster Avenue (U.S. Route 30)/I-476 NB Off-Ramp-
  - i. Restripe northbound I-476 off-ramp for a shared through/right-turn lane.
- B. King of Prussia Road and Raider Road-
  - i. Construct a new traffic signal.
  - ii. Construct left turn lanes on both approaches of King of Prussia Road
- C. King of Prussia Road and Southern Site Access-
  - i. Restripe northbound King of Prussia Road to provide a shared through/ right lane
  - ii. Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
  - iii. Provide 45-foot curb radii (at minimum), or larger if necessary for the anticipated delivery traffic.
- D. King of Prussia Road and SEPTA Access/Northern Site Access-
  - i. Widen the roadway to 25 feet.
  - ii. Construct a southbound King of Prussia Road left turn lane into the Northern Site Access.
  - iii. Construct a bus shelter on King of Prussia Road southeast of the SEPTA Access/Northern Site Access, to the extent that it is approved by SEPTA.
  - iv. Construct sidewalks from the site to the R-100 Station at the rear of the property.
- E. King of Prussia Road-
  - i. Provide a four-lane cross section along the property's site frontage along King of Prussia Road (between the Southern Access and the Main Site Driveway/ Raider Road).
  - ii. Construct 5 foot wide sidewalks along the entire property frontage on King of Prussia Road.
- F. Partner with the Township to install Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review and approval:



- i. Route 30 & I-476 Northbound Ramps
  - ii. Route 30 & I-476/King of Prussia Road.
  - iii. Route 30 & I-476 Southbound Ramps.
  - iv. Route 30 & Radnor-Chester Road.
  - v. Route 30 & Radnor Financial Center Eastern Driveway
  - vi. Route 30 & Radnor Financial Center Western Driveway
  - vii. King of Prussia Road & Radnor-Chester Road.
  - viii. King of Prussia Road & Matsonford Road.
  - ix. Matsonford Road & South Centennial Drive.
  - x. Matsonford Road & North Centennial Drive.
  - xi. King of Prussia Road & Raider Road.
  - xii. King of Prussia Road & Northern Driveway (if signalized).
  - xiii. Radnor Chester and Raider Road
  - xiv. Radnor Chester and Radnor Financial Center
- G. Construct a trail extension from the Southern Driveway through the existing PennDOT Right-of-Way, southeast of the site with connections to the existing Route 30 sidewalks. The location, width and composition of the path materials shall be approved by the Radnor Township Engineer.



One South Church Street  
Second Floor  
West Chester, PA 19382  
T: 610-429-8907  
F: 610-429-8918

www.pennoni.com

January 17, 2018

UPHS1504

Radnor Township  
Attn: Mr. Robert Zienkowski  
301 Iven Ave.  
Wayne, PA19087

**RE: PRELIMINARY LAND DEVELOPMENT APPLICATION  
PENN MEDICINE AT RADNOR  
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA**

Dear Mr. Zienkowski:

We are in receipt of the Township's consultants review letters, including Gilmore & Associates, Inc letter dated November 29, 2017 and Gannett Fleming's letter dated November 28, 2017. Below is a summary of the Township's consultants comments in *italics* with our responses in **bold**. Please note that we will submit revised plans based on these comments as part of the Final Land Development process.

**Comments from Gannett Fleming Letter dated November 28, 2017:**

*Sewage Facilities Planning*

1. *Final plan approval will not be granted until Planning Approval is received from the PA DEP.*

**Pennoni Response:** We have submitted documentation for an exemption of Sanitary Sewer Planning to Radnor Township for review. We will provide PA DEP approval once received.

*Zoning*

1. *§280-63.D(5) – A parking structure, when constructed as an accessory structure for the purposed of eliminating allowable surface parking is allowed. The applicant must indicate on the plans where any surface parking that is being eliminated would have been located.*

**Pennoni Response:** Included with this submission is an exhibit which demonstrate the surface parking to be eliminated and relocated to the parking garage. Please refer to sheet EX-24.

2. *§280-64.D(2) – The distance at the closet point between any two buildings or group of attached buildings, including accessory structures, shall not be less than 45 feet. A dimension must be added to the plan between the corner of the hotel and the corner of the office building. Plan measurements appears to indicate a separation distance of less than 45 feet.*

**Pennoni Response:** A dimension has been added to the site plan to show the required 45-ft separation between buildings. Please refer to sheet CS1001.

3. *§280-64.G – The Zoning Table must be revised to clearly indicated the zoning compliance requirements for each building and structure. The square footage of the buildings provided on the plan, do not*

*match the square footage of the buildings located on a table subsequently provided by the applicant. This must be revised to be consistent.*

**Pennoni Response:** A table summarizing the building areas has been added to sheet CS1001. In addition, the building areas on plan view have been updated accordingly.

4. *§280-64.G.(4) – A parking garage or parking structure may have a height of up to 55 feet so long as such parking garage or parking structure does not exceed the height of any building on the site. The mixed use medical building is proposed to be 54.5' and the parking garage next to the hotel is 54.83'. This must be revised or a variance requested.*

**Pennoni Response:** The parking garage height has been revised to 54.2'. Please refer to sheet CS1001.

5. *§280-64.G.(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. Additional information must be provided to indicate that the proposed buildings are in compliance with this section.*

**Pennoni Response:** We will coordinate with the Township consultants and comply as provide additional detail as part of the Final Land Development process.

6. *§280-64.G.(10) – All Mixed Use developments shall submit a Transportation Impact and Mitigation Report to the Township as part of the land development application. We note that a Traffic Impact Study was submitted.*

**Pennoni Response:** The Traffic Impact Study has been revised based on comments from Gilmore & Associates, Inc. outlined later in this letter.

7. *§280-70.C. – Service, utility, maintenance and storage areas, including solid waste containers, loading and unloading areas and heating, ventilating and air condition equipment, shall be screened from view from public streets and abutting properties. This may be accomplished by means of enclosing walls, stone, brick or wood fences or a buffer planting strip. Visual screening so provided shall be of sufficient density so as not to be seen through and of sufficient height to constitute an effective screen. Appropriate visual screenings must be provided.*

**Pennoni Response:** We will coordinate with the Township consultants and comply as provide additional detail as part of the Final Land Development process.

8. *§280-103.B(4) – The parking calculations provided must be revised to include the specific use of hotel.*

**Pennoni Response:** The parking table on sheet CS1001 has been updated to include the specific use of hotel.

9. *§280-112.C. – Areas of steep slopes containing slopes steeper than 14% shall be outlined as following (1) Areas containing slopes steeper than 14% but less than 20% shall be distinguished from the areas containing slopes of 20% or steeper. (2) Areas containing slopes of 20% and steeper shall be separately identified. The applicant has shown the location of these areas on the plans and has indicated that these slopes are manmade and excluded from this section.*

**Pennoni Response: No comment necessary.**

Subdivision and Land Development

1. §255.20.B(1)(n) – Existing principal buildings and their respective uses, and driveways on the adjacent peripheral strip; sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site (this includes properties across streets). This must be provided or a waiver requested.

**Pennoni Response: A waiver request has been added to sheet CS1001. In addition, an overall existing conditions plan with an aerial photograph has been added to the plan set as sheet CS0200.**

2. §255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.

**Pennoni Response: A waiver request has been added to sheet CS1001.**

3. §255-27.C.(1) – King of Prussia Road is designated as a major collector and has a required Right-of-Way of 80 feet, and cartway of 48 feet. The ultimate right of way shown on the plans is 65 feet.

**Pennoni Response: The ultimate right-of-way shown on the plans equates to half of the required 80-ft width or 40-ft. Please refer to sheet CS1001.**

4. §255-27.C.(2) – Additional right-of-way and/or cartway widths may be required by the Board of Commissioners in order to lessen traffic congestion, to secure safety from fire, panic and other dangers, to facilitate the adequate provision for transportation and other public requirements and to promote the general welfare.

**Pennoni Response: Roadway improvements have been provided within the ultimate right-of-way based on discussions with Township Staff. Roadway improvements are discussed later in this letter.**

5. §255-29.A.(12)(b) – The width of entrance and exit drives shall be 25 feet for two way use. The two-way drive on the Northerly side of the property is 20 feet wide. This must be revised or a waiver requested.

**Pennoni Response: The plans have been revised to include 5-ft of widening for the Northerly driveway to the SEPTA station in order to provide the 25-ft cartway width. Please refer to sheet CS1001.**

6. §255-29.A.(14) – No less than a five-foot radius of curvature shall be permitted for all curblines in the parking areas. The radii of all curb lines must be clearly identified on the plans.

**Pennoni Response: The plans have been revised to label curb radii as needed. A note has also been added to General Note #16 on sheet CS0002 to state that the minimum curb radii shall be 5-ft unless otherwise noted.**

7. §255-29.B.(1) – All parking areas shall have at least one tree 2 ½ inches minimum in caliper for every five parking spaces in single bays and one tree 2 ½ inches minimum in caliper for every 10 parking spaces in double bays. This must be clearly shown on the plans.

**Pennoni Response:** The Landscape plans have been revised as required.

8. §255-37.E. – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners.

**Pennoni Response:** Lighting is provided along sidewalks and pedestrian paths. We will discuss this item further with the Board of Commissioners. Please refer to sheet CS2201.

9. §255-38.A. – Within any land development or major subdivision, street trees shall be planted along all streets where suitable street trees do not exist.

**Pennoni Response:** The Landscape plans have been revised as required.

10. §255-38.B. – Street trees 2 ½ inches dbh at intervals of not more than 30 feet along both sides of new streets and along one or both sides of an existing street within the proposed subdivision and land development. An equivalent number may be planted in an informal arrangement subject to the approval of the Board of Commissioners.

**Pennoni Response:** The Landscape plans have been revised as required.

11. §255-41.H. – Outdoor collection stations shall be provided for garbage and trash removal when indoor collection is not provided. Collection stations shall be screened from view and landscaped. We note there is one collection station shown on the plans. The applicant must explain how garbage and trash removal will be provided for the hotel and office building.

**Pennoni Response:** Additional detail has been added to the loading areas for the hotel and office building to demonstrate the location of dumpsters. Please refer to sheet CS1001.

12. §255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be \$3,307 per 4,000 square feet of building area. The applicant must conform to this section.

**Pennoni Response:** The required fee will be paid upon Final Land Development Approval.

13. §255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided.

**Pennoni Response:** Water lines and fire hydrants have been depicted on the Utility Plan. We will work with the Township Engineer and Fire Marshall as needed.

1. *The applicant has indicated that sanitary sewer service is being provided to the hotel, office building and one of the parking garages. The applicant must provide sewer service to the mixed medical facility. An explanation must be provided as to why sanitary sewer service to the parking garage is provided.*

**Pennoni Response: Sanitary sewer connections will be coordinated on future plans.**

2. *A profile of the proposed sanitary sewer must be provided. The sizes of all proposed sanitary sewer must be shown on the profile. All utilities crossing the sanitary sewer must be shown on the profile to ensure adequate clearance.*

**Pennoni Response: Profiles will be provided on Final Land Development Plans.**

3. *The plans indicate that the contractor will connection to the existing sewer. It is unclear from the plans if the contractor is going to connect to a portion of the existing service lateral. If that is the case, the condition of the existing lateral must be evaluated to determine if this is acceptable.*

**Pennoni Response: The plans have been revised to show a new connection to the existing sanitary sewer manhole located within King of Prussia Road.**

4. *Sanitary sewer note #5 on sheet 2 of 26 must be revised to indicate that the typical cover of a sanitary sewer main must be 5 feet.*

**Pennoni Response: Sanitary sewer note #4 has been revised to specify 5-ft of cover.**

#### *Storm Sewer*

1. *Please provide pre-development hydrographs for POI #2 for the 1-yr through 50-yr storm events.*

**Pennoni Response: The hydrographs for POI #2 have been added to the revised PCSM Report.**

2. *§245-23(D)(2) – Water quality volume requirement can be accomplished by the permanent volume of a wet basin or the detained volume from other BMPs. Where appropriate, wet basins shall be utilized for water quality control and shall follow the guidelines of the BMP manuals referenced in Appendix G. The applicant is proposing soil amendment credit for the water quality volume required at POI #1, which does not meet Ordinance requirements. Please revise to meet the Ordinance requirement.*

**Pennoni Response: The water quality calculations have been revised to remove the soil amendment credit.**

3. *§245-27(J) - Underground stormwater management systems must be designed to store the two-through one-hundred-year storms within a pipe or other open system that will permit the inspection and maintenance of the system. The entire storm must be placed in the pipe (i.e., the stone bedding around the pipe is not to be included in the volume calculations). We note that in Section 4.3 of the stormwater management report the applicant states that the basin volume will include the storage in the rock voids. This must be revised to meet the Ordinance requirements or a waiver must be requested.*

**Pennoni Response: The stormwater calculations have been revised to exclude the stone voids for subsurface basins as required.**

4. *Table 10 on page 15 of the stormwater management report lists a tree credit for POI #1 water quality volume. Worksheet #5 for POI #1 in Appendix C and the Runoff Calculation in Appendix D list a soil amendment credit. Please revise this inconsistency.*

**Pennoni Response:** The calculations have been revised to remove the tree credit and soil amendment credits.

5. *Please provide permeability/infiltration rates for the permeable pavers and permeable pavement.*

**Pennoni Response:** Infiltration testing will be provided during future submissions.

6. *Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans.*

**Pennoni Response:** Infiltration testing will be provided during future submissions.

7. *Please clarify what the stippled pattern shown in Proposed Surface Stormwater Basin 1 and Proposed Bio Retention Basin 2 on Sheet CS9001 represents.*

**Pennoni Response:** The hatch pattern depicts the area of the amended soil for the bio-retention basins. The hatch pattern has been labeled on the revised plans.

8. *A profile of the proposed storm sewer must be provided. The sizes of all proposed storm sewer must be shown on the profile. All utilities crossing the storm sewer must be shown on the profile to ensure adequate clearance.*

**Pennoni Response:** Storm sewer profiles will be provided on Final Land Development Plans.

9. *Stormwater calculations demonstrating that the requirements of the stormwater ordinance must be submitted as part of the Final Plan submission. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time.*

**Pennoni Response:** All required stormwater calculations will be submitted with Final Land Development Plans.

#### General

1. *New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots.*

**Pennoni Response:** New deeds will be prepared and recorded as part of the Final Land Development Plan process.

2. *The Radnor Township tree protection detail must be shown on the plans.*

**Pennoni Response:** The tree protection detail has been added to sheet CS8502.

3. *Lighting details must be provided on the plans.*

**Pennoni Response:** Lighting details have been added to sheet CS6001.

4. *The height of all retaining walls must be indicated on the plans.*

**Pennoni Response:** Top and bottom of wall elevations have been added to the Grading Plan, sheet CS1501.

5. *Detailed parking structure plans must be provided for review.*

**Pennoni Response:** Parking structure plans will be provided with the Final Land Development submission.

**Comments from Gilmore & Associates, Inc. Letter dated November 29, 2017:**

Land Development Plan Review

A. *Subdivision and Land Development Ordinance (SALDO) comments:*

1. *§255-20.B(1)(n) – Existing principal buildings, and their respective uses, and driveways on the adjacent peripheral strip, sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site shall be shown on the plans.*

**Pennoni Response:** A waiver request has been added to sheet CS1001.

2. *§255-20.B(5)(d)[2][a] and §255-20.B(5)(d)[6][b] Coordinate with SEPTA and revise the plans to provide an ADA accessible connection from the proposed on-site sidewalk to the existing SEPTA facilities.*

**Pennoni Response:** We will coordinate with SEPTA in regard to sidewalk connections from the proposed site to the existing SEPTA station at the northwest corner of the site.

3. *§255-21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be so drawn as to be legible if the plan should be reduced to half size. The Applicant has requested a waiver from this requirement; we have no engineering objection to this request.*

**Pennoni Response:** A waiver request has been added to sheet CS1001.

4. *§255-27.B(3)(c) and §255-27.C(1) - King of Prussia Road is identified as a Major Collector and requires an 80' right-of-way (40' half-width) and a minimum 48' cartway width (24' half-width). The applicant proposes to provide a half-width right-of-way of 40' from the centerline of the roadway. The existing cartway width (36') is less than the minimum required cartway width (48' full width; 24' half-width) and the Applicant is required to widen the cartway for the full length of the site frontage along King of Prussia Road. Revise the plans to continue the two northbound lanes along the entire site frontage on King of Prussia Road beginning at the South Driveway and extending through and including the SEPTA/Northern site driveway.*

**Pennoni Response:** The plans have been revised to include widening of King of Prussia Road from the Raider Road/Main Site Driveway intersection to the southern driveway entrance to the site. The proposed ultimate right-of-way is equal to the half width of 40-ft. Please refer to sheet CS1001.



5. *§255-27.C(1) – Sidewalk shall be provided along the entire site frontage. The onsite trail doesn't provide an adequate walkway for pedestrians walking along the site frontage. If the Applicant considers and the Township agrees the sidewalks located along the west side of King of Prussia Road (along the Radnor Township School District frontage) as adequate; additional improvements should be provided as follows:*
- Pedestrian crosswalks meeting the current Public Right-of-Way Accessibility Guidelines for Americans with Disabilities Act Accessibility Guidelines (PROWAG/ADAAG) requirements as indicated in PennDOT Publication 13M DM-2 Design Manual 2: Highway Design, Chapter 6; and PennDOT Publication 70M Roadway Construction Standards (RC-67) must be constructed on all approaches to the proposed traffic signal at Raider Road and at the north and south access driveways to provide adequate crossing locations.*
  - Widen the sidewalks along the west side of King of Prussia Road (Radnor Township School District frontage) to five feet (5') as required by PROWAG/ADAAG or provide 5 foot by 5 foot passing areas at a 200 foot minimum interval along the length of the roadway.*

**Pennoni Response:** The plans have been revised based on discussions with the Township Staff to show a 5-ft sidewalk with 5-ft grass strip from the northern driveway/SEPTA entrance to main driveway/Raider Road intersection. From the main driveway/Raider Road intersection the sidewalk is proposed to meander through the site to a point on the southern driveway near the trail entrance under I-476. Please refer to sheet CS1001.

6. *§255-29.A(12)(b) – The width of entrance and exit drives shall be 25 feet for two- way use. The width of the existing SEPTA/Northern site driveway is 20 feet and must be widened to comply with this section of the ordinance or a waiver must be requested.*

**Pennoni Response:** As shown on the revised sheet CS1001, the northern driveway/SEPTA driveway is proposed to be widened by 5-ft.

7. *§255-29.A(14) – No less than a five-foot radius of curvature shall be permitted for all curblines in parking areas. Revise the plans to label all curb radii and provide a minimum 5' curb radii along the south end of the drop-off area behind the proposed 4- story office building.*

**Pennoni Response:** The plans have been revised to label curb radii as needed. A note has also been added to General Note #16 on sheet CS0002 to state that the minimum curb radii shall be 5-ft unless otherwise noted.

8. *§255-30 – Revise the plans to delineate the proposed loading stall(s) adjacent to the proposed hotel and office building.*

**Pennoni Response:** The plans have been revised to depict the loading stalls adjacent to the proposed hotel and office building. Please refer to sheet CS1001.

9. *§255-30.A – Identify the area adjacent to the parking garage that is east of the loading area wall and is approximately 10'x 60'. If this area is intended for loading, it must meet the requirements for this section.*

**Pennoni Response:** The plans have been revised to depict the loading stalls adjacent to the proposed hotel and office building. Please refer to sheet CS1001.

10. *§255-37.A – Sidewalks and pedestrian paths shall minimize pedestrian-vehicle conflicts. As a pedestrian safety precaution, include a grass verge between the curbline and the proposed sidewalk*

*along the King of Prussia Road site frontage to match the existing sidewalk opposite the site.*

**Pennoni Response:** The plans have been revised based on discussions with the Township Staff to show a 5-ft sidewalk with 5-ft grass strip from the northern driveway/SEPTA entrance to main driveway/Raider Road intersection. From the main driveway/Raider Road intersection the sidewalk is proposed to meander through the site to a point on the southern driveway near the trail entrance under I-476. Please refer to sheet CS1001.

11. *§255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. Revise the lighting plan to provide pedestrian lighting along all proposed sidewalks including along King of Prussia Road. Coordinate with the Township Engineer and Township Planner regarding lighting levels.*

**Pennoni Response:** Lighting is provided along sidewalks and pedestrian paths. We will discuss this item further with the Board of Commissioners. Please refer to sheet CS2201.

12. *§255-37.H – Steps or a combination of steps and ramps shall be utilized to maintain maximum grades, where necessary. Where sidewalk grades exceed 5%, a nonslip surface texture shall be used. We recommend the Applicant provide a sidewalk connection along the north side of the central access driveway opposite to the intersection of Raider Road. We understand the ADA accessible access is provided on the south side of the driveway.*

**Pennoni Response:** An ADA accessible route has been added south of the main entrance drive from King of Prussia Road to the site. In addition, a sidewalk with stairs has been added on the north side of the main entrance drive from King of Prussia Road to the site. Please refer to sheets CS1001 and CS1501.

13. *§255-40.F – Revise the plans to indicate the location of refuse collection stations for the proposed hotel and 4-story office building.*

**Pennoni Response:** Dumpster locations have been added for the proposed hotel and 4-story office building. Please refer to sheet CS1001.

#### B. General Comments

1. *We recommend the Applicant coordinate with the Township staff regarding the width and location of the proposed trail and consider providing a trail or sidewalk connection adjacent to the Southern Site Driveway from the trail to King of Prussia Road.*

**Pennoni Response:** The plans have been revised based on discussions with the Township Staff to show a 5-ft sidewalk with 5-ft grass strip from the northern driveway/SEPTA entrance to main driveway/Raider Road intersection. From the main driveway/Raider Road intersection the sidewalk is proposed to meander through the site to a point on the southern driveway near the trail entrance under I-476. Please refer to sheet CS1001. This walkway is proposed as porous asphalt and a detail is located on sheet CS9503.

2. *Provide a separate pavement marking and signage plan including all right-of-way lines, lane lengths, widths, bay taper lengths, lane line colors, lane line widths, etc.*

**Pennoni Response:** Detailed roadway improvement plans will be provided with the Final Land Development Plan submission.

3. *Provide a 24" stop bar and an R1-1 stop sign at the northern and Southern Site Driveway egresses.*

**Pennoni Response:** A stop bar and stop sign has been added to the northern and southern driveway

egresses. Please refer to sheet CS1001.

4. *Install R7-302 No Parking SYMBOL/ARROW signs along the Northern/SEPTA driveway. It appears this is currently being used as overflow parking and the illegal parking creates a de facto and unacceptable single travel lane.*

**Pennoni Response:** No parking signs have been added along the Northern/SEPTA driveway. Please refer to sheet CS1001.

5. *Revise the plans to provide a minimum 6' crosswalk as required in PennDOT Publication 111, TC-8600.*

**Pennoni Response:** The plans and details have been revised to show a 6-ft crosswalk. Please refer to sheets CS1001 and CS6000.

6. *Per PennDOT Publication 111, TC-8600, we recommend the Applicant provide a 4" DY centerline along the central access and Raider Road driveways extending for a minimum of 150 feet beyond the intersection of King of Prussia Road.*

**Pennoni Response:** The plans have been revised to show a 4" double yellow line along the main driveway to the site. Please refer to sheet CS1001.

7. *Revise the plans to include stop bars on driveway and roadway approaches to King of Prussia Road and Raider Road/Site Driveway associated with the traffic signal.*

**Pennoni Response:** The plans have been revised to show 24" stop bars on driveway and roadway approaches to King of Prussia Road and Raider Road/Site Driveway associated with the traffic signal.

8. *Replace any references to R7-7A with the PennDOT approved R7-302 NO PARKING SYMBOL/ARROW sign. Refer to PennDOT Publication 236 for further details.*

**Pennoni Response:** The plans have been revised accordingly.

9. *Replace any references to R5-3-6 with the PennDOT approved R5-101, EMERGENCY AND AUTHORIZED VEHICLES ONLY. Refer to PennDOT Publication 236 for further details.*

**Pennoni Response:** The plans have been revised accordingly.

10. *Sheet 2 includes symbols to assist in identifying proposed signs; however, the symbol callouts were not utilized in the plan set. Include all proposed signs on the various sheets and also include on the requested pavement marking and signage plan.*

**Pennoni Response:** The plans have been revised accordingly.

11. *We recommend the Applicant include one ingress and two egress lanes at the site access driveway opposite Raider Road on King of Prussia Road.*

**Pennoni Response:** The plans have been revised to provide a second egress lane from the site to King of Prussia Road at the main entrance. Please refer to sheet CS1001.

12. *We recommend eliminating the dedicated right-turn and left-turn lanes into the Southern Site Driveway. Due to the fact that this will be a loading area only, the auxiliary lanes may not be necessary.*

**Pennoni Response:** The dedicated right turn lane has been eliminated in favor of continuing the 2<sup>nd</sup> northbound through lane to Raider Road. A right turn will be permitted from this lane as on any other through lane. The dedicated left turn lane is formed from an area that would otherwise be a

median gore and provides storage for left turning delivery trucks into the site, thus providing a clear lane for through traffic on King of Prussia Road, and we recommend keeping it.

13. *Provide curb radii (at minimum) necessary for the anticipated delivery traffic at the Southern Site Driveway. A 45 foot curb radii is recommended for truck access.*

**Pennoni Response:** The plans have been revised to show a 45-ft radii at the southern driveway to accommodate for large vehicle movements.

14. *The fire truck turning templates should be submitted to the Fire Marshall for review.*

**Pennoni Response:** We will coordinate with the Fire Marshall as required.

15. *We note the Applicant is only demonstrating the use of a WB-40 truck at the SEPTA/Northern site driveway. Verify that a WB-40 truck will be the largest truck anticipated for Hotel deliveries. Consider increasing the radii to accommodate larger vehicles. If the Northern driveway will only be accommodating WB-40 trucks, the appropriate truck restriction signage will be required.*

**Pennoni Response:** Currently this loading dock is planned for a WB-40, we will coordinate and provide necessary signage as part of Final Land Development.

16. *Sheet 25 of 26 (CS9801):*

- a. *The northbound WB-67 movement at the Southern Site Driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane. Increase the corner radii and/or widen the driveway as necessary to accommodate WB-67 trucks.*
- b. *At the Southern Site Driveway, show the WB-67 exiting movement onto King of Prussia Road.*
- c. *Revise the WB-67 movements to eliminate any contact with the adjacent dumpster bay walls and curblines.*
- d. *Revise the WB-67 movement to show the truck not conflicting with the compactor.*
- e. *The WB-67 movement shows the truck reversing into the generator area. Bollards are recommended around the generator area.*
- f. *Show the WB-40 exiting movement onto King of Prussia Road beginning from the loading area at the SEPTA/Northern driveway.*

**Pennoni Response:** The truck turning plan has been revised accordingly. Bollards have been added to the area near the generator.

17. *Sheet 26 of 26 (CS9802):*

- a. *The eastbound fire truck movement at the Raider Road site driveway should be revised to eliminate any contact with the adjacent curb and curb ramp along the patient drop-off area.*
- b. *The northbound fire truck movement at the Raider Road site driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane.*
- c. *The northbound fire truck movement at the Southern Site Driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane.*
- d. *Revise the fire truck movement along the Southern Site Driveway so that the truck remains completely on the roadway during the movement.*

**Pennoni Response: The truck turning plan has been revised accordingly.**

18. *The Applicant will be responsible for providing the following documents prior to Final Land Development approval:*

a. *Construction details related to ADA curb ramps, including spot elevations, dimensions and slopes.*

**Pennoni Response: Will Comply and provide construction details for the ADA curb ramps with Final Land Development plans.**

b. *Traffic Signal Construction Plans, Traffic Signal Permit Plans, Traffic Signal System Plans, and a Traffic Signal design report must be provided to the Township and PennDOT for review and approval.*

**Pennoni Response: Will Comply and provide Traffic Signal Construction Plans, Traffic Signal Permit Plans, Traffic Signal System Plans, and a Traffic Signal design report with Final Land Development Plans.**

c. *All new or modified signal permit plans require a completed TE-160 form and associated resolution.*

**Pennoni Response: Will Comply and provide completed TE-160 form for each new or modified signal permit plan with Final Land Development Plans.**

d. *The Applicant will need to coordinate with Radnor Township School District to eliminate parking along the south side of Raider Road near King of Prussia Road. The on-street parking along the south side of Raider Road effectively narrows the 30' cartway width to a 22 foot width which is inadequate to store busses and automobiles. We recommend evaluating the length of parking to be eliminated based on the results of the impending queue analysis noted under the Transportation Impact Assessment section below.*

**Pennoni Response: The Applicant will coordinate with the School District regarding the elimination of existing on-street parking on Raider Road with Final Land Development Plans.**

Transportation Impact Assessment (TIS) Review

A. *Subdivision and Land Development Ordinance (SALDO) comments:*

1. *§255-20.B(5)(d)[2][a] - We recommend the applicant discuss with SEPTA the installation of a bus shelter along King of Prussia Road near the corner of the Raider Road site driveway to encourage and promote transit riders. In addition, we recommend installing a bus turn out lane to minimize traffic flow disruptions along King of Prussia Road.*

**Pennoni Response: Will comply. A bus shelter will be installed on King of Prussia Road southeast of the SEPTA Access/Northern Site Access, to the extent that it is approved by SEPTA.**

2. *§255-20.B(5)(d)[3] Existing traffic conditions.*

a. *Traffic counts were conducted on November 18, 2015 and November 24, 2015 at some of the studied intersections. These dates were noted as early dismissal days on the Radnor School District calendar. The Applicant should provide a comparison with historical counts at these intersection indicating similar volumes or recount the intersections during a typical full day of school.*

**Pennoni Response: Dismissal on an average school day in Radnor Township occurs between 2:30 and 3:30 PM (depending on the school). The PM traffic counts were collected from 4-6 PM with the system peak hour occurring from 5-6 PM. Typical dismissal occurs outside of the PM**

peak period evaluated, therefore an early dismissal will not affect the traffic volumes collected. Also, the early dismissal on November 18<sup>th</sup> was for grades K-8, which did not affect Radnor High School, which is located on Raider Road.

b. *Crash Data Analysis*

- i. *The crash data provided in the body of the report and in Appendix E should be removed from the TIA and provided under separate cover.*

**Pennoni Response: The crash data has been removed from the TIA and submitted under a separate cover.**

- ii. *PennDOT Strike-Off-Letter (SOL) 470-09-4 Transportation Impact Study Guidelines indicates 5 years of crash data should be reviewed; the submission only provided 3 years of historical data. In addition, the crash report should include non-reportable crashes obtained from Radnor Township Police Department. The crash analysis should be revised to provide a more detailed crash data analysis as follows:*

- a) *Quantify the number of correctible reportable and non-reportable crash incidents in a rolling 12 month analysis period.*
- b) *To identify potential mitigation measures for reportable and non-reportable crashes incidents exceeding five during the rolling 12 month period.*

**Pennoni Response: Will comply. 5 years of crash data has been provided along with a more detailed crash data analysis including the number of correctible reportable and non-reportable crash incidents in a rolling 12 month analysis period and potential mitigation measures for reportable and non-reportable crashes incidents exceeding five.**

3. *§255-20.B(5)(d)[4] The TIA shall be updated to remove the 7% Transit Ridership reduction for the Trip Generation based on the following:*

- a. *As discussed in the ITE Trip Generation Handbook, 3rd Edition, Section 8.4.2, the national database of person trips by mode for the Transit Friendly Development (TFD) is limited. Therefore, the preferred method for estimating a transit mode share for external trips at a TFD would be through development of surveys at proxy sites. The TIA would need to be modified to identify any transit studies previously done for the existing site or any similar nearby sites (i.e., employee transit usage survey, origin/destination study, boarding/alighting at Paoli/Thorndale station, etc.).*
- b. *In accordance with the information provided in Appendix B of the ITE publication Trip Generation Manual, 9th Edition Guide and Handbook, this project's Floor Area Ratio (FAR) of 0.40 does not meet the required development intensity to utilize the minimum transit reductions identified in Tables B.2 & B.3.*
- c. *Per PennDOT Strike-off-Letter 470-09-4 Transportation Impact Study Guidelines, the Paoli/69th Street SEPTA bus route does not meet the minimum requirement of 3-4 buses per hour and 14-16 daily operation hours to justify a bus related trip reduction.*
- d. *More importantly, the agreed upon trip generation methodology for the proposed mixed medical use is based on data collected at local existing sites which inherently accounts for any transit reduction in the data collection process. If there is a 7% transit reduction, the reduction was already accounted for in the lack of a vehicle entering and exiting the local site driveways that were used to develop the trip generation rates for the Mixed Medical Use.*

**Pennoni Response: Will comply.**

4. *§255-20.B(5)(d)[5] Provide a traffic signal warrant analysis for the intersection of the SEPTA/Northern site driveway and King of Prussia Road.*

**Pennoni Response: Will comply.** The signal warrant analysis for the SEPTA/Northern site driveway and King of Prussia Road intersection has been provided.

5. *§255-20.B(5)(d)[6] All streets or intersections showing Level of Service below C shall be considered deficient and specific recommendations for elimination of these problems shall be listed. The analysis indicates the corridor along the site frontage of King of Prussia Road is congested with multiple LOS deficiencies. The roadway should be widened to accommodate additional through lanes where possible along King of Prussia Road. The Applicant should evaluate the feasibility of constructing a 4-lane or 5-lane roadway section along King of Prussia Road.*

**Pennoni Response:** The applicant is requesting a waiver of this requirement. According to PennDOT's "Policies and Procedures for Transportation Impact Studies" from July 2017, the overall intersection Level of Service (LOS) for existing signalized intersections in the horizon year build condition should be no worse than the intersection LOS in the horizon year in the no-build condition. If evaluation of the horizon year build condition indicates that the overall intersection LOS has dropped, the applicant will be required to mitigate the LOS if the increase in overall intersection delay is greater than 10-seconds. If the overall intersection delay increase is less than or equal to 10-seconds mitigation of the intersection will not be required. For locations where the level of service of the design horizon year no-build condition is LOS F and with development, the delay increases more than 10 seconds, the remedies shall provide an estimated delay which will be no worse than the delay for the design year without the development. The improvements recommended in the TIS result in all of the study intersection maintaining the no-build level of service or meeting the PennDOT mitigation delay requirements.

6. *§255-20.B(5)(d)[6][b] A listing of all actions to be undertaken to increase present public transportation usage and improve service, if applicable, shall be included.*

**Pennoni Response: Will comply.**

**B. General TIA Comments**

1. *The Applicant indicates a credit was applied for site trips from a previously approved plan for a 427,110 SF General Office Building (Land Use Code 710); this credit is inappropriate and should not be applied to the No-Build conditions for this study. The applicant indicates the existing facility was previously approved and could be occupied by a tenant without additional approvals; however, in our opinion, this has no bearing on the current land development application.*

**Pennoni Response:** The TIS includes the evaluation of the 2016 existing condition, future no-build conditions with the existing site fully occupied, and build conditions with the proposed development on the site. In PennDOT Pub 282, The Policies and Procedures for Transportation Impact Studies from July 2017 states that as a means of encouraging the redevelopment of existing site "the Department may consider permitting trips being generated by the existing development be applied to the proposed redeveloped site as a "trip credit".

2. *The report should be revised to include volume development spreadsheets for each studied intersection. We were unable to verify the No-Build and Build conditions based on the figures provided.*

**Pennoni Response: Will comply.** A volume development table has been provided within the appendices of the TIA.

3. *The capacity analyses should be revised to include the timings for all signalized intersections and 95 percentile queues. We were unable to verify the capacity analyses due to insufficient data.*

**Pennoni Response: Will comply.** The capacity analyses summary tables and text has been revised to include 95<sup>th</sup> percentile queues.

4. *The Applicant should provide a 95th percentile queue analysis to determine that adequate storage*

*lengths are available at the studied intersections.*

**Pennoni Response:** The capacity analyses summary tables and text have been revised to include 95<sup>th</sup> percentile queues.

5. *Please provide a Level of Service/Delay in tabular format for the No-Build and Build scenarios as required in PennDOT Strike-off-Letter 470-09-4. Provide No- Build and Build conditions scenarios in the same table for a comparison for each peak hour on each approach by lane movement.*

**Pennoni Response:** Will comply. The capacity analyses summary comparison tables have been provided that include No- Build and Build conditions scenarios in the same table for a comparison.

6. *The Applicant should provide turn lane warrant analyses for all three site driveways. Appendix H only provides an analysis for the Raider Road/Site Driveway along King of Prussia Road. In addition provide an analysis for the Raider Road (eastbound) leg at the intersection of King of Prussia Road/Raider Road.*

**Pennoni Response:** Will comply. Turn lane warrant analyses for all three site driveways have been included in Appendix H including an analysis for the Raider Road (eastbound) leg at the intersection of King of Prussia Road/Raider Road.

7. *Provide 2025 Build turn lane warrants to determine the maximum turn lane lengths required.*

**Pennoni Response:** 2025 Build turn lane warrants have been provided at study intersections.

8. *Per the Institute of Transportation Engineers (ITE) Trip Generation Manual, 3rd Edition, revise the report to include the rates/equations regarding ITE Land Use Code 710 (General Office Building) and Land Use Code 310 (Hotel). The submission only provides the rates and distribution percentages for the Mixed Medical Use Facility.*

**Pennoni Response:** Will comply. Table 6 has been revised to include the trip generation rates/equations for Land Uses 310(Hotel) and 710(General Office Building).

9. *Verify the speed along Matsonford Road and revise as needed.*

**Pennoni Response:** Will comply. The posted speed limit on Matsonford Road is 40 MPH. The TIA has been revised accordingly.

10. *Revise Figures 3 through 11 to identify the location of King of Prussia Road.*

**Pennoni Response:** Will comply. Figures 3 through 11 have been revised accordingly.

11. *The pedestrian and vehicle clearance interval calculations provided in Appendix L will need to be verified and updated based on the final traffic signal permit plan.*

**Pennoni Response:** The pedestrian and vehicle clearance calculations will be updated upon the development of a final traffic signal permit plan.

12. *The following comments pertain to discrepancies between the Manual Turning Movement counts and the Capacity Analyses provided in Appendices D, F, I & M:*

- a. *I-476/Southbound Off-Ramp & Lancaster Avenue; Revise the eastbound lane configuration to include a right-turn volume.*

**Pennoni Response:** The eastbound right turn from Lancaster Avenue to the I-476 SB ramp is a channelized right turn that does not reach the traffic signal and is not included in the intersection analysis.

- b. *I-476/Southbound Off-Ramp & Lancaster Avenue; Verify the westbound left volume during the 2020 No-Build PM conditions; it appears the volume should be revised from 584 to 571 vehicles.*

**Pennoni Response:** Will comply. The no-build volumes have been revised in accordance with



**comment #3.**

- c. *King of Prussia Road & Southern Site Driveway: Verify the northbound through 2020 PM Build volume; it appears the volume should be revised from 405 to 451 vehicles.*

**Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.**

*King of Prussia Road & Southern Site Driveway: Verify the southbound through 2025 PM Build volume; it appears the volume should be revised from 1382 to 1319 vehicles.*

**Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.**

*King of Prussia Road & Southern Site Driveway: Verify the northbound through 2025 PM Build volume; it appears the volume should be revised from 411 to 457 vehicles.*

**Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.**

- d. *King of Prussia Road & Southern Site Driveway: Verify the southbound through 2025 PM Build volume; it appears the volume should be revised from 1403 to 1338 vehicles.*

**Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.**

- e. *King of Prussia Road & Southern Site Driveway: Verify the northbound through 2020 AM Build volume; it appears the volume should be revised from 1544 to 1554 vehicles.*

**Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.**

13. *The following comments pertain to discrepancies between the Turning Movement counts and the existing 2016 weekday volumes included in Figure 3:*

- a. *Northern Driveway and King of Prussia Road: verify the southbound PM through volume; it appears the volume should be revised from 1038 to 1046.*

**Pennoni Response: Will comply. The 2016 PM southbound through volume has been revised to 1042 in Figure 3.**

- b. *Southern Site Driveway and King of Prussia Road: Verify the southbound PM through volume; it appears the volume should be revised from 1011 to 1077.*

**Pennoni Response: Will comply. The 2016 PM southbound through volume has been revised to 1042 in Figure 3.**

- c. *Southern Site Driveway and King of Prussia Road: Verify the northbound PM through volume; it appears the volume should be revised from 337 to 292.*

**Pennoni Response: Will comply. The 2016 PM northbound through volume has been revised to 292 in Figure 3.**

14. *There is an existing coordinated signal system along King of Prussia Road that includes Radnor-Chester Road and Matsonford Road. Any traffic signals proposed along the site frontage should be included in the overall coordinated system. The Applicant should also investigate coordinating the Matsonford Road/King of Prussia Road signal system with the Lancaster Avenue System.*

**Pennoni Response: Will comply.**

15. *We recommend the Transportation Impact Study be revised to address the above comments to the satisfaction of the Township. In order to expedite the review process for the resubmission of the above,*

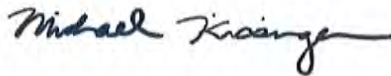
*the Applicant should submit a response letter which addresses each of the above comments including the original comment and identify any changes made unrelated to the review.*

**Pennoni Response: Will comply.**

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2457 or [mkissinger@pennoni.com](mailto:mkissinger@pennoni.com).

Sincerely,

**PENNONI ASSOCIATES INC.**



Michael Kissinger, PE  
Land Development Division Manager

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems  
David Falcone, Saul Ewing Arnstein & Lehr LLP



One South Church Street  
Second Floor  
West Chester, PA 19382  
T: 610-429-8907  
F: 610-429-8918  
www.pennoni.com

January 17, 2018

UPHS1504

Radnor Township  
Attn: Board of Supervisors  
301 Iven Ave.  
Wayne, PA19087

RE: **WAVER REQUEST LETTER  
PENN MEDICINE AT RADNOR  
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA**

Dear Supervisors:

On behalf of the Trustees of the University of Pennsylvania Health Systems, Pennoni Associates Inc. is respectfully requesting a waiver from the following section of the Township's Subdivision and Land Development Ordinances.

1. Section 255-21.A(6): A waiver is requested for the maximum plan sheet size if 24 inches by 34 inches. The plans will be reduced for recording purposes.
2. Section 255.20.B(1): A waiver is requested for the requirement that the plans include existing principal buildings and their respective uses, and driveways on the adjacent peripheral strip: sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site. We have provided an aerial photograph demonstrating the existing conditions within 500-ft of the site.
3. SECTION 255-20.B(5)(d)(6): A waiver is requested for the requirement that streets or intersections showing Level of Service below C shall be considered deficient and specific recommendations for elimination of these problems shall be listed.

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2457 or [mikissinger@pennoni.com](mailto:mikissinger@pennoni.com).

Sincerely,

PENNONI ASSOCIATES INC.

Michael Kissinger, PE  
Land Development Division Manager

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems  
David Falcone, Saul Ewing Arnstein & Lehr LLP



# Gannett Fleming

*Excellence Delivered **As Promised***

**Date:** January 12, 2018

**To:** Steve Norcini, PE Township Engineer

**From:** Roger Phillips, PE

**cc:** Kevin W. Kochanski, RLA, CZO – Director of Community Development  
Peter Nelson, Esq. – Grim, Biehn, and Thatcher  
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.  
Patricia Sherwin – Radnor Township Engineering Department  
Ray Daly – Radnor Township Codes Official

**RE:** 145 King of Prussia Road – Preliminary Land Development Plan  
Penn Medicine – Applicant

Date Accepted: October 2, 2017

90 Day Review: December 31, 2017, extended to January 31, 2018

---

Gannett Fleming, Inc. has completed a review of the Preliminary Land Development Plans. We have reviewed the plans based on the contents of ordinance No. 2016-13 amending Chapter 280 Zoning, Article XV, PLO Planned Laboratory District Sections 280-62, 280-63 and 280-64. These Plans were also reviewed for conformance with Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The applicant is proposing to demolish the three existing buildings on the site, and construct three new buildings and two parking structures for mixed uses including a mixed use medical facility, hotel and office.

The applicant has indicated that a waiver will be requested from the following requirement:

1. §255.21.A(6) – A waiver is requested for the maximum plan sheet size of 24 inches by 34 inches. The plans will be reduced for recording purposes.

## Penn Medicine at Radnor

Plans Prepared By: Pennoni Associates, Inc.

Dated: 09/29/2017

## Sewage Facilities Planning

1. Final plan approval will not be granted until Planning Approval is received from the PA DEP.



Zoning

1. §280-63.D(5) – A parking structure, when constructed as an accessory structure for the purpose of eliminating allowable surface parking is allowed. The applicant must indicate on the plans where any surface parking that is being eliminated would have been located.
2. §280-64.D(2) – The distance at the closest point between any two buildings or group of attached buildings, including accessory structures, shall not be less than 45 feet. A dimension must be added to the plan between the corner of the hotel and the corner of the office building. Plan measurements appear to indicate a separation distance of less than 45 feet.
3. §280-64.G – The Zoning Table must be revised to clearly indicate the zoning compliance requirements for each building and structure. The square footage of the buildings provided on the plan, do not match the square footage of the buildings located on a table subsequently provided by the applicant. This must be revised to be consistent.
4. §280-64.G(4) – A parking garage or parking structure may have a height of up to 55 feet so long as such parking garage or parking structure does not exceed the height of any building on the site. The mixed use medical building is proposed to be 54.5' and the parking garage next to the hotel is 54.83'. This must be revised or a variance requested.
5. §280-64.G(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. Additional information must be provided to indicate that the proposed buildings are in compliance with this section.
6. §280-64.G(10) – All Mixed Use developments shall submit a Transportation Impact and Mitigation Report to the Township as part of the land development application. We note that a Traffic Impact Study was submitted.
7. §280-70.C – Service, utility, maintenance and storage areas, including solid waste containers, loading and unloading areas and heating, ventilating and air condition equipment, shall be screened from view from public streets and abutting properties. This may be accomplished by means of enclosing walls, stone, brick or wood fences or a buffer planting strip. Visual screening so provided shall be of sufficient density so as not to be seen through and of sufficient height to constitute an effective screen. Appropriate visual screenings must be provided.



8. §280-103.B(4) – The parking calculations provided must be revised to include the specific use of hotel.
9. §280-112.C. – Areas of steep slopes containing slopes steeper than 14% shall be outlined as following (1) Areas containing slopes steeper than 14% but less than 20% shall be distinguished from the areas containing slopes of 20% or steeper. (2) Areas containing slopes of 20% and steeper shall be separately identified. The applicant has shown the location of these areas on the plans and has indicated that these slopes are manmade and excluded from this section.

Subdivision and Land Development

1. §255.20.B(1)(n) – Existing principal buildings and their respective uses, and driveways on the adjacent peripheral strip; sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site (this includes properties across streets). This must be provided or a waiver requested.
2. §255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.
3. §255-27.C(1) – King of Prussia Road is designated as a major collector and has a required Right-of-Way of 80 feet, and cartway of 48 feet. The ultimate right of way shown on the plans is 65 feet.
4. §255-27.C(2) – Additional right-of-way and/or cartway widths may be required by the Board of Commissioners in order to lessen traffic congestion, to secure safety from fire, panic and other dangers, to facilitate the adequate provision for transportation and other public requirements and to promote the general welfare.
5. §255-29.A(12)(b) – The width of entrance and exit drives shall be 25 feet for two way use. The two-way drive on the Northerly side of the property is 20 feet wide. This must be revised or a waiver requested.
6. §255-29.A(14) – No less that a five-foot radius of curvature shall be permitted for all curblines in the parking areas. The radii of all curb lines must be clearly identified on the plans.



7. §255-29.B(1) – All parking areas shall have at least one tree 2 ½ inches minimum in caliper for every five parking spaces in single bays and one tree 2 ½ inches minimum in caliper for every 10 parking spaces in double bays. This must be clearly shown on the plans.
8. §255-37.E. – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners.
9. §255-38.A. – Within any land development or major subdivision, street trees shall be planted along all streets where suitable street trees do not exist.
10. §255-38.B. – Street trees 2 ½ inches dbh at intervals of not more than 30 feet along both sides of new streets and along one or both sides of an existing street within the proposed subdivision and land development. An equivalent number may be planted in an informal arrangement subject to the approval of the Board of Commissioners.
11. §255-41.H. – Outdoor collection stations shall be provided for garbage and trash removal when indoor collection is not provided. Collection stations shall be screened from view and landscaped. We note there is one collection station shown on the plans. The applicant must explain how garbage and trash removal will be provided for the hotel and office building.
12. §255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be \$3,307 per 4,000 square feet of building area. The applicant must conform to this section.
13. §255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided.

#### Sanitary Sewer

1. The applicant has indicated that sanitary sewer service is being provided to the hotel, office building and one of the parking garages. The applicant must provide sewer service to the mixed medical facility. An explanation must be provided as to why sanitary sewer service to the parking garage is provided.



2. A profile of the proposed sanitary sewer must be provided. The sizes of all proposed sanitary sewer must be shown on the profile. All utilities crossing the sanitary sewer must be shown on the profile to ensure adequate clearance.
3. The plans indicate that the contractor will connection to the existing sewer. It is unclear from the plans if the contractor is going to connect to a portion of the existing service lateral. If that is the case, the condition of the existing lateral must be evaluated to determine if this is acceptable.
4. Sanitary sewer note #5 on sheet 2 of 26 must be revised to indicate that the typical cover of a sanitary sewer main must be 5 feet.

#### Storm Sewer

1. Please provide pre-development hydrographs for POI #2 for the 1-yr through 50-yr storm events.
2. §245-23(D)(2) – Water quality volume requirement can be accomplished by the permanent volume of a wet basin or the detained volume from other BMPs. Where appropriate, wet basins shall be utilized for water quality control and shall follow the guidelines of the BMP manuals referenced in Appendix G. The applicant is proposing soil amendment credit for the water quality volume required at POI #1, which does not meet Ordinance requirements. Please revise to meet the Ordinance requirement.
3. §245-27(J) - Underground stormwater management systems must be designed to store the two- through one-hundred-year storms within a pipe or other open system that will permit the inspection and maintenance of the system. The entire storm must be placed in the pipe (i.e., the stone bedding around the pipe is not to be included in the volume calculations). We note that in Section 4.3 of the stormwater management report the applicant states that the basin volume will include the storage in the rock voids. This must be revised to meet the Ordinance requirements or a waiver must be requested.
4. Table 10 on page 15 of the stormwater management report lists a tree credit for POI #1 water quality volume. Worksheet #5 for POI #1 in Appendix C and the Runoff Calculation in Appendix D list a soil amendment credit. Please revise this inconsistency.
5. Please provide permeability/infiltration rates for the permeable pavers and permeable pavement.
6. Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans.



7. Please clarify what the stippled pattern shown in Proposed Surface Stormwater Basin 1 and Proposed Bio Retention Basin 2 on Sheet CS9001 represents.
8. A profile of the proposed storm sewer must be provided. The sizes of all proposed storm sewer must be shown on the profile. All utilities crossing the storm sewer must be shown on the profile to ensure adequate clearance.
9. Stormwater calculations demonstrating that the requirements of the stormwater ordinance must be submitted as part of the Final Plan submission. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time.

**General**

1. New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots.
2. The Radnor Township tree protection detail must be shown on the plans.
3. Lighting details must be provided on the plans.
4. The height of all retaining walls must be indicated on the plans.
5. Detailed parking structure plans must be provided for review.

The applicant appeared before the Planning Commission on January 9, 2018. The Planning Commission recommended approval of the preliminary land development plans and waivers noting a level of service C is recommended in conjunction with other improvements as discussed with staff.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.



Roger A. Phillips, P.E.  
Senior Project Manager



**SAUL EWING**  
**ARNSTEIN**  
**& LEHR**<sup>LLP</sup>

David J. Falcone  
Phone: (610) 251-5752  
Fax: (610) 722-3270  
David.Falcone@saul.com  
www.saul.com

December 19, 2017

**VIA ELECTRONIC MAIL**

Roger Phillips, P.E.  
Gannett Fleming  
PA Box 80794  
Valley Forge, PA 19484

***Re: Trustees of the University of Pennsylvania  
145 King of Prussia Road***

Dear Roger:

As you are aware, applicant, the Trustees of the University of Pennsylvania (the "UPenn"), submitted a Preliminary Land Development Application to the Township on September 29, 2017 (the "Application"). The Application is pending before Radnor Township. Pursuant to the Pennsylvania Municipalities Code, the governing body shall render a decision and communicate it to the applicant not later than ninety (90) days following the date of the regular meeting next following the date that the application is filed. UPenn hereby extends until January 31, 2018, the deadline for Radnor Township to act on the above-referenced Application.

Thank you for your continued help with this project. Please feel free to call me if you have any questions, or if you would like to discuss this issue further.

Very truly yours,

  
David J. Falcone

cc: Amy Kaminski, P.E.  
Steve Norcini, P.E.  
John Rice, Esquire  
Mr. Robert Zienkowski  
Mr. Kevin Mahoney  
Mr. Patrick Dorris  
Michael Kissinger, P.E.  
Eric Swanson, AIA  
Ms. Patricia Desmond



# Gannett Fleming

Excellence Delivered *As Promised*

**Date:** November 28, 2017

**To:** Steve Norcini, PE Township Engineer

**From:** Roger Phillips, PE

**cc:** Kevin W. Kochanski, RLA, CZO – Director of Community Development  
Peter Nelson, Esq. – Grim, Biehn, and Thatcher  
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.  
Patricia Sherwin – Radnor Township Engineering Department  
Ray Daly – Radnor Township Codes Official

**RE:** 145 King of Prussia Road – Preliminary Land Development Plan  
Penn Medicine – Applicant

Date Accepted: October 2, 2017

90 Day Review: December 31, 2017

---

Gannett Fleming, Inc. has completed a review of the Preliminary Land Development Plans. We have reviewed the plans based on the contents of proposed ordinance No. 2016-13 amending Chapter 280 Zoning, Article XV, PLO Planned Laboratory District Sections 280-62, 280-63 and 280-64. These Plans were also reviewed for conformance with Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The applicant is proposing to demolish the three existing buildings on the site, and construct three new buildings and two parking structures for mixed uses including a mixed use medical facility, hotel and office.

The applicant has indicated that a waiver will be requested from the following requirement:

1. §255.21.A(6) – A waiver is requested for the maximum plan sheet size of 24 inches by 34 inches. The plans will be reduced for recording purposes.

## Penn Medicine at Radnor

Plans Prepared By: Pennoni Associates, Inc.

Dated: 09/29/2017

## Sewage Facilities Planning

1. Final plan approval will not be granted until Planning Approval is received from the PA DEP.



Zoning

1. §280-63.D(5) – A parking structure, when constructed as an accessory structure for the purposed of eliminating allowable surface parking is allowed. The applicant must indicate on the plans where any surface parking that is being eliminated would have been located.
2. §280-64.D(2) – The distance at the closet point between any two buildings or group of attached buildings, including accessory structures, shall not be less than 45 feet. A dimension must be added to the plan between the corner of the hotel and the corner of the office building. Plan measurements appears to indicate a separation distance of less than 45 feet.
3. §280-64.G – The Zoning Table must be revised to clearly indicated the zoning compliance requirements for each building and structure. The square footage of the buildings provided on the plan, do not match the square footage of the buildings located on a table subsequently provided by the applicant. This must be revised to be consistent.
4. §280-64.G.(4) – A parking garage or parking structure may have a height of up to 55 feet so long as such parking garage or parking structure does not exceed the height of any building on the site. The mixed use medical building is proposed to be 54.5’ and the parking garage next to the hotel is 54.83’. This must be revised or a variance requested.
5. §280-64.G.(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. Additional information must be provided to indicate that the proposed buildings are in compliance with this section.
6. §280-64.G.(10) – All Mixed Use developments shall submit a Transportation Impact and Mitigation Report to the Township as part of the land development application. We note that a Traffic Impact Study was submitted.
7. §280-70.C. – Service, utility, maintenance and storage areas, including solid waste containers, loading and unloading areas and heating, ventilating and air condition equipment, shall be screened from view from public streets and abutting properties. This may be accomplished by means of enclosing walls, stone, brick or wood fences or a buffer planting strip. Visual screening so provided shall be of sufficient density so as not to be seen through and of sufficient height to constitute an effective screen. Appropriate visual screenings must be provided.



8. §280-103.B(4) – The parking calculations provided must be revised to include the specific use of hotel.
9. §280-112.C. – Areas of steep slopes containing slopes steeper than 14% shall be outlined as following (1) Areas containing slopes steeper than 14% but less than 20% shall be distinguished from the areas containing slopes of 20% or steeper. (2) Areas containing slopes of 20% and steeper shall be separately identified. The applicant has shown the location of these areas on the plans and has indicated that these slopes are manmade and excluded from this section.

#### Subdivision and Land Development

1. §255.20.B(1)(n) – Existing principal buildings and their respective uses, and driveways on the adjacent peripheral strip; sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site (this includes properties across streets). This must be provided or a waiver requested.
2. §255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.
3. §255-27.C.(1) – King of Prussia Road is designated as a major collector and has a required Right-of-Way of 80 feet, and cartway of 48 feet. The ultimate right of way shown on the plans is 65 feet.
4. §255-27.C.(2) – Additional right-of-way and/or cartway widths may be required by the Board of Commissioners in order to lessen traffic congestion, to secure safety from fire, panic and other dangers, to facilitate the adequate provision for transportation and other public requirements and to promote the general welfare.
5. §255-29.A.(12)(b) – The width of entrance and exit drives shall be 25 feet for two way use. The two-way drive on the Northerly side of the property is 20 feet wide. This must be revised or a waiver requested.
6. §255-29.A.(14) – No less that a five-foot radius of curvature shall be permitted for all curblines in the parking areas. The radii of all curb lines must be clearly identified on the plans.



7. §255-29.B.(1) – All parking areas shall have at least one tree 2 ½ inches minimum in caliper for every five parking spaces in single bays and one tree 2 ½ inches minimum in caliper for every 10 parking spaces in double bays. This must be clearly shown on the plans.
8. §255-37.E. – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners.
9. §255-38.A. – Within any land development or major subdivision, street trees shall be planted along all streets where suitable street trees do not exist.
10. §255-38.B. – Street trees 2 ½ inches dbh at intervals of not more than 30 feet along both sides of new streets and along one or both sides of an existing street within the proposed subdivision and land development. An equivalent number may be planted in an informal arrangement subject to the approval of the Board of Commissioners.
11. §255-41.H. – Outdoor collection stations shall be provided for garbage and trash removal when indoor collection is not provided. Collection stations shall be screened from view and landscaped. We note there is one collection station shown on the plans. The applicant must explain how garbage and trash removal will be provided for the hotel and office building.
12. §255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be \$3,307 per 4,000 square feet of building area. The applicant must conform to this section.
13. §255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided.

#### Sanitary Sewer

1. The applicant has indicated that sanitary sewer service is being provided to the hotel, office building and one of the parking garages. The applicant must provide sewer service to the mixed medical facility. An explanation must be provided as to why sanitary sewer service to the parking garage is provided.



2. A profile of the proposed sanitary sewer must be provided. The sizes of all proposed sanitary sewer must be shown on the profile. All utilities crossing the sanitary sewer must be shown on the profile to ensure adequate clearance.
3. The plans indicate that the contractor will connection to the existing sewer. It is unclear from the plans if the contractor is going to connect to a portion of the existing service lateral. If that is the case, the condition of the existing lateral must be evaluated to determine if this is acceptable.
4. Sanitary sewer note #5 on sheet 2 of 26 must be revised to indicate that the typical cover of a sanitary sewer main must be 5 feet.

#### Storm Sewer

1. Please provide pre-development hydrographs for POI #2 for the 1-yr through 50-yr storm events.
2. §245-23(D)(2) – Water quality volume requirement can be accomplished by the permanent volume of a wet basin or the detained volume from other BMPs. Where appropriate, wet basins shall be utilized for water quality control and shall follow the guidelines of the BMP manuals referenced in Appendix G. The applicant is proposing soil amendment credit for the water quality volume required at POI #1, which does not meet Ordinance requirements. Please revise to meet the Ordinance requirement.
3. §245-27(J) - Underground stormwater management systems must be designed to store the two- through one-hundred-year storms within a pipe or other open system that will permit the inspection and maintenance of the system. The entire storm must be placed in the pipe (i.e., the stone bedding around the pipe is not to be included in the volume calculations). We note that in Section 4.3 of the stormwater management report the applicant states that the basin volume will include the storage in the rock voids. This must be revised to meet the Ordinance requirements or a waiver must be requested.
4. Table 10 on page 15 of the stormwater management report lists a tree credit for POI #1 water quality volume. Worksheet #5 for POI #1 in Appendix C and the Runoff Calculation in Appendix D list a soil amendment credit. Please revise this inconsistency.
5. Please provide permeability/infiltration rates for the permeable pavers and permeable pavement.
6. Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans.



7. Please clarify what the stippled pattern shown in Proposed Surface Stormwater Basin 1 and Proposed Bio Retention Basin 2 on Sheet CS9001 represents.
8. A profile of the proposed storm sewer must be provided. The sizes of all proposed storm sewer must be shown on the profile. All utilities crossing the storm sewer must be shown on the profile to ensure adequate clearance.
9. Stormwater calculations demonstrating that the requirements of the stormwater ordinance must be submitted as part of the Final Plan submission. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time.

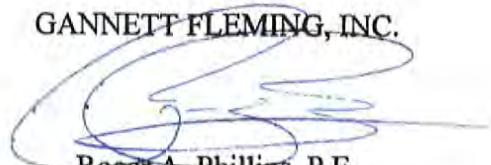
General

1. New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots.
2. The Radnor Township tree protection detail must be shown on the plans.
3. Lighting details must be provided on the plans.
4. The height of all retaining walls must be indicated on the plans.
5. Detailed parking structure plans must be provided for review.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.



Roger A. Phillips, P.E.  
Senior Project Manager





**GILMORE & ASSOCIATES, INC.**  
ENGINEERING & CONSULTING SERVICES

**MEMORANDUM**

---

**Date:** November 29, 2017

**To:** Steve Norcini, P.E.  
Radnor Township Engineer

**From:** Amy Kaminski, P.E., PTOE  
Transportation Services Manager

**cc:** John Rice, Esq., Grim, Biehn & Thatcher  
Peter Nelson, Esq., Grim, Biehn & Thatcher  
Roger Phillips, P.E., Gannett Fleming, Inc.  
Damon Drummond, P.E., PTOE, Gilmore & Associates, Inc.

**Reference:** 145 King of Prussia Road – The University of Pennsylvania Health Systems  
Preliminary Land Development Review 1  
Transportation Impact Study Review 1  
Radnor Township, Delaware County, PA  
G&A 15-12020

---

Gilmore & Associates, Inc. (G&A) has completed a transportation review for the above referenced project and offers the following transportation comments for Radnor Township consideration:

**I. BACKGROUND**

The University of Pennsylvania Health Systems is proposing the re-development of a 26 acre parcel, located at 145 King of Prussia Road, in Radnor Township, Delaware County. The project includes a total proposed gross floor area of 475,000 sf. The proposed development will consist of a 250,000 square foot mixed medical use building with an associated 1,000 space parking garage, a 4-story 150,000 square foot general office building, a 4-story 75,000 square foot (120 room) hotel and an associated 850 space parking garage. The site is expected to generate a total of 731 AM peak hour trips, 583 PM peak hour trips, and 7,518 weekday trips without any trip reductions for internal or transit trips. The ADT along King of Prussia Road is 10,283 vehicles per day (combined).

As reminder, the Applicant withdrew the Land Development submission on October 31, 2017; and resubmitted on November 14, 2017.

---

BUILDING ON A FOUNDATION OF EXCELLENCE

65 E. Butler Avenue | Suite 100 | New Britain, PA 18901  
Phone: 215-345-4330 | Fax: 215-345-8606

[www.gilmore-assoc.com](http://www.gilmore-assoc.com)

## **II. DOCUMENTS REVIEWED**

- A. Preliminary Land Development Plans for Penn Medicine at Radnor, prepared for the University of Pennsylvania Health Systems, prepared by Pennoni Associates, Inc., dated September 29, 2017.
- B. Traffic Impact Study for Mixed Medical Facility 145 King of Prussia Road, prepared for the University of Pennsylvania Health System, prepared by Pennoni Associates, Inc., dated September 2017.
- C. Cover letter dated September 29, 2017 prepared by Pennoni Associates, Inc.
- D. Waiver Request Letter for Penn Medicine at Radnor, prepared for Radnor Township, prepared by Pennoni Associates, Inc., dated September 29, 2017.
- E. Subdivision and Land Development Application.
- F. Application for Act 247 Review.

## **III. IDENTIFIED IMPROVEMENTS**

- A. Traffic Signal Timing Optimization at the following intersections:
  - 1. King of Prussia Road and Matsonford Road/Park Driveway:
  - 2. King of Prussia Road and Radnor-Chester Road:
  - 3. Lancaster Avenue and I-476 SB Off-Ramp:
  - 4. Lancaster Avenue and Radnor-Chester Road
  - 5. Lancaster Avenue and I-476 NB On-Ramp/Hillside Circle
- B. King of Prussia Road and Raider Road/Site Driveway:
  - 1. Construct a new traffic signal.
  - 2. Provide left turn lanes on both approaches of King of Prussia Road.
  - 3. Construction of a northbound King of Prussia Road right turn lane.
- C. King of Prussia Road and Southern Site Driveway:
  - 1. Restripe northbound King of Prussia Road to provide a shared through/right turn lane.
  - 2. Widen the east side of King of Prussia Road north of the Southern Site Driveway to provide two northbound receiving lanes and a taper to a single northbound lane.
- D. King of Prussia Road and Lancaster Avenue (U.S. Route 30)/NB Off-Ramp:
  - Restripe the northbound I-76 off-ramp at Lancaster Avenue to provide a shared through/right lane.

## **IV. LAND DEVELOPMENT PLAN REVIEW**

- A. Subdivision and Land Development Ordinance (SALDO) comments:
  - 1. §255-20.B(1)(n) – Existing principal buildings, and their respective uses, and driveways on the adjacent peripheral strip, sewer lines, storm drains, culverts,

bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site shall be shown on the plans.

2. §255-20.B(5)(d)[2][a] and §255-20.B(5)(d)[6][b] Coordinate with SEPTA and revise the plans to provide an ADA accessible connection from the proposed on-site sidewalk to the existing SEPTA facilities.
3. §255-21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be so drawn as to be legible if the plan should be reduced to half size. The Applicant has requested a waiver from this requirement; we have no engineering objection to this request.
4. §255-27.B(3)(c) and §255-27.C(1) - King of Prussia Road is identified as a Major Collector and requires an 80' right-of-way (40' half-width) and a minimum 48' cartway width (24' half-width). The applicant proposes to provide a half-width right-of-way of 40' from the centerline of the roadway. The existing cartway width (36') is less than the minimum required cartway width (48' full width; 24' half-width) and the Applicant is required to widen the cartway for the full length of the site frontage along King of Prussia Road. Revise the plans to continue the two northbound lanes along the entire site frontage on King of Prussia Road beginning at the South Driveway and extending through and including the SEPTA/Northern site driveway.
5. §255-27.C(1) – Sidewalk shall be provided along the entire site frontage. The onsite trail doesn't provide an adequate walkway for pedestrians walking along the site frontage. If the Applicant considers and the Township agrees the sidewalks located along the westside of King of Prussia Road (along the Radnor Township School District frontage) as adequate; additional improvements should be provided as follows:
  - a. Pedestrian crosswalks meeting the current Public Right-of-Way Accessibility Guidelines for Americans with Disabilities Act Accessibility Guidelines (PROWAG/ADAAG) requirements as indicated in PennDOT Publication 13M DM-2 Design Manual 2: Highway Design, Chapter 6; and PennDOT Publication 70M Roadway Construction Standards (RC-67) must be constructed on all approaches to the proposed traffic signal at Raider Road and at the north and south access driveways to provide adequate crossing locations.
  - b. Widen the sidewalks along the westside of King of Prussia Road (Radnor Township School District frontage) to five feet (5') as required by PROWAG/ADAAG or provide 5 foot by 5 foot passing areas at a 200 foot minimum interval along the length of the roadway.
6. §255-29.A(12)(b) – The width of entrance and exit drives shall be 25 feet for two-way use. The width of the existing SEPTA/Northern site driveway is 20 feet and must be widened to comply with this section of the ordinance or a waiver must be requested.

7. §255-29.A(14) – No less than a five-foot radius of curvature shall be permitted for all curblines in parking areas. Revise the plans to label all curb radii and provide a minimum 5' curb radii along the south end of the drop-off area behind the proposed 4- story office building.
8. §255-30 – Revise the plans to delineate the proposed loading stall(s) adjacent to the proposed hotel and office building.
9. §255-30.A – Identify the area adjacent to the parking garage that is east of the loading area wall and is approximately 10'x 60'. If this area is intended for loading, it must meet the requirements for this section.
10. §255-37.A – Sidewalks and pedestrian paths shall minimize pedestrian-vehicle conflicts. As a pedestrian safety precaution, include a grass verge between the curbline and the proposed sidewalk along the King of Prussia Road site frontage to match the existing sidewalk opposite the site.
11. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. Revise the lighting plan to provide pedestrian lighting along all proposed sidewalks including along King of Prussia Road. Coordinate with the Township Engineer and Township Planner regarding lighting levels.
12. §255-37.H – Steps or a combination of steps and ramps shall be utilized to maintain maximum grades, where necessary. Where sidewalk grades exceed 5%, a nonslip surface texture shall be used. We recommend the Applicant provide a sidewalk connection along the north side of the central access driveway opposite to the intersection of Raider Road. We understand the ADA accessible access is provided on the south side of the driveway.
13. §255-40.F – Revise the plans to indicate the location of refuse collection stations for the proposed hotel and 4-story office building.

B. General Comments

We offer the following recommendations based on a transportation review of the land development plan submission:

1. We recommend the Applicant coordinate with the Township staff regarding the width and location of the proposed trail and consider providing a trail or sidewalk connection adjacent to the Southern Site Driveway from the trail to King of Prussia Road.
2. Provide a separate pavement marking and signage plan including all right-of-way lines, lane lengths, widths, bay taper lengths, lane line colors, lane line widths, etc.
3. Provide a 24" stop bar and an R1-1 stop sign at the northern and Southern Site Driveway egresses.

4. Install R7-302 No Parking SYMBOL/ARROW signs along the Northern/SEPTA driveway. It appears this is currently being used as overflow parking and the illegal parking creates a de facto and unacceptable single travel lane.
5. Revise the plans to provide a minimum 6' crosswalk as required in PennDOT Publication 111, TC-8600.
6. Per PennDOT Publication 111, TC-8600, we recommend the Applicant provide a 4" DY centerline along the central access and Raider Road driveways extending for a minimum of 150 feet beyond the intersection of King of Prussia Road.
7. Revise the plans to include stop bars on driveway and roadway approaches to King of Prussia Road and Raider Road/Site Driveway associated with the traffic signal.
8. Replace any references to R7-7A with the PennDOT approved R7-302 NO PARKING SYMBOL/ARROW sign. Refer to PennDOT Publication 236 for further details.
9. Replace any references to R5-3-6 with the PennDOT approved R5-101, EMERGENCY AND AUTHORIZED VEHICLES ONLY. Refer to PennDOT Publication 236 for further details.
10. Sheet 2 includes symbols to assist in identifying proposed signs; however, the symbol callouts were not utilized in the plan set. Include all proposed signs on the various sheets and also include on the requested pavement marking and signage plan.
11. We recommend the Applicant include one ingress and two egress lanes at the site access driveway opposite Raider Road on King of Prussia Road.
12. We recommend eliminating the dedicated right-turn and left-turn lanes into the Southern Site Driveway. Due to the fact that this will be a loading area only, the auxiliary lanes may not be necessary.
13. Provide curb radii (at minimum) necessary for the anticipated delivery traffic at the Southern Site Driveway. A 45 foot curb radii is recommended for truck access.
14. The fire truck turning templates should be submitted to the Fire Marshall for review.
15. We note the Applicant is only demonstrating the use of a WB-40 truck at the SEPTA/Northern site driveway. Verify that a WB-40 truck will be the largest truck anticipated for Hotel deliveries. Consider increasing the radii to accommodate larger vehicles. If the Northern driveway will only be accommodating WB-40 trucks, the appropriate truck restriction signage will be required.
16. Sheet 25 of 26 (CS9801):

- a. The northbound WB-67 movement at the Southern Site Driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane. Increase the corner radii and/or widen the driveway as necessary to accommodate WB-67 trucks.
  - b. At the Southern Site Driveway, show the WB-67 exiting movement onto King of Prussia Road.
  - c. Revise the WB-67 movements to eliminate any contact with the adjacent dumpster bay walls and curblines.
  - d. Revise the WB-67 movement to show the truck not conflicting with the compactor.
  - e. The WB-67 movement shows the truck reversing into the generator area. Bollards are recommended around the generator area.
  - f. Show the WB-40 exiting movement onto King of Prussia Road beginning from the loading area at the SEPTA/Northern driveway.
17. Sheet 26 of 26 (CS9802):
  - a. The eastbound fire truck movement at the Raider Road site driveway should be revised to eliminate any contact with the adjacent curb and curb ramp along the patient drop-off area.
  - b. The northbound fire truck movement at the Raider Road site driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane.
  - c. The northbound fire truck movement at the Southern Site Driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane.
  - d. Revise the fire truck movement along the Southern Site Driveway so that the truck remains completely on the roadway during the movement.
18. The Applicant will be responsible for providing the following documents prior to Final Land Development approval:
  - a. Construction details related to ADA curb ramps, including spot elevations, dimensions and slopes.
  - b. Traffic Signal Construction Plans, Traffic Signal Permit Plans, Traffic Signal System Plans, and a Traffic Signal design report must be provided to the Township and PennDOT for review and approval.
  - c. All new or modified signal permit plans require a completed TE-160 form and associated resolution.
  - d. The Applicant will need to coordinate with Radnor Township School District to eliminate parking along the south side of Raider Road near King of Prussia Road. The onstreet parking along the south side of Raider Road effectively narrows the 30' cartway width to a 22 foot width which is inadequate to store busses and automobiles. We recommend evaluating the length of parking to be eliminated based on the results of

the impending queue analysis noted under the Transportation Impact Assessment section below.

## V. TRANSPORTATION IMPACT ASSESSMENT (TIA) REVIEW

### A. Subdivision and Land Development Ordinance (SALDO) comments:

1. §255-20.B(5)(d)[2][a] - We recommend the applicant discuss with SEPTA the installation of a bus shelter along King of Prussia Road near the corner of the Raider Road site driveway to encourage and promote transit riders. In addition, we recommend installing a bus turn out lane to minimize traffic flow disruptions along King of Prussia Road.
2. §255-20.B(5)(d)[3] Existing traffic conditions.
  - a. Traffic counts were conducted on November 18, 2015 and November 24, 2015 at some of the studied intersections. These dates were noted as early dismissal days on the Radnor School District calendar. The Applicant should provide a comparison with historical counts at these intersection indicating similar volumes or recount the intersections during a typical full day of school.
  - b. Crash Data Analysis
    - i. The crash data provided in the body of the report and in Appendix E should be removed from the TIA and provided under separate cover.
    - ii. PennDOT Strike-Off-Letter (SOL) 470-09-4 *Transportation Impact Study Guidelines* indicates 5 years of crash data should be reviewed; the submission only provided 3 years of historical data. In addition, the crash report should include non-reportable crashes obtained from Radnor Township Police Department. The crash analysis should be revised to provide a more detailed crash data analysis as follows:
      - a) Quantify the number of correctible reportable and non-reportable crash incidents in a rolling 12 month analysis period.
      - b) To identify potential mitigation measures for reportable and non-reportable crashes incidents exceeding five during the rolling 12 month period.
3. §255-20.B(5)(d)[4] The TIA shall be updated to remove the 7% Transit Ridership reduction for the Trip Generation based on the following:
  - a. As discussed in the *ITE Trip Generation Handbook, 3<sup>rd</sup> Edition*, Section 8.4.2, the national database of person trips by mode for the Transit Friendly Development (TFD) is limited. Therefore, the preferred method for estimating a transit mode share for external trips at a TFD would be through development of surveys at proxy sites. The TIA would need to be modified to identify any transit studies previously done for the existing site or any similar nearby sites (i.e., employee transit usage survey, origin/destination study, boarding/alighting at Paoli/Thorndale station, etc.).
  - b. In accordance with the information provided in Appendix B of the ITE publication *Trip Generation Manual, 9<sup>th</sup> Edition Guide and Handbook*, this

project's Floor Area Ratio (FAR) of 0.40 does not meet the required development intensity to utilize the minimum transit reductions identified in Tables B.2 & B.3.

- c. Per PennDOT Strike-off-Letter 470-09-4 *Transportation Impact Study Guidelines*, the Paoli/69th Street SEPTA bus route does not meet the minimum requirement of 3-4 buses per hour and 14-16 daily operation hours to justify a bus related trip reduction.
  - d. More importantly, the agreed upon trip generation methodology for the proposed mixed medical use is based on data collected at local existing sites which inherently accounts for any transit reduction in the data collection process. If there is a 7% transit reduction, the reduction was already accounted for in the lack of a vehicle entering and exiting the local site driveways that were used to develop the trip generation rates for the Mixed Medical Use.
4. §255-20.B(5)(d)[5] Provide a traffic signal warrant analysis for the intersection of the SEPTA/Northern site driveway and King of Prussia Road.
  5. §255-20.B(5)(d)[6] All streets or intersections showing Level of Service below C shall be considered deficient and specific recommendations for elimination of these problems shall be listed. The analysis indicates the corridor along the site frontage of King of Prussia Road is congested with multiple LOS deficiencies. The roadway should be widened to accommodate additional through lanes where possible along King of Prussia Road. The Applicant should evaluate the feasibility of constructing a 4-lane or 5-lane roadway section along King of Prussia Road.
  6. §255-20.B(5)(d)[6][b] A listing of all actions to be undertaken to increase present public transportation usage and improve service, if applicable, shall be included.

#### B. General TIA Comments

1. The Applicant indicates a credit was applied for site trips from a previously approved plan for a 427,110 SF General Office Building (Land Use Code 710); this credit is inappropriate and should not be applied to the No-Build conditions for this study. The applicant indicates the existing facility was previously approved and could be occupied by a tenant without additional approvals; however, in our opinion, this has no bearing on the current land development application.
2. The report should be revised to include volume development spreadsheets for each studied intersection. We were unable to verify the No-Build and Build conditions based on the figures provided.
3. The capacity analyses should be revised to include the timings for all signalized intersections and 95 percentile queues. We were unable to verify the capacity analyses due to insufficient data.
4. The Applicant should provide a 95th percentile queue analysis to determine that adequate storage lengths are available at the studied intersections.



5. Please provide a Level of Service/Delay in tabular format for the No-Build and Build scenarios as required in PennDOT Strike-off-Letter 470-09-4. Provide No-Build and Build conditions scenarios in the same table for a comparison for each peak hour on each approach by lane movement.
6. The Applicant should provide turn lane warrant analyses for all three site driveways. Appendix H only provides an analysis for the Raider Road/Site Driveway along King of Prussia Road. In addition provide an analysis for the Raider Road (eastbound) leg at the intersection of King of Prussia Road/Raider Road.
7. Provide 2025 Build turn lane warrants to determine the maximum turn lane lengths required.
8. Per the Institute of Transportation Engineers (ITE) Trip Generation Manual, 3rd Edition, revise the report to include the rates/equations regarding ITE Land Use Code 710 (General Office Building) and Land Use Code 310 (Hotel). The submission only provides the rates and distribution percentages for the Mixed Medical Use Facility.
9. Verify the speed along Matsonford Road and revise as needed.
10. Revise Figures 3 through 11 to identify the location of King of Prussia Road.
11. The pedestrian and vehicle clearance interval calculations provided in Appendix L will need to be verified and updated based on the final traffic signal permit plan.
12. The following comments pertain to discrepancies between the Manual Turning Movement counts and the Capacity Analyses provided in Appendices D, F, I & M:
  - a. I-476/Southbound Off-Ramp & Lancaster Avenue: Revise the eastbound lane configuration to include a right-turn volume.
  - b. I-476/Southbound Off-Ramp & Lancaster Avenue: Verify the westbound left volume during the 2020 No-Build PM conditions; it appears the volume should be revised from 584 to 571 vehicles.
  - c. King of Prussia Road & Southern Site Driveway: Verify the northbound through 2020 PM Build volume; it appears the volume should be revised from 405 to 451 vehicles.
  - d. King of Prussia Road & Southern Site Driveway: Verify the southbound through 2025 PM Build volume; it appears the volume should be revised from 1382 to 1319 vehicles.
  - e. King of Prussia Road & Southern Site Driveway: Verify the northbound through 2025 PM Build volume; it appears the volume should be revised from 411 to 457 vehicles.

- f. King of Prussia Road & Southern Site Driveway: Verify the southbound through 2025 PM Build volume; it appears the volume should be revised from 1403 to 1338 vehicles.
  - g. King of Prussia Road & Southern Site Driveway: Verify the northbound through 2020 AM Build volume; it appears the volume should be revised from 1544 to 1554 vehicles.
13. The following comments pertain to discrepancies between the Turning Movement counts and the existing 2016 weekday volumes included in Figure 3:
- a. Northern Driveway and King of Prussia Road: verify the southbound PM through volume; it appears the volume should be revised from 1038 to 1046.
  - b. Southern Site Driveway and King of Prussia Road: Verify the southbound PM through volume; it appears the volume should be revised from 1011 to 1077.
  - c. Southern Site Driveway and King of Prussia Road: Verify the northbound PM through volume; it appears the volume should be revised from 337 to 293.
14. There is an existing coordinated signal system along King of Prussia Road that includes Radnor-Chester Road and Matsonford Road. Any traffic signals proposed along the site frontage should be included in the overall coordinated system. The Applicant should also investigate coordinating the Matsonford Road/King of Prussia Road signal system with the Lancaster Avenue System.
15. We recommend the Transportation Impact Study be revised to address the above comments to the satisfaction of the Township. In order to expedite the review process for the resubmission of the above, the Applicant should submit a response letter which addresses each of the above comments including the original comment and identify any changes made unrelated to the review.

If you have any questions regarding the above, please contact this office.

ABK:DAD:las



## DELAWARE COUNTY PLANNING COMMISSION

COURT HOUSE/GOVERNMENT CENTER  
201 W. Front St. Media, PA 19063

### COUNCIL

MARIO J. CIVERA, JR.  
CHAIRMAN

COLLEEN P. MORRONE  
VICE CHAIRMAN

JOHN P. McBLAIN  
DAVID J. WHITE  
MICHAEL F. CULP

**Office Location:** Toal Building, 2<sup>nd</sup> & Orange Sts., Media, PA 19063  
**Phone:** (610) 891-5200 **FAX:** (610) 891-5203  
**E-mail:** [planning\\_department@co.delaware.pa.us](mailto:planning_department@co.delaware.pa.us)

LINDA F. HILL  
DIRECTOR

November 16, 2017

Mr. Robert A. Zienkowski  
Radnor Township  
301 Iven Avenue  
Wayne, PA 19087-5297

RE: Name of Dev't: Penn Medicine at Radnor  
DCPD File No.: 34-845-78-92-08-14-17  
Developer: The Trustees of the University of  
Pennsylvania  
Location: East side of King of Prussia Road,  
approximately 400' north of Lancaster  
Avenue  
Recv'd in DCPD: October 17, 2017

Dear Mr. Zienkowski:

In accordance with the provisions of Section 502 of the Pennsylvania Municipalities Planning Code, the above described proposal has been sent to the Delaware County Planning Commission for review. At a meeting held on November 16, 2017, the Commission took action as shown in the recommendation of the attached review.

Please refer to the DCPD file number shown above in any future communications related to this application.

Very truly yours,

Linda F. Hill  
Director

cc: The Trustees of the University of Pennsylvania  
Pennoni Associates, Inc.



# DCPD

## DELAWARE COUNTY PLANNING DEPARTMENT

Court House/ Government Center, 201 W. Front St., Media, PA 19063  
Office Location: Toal Building, 2nd & Orange Sts., Media, PA 19063  
Phone: (610) 891-5200 FAX: (610) 891-5203  
E-mail: [planning\\_department@co.delaware.pa.us](mailto:planning_department@co.delaware.pa.us)

Date: November 16, 2017  
File No.: 34-845-78-92-08-14-17

PLAN TITLE: Penn Medicine at Radnor

DATE OF PLAN: September 29, 2017

OWNER OR AGENT: The Trustees of the University of Pennsylvania

LOCATION: East side of King of Prussia Road, approximately 400' north of Lancaster Avenue

MUNICIPALITY: Radnor Township

TYPE OF REVIEW: Subdivision and land development

ZONING DISTRICT: PLO

SUBDIVISION ORDINANCE: Local

PROPOSAL: Subdivision: Incorporate two lots totaling 18.71 acres into one lot  
Land development: Develop 475,000 sq. ft. of mixed-use development

UTILITIES: Public

RECOMMENDATIONS: Subdivision: Approval  
Land development: Approval, with consideration given to staff comments

STAFF REVIEW BY: Michael A. Leventry



Date: November 16, 2017  
File No.: 34-845-78-92-08-14-17

REMARKS:

**PREVIOUS ACTION**

A plan for the site was last reviewed by the Delaware County Planning Commission at its meeting on October 16, 2014, as a land development. The applicant proposed to redevelop the site with four buildings totaling 550,441 sq. ft. The Commission recommended revise and resubmit.

**CURRENT PROPOSAL**

The applicant currently proposes to demolish the buildings that exist on the site and redevelop with a 475,000 sq. ft. mixed-use development that is to include office, medical offices, ambulatory care, and parking.

**SITE CHARACTERISTICS**

The site currently contains a mix of uses that primarily include office and institutional.

**APPLICABLE ZONING**

The proposal is located within the PLO district and is subject to applicable regulations set forth in the Township zoning code.

**COMPLIANCE**

The proposal appears to comply with the PLO district provisions.

**SEWAGE FACILITIES**

The developer should contact the Pennsylvania Department of Environmental Protection regarding the need for sewage facilities planning approval.

Date: November 16, 2017  
File No.: 34-845-78-92-08-14-17

REMARKS (continued):

The Township should confirm receipt of any necessary Pennsylvania Department of Environmental Protection planning approval prior to final approval.

**STORMWATER MANAGEMENT**

The Township Engineer must verify the adequacy of all proposed stormwater management facilities.

**TRANSPORTATION COMMENTS**

The applicant should provide financial incentives for employees to take transit, car pool, bicycle, or walk to the site. This would reduce the number of parking spaces needed, reduce the applicant's cost to construct and maintain parking facilities, mitigate stormwater runoff, and improve employee health (consistent with a health care provider's mission). The applicant should consider providing pervious pavement to reduce stormwater runoff.

The Township should request that SEPTA (Mark Cassel 215-580-7947) place a bus stop at the proposed main entrance to the site (at the proposed sidewalk on King of Prussia Road) for the convenience of bus riders. Currently, the nearest bus stop is at the northern end of the site at the entrance drive to the High Speed Line station. The Township should also consider installing passenger shelters at the bus stops for rider security, weather protection, and advertising revenue for the Township.

The applicant should provide bicycle parking facilities so employees and visitors can bike to the site. The bicycle parking, such as inverted "U" bike docks, should secure bicycles by their frames, rather than only by their wheels.

Date: November 16, 2017  
File No.: 34-845-78-92-08-14-17

REMARKS (continued):

The applicant proposes to construct a sidewalk to King of Prussia Road. This sidewalk should be extended to the intersection of the applicant's entrance road and Raider Road, where a traffic signal is proposed. A continental/zebra style crosswalk should be installed across King of Prussia Road at this location, as it would improve safety for bus riders at the new bus stop.

**RECORDING**

In accordance with Section 513(a) of the Pennsylvania Municipalities Planning Code (MPC), final plans must be recorded within ninety (90) days of municipal approval.



## DELAWARE COUNTY PLANNING DEPARTMENT

COURT HOUSE/GOVERNMENT CENTER  
201 W. Front St. Media, PA 19063

### COUNCIL

MARIO J. CIVERA, JR.  
CHAIRMAN

COLLEEN P. MORRONE  
VICE CHAIRMAN

JOHN P. McBLAIN  
DAVID J. WHITE  
MICHAEL F. CULP

**Office Location:** Toal Building, 2<sup>nd</sup> & Orange Sts., Media, PA 19063  
**Phone:** (610) 891-5200 **FAX:** (610) 891-5203  
**E-mail:** planning\_department@co.delaware.pa.us

LINDA F. HILL  
DIRECTOR

October 26, 2017

Mr. Robert A. Zienkowski  
Radnor Township  
301 Iven Avenue  
Wayne, PA 19087-5297

**RE: Title:** Penn Medicine at Radnor  
**Applicant(s):** The Trustees of the University of Pennsylvania  
**File Number:** 34-845-78-92-08-14-17  
**Meeting Date:** 11/16/2017  
**Municipality:** Radnor Township  
**Location:** East side of King of Prussia Road, approximately  
400' north of Lancaster Avenue  
**Received:** 10/17/2017

Dear Mr. Zienkowski,

This is to acknowledge receipt of the above referenced application for review and report. The Commission has tentatively scheduled consideration of the application for its public meeting on the date shown above at 4:00 p.m. in the Government Center Building, (Room 100), Court House Complex, Media, PA. Attendance is not required but is welcomed. If you have any questions concerning this matter, please contact Dennis De Rosa at (610) 891-5222.

NOTE: In order to avoid processing delays, the DCPD file number shown above MUST be provided in any transactions with the county regarding this or future applications related to this location.

Very truly yours,

Linda F. Hill  
Director

cc: The Trustees of the University of Pennsylvania  
Pennoni Associates, Inc.







**PENNONI ASSOCIATES INC.**  
**CONSULTING ENGINEERS**

One South Church Street  
 2<sup>nd</sup> Floor

West Chester, PA 19382

Tel: 610 - 429 - 8907

Fax: 610 - 429 - 8918

**LETTER OF TRANSMITTAL**

**TO:** Radnor Township  
 301 Iven Avenue  
 Wayne, PA 19087

<b>DATE</b>	09/29/17	<b>JOB NO.</b>	UPHS1504
<b>ATTENTION</b>	Mr. Robert Zienkowski		
<b>RE:</b>	Penn Medicine at Radnor		

**WE ARE SENDING YOU**  Attached  Under separate cover via Hand delivered the following items:  
 Shop Drawings  Prints  Plans  Samples  Specifications  
 Copy of Letter  Change Order  \_\_\_\_\_

<b>LIST OF ITEMS TRANSMITTED</b>			
<b>COPIES</b>	<b>DATE</b>	<b>NO:</b>	<b>DESCRIPTION</b>
1	09/29/17	1	Cover Letter
1	09/29/17	1	Waiver Request Letter
1	-	2	Radnor Township Application
1	-	2	Delaware County Planning Commission Application
1	-	2	Checks for Application Fees
26	09/29/17	28	Preliminary Land Development Plans (full size)
7	09/29/17	28	Preliminary Land Development Plans (half size)
2	09/29/17	-	PCSM Report
2		-	Traffic Impact Study
2	-	8	Deed of Property
2	04/10/15	142	Commitment for Title Insurance
10	-	-	Thumb drives with all documents

**THESE ARE TRANSMITTED** as checked below:

<input checked="" type="checkbox"/> For approval	<input type="checkbox"/> Approved as submitted	<input type="checkbox"/> Resubmit _____ copies for approval
<input type="checkbox"/> For your use	<input type="checkbox"/> Approved as noted	<input type="checkbox"/> Submit _____ copies for distribution
<input type="checkbox"/> As requested	<input type="checkbox"/> Returned for corrections	<input type="checkbox"/> Return _____ corrected prints
<input type="checkbox"/> For review and comment	<input type="checkbox"/> _____	
<input type="checkbox"/> FOR BIDS DUE _____	<input type="checkbox"/> PRINTS RETURNED AFTER LOAN TO US	

**REMARKS**

**COPY TO** file

**SIGNED:** Christopher Poterjoy, PE

*If enclosures are not as noted, kindly notify us at once.*

September 29, 2017

UPHS1504

Radnor Township  
Attn: Mr. Robert Zienkowski  
301 Iven Ave.  
Wayne, PA19087

**RE: PRELIMINARY LAND DEVELOPMENT APPLICATION  
PENN MEDICINE AT RADNOR  
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA**

Dear Mr. Zienkowski:

On behalf of the Trustees of the University of Pennsylvania Health Systems, Pennoni Associates Inc. is submitting the attached plans, reports and documentation for consideration of a Preliminary Land Development approval. As you are aware, The Trustees of the University of Pennsylvania Health Systems are proposing the re-development of 145 King of Prussia Road. The development will involve the demolition of existing buildings and construction of a mixed-use facility including a mixed medical use facility, office and hotel. Two parking garages are proposed in conjunction with a surface parking lot. The site has been designed based on the draft Ordinance No. 2016-13 amending the Chapter 280, Article XV of the Radnor Township Code.

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2459 or [cpoterjoy@pennoni.com](mailto:cpoterjoy@pennoni.com).

Sincerely,

**PENNONI ASSOCIATES INC.**

A handwritten signature in blue ink, appearing to read "C. Poterjoy", is written over the typed name of Christopher Poterjoy.

Christopher Poterjoy, PE  
Project Engineer

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems  
David Falcone, Saul Ewing Arnstein & Lehr LLP

September 29, 2017

UPHS1504

Radnor Township  
Attn: Board of Supervisors  
301 Iven Ave.  
Wayne, PA19087

**RE: WAIVER REQUEST LETTER  
PENN MEDICINE AT RADNOR  
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA**

Dear Supervisors:

On behalf of the Trustees of the University of Pennsylvania Health Systems, Pennoni Associates Inc. is respectfully requesting a waiver from the following section of the Township's Subdivision and Land Development Ordinances.

**1. Section 255-21.A(6)**

A waiver is requested for the maximum plan sheet size if 24 inches by 34 inches. The plans will be reduced for recording purposes.

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2459 or [cpoterjoy@pennoni.com](mailto:cpoterjoy@pennoni.com).

Sincerely,

**PENNONI ASSOCIATES INC.**



Christopher Poterjoy, PE  
Project Engineer

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems  
David Falcone, Saul Ewing Arnstein & Lehr LLP

**DELAWARE COUNTY PLANNING COMMISSION**

**APPLICATION FOR ACT 247 REVIEW**

**Incomplete applications will be returned and will not be considered "received" until all required information is provided.**

Please type or print legibly

**DEVELOPER/APPLICANT**

Name The Trustees of the University of Pennsylvania; Attn: Pat Dorris E-mail \_\_\_\_\_

Address 3400 Spruce Street; Philadelphia, PA 19104 Phone \_\_\_\_\_

Name of Development Penn Medicina at Radnor

Municipality Radnor Township

**ARCHITECT, ENGINEER, OR SURVEYOR**

Name of Firm Pennoni Associates Inc. Phone 610-422-2459

Address One South Church St.; 2nd Floor; West Chester, PA 19382

Contact Christopher Poterjoy E-mail cpoterjoy@pennoni.com

Type of Review	Plan Status	Utilities		Environmental Characteristics
		Existing	Proposed	
<input type="checkbox"/> Zoning Change	<input type="checkbox"/> Sketch	<input checked="" type="checkbox"/> Public Sewerage	<input type="checkbox"/> Public Sewerage	
<input checked="" type="checkbox"/> Land Development	<input checked="" type="checkbox"/> Preliminary	<input type="checkbox"/> Private Sewerage	<input type="checkbox"/> Private Sewerage	<input type="checkbox"/> Wetlands
<input type="checkbox"/> Subdivision	<input type="checkbox"/> Final	<input checked="" type="checkbox"/> Public Water	<input type="checkbox"/> Public Water	<input type="checkbox"/> Floodplain
<input type="checkbox"/> PRD	<input type="checkbox"/> Tentative	<input type="checkbox"/> Private Water	<input type="checkbox"/> Private Water	<input type="checkbox"/> Steep Slopes

Zoning District PL0

Tax Map #  / /

Tax Folio # 36 / 02 / 01234 / 00

**STATEMENT OF INTENT**  
WRITING "SEE ATTACHED PLAN" IS NOT ACCEPTABLE.


**Existing and/or Proposed Use of Site/Buildings:**

The site contains 3 existing buildings which will be demolished

3 new buildings and 2 new parking structures proposed. A total of 475,000-sf of gross floor area between the 3 buildings. The site is a mixed use with uses including  
a Mixed Use Medical Facility, Hotel, and Office.

Total Site Area 18.71 Acres  
Size of All Existing Buildings 120,365 (footprint) Square Feet  
Size of All Proposed Buildings 120,105 (footprint) Square Feet  
Size of Buildings to be Demolished 120,355 (footprint) Square Feet

Patrick Dorris  
Print Developer's Name

  
Developer's Signature

**MUNICIPAL SECTION**  
ALL APPLICATIONS AND THEIR CONTENT ARE A MUNICIPAL RESPONSIBILITY.

Local Planning Commission Regular Meeting \_\_\_\_\_

Local Governing Body Regular Meeting \_\_\_\_\_

Municipal request for DCPD staff comments prior to DCPC meeting, to meet municipal meeting date:

Actual Date Needed \_\_\_\_\_

IMPORTANT: If previously submitted, show assigned DCPD File # \_\_\_\_\_

Print Name and Title of Designated Municipal Official \_\_\_\_\_ Phone Number \_\_\_\_\_

Official's Signature \_\_\_\_\_ Date \_\_\_\_\_

**FOR DCPD USE ONLY**

Review Fee: Check # \_\_\_\_\_ Amount \$ \_\_\_\_\_ Date Received \_\_\_\_\_

**Applications with original signatures must be submitted to DCPD.**

RADNOR TOWNSHIP  
301 IVEN AVE  
WAYNE PA 19087  
P) 610 688-5600  
F) 610 971-0450  
WWW.RADNOR.COM

SUBDIVISION ~ LAND DEVELOPMENT

Location of Property 145 King of Prussia Road

Zoning District PLO - Planned Laboratory - Application No. \_\_\_\_\_  
Office District (Twp. Use)

Fee \$5,150.00 Ward No. 2 Is property in HARB District no

Applicant: (Choose one) Owner x Equitable Owner \_\_\_\_\_

Name Trustees of the University of Pennsylvania Health Systems; Attn: Pat Dorris

Address 3400 Spruce Street; Philadelphia, PA 19104

Telephone \_\_\_\_\_ Fax \_\_\_\_\_ Cell \_\_\_\_\_

Email \_\_\_\_\_

Designer: (Choose one) Engineer x Surveyor \_\_\_\_\_

Name Pennoni Associates Inc.; Michael Kissinger

Address One South Church St.; 2nd Floor; West Chester, PA 19382

Telephone (610) 422-2459 Fax (610) 429-8918

Email mkissinger@pennoni.com

Area of property 18.71 Area of disturbance 18.71

Number of proposed buildings 5 Proposed use of property Mixed Use

Number of proposed lots 1

Plan Status: Sketch Plan \_\_\_\_\_ Preliminary x Final \_\_\_\_\_ Revised \_\_\_\_\_

Are there any requirements of Chapter 255 (SALDO) that are not in compliance with?

Are there any requirements of Chapter 255 (SALDO) not being adhered to?  
Explain the reason for noncompliance.

N/A

Are there any infringements of Chapter 280 (Zoning), and if so what and why?  
Pending zoning amendment

Individual/Corporation/Partnership Name

I do hereby certify that I am the owner, equitable owner or authorized representative of the property which is the subject of this application.

Signature



Print Name Patrick Dorris

By filing this application, you are hereby granting permission to Township officials to visit the site for review purposes.

NOTE: All requirements of Chapter 255 (Subdivision of Lane) of the Code of the Township of Radnor must be complied with whether or not indicated in this application.

**Prepared By:**  
Erik F. Williams, Esq.  
Saul Ewing LLP  
1500 Market Street, 38th Floor  
Philadelphia, PA 19102

RD BK05648-1676 DT-DEED  
2015026773 06/02/2015 03:13:55 PM:1  
RCD FEE: \$112.50 POL SUB TAX: \$525,000.00 ST TAX: \$350,000.00



**When Recorded**  
Record and Return To:  
Land Services USA, Inc.  
1835 Market Street, Suite 420  
Philadelphia, PA 19103  
File No: *PAS 715-1804 JLS*

**Folio Number: 36-02-01234-00**

**SPECIAL WARRANTY DEED**

\*Document dated May 27, 2015 yet made effective as of May 29, 2015

THIS SPECIAL WARRANTY DEED, made as of this 29<sup>th</sup> day of May, 2015, by and between **BMR-145 KING OF PRUSSIA ROAD LP**, a Delaware limited partnership, as grantor ("Grantor"), and **THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, AS OWNER AND OPERATOR OF THE UNIVERSITY OF PENNSYLVANIA HEALTH SYSTEM**, a Pennsylvania non-profit corporation, as grantee ("Grantee") and provides as follows:

WITNESSETH

That in consideration of the sum of Thirty-Five Million Dollars (\$35,000,000), in hand paid, the receipt whereof is hereby acknowledged, Grantor does grant and convey to the Grantee, in fee simple the lands and property, together with all improvements located on the property commonly known as 145 King of Prussia Road, Radnor, Pennsylvania, and situated and lying in Delaware County, Pennsylvania, and described on Exhibit A attached hereto (the "Property").

TOGETHER with all the buildings, improvements, rights, privileges, advantages, hereditaments and appurtenances to the same belonging or anywise appertaining, and the reversions and remainders, rents, issues and profits thereof; and all the estate, right, title, interest, property, claim and demand whatsoever of the Grantor as well at law as in equity, of, in and to the same.

TO HAVE AND TO HOLD the Property, together with all rights, privileges and advantages thereunto belonging or appertaining to the Grantee, its successors and assigns, forever.

SUBJECT to all covenants, conditions, restrictions, easements, agreements, encumbrances, rights of way and reservations of record and all matters discoverable by a current survey of the Property insofar as they affect the Property or any part thereof.



**Exhibit A to Special Warranty Deed**

**Legal Description**

**PREMISES "A"**

ALL THAT CERTAIN tract of land, Hereditaments and Appurtenances, SITUATE in Radnor Township, Delaware County, Commonwealth of Pennsylvania and described according to an ALTA/ACSM Land Title Survey prepared for The Rubenstein Company, L.P. by Bock & Clark's National Surveyors Network as #4200400832, dated July 14, 2004 as more fully described as follows, to wit:

BEGINNING at a point on the title line in Lancaster Avenue (being also known as Lincoln Highway (Route 30), width varies), said point being at the distance of 3501.89 feet measured Southeasterly along the title line in Lancaster Avenue from its intersection with the title line in Radnor - Chester Road, thence from said point of beginning along lands now or formerly of PA. D.O.T. the 5 following courses and distances: (1) on a line curving to the left with a radius of 161.52 feet the arc distance of 123.76 feet, the chord of said curved line extending North 4 degrees 39 minutes 05 seconds West 120.76 feet to a point of tangency, (2) North 26 degrees 36 minutes 10 seconds West 181.79 feet to a point of curve, (3) on a line curving to the right with a radius of 700.0 feet the arc distance of 198.16 feet, the chord of said curved line extending North 18 degrees 29 minutes 35 seconds West 197.50 feet to a point of tangency, (4) North 10 degrees 23 minutes West 39.35 feet to a point of curve, (5) on a line curving to the left with a radius of 200.0 feet the arc distance of 121.46 feet, the chord of said curved line extending North 27 degrees 46 minutes 50 seconds West 119.60 feet to a point of tangency; thence North 45 degrees 10 minutes 40 seconds West 83.08 feet to a point of curve; thence on a line curving to the right with a radius of 350.0 feet the arc distance of 193.24 feet; the chord of said curved line extending North 29 degrees 21 minutes 40 seconds West 190.79 feet to a point of tangency in the bed of King of Prussia Road; thence North 13 degrees 32 minutes 40 seconds West 246.94 feet to a point of curve in the centerline of King of Prussia Road (50 feet wide); thence along said line the 4 following courses and distances; (1) on a line curving to the right with a radius of 400.0 feet the arc distance of 194.18 feet, the chord of said curved line extending North 00 degrees 21 minutes 45 seconds East 192.28 feet to a point of tangency, (2) North 14 degrees 16 minutes 10 seconds East 258.06 feet to a point of curve, (3) on a line curving to the left with a radius of 400.0 feet the arc distance of 124.29 feet, the chord of said curved line extending North 5 degrees 22 minutes 05 seconds East 123.79 feet to a point of tangency, (4) North 3 degrees 32 minutes West 228.16 feet to a spike; thence leaving King of Prussia Road and extending along lands now or formerly of Radnor Racquet Club, North 84 degrees 29 minutes 30 seconds East 631.651 feet to an iron pin in line of lands now or formerly of S.E.P.T.A.; thence along said lands the 3 following courses and distances, (1) South 2 degrees 55 minutes East, 1675.84 feet to a point (2) South 87 degrees 05 minutes West 10.0 feet to a point, (3) South 2 degrees 55 minutes East 390.96 feet to a point in the title line in Lancaster Avenue aforesaid; and thence along the title line in Lancaster Avenue North 69 degrees 58 minutes West 382.45 feet to the place of beginning.

**PREMISES "B"**

ALL THAT CERTAIN tract of land, Hereditaments and Appurtenances, SITUATE in Radnor Township, Delaware County, Commonwealth of Pennsylvania, and described according to an ALTA/ACSM Land Title Survey Plan prepared for The Rubenstein Company, L.P., by Yerkes Associates Inc., Consulting Engineers and Surveyors dated 11/8/2000, as follows, to wit BEGINNING at an iron pin at an interior corner of lands now or formerly of PA D.O.T. said point being located the 5 following courses and distances along said lands of PA D.O.T. from a point on the title line in Lancaster Avenue (the point of beginning of Premises "A": (1) on a line curving to the left with a radius of 161.52 feet the arc distance of 123.76 feet the chord of said curved line extending North 4 degrees 39 minutes 05 seconds West 120.786 feet to a point, (2) thence North 26 degrees 36 minutes 10 seconds West 181.79 feet to a point, (3) thence on a line curving to the right with a radius of 700.0 feet the arc distance of 198.16 feet the chord of said curved line extending North 18 degrees 29 minutes 35 seconds West 197.50 feet to a point, (4) thence North 10 degrees 23 minutes West 39.35 feet to a point, and (5) thence on a line curving to the left with a radius of 200.0 feet the arc distance of 84.83 feet the chord of said curved line extending North 22 degrees 32 minutes 03 seconds West 84.20 feet to the point and place of beginning, thence from said point and place of beginning, along lands of said PA D.O.T. North 70 degrees 32 minutes 40 seconds West 226.29 feet to a spike in the middle line of King of Prussia Road (50 feet wide); thence along the middle line of said King of Prussia Road on a line curving to the left with a radius of 395.18 feet the arc distance of 252.62 feet the chord of said curved line extending North 4 degrees 46 minute 11 seconds East 248.34 feet to a point on the Southwesterly line of Premises "A"; thence along said line South 13 degrees 32 minutes 40 seconds East 72.0 feet to a point, thence along the same, on a line curving to the left with a radius of 350.0 feet the arc distance of 193.24 feet the chord of said curved line extending South 29 degrees 21 minutes 40 seconds East 190.79 feet to a point, thence along the same South 45 degrees 10 minutes 40 seconds East 83.08 feet to a point; thence along the same, on a line curving to the right with a radius of 200.0 feet the arc distance of 36.63 feet the chord of said curved line extending South 39 degrees 55 minutes 52 seconds East 36.58 feet to the first mentioned point and place of beginning.

**PARCEL "C" (Easement Parcel)**

TOGETHER with all the rights and benefits set forth in those certain Agreements each dated January 20, 1956 and recorded in the Delaware County Recorder of Deeds Office in Deed Book 2137 page 548 and in Deed Book 2137 page 551 as modified by that certain Agreement dated December 10, 1965 and recorded in the Delaware County Recorder of Deeds Office in Deed Book 2227 page 592.

**PARCEL "D" (Easement Parcel)**

ALSO TOGETHER WITH all the rights and benefits conferred in the certain Indenture dated June 24, 1946 and recorded in the Delaware County Recorder of Deeds Office in Deed Book 1278 page 499.

PARCEL "E" (Easement Parcel)

ALSO TOGETHER WITH all the rights and benefits conferred in that certain Indenture dated April 7, 1953 and recorded in the Delaware County Recorder of Deeds Office in Deed Book 1573 page 567.

PARCEL #36-02-01234-00

BEING the same premises which Wyeth-Ayerst Pharmaceuticals, Inc., a New York Corporation, by Indenture bearing date the 6th day of April A.D. 2001 and recorded in the Office of the Recorder of Deeds in and for the County of Delaware, aforesaid, in Volume 2155 page 378 &c., granted and conveyed unto Radnor Properties-145 KOP, L.P., a Delaware Limited Partnership, in fee.

---

AND Grantor covenants that Grantor will warrant specially the Property hereby conveyed and will only forever warrant and defend the Property, and any part thereof, unto the Grantee, its heirs, personal representatives and assigns, against the lawful claims and demands of the Grantor and all those persons claiming by, through or under Grantor, but not otherwise.

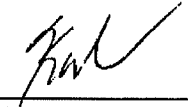
***[Signature Page Follows]***

IN WITNESS WHEREOF, Grantor has caused this Special Warranty Deed to be properly executed and sealed the day and year first above written.

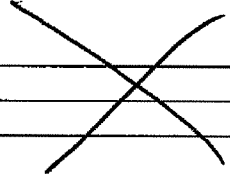
**GRANTOR:**

**BMR-145 KING OF PRUSSIA ROAD LP,**  
a Delaware limited partnership

By: BMR-145 King of Prussia Road GP LLC,  
a Delaware limited liability company,  
its general partner

By:  \_\_\_\_\_ (SEAL)  
Name: Kevin M. Simonsen  
Title: Sr. VP, Real Estate Legal

SIGNED AND DELIVERED in the presence of

 \_\_\_\_\_ (SEAL)  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

[Notary block follows]

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT**

**CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )  
County of San Diego )

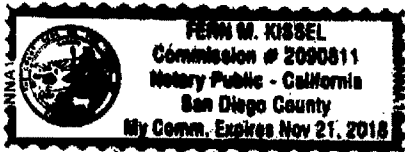
On May 27, 2015 before me, Fern M. Kissel, Notary Public  
*Date Here Insert Name and Title of the Officer*

personally appeared Kevin M. Simonsen  
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.



Signature Fern M. Kissel  
*Signature of Notary Public*

Place Notary Seal Above

**OPTIONAL**

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

**Description of Attached Document**

Title or Type of Document: \_\_\_\_\_ Document Date: \_\_\_\_\_  
Number of Pages: \_\_\_\_\_ Signer(s) Other Than Named Above: \_\_\_\_\_

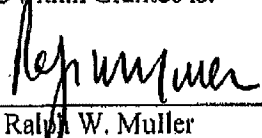
**Capacity(ies) Claimed by Signer(s)**

Signer's Name: \_\_\_\_\_  
 Corporate Officer — Title(s): \_\_\_\_\_  
 Partner —  Limited  General  
 Individual  Attorney in Fact  
 Trustee  Guardian or Conservator  
 Other: \_\_\_\_\_  
Signer Is Representing: \_\_\_\_\_

Signer's Name: \_\_\_\_\_  
 Corporate Officer — Title(s): \_\_\_\_\_  
 Partner —  Limited  General  
 Individual  Attorney in Fact  
 Trustee  Guardian or Conservator  
 Other: \_\_\_\_\_  
Signer Is Representing: \_\_\_\_\_

I HEREBY CERTIFY that the precise address of the within Grantee is:

3451 Walnut Street  
The Franklin Building, Suite 737  
Philadelphia, PA 19104

By:  (SEAL)  
Name: Ralph W. Muller  
Title: Chief Executive Officer  
(On behalf of Grantee)

# Penn Medicine Road Improvements



## PENN MEDICINE ROAD IMPROVEMENTS

- A. King of Prussia Road and Lancaster Avenue (U.S. Route 30)/I-476 NB Off-Ramp-
  - i. Restripe northbound I-476 off-ramp for a shared through/right-turn lane.
- B. King of Prussia Road and Raider Road-
  - i. Construct a new traffic signal.
  - ii. Construct left turn lanes on both approaches of King of Prussia Road
- C. King of Prussia Road and Southern Site Access-
  - i. Restripe northbound King of Prussia Road to provide a shared through/ right lane
  - ii. Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
  - iii. Provide 45-foot curb radii (at minimum), or larger if necessary for the anticipated delivery traffic.
- D. King of Prussia Road and SEPTA Access/Northern Site Access-
  - i. Widen the roadway to 25 feet.
  - ii. Construct a southbound King of Prussia Road left turn lane into the Northern Site Access.
  - iii. Construct a bus shelter on King of Prussia Road southeast of the SEPTA Access/Northern Site Access, to the extent that it is approved by SEPTA.
  - iv. Construct sidewalks from the site to the R-100 Station at the rear of the property.
- E. King of Prussia Road-
  - i. Provide a four-lane cross section along the property's site frontage along King of Prussia Road (between the Southern Access and the Main Site Driveway/ Raider Road).
  - ii. Construct 5 foot wide sidewalks along the entire property frontage on King of Prussia Road.
- F. Partner with the Township to install Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review and approval:

- i. Route 30 & I-476 Northbound Ramps
  - ii. Route 30 & I-476/King of Prussia Road.
  - iii. Route 30 & I-476 Southbound Ramps.
  - iv. Route 30 & Radnor-Chester Road.
  - v. Route 30 & Radnor Financial Center Eastern Driveway
  - vi. Route 30 & Radnor Financial Center Western Driveway
  - vii. King of Prussia Road & Radnor-Chester Road.
  - viii. King of Prussia Road & Matsonford Road.
  - ix. Matsonford Road & South Centennial Drive.
  - x. Matsonford Road & North Centennial Drive.
  - xi. King of Prussia Road & Raider Road.
  - xii. King of Prussia Road & Northern Driveway (if signalized).
  - xiii. Radnor Chester and Raider Road
  - xiv. Radnor Chester and Radnor Financial Center
- G. Construct a trail extension from the Southern Driveway through the existing PennDOT Right-of-Way, southeast of the site with connections to the existing Route 30 sidewalks. The location, width and composition of the path materials shall be approved by the Radnor Township Engineer.

# Sanitary Sewer



**Gannett Fleming**

*Excellence Delivered **As Promised***

**MEMORANDUM**

**Date:** January 26, 2018

**To:** Stephen Norcini, PE – Township Engineer

**From:** Roger Phillips, PE

**RE:** Penn Medicine at Radnor  
Sewage Facilities Planning Module Flow

---

We have reviewed the Sewage Module Exemption Request for “Penn Medicine at Radnor” prepared by Pennoni Associates Inc., dated December 9, 2016 and revised January 23, 2017. The applicant has provided historical wastewater flow information for the Bio-Med facility and also flow projections for the proposed uses on the site. The applicant has also provided a copy of the Industrial Wastewater Permit from DELCORA that permitted 100,000 gpd of sewage from this site. We believe this permit is irrelevant to determine existing flows because the 100,000 gpd is a permit maximum and not actual flows discharged.

Flow data for the previous uses (Bio-Med) have been provided for 2010, 2011, 2012 and portions of 2009, 2013 and 2014. The average daily flow from historical flow information is 63,383 gpd. Data from 2014 was excluded from the flow calculations since Bio-Med was ramping down their production and vacating the buildings.

The applicant has based the proposed flows for the Penn Medicine building on data from the existing Penn Medicine Radnor Facility. It was determined that the existing building utilized 0.08 gpd/sf. The proposed Penn Medicine Facility building is anticipated to be 250,000 sf. The flow for the proposed Penn Medicine building would be 20,000 gpd (250,000 sf x 0.08 gpd/sf).

The proposed flow for the office building use determined by utilizing the DEP flow of 10 gpd/employee. The number of employees was determined by assuming 1 employee per 75 sf of building area. The proposed office building is 150,000 sf, and the corresponding proposed flow would be 20,000 gpd. We believe that this projection higher than anticipated for flow since the 75 sf of building area per person does not take into account walkways, common areas, etc. The planning module submission indicates that there will be 2,000 employees in the office building.

The proposed flow for the hotel is based on existing water data provided for a similar hotel use. Based on the analysis provided the proposed flow would be 13,560 gpd.

The applicant has proposed total flows for this project of 53,630 gpd. This is less than the historical flow of 63,383 gpd.

If you have any questions, please contact me.



**LISA BOROWSKI**  
*President*

**LUCAS A. CLARK, ESQ.**  
*Vice President*

**JAKE ABEL**

**RICHARD F. BOOKER, ESQ.**

**SEAN FARHY**

**JOHN NAGLE**



**RADNOR TOWNSHIP**  
301 IVEN AVENUE  
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600  
Fax (610) 971-0450  
[www.radnor.com](http://www.radnor.com)

**ROBERT A. ZIENKOWSKI**  
*Township Manager*  
*Township Secretary*

**JOHN B. RICE, ESQ.**  
*Solicitor*

**KATHRYN GARTLAND**  
*Treasurer*

January 25, 2018

Ms. Stefanie Rittenhouse  
Sewage Planning Specialist  
Pennsylvania Department of Environmental Protection  
Southeast Regional Office  
2 East Main Street  
Norristown, PA 19401

Re: 145 King of Prussia Road, Radnor Township, Delaware County, Pennsylvania  
Penn Medicine at Radnor, Sewage Facilities Planning Module Application Mailer

Dear Ms. Rittenhouse:

The Township and its consultant have reviewed the methodology to determine the above referenced project's estimated flows of 53,630 gallons per day. There is adequate capacity to receive and convey the estimated flow of 53,630 gallons per day, and the waste load from the project will not create a hydraulic overload, organic overload, or a five-year projected overload.

Sincerely,

Stephen F. Norcini, PE  
Township Engineer  
Radnor Township  
[snorcini@radnor.org](mailto:snorcini@radnor.org)  
610-688-5600, ext. 130

CC: Robert A. Zienkowski, Township Manager  
Roger Phillips, PE, Gannett Fleming, Incorporated  
Michael Kissinger, PE, Pennoni Associates, Incorporated

1. Development Information

Name of Development Penn Medicine at Radnor  
 Developer Name University of Pennsylvania Health Systems  
 Address 3400 Spurce Street  
Philadelphia, PA 19104  
 Telephone # \_\_\_\_\_  
 Email \_\_\_\_\_

2. Location of Development

a. County Delaware  
 b. Municipality Radnor Township  
 c. Address or Coordinates 145 King of Prussia Road;  
Wayne, PA 19087  
 d. Tax Parcel # 36-02-0123-00  
 e. USGS Quad Name Norristown, PA  
 inches up 7.3 over 14.3  
 from bottom right corner of map.  
 f. Located in a High Quality/Exceptional Value watershed?  
 Yes  No

3. Type of Development Proposed (check appropriate box)

Residential  Multi-Residential  
 Describe \_\_\_\_\_  
 Commercial  Institutional  
 Describe Demolish existing office/research campus and  
construct 250,000-sf Ambulatory Care Building, 150,000-sf  
Office Building and 120 room Hotel.  
 Brownfield Site Redevelopment  
 Other (specify) \_\_\_\_\_

4. Size

a. # of lots 1 # of EDUs 0 (no increase)  
 b. # of lots since 5/15/72 1  
 c. Development Acreage 26  
 d. Remaining Acreage 0

5. Sewage Flows 0 (no increase) gpd

6. Proposed Sewage Disposal Method (check applicable boxes)

a.  Sewerage System  
 Existing (connection only)  New (extension)  
 Public  Private  
 Pump Station(s)/Force Main  Gravity  
 Name of existing system being extended  
Radnor Township  
 Interceptor Name Darby Creek  
 Treatment Facility Name City of Philadelphia's  
Southwest Wastewater Treatment Plant  
 NPDES Permit # PA0026671  
 b.  Construction of Treatment Facility  
 With Stream Discharge  
 With Land Application (not including IRSIS)  
 Other  
 Repair?  
 Name of waterbody where point of discharge is proposed  
 (if stream discharge)

c.  Onlot Sewage Disposal Systems  
 (check appropriate box)  
 Individual onlot system(s) (including IRSIS)  
 Community onlot system  
 Large-Volume onlot system  
 d.  Retaining tanks  
 Number of Holding Tanks \_\_\_\_\_  
 Number of Privies \_\_\_\_\_

7.  Request Sewage Facilities Planning Module forms in electronic format

8. Request for Planning Exemption

a. Protection of rare, endangered or threatened species  
 Check one:  
 The "PNDI Project Environmental Review Receipt" is attached.  
 or  
 A completed "PNDI Project Planning & Environmental Review Form," (PNDI Form) is attached. I request DEP staff to complete the required PNDI search for my project. I realize that my planning exemption will be considered incomplete and that the DEP processing of my planning exemption request will be delayed, until a "PNDI Project Environmental Review Receipt" and all supporting documentation from jurisdictional agencies (when necessary) is/are received by DEP.

Applicant or Consultant Initials \_\_\_\_\_

b.  Plot Plan Attached  Site Reports Attached

c. Onlot Disposal Systems

(1) I certify that the Official Plan shows this area as an onlot service area.

\_\_\_\_\_  
 (Signature of Municipal Official) Date

\_\_\_\_\_  
 Name (Print) Title

Municipality (must be same as in 2.b.)

Telephone # \_\_\_\_\_

(2) I certify that each lot in this subdivision has been tested and is suitable for both a primary and replacement sewage disposal system.

\_\_\_\_\_  
 Signature of SEO Date

\_\_\_\_\_  
 Name (Print) Certification #

Telephone # \_\_\_\_\_

(3) I certify that each lot in this subdivision is at least 1 acre in size

\_\_\_\_\_  
 (Signature of Project Applicant/Agent) Date

d. Public Sewerage Service (i.e., ownership by municipality or authority)

Based upon written documentation, I certify that the facilities proposed for use have capacity and that no overload exists or is projected within 5 years. (Attach documents.)

Stephan J. Puz 11/25/18  
 (Signature of Municipal Official) Date

Stephan F. Norcia Sup. Eng  
 Name (Print) Title

Municipality (must be same as in 2.b.)

Telephone # 610-688-5600 ext 130

Radnor Twp.  
Delaware County, Pa  
301 Iren Avenue  
Wayne Pa 19087

December 9, 2016 – revised January 23, 2017

UPHS1504

Mr. Steve Norcini  
Radnor Township  
301 Iven Avenue  
Wayne, PA 19087

**RE: SEWAGE MODULE EXEMPTION REQUEST  
PENN MEDICINE AT RADNOR  
145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP, DELAWARE COUNTY, PA**

Dear Mr. Norcini:

On behalf of the Trustees of the University of Pennsylvania Health System (UPHS), Pennoni is submitting a sewage planning module exemption for the above referenced project. UPHS is proposing the redevelopment of an existing 26-acre parcel, located at 145 King of Prussia Road in Radnor. The project site was formerly owned and operated by Bio-Med. Attached is a copy of Bio-Meds Industrial Wastewater Permit, which allowed the release of 100,000 gpd of sewage from the site.

Background/Existing Use:

The project site was formerly owned and operated by Bio-Med as a pharmaceutical research/manufacturing facility. During 2014 Bio-Med began ramping down their production and vacated the building in December 2014. Since December 2014 the building has been vacant. Due to the nature of the facility an Industrial Wastewater Permit was obtained for the site and is attached for reference. This permit allowed the release of 100,000 gpd of sewage from the site. In addition to the Industrial Wastewater Permit, please find quarterly monitoring reports prepared by IES Engineers and submitted to DELCORA as part of the monitoring required by the Industrial Wastewater Permit. As part of the reporting, meter reads were provided on a weekly basis. We are providing reports for Quarter 4 of 2009, Quarter 2 of 2010, Quarter 4 of 2013 and Quarter 4 of 2014. Additional flow data was provided by DELCORA for the remainder of 2010, 2011 and 2012. Based on the summarized data and discussions with DELCORA and PA DEP, we have excluded the 2014 flow data from our calculations, as this data is not representative of the previous sanitary flows. We have summarized the available data and determined an average daily flow of 63,383-gpd.

Proposed Use:

UPHS proposes to re-develop the 26-acre parcel to construct a new 250,000-sf Building for their use, a new 150,000-sf Office Building, and a new 120 room Hotel. UPHS proposed to relocate their practice from 250 King of Prussia Road to this new facility at 145 King of Prussia Road upon completion of the project. The following is a summary of the flow calculations for the various uses.

Penn Medicine Building:

Pennoni has reviewed existing water data from the existing Penn Medicine Radnor facility located at 250 King of Prussia Road. Based on this data, we have determined that the average sanitary flow per square-foot of building for that facility is 0.08 gpd/sf. A summary of this determination is included with the attached calculations. This average sanitary flow per square-foot of building was then applied to the new site to determine the flow associated with the new Penn Medicine Building (total of 250,000-sf at 0.08 gpd/sf), which is equivalent to 20,070-gpd.



Office Building:

A flow was calculated for the office building by utilizing the DEP flow of 10 gpd/employee. The number of employees was determined assuming 1 employee per 75 sf of building area. The office flow was determined to be 20,000 gpd (2,000 employees at 10 gpd/employee).

Hotel Building:

Existing water data was analyzed for a similar hotel use. The data was analyzed based on water usage during a twelve (12) month period. For the purposes of calculations, we have assumed an average occupancy of 80% for the twelve-month period. Water bills and a summary table are attached for your review. Based on our analysis the daily flow rate for this 96-room hotel is 10,889 gpd or 113 gpd/room. This average rate per room was then applied to the new site to determine the flow associated with the new 120 room hotel (120 rooms at 113 gpd/room), which is equivalent to 13,560 gpd.

The total combined flow for the site is equal to 53,630 gpd. Based on Radnor Township's criteria of 1 EDU equals 262.5 gpd, the flow from the project site of 53,630 gpd is equal to 206 EDUs. The existing site's Industrial Wastewater Permit which allowed for 100,000 gpd; however, based on our calculations had an average daily flow of 63,383-gpd or 241 EDUs, which is greater than the proposed flow. Please refer to the attached calculations for additional information.

The PA DEP Sewage Facilities Planning Module Application mailer and EDU Calculation have been completed for the project and are attached for your review. After reviewing the attached calculations, can you provide a letter stating that "there is adequate capacity to receive flows from the project and that the additional wasteload from the project will not create a hydraulic or organic overload or a 5-year projected overload." In addition, please sign the attached Sanitary Sewer Mailer, line 8.d and return to our office.

Should you have any questions or comments, concerning this matter, please do not hesitate to call me at (610) 422-2459 or email at [cpoterjoy@pennoni.com](mailto:cpoterjoy@pennoni.com). I would like to thank you in advance for your help with this project.

Sincerely,

**PENNONI ASSOCIATES INC.**



Christopher Poterjoy, PE  
Project Engineer

CRP/crp

Attachments

cc: Roger Phillips, Gannett Fleming  
Dave Adams, RHM  
Stefanie Rittenhouse, PA DEP  
William Cervino, Springfield Township  
Susan Guisinger-Colon, McCormick Taylor  
Ed Bothwell, DELCORA  
Charles Catania, Catania Engineering Associates, Inc.

**Pennoni Associates Inc.**JOB NO.: **UPHS1504**

Consulting Engineers

SHEET: 1 of 1

DATE:

1/23/2017

PROJECT: **Penn Medicine - Radnor**

BY: CRP

SUBJECT: **Sewage Flow Calculations**

CHK'D

**Scope:** Prepare ACT 537 Sewerage Facilities Planning Module Mailer for the proposed development at 145 King of Prussia Road. The project is for the re-development of the 26-acre parcel to include an Ambulatory Care Building, Office Building and Hotel.

**Approach:** Determine water use consumption at a similar facility, per dwelling unit, and apply to the proposed project. Assumption that the Water Usage equals the sewer usage.

**Previous Water Usage:** 100,000 gpd per Wastewater Discharge Permit No. 2DC-09-01

Assume 1 employee per 75-sf

Assume 1 EDU = 262.5-gpd

Previous Flow = 63,383-gpd (241 EDU)

	Average Daily Usage (gpd/sf or gpd/employee)	Average Number of Employees	Number of Rooms	Proposed Building Area (sf)	Proposed Average Daily Usage (gpd)	Proposed Average Daily Usage (EDU)
Penn Medicine	0.08	-	-	250,000	20,070	77
Office Building	10.00	2,000	-	150,000	20,000	77
Hotel Building	113.00	-	120	75,000	13,560	52
<b>Totals</b>				<b>475,000</b>	<b>53,630</b>	<b>206</b>

1. Development Information

Name of Development Penn Medicine at Radnor
Developer Name University of Pennsylvania Health Systems
Address 3400 Spurce Street
Philadelphia, PA 19104
Telephone #
Email

2. Location of Development

a. County Delaware
b. Municipality Radnor Township
c. Address or Coordinates 145 King of Prussia Road:
Wayne, PA 19087
d. Tax Parcel # 36-02-0123-00
e. USGS Quad Name Norristown, PA
inches up 7.3 over 14.3
from bottom right corner of map.
f. Located in a High Quality/Exceptional Value watershed?
Yes No

3. Type of Development Proposed (check appropriate box)

Residential Multi-Residential
Describe
Commercial Institutional
Describe Demolish existing office/research campus and
construct 250,000-sf Ambulatory Care Building, 150,000-sf
Office Building and 120 room Hotel.
Brownfield Site Redevelopment
Other (specify)

4. Size

a. # of lots 1 # of EDUs 0 (no increase)
b. # of lots since 5/15/72 1
c. Development Acreage 26
d. Remaining Acreage 0

5. Sewage Flows 0 (no increase) gpd

6. Proposed Sewage Disposal Method (check applicable boxes)

Sewerage System
Existing (connection only) New (extension)
Public Private
Pump Station(s)/Force Main Gravity
Name of existing system being extended
Radnor Township
Interceptor Name Darby Creek
Treatment Facility Name City of Philadelphia's
Southwest Wastewater Treatment Plant
NPDES Permit # PA0026671
Construction of Treatment Facility
With Stream Discharge
With Land Application (not including IRSIS)
Other
Repair?
Name of waterbody where point of discharge is proposed
(if stream discharge)

- Onlot Sewage Disposal Systems (check appropriate box)
Individual onlot system(s) (including IRSIS)
Community onlot system
Large-Volume onlot system

Retaining tanks
Number of Holding Tanks
Number of Privies

7. Request Sewage Facilities Planning Module forms in electronic format

8. Request for Planning Exemption

Protection of rare, endangered or threatened species
Check one:
The "PNDI Project Environmental Review Receipt" is attached.
or
A completed "PNDI Project Planning & Environmental Review Form," (PNDI Form) is attached. I request DEP staff to complete the required PNDI search for my project. I realize that my planning exemption will be considered incomplete and that the DEP processing of my planning exemption request will be delayed, until a "PNDI Project Environmental Review Receipt" and all supporting documentation from jurisdictional agencies (when necessary) is/are received by DEP.

Applicant or Consultant Initials

- Plot Plan Attached Site Reports Attached

c. Onlot Disposal Systems

I certify that the Official Plan shows this area as an onlot service area.

(Signature of Municipal Official) Date

Name (Print) Title

Municipality (must be same as in 2.b.)

Telephone #

I certify that each lot in this subdivision has been tested and is suitable for both a primary and replacement sewage disposal system.

(Signature of SEO) Date

Name (Print) Certification #

Telephone #

I certify that each lot in this subdivision is at least 1 acre in size

(Signature of Project Applicant/Agent) Date

d. Public Sewerage Service (i.e., ownership by municipality or authority)

Based upon written documentation, I certify that the facilities proposed for use have capacity and that no overload exists or is projected within 5 years. (Attach documents.)

(Signature of Municipal Official) Date

Name (Print) Title

Municipality (must be same as in 2.b.)

Telephone # \_\_\_\_\_

Return Correspondence/Forms to:

---

---

---

---

**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

---

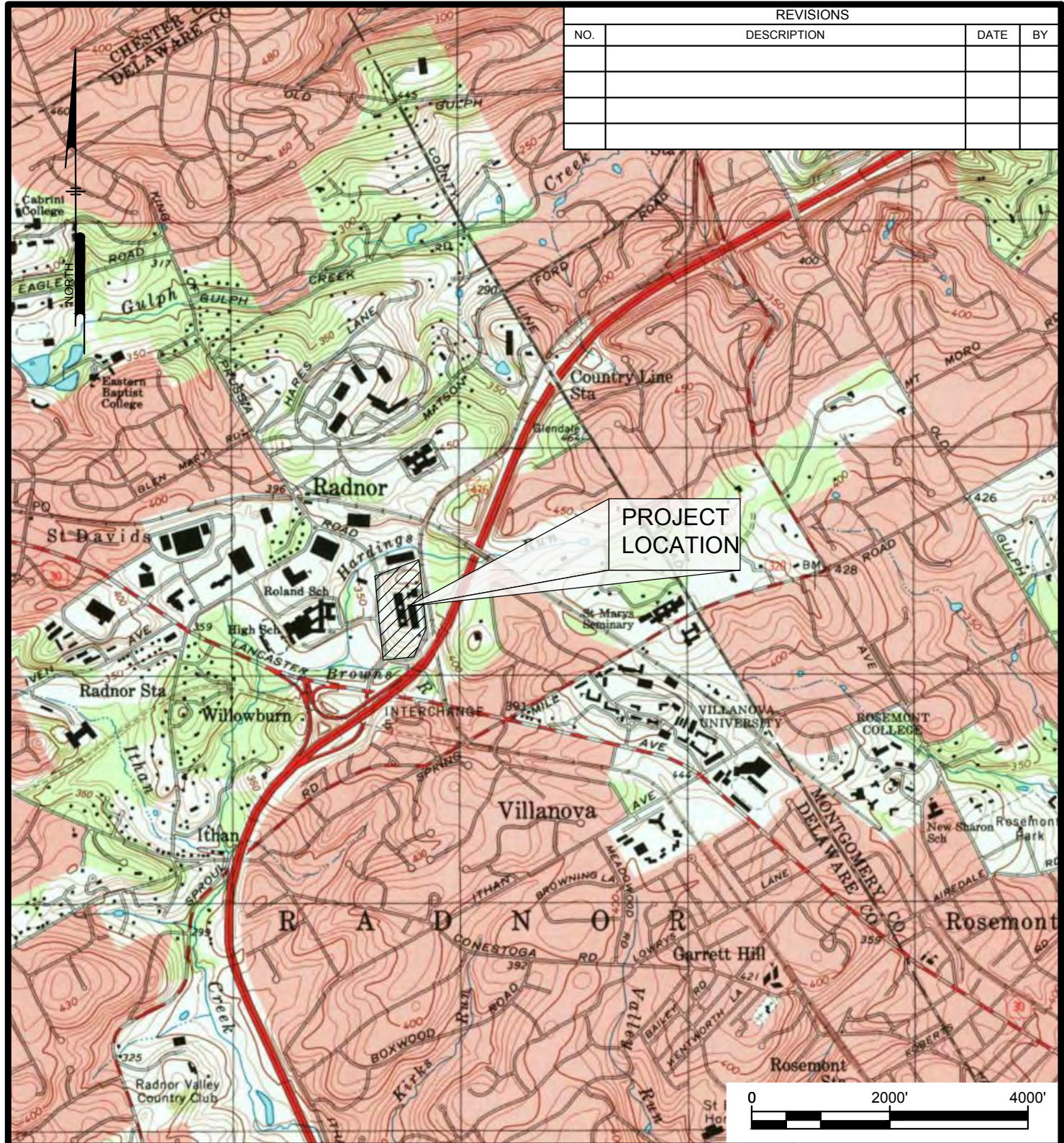
---

---

DEP USE	
<b>Components Sent</b>	
Onlot Disposal	<input type="checkbox"/>
Collection and Treatment	<input type="checkbox"/>
Planning Agency Review	<input type="checkbox"/>
Exempt from Planning	<input type="checkbox"/>
Code	_____
Date	_____

"Fold Here"





REVISIONS			
NO.	DESCRIPTION	DATE	BY

R:\PROJECTS\UPHS\1504-145 KING OF PRUSSIA ROAD\DESIGN\_PUBLISH\LOCATION MAP.DWG  
 PLOTTED: 3/18/2016 8:49:08 AM, BY: MICHAEL LOFTUS, PLOTSTYLE: PENNONI NCS.STB, PROJECT STATUS: ---



**PENNONI ASSOCIATES INC.**  
 One South Church Street, 2nd Floor  
 West Chester, PA 19382  
 T 610.429.8907 F 610.429.8918

ALL DOCUMENTS PREPARED BY PENNONI ASSOCIATES ARE INSTRUMENTS OF SERVICE IN RESPECT OF THE PROJECT. THEY ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS ON THE EXTENSIONS OF THE PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY PENNONI ASSOCIATES FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT OWNERS SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATES; AND OWNER SHALL INDEMNIFY AND HOLD HARMLESS PENNONI ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM.

**PENN MEDICINE AT RADNOR**  
 145 KING OF PRUSSIA ROAD  
 WAYNE, PA

**LOCATION MAP**

**UNIVERSITY OF PENNSYLVANIA HEALTH SYSTEMS**  
 3400 SPRUCE STREET  
 PHILADELPHIA, PA 19104

PROJECT	UPHS1504
DATE	2016-03-18
DRAWING SCALE	1"=2000'
DRAWN BY	MBL
APPROVED BY	CRP

**MAP-1**

SHEET 1 OF 1

# 1. PROJECT INFORMATION

Project Name: **UPHS1504**

Date of review: **8/24/2015 9:22:06 AM**

Project Category: **Development, New public/community development (school, library, church, museum)**

Project Area: **18.5 acres**

County: **Delaware** Township/Municipality: **Radnor**

Quadrangle Name: **NORRISTOWN** ~ ZIP Code: **19087**

Decimal Degrees: **40.040240 N, -75.354651 W**

Degrees Minutes Seconds: **40° 2' 24.9" N, -75° 21' 16.7" W**



# 2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

Note that regardless of PNDI search results, projects requiring a Chapter 105 DEP individual permit or GP 5, 6, 7, 8, 9 or 11 in certain counties (Adams, Berks, Bucks, Carbon, Chester, Cumberland, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill and York) must comply with the bog turtle habitat screening requirements of the PASPGP.

### 3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

#### PA Game Commission

**RESPONSE:** No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

#### PA Department of Conservation and Natural Resources

**RESPONSE:** No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

#### PA Fish and Boat Commission

**RESPONSE:** No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

#### U.S. Fish and Wildlife Service

**RESPONSE:** No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

### 4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special



concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at <http://www.naturalheritage.state.pa.us>.



## 5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page ([www.naturalheritage.state.pa.us](http://www.naturalheritage.state.pa.us)). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

## 6. AGENCY CONTACT INFORMATION

### PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section  
400 Market Street, PO Box 8552, Harrisburg, PA.  
17105-8552  
Fax:(717) 772-0271

### U.S. Fish and Wildlife Service

Pennsylvania Field Office  
110 Radnor Rd; Suite 101, State College, PA 16801  
NO Faxes Please.

### PA Fish and Boat Commission

Division of Environmental Services  
450 Robinson Lane, Bellefonte, PA. 16823-7437  
NO Faxes Please

### PA Game Commission

Bureau of Wildlife Habitat Management  
Division of Environmental Planning and Habitat Protection  
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797  
Fax:(717) 787-6957

## 7. PROJECT CONTACT INFORMATION

Name: Christopher Poterjoy, PE

Company/Business Name: Pennoni Associates Inc.

Address: One South Church St.; 2nd Floor

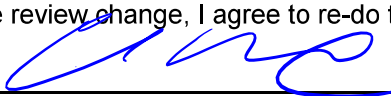
City, State, Zip: West Chester, PA 19382

Phone: ( 610 ) 422-2459 Fax: ( 610 ) 429-8918

Email: cpoterjoy@pennoni.com

## 8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

  
\_\_\_\_\_  
applicant/project proponent signature

8/24/2015

\_\_\_\_\_  
date

SEM



DELAWARE COUNTY REGIONAL WATER QUALITY CONTROL AUTHORITY  
P.O. Box 999 • Chester, PA 19016-0999

**WASTEWATER DISCHARGE PERMIT**

Permit No. **2DC-09-01**

In accordance with the provisions of the DELCORA Standards, Rules, and Regulations of 1991, Resolution No. 91-03 and 91-04, or as amended,

**BMR-145 King of Prussia Road, LP (Permittee)**  
**1205 Westlakes Drive**  
**Suite 240**  
**Radnor, Pennsylvania 19087**

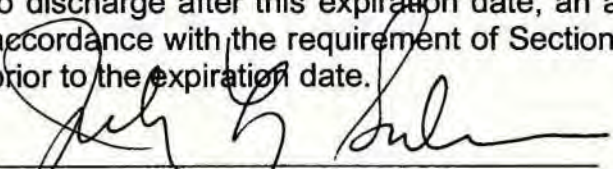
is hereby authorized to discharge industrial wastewater from the above identified facility into the DELCORA sewer system in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit.

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.

This permit will be reopened and modified by DELCORA to incorporate any new or revised Federal, State, or Local Pretreatment Standards or requirements. Modified permits will be reissued according to Section 321 of Resolution No. 91-03.

This permit shall become effective on **October 5, 2006** and shall expire at midnight on **October 4, 2010**.

The Permittee shall not discharge after the date of expiration. If the Permittee wishes to continue to discharge after this expiration date, an application must be filed for reissuing of this permit in accordance with the requirement of Section 319 of Resolution No. 91-03, a minimum of 180 days prior to the expiration date.

  
\_\_\_\_\_  
Signature

\_\_\_\_\_  
Executive Director  
Title

\_\_\_\_\_  
Joseph L. Salvucci  
Name (Typed)

\_\_\_\_\_  
9-29-06  
Date

- |  |  |  |  |
|--|--|--|--|
| ADMINISTRATION                             | CUSTOMER SERVICE/BILLING                   | PURCHASING & STORES                        | PLANT & MAINTENANCE                        |
| <input type="checkbox"/> 610-876-5523      | <input type="checkbox"/> 610-876-5526      | <input type="checkbox"/> 610-876-5523      | <input type="checkbox"/> 610-876-5523      |
| <input type="checkbox"/> FAX: 610-876-2728 | <input type="checkbox"/> FAX: 610-876-1460 | <input type="checkbox"/> FAX: 610-497-7959 | <input type="checkbox"/> FAX: 610-497-7950 |

## **DEFINITION OF TERMS AND ABBREVIATIONS**

**Accidental Discharge** - Any unpermitted or non-routine discharge of pollutants into the sewer system, which may be intentional or unintentional in nature or cause problems to the POTW.

**Authority** - DELCORA, The Delaware County Regional Water Quality Control Authority, including agents or persons authorized to act on its behalf.

**B.O.D.<sub>5</sub>** - 5-Day Biochemical Oxygen Demand as outlined in 40 CFR 136.

**B.O.D.<sub>20</sub>** - 20-Day Biochemical Oxygen Demand with nitrogenous demand inhibited, also called First Stage Oxygen Demand (FSOD).

**BTEX** - Benzene, Toluene, Ethylbenzene and Xylenes.

**Bypass** - The intentional diversion of wastestreams from any portion of an Industrial User's pretreatment facility.

**City** - City of Philadelphia Water Department

**COD** - Chemical Oxygen Demand as outlined in 40 CFR 136.

**Composite Sample** - A sample prepared by combining discrete samples collected from the wastestream either at periodic time intervals or in proportion to the wastestream flow. The frequency of discrete sample collection is variable.

**24 HC** - 24-hour composite sample, either time or flow proportional.

**CTAS** - Cobalt thiocyanate active substances, also called nonionic surfactants.

**Daily Maximum** - The maximum allowable discharge of a pollutant into the sewer system during a calendar day. Where expressed in units of mass, it is the total mass discharged in one day. Where expressed in concentration, it is the arithmetic average of that pollutant from all measurements taken that day.

**F.O.G.** - Fats, oils and greases, listed as oil and grease in 40 CFR 136 for purposes of analysis.

**GPD** - Gallons per day.

**Grab Sample** - An individual, discrete sample collected from a wastestream on a one-time basis, in 15 minutes or less, and with no regard to the volume of flow of the wastestream.

**Industrial Wastewater** - The liquid or water-borne wastes from industrial or manufacturing processes. Unless specifically stated otherwise, this term shall not include sanitary sewage or sanitary wastewater components.

**Monthly Average** - The arithmetic mean of the values for effluent samples collected over a calendar month. Sum of the values divided by the number of samples. In the case of flow, it is the total flow for the month divided by the number of days discharged.

MBAS - Methylene blue active substances, also called Anionic Surfactants.

MGD -Millions of gallons per day.

NAICS – North American Industry Classification System

Peak Daily Rate -The maximum allowable flow of wastewater to the sewer system in a calendar day.

Priority Pollutants - Metals, Base/Neutral Organics, Acid Organics, Volatile Organics, Pesticides/PCB's, Cyanide and Phenol as listed by the EPA.

- Metals -antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium and zinc.
- Acid/Base/Neutral Organics - organic compounds extractable.
- Volatile Organics – also called purgable organics.

Process Wastewater - Any water which during manufacturing or processing, comes into direct contact with or results from the production or use of: any raw material, intermediate product, finished product, by-product, or waste product. It can be discharged continuously, intermittently, or as a batch.

PWD – Philadelphia Water Department

Shall - Mandatory requirement.

SIC - Standard Industrial Classification as listed in the Standard Industrial Classification Manual issued by the U.S. Government Printing Office.

Slug Discharge - Any discharge of a non-routine, episodic nature including but not limited to an accidental spill or non-customary batch discharge, which could cause a violation of the prohibited discharge standards of Section 202 (A) (1) – (8) of DELCORA's Standards Rules.

TDS – Total dissolved solids, also listed as filterable residue.

TSS – Total suspended solids, also listed as nonfilterable residue. That which is retained during laboratory filtering per 40 CFR 136.

TKN – Total Kjeldahl Nitrogen.

TOX – Total halogenated organics as listed in Appendix A of 40 CFR 136.

TPH – Total petroleum hydrocarbons.

All terms used in this permit which are not defined in this section are taken to have the same meaning as that in the Delcora Standards, Rules, and Regulations of 1991, Delcora Resolution No. 91-03.

**PART I - EFFLUENT LIMITATIONS**

A. During the period of October 5, 2006 to October 4, 2010 the Permittee is authorized to discharge processed wastewater from \_\_\_\_\_ to the DELCORA sewer system through the outfall(s) listed below:

**OUTFALL**

**001**

**DESCRIPTION**

**Research Building connection at manhole along King of Prussia Road as noted in Site Plan, L-1-774 submitted with application.**

B. During the period of October 5, 2006 to October 4, 2010 the process discharge(s) through Outfall **001** shall comply with all applicable Federal, State and Local Statutes, Ordinances and Regulations, including Resolution No. 91-04 and the following effluent limitations:

**EFFLUENT LIMITATIONS**

<b><u>PARAMETER</u></b>	<b><u>MONTHLY AVERAGE RATE (GPD)</u></b>	<b><u>PEAK DAILY RATE (GPD)</u></b>	<b><u>DAILY MAXIMUM (µCi/mL)</u></b>
Flow	100,000	120,000	
pH			(1)
<b>Radioactive Materials:</b>			
Tritium (H <sub>3</sub> )			1x10 <sup>-2</sup>
Carbon-14			3x10 <sup>-4</sup>
Iodine-125			2x10 <sup>-5</sup>
Chromium-51			5x10 <sup>-3</sup>
Phosphorous-32			9x10 <sup>-5</sup>
Sulfur-35			1x10 <sup>-3</sup>
Indium-111			6x10 <sup>-4</sup>

**NOTES:**

(1) The pH shall not be less than 5.5 nor greater than 12.0 standard units (S.U.) at any time.

## PART II - MONITORING REQUIREMENTS

- A. From the period of October 5, 2006 to October 4, 2010 the Permittee shall monitor Outfall 001 for the following:

<u>Parameter</u>	<u>Sample Location</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow	---	Continuous	Meter (1)
pH	(2)	1x/Week	Grab
TSS	(2)	1x/Month	10 HC (3)
BOD <sub>5</sub>	(2)	1x/Month	10 HC (3)
Tritium (H <sub>3</sub> )	(2)	1x/Month	10 HC (3) (4)
Carbon-14	(2)	1x/Month	10 HC (3) (4)
Iodine-125	(2)	1x/Month	10 HC (3) (4)
Chromium-51	(2)	1x/Month	10 HC (3) (4)
Phosphorus-32	(2)	1x/Month	10 HC (3) (4)
Sulfur-35	(2)	1x/Month	10 HC (3) (4)
Indium – 111	(2)	1x/Month	10 HC (3) (4)

### NOTES:

- (1) The meter shall be the incoming water meter for the entire facility. It shall be calibrated once per year and a certification of accuracy filed no later than January 28<sup>th</sup> for the previous year. The flow shall be read and recorded on a weekly basis.
  - (2) Samples shall be collected from a manhole outside the research building, which contains only that buildings discharge, before mixing with any other discharge.
  - (3) A 10-hour (7:00 a.m. – 5:00 p.m.) shall be collected with an automatic sampling device capable of collecting at least one (1) sample per hour and maintaining sample temperatures at 4°C.
  - (4) In lieu of composite samplings for radioisotopes, BMR-145 King of Prussia LP may have Centocor, Inc. (tenant), report daily disposal limits and records of all radioactive isotopes discharged, measured against an internal standard that does not exceed 1/10 of the Nuclear Regulatory limit on a monthly basis to DELCORA. BMR-145 King of Prussia LP must be in compliance with the effluent limitations.
- B. All handling and preservation of collected samples and laboratory analyses of samples shall be performed in accordance with 40 CFR Part 136 and amendments thereto unless specified otherwise in the monitoring conditions of this permit.

## PART III - OPERATION & MAINTENANCE OF POLLUTION CONTROLS

### A. Pretreatment Facilities and Control Structure Provisions.

Where deemed necessary to comply with applicable regulations and the terms of this permit, Permittee shall provide suitable pretreatment facilities. They shall be planned, designed, constructed, owned, operated, and maintained by the Permittee at his expense and shall be located for ease of inspection and cleaning.

A summary of the pretreatment system(s) to be provided by Permittee follows:

**Acid Neutralization Tank for research building (laboratory sink discharge).**

**Adhere to all Nuclear Regulatory Commission (NRC) regulations concerning radionuclide disposal in accordance with the permittee's NRC License.**

It is Permittee's responsibility to effectively manage these facilities. Failure to do so constitutes a violation of DELCORA's regulations and is subject to enforcement as cited therein.

The Permittee shall also provide a suitable control structure for the inspection, observation, sampling, and flow measurement of Permittee's industrial contribution. The control structure shall be safe, accessible at all times, secure from unauthorized tampering, and continuously operated and maintained at Permittee's expense. In addition to being compatible with all of Permittee's monitoring requirements, the control structure shall be of suitable capabilities so as to accommodate the installation of DELCORA's monitoring equipment.

In addition, the following monitoring and control equipment shall be provided:

1. The Permittee shall install and maintain at its expense suitable (totalizing) flow meter(s) of design and manufacture acceptable to DELCORA which will continuously monitor rates of flow and/or volumes of wastewater being discharged to the DELCORA Wastewater Management System.
2. The Permittee shall incorporate a lockable isolation device as a means to sever access to the system satisfactory to DELCORA.

### B. Duty to Halt or Reduce Activity.

Upon reduction, loss or failure of the Permittee's pretreatment facility, the Permittee shall, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until operation of the pretreatment facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power for the pretreatment facility fails or is reduced.

### C. Bypass of Treatment Facilities.

- (1) Bypass is prohibited unless it is unavoidable to prevent loss of life, personal injury or severe property damage or no feasible alternatives exist.



(2) Bypass not exceeding limitations. The Permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it is also for essential maintenance or to assure efficient pretreatment facility operation.

(3) Notification of bypass:

- (a) Anticipated bypass. If the Permittee knows in advance of the need for a bypass, it shall submit prior written notice, at least ten (10) days before the date of the bypass, to DELCORA and the Philadelphia Water Department.
- (b) Unanticipated bypass. The Permittee shall immediately notify DELCORA and the Philadelphia Water Department and submit a written notice to the POTW within 5 days. This report shall specify:
  - (i) A description of the bypass, and its cause, including its duration;
  - (ii) Whether the bypass has been corrected; and
  - (iii) The steps being taken or to be taken to reduce, eliminate and prevent a reoccurrence of the bypass.

#### **PART IV - REPORTING REQUIREMENTS**

##### **A. Self-Monitoring Reports**

Monitoring results obtained shall be summarized and reported on an Industrial User Monitoring Form on a **quarterly** basis. The reports are due on the twenty-eighth (28th) of the month following the period covered by the report. The written report shall be certified and signed by an Authorized Representative of the Industrial User. Contents of the report are defined under Part II, Section A of this permit.

1. Where the Permittee contracts sample analyses (in satisfaction of monitoring requirements), a copy of the laboratory report showing results, methods used, and signature(s) shall be included with the self-monitoring report. It is the Permittee's responsibility to ensure contract laboratory compliance with Part II, Section B of this permit.
2. Where the Permittee performs sample analyses in satisfaction of monitoring requirements, the Permittee shall ensure compliance with Part II, Section B of this permit.
3. The monthly monitoring report shall include a statement as to whether or not Industrial User has achieved compliance with Federal and local pretreatment limits.
4. If Industrial User has not achieved compliance with all limits, the monthly monitoring report shall;
  - a. Provide an explanation for failure to achieve compliance; and

- b. A proposed corrective plan, including milestone dates, shall be submitted to and approved by DELCORA and, should a compliance schedule be necessary, it shall be appended to this Permit as Part VI.
  5. If Industrial User's manufacturing process ceases to involve a pollutant parameter listed in Part I a principal or executive officer of Industrial User may so certify to this fact on an annual basis. Upon approval of this certification by DELCORA, testing and reporting for that parameter shall be limited to once per 6 months.
  6. Industrial User shall notify the Authority of any changes in production which exceed twenty percent (20%) of the production units used in calculating production based limits, if applicable.
  7. Monitoring reports shall be based upon data obtained through appropriate sampling and analysis performed during the period covered by the report, which is representative of conditions occurring during the reporting period.
- B. If the Permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of such monitoring shall be included in the calculation and results shall be reported in the report and submitted to DELCORA.

C. Automatic Resampling

If the results of the Permittee's wastewater analysis indicate a effluent limit exceedance has occurred, the Permittee must:

1. Inform DELCORA of the violation within 24 hours of awareness of result; and
2. Repeat the sampling and pollutant analysis and submit, in writing, the results of this second analysis within thirty (30) days of becoming aware of the first violation. The industrial user is not required to resample if:
  - (A) The Control Authority performs sampling at the industrial user at a frequency of at least once per month.
  - (B) The Control Authority performs sampling at the industrial user between the time when the user performs the initial sampling and the time when the user receives the results of this sampling.

D. Potential Problems for POTW (Accidental or Intentional Discharge)

1. The Permittee shall notify DELCORA immediately upon the occurrence of an intentional or uncontrolled discharge that may cause problems to the POTW or that does or may violate permit conditions. Notification shall be by telephone at (610)876-5523, extension 213 from 8:30 a.m. to 4:30 p.m., and (610)876-5523, extension 214, 24 hours a day, and to Philadelphia Water Department at (215)686-4514, 24 hours a

day. The notification shall include location of discharge, date and time thereof, type of waste, including concentration and volume, and corrective action taken.

Within five (5) days following such a discharge, the Permittee shall submit to DELCORA a detailed written report. The report shall specify:

- a. Description and cause of the slug loading or unintentional discharge or problem discharge, and the impact on the Permittee's compliance status. The description should also include location of discharge, type, concentration and volume of waste.
- b. Duration of noncompliance, including exact dates and times of noncompliance, and if the noncompliance continues, the time by which compliance is reasonably expected to occur.
- c. All steps taken or to be taken to reduce, eliminate, and prevent recurrence of such a slug loading, intentional discharge, problem discharge or other conditions of noncompliance.

#### E. Facility Changes

The Permittee shall give notice to DELCORA 90 days prior to any facility expansion, production increase process modifications or other changes which result in new or substantially increased discharges or a change in the nature of the discharge.

#### F. Signatory Requirements

- (1) All applications, correspondence, reports and self-monitoring reports shall be signed and certified:
  - a) In the case of a corporation, a president, secretary, treasurer or vice president of the corporation in charge of a principle business function or any other person who performs similar policy-making or decision-making functions for the corporation; or the manager of one or more manufacturing, production or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures; or
  - b) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or
  - c) For a government entity: by the administrator, chairman, director, or principal executive responsible for operation at the facility.
- (2) All applications, correspondence, reports, and self-monitoring reports may be signed by a duly authorized representative of the person described above. A person is a duly authorized representative only if:
  - a) The authorization is made in writing by a person described in Section F (1), above;

- b) The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, superintendent, or position of equivalent responsibility, or having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

(3) Certification. All applications and reports shall contain the following certification:

" I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

G. All reports required by this permit shall be submitted to DELCORA and Philadelphia Water Department at the following addresses:

Delaware County Regional Water Quality Control Authority (DELCORA)  
Post Office Box 999  
Chester, Pennsylvania 19016  
Attention: Laboratory & Pretreatment Manager  
Or By Courier Service:  
100 E. 5<sup>th</sup> Street, Chester, PA 19016

and

Philadelphia Water Department  
9001 State Road  
Philadelphia, Pennsylvania 19136  
Attention: Joseph Cerrone

## **PART V - GENERAL CONDITIONS**

### **A. Re-opener Clause**

This permit will be reopened and modified by DELCORA to incorporate any new or revised Federal, State, or Local Pretreatment Standards or requirements. Modified permits will be reissued according to Section 321 of Resolution No. 91-03.

### **B. Non-Transferability**

A Wastewater Discharge Permit issued for industrial usage of the system shall not be reassigned or transferred or sold to a new owner, new user, or different premises without the express written consent of DELCORA. The industrial user must provide at least 30 days advance written notice to DELCORA.

C. Site Access

DELCORA personnel shall be admitted to any site which contributes wastewater to the DELCORA Wastewater Management System for the purpose of inspection, record examination, monitoring, sampling, enforcement or any other form of surveillance deemed necessary in determining a User's compliance with these Standards, Rules and Regulations, including securing copies of any relevant documents or other information.

DELCORA shall exert every effort to be reasonable in the exercise of this provision including, where feasible, scheduling such access during times when the site is normally occupied. However, this shall not preclude the Authority from securing entrance upon minimal notification at unusual times regardless of site occupancy if there is urgent cause for such admittance, or if reasons for access are not consistent with advance notice. In either case, whether scheduled or unannounced, site access shall not be unduly withheld; the presentation of suitable credentials shall entitle the bearer prompt site admittance. It shall be the User's responsibility to incorporate this requirement with any applicable security procedures employed so that prompt admittance for the performance of these specific responsibilities will not be impeded.

D. Retention of Records

The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit as well as; 1) The date, exact place, method and time of sampling and the names of the person or persons taking the samples. 2) The dates analysis were performed, 3) Who performed the analysis 4) The analytical techniques / methods used and the results of such analysis and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of DELCORA at any time.

E. Severability

The provisions of this permit are severable. If any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

F. Duty to Comply

The Permittee must comply with all conditions of this permit. Failure to comply with the requirements of this permit may be grounds for administrative action, or enforcement proceedings including civil or criminal penalties, injunctive relief, and summary abatements.

G. Penalties for Violations of Permit Conditions

DELCORA's Resolution No. 91-03 provides that any person who violates a permit condition is subject to a civil penalty of up to \$25,000.00 per day, per violation, up to the maximum penalty or fine allowable by law. Any person who willfully or negligently violates permit conditions is subject to a fine of up to \$25,000.00 per day, per violation, or by imprisonment, or both.

DELCORA may further require Industrial User to take corrective steps to achieve compliance. These penalties do not relieve Industrial User from any other civil or criminal penalties which may be leveled under federal, state or local laws or DELCORA's Wastewater Control Regulations.

For any accidental or slug discharge, DELCORA may assess Industrial User all costs incurred by DELCORA and/or PWD, including but not limited to remediation costs, legal fees, and penalties incurred by DELCORA and/or PWD under federal, state or local law. Additionally, all penalties under federal, state or local law incurred by DELCORA as a direct result of any violation of this Permit may be assessed against the Industrial User.

Within fifteen (15) days from DELCORA's notice of failure to fulfill any condition of the Permit, Industrial User shall provide both DELCORA and PWD with an explanation of the failure. Within thirty (30) days Industrial User shall submit a proposed plan to achieve compliance with the condition, if necessary.

#### H. Spill Prevention Plan

Within three (3) months of the effective date of this Permit, Industrial User shall submit to DELCORA for DELCORA's written approval an accidental spill prevention plan ("spill plan") specifying processes to eliminate or minimize any accidental or slug discharges. DELCORA's written approval of a spill plan shall not relieve Industrial User of any liability under Federal, state or local law. The spill plan shall contain, at a minimum, the following elements:

- (a) Description of discharge practices, including routine and non-routine batch discharges;
- (b) Description of stored chemicals;
- (c) Procedures for promptly notifying Delcora of slug discharges as defined under 40 CFR Section 403.5(b), with procedures for follow-up written notification within five (5) days;
- (d) Any necessary procedures to prevent accidental spills, including maintenance of storage areas, handling and transfer of materials; loading and unloading operations, and control of plant site runoff;
- (e) Any necessary measures for building containment structures or equipment;
- (f) Any necessary measures to assure the integrity of storage vessels and piping;
- (g) Any necessary measures for controlling toxic organic pollutants (including solvents);
- (h) Any necessary procedures and equipment for emergency response;
- (i) Any necessary follow-up practices to limit the damage suffered by the treatment plant or its environment.

#### I. Proper Disposal of Pretreatment Sludges and Spent Chemicals and Hazardous Waste

An Industrial User must dispose of a hazardous sludge and spent chemicals in accordance with any applicable laws including but not limited to Section 405 of the Clean Water Act and

Subtitles C and D of the Resources Conservation and Recovery Act ("RCRA"). The user must notify DELCORA in the event of a discharge of a substance which, if otherwise disposed of, would be a hazardous waste under 40 CFR 261.

J. Confidentiality

An Industrial User may assert confidentiality claims in accordance with 40 CFR Part 403.14 by designating business information as such. DELCORA and PWD will maintain reasonably designated information as confidential from third parties except for federal or state agencies. In the event of a third party request for access to confidential business information, the Industrial User shall indemnify and defend DELCORA and PWD or the claim of confidentiality shall be deemed waived.

K. Dilution

The Industrial User shall not increase the use of potable or process water or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in this permit.

L. Revocation of Permit

- (1) This Permit may be modified, revoked and reissued, or terminated for good cause including, but not limited to, the following:
  - (a) To incorporate any new or revised federal, state, or local pretreatment standards or requirements;
  - (b) Material or substantial alterations or additions to Industrial Users operation which were not covered in the effective permit;
  - (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge;
  - (d) Information indicating that the permitted discharge poses a threat to DELCORA's collection and treatment systems, plant personnel or the receiving waters;
  - (e) Violation of any terms or conditions of this Permit;
  - (f) Obtaining this Permit by misrepresentation or failure to disclose fully all relevant facts; or
  - (g) Upon request of the Industrial User, provided such request does not create a violation of any existing applicable requirements, standards, laws or rules and regulations.
- (2) The filing of a request by an Industrial User for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

**PART VI – NOTES & REVISIONS**

9/28/06: Name change from Bio Med Realty to current

**PART VI - COMPLIANCE SCHEDULE**

None

Acknowledgement of Permit Receipt: (This in no way states or implies contractual agreement.)

By: BMR-145 King of Prussia Road GP LLC,  
Permittee's General Partner

  
\_\_\_\_\_  
Permittee Signature

**Kent Griffin**

\_\_\_\_\_  
Full Name of Signatory (Typed)

**Chief Financial Officer**

\_\_\_\_\_  
Title of Signatory (Typed)

10/6/06  
\_\_\_\_\_  
Date



**Pennoni Associates Inc.**JOB NO.: **UPHS1504**

Consulting Engineers

SHEET: 1 of 1

DATE:

11/16/2016

PROJECT **Penn Medicine - Radnor**

BY: CRP

SUBJECT: **Sewage Flow Calculations**

CHK'D

Year	Average Flow (gpd)
2009	66,433
2010	69,085
2011	62,193
2012	59,640
2013	59,563
2014	39,713
<b>Total Average (2009 to 2013)</b>	<b>63,383</b>

\* Excludes 2014 data

**Pennoni Associates Inc.**JOB NO.: **UPHS1504**

Consulting Engineers

SHEET: 1 of 1

DATE:

11/16/2016

PROJECT: **Penn Medicine - Radnor**

BY: CRP

SUBJECT: **Sewage Flow Calculations**

CHK'D

## 2009 Q4 Results

Date Range		Number Days in Period	Total Flow (gal)	Total Flow (gpd)
1/6/2009	1/13/2009	7.00	340,220.00	48,602.86
1/13/2009	1/20/2009	7.00	361,930.00	51,704.29
1/20/2009	1/27/2009	7.00	354,440.00	50,634.29
1/27/2009	2/3/2009	7.00	357,370.00	51,052.86
2/3/2009	2/10/2009	7.00	488,640.00	69,805.71
2/10/2009	2/17/2009	7.00	253,100.00	36,157.14
2/17/2009	2/24/2009	7.00	373,160.00	53,308.57
2/24/2009	3/3/2009	7.00	424,960.00	60,708.57
3/3/2009	3/10/2009	7.00	420,940.00	60,134.29
3/10/2009	3/17/2009	7.00	479,210.00	68,458.57
3/17/2009	3/24/2009	7.00	438,020.00	62,574.29
3/24/2009	3/31/2009	7.00	521,770.00	74,538.57
3/31/2009	4/7/2009	7.00	337,770.00	48,252.86
4/7/2009	4/14/2009	7.00	424,900.00	60,700.00
4/14/2009	4/21/2009	7.00	601,130.00	85,875.71
4/21/2009	4/28/2009	7.00	425,660.00	60,808.57
4/28/2009	5/5/2009	7.00	494,390.00	70,627.14
5/5/2009	5/12/2009	7.00	510,270.00	72,895.71
5/12/2009	5/19/2009	7.00	540,730.00	77,247.14
5/19/2009	5/27/2009	8.00	512,590.00	64,073.75
5/27/2009	6/2/2009	6.00	507,050.00	84,508.33
6/2/2009	6/9/2009	7.00	525,220.00	75,031.43
6/9/2009	6/15/2009	6.00	496,480.00	82,746.67
6/15/2009	6/23/2009	8.00	672,320.00	84,040.00
6/23/2009	6/30/2009	7.00	460,260.00	65,751.43
6/30/2009	7/7/2009	7.00	623,830.00	89,118.57
7/7/2009	7/14/2009	7.00	607,690.00	86,812.86
7/14/2009	7/21/2009	7.00	592,440.00	84,634.29
7/21/2009	7/28/2009	7.00	620,050.00	88,578.57
7/28/2009	8/4/2009	7.00	664,970.00	94,995.71
8/4/2009	8/11/2009	7.00	639,000.00	91,285.71
8/11/2009	8/18/2009	7.00	795,180.00	113,597.14
8/18/2009	8/25/2009	7.00	502,500.00	71,785.71
8/25/2009	9/1/2009	7.00	556,190.00	79,455.71
9/1/2009	9/8/2009	7.00	473,370.00	67,624.29
9/8/2009	9/15/2009	7.00	498,460.00	71,208.57
9/15/2009	9/22/2009	7.00	550,600.00	78,657.14
9/22/2009	9/29/2009	7.00	468,000.00	66,857.14
9/29/2009	10/6/2009	7.00	454,140.00	64,877.14
10/6/2009	10/13/2009	7.00	385,800.00	55,114.29
10/13/2009	10/20/2009	7.00	423,360.00	60,480.00
10/20/2009	10/27/2009	7.00	426,480.00	60,925.71
10/27/2009	11/3/2009	7.00	445,690.00	63,670.00
11/3/2009	11/12/2009	9.00	516,500.00	57,388.89
11/12/2009	11/17/2009	5.00	320,210.00	64,042.00
11/17/2009	12/1/2009	14.00	349,590.00	24,970.71
12/1/2009	12/9/2009	8.00	410,090.00	51,261.25
12/9/2009	12/16/2009	7.00	362,820.00	51,831.43
12/16/2009	12/22/2009	6.00	362,830.00	60,471.67
12/22/2009	12/29/2009	7.00	385,680.00	55,097.14
12/29/2009	1/5/2010	7.00	423,580.00	60,511.43
		<b>364.00</b>	<b>24,181,580.00</b>	<b>66,432.91</b>

**Pennoni Associates Inc.**JOB NO.: **UPHS1504**

Consulting Engineers

SHEET: 1 of 1

DATE:

11/16/2016

PROJECT: **Penn Medicine - Radnor**

BY: CRP

SUBJECT: **Sewage Flow Calculations**

CHK'D

## 2010 Q2 Results

Date Range		Number Days in Period	Total Flow (gal)	Total Flow (gpd)
1/5/2010	1/12/2010	7.00	423,580.00	60,511.43
1/12/2010	1/19/2010	7.00	412,800.00	58,971.43
1/19/2010	1/26/2010	7.00	414,790.00	59,255.71
1/26/2010	2/2/2010	7.00	488,230.00	69,747.14
2/2/2010	2/9/2010	7.00	324,600.00	46,371.43
2/9/2010	2/16/2010	7.00	416,520.00	59,502.86
2/16/2010	2/23/2010	7.00	355,310.00	50,758.57
2/23/2010	3/2/2010	7.00	616,710.00	88,101.43
3/2/2010	3/9/2010	7.00	35,590.00	5,084.29
3/9/2010	3/16/2010	7.00	447,980.00	63,997.14
3/16/2010	3/23/2010	7.00	341,300.00	48,757.14
3/23/2010	3/30/2010	7.00	539,200.00	77,028.57
3/30/2010	4/6/2010	7.00	408,300.00	58,328.57
4/6/2010	4/13/2010	7.00	385,340.00	55,048.57
4/13/2010	4/20/2010	7.00	386,800.00	55,257.14
4/20/2010	4/27/2010	7.00	459,830.00	65,690.00
4/27/2010	5/5/2010	8.00	425,050.00	53,131.25
5/5/2010	5/11/2010	6.00	403,670.00	67,278.33
5/11/2010	5/18/2010	7.00	444,520.00	63,502.86
5/18/2010	5/25/2010	7.00	541,860.00	77,408.57
5/25/2010	6/1/2010	7.00	600,990.00	85,855.71
6/1/2010	6/8/2010	7.00	610,730.00	87,247.14
6/8/2010	6/15/2010	7.00	633,950.00	90,564.29
6/15/2010	6/22/2010	7.00	595,970.00	85,138.57
6/22/2010	6/29/2010	7.00	661,100.00	94,442.86
6/29/2010	7/6/2010	7.00	822,030.00	117,432.86
7/6/2010	7/13/10	7.00	464,330.00	66,332.86
7/13/2010	7/20/10	7.00	787,970.00	112,567.14
7/20/2010	7/27/10	7.00	661,940.00	94,562.86
7/27/2010	8/3/10	7.00	712,890.00	101,841.43
8/3/2010	8/10/10	7.00	869,820.00	124,260.00
8/10/2010	8/17/10	7.00	716,830.00	102,404.29
8/17/2010	8/24/10	7.00	603,470.00	86,210.00
8/24/2010	8/31/10	7.00	662,390.00	94,627.14
8/31/2010	9/7/10	7.00	622,030.00	88,861.43
9/7/2010	9/14/10	7.00	346,100.00	49,442.86
9/14/2010	9/21/10	7.00	653,700.00	93,385.71
9/21/2010	9/28/10	7.00	438,600.00	62,657.14
9/28/2010	10/5/10	7.00	445,000.00	63,571.43
10/5/2010	10/12/10	7.00	403,100.00	57,585.71
10/12/2010	10/19/10	7.00	392,900.00	56,128.57
10/19/2010	10/26/10	7.00	409,040.00	58,434.29
10/26/2010	11/2/10	7.00	342,730.00	48,961.43
11/2/2010	11/9/10	7.00	362,220.00	51,745.71
11/9/2010	11/16/10	7.00	348,840.00	49,834.29
11/16/2010	11/23/10	7.00	367,660.00	52,522.86
11/23/2010	11/30/10	7.00	399,270.00	57,038.57
11/30/2010	12/7/10	7.00	383,720.00	54,817.14
12/7/2010	12/14/10	7.00	358,770.00	51,252.86
12/14/2010	12/21/10	7.00	356,790.00	50,970.00
12/21/2010	12/28/10	7.00	356,600.00	50,942.86
		<b>357.00</b>	<b>24,663,460.00</b>	<b>69,085.32</b>

**Pennoni Associates Inc.**

Consulting Engineers

JOB NO.: **UPHS1504**

SHEET: 1 of 1

DATE:

11/16/2016

PROJECT: **Penn Medicine - Radnor**

BY: CRP

SUBJECT: **Sewage Flow Calculations**

CHK'D

## 2011 Q4 Results

Date Range		Number Days in Period	Total Flow (gal)	Total Flow (gpd)
12/28/2010	1/4/11	7.00	411,080.00	58,725.71
1/4/2011	1/11/11	7.00	410,550.00	58,650.00
1/11/2011	1/18/11	7.00	405,700.00	57,957.14
1/18/2011	1/25/11	7.00	369,500.00	52,785.71
1/25/2011	2/3/11	9.00	421,180.00	46,797.78
2/3/2011	2/8/11	5.00	393,380.00	78,676.00
2/8/2011	2/15/11	7.00	396,820.00	56,688.57
2/15/2011	2/22/11	7.00	409,710.00	58,530.00
2/22/2011	3/1/11	7.00	367,690.00	52,527.14
3/1/2011	3/8/11	7.00	381,120.00	54,445.71
3/8/2011	3/15/11	7.00	328,350.00	46,907.14
3/15/2011	3/22/11	7.00	297,390.00	42,484.29
3/22/2011	3/30/11	8.00	456,630.00	57,078.75
3/30/2011	4/5/11	6.00	326,290.00	54,381.67
4/5/2011	4/12/11	7.00	421,570.00	60,224.29
4/12/2011	4/19/11	7.00	373,410.00	53,344.29
4/19/2011	4/26/11	7.00	346,470.00	49,495.71
4/26/2011	5/3/11	7.00	346,470.00	49,495.71
5/3/2011	5/10/11	7.00	380,390.00	54,341.43
5/10/2011	5/17/11	7.00	381,760.00	54,537.14
5/17/2011	5/24/11	7.00	498,680.00	71,240.00
5/24/2011	5/31/11	7.00	526,840.00	75,262.86
5/31/2011	6/7/11	7.00	526,450.00	75,207.14
6/7/2011	6/14/11	7.00	537,830.00	76,832.86
6/14/2011	6/21/11	7.00	655,590.00	93,655.71
6/21/2011	6/28/11	7.00	464,340.00	66,334.29
6/28/2011	7/5/11	7.00	595,220.00	85,031.43
7/5/2011	7/12/11	7.00	626,240.00	89,462.86
7/12/2011	7/19/11	7.00	676,260.00	96,608.57
7/19/2011	7/26/11	7.00	609,400.00	87,057.14
7/26/2011	8/2/11	7.00	602,880.00	86,125.71
8/2/2011	8/9/11	7.00	493,650.00	70,521.43
8/9/2011	8/16/11	7.00	506,020.00	72,288.57
8/16/2011	8/23/11	7.00	461,220.00	65,888.57
8/23/2011	8/30/11	7.00	470,530.00	67,218.57
8/30/2011	9/6/11	7.00	455,640.00	65,091.43
9/6/2011	9/13/11	7.00	349,800.00	49,971.43
9/13/2011	9/20/11	7.00	451,500.00	64,500.00
9/20/2011	9/27/11	7.00	357,290.00	51,041.43
9/27/2011	10/4/11	7.00	401,120.00	57,302.86
10/4/2011	10/11/11	7.00	396,840.00	56,691.43
10/11/2011	10/18/11	7.00	376,630.00	53,804.29
10/18/2011	10/25/11	7.00	401,540.00	57,362.86
10/25/2011	11/1/11	7.00	390,040.00	55,720.00
11/1/2011	11/8/11	7.00	406,580.00	58,082.86
11/8/2011	11/15/11	7.00	376,070.00	53,724.29
11/15/2011	11/22/11	7.00	376,070.00	53,724.29
11/22/2011	11/29/11	7.00	393,660.00	56,237.14
11/29/2011	12/6/11	7.00	435,690.00	62,241.43
12/6/2011	12/13/11	7.00	435,590.00	62,227.14
12/13/2011	12/20/11	7.00	349,020.00	49,860.00
12/20/2011	12/27/11	7.00	408,630.00	58,375.71
		<b>364.00</b>	<b>22,638,320.00</b>	<b>62,193.19</b>

**Pennoni Associates Inc.**

Consulting Engineers

JOB NO.: **UPHS1504**

SHEET: 1 of 1

DATE:

11/16/2016

PROJECT: **Penn Medicine - Radnor**

BY: CRP

SUBJECT: **Sewage Flow Calculations**

CHK'D

## 2012 Q4 Results

Date Range		Number Days in Period	Total Flow (gal)	Total Flow (gpd)
12/27/2011	1/3/12	7.00	317,110.00	45,301.43
1/3/2012	1/10/12	7.00	460,760.00	65,822.86
1/10/2012	1/17/12	7.00	287,220.00	41,031.43
1/17/2012	1/24/12	7.00	377,620.00	53,945.71
1/24/2012	1/31/12	7.00	401,340.00	57,334.29
1/31/2012	2/7/12	7.00	360,450.00	51,492.86
2/7/2012	2/14/12	7.00	414,770.00	59,252.86
2/14/2012	2/21/12	7.00	316,650.00	45,235.71
2/21/2012	2/28/12	7.00	396,290.00	56,612.86
2/28/2012	3/6/12	7.00	417,020.00	59,574.29
3/6/2012	3/13/12	7.00	379,700.00	54,242.86
3/13/2012	3/20/12	7.00	388,940.00	55,562.86
3/20/2012	3/27/12	7.00	376,480.00	53,782.86
3/27/2012	5/1/12	35.00	388,590.00	11,102.57
5/1/2012	5/8/12	7.00	388,590.00	55,512.86
5/8/2012	5/15/12	7.00	409,080.00	58,440.00
5/15/2012	5/22/12	7.00	402,330.00	57,475.71
5/22/2012	5/29/12	7.00	359,020.00	51,288.57
5/29/2012	6/5/12	7.00	505,580.00	72,225.71
6/5/2012	6/12/12	7.00	575,270.00	82,181.43
6/12/2012	6/19/12	7.00	797,760.00	113,965.71
6/19/2012	6/26/12	7.00	654,120.00	93,445.71
6/26/2012	7/3/12	7.00	654,120.00	93,445.71
7/3/2012	7/10/12	7.00	686,990.00	98,141.43
7/10/2012	7/17/12	7.00	649,030.00	92,718.57
7/17/2012	7/24/12	7.00	433,400.00	61,914.29
7/24/2012	7/31/12	7.00	592,430.00	84,632.86
7/31/12	8/7/12	7.00	587,240.00	83,891.43
8/7/2012	8/14/12	7.00	537,260.00	76,751.43
8/14/2012	8/21/12	7.00	631,380.00	90,197.14
8/21/2012	8/28/12	7.00	519,710.00	74,244.29
8/28/2012	9/4/12	7.00	500,200.00	71,457.14
9/4/2012	9/11/12	7.00	447,700.00	63,957.14
9/11/2012	9/18/12	7.00	581,190.00	83,027.14
9/18/2012	9/25/12	7.00	557,350.00	79,621.43
9/25/2012	10/2/12	7.00	569,720.00	81,388.57
10/2/2012	10/9/12	7.00	435,380.00	62,197.14
10/9/2012	10/16/12	7.00	370,640.00	52,948.57
10/16/2012	10/23/12	7.00	360,130.00	51,447.14
10/23/2012	10/30/12	7.00	314,760.00	44,965.71
10/30/2012	11/6/12	7.00	493,460.00	70,494.29
11/6/2012	11/13/12	7.00	339,470.00	48,495.71
11/13/2012	11/20/12	7.00	374,300.00	53,471.43
11/20/2012	11/27/12	7.00	326,040.00	46,577.14
11/27/2012	12/4/12	7.00	348,510.00	49,787.14
12/4/2012	12/11/12	7.00	378,580.00	54,082.86
12/11/2012	12/18/12	7.00	338,470.00	48,352.86
12/18/2012	12/25/12	7.00	306,800.00	43,828.57
		<b>364.00</b>	<b>21,708,950.00</b>	<b>59,639.97</b>

**Pennoni Associates Inc.**JOB NO.: **UPHS1504**

Consulting Engineers

SHEET: 1 of 1

DATE:

11/16/2016

PROJECT **Penn Medicine - Radnor**

BY: CRP

SUBJECT: **Sewage Flow Calculations**

CHK'D

## 2013 Q4 Results

Date Range		Number Days in Period	Total Flow (gal)	Total Flow (gpd)
12/25/2012	1/1/2013	7.00	318,150.00	45,450.00
1/1/2013	1/8/2013	7.00	331,680.00	47,382.86
1/8/2013	1/15/2013	7.00	417,190.00	59,598.57
1/15/2013	1/22/2013	7.00	195,310.00	27,901.43
1/22/2013	1/29/2013	7.00	309,120.00	44,160.00
1/29/2013	2/5/2013	7.00	284,200.00	40,600.00
2/5/2013	2/12/2013	7.00	454,360.00	64,908.57
2/12/2013	2/19/2013	7.00	214,570.00	30,652.86
2/19/2013	2/26/2013	7.00	322,030.00	46,004.29
2/26/2013	3/5/2013	7.00	319,690.00	45,670.00
3/5/2013	3/12/2013	7.00	342,360.00	48,908.57
3/12/2013	3/19/2013	7.00	302,860.00	43,265.71
3/19/2013	3/26/2013	7.00	306,290.00	43,755.71
3/26/2013	4/2/2013	7.00	376,270.00	53,752.86
4/2/2013	4/9/2013	7.00	359,490.00	51,355.71
4/9/2013	4/16/2013	7.00	426,900.00	60,985.71
4/16/2013	4/23/2013	7.00	320,630.00	45,804.29
4/23/2013	4/30/2013	7.00	369,050.00	52,721.43
4/30/2013	5/7/2013	7.00	342,460.00	48,922.86
5/7/2013	5/14/2013	7.00	397,390.00	56,770.00
5/14/2013	5/21/2013	7.00	426,080.00	60,868.57
5/21/2013	5/28/2013	7.00	587,720.00	83,960.00
5/28/2013	6/4/2013	7.00	431,700.00	61,671.43
6/4/2013	6/11/2013	7.00	449,810.00	64,258.57
6/11/2013	6/18/2013	7.00	459,690.00	65,670.00
6/18/2013	6/25/2013	7.00	435,360.00	62,194.29
6/25/2013	7/2/2013	7.00	521,620.00	74,517.14
7/2/2013	7/11/2013	9.00	1,633,580.00	181,508.89
7/11/2013	7/16/2013	5.00	2,068,800.00	413,760.00
7/16/2013	7/23/2013	7.00	512,430.00	73,204.29
7/23/2013	7/30/2013	7.00	265,790.00	37,970.00
7/30/2013	8/6/2013	7.00	433,750.00	61,964.29
8/6/2013	8/13/2013	7.00	293,570.00	41,938.57
8/13/2013	8/20/2013	7.00	401,810.00	57,401.43
8/20/2013	8/27/2013	7.00	386,030.00	55,147.14
8/27/2013	9/3/2013	7.00	365,260.00	52,180.00
9/3/2013	9/10/2013	7.00	370,900.00	52,985.71
9/10/2013	9/17/2013	7.00	297,010.00	42,430.00
9/17/2013	9/24/2013	7.00	308,210.00	44,030.00
9/24/2013	10/1/2013	7.00	401,520.00	57,360.00
10/1/2013	10/8/2013	7.00	307,520.00	43,931.43
10/8/2013	10/15/2013	7.00	292,040.00	41,720.00
10/15/2013	10/22/2013	7.00	340,370.00	48,624.29
10/22/2013	10/30/2013	8.00	359,250.00	44,906.25
10/30/2013	11/5/2013	6.00	219,960.00	36,660.00
11/5/2013	11/12/2013	7.00	296,780.00	42,397.14
11/12/2013	11/19/2013	7.00	317,790.00	45,398.57
11/19/2013	11/26/2013	7.00	261,880.00	37,411.43
11/26/2013	12/3/2013	7.00	273,830.00	39,118.57
		<b>343.00</b>	<b>20,430,060.00</b>	<b>59,562.86</b>

**Pennoni Associates Inc.**JOB NO.: **UPHS1504**

Consulting Engineers

SHEET: 1 of 1

DATE:

11/16/2016

PROJECT **Penn Medicine - Radnor**

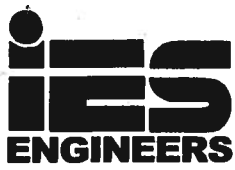
BY: CRP

SUBJECT: **Sewage Flow Calculations**

CHK'D

## 2014 Q4 Results

Date Range		Number Days in Period	Total Flow (gal)	Total Flow (gpd)
12/31/2013	1/7/2014	7.00	333,360.00	47,622.86
1/7/2014	1/14/2014	7.00	346,160.00	49,451.43
1/14/2014	1/21/2014	7.00	424,430.00	60,632.86
1/21/2014	1/28/2014	7.00	576,350.00	82,335.71
1/28/2014	2/4/2014	7.00	381,580.00	54,511.43
2/4/2014	2/11/2014	7.00	322,530.00	46,075.71
2/11/2014	2/18/2014	7.00	324,060.00	46,294.29
2/18/2014	2/25/2014	7.00	306,050.00	43,721.43
2/25/2014	3/4/2014	7.00	316,740.00	45,248.57
3/4/2014	3/11/2014	7.00	330,670.00	47,238.57
3/11/2014	3/18/2014	7.00	331,390.00	47,341.43
3/18/2014	3/25/2014	7.00	287,630.00	41,090.00
3/25/2014	4/1/2014	7.00	303,600.00	43,371.43
4/1/2014	4/8/2014	7.00	290,930.00	41,561.43
4/8/2014	4/15/2014	7.00	291,520.00	41,645.71
4/15/2014	4/22/2014	7.00	241,430.00	34,490.00
4/22/2014	4/29/2014	7.00	203,960.00	29,137.14
4/29/2014	5/6/2014	7.00	208,970.00	29,852.86
5/6/2014	5/13/2014	7.00	230,980.00	32,997.14
5/13/2014	5/20/2014	7.00	240,080.00	34,297.14
5/20/2014	5/27/2014	7.00	184,900.00	26,414.29
5/27/2014	6/3/2014	7.00	252,440.00	36,062.86
6/3/2014	6/10/2014	7.00	229,970.00	32,852.86
6/10/2014	6/17/2014	7.00	275,170.00	39,310.00
6/17/2014	6/23/2014	6.00	269,370.00	44,895.00
6/23/2014	7/1/2014	8.00	384,800.00	48,100.00
7/1/2014	7/8/2014	7.00	267,340.00	38,191.43
7/8/2014	7/15/2014	7.00	300,780.00	42,968.57
7/15/2014	7/22/2014	7.00	263,960.00	37,708.57
7/22/2014	7/29/2014	7.00	255,720.00	36,531.43
7/29/2014	8/5/2014	7.00	259,560.00	37,080.00
8/5/2014	8/12/2014	7.00	511,360.00	73,051.43
8/12/2014	8/19/2014	7.00	520,570.00	74,367.14
8/19/2014	8/26/2014	7.00	528,190.00	75,455.71
8/26/2014	9/2/2014	7.00	161,880.00	23,125.71
9/2/2014	9/9/2014	7.00	307,780.00	43,968.57
9/9/2014	9/16/2014	7.00	194,550.00	27,792.86
9/16/2014	9/23/2014	7.00	181,080.00	25,868.57
9/23/2014	9/30/2014	7.00	187,310.00	26,758.57
9/30/2014	10/7/2014	7.00	215,610.00	30,801.43
10/7/2014	10/14/2014	7.00	107,130.00	15,304.29
10/14/2014	10/21/2014	7.00	38,200.00	5,457.14
10/21/2014	10/28/2014	7.00	38,150.00	5,450.00
10/28/2014	11/4/2014	7.00	3,290.00	470.00
		<b>308.00</b>	<b>12,231,530.00</b>	<b>39,712.76</b>



January 20, 2010

**CERTIFIED MAIL; RETURN RECEIPT REQUESTED**

*Certification No. 7009-1410-0002-1279-2595*

Mr. Christopher C. Flannery  
Laboratory & Pretreatment Manager  
Delaware County Regional Water Quality Control Authority  
P.O. Box 999  
Chester, Pennsylvania 19016-0999

Subject: 2009 Fourth Quarter Report  
BioMed Realty Trust, Inc.  
145 King Of Prussia Road  
IES Project No. EHS09687.01

Dear Mr. Flannery:

On behalf of BioMed Realty Trust, Inc. (BMR), IES Engineers is pleased to submit the 2009 Fourth Quarter Report from BMR's 145 King of Prussia Road facility. The report includes all analytical data with a chain of custody from a contract laboratory, individual data including flow and pH levels taken on an individual day. Also, attached for your review is a report from Centocor regarding the Radioisotope usage during the Fourth Quarter of 2009.

If you have any questions or need any additional information, please feel free to contact me or Ms. Maureen Delaney of BMR at (610) 647-9590.

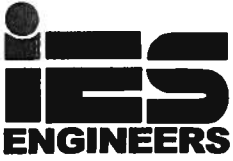
Very truly yours,

  
Gwendolyn K. Supplee  
Project Manager

Attachment(s)

cc: M. Delaney, BMR  
C. Geanopulos, BMR  
K. Turner, Centocor  
J. Yaroch, IES





January 20, 2010

CERTIFIED MAIL; RETURN RECEIPT REQUESTED

*Certified No. 7009-1410-0002-1279-2588*

Mr. Joseph Cerrone  
Philadelphia Water Department  
9001 State Road  
Chester, Pennsylvania 19136

Subject: 2009 Fourth Quarter Report  
BioMed Realty Trust, Inc.  
145 King Of Prussia Road  
IES Project No. EHS09687.01

Dear Mr. Cerrone:

On behalf of BioMed Realty Trust, Inc. (BMR), IES Engineers is pleased to submit the 2009 Fourth Quarter Report from BMR's 145 King of Prussia Road facility. The report includes all analytical data with a chain of custody from a contract laboratory, individual data including flow and pH levels taken on an individual day. Also, attached for your review is a report from Centocor regarding the Radioisotope usage during the Fourth Quarter of 2009.

If you have any questions or need any additional information, please feel free to contact me or Ms. Maureen Delaney of BMR at (610) 647-9590.

Very truly yours,

Gwendolyn K. Supplee  
Project Manager

Attachment(s)

cc: M. Delaney, BMR  
C. Geanopulos, BMR  
K. Turner, Centocor  
J. Yaroch, IES

ATTACHMENT 1  
CERTIFICATION STATEMENT

**Certification Statement, 2009 4th Quarter Wastewater Report:**

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility fines and imprisonment for knowing violations.”

Michael Bodendorf, Director – Real Estate Operations  
Name/Title

  
Signature

7/15/10  
Date

ATTACHMENT 2  
2009 Fourth Quarter Report

**Biomed Realty Trust**  
**145 King of Prussia Road**  
**Radnor, PA 19087**

**Monthly Ph Level - 2009**

<u>Date</u>	<u>Jan</u>	<u>Water Flow</u>	<u>Actual</u>	<u>Actual</u>	<u>Date</u>	<u>Feb</u>	<u>Water Flow</u>	<u>Actual</u>	<u>Actual</u>
		<u>Week of:</u>	<u>Usage</u>	<u>Usage</u>			<u>Week of:</u>	<u>Usage</u>	<u>Usage</u>
			<u>Meter #1</u>	<u>Meter #2</u>				<u>Meter #1</u>	<u>Meter #2</u>
1/6/2009	7.92	12/30/08-1/6/09	89977	289671	2/3/2009	8.27	1/27/09-2/3/09	98980	341037
1/13/2009	8.36	1/6/09-1/13/09	92102	302443	2/10/2009	8.34	2/3/09-2/10/09	102204	357661
1/20/2009	9.69	1/13/09-1/20/09	94431	315346	2/17/2009	8.50	2/10/09-2/17/09	103810	366911
1/27/2009	8.24	1/20/09-1/27/09	96691	328190	2/24/2009	8.37	2/17/09-2/24/09	106251	379817

<u>Date</u>	<u>March</u>	<u>Water Flow</u>	<u>Actual</u>	<u>Actual</u>	<u>Date</u>	<u>April</u>	<u>Water Flow</u>	<u>Actual</u>	<u>Actual</u>
		<u>Week of:</u>	<u>Usage</u>	<u>Usage</u>			<u>Week of:</u>	<u>Usage</u>	<u>Usage</u>
			<u>Meter #1</u>	<u>Meter #2</u>				<u>Meter #1</u>	<u>Meter #2</u>
3/3/2009	8.69	2/24/09-3/3/09	109210	392723	4/7/2009	7.69	3/31/09-4/7/09	124714	457454
3/10/2009	8.17	3/3/09-3/10/09	112104	405877	4/14/2009	8.26	4/7/09-4/14/09	128959	470822
3/17/2009	8.42	3/10/09-3/17/09	115534	419498	4/21/2009	7.93	4/14/09-4/21/09	131917	483732
3/24/2009	7.36	3/17/09-3/24/09	118663	432010	4/28/2009	7.98	4/21/09-4/28/09	136586	497155
3/31/2009	7.81	3/24/09-3/31/09	122593	444887					

<u>Date</u>	<u>May</u>	<u>Water Flow</u>	<u>Actual</u>	<u>Actual</u>	<u>Date</u>	<u>June</u>	<u>Water Flow</u>	<u>Actual</u>	<u>Actual</u>
		<u>Week of:</u>	<u>Usage</u>	<u>Usage</u>			<u>Week of:</u>	<u>Usage</u>	<u>Usage</u>
			<u>Meter #1</u>	<u>Meter #2</u>				<u>Meter #1</u>	<u>Meter #2</u>
5/5/2009	8.98	4/28/09-5/5/09	139626	509321	6/2/2009	7.78	5/27/09-6/2/09	155094	560439
5/12/2009	8.68	5/5/09-5/12/09	143291	522110	6/9/2009	7.78	6/2/09-6/9/09	158886	573224
5/19/2009	8.06	5/12/09-5/19/09	147110	534947	6/16/2009	7.98	6/9/09-6/15/09	162860	586006
5/27/2009	8.24	5/19/09-5/27/09	151296	547160	6/23/2009	8.11	6/16/09-6/23/09	166551	598774
					6/30/2009	7.85	6/23/09-6/30/09	171816	613356

**Biomed Realty Trust**  
**145 King of Prussia Road**  
**Radnor, PA 19087**

<u>Date</u>	<u>July</u>	<u>Water Flow</u> <u>Week of:</u>
7/7/2009	<b>7.98</b>	6/30/09-7/7/09
7/14/2009	<b>7.97</b>	7/7/09-7/14/09
7/21/2009	<b>8.13</b>	7/14/09-7/21/09
7/28/2009	<b>8.26</b>	7/21/09-7/28/09

<u>Actual Usage</u> <u>Meter #1</u>	<u>Actual Usage</u> <u>Meter #2</u>
175335	624192
180308	636845
185120	649494
189780	662138

<u>Date</u>	<u>Aug</u>
8/4/2009	<b>8.10</b>
8/11/2009	<b>8.26</b>
8/18/2009	<b>7.83</b>
8/25/2009	<b>7.99</b>

<u>Water Flow</u> <u>Week of:</u>	<u>Actual Usage</u> <u>Meter #1</u>	<u>Actual Usage</u> <u>Meter #2</u>
7/28/09-8/4/09	194714	674803
8/4/09-8/11/09	200091	687530
8/11/09-8/18/09	205231	700030
8/18/09-8/25/09	211752	714338

<u>Date</u>	<u>Sept</u>	<u>Water Flow</u> <u>Week of:</u>
9/1/2009	<b>7.50</b>	8/25/09-9/1/09
9/8/2009	<b>7.78</b>	9/1/09-9/8/09
9/15/2009	<b>7.99</b>	9/8/09-9/15/09
9/22/2009	<b>8.16</b>	9/15/09-9/22/09
9/29/2009	<b>7.86</b>	9/22/09-9/29/09

<u>Actual Usage</u> <u>Meter #1</u>	<u>Actual Usage</u> <u>Meter #2</u>
215698	725128
219983	737897
223453	750534
227165	763260
231402	775950

<u>Date</u>	<u>Oct</u>
10/6/2009	<b>7.76</b>
10/13/2009	<b>8.07</b>
10/20/2009	<b>7.51</b>
10/27/2009	<b>7.24</b>

<u>Water Flow</u> <u>Week of:</u>	<u>Actual Usage</u> <u>Meter #1</u>	<u>Actual Usage</u> <u>Meter #2</u>
9/29/09-10/6/09	234807	788700
10/6/09-10/13/09	238076	801424
10/13/09-10/20/09	240664	814124
10/20/09-10/27/09	243686	826240

<u>Date</u>	<u>Nov</u>	<u>Water Flow</u> <u>Week of:</u>
11/3/2009	<b>7.34</b>	10/27/09-11/3/09
11/12/2009	<b>7.15</b>	11/3/09-11/12/09
11/17/2009	<b>8.01</b>	11/12/09-11/17/09
11/24/2009	<b>7.56</b>	11/17/09-11/24/09

<u>Actual Usage</u> <u>Meter #1</u>	<u>Actual Usage</u> <u>Meter #2</u>
246584	839908
249766	852657
253464	867327
255577	878218

<u>Date</u>	<u>Dec</u>
12/1/2009	<b>7.84</b>
12/9/2009	<b>8.26</b>
12/16/2009	<b>6.61</b>
12/22/2009	<b>6.48</b>
12/29/2009	<b>6.35</b>
1/5/2010	<b>6.52</b>

<u>Water Flow</u> <u>Week of:</u>	<u>Actual Usage</u> <u>Meter #1</u>	<u>Actual Usage</u> <u>Meter #2</u>
11/24/09-12/01/09	257808	890867
12/01/09-12/09/09	261272	905848
12/09/09-12/16/09	264100	918577
12/16/09-12/22/09	266524	930619
12/22/09-12/29/09	268948	942662
12/29/09-1/5/10	271500	955710

BioMed Realty Trust, Inc  
 145 King of Prussia Road  
 Radnor, PA 19087

**Actual Monthly Flow - 2009**

<b>Date Range</b>	<b>Meter #1</b>	<b>Meter #2</b>	<b>Total Flow</b>
1/6/09-1/13/09	212,500	127,720	340,220
1/13/09-1/20/09	282,800	129,030	362,830
1/20/09-1/27/09	228,900	126,440	354,440
1/27/09-2/3/09	228,900	128,470	357,370
2/3/09-2/10/09	322,400	166,240	488,640
2/10/09-2/17/09	160,600	92,500	253,100
2/17/09-2/24/09	244,100	129,060	373,160
2/24/09-3/3/09	295,900	129,060	424,960
3/3/09-3/10/09	289,400	131,540	420,940
3/10/09-3/17/09	343,000	136,210	479,210
3/17/09-3/24/09	312,900	129,100	438,020
3/24/09-3/31/09	393,000	128,770	521,770
3/31/09-4/7/09	212,100	125,670	337,770
4/7/09-4/14/09	295,800	129,100	424,960
4/14/09-4/21/09	466,900	134,230	601,130
4/21/09-4/28/09	301,900	121,660	425,660
4/28/09-5/5/09	368,800	127,890	494,390
5/5/09-5/12/09	381,900	128,370	510,270
5/12/09-5/19/09	418,600	122,130	540,730
5/19/09-5/27/09	379,800	132,790	607,690
5/27/09-6/2/09	379,800	127,820	607,690
6/2/09-6/9/09	397,400	127,820	525,220
6/9/09-6/15/09	369,100	127,820	496,780
6/16/09-6/23/09	526,500	145,820	672,320
6/23/09-6/30/09	381,900	108,360	460,000
6/30/09-7/7/09	497,300	126,530	623,830
7/7/09-7/14/09	481,200	126,490	607,690
7/14/09-7/21/09	466,900	126,440	592,440
7/21/09-7/28/09	493,400	125,000	424,960
7/28/09-8/4/09	537,700	127,270	664,970
8/4/09-8/11/09	514,000	125,000	639,000
8/11/09-8/18/09	652,100	143,080	795,180
8/18/09-8/25/09	394,600	127,820	607,690
8/25/09-9/1/09	428,500	127,500	556,190
9/1/09-9/8/09	347,000	126,370	473,370
9/8/09-9/15/09	371,200	127,260	498,460
9/15/09-9/22/09	423,700	126,900	550,600
9/22/09-9/29/09	340,500	127,500	468,000
9/29/09-10/6/09	326,900	127,240	454,140
10/6/09-10/13/09	282,800	127,200	385,600
10/13/09-10/20/09	302,200	121,160	423,360
10/20/09-10/27/09	282,800	136,680	426,480
10/27/09-11/3/09	318,200	127,490	445,690
11/3/09-11/12/09	369,800	146,700	516,500
11/12/09-11/17/09	211,300	108,910	320,210
11/24/09-12/01/09	223,100	120,430	349,590
12/01/09-12/09/09	282,800	127,260	410,090
12/09/09-12/16/09	282,800	120,420	362,820
12/16/09-12/22/09	282,800	120,430	362,830
12/22/09-12/29/09	282,800	130,480	385,680
12/29/09-1/5/10	293,600	129,980	423,580



TINA GEANOPULOS  
 BIOMED REALTY TRUST, INC.  
 1205 WESTLAKES DRIVE  
 SUITE 240  
 BERWYN, PA 19312

Regarding:

ERIN SHEA  
 BMR  
 145 KING OF PRUSSIA ROAD  
 RADNOR, PA 19087

Account No: AC0171, BIOMED REALTY TRUST, INC.  
 Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:  
 PWSID No:

Inv. No: 1139910

Sample Number L3123234-1	Sample Description EFFLUENT 10 HR COMPOSITE 0700-1700 Received Temp: 37 F Iced (Y/N): Y	Samp. Date/Time/Temp 10/06/09 05:00pm NA F	Sampled by Kenneth L. Tanner, QC Laboratories
-----------------------------	---	---	--

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>GENERAL CHEMISTRY</b>				
BIOCHEMICAL OXYGEN DEMAND	SM 5210B	132 mg/l	77.6 mg/l	10/08/09 12:07AM GAP
TOTAL SUSPENDED SOLIDS	SM 2540D	98.0 mg/l	2.00 mg/l	10/08/09 07:35AM GLE

Sample Number L3123234-2	Sample Description EFFLUENT GRAB Received Temp: 37 F Iced (Y/N): Y	Samp. Date/Time/Temp 10/07/09 12:10pm NA F	Sampled by Kenneth L. Tanner, QC Laboratories
-----------------------------	--	---	--

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>FIELD SERVICES</b>				
FIELD TEMPERATURE CELSIUS	SM 2550B	23.8 Deg. C	0.5 Deg. C	10/07/09 12:10PM KLT
FLOW		0.0292 mgd		10/07/09 12:10PM KLT
PH FIELD	SM 4500H+B	7.36 units	units	10/07/09 12:10PM KLT

- A result of "ND" indicates the concentration of the analyte tested was either not detected or below the RLs.
- Definitions: ND=not detected; NEG=negative; POS=positive; COL=colonies; RLs=laboratory reporting limits; L/A=laboratory accident; TNTC=too numerous to count
- A result marked with "DRY" indicates that the result was calculated and reported on a dry weight basis.
- All analysis, except field tests are conducted in Southampton, PA unless otherwise identified.
- The test "ph lab" is analyzed upon receipt at the laboratory, the result will not be suitable for regulatory purposes.
- The reported results relate only to the samples.
- QC NELAP ID's: PA 09-00131, NJ PA166, FL E87954, NY 11223, CT PH-0768, DE PA-018, KY 90228, MD 206, EPA PA00018. Bioassay: PA 09-03574, NJ PA034, FL E87953, KS E10373, SC 89020001.
- QC STATE ID's: Wind Gap, NJ PA001, PA 48-01334; E RUTHERFORD NJ02015; Vineland NJ06005; Reading PA 06-03543.
- All samples are collected as "grab" samples unless otherwise identified.
- MCL= is the EPA recommended "maximum contaminant level" for a parameter. PLS=customer specific permit limits.
- The test results meet all requirements of NELAC unless otherwise specified.
- The report shall not be reproduced except in full without the written consent of the laboratory.

*Thomas J. Hines*  
 Thomas J. Hines, President



# QC Laboratories

# Analytical Report



Account No: AC0171, BIOMED REALTY TRUST, INC.  
Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:  
PWSID No:

Inv. No: 1139910

---

Regulatory authorities are assessing substantial fines for testing omissions. Please track your sample collections and results on a weekly, monthly, or quarterly basis to ensure compliance. QC's internet program 'LIVE ACCESS' will provide you with real-time access to collection dates and results. Please contact Customer Service for further information on acquiring LIVE ACCESS.

*Thomas J. Hines*  
Thomas J. Hines, President



**QC Laboratories**

1205 Industrial Blvd.  
Southampton, PA 18966-0514  
Phone: 215-355-3900  
Fax: 215-355-7231

Client/Acct. No. BMC

Address \_\_\_\_\_

City/State/Zip King of Prussia, PA

Phone/Fax \_\_\_\_\_

Client Contact Erin Shea

P.O. No. \_\_\_\_\_  
QC Contact \_\_\_\_\_

**CHAIN OF CUSTODY**

Page \_\_\_\_\_ of \_\_\_\_\_  
Bill to/Report to: (if different) \_\_\_\_\_

Sampling Site Address: (if different) \_\_\_\_\_

Collection \_\_\_\_\_

Date \_\_\_\_\_

Military Time \_\_\_\_\_

Matrix Code \_\_\_\_\_

Number of Containers \_\_\_\_\_

Total \_\_\_\_\_

Standard \_\_\_\_\_

NI Reduced \_\_\_\_\_

Forms \_\_\_\_\_

Disk \_\_\_\_\_

Verbal/fax data due: \_\_\_\_\_

Hardcopy due: \_\_\_\_\_

Please call for pricing and availability on rush (<14-21 day) turnaround and on all but standard format.

SAMPLED BY: (Name/Company) KR

Field Parameters Analyzed By: \_\_\_\_\_

Date/Time: 10/7/08

Lab LIMS No: \_\_\_\_\_  
LAB USE ONLY:  
# \_\_\_\_\_ Ascorbic/HCl Vials # \_\_\_\_\_ HCl Vials  
# \_\_\_\_\_ Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>  
# \_\_\_\_\_ Na OH/Zn acetate pH  
# \_\_\_\_\_ HNO<sub>3</sub> pH  
# \_\_\_\_\_ H<sub>2</sub>SO<sub>4</sub> pH  
# \_\_\_\_\_ NaOH pH  
# \_\_\_\_\_ Unpreserved/194  
# \_\_\_\_\_ HCl pH  
# 37 Temp control 164 ID# \_\_\_\_\_  
ANALYSIS REQUESTED  
600, TSI  
Temp - 23.8, pH - 7.36, Flu - 0.2912 mg/d

PROJECT	FIELD ID	Date	Military Time	Matrix Code	Number of Containers															
					H	H	N	Z	U	B	S	O	A	C	P					
A	31232341	10/6/08	1700	W	1															
B	- 2 Eff grab	10/7/08	1210	W	0															
USE ONLY																				

Report Format:  Standard  Forms  NI Reduced  Disk

Delivery Method:  UPS  FEDEX  OTHER

Comments: \_\_\_\_\_

Relinquished by Sampler: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
1	10/7/08	1400	[Signature]	10/7/08	1400
2					
3					
4					
5					

Hazardous: yes / no

Customer Seal Number \_\_\_\_\_

FINAL REPORT

For example to aid completion, see reverse side.

# SAMPLING DOCUMENTATION FORM

Customer Number: B ACO171

QC Field Technician: KLT

Compositor ID: \_\_\_\_\_

Date/Time Installed: 10-6-09 070  
Custody Seal/Lock Installed: Yes  No \_\_\_\_\_

Date/Time Extracted: 10-6-09 1700  
Custody Seal/Lock Intact: Yes  No \_\_\_\_\_

### Sample Type:

Grab: Yes

Composite: 8HR \_\_\_\_\_ 12 HR \_\_\_\_\_ 24 HR \_\_\_\_\_

Shift 10

Program: Minutes/ML 15/100

Total Vol. Collected: ML 2901

Site Description	Location	Diagram
	<u>manhole top of Hill</u>	

### Sampling Notes:

Grab Sample Iced: Yes \_\_\_\_\_ No

Composite Sample Iced: Yes  No \_\_\_\_\_

Decon Performed: Yes  No \_\_\_\_\_

Field Test Performed Onsite: Yes  No \_\_\_\_\_

Customer Authorization MA

Date 10-7-09



TINA GEANOPULOS  
 BIOMED REALTY TRUST, INC.  
 1205 WESTLAKES DRIVE  
 SUITE 240  
 BERWYN, PA 19312

Regarding:

ERIN SHEA  
 BMR  
 145 KING OF PRUSSIA ROAD  
 RADNOR, PA 19087

Account No: ACO171, BIOMED REALTY TRUST, INC.  
 Project No: ACO171, BIOMED REALTY TRUST, INC.

P.O. No:  
 PWSID No:

Inv. No: 1147688

Sample Number L3149311-1    Sample Description EFFLUENT 10 HR COMPOSITE 0700-1700  
 Received Temp: 37 F    Iced (Y/N): Y    Samp. Date/Time/Temp 11/04/09 05:00pm NA F    Sampled by Kenneth L. Tanner, QC Laboratories

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>GENERAL CHEMISTRY</b>				
BIOCHEMICAL OXYGEN DEMAND	SM 5210B	47.6 mg/l	13.8 mg/l	11/05/09 08:53PM LS
TOTAL SUSPENDED SOLIDS	SM 2540D	75.4 mg/l	2.00 mg/l	11/09/09 08:50AM GLE

Sample Number L3149311-2    Sample Description EFFLUENT GRAB  
 Received Temp: 37 F    Iced (Y/N): Y    Samp. Date/Time/Temp 11/05/09 12:40pm NA F    Sampled by Kenneth L. Tanner, QC Laboratories

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>FIELD SERVICES</b>				
FIELD TEMPERATURE CELSIUS	SM 2550B	18.5 Deg. C	0.5 Deg. C	11/05/09 12:40PM KLT
FLOW		0.0279 mgd		11/05/09 12:40PM KLT
PH FIELD	SM 4500H+B	8.37 units	units	11/05/09 12:40PM KLT

L3149311-1:  
 1. BOD samples reported on this day were based on an initial acceptable GGA. Subsequent GGA were outside the acceptance limits, low. Sample results may or may not be biased.

- A result of "ND" indicates the concentration of the analyte tested was either not detected or below the RLs.
- Definitions: ND=not detected; NEG=negative; POS=positive; COL=colonies; RLs=laboratory reporting limits; L/A=laboratory accident; TNTC=too numerous to count
- A result marked with "DRY" indicates that the result was calculated and reported on a dry weight basis.
- All analysis, except field tests are conducted in Southampton, PA unless otherwise identified.
- The test "pH lab" is analyzed upon receipt at the laboratory, the result will not be suitable for regulatory purposes.
- The reported results relate only to the samples.
- QC NELAP ID's: PA 09-00131, NJ PA166, FL E87954, NY 11223, CT PH-0768, DE PA-018, KY 90228, MD 206, EPA PA00018, Bioassay: PA 09-03574, NJ PA034, FL E87953, KS E10373, SC 89020001.

*Thomas J. Hines*  
 Thomas J. Hines, President

# QC Laboratories

# Analytical Report



Account No: AC0171, BIOMED REALTY TRUST, INC.  
Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:  
PWSID No:

Inv. No: 1147688

- 
- QC STATE ID's: Wind Gap, NJ PA001, PA 48-01334; E RUTHERFORD NJ02015; Vineland NJ06005; Reading PA 06-03543.
  - All samples are collected as "grab" samples unless otherwise identified.
  - MCL= is the EPA recommended "maximum contaminant level" for a parameter. PLs=customer specific permit limits.
  - The test results meet all requirements of NELAC unless otherwise specified.
  - The report shall not be reproduced except in full without the written consent of the laboratory.
- Regulatory authorities are assessing substantial fines for testing omissions. Please track your sample collections and results on a weekly, monthly, or quarterly basis to ensure compliance. QC's internet program 'LIVE ACCESS' will provide you with real-time access to collection dates and results. Please contact Customer Service for further information on acquiring LIVE ACCESS.







# SAMPLING DOCUMENTATION FORM

Customer Number: AC0171

QC Field Technician: KLT

Compositor ID: \_\_\_\_\_

Date/Time Installed: 11-4-09 0700  
Custody Seal/Lock Installed: Yes  No

Date/Time Extracted: 11-5-09 1700  
Custody Seal/Lock Intact: Yes  No

### Sample Type:

Grab: Yes

Composite: 8HR \_\_\_\_\_ 12 HR \_\_\_\_\_ 24 HR \_\_\_\_\_

Shift 10 hr

Program: Minutes/ML 15/100

Total Vol. Collected: ML 2 gal

Site Description	Location	Diagram
	<u>manhole top of H117</u>	

### Sampling Notes:

Grab Sample Iced: Yes  No

Composite Sample Iced: Yes  No

Decon Performed: Yes  No

Field Test Performed Onsite: Yes  No

Customer Authorization MA

Date 11-5-09



TINA GEANOPULOS  
 BIOMED REALTY TRUST, INC.  
 1205 WESTLAKES DRIVE  
 SUITE 240  
 BERWYN, PA 19312

Regarding:

ERIN SHEA  
 BMR  
 145 KING OF PRUSSIA ROAD  
 RADNOR, PA 19087

Account No: ACO171, BIOMED REALTY TRUST, INC.  
 Project No: ACO171, BIOMED REALTY TRUST, INC.

P.O. No:  
 PWSID No:

Inv. No: 1168367

Sample Number	Sample Description	Samp. Date/Time/Temp	Sampled by
L3177733-1	EFFLUENT 10 HR COMPOSITE 0700-1700 Received Temp: 34 F Iced (Y/N): Y	12/08/09 05:00pm NA F	Kenneth L. Tanner, QC Laboratories

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>GENERAL CHEMISTRY</b>				
BIOCHEMICAL OXYGEN DEMAND	SM 5210B	85.1 mg/l	30.4 mg/l	12/10/09 05:54PM LS
TOTAL SUSPENDED SOLIDS	SM 2540D	72.0 mg/l	2.00 mg/l	12/11/09 10:05AM GLE

Sample Number	Sample Description	Samp. Date/Time/Temp	Sampled by
L3177733-2	EFFLUENT GRAB Received Temp: 34 F Iced (Y/N): Y	12/09/09 12:15pm NA F	Kenneth L. Tanner, QC Laboratories

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>FIELD SERVICES</b>				
FIELD TEMPERATURE CELSIUS	SM 2550B	17.1 Deg. C	0.5 Deg. C	12/09/09 12:15PM KLT
FLOW		0.0292 mgd		12/09/09 12:15PM KLT
PH FIELD	SM 4500H+B	8.04 units	units	12/09/09 12:15PM KLT

L3177733-1:

1. For BOD test on this day, the batch water blank depletion (0.56 mg/L) exceeded the SOP criteria (0.3 mg/l). Batch control samples were within range.

- A result of "ND" indicates the concentration of the analyte tested was either not detected or below the RLs.
- Definitions: ND=not detected; NEG=negative; POS=positive; COL=colonies; RLs=laboratory reporting limits; L/A=laboratory accident; TNTC=too numerous to count
- A result marked with "DRY" indicates that the result was calculated and reported on a dry weight basis.
- All analysis, except field tests are conducted in Southampton, PA unless otherwise identified.
- The test "pH lab" is analyzed upon receipt at the laboratory, the result will not be suitable for regulatory purposes.
- The reported results relate only to the samples.
- QC NELAP ID's: PA 09-00131, NJ PA166, FL E87954, NY 11223, CT PH-0768, DE PA-018, KY 90228, MD 206, EPA PA00018, Bioassay: PA 09-03574, NJ PA034, FL E87953, KS E10373, SC 89020001.

# QC Laboratories

# Analytical Report



Account No: AC0171, BIOMED REALTY TRUST, INC.  
Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:  
PWSID No:

Inv. No: 1168367

- 
- QC STATE ID's: Wind Gap, NJ PA001, PA 48-01334; E RUTHERFORD NJ02015; Vineland NJ06005; Reading PA 06-03543.
  - All samples are collected as "grab" samples unless otherwise identified.
  - MCL= is the EPA recommended "maximum contaminant level" for a parameter. PLs=customer specific permit limits.
  - The test results meet all requirements of NELAC unless otherwise specified.
  - The report shall not be reproduced except in full without the written consent of the laboratory.
- Regulatory authorities are assessing substantial fines for testing omissions. Please track your sample collections and results on a weekly, monthly, or quarterly basis to ensure compliance. QC's internet program 'LIVE ACCESS' will provide you with real-time access to collection dates and results. Please contact Customer Service for further information on acquiring LIVE ACCESS.





## Inter-Laboratory Transport Form

### Coolers for Transport to Southampton from Vineland

Cooler ID No.	To be completed by person sealing coolers	Custody Seal No.	Date	Time	Initials	Temp. in Cooler	Southampton Use only	Iced Y/N
03	12-9-9-1		12-9-9	1630	MJO	30		Y
55	-2					30		Y
33	-3					34		Y
08	-4					38		Y
2	-5					37		Y
2204	-6					40		Y
17294	-7							X
3	-8					39		Y
505	-9							X
80	-10							X
66	-11							X
61	-12							X

Please Note the Following:

Individual sample chains of custody must accompany this form.

Upon receipt and login at QC Laboratories, Southampton, PA., attach a copy of this form to each sample chain of custody.

Once a cooler is sealed, custody seals may not be broken until samples are received at the Southampton laboratory.

If a temperature blank is not received with a cooler, enter "X" in the Temp. column corresponding to that cooler.

An "X" in the "Iced" column indicates cooler was not received by Sample Custody and may have gone directly to Water Micro, Food, or Dairy labs.

Southampton Laboratory use only

Custody seals intact upon receipt?  Y /  N

List ID of any seal found broken upon receipt below:

Initials: **LAB**

A full legal signature is required. Record all times in military time (24-HR Clock: 4:00 PM = 1600)

Relinquished by:	<i>[Signature]</i>	Date:	12/9/09	Time:	1850
Relinquished by:	Jana Burrell	Date:	12/9/09	Time:	1850
Relinquished by:		Date:		Time:	
Relinquished by:		Date:		Time:	

ATTACHMENT 3

2009 Fourth Quarter Radioisotope Usage





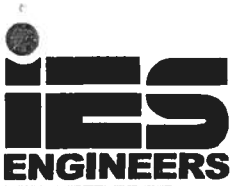












July 28, 2010

OVERNIGHT DELIVERY

*Fed. Ex No. 7937 6927 4153*

Mr. Mark C. Smithgall  
Laboratory & Pretreatment Manager  
Delaware County Regional Water Quality Control Authority  
100 East 5th Street  
Chester, PA 19013-4508

Subject: 2010 Second Quarter Report  
BioMed Realty Trust, Inc.  
145 King Of Prussia Road  
Industrial Discharge Permit No. 2DC-09-01  
IES Project No. EHS10687.01

Dear Mr. Smithgall:

On behalf of BioMed Realty Trust, Inc. (BMR), IES Engineers is pleased to submit the 2010 Second Quarter Report from BMR's 145 King of Prussia Road facility. This report is being submitted in accordance with Industrial Discharge Permit No. 2DC-09-01, issued on October 5, 2006.

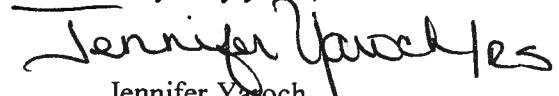
The Second Quarter Report includes:

- Analytical Laboratory Results from QC Laboratories
- Analytical Laboratory Chain-of-Custody Sheets
- Individual data including flow and pH levels taken on an individual day

Also attached for your review is a report from Centocor regarding the Radioisotope usage during the Second Quarter of 2010.

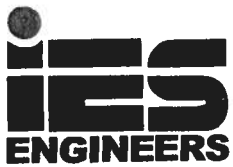
If you have any questions or need any additional information, please feel free to contact me or Ms. Christina Geanopulos of BMR at 858-207-5924.

Very truly yours,

  
Jennifer Yaroach  
Project Scientist

Attachment(s)

cc: C. Geanopulos, BMR  
K. Turner, Centocor  
B. Schlosser, IES



July 28, 2010

OVERNIGHT DELIVERY

*Fed. Ex. No. 7988 9303 9626*

Mr. Joseph Cerrone  
Philadelphia Water Department  
9001 State Road  
Chester, Pennsylvania 19136

Subject: 2010 Second Quarter Report  
BioMed Realty Trust, Inc.  
145 King Of Prussia Road  
Industrial Discharge Permit No. 2DC-09-01  
IES Project No. EHS10687.01

Dear Mr. Cerrone:

On behalf of BioMed Realty Trust, Inc. (BMR), IES Engineers is pleased to submit the 2010 Second Quarter Report from BMR's 145 King of Prussia Road facility. This report is being submitted in accordance with Industrial Discharge Permit No. 2DC-09-01, issued on October 5, 2006.

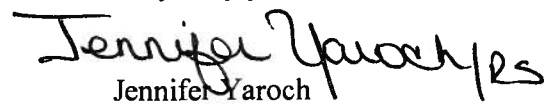
The Second Quarter Report includes:

- Analytical Laboratory Results from QC Laboratories
- Analytical Laboratory Chain-of-Custody Sheets
- Individual data including flow and pH levels taken on an individual day

Also attached for your review is a report from Centocor regarding the Radioisotope usage during the Second Quarter of 2010.

If you have any questions or need any additional information, please feel free to contact me or Ms. Christina Geanopulos of BMR at 858-207-5924.

Very truly yours,

  
Jennifer Yaroch  
Project Scientist

Attachment(s)

cc: C. Geanopulos, BMR  
K. Turner, Centocor  
B. Schlosser, IES

ATTACHMENT 1  
CERTIFICATION STATEMENT



**Certification Statement, 2010 2<sup>nd</sup> Quarter Wastewater Report:**

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility fines and imprisonment for knowing violations."

Michael Bodendorf, Director - Real Estate Operations  
Name/Title

Signature



Date

7/26/10

ATTACHMENT 2  
2010 SECOND QUARTER REPORT

**BioMed Realty Trust**  
**145 King of Prussia Road**  
**Radnor, PA 19087**

**Monthly pH Level - 2010**

Date	Jan	Water Flow Week of:	Actual Usage		Feb	Water Flow Week of:	Actual Usage	
			Meter #1	Meter #2			Meter #1	Meter #2
1/5/2010	6.52	12/29/09-1/5/10	271500	955710	8.20	1/26/10-2/2/10	282777	1016880
1/12/2010	7.51	1/5/10-1/12/10	274436	968708	8.21	2/2/10-2/9/10	285596	1021150
1/19/2010	7.35	1/12/10-1/19/10	277266	981688	8.59	2/9/10-2/16/10	288415	1034612
1/26/2010	6.71	1/19/10-1/26/10	280123	994597	7.90	2/16/10-2/23/10	291295	1041343

Date	March	Water Flow Week of:	Actual Usage		April	Water Flow Week of:	Actual Usage	
			Meter #1	Meter #2			Meter #1	Meter #2
3/2/2010	7.59	2/23/10-3/2/10	295682	1059144	7.25	3/30/10-4/6/10	306602	1127181
3/9/2010	7.83	3/2/10-3/9/10	295733	1062193	7.34	4/6/10-4/13/10	310070	1136069
3/16/2010	7.53	3/9/10-3/16/10	297955	1084771	6.85	4/13/10-4/20/10	312646	1148843
3/23/2010	7.20	3/16/10-3/23/10	300087	1097581	7.24	4/20/10-4/27/10	315241	1161573
3/30/2010	7.50	3/23/10-3/30/10	303999	1112381				

Date	May	Water Flow Week of:	Actual Usage		June	Water Flow Week of:	Actual Usage	
			Meter #1	Meter #2			Meter #1	Meter #2
5/4/2010	6.93	4/27/10-5/4/10	318556	1174406	7.91	5/25/10-6/1/10	331654	1224936
5/11/2010	6.45	5/3/10-5/11/10	321542	1187051	7.73	6/1/10-6/8/10	336398	1237595
5/18/2010	8.27	5/11/10-5/18/10	324307	1199768	8.26	6/8/10-6/15/10	341202	1250628
5/25/2010	8.64	5/18/10-5/25/10	327485	1212440	8.45	6/15/10-6/22/10	346141	1264633
					8.24	6/22/10-6/29/10	351039	1275250

BioMed Realty Trust  
 145 King of Prussia Road  
 Radnor, PA 19087

Date	July	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2
7/6/2010	8.51	6/29/10-7/6/10	356400	1287750
7/13/2010	8.36	7/9/10-7/13/10	363178	1367776

BioMed Realty Trust, Inc  
 145 King of Prussia Road  
 Radnor, PA 19087

**Actual Monthly Flow - 2010**

<b>Date Range</b>	<b>Meter #1</b>	<b>Meter #2</b>	<b>Total Flow</b>
1/5/10-1/12/10	293,600	129,980	423,580
1/12/10-1/19/10	283,000	129,800	412,800
1/19/10-1/26/10	285,700	129,090	414,790
1/26/10-2/2/10	265,400	222,830	488,230
2/2/10-2/9/10	281,900	42,700	324,600
2/9/10-2/16/10	281,900	134,620	416,520
2/16/10-2/23/10	288,000	67,310	355,310
2/23/10-3/2/10	438,700	178,010	616,710
3/2/10-3/9/10	5,100	30,490	35,590
3/9/10-3/16/10	222,200	225,780	447,980
3/16/10-3/23/10	213,200	128,100	341,300
3/23/10-3/30/10	391,200	148,000	539,200
3/30/10-4/6/10	260,300	148,000	408,300
4/6/10-4/13/10	257,600	127,740	385,340
4/13/10-4/20/10	259,500	127,300	386,800
4/20/10-4/27/10	331,500	128,330	459,830
4/28/09-5/5/09	298,600	126,450	425,050
5/3/10-5/11/10	276,500	127,170	403,670
5/11/10-5/18/10	317,800	126,720	444,520
5/18/10-5/25/10	416,900	124,960	541,860
5/25/10-6/1/10	474,400	126,590	600,990
6/1/10-6/8/10	480,400	130,330	610,730
6/8/10-6/15/10	493,900	140,050	633,950
6/15/10-6/22/10	489,800	106,170	595,970
6/22/10-6/29/10	536,100	125,000	661,100
6/29/10-7/6/10	677,800	800,260	1,478,060



TINA GEANPULOS  
 BIOMED REALTY TRUST, INC.  
 1205 WESTLAKES DRIVE  
 SUITE 240  
 BERWYN, PA 19312

Regarding:

ERIN SHEA  
 BMR  
 145 KING OF PRUSSIA ROAD  
 RADNOR, PA 19087

Account No: AC0171, BIOMED REALTY TRUST, INC.  
 Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:  
 PWSID No:

Inv. No: 1195113

Sample Number	Sample Description	Samp. Date/Time/Temp	Sampled by
L3286913-1	EFFLUENT 10 HR COMPOSITE 0700-1700 Received Temp: 36 F Iced (Y/N): Y	04/07/10 05:00pm NA F	Kenneth L. Tanner, QC Laboratori

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>GENERAL CHEMISTRY</b>				
BIOCHEMICAL OXYGEN DEMAND	SM 5210B	50.5 mg/l	33.8 mg/l	04/09/10 05:10PM LS
TOTAL SUSPENDED SOLIDS	SM 2540D	64.0 mg/l	2.00 mg/l	04/13/10 09:10AM GLE

Sample Number	Sample Description	Samp. Date/Time/Temp	Sampled by
L3286913-2	EFFLUENT GRAB Received Temp: 36 F Iced (Y/N): Y	04/07/10 07:00am NA F	Kenneth L. Tanner, QC Laboratori

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>FIELD SERVICES</b>				
FIELD TEMPERATURE CELSIUS	SM 2550B	23.0 Deg. C	0.5 Deg. C	04/07/10 07:00AM KLT
FLOW		0.0288 mgd		04/07/10 07:00AM KLT
PH FIELD	SM 4500H+B	7.13 units	units	04/07/10 07:00AM KLT

- A result of "ND" indicates the concentration of the analyte tested was either not detected or below the RLs.
- Definitions: ND=not detected; NEG=negative; POS=positive; COL=colonies; RLs=laboratory reporting limits; L/A=laboratory accident; TNTC=too numerous to count
- A result marked with "DRY" indicates that the result was calculated and reported on a dry weight basis.
- All analysis, except field tests are conducted in Southampton, PA unless otherwise identified.
- The test "pH lab" is analyzed upon receipt at the laboratory, the result will not be suitable for regulatory purposes.
- The reported results relate only to the samples.
- QC NELAP ID's: PA 09-00131, NJ PA166, FL E87954, NY 11223, CT PH-0768, DE PA-018, KY 90228, MD 206, EPA PA00018, Bioassay: PA 09-03574, NJ PA034, FL E87953, KS E10373, SC 89020001.
- QC STATE ID's: Wind Gap, NJ PA001, PA 48-01334; E RUTHERFORD NJ02015; Vineyard NJ06005; Reading PA 06-03543.
- All samples are collected as "grab" samples unless otherwise identified.
- MCL= is the EPA recommended "maximum contaminant level" for a parameter. PLs=customer specific permit limits.
- The test results meet all requirements of NELAC unless otherwise specified.
- The report shall not be reproduced except in full without the written consent of the laboratory.

# QC Laboratories

# Analytical Report



Account No: AC0171, BIOMED REALTY TRUST, INC.  
Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:  
PWSID No:

Inv. No: 1195113

---

Regulatory authorities are assessing substantial fines for testing omissions. Please track your sample collections and results on a weekly, monthly, or quarterly basis to ensure compliance. QC's internet program 'LIVE ACCESS' will provide you with real-time access to collection dates and results. Please contact Customer Service for further information on acquiring LIVE ACCESS.







**QC Laboratories**

1205 Industrial Blvd. Phone: 215-355-3900  
 Southampton, PA 18966-0514 Fax: 215-355-7231

Client/Acct. No. BmR

Address

City/State/Zip Radnor, PA

Phone/Fax

P.O. No.

Client Contact Erin Shea

QC Contact

Sampling Site Address: (if different)

**CHAIN OF CUSTODY**

Page \_\_\_\_\_ of \_\_\_\_\_

Bill to/Report to: (if different)

**PROJECT**

**FIELD ID**

3286913-1 Eff. 10 hr comp 0700  
 -2 Effluent grab

**Collection**

**Date**

**Military Time**

4-7-10 1700  
 4-7-10 0700

**Matrix Code**

W  
 J

**Number of Containers**

Total  
 1  
 0

N H Y H M Z U B  
 C I S O A P P I

Matrix Code

Collection

Date

Military Time

Matrix Code

Number of Containers

Total

N H Y H M Z U B

C I S O A P P I

Matrix Code

Collection

Date

Military Time

Matrix Code

Number of Containers

Total

N H Y H M Z U B

C I S O A P P I

Lab LIMS No: L3280913.

**LAB USE ONLY:**

#    Ascorbic/HCl Vials #    HCl Vials  
 #    Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>  
 #    Na OH/Zn acetate pH  
 #    HNO<sub>3</sub> pH  
 #    H<sub>2</sub>SO<sub>4</sub> pH  
 #    NaOH pH  
 #    Unpreserved plat.  
 #    Hcl pH

# 30 Temp control QC ID# TAP-11-1-1  
**ANALYSIS REQUESTED**

BOD5, TSS

Temp-23.0° Pn-7.13 Flow-02982 mgd

SAMPLED BY: (Name/Company)  
QC  
Kent

Verbal/fax data due: / /

Hardcopy due: / /

Report Format:  Standard  Forms

Standard + QC  NJ Reduced  Disk

Field Parameters Analyzed By:

Date/Time:

4-8-10

**SAMPLE CUSTODY EXCHANGES MUST BE DOCUMENTED BELOW: USE FULL LEGAL SIGNATURE, DATE AND MILITARY TIME (24 HOUR CLOCK, I.E. 8AM IS 0800, 4 PM IS 1600)**

RELINQUISHED BY SAMPLER	DATE	TIME	RECEIVED BY	DATE	TIME	DELIVERY METHOD:	CUSTOMY SEAL NUMBER
1	4-8-10	1445	COOK	4-9-10	1445	<input type="checkbox"/> UPS <input type="checkbox"/> FEDEX <input type="checkbox"/> OTHER	
2	4/8/10	1900	JULIA BUNSON	4/8/10	1900		
3							
4							
5							

370 V K R 1  
 Hazardous: yes / no

**For example to aid completion, see reverse side.**

# SAMPLING DOCUMENTATION FORM

Customer Number: BMR

QC Field Technician: KCT

Compositor ID: \_\_\_\_\_

Date/Time Installed: 4-7-10 0700

Custody Seal/Lock Installed: Yes  No \_\_\_\_\_

Date/Time Extracted: 4-7-10 1700

Custody Seal/Lock Intact: Yes  No \_\_\_\_\_

### Sample Type:

Grab: Yes

Composite: 8HR \_\_\_\_\_ 12 HR \_\_\_\_\_ 24 HR \_\_\_\_\_

Shift

Program: Minutes/ML 15/100

Total Vol. Collected: ML 2 gal

Site Description	Location	Diagram
	<u>manhole top of Hill</u>	

### Sampling Notes:

Grab Sample Iced: Yes \_\_\_\_\_ No

Composite Sample Iced: Yes  No \_\_\_\_\_

Decon Performed: Yes  No \_\_\_\_\_

Field Test Performed Onsite: Yes  No \_\_\_\_\_

Customer Authorization: N/A

Date: 4-8-10



# Vineland

Laboratories

1205 Industrial Highway, Southampton, PA 18966

## Inter-Laboratory Transfer Form

### Coolers for Transport to Southampton from Vineland

Cooler ID No.	QC Custodial Seal No.	QC Seal Date	QC Seal Time	QC Seal Initial	Southampton Custodial Seal No.	Southampton Seal Date	Southampton Seal Time	Southampton Seal Initial
204	04-08-0-2	04-08-10	1730	MJC	37			Y
01161	-3				38			Y
2412	-4				39			Y
665	-5				40			Y
1003	-6				41			Y
367	-7				42			Y
10	-8				43			Y
13A	-9				44			Y
92	-10				45			Y
3200	-11				46			X
3204	-12				47			X
506	-13				48			X
01609	-14				49			X

Please Note the Following:

Individual sample chains of custody must accompany this form.

Upon receipt and login at QC Laboratories, Southampton, PA., attach a copy of this form to each sample chain of custody.

Once a cooler is sealed, custody seals may not be broken until samples are received at the Southampton laboratory.

If a temperature blank is not received with a cooler, enter "X" in the Temp. column corresponding to that cooler.

An "X" in the "Iced" column indicates cooler was not received by Sample Custody and may have gone directly to Water Micro, Food, or Dairy labs.

### Southampton Laboratory Receipt

Custody seals intact upon receipt? O/N Initials: CMJ

List ID of any seal found broken upon receipt below:

All legal evidence is required. Record all times in Military Time (24-Hr Clock) 4:00 P.M. = 1600

Relinquished by: [Signature]

Date: 4-8-10

Time: 1900

Received by: [Signature]

Date: 1900

Time: 1900

Relinquished by:

Date:

Time:

Received by:

Date:

Time:

Relinquished by:

Date:

Time:

Received by:

Date:

Time:



TINA GEANOPULOS  
 BIOMED REALTY TRUST, INC.  
 1205 WESTLAKES DRIVE  
 SUITE 240  
 BERWYN, PA 19312

Regarding:

ERIN SHEA  
 BMR  
 145 KING OF PRUSSIA ROAD  
 RADNOR, PA 19087

Account No: AC0171, BIOMED REALTY TRUST, INC.  
 Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:  
 PWSID No:

Inv. No: 1202687

Sample Number: L3317183-1    Sample Description: EFFLUENT 10 HR COMPOSITE 0700-1700  
 Received Temp: 37 F    Iced (Y/N): Y    Samp. Date/Time/Temp: 05/06/10 05:00pm NA F    Sampled by: Kenneth L. Tanner, QC Laboratories

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>GENERAL CHEMISTRY</b>				
BIOCHEMICAL OXYGEN DEMAND	SM 5210B	64.5 mg/l	13.6 mg/l	05/07/10 09:30PM GAP
TOTAL SUSPENDED SOLIDS	SM 2540D	136 mg/l	2.00 mg/l	05/11/10 09:30AM GLE

Sample Number: L3317183-2    Sample Description: EFFLUENT GRAB  
 Received Temp: 37 F    Iced (Y/N): Y    Samp. Date/Time/Temp: 05/07/10 09:30am NA F    Sampled by: Kenneth L. Tanner, QC Laboratories

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>FIELD SERVICES</b>				
FIELD TEMPERATURE CELSIUS	SM 2550B	24.2 Deg. C	0.5 Deg. C	05/07/10 09:30AM KLT
FLOW		0.0288 mgd		05/07/10 09:30AM KLT
PH FIELD	SM 4500H+B	8.79 units	units	05/07/10 09:30AM KLT

- A result of "ND" indicates the concentration of the analyte tested was either not detected or below the RLs.
- Definitions: ND=not detected; NEG=negative; POS=positive; COL=colonies; RLs=laboratory reporting limits; L/A=laboratory accident; TNTC=too numerous to count
- A result marked with "DRY" indicates that the result was calculated and reported on a dry weight basis.
- All analysis, except field tests are conducted in Southampton, PA unless otherwise identified.
- The test "pH lab" is analyzed upon receipt at the laboratory, the result will not be suitable for regulatory purposes.
- The reported results relate only to the samples.
- QC NELAP ID's: PA 09-00131, NJ PA166, FL E87954, NY 11223, CT PH-0768, DE PA-018, KY 90228, MD 206, EPA PA00018, Bioassay: PA 09-03574, NJ PA034, FL E87953, KS E10373, SC 89020001.
- QC STATE ID's: Wind Gap, NJ PA001, PA 48-01334; E RUTHERFORD NJ02015; Vineland NJ06005; Reading PA 06-03543.
- All samples are collected as "grab" samples unless otherwise identified.
- MCL= is the EPA recommended "maximum contaminant level" for a parameter. PLS=customer specific permit limits.
- The test results meet all requirements of NELAC unless otherwise specified.
- The report shall not be reproduced except in full without the written consent of the laboratory.

*Thomas J. Hines*  
 Thomas J. Hines, President

# QC Laboratories

# Analytical Report



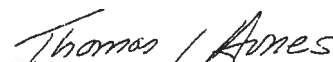
Account No: AC0171, BIOMED REALTY TRUST, INC.  
Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:  
PWSID No:

Inv. No: 1202687

---

Regulatory authorities are assessing substantial fines for testing omissions. Please track your sample collections and results on a weekly, monthly, or quarterly basis to ensure compliance. QC's internet program 'LIVE ACCESS' will provide you with real-time access to collection dates and results. Please contact Customer Service for further information on acquiring LIVE ACCESS.

  
Thomas J. Hines, President

ERIN SHEA  
 BMR  
 145 KING OF PRUSSIA ROAD  
 RADNOR, PA 19087  
 (610)647-9590

PickSheet: P3317183  
 Cust: AC071  
 Schd: 37686

P.O. #: MONDAY  
 Project Name: BIOMED REALTY TRUST, INC.  
 Start Date: 03/08/04 Stop Date:  
 MUST SET UP COMPOSITE FROM 7AM TO 5PM PER PERMIT REQUIREMENTS

05/03/10 - 05/31/10  
 Sample Collect Received Tested Complete  
 Date 5.7.10  
 Time  
 By  
 Temp. °F °F °F App.

Route: 86 KEN TANNER LANDFILLS / DISCHARGES, ETC.

Temp	Site	Initials	Iced?
37 °F	QC	ET	YES NO
°F			YES NO

X: -75.35579 Y: 40.0401

BR	CL	PH
3317183-1	EFFLUENT 10 HR COMPOSITE 0700-1700 BOD 5, CHAIN OF CUSTODY RET, ISCO SAMPLER, TSS	
3317183-2	EFFLUENT GRAB CHAIN OF CUSTODY RET, FLD TEMP C, FLOW, PH FLD	

Dept.	Relinquished By	Time	Date

Dept.	Relinquished To	Time	Date

Hours of Operation:  
 M: 07:00-18:00 T: 07:00-18:00 W: 07:00-18:00 Th: 07:00-18:00 F: 07:00-18:00 St: - Sn: -

# \_\_\_\_\_ Ascorbic/HCl Vials # \_\_\_\_\_ HCl Vials  
 # \_\_\_\_\_ Na2-S2-O3  
 # \_\_\_\_\_ Na OH/Zn acetate pH  
 # \_\_\_\_\_ HNO3 pH  
 # \_\_\_\_\_ H2-SO4 pH  
 # \_\_\_\_\_ NaOH pH  
 # \_\_\_\_\_ Unpreserved # \_\_\_\_\_ HCl pH

Health Dept:

**QC Laboratories**

1205 Industrial Blvd. Phone: 215-355-3900  
Southampton, PA 18966-0514 Fax: 215-355-7231

Client/Acct. No. **BMR**  
Address \_\_\_\_\_

City/State/Zip **Radnor, PA**

Phone/Fax \_\_\_\_\_

Client Contact **Erin Shea**

P.O. No. \_\_\_\_\_

QC Contact \_\_\_\_\_

Sampling Site Address: (if different) \_\_\_\_\_

Bill to/Report to: (if different) \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_

**CHAIN OF CUSTODY**

PROJECT	FIELD ID	Collection		Total	Number of Containers												
		Date	Military Time		G	C	M	A	M	B	P	H	H	N	Z	V	D
	3317183-1 Eff. 10/6/09	5/6/10	1700	1													
	-2	5/7/10	0930	0													

Verbal/fax data due: \_\_\_\_\_

Hardcopy due: \_\_\_\_\_

Please call for pricing and availability on rush (<14-21 day) turnaround and on all but standard format.

SAMPLE CUSTODY EXCHANGES MUST BE DOCUMENTED BELOW. USE FULL LEGAL SIGNATURE, DATE AND MILITARY TIME (24 HOUR CLOCK. I.E. 8AM IS 0800. 4 PM IS 1600)

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
<i>[Signature]</i>	5-7-10	1430	<i>[Signature]</i>	5/7/10	1430

DELIVERY METHOD:  QC COURIER  CLIENT  
 UPS  FEDEX  OTHER

COMMENTS:

Hazardous: yes / no

Field Parameters Analyzed By: *[Signature]*

Date/Time: 5.7.10

Lab LIMS No: \_\_\_\_\_

**LAB USE ONLY:**

- # Ascorbic/HCl Vials # \_\_\_\_\_ HCl Vials \_\_\_\_\_
- # Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> \_\_\_\_\_
- # Na OH/Zn acetate pH \_\_\_\_\_
- # HNO<sub>3</sub> pH \_\_\_\_\_
- # H<sub>2</sub>SO<sub>4</sub> pH \_\_\_\_\_
- # NaOH pH \_\_\_\_\_
- # Unpreserved *[Signature]*
- # Hcl pH \_\_\_\_\_
- # Temp control *[Signature]* ID# \_\_\_\_\_

**ANALYSIS REQUESTED**

BODS, TSS

Temp-24.2° Pm-8.79 Pm • 02882

Report Format:  Standard  Forms  
 Standard + QC  NJ Reduced  Disk

Sig: \_\_\_\_\_

Date/Time: 5.7.10

Custody Seal Number

**MATRIX CODES**

- DW: DRINKING WATER
- GW: GROUND WATER
- WW: WASTEWATER
- SO: SOIL
- SL: SLUDGE
- OIL: OIL
- SOL: NON SOIL SOLID
- MI: MISCELLANEOUS
- X: OTHER

Field pH, Temp (C or F), DO, Cl<sub>2</sub>, S. Cond. etc.

For example to aid completion, see reverse side.

# SAMPLING DOCUMENTATION FORM

Customer Number: AC0171

QC Field Technician: KJ

Compositor ID: S-6-10 0700

Date/Time Installed: S-6-10 1700

Custody Seal/Lock Installed: Yes  No

Date/Time Extracted: \_\_\_\_\_

Custody Seal/Lock Intact: Yes  No

Sample Type:

Grab: Yes

Composite: 8HR \_\_\_\_\_ 12 HR \_\_\_\_\_ 24 HR \_\_\_\_\_

Shift 10hr

Program: Minutes/ML 15/100

Total Vol. Collected: ML 1gal

Site Description	Location	Diagram
	<u>manhole top of Hill</u>	

Sampling Notes:

Grab Sample Iced: Yes \_\_\_\_\_ No

Composite Sample Iced: Yes  No \_\_\_\_\_

Decon Performed: Yes  No \_\_\_\_\_

Field Test Performed Onsite: Yes  No \_\_\_\_\_

Customer Authorization NA

Date S-6-10





TINA GEANOPULOS  
 BIOMED REALTY TRUST, INC.  
 1205 WESTLAKES DRIVE  
 SUITE 240  
 BERWYN, PA 19312

Regarding:

ERIN SHEA  
 BMR  
 145 KING OF PRUSSIA ROAD  
 RADNOR, PA 19087

Account No: ACO171, BIOMED REALTY TRUST, INC.  
 Project No: ACO171, BIOMED REALTY TRUST, INC.

P.O. No:  
 PWSID No:

Inv. No: 1214380

Sample Number L3355809-1	Sample Description EFFLUENT 10 HR COMPOSITE 0700-1700 Received Temp: 37 F Iced (Y/N): Y	Samp. Date/Time/Temp 06/15/10 05:00pm NA F	Sampled by Kenneth L. Tanner, QC Laboratories
-----------------------------	---	---	--

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>GENERAL CHEMISTRY</b>				
BIOCHEMICAL OXYGEN DEMAND	SM 5210B	107 mg/l	30.0 mg/l	06/16/10 11:09PM GAP
TOTAL SUSPENDED SOLIDS	SM 2540D	92.0 mg/l	2.00 mg/l	06/18/10 07:10AM DJP

Sample Number L3355809-2	Sample Description EFFLUENT GRAB Received Temp: 37 F Iced (Y/N): Y	Samp. Date/Time/Temp 06/15/10 07:05am NA F	Sampled by Kenneth L. Tanner, QC Laboratories
-----------------------------	--	---	--

Parameter	Method	Result	RLs	Test Date, Time, Analyst
<b>FIELD SERVICES</b>				
FIELD TEMPERATURE CELSIUS	SM 2550B	31.7 Deg. C	0.5 Deg. C	06/15/10 07:05AM KLT
FLOW		0.0296 mgd		06/15/10 07:05AM KLT
PH FIELD	SM 4500H+B	7.40 units	units	06/15/10 07:05AM KLT

- A result of "ND" indicates the concentration of the analyte tested was either not detected or below the RLs.
- Definitions: ND=not detected; NEG=negative; POS=positive; COL=colonies; RLs=laboratory reporting limits; L/A=laboratory accident; TNTC=too numerous to count
- A result marked with "DRY" indicates that the result was calculated and reported on a dry weight basis.
- All analysis, except field tests are conducted in Southampton, PA unless otherwise identified.
- The test "pH lab" is analyzed upon receipt at the laboratory, the result will not be suitable for regulatory purposes.
- The reported results relate only to the samples.
- QC NELAP ID's: PA 09-00131, NJ PA166, FL E87954, NY 11223, CT PH-0768, DE PA-018, KY 90228, MD 206, EPA PA00018, Bioassay: PA 09-03574, NJ PA034, FL E87953, KS E10373, SC 89020001.
- QC STATE ID's: Wind Gap, NJ PA001, PA 48-01334; E RUTHERFORD NJ02015; Vineland NJ06005; Reading PA 06-03543.
- All samples are collected as "grab" samples unless otherwise identified.
- MCL= is the EPA recommended "maximum contaminant level" for a parameter. PLs=customer specific permit limits.
- The test results meet all requirements of NELAC unless otherwise specified.
- The report shall not be reproduced except in full without the written consent of the laboratory.

*Thomas J. Hines*  
 Thomas J. Hines, President

# QC Laboratories

# Analytical Report



Account No: AC0171, BIOMED REALTY TRUST, INC.  
Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:  
PWSID No:

Inv. No: 1214380

---

Regulatory authorities are assessing substantial fines for testing omissions. Please track your sample collections and results on a weekly, monthly, or quarterly basis to ensure compliance. QC's internet program 'LIVE ACCESS' will provide you with real-time access to collection dates and results. Please contact Customer Service for further information on acquiring LIVE ACCESS.

ERIN SHEA  
 BMR  
 145 KING OF PRUSSIA ROAD  
 RADNOR, PA 19087  
 (610)647-9590

PickSheet: P3355809 P.O. #: MONDAY 06/07/10 - 06/30/10 Printed on: 05/19/10

Cust: AC0717 Project Name: BIONED REALTY TRUST, INC.  
 Start Date: 03/08/04 Stop Date:  
 Schd: 37686

MUST SET UP COMPOSITE FROM 7AM TO 5PM PER PERMIT REQUIREMENTS

Temp	Site	Initials	Iced?
37 °F	DL	KJ	YES NO
°F			YES NO

Route: 86 KEN TANNER LANDFILLS / DISCHARGES, ETC.

X: -75.35579 Y: 40.0401

	BR	CL	PH
3355809-1 EFFLUENT 10 HR COMPOSITE 0700-1700 BOD 5, CHAIN OF CUSTODY RET, ISCO SAMPLER, TSS			
3355809-2 EFFLUENT GRAB CHAIN OF CUSTODY RET, FLD TEMP C, FLOW, PH FLD			

Dept.	Relinquished By	Time	Date	Dept.	Relinquished To	Time	Date

Hours of Operation:  
 M: 07:00-18:00 T: 07:00-18:00 W: 07:00-18:00 Th: 07:00-18:00 F: 07:00-18:00 St: - Sn: -

Health Dept: # \_\_\_\_\_ Unpreserved # \_\_\_\_\_ HCL pH \_\_\_\_\_

#	Ascorbic/HCL Vials	#	HCL Vials
#	Na2-S2-O3		
#	Na OH/Zn acetate pH		
#	HNO3 pH		
#	H2-SO4 pH		
#	NaOH pH		



1205 Industrial Blvd.  
 Southampton, PA 18966-0514  
 Phone: 215-355-3900  
 Fax: 215-355-7231

Client/Acct. No. BMK

Address \_\_\_\_\_

City/State/Zip Radnor, PA.

Phone/Fax \_\_\_\_\_

Client Contact Erin Sheg

P.O. No. \_\_\_\_\_

QC Contact \_\_\_\_\_

### CHAIN OF CUSTODY

Page            of             
 Bill to/Report to: (if different) \_\_\_\_\_

Sampling Site Address: (if different) \_\_\_\_\_

PROJECT \_\_\_\_\_

FIELD ID \_\_\_\_\_

LAB USE ONLY  
3355809-1 Eff. 10 hrs ap 1700  
-2 Eff. grab

Date	Military Time	Collection	Matrix		Number of Containers	
			G	C	H	C
<u>6-16-10</u>	<u>1700</u>	<u>W</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
<u>6-15-10</u>	<u>0705</u>	<u>W</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

Verbal/fax date due: \_\_\_\_\_  
 Hardcopy due: \_\_\_\_\_

SAMPLED BY: (Name/Company) Kantar  
 Date/Time: \_\_\_\_\_

Report Format:  Standard  Forms  
 Standard + OC  NJ Reduced  Disk

Field Parameters Analyzed By: \_\_\_\_\_  
 Date/Time: 6-15-10

Field pH, Temp (C or F), DO, Cl<sub>2</sub>, S. Cond. etc. \_\_\_\_\_

LAB USE ONLY  
BOD 5, TSS  
Temp - 31.7°C Pm = 7.40  
Flow = 0.2955 mg/d

ANALYSIS REQUESTED

LAB USE ONLY

DELIVERY METHOD:  OC COURIER  CLIENT  
 UPS  FEDEX  OTHER

Comments: \_\_\_\_\_

Hazardous: yes / no \_\_\_\_\_

SAMPLE CUSTODY EXCHANGES MUST BE DOCUMENTED BELOW. USE FULL LEGAL SIGNATURE. DATE AND MILITARY TIME (24 HOUR CLOCK, I.E. 8AM IS 0800, 4 PM IS 1600)

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME	Custody Seal Number
_____	<u>6-16-10</u>	<u>1340</u>	<u>[Signature]</u>	<u>6/16/10</u>	<u>1340</u>	
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME	
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME	
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME	
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME	

For example to aid completion, see reverse side.

# SAMPLING DOCUMENTATION FORM

Customer Number: AC0171

QC Field Technician: KLT

Compositor ID: \_\_\_\_\_

Date/Time Installed: 6-15-10 0700  
Custody Seal/Lock Installed: Yes  No

Date/Time Extracted: 6-15-10 1700  
Custody Seal/Lock Intact: Yes  No

Sample Type:

Grab: Yes

Composite: 8HR \_\_\_\_\_ 12 HR \_\_\_\_\_ 24 HR \_\_\_\_\_

Shift 10 hr

Program: Minutes/ML \_\_\_\_\_

Total Vol. Collected: ML 1.6 gal

Site Description	Location	Diagram
	<u>manhole top of Hill</u>	

Sampling Notes:

Grab Sample Iced: Yes \_\_\_\_\_ No   
Composite Sample Iced: Yes  No \_\_\_\_\_  
Decon Performed: Yes  No \_\_\_\_\_  
Field Test Performed Onsite: Yes  No \_\_\_\_\_

Customer Authorization NA  
Date 6-15-10

ATTACHMENT 3

2010 SECOND QUARTER RADIOISOTOPE USAGE

















---

1720 Walton Road, Blue Bell, PA 19422 610-828-3078 Fax 610-828-7842

January 24, 2014

DRAFT  
CERTIFIED MAIL; RETURN RECEIPT REQUESTED

*Certified No.*

Mr. Joseph Cerrone  
Philadelphia Water Department  
9001 State Road  
Chester, Pennsylvania 19136

Subject: December 2013 Report  
BioMed Realty Trust, Inc.  
145 King Of Prussia Road  
Industrial Discharge Permit No. 2DC-09-01  
IES Project No. ON130687.01

Dear Mr. Cerrone:

On behalf of BioMed Realty Trust, Inc. (BMR), IES Engineers is pleased to submit the December 2013 Report from BMR's 145 King of Prussia Road facility. This report is now being submitted on a monthly basis in accordance with Industrial Discharge Permit No. 2DC-09-01, issued on October 1, 2010.

The December 2013 Report includes:

- Analytical Laboratory Results from QC Laboratories
- Analytical Laboratory Chain-of-Custody Sheets
- Individual data including flow and pH levels taken on an individual day

If you have any questions or need any additional information, please feel free to contact me or Ms. Maureen Delaney of BMR at (610) 647-9590.

Very truly yours,

Jennifer Yaroeh  
Project Scientist III

Attachment(s)

cc: M. Delaney, BMR  
M. Deluga, BMR  
K. Turner, Janssen R&D  
R. Schlosser, IES



ATTACHMENT 1  
CERTIFICATION STATEMENT

**Certification Statement, December 2013 Wastewater Report:**

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility fines and imprisonment for knowing violations.”

Russell Garland – Regional Director, East Coast Operations  
Name/Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



ATTACHMENT 2  
December 2013 Report



BioMed Realty Trust  
145 King of Prussia Road  
Radnor, PA 19087

**Monthly pH Level - 2013**

<u>Date</u>	<u>Jan</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>
1/1/2013	<b>7.28</b>	12/25/12-1/1/13	785621	2922220
1/8/2013	<b>7.15</b>	1/1/13-1/8/13	787614	2934105
1/15/2013	<b>7.35</b>	1/8/13-1/15/13	789696	2946453
1/22/2013	<b>6.34</b>	1/15/13-1/22-13	792234	2962792
1/29/2013	<b>6.65</b>	1/22/13-1/29/12	793354	2971123

<u>Date</u>	<u>Feb</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>
2/5/2013	<b>6.69</b>	1/29/13-2/5/13	795232	2983255
2/12/2013	<b>6.83</b>	2/5/13-2/12/13	796864	2995355
2/19/2013	<b>6.78</b>	2/12/13-2/19/13	799800	3011431
2/26/2013	<b>6.95</b>	2/19/13-2/26/13	801066	3020228

<u>Date</u>	<u>March</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>
3/5/2013	<b>7.20</b>	2/26/13-3/5/13	803048	3032611
3/12/2013	<b>6.85</b>	3/5/13-3/12/13	805016	3044900
3/19/2013	<b>6.91</b>	3/12/13-3/19/13	807039	3058906
3/26/2013	<b>7.45</b>	3/19/13-3/26/13	808830	3071282

<u>Date</u>	<u>April</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>
4/2/2013	<b>7.25</b>	3/26/13-4/2/13	810810	3082111
4/9/2013	<b>6.67</b>	4/2/13-4/9/13	813323	3094608
4/16/2013	<b>6.84</b>	4/9/13-4/16/13	815668	3107107
4/23/2013	<b>6.76</b>	4/16/13-4/23/13	818700	3119477
4/30/2013	<b>7.34</b>	4/23/13-4/30/13	820692	3131620

<u>Date</u>	<u>May</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>
5/7/2013	<b>7.25</b>	4/30/13-5/7/13	823114	3144305
5/14/2013	<b>7.10</b>	5/7/13-5/14/13	825297	3156721
5/21/2013	<b>7.28</b>	5/14/13-5/21/13	828035	3169080
5/28/2013	<b>7.16</b>	5/21/13-5/28/13	831060	3181438

<u>Date</u>	<u>June</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>
6/4/2013	<b>6.74</b>	5/28/13-6/4/13	835634	3194470
6/11/2013	<b>6.80</b>	6/4/13-6/11/13	838690	3207080
6/18/2013	<b>7.24</b>	6/11/13-6/18/13	841925	3219711
6/25/2013	<b>7.32</b>	6/18/13-6/25/13	845232	3232610

BioMed Realty Trust  
 145 King of Prussia Road  
 Radnor, PA 19087

<u>Date</u>	<u>July</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>	<u>Date</u>	<u>Aug</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>
7/2/2013	<b>7.43</b>	6/25/13-7/2/13	848370	3244766	8/6/2013	<b>7.25</b>	7/30/13-8/6/13	892413	3304558
7/9/2013	<b>7.33</b>	7/2/13-7/9/13	852105	3259578	8/13/2013	<b>7.43</b>	8/6/13-8/13/13	895332	3318743
7/16/2013	<b>7.30</b>	7/11/13-7/16/13	867525	3268736	8/20/2013	<b>7.26</b>	8/13/13-8/20/13	897185	3329570
7/23/2013	<b>7.67</b>	7/16/13-7/23/13	887090	3279966	8/27/2013	<b>6.85</b>	8/20/13-8/27/13	899963	3341971
7/30/2013	<b>6.85</b>	7/23/13-7/30/13	890989	3292219					

<u>Date</u>	<u>Sept</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>	<u>Date</u>	<u>Oct</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>
9/3/2013	<b>6.72</b>	8/27/13-9/3/13	902572	3354484	10/1/2013	<b>6.73</b>	9/24/13-10/1/13	911054	3403802
9/10/2013	<b>6.53</b>	9/3/13-9/10/13	904985	3366880	10/8/2013	<b>6.63</b>	10/1/13-10/8/13	913809	3416404
9/17/2013	<b>6.72</b>	9/10/13-9/17/13	907455	3379270	10/15/2013	<b>6.53</b>	10/8/13-10/15/13	915645	3428796
9/24/2013	<b>6.56</b>	9/17/13-9/24/13	909215	3391371	10/22/2013	<b>6.85</b>	10/15/13-10/22/13	917328	3441170
					10/30/2013	<b>6.79</b>	10/22/13-10/30/13	919277	3455717

<u>Date</u>	<u>Nov</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>	<u>Date</u>	<u>Dec</u>	<u>Water Flow</u> <u>Week of:</u>	<u>Actual</u> <u>Usage</u> <u>Meter #1</u>	<u>Actual</u> <u>Usage</u> <u>Meter #2</u>
11/5/2013	<b>6.54</b>	10/30/13-11/5/13	921486	3469552	12/3/2013	<b>6.75</b>	11/26/13-12/3/13	927833	3515723
11/12/2013	<b>6.73</b>	11/5/13-11/12/13	922783	3478578	12/10/2013	<b>7.85</b>	12/3/13-12/10/13	929340	3528036
11/19/2013	<b>6.75</b>	11/12/13-11/19/13	924508	3491006	12/17/2013	<b>7.55</b>	12/10/13-12/17/13	930777	3540415
11/26/2013	<b>6.79</b>	11/19/13-11/26/13	926442	3503445	12/24/2013	<b>7.75</b>	12/17/13-12/24/13	932477	3553143
					12/31/2013	<b>7.85</b>	12/24/13-12/31/13	934087	3566785

BioMed Realty Trust, Inc  
 145 King of Prussia Road  
 Radnor, PA 19087

**Actual Monthly Flow - 2013**

<b>Date Range</b>	<b>Meter #1</b>	<b>Meter #2</b>	<b>Total Flow</b>	
12/25/12-1/1/13	199,300	118,850	<b>318,150</b>	gallons
1/1/13-1/8/13	208,200	123,480	<b>331,680</b>	gallons
1/8/13-1/15/13	253,800	163,390	<b>417,190</b>	gallons
1/15/13-1/22-13	112,000	83,310	<b>195,310</b>	gallons
1/22/13-1/29/12	187,800	121,320	<b>309,120</b>	gallons
1/29/13-2/5/13	163,200	121,000	<b>284,200</b>	gallons
2/5/13-2/12/13	293,600	160,760	<b>454,360</b>	gallons
2/12/13-2/19/13	126,600	87,970	<b>214,570</b>	gallons
2/19/13-2/26/13	198,200	123,830	<b>322,030</b>	gallons
2/26/13-3/5/13	196,800	122,890	<b>319,690</b>	gallons
3/5/13-3/12/13	202,300	140,060	<b>342,360</b>	gallons
3/12/13-3/19/13	179,100	123,760	<b>302,860</b>	gallons
3/19/13-3/26/13	198,000	108,290	<b>306,290</b>	gallons
3/26/13-4/2/13	251,300	124,970	<b>376,270</b>	gallons
4/2/13-4/9/13	234,500	124,990	<b>359,490</b>	gallons
4/9/13-4/16/13	303,200	123,700	<b>426,900</b>	gallons
4/16/13-4/23/13	199,200	121,430	<b>320,630</b>	gallons
4/23/13-4/30/13	242,200	126,850	<b>369,050</b>	gallons
4/30/13-5/7/13	218,300	124,160	<b>342,460</b>	gallons
5/7/13-5/14/13	273,800	123,590	<b>397,390</b>	gallons
5/14/13-5/21/13	302,500	123,580	<b>426,080</b>	gallons
5/21/13-5/28/13	457,400	130,320	<b>587,720</b>	gallons
5/28/13-6/4/13	305,600	126,100	<b>431,700</b>	gallons
6/4/13-6/11/13	323,500	126,310	<b>449,810</b>	gallons
6/11/13-6/18/13	330,700	128,990	<b>459,690</b>	gallons
6/18/13-6/25/13	313,800	121,560	<b>435,360</b>	gallons
6/25/13-7/2/13	373,500	148,120	<b>521,620</b>	gallons
7/2/13-7/9/13	1,542,000	91,580	<b>1,633,580</b>	gallons
7/11/13-7/16/13	1,956,500	112,300	<b>2,068,800</b>	gallons
7/16/13-7/23/13	389,900	122,530	<b>512,430</b>	gallons
7/23/13-7/30/13	142,400	123,390	<b>265,790</b>	gallons
7/30/13-8/6/13	291,900	141,850	<b>433,750</b>	gallons
8/6/13-8/13/13	185,300	108,270	<b>293,570</b>	gallons
8/13/13-8/20/13	277,800	124,010	<b>401,810</b>	gallons
8/20/13-8/27/13	260,900	125,130	<b>386,030</b>	gallons
8/27/13-9/3/13	241,300	123,960	<b>365,260</b>	gallons
9/3/13-9/10/13	247,000	123,900	<b>370,900</b>	gallons
9/10/13-9/17/13	176,000	121,010	<b>297,010</b>	gallons
9/17/13-9/24/13	183,900	124,310	<b>308,210</b>	gallons
9/24/13-10/1/13	275,500	126,020	<b>401,520</b>	gallons
10/1/13-10/8/13	183,600	123,920	<b>307,520</b>	gallons
10/8/13-10/15/13	168,300	123,740	<b>292,040</b>	gallons
10/15/13-10/22/13	194,900	145,470	<b>340,370</b>	gallons
10/22/13-10/30/13	220,900	138,350	<b>359,250</b>	gallons
10/30/13-11/5/13	129,700	90,260	<b>219,960</b>	gallons
11/5/13-11/12/13	172,500	124,280	<b>296,780</b>	gallons
11/12/13-11/19/13	193,400	124,390	<b>317,790</b>	gallons
11/19/13-11/26/13	139,100	122,780	<b>261,880</b>	gallons
11/26/13-12/3/13	150,700	123,130	<b>273,830</b>	gallons



# Analytical Report

Serialized: 12/12/2013 07:17pm

TINA GEANOPULOS  
BIOMED REALTY TRUST, INC.  
1205 WESTLAKES DRIVE  
SUITE 240  
BERWYN, PA 19312

Regarding:  
ERIN SHEA  
BMR  
145 KING OF PRUSSIA ROAD  
RADNOR, PA 19087

**PROJECT ID:**

AC0171

**LABORATORY REPORT NUMBER:**

L4830159



Authorized by: Oommen V. Kappil, QA Director

QCL Accreditations: Southampton Div: EPA ID PA00018; NELAP ID's: PA 09-00131, NJ PA166, NY 11223  
State ID's: CT PH-0768, DE PA-018, MD 206, SC 89021001; FDA Reg. #: 2515238  
Delaware Division: State ID's: DE 00011, MD 138  
Vineland Division: State ID: NJ 06005; Reading Div: State ID: PA 06-03543  
Wind Gap Division: State ID's: PA 48-01334, NJ PA001  
E. Rutherford Division: State ID: NJ 02015



September 3, 2013

RE: Electronic Information Availability

Dear Valued Client,

QC Laboratories (QCL) has continually taken advantage of technological advancements to improve services to our clients. These improvements frequently focus on streamlining information delivery through electronic means that promote the reduction and elimination of paper, while accelerating client delivery. We are very pleased to offer several information delivery options which take us one step closer to that goal.

QCL will shortly convert to simultaneous electronic delivery of invoices and reports. Many of our clients have long been enjoying paperless report and invoices through our existing electronic delivery options (Live Access, email, etc.) These reports can be delivered directly to your account by e-mail or downloaded through QCL's Live Access on-line system.

Electronic reports and invoices will be available in parallel with paper reports through January 1, 2014. After that date, electronic reporting and invoicing will become QCL's preferred method of delivery. Paper reports and invoices will always be available for a nominal charge after January 1, 2014. However, if you are working under an existing contract, QCL will continue to honor the specified delivery method under the terms of your contract. If you would like to begin electronic delivery now, please register by contacting your QCL client services representative with a valid e-mail address to ensure correct delivery.

Regardless, we urge all clients to register for QC Laboratories' "Live Access" data portal now. This portal enables clients to instantly access data as soon as they are approved by the department managers and has been available for several years. It contains many data reporting options that simplify data usability and enables the download of routine data reports and customized data reports in user defined formats. This online feature is user-friendly, can be customized for various users within your account and best of all it is FREE of charge. All your account's analytical data, chains of custody, invoices and QA packages are available for viewing and printing in real-time through "Live Access", 24/7. Sign-up is easy and can be performed online through the QCL website ([www.qclaboratories.com](http://www.qclaboratories.com)).

We are excited to offer these improvements to our clients and look forward to offering additional data delivery enhancements that improve the efficiency of all data user tasks. If you have any questions regarding these changes, please contact me at 215.355.3900 ex 3363.

Sincerely

A handwritten signature in black ink, appearing to read "Stephen Bobbs", written over a white background.

Stephen Bobbs  
Manager, Client Services  
QC Laboratories

ERIN SHEA  
BMR  
145 KING OF PRUSSIA ROAD  
RADNOR, PA 19087

Regarding:  
ERIN SHEA  
BMR  
145 KING OF PRUSSIA ROAD  
RADNOR, PA 19087

Account No: AC0171, BIOMED REALTY TRUST, INC.  
Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:

Inv. No: 1571952  
PWSID No:

Sample ID L4830159-1 Sample Description EFFLUENT 10 HR COMPOSITE 0700-1700  
Received Date/Time/Temp 12/06/13 08:40pm 1.0 C Iced (Y/N): Y  
Samp. Date/Time/Temp 12/05/13 05:00pm NA C Sampled by Kenneth L. Tanner, QC Laboratories

Parameter	Result	RL	Units	Method	DF	Q	Test Date, Time, Analyst
-----------	--------	----	-------	--------	----	---	--------------------------

**GENERAL CHEMISTRY**

TOTAL SUSPENDED SOLIDS	58.0	2.00	mg/l	SM 2540D	1		12/10/13 09:07AM LMB
BIOCHEMICAL OXYGEN DEMAND	97.9	31.3	mg/l	SM 5210B	25		12/07/13 04:02AM LS

Sample ID L4830159-2 Sample Description EFFLUENT GRAB  
Received Date/Time/Temp 12/06/13 08:40pm 1.0 C Iced (Y/N): Y  
Samp. Date/Time/Temp 12/06/13 08:15am NA C Sampled by Kenneth L. Tanner, QC Laboratories

Parameter	Result	RL	Units	Method	DF	Q	Test Date, Time, Analyst
-----------	--------	----	-------	--------	----	---	--------------------------

**FIELD SERVICES**

FIELD TEMPERATURE CELSIUS	16.2	0.5	Deg. C	SM 2550B			12/06/13 08:15AM KLT
PH FIELD	7.49		units	SM 4500H+B	1		12/06/13 08:15AM KLT
FLOW	0.0274		mgd				12/06/13 08:15AM KLT

Account No: AC0171, BIOMED REALTY TRUST, INC.  
Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:

Inv. No: 1571952  
PWSID No:

### General Notes:

Definitions: ND= The analyte tested was either not detected or the concentration was below the RL; Q=Qualifier  
NEG=negative; POS=positive; COL=colonies; RL=laboratory reporting limit; L/A=laboratory accident; TNTC= Too numerous to count;  
pres=presumptive; DF=Dilution Factor

A result marked with "DRY" Indicates that the result was calculated and reported on a dry weight basis.

Results for Tentatively Identified Compounds are estimated values only.

The test results meet all requirements of NELAC unless otherwise specified.

The report shall not be reproduced except in full without the written consent of the laboratory.

Unless otherwise specified, the Environmental testing except Field Parameters were performed by  
QC Inc. located at 1205 Industrial Blvd., Southampton, PA 18966; Pharmaceutical, Dairy and Food Microbiological tests  
were performed by QC Inc. located at 702 Electronic Dr., Horsham, PA 19044.

QCL Accreditations: Southampton Div: EPA ID PA00018; NELAP ID's: PA 09-00131, NJ PA166, NY 11223

State ID's: CT PH-0768, DE PA-018, MD 206, FDA Reg. #: 2515238

ACL Div: State ID's: DE 00011, MD 138; Wind Gap Div: State ID's: PA 48-01334, NJ PA001

E. Rutherford Div: State ID: NJ 02015; Vineland Div: State ID: NJ 06005; Reading Div: State ID: PA 06-03543

The reported results relate only to the samples.

All samples are collected as "grab" samples unless otherwise identified.

Regulatory authorities are assessing substantial fines for testing omissions. Please track your sample collections and results  
on a weekly, monthly, or quarterly basis to ensure compliance. QC's internet program 'LIVE ACCESS' will provide you with  
real-time access to collection dates and results. Please contact Customer Service for further information on acquiring LIVE ACCESS.



ERIN SHEA  
 BNR  
 145 KING OF PRUSSIA ROAD  
 RADNOR, PA 19087  
 (610)667-8590

PickSheet: P4830159 P.O. #:  
 Cust: AC0171 Project Name: BIONED REALTY TRUST, INC.  
 Schd: 37686 Start Date: 03/08/04 Stop Date:  
 MUST SET UP COMPOSITE FROM 7AM TO 5PM PER PERMIT REQUIREMENTS

MONDAY 12/02/13 - 12/31/13  
 Printed on: 11/13/13

Route: 86 KEN MCGRADY: LANDFILLS / DISCHARGES, ETC.

Temp °C	Site	Initials	Iced?
3	U	KG	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

Date	Sample	Collect	Received	Tested	Complete
	S6-13				
Temp. °C	°C	°C	°C	°C	°C App.

Sample Date/Time Tot # Btls BR CL PH

4830159-1 EFFLUENT TO HR COMPOSITE 0700-1700  
 BOD 5, CHAIN OF CUSTODY RET, ISCO SAMPLER, TSS

4830159-2 EFFLUENT GRAB  
 FLD TEMP C, FLOW, PH FLD

Sample Date/Time	Tot # Btls	BR	CL	PH

Dept.	Relinquished By	Time	Date

Dept.	Relinquished To	Time	Date

# \_\_\_\_\_ Ascorbic/HCl Vials # \_\_\_\_\_ HCl Vials  
 # \_\_\_\_\_ Na2-S2-O3  
 # \_\_\_\_\_ Na OH/Zn acetate pH  
 # \_\_\_\_\_ HNO3 pH  
 # \_\_\_\_\_ H2-SO4 pH  
 # \_\_\_\_\_ NaOH pH  
 # \_\_\_\_\_ Unpreserved # \_\_\_\_\_ HCl pH

Hours of Operation:  
 M: 07:00-18:00 T: 07:00-18:00 W: 07:00-18:00 Th: 07:00-18:00 F: 07:00-18:00 St:  
 Health Dept:





1205 Industrial Blvd.  
Southampton, PA 18966-0514  
Phone: 215-355-3900  
Fax: 215-355-7231

# CHAIN OF CUSTODY

Page 5 of 7  
Lab LIMS No: 4830159

MATRIX CODES

Client/Vac. No. BMR  
Address \_\_\_\_\_  
Sampling Site Address: (if different) \_\_\_\_\_

City/State/Zip Radnor PA  
Phone/Fax \_\_\_\_\_  
P.O. No. \_\_\_\_\_

Client Contact Erin Shea  
OC Contact \_\_\_\_\_

PROJECT	FIELD ID	Date	Military Time	Collection G R O M P P	Matrix Code	Total	Number of Containers																	
							H	H	H	H	M	M	M	M	Z	Z	U	U	B	B				
	<u>4830159-1 ERF, 10h vep 0708</u>	<u>12-5-13</u>	<u>1760</u>		<u>1w</u>	<u>1</u>																		
	<u>-2 ERFat grab</u>	<u>12-6-13</u>	<u>0815</u>		<u>w</u>	<u>0</u>																		

LAB USE ONLY:

Ascorbic/HCl Vials    # \_\_\_\_\_ HCl Vials

Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> \_\_\_\_\_

Na OH/Zn acetate pH \_\_\_\_\_

HNO<sub>3</sub> pH \_\_\_\_\_

H<sub>2</sub>SO<sub>4</sub> pH \_\_\_\_\_

NaOH pH \_\_\_\_\_

Unpreserved PI95

Hcl pH \_\_\_\_\_

# \_\_\_\_\_

# \_\_\_\_\_

DW: DRINKING WATER

GW: GROUND WATER

WW: WASTEWATER

SO: SOIL

SL: SLUDGE

OIL: OIL

SOL: NON SOIL SOLID

MI: MISCELLANEOUS

X: OTHER

Field pH, Temp (C or F), DO, Cl<sub>2</sub>, S. Cond. etc.

BADS ITSS

Temp - 16.2°C on 7.19 F on 002744 mgd

SAMPLED BY: (Name/Company) QC  
 Verbal/fax data due: / /  
 Handcopy due: / /  
 Report Format:  Standard  Standard + OC  NJ Reduced  Disk

Field Parameters Analyzed By: [Signature]  
 Date/Time: 12-6-13

**SAMPLE CUSTODY EXCHANGES MUST BE DOCUMENTED BELOW. USE FULL LEGAL SIGNATURE, DATE AND MILITARY TIME (24 HOUR CLOCK, I.E. 8AM IS 0800, 4 PM IS 1600)**

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME	DELIVERY METHOD	COMMENTS
<u>[Signature]</u>	<u>12-6-13</u>	<u>1045</u>	<u>1 cooler # 28</u>	<u>12-6-13</u>	<u>1045</u>	<input type="checkbox"/> UPS <input type="checkbox"/> FEDEX <input type="checkbox"/> OTHER	<u>30 Vials + Ins + d</u>
<u>[Signature]</u>	<u>12/6/13</u>	<u>1040</u>	<u>[Signature]</u>	<u>12/6/13</u>	<u>0940</u>	<input type="checkbox"/> OC COURIER <input type="checkbox"/> CLIENT	<u>Hazardous: yes / no</u>
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME		
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME		
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME		
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME		

For example to aid completion, see reverse side.



**SAMPLING DOCUMENTATION FORM**

Customer Acct Number: AC0171

QC Field Technician: KLT

Compositer ID: \_\_\_\_\_

Compositer Started: 12-5-13 0700  
Date Time

Custody Seal / Lock Installed?  Y or N

Compositer Stopped: 12-5-13 0700  
Date Time

Sample Collected: 12-6-13 0815  
Date Time

Custody Seal / Lock Intact?  Y or N

Sample Type: Grab: —

Composite: 4 HR \_\_\_\_\_ 8 HR \_\_\_\_\_  
10 hr \_\_\_\_\_ 12 HR \_\_\_\_\_ 24 HR \_\_\_\_\_

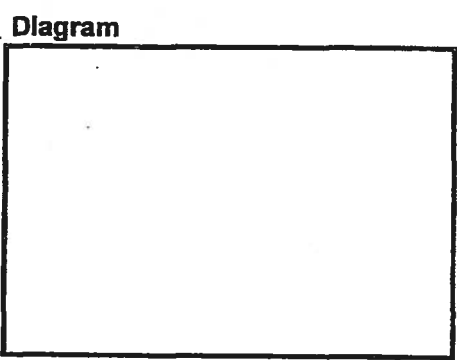
Program: 15/100 minutes / mL

Total Volume Collected: 3 gal mL

Field Filtered Sample: Y or N

Volume and container type and preservation

Location and Site Description:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**Sampling Notes:**

Grab Sample Iced? Y or  N  
Composite Sample Iced?  Y or N  
Decon Performed?  Y or N  
Field Tests Performed Within 15 min. of Sample Collection?  Y or N

Customer Authorization: MA Date: 12-6-13



Inter-Laboratory Transport Form: VIN20613

Coolers for Transport from VINELAND

To be completed by person sealing coolers

Cooler ID No.	Custody Seal No.	Date	Time	Initials	Complete Section Upon Delivery	
					Temp °C	iced Y/N
N18	60613-1	12/6/13	1:30	GMW	1.1	Yes
12	GMW				0.4	Yes
28					1.0	Yes
38					1.7	Yes
42					0.1	Yes
9					8.6	Yes

**Please Note the Following:**

Individual sample chains of custody must accompany this form.  
Once a cooler is sealed, custody seals may not be broken until samples are received at the designated OCL laboratory.

**Laboratory use only**

Custody Seals intact upon receipt?  Y  N

List ID of any seal found broken upon receipt below:

Initials: GMW

A full legal signature is required. Record all times in military time (24-Hr Clock; 4:00 PM=1600)

Relinquished by: *[Signature]* Date: 12/6/13 Time: 2:00 PM Received by: *[Signature]* Date: 12/6/13 Time: 2:40

Relinquished by: *[Signature]* Date: Date: Time: Received by: Date: Time:

Relinquished by: Date: Time: Received by: Date: Time:

Relinquished by: Date: Time: Received by: Date: Time:



---

1720 Walton Road, Blue Bell, PA 19422 610-828-3078 Fax 610-828-7842

November 26, 2014

CERTIFIED MAIL; RETURN RECEIPT REQUESTED

*Certified No. 7013 2250 0000 2603 0760*

Ms. Irene Fitzgerald  
Laboratory & Pretreatment Manager  
Dclaware County Regional Water Quality Control Authority  
100 E. Fifth Street  
Chester, Pennsylvania 19016-0999

Subject: October 2014 Report  
BioMed Realty Trust, Inc.  
145 King Of Prussia Road  
Industrial Discharge Permit No. 2DC-09-01  
IES Project No. ON140687.01

Dear Ms. Fitzgerald:


On behalf of BioMed Realty Trust, Inc. (BMR), IES Engineers is pleased to submit the October 2014 Report from BMR's 145 King of Prussia Road facility. This report is submitted on a monthly basis in accordance with Industrial Discharge Permit No. 2DC-09-01, issued on October 1, 2010.

The October 2014 Report includes:

- Analytical Laboratory Results from QC Laboratories
- Analytical Laboratory Chain-of-Custody Sheets
- Individual data including flow and pH levels taken on an individual day

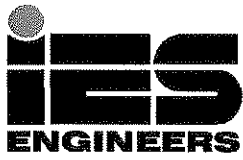
If you have any questions or need any additional information, please feel free to contact me or Ms. Maureen Delaney of BMR at (610) 647-9590.

Very truly yours,

  
Jennifer Yaroeh  
Project Scientist III

Attachment(s)

cc: M. Delaney, BMR  
M. Deluga, BMR  
R. Schlosser, IES



ATTACHMENT 1  
CERTIFICATION STATEMENT

**Certification Statement, October 2014 Wastewater Report:**

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility fines and imprisonment for knowing violations.”

Russell Garland – Regional Director, East Coast Operations

Name/Title

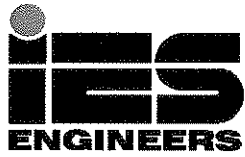
Russell Garland  
Mon Nov 24 2014 13:47



Signature

11/24/14

Date



ATTACHMENT 2  
October 2014 Report

BioMed Realty Trust  
 145 King of Prussia Road  
 Radnor, PA 19087

Monthly pH Level - 2014

Date	Jan	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2	Date	Feb	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2
1/7/2014	7.84	12/31/13-01/07/14	935150	3579891	2/4/2014	7.24	01/28/14-02/04/14	947086	3628561
1/14/2014	7.24	01/07/14-01/14/14	937470	3590027	2/11/2014	6.74	02/4/14-02/11/14	949627	3641309
1/21/2014	8.43	01/14/14-01/21/14	939650	3602843	2/18/2014	6.54	02/11/14-02/18/14	951580	3654032
1/28/2014	8.15	01/21/14-01/28/14	942601	3615776	2/25/2014	6.15	2/18/14-2/25/14	953545	3666788

Date	March	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2	Date	April	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2
3/4/2014	6.38	2/25/14-3/4/14	955365	3679193	4/1/2014	6.87	3/25/14-4/1/14	962988	3729606
3/11/2014	6.81	3/4/14-3/11/14	957272	3691797	4/8/2014	6.93	4/1/14-4/8/14	964774	3742106
3/18/2014	6.95	3/11/14-3/18/14	959330	3704284	4/15/2014	6.96	4/8/14-4/15/14	966451	3754429
3/25/2014	6.77	3/18/14-3/25/14	961345	3717273	4/22/2014	6.73	4/15/14-4/22/14	968128	3766811
					4/29/2014	6.92	4/22/14-4/29/14	969369	3778544

Date	May	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2	Date	June	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2
5/6/2014	6.73	4/29/14-5/6/14	970267	3789960	6/3/2014	8.60	5/27/14-6/3/14	974298	3836143
5/13/2014	6.84	5/6/14-5/13/14	971210	3801427	6/10/2014	8.70	6/3/14-6/10/14	975632	3848047
5/20/2014	7.10	5/13/14-5/20/14	972342	3813205	6/17/2014	8.79	6/10/14-6/17/14	976750	3859864
5/27/2014	8.76	5/20/14-5/27/14	973505	3825583	6/23/2014	9.23	6/17/14-6/23/14	978286	3872021



BioMed Realty Trust  
 145 King of Prussia Road  
 Radnor, PA 19087

Date	July	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2	Date	Aug	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2
7/1/2014	8.96	6/23/14-7/1/14	979776	3884058	8/5/2014	8.24	7/29/14-8/5/14	988428	3944798
7/8/2014	8.83	7/1/14-7/8/14	982355	3896748	8/12/2014	8.65	8/5/14-8/12/14	989804	3956994
7/15/2014	8.62	7/8/14-7/15/14	983840	3908632	8/19/2014	9.13	8/12/14-8/19/14	993656	3969610
7/22/2014	9.46	7/15/14-7/22/14	985611	3921000	8/26/2014	8.75	8/19/14-8/26/14	997605	3982177
7/29/2014	8.01	7/22/14-7/29/14	987058	3932926					

Date	Sept	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2	Date	Oct	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2
9/2/2014	8.66	8/26/14-9/2/14	1001640	3994646	10/7/2014	7.37	9/30/14-10/7/14	1006378	4050526
9/9/2014	9.24	9/2/14-9/9/14	1003131	3995924	10/14/2014	7.25	10/7/14-10/14/14	1007333	4062537
9/16/2014	8.57	9/9/14-9/16/14	1004078	4017232	10/21/2014	7.65	10/14/14-10/21/14	1007733	4069250
9/23/2014	8.62	9/16/14-9/23/14	1004897	4028497	10/28/2014	7.86	10/21/14-10/28/14	1007752	4072883
9/30/2014	7.14	9/23/14-9/30/14	1005612	4039455					

Date	Nov	Water Flow Week of:	Actual Usage Meter #1	Actual Usage Meter #2
11/4/2014	7.83	10/28/14-11/4/14	1007770	4076518
11/11/2014	8.10	11/4/14-11/11/14	1007770	4076847

BioMed Realty Trust, Inc  
 145 King of Prussia Road  
 Radnor, PA 19087

Actual Monthly Flow - 2014

Date Range	Meter #1	Meter #2	Total Flow	
12/31/13-01/07/14	232,000	101,360	333,360	gallons
01/07/14-01/14/14	218,000	128,160	346,160	gallons
01/14/14-01/21/14	295,100	129,330	424,430	gallons
01/21/14-01/28/14	448,500	127,850	576,350	gallons
01/28/14-02/04/14	254,100	127,480	381,580	gallons
02/4/14-02/11/14	195,300	127,230	322,530	gallons
02/11/14-02/18/14	196,500	127,560	324,060	gallons
2/18/14-2/25/14	182,000	124,050	306,050	gallons
2/25/14-3/4/14	190,700	126,040	316,740	gallons
3/4/14-3/11/14	205,800	124,870	330,670	gallons
3/11/14-3/18/14	201,500	129,890	331,390	gallons
3/18/14-3/25/14	164,300	123,330	287,630	gallons
3/25/14-4/1/14	178,600	125,000	303,600	gallons
4/1/14-4/8/14	167,700	123,230	290,930	gallons
4/8/14-4/15/14	167,700	123,820	291,520	gallons
4/15/14-4/22/14	124,100	117,330	241,430	gallons
4/22/14-4/29/14	89,800	114,160	203,960	gallons
4/29/14-5/6/14	94,300	114,670	208,970	gallons
5/6/14-5/13/14	113,200	117,780	230,980	gallons
5/13/14-5/20/14	116,300	123,780	240,080	gallons
5/20/14-5/27/14	79,300	105,600	184,900	gallons
5/27/14-6/3/14	133,400	119,040	252,440	gallons
6/3/14-6/10/14	111,800	118,170	229,970	gallons
6/10/14-6/17/14	153,600	121,570	275,170	gallons
6/17/14-6/23/14	149,000	120,370	269,370	gallons
6/23/14-7/1/14	257,900	126,900	384,800	gallons
7/1/14-7/8/14	148,500	118,840	267,340	gallons
7/8/14-7/15/14	177,100	123,680	300,780	gallons
7/15/14-7/22/14	144,700	119,260	263,960	gallons
7/22/14-7/29/14	137,000	118,720	255,720	gallons
7/29/14-8/5/14	137,600	121,960	259,560	gallons
8/5/14-8/12/14	385,200	126,160	511,360	gallons
8/12/14-8/19/14	394,900	125,670	520,570	gallons
8/19/14-8/26/14	403,500	124,690	528,190	gallons
8/26/14-9/2/14	149,100	12,780	161,880	gallons
9/2/14-9/9/14	94,700	213,080	307,780	gallons
9/9/14-9/16/14	81,900	112,650	194,550	gallons
9/16/14-9/23/14	71,500	109,580	181,080	gallons
9/23/14-9/30/14	76,600	110,710	187,310	gallons
9/30/14-10/7/14	95,500	120,110	215,610	gallons
10/7/14-10/14/14	40,000	67,130	107,130	gallons
10/14/14-10/21/14	1,900	36,330	38,230	gallons
10/21/14-10/28/14	1,800	36,350	38,150	gallons
10/28/14-11/4/14	0	3,290	3,290	gallons



# Analytical Report

Serialized: 10/08/2014 03:01pm QC36

TINA GEANOPULOS  
BIOMED REALTY TRUST, INC.  
1205 WESTLAKES DRIVE  
SUITE 240  
BERWYN, PA 19312

Regarding:  
ERIN SHEA  
BMR  
145 KING OF PRUSSIA ROAD  
RADNOR, PA 19087

PROJECT ID:

AC0171

LABORATORY REPORT NUMBER:

L5249684



Authorized by: Gommen V. Kappil, QA Director

QCL Accreditations: Southampton Div: EPA ID PA00018; NELAP ID's: PA 09-00131, NJ PA166, NY 11223  
State ID's: CT PH-0768, DE PA-018, MD 206, SC 89021001; FDA Reg. # - 2515238  
Delaware Division: State ID's: DE 00011, MD 138  
Vineland Division: State ID: NJ 06005; Reading Div: State ID: PA 06-03543  
Wind Gap Division: State ID's: PA 48-01334, NJ PA001  
E. Rutherford Division: State ID: NJ 02015

# QC Laboratories

# Analytical Report

Printed 10/08/14 15:01 QC36

ERIN SHEA  
BMR  
145 KING OF PRUSSIA ROAD  
RADNOR, PA 19087

Regarding:  
ERIN SHEA  
BMR  
145 KING OF PRUSSIA ROAD  
RADNOR, PA 19087

Account No: AC0171, BIOMED REALTY TRUST, INC.  
Project No: AC0171, BIOMED REALTY TRUST, INC.

P.O. No:

Inv. No: 1650324  
PWSID No:

Sample ID L5249684-1 Sample Description EFFLUENT 10 HR COMPOSITE 0700-1700  
Received Date/Time/Temp 10/02/14 07:25pm 0.4 C Iced (Y/N): Y  
Samp. Date/Time/Temp 10/01/14 05:00pm NA C Sampled by Kenneth L. Tanner, QC Laboratories

Parameter	Result	RL	Units	Method	DF	Qual	Test Date, Time, Analyst
-----------	--------	----	-------	--------	----	------	--------------------------

### GENERAL CHEMISTRY

Total Suspended Solids	2.00	2.00	mg/l	SM 2540D	1		10/07/14 09:08AM LMB
Biochemical Oxygen Demand, 5 Day	ND	2.80	mg/l	SM 5210B	2		10/02/14 11:06PM LS

Sample ID L5249684-2 Sample Description EFFLUENT GRAB  
Received Date/Time/Temp 10/02/14 07:25pm 0.4 C Iced (Y/N): Y  
Samp. Date/Time/Temp 10/02/14 10:50am NA C Sampled by Kenneth L. Tanner, QC Laboratories

Parameter	Result	RL	Units	Method	DF	Qual	Test Date, Time, Analyst
-----------	--------	----	-------	--------	----	------	--------------------------

### FIELD SERVICES

Field Temperature Celsius	23.6	0.5	Deg. C	SM 2550B			10/02/14 10:50AM KLT
pH, field	7.50	0.010	units	SM 4500H+B	1		10/02/14 10:50AM KLT
Flow	0.0277		mgd				10/02/14 10:50AM KLT



PIN: 94214

Serial Number: 4103266

## DEFINITIONS

**The following terms or abbreviations are used in this report:**

MPN	Most probable number	PL	Customer-specific limit
CFU	Colony forming unit	DF	Dilution Factor
POS	Positive	QUAL	Qualifier
NEG	Negative	NTU	Nephelometric turbidity units
PRES	Presumptive	RL	Laboratory reporting limit or Limit of Quantitation (LOQ)
MF	Membrane Filtration	MCL	EPA recommended "Maximum Contaminant Level"
TNTC	Too numerous to count	MDL	Method Detection Limit

ND	The analyte was not detected at a concentration above the RL / MDL.
J	Estimated value $\geq$ MDL but $<$ RL. Applies to organics and general chemistry results (see below for metals)
Q	Indicates this analyte did not meet quality control requirements.
DRY	Indicates the result was calculated and reported on a dry weight basis.
TIC	Tentatively Identified Compounds (Library Search Compounds); concentrations are estimated values only.
ppm (mg/l)	Parts per million: equivalent to 1 milligram per kilogram (mg/Kg) for solids or one milligram per liter (mg/L) for aqueous samples.
ppb (ug/L)	Parts per billion: equivalent to 1 microgram per kilogram (ug/Kg) for solids or one microgram per liter (ug/L) for aqueous samples.
<	Less than: In conjunction with a numerical value, indicates a concentration less than RL / MDL.
>	Greater than: In conjunction with a numerical value, indicates a concentration greater than RL / MDL.

**Data Qualifiers (EPA CLP Convention)**

<u>Organics</u>		<u>Metals</u>	
B	Analyte was detected in the method blank	B	Value is $\geq$ MDL and $<$ RL
E	Concentration exceeds calibration range	E	Estimated value due to presence of interference
U	Compound not detected above MDL/RL	M	Duplicate precision for an element outside control limit
N	Presumptive evidence of compound in library search	N	Spike recovery for an element outside control limits
P1	Column precision criteria not met, report lower value	U	Element not detected above MDL/RL
P2	Column precision criteria not met, report higher value	Other	Defined in case narrative or data package
Other	Defined in case narrative or data package		

**Warranties, Terms, and Conditions**

- Unless otherwise specified in the Parameter field, analyses (excluding "Field Parameters") were performed at the QCL Southampton Division (1205 Industrial Boulevard, Southampton, PA 18966). Food, pharmaceutical, and dairy testing were performed the QCL facility in Horsham (702 Electronic Drive, Horsham, PA 19044).
- The test results meet all TNI or other applicable regulatory agency requirements, including holding times and preservation, unless otherwise indicated.
- The report shall not be reproduced, except in full, without the written consent of the laboratory.
- All samples are collected as "grab" samples unless otherwise identified.
- The reported results relate only to the sample as tested. QCL is not responsible for sample integrity unless sampling has been performed by a member of our staff.
- QCL is not responsible for sampling and/or testing omissions. Note that regulatory authorities may assess substantial fines for testing omissions. Please track your sample collection schedules and results on a regular basis (e.g. weekly, monthly, or quarterly) to ensure compliance. QCL's internet program "LIVE ACCESS" will provide you with real-time access to collection dates and testing results. Please contact Customer Service for further information.
- The following personnel or their deputies have approved the results of the tests performed by QCL: Nicki Smith (Environmental Chemistry), Amanda Lukaszewski (Pharmaceutical), Ryan Baker (Dairy), Karen Battista (Food Micro), Jonathan Decenzi (Food Chemistry), Sue Abbott (QCL Delaware).

**QCL Accreditations**

Southampton Division	EPA ID:	PA00018			
	NELAP IDs:	PA 09-00131; NJ PA166; NY 11223			
	State IDs:	CT PH-0768; DE PA-018; MD 206			
	FDA Reg #:	2515238			
Delaware Division	State IDs:	DE 00011; MD 138	Reading Division	State ID:	PA 06-03543
Wind Gap Division	State IDs:	PA 48-01334; NJ PA001	Vineland Division	State ID:	NJ 06005
East Rutherford Division	State ID:	NJ 02015			



Picksheet: P5249684  
 Cust: AC0171  
 QC Laboratories  
 Schd: 37686

ERIN SHEA  
 BMR  
 145 KING OF PRUSSIA ROAD

RADNOR, PA. 19087  
 (610)847-9590

Expected: MONDAY 10/06/14 - 10/31/14  
 Project Name: BIOMED REALTY TRUST, INC.  
 Start Date: 03/09/04 Stop Date:

Comments/Schedule Details:  
 MUST SET UP COMPOSITE FROM 7AM TO 5PM  
 PER PERMIT REQUIREMENTS

Route: 86 KEN MCGRADY: LANDFILLS  
 / DISCHARGES, ETC.

PWSID:

P S e C  
 U H P O  
 D C

LAB USE ONLY  
 # Accorb/HCL Vials # HCL Vials  
 # Na2S2O3  
 # NaOH/Zn acetate pH  
 # HNO3 pH  
 # H2SO4 pH  
 # NaOH pH  
 # Unpreserved  
 # HCL  
 # NH4CL  
 # MEOH  
 # Na2SO3/HCL  
 # DI Water

Sample ID	Sample Description	Collection Date	Collection Time (Military)	Collection Time Total (# Bottles)	Free Cl2 (mg/L)	pH	Temp. (°C)	Temp. (°F)	Total Cl2 (mg/L)	Field Tests By	Time
5249684-1	EFFLUENT 10 HR COMPOSITE 0700-1700 BOD 5, CHAIN OF CUSTODY RET. ISCO SAMPLER, TSS										
5249684-2	EFFLUENT GRAB FLO TEMP C, FLOW, PH FLO										

Cooler ID:

Sample Collected By	Circle One Client	Initials	Time	Date


Received By	Time	Date	Temp	Iced Y/N	Site	Initials

Comments (reporting, methods, etc)

M: 07:00-19:00 T: 07:00-18:00 W: 07:00-18:00 Th: 07:00-18:00 F: 07:00-18:00 S:  
 - T: - W: - Th: - F: - S: - Sn: - Sn:

Printed: 09/17/14 GPS X: -75.35579 Y: 40.0401

Hazardous Y/N

 <p>QCL LABORATORIES 1205 Industrial Blvd. Southampton, PA 18966-0514 Phone: 215-355-3900 Fax: 215-355-7231</p>	<p align="center"><b>CHAIN OF CUSTODY</b></p> <p>Page _____ of _____</p> <p>Bill to/report to: (if different)</p> <p>Sampling Site Address: (if different)</p> <p>P.D. No.</p> <p>QC Contact</p>	<p>Lab LIMS No:</p> <p><b>LAB USE ONLY:</b></p> <p># _____ Ascorbic/HCl Vials # _____ HCl Vials</p> <p># _____ Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub></p> <p># _____ Na OH/Zn acetate pH</p> <p># _____ HNO<sub>3</sub> pH</p> <p># _____ H<sub>2</sub>SO<sub>4</sub> pH</p> <p># _____ NaOH pH</p> <p># _____ Unpreserved</p> <p># _____ HCl pH</p> <p># _____ Temp control</p>	<p><b>MATRIX CODES</b></p> <p>DW: DRINKING WATER</p> <p>GW: GROUND WATER</p> <p>WW: WASTEWATER</p> <p>SO: SOIL</p> <p>SL: SLUDGE</p> <p>OIL: OIL</p> <p>SN: NON SOIL SOLID</p> <p>MI: MISCELLANEOUS</p> <p>X: OTHER</p> <p>Field pH, Temp (C or F), DO, Cl<sub>2</sub>, S, Cond. etc.</p>
<p>Client/Acct. No. <u>BMR</u></p> <p>Address</p> <p>City/State/Zip <u>Badner, PA</u></p> <p>Phone/Fax</p> <p>Client Contact <u>Erin Shea</u></p>		<p><b>ANALYSIS REQUESTED</b></p> <p><u>BOS-TSS</u></p> <p><u>Top 236° Ph-7.50 Flow #02774 mg/L</u></p>	
<p><b>PROJECT</b></p> <p><b>FIELD ID</b></p>		<p><b>LAB USE ONLY</b></p>	
<p>Verbal/fax data due: _____</p> <p>Hardcopy due: _____</p> <p>Please call for pricing and availability on rush (&lt;14-21 day) turnaround and on all but standard format.</p>		<p>Field Parameters Analyzed By: _____</p> <p>Date/Time: <u>10.2.14</u></p>	
<p>SAMPLED BY: (Name/Company) <u>Kate</u></p>		<p>Report Format: <input type="checkbox"/> Standard <input type="checkbox"/> Forms <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Disk</p>	
<p><b>SAMPLE CUSTODY EXCHANGES MUST BE DOCUMENTED BELOW. USE FULL LEGAL SIGNATURE, DATE AND MILITARY TIME (24 HOUR CLOCK, I.E. 8AM IS 0800, 4 PM IS 1600)</b></p>		<p>DELIVERY METHOD: <input type="checkbox"/> OC COURIER <input type="checkbox"/> CLIENT <input type="checkbox"/> UPS <input type="checkbox"/> FEDEX <input type="checkbox"/> OTHER</p> <p>COMMENTS:</p>	
<p>RELINQUISHED BY SAMPLER</p> <p>1 <u>[Signature]</u></p>	<p>RECEIVED BY</p> <p>1 <u>Cooler</u></p>	<p>DATE</p> <p>1 <u>10-2-14</u></p>	<p>TIME</p> <p>1 <u>1655</u></p>
<p>RELINQUISHED BY</p> <p>2 <u>[Signature]</u></p>	<p>RECEIVED BY</p> <p>2 <u>[Signature]</u></p>	<p>DATE</p> <p>2 <u>10-2-14</u></p>	<p>TIME</p> <p>2 <u>1625</u></p>
RELINQUISHED BY	RECEIVED BY	DATE	TIME
RELINQUISHED BY	RECEIVED BY	DATE	TIME
RELINQUISHED BY	RECEIVED BY	DATE	TIME
RELINQUISHED BY	RECEIVED BY	DATE	TIME
RELINQUISHED BY	RECEIVED BY	DATE	TIME

For example to aid completion, see reverse side. Page 5 of 7

3% v K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>  
Hazardous: yes / no



**SAMPLING DOCUMENTATION FORM**

Customer Acct Number: A 0171 Sample Log In Number: \_\_\_\_\_

Compositer ID: \_\_\_\_\_ Decon Performed prior to setup? (Y) or N Compositer base fully iced? (Y) or N

Compositer Started: 10-1-14 0700 QC Field Tech: KT Custody Seal / Lock Installed? (Y) or N  
Date Time

Compositer Stopped: 10-1-14 1700 QC Field Tech: KT Custody Seal / Lock Installed? (Y) or N  
Date Time

Compositer: (10) HR  8 HR  12 HR  24 HR

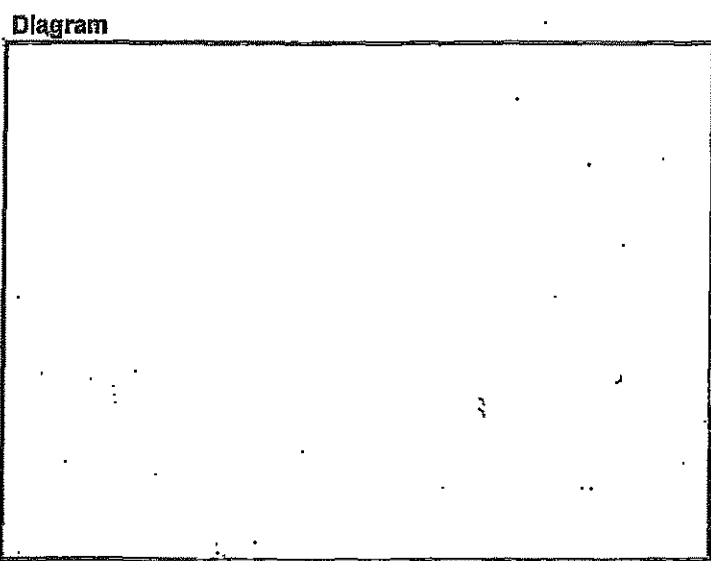
Program: Collection Frequency: 15 minutes Volume: 100 mL

Total Volume Collected: 2.961 mL

Grab Collected Y/N 10-2-14 1050 Volume: \_\_\_\_\_ mL  
Date Time

Field Filtered Sample: Y or N \_\_\_\_\_  
Volume and container type and preservation

Location and Site Description:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Sampling Notes:  
Grab Sample iced for transport? Y or (N)  
Composite Sample iced for transport? (Y) or N  
Field Tests Performed Within 15 min. of Sample Collection? (Y) or N

Customer Authorization: MA Date: 10-2-14  
(when possible)



# QC Laboratories

1205 Industrial Highway, Southampton, PA 18966

VINELAND-SOUTHAMPTON



Inter-Laboratory Transport Form: VS100214

## Coolers for Transport

To be completed by person sealing coolers					Complete Section Upon Delivery	
Cooler ID No.	Custody Seal No.	Date	Time	Initials	Temp °C	Iced Y/N
0710	VS100214-1	10-2-14	1455	KCT	0.4	Y
A227	VS100214-2	10/2/14	1510	JIM	0.2	Y
25	VS100214-3	10/2/14	1510	JIM	0.3	Y
9	VS100214-4	10-2-14	1515	MJO	0.3	Y
24	VS00214-5	10-2-14	1580	DEM	0.3	Y
34	VS100214-6	10-2-14	1525	GLM		
12	VS100214-7	10-2-14	1525	GLM		
66	VS100214-6	10/2/14	1949	JTS	1.3	Y
917	VS100214-7	10-2-14	1553	JST	2.4	Y
Box 1	VS100214-8	10-2-14	1605	JLS	17.8	N
43	VS100214-9	10-2-14	1630	MJO	0.1	Y
<b>Laboratory use only</b>						
Custody Seals intact upon receipt? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N					Initials: MJS	
List ID of any seal found broken upon receipt below:						
Relinquished by:			Date: 10/2/14	Time: 1925	Received by:	
Relinquished by:			Date:	Time:	Received by:	
Relinquished by:			Date:	Time:	Received by:	
Relinquished by:			Date:	Time:	Received by:	

A full legal signature is required. Record all times in military time (24-HR Clock: 4:00 PM=1600)

**Pennoni Associates Inc.**

Consulting Engineers

JOB NO.: **UPHS1504**

SHEET: 1 of 1

DATE:

3/28/2016

PROJECT: **Penn Medicine - Radnor**

BY: CRP

SUBJECT: **Water Data Summary**

CHK'D

**Radnor - Meter #09056585**

Bill Date	Billing Period		Billing Days	Average Daily Usage	Usage
11/12/2015	10/9/2015	11/10/2015	32	10,103	323,300
10/13/2015	9/10/2015	10/9/2015	29	13,134	380,800
9/14/2015	8/22/2015	9/10/2015	19	14,542	276,300
8/13/2015	7/13/2015	8/11/2015	29	15,103	438,000
7/15/2015	6/11/2015	7/13/2015	32	14,362	459,600
6/15/2015	5/12/2015	6/11/2015	30	12,833	385,000
5/14/2015	4/13/2015	5/12/2015	29	10,989	318,700
4/15/2015	3/11/2015	4/13/2015	33	8,524	281,300
3/17/2015	2/10/2015	3/11/2015	29	8,855	256,800
2/12/2015	1/12/2015	2/10/2015	29	8,796	255,100
1/15/2015	12/11/2015	1/12/2015	32	7,640	244,500
12/15/2014	11/12/2015	12/11/2014	29	8,555	248,100
11/14/2014	10/10/2014	11/12/2014	33	9,524	314,300

**Total Building Data (Office Area + Medical Office Area)**

Average Daily Usage (gpd)	10,997
Gross Building Square Footage	165,088
Average Daily Usage/SF (gpd/sf)	0.0666

**Office Data**

Office Area (sf)	46,788
Number of Employees	150
DEP Flow per Employee	10.00
Office Flow (gpd)	1,500
Average Area per Employee	312

**Medical Office Data**

Medical Office Area (sf)	118,300
Medical Office Flow (gpd)	9,497
Medical Office Flow per building area (gpd/sf)	0.0803



Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
**www.aquaamerica.com**

Questions about your water service?... Contact us before the due date.  
 Bill Date **November 12, 2015** Total Amount Due **\$ 2,675.21** Current Charges Due Date **December 04, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings		Usage	Units
09056585	3"	11/10/15	32	A 8270000	A 7561600	323,300	Gallons
		10/09/15		A 8157000	A 7351300		
Average Daily Usage = 10,103 Gallons		Total Days:	32	* A = Actual E = Estimated		Total Usage:	323,300 Gallons

**Billing Detail**

Amount Owed from Last Bill.....	\$ 3,065.49
Total Payments Received.....	3,065.49
<b>Remaining Balance .....</b>	<b>0.00</b>
Customer Charge.....	257.00
10,000 gallons @ \$0.01 per gallon.....	100.00
Next 23,300 gallons @ \$0.008785 per gallon.....	204.69
Next 290,000 gallons @ \$0.007288 per gallon.....	2,113.52
Total Water Charges .....	2,675.21
<b>Amount Due.....</b>	<b>\$ 2,675.21</b>

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at [www.aquaamerica.com](http://www.aquaamerica.com).
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10W8 1up=1646345 HIG

Seq=13997

TRUSTEES OF U OF PA  
 NEAL ALI  
 0250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235

Account Number - Please print on your check

**000349512 0349512**

Amount Due **\$ 2,675.21** Current Charges Due Date **December 04, 2015**

Amount Enclosed

\$

Please make check payable to  
**Aqua PA**

MAIL TO ADDRESS ON BACK OF THIS STUB

00034951203495120000002675211



Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
**www.aquaamerica.com**

Questions about your water service?... Contact us before the due date.  
 Bill Date **October 13, 2015** Total Amount Due **\$ 3,065.49** Current Charges Due Date **November 04, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings		Usage	Units
09056585	3"	10/09/15 09/10/15	29	A 8157000 A 8018000	A 7351300 A 7109400	380,900	Gallons
Average Daily Usage = 13,134 Gallons		Total Days:	29	* A = Actual E = Estimated		Total Usage:	380,900 Gallons

**Billing Detail**

Amount Owed from Last Bill .....	\$ 4,724.02
Total Payments Received .....	4,724.02
<b>Remaining Balance .....</b>	<b>0.00</b>
Customer Charge.....	257.00
10,000 gallons @ \$0.01 per gallon .....	100.00
Next 23,300 gallons @ \$0.008785 per gallon.....	204.69
Next 300,000 gallons @ \$0.007288 per gallon.....	2,186.40
Next 47,600 gallons @ \$0.006668 per gallon.....	317.40
Total Water Charges .....	3,065.49
<b>Amount Due.....</b>	<b>\$ 3,065.49</b>

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at [www.aquaamerica.com](http://www.aquaamerica.com).
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10W8 1up=1636257

Seq=14286

TRUSTEES OF U OF PA  
 NEAL ALI  
 0250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235

Account Number - Please print on your check

**000349512 0349512**

Amount Due **\$ 3,065.49** Current Charges Due Date **November 04, 2015**

Amount Enclosed

\$

Please make check payable to  
**Aqua PA**  
 MAIL TO ADDRESS ON BACK OF THIS STUB

00034951203495120000003065495



Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

Aqua Pennsylvania, Inc.  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
 www.aquaamerica.com

Questions about your water service?... Contact us before the due date.  
 Bill Date **September 14, 2015** Total Amount Due **\$ 4,724.02** Current Charges Due Date **October 06, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings		Usage	Units
09056585	3"	09/10/15	19	A 8018000	A 7109400	276,300	Gallons
		08/22/15		A 7937000	A 6914100		
Average Daily Usage = 14,542 Gallons		Total Days: 19		* A = Actual E = Estimated		Total Usage: 276,300	Gallons

**Billing Detail**

Amount Owed from Last Bill .....	\$ 5,994.97
Total Payments Received .....	3,446.23
Remaining Balance .....	2,548.74 <i>-pd</i>
Customer Charge .....	162.77
6,333 gallons @ \$0.01 per gallon .....	63.33
Next 14,757 gallons @ \$0.008785 per gallon .....	129.64
Next 190,000 gallons @ \$0.007288 per gallon .....	1,384.72
Next 65,210 gallons @ \$0.006668 per gallon .....	434.82
Total Water Charges .....	2,175.28 ✓
Amount Due .....	\$ 4,724.02

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at www.aquaamerica.com.
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

Aqua Pennsylvania, Inc.  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10W8 Tup=1626188

Seq=14147

TRUSTEES OF U OF PA  
 NEAL ALI  
 0250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235

Account Number - Please print on your check

**000349512 0349512**

Amount Due Current Charges Due Date

**\$ 4,724.02 October 06, 2015**

Amount Enclosed

\$

Please make check payable to

**Aqua PA**

**MAIL TO ADDRESS ON BACK OF THIS STUB**

00034951203495120000004724021



Service To:  
 TRUSTEES OF U OF PA  
 0250 KING OF PRUSSIA RD  
 RADNOR, PA 19087-5220

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460673

Aqua Pennsylvania, Inc.  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
 www.aquaamerica.com

Questions about your water service?... Contact us before the due date.

Bill Date: **August 25, 2015** Total Amount Due: **\$ 5,994.97** Current Charges Due Date: **September 16, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings		Usage	Units
09056585	3"	08/22/15	102	A 7937000	A 6914100	1,633,300	Gallons
		05/12/15		A 7389000	A 5828800		
Average Daily Usage = 16,012 Gallons		Total Days: 102		* A = Actual E = Estimated		Total Usage: 1,633,300	Gallons

**Billing Detail**

Amount Owed from Last Bill ..... \$ 3,446.23  
 Total Payments Received ..... 0.00  
 Remaining Balance ..... 3,446.23 - Pd  
 Adjustments ..... 10,129.32 Credit  
 Customer Charge ..... 873.80  
 34,000 gallons @ \$0.01 per gallon ..... 340.00  
 Next 79,220 gallons @ \$0.008785 per gallon ..... 695.95  
 Next 1,020,000 gallons @ \$0.007288 per gallon... 7,433.76  
 Next 500,080 gallons @ \$0.006668 per gallon ..... 3,334.55  
 Total Water Charges ..... 12,678.06  
 Amount Due ..... \$ 5,994.97 # 2548.74

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at www.aquaamerica.com.
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

Aqua Pennsylvania, Inc.  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
 TRUSTEES OF U OF PA  
 0250 KING OF PRUSSIA RD  
 RADNOR, PA 19087-5220

PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS

Cyc= 1up=1620065

Seq=40288

Account Number - Please print on your check

**000349512 0349512**

Amount Due: **\$ 5,994.97** Current Charges Due Date: **September 16, 2015**

Amount Enclosed

\$

Please make check payable to  
**Aqua PA**

MAIL TO ADDRESS ON BACK OF THIS STUB

TRUSTEES OF U OF PA  
 NEAL ALI  
 0250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235

0003495120349512000000599497



Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101070 PWSID # PA1460073

Aqua Pennsylvania, Inc.  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
 www.aquaamerica.com

Questions about your water service?... Contact us before the due date.  
 Bill Date **August 13, 2015** Total Amount Due **\$ 3,446.23** Current Charges Due Date **September 04, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings	Usage	Units
09056585	3"	08/11/15	29	E 7712000 A 6788400	438,000	Gallons
		07/13/15		7609000 A 6453400		
Average Daily Usage = 15,103 Gallons		Total Days:	29	* A = Actual E = Estimated	Total Usage:	438,000 Gallons

**Billing Detail**

Amount Owed from Last Bill .....	\$ 3,590.26
Total Payments Received .....	3,590.26
Remaining Balance .....	0.00
Customer Charge .....	257.00
10,000 gallons @ \$0.01 per gallon .....	100.00
Next 23,300 gallons @ \$0.008785 per gallon.....	204.69
Next 300,000 gallons @ \$0.007288 per gallon.....	2,186.40
Next 104,700 gallons @ \$0.006668 per gallon.....	698.14
Total Water Charges .....	3,446.23
Amount Due.....	\$ 3,446.23

**Message Center** (see reverse side for other information)

- This bill is based on an estimated reading. Your actual usage could be higher. Please refer to the back for estimated billing procedure.
- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at www.aquaamerica.com.
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

Aqua Pennsylvania, Inc.  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS

Cyc=10W8 1up=1516255

Seq=15495

TRUSTEES OF U OF PA  
 NEAL ALI  
 0250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235

Account Number - Please print on your check  
**000349512 0349512**  
 Amount Due **\$ 3,446.23** Current Charges Due Date **September 04, 2015**

Amount Enclosed

\$

Please make check payable to  
**Aqua PA**  
 MAIL TO ADDRESS ON BACK OF THIS STUB

00034951203495120000003446235



Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
**www.aquaamerica.com**

Questions about your water service?... Contact us before the due date.  
 Bill Date **July 15, 2015** Total Amount Due **\$ 3,590.26** Current Charges Due Date **August 06, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings	Usage	Units
09056585	3"	07/13/15	32	E 7609000 A 6453400	459,600	Gallons
		06/11/15		7496000 A 6106800		
Average Daily Usage = 14,362 Gallons		Total Days: 32		* A = Actual E = Estimated	Total Usage:	459,600 Gallons

**Billing Detail**

Amount Owed from Last Bill..... \$ 3,092.83  
 Total Payments Received..... 3,092.83  
**Remaining Balance..... 0.00**  
 Customer Charge..... 257.00  
 10,000 gallons @ \$0.01 per gallon..... 100.00  
 Next 23,300 gallons @ \$0.008785 per gallon..... 204.69  
 Next 300,000 gallons @ \$0.007288 per gallon..... 2,186.40  
 Next 126,300 gallons @ \$0.006668 per gallon..... 842.17  
 Total Water Charges..... 3,590.26  
**Amount Due..... \$ 3,590.26** ✓

**Message Center** (see reverse side for other information)

- This bill is based on an estimated reading. Your actual usage could be higher. Please refer to the back for estimated billing procedure.
- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at [www.aquaamerica.com](http://www.aquaamerica.com).
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10WB 1up=1806775 10065 1 AV 0.391 Seq=10065

\*\*AUT0\*\*SCH 5-DIGIT 19087 C 23 P 25  
 TRUSTEES OF U OF PA  
 NEAL ALI  
 0250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235



Account Number - Please print on your check  
**000349512 0349512**  
 Amount Due **\$ 3,590.26** Current Charges Due Date **August 06, 2015**

Amount Enclosed  
 \$  ,

Please make check payable to  
**Aqua PA**  
**MAIL TO ADDRESS ON BACK OF THIS STUB**

00034951203495120000003590266







Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
 www.aquaamerica.com

Questions about your water service?... Contact us before the due date.  
 Bill Date **June 15, 2015** Total Amount Due **\$ 3,092.83** Current Charges Due Date **July 07, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings	Usage	Units
09056585	3"	06/11/15 05/12/15	30	E 7496000 A 6106800 A 7389000 A 5828800	385,000	Gallons
Average Daily Usage = 12,833 Gallons		Total Days: 30		* A = Actual E = Estimated	Total Usage:	385,000 Gallons

**Billing Detail**

Amount Owed from Last Bill .....	\$ 2,641.69
Total Payments Received .....	2,641.69
<b>Remaining Balance .....</b>	<b>0.00</b>
Customer Charge .....	257.00
10,000 gallons @ \$0.01 per gallon .....	100.00
Next 23,300 gallons @ \$0.008785 per gallon .....	204.69
Next 300,000 gallons @ \$0.007288 per gallon .....	2,186.40
Next 51,700 gallons @ \$0.006668 per gallon .....	344.74
Total Water Charges .....	3,092.83
<b>Amount Due .....</b>	<b>\$ 3,092.83</b>

**Message Center** (see reverse side for other information)

- \* This bill is based on an estimated reading. Your actual usage could be higher. Please refer to the back for estimated billing procedure.
- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at www.aquaamerica.com.
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number - Please print on your check

**000349512 0349512**

Amount Due **\$ 3,092.83** Current Charges Due Date **July 07, 2015**

Amount Enclosed

\$  ,

Please make check payable to  
**Aqua PA**

**MAIL TO ADDRESS ON BACK OF THIS STUB**

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10W8 sup=1597235

14665 1 AV 0,391  
 Seq=14665

\*\*AUTO\*\*SCH 5-DIGIT 19087 C 33 P 33  
 TRUSTEES OF U OF PA  
 NEAL ALI  
 0250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235



00034951203495120000003092839





Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
**www.aquaamerica.com**

Questions about your water service?... Contact us before the due date.  
 Bill Date **May 14, 2015** Total Amount Due **\$ 2,641.69** Current Charges Due Date **June 05, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings		Usage	Units
09056585	3"	05/12/15	29	A 7389000	A 5828800	318,700	Gallons
		04/13/15		A 7283000	A 5616100		
Average Daily Usage = 10,989 Gallons		Total-Days:	29	* A = Actual E = Estimated		Total Usage:	318,700 Gallons

**Billing Detail**

Amount Owed from Last Bill ..... \$ 2,369.11  
 Total Payments Received..... 2,369.11  
**Remaining Balance** ..... **0.00**  
 Customer Charge..... 257.00  
 10,000 gallons @ \$0.01 per gallon ..... 100.00  
 Next 23,300 gallons @ \$0.008785 per gallon..... 204.69  
 Next 285,400 gallons @ \$0.007288 per gallon..... 2,080.00  
 Total Water Charges ..... 2,641.69  
**Amount Due**..... **\$ 2,641.69**

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at [www.aquaamerica.com](http://www.aquaamerica.com).
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

PAP-516-E-0

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number - Please print on your check  
**000349512 0349512**

Amount Due **\$ 2,641.69** Current Charges Due Date **June 05, 2015**

Amount Enclosed  
 \$  ,

Please make check payable to  
**Aqua PA**  
**MAIL TO ADDRESS ON BACK OF THIS STUB**

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10W8 1up=1587765 16127 1 AV 0.381 Seq=16127

\*\*AUTO\*\*SCH 5-DIGIT 19087 C 53 P 55  
 TRUSTEES OF U OF PA  
 NEAL ALI  
 250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235



00034951203495120000002641695





Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-S220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
**www.aquaamerica.com**

Questions about your water service?... Contact us before the due date.  
 Bill Date **April 15, 2015** Total Amount Due **\$ 2,369.11** Current Charges Due Date **May 07, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings	Usage	Units
09056585	3"	04/13/15 03/11/15	33	A 7283000 A 5616100 A 7203000 A 5414800	281,300	Gallons
Average Daily Usage = 8,524 Gallons		Total Days: 33		* A = Actual E = Estimated	Total Usage: 281,300	Gallons

**Billing Detail**

Amount Owed from Last Bill ..... \$ 2,190.56  
 Total Payments Received ..... 2,190.56  
**Remaining Balance..... 0.00**  
 Customer Charge..... 257.00  
 10,000 gallons @ \$0.01 per gallon ..... 100.00  
 Next 23,300 gallons @ \$0.008785 per gallon..... 204.69  
 Next 248,000 gallons @ \$0.007288 per gallon..... 1,807.42  
 Total Water Charges ..... 2,369.11  
**Amount Due..... \$ 2,369.11**

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at [www.aquaamerica.com](http://www.aquaamerica.com).
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

PAF-910-B-0

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-S220**

Account Number - Please print on your check  
**000349512 0349512**

Amount Due **\$ 2,369.11** Current Charges Due Date **May 07, 2015**

Amount Enclosed

\$  ,

Please make check payable to  
**Aqua PA**

MAIL TO ADDRESS ON BACK OF THIS STUB

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10WB 1up=1578068

82141 AV 0.381  
 Seq=8214

**\*\*AUTO\*\*SCH 5-DIGIT 19087 C 19 P 21**  
**TRUSTEES OF U OF PA**  
**NEAL ALI**  
**250 KING OF PRUSSIA RD**  
**RADNOR PA 19087-5235**



00034951203495120000002369114

1 of 1

008214



Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
 www.aquaamerica.com

Questions about your water service?... Contact us before the due date.  
 Bill Date **March 17, 2015** Total Amount Due **\$ 2,190.56** Current Charges Due Date **April 08, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings	Usage	Units
09056585	3"	03/11/15 02/10/15	29	A 7203000 A 5414800 A 7132000 A 5229000	256,800	Gallons
Average Daily Usage = 8,855 Gallons		Total Days: 29		* A = Actual E = Estimated	Total Usage: 256,800	Gallons

**Billing Detail**

Amount Owed from Last Bill ..... \$ 2,178.17  
 Total Payments Received..... 2,178.17  
**Remaining Balance ..... 0.00**  
 Customer Charge..... 257.00  
 10,000 gallons @ \$0.01 per gallon ..... 100.00  
 Next 23,300 gallons @ \$0.008785 per gallon..... 204.69  
 Next 223,500 gallons @ \$0.007288 per gallon..... 1,628.87  
 Total Water Charges ..... 2,190.56  
**Amount Due..... \$ 2,190.56**

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at www.aquaamerica.com.
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

PAP-515-B-0

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number - Please print on your check

**000349512 0349512**

Amount Due Current Charges Due Date

**\$ 2,190.56 April 08, 2015**

Amount Enclosed

\$  ,

Please make check payable to  
**Aqua PA**

MAIL TO ADDRESS ON BACK OF THIS STUB

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10W8 1up=1568397

10991 1 AV 0.361  
 Seq=10961

\*\*AUTO\*\*SCH 5-DIGIT 19087 C 34 P 40  
 TRUSTEES OF U OF PA  
 NEAL ALI  
 250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235



00034951203495120000002190565





Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
**www.aquaamerica.com**

Questions about your water service?... Contact us before the due date.  
 Bill Date: **February 12, 2015** Total Amount Due: **\$ 2,178.17** Current Charges Due Date: **March 06, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings		Usage	Units
09056585	3"	02/10/15	29	A 7132000	A 5229000	255,100	Gallons
		01/12/15		A 7055000	A 5050900		
Average Daily Usage = 8,796 Gallons		Total Days:	29	* A = Actual E = Estimated		Total Usage:	255,100 Gallons

**Billing Detail**

Amount Owed from Last Bill..... \$ 2,100.92  
 Total Payments Received..... 2,100.92  
 Remaining Balance..... **0.00**  
 Customer Charge..... 257.00  
 10,000 gallons @ \$0.01 per gallon..... 100.00  
 Next 23,300 gallons @ \$0.008785 per gallon..... 204.69  
 Next 221,800 gallons @ \$0.007288 per gallon..... 1,616.48  
 Total Water Charges..... 2,178.17  
 Amount Due..... **\$ 2,178.17**

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at [www.aquaamerica.com](http://www.aquaamerica.com).
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

PAP-S15-A-D

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10W8 1up=1557329

9105 1 AV 0.381  
 Seq=9105

0349512

\*\*AUTO\*\*SCH 5-DIGIT 19087 C 21 P 24  
 TRUSTEES OF U OF PA  
 NEAL ALI  
 250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235



Account Number - Please print on your check

**000349512 0349512**

Amount Due: **\$ 2,178.17** Current Charges Due Date: **March 06, 2015**

Amount Enclosed

\$  ,    .

Please make check payable to  
**Aqua PA**

MAIL TO ADDRESS ON BACK OF THIS STUB

00034951203495120000002178179





Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
[www.aquaamerica.com](http://www.aquaamerica.com)

Questions about your water service? ... Contact us before the due date.

Bill Date: **January 15, 2015** Total Amount Due: **\$ 2,100.92** Current Charges Due Date: **February 06, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings		Usage	Units
09056585	3"	01/12/15	32	A 7055000	A 5050900	244,500	Gallons
		12/11/14		A 6989000	A 4872400		
Average Daily Usage = 7,640 Gallons		Total Days: 32		* A = Actual E = Estimated		Total Usage: 244,500	Gallons

**Billing Detail**

Amount Owed from Last Bill.....	\$ 2,147.15
Total Payments Received.....	2,147.15
<b>Remaining Balance.....</b>	<b>0.00</b>
Customer Charge.....	257.00
10,000 gallons @ \$0.01 per gallon.....	100.00
Next 23,300 gallons @ \$0.008785 per gallon.....	204.69
Next 211,200 gallons @ \$0.007288 per gallon.....	1,539.23
Total Water Charges.....	2,100.92
<b>Amount Due.....</b>	<b>\$ 2,100.92</b>

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at [www.aquaamerica.com](http://www.aquaamerica.com).
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

PAP-515-A-0

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number - Please print on your check

**000349512 0349512**

Amount Due: **\$ 2,100.92** Current Charges Due Date: **February 06, 2015**

Amount Enclosed

\$  ,

Please make check payable to  
**Aqua PA**

MAIL TO ADDRESS ON BACK OF THIS STUB

PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS

Cyc=10W8 1up=1547598

13329 1 AV 0.381  
 Seq=13329

0349512

\*\*AUTO\*\*SCH 5-DIGIT 19087 C 39 P 44  
 TRUSTEES OF U OF PA  
 NEAL ALI  
 250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235



00034951203495120000002100920





Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number:  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1460073

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
 www.aquaamerica.com

Questions about your water service? ... Contact us before the due date.  
 Bill Date: **December 15, 2014** Total Amount Due: **\$ 2,147.15** Current Charges Due Date: **January 06, 2015**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings		Usage	Units
09056585	3"	12/11/14	29	A 6989000	A 4872400	248,100	Gallons
		11/12/14		A 6912000	A 4701300		
Average Daily Usage = 8,555 Gallons		Total Days:	29	* A = Actual E = Estimated		Total Usage:	248,100 Gallons

**Billing Detail**

Amount Owed from Last Bill ..... \$ 2,609.62  
 Total Payments Received..... 2,609.62  
**Remaining Balance..... 0.00**  
 Customer Charge..... 257.00  
 10,000 gallons @ \$0.01 per gallon ..... 100.00  
 Next 23,300 gallons @ \$0.008785 per gallon..... 204.69  
 Next 214,800 gallons @ \$0.007288 per gallon..... 1,565.46  
 Total Water Charges ..... 2,127.15  
 Annual Backflow Admin Fee \$5 Per Device ..... 20.00  
**Amount Due..... \$ 2,147.15**

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at www.aquaamerica.com.
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

PAP-515-A-0

**AQUA Water Bill**

**Aqua Pennsylvania, Inc.**  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

**PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS**

Cyc=10W8 1up=1536227

1526 1 AV 0.381

Seq=1526

0349512

\*\*AUT0\*\*SCH 5-DIGIT 19087 C 5 P 5  
 TRUSTEES OF U OF PA  
 NEAL ALI  
 250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235



Account Number - Please print on your check

**000349512 0349512**

Amount Due **\$ 2,147.15** Current Charges Due Date **January 06, 2015**

Amount Enclosed

\$  ,

Please make check payable to  
**Aqua PA**

MAIL TO ADDRESS ON BACK OF THIS STUB

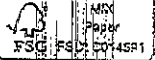
00034951203495120000002147159





Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number  
**000349512 0349512**  
 MAIN DIVISION  
 1101010 PWSID # PA1450075



Aqua Pennsylvania, Inc.  
 762 W. Lancaster Avenue  
 Bryn Mawr, PA 19010-3489

Toll Free: **877.987.2782**  
 Fax: **866.780.8292**  
**www.aquaamerica.com**

Questions about your water service?... Contact us before the due date.  
 Bill Date: **November 14, 2014** Total Amount Due: **\$ 2,609.62** Current Charges Due Date: **December 08, 2014**

**Meter Data**

Meter	Size	Billing Period	Days	Read Type / Meter Readings	Usage	Units	
09056585	3"	11/12/14	33	A 6912000 A 4701300	314,300	Gallons	
		10/10/14		A 6801000 A 4498000			
Average Daily Usage = 9,524 Gallons		Total Days:	33	* A = Actual E = Estimated	Total Usage:	314,300	Gallons

**Billing Detail**

Amount Owed from Last Bill ..... \$ 3,034.81  
 Total Payments Received ..... 3,034.81  
**Remaining Balance ..... 0.00**  
 Customer Charge ..... 257.00  
 10,000 gallons @ \$0.01 per gallon ..... 100.00  
 Next 23,300 gallons @ \$0.008785 per gallon ..... 204.69  
 Next 281,000 gallons @ \$0.007288 per gallon ..... 2,047.93  
 Total Water Charges ..... 2,609.62  
**Amount Due ..... \$ 2,609.62**

**Message Center** (see reverse side for other information)

- Would you like to quickly and easily learn important information about your water? Please let us know how you want to be contacted via our new automated notification system by clicking on the Aqua Notify button at [www.aquaamerica.com](http://www.aquaamerica.com).
- The due date refers to current charges and any deferred payment amount only. If you do not pay your bill on time, your service could be subject to interruption. To ensure proper credit, please remember to provide your full 16-digit account number when paying your bill.

Keep top portion for your records.  
 Return this portion with your payment.

**AQUA Water Bill**

Aqua Pennsylvania, Inc.  
 762 W. Lancaster Avenue • Bryn Mawr, PA 19010-3489

Service To:  
**TRUSTEES OF U OF PA**  
**0250 KING OF PRUSSIA RD**  
**RADNOR, PA 19087-5220**

Account Number - Please print on your check

**000349512 0349512**

Amount Due: **\$ 2,609.62** Current Charges Due Date: **December 08, 2014**

Amount Enclosed

\$

Please make check payable to  
**Aqua PA**

MAIL TO ADDRESS ON BACK OF THIS SLIP

PLEASE DO NOT REMIT PAYMENT TO THE ABOVE ADDRESS

Cyc=10W9 1up=1525989A PC=H

Seq=84

0349512

\*\*\*\*\*SINGLE-PIECE C 1 P 2  
 TRUSTEES OF U OF PA  
 NEAL ALI  
 250 KING OF PRUSSIA RD  
 RADNOR PA 19087-5235



00034951203495120000002609622





**Pennoni Associates Inc.**

Consulting Engineers

JOB NO.: **UPHS1504**

SHEET: 1 of 1      DATE: 1/23/2017

PROJECT: **Penn Medicine - Radnor**

BY: CRP

SUBJECT: **Hotel Water Data Summary**

CHK'D

BILLING DATE	BILLING DATE	TOTAL GALLONS USED DURING BILLING CYCLE	NUMBER OF DAYS IN BILLING CYCLE	TOTAL GALLONS USED PER DAY (GPD)	No. of Rooms Occupied	GPD/Room
12/11/2015	3/2/2016	677,000.00	82	8,256.10	76	108.63
3/2/2016	6/6/2016	825,000.00	96	8,593.75	76	113.08
6/6/2016	9/6/2016	872,000.00	92	9,478.26	76	124.71
9/6/2016	12/7/2016	750,000.00	92	8,152.17	76	107.27
	TOTALS	3,124,000.00	362.00	34,480.28		453.69
	AVERAGE	781,000.00		8,620.07		113.42


ASSUME 80% OCCUPANCY FOR 96 ROOM HOTEL      76.00 ROOMS OCCUPIED  
96 SUITE HOTEL FULLY OCCUPIED      10,889 gpd  
AVERAGE FLOW PER ROOM      113.00 gpd/room

# WARRINGTON TOWNSHIP WATER & SEWER DEPARTMENT

852 Easton Rd, Warrington, PA 18976 Phone: 215-343-1800

Account Number: **420024-420024**  
Name: HOMEWOOD SUITES  
Service Location: 2650 KELLY RD

Invoice Date: 12/16/2016  
Invoice Number: 702060  
Payment Due Date: 01/17/2016

SERVICE	CURRENT DATE	CURRENT READING	PREVIOUS DATE	PREVIOUS READING	USE	
Water	12/7/2016	12,417	9/6/2016	11,667	750	
						<b>Current Charges</b>
						Balance 970.37
						Sewer 4,857.65
						Water 3,494.28
						
828						<b>PAY BY DUE DATE \$9,322.30</b>
<b>Please keep this portion for your records</b>						<b>DUE DATE: January 17, 2016</b>
						<b>PAY AFTER DUE DATE \$10,157.49</b>

A ten percent (10%) penalty will be added to any balance not paid by the due date.

## NOTES AND OTHER IMPORTANT INFORMATION ABOUT YOUR ACCOUNT

- To pay your bill online**
- 1) Go to [www.warringtontownship.org](http://www.warringtontownship.org), then Departments
  - 2) Click on Water and Sewer, then Online payments.
  - 3) In the SEARCH field (on the LEFT side of the screen) enter your entire account number with the dash.
  - 4) Enter JUST your LAST name. Click on the blue "ubpayment", then checkout.

**Checks should be made payable to WTWSD**


The Warrington Township 2014 Water Quality report is available  
<http://www.warringtontownship.org/waterandsewer.cfm>

# WARRINGTON TOWNSHIP WATER & SEWER DEPARTMENT

852 Easton Rd, Warrington, PA 18976 Phone: 215-343-1800

Account Number: **420024-420024**  
Name: **HOMWOOD SUITES**  
Service Location: **2650 KELLY RD**

Invoice Date: **09/16/2016**  
Invoice Number: **679177**  
Payment Due Date: **10/17/2016**

SERVICE	CURRENT DATE	CURRENT READING	PREVIOUS DATE	PREVIOUS READING	USE	
Water	9/6/2016	11,667	6/6/2016	10,795	872	
						<b>Current Charges</b>
						Balance 0.00
						Sewer 5,646.99
						Water 4,056.70
						
821 <b>Please keep this portion for your records</b>						<b>PAY BY DUE DATE \$9,703.69</b>
						<b>DUE DATE: October 17, 2016</b>
						<b>PAY AFTER DUE DATE \$10,674.06</b>

A ten percent (10%) penalty will be added to any balance not paid by the due date.

## NOTES AND OTHER IMPORTANT INFORMATION ABOUT YOUR ACCOUNT

**Please note our rates have increased for 2016 usage.  
Please be mindful of your water usage, visit  
[www.warringtontownship.org](http://www.warringtontownship.org) for more tips and to view  
the 2015 Water Quality Report.**

### TO PAY ONLINE


- 1) Go to [www.warringtontownship.org](http://www.warringtontownship.org), then Departments
- 2) Click on Water and Sewer, then Online payments.
- 3) In the SEARCH field (on the LEFT side of the screen) enter your entire account number with the dash.
- 4) Enter JUST your LAST name. Click on the blue "ubpayment," then checkout.

# WARRINGTON TOWNSHIP WATER & SEWER DEPARTMENT

852 Easton Rd, Warrington, PA 18976 Phone: 215-343-1800

Account Number: **420024-420024**  
Name: **HOMEWOOD SUITES**  
Service Location: **2650 KELLY RD**

Invoice Date: 06/16/2016  
Invoice Number: 646570  
Payment Due Date: 07/15/2016

SERVICE	CURRENT		PREVIOUS		USE		
	DATE	READING	DATE	READING			
Water	6/6/2016	10,795	3/2/2016	9,970	825	<b>Current Charges</b>	
						Balance	0.00
						Sewer	5,342.90
						Water	3,840.03
						<b>PAY BY DUE DATE \$9,182.93</b>	
821 <b>Please keep this portion for your records</b>						<b>DUE DATE: July 15, 2016</b>	
						<b>PAY AFTER DUE DATE \$10,101.22</b>	

A ten percent (10%) penalty will be added to any balance not paid by the due date.

## NOTES AND OTHER IMPORTANT INFORMATION ABOUT YOUR ACCOUNT

**Please note our rates have increased for 2016 usage.  
Although, Warrington has sufficient water supply,  
please be mindful of your water usage.  
Visit [www.warringtontownship.org](http://www.warringtontownship.org) for more tips.**

### TO PAY ONLINE


- 1) Go to [www.warringtontownship.org](http://www.warringtontownship.org), then Departments
- 2) Click on Water and Sewer, then Online payments.
- 3) In the SEARCH field (on the LEFT side of the screen) enter your entire account number with the dash.
- 4) Enter JUST your LAST name. Click on the blue "ubpayment," then checkout.

# WARRINGTON TOWNSHIP WATER & SEWER DEPARTMENT

852 Easton Rd, Warrington, PA 18976 Phone: 215-343-1800

Account Number: **420024-420024**  
Name: **HOMWOOD SUITES**  
Service Location: **2650 KELLY RD**

Invoice Date: 03/09/2016  
Invoice Number: 617383  
Payment Due Date: 04/09/2016

SERVICE	CURRENT DATE	CURRENT READING	PREVIOUS DATE	PREVIOUS READING	USE		
Water	3/2/2016	9,970	12/11/2015	9,293	677	<b>Current Charges</b>	
						Balance	0.00
						Sewer	4,256.56
						Water	3,069.76
						<b>PAY BY DUE DATE</b>	<b>\$7,326.32</b>
821 <b>Please keep this portion for your records</b>						<b>DUE DATE:</b>	<b>April 9, 2016</b>
						<b>PAY AFTER DUE DATE</b>	<b>\$8,058.95</b>

A ten percent (10%) penalty will be added to any balance not paid by the due date.

## NOTES AND OTHER IMPORTANT INFORMATION ABOUT YOUR ACCOUNT

- To pay your bill online**
- 1) Go to [www.warringtontownship.org](http://www.warringtontownship.org), then Departments
  - 2) Click on Water and Sewer, then Online payments.
  - 3) In the SEARCH field (on the LEFT side of the screen) enter your entire account number with the dash.
  - 4) Enter JUST your LAST name. Click on the blue "ubpayment", then checkout.

**Checks should be made payable to WTWSD**

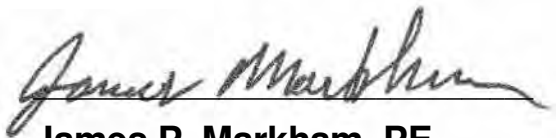
The Warrington Township 2014 Water Quality report is available  
<http://www.warringtontownship.org/waterandsewer.cfm>

# Traffic

# TRAFFIC IMPACT STUDY

## MIXED MEDICAL FACILITY

145 King of Prussia Road  
Radnor Township  
Delaware County, Pennsylvania



**James P. Markham, PE**

Pennsylvania Professional Engineer License No. PE061283

### Prepared For:

**University of Pennsylvania Health System**  
3400 Civic Center Boulevard  
Philadelphia, PA 19104

September 2017  
Revised January 2018  
UPHS 1507



PARTNERS FOR WHAT'S POSSIBLE

[pennoni.com](http://pennoni.com)





**TRAFFIC IMPACT STUDY**  
**TABLE OF CONTENTS**

EXECUTIVE SUMMARY ..... i

INTRODUCTION ..... 1

EXISTING CONDITIONS ..... 3

2020 AND 2025 NO-BUILD TRAFFIC CONDITIONS ..... 9

DEVELOPMENT TRAFFIC ..... 19

2020 and 2025 BUILD TRAFFIC CONDITIONS WITHOUT IMPROVEMENTS ..... 23

2020 and 2025 BUILD TRAFFIC CONDITIONS WITH IMPROVEMENTS ..... 38

CONCLUSIONS AND RECOMMENDATIONS ..... 49

**LIST OF TABLES**

TABLE 1: 2016 EXISTING CONDITIONS SUMMARY TABLE ..... 7

TABLE 2: EXISTING SITE TRIP GENERATION ..... 9

TABLE 3: 2020 NO-BUILD CONDITIONS SUMMARY TABLE ..... 13

TABLE 4: 2025 NO-BUILD CONDITION SUMMARY TABLE ..... 17

TABLE 5: TRIP GENERATION RATES ..... 20

TABLE 6: PROPOSED SITE TRIP GENERATION ..... 21

TABLE 7: NET TRIP COMPARISON ..... 21

TABLE 8: 2020 BUILD CONDITION SUMMARY TABLE ..... 26

TABLE 9: 2025 BUILD CONDITION SUMMARY TABLE ..... 32

TABLE 10: CAPACITY VS ANTICIPATED TRAFFIC VOLUME ..... 36

TABLE 11: 2020 BUILD CONDITIONS WITH IMPROVEMENTS SUMMARY TABLE ..... 41

TABLE 12: 2025 BUILD CONDITIONS WITH IMPROVEMENTS SUMMARY TABLE ..... 45

**LIST OF FIGURES**

- FIGURE 1: PROJECT LOCATION
- FIGURE 2: SITE PLAN
- FIGURE 3: EXISTING 2016 WEEKDAY PEAK HOUR TRAFFIC VOLUMES
- FIGURE 4: EXISTING SITE TRIP DISTRIBUTION
- FIGURE 5: EXISTING SITE TRIPS (CALCULATED)
- FIGURE 6: 2020 NO-BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES
- FIGURE 7: 2025 NO-BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES
- FIGURE 8: PROPOSED SITE TRIP DISTRIBUTION
- FIGURE 9: PROPOSED SITE TRIPS
- FIGURE 10: 2020 BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES
- FIGURE 11: 2025 BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES

**LIST OF APPENDICES**

- APPENDIX A: LEVEL OF SERVICE CRITERIA
- APPENDIX B: EXISTING SIGNAL PERMIT PLANS / TIMING DIRECTIVES
- APPENDIX C: TRAFFIC COUNT AND GAP DATA
- APPENDIX D: EXISTING CONDITION CAPACITY ANALYSIS WORKSHEETS
- APPENDIX E: VOLUME DEVELOPMENT WORKSHEETS
- APPENDIX F: 2020 and 2025 NO-BUILD CONDITION CAPACITY ANALYSIS WORKSHEETS
- APPENDIX G: TRIP GENERATION
- APPENDIX H: TURN LANE EVALUATION
- APPENDIX I: 2020 AND 2025 BUILD CONDITION WITHOUT IMPROVEMENTS QUEUE AND CAPACITY ANALYSIS WORKSHEETS
- APPENDIX J: SIGNAL WARRANT EVALUATION
- APPENDIX K: LEFT TURN PHASE EVALUATION
- APPENDIX L: PEDESTRIAN AND VEHICLE CLEARANCE CALCULATIONS
- APPENDIX M: 2020 AND 2025 BUILD CONDITION WITH IMPROVEMENTS QUEUE AND CAPACITY ANALYSIS WORKSHEETS

# Traffic Impact Study

## 145 King of Prussia Road

---

### EXECUTIVE SUMMARY

This document summarizes the results of an evaluation of traffic impacts associated with the proposed University of Pennsylvania Health Systems site located at 145 King of Prussia Road in Radnor Township, Delaware County, Pennsylvania.

The site currently is vacated and located on the east side of King of Prussia Road between the existing Southern driveway and existing Septa/Northern driveway. The proposed site will be comprised of a 250,000 square foot mixed medical use building, a 150,000 square foot general office building, and a 75,000 square foot, 120 room hotel. The proposed development is anticipated to be constructed and occupied by 2020.

Turning movement counts, including heavy vehicles and pedestrian counts, were conducted between the hours of 7:00 – 9:00A.M. and 4:00 – 6:00 P.M. at the following intersections:

1. King of Prussia Road & Matsonford Road (SR 1038) – November 18, 2015
2. King of Prussia Road & Radnor Chester Road (SR 1021) – April 27, 2016
3. King of Prussia Road & SEPTA Station Driveway – September 15, 2016
4. King of Prussia Road & Existing Northern Site Driveway – April 27, 2016
5. King of Prussia Road & Existing Raider Road/Site Driveway – November 18, 2015
6. King of Prussia Road & Existing Southern Site Driveway – April 27, 2016
7. Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp – November 18, 2015
8. Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps – September 15, 2016
9. Lancaster Avenue (SR 0030) & I-476 NB On Ramp Hillside Circle – November 18, 2015
10. Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021) – April 27, 2016

The performance of the study intersections were evaluated under existing, no-build, and build conditions through a qualitative measure of operating conditions called Levels of Service. Levels of Service (LOS) are determined through analysis procedures outlined in the 2010 Highway Capacity Manual (Transportation Research Board, Washington, D.C.). The Levels of Service were obtained using *Synchro 9* and the 2016 existing, 2020 no-build, and 2020 build conditions and were evaluated to identify impacts to the study area. The need for additional mitigations is based on the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies*.

As the existing space was previously approved and could be occupied by a tenant without additional approvals, trips for the existing site were calculated and applied to the existing traffic to develop the future “no build” conditions. The traffic volumes for the existing site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The existing site trips are based upon the ITE Land Use Codes 710 “General Office” utilizing the square footage of the building as the independent variable. The trip calculations result in a total of **611 (538 entering and 73 exiting)** and **557 (95 entering and 462 exiting)** new trips generated by the site during the morning and afternoon peak hours, respectively.

The proposed mixed use site will be located at 145 King of Prussia Road between the existing Southern Driveway and the shared SEPTA/Site Driveway. The proposed site will have three driveways along King of Prussia Drive at the location of the of the existing entry driveways. The existing driveway across from Raider Road will become a full access driveway. The southern driveway will primarily be for accessing the loading area.

The traffic volumes for the hotel and general office components of the proposed site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The *ITE Trip Generation Manual* defines a trip as a “single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site.”

## Traffic Impact Study

### 145 King of Prussia Road

---

The proposed Penn Medicine mixed medical use portion of the development will have a gross floor area of 250,000 SF, more than triple the size of 90% of the facilities used by ITE to derive trip generation data. Also, unlike private physician practices used to generate the ITE rates, the proposed Penn Medicine mixed medical use facility will include a number of treatment facilities that are uncommon in a typical medical office and that occupy a larger portion of the gross square floor area of the building, while not accommodating a larger number of patients. These facilities include ambulatory operating rooms, endoscopy rooms, chemotherapy treatment areas, radiological imaging rooms and radiation oncology treatment areas. Therefore, the proposed facility is very different from those used to derive ITE trip generation data. It is for these reasons that the ITE trip generation is not appropriate to use for the proposed Penn Medicine building and a trip generation rate was developed based on an evaluation of three existing mixed medical use facilities for the peak hour of the adjacent street which, based on traffic counts, is 7:15-8:15 AM and 5:00–6:00 PM.

The following existing mixed medical use facilities were evaluated to develop trip generation rates:

- 171,000 square foot facility at 250 King of Prussia Rd in Radnor PA
- 83,000 square foot facility at 1001 Chesterbrook Blvd. in Berwyn PA
- 154,826 square foot facility at 915 Old Fern Hill Road in West Chester, PA

Based on driveway counts and data regarding the number of patient positions at each facility, average weekday, AM and PM trip generation rates and entry/exit distributions were developed and presented to Radnor Township for review and approval.

The trip calculations result in a total of **731** (**577** entering and **154** exiting) and **583** (**158** entering and **425** exiting) new trips generated to the site during the morning and afternoon peak hours, respectively. The proposed site will generate approximately 90% more net trips over the course of a whole day than the existing land use “general office building” but only generates approximately 20% more net trips in the AM peak period and approximately 5% more net trips during the PM peak period.

An analysis was conducted to determine whether left turn lanes or a right turn lane into the site from are warranted. Based on the standard worksheets in the Chapter 11 Appendix of PennDOT Publication 46, the warrants for left turn lanes on King of Prussia Road and a northbound right turn lane into the site at the intersection of King of Prussia Road and Raider Road/Site Driveway are met, along with a southbound left turn lane from King of Prussia Road into the Septa Station Driveway.

Traffic Signal warrant requirements were evaluated at the unsignalized intersections of King of Prussia Road & Raider Road/Site Driveway and King of Prussia Road & Septa Station Driveway using the manual counts and generated site trips. From the signal warrant analysis, it was determined that the 4-Hour and Peak Hour signal warrants were satisfied at the intersection of King of Prussia Road & Raider Road/Site Driveway. Evaluation of the left turn signalization warrants for the northbound and southbound left turn lanes on King of Prussia Road at Raider Road and the proposed site driveway indicate that the left turn movements from King of Prussia Road should be controlled with permitted phases.

Vehicular and pedestrian clearances were calculated for the proposed signal at King of Prussia Road and Raider Road/site driveway based on PennDOT policies.

Operations of the study intersections during the AM and PM peak hours were evaluated for the build configuration of the proposed development in the proposed build year of 2020 and the horizon year of 2025 with the optimized timings from the no-build condition.

Under the 2020 and 2025 no-build configuration, all the study intersections operate at an acceptable LOS D or better except for the following locations:

#### King of Prussia Road & Radnor-Chester Road (SR 1021)

- In 2020 the overall intersection operates at a LOS F (218.9 seconds of delay) during the AM peak hour and LOS F (85.7 seconds of delay) during the PM peak hour.
- In 2025 the overall intersection operates at a LOS F (227.1 seconds of delay) during the AM peak hour and LOS F

## Traffic Impact Study

### 145 King of Prussia Road

---

(88.4 seconds of delay) during the PM peak hour.

#### King of Prussia Road & South Site Driveway

- In 2020 the overall intersection operates at a LOS F (83.9 seconds of delay) during the PM peak hour.
- In 2025 the overall intersection operates at a LOS F (87.3 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

- In 2020 the overall intersection operates at a LOS E (66.2 seconds of delay) during the AM peak hour and LOS E (55.6 seconds of delay) during the PM peak hour.
- In 2025 the overall intersection operates at a LOS E (69.4 seconds of delay) during the AM peak hour and LOS E (60.5 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & Radnor Chester Road

- Overall Intersection operates at a LOS E (57.2 seconds of delay) during the PM peak hour in 2020.
- Overall Intersection operates at a LOS E (62.1 seconds of delay) during the PM peak hour in 2025.

Based on the anticipated Level of Service for the exiting movements from the site via the SEPTA Driveway and south site driveway to King of Prussia Road a gap study was performed at both locations. The gap study was conducted from 7:00-9:00 AM and 4:00-6:00 PM on April 27, 2016. Based on the peak hour gap analysis, it is anticipated that sufficient gaps are available to accommodate the anticipated traffic from the site at the two locations.

As required by 255-20.B(5)(d)(6)(a) of the Radnor Township Subdivision and Land Development Ordinance, additional off-site improvements would be necessary to achieve LOS C at all of the off-site intersections. Based on Synchro analysis, Lancaster Avenue would require significant intersection upgrades including widening to provide additional through lanes and providing additional dedicated turn lanes on most approaches. The King of Prussia Road intersections at Radnor-Chester Road and Matsonford Road would require two through lanes in each direction on King of Prussia Road and dual turn lanes on the minor approaches. Due to physical constraints at most of the project intersections, including the SEPTA Rail Bridge on King of Prussia Road and the I-476 Bridges on Lancaster Avenue, the necessary improvements are not feasible and are not proposed by the applicant.

The Intersection LOS and delay under no-build conditions was compared to the 2020 and 2025 build conditions. The comparison indicated that there are no changes in overall intersection LOS at existing signalized intersections between the no-build and build conditions as a result of the trips generated by the proposed site. In conjunction with the proposed development the following roadway improvements are recommended:

- At King of Prussia Road and Matsonford Road/Park Driveway:
  - Modify AM signal timings to shift 3 seconds from the SB King of Prussia Road lead phase to the NB/SB King of Prussia phase (1 second) and the EB/WB Matsonford Road/Park Driveway Phase (2 seconds).
- At King of Prussia Road and Radnor-Chester Road:
  - Modify PM signal timings to shift 6 seconds from the EB/WB King of Prussia Road phase to the NB/SB Radnor Chester Road phase.
- At King of Prussia Road and Septa Station Driveway:
  - Restripe southbound King of Prussia Road to provide a dedicated left turn lane.
- At King of Prussia Road and Raider Road/Site Driveway :
  - Provide left turn lanes on both approaches of King of Prussia Road
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road.
  - Install 2 phase semi-actuated traffic signal.
- At King of Prussia Road and South Site Driveway :

## Traffic Impact Study

### 145 King of Prussia Road

---

- Restripe northbound King of Prussia Road to provide shared through/right turn lane.
- Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
- At Lancaster Avenue and NB Off Ramps/King of Prussia Road:
  - Restripe northbound I-76 off-ramp at Lancaster Avenue to provide shared through/right turn lane
- At Lancaster Avenue and I-476 SB Off Ramp:
  - Modify PM signal timings to shift 1 second from the EB/WB Lancaster Avenue phase to the WB Lancaster Avenue lead phase.
- At Lancaster Avenue and I-476 NB On Ramp/Hillside Circuit:
  - Modify PM signal timings to shift 7 second from the EB/WB Lancaster Avenue phase to the EB Lancaster Avenue lead phase.
- At Lancaster Avenue and Radnor-Chester Road:
  - Modify AM signal timings to shift 12 seconds from the southbound Radnor-Chester Road lead phase and 1 second from the Lancaster Avenue Phase lead left phase to the EB/WB Lancaster Avenue EB/WB Phase.

The additional improvements result in the overall intersection LOS at Lancaster Avenue and I-476 NB Off Ramp/King of Prussia Road improving from LOS E to LOS D during the AM peak hour in both 2020 and 2025. Striping the additional NB thru lane improves the approach from LOS E to LOS D and the through movement from LOS F to LOS E during the AM peak hour in 2020 and 2025.

Under the build Conditions with the identified improvements implemented, all of the study intersections maintain existing levels of service between the no-build and build conditions and operate at overall LOS D or better with the exception of those that operate at LOS E or F under no-build conditions.

Based on the comparison of the Intersection LOS and delay under no-build conditions and build conditions with the identified mitigation measures, the intersections meet the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies* at all of the study intersections. The Levels of Service exhibited are not a result of, nor is the need for additional mitigation measures triggered as a result of the trips generated by the proposed site.

In addition to the improvements identified within the is TIS, a bus shelter is to be constructed on King of Prussia Road southeast of the SEPTA Driveway to the extent that it is approved by SEPTA and the University of Pennsylvania Health System will partner with the Township to install a Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review:

- Route 30 & I-476 Northbound Ramps
- Route 30 & I-476/King of Prussia Road
- Route 30 & I-476 Southbound Ramps.
- Route 30 & Radnor-Chester Road.
- Route 30 & Radnor Financial Center Eastern Driveway
- Route 30 & Radnor Financial Center Western Driveway
- King of Prussia Road & Radnor-Chester Road.
- King of Prussia Road & Matsonford Road.
- Matsonford Road & South Centennial Drive.
- Matsonford Road & North Centennial Drive
- King of Prussia Road & Raider Road.

## Traffic Impact Study 145 King of Prussia Road

---

- Radnor Chester and Raider Road
- Radnor Chester and Radnor Financial Center

# Traffic Impact Study

## 145 King of Prussia Road

---

### INTRODUCTION

This document summarizes the results of an evaluation of traffic impacts associated with the proposed University of Pennsylvania Health Systems site located at 145 King of Prussia Road in Radnor Township, Delaware County, Pennsylvania.

The site currently is vacated and located on the east side of King of Prussia Road between the existing Southern driveway and existing Northern driveway. The proposed site will be comprised of a 250,000 square foot mixed medical use building with 130,000 square foot of clinical space and 120,000 square feet of ambulatory care space, a 150,000 square foot general office building, and a 75,000 square foot, 120 room hotel. The proposed development is anticipated to be constructed and occupied in 2020. The overall project area is shown in **Figure 1**. A site plan of the proposed development is illustrated in **Figure 2**.

### **Study Area (Traffic Impact Area)**

The peak traffic periods evaluated on the adjacent roadway network are: morning (7:00 am to 9:00 am) and late afternoon (4:00 pm to 6:00 pm) periods on a typical weekday when school is in session.

The following intersections were selected for study:

1. King of Prussia Road & Matsonford Road (SR 1038)
2. King of Prussia Road & Radnor Chester Road (SR 1021)
3. King of Prussia Road & SEPTA Station Driveway
4. King of Prussia Road & Existing Northern Site Driveway
5. King of Prussia Road & Existing Raider Road/Site Driveway
6. King of Prussia Road & Existing Southern Site Driveway
7. Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp
8. Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps
9. Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circle
10. Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)

### **Study Contents**

Specific elements included in this assessment are:

- An inventory of the roadway facilities in the vicinity of this project, including the existing physical and traffic operating characteristics.
- Manual turning movement counts performed at the study intersections during weekday morning and afternoon peak traffic hours.
- Calculation of vehicular trip generation for the proposed development within the study area based on trip generation rates contained in the Institute of Transportation Engineers (ITE) manual entitled *Trip Generation*, An ITE Information Report (9<sup>th</sup> Edition, 2012).
- Gap study of the existing site driveways
- Distribution of development-generated traffic onto the study area roadways in accordance with current travel patterns.
- Assessment of Existing (2016), Opening Year (2020), and Horizon Year (2025) traffic conditions based on





FIGURE 1  
PROJECT LOCATION

SOUTHEASTERN PENNSYLVANIA  
TRANSPORTATION AUTHORITY

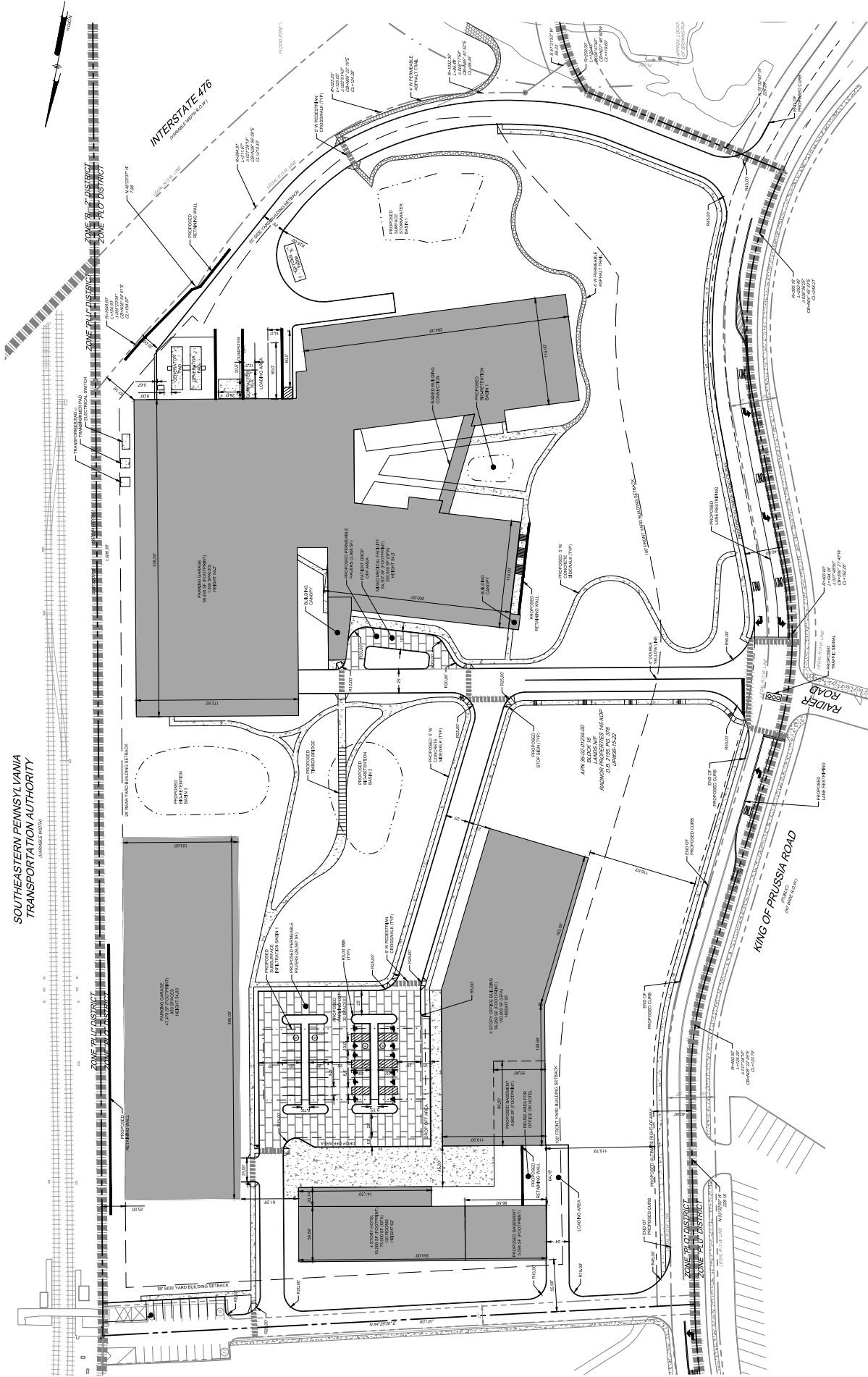


FIGURE 2  
SITE PLAN



## Traffic Impact Study 145 King of Prussia Road

---

capacity and level of service analyses performed at the study intersections.

### Study Methodology

The analysis was conducted in accordance with guidelines presented in Pennsylvania Department of Transportation (PennDOT) Policies and Procedures for Transportation Impact Studies, dated January 28, 2009. As required, three analysis years are considered: existing baseline traffic conditions, opening year analysis and design horizon year analysis (5 years after the opening year). The opening year and horizon year analyses include an assessment of the operational conditions of the study intersections under “no-build” and “build” scenarios. Mitigation is assessed for intersections that experience an overall level of service drop and delay increase of more than ten (10) seconds from the “no-build” to “build” conditions.

The performance of the study intersections for each analysis scenario was evaluated through a qualitative measure of operating conditions called Levels of Service (LOS). Six levels of Service (LOS) are defined with letter designations from ‘A’ to ‘F’, with Level of Service ‘A’ representing delays up to ten seconds and Level of Service ‘F’ indicating delays exceeding eighty seconds. Level of Service ‘C’ or better is considered acceptable, with a threshold of Level of Service ‘D’ in urban areas. Levels of Service are determined through analysis procedures outlined in the 2010 Highway Capacity Manual (Transportation Research Board, Washington, D.C.).

Levels of Service for signalized intersections are based on average delay experienced by motorists passing the intersection. The delay is based on the results of the capacity analysis (rate of demand flow to capacity) and other important variables such as quality of progression, cycle length, and ratio of green time.

Levels of Service for unsignalized intersections are defined in terms of delay to vehicles entering from the side road and turning left from a major road. Delay is a function of the capacity of the approach and degree of saturation. The capacity is based on the distribution of gaps in the major street traffic stream, driver judgment in selecting a gap through which to execute the desired maneuver, and follow-up time required by each driver in a queue. The Level of Service Criteria for signalized and unsignalized intersections is provided in **APPENDIX A**.

The operational analyses of the study intersections under all conditions were performed using the Synchro 9 software. Chapter 10 of PennDOT Publication 46 provides Pennsylvania default values to be utilized in the HCM 2010 Level of Service analysis. The following default values were used for signalized intersections: base saturation flow rate of 1800 passenger cars per hour per lane (suburban); an extension of effective green time of 3.5 seconds, and a start-up lost time of 2.5 seconds.

# Traffic Impact Study

## 145 King of Prussia Road

---

### EXISTING CONDITIONS

#### Existing Roadway Facilities

The following roadways within the immediate vicinity of the project site were evaluated as part of this study:

- **Lancaster Avenue (SR 0030)** is an east-west oriented Principal Arterial Highway. Within the study area, Lancaster Avenue is 90' wide and designated two-way. There are two travel lanes in each direction with separate eastbound and westbound left turn lanes at the two study intersections. The posted speed limit on Lancaster Avenue is 35 mph.
- **King of Prussia Road** is a north-south oriented local roadway with sidewalk on the western side of the roadway. Within the study area, King of Prussia Road is 40' wide with one lane of travel in each direction. The posted speed limit on King of Prussia Road is 35 mph.
- **Matsonford Road (SR 1038)** is an east-west oriented minor arterial roadway. Within the study area, Matsonford Road is 50' wide with one lane of traffic in each direction and a westbound left turn lane. The posted speed limit on Matsonford Road is 40 mph.
- **Radnor Chester Road (SR 1021)** is a north-south oriented minor arterial roadway. Within the study area, Radnor Chester Road is 25' wide with one lane of traffic in each direction. The posted speed limit on Radnor Chester Road is 35 mph.
- **Raider Road** is an east-west oriented local roadway. Within the study area, Raider Road is 30' wide with one lane of traffic in each direction with sidewalk on the southern side. The speed limit on Raider Road is not posted but is assumed to be 25 mph.

#### Existing Intersections

The following existing intersections were analyzed for existing and future capacity restraints as part of this study:

- **King of Prussia Road & Matsonford Road (SR 1038)/Driveway.** The intersection of King of Prussia Road and Matsonford Road is a four-legged signalized intersection operating on a three-phase traffic signal with a southbound lead. Matsonford Road has a left turn lane and a through/right lane in each direction. Northbound King of Prussia Road has one left turn lane, one through lane, and one yield controlled right turn lane. The southbound approach of King of Prussia Road has a left turn lane and a southbound through/right turn lane.
- **King of Prussia Road & Radnor-Chester Road (SR 1021).** The intersection of King of Prussia Road and Radnor-Chester Road is a four-legged signalized intersection operating on a two-phase timing with a 90 second cycle length. Radnor-Chester Road provides one eastbound through/left turn lane and one eastbound right turn lane along with one westbound lane. Radnor-Chester Road contains one northbound left turn lane and one northbound through/right turn lane along with one southbound left turn lane, one southbound through lane and one southbound right turn lane.
- **King of Prussia Road & SEPTA Station Driveway.** The intersection of King of Prussia Road and the SEPTA Station Driveway is a three-legged stop-controlled intersection with stop control on the SEPTA Station Driveway. Northbound King of Prussia Road has one lane. Southbound King of Prussia Road has one through lane and one left turn lane. The driveway has one lane in each direction.

## Traffic Impact Study

### 145 King of Prussia Road

---

- **King of Prussia Road & Northern Site Exit Driveway** The intersection of Lancaster Avenue and the site's northern driveway is a three-legged stop-controlled intersection with stop control on the driveway. King of Prussia Road contains one lane in each direction with a center two-way left turn lane. Raider Road has one lane in each direction. The site driveway is a one lane exit driveway.
- **King of Prussia Road & Raider Road/ Entry Driveway.** The intersection of King of Prussia Road and Raider Road is a three-legged unsignalized intersection with stop-control on Raider Road. King of Prussia Road contains one lane in each direction with a center two-way left turn lane. Raider Road has one lane in each direction. The site driveway is a one lane entry driveway.
- **King of Prussia Road & Southern Site Driveway.** The intersection of King of Prussia Road and the sites southern driveway is a three-legged stop-controlled intersection with stop control on the driveway. Northbound King of Prussia Road has one lane. Southbound King of Prussia Road has one through lane and one left turn lane. The driveway has one lane in each direction.
- **Lancaster Avenue (SR 0030) & King of Prussia Road /I-476 NB Off Ramp.** The intersection of Lancaster Avenue and I-476 NB off-ramps/King of Prussia Road is a four-legged signalized intersection. Lancaster Avenue has two eastbound left turn lanes and two eastbound through lanes. Westbound Lancaster Avenue has two through lanes and one channelized right turn lane. The I-476 NB off-ramp contains two left turn lanes, one through lane, and one right turn lane. Southbound King of Prussia Road has two left turn lanes and one right turn lane.
- **Lancaster Avenue (SR 0030) & I-476 SB on/off-ramps.** The intersection of Lancaster Avenue and I-476 on/off-ramps is a three-legged intersection with a three-phase traffic signal. Westbound Lancaster Avenue has two through lanes and two left turn lanes. Eastbound Lancaster Avenue has two through lanes and one eastbound channelized right turn lane. The I-476 SB off-ramp has two northbound left turn lanes and one channelized right turn lane.
- **Lancaster Avenue (SR 0030) & I-476 NB On Ramps/Hillside Circle.** The intersection of Lancaster Avenue and I-476 off-ramps is a four-legged signalized intersection. Westbound Lancaster Avenue has one left turn lane, two through lanes, and one right turn lane. Eastbound Lancaster Avenue has two left turn lanes, one through lane, and one through/right turn lane. Hillside Circle has one northbound through/left turn lane and one northbound right turn lane.
- **Lancaster Avenue (SR 0030) & Radnor-Chester Road (SR 1021).** The intersection of Lancaster Avenue and Radnor-Chester Road four-legged signalized intersection. Eastbound Lancaster Avenue has one left turn lane, two through lanes, and one right turn lane. Westbound Lancaster Avenue has one left turn lane, one through lane, and one through/right turn lane. Northbound Radnor-Chester Road has one left turn lane, one through lane, and one through/right turn lane. Southbound Radnor-Chester Road has one left/through lane, one through/right lane.

Signal plans and timings Signal for the study area intersections were obtained PennDOT and are provided in **APPENDIX B**.

### Pedestrian Access

King of Prussia Road has sidewalk on both sides of the roadway from the Matsonford Road to the SEPTA station driveway. Sidewalk is provided on the west side of King of Prussia Road from the SEPTA station driveway to Lancaster Avenue. Crosswalks with ADA compliant crosswalks are provided at each of the signalized intersections on King of Prussia Road. There is an unsignalized midblock crosswalk approximately 400' south of Matsonford Road.

Sidewalk is provided on the north side of Lancaster Avenue east of King of Prussia Road. There is no sidewalk provided on Lancaster Avenue west of King of Prussia Road.

### Transit Facilities

Transit facilities are present within the study area including, Septa Regional Rail and Septa Bus Routes. The site is located

## Traffic Impact Study

### 145 King of Prussia Road

---

adjacent to the Radnor Train Station which is serviced by Norristown High Speed Line and the Paoli-Thorndale Regional Rail Line. Several bus routes run adjacent to the site including the 105 and 106 lines on King of Prussia Road.

#### Data Collection

Turning movement counts, including heavy vehicles and pedestrian counts, were conducted between the hours of 7:00 – 9:00 A.M. and 4:00 – 6:00 P.M. at the following intersections:

1. King of Prussia Road & Matsonford Road (SR 1038) – November 18, 2015
2. King of Prussia Road & Radnor Chester Road (SR 1021) – April 27, 2016
3. King of Prussia Road & Existing Northern Site Driveway – April 27, 2016
4. King of Prussia Road & Existing Raider Road/Site Driveway – November 18, 2015
5. King of Prussia Road & Existing Southern Site Driveway – April 27, 2016
6. Lancaster Avenue (SR 0030) & King of Prussia Road / I-476 NB Off Ramp– November 18, 2015
7. Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps – September 15, 2016
8. Lancaster Avenue (SR 0030) & I-476 NB On Ramp Hillside Circle – November 18, 2015
9. Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021) – April 27, 2016

A gap study was also performed for the existing site driveways on April 27, 2016 between the hours of 7:00 – 9:00 A.M. and 4:00 – 6:00 P.M.

The existing traffic volumes are shown on **FIGURE 3**.

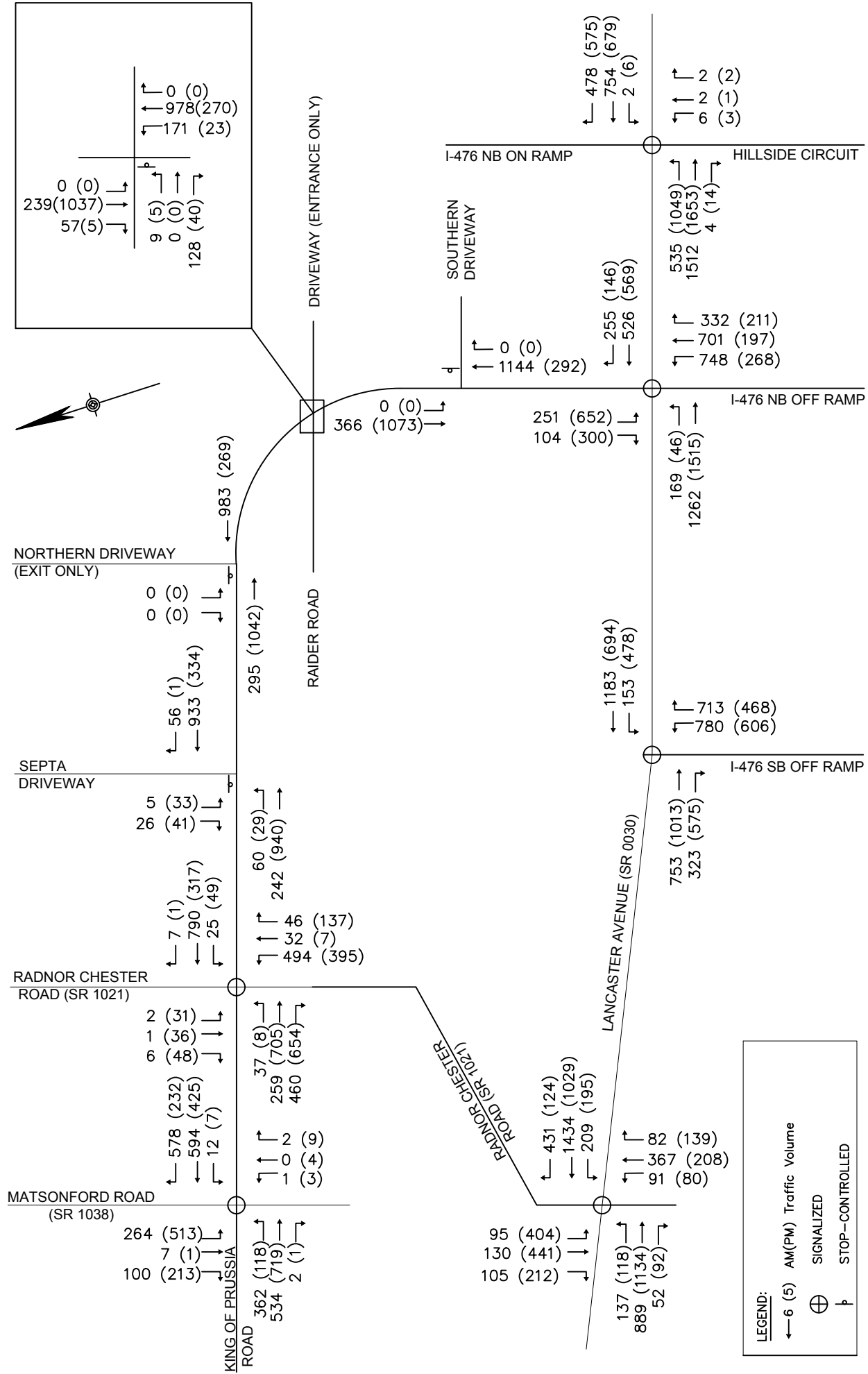
The count and gap study data is provided in **APPENDIX C**.

#### Existing Levels of Service/Queue Analysis

The operational analyses of the study intersections under all conditions were performed using the *Synchro/Simtraffic* Version 9.0 software. Chapter 10 of *PennDOT Publication 46* provides Pennsylvania default values to be utilized in the HCM 2010 Level of Service analysis.

Under the existing conditions, all of the study intersections operate at an overall Level of Service D or better, with all movements operating at Level of Service D or better during the AM and PM peak hours besides the following locations:

- King of Prussia Road & Radnor Chester Road
  - Northbound approach operates at a LOS F during the AM and PM peak hours with 613.9 and 249.3 seconds of delay, respectively.
  - Northbound left/through movement operates at a LOS F during the AM and PM peak hours with 666.0 and 328.0 seconds of delay, respectively.
  - The overall intersection operates at a LOS F during the AM peak hour (228.6 seconds of delay) and at a LOS F during the PM peak hour (93.3 seconds of delay).
- King of Prussia Road & Raider Road
  - Eastbound movement operates at a LOS F (53.4 seconds of delay) during the AM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road
  - Eastbound approach operates at a LOS E (57.4 seconds of delay) during the AM peak hour.
  - Eastbound through operates at a LOS E (58.1 seconds of delay) during the AM peak hour.
  - Northbound through movement operates at LOS F (81.1 seconds of delay) during the AM peak hour.
  - Northbound right movement operates at LOS E (78.0 seconds of delay) during the PM peak hour.



**LEGEND:**

- ← 6 (5) AM(PM) Traffic Volume
- ⊕ SIGNALIZED
- ⊖ STOP-CONTROLLED

**FIGURE 3**  
**EXISTING 2016 WEEKDAY**  
**PEAK HOUR TRAFFIC VOLUMES**



## Traffic Impact Study

### 145 King of Prussia Road

---

- Southbound approach movement operates at a LOS E (57.1 seconds of delay) during the AM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit
  - Eastbound left movement operates at a LOS E (57.4 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS E during the AM and PM peak hours with 56.5 and 59.3 seconds of delay, respectively.
  - Northbound approach operates at a LOS E during the AM and PM peak hours with 58.1 and 56.7 seconds of delay, respectively.
  - Northbound through/left movement operates at a LOS E during the AM and PM peak hours with 58.8 and 56.9 seconds of delay, respectively.
  - Northbound right movement operates at a LOS E during the AM and PM peak hours with 55.1 and 56.2 seconds of delay, respectively.
- Lancaster Avenue (SR 0030) & Radnor Chester Road
  - Westbound left operates at LOS E (62.2 seconds of delay) during the PM peak hour.
  - Westbound thru operates at LOS E (63.7 seconds of delay) during the AM peak hour.
  - Southbound approach operates at a LOS F (81.9 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (174.7 seconds of delay) during the PM peak hour.

In the existing conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 345' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 60' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 925' and 40' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 40' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 128' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 505' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 143' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 232' and 138' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 658' during the PM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the existing conditions analysis are summarized in **TABLE 1**. Detailed outputs of the 2016 existing conditions analysis are provided in **APPENDIX D**.



Table 1 – 2016 Existing Conditions Summary Table

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		27.9	C	-	19.3	B	-
	(EB Left)	50'	30.8	C	0	24.5	C	3
	(EB Thru/Right)	50'	26.5	C	3	18.2	B	10
	WB Approach	-	36.7	D	-	43.1	D	-
	(WB Left)	550'	39.7	D	310	52.1	D	610
	(WB Thru/Right)	950'	29.3	C	113	21.6	C	195
	SB Approach	-	23.9	C	-	23.3	C	-
	(SB Left)	100'	45.5	D	445	15.9	B	80
	(SB Thru/Right)	1000'+	9.3	A	313	24.5	C	618
	NB Approach	-	40.8	D	-	27.5	C	-
	(NB Left)	130'	17.7	B	10	30.6	C	8
(NB Thru)	1150'	41.3	D	543	27.4	C	382	
<b>Overall</b>	-	<b>31.9</b>	<b>C</b>	-	<b>31.3</b>	<b>C</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	18.1	B	-	21.0	C	-
	(EB Left)	75'	46.3	D	50	16.6	B	5
	(EB Thru)	1200'	14.1	B	178	21.1	C	470
	WB Approach	-	38.1	D	-	18.0	B	-
	(WB Left)	160'	16.6	B	20	38.2	D	60
	(WB Thru/Right)	1100'	38.8	D	800	14.8	B	225
	NB Approach	-	613.9	F	-	249.3	F	-
	(NB Left/Thru)	1200'	666.0	F	2125	328.0	F	1240
	(NB Right)	280'	18.1	B	35	19.5	B	110
SB Approach	100'	21.8	C	8	50.8	D	140	
<b>Overall</b>	-	<b>228.6</b>	<b>F</b>	-	<b>93.3</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	26.2	D	73	19.1	C	25
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	2.5	A	90	0.3	A	3
	<b>Overall</b>	-	<b>1.2</b>	<b>A</b>	-	<b>1.2</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	0.0	A	0	0.0	A	0
	NB Approach	280'	0.0	A	0	0.0	A	0
	SB Approach	380'	0.0	A	0	0.0	A	0
	<b>Overall</b>	-	<b>0.0</b>	<b>A</b>	-	<b>0.0</b>	<b>A</b>	-
King of Prussia Road (N/S) & Raider Road/Driveway (E)	EB Approach	500'	53.4	F	128	24.1	C	18
	NB Approach	550'	1.3	A	18	0.9	A	3
	SB Approach	280'	0.0	A	0	0.0	A	0
	<b>Overall</b>	-	<b>5.6</b>	<b>A</b>	-	<b>1.0</b>	<b>A</b>	-
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	0.0	A	0	0.0	A	0
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.0	A	0	0.0	A	0
	(SB Left)	75'	0.0	A	-	0.0	A	-
	<b>Overall</b>	-	<b>0.0</b>	<b>A</b>	-	<b>0.0</b>	<b>A</b>	-

Table 1 – 2016 Existing Conditions Summary Table (Cont.)

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	57.4	E	-	56.6	E	-
	(EB Left)	800'	52.1	D	120	54.0	D	35
	(EB Thru)	800'	58.1	E	765	56.7	E	928
	WB Approach	600'	23.8	C	240	8.3	A	128
	NB Approach	-	44.5	D	-	47.4	D	-
	(NB Left)	500'	17.6	B	300	19.8	B	123
	(NB Thru)	1900'	81.1	F	1350	52.0	D	275
	(NB Right)	500'	27.9	C	330	78.0	E	345
	SB Approach	500'	57.1	E	32	47.5	D	407
<b>Overall</b>	-	<b>47.2</b>	<b>D</b>	-	<b>45.1</b>	<b>D</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	16.9	B	208	21.6	C	298
	WB Approach	-	33.7	C	-	33.9	C	-
	(WB Left)	600'	53.4	D	108	52.6	D	295
	(WB Thru)	800'	31.1	C	556	20.9	C	340
	NB Approach	1000'+	40.1	D	435	46.5	D	365
<b>Overall</b>	-	<b>31.0</b>	<b>C</b>	-	<b>32.1</b>	<b>C</b>	-	
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.9	A	-	22.4	C	-
	(EB Left)	400'	32.9	C	250	57.4	E	905
	(EB Thru/Right)	600'	0.4	A	8	0.3	A	5
	WB Approach	-	9.5	A	-	15.6	B	-
	(WB Left)	100'	56.5	E	3	59.3	E	10
	(WB Thru/Right)	750'	9.4	A	238	15.3	B	263
	NB Approach	-	58.1	E	-	56.7	E	-
	(NB Left/Thru)	750'	58.8	E	13	56.9	E	8
(NB Right)	50'	55.1	E	3	56.2	E	3	
<b>Overall</b>	-	<b>9.2</b>	<b>A</b>	-	<b>21.1</b>	<b>C</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	31.2	C	-	51.0	D	-
	(EB Left)	260'	42.6	D	143	22.2	C	93
	(EB Thru)	750'	29.6	C	473	53.7	D	730
	WB Approach	-	53.5	D	-	35.7	D	-
	(WB Left)	340'	30.2	C	155	62.2	E	240
	(WB Thru)	1800'	63.7	E	1280	32.4	C	503
	(WB Right)	300'	30.9	C	443	21.0	C	113
	NB Approach	-	45.7	D	-	34.8	C	-
	(NB Left/Thru)	1000'+	44.6	D	340	34.9	C	235
	(NB Thru/Right)	100	46.9	D	332	34.8	C	238
	SB Approach	-	26.3	C	-	81.9	F	-
	(SB Left)	160'	29.4	C	98	174.7	F	818
(SB Thru)	350'	25.1	C	118	24.7	C	300	
<b>Overall</b>	-	<b>44.3</b>	<b>D</b>	-	<b>52.2</b>	<b>D</b>	-	

# Traffic Impact Study

## 145 King of Prussia Road

### 2020 and 2025 “NO-BUILD” TRAFFIC CONDITIONS

Operations of the study intersections during the AM and PM peak hours were evaluated for the no-build configuration without the proposed development in the proposed build year 2020 and the horizon year 2025.

#### No-Build Traffic Volumes

In order to account for general traffic growth in the area, an annual background growth rate is applied to existing traffic volumes on the study area roadways. An annual background growth rate of 0.38% per year has been previously established by PennDOT’s *Bureau of Planning and Research* for urban, non-interstate roadways in the study area.

The existing 427,109 SF office/research and development space is currently vacant with access provided via four driveways along King of Prussia Road. As the existing space was previously approved and could be occupied by a tenant without additional approvals, trips for the existing site were calculated and applied to the existing traffic to develop the future “no-build” conditions.

The traffic volumes for the existing site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The existing site trips are based upon the ITE Land Use Codes 710 “General Office” utilizing the square footage of the building as the independent variable. The trip calculations result in a total of **611** (**538** entering and **73** exiting) and **557** (**95** entering and **462** exiting) new trips generated to the site during the morning and afternoon peak hours, respectively. **TABLE 2** summarizes the trip calculation for the existing site during the weekday morning and weekday afternoon peak hours.

**Table 2 – Existing Site Trip Generation**

Land Use Code	Size	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
General Office Building (ITE Land Use 710)	427,110 SF	1,000 SF GFA	1,979	1,978	3,957	538	73	611	95	462	557
<b>Total</b>			<b>1,979</b>	<b>1,978</b>	<b>3,957</b>	<b>538</b>	<b>73</b>	<b>611</b>	<b>95</b>	<b>462</b>	<b>557</b>

The trip distribution of the existing site based on the proposed location along King of Prussia Road and the existing traffic patterns on the surrounding roadway network. The estimated distribution of the site traffic is:

- To/From King of Prussia Road northbound - 25%
- To/From King of Prussia Road southbound - 75%

The trip distribution and volumes generated at the proposed site are provided in **FIGURES 4 and 5**. The 2020 and 2025 no-build Traffic volumes are illustrated in **FIGURES 6 and 7**. Traffic volumes development tables are provided in **APPENDIX E**.

Signal timing adjustments were made for future no-build conditions to optimize the intersection performance minimizing the overall intersection delay where possible. The following timing adjustments were made:

- At King of Prussia Road and Matsonford Road/Park Driveway:
  - Modify AM signal timings to shift 3 seconds from the SB King of Prussia Road lead phase to the NB/SB King of Prussia phase (1 second) and the EB/WB Matsonford Road/Park Driveway Phase (2 seconds).
- At King of Prussia Road and Radnor-Chester Road:

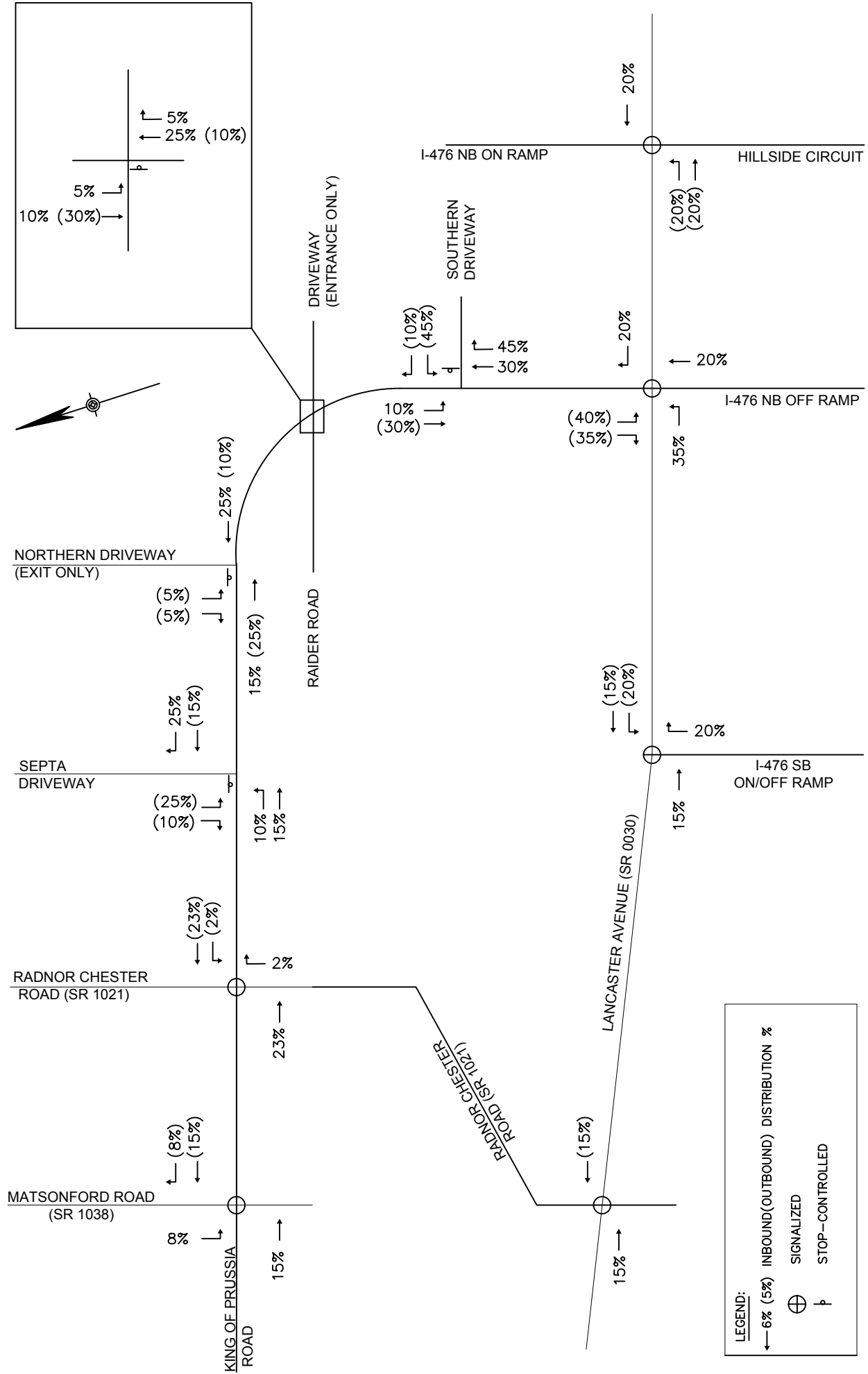
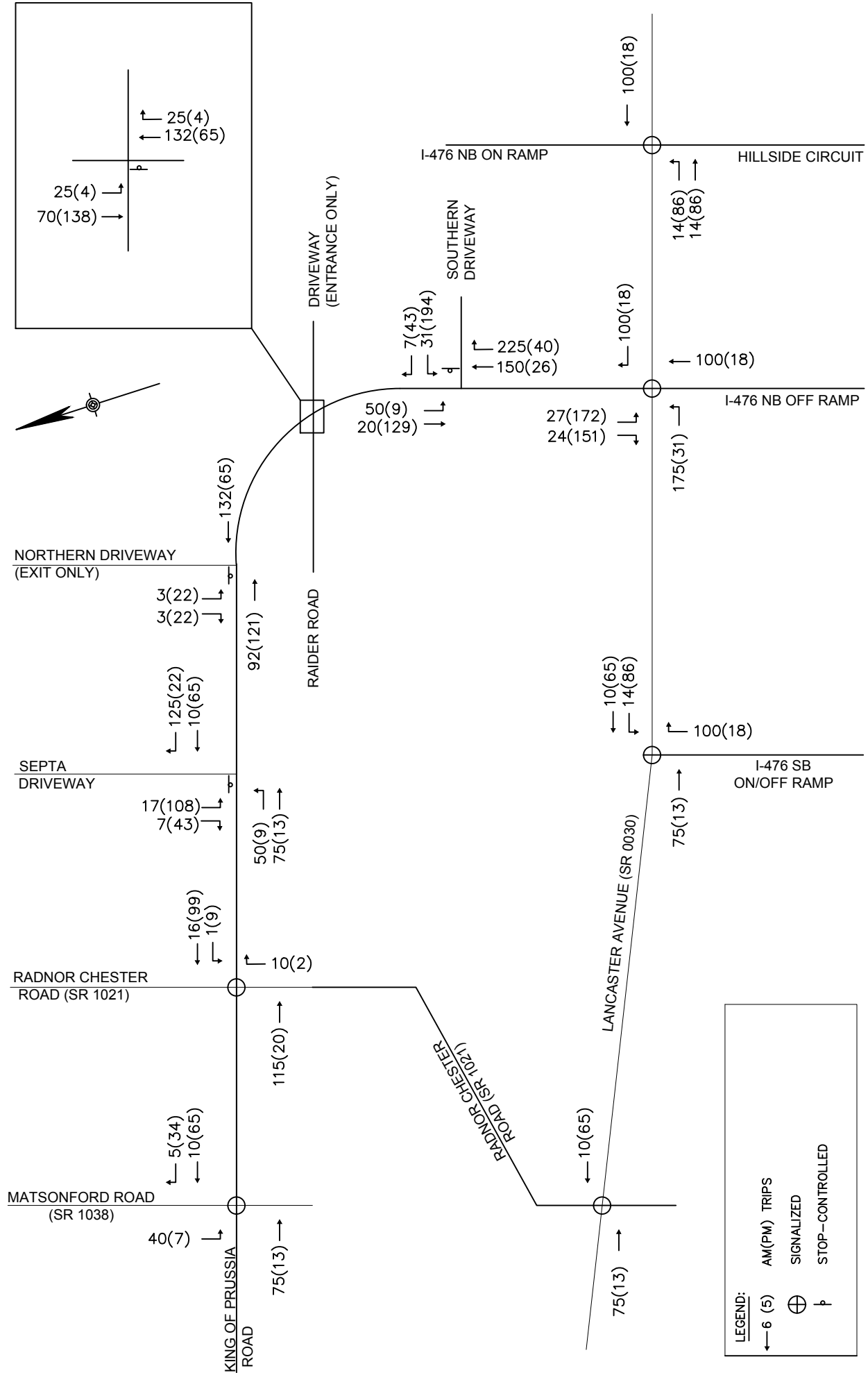


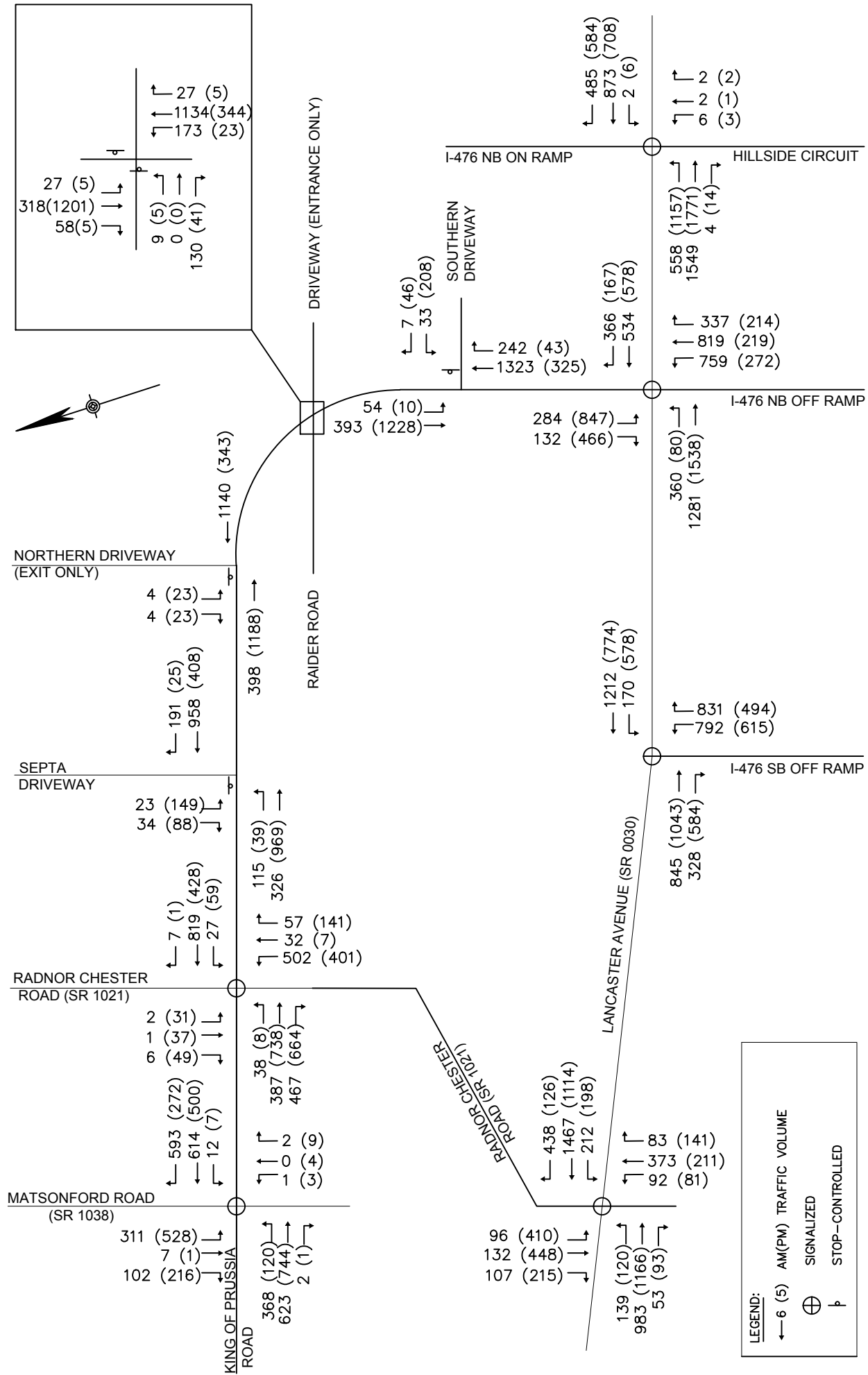
FIGURE 4  
EXISTING SITE TRIP DISTRIBUTION





**FIGURE 5  
EXISTING SITE TRIPS  
(CALCULATED)**



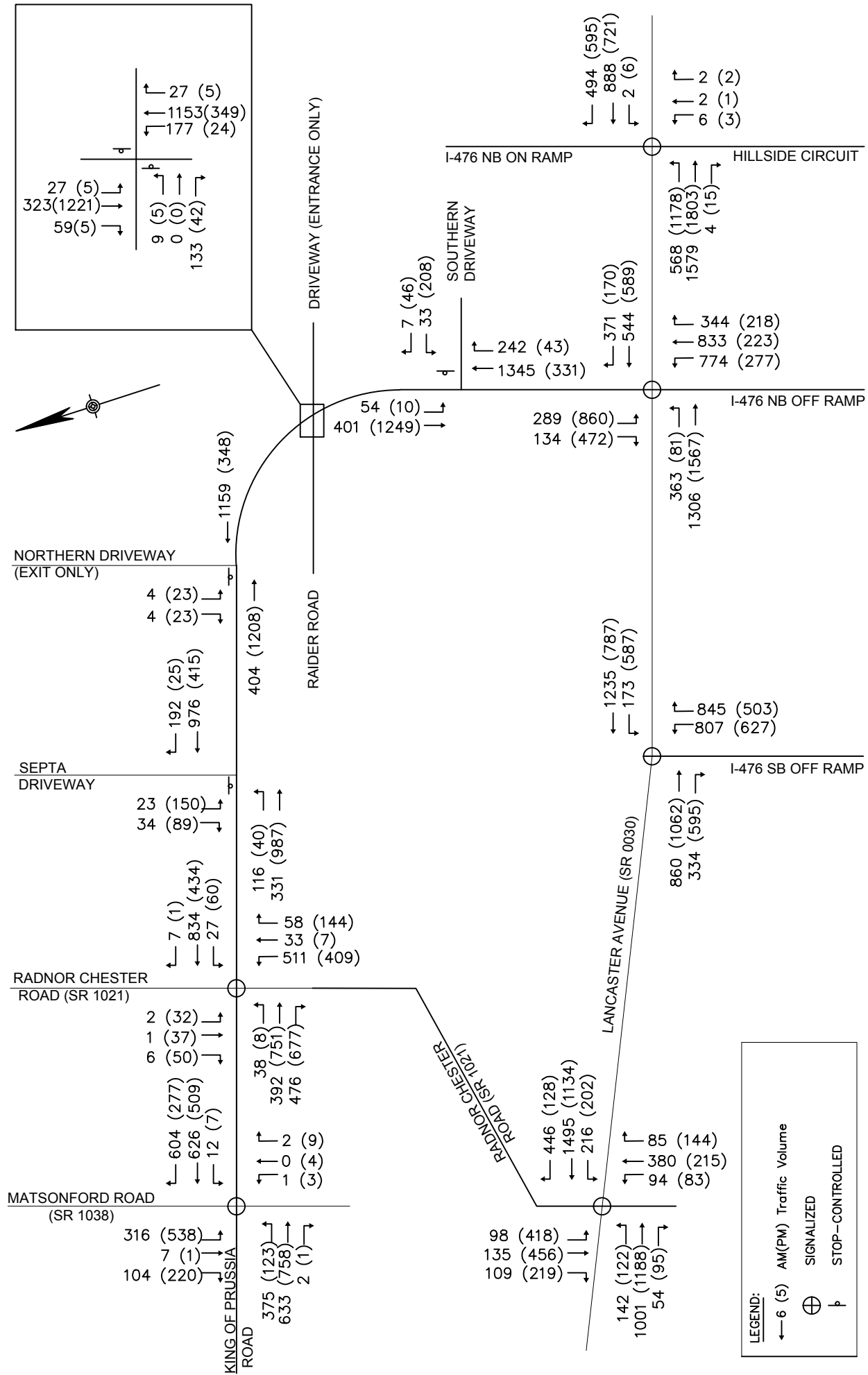


**LEGEND:**

- ← 6 (5) AM(PM) TRAFFIC VOLUME
- ⊕ SIGNALIZED
- ⊔ STOP-CONTROLLED

**FIGURE 6**  
**2020 NO-BUILD WEEKDAY**  
**PEAK HOUR TRAFFIC VOLUMES**





**LEGEND:**

- ← 6 (5) AM(PM) Traffic Volume
- ⊕ SIGNALIZED
- ⊔ STOP-CONTROLLED

**FIGURE 7**  
**2025 NO-BUILD WEEKDAY**  
**PEAK HOUR TRAFFIC VOLUMES**



## Traffic Impact Study

### 145 King of Prussia Road

---

- Modify PM signal timings to shift 4 seconds from the EB/WB King of Prussia Road phase to the NB/SB Radnor Chester Road phase.
- At Lancaster Avenue and I-476 SB Off Ramp:
  - Modify PM signal timings to shift 1 second from the EB/WB Lancaster Avenue phase to the WB Lancaster Avenue lead phase.
- At Lancaster Avenue and I-476 NB On Ramp/Hillside Circuit:
  - Modify PM signal timings to shift 6 seconds from the EB/WB Lancaster Avenue phase to the EB Lancaster Avenue lead phase.
- At Lancaster Avenue and Radnor-Chester Road:
  - Modify AM signal timings to shift 12 seconds from the southbound Radnor-Chester Road lead phase to the EB/WB Lancaster Avenue Phase.

### 2020 No-Build Levels of Service Analysis

Operations of the study intersections during the AM and PM peak hours were evaluated for the no-build configuration of the proposed development in the proposed build year of 2020. The signal timing adjustments were made for future no-build conditions to minimizing the overall intersection delay where possible. Under the 2020 no-build Conditions, all the study intersections and movements operate at an acceptable LOS D or better besides the following locations:

- King of Prussia Road & Matsonford Road
  - Westbound left movement operates at a LOS E (55.8 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (84.9 seconds of delay) during the AM peak hour.
  - Northbound approach movement operates at LOS E (60.9 seconds of delay) during the AM peak hour.
  - Northbound thru movement operates at LOS E (61.7 seconds of delay) during the AM peak hour.
- King of Prussia Road & Radnor Chester Road
  - Overall intersection LOS of F (218.9 seconds of delay) during the AM peak hour and LOS F (85.7 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS E (62.4 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS F (617.3 seconds of delay) during the AM peak hour and at a LOS F (225.5 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS F (681.6 seconds of delay) during the AM peak hour and a LOS E (297.7 seconds of delay) during the PM peak hour.
- King of Prussia and SEPTA Driveway
  - Westbound approach movement operates at a LOS E (38.6 seconds of delay) during the AM peak hour and at LOS F (120.0 seconds of delay) during the PM peak hour.
- King of Prussia and Southern Driveway
  - Overall intersection LOS of F (83.9 seconds of delay) during the PM peak hour.
  - Westbound approach movement operates at a LOS F (265.0 seconds of delay) during the AM peak hour and at a LOS F (613.8 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road
  - Overall intersection LOS of E (66.2 seconds of delay) during the AM peak hour and LOS E (55.6 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (60.5 seconds of delay) during the AM peak hour and at a LOS E (58.5 seconds of delay) during the PM peak hour.
  - Eastbound left movement operates at a LOS E (59.1 seconds of delay) during the AM peak hour.
  - Eastbound through movement operates at a LOS E (60.9 seconds of delay) during the AM peak hour and at a LOS E (58.8 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (74.8 seconds of delay) during the AM peak hour.



## Traffic Impact Study

### 145 King of Prussia Road

---

- Northbound through movement operates at a LOS F (146.9 seconds of delay) during the AM peak hour and a LOS E (57.8 seconds of delay) during the PM peak hour.
- Northbound right movement operates at a LOS E (79.3 seconds of delay) during the PM peak hour.
- Southbound approach movement operates at a LOS E (63.9 seconds of delay) during the AM peak hour and at a LOS F (85.8 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit
  - Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and at a LOS E (59.3 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (58.1 seconds of delay) during the AM peak hour and at a LOS E (56.7 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and at a LOS E (56.9 seconds of delay) during the PM peak hour
  - Northbound right movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour and at a LOS E (56.2 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & Radnor Chester Road
  - Overall intersection operates at a LOS E (57.2 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (59.1 seconds of delay) during the PM peak hour.
  - Eastbound through movement operates at a LOS E (62.5 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS E (79.4 seconds of delay) during the PM peak hour.
  - Westbound thru movement operates at a LOS E (58.0 seconds of delay) during the AM peak hour.
  - Southbound approach movement operates at a LOS F (83.9 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (180.3 seconds of delay) during the PM peak hour.

In the 2020 no-build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 618' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 90' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 970' and 15' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 38' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 535' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 17' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 442' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 45' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 2' during the PM peak period.

## Traffic Impact Study

### 145 King of Prussia Road

---

- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 135' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 240' and 142' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 688' during the PM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the no-build conditions analysis are summarized in **TABLE 3**. Detailed outputs of the 2020 no-build conditions analysis are provided in **APPENDIX F**.

Table 3 – 2020 No-Build Conditions Summary Table

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	19.3	B	-
	(EB Left)	50'	29.1	C	0	24.5	C	3
	(EB Thru/Right)	50'	25.0	C	3	18.2	B	10
	WB Approach	-	38.8	D	-	45.9	D	-
	(WB Left)	550'	42.8	D	368	55.8	E	640
	(WB Thru/Right)	950'	27.6	C	110	21.6	C	195
	SB Approach	-	39.0	D	-	25.9	C	-
	(SB Left)	100'	84.9	F	718	18.0	B	83
	(SB Thru/Right)	1000'+	12.0	B	403	27.1	C	660
	NB Approach	-	60.9	E	-	33.5	C	-
	(NB Left)	130'	17.3	B	10	33.1	C	8
	(NB Thru)	1150'	61.7	E	785	33.5	C	492
<b>Overall</b>	-	<b>45.7</b>	<b>D</b>	-	<b>34.6</b>	<b>C</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.0	B	-	28.1	C	-
	(EB Left)	75'	50.4	D	53	23.2	C	8
	(EB Thru)	1200'	16.0	B	255	28.1	C	548
	WB Approach	-	44.2	D	-	25.2	C	-
	(WB Left)	160'	20.5	C	25	62.4	E	93
	(WB Thru/Right)	1100'	45.0	D	883	20.1	C	333
	NB Approach	-	617.3	F	-	225.5	F	-
	(NB Left/Thru)	1200'	681.6	F	2170	297.7	F	1215
	(NB Right)	280'	18.2	B	45	16.8	B	105
	SB Approach	100'	21.8	C	8	49.3	D	138
<b>Overall</b>	-	<b>218.9</b>	<b>F</b>	-	<b>85.7</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	38.6	E	43	120.0	F	288
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.2	A	30	0.3	A	3
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>17.1</b>	<b>C</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	21.8	C	3	18.2	C	13
	NB Approach	280'	0.0	A	0	0.0	A	0
	SB Approach	380'	0.0	A	0	0.0	A	0
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	<b>0.5</b>	<b>A</b>	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.3	B	30	32.1	D	25
	NB Approach	550'	1.2	A	20	0.7	A	3
	SB Approach	280'	0.9	A	5	0.0	A	0
	<b>Overall</b>	-	<b>2.0</b>	<b>A</b>	-	<b>1.1</b>	<b>A</b>	-
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	265.0	F	108	613.8	F	567
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.1	A	-
	(SB Left)	75'	15.2	C	13	8.0	A	0
	<b>Overall</b>	-	<b>5.6</b>	<b>A</b>	-	<b>83.9</b>	<b>F</b>	-

Table 3 – 2020 No-Build Conditions Summary Table (Cont.)

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	60.5	E	-	58.5	E	-
	(EB Left)	800'	59.1	E	252	52.5	D	58
	(EB Thru)	800'	60.9	E	787	58.8	E	1335
	WB Approach	600'	53.9	D	338	10.3	B	163
	NB Approach	-	74.8	E	-	49.7	D	-
	(NB Left)	500'	17.6	B	305	19.8	B	123
	(NB Thru)	1900'	146.9	F	1917	57.8	E	313
	(NB Right)	500'	28.1	C	335	79.3	E	353
	SB Approach	500'	63.9	E	78	85.8	F	328
	<b>Overall</b>	-	<b>66.2</b>	<b>E</b>	-	<b>55.6</b>	<b>E</b>	-
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.0	B	235	24.6	C	323
	WB Approach	-	34.5	C	-	35.3	D	-
	(WB Left)	600'	53.8	D	120	53.1	D	342
	(WB Thru)	800'	31.8	C	568	22.0	C	370
	NB Approach	1000'+	40.0	D	443	46.6	D	370
	<b>Overall</b>	-	<b>31.3</b>	<b>C</b>	-	<b>33.9</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.6	A	-	9.7	A	-
	(EB Left)	400'	31.8	C	248	24.4	C	842
	(EB Thru/Right)	600'	0.3	A	5	0.2	A	5
	WB Approach	-	10.4	B	-	19.8	B	-
	(WB Left)	100'	56.5	E	3	59.3	E	10
	(WB Thru/Right)	750'	10.3	B	280	19.4	B	303
	NB Approach	-	58.1	E	-	56.7	E	-
	(NB Left/Thru)	750'	58.8	E	13	56.9	E	8
	(NB Right)	50'	55.1	E	3	56.2	E	3
<b>Overall</b>	-	<b>9.3</b>	<b>A</b>	-	<b>11.8</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	31.5	C	-	59.1	E	-
	(EB Left)	260'	43.8	D	145	24.3	C	95'
	(EB Thru)	750'	30.0	C	520	62.5	E	795
	WB Approach	-	49.7	D	-	42.2	D	-
	(WB Left)	340'	35.0	C	185	79.4	E	342
	(WB Thru)	1800'	58.0	E	1285	37.9	D	575
	(WB Right)	300'	29.0	C	435	21.5	C	115
	NB Approach	-	45.9	D	-	34.6	C	-
	(NB Left/Thru)	1000'+	44.7	D	345	34.8	C	238
	(NB Thru/Right)	100	47.1	D	340	34.4	C	242
	SB Approach	-	27.8	C	-	83.9	F	-
	(SB Left)	160'	31.3	C	103	180.3	F	848
	(SB Thru)	350'	26.5	C	125	24.4	C	300
<b>Overall</b>	-	<b>42.3</b>	<b>D</b>	-	<b>57.2</b>	<b>E</b>	-	

### 2025 No-Build Levels of Service Analysis

Operations of the study intersections during the AM and PM peak hours were evaluated for the no-build configuration of the proposed development in the proposed build year of 2020. The signal timing adjustments were made for future no-build conditions to minimizing the overall intersection delay where possible. Under the 2025 no-build Conditions, all the study intersections and movements operate at an acceptable LOS D or better besides the following locations:

- King of Prussia Road & Matsonford Road
  - Northbound approach movement operates at a LOS E (64.6 seconds of delay) during the AM peak hour.
  - Southbound left movement operates at a LOS F (93.0 seconds of delay) during the AM peak hour.
  - Northbound thru movement operates at a LOS E (65.5 seconds of delay) during the AM peak hour.
- King of Prussia Road & Radnor Chester Road
  - Overall intersection LOS of F (227.1 seconds of delay) during the AM peak hour and LOS F (88.4 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS F (96.4 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS F (636.0 seconds of delay) during the AM peak hour and at a LOS F (212.9 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS F (702.2 seconds of delay) during the AM peak hour and a LOS E (281.3 seconds of delay) during the PM peak hour.
- King of Prussia and SEPTA Driveway
  - Westbound approach movement operates at a LOS E (39.8 seconds of delay) during the AM peak hour and at a LOS F (132.3 seconds of delay) during the PM peak hour.
- King of Prussia and Southern Driveway
  - Overall intersection LOS of F (87.3 seconds of delay) during the PM peak hour.
  - Westbound approach movement operates at a LOS F (298.0 seconds of delay) during the AM peak hour and at a LOS F (647.9 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road
  - Overall intersection LOS of E (69.4 seconds of delay) during the AM peak hour and at a LOS E (60.5 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (64.2 seconds of delay) during the AM peak hour and at a LOS E (64.6 seconds of delay) during the PM peak hour.
  - Eastbound left movement operates at a LOS E (59.6 seconds of delay) during the AM peak hour.
  - Eastbound through movement operates at a LOS E (65.4 seconds of delay) during the AM peak hour and at a LOS E (65.2 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (78.6 seconds of delay) during the AM peak hour.
  - Northbound through movement operates at a LOS F (155.9 seconds of delay) during the AM peak hour and a LOS E (60.3 seconds of delay) during the PM peak hour.
  - Northbound right movement operates at a LOS E (85.4 seconds of delay) during the PM peak hour.
  - Southbound approach movement operates at a LOS E (65.3 seconds of delay) during the AM peak hour and at a LOS F (94.1 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit
  - Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and at a LOS E (59.3 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (58.1 seconds of delay) during the AM peak hour and at a LOS E (56.7 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and at a LOS E (56.9 seconds of delay) during the PM peak hour
  - Northbound right movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour and at a LOS E (56.2 seconds of delay) during the PM peak hour.

## Traffic Impact Study

### 145 King of Prussia Road

---

- Lancaster Avenue (SR 0030) & Radnor Chester Road
  - Overall intersection LOS of E (62.1 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (67.7 seconds of delay) during the PM peak hour.
  - Eastbound left movement operates at a LOS E (63.1 seconds of delay) during the AM peak hour.
  - Eastbound through movement operates at a LOS E (71.9 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS F (92.1 seconds of delay) during the PM peak hour.
  - Westbound through movement operates at a LOS E (57.1 seconds of delay) during the AM peak hour.
  - Southbound approach movement operates at a LOS F (86.4 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (187.1 seconds of delay) during the PM peak hour.

In the 2025 no-build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

In the 2020 no-build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 653' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 70' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 20' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200' by 1030' and 10' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 43' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 323' and 593' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 95' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 130' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 398' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 85' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 413' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 250' and 145' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 725' during the PM peak period.

# Traffic Impact Study

## 145 King of Prussia Road

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the no-build conditions analysis are summarized in **TABLE 4**. Detailed outputs of the 2025 no-build conditions analysis are provided in **APPENDIX F**.

**Table 4 – 2025 No-Build Conditions Summary Table**

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	18.0	B	-
	(EB Left)	50'	29.3	C	0	22.9	C	3
	(EB Thru/Right)	50'	25.0	C	3	17.0	B	10
	WB Approach	-	39.6	D	-	39.8	D	-
	(WB Left)	550'	43.8	D	378	47.9	D	620
	(WB Thru/Right)	950'	27.7	C	115	20.1	C	193
	SB Approach	-	42.3	D	-	31.6	C	-
	(SB Left)	100'	93.0	F	753	20.2	C	90
	(SB Thru/Right)	1000'+	12.2	B	415	33.4	C	733
	NB Approach	-	64.6	E	-	41.0	D	-
	(NB Left)	130'	17.3	B	10	37.5	D	10
(NB Thru)	1150'	65.5	F	1090	41.0	D	542	
<b>Overall</b>	-	48.5	D	-	36.6	D	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.2	B	-	39.5	D	-
	(EB Left)	75'	53.0	D	63	25.3	C	8
	(EB Thru)	1200'	16.0	B	260	39.7	D	992
	WB Approach	-	48.0	D	-	31.1	C	-
	(WB Left)	160'	20.6	C	25	96.4	F	120
	(WB Thru/Right)	1100'	48.9	D	928	22.1	C	350
	NB Approach	-	636.0	F	-	212.9	F	-
	(NB Left/Thru)	1200'	702.2	F	2230	281.3	F	1210
	(NB Right)	280'	18.2	B	45	15.6	B	105
	SB Approach	100'	21.8	C	8	53.0	D	143
<b>Overall</b>	-	227.1	F	-	88.4	F	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	39.8	E	43	132.3	F	305
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.3	A	33	0.3	A	5
	<b>Overall</b>	-	2.5	A	-	18.7	C	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	22.3	C	3	18.4	C	13
	NB Approach	280'	0.0	A	0	0.0	A	0
	SB Approach	380	0.0	A	0	0.0	A	0
	<b>Overall</b>	-	0.1	A	-	0.5	A	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.5	B	33	33.4	D	28
	NB Approach	550'	1.2	A	20	0.8	A	3
	SB Approach	280	0.9	A	8	0.0	A	0
	<b>Overall</b>	-	2.1	A	-	1.1	A	-
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	298.0	F	113	647.9	F	580
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.1	A	-
	(SB Left)	75'	15.5	C	15	8.0	A	0
	<b>Overall</b>	-	6.1	A	-	87.3	F	-

Table 5 – 2025 No-Build Conditions Summary Table (Cont.)

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.2	E	-	64.6	E	-
	(EB Left)	800'	59.6	E	253	53.1	D	60
	(EB Thru)	800'	65.4	E	1123	65.2	F	1393
	WB Approach	600'	54.4	D	345	10.0	A	165
	NB Approach	-	78.6	E	-	52.3	D	-
	(NB Left)	500'	17.8	B	313	19.9	B	128
	(NB Thru)	1900'	155.9	F	1995	60.3	E	323
	(NB Right)	500'	28.5	C	345	85.4	F	370
	SB Approach	500'	65.3	E	83	94.1	F	368
<b>Overall</b>	-	<b>69.4</b>	<b>E</b>	-	<b>60.5</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.5	B	240	25.3	C	330
	WB Approach	-	35.0	C	-	35.5	D	-
	(WB Left)	600'	53.9	D	123	53.2	D	345
	(WB Thru)	800'	32.4	C	578	22.3	C	372
	NB Approach	1000'+	39.9	D	450	46.7	D	375
	<b>Overall</b>	-	<b>31.7</b>	<b>C</b>	-	<b>34.3</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.4	A	-	8.7	A	-
	(EB Left)	400'	31.3	C	245	21.6	C	530
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	10.7	B	-	20.6	C	-
	(WB Left)	100'	56.5	E	3	59.3	E	10
	(WB Thru/Right)	750'	10.6	B	288	20.3	C	310
	NB Approach	-	58.1	E	-	56.7	E	-
	(NB Left/Thru)	750'	58.8	E	13	56.9	E	8
	(NB Right)	50'	55.1	E	3	56.2	E	3
<b>Overall</b>	-	<b>9.2</b>	<b>A</b>	-	<b>11.1</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	33.3	C	-	67.7	E	-
	(EB Left)	260'	63.1	E	258	25.3	C	98
	(EB Thru)	750'	29.4	C	528	71.9	E	1148
	WB Approach	-	50.1	D	-	47.0	D	-
	(WB Left)	340'	46.6	D	228	92.1	F	425
	(WB Thru)	1800'	57.1	E	1313	41.7	D	605
	(WB Right)	300'	28.5	C	713	22.1	C	118
	NB Approach	-	47.0	D	-	34.3	C	-
	(NB Left/Thru)	1000'+	45.7	D	357	34.6	C	240
	(NB Thru/Right)	100	48.3	D	350	34.1	C	245
	SB Approach	-	28.0	C	-	86.4	F	-
	(SB Left)	160'	31.7	C	115	187.1	F	885
	(SB Thru)	350'	26.6	C	128	24.1	C	305
<b>Overall</b>	-	<b>43.2</b>	<b>D</b>	-	<b>62.1</b>	<b>E</b>	-	



# Traffic Impact Study

## 145 King of Prussia Road

---

### DEVELOPMENT TRAFFIC

#### Project Description

The proposed mixed use site will be located at 145 King of Prussia Road between the existing Southern Driveway and the shared SEPTA/Site Driveway. The proposed site will have three full access driveways along King of Prussia Drive at the location of the of the existing entry driveways. The existing driveway across from Raider Road will become a 2-lane full access driveway. The southern driveway will primarily be for accessing the loading area. The proposed facility is anticipated to be constructed and occupied in 2020.

The following assumptions regarding the square footage and other parameters about the site were provided by the University of Pennsylvania Health Systems:

- 250,000 square foot mixed medical use building with 271 patient positions
- 150,000 square foot general office building
- 120 room hotel

**Figure 2** is a Site Plan of the proposed development.

#### Site Access

Access to the site will be provided through 3 full access driveways. The primary site driveway will be a full access driveway located on King of Prussia Drive across from Raider Road. A second driveway will be located on the north side of the site and accessed via the existing SEPTA driveway on King of Prussia Drive. The third site driveway provides access to loading areas and is located at the southern corner of the site on King of Prussia Road approximately 500' north of Lancaster Avenue (SR 0030). The site driveways are shown on the Site Plan illustrated in **Figure 2**.

#### Public Transit

University of Pennsylvania Health Systems (UPHS) promotes public transportation and tax incentive programs for commuting costs at all of its City and suburban locations and encourages the use of public transportation options by staff and patients. UPHS educates its employees on programs like Transportation Reimbursement Incentive Program (TRIP) that allow commuting costs to be paid with pre-tax dollars and offers discounts on SEPTA travel and new employees to Penn Medicine Radnor receive are public transportation options around the campus during a new employee orientation. UPHS also uses its website to inform patients of opportunities to use public transportation to and from their facilities.

#### Trip Generation

The traffic volumes for the hotel and general office components of the proposed site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The *ITE Trip Generation Manual* defines a trip as a "single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site."

The traffic volumes for the hotel and office portions of the site proposed site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The expected trip generation for the site is based upon the following ITE Land Use Codes utilizing the square footage of the building as the independent variable:

- 310 "Hotel"

## Traffic Impact Study 145 King of Prussia Road

- 710 “General Office”

The Institute of Transportation Engineers’ Trip Generation Manual, 9<sup>th</sup> Edition states: “A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility.” The AM and PM ITE Trip Generation Rate for a medical-dental office are derived based on 64 studies, of which 63 had buildings with a gross floor area of less than 70,000 SF.

The proposed Penn Medicine mixed medical use portion of the development will have a gross floor area of 250,000 SF, more than triple the size of 90% of the facilities used by ITE to derive trip generation data. Also, unlike private physician practices used to generate the ITE rates, the proposed Penn Medicine mixed medical use facility will include a number of treatment facilities that are uncommon in a typical medical office and that occupy a larger portion of the gross square floor area of the building, while not accommodating a larger number of patients. These facilities include ambulatory operating rooms, endoscopy rooms, chemotherapy treatment areas, radiological imaging rooms and radiation oncology treatment areas. Therefore, the proposed facility is very different from those used to derive ITE trip generation data.

It is for these reasons that the ITE trip generation is not appropriate to use for the proposed Penn Medicine building and a trip generation rate was developed based on an evaluation of three existing mixed medical use facilities for the peak hour of the adjacent street which, based on traffic counts, is 7:15-8:15 AM and 5:00–6:00 PM.

The following existing mixed medical use facilities were evaluated to develop trip generation rates:

- 171,000 square foot facility at 250 King of Prussia Rd in Radnor PA
- 83,000 square foot facility at 1001 Chesterbrook Blvd. in Berwyn PA
- 154,826 square foot facility at 915 Old Fern Hill Road in West Chester, PA

Based on driveway counts and data regarding the number of patient positions at each facility average weekday, AM and PM trip generation rates and entry/exit distributions were developed and approved by Radnor Township. The following are the developed trip generation rates for a mixed medical use facility and the rates used for the general office and hotel land uses:

**Table 5 –Trip Generation Rates**

Land Use Code	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
		Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out
Medical Mixed Use*	Patient Positions	18.02	50%	50%	1.60	77%	23%	1.06	29%	71%

\* Trip generation calculated using calculated trip rates for Medical Mixed Use based on observations of similar facilities

Land Use Code	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
		Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out
General Office	KSF	11.03	50%	50%	1.56	88%	12%	1.49	17%	83%

Land Use Code	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
		Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out
Hotel	Rooms	8.17	50%	50%	0.53	59%	41%	0.60	51%	49%

## Traffic Impact Study 145 King of Prussia Road

The proposed development is a mixed use site and internal trips were calculated using the methodology outlined in the [ITE Trip Generation Handbook](#).

The trip calculations result in a total of **731** (577 entering and 154 exiting) and **583** (158 entering and 425 exiting) new trips generated to the site during the morning and afternoon peak hours, respectively. **TABLE 6** summarizes the calculated peak hour trips to/from the proposed development during the weekday morning and weekday afternoon peak hours.

**Table 6 –Proposed Site Trip Generation**

Land Use Code	Size	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
Medical Mixed Use*	250,000 SF (271 PP)	Patient Positions	2,442	2,442	4,883	334	100	434	83	204	287
General Office Building (ITE Land Use 710)	150,000 SF	1,000 SF GFA	827	827	1,655	206	28	234	38	186	224
Hotel (ITE Land Use 310)	75,000 SF (120 rooms)	Rooms	490	490	980	38	26	64	37	35	72
<b>Total</b>			<b>3,759</b>	<b>3,759</b>	<b>7,518</b>	<b>577</b>	<b>154</b>	<b>731</b>	<b>158</b>	<b>425</b>	<b>583</b>

The trip generation calculations and the Letter to Radnor Township outlining the development of the trip generation rates for the mixed medical use facility are provided in **APPENDIX G**.

The proposed site will generate approximately 90% more net trips over the course of a whole day than the existing land use “general office building” but only generates approximately 20% more net trips in the AM peak period and approximately 5% more net trips during the PM peak period. The comparison of the net trips generated by the existing land use versus the proposed is illustrated in **TABLE 7**.

**Table 7 –Net Trip Comparison**

Land Use	Size	Net Trips		
		Weekday	AM Peak Hour	PM Peak Hour
Existing General Office Building	427,110 SF	3,957	611	557
Proposed Mixed Use (Mixed Medical/ Hotel/General Office )	475,000 SF	7,518	731	583
Difference	Volume	<b>3,561</b>	<b>120</b>	<b>26</b>
	% Difference	<b>90.0%</b>	<b>19.6%</b>	<b>4.7%</b>

### Trip Distribution and Assignment

The trip distribution of the University of Pennsylvania Health Systems medical-dental office, general office building, and hotel were based on the proposed location along King of Prussia Road and the existing traffic patterns on the surrounding roadway network. The proposed site will have 3 driveways along King of Prussia Road with the primary driveway located across from Raider Road. The estimated distribution of the site traffic is:

To/From the north on King of Prussia Road northbound 25%  
To/From south on King of Prussia Road southbound 75%

The trip distribution and volumes generated at the proposed site are provided in **Figures 8 and 9**.

#### Build Traffic Volumes

The traffic volumes generated by the proposed development were added to the 2020 and 2025 base traffic volumes to provide the 2020 and 2025 build traffic volumes. The peak hour traffic volumes are illustrated in **Figures 10 and 11** and traffic volumes development tables are provided in **APPENDIX E**.

#### Turn Lane Warrant Assessment

An analysis was conducted at the proposed site driveways using the 2025 build volumes to determine whether left turn lanes or a right turn lane into the site from are warranted. Based on the standard worksheets in the Chapter 11 Appendix of PennDOT Publication 46, the following turn lanes at site driveways are warranted during both the AM and PM peak periods:

##### King of Prussia Road & Septa Driveway

- Left turn lane from SB King of Prussia Road into the Septa Driveway.

##### King of Prussia Road & Raider Road

- Left turn lane from SB King of Prussia Road into the Site Driveway.
- Left turn lane from NB King of Prussia Road into Raider Road.
- Right turn lane from NB King of Prussia Road into the Site Driveway.

The turn lanes warranted in both the AM and PM Peak periods are being recommended as mitigation measures to the proposed development.

Although the southbound left turn lane from King of Prussia Drive to the Southern Driveway is only warranted in the AM peak period, it is an existing condition. Therefore, the dedicated left lane on southbound King of Prussia Road is proposed to remain. The dedicated left turn lane is formed from an area that would otherwise be a median gore and provides storage for left turning delivery trucks into the site, thus providing a clear lane for through traffic on King of Prussia Road.

A northbound right turn lane from King of Prussia Drive to the Septa is only warranted during the AM peak period and is not being recommended as a mitigation measure.

The detailed turn lane warrant analysis for the driveway entries is provided in **APPENDIX H**.

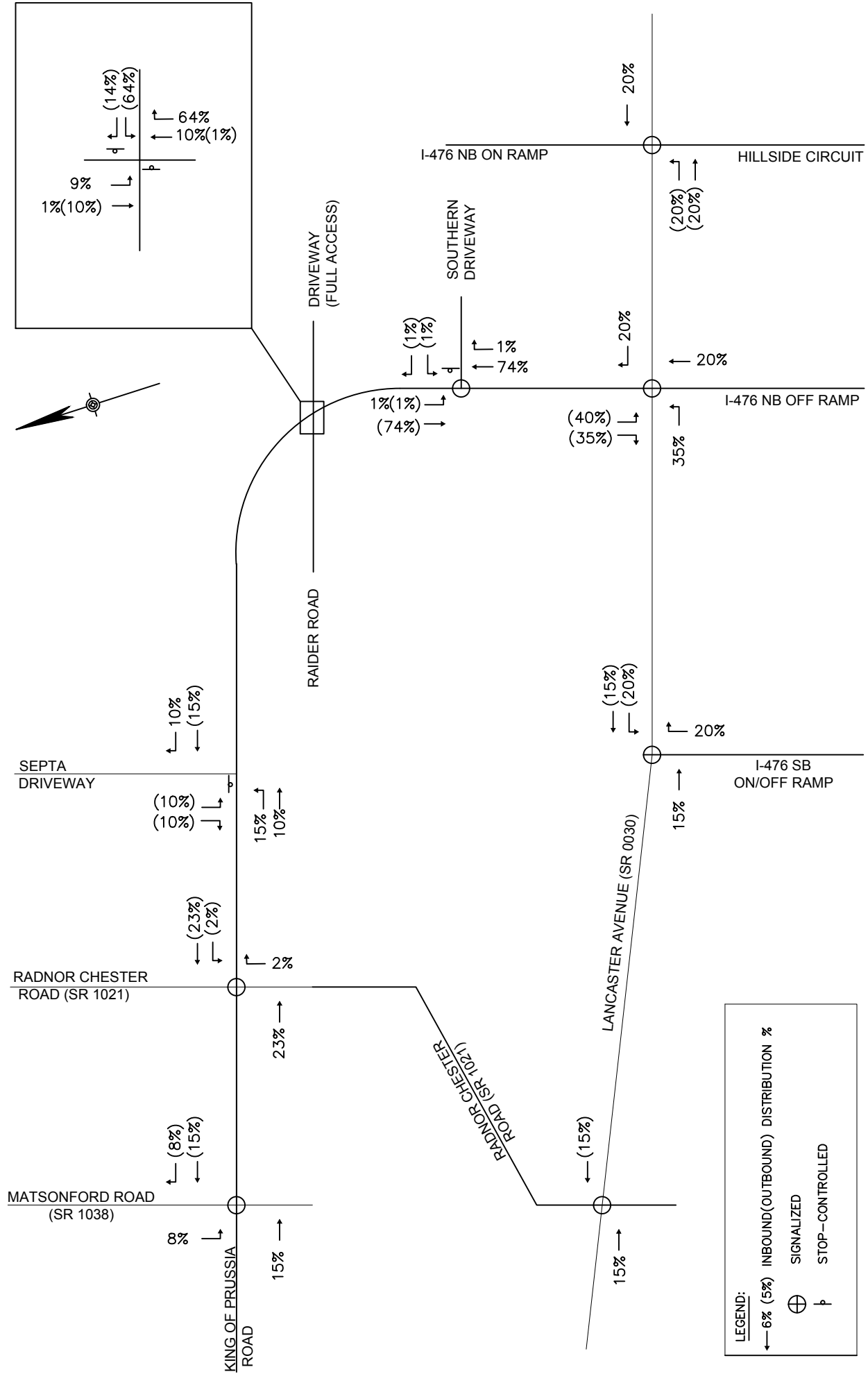
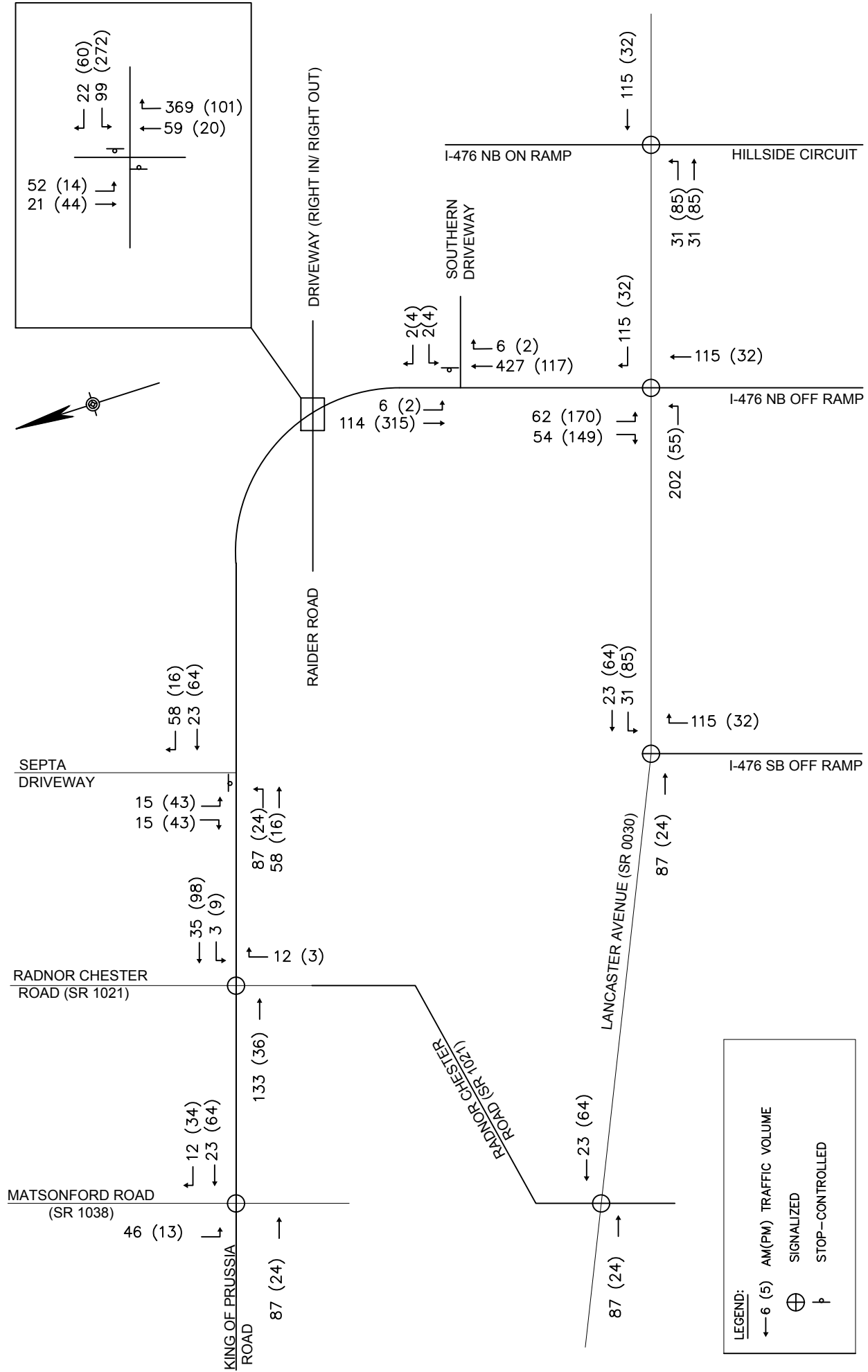


FIGURE 8  
PROPOSED SITE TRIP DISTRIBUTION



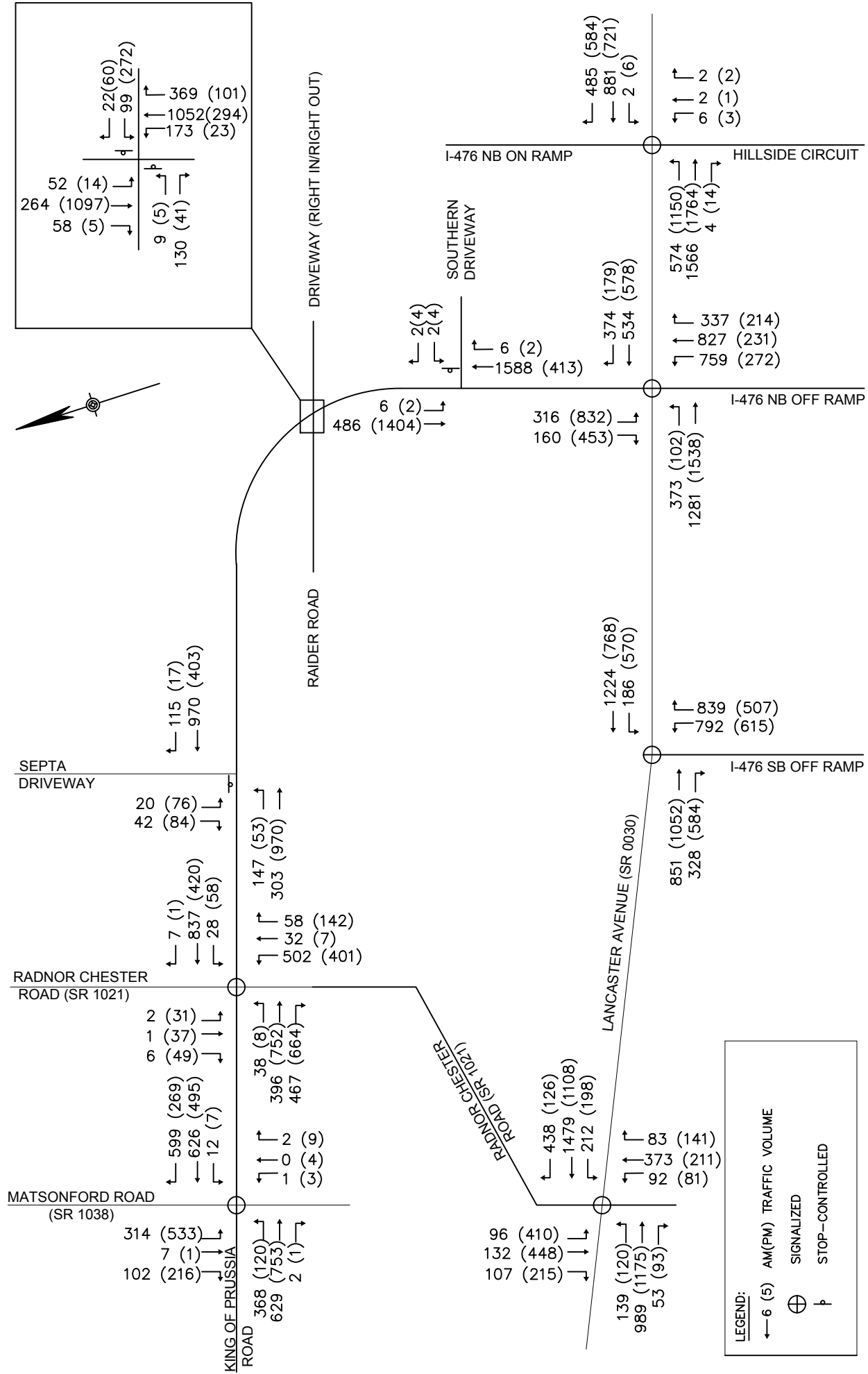


**LEGEND:**

- ←-6 (5) AM(PM) TRAFFIC VOLUME
- ⊕ SIGNALIZED
- ⊥ STOP-CONTROLLED

FIGURE 9  
PROPOSED SITE TRIPS





**LEGEND:**

- ← 6 (5) AM(PM) TRAFFIC VOLUME
- ⊕ SIGNALIZED
- ⊥ STOP-CONTROLLED

**FIGURE 10**  
**2020 BUILD WEEKDAY**  
**PEAK HOUR TRAFFIC VOLUMES**



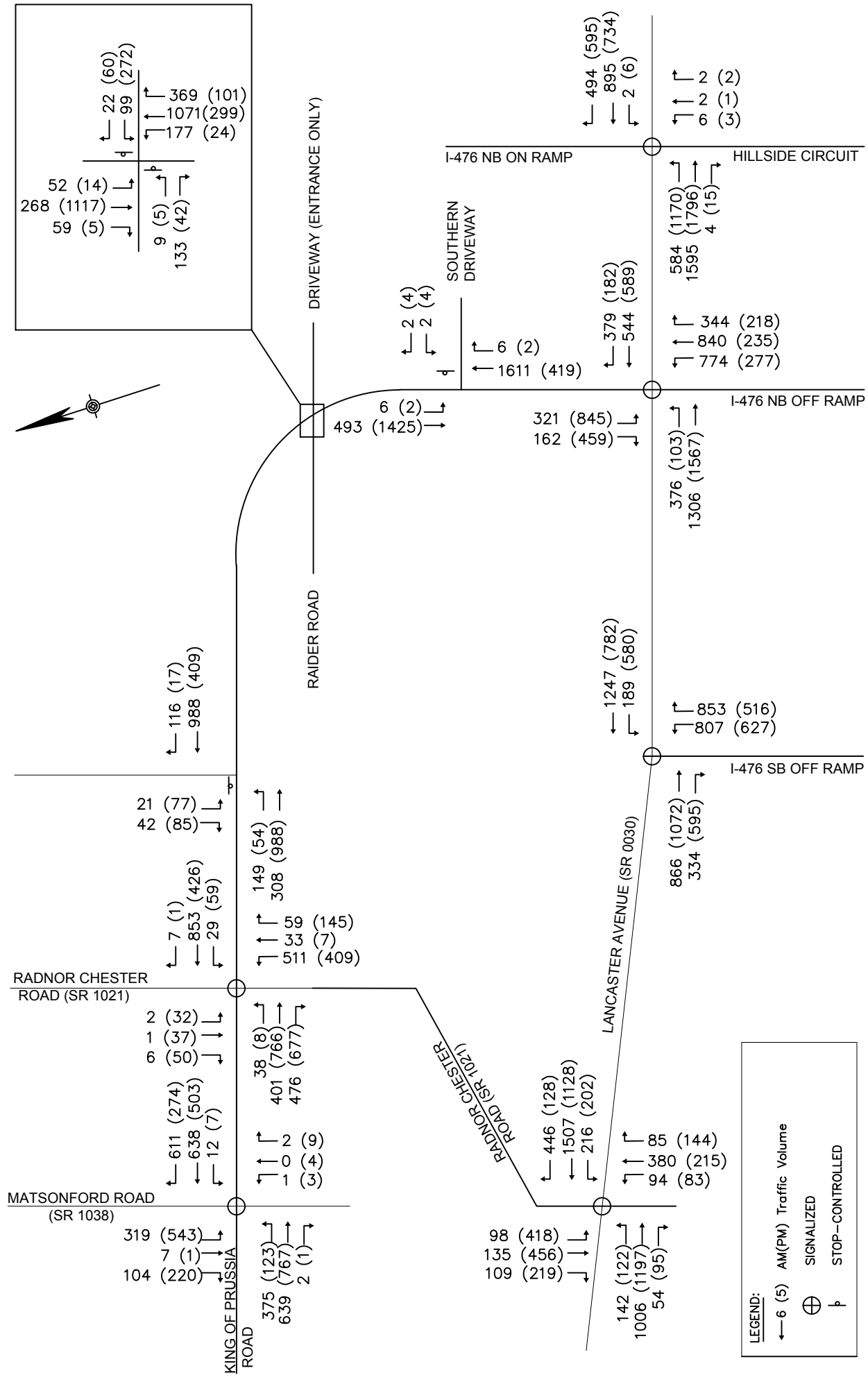


FIGURE 11  
2025 BUILD WEEKDAY  
PEAK HOUR TRAFFIC VOLUMES





### 2020 and 2025 “BUILD” TRAFFIC CONDITIONS WITHOUT MITIGATION

Operations of the study intersections during the AM and PM peak hours were evaluated for the build configuration of the proposed development in the proposed build year of 2020 and the horizon year of 2025 with the optimized timings from the no-build condition.

#### **2020 Build Levels of Service**

Under the 2020 build configuration without any improvements, all the study intersections and movements operate at an acceptable LOS D or better except for the following locations:

##### King of Prussia Road & Matsonford Road (SR 1038)

- Southbound left movement operates at a LOS F (86.7 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS E (57.7 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at LOS E (64.6 seconds of delay) during the AM peak hour.
- Northbound thru movement operates at LOS E (65.5 seconds of delay) during the AM peak hour.

##### King of Prussia Road & Radnor-Chester Road (SR 1021)

- Overall intersection operates at a LOS F (218.4 seconds of delay) during the AM peak hour and LOS F (86.0 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS E (67.9 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS F (616.3 seconds of delay) during the AM peak hour and at a LOS F (225.1 seconds of delay) during the PM peak hour.
- Northbound through/left movement operates at a LOS F (681.6 seconds of delay) during the AM peak hour and a LOS F (297.7 seconds of delay) during the PM peak hour.

##### King of Prussia Road & Septa Driveway

- Westbound approach movement operates at a LOS E (39.3 seconds of delay) during the AM peak hour and LOS E (38.6 seconds of delay) during the PM peak hour.

##### King of Prussia Road & Raider Road

- The intersection operates at a LOS F (282.8 seconds of delay) during the AM peak hour and at a LOS F (260.3 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS F (240.2 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS F (5992.0 seconds of delay) during the AM peak hour and at LOS F (1820.4 seconds of delay) during the PM peak hour.
- Westbound thru/right movement operates at a LOS E (39.5 seconds of delay) during the AM peak hour.

##### King of Prussia Road & Southern Driveway

- Westbound approach movement operates at LOS F (92.2 seconds of delay) during the AM peak hour.

##### Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

- Overall intersection operates at a LOS E (68.4 seconds of delay) during the AM peak hour and at a LOS E (56.0 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (61.1 seconds of delay) during the AM peak hour and at LOS E (59.6 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (62.0 seconds of delay) during the AM peak hour.
- Eastbound through movement operates at a LOS E (60.9 seconds of delay) during the AM peak hour and at LOS E (60.0 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS E (77.4 seconds of delay) during the AM peak hour.
- Northbound through movement operates at a LOS F (152.3 seconds of delay) during the AM peak hour and at a LOS E (64.3 seconds of delay) during the PM peak hour.

## Traffic Impact Study

### 145 King of Prussia Road

---

- Northbound right operates at a LOS F (81.6 seconds of delay) during the PM peak hour.
- Southbound approach movement operates at a LOS E (75.9 seconds of delay) during the AM peak hour and at a LOS F (83.2 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit

- Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and a LOS E (59.3 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS E (58.1 seconds of delay) during the AM peak hour and a LOS E (56.7 seconds of delay) during the PM peak hour.
- Northbound left/through movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and a LOS E (56.9 seconds of delay) during the PM peak hour.
- Northbound right movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour and at LOS E (56.2 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & Radnor Chester Road

- Overall Intersection operates at a LOS E (57.7 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (60.6 seconds of delay) during the PM peak hour.
- Eastbound thru movement operates at a LOS E (63.9 seconds of delay) during the PM peak hour.
- Westbound approach movement operates at LOS E (64.5 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS F (82.5 seconds of delay) during the PM peak hour.
- Westbound through movement operates at a LOS E (77.1 seconds of delay) during the AM peak hour
- Southbound approach movement operates at a LOS F (83.9 seconds of delay) during the PM peak hour.
- Southbound left movement operates at a LOS F (180.3 seconds of delay) during the PM peak hour.

In the 2020 build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 622' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 103' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 970' and 15' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 38' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound lefts at the intersection of King of Prussia Road & Raider Road exceeds the available storage length of 500' by 298' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 540' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 62' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 433' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 63' during the PM peak period.

## Traffic Impact Study

### 145 King of Prussia Road

---

- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 5' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 153' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 240' and 143' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 728' during the PM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the build conditions analysis are summarized in **TABLE 8**. Detailed outputs of the 2020 build conditions analysis are provided in **APPENDIX I**.

**Table 8 – 2020 Build Conditions Summary Table**

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.1	C	0	29.1	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	39.3	D	-	39.3	D	-
	(WB Left)	550'	43.4	D	375	43.4	D	375
	(WB Thru/Right)	950'	27.6	C	110	27.6	C	110
	SB Approach	-	39.6	D	-	49.5	D	-
	(SB Left)	100'	86.7	F	722	86.7	F	722
	(SB Thru/Right)	1000'+	12.2	B	198	8.3	A	408
	NB Approach	-	64.6	E	-	64.6	E	-
(NB Left)	130'	17.1	B	10	17.1	B	10	
(NB Thru)	1150'	65.5	E	1090	65.5	E	1090	
<b>Overall</b>	-	<b>47.3</b>	<b>D</b>	-	<b>52.5</b>	<b>D</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.0	B	-	19.6	B	-
	(EB Left)	75'	50.4	D	53	55.1	E	55
	(EB Thru)	1200'	16.0	B	255	16.3	B	270
	WB Approach	-	44.2	D	-	48.7	D	-
	(WB Left)	160'	20.5	C	25	20.8	C	25
	(WB Thru/Right)	1100'	45.0	D	883	49.7	D	940
	NB Approach	-	617.3	F	-	616.3	F	-
	(NB Left/Thru)	1200'	681.6	F	2170	681.6	F	2170
	(NB Right)	280'	18.2	B	45	18.2	B	45
SB Approach	100'	21.8	C	8	21.8	C	8	
<b>Overall</b>	-	<b>218.9</b>	<b>F</b>	-	<b>218.4</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	38.6	E	43	39.3	E	45
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.2	A	30	5.4	A	40
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>3.0</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	21.8	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.3	B	30	240.2	F	278
	WB Approach	500'	-	-	-	4909.7	F	-
	(WB Left)	500'	-	-	-	5992.0	F	435
	(WB Thru/Right)	500'	-	-	-	39.5	E	20
	NB Approach	550'	1.2	A	20	1.0	A	0
	SB Approach	660'	0.9	A	5	2.5	A	18
<b>Overall</b>	-	<b>2.0</b>	<b>A</b>	-	<b>282.8</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	265.0	F	108	92.2	F	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.2	C	13	16.7	C	3
	<b>Overall</b>	-	<b>5.6</b>	<b>A</b>	-	<b>0.2</b>	<b>A</b>	-

Table 8 – 2020 Build Conditions Summary Table (Cont.)

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	60.5	E	-	61.1	E	-
	(EB Left)	800'	59.1	E	252	62.0	E	263
	(EB Thru)	800'	60.9	E	787	60.9	E	785
	WB Approach	600'	53.9	D	338	53.9	D	338
	NB Approach	-	74.8	E	-	77.4	E	-
	(NB Left)	500'	17.6	B	305	17.6	B	305
	(NB Thru)	1900'	146.9	F	1917	152.3	F	1962
	(NB Right)	500'	28.1	C	335	28.1	C	333
	SB Approach	500'+	63.9	E	78	75.9	E	125
<b>Overall</b>	-	<b>66.2</b>	<b>E</b>	-	<b>68.4</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.0	B	235	18.4	B	238
	WB Approach	-	34.5	C	-	34.9	C	-
	(WB Left)	600'	53.8	D	120	54.4	D	130
	(WB Thru)	800'	31.8	C	568	31.9	C	573
	NB Approach	1000'+	40.0	D	443	40.0	D	443
	<b>Overall</b>	-	<b>31.3</b>	<b>C</b>	-	<b>31.6</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.6	A	-	8.4	A	-
	(EB Left)	400'	31.8	C	248	30.9	C	240
	(EB Thru/Right)	600'	0.3	A	5	0.2	A	3
	WB Approach	-	10.4	B	-	10.8	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.3	B	280	10.7	B	285
	NB Approach	-	58.1	E	-	58.1	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	55.1	E	3
<b>Overall</b>	-	<b>9.3</b>	<b>A</b>	-	<b>9.2</b>	<b>A</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	31.5	C	-	34.3	C	-
	(EB Left)	260'	43.8	D	145	43.9	D	150
	(EB Thru)	750'	30.0	C	520	33.1	C	545
	WB Approach	-	49.7	D	-	64.5	E	-
	(WB Left)	340'	35.0	C	185	43.5	D	200
	(WB Thru)	1800'	58.0	E	1285	77.1	E	1390
	(WB Right)	300'	29.0	C	435	31.8	C	453
	NB Approach	-	45.9	D	-	45.9	D	-
	(NB Left/Thru)	1000'+	44.7	D	345	44.7	D	345
	(NB Thru/Right)	100	47.1	D	340	47.1	D	340
	SB Approach	-	27.8	C	-	26.1	C	-
	(SB Left)	160'	31.3	C	103	29.3	C	100
	(SB Thru)	350'	26.5	C	125	24.9	C	120
<b>Overall</b>	-	<b>42.3</b>	<b>D</b>	-	<b>50.5</b>	<b>D</b>	-	

Table 8 – 2020 Build Conditions Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		19.3	B	-	19.3	B	-
	(EB Left)	50'	24.5	C	3	24.5	C	3
	(EB Thru/Right)	50'	18.2	B	10	18.2	B	10
	WB Approach	-	45.9	D	-	47.3	D	-
	(WB Left)	550'	55.8	E	640	57.7	E	653
	(WB Thru/Right)	950'	21.6	C	195	21.6	C	195
	SB Approach	-	25.9	C	-	26.5	C	-
	(SB Left)	100'	18.0	B	83	17.8	B	83
	(SB Thru/Right)	1000'+	27.1	C	660	27.8	C	678
	NB Approach	-	33.5	C	-	31.6	C	-
(NB Left)	130'	33.1	C	8	33.6	C	8	
(NB Thru)	1150'	33.5	C	492	31.6	C	460	
<b>Overall</b>	-	<b>34.6</b>	<b>C</b>	-	<b>34.9</b>	<b>C</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	28.1	C	-	29.0	C	-
	(EB Left)	75'	23.2	C	8	22.9	C	8
	(EB Thru)	1200'	28.1	C	548	29.1	C	560
	WB Approach	-	25.2	C	-	25.7	C	-
	(WB Left)	160'	62.4	E	93	67.9	E	95
	(WB Thru/Right)	1100'	20.1	C	333	19.9	B	328
	NB Approach	-	225.5	F	-	225.1	F	-
	(NB Left/Thru)	1200'	297.7	F	1215	297.7	F	1215
	(NB Right)	280'	16.8	B	105	16.8	B	108
SB Approach	100'	49.3	D	138	49.3	D	138	
<b>Overall</b>	-	<b>85.7</b>	<b>F</b>	-	<b>86.0</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	120.0	F	288	38.6	E	108
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	0.3	A	3	0.5	A	5
	<b>Overall</b>	-	<b>17.1</b>	<b>C</b>	-	<b>4.2</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	18.2	C	3	-	-	13
	NB Approach	280'	0.0	A	0	-	-	0
	SB Approach	380'	0.0	A	0	-	-	0
	<b>Overall</b>	-	<b>0.5</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	32.1	D	25	31.1	D	25
	WB Approach	500'	-	-	-	1493.4	F	-
	(WB Left)	500'	-	-	-	1820.4	F	798
	(WB Thru/Right)	500'	-	-	-	10.9	B	8
	NB Approach	550'	0.7	A	3	0.6	A	3
	SB Approach	660'	0.0	A	0	0.1	A	0
<b>Overall</b>	-	<b>1.1</b>	<b>A</b>	-	<b>260.3</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	613.8	F	567	34.4	D	5
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.1	A	-	0.0	A	-
	(SB Left)	75'	8.0	A	0	8.2	A	0
	<b>Overall</b>	-	<b>83.9</b>	<b>F</b>	-	<b>0.2</b>	<b>A</b>	-

Table 8 – 2020 Build Conditions Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	58.5	E	-	59.6	E	-
	(EB Left)	800'	52.5	D	58	52.5	D	75
	(EB Thru)	800'	58.8	E	1335	60.0	E	1340
	WB Approach	600'	10.3	B	163	11.1	B	170
	NB Approach	-	49.7	D	-	52.6	D	-
	(NB Left)	500'	19.8	B	123	19.9	B	125
	(NB Thru)	1900'	57.8	E	313	64.3	E	343
	(NB Right)	500'	79.3	E	353	81.6	F	360
	SB Approach	500'+	85.8	F	328	83.2	F	310
<b>Overall</b>	-	<b>55.6</b>	<b>E</b>	-	<b>56.0</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	24.6	C	323	24.5	C	323
	WB Approach	-	35.3	D	-	35.2	D	-
	(WB Left)	600'	53.1	D	342	53.1	D	338
	(WB Thru)	800'	22.0	C	370	21.9	C	368
	NB Approach	1000'+	46.6	D	370	46.6	D	370
	<b>Overall</b>	-	<b>33.9</b>	<b>C</b>	-	<b>33.8</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	9.7	A	-	9.1	A	-
	(EB Left)	400'	24.4	C	842	22.9	C	833
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	19.8	B	-	19.9	B	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	19.4	B	303	19.6	B	308
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
<b>Overall</b>	-	<b>11.8</b>	<b>B</b>	-	<b>11.3</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	59.1	E	-	60.6	E	-
	(EB Left)	260'	24.3	C	95	24.2	C	95
	(EB Thru)	750'	62.5	E	795	63.9	E	813
	WB Approach	-	42.2	D	-	42.3	D	-
	(WB Left)	340'	79.4	E	342	82.5	F	345
	(WB Thru)	1800'	37.9	D	575	37.5	D	570
	(WB Right)	300'	21.5	C	115	21.5	C	115
	NB Approach	-	34.6	C	-	34.6	C	-
	(NB Left/Thru)	1000'+	34.8	C	238	34.8	C	238
	(NB Thru/Right)	100	34.4	C	242	34.4	C	243
	SB Approach	-	83.9	F	-	83.9	F	-
	(SB Left)	160'	180.3	F	848	180.3	F	848
	(SB Thru)	350'	24.4	C	300	24.4	C	300
<b>Overall</b>	-	<b>57.2</b>	<b>E</b>	-	<b>57.7</b>	<b>E</b>	-	

## Traffic Impact Study

### 145 King of Prussia Road

---

#### 2025 Build Levels of Service

Under the 2025 build configuration with identified improvements, all the study intersections and movements operate at an acceptable LOS D or better except for the following locations:

##### King of Prussia Road & Matsonford Road (SR 1038)

- Southbound left movement operates at a LOS F (93.0 seconds of delay) during the AM peak hour.
- Northbound approach movement operates at a LOS E (69.8 seconds of delay) during the AM peak hour.
- Northbound thru movement operates at a LOS E (70.7 seconds of delay) during the AM peak hour.

##### King of Prussia Road & Radnor-Chester Road (SR 1021)

- Overall intersection operates at a LOS F (226.5 seconds of delay) during the AM peak hour and LOS F (90.4 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (55.6 seconds of delay) during the AM peak hour.
- Eastbound thru movement operates at a LOS F (45.4 seconds of delay) during the PM peak hour.
- Westbound left movement operates at a LOS F (94.4 seconds of delay) during the PM peak hour.
- Westbound thru/right movement operates at a LOS F (54.4 seconds of delay) during the AM peak hour.
- Northbound approach movement operates at a LOS F (635.1 seconds of delay) during the AM peak hour and at a LOS F (212.6 seconds of delay) during the PM peak hour.
- Northbound through/left movement operates at a LOS F (702.2 seconds of delay) during the AM peak hour and a LOS F (281.3 seconds of delay) during the PM peak hour.

##### King of Prussia Road & Septa Driveway

- Westbound approach movement operates at a LOS E (41.4 seconds of delay) during the AM peak hour and at a LOS E (41.4 seconds of delay) during the PM peak hour.

##### King of Prussia Road & Raider Road

- The intersection operates at a LOS F (313.4 seconds of delay) during the AM peak hour and at LOS F (278.8 seconds of delay) during the PM peak hour.
- The eastbound approach operates at a LOS F (287.6 seconds of delay) during the AM peak hour.
- The westbound approach operates at a LOS F (5492.6 seconds of delay) during the AM peak hour and at LOS F (1622.6 seconds of delay) during the PM peak hour.
- Westbound left movement operates at a LOS F (6704.1 seconds of delay) during the AM peak hour and at LOS F (1978.1 seconds of delay) during the PM peak hour.
- Westbound thru/right movement operates at a LOS E (40.9 seconds of delay) during the AM peak hour.

##### King of Prussia Road & Southern Driveway

- Westbound approach movement operates at LOS F (99.0 seconds of delay) during the AM peak hour.

##### Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

- Overall intersection operates at a LOS E (71.4 seconds of delay) during the AM peak hour and a LOS E (59.5 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (64.8 seconds of delay) during the AM peak hour and at a LOS E (64.4 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (62.6 seconds of delay) during the AM peak hour.
- Eastbound through movement operates at a LOS E (65.4 seconds of delay) during the AM peak hour and at a LOS E (65.2 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS F (80.7 seconds of delay) during the AM peak hour.
- Northbound thru movement operates at a LOS F (160.2 seconds of delay) during the AM peak hour and at a LOS E (66.3 seconds of delay) during the PM peak hour.
- Northbound right operates at a LOS F (85.4 seconds of delay) during the PM peak hour.
- Southbound approach movement operates at a LOS E (78.5 seconds of delay) during the AM peak hour and at a LOS F (88.1 seconds of delay) during the PM peak hour.



## Traffic Impact Study

### 145 King of Prussia Road

---

#### Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit

- Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and a LOS E (59.3 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS E (58.0 seconds of delay) during the AM peak hour and a LOS E (56.7 seconds of delay) during the PM peak hour.
- Northbound left/through movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and a LOS E (56.9 seconds of delay) during the PM peak hour.
- Northbound right movement operates at a LOS E (56.2 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & Radnor Chester Road

- Overall Intersection operates at a LOS E (62.5 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (69.4 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (60.6 seconds of delay) during the AM peak hour.
- Eastbound through movement operates at a LOS E (73.8 seconds of delay) during the PM peak hour.
- Westbound left movement operates at a LOS F (92.1 seconds of delay) during the PM peak hour.
- Westbound through movement operates at a LOS E (61.9 seconds of delay) during the AM peak hour.
- Southbound approach movement operates at a LOS F (86.4 seconds of delay) during the PM peak hour.
- Southbound left movement operates at a LOS F (187.1 seconds of delay) during the PM peak hour.

In the 2025 build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 652' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 80' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for westbound thru/right lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1100 by 270' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 1030' and 10' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 43' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound lefts at the intersection of King of Prussia Road & Raider Road exceeds the available storage length of 500' by 310' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 325' and 593' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 132' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 110' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 413' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 85' during the PM peak period.

# Traffic Impact Study

## 145 King of Prussia Road

- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 145' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 248' and 145' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 725' during the PM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the build conditions analysis are summarized in **TABLE 9**. Detailed outputs of the 2025 build conditions analysis are provided in **APPENDIX I**.

**Table 9 – 2025 Build Conditions Summary Table**

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.3	C	0	29.3	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	39.6	D	-	40.1	D	-
	(WB Left)	550'	43.8	D	378	44.4	D	383
	(WB Thru/Right)	950'	27.7	C	115	27.7	C	115
	SB Approach	-	42.3	D	-	42.2	D	-
	(SB Left)	100'	93.0	F	753	93.0	F	752
	(SB Thru/Right)	1000'+	12.2	B	415	12.4	B	420
	NB Approach	-	64.6	E	-	69.8	E	-
	(NB Left)	130'	17.3	B	10	17.3	B	10
(NB Thru)	1150'	65.5	F	1090	70.7	F	1135	
<b>Overall</b>	-	<b>48.5</b>	<b>D</b>	-	<b>50.3</b>	<b>D</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.2	B	-	19.5	B	-
	(EB Left)	75'	53.0	D	63	55.6	E	55
	(EB Thru)	1200'	16.0	B	260	16.1	B	265
	WB Approach	-	48.0	D	-	53.3	D	-
	(WB Left)	160'	20.6	C	25	21.0	C	25
	(WB Thru/Right)	1100'	48.9	D	928	54.4	F	1370
	NB Approach	-	636.0	F	-	635.1	F	-
	(NB Left/Thru)	1200'	702.2	F	2230	702.2	F	2230
	(NB Right)	280'	18.2	B	45	18.3	B	48
SB Approach	100'	21.8	C	8	21.8	C	8	
<b>Overall</b>	-	<b>227.1</b>	<b>F</b>	-	<b>226.5</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	39.8	E	43	41.4	E	48
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.3	A	33	5.5	A	40
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>3.2</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	22.3	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.5	B	33	287.6	F	305
	WB Approach	500'	-	-	-	5492.6	F	-
	(WB Left)	500'	-	-	-	6704.1	F	438
	(WB Thru/Right)	500'	-	-	-	40.9	E	20
	NB Approach	550'	1.2	A	20	1.0	A	0
	SB Approach	660'	0.9	A	8	2.6	A	18
<b>Overall</b>	-	<b>2.1</b>	<b>A</b>	-	<b>313.4</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	298.0	F	113	99.0	F	10
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.5	C	15	17.0	C	3
	<b>Overall</b>	-	<b>6.1</b>	<b>A</b>	-	<b>0.2</b>	<b>A</b>	-

Table 9 – 2025 Build Conditions Summary Table (Cont.)

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.2	E	-	64.8	E	-
	(EB Left)	800'	59.6	E	253	62.6	E	265
	(EB Thru)	800'	65.4	E	1123	65.4	F	1125
	WB Approach	600'	54.4	D	345	54.3	D	343
	NB Approach	-	78.6	E	-	80.7	F	-
	(NB Left)	500'	17.8	B	313	17.8	B	313
	(NB Thru)	1900'	155.9	F	1995	160.2	F	2032
	(NB Right)	500'	28.5	C	345	28.5	C	345
	SB Approach	500'+	65.3	E	83	78.5	E	135
<b>Overall</b>	-	<b>69.4</b>	<b>E</b>	-	<b>71.4</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.5	B	240	18.9	B	245
	WB Approach	-	35.0	C	-	35.5	D	-
	(WB Left)	600'	53.9	D	123	54.4	D	133
	(WB Thru)	800'	32.4	C	578	32.6	C	583
	NB Approach	1000'+	39.9	D	450	39.9	D	450
	<b>Overall</b>	-	<b>31.7</b>	<b>C</b>	-	<b>32.0</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.4	A	-	8.3	A	-
	(EB Left)	400'	31.3	C	245	30.7	C	243
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	3
	WB Approach	-	10.7	B	-	11.0	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.6	B	288	10.9	B	293
	NB Approach	-	58.1	E	-	58.0	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	54.7	D	3
<b>Overall</b>	-	<b>9.2</b>	<b>A</b>	-	<b>9.2</b>	<b>A</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	33.3	C	-	33.4	C	-
	(EB Left)	260'	63.1	E	258	60.6	E	252
	(EB Thru)	750'	29.4	C	528	29.8	C	532
	WB Approach	-	50.1	D	-	53.7	D	-
	(WB Left)	340'	46.6	D	228	48.0	D	228
	(WB Thru)	1800'	57.1	E	1313	61.9	E	1340
	(WB Right)	300'	28.5	C	713	28.8	C	445
	NB Approach	-	47.0	D	-	46.2	D	-
	(NB Left/Thru)	1000'+	45.7	D	357	45.0	D	353
	(NB Thru/Right)	100	48.3	D	350	47.6	D	348
	SB Approach	-	28.0	C	-	27.6	C	-
	(SB Left)	160'	31.7	C	115	31.2	C	105
	(SB Thru)	350'	26.6	C	128	26.3	C	128
<b>Overall</b>	-	<b>43.2</b>	<b>D</b>	-	<b>44.9</b>	<b>D</b>	-	

Table 9 – 2025 Build Conditions Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.6	E	-	64.4	E	-
	(EB Left)	800'	53.1	D	60	52.4	D	75
	(EB Thru)	800'	65.2	F	1393	65.2	F	1393
	WB Approach	600'	10.0	A	165	11.2	B	170
	NB Approach	-	52.3	D	-	54.4	D	-
	(NB Left)	500'	19.9	B	128	19.9	B	128
	(NB Thru)	1900'	60.3	E	323	66.3	E	353
	(NB Right)	500'	85.4	F	370	85.4	F	370
	SB Approach	500'+	94.1	F	368	88.1	F	235
<b>Overall</b>	-	<b>60.5</b>	<b>E</b>	-	<b>59.5</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	25.3	C	330	25.3	C	333
	WB Approach	-	35.5	D	-	35.4	D	-
	(WB Left)	600'	53.2	D	345	53.1	D	343
	(WB Thru)	800'	22.3	C	372	22.3	C	373
	NB Approach	1000'+	46.7	D	375	46.7	D	375
	<b>Overall</b>	-	<b>34.3</b>	<b>C</b>	-	<b>34.2</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.7	A	-	8.0	A	-
	(EB Left)	400'	21.6	C	530	20.1	C	510
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	20.6	C	-	20.7	C	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	20.3	C	310	20.4	C	318
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
<b>Overall</b>	-	<b>11.1</b>	<b>B</b>	-	<b>10.6</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	67.7	E	-	69.4	E	-
	(EB Left)	260'	25.3	C	98	25.2	C	98
	(EB Thru)	750'	71.9	E	1148	73.8	E	1163
	WB Approach	-	47.0	D	-	46.6	D	-
	(WB Left)	340'	92.1	F	425	92.1	F	425
	(WB Thru)	1800'	41.7	D	605	41.2	D	603
	(WB Right)	300'	22.1	C	118	22.1	C	118
	NB Approach	-	34.3	C	-	34.3	C	-
	(NB Left/Thru)	1000'+	34.6	C	240	34.6	C	240
	(NB Thru/Right)	100	34.1	C	245	34.1	C	245
	SB Approach	-	86.4	F	-	86.4	F	-
	(SB Left)	160'	187.1	F	885	187.1	F	885
	(SB Thru)	350'	24.1	C	305	24.1	C	305
<b>Overall</b>	-	<b>62.1</b>	<b>E</b>	-	<b>62.5</b>	<b>E</b>	-	

Table 9 – 2025 Build Conditions Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.6	E	-	64.4	E	-
	(EB Left)	800'	53.1	D	60	52.4	D	75
	(EB Thru)	800'	65.2	F	1393	65.2	F	1393
	WB Approach	600'	10.0	A	165	11.2	B	170
	NB Approach	-	52.3	D	-	54.4	D	-
	(NB Left)	500'	19.9	B	128	19.9	B	128
	(NB Thru)	1900'	60.3	E	323	66.3	E	353
	(NB Right)	500'	85.4	F	370	85.4	F	370
	SB Approach	500'+	94.1	F	368	88.1	F	235
<b>Overall</b>	-	<b>60.5</b>	<b>E</b>	-	<b>59.5</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	25.3	C	330	25.3	C	333
	WB Approach	-	35.5	D	-	35.4	D	-
	(WB Left)	600'	53.2	D	345	53.1	D	343
	(WB Thru)	800'	22.3	C	372	22.3	C	373
	NB Approach	1000'+	46.7	D	375	46.7	D	375
<b>Overall</b>	-	<b>34.3</b>	<b>C</b>	-	<b>34.2</b>	<b>C</b>	-	
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.7	A	-	8.0	A	-
	(EB Left)	400'	21.6	C	530	20.1	C	510
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	20.6	C	-	20.7	C	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	20.3	C	310	20.4	C	318
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
(NB Right)	50'	56.2	E	3	56.2	E	3	
<b>Overall</b>	-	<b>11.1</b>	<b>B</b>	-	<b>10.6</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	67.7	E	-	69.4	E	-
	(EB Left)	260'	25.3	C	98	25.2	C	98
	(EB Thru)	750'	71.9	E	1148	73.3	E	1163
	WB Approach	-	47.0	D	-	46.6	D	-
	(WB Left)	340'	92.1	F	425	92.1	F	425
	(WB Thru)	1800'	41.7	D	605	41.2	D	603
	(WB Right)	300'	22.1	C	118	22.1	C	118
	NB Approach	-	34.3	C	-	34.3	C	-
	(NB Left/Thru)	1000'+	34.6	C	240	34.6	C	240
	(NB Thru/Right)	100	34.1	C	245	34.1	C	245
	SB Approach	-	86.4	F	-	86.4	F	-
	(SB Left)	160'	187.1	F	885	187.1	F	885
(SB Thru)	350'	24.1	C	305	24.1	C	305	
<b>Overall</b>	-	<b>62.1</b>	<b>E</b>	-	<b>62.5</b>	<b>E</b>	-	

# Traffic Impact Study

## 145 King of Prussia Road

### Gap Analysis

Based on the anticipated Level of Service for the exiting movements from the site via the SEPTA Driveway and south site driveway to King of Prussia Road a gap study was performed at both locations. The gap study was conducted from 7:00-9:00 AM and 4:00-6:00 PM on April 27, 2016.

Based on the weekday AM and PM peak hour gap analysis, it is anticipated that sufficient gaps are available to accommodate the anticipated traffic from the site at the two locations. The summary of the available gaps compared to the anticipated exiting traffic is shown in **TABLE 10**. The gap data is provided in **APPENDIX C**.

**Table 10 – Capacity vs Anticipated Traffic Volume**

#### King of Prussia Road and SEPTA Driveway

Peak Hour	Existing Capacity per Field Data fo Left Turns <sup>1</sup>	Existing Capacity per Field Data for RightTurns <sup>1</sup>	2020 Anticipated Traffic Volume		2025 Anticipated Traffic Volume	
			Left	Right	Left	Right
Weekday AM	59	149	20	42	21	42
Weekday PM	104	733	76	84	77	85

#### King of Prussia Road and Southern Driveway

Peak Hour	Existing Capacity per Field Data fo Left Turns <sup>1</sup>	Existing Capacity per Field Data for RightTurns <sup>1</sup>	2020 Anticipated Traffic Volume		2025 Anticipated Traffic Volume	
			Left	Right	Left	Right
Weekday AM	33	75	2	2	2	2
Weekday PM	80	654	4	4	4	4

1. Gap Data provided in Appendix C

### Comparison of No Build versus Build without mitigation

A comparison of the performance of the study intersections under no-build conditions and build conditions was evaluated to identify impacts to the study area and the need for additional mitigation area based on the LOS requirements identified in the PennDOT’s *Policies and Procedures for Traffic Impact Studies* which are that overall intersection LOS should be no worse than no-build Year overall intersection LOS. If the overall intersection LOS drops, mitigation will be required if the overall intersection delay increases by more than 10 seconds.

#### King of Prussia Road & Matsonford Road (SR 1038)

Under the 2020 and 2025 build conditions, the overall intersection and approaches maintain the no-build condition LOS in both the AM and PM peak periods. The overall intersection delay increase between no-build and build condition is less than 7 seconds for both peak periods in 2020 and 2025.

#### King of Prussia Road & Radnor-Chester Road (SR 1021)

Under the 2020 and 2025 build conditions, the overall intersection and approaches maintain the no-build condition LOS in both the AM and PM peak periods. The overall intersection delay increase between no-build and Build condition is less than 2 seconds for both peak periods in 2020 and 2025.

#### King of Prussia Road & SEPTA Driveway

Under the 2020 and 2025 build conditions, the intersection does not experience a worsening of LOS under the build conditions in either the AM or PM peak periods.

## Traffic Impact Study

### 145 King of Prussia Road

---

#### King of Prussia Road & Raider Road/Site Driveway

Under the 2020 and 2025 No-Build conditions the intersection is stop controlled with the north approach being an in only driveway. Under the 2020 and 2025 Build conditions without mitigation the intersection will remain stop-controlled with the north approach being a 2-lane full access site driveway. The unsignalized intersection operates with significant increase in delay and at an overall LOS F during the AM and PM peak periods in both the 2020 and 2025 Build conditions.

#### King of Prussia Road & Southern Driveway

Under the 2020 and 2025 Build conditions, the intersection operates at the same overall LOS as under the no-build conditions in the AM peak period. Under the 2020 and 2025 build PM peak period condition, the southern driveway experiences a significant reduction in traffic and thus improved LOS. . The reduced traffic is due to the fact that the southern driveway will primarily be used for deliveries.

#### Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. The overall intersection delay increase between no-build and build condition is less than 3 seconds in both peak periods in 2020 and 2025.

#### Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. There is very little change in overall intersection delay between no-build and build conditions in either peak period in 2020 and 2025.

#### Lancaster Avenue (SR 0030) & I-476 SB Off Ramps

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. There is less than 1 second change in overall intersection delay between no-build and build condition in either peak period in 2020 and 2025.

#### Lancaster Avenue (SR 0030) & Radnor Chester Road

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. The overall intersection delay increase between no-build and build condition is less than 8 seconds in all both peak periods in 2020 and 2025.

Based on the comparison of the Intersection LOS and delay under no build conditions and build conditions and using the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies*, the need for additional mitigation measures at most of the study intersections is not triggered as a result of the trips generated by the proposed site. However, the unsignalized intersection of King of Prussia Road & Raider Road/Site Driveway exhibits a significant increase in overall intersection delay will be mitigated through the installation of a traffic signal.

**2020 and 2025 “BUILD” TRAFFIC CONDITIONS WITH MITIGATION**

**Improvements to Achieve LOS C per SLDO Requirements and Mitigate Intersections**

As required by 255-20.B(5)(d)(6)(a) of the Radnor Township Subdivision and Land Development Ordinance, additional off-site improvements would be necessary to achieve LOS C at all of the off-site intersections. Based on Synchro analysis, Lancaster Avenue would require significant intersection upgrades including widening to provide additional through lanes and providing additional dedicated turn lanes on most approaches. The King of Prussia Road intersections at Radnor-Chester Road and Matsonford Road would require two lanes in each direction on King of Prussia Road and dual turn lanes on the minor approaches. Due to physical constraints at most of the project intersections, including the SEPTA Rail Bridge on King of Prussia Road and the I-476 Bridges on Lancaster Avenue, the necessary improvements are not feasible and are not proposed by the applicant.

The intersection of King of Prussia Road & Raider Road/Site Driveway exhibits a significant increase in overall intersection delay as a result of proposed site traffic. In order to mitigate the intersection, it is proposed that the intersection be signalized and left turn lanes be added on both approaches of King of Prussia Road.

The following additional improvements are proposed:

- Restripe northbound I-476 off-ramp at Lancaster Avenue to provide a shared through/right turn lane
- Restripe northbound King of Prussia Road at the southern site driveway to provide a shared through/right turn lane
- Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
- Construct a southbound King of Prussia Road left turn lane into the Septa Driveway.

**Signal Warrant Assessment**

Signal warrant analyses were conducted for the intersections of King of Prussia Road and Raider Road/Site Driveway and King of Prussia Road and Septa Station Driveway using the warrants set forth in FHWA’s Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition. Based on the MUTCD requirements for intersections warranting a signal, MUTCD Warrants 2 and 3 are applicable to the intersections King of Prussia Road and Raider Road/Site Driveway and King of Prussia Road and Septa Station Driveway.

**King of Prussia Road and Raider Road/Site Driveway**

Warrant 2 – Four Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-1 of the MUTCD. For the intersection of King of Prussia Road and Raider Road/Site Driveway, an Urban 2 or more major lanes and 1 minor lane curve is used for the Warrant 2 analysis. As illustrated on Table 4C-1 provided in **APPENDIX J**, four of the plotted points exceed the four hour warrant curve using the combination of manual count data and trip generation data. Therefore for the purposes of this analysis, **Warrant 2 is satisfied.**

Warrant 3 – Peak Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-3 of the MUTCD. For the intersection of King of Prussia Road and Raider Road/Site Driveway, an Urban 2 major lanes and 1 minor lane curve is used for the Warrant 3 analysis. As illustrated on Table 4C-3 provided in **APPENDIX J**, four of the plotted points exceed the peak hour warrant curve using the combination of manual count data and trip generation data. Therefore for the purposes of this analysis, **Warrant 3 is satisfied.**

**King of Prussia Road and Septa Station Driveway**

Warrant 2 – Four Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor



## Traffic Impact Study

### 145 King of Prussia Road

---

street approaches fall above the appropriate curve on Figure 4C-1 of the MUTCD. For the intersection of King of Prussia Road and Septa Station Driveway, an Urban 2 major lanes and 1 minor lane curve is used for the Warrant 2 analysis. As illustrated on Table 4C-1 provided in **APPENDIX J**, only two of the plotted points exceed the four hour warrant curve using the combination of manual count data and trip generation data. Therefore for the purposes of this analysis, **Warrant 2 is not satisfied**.

Warrant 3 – Peak Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-3 of the MUTCD. For the intersection of King of Prussia Road and Septa Station Driveway, an Urban 2 major lanes and 1 minor lane curve is used for the Warrant 3 analysis. As illustrated on Table 4C-3 provided in **APPENDIX J**, four of the plotted points exceed the peak hour warrant curve using the combination of manual count data and trip generation data. Therefore for the purposes of this analysis, **Warrant 3 is satisfied**.

As both Warrant 2 and Warrant 3 are satisfied at the intersection of King of Prussia Road and Raider Road/Site Driveway, a traffic signal is proposed at the intersection as a mitigation measure.

At the King of Prussia Road and Septa Station Driveway warrant 3 is satisfied during the PM peak period but Warrant 2 was not met. Typically, a traffic signal is not considered if Warrant 3 is the only warrant that can be met. Therefore, a traffic signal was not proposed as a mitigation measure at the intersection.

The warrant volume analysis worksheet and MUTCD Figures are provided in **APPENDIX J**.

#### Left Turn Signalization Warrant Assessment

Left turn signalization warrants were performed for the northbound and southbound left turns on King of Prussia Road at Raider Road and the proposed site driveway. The results indicate that the left turn movements from King of Prussia Road should be provided by permitted left turn phases. The warrant worksheet is provided in **APPENDIX K**.

#### Vehicular and Pedestrian Clearances

Estimated vehicular and pedestrian clearances were calculated for the proposed signal at King of Prussia Road and Raider Road/site driveway based on PennDOT policies. The yellow and all-red times determined from these calculations were used for the future build scenario traffic analyses. The policies and the results of the calculations are provided in **APPENDIX L**. It is anticipated that the pedestrian and vehicular clearances will be refined during the development of an approved traffic signal plan.

#### 2020 and 2025 Build Levels of Service with Mitigation Improvements

Operations of the study intersections during the AM and PM peak hours were evaluated for the build configuration of the proposed development in the proposed build year of 2020 and the horizon year of 2025 with the with the implementation of the identified mitigations.

Under the build conditions with the identified improvements implemented the following changes occur to overall and approach LOS:

##### 2020

- At King of Prussia Road and Raider Road/Site Driveway:
  - Overall PM intersection operation improves from an overall LOS F (282.8 seconds of delay) to LOS D (41.4 seconds of delay) during the AM peak hour and from overall LOS F (260.3 seconds of delay) to LOS C (31.1 seconds of delay) during the PM peak hour.
  - Westbound approach improves from LOS F (4909.7 seconds of delay) to LOS D (34.4 seconds of delay) during the AM peak hour and from LOS F (1493.4 seconds of delay) to LOS C (38.5 seconds of delay) during the PM peak hour.

## Traffic Impact Study

### 145 King of Prussia Road

---

- Eastbound improves from LOS F (240.2 seconds of delay) to LOS C (33.7 seconds of delay) during the AM peak hour.
- At Lancaster Avenue and I-476 NB Off Ramp/King of Prussia Road:
  - Overall intersection operation improves from LOS E (68.4 seconds of delay) to LOS D (51.5 seconds of delay) during the AM peak hour.
  - Northbound approach improves from LOS E (74.8 seconds of delay) to LOS D (43.2 seconds of delay) during the AM peak hour.
  - NB Through movement improves from LOS F (152.3 seconds of delay) to LOS E (58.5 seconds of delay) during the AM peak hour

Under the 2020 build conditions with the identified improvements implemented the following changes will occur to the reported 95<sup>th</sup> percentile queues:

- The reported 95<sup>th</sup> percentile queue for northbound approach at the intersection of King of Prussia Road & Raider Road will increase to 1068' during the AM peak period. This will extend through the southern site driveway and approach the intersection of Lancaster Avenue.
- The reported 95<sup>th</sup> percentile queue for westbound left at the intersection of King of Prussia Road & Raider Road will be reduced from 795' to 308' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road will be reduced from 1962' to 760' during the AM peak period.

#### 2025

- At King of Prussia Road and Raider Road/Site Driveway:
  - Overall intersection operation improves from an overall LOS F (313.4 seconds of delay) to LOS D (45.7 seconds of delay) during the AM peak hour and from overall LOS F (278.8 seconds of delay) to LOS D (33.8 seconds of delay) during the PM peak hour.
  - Westbound approach improves from LOS F (5492.6 seconds of delay) to LOS D (34.4 seconds of delay) during the AM peak hour and from LOS F (1622.6 seconds of delay) to LOS C (38.5 seconds of delay) during the PM peak hour.
  - Eastbound improves from LOS F (287.6 seconds of delay) to LOS C (33.7 seconds of delay) during the AM peak hour.
- At Lancaster Avenue and I-476 NB Off Ramp/King of Prussia Road:
  - Overall intersection operation improves from LOS E (71.4 seconds of delay) to LOS D (53.8 seconds of delay) during the AM peak hour.
  - Northbound approach improves from LOS F (80.7 seconds of delay) to LOS D (45.4 seconds of delay) during the AM peak hour.
  - NB Through movement improves from LOS F (160.2 seconds of delay) to LOS E (62.0 seconds of delay) during the AM peak hour.

Under the 2025 build conditions with the identified improvements implemented the following changes will occur to the reported 95<sup>th</sup> percentile queues:

- The reported 95<sup>th</sup> percentile queue for northbound approach at the intersection of King of Prussia Road & Raider Road will increase to 1138'' during the AM peak period. This will extend through the southern site driveway to the intersection of Lancaster Avenue.
- The reported 95<sup>th</sup> percentile queue for westbound left at the intersection of King of Prussia Road & Raider Road will be reduced from 810' to 308' during the PM peak period.

# Traffic Impact Study

## 145 King of Prussia Road

- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road will be reduced from 2032' to 787' during the AM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the build conditions analysis are summarized in **TABLE 11** and **TABLE 12**. Detailed outputs of the 2025 build conditions analysis are provided in **APPENDIX M**.

**Table 11 – 2020 Build Conditions with Improvements Summary Table**

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.1	C	0	29.1	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	38.8	D	-	39.3	D	-
	(WB Left)	550'	42.8	D	368	43.4	D	375
	(WB Thru/Right)	950'	27.6	C	110	27.6	C	110
	SB Approach	-	39.0	D	-	39.6	D	-
	(SB Left)	100'	84.9	F	718	86.7	F	723
	(SB Thru/Right)	1000'+	12.0	B	403	12.2	B	158
	NB Approach	-	60.9	E	-	64.6	E	-
	(NB Left)	130'	17.3	B	10	17.3	B	10
(NB Thru)	1150'	61.7	E	785	65.5	E	1090	
<b>Overall</b>	-	<b>45.7</b>	<b>D</b>	-	<b>47.3</b>	<b>D</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.0	B	-	19.3	B	-
	(EB Left)	75'	50.4	D	53	53.7	D	55
	(EB Thru)	1200'	16.0	B	255	16.1	B	263
	WB Approach	-	44.2	D	-	48.7	D	-
	(WB Left)	160'	20.5	C	25	20.8	C	25
	(WB Thru/Right)	1100'	45.0	D	883	49.7	D	940
	NB Approach	-	617.3	F	-	616.3	F	-
	(NB Left/Thru)	1200'	681.6	F	2170	681.6	F	2170
	(NB Right)	280'	18.2	B	45	18.3	B	45
SB Approach	100'	21.8	C	8	21.8	C	8	
<b>Overall</b>	-	<b>218.9</b>	<b>F</b>	-	<b>218.3</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	38.6	E	43	39.3	E	45
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.2	A	30	5.4	A	40
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>3.0</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	21.8	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.3	B	30	33.7	C	183
	WB Approach	500'	-	-	-	34.4	C	-
	(WB Left)	500'	-	-	-	35.5	D	135
	(WB Thru/Right)	500'	-	-	-	29.2	C	25
	NB Approach	550'	1.2	A	20	47.9	D	-
	(NB Left)	75'	-	-	-	10.1	B	133
	(NB Thru)	550'	-	-	-	68.4	F	1068
	(NB Right)	550'	-	-	-	7.0	A	35
	SB Approach	550'	0.9	A	5	18.8	B	-
	(SB Left)	75'	-	-	-	96.9	F	128
	(SB Thru)	660'	-	-	-	6.2	A	188
<b>Overall</b>	-	<b>2.0</b>	<b>A</b>	-	<b>41.4</b>	<b>D</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	265.0	F	108	90.2	F	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.2	C	13	16.8	C	3
	<b>Overall</b>	-	<b>5.6</b>	<b>A</b>	-	<b>0.2</b>	<b>A</b>	-

Table 11 – 2020 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	60.5	E	-	55.8	E	-
	(EB Left)	800'	59.1	E	252	56.3	E	253
	(EB Thru)	800'	60.9	E	787	55.6	E	758
	WB Approach	600'	53.9	D	338	53.9	D	338
	NB Approach	-	74.8	E	-	43.2	D	-
	(NB Left)	500'	17.6	B	305	18.3	B	313
	(NB Thru)	1900'	146.9	F	1917	58.5	E	760
	(NB Right)	500'	28.1	C	335	60.5	E	740
	SB Approach	500'+	63.9	E	78	75.9	E	125
<b>Overall</b>	-	<b>66.2</b>	<b>E</b>	-	<b>51.5</b>	<b>D</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.0	B	235	18.4	B	238
	WB Approach	-	34.5	C	-	34.9	C	-
	(WB Left)	600'	53.8	D	120	54.4	D	130
	(WB Thru)	800'	31.8	C	568	31.9	C	575
	NB Approach	1000'+	40.0	D	443	40.0	D	443
	<b>Overall</b>	-	<b>31.3</b>	<b>C</b>	-	<b>31.6</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.6	A	-	8.4	A	-
	(EB Left)	400'	31.8	C	248	30.9	C	240
	(EB Thru/Right)	600'	0.3	A	5	0.2	A	5
	WB Approach	-	10.4	B	-	10.8	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.3	B	280	10.7	B	285
	NB Approach	-	58.1	E	-	58.1	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	55.0	D	3
<b>Overall</b>	-	<b>9.3</b>	<b>A</b>	-	<b>9.2</b>	<b>A</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	31.5	C	-	34.3	C	-
	(EB Left)	260'	43.8	D	145	43.9	D	150
	(EB Thru)	750'	30.0	C	520	33.1	C	545
	WB Approach	-	49.7	D	-	64.5	E	-
	(WB Left)	340'	35.0	C	185	43.5	D	200
	(WB Thru)	1800'	58.0	E	1285	77.1	E	1390
	(WB Right)	300'	29.0	C	435	31.8	C	453
	NB Approach	-	45.9	D	-	45.9	D	-
	(NB Left/Thru)	1000'+	44.7	D	345	44.7	D	345
	(NB Thru/Right)	100	47.1	D	340	47.1	D	340
	SB Approach	-	27.8	C	-	26.1	C	-
	(SB Left)	160'	31.3	C	103	29.3	C	100
(SB Thru)	350'	26.5	C	125	24.9	C	120	
<b>Overall</b>	-	<b>42.3</b>	<b>D</b>	-	<b>50.5</b>	<b>D</b>	-	

Table 11 – 2020 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		19.3	B	-	19.3	B	-
	(EB Left)	50'	24.5	C	3	24.5	C	3
	(EB Thru/Right)	50'	18.2	B	10	18.2	B	10
	WB Approach	-	45.9	D	-	47.3	D	-
	(WB Left)	550'	55.8	E	640	57.7	E	653
	(WB Thru/Right)	950'	21.6	C	195	21.6	C	195
	SB Approach	-	25.9	C	-	26.5	C	-
	(SB Left)	100'	18.0	B	83	17.8	B	83
	(SB Thru/Right)	1000'+	27.1	C	660	27.8	C	678
	NB Approach	-	33.5	C	-	31.6	C	-
	(NB Left)	130'	33.1	C	8	33.6	C	8
(NB Thru)	1150'	33.5	C	492	31.6	C	460	
<b>Overall</b>	-	<b>34.6</b>	<b>C</b>	-	<b>34.9</b>	<b>C</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	28.1	C	-	29.0	C	-
	(EB Left)	75'	23.2	C	8	22.9	C	8
	(EB Thru)	1200'	28.1	C	548	29.1	C	560
	WB Approach	-	25.2	C	-	25.7	C	-
	(WB Left)	160'	62.4	E	93	67.9	E	95
	(WB Thru/Right)	1100'	20.1	C	333	19.9	B	328
	NB Approach	-	225.5	F	-	225.1	F	-
	(NB Left/Thru)	1200'	297.7	F	1215	297.7	F	1215
	(NB Right)	280'	16.8	B	105	16.8	B	108
SB Approach	100'	49.3	D	138	49.3	D	138	
<b>Overall</b>	-	<b>85.7</b>	<b>F</b>	-	<b>86.0</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	120.0	F	288	38.6	E	108
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	0.3	A	3	0.5	A	5
	<b>Overall</b>	-	<b>17.1</b>	<b>C</b>	-	<b>4.2</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	18.2	C	13	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.5</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	32.1	D	25	28.2	C	45
	WB Approach	500'	-	-	-	38.5	D	-
	(WB Left)	500'	-	-	-	40.7	D	308
	(WB Thru/Right)	500'	-	-	-	28.7	C	60
	NB Approach	550'	0.7	A	3	8.7	A	-
	(NB Left)	75'	-	-	-	50.5	D	35
	(NB Thru)	550'	-	-	-	6.6	A	150
	(NB Right)	550'	-	-	-	5.6	A	45
	SB Approach	550'	0.0	A	0	37.5	D	-
	(SB Left)	75'	-	-	-	7.5	A	8
(SB Thru)	660'	-	-	-	37.8	D	1128	
<b>Overall</b>	-	<b>1.1</b>	<b>A</b>	-	<b>31.1</b>	<b>C</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	613.8	F	567	37.3	E	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.1	A	-	0.0	A	-
	(SB Left)	75'	8.0	A	0	8.2	A	0
	<b>Overall</b>	-	<b>83.9</b>	<b>F</b>	-	<b>0.2</b>	<b>A</b>	-

Table 11 – 2020 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	58.5	E	-	59.6	E	-
	(EB Left)	800'	52.5	D	58	52.5	D	75
	(EB Thru)	800'	58.8	E	1335	60.0	E	1340
	WB Approach	600'	10.3	B	163	11.1	B	170
	NB Approach	-	49.7	D	-	55.3	E	-
	(NB Left)	500'	19.8	B	123	19.9	B	125
	(NB Thru)	1900'	57.8	E	313	72.1	E	360
	(NB Right)	500'	79.3	E	353	82.1	F	360
	SB Approach	500'+	85.8	F	328	83.2	E	310
<b>Overall</b>	-	<b>55.6</b>	<b>E</b>	-	<b>56.5</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	24.6	C	323	24.5	C	323
	WB Approach	-	35.3	D	-	35.2	D	-
	(WB Left)	600'	53.1	D	342	53.1	D	338
	(WB Thru)	800'	22.0	C	370	21.9	C	368
	NB Approach	1000'+	46.6	D	370	46.6	D	370
	<b>Overall</b>	-	<b>33.9</b>	<b>C</b>	-	<b>33.8</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	9.7	A	-	9.1	A	-
	(EB Left)	400'	24.4	C	842	22.9	C	833
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	19.8	B	-	19.9	B	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	19.4	B	303	19.6	B	308
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
<b>Overall</b>	-	<b>11.8</b>	<b>B</b>	-	<b>11.3</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	59.1	E	-	49.4	D	-
	(EB Left)	260'	24.3	C	95	25.9	C	98
	(EB Thru)	750'	62.5	E	795	51.6	D	740
	WB Approach	-	42.2	D	-	44.4	D	-
	(WB Left)	340'	79.4	E	342	118.0	F	323
	(WB Thru)	1800'	37.9	D	575	33.9	C	550
	(WB Right)	300'	21.5	C	115	20.4	C	113
	NB Approach	-	34.6	C	-	34.6	C	-
	(NB Left/Thru)	1000'+	34.8	C	238	34.8	C	238
	(NB Thru/Right)	100	34.4	C	242	34.4	C	243
	SB Approach	-	83.9	F	-	83.9	F	-
	(SB Left)	160'	180.3	F	848	180.3	F	848
(SB Thru)	350'	24.4	C	300	24.4	C	300	
<b>Overall</b>	-	<b>57.2</b>	<b>E</b>	-	<b>54.8</b>	<b>D</b>	-	

Table 12 – 2025 Build Conditions with Improvements Summary Table

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.3	C	0	29.3	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	39.6	D	-	39.9	D	-
	(WB Left)	550'	43.8	D	378	44.2	D	380
	(WB Thru/Right)	950'	27.7	C	115	27.7	C	115
	SB Approach	-	42.3	D	-	42.2	D	-
	(SB Left)	100'	93.0	F	753	93.0	F	753
	(SB Thru/Right)	1000'+	12.2	B	415	12.4	B	420
	NB Approach	-	64.6	E	-	69.8	E	-
	(NB Left)	130'	17.3	B	10	17.3	B	10
(NB Thru)	1150'	65.5	F	1090	70.7	E	1135	
<b>Overall</b>	-	<b>48.5</b>	<b>D</b>	-	<b>50.2</b>	<b>D</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.2	B	-	19.5	B	-
	(EB Left)	75'	53.0	D	63	55.7	E	55
	(EB Thru)	1200'	16.0	B	260	16.1	B	265
	WB Approach	-	48.0	D	-	53.3	D	-
	(WB Left)	160'	20.6	C	25	21.0	C	25
	(WB Thru/Right)	1100'	48.9	D	928	54.4	F	1370
	NB Approach	-	636.0	F	-	635.1	F	-
	(NB Left/Thru)	1200'	702.2	F	2230	702.2	F	2230
	(NB Right)	280'	18.2	B	45	18.3	B	48
SB Approach	100'	21.8	C	8	21.8	C	8	
<b>Overall</b>	-	<b>227.1</b>	<b>F</b>	-	<b>226.5</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	39.8	E	43	41.4	E	48
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.3	A	33	5.5	A	40
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>3.2</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	22.3	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.5	B	33	33.7	C	187
	WB Approach	500'	-	-	-	34.4	C	-
	(WB Left)	500'	-	-	-	35.6	D	135
	(WB Thru/Right)	500'	-	-	-	29.1	C	25
	NB Approach	550'	1.2	A	20	54.0	D	-
	(NB Left)	75'	-	-	-	10.9	B	140
	(NB Thru)	550'	-	-	-	77.2	F	1138
	(NB Right)	550'	-	-	-	7.1	A	225
	SB Approach	550'	0.9	A	8	18.8	B	-
	(SB Left)	75'	-	-	-	97.2	F	120
(SB Thru)	660'	-	-	-	6.3	A	195	
<b>Overall</b>	-	<b>2.1</b>	<b>A</b>	-	<b>45.7</b>	<b>D</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	298.0	F	113	92.2	F	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.5	C	15	17.1	C	3
	<b>Overall</b>	-	<b>6.1</b>	<b>A</b>	-	<b>0.2</b>	<b>A</b>	-

Table 12 – 2025 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.2	E	-	58.7	E	-
	(EB Left)	800'	59.6	E	253	56.7	E	255
	(EB Thru)	800'	65.4	E	1123	59.3	E	790
	WB Approach	600'	54.4	D	345	54.4	D	343
	NB Approach	-	78.6	E	-	45.4	D	-
	(NB Left)	500'	17.8	B	313	18.4	B	318
	(NB Thru)	1900'	155.9	F	1995	62.0	E	787
	(NB Right)	500'	28.5	C	345	64.3	E	770
	SB Approach	500'+	65.3	E	83	78.5	E	135
<b>Overall</b>	-	<b>69.4</b>	<b>E</b>	-	<b>53.8</b>	<b>D</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.5	B	240	18.9	B	245
	WB Approach	-	35.0	C	-	35.5	D	-
	(WB Left)	600'	53.9	D	123	54.4	D	133
	(WB Thru)	800'	32.4	C	578	32.6	C	585
	NB Approach	1000'+	39.9	D	450	39.9	D	450
<b>Overall</b>	-	<b>31.7</b>	<b>C</b>	-	<b>32.0</b>	<b>C</b>	-	
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.4	A	-	8.3	A	-
	(EB Left)	400'	31.3	C	245	30.6	C	245
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	10.7	B	-	11.0	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	5
	(WB Thru/Right)	750'	10.6	B	288	10.9	B	293
	NB Approach	-	58.1	E	-	58.1	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	55.1	E	3
<b>Overall</b>	-	<b>9.2</b>	<b>A</b>	-	<b>9.2</b>	<b>A</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	33.3	C	-	33.4	C	-
	(EB Left)	260'	63.1	E	258	60.6	E	252
	(EB Thru)	750'	29.4	C	528	29.8	C	533
	WB Approach	-	50.1	D	-	53.7	D	-
	(WB Left)	340'	46.6	D	228	48.0	D	228
	(WB Thru)	1800'	57.1	E	1313	61.9	F	1340
	(WB Right)	300'	28.5	C	713	28.8	C	445
	NB Approach	-	47.0	D	-	46.2	D	-
	(NB Left/Thru)	1000'+	45.7	D	357	45.0	D	353
	(NB Thru/Right)	100	48.3	D	350	47.6	D	348
	SB Approach	-	28.0	C	-	27.6	C	-
	(SB Left)	160'	31.7	C	115	31.2	C	105
(SB Thru)	350'	26.6	C	128	26.3	C	128	
<b>Overall</b>	-	<b>43.2</b>	<b>D</b>	-	<b>44.9</b>	<b>D</b>	-	



Table 12 – 2025 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		18.0	B	-	18.0	B	-
	(EB Left)	50'	22.9	C	3	22.9	C	3
	(EB Thru/Right)	50'	17.0	B	10	17.0	B	10
	WB Approach	-	39.8	D	-	40.9	D	-
	(WB Left)	550'	47.9	D	620	49.4	D	638
	(WB Thru/Right)	950'	20.1	C	193	20.1	C	193
	SB Approach	-	31.6	C	-	32.6	C	-
	(SB Left)	100'	20.2	C	90	19.9	B	90
	(SB Thru/Right)	1000'+	33.4	C	733	34.7	C	756
	NB Approach	-	41.0	D	-	37.7	D	-
	(NB Left)	130'	37.5	D	10	38.2	D	8
(NB Thru)	1150'	41.0	D	542	37.7	D	200	
<b>Overall</b>	-	<b>36.6</b>	<b>D</b>	-	<b>36.6</b>	<b>D</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	39.5	D	-	45.2	D	-
	(EB Left)	75'	25.3	C	8	25.0	C	8
	(EB Thru)	1200'	39.7	D	992	45.4	D	1037
	WB Approach	-	31.1	C	-	30.7	C	-
	(WB Left)	160'	96.4	F	120	94.4	F	118
	(WB Thru/Right)	1100'	22.1	C	350	21.9	C	345
	NB Approach	-	212.9	F	-	212.6	F	-
	(NB Left/Thru)	1200'	281.3	F	1210	281.3	F	1210
	(NB Right)	280'	15.6	B	105	15.6	B	105
SB Approach	100'	53.0	D	143	52.5	D	143	
<b>Overall</b>	-	<b>88.4</b>	<b>F</b>	-	<b>90.4</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	132.3	F	305	41.0	E	113
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	0.3	A	5	0.5	A	5
	<b>Overall</b>	-	<b>18.7</b>	<b>C</b>	-	<b>4.4</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	18.4	C	13	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.5</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	33.4	D	28	28.3	C	45
	WB Approach	500'	-	-	-	38.5	D	-
	(WB Left)	500'	-	-	-	40.6	D	308
	(WB Thru/Right)	500'	-	-	-	28.7	C	60
	NB Approach	550'	0.8	A	3	9.2	A	-
	(NB Left)	75'	-	-	-	55.5	E	4
	(NB Thru)	550'	-	-	-	6.6	A	153
	(NB Right)	550'	-	-	-	5.6	A	45
	SB Approach	550'	0.0	A	0	41.9	D	-
	(SB Left)	75'	-	-	-	7.6	A	8
(SB Thru)	660'	-	-	-	42.3	F	1058	
<b>Overall</b>	-	<b>1.1</b>	<b>A</b>	-	<b>33.8</b>	<b>C</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	647.9	F	580	38.2	E	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.1	A	-	0.0	A	-
	(SB Left)	75'	8.0	A	0	8.2	A	0
	<b>Overall</b>	-	<b>87.3</b>	<b>F</b>	-	<b>0.2</b>	<b>A</b>	-

Table 12 – 2025 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.6	E	-	56.1	E	-
	(EB Left)	800'	53.1	D	60	51.3	D	75
	(EB Thru)	800'	65.2	F	1393	56.4	F	1390
	WB Approach	600'	10.0	A	165	11.2	B	173
	NB Approach	-	52.3	D	-	57.3	E	-
	(NB Left)	500'	19.9	B	128	19.9	B	128
	(NB Thru)	1900'	60.3	E	323	75.1	E	356
	(NB Right)	500'	85.4	F	370	85.7	F	373
	SB Approach	500'+	94.1	F	368	88.1	F	235
<b>Overall</b>	-	<b>60.5</b>	<b>E</b>	-	<b>56.5</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	25.3	C	330	24.8	C	335
	WB Approach	-	35.5	D	-	19.6	B	-
	(WB Left)	600'	53.2	D	345	43.0	D	335
	(WB Thru)	800'	22.3	C	372	2.1	A	75
	NB Approach	1000'+	46.7	D	375	46.7	D	380
	<b>Overall</b>	-	<b>34.3</b>	<b>C</b>	-	<b>27.0</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.7	A	-	8.0	A	-
	(EB Left)	400'	21.6	C	530	20.1	C	510
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	20.6	C	-	20.7	C	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	20.3	C	310	20.4	C	308
	NB Approach	-	56.7	E	-	56.6	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.0	E	3
<b>Overall</b>	-	<b>11.1</b>	<b>B</b>	-	<b>10.6</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	67.7	E	-	69.2	E	-
	(EB Left)	260'	25.3	C	98	28.3	C	108
	(EB Thru)	750'	71.9	E	1148	73.3	E	1160
	WB Approach	-	47.0	D	-	42.5	D	-
	(WB Left)	340'	92.1	F	425	92.2	F	425
	(WB Thru)	1800'	41.7	D	605	36.1	D	570
	(WB Right)	300'	22.1	C	118	20.8	C	113
	NB Approach	-	34.3	C	-	34.4	C	-
	(NB Left/Thru)	1000'+	34.6	C	240	34.7	C	238
	(NB Thru/Right)	100	34.1	C	245	34.1	C	243
	SB Approach	-	86.4	F	-	86.9	F	-
	(SB Left)	160'	187.1	F	885	188.3	F	883
(SB Thru)	350'	24.1	C	305	24.1	C	300	
<b>Overall</b>	-	<b>62.1</b>	<b>E</b>	-	<b>61.3</b>	<b>E</b>	-	

### CONCLUSIONS & RECOMMENDATIONS

The proposed 475,000 square foot development located at 145 King of Prussia Road in Radnor Township, Delaware County, Pennsylvania is expected to generate a total of **731** (**577** entering and **154** exiting) and **583** (**158** entering and **425** exiting) new trips generated by the site during the morning and afternoon peak hours, respectively. Access to the site will be provided through a 3 full access driveways. The primary site driveway will be a full access driveway located on King of Prussia Drive across from Raider Road. A second driveway will be located on the north side of the site and accessed via the existing Septa driveway on King of Prussia Road. The third site driveway is provides access to loading areas and is located at the southern corner of the site on King of Prussia Road approximately 550' north of Lancaster Avenue (SR 0030).

In conjunction with the proposed development the following roadway improvements are recommended:

- At King of Prussia Road and Matsonford Road/Park Driveway:
  - Modify AM signal timings to shift 3 seconds from the SB King of Prussia Road lead phase to the NB/SB King of Prussia phase (1 second) and the EB/WB Matsonford Road/Park Driveway Phase (2 seconds).
- At King of Prussia Road and Radnor-Chester Road:
  - Modify PM signal timings to shift 6 seconds from the EB/WB King of Prussia Road phase to the NB/SB Radnor Chester Road phase.
- At King of Prussia Road and Raider Road/Site Driveway :
  - Provide left turn lanes on both approaches of King of Prussia Road
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road.
  - Install 2 phase semi-actuated traffic signal.
- At King of Prussia Road and South Site Driveway :
  - Restripe northbound King of Prussia Road at the southern site driveway to provide shared through/right turn lane.
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
- At Lancaster Avenue and NB Off Ramps/King of Prussia Road:
  - Restripe northbound I-76 off-ramp at Lancaster Avenue to provide shared through/right turn lane
- At Lancaster Avenue and I-476 SB Off Ramp:
  - Modify PM signal timings to shift 1 second from the EB/WB Lancaster Avenue phase to the WB Lancaster Avenue lead phase.
- At Lancaster Avenue and I-476 NB On Ramp/Hillside Circuit:
  - Modify PM signal timings to shift 7 second from the EB/WB Lancaster Avenue phase to the EB Lancaster Avenue lead phase.
- At Lancaster Avenue and Radnor-Chester Road:
  - Modify AM signal timings to shift 12 seconds from the southbound Radnor-Chester Road lead phase and 1 second from the Lancaster Avenue Phase lead left phase to the EB/WB Lancaster Avenue EB/WB Phase.

Under the build Conditions with the identified improvements implemented, all of the study intersections maintain existing levels of service between the no-build and build conditions and operate at overall LOS D or better with the exception of those that operate at LOS E or F under no-build conditions.

Under the build Conditions with the identified improvements implemented, all of the study intersections maintain existing

## Traffic Impact Study

### 145 King of Prussia Road

---

levels of service between the no-build and build conditions and operate at overall LOS D or better with the exception of those that operate at LOS E or F under no-build conditions.

Based on the comparison of the Intersection LOS and delay under no-build conditions and build conditions with the identified mitigation measures, the intersections meet the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies* at all of the study intersections. The Levels of Service exhibited are not a result of, nor is the need for additional mitigation measures triggered as a result of the trips generated by the proposed site.

In addition to the improvements identified within the is TIS, a bus shelter is to be constructed on King of Prussia Road southeast of the SEPTA Driveway to the extent that it is approved by SEPTA and the University of Pennsylvania Health System will partner with the Township to install a Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review:

- Route 30 & I-476 Northbound Ramps
- Route 30 & I-476/King of Prussia Road
- Route 30 & I-476 Southbound Ramps.
- Route 30 & Radnor-Chester Road.
- Route 30 & Radnor Financial Center Eastern Driveway
- Route 30 & Radnor Financial Center Western Driveway
- King of Prussia Road & Radnor-Chester Road.
- King of Prussia Road & Matsonford Road.
- Matsonford Road & South Centennial Drive.
- Matsonford Road & North Centennial Drive
- King of Prussia Road & Raider Road.
- Radnor Chester and Raider Road
- Radnor Chester and Radnor Financial Center

# APPENDIX

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



# APPENDIX A

## Level of Service Criteria

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507





## LEVEL OF SERVICE

Level of Service is a term used to describe vehicle operator satisfaction with the driving experience. Research has determined that operator satisfaction is based primarily on travel speed and delay. In urban environments these factors, travel speed and delay, are primarily controlled by the operation of intersections.

By utilizing models to simulate the flow of traffic at intersections, the average delay experienced by vehicles can be estimated. These models consider such factors as traffic volumes, roadway geometry, traffic control, and driver behavior. Levels of Service designations are based on a comparison of the average delays calculated by the models with perceived acceptable delays.

The following tables illustrate the guidelines used for designated Levels of Service at intersections:

Level of Service Criteria  
for Signalized Intersections<sup>(1)</sup>

Level of Service	Control Delay (Seconds per Vehicle)
A	$\leq 10$
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	> 80

<sup>(1)</sup> Exhibit 18-4, Level of Service from Control Delay (2010 HCM)

Level of Service Criteria  
for Unsignalized Intersections<sup>(2)</sup>

Level of Service	Control Delay (Seconds per Vehicle)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	> 50

<sup>(2)</sup> Table Exhibit 19-1, Level of Service Criteria for TWSC and AWSC intersections (2010 HCM)



# APPENDIX B

Existing Signal Permit Plans/Timing Directives

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



**GENERAL NOTES**

NO ELECTRICAL INSTALLATION IS PERMITTED UNLESS PRIOR APPROVAL IS GRANTED 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.  
 SIGNALS AND MOUNTING MARKINGS INDICATED ON THIS DRAWING SHALL BE INSTALLED IN ACCORDANCE WITH PUBLICATION NO. 212 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 FACE OF THE ROADWAY. THE SIGNALS SHALL BE A MINIMUM OF 2 FEET FROM THE FACE OF CURB OR THE FACE OF THE ROADWAY. SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET VERTICALLY CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE ROADWAY AND EQUIPPED WITH BACKPLATES.  
 THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET. THE EXACT LOCATION OF THE APPROACH SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PERMITTEE.  
 CURBS TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE 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 UTILITIES WHICH MAY BE CREATED DUE TO THE LOCATION OF SIGNALS.  
 THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITEE COMPLETES WITH THE PROVISIONS OF THE UNDERGROUND UTILITIES LOCATED RECORDED AT 194.  
 WHEN LIQUID FUELS ARE USED, SIGNAL MOUNTING MUST CONFORM TO FORM 408 AND A COPY OF THE PROCEEDINGS OF THE BOARD OF PUBLIC WORKS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC ENGINEER PRIOR TO BEING.  
 PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

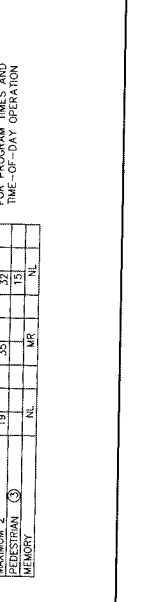
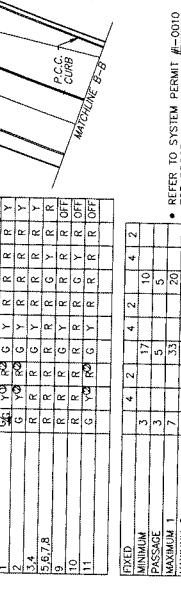
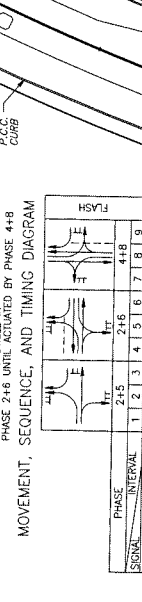
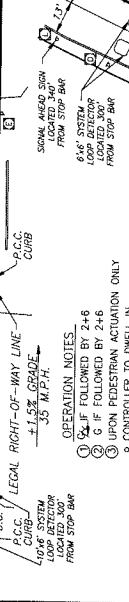
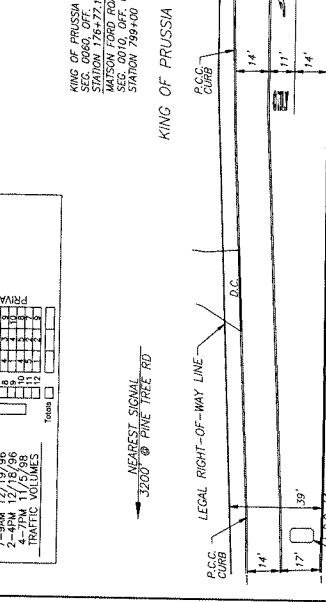
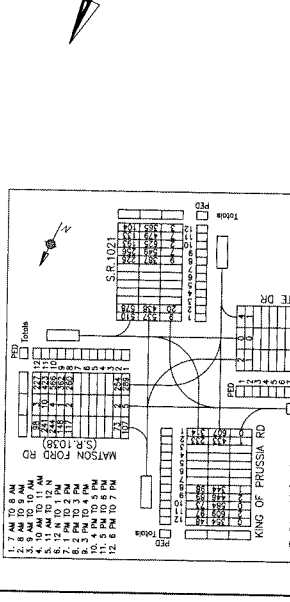
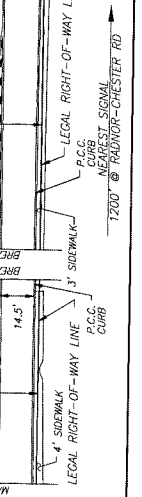
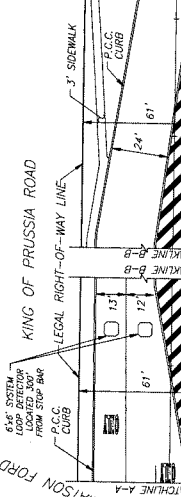
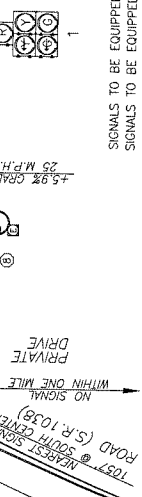
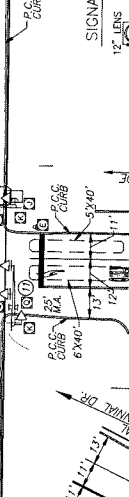
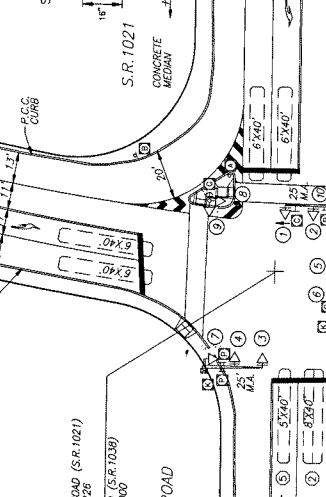
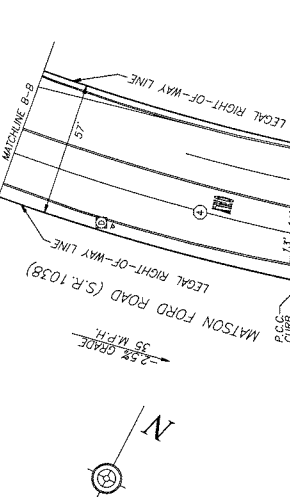
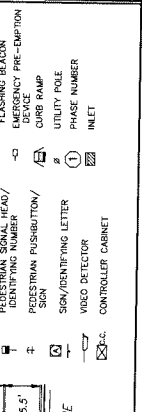
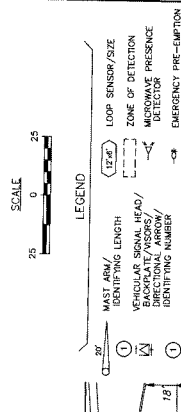
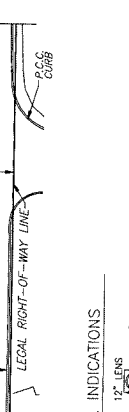
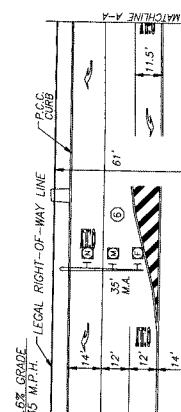
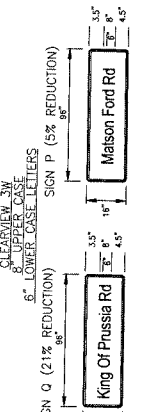
PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PERMITS IN INTERSECTION OF OCCUPANCY PERMIT FOR CONDUIT CHANGES IN RETURNING ROADWAYS REQUIRING EXCAVATION, OLD OR CONCRETE ROADWAY REGARDLESS OF AGE MUST BE SECURED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH DISTRICT SPECIFICATIONS 10-7900 SERIES.

PLAN SYMBOL	SERIES	SIZE	MESSAGE
(A)	W16-1	18"x18"	HAZARD MARKER
(B)	R1-2	36"x36"	YIELD
(C)	R10-12	30"x36"	LEFT TURN YIELD ON GREEN
(D)	R2-8-SR	30"x30"	LANE USE CONTROL SIGN
(E)	R2-7L	30"x30"	LEFT LANE MUST TURN LEFT
(F)	R10-3	5'x12'	LEFT TURN SIGN
(G)	R10-3	5'x12'	PUSH BUTTON FOR GREEN LIGHT
(H)	R9-3A	18"x18"	NO PEDESTRIAN CROSSING
(I)	W3-3	36"x36"	SIGNAL AHEAD SIGN
(J)	R3-5S	30"x36"	STRAIGHT THROUGH SIGN
(K)	R3-SR	30"x36"	RIGHT TURN SIGN
(L)	D3-4	96"x16"	STREET SIGN "Matson Ford Rd"
(M)	D3-4	96"x16"	STREET SIGN "King Of Prussia Rd"



TIME	PHASE	INTERVAL	SEQUENCE	MOVEMENT	
7-9 AM	12/19/06	2-4 PM	12/18/96	4-7 PM	11/15/88
9-11 AM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
1-3 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
3-5 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
5-7 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
7-9 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
9-11 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
11-12 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
12-1 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
1-3 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
3-5 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
5-7 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
7-9 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
9-11 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06
11-12 PM	10/16/06	11-12 PM	10/16/06	11-12 PM	10/16/06

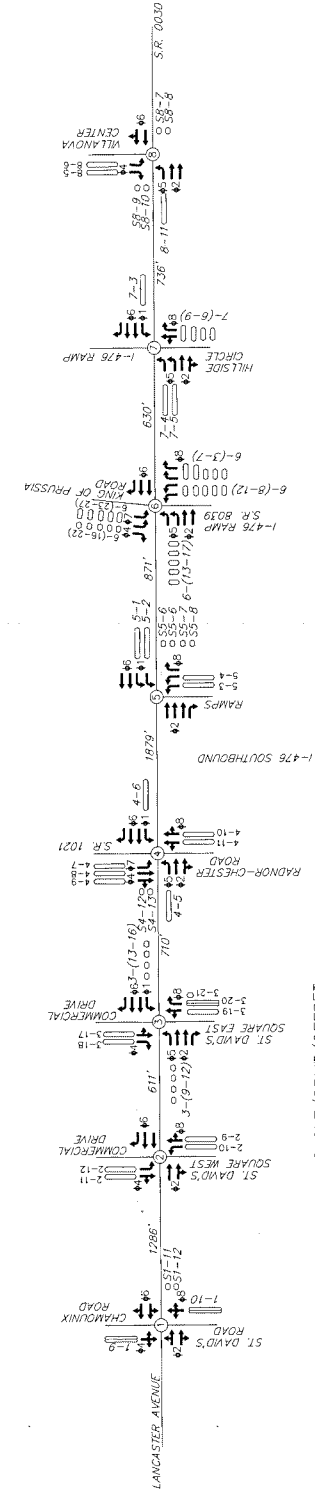


# TRAFFIC SIGNAL SYSTEM PERMIT PLAN

WEEKLY PROGRAM CHART			
EVENT	DAY	TIME	CYCLE/OFFSET
1	1-7	20:00	FREE
2	1-7	20:00	MAX 1
3	1-7	20:00	OFF PEAK
4	1-7	20:00	PM PEAK
5	6,7	20:00	OFF PEAK
6	6,7	20:00	OFF PEAK

MINIMUM 15 MIN OFFSET REFERENCED TO START OF YELLOW ON LANCASTER AVE.

NOTES: - ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.  
 - REFER TO SIGNAL PERMIT PLAN FOR MAX 1, MAX 2, CLEARANCE AND PED TIMES.



### CYCLE/SPLIT/OFFSET

Program 1 = Intersections	File #	Master	Phase	Cycle	Offset
1	LANCASTER AVE & ST. DAVID'S/CHAMQUINX RD	0981	24	60	20
2	LANCASTER AVE & ST. DAVID'S SQUARE WEST	0082	38	120	34
3	LANCASTER AVE & ST. DAVID'S SQUARE EAST	0082	39	120	34
4	LANCASTER AVE & RADNOR-CHESTER RD	0083	52	120	22
5	LANCASTER AVE & 1-476 SOUTHBOUND RAMP	2532	42	110	65
6	LANCASTER AVE & 1-476 RAMP/HILLSIDE CIRCLE	2530	49	110	66
7	LANCASTER AVE & 1-476 RAMP/HILLSIDE CIRCLE	2531	25	110	76
8	LANCASTER AVE & VILLANOVA CENTER	3416	25	110	66

### CYCLE/SPLIT/OFFSET

Program 2 = Intersections	File #	Master	Phase	Cycle	Offset
1	LANCASTER AVE & ST. DAVID'S/CHAMQUINX RD	0981	2	110	15
2	LANCASTER AVE & ST. DAVID'S SQUARE WEST	0082	72	110	12
3	LANCASTER AVE & ST. DAVID'S SQUARE EAST	0082	45	110	5
4	LANCASTER AVE & RADNOR-CHESTER RD	0083	25	110	0
5	LANCASTER AVE & 1-476 SOUTHBOUND RAMP	2532	39	96	6.3
6	LANCASTER AVE & 1-476 RAMP/HILLSIDE CIRCLE	2530	38	96	6.3
7	LANCASTER AVE & 1-476 RAMP/HILLSIDE CIRCLE	2531	24	96	5
8	LANCASTER AVE & VILLANOVA CENTER	3416	28	96	1.5

### CYCLE/SPLIT/OFFSET

Program 3 = Intersections	File #	Master	Phase	Cycle	Offset
1	LANCASTER AVE & ST. DAVID'S/CHAMQUINX RD	0981	2	100	66
2	LANCASTER AVE & ST. DAVID'S SQUARE WEST	0082	71	100	12
3	LANCASTER AVE & ST. DAVID'S SQUARE EAST	0082	43	100	12
4	LANCASTER AVE & RADNOR-CHESTER RD	0083	52	100	0
5	LANCASTER AVE & 1-476 SOUTHBOUND RAMP	2532	35	110	51
6	LANCASTER AVE & 1-476 RAMP/HILLSIDE CIRCLE	2530	35	110	51
7	LANCASTER AVE & 1-476 RAMP/HILLSIDE CIRCLE	2531	29	110	88
8	LANCASTER AVE & VILLANOVA CENTER	3416	25	110	99

### LEGEND

- ◻ SYSTEM DETECTOR - LOOP NO. Y
- ◻ INTERSECTION X - LOOP NO. Y
- ◻ DETECTOR - INTERSECTION X - LOOP NO. Y
- ◻ PHASE

SCALE: NOT TO SCALE

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	DELAWARE	0030	CUR-1	3 OF 4

RADNOR TOWNSHIP

### GENERAL NOTES

NO MODIFICATIONS TO THIS INSTALLATION ARE PERMITTED UNLESS APPROVED BY THE ENGINEER OR 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 OF THE SYSTEM PERMIT DRAWING, ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.

TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL, SUSPENSION LEVEL, SIGNAL LEVEL, AND PERSONAL COMPUTER BOARD, 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 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 TAPERS.

BEFORE 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 IT IS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL ACT UPON PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES EFFECTIVE DATE MARCH 29, 2007.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED PERMIT 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.

CONCRETE INSTALLED IN BELMONT ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED AND JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH FEDERAL SPECIFICATIONS TO 800-8600 SERIES.

REVISIONS		DATE	BY
1	AS-BUILT DRAWING	03/11/07	PAUL M. LUIZ
2	ADDITIONAL WORK TO CORRECT	03/11/07	PAUL M. LUIZ
3	FOR MODIFICATION 8		
4			
5			
6			
7			
8			

RECOMMENDED:

PAUL M. LUIZ 11/24/08

LOUIS R. BELMONT, P.E. 11/24/08

DISTRICT TRAFFIC ENGINEER

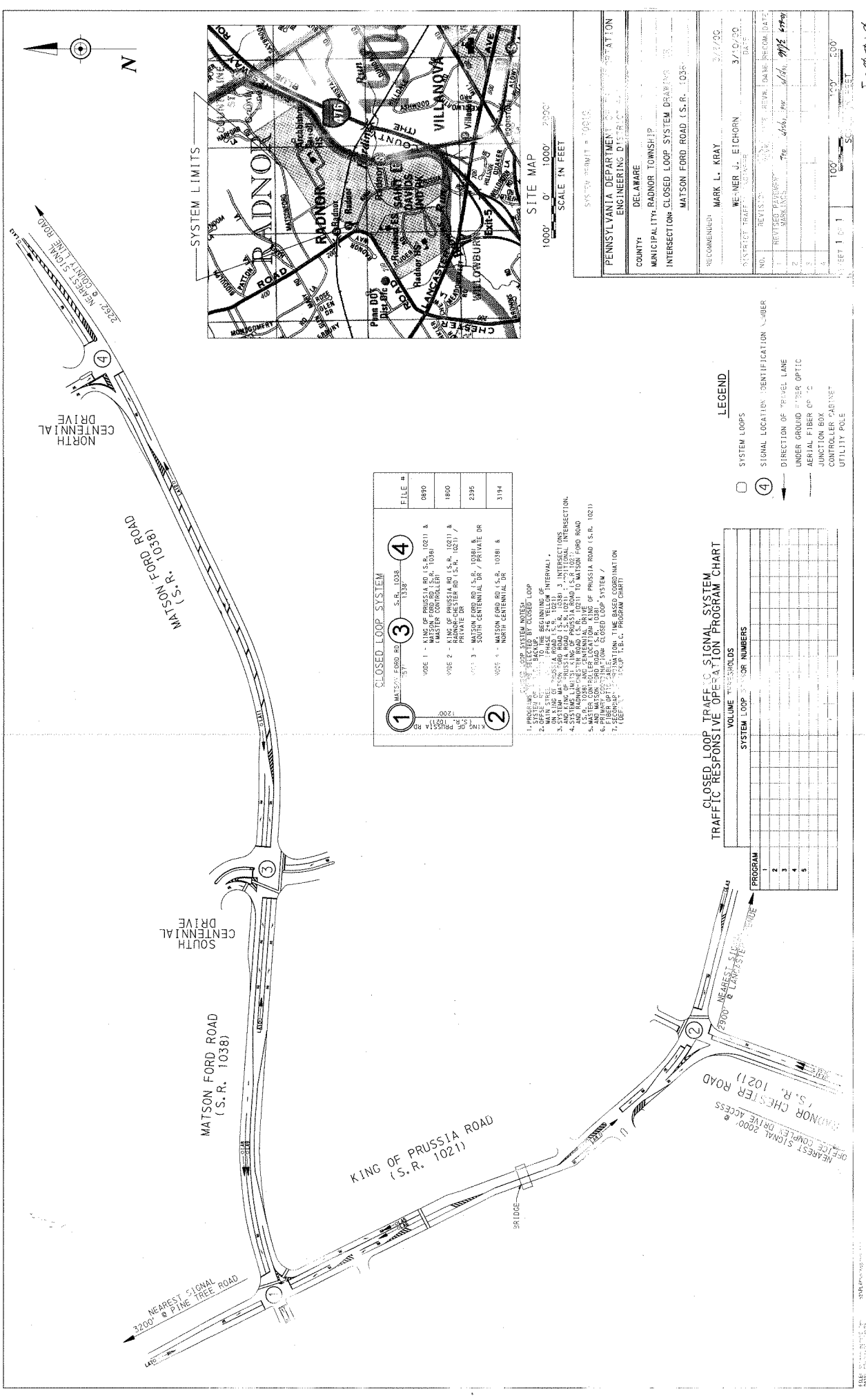
REVIEWED:

*John P. ...*

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION  
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE  
MUNICIPALITY: RADNOR TOWNSHIP  
INTERSECTION: TRAFFIC SIGNAL SYSTEM

INTERCONNECT PERMIT #1-0071 SHEET 1 OF 1



**CLOSED LOOP SYSTEM**

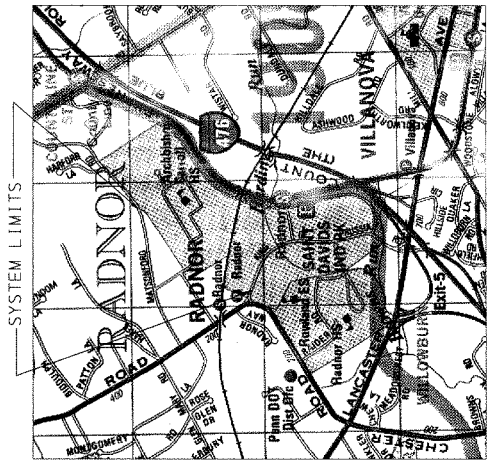
FILE #	1	3	4
	MATSON FORD RD (S.R. 1038)	S.R. 1038 / S.R. 1338	
0890	KING OF PRUSSIA RD (S.R. 1021) & MATSON FORD RD (S.R. 1038) (MASTER CONTROLLER)		
1800	KING OF PRUSSIA RD (S.R. 1021) & MATSON FORD RD (S.R. 1038) (PRIVATE TR)		
2385	MATSON FORD RD (S.R. 1038) & SOUTH CENTENNIAL DR / PRIVATE DR		
3194	MATSON FORD RD (S.R. 1038) & NORTH CENTENNIAL DR		

- 1- PROGRAMS TO BE SELECTED BY CLOSED LOOP  
 2- OPERATIONAL PHASE BEGINNING OF MAIN STREET (YELLOW INTERVAL)  
 3- SYSTEM MATSON FORD ROAD (S.R. 1038) 3- INTERSECTIONS INTERSECTION  
 4- SYSTEM KING OF PRUSSIA ROAD (S.R. 1021)  
 5- SYSTEM SOUTH CENTENNIAL DRIVE (S.R. 1038) AND CENTENNIAL DRIVE  
 6- MATSON FORD ROAD LOCATION (S.R. 1038)  
 7- PRIMARY FUNCTION (SIGNAL LAMP) OF MATSON FORD ROAD (S.R. 1038)  
 8- SECONDARY FUNCTION (SIGNAL LAMP) OF MATSON FORD ROAD (S.R. 1038)  
 (E.G. PROGRAM CHART)

**CLOSED LOOP TRAFFIC SIGNAL SYSTEM TRAFFIC RESPONSIVE OPERATION PROGRAM CHART**

PROGRAM	VOLUME TRIP HOURS	SYSTEM LOOP	TRIP HOURS
1			
2			
3			
4			
5			

- LEGEND**
- SYSTEM LOOPS
  - ④ SIGNAL LOCATION IDENTIFICATION NUMBER
  - DIRECTION OF TRAVEL LANE
  - UNDERGROUND FIBER OPTIC
  - AERIAL FIBER OPTIC
  - JUNCTION BOX
  - CONTROLLER CABINET
  - UTILITY POLE



**SITE MAP**  
 1000' 0' 1000' 2000'  
 SCALE IN FEET

SYSDRAWING # 10010

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION	
ENGINEERING DIVISION	
COUNTY	DELAWARE
MUNICIPALITY, RADNOR TOWNSHIP	
INTERSECTION, CLOSED LOOP SYSTEM DRAWING	
MATSON FORD ROAD (S.R. 1038)	
RECOMMENDED BY	MARK L. KRAY
DATE	3/17/90
DESIGNED BY	WEINER J. EICHORN
DATE	3/10/90
NO.	1
REVISION	1
NO.	2
REVISION	2
NO.	3
REVISION	3
NO.	4
REVISION	4
NO.	5
REVISION	5
NO.	6
REVISION	6
NO.	7
REVISION	7
NO.	8
REVISION	8
NO.	9
REVISION	9
NO.	10
REVISION	10
NO.	11
REVISION	11
NO.	12
REVISION	12
NO.	13
REVISION	13
NO.	14
REVISION	14
NO.	15
REVISION	15
NO.	16
REVISION	16
NO.	17
REVISION	17
NO.	18
REVISION	18
NO.	19
REVISION	19
NO.	20
REVISION	20





# 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 THE REPAIRING OF SIGNS, SHALL BE THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND FAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION 110.1211 AND POST MOUNTED SIGNALS SHALL BE INSTALLED IN ACCORDANCE WITH THE SIGNAL EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALITY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM CLEARANCE OF 14 FEET. OVERHEAD 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 BACK-PLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SIGNAL SHALL BE THE EXACT LOCATION OF THE APPROACH SIGNAL TO BE PERFORMED PRIOR TO INSTALLATION OF THE OVERHEAD SIGNAL.

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

WORK TO OCCUR FROM THE CONTRACTOR SHALL CONSENT WITH THE SIGNALS 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 IT IS APPROVED BY THE DEPARTMENT OF TRANSPORTATION LATEST AMENDMENT TO ACT 267, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST BE IN ACCORDANCE WITH THE DEPARTMENT SPECIFICATIONS. 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 6 FEET BELOW THE SURFACE OF THE ROADWAY, OR CHANGES IN ROADWAY OR LACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8600 SERIES.

SYSTEM PERMIT # 0071

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION  
ENGINEERING DISTRICT 6-0  
COUNTY: DELAWARE  
MUNICIPALITY: RAONOR TOWNSHIP  
INTERSECTION: LANCASTER AVENUE (S.R. 0030) & KING OF PRUSSIA RD / -476 RAMP (S.R. 8039)

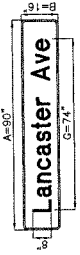
DATE: \_\_\_\_\_  
DATE: \_\_\_\_\_  
RECOMMENDED: 11/24/08  
PAUL LUITZ  
LOUIS R. BELMONT, P.E.  
ENGINEER

NO.	REVISION	BY	DATE	REASON	DATE
1	AS-BUILT DRAWING	MCM	10/6/07	5	11/14/08
2					
3					
4					
5					
6					
7					
8					

SHEET 3 OF 3 PERMIT # 63-2930 FILE # 2530

## SIGN DETAILS

NOT TO SCALE  
FONT: CLEARVIEW ONE



8' UPPER CASE  
6' LOWER CASE



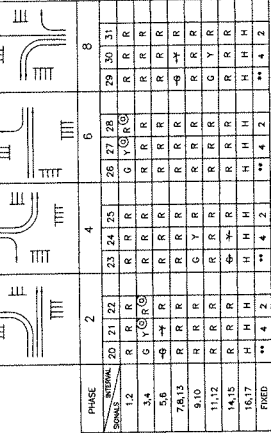
8' UPPER CASE  
6' LOWER CASE



8' UPPER CASE  
6' LOWER CASE

## EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM



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.

⊙ G WHEN RETURNING TO NORMAL OPERATION

## EMERGENCY PRE-EMPTION NOTES:

- CONTROLLED TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE SOUTHBOUND APPROACH OF KING OF PRUSSIA ROAD AND THE NORTHBOUND APPROACH OF THE I-476 RAMP AND THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVE WITH A FALL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND OPERATION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE RED CLEARANCE INTERVALS, ACCORDINGLY, THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE RED CLEARANCE INTERVALS, ACCORDINGLY, THEN THE GREEN INTERVAL OF THE PRE-EMPTION PHASE SHALL FOLLOW.
- IF SIGNAL HAS BEEN COVERED BY PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN RED AND FOLLOWED BY THE "RED HAND" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE GOING INTO EMERGENCY PRE-EMPTION.
- 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, 6 OR 8 IN RETURNING TO NORMAL OPERATION PHASE 2, 4, 6 INTERVAL 4 SHALL FOLLOW.
- IF ADDITIONAL PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- IF ADDITIONAL PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.



# GENERAL NOTES

NO MODIFICATIONS OF THE INSTALLATION SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER. APPROVALS SHALL BE WRITTEN BY A REPRESENTATIVE OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, INSTALLATION AND MAINTENANCE OF SIGNALS SHALL BE THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVERS MARKINGS INDICATED ON THIS DRAWING ARE TO BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL POLES LOCATED AT THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS SITED OVER THE ROADWAY SHALL HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET FROM THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE ROYALLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BANNULETS.

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 PERMITTEE.

SIGNALS SHALL BE INSTALLED AT MINORITY AND WHERE NOTED, SHALL BE PLANNED AND INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FOR TRAFFIC SIGNALS.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION TO DETERMINE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

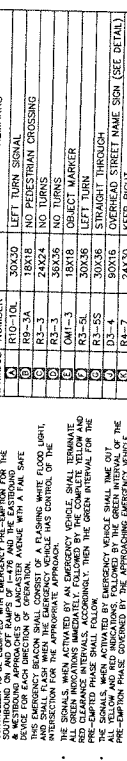
THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS IT IS APPROVED BY THE ENGINEER AND THE PERMITTEE'S LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

CONCRETE UNDERPAVEMENT SHALL BE USED. SIGNAL INSTALLATION MUST BE COMPLETED AND THE ROADWAY OPEN TO TRAFFIC WITHIN 14 DAYS OF THE PERMIT START DATE.

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

CONDUIT INSTALLED IN BIRMINGHAM ROADWAY LESS THAN 5 YEARS FROM THE DATE OF INSTALLATION MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TO-8800 SERIES.

# EMERGENCY PRE-EMPTION PHASING



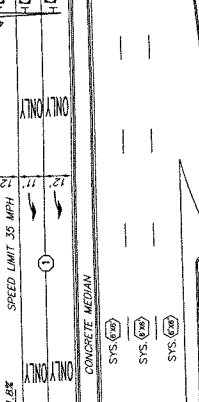
EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE CONTROLLED AND OFF RAMP OF I-476 AND THE ENTRANCE AND EXIT RAMP FOR EACH DIRECTION OF OPERATION. TRAFFIC WITH A TAIL SWEET AND SMALL FLASH WITH THE EMERGENCY SIGNAL. PHASE SEQUENCE OF THE SIGNALS SHALL BE AS FOLLOWS:
- ALL GREEN INDICATORS IMMEDIATELY FOLLOWED BY THE CORRESPONDING PRE-EMPTION PHASE SHALL FOLLOW. WHEN THE GREEN INTERVAL FOR THE PRE-EMPTION PHASE IS EXHAUSTED, THE PRE-EMPTION PHASE SHALL FOLLOW. ALL SIGNALS SHALL REMAIN IN THE PRE-EMPTION PHASE UNTIL ALL EMERGENCY VEHICLES ARE FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE PRE-EMPTION PHASE SHALL BE MAINTAINED UNTIL ALL PHASES IN THE PRE-EMPTION PHASE ARE COMPLETELY EXHAUSTED.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2, 4, 6 OR 8 IS RETURNING TO NORMAL OPERATION AND THE GREEN INTERVAL SHALL FOLLOW.
- EMERGENCY PRE-EMPTION PHASE SHALL BE MAINTAINED UNTIL ALL PHASES IN THE PRE-EMPTION PHASE ARE COMPLETELY EXHAUSTED.
- EMERGENCY PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVED" OPERATION.

### SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
R-10-10L	30X20	LEFT TURN SIGNAL	
R-9-3A	18X18	NO PEDESTRIAN CROSSINGS	
R-2-3	24X24	NO TURNS	
R-3-3	36X36	NO TURNS	
R-1-3	18X18	OBJECT MARKER	
R-1-SS	30X30	LEFT TURN SIGNAL	
R-1-SS	30X30	OVERHEAD STREET NAME SIGN (SEE DETAIL)	
R-4-7	24X20	KEEP RIGHT	
R-6-7R	36X12	HORIZONTAL LEFT ONE WAY	
R-6-7L	36X12	HORIZONTAL RIGHT ONE WAY	
R-5-1	30X30	YIELD	
R-5-1A	30X30	NO ROADWAY	
R-4-7R	36X30	MERGE, RIGHT	

# EMERGENCY PRE-EMPTION MOVEMENT, SEQUENCE AND TIMING DIAGRAM

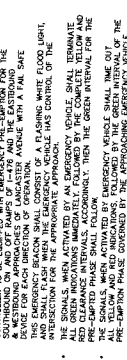


FOR DURATION OF PRE-EMPTION

IF PRE-EMPTION EQUIPMENT HAS ENOUGH CAPABILITY FOR PHASE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "OFF" FEATURE IDENTIFICATION. OTHERWISE, LETTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

© C WHEN RETURNING TO NORMAL OPERATION

# SIGNAL INDICATIONS



OPERATION NOTES:

① G IF FOLLOWED BY 1+6

### MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	SEQUENCE	TIMING
1-4	1-2-3	1-2
5-8	5-6-7-8	3-4
9-12	9-10-11-12	5-6
13-16	13-14-15-16	7-8
17-20	17-18-19-20	9-10
21-24	21-22-23-24	11-12
25-28	25-26-27-28	13-14
29-32	29-30-31-32	15-16
33-36	33-34-35-36	17-18
37-40	37-38-39-40	19-20
41-44	41-42-43-44	21-22
45-48	45-46-47-48	23-24
49-52	49-50-51-52	25-26
53-56	53-54-55-56	27-28
57-60	57-58-59-60	29-30
61-64	61-62-63-64	31-32
65-68	65-66-67-68	33-34
69-72	69-70-71-72	35-36
73-76	73-74-75-76	37-38
77-80	77-78-79-80	39-40
81-84	81-82-83-84	41-42
85-88	85-86-87-88	43-44
89-92	89-90-91-92	45-46
93-96	93-94-95-96	47-48
97-100	97-98-99-100	49-50

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



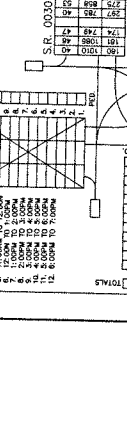
OPERATION NOTES:

① G IF FOLLOWED BY 1+6

### MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	SEQUENCE	TIMING
1-4	1-2-3	1-2
5-8	5-6-7-8	3-4
9-12	9-10-11-12	5-6
13-16	13-14-15-16	7-8
17-20	17-18-19-20	9-10
21-24	21-22-23-24	11-12
25-28	25-26-27-28	13-14
29-32	29-30-31-32	15-16
33-36	33-34-35-36	17-18
37-40	37-38-39-40	19-20
41-44	41-42-43-44	21-22
45-48	45-46-47-48	23-24
49-52	49-50-51-52	25-26
53-56	53-54-55-56	27-28
57-60	57-58-59-60	29-30
61-64	61-62-63-64	31-32
65-68	65-66-67-68	33-34
69-72	69-70-71-72	35-36
73-76	73-74-75-76	37-38
77-80	77-78-79-80	39-40
81-84	81-82-83-84	41-42
85-88	85-86-87-88	43-44
89-92	89-90-91-92	45-46
93-96	93-94-95-96	47-48
97-100	97-98-99-100	49-50

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



OPERATION NOTES:

① G IF FOLLOWED BY 1+6

### MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	SEQUENCE	TIMING
1-4	1-2-3	1-2
5-8	5-6-7-8	3-4
9-12	9-10-11-12	5-6
13-16	13-14-15-16	7-8
17-20	17-18-19-20	9-10
21-24	21-22-23-24	11-12
25-28	25-26-27-28	13-14
29-32	29-30-31-32	15-16
33-36	33-34-35-36	17-18
37-40	37-38-39-40	19-20
41-44	41-42-43-44	21-22
45-48	45-46-47-48	23-24
49-52	49-50-51-52	25-26
53-56	53-54-55-56	27-28
57-60	57-58-59-60	29-30
61-64	61-62-63-64	31-32
65-68	65-66-67-68	33-34
69-72	69-70-71-72	35-36
73-76	73-74-75-76	37-38
77-80	77-78-79-80	39-40
81-84	81-82-83-84	41-42
85-88	85-86-87-88	43-44
89-92	89-90-91-92	45-46
93-96	93-94-95-96	47-48
97-100	97-98-99-100	49-50

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

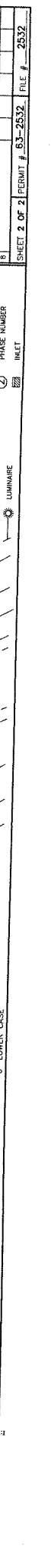
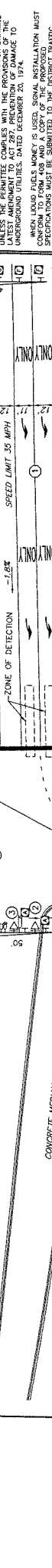
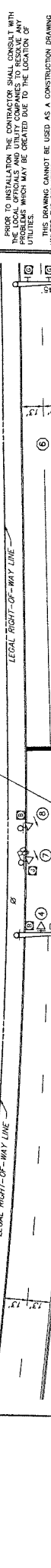


OPERATION NOTES:

① G IF FOLLOWED BY 1+6

### MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	SEQUENCE	TIMING
1-4	1-2-3	1-2
5-8	5-6-7-8	3-4
9-12	9-10-11-12	5-6
13-16	13-14-15-16	7-8
17-20	17-18-19-20	9-10
21-24	21-22-23-24	11-12
25-28	25-26-27-28	13-14
29-32	29-30-31-32	15-16
33-36	33-34-35-36	17-18
37-40	37-38-39-40	19-20
41-44	41-42-43-44	21-22
45-48	45-46-47-48	23-24
49-52	49-50-51-52	25-26
53-56	53-54-55-56	27-28
57-60	57-58-59-60	29-30
61-64	61-62-63-64	31-32
65-68	65-66-67-68	33-34
69-72	69-70-71-72	35-36
73-76	73-74-75-76	37-38
77-80	77-78-79-80	39-40
81-84	81-82-83-84	41-42
85-88	85-86-87-88	43-44
89-92	89-90-91-92	45-46
93-96	93-94-95-96	47-48
97-100	97-98-99-100	49-50



**SYSTEM PERMIT #0071**

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION  
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE

MUNICIPALITY: RADNOR TOWNSHIP

INTERSECTION: LANCASTER AVENUE (S.R. 0030)  
AND I-476 SOUTHBOUND ON/OFF RAMP

REVIEWER: \_\_\_\_\_ DATE: \_\_\_\_\_

ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_

RECOMMENDED: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED: PAUL R. BELMONT, P.E. 11/24/08  
DISTRICT MANAGER

DESIGNED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

DRAWN BY: \_\_\_\_\_ DATE: \_\_\_\_\_

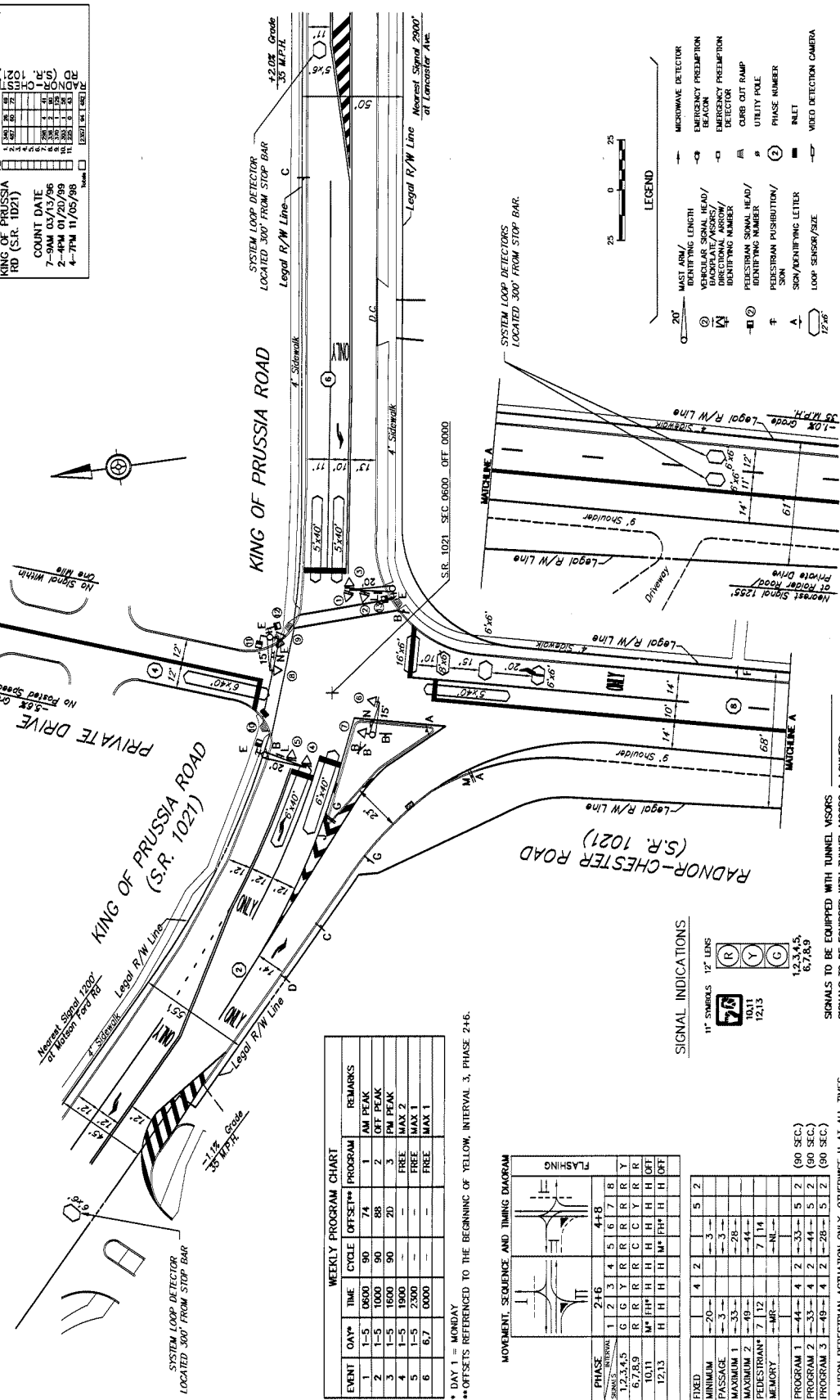
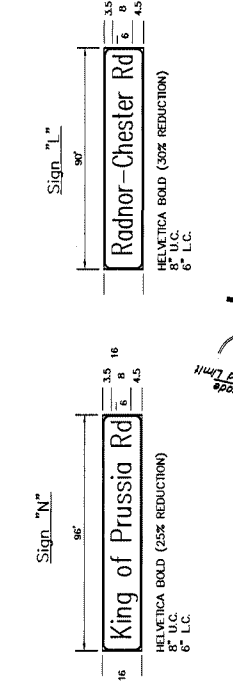
CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

IN CHARGE: \_\_\_\_\_ DATE: \_\_\_\_\_

FILE # 2532

2 OF 2

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	RS-1	30" x 30"	DO NOT ENTER
B	RS-3	18" x 18"	NO PEDESTRIAN CROSSING
C	RS-7	30" x 30"	LEFT LANE MUST TURN LEFT
D	RS-7R	30" x 30"	RIGHT LANE MUST TURN RIGHT
E	R10-38	9" x 12"	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
F	RS-8	30" x 30"	LANE USE CONTROL
G	RS-9	30" x 24"	WRONG WAY
H	RS-9	30" x 24"	WRONG WAY
J	W16-1	18" x 18"	HAZARD MARKER
K	RI-2	36" x 36"	RAIDOR-CHESTER RD
L	RI-2	36" x 36"	FIELD
M	RI-4	96" x 116"	KING OF PRUSSIA RD
N	RI-4	96" x 116"	KING OF PRUSSIA RD



### GENERAL NOTES

- NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS OBTAINED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.
- ALL MAINTENANCE WORK INCLUDING TROWING OF TILES, NECESSARY FOR PROPER MAINTENANCE OF THE SIGNALS IS THE RESPONSIBILITY OF THE PROPERTY.
- ALL SIGNS AND PAVERS MARKINGS INDICATED ON THIS DRAWING SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION  
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE  
MUNICIPALITY: RAIDOR TOWNSHIP  
INTERSECTION: KING OF PRUSSIA RD (S.R. 1021) & RAIDOR-CHESTER RD (S.R. 1021)/PRIVATE DR.

REVIEWED: \_\_\_\_\_ DATE: \_\_\_\_\_  
RECOMMENDED: \_\_\_\_\_ DATE: \_\_\_\_\_

DISTRICT TRAFFIC ENGINEER: **Walter J. Eichorn** DATE: 12/18/97

NO.	REV.	DATE	BY	REASON
1	1	12/18/97	WJE	PREPARED
2	2	12/18/97	WJE	REVISED
3	3	12/18/97	WJE	REVISED
4	4	12/18/97	WJE	REVISED
5	5	12/18/97	WJE	REVISED
6	6	12/18/97	WJE	REVISED
7	7	12/18/97	WJE	REVISED

PERMIT # 63-18000 FILE # 1800  
SHEET 2 OF 2

#### SIGN INDICATIONS

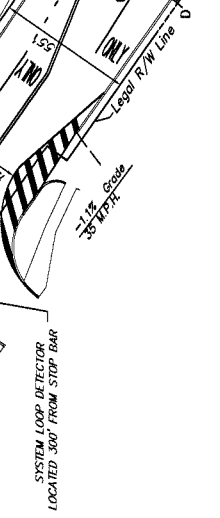
12" LENS	(R)	12, 34, 5, 6, 7, 8, 9
18" LENS	(Y)	12, 13
24" LENS	(G)	12, 13

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

#### WEEKLY PROGRAM CHART

EVENT	QAM	TIME	CYCLE	OFFSET**	PROGRAM	REMARKS
1	1-5	0600	90	74	1	AM PEAK
2	1-5	1000	90	88	2	OFF PEAK
3	1-5	1600	90	20	3	PM PEAK
4	1-5	1900	---	---	---	FREE
5	1-5	2300	---	---	---	FREE
6	6, 7	0000	---	---	---	FREE

\* DAY 1 = MONDAY  
\*\* OFFSETS REFERENCED TO THE BEGINNING OF YELLOW INTERVAL 3, PHASE 2+6.



# APPENDIX C

Traffic Count and Gap Data

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Northbound Left from Major**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps	
7:00 AM	6	2	4	4	3	3	2	3	2	2	0	2	2	0	11	38	285	323
7:15 AM	24	9	1	5	2	0	3	4	0	0	1	1	1	1	9	37	233	270
7:30 AM	19	6	3	3	2	3	4	4	0	0	1	0	0	1	7	34	236	270
7:45 AM	7	1	4	5	3	3	3	1	2	2	0	0	2	10	36	269	305	
8:00 AM	8	3	4	4	3	2	5	2	2	2	2	2	2	8	39	264	303	
8:15 AM	7	4	1	2	0	4	2	1	3	4	0	0	2	12	36	289	325	
8:30 AM	10	4	2	0	2	2	2	2	0	3	2	2	2	9	30	309	339	
8:45 AM	11	6	4	2	6	2	2	2	4	2	0	1	3	9	43	268	311	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	56	14	11	8	7	5	1	1	2	1	1	0	1	0	51	108	159	159
4:15 PM	42	15	10	5	5	3	1	2	1	2	1	1	1	2	48	133	181	181
4:30 PM	68	17	15	5	6	1	0	0	0	0	2	1	0	0	47	67	114	114
4:45 PM	73	19	14	6	6	2	3	1	1	0	0	0	1	1	51	95	146	146
5:00 PM	88	13	8	4	2	1	1	0	0	1	0	0	0	0	28	60	60	60
5:15 PM	81	17	4	2	1	4	1	2	0	0	3	0	0	0	30	63	93	93
5:30 PM	84	25	18	5	0	2	1	3	1	0	0	0	0	0	54	58	112	112
5:45 PM	50	21	17	10	2	3	1	1	3	0	0	0	0	2	53	103	156	156
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	58	19	12	17	10	8	15	11	4	4	4	1	5	6	146	1002	1148	1148
PM Peak	303	76	47	21	5	10	4	6	4	4	1	3	0	0	165	256	421	421

**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Southbound Left from Major**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps
7:00 AM	44	9	9	2	3	2	3	2	2	1	2	1	0	5	41	166	207
7:15 AM	84	14	11	3	1	2	0	0	0	3	2	0	0	2	37	88	125
7:30 AM	95	5	8	3	0	2	1	0	0	0	0	0	0	1	19	38	57
7:45 AM	108	15	4	2	1	1	0	0	1	1	0	0	1	0	25	28	53
8:00 AM	107	16	5	3	2	0	0	2	1	0	0	0	0	1	30	41	71
8:15 AM	107	16	4	1	2	1	1	0	1	0	0	0	0	0	25	25	50
8:30 AM	90	16	5	4	3	0	2	0	2	0	0	1	0	1	34	71	105
8:45 AM	76	15	5	2	4	3	2	2	1	0	0	0	0	0	34	71	105
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	7	10	9	2	2	6	1	2	1	1	3	2	5	54	240	294
4:15 PM	14	9	5	8	3	2	5	1	1	2	4	1	1	7	49	239	288
4:30 PM	26	5	4	5	5	3	1	2	0	0	0	0	0	12	39	261	300
4:45 PM	18	11	8	4	4	0	0	2	2	2	2	1	1	10	46	237	283
5:00 PM	12	3	5	1	2	3	5	4	3	3	3	1	0	7	38	285	323
5:15 PM	17	5	4	1	3	5	2	2	1	2	5	1	1	7	38	260	298
5:30 PM	9	5	7	6	2	3	3	3	3	3	3	1	3	7	48	262	310
5:45 PM	12	8	5	7	5	2	4	2	2	0	1	2	1	7	47	249	296
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	394	50	28	11	4	5	1	2	5	2	2	0	1	4	111	195	306
PM Peak	50	21	21	15	12	13	14	11	7	9	11	3	8	28	171	1056	1227



**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Eastbound Right from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps	
7:00 AM	6	2	4	4	3	3	2	3	4	2	0	2	2	0	11	36	162	198
7:15 AM	24	9	1	5	2	0	3	4	4	0	1	1	1	1	9	28	132	160
7:30 AM	19	6	3	3	2	3	4	4	4	0	0	0	1	7	28	28	134	162
7:45 AM	7	1	4	5	3	3	3	1	2	2	0	2	2	10	35	35	151	186
8:00 AM	8	3	4	4	3	2	5	2	2	2	2	0	2	8	36	36	146	182
8:15 AM	7	4	1	2	0	4	2	1	3	4	0	2	1	12	32	32	166	198
8:30 AM	10	4	2	0	2	2	2	2	2	3	2	2	0	9	26	26	183	209
8:45 AM	11	6	4	2	6	2	2	2	4	2	0	1	3	9	37	37	150	187
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	56	14	11	8	7	5	1	1	2	1	1	0	1	0	38	44	44	82
4:15 PM	42	15	10	5	5	3	1	2	1	2	1	1	1	2	34	34	64	98
4:30 PM	68	17	15	5	6	1	0	0	0	0	2	1	0	0	28	28	25	53
4:45 PM	73	19	14	6	6	2	3	1	1	0	0	0	1	1	34	34	37	71
5:00 PM	88	13	8	4	2	1	1	0	0	1	0	0	0	0	17	17	9	26
5:15 PM	81	17	4	2	1	4	1	2	0	0	3	0	0	0	16	16	29	45
5:30 PM	84	25	18	5	0	2	1	3	1	0	0	0	0	0	29	29	18	47
5:45 PM	50	21	17	10	2	3	1	1	1	3	0	0	0	2	37	37	42	79
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	58	19	12	17	10	8	15	11	4	4	4	1	5	6	34	127	563	690
PM Peak	303	76	47	21	5	10	4	6	4	4	1	3	0	0	99	98	98	197

**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Westbound Right from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps	
7:00 AM	44	9	11	2	3	2	3	2	2	1	2	1	0	0	5	33	86	119
7:15 AM	84	14	11	3	1	2	0	0	0	3	2	0	0	2	24	41	41	65
7:30 AM	95	5	8	3	0	2	1	0	0	0	0	0	0	1	15	15	15	30
7:45 AM	108	15	4	2	1	1	0	0	1	1	0	0	1	0	10	10	12	22
8:00 AM	107	16	5	3	2	0	0	2	1	0	0	0	0	1	13	19	19	32
8:15 AM	107	16	4	1	2	1	1	0	1	0	0	0	0	0	9	9	9	18
8:30 AM	90	16	5	4	3	0	2	0	2	0	0	1	0	1	17	32	32	49
8:45 AM	76	15	5	2	4	3	2	2	1	0	0	2	0	0	19	31	31	50
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	7	10	9	2	2	6	1	2	1	1	3	2	5	46	125	125	171
4:15 PM	14	9	5	8	3	2	5	1	1	2	4	1	1	7	39	130	169	
4:30 PM	26	5	4	5	5	3	1	2	0	2	0	0	0	12	34	148	182	
4:45 PM	18	11	8	4	4	0	0	2	2	2	2	1	1	10	36	130	166	
5:00 PM	12	3	5	1	2	3	5	4	3	3	3	1	0	7	34	164	198	
5:15 PM	17	5	4	1	3	5	2	2	1	2	5	1	1	7	34	146	180	
5:30 PM	9	5	7	6	2	3	3	3	3	3	3	1	3	7	42	139	181	
5:45 PM	12	8	5	7	5	2	4	2	2	1	2	1	3	7	37	137	174	
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	394	50	28	11	4	5	1	2	5	2	2	0	1	4	62	87	149	
PM Peak	50	21	21	15	12	13	14	11	7	9	11	3	8	28	147	586	733	

Study Name King of Prussia Rd/Septa Driveway  
 Start Date 04/27/2016  
 Start Time 7:00 AM

Through Traffic on Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (6.5 sec)	Follow-up Gaps (4.0 sec)	Total Gaps	
7:00 AM	41	13	11	7	7	6	1	1	1	3	1	0	0	0	2	35	35	70
7:15 AM	88	13	4	1	2	1	2	0	0	0	1	0	0	0	1	12	12	24
7:30 AM	92	7	6	1	1	1	0	0	0	0	0	0	0	0	0	8	2	10
7:45 AM	102	9	3	3	0	0	0	0	0	0	0	0	1	0	5	5	4	9
8:00 AM	97	10	4	2	1	1	0	1	1	1	0	0	0	0	0	8	6	14
8:15 AM	100	14	2	1	0	1	1	1	1	0	0	0	0	0	0	6	5	11
8:30 AM	100	19	5	3	0	0	2	0	2	1	1	0	0	0	10	13	23	23
8:45 AM	82	17	5	3	4	3	0	0	1	1	1	1	0	0	15	16	31	31
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	70	16	13	9	5	2	0	2	0	0	0	0	0	0	0	30	10	40
4:15 PM	56	21	12	6	3	3	4	1	2	0	0	0	0	0	0	26	18	44
4:30 PM	79	13	13	2	3	1	0	0	1	1	1	0	0	0	0	20	10	30
4:45 PM	92	21	14	5	2	0	1	1	1	0	0	0	1	1	22	15	37	37
5:00 PM	69	14	6	3	2	1	2	0	0	0	0	0	0	0	13	6	19	19
5:15 PM	87	14	5	3	1	4	2	1	0	0	0	0	0	0	13	11	24	24
5:30 PM	95	20	14	4	3	1	0	2	0	0	0	0	0	0	20	8	28	28
5:45 PM	60	18	17	7	3	2	2	0	2	1	0	0	0	0	29	17	46	46
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	379	39	17	7	4	3	2	1	1	1	1	0	1	1	33	24	57	57
PM Peak	311	66	42	17	9	8	6	3	2	1	1	0	0	0	75	42	117	117

**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Left from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (7.1 sec)	Follow-up Gaps (3.5 sec)	Total Gaps
7:00 AM	41	13	11	7	7	6	1	1	3	1	0	0	0	2	31	40	71
7:15 AM	88	13	4	1	2	1	2	0	0	1	0	0	0	1	10	15	25
7:30 AM	92	7	6	1	1	1	0	0	0	0	0	0	0	0	7	2	9
7:45 AM	102	9	3	3	0	0	0	0	0	0	0	0	1	0	5	5	10
8:00 AM	97	10	4	2	1	1	0	1	1	0	0	0	0	0	8	7	15
8:15 AM	100	14	2	1	0	1	1	1	0	0	0	0	0	0	4	5	9
8:30 AM	100	19	5	3	0	0	2	0	2	1	0	0	0	0	9	14	23
8:45 AM	82	17	5	3	4	3	0	0	1	1	1	0	0	0	13	17	30
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	70	16	13	9	5	2	0	2	0	0	0	0	0	0	24	10	34
4:15 PM	56	21	12	6	3	3	4	1	2	0	0	0	0	0	21	20	41
4:30 PM	79	13	13	2	3	1	0	0	0	1	1	0	0	0	16	12	28
4:45 PM	92	21	14	5	2	0	1	1	0	0	0	0	1	1	15	16	31
5:00 PM	69	14	6	3	2	1	2	0	0	0	0	0	0	0	7	7	18
5:15 PM	87	14	5	3	1	4	2	1	0	0	0	0	0	0	12	12	24
5:30 PM	95	20	14	4	3	1	0	2	0	0	0	0	0	0	15	8	23
5:45 PM	60	18	17	7	3	2	2	0	2	1	0	0	0	0	23	16	39
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	379	39	17	7	4	3	2	1	1	1	0	0	1	1	30	29	59
PM Peak	311	66	42	17	9	8	6	3	2	1	0	0	0	0	61	43	104

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Northbound Left from Major**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps	
7:00 AM	4	3	2	6	4	1	1	2	1	2	0	0	0	1	11	34	308	342
7:15 AM	17	10	9	5	6	3	3	1	0	1	0	0	0	1	9	47	237	284
7:30 AM	10	8	3	0	3	2	2	0	0	1	0	0	0	1	12	34	279	313
7:45 AM	9	0	3	5	2	2	4	0	0	3	1	0	0	0	9	31	282	313
8:00 AM	10	2	2	5	3	4	3	4	2	0	0	0	0	3	11	39	289	328
8:15 AM	4	3	4	2	1	3	0	3	2	2	3	0	0	4	10	34	283	317
8:30 AM	6	3	3	1	3	0	3	2	2	2	2	0	1	10	31	310	341	
8:45 AM	12	6	1	4	2	5	1	4	5	0	1	1	1	9	40	276	316	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	55	16	10	12	4	5	3	1	1	0	2	1	1	0	0	53	103	156
4:15 PM	30	19	10	5	5	2	1	2	1	1	2	0	0	1	2	52	135	187
4:30 PM	56	12	13	4	2	1	3	0	0	1	0	2	0	2	0	39	102	141
4:45 PM	35	10	13	8	6	4	1	3	0	0	0	0	0	0	2	48	117	165
5:00 PM	73	16	4	3	2	1	0	0	0	0	0	1	0	0	0	27	26	53
5:15 PM	65	14	5	1	1	3	2	1	1	2	1	0	0	0	1	30	70	100
5:30 PM	69	24	13	9	1	3	0	3	0	0	0	0	0	0	0	52	53	105
5:45 PM	57	23	13	6	5	1	1	3	2	0	0	0	0	2	54	92	146	
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	46	20	17	15	14	11	10	4	10	3	2	0	0	5	41	151	1087	1238
PM Peak	264	77	35	19	9	8	3	7	3	2	1	1	0	3	163	241	404	

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Southbound Left from Major**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps	
7:00 AM	50	11	5	2	6	1	2	0	0	4	0	0	0	1	3	37	117	154
7:15 AM	86	8	9	3	0	1	0	0	0	0	0	0	0	0	0	21	40	40
7:30 AM	114	4	1	1	0	2	0	0	0	0	0	0	0	0	0	8	11	19
7:45 AM	127	13	2	0	1	0	0	0	0	1	0	0	0	0	16	16	10	26
8:00 AM	102	10	5	6	3	1	1	1	0	1	0	0	0	1	27	27	54	81
8:15 AM	96	12	5	2	3	1	2	0	1	0	0	1	1	1	26	26	55	81
8:30 AM	85	12	7	5	4	2	1	1	3	0	0	1	1	1	36	36	95	131
8:45 AM	72	10	8	5	2	2	2	1	3	1	1	0	1	1	36	36	94	130
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	14	7	4	2	3	4	2	1	3	3	1	4	5	52	52	219	271
4:15 PM	19	1	6	2	1	4	4	9	3	0	0	1	1	7	39	259	288	288
4:30 PM	30	9	6	5	2	2	2	2	1	1	1	3	0	8	41	221	262	262
4:45 PM	20	6	6	3	1	3	4	1	3	3	1	0	0	9	40	230	270	270
5:00 PM	14	5	5	1	8	1	3	5	3	5	1	0	1	6	43	245	288	288
5:15 PM	22	5	4	3	6	3	4	2	0	3	3	2	1	6	42	246	288	288
5:30 PM	16	8	5	1	3	2	5	2	3	2	2	3	1	5	42	219	261	261
5:45 PM	17	9	8	2	5	2	3	3	1	2	4	1	0	6	46	223	269	269
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	429	35	17	10	4	4	1	1	0	2	0	0	0	1	72	94	166	166
PM Peak	69	27	22	7	22	8	15	12	7	12	10	6	3	23	173	933	1106	1106

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Eastbound Right from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps
7:00 AM	4	3	2	6	4	1	1	2	1	2	0	0	1	11	30	182	212
7:15 AM	17	10	9	5	6	3	3	1	0	1	0	0	1	9	37	131	168
7:30 AM	10	8	3	0	3	2	2	0	2	1	0	0	1	12	26	166	192
7:45 AM	9	0	3	5	2	2	4	0	0	3	2	0	0	9	30	165	195
8:00 AM	10	2	2	5	3	4	3	4	2	0	0	0	3	11	37	162	199
8:15 AM	4	3	4	2	1	3	0	3	2	2	3	0	4	10	32	165	197
8:30 AM	6	3	3	1	3	0	3	2	2	2	2	0	1	10	29	185	214
8:45 AM	12	6	1	4	2	5	1	4	5	0	1	1	1	9	33	160	193
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	55	16	10	12	4	5	3	1	1	0	2	1	0	0	36	39	75
4:15 PM	30	19	10	5	5	2	1	2	1	1	2	1	1	2	33	63	96
4:30 PM	56	12	13	4	2	1	3	0	0	1	0	2	0	2	28	47	75
4:45 PM	35	10	13	8	6	4	1	3	0	0	0	0	0	2	36	50	86
5:00 PM	73	16	4	3	2	1	0	0	0	0	0	1	0	0	10	9	19
5:15 PM	65	14	5	1	1	3	2	1	1	2	1	0	0	1	17	33	50
5:30 PM	69	24	13	9	1	3	0	3	0	0	0	0	0	0	27	17	44
5:45 PM	57	23	13	6	5	1	1	3	2	0	0	0	0	2	31	38	69
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	46	20	17	15	14	11	10	4	10	3	2	0	5	41	130	624	754
PM Peak	264	77	35	19	9	8	3	7	3	2	1	1	0	3	85	97	182

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Westbound Right from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps	
7:00 AM	50	11	5	2	6	1	2	0	0	2	4	0	0	1	3	24	61	85
7:15 AM	86	8	9	3	0	1	0	0	0	0	0	0	0	0	0	13	3	16
7:30 AM	114	4	1	1	0	2	0	0	0	0	0	0	0	0	0	4	4	8
7:45 AM	127	13	2	0	1	0	0	0	0	0	1	0	0	0	0	4	5	9
8:00 AM	102	10	5	6	3	1	1	1	0	0	1	0	0	1	18	18	24	42
8:15 AM	96	12	5	2	3	1	2	0	0	0	0	0	1	1	16	16	24	40
8:30 AM	85	12	7	5	4	2	1	1	3	0	0	1	1	1	26	26	44	70
8:45 AM	72	10	8	5	2	2	2	1	3	1	1	0	1	1	26	26	44	70
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	16	14	7	4	2	3	4	2	1	3	3	3	1	4	38	118	156	156
9:30 AM	19	1	6	2	1	4	4	9	3	0	0	0	1	1	38	142	180	180
9:45 PM	30	9	6	5	2	2	2	2	1	1	1	3	0	8	33	123	156	156
10:00 PM	20	6	6	3	1	3	4	1	3	3	3	1	0	9	33	126	159	159
10:15 PM	14	5	5	1	8	1	3	5	3	5	5	1	0	6	38	136	174	174
10:30 PM	22	5	4	3	6	3	4	2	0	3	3	3	2	1	36	135	171	171
10:45 PM	16	8	5	1	3	2	5	2	3	2	2	3	1	5	34	118	152	152
11:00 PM	17	9	8	2	5	2	3	3	3	1	2	4	1	6	36	121	157	157
11:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	429	35	17	10	4	4	1	1	0	2	2	0	0	1	39	36	75	75
PM Peak	69	27	22	7	22	8	15	12	7	12	10	6	3	23	144	510	654	654



**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Through Traffic on Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (6.5 sec)	Follow-up Gaps (4.0 sec)	Total Gaps	
7:00 AM	48	17	6	2	6	0	4	2	1	2	0	0	0	1	1	24	34	58
7:15 AM	77	7	6	2	0	0	0	0	0	0	0	0	0	0	0	7	0	7
7:30 AM	102	3	3	1	0	1	0	0	0	0	0	0	0	0	0	3	1	4
7:45 AM	108	12	1	1	0	0	0	0	1	0	0	0	0	0	0	2	3	5
8:00 AM	94	11	6	7	1	1	0	0	1	1	0	0	0	0	15	8	23	
8:15 AM	90	13	6	2	2	2	1	0	0	0	1	0	1	0	14	13	27	
8:30 AM	93	13	6	6	7	2	2	0	0	0	0	0	0	1	21	15	36	
8:45 AM	79	15	7	9	3	0	1	3	0	0	2	0	0	0	25	17	42	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00 PM	62	23	9	9	1	2	3	0	0	1	1	0	0	0	19	15	34	
4:15 PM	43	18	10	5	7	7	2	2	0	1	0	0	0	0	30	21	51	
4:30 PM	66	16	12	4	3	0	1	0	0	0	1	0	0	1	18	10	28	
4:45 PM	47	16	12	3	4	2	2	0	1	0	1	0	0	1	21	22	43	
5:00 PM	63	11	3	3	0	1	0	0	0	0	0	1	0	0	5	5	10	
5:15 PM	68	12	3	4	0	2	2	1	0	1	0	0	1	0	13	13	26	
5:30 PM	81	22	9	5	2	0	1	0	0	0	0	0	0	0	13	4	17	
5:45 PM	78	23	11	3	2	2	1	0	1	1	0	0	0	0	18	12	30	
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AM Peak	381	33	16	11	1	2	0	0	2	1	1	0	0	0	27	12	39	
PM Peak	290	68	26	15	4	5	4	1	1	2	0	1	1	0	49	34	83	

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Left from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (7.1 sec)	Follow-up Gaps (3.5 sec)	Total Gaps
7:00 AM	48	17	6	2	6	0	4	2	1	2	0	0	1	1	23	39	62
7:15 AM	77	7	6	2	0	0	0	0	0	0	0	0	0	0	4	0	4
7:30 AM	102	3	3	1	0	1	0	0	0	0	0	0	0	0	2	1	3
7:45 AM	108	12	1	1	0	0	0	0	1	0	0	0	0	0	2	3	5
8:00 AM	94	11	6	7	1	1	0	0	0	1	0	0	0	0	13	8	21
8:15 AM	90	13	6	2	2	2	1	0	0	0	1	0	1	0	11	14	25
8:30 AM	93	13	6	6	7	2	2	0	0	0	0	0	0	1	20	15	35
8:45 AM	79	15	7	9	3	0	1	3	0	0	2	0	0	0	19	19	38
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	62	23	9	9	1	2	3	0	0	1	1	0	0	0	18	17	35
9:30 AM	43	18	10	5	7	7	2	2	0	1	0	0	0	0	29	51	22
9:45 AM	66	16	12	4	3	0	1	0	0	0	1	0	0	1	14	12	26
10:00 AM	47	16	12	3	4	2	2	0	1	0	1	0	0	1	15	24	39
10:15 AM	63	11	3	3	0	1	0	0	0	0	0	1	0	0	5	5	10
10:30 AM	68	12	3	4	0	2	2	1	0	1	0	0	1	0	13	16	29
10:45 AM	81	22	9	5	2	0	1	0	0	0	0	0	0	0	9	4	13
11:00 AM	78	23	11	3	2	2	1	0	1	1	0	0	0	0	15	13	28
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	381	33	16	11	1	2	0	0	2	1	0	0	0	0	21	12	33
PM Peak	290	68	26	15	4	5	4	1	1	2	0	1	1	0	42	38	80



www.TSTData.com  
184 Baker Rd

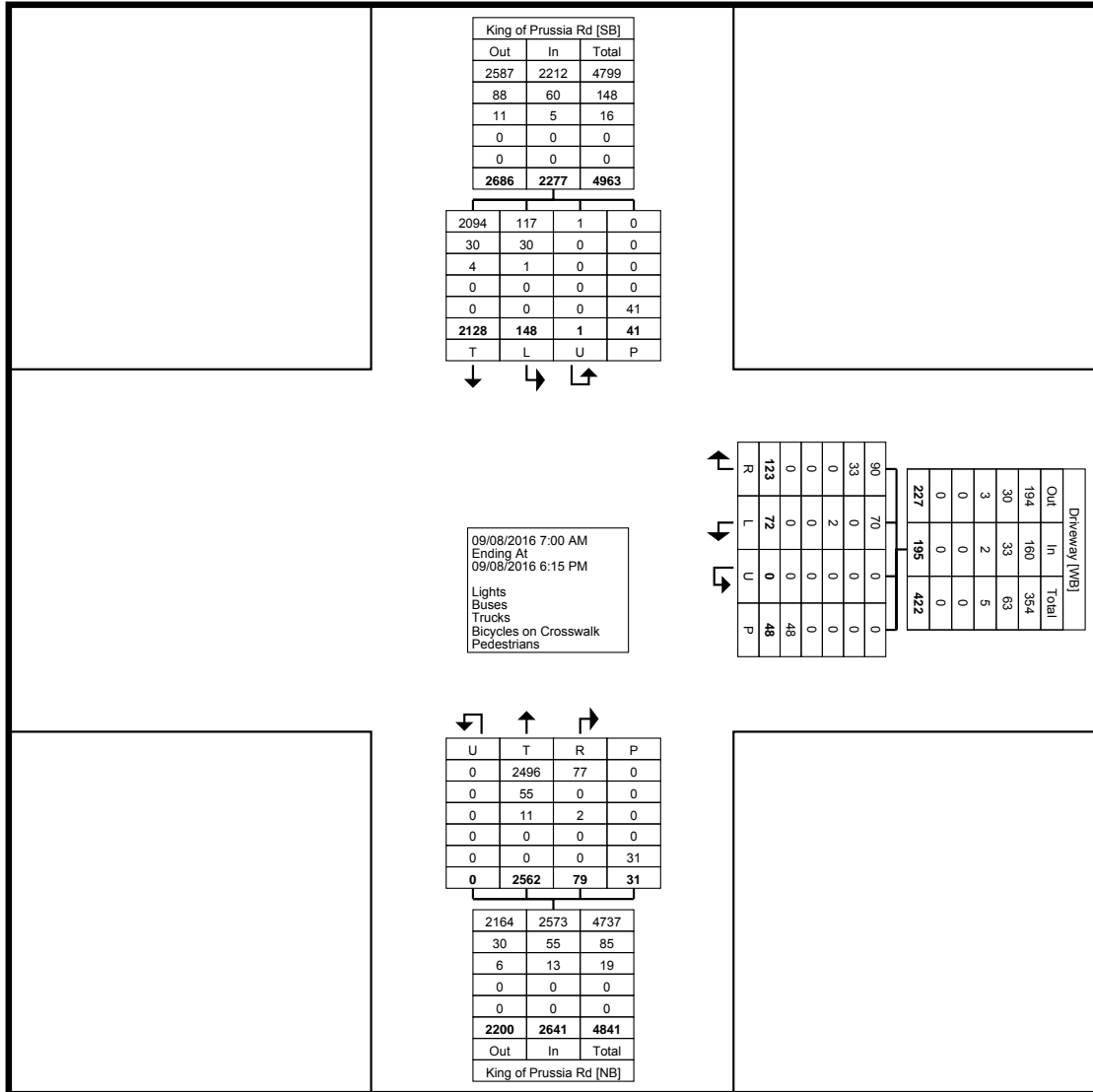
Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Montgomery County, PA  
King of Prussia Rd/Driveway (Septa)  
Thursday, September 8, 2016  
Location: 40.041752, -  
75.355913

Count Name: King of Prussia Rd / Driveway  
Site Code:  
Start Date: 09/08/2016  
Page No: 1

### Turning Movement Data

Start Time	King of Prussia Rd Southbound					Driveway Westbound					King of Prussia Rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	49	13	0	3	62	2	1	0	5	3	5	204	0	2	209	274
7:15 AM	97	13	0	5	110	5	1	0	3	6	12	245	0	0	257	373
7:30 AM	51	14	0	5	65	8	2	0	2	10	11	210	0	0	221	296
7:45 AM	52	14	0	1	66	4	0	0	3	4	13	236	0	2	249	319
Hourly Total	249	54	0	14	303	19	4	0	13	23	41	895	0	4	936	1262
8:00 AM	42	19	0	6	61	9	2	0	2	11	20	242	0	0	262	334
8:15 AM	44	9	0	3	53	5	1	0	1	6	10	246	0	0	256	315
8:30 AM	49	9	0	5	58	5	0	0	2	5	4	224	0	0	228	291
8:45 AM	54	5	0	3	59	3	0	0	1	3	3	263	0	0	266	328
Hourly Total	189	42	0	17	231	22	3	0	6	25	37	975	0	0	1012	1268
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	194	7	0	2	201	11	6	0	1	17	0	94	0	2	94	312
4:15 PM	164	5	0	1	169	9	4	0	0	13	0	89	0	0	89	271
4:30 PM	201	6	0	0	207	16	14	0	17	30	0	98	0	18	98	335
4:45 PM	191	5	0	1	196	5	8	0	3	13	0	77	0	0	77	286
Hourly Total	750	23	0	4	773	41	32	0	21	73	0	358	0	20	358	1204
5:00 PM	285	11	0	5	296	14	21	0	2	35	1	73	0	0	74	405
5:15 PM	221	6	1	0	228	8	5	0	4	13	0	90	0	7	90	331
5:30 PM	227	8	0	1	235	12	7	0	1	19	0	85	0	0	85	339
5:45 PM	207	4	0	0	211	7	0	0	1	7	0	86	0	0	86	304
Hourly Total	940	29	1	6	970	41	33	0	8	74	1	334	0	7	335	1379
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	2128	148	1	41	2277	123	72	0	48	195	79	2562	0	31	2641	5113
Approach %	93.5	6.5	0.0	-	-	63.1	36.9	0.0	-	-	3.0	97.0	0.0	-	-	-
Total %	41.6	2.9	0.0	-	44.5	2.4	1.4	0.0	-	3.8	1.5	50.1	0.0	-	51.7	-
Lights	2094	117	1	-	2212	90	70	0	-	160	77	2496	0	-	2573	4945
% Lights	98.4	79.1	100.0	-	97.1	73.2	97.2	-	-	82.1	97.5	97.4	-	-	97.4	96.7
Buses	30	30	0	-	60	33	0	0	-	33	0	55	0	-	55	148
% Buses	1.4	20.3	0.0	-	2.6	26.8	0.0	-	-	16.9	0.0	2.1	-	-	2.1	2.9
Trucks	4	1	0	-	5	0	2	0	-	2	2	11	0	-	13	20
% Trucks	0.2	0.7	0.0	-	0.2	0.0	2.8	-	-	1.0	2.5	0.4	-	-	0.5	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	41	-	-	-	-	48	-	-	-	-	31	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Turning Movement Data Plot



www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

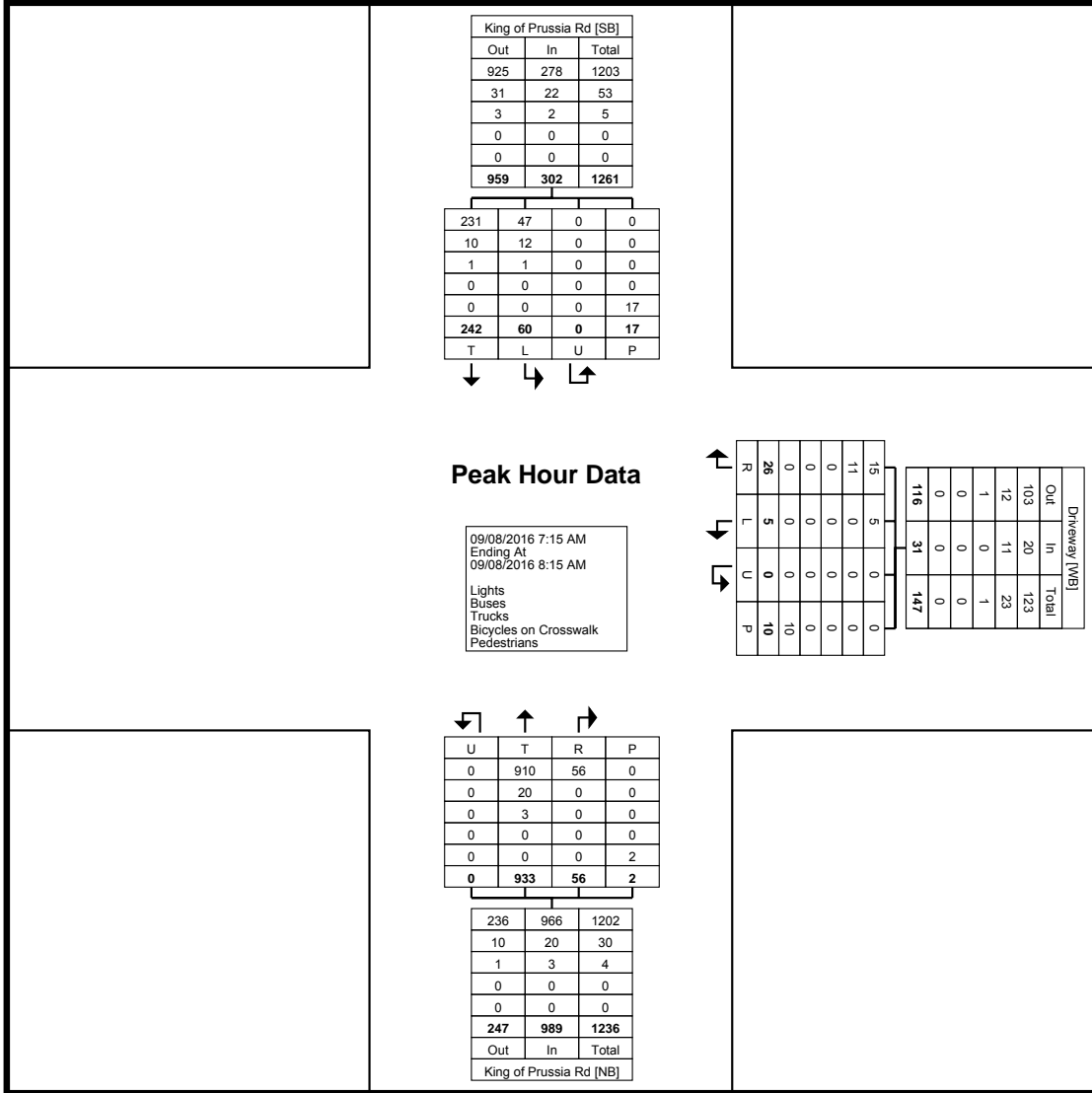
Montgomery County, PA  
King of Prussia Rd/Driveway (Septa)  
Thursday, September 8, 2016  
Location: 40.041752, -  
75.355913

Count Name: King of Prussia Rd  
/ Driveway  
Site Code:  
Start Date: 09/08/2016  
Page No: 3

### Turning Movement Peak Hour Data (7:15 AM)

Start Time	King of Prussia Rd Southbound					Driveway Westbound					King of Prussia Rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:15 AM	97	13	0	5	110	5	1	0	3	6	12	245	0	0	257	373
7:30 AM	51	14	0	5	65	8	2	0	2	10	11	210	0	0	221	296
7:45 AM	52	14	0	1	66	4	0	0	3	4	13	236	0	2	249	319
8:00 AM	42	19	0	6	61	9	2	0	2	11	20	242	0	0	262	334
<b>Total</b>	<b>242</b>	<b>60</b>	<b>0</b>	<b>17</b>	<b>302</b>	<b>26</b>	<b>5</b>	<b>0</b>	<b>10</b>	<b>31</b>	<b>56</b>	<b>933</b>	<b>0</b>	<b>2</b>	<b>989</b>	<b>1322</b>
<b>Approach %</b>	<b>80.1</b>	<b>19.9</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>83.9</b>	<b>16.1</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>5.7</b>	<b>94.3</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total %</b>	<b>18.3</b>	<b>4.5</b>	<b>0.0</b>	<b>-</b>	<b>22.8</b>	<b>2.0</b>	<b>0.4</b>	<b>0.0</b>	<b>-</b>	<b>2.3</b>	<b>4.2</b>	<b>70.6</b>	<b>0.0</b>	<b>-</b>	<b>74.8</b>	<b>-</b>
<b>PHF</b>	<b>0.624</b>	<b>0.789</b>	<b>0.000</b>	<b>-</b>	<b>0.686</b>	<b>0.722</b>	<b>0.625</b>	<b>0.000</b>	<b>-</b>	<b>0.705</b>	<b>0.700</b>	<b>0.952</b>	<b>0.000</b>	<b>-</b>	<b>0.944</b>	<b>0.886</b>
<b>Lights</b>	<b>231</b>	<b>47</b>	<b>0</b>	<b>-</b>	<b>278</b>	<b>15</b>	<b>5</b>	<b>0</b>	<b>-</b>	<b>20</b>	<b>56</b>	<b>910</b>	<b>0</b>	<b>-</b>	<b>966</b>	<b>1264</b>
<b>% Lights</b>	<b>95.5</b>	<b>78.3</b>	<b>-</b>	<b>-</b>	<b>92.1</b>	<b>57.7</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>64.5</b>	<b>100.0</b>	<b>97.5</b>	<b>-</b>	<b>-</b>	<b>97.7</b>	<b>95.6</b>
<b>Buses</b>	<b>10</b>	<b>12</b>	<b>0</b>	<b>-</b>	<b>22</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>11</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>-</b>	<b>20</b>	<b>53</b>
<b>% Buses</b>	<b>4.1</b>	<b>20.0</b>	<b>-</b>	<b>-</b>	<b>7.3</b>	<b>42.3</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>35.5</b>	<b>0.0</b>	<b>2.1</b>	<b>-</b>	<b>-</b>	<b>2.0</b>	<b>4.0</b>
<b>Trucks</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>-</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>-</b>	<b>3</b>	<b>5</b>
<b>% Trucks</b>	<b>0.4</b>	<b>1.7</b>	<b>-</b>	<b>-</b>	<b>0.7</b>	<b>0.0</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>-</b>	<b>-</b>	<b>0.3</b>	<b>0.4</b>
<b>Bicycles on Crosswalk</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>-</b>
<b>% Bicycles on Crosswalk</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>-</b>	<b>-</b>
<b>Pedestrians</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>17</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>10</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>
<b>% Pedestrians</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>

Montgomery County, PA  
King of Prussia Rd/Driveway (Septa)  
Thursday, September 8, 2016  
Location: 40.041752, -  
75.355913



Turning Movement Peak Hour Data Plot (7:15 AM)



www.TSTData.com  
184 Baker Rd

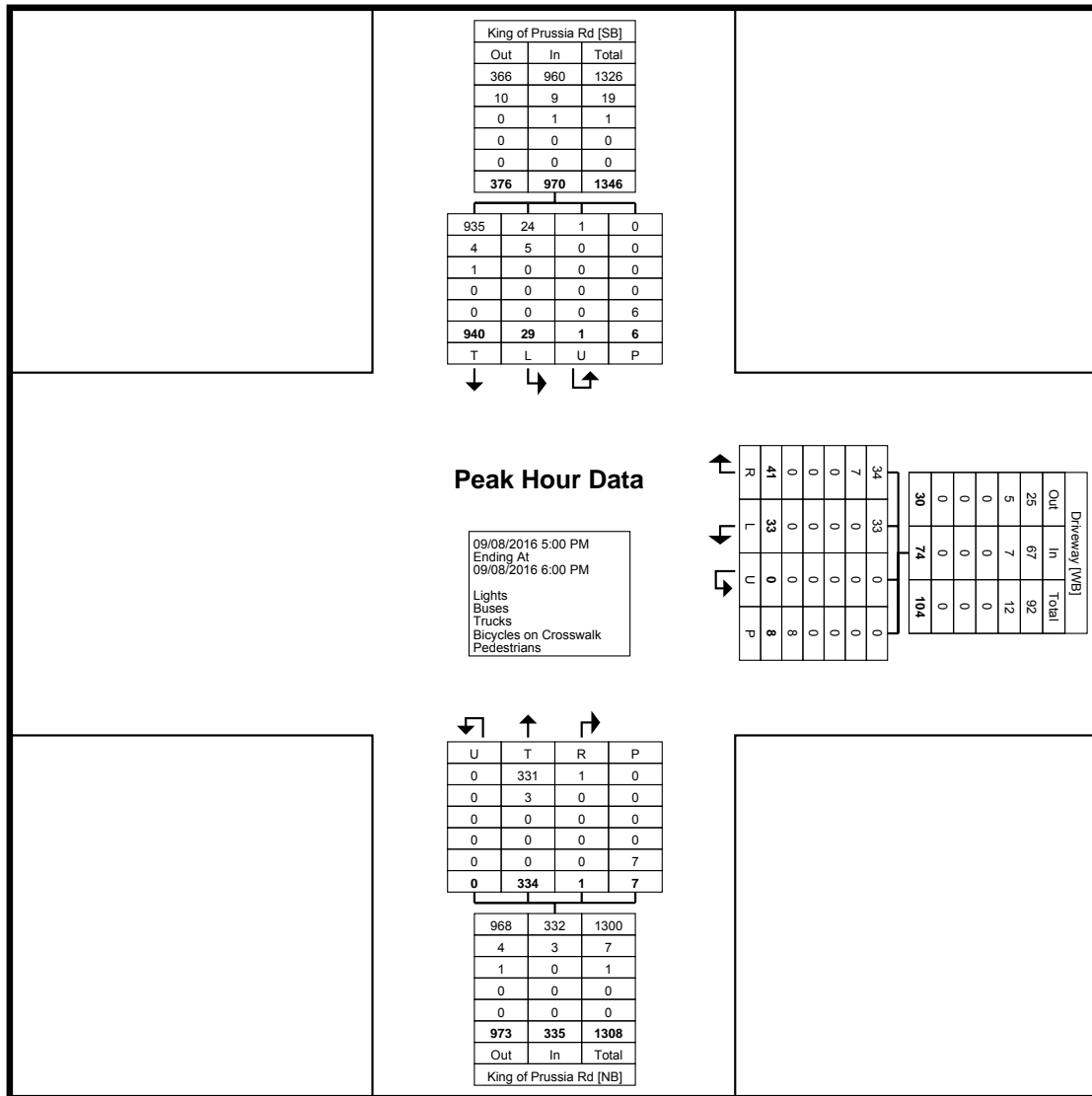
Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Montgomery County, PA  
King of Prussia Rd/Driveway (Septa)  
Thursday, September 8, 2016  
Location: 40.041752, -  
75.355913

Count Name: King of Prussia Rd / Driveway  
Site Code:  
Start Date: 09/08/2016  
Page No: 5

### Turning Movement Peak Hour Data (5:00 PM)

Start Time	King of Prussia Rd Southbound					Driveway Westbound					King of Prussia Rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
5:00 PM	285	11	0	5	296	14	21	0	2	35	1	73	0	0	74	405
5:15 PM	221	6	1	0	228	8	5	0	4	13	0	90	0	7	90	331
5:30 PM	227	8	0	1	235	12	7	0	1	19	0	85	0	0	85	339
5:45 PM	207	4	0	0	211	7	0	0	1	7	0	86	0	0	86	304
<b>Total</b>	<b>940</b>	<b>29</b>	<b>1</b>	<b>6</b>	<b>970</b>	<b>41</b>	<b>33</b>	<b>0</b>	<b>8</b>	<b>74</b>	<b>1</b>	<b>334</b>	<b>0</b>	<b>7</b>	<b>335</b>	<b>1379</b>
<b>Approach %</b>	<b>96.9</b>	<b>3.0</b>	<b>0.1</b>	<b>-</b>	<b>-</b>	<b>55.4</b>	<b>44.6</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>0.3</b>	<b>99.7</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total %</b>	<b>68.2</b>	<b>2.1</b>	<b>0.1</b>	<b>-</b>	<b>70.3</b>	<b>3.0</b>	<b>2.4</b>	<b>0.0</b>	<b>-</b>	<b>5.4</b>	<b>0.1</b>	<b>24.2</b>	<b>0.0</b>	<b>-</b>	<b>24.3</b>	<b>-</b>
<b>PHF</b>	<b>0.825</b>	<b>0.659</b>	<b>0.250</b>	<b>-</b>	<b>0.819</b>	<b>0.732</b>	<b>0.393</b>	<b>0.000</b>	<b>-</b>	<b>0.529</b>	<b>0.250</b>	<b>0.928</b>	<b>0.000</b>	<b>-</b>	<b>0.931</b>	<b>0.851</b>
<b>Lights</b>	<b>935</b>	<b>24</b>	<b>1</b>	<b>-</b>	<b>960</b>	<b>34</b>	<b>33</b>	<b>0</b>	<b>-</b>	<b>67</b>	<b>1</b>	<b>331</b>	<b>0</b>	<b>-</b>	<b>332</b>	<b>1359</b>
<b>% Lights</b>	<b>99.5</b>	<b>82.8</b>	<b>100.0</b>	<b>-</b>	<b>99.0</b>	<b>82.9</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>90.5</b>	<b>100.0</b>	<b>99.1</b>	<b>-</b>	<b>-</b>	<b>99.1</b>	<b>98.5</b>
<b>Buses</b>	<b>4</b>	<b>5</b>	<b>0</b>	<b>-</b>	<b>9</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>7</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>-</b>	<b>3</b>	<b>19</b>
<b>% Buses</b>	<b>0.4</b>	<b>17.2</b>	<b>0.0</b>	<b>-</b>	<b>0.9</b>	<b>17.1</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>9.5</b>	<b>0.0</b>	<b>0.9</b>	<b>-</b>	<b>-</b>	<b>0.9</b>	<b>1.4</b>
<b>Trucks</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0</b>	<b>1</b>
<b>% Trucks</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>-</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>0.1</b>
<b>Bicycles on Crosswalk</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>-</b>
<b>% Bicycles on Crosswalk</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>-</b>	<b>-</b>
<b>Pedestrians</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>6</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>8</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>7</b>	<b>-</b>	<b>-</b>
<b>% Pedestrians</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>



Turning Movement Peak Hour Data Plot (5:00 PM)





Montgomery County, PA  
 King of Prussia Rd Northern  
 Driveway  
 Wednesday, April 27, 2016  
 Location: 40.0417473175836, -  
 75.3559260070324

www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: King of Prussia  
 Rd/North Driveway  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 1

**Combined Direction**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Total
7:00 AM	41	13	11	7	7	6	1	1	3	1	0	0	0	2	93
7:15 AM	88	13	4	1	2	1	2	0	0	1	0	0	0	1	113
7:30 AM	92	7	6	1	1	1	0	0	0	0	0	0	0	0	108
7:45 AM	102	9	3	3	0	0	0	0	0	0	0	0	1	0	118
8:00 AM	97	10	4	2	1	1	0	1	1	0	0	0	0	0	117
8:15 AM	100	14	2	1	0	1	1	1	0	0	0	0	0	0	120
8:30 AM	100	19	5	3	0	0	2	0	2	1	0	0	0	0	132
8:45 AM	82	17	5	3	4	3	0	0	1	1	1	0	0	0	117
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	70	16	13	9	5	2	0	2	0	0	0	0	0	0	117
4:15 PM	56	21	12	6	3	3	4	1	2	0	0	0	0	0	108
4:30 PM	79	13	13	2	3	1	0	0	0	1	1	0	0	0	113
4:45 PM	92	21	14	5	2	0	1	1	0	0	0	0	1	1	138
5:00 PM	69	14	6	3	2	1	2	0	0	0	0	0	0	0	97
5:15 PM	87	14	5	3	1	4	2	1	0	0	0	0	0	0	117
5:30 PM	95	20	14	4	3	1	0	2	0	0	0	0	0	0	139
5:45 PM	60	18	17	7	3	2	2	0	2	1	0	0	0	0	112
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1310</b>	<b>239</b>	<b>134</b>	<b>60</b>	<b>37</b>	<b>27</b>	<b>17</b>	<b>10</b>	<b>11</b>	<b>6</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>1859</b>
<b>Total %</b>	<b>70.5</b>	<b>12.9</b>	<b>7.2</b>	<b>3.2</b>	<b>2.0</b>	<b>1.5</b>	<b>0.9</b>	<b>0.5</b>	<b>0.6</b>	<b>0.3</b>	<b>0.1</b>	<b>0.0</b>	<b>0.1</b>	<b>0.2</b>	<b>100.0</b>



Montgomery County, PA  
 King of Prussia Rd Northern  
 Driveway  
 Wednesday, April 27, 2016  
 Location: 40.0417473175836, -  
 75.3559260070324

www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: King of Prussia  
 Rd/North Driveway  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 2

**Southbound (Southbound)**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Total
7:00 AM	6	2	4	4	3	3	2	3	2	0	2	2	0	11	44
7:15 AM	24	9	1	5	2	0	3	4	0	1	1	1	1	9	61
7:30 AM	19	6	3	3	2	3	4	4	0	1	0	0	1	7	53
7:45 AM	7	1	4	5	3	3	3	1	2	0	0	2	2	10	43
8:00 AM	8	3	4	4	3	2	5	2	2	2	0	2	2	8	47
8:15 AM	7	4	1	2	0	4	2	1	3	4	0	2	1	12	43
8:30 AM	10	4	2	0	2	2	2	2	0	3	2	2	0	9	40
8:45 AM	11	6	4	2	6	2	2	2	4	2	0	1	3	9	54
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	56	14	11	8	7	5	1	1	2	1	1	0	1	0	108
4:15 PM	42	15	10	5	5	3	1	2	1	2	2	1	1	2	92
4:30 PM	68	17	15	5	6	1	0	0	0	0	2	1	0	0	115
4:45 PM	73	19	14	6	6	2	3	1	1	0	0	0	1	1	127
5:00 PM	88	13	8	4	2	1	1	0	0	1	0	0	0	0	118
5:15 PM	81	17	4	2	1	4	1	2	0	0	3	0	0	0	115
5:30 PM	84	25	18	5	0	2	1	3	1	0	0	0	0	0	139
5:45 PM	50	21	17	10	2	3	1	1	3	0	0	0	0	2	110
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>634</b>	<b>176</b>	<b>120</b>	<b>70</b>	<b>50</b>	<b>40</b>	<b>32</b>	<b>29</b>	<b>21</b>	<b>17</b>	<b>13</b>	<b>14</b>	<b>13</b>	<b>80</b>	<b>1309</b>
<b>Total %</b>	<b>48.4</b>	<b>13.4</b>	<b>9.2</b>	<b>5.3</b>	<b>3.8</b>	<b>3.1</b>	<b>2.4</b>	<b>2.2</b>	<b>1.6</b>	<b>1.3</b>	<b>1.0</b>	<b>1.1</b>	<b>1.0</b>	<b>6.1</b>	<b>100.0</b>



Montgomery County, PA  
 King of Prussia Rd Northern  
 Driveway  
 Wednesday, April 27, 2016  
 Location: 40.0417473175836, -  
 75.3559260070324

www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: King of Prussia  
 Rd/North Driveway  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 3

**Northbound (Northbound)**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Total
7:00 AM	44	9	9	2	3	2	3	2	1	2	1	3	0	5	86
7:15 AM	84	14	11	3	1	2	0	0	3	2	0	0	0	2	122
7:30 AM	95	5	8	3	0	2	1	0	0	0	0	0	0	1	115
7:45 AM	108	15	4	2	1	1	0	0	1	0	0	0	1	0	133
8:00 AM	107	16	5	3	2	0	0	2	1	0	0	0	0	1	137
8:15 AM	107	16	4	1	2	1	1	0	1	0	0	0	0	0	133
8:30 AM	90	16	5	4	3	0	2	0	2	0	0	1	0	1	124
8:45 AM	76	15	5	2	4	3	2	2	1	0	0	2	0	0	112
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	7	10	9	2	2	6	1	2	1	3	2	5	5	71
4:15 PM	14	9	5	8	3	2	5	1	1	2	4	1	1	7	63
4:30 PM	26	5	4	5	5	3	1	2	0	2	0	0	0	12	65
4:45 PM	18	11	8	4	4	0	0	2	2	2	2	1	1	10	65
5:00 PM	12	3	5	1	2	3	5	4	3	3	1	0	1	7	50
5:15 PM	17	5	4	1	3	5	2	2	1	2	5	1	1	7	56
5:30 PM	9	5	7	6	2	3	3	3	3	3	3	1	3	7	58
5:45 PM	12	8	5	7	5	2	4	2	0	1	2	1	3	7	59
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>835</b>	<b>159</b>	<b>99</b>	<b>61</b>	<b>42</b>	<b>31</b>	<b>35</b>	<b>23</b>	<b>22</b>	<b>20</b>	<b>21</b>	<b>13</b>	<b>16</b>	<b>72</b>	<b>1449</b>
<b>Total %</b>	<b>57.6</b>	<b>11.0</b>	<b>6.8</b>	<b>4.2</b>	<b>2.9</b>	<b>2.1</b>	<b>2.4</b>	<b>1.6</b>	<b>1.5</b>	<b>1.4</b>	<b>1.4</b>	<b>0.9</b>	<b>1.1</b>	<b>5.0</b>	<b>100.0</b>





www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Count Name: King of Prussia Rd  
South Driveway Gap  
Site Code:  
Start Date: 04/27/2016  
Page No: 1

Montgomery County, PA  
King of Prussia Rd South  
Driveway  
Wednesday, April 27, 2016  
Location: 40.0399194154879, -  
75.3558924794197

**Combined Direction**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Total
7:00 AM	48	17	6	2	6	0	4	2	1	2	0	0	1	1	90
7:15 AM	77	7	6	2	0	0	0	0	0	0	0	0	0	0	92
7:30 AM	102	3	3	1	0	1	0	0	0	0	0	0	0	0	110
7:45 AM	108	12	1	1	0	0	0	0	1	0	0	0	0	0	123
8:00 AM	94	11	6	7	1	1	0	0	1	1	0	0	0	0	122
8:15 AM	90	13	6	2	2	2	1	0	0	0	1	0	1	0	118
8:30 AM	93	13	6	6	7	2	2	0	0	0	0	0	0	1	130
8:45 AM	79	15	7	9	3	0	1	3	0	0	2	0	0	0	119
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	62	23	9	9	1	2	3	0	0	1	1	0	0	0	111
4:15 PM	43	18	10	5	7	7	2	2	0	1	0	0	0	0	95
4:30 PM	66	16	12	4	3	0	1	0	0	0	1	0	0	1	104
4:45 PM	47	16	12	3	4	2	2	0	1	0	1	0	0	1	89
5:00 PM	63	11	3	3	0	1	0	0	0	0	0	1	0	0	82
5:15 PM	68	12	3	4	0	2	2	1	0	1	0	0	1	0	94
5:30 PM	81	22	9	5	2	0	1	0	0	0	0	0	0	0	120
5:45 PM	78	23	11	3	2	2	1	0	1	1	0	0	0	0	122
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1199</b>	<b>232</b>	<b>110</b>	<b>66</b>	<b>38</b>	<b>22</b>	<b>20</b>	<b>8</b>	<b>5</b>	<b>7</b>	<b>6</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>1721</b>
<b>Total %</b>	<b>69.7</b>	<b>13.5</b>	<b>6.4</b>	<b>3.8</b>	<b>2.2</b>	<b>1.3</b>	<b>1.2</b>	<b>0.5</b>	<b>0.3</b>	<b>0.4</b>	<b>0.3</b>	<b>0.1</b>	<b>0.2</b>	<b>0.2</b>	<b>100.0</b>



www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Count Name: King of Prussia Rd  
South Driveway Gap  
Site Code:  
Start Date: 04/27/2016  
Page No: 2

Montgomery County, PA  
King of Prussia Rd South  
Driveway  
Wednesday, April 27, 2016  
Location: 40.0399194154879, -  
75.3558924794197

**Southbound (Southbound)**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Total
7:00 AM	4	3	2	6	4	1	1	2	1	2	0	0	1	11	38
7:15 AM	17	10	9	5	6	3	1	0	3	1	0	0	1	9	65
7:30 AM	10	8	3	0	3	2	2	0	2	1	0	0	1	12	44
7:45 AM	9	0	3	5	2	2	4	0	3	1	2	0	0	9	40
8:00 AM	10	2	2	5	3	4	3	4	2	0	0	0	3	11	49
8:15 AM	4	3	4	2	1	3	0	3	1	2	3	0	4	10	40
8:30 AM	6	3	3	1	3	0	3	2	2	2	2	0	1	10	38
8:45 AM	12	6	1	4	2	5	1	4	5	0	1	1	1	9	52
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	55	16	10	12	4	5	3	1	1	0	2	1	0	0	110
4:15 PM	30	19	10	5	5	2	1	2	1	1	2	2	1	2	83
4:30 PM	56	12	13	4	2	1	3	0	0	1	0	2	0	2	96
4:45 PM	35	10	13	8	6	4	1	3	0	0	0	1	0	2	83
5:00 PM	73	16	4	3	2	1	0	0	0	0	0	1	0	0	100
5:15 PM	65	14	5	1	1	3	2	1	1	2	1	0	0	1	97
5:30 PM	69	24	13	9	1	3	0	3	0	0	0	0	0	0	122
5:45 PM	57	23	13	6	5	1	1	3	2	0	0	0	0	2	113
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>512</b>	<b>169</b>	<b>108</b>	<b>76</b>	<b>50</b>	<b>40</b>	<b>26</b>	<b>28</b>	<b>24</b>	<b>13</b>	<b>13</b>	<b>8</b>	<b>13</b>	<b>90</b>	<b>1170</b>
<b>Total %</b>	<b>43.8</b>	<b>14.4</b>	<b>9.2</b>	<b>6.5</b>	<b>4.3</b>	<b>3.4</b>	<b>2.2</b>	<b>2.4</b>	<b>2.1</b>	<b>1.1</b>	<b>1.1</b>	<b>0.7</b>	<b>1.1</b>	<b>7.7</b>	<b>100.0</b>



www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Count Name: King of Prussia Rd  
South Driveway Gap  
Site Code:  
Start Date: 04/27/2016  
Page No: 3

Montgomery County, PA  
King of Prussia Rd South  
Driveway  
Wednesday, April 27, 2016  
Location: 40.0399194154879, -  
75.3558924794197

**Northbound (Northbound)**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Total
7:00 AM	50	11	5	2	6	1	2	0	2	4	0	0	1	3	87
7:15 AM	86	8	9	3	0	1	0	0	0	0	0	0	0	0	107
7:30 AM	114	4	1	1	0	2	0	0	0	0	0	0	0	0	122
7:45 AM	127	13	2	0	1	0	0	0	0	1	0	0	0	0	144
8:00 AM	102	10	5	6	3	1	1	1	0	1	0	0	0	1	131
8:15 AM	96	12	5	2	3	1	2	0	1	0	0	1	1	0	124
8:30 AM	85	12	7	5	4	2	1	1	3	0	0	1	1	1	123
8:45 AM	72	10	8	5	2	2	2	1	3	1	1	0	1	1	109
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	14	7	4	2	3	4	2	1	3	3	1	4	5	69
4:15 PM	19	1	6	2	1	4	4	9	3	0	0	1	1	7	58
4:30 PM	30	9	6	5	2	2	2	2	1	1	1	3	0	8	72
4:45 PM	20	6	6	3	1	3	4	1	3	3	1	0	0	9	60
5:00 PM	14	5	5	1	8	1	3	5	3	5	1	0	1	6	58
5:15 PM	22	5	4	3	6	3	4	2	0	3	3	2	1	6	64
5:30 PM	16	8	5	1	3	2	5	2	3	2	2	3	1	5	58
5:45 PM	17	9	8	2	5	2	3	3	1	2	4	1	0	6	63
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>886</b>	<b>137</b>	<b>89</b>	<b>45</b>	<b>47</b>	<b>30</b>	<b>37</b>	<b>29</b>	<b>24</b>	<b>26</b>	<b>16</b>	<b>13</b>	<b>12</b>	<b>58</b>	<b>1449</b>
<b>Total %</b>	<b>61.1</b>	<b>9.5</b>	<b>6.1</b>	<b>3.1</b>	<b>3.2</b>	<b>2.1</b>	<b>2.6</b>	<b>2.0</b>	<b>1.7</b>	<b>1.8</b>	<b>1.1</b>	<b>0.9</b>	<b>0.8</b>	<b>4.0</b>	<b>100.0</b>







www.TSTData.com  
184 Baker Rd

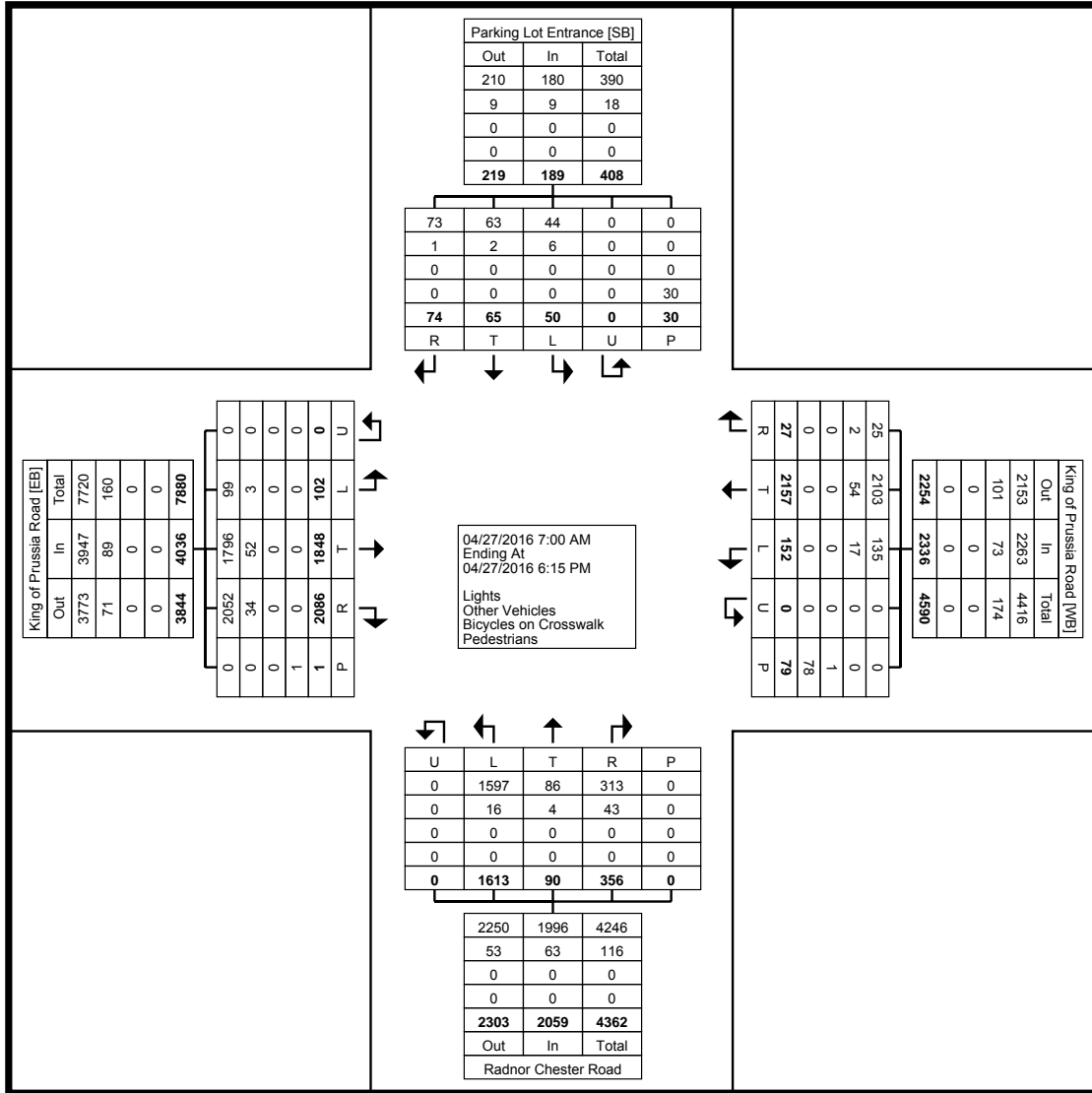
Montgomery County, PA  
Radnor-Chester Rd-King of Prussia Rd  
Wednesday, April 27, 2016  
Location: 40.0436560224454, -75.3591030836105

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Count Name: Radnor Chester Rd/King of Prussia Rd  
Site Code:  
Start Date: 04/27/2016  
Page No: 1

### Turning Movement Data

Start Time	Parking Lot Entrance Southbound							King of Prussia Road Westbound							Radnor Chester Road Northbound							King of Prussia Road Eastbound						Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	0	0	3	0	0	3	3	1	0	149	10	0	4	160	12	1	10	58	0	0	81	69	35	5	0	0	109	353
7:15 AM	1	0	1	0	0	2	2	3	0	193	3	0	15	199	4	8	3	82	0	0	97	101	108	4	0	0	213	511
7:30 AM	2	0	0	0	0	2	2	0	0	204	5	0	2	209	5	7	5	141	0	0	158	102	86	9	0	0	197	566
7:45 AM	1	0	1	0	0	1	2	1	0	206	10	0	6	217	13	3	9	118	0	0	143	138	65	9	0	0	212	574
Hourly Total	4	0	5	0	0	8	9	5	0	752	28	0	27	785	34	19	27	399	0	0	479	410	294	27	0	0	731	2004
8:00 AM	1	0	0	1	0	0	2	2	0	192	5	0	4	199	5	2	6	117	0	0	130	103	57	4	0	0	164	495
8:15 AM	1	1	0	1	0	0	3	4	0	188	5	0	7	197	8	6	12	118	0	0	144	117	51	15	0	0	183	527
8:30 AM	1	1	1	0	0	3	3	5	0	192	11	0	1	208	11	4	12	119	0	0	146	104	54	18	0	0	176	533
8:45 AM	2	0	2	2	0	6	6	9	0	172	9	0	5	190	10	7	13	110	0	0	140	111	67	17	0	0	195	531
Hourly Total	5	2	3	4	0	9	14	20	0	744	30	0	17	794	34	19	43	464	0	0	560	435	229	54	0	0	718	2086
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0	0	2	
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0	0	2	
4:00 PM	1	2	2	3	0	0	8	0	0	91	11	0	2	102	21	12	0	108	0	0	141	148	142	4	0	0	294	545
4:15 PM	0	1	3	0	0	0	4	0	0	88	10	0	3	98	13	7	4	94	0	0	118	156	147	2	0	0	305	525
4:30 PM	2	4	9	9	0	2	24	0	0	92	13	0	6	105	21	14	5	83	0	0	123	138	161	6	0	0	305	557
4:45 PM	1	5	6	5	0	1	17	0	0	83	11	0	4	94	18	15	2	93	0	0	128	150	160	2	0	0	312	551
Hourly Total	4	12	20	17	0	3	53	0	0	354	45	0	15	399	73	48	11	378	0	0	510	592	610	14	0	0	1216	2178
5:00 PM	18	3	13	14	0	6	48	0	0	73	18	0	10	91	19	8	3	109	0	0	139	145	193	2	0	0	340	618
5:15 PM	8	4	7	7	0	1	26	0	0	85	13	0	1	98	21	19	0	85	0	0	125	168	183	2	0	0	353	602
5:30 PM	5	4	10	5	0	3	24	1	0	76	7	0	7	84	29	8	2	108	0	0	147	191	169	2	0	1	362	617
5:45 PM	2	3	7	3	0	0	15	1	0	73	11	0	2	85	16	8	4	69	0	0	97	144	170	1	0	0	315	512
Hourly Total	33	14	37	29	0	10	113	2	0	307	49	0	20	358	85	43	9	371	0	0	508	648	715	7	0	1	1370	2349
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	
Grand Total	46	28	65	50	0	30	189	27	0	2157	152	0	79	2336	227	129	90	1613	0	0	2059	2086	1848	102	0	1	4036	8620
Approach %	24.3	14.8	34.4	26.5	0.0	-	-	1.2	0.0	92.3	6.5	0.0	-	-	11.0	6.3	4.4	78.3	0.0	-	-	51.7	45.8	2.5	0.0	-	-	-
Total %	0.5	0.3	0.8	0.6	0.0	-	2.2	0.3	0.0	25.0	1.8	0.0	-	27.1	2.6	1.5	1.0	18.7	0.0	-	23.9	24.2	21.4	1.2	0.0	-	46.8	-
Lights	46	27	63	44	0	-	180	25	0	2103	135	0	-	2263	197	116	86	1597	0	-	1996	2052	1796	99	0	-	3947	8386
% Lights	100.0	96.4	96.9	88.0	-	-	95.2	92.6	-	97.5	88.8	-	-	96.9	86.8	89.9	95.6	99.0	-	-	96.9	98.4	97.2	97.1	-	-	97.8	97.3
Other Vehicles	0	1	2	6	0	-	9	2	0	54	17	0	-	73	30	13	4	16	0	-	63	34	52	3	0	-	89	234
% Other Vehicles	0.0	3.6	3.1	12.0	-	-	4.8	7.4	-	2.5	11.2	-	-	3.1	13.2	10.1	4.4	1.0	-	-	3.1	1.6	2.8	2.9	-	-	2.2	2.7
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	30	-	-	-	-	-	-	78	-	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	98.7	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Turning Movement Data Plot



Montgomery County, PA  
 Radnor-Chester Rd-King of Prussia Rd  
 Wednesday, April 27, 2016  
 Location: 40.0436560224454, -75.3591030836105

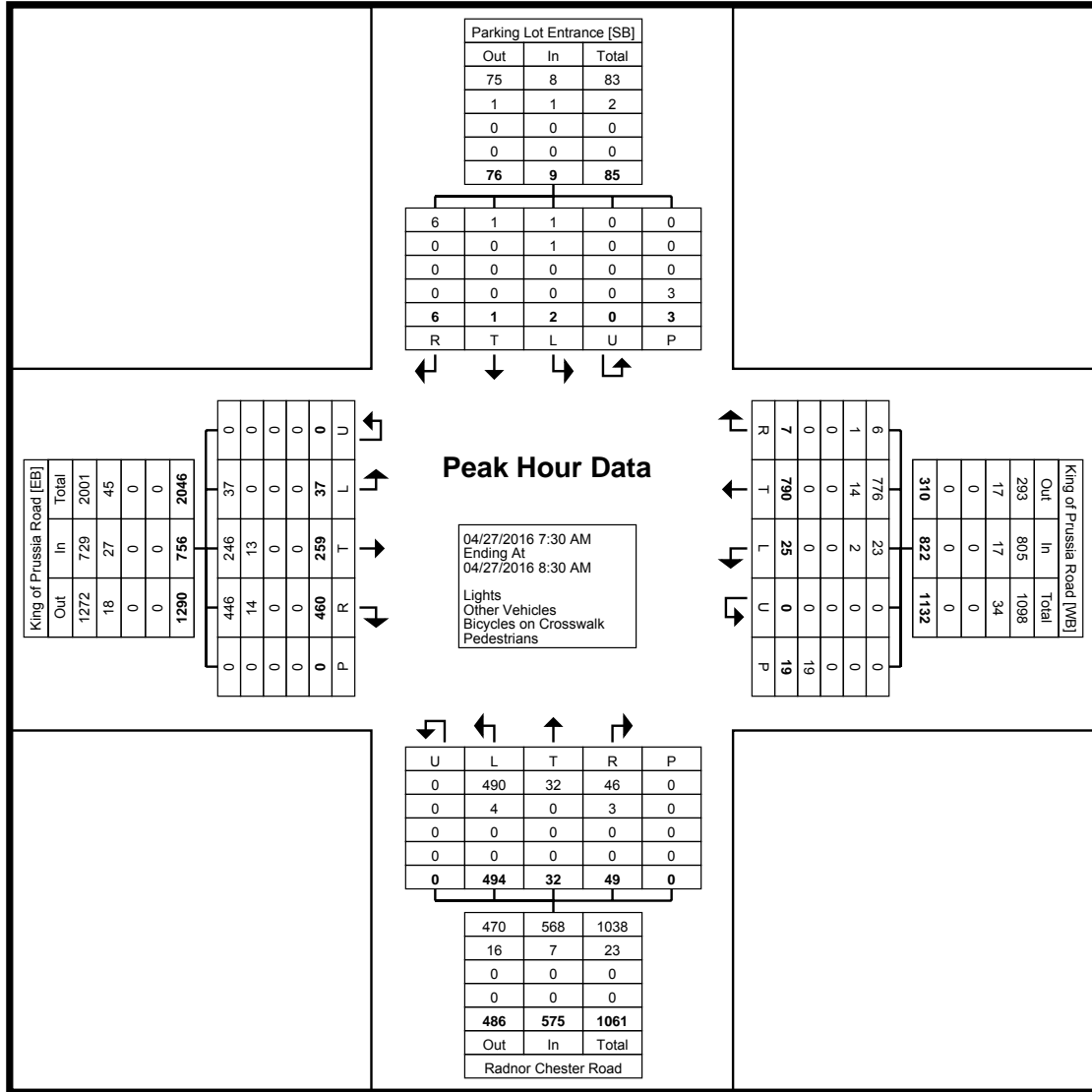
www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: Radnor Chester Rd/King of Prussia Rd  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 3

### Turning Movement Peak Hour Data (7:30 AM)

Start Time	Parking Lot Entrance Southbound							King of Prussia Road Westbound							Radnor Chester Road Northbound							King of Prussia Road Eastbound							Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
7:30 AM	2	0	0	0	0	2	2	0	0	204	5	0	2	209	5	7	5	141	0	0	158	102	86	9	0	0	197	566	
7:45 AM	1	0	1	0	0	1	2	1	0	206	10	0	6	217	13	3	9	118	0	0	143	138	65	9	0	0	212	574	
8:00 AM	1	0	0	1	0	0	2	2	0	192	5	0	4	199	5	2	6	117	0	0	130	103	57	4	0	0	164	495	
8:15 AM	1	1	0	1	0	0	3	4	0	188	5	0	7	197	8	6	12	118	0	0	144	117	51	15	0	0	183	527	
Total	5	1	1	2	0	3	9	7	0	790	25	0	19	822	31	18	32	494	0	0	575	460	259	37	0	0	756	2162	
Approach %	55.6	11.1	11.1	22.2	0.0	-	-	0.9	0.0	96.1	3.0	0.0	-	-	5.4	3.1	5.6	85.9	0.0	-	-	60.8	34.3	4.9	0.0	-	-	-	
Total %	0.2	0.0	0.0	0.1	0.0	-	0.4	0.3	0.0	36.5	1.2	0.0	-	38.0	1.4	0.8	1.5	22.8	0.0	-	26.6	21.3	12.0	1.7	0.0	-	35.0	-	
PHF	0.625	0.250	0.250	0.500	0.000	-	0.750	0.438	0.000	0.959	0.625	0.000	-	0.947	0.596	0.643	0.667	0.876	0.000	-	0.910	0.833	0.753	0.617	0.000	-	0.892	0.942	
Lights	5	1	1	1	0	-	8	6	0	776	23	0	-	805	28	18	32	490	0	-	568	446	246	37	0	-	729	2110	
% Lights	100.0	100.0	100.0	50.0	-	-	88.9	85.7	-	98.2	92.0	-	-	97.9	90.3	100.0	100.0	99.2	-	-	98.8	97.0	95.0	100.0	-	-	96.4	97.6	
Other Vehicles	0	0	0	1	0	-	1	1	0	14	2	0	-	17	3	0	0	4	0	-	7	14	13	0	0	-	27	52	
% Other Vehicles	0.0	0.0	0.0	50.0	-	-	11.1	14.3	-	1.8	8.0	-	-	2.1	9.7	0.0	0.0	0.8	-	-	1.2	3.0	5.0	0.0	-	-	3.6	2.4	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	-	19	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Turning Movement Peak Hour Data Plot (7:30 AM)



Montgomery County, PA  
 Radnor-Chester Rd-King of Prussia Rd  
 Wednesday, April 27, 2016  
 Location: 40.0436560224454, -75.3591030836105

www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: Radnor Chester Rd/King of Prussia Rd  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 5

### Turning Movement Peak Hour Data (4:45 PM)

Start Time	Parking Lot Entrance Southbound							King of Prussia Road Westbound							Radnor Chester Road Northbound							King of Prussia Road Eastbound							Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
4:45 PM	1	5	6	5	0	1	17	0	0	83	11	0	4	94	18	15	2	93	0	0	128	150	160	2	0	0	312	551	
5:00 PM	18	3	13	14	0	6	48	0	0	73	18	0	10	91	19	8	3	109	0	0	139	145	193	2	0	0	340	618	
5:15 PM	8	4	7	7	0	1	26	0	0	85	13	0	1	98	21	19	0	85	0	0	125	168	183	2	0	0	353	602	
5:30 PM	5	4	10	5	0	3	24	1	0	76	7	0	7	84	29	8	2	108	0	0	147	191	169	2	0	1	362	617	
<b>Total</b>	<b>32</b>	<b>16</b>	<b>36</b>	<b>31</b>	<b>0</b>	<b>11</b>	<b>115</b>	<b>1</b>	<b>0</b>	<b>317</b>	<b>49</b>	<b>0</b>	<b>22</b>	<b>367</b>	<b>87</b>	<b>50</b>	<b>7</b>	<b>395</b>	<b>0</b>	<b>0</b>	<b>539</b>	<b>654</b>	<b>705</b>	<b>8</b>	<b>0</b>	<b>1</b>	<b>1367</b>	<b>2388</b>	
Approach %	27.8	13.9	31.3	27.0	0.0	-	-	0.3	0.0	86.4	13.4	0.0	-	-	16.1	9.3	1.3	73.3	0.0	-	-	47.8	51.6	0.6	0.0	-	-	-	
Total %	1.3	0.7	1.5	1.3	0.0	-	4.8	0.0	0.0	13.3	2.1	0.0	-	15.4	3.6	2.1	0.3	16.5	0.0	-	22.6	27.4	29.5	0.3	0.0	-	57.2	-	
PHF	0.44 4	0.800	0.692	0.554	0.000	-	0.599	0.250	0.000	0.932	0.681	0.000	-	0.936	0.750	0.658	0.583	0.906	0.000	-	0.917	0.856	0.913	1.000	0.000	-	0.944	0.966	
Lights	32	15	35	30	0	-	112	0	0	313	43	0	-	356	84	48	6	393	0	-	531	651	700	8	0	-	1359	2358	
% Lights	100.0	93.8	97.2	96.8	-	-	97.4	0.0	-	98.7	87.8	-	-	97.0	96.6	96.0	85.7	99.5	-	-	98.5	99.5	99.3	100.0	-	-	99.4	98.7	
Other Vehicles	0	1	1	1	0	-	3	1	0	4	6	0	-	11	3	2	1	2	0	-	8	3	5	0	0	-	8	30	
% Other Vehicles	0.0	6.3	2.8	3.2	-	-	2.6	100.0	-	1.3	12.2	-	-	3.0	3.4	4.0	14.3	0.5	-	-	1.5	0.5	0.7	0.0	-	-	0.6	1.3	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	4.5	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	
Pedestrians	-	-	-	-	-	11	-	-	-	-	-	-	21	-	-	-	-	-	-	0	-	-	-	-	-	1	-	-	
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	95.5	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	





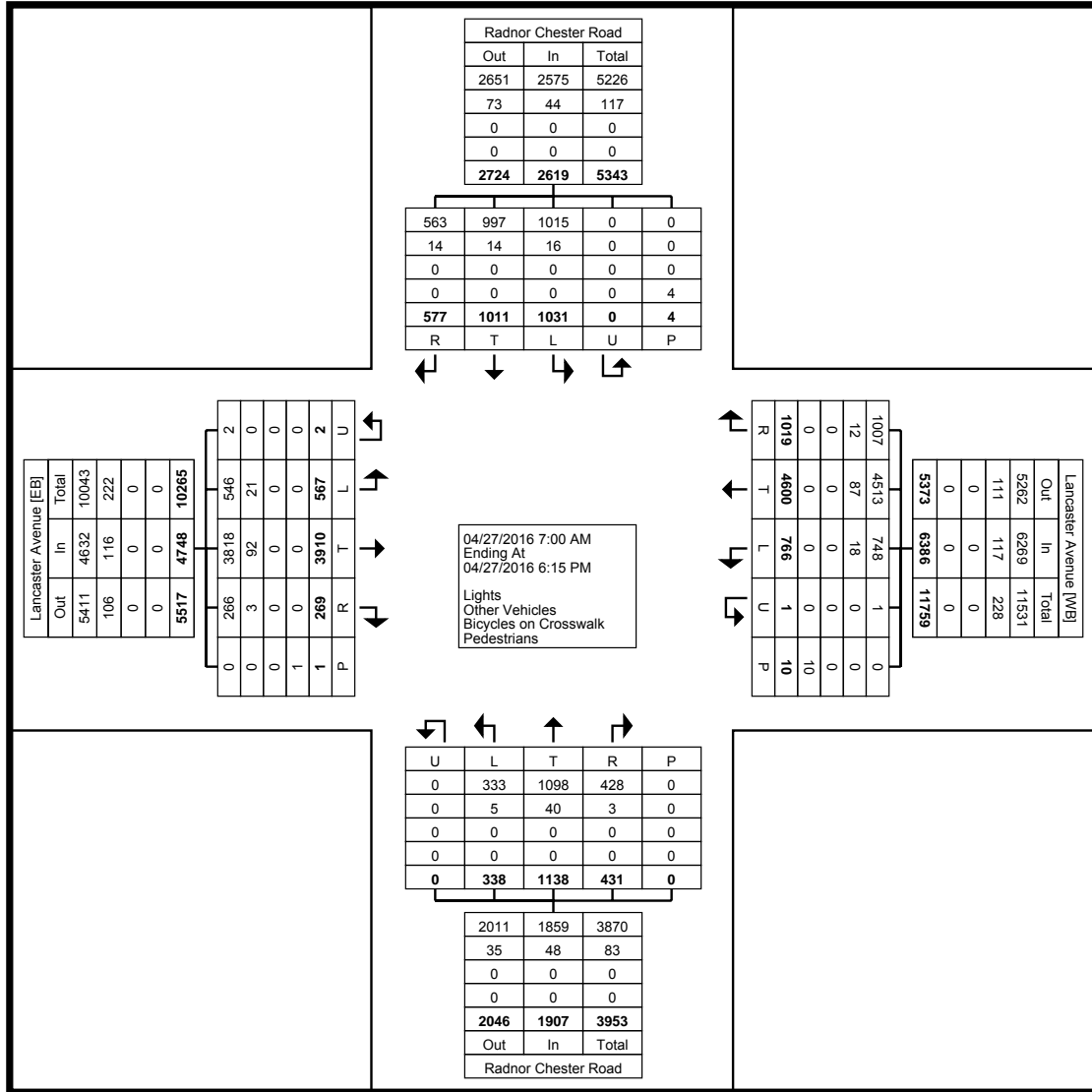
Montgomery County, PA  
 Radnor-Chester Rd/Lancaster Ave  
 Wednesday, April 27, 2016  
 Location: 40.0394916465948, -75.3656798601151

www.TSTData.com  
 184 Baker Rd  
 Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: Radnor Chester Rd/Lancaster Ave  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 1

### Turning Movement Data

Start Time	Radnor Chester Road Southbound							Lancaster Avenue Westbound							Radnor Chester Road Northbound							Lancaster Avenue Eastbound							Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	11	6	17	42	0	0	76	42	1	211	43	0	4	297	14	0	73	16	0	0	103	8	0	171	41	0	0	220	696
7:15 AM	30	2	40	24	0	0	96	63	0	334	49	0	1	446	16	0	118	10	0	0	144	7	0	247	49	1	0	304	990
7:30 AM	30	2	41	36	0	0	109	89	1	331	56	0	0	477	20	0	118	20	0	0	158	7	1	207	33	0	0	248	992
7:45 AM	28	1	39	27	0	1	95	109	0	378	56	0	0	543	22	0	70	24	0	0	116	17	0	249	33	0	0	299	1053
Hourly Total	99	11	137	129	0	1	376	303	2	1254	204	0	5	1763	72	0	379	70	0	0	521	39	1	874	156	1	0	1071	3731
8:00 AM	22	4	29	13	0	0	68	118	0	338	53	0	0	509	25	1	74	21	0	0	121	18	1	199	36	0	0	254	952
8:15 AM	16	2	21	19	0	0	58	114	0	387	44	0	0	545	14	0	105	26	0	0	145	8	0	234	35	0	0	277	1025
8:30 AM	14	2	27	32	0	0	75	97	0	306	35	0	0	438	23	0	110	34	0	0	167	16	0	195	38	0	0	249	929
8:45 AM	20	4	31	24	0	0	79	130	0	361	48	0	0	539	16	0	82	22	0	0	120	3	0	191	39	0	0	233	971
Hourly Total	72	12	108	88	0	0	280	459	0	1392	180	0	0	2031	78	1	371	103	0	0	553	45	1	819	148	0	0	1013	3877
9:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3	
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hourly Total	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3	
4:00 PM	40	8	66	120	0	0	234	26	1	210	41	0	0	278	43	0	39	21	0	0	103	23	2	272	31	0	0	328	943
4:15 PM	29	7	83	101	0	0	220	37	0	206	44	0	0	287	31	1	52	20	0	0	104	24	0	301	36	0	0	361	972
4:30 PM	42	3	101	103	0	0	249	30	2	210	40	0	0	282	31	2	45	16	0	0	94	21	0	279	37	0	1	337	962
4:45 PM	47	0	102	97	0	0	246	34	0	237	50	0	0	321	32	0	51	24	0	0	107	22	0	286	34	0	0	342	1016
Hourly Total	158	18	352	421	0	0	949	127	3	863	175	0	0	1168	137	3	187	81	0	0	408	90	2	1138	138	0	1	1368	3893
5:00 PM	51	2	122	98	0	1	273	23	0	254	43	0	2	320	48	0	46	24	0	0	118	25	0	299	30	0	0	354	1065
5:15 PM	50	2	118	98	0	1	268	30	0	241	52	0	1	323	35	0	60	12	0	0	107	12	0	279	30	1	0	322	1020
5:30 PM	60	0	99	111	0	1	270	37	0	297	50	1	0	385	24	0	51	20	0	0	95	33	0	270	24	0	0	327	1077
5:45 PM	37	5	75	86	0	0	203	32	3	297	62	0	2	394	33	0	44	28	0	0	105	21	0	230	41	0	0	292	994
Hourly Total	198	9	414	393	0	3	1014	122	3	1089	207	1	5	1422	140	0	201	84	0	0	425	91	0	1078	125	1	0	1295	4156
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Total	527	50	1011	1031	0	4	2619	1011	8	4600	766	1	10	6386	427	4	1138	338	0	0	1907	265	4	3910	567	2	1	4748	15660
Approach %	20.1	1.9	38.6	39.4	0.0	-	-	15.8	0.1	72.0	12.0	0.0	-	-	22.4	0.2	59.7	17.7	0.0	-	-	5.6	0.1	82.4	11.9	0.0	-	-	-
Total %	3.4	0.3	6.5	6.6	0.0	-	16.7	6.5	0.1	29.4	4.9	0.0	-	40.8	2.7	0.0	7.3	2.2	0.0	-	12.2	1.7	0.0	25.0	3.6	0.0	-	30.3	-
Lights	515	48	997	1015	0	-	2575	1000	7	4513	748	1	-	6269	424	4	1098	333	0	-	1859	262	4	3818	546	2	-	4632	15335
% Lights	97.7	96.0	98.6	98.4	-	-	98.3	98.9	87.5	98.1	97.7	100.0	-	98.2	99.3	100.0	96.5	98.5	-	-	97.5	98.9	100.0	97.6	96.3	100.0	-	97.6	97.9
Other Vehicles	12	2	14	16	0	-	44	11	1	87	18	0	-	117	3	0	40	5	0	-	48	3	0	92	21	0	-	116	325
% Other Vehicles	2.3	4.0	1.4	1.6	-	-	1.7	1.1	12.5	1.9	2.3	0.0	-	1.8	0.7	0.0	3.5	1.5	-	-	2.5	1.1	0.0	2.4	3.7	0.0	-	2.4	2.1
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	-	10	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Turning Movement Data Plot









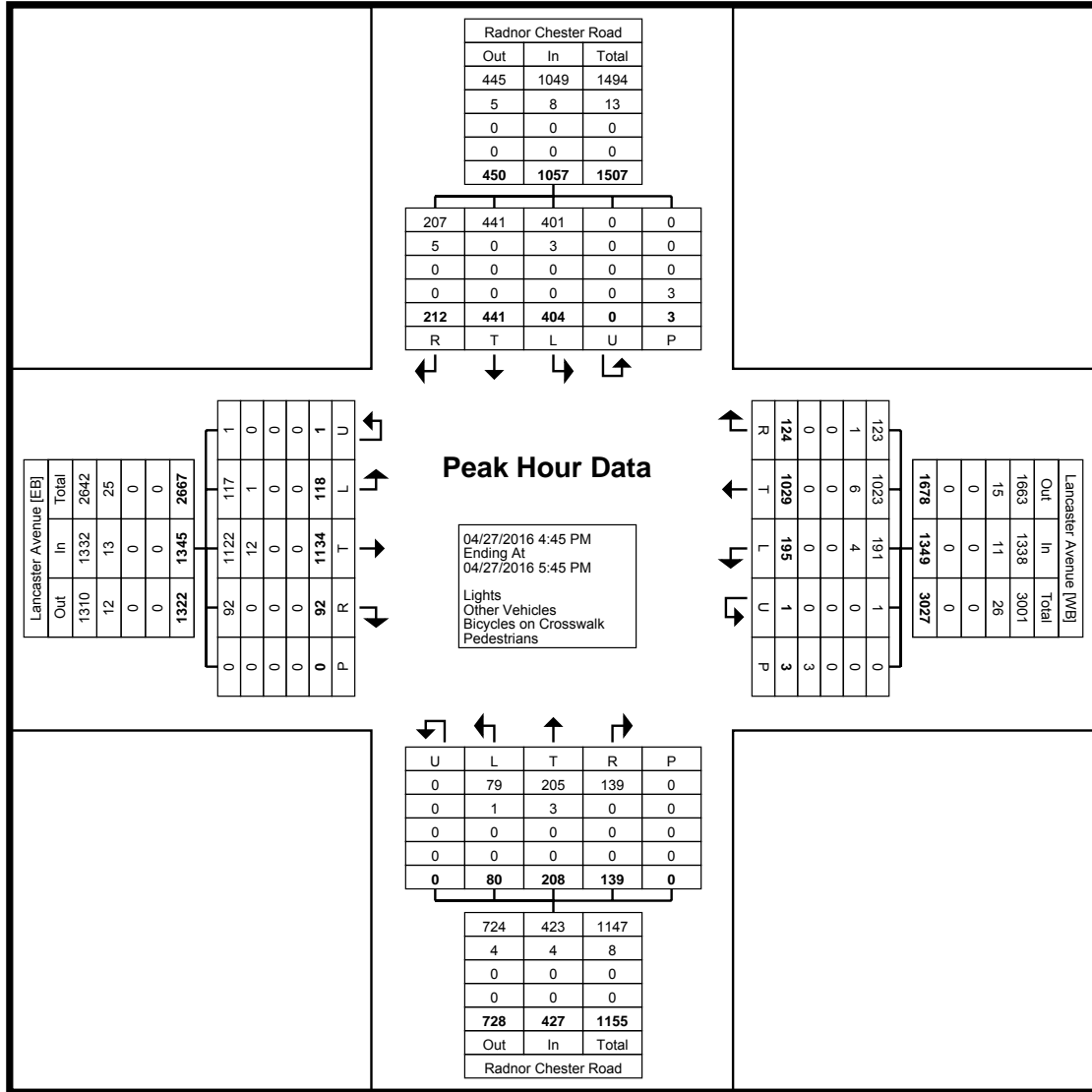


Montgomery County, PA  
 Radnor-Chester Rd/Lancaster Ave  
 Wednesday, April 27, 2016  
 Location: 40.0394916465948, -75.3656798601151

www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: Radnor Chester Rd/Lancaster Ave  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 6



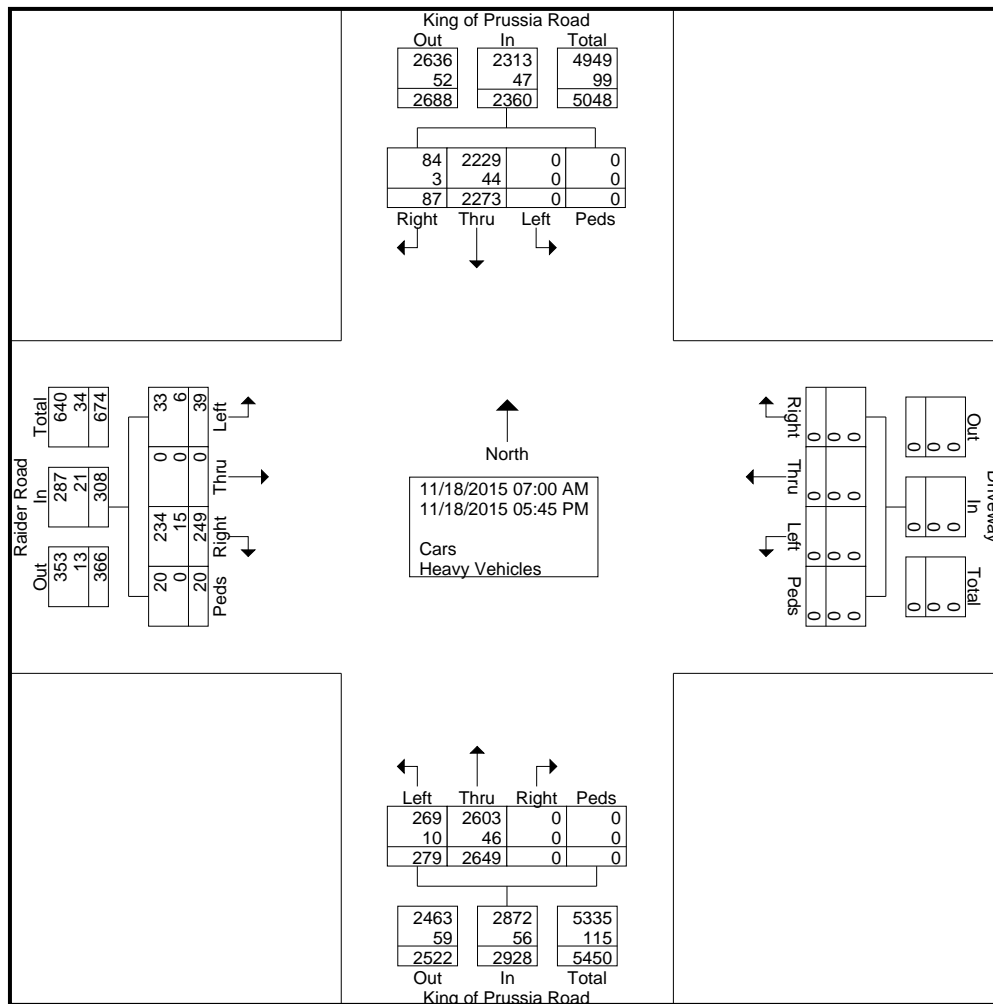
Turning Movement Peak Hour Data Plot (4:45 PM)



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Raider Rd  
 Date: Wednesday, November 18, 2015  
 Counter: PB

File Name : SS1118-1  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 2

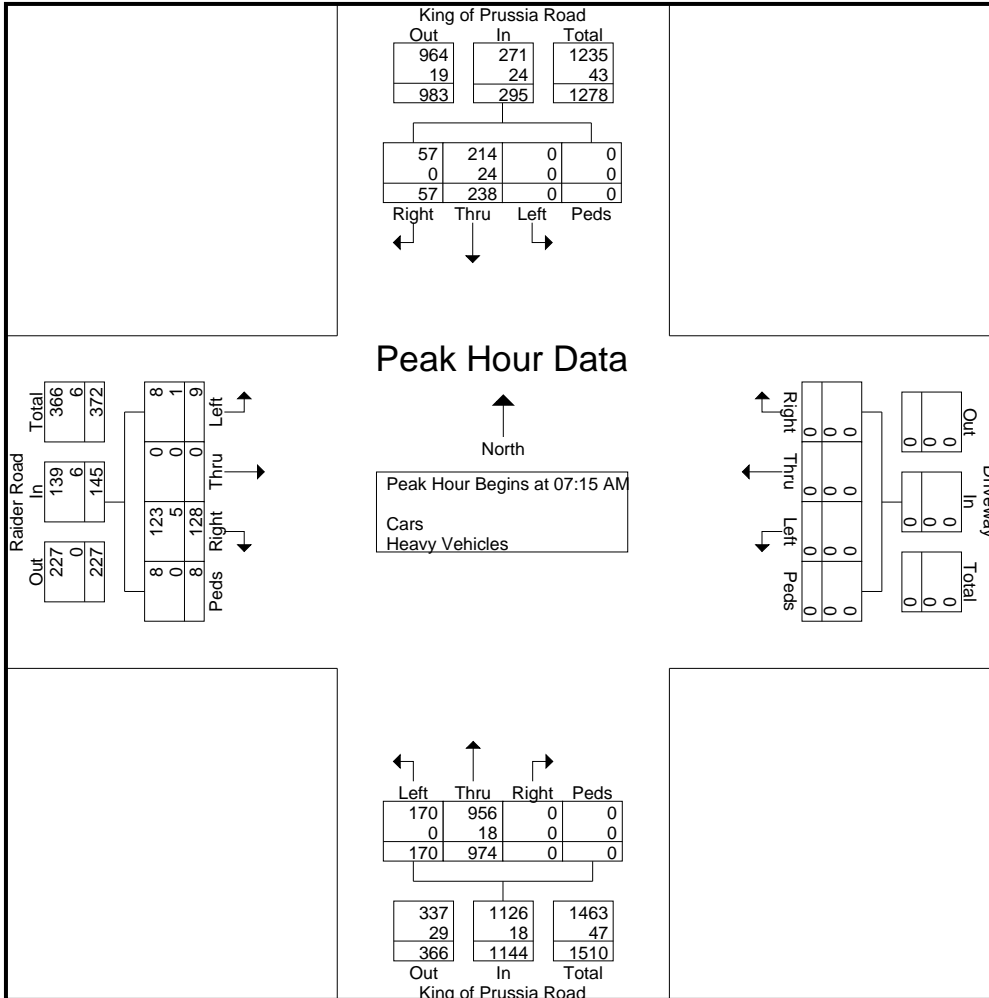


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Raider Rd  
 Date: Wednesday, November 18, 2015  
 Counter: PB

File Name : SS1118-1  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 3

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Raider Road Eastbound					Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	132				349	0	42	41		83	4		65	7	76	0	0	0	0	0	508
07:30 AM	29	263	0	0	292	0	60	14	0	74	3	0	52	0	55	0	0	0	0	0	421
07:45 AM	4	238	0	0	242	0	72	1	0	73	1	0	7	1	9	0	0	0	0	0	324
08:00 AM	5	256	0	0	261	0	64	1	0	65	1	0	4	0	5	0	0	0	0	0	331
Total Volume	170	974	0	0	1144	0	238	57	0	295	9	0	128	8	145	0	0	0	0	0	1584
% App. Total	14.9	85.1	0	0		0	80.7	19.3	0		6.2	0	88.3	5.5		0	0	0	0	0	
PHF	.322	.926	.000	.000	.819	.000	.826	.348	.000	.889	.563	.000	.492	.286	.477	.000	.000	.000	.000	.000	.780
Cars	170	956	0	0	1126	0	214	57	0	271	8	0	123	8	139	0	0	0	0	0	1536
% Cars	100	98.2					89.9				88.9	0	96.1	100	95.9						97.0
Heavy Vehicles																					
% Heavy Vehicles	0	1.8	0	0	1.6	0	10.1	0	0	8.1	11.1	0	3.9	0	4.1	0	0	0	0	0	3.0

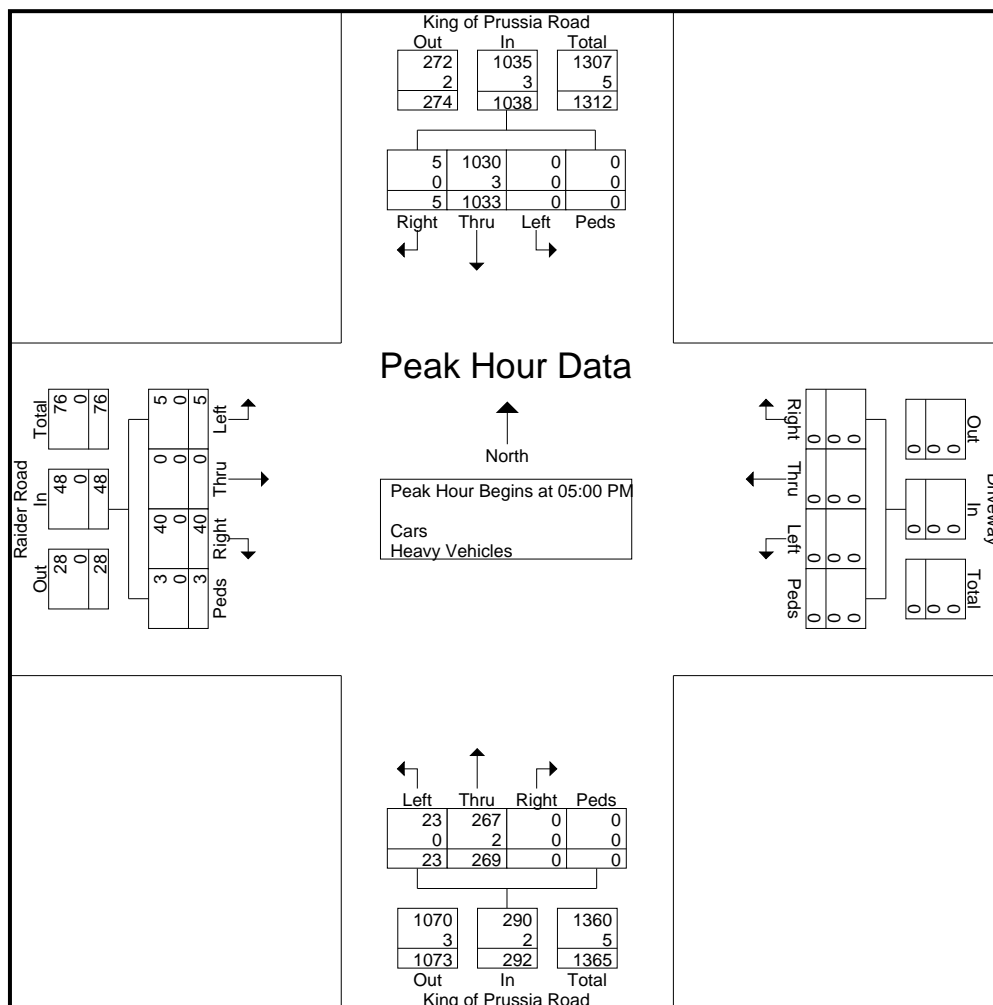


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Raider Rd  
 Date: Wednesday, November 18, 2015  
 Counter: PB

File Name : SS1118-1  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Raider Road Eastbound					Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	<b>9</b>										<b>3</b>	<b>14</b>	<b>2</b>	<b>19</b>	0	0	0	0	0	0	359
05:15 PM	3	68	0	0	71	0	<b>281</b>	1	0	<b>282</b>	1	0	13	1	15	0	0	0	0	0	<b>368</b>
05:30 PM	5	53	0	0	58	0	263	0	0	263	1	0	9	0	10	0	0	0	0	0	331
05:45 PM	6	<b>90</b>	0	0	<b>96</b>	0	216	<b>4</b>													
Total Volume	23	269	0	0	292	0	1033	5	0	1038	5	0	40	3	48	0	0	0	0	0	1378
% App. Total	7.9	92.1	0	0		0	99.5	0.5	0		10.4	0	83.3	6.2		0	0	0	0		
PHF	.639	.747	.000	.000	.760	.000	.919	.313	.000	.920	.417	.000	.714	.375	.632	.000	.000	.000	.000	.000	.936
Cars	23	267	0	0	290	0	1030				100	0	100	100	100	0	0	0	0	0	99.6
% Cars	100	99.3	0	0	99.3	0	99.7	100	0	99.7	100	0	100	100	100	0	0	0	0	0	
Heavy Vehicles	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	5
% Heavy Vehicles	0	0.7	0	0	0.7	0	0.3	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0.4





# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Matson Ford Rd  
 Date: Wednesday, November 18, 2015  
 Tech: RZ

File Name : SS1118-2  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 1

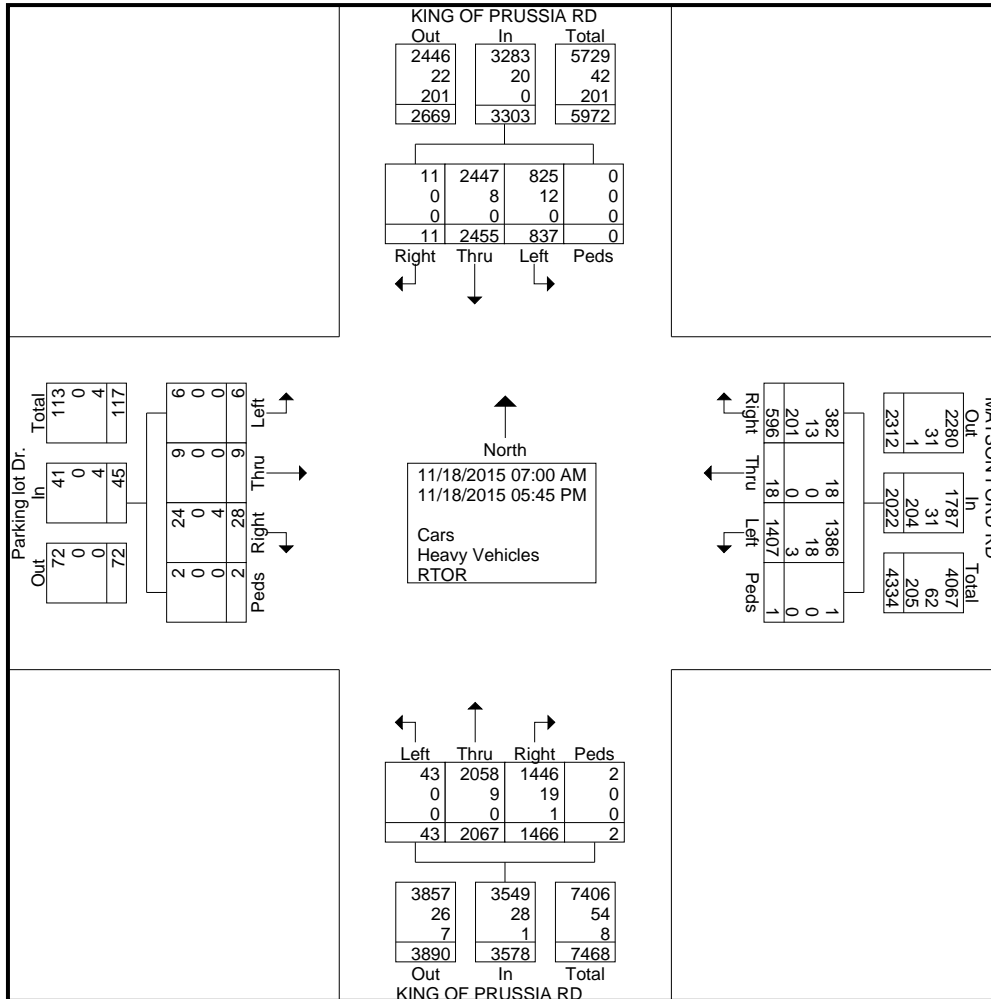
### Groups Printed- Cars - Heavy Vehicles - RTOR

Start Time	KING OF PRUSSIA RD Northbound					KING OF PRUSSIA RD Southbound					Parking lot Dr. Eastbound					MATSON FORD RD Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	2	113	91	0	206	53	91	0	0	144	0	0	0	0	0	38	0	6	0	44	394
07:15 AM	2	123	133	0	258	80	144	0	0	224	0	0	0	0	0	51	0	22	0	73	555
07:30 AM	1	153	178	0	332	104	124	0	0	228	0	0	0	0	0	84	1	34	0	119	679
07:45 AM	4	162	139	0	305	95	136	1	0	232	0	0	0	0	0	75	1	26	0	102	639
<b>Total</b>	<b>9</b>	<b>551</b>	<b>541</b>	<b>0</b>	<b>1101</b>	<b>332</b>	<b>495</b>	<b>1</b>	<b>0</b>	<b>828</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>248</b>	<b>2</b>	<b>88</b>	<b>0</b>	<b>338</b>	<b>2267</b>
08:00 AM	5	154	126	0	285	82	128	1	0	211	1	0	2	0	3	53	5	18	1	77	576
08:15 AM	8	142	104	0	254	79	126	0	0	205	0	1	4	0	5	64	3	15	0	82	546
08:30 AM	4	170	127	0	301	67	136	4	0	207	0	0	2	0	2	56	1	10	0	67	577
08:45 AM	5	144	132	0	281	60	136	3	0	199	0	2	0	0	2	84	2	35	0	121	603
<b>Total</b>	<b>22</b>	<b>610</b>	<b>489</b>	<b>0</b>	<b>1121</b>	<b>288</b>	<b>526</b>	<b>8</b>	<b>0</b>	<b>822</b>	<b>1</b>	<b>3</b>	<b>8</b>	<b>0</b>	<b>12</b>	<b>257</b>	<b>11</b>	<b>78</b>	<b>1</b>	<b>347</b>	<b>2302</b>
*** BREAK ***																					
04:00 PM	2	145	40	0	187	22	157	0	0	179	1	0	4	0	5	89	0	56	0	145	516
04:15 PM	1	122	44	0	167	22	193	0	0	215	0	1	4	0	5	80	1	39	0	120	507
04:30 PM	1	123	64	0	188	18	169	1	0	188	1	0	3	0	4	110	2	70	0	182	562
04:45 PM	1	93	57	0	151	37	199	0	0	236	0	1	0	0	1	112	1	53	0	166	554
<b>Total</b>	<b>5</b>	<b>483</b>	<b>205</b>	<b>0</b>	<b>693</b>	<b>99</b>	<b>718</b>	<b>1</b>	<b>0</b>	<b>818</b>	<b>2</b>	<b>2</b>	<b>11</b>	<b>0</b>	<b>15</b>	<b>391</b>	<b>4</b>	<b>218</b>	<b>0</b>	<b>613</b>	<b>2139</b>
05:00 PM	3	106	56	2	167	27	172	1	0	200	2	2	2	2	8	126	0	57	0	183	558
05:15 PM	1	108	74	0	183	35	183	0	0	218	1	0	1	0	2	150	1	56	0	207	610
05:30 PM	0	101	51	0	152	18	172	0	0	190	0	1	1	0	2	130	0	65	0	195	539
05:45 PM	3	108	50	0	161	38	189	0	0	227	0	1	5	0	6	105	0	34	0	139	533
<b>Total</b>	<b>7</b>	<b>423</b>	<b>231</b>	<b>2</b>	<b>663</b>	<b>118</b>	<b>716</b>	<b>1</b>	<b>0</b>	<b>835</b>	<b>3</b>	<b>4</b>	<b>9</b>	<b>2</b>	<b>18</b>	<b>511</b>	<b>1</b>	<b>212</b>	<b>0</b>	<b>724</b>	<b>2240</b>
<b>Grand Total</b>	<b>43</b>	<b>2067</b>	<b>1466</b>	<b>2</b>	<b>3578</b>	<b>837</b>	<b>2455</b>	<b>11</b>	<b>0</b>	<b>3303</b>	<b>6</b>	<b>9</b>	<b>28</b>	<b>2</b>	<b>45</b>	<b>1407</b>	<b>18</b>	<b>596</b>	<b>1</b>	<b>2022</b>	<b>8948</b>
Apprch %	1.2	57.8	41	0.1		25.3	74.3	0.3	0		13.3	20	62.2	4.4		69.6	0.9	29.5	0		
Total %	0.5	23.1	16.4	0	40	9.4	27.4	0.1	0	36.9	0.1	0.1	0.3	0	0.5	15.7	0.2	6.7	0	22.6	
Cars	43	2058	1446	2	3549	825	2447	11	0	3283	6	9	24	2	41	1386	18	382	1	1787	8660
% Cars	100	99.6	98.6	100	99.2	98.6	99.7	100	0	99.4	100	100	85.7	100	91.1	98.5	100	64.1	100	88.4	96.8
Heavy Vehicles	0	0.4	1.3	0	0.8	1.4	0.3	0	0	0.6	0	0	0	0	0	1.3	0	2.2	0	1.5	0.9
% Heavy Vehicles	0	0	1	0	1	0	0	0	0	0	0	0	4	0	4	3	0	201	0	204	209
RTOR	0	0	0.1	0	0	0	0	0	0	0	0	0	14.3	0	8.9	0.2	0	33.7	0	10.1	2.3
% RTOR	0	0	0.1	0	0	0	0	0	0	0	0	0	14.3	0	8.9	0.2	0	33.7	0	10.1	2.3

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Matson Ford Rd  
 Date: Wednesday, November 18, 2015  
 Tech: RZ

File Name : SS1118-2  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 2



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Matson Ford Rd  
 Date: Wednesday, November 18, 2015  
 Tech: RZ

File Name : SS1118-2  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 3

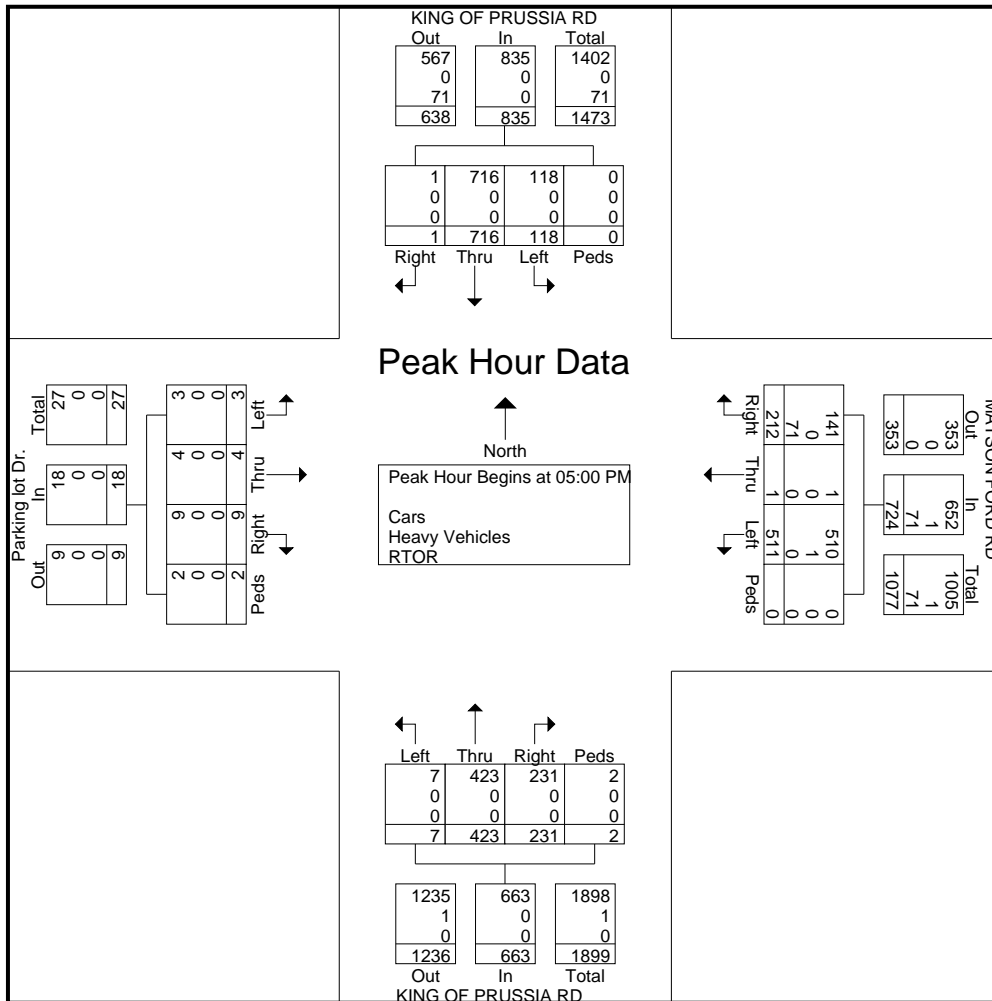
Start Time	KING OF PRUSSIA RD Northbound					KING OF PRUSSIA RD Southbound					Parking lot Dr. Eastbound					MATSON FORD RD Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	2	123	133	0	258	80	<b>144</b>														
<b>07:30 AM</b>	<b>1</b>	<b>153</b>	<b>178</b>	<b>0</b>	<b>332</b>	<b>104</b>	124	0	0	228	0	0	0	0	0	<b>84</b>	<b>1</b>	<b>34</b>	<b>0</b>	<b>119</b>	<b>679</b>
07:45 AM	4	<b>162</b>	139	0	305	95	136	<b>1</b>		<b>232</b>	0	0	0	0	0	75	1	26	0	102	639
08:00 AM	<b>5</b>										<b>1</b>		<b>2</b>	0	<b>3</b>	53	<b>5</b>	18	<b>1</b>		
Total Volume	12	592	576	0	1180	361	532	2	0	895	1	0	2	0	3	263	7	100	1	371	2449
% App. Total	1	50.2	48.8	0		40.3	59.4	0.2	0		33.3	0	66.7	0		70.9	1.9	27	0.3		
PHF	.600	.914	.809	.000	.889	.868	.924	.500	.000	.964	.250	.000	.250	.000	.250	.783	.350	.735	.250	.779	.902
Cars	12	588	568	0	1168	352	529	2	0	883	1	0	2	0	3	250	7	46	1	304	2358
% Cars	100	99.3	98.6	0	99.0	97.5	99.4	100	0	98.7	100	0	100	0	100	95.1	100	46.0	100	81.9	96.3
Heavy Vehicles	0	4	7	0	11	9	3	0	0	12	0	0	0	0	0	10	0	9	0	19	42
% Heavy Vehicles	0	0.7	1.2	0	0.9	2.5	0.6	0	0	1.3	0	0	0	0	0	3.8	0	9.0	0	5.1	1.7
RTOR	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	3	0	45	0	48	49
% RTOR	0	0	0.2	0	0.1	0	0	0	0	0	0	0	0	0	0	1.1	0	45.0	0	12.9	2.0

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Matson Ford Rd  
 Date: Wednesday, November 18, 2015  
 Tech: RZ

File Name : SS1118-2  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	KING OF PRUSSIA RD Northbound					KING OF PRUSSIA RD Southbound					Parking lot Dr. Eastbound					MATSON FORD RD Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	3			2				1			2	2		2	8	126	0	57	0	183	558
05:15 PM	1	108	74		183	35	183	0	0	218	1	0	1	0	2	150	1	56	0	207	610
05:30 PM	0	101	51	0	152	18	172	0	0	190	0	1	1	0	2	130	0	65			
<b>05:45 PM</b>	<b>3</b>	<b>108</b>	<b>50</b>	<b>0</b>	<b>161</b>	<b>38</b>	<b>189</b>	<b>0</b>	<b>0</b>	<b>227</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>0</b>	<b>6</b>	<b>105</b>	<b>0</b>	<b>34</b>	<b>0</b>	<b>139</b>	<b>533</b>
Total Volume	7	423	231	2	663	118	716	1	0	835	3	4	9	2	18	511	1	212	0	724	2240
% App. Total	1.1	63.8	34.8	0.3		14.1	85.7	0.1	0		16.7	22.2	50	11.1		70.6	0.1	29.3	0		
PHF	.583	.979	.780	.250	.906	.776	.947	.250	.000	.920	.375	.500	.450	.250	.563	.852	.250	.815	.000	.874	.918
Cars	7	423	231	2	663	118	716	1	0	835	3	4	9	2	18	510	1	141	0	652	2168
% Cars	100	100	100	100	100	100	100	100	0	100	100	100	100	100	100	99.8	100	66.5	0	90.1	96.8
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0.1	0.0
RTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	0	71	71
% RTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33.5	0	9.8	3.2



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: I476 NB Ramp/Route 30  
 Date: Wednesday, November 18, 2015  
 Counter: ET/JT

File Name : SS1118-3  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 1

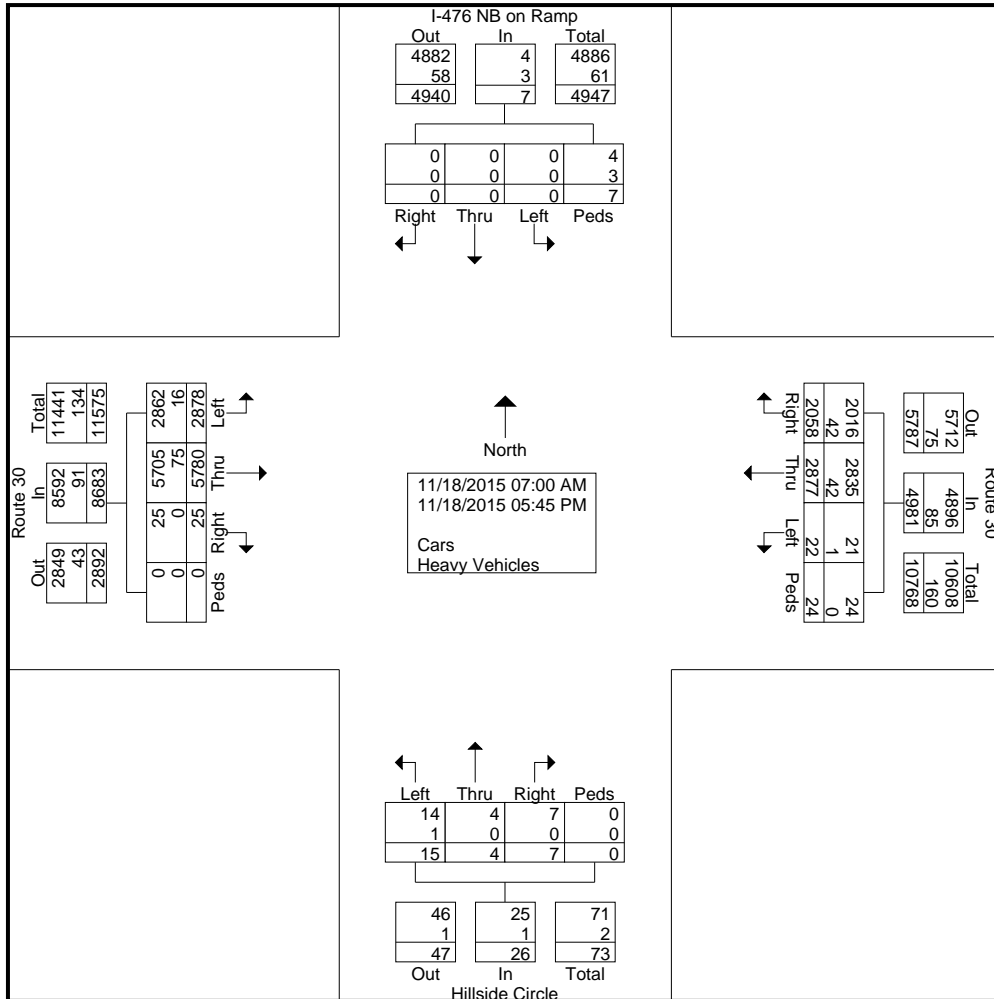
### Groups Printed- Cars - Heavy Vehicles

Start Time	Hillside Circle Northbound					I-476 NB on Ramp Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	1	0	0	0	1	0	0	0	0	0	88	243	0	0	331	2	137	89	0	228	560
07:15 AM	3	0	0	0	3	0	0	0	0	0	108	306	1	0	415	0	211	100	0	311	729
07:30 AM	1	0	0	0	1	0	0	0	2	2	152	404	1	0	557	0	157	126	11	294	854
07:45 AM	1	2	2	0	5	0	0	0	0	0	121	404	2	0	527	0	200	128	0	328	860
<b>Total</b>	<b>6</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>469</b>	<b>1357</b>	<b>4</b>	<b>0</b>	<b>1830</b>	<b>2</b>	<b>705</b>	<b>443</b>	<b>11</b>	<b>1161</b>	<b>3003</b>
08:00 AM	1	0	0	0	1	0	0	0	0	0	152	392	0	0	544	2	183	122	0	307	852
08:15 AM	0	0	0	0	0	0	0	0	0	0	117	318	2	0	437	0	188	126	4	318	755
08:30 AM	1	0	1	0	2	0	0	0	0	0	137	359	0	0	496	7	229	122	0	358	856
08:45 AM	3	0	1	0	4	0	0	0	0	0	108	372	1	0	481	0	197	92	0	289	774
<b>Total</b>	<b>5</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>514</b>	<b>1441</b>	<b>3</b>	<b>0</b>	<b>1958</b>	<b>9</b>	<b>797</b>	<b>462</b>	<b>4</b>	<b>1272</b>	<b>3237</b>
*** BREAK ***																					
04:00 PM	0	0	0	0	0	0	0	0	2	2	202	281	1	0	484	3	161	153	0	317	803
04:15 PM	0	0	1	0	1	0	0	0	0	0	216	354	1	0	571	1	159	140	0	300	872
04:30 PM	1	1	0	0	2	0	0	0	0	0	214	343	2	0	559	1	195	142	0	338	899
04:45 PM	0	0	0	0	0	0	0	0	1	1	218	357	0	0	575	0	184	145	0	329	905
<b>Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>850</b>	<b>1335</b>	<b>4</b>	<b>0</b>	<b>2189</b>	<b>5</b>	<b>699</b>	<b>580</b>	<b>0</b>	<b>1284</b>	<b>3479</b>
05:00 PM	0	0	0	0	0	0	0	0	0	0	270	376	1	0	647	1	165	147	3	316	963
05:15 PM	0	0	0	0	0	0	0	0	0	0	269	400	2	0	671	1	188	179	2	370	1041
05:30 PM	1	0	0	0	1	0	0	0	0	0	251	450	0	0	701	1	139	132	0	272	974
05:45 PM	2	1	2	0	5	0	0	0	2	2	255	421	11	0	687	3	184	115	4	306	1000
<b>Total</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1045</b>	<b>1647</b>	<b>14</b>	<b>0</b>	<b>2706</b>	<b>6</b>	<b>676</b>	<b>573</b>	<b>9</b>	<b>1264</b>	<b>3978</b>
<b>Grand Total</b>	<b>15</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>26</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>7</b>	<b>2878</b>	<b>5780</b>	<b>25</b>	<b>0</b>	<b>8683</b>	<b>22</b>	<b>2877</b>	<b>2058</b>	<b>24</b>	<b>4981</b>	<b>13697</b>
<b>Apprch %</b>	<b>57.7</b>	<b>15.4</b>	<b>26.9</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>100</b>		<b>33.1</b>	<b>66.6</b>	<b>0.3</b>	<b>0</b>		<b>0.4</b>	<b>57.8</b>	<b>41.3</b>	<b>0.5</b>		
<b>Total %</b>	<b>0.1</b>	<b>0</b>	<b>0.1</b>	<b>0</b>	<b>0.2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.1</b>	<b>0.1</b>	<b>21</b>	<b>42.2</b>	<b>0.2</b>	<b>0</b>	<b>63.4</b>	<b>0.2</b>	<b>21</b>	<b>15</b>	<b>0.2</b>	<b>36.4</b>	
<b>Cars</b>	<b>14</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>2862</b>	<b>5705</b>	<b>25</b>	<b>0</b>	<b>8592</b>	<b>21</b>	<b>2835</b>	<b>2016</b>	<b>24</b>	<b>4896</b>	<b>13517</b>
<b>% Cars</b>	<b>93.3</b>	<b>100</b>	<b>100</b>	<b>0</b>	<b>96.2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>57.1</b>	<b>57.1</b>	<b>99.4</b>	<b>98.7</b>	<b>100</b>	<b>0</b>	<b>99</b>	<b>95.5</b>	<b>98.5</b>	<b>98</b>	<b>100</b>	<b>98.3</b>	<b>98.7</b>
<b>Heavy Vehicles</b>																					
<b>% Heavy Vehicles</b>	<b>6.7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3.8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>42.9</b>	<b>42.9</b>	<b>0.6</b>	<b>1.3</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>4.5</b>	<b>1.5</b>	<b>2</b>	<b>0</b>	<b>1.7</b>	<b>1.3</b>

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: I476 NB Ramp/Route 30  
 Date: Wednesday, November 18, 2015  
 Counter: ET/JT

File Name : SS1118-3  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 2

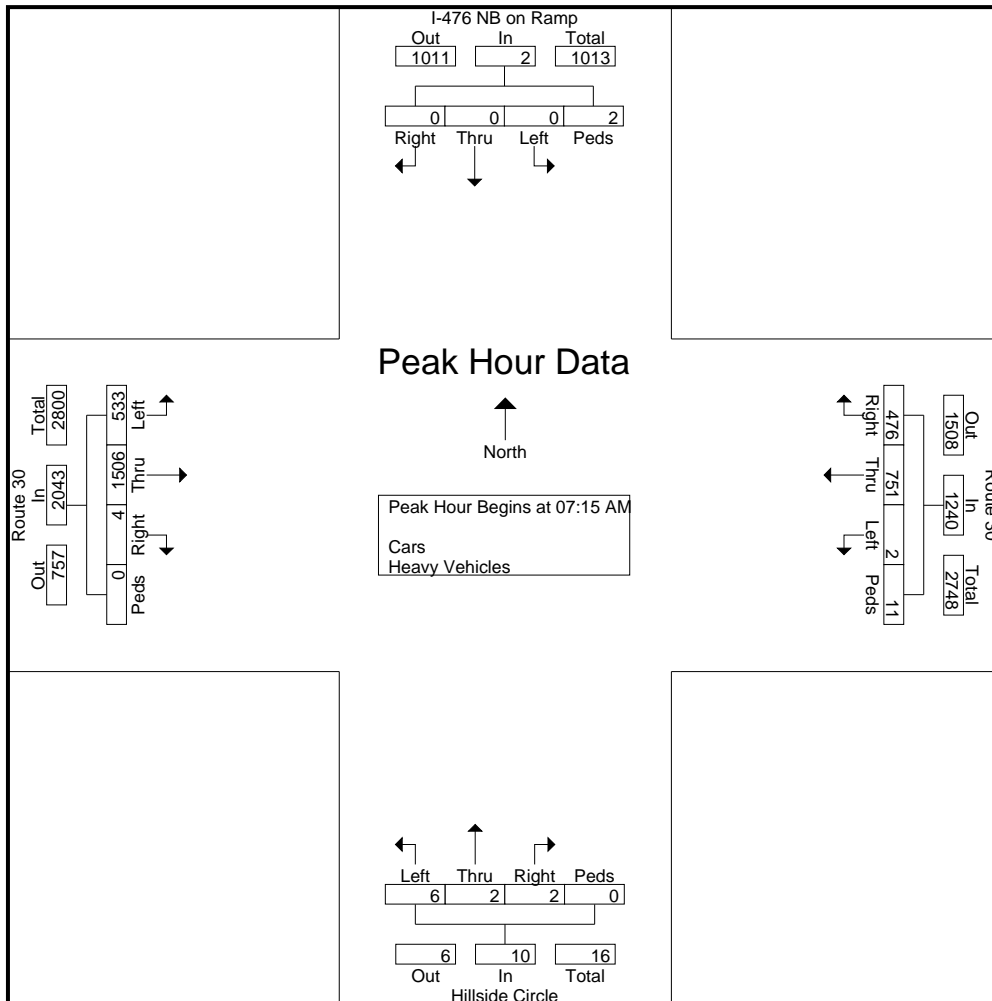


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: I476 NB Ramp/Route 30  
 Date: Wednesday, November 18, 2015  
 Counter: ET/JT

File Name : SS1118-3  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 3

Start Time	Hillside Circle Northbound					I-476 NB on Ramp Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	<b>3</b>															<b>211</b>					729
07:30 AM	1	0	0	0	1	0	0	0	2	2	152	404			557	0	157	126	11		
<b>07:45 AM</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>5</b>	0	0	0	0	0	121	404	2	0	527	0	200	<b>128</b>	<b>0</b>	<b>328</b>	<b>860</b>
08:00 AM	1	0	0	0	1	0	0	0	0	0	152	392	0	0	544	2					
Total Volume	6	2	2	0	10	0	0	0	2	2	533	1506	4	0	2043	2	751	476	11	1240	3295
% App. Total																					
PHF	.500	.250	.250	.000	.500	.000	.000	.000	.250	.250	.877	.932	.500	.000	.917	.250	.890	.930	.250	.945	.958

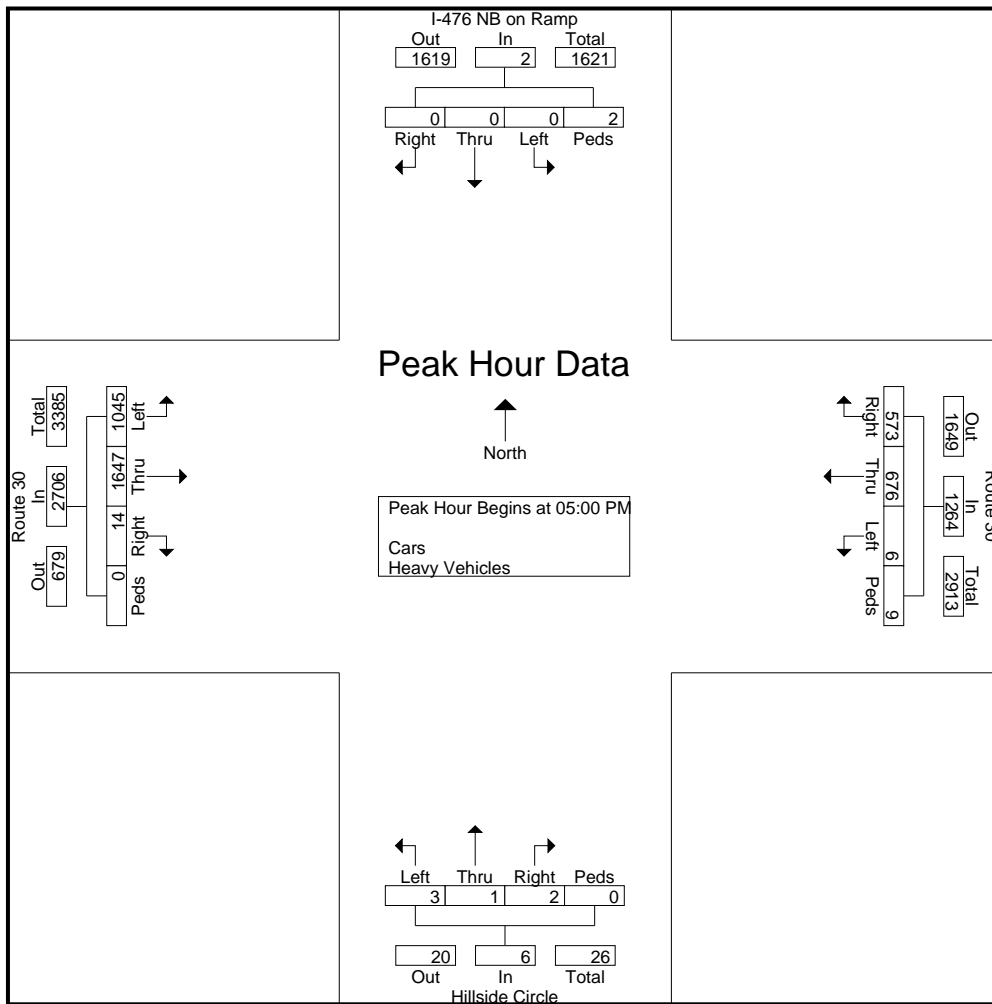


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: I476 NB Ramp/Route 30  
 Date: Wednesday, November 18, 2015  
 Counter: ET/JT

File Name : SS1118-3  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	Hillside Circle Northbound					I-476 NB on Ramp Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	0	0	0	0	0	0	0	0	0	270										
05:15 PM	0	0	0	0	0	0	0	0	0	0	269	400	2	0	671	1	188	179	2	370	1041
05:30 PM	1	0	0	0	1	0	0	0	0	0	251	450			701	1	139	132	0	272	974
05:45 PM	2	1	2		5	0	0	0	2	2	255	421	11	0	687	3			4		
Total Volume	3	1	2	0	6	0	0	0	2	2	1045	1647	14	0	2706	6	676	573	9	1264	3978
% App. Total																					
PHF	.375	.250	.250	.000	.300	.000	.000	.000	.250	.250	.968	.915	.318	.000	.965	.500	.899	.800	.563	.854	.955





# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/North Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: ACB

File Name : ss1118-4  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 1

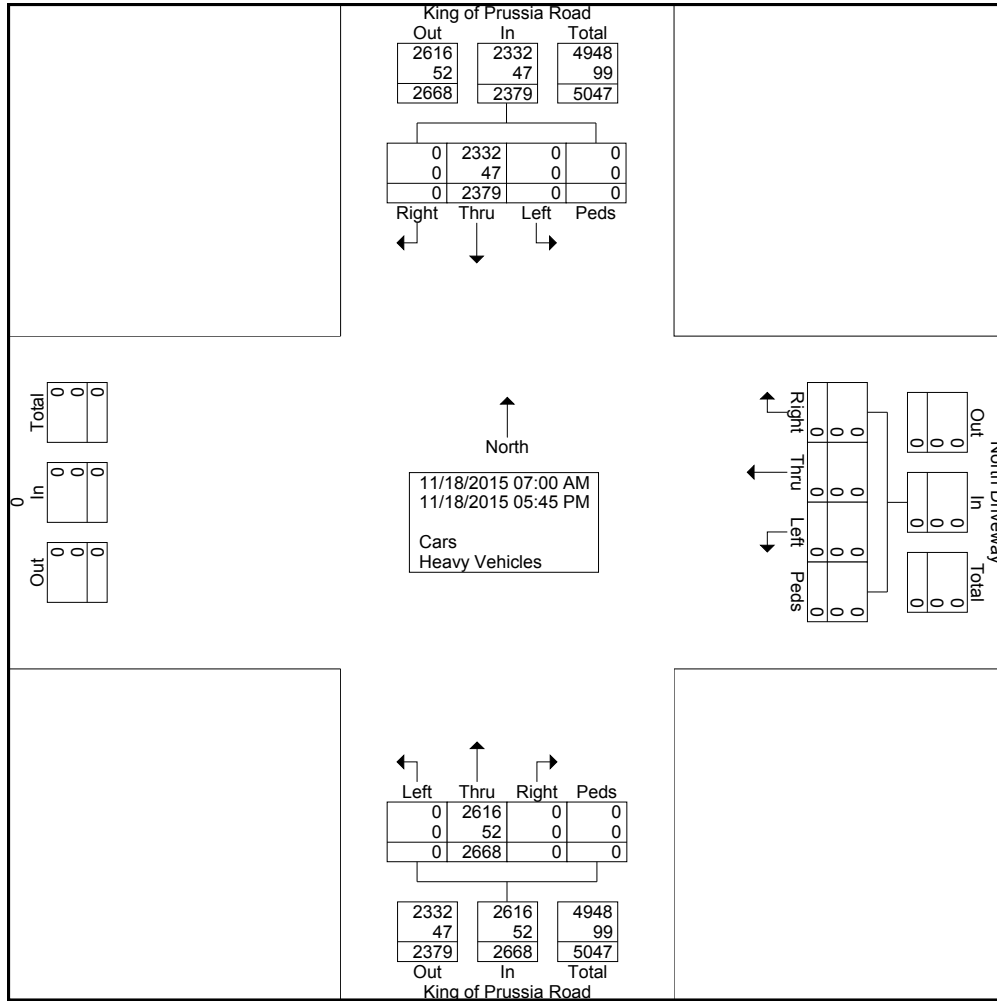
### Groups Printed- Cars - Heavy Vehicles

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	North Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	196	0	0	196	0	38	0	0	38	0	0	0	0	0	0	234
07:15 AM	0	221	0	0	221	0	83	0	0	83	0	0	0	0	0	0	304
07:30 AM	0	266	0	0	266	0	74	0	0	74	0	0	0	0	0	0	340
07:45 AM	0	239	0	0	239	0	73	0	0	73	0	0	0	0	0	0	312
Total	0	922	0	0	922	0	268	0	0	268	0	0	0	0	0	0	1190
08:00 AM	0	257	0	0	257	0	65	0	0	65	0	0	0	0	0	0	322
08:15 AM	0	298	0	0	298	0	55	0	0	55	0	0	0	0	0	0	353
08:30 AM	0	292	0	0	292	0	54	0	0	54	0	0	0	0	0	0	346
08:45 AM	0	306	0	0	306	0	61	0	0	61	0	0	0	0	0	0	367
Total	0	1153	0	0	1153	0	235	0	0	235	0	0	0	0	0	0	1388
04:00 PM	0	92	0	0	92	0	193	0	0	193	0	0	0	0	0	0	285
04:15 PM	0	86	0	0	86	0	202	0	0	202	0	0	0	0	0	0	288
04:30 PM	0	73	0	0	73	0	228	0	0	228	0	0	0	0	0	0	301
04:45 PM	0	73	0	0	73	0	211	0	0	211	0	0	0	0	0	0	284
Total	0	324	0	0	324	0	834	0	0	834	0	0	0	0	0	0	1158
05:00 PM	0	58	0	0	58	0	276	0	0	276	0	0	0	0	0	0	334
05:15 PM	0	68	0	0	68	0	283	0	0	283	0	0	0	0	0	0	351
05:30 PM	0	53	0	0	53	0	263	0	0	263	0	0	0	0	0	0	316
05:45 PM	0	90	0	0	90	0	220	0	0	220	0	0	0	0	0	0	310
Total	0	269	0	0	269	0	1042	0	0	1042	0	0	0	0	0	0	1311
Grand Total	0	2668	0	0	2668	0	2379	0	0	2379	0	0	0	0	0	0	5047
Apprch %	0	100	0	0		0	100	0	0		0	0	0	0	0		
Total %	0	52.9	0	0	52.9	0	47.1	0	0	47.1	0	0	0	0	0	0	
Cars	0	2616	0	0	2616	0	2332	0	0	2332	0	0	0	0	0	0	4948
% Cars	0	98.1	0	0	98.1	0	98	0	0	98	0	0	0	0	0	0	98
Heavy Vehicles	0	52	0	0	52	0	47	0	0	47	0	0	0	0	0	0	99
% Heavy Vehicles	0	1.9	0	0	1.9	0	2	0	0	2	0	0	0	0	0	0	2

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/North Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: ACB

File Name : ss1118-4  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 2

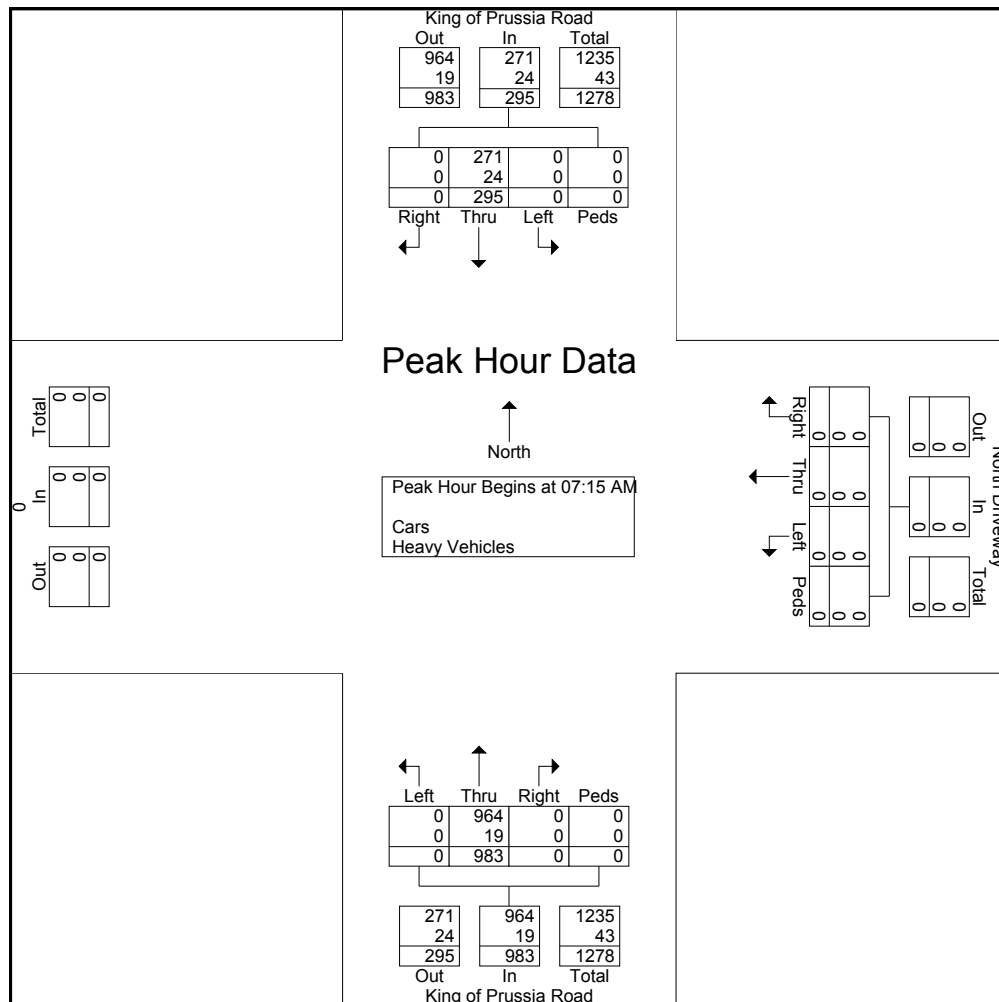


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/North Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: ACB

File Name : ss1118-4  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 3

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	North Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		App. Total	Left	Thru	Right	Peds	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	221	0	0	221	0	83	0	0	83	0	0	0	0	0	0	0
07:30 AM	0	266	0	0	266	0	74	0	0	74	0	0	0	0	0	0	0
07:45 AM	0	239	0	0	239	0	73	0	0	73	0	0	0	0	0	0	0
08:00 AM	0	257	0	0	257	0	65	0	0	65	0	0	0	0	0	0	0
Total Volume	0	983	0	0	983	0	295	0	0	295	0	0	0	0	0	0	0
% App. Total	0	100	0	0		0	100	0	0			0	0	0	0		
PHF	.000	.924	.000	.000	.924	.000	.889	.000	.000	.889	.000	.000	.000	.000	.000	.000	.940
Cars	0	964	0	0	964	0	271	0	0	271	0	0	0	0	0	0	1235
% Cars	0	98.1	0	0	98.1	0	91.9	0	0	91.9	0	0	0	0	0	0	96.6
Heavy Vehicles	0	19	0	0	19	0	24	0	0	24	0	0	0	0	0	0	43
% Heavy Vehicles	0	1.9	0	0	1.9	0	8.1	0	0	8.1	0	0	0	0	0	0	3.4



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/North Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: ACB

File Name : ss1118-4  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	North Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	58	0	0	58	0	276	0	0	276	0	0	0	0	0	0	334
05:15 PM	0	68	0	0	68	0	283	0	0	283	0	0	0	0	0	0	351
05:30 PM	0	53	0	0	53	0	263	0	0	263	0	0	0	0	0	0	316
05:45 PM	0	90	0	0	90	0	220	0	0	220	0	0	0	0	0	0	310
Total Volume	0	269	0	0	269	0	1042	0	0	1042	0	0	0	0	0	0	1311
% App. Total	0	100	0	0		0	100	0	0		0	0	0	0	0		
PHF	.000	.747	.000	.000	.747	.000	.920	.000	.000	.920	.000	.000	.000	.000	.000	.000	.934
Cars	0	267	0	0	267	0	1039	0	0	1039	0	0	0	0	0	0	1306
% Cars	0	99.3	0	0	99.3	0	99.7	0	0	99.7	0	0	0	0	0	0	99.6
Heavy Vehicles	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	5
% Heavy Vehicles	0	0.7	0	0	0.7	0	0.3	0	0	0.3	0	0	0	0	0	0	0.4

# Pennoni Associates

Location: Montgomery County, PA  
 South Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: PG

File Name : SS1118-5  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 1

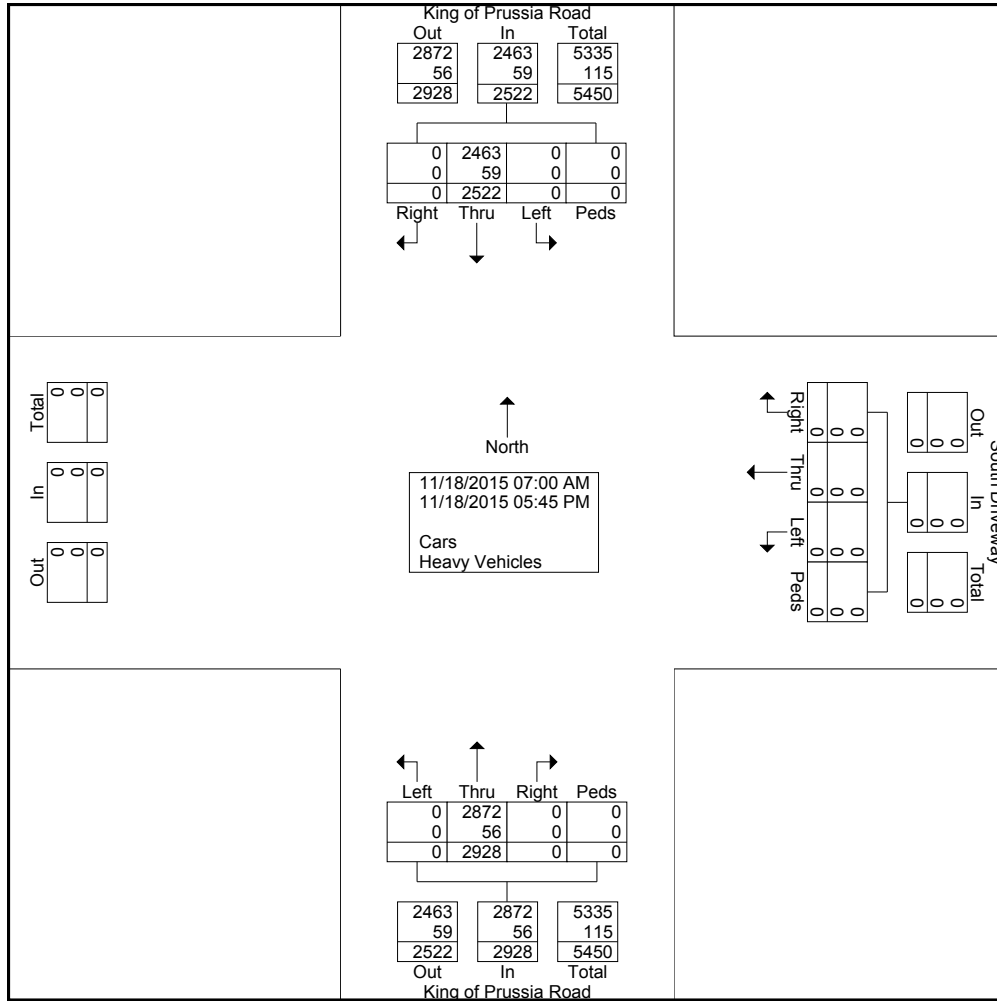
### Groups Printed- Cars - Heavy Vehicles

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	South Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	240	0	0	240	0	47	0	0	47	0	0	0	0	0	0	287
07:15 AM	0	349	0	0	349	0	107	0	0	107	0	0	0	0	0	0	456
07:30 AM	0	292	0	0	292	0	112	0	0	112	0	0	0	0	0	0	404
07:45 AM	0	242	0	0	242	0	79	0	0	79	0	0	0	0	0	0	321
Total	0	1123	0	0	1123	0	345	0	0	345	0	0	0	0	0	0	1468
08:00 AM	0	261	0	0	261	0	68	0	0	68	0	0	0	0	0	0	329
08:15 AM	0	301	0	0	301	0	60	0	0	60	0	0	0	0	0	0	361
08:30 AM	0	296	0	0	296	0	54	0	0	54	0	0	0	0	0	0	350
08:45 AM	0	313	0	0	313	0	61	0	0	61	0	0	0	0	0	0	374
Total	0	1171	0	0	1171	0	243	0	0	243	0	0	0	0	0	0	1414
04:00 PM	0	94	0	0	94	0	198	0	0	198	0	0	0	0	0	0	292
04:15 PM	0	90	0	0	90	0	202	0	0	202	0	0	0	0	0	0	292
04:30 PM	0	74	0	0	74	0	243	0	0	243	0	0	0	0	0	0	317
04:45 PM	0	84	0	0	84	0	218	0	0	218	0	0	0	0	0	0	302
Total	0	342	0	0	342	0	861	0	0	861	0	0	0	0	0	0	1203
05:00 PM	0	67	0	0	67	0	287	0	0	287	0	0	0	0	0	0	354
05:15 PM	0	71	0	0	71	0	294	0	0	294	0	0	0	0	0	0	365
05:30 PM	0	58	0	0	58	0	272	0	0	272	0	0	0	0	0	0	330
05:45 PM	0	96	0	0	96	0	220	0	0	220	0	0	0	0	0	0	316
Total	0	292	0	0	292	0	1073	0	0	1073	0	0	0	0	0	0	1365
Grand Total	0	2928	0	0	2928	0	2522	0	0	2522	0	0	0	0	0	0	5450
Apprch %	0	100	0	0		0	100	0	0		0	0	0	0	0		
Total %	0	53.7	0	0	53.7	0	46.3	0	0	46.3	0	0	0	0	0	0	
Cars	0	2872	0	0	2872	0	2463	0	0	2463	0	0	0	0	0	0	5335
% Cars	0	98.1	0	0	98.1	0	97.7	0	0	97.7	0	0	0	0	0	0	97.9
Heavy Vehicles	0	56	0	0	56	0	59	0	0	59	0	0	0	0	0	0	115
% Heavy Vehicles	0	1.9	0	0	1.9	0	2.3	0	0	2.3	0	0	0	0	0	0	2.1

# Pennoni Associates

Location: Montgomery County, PA  
 South Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: PG

File Name : SS1118-5  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 2



# Pennoni Associates

Location: Montgomery County, PA  
 South Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: PG

File Name : SS1118-5  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 3

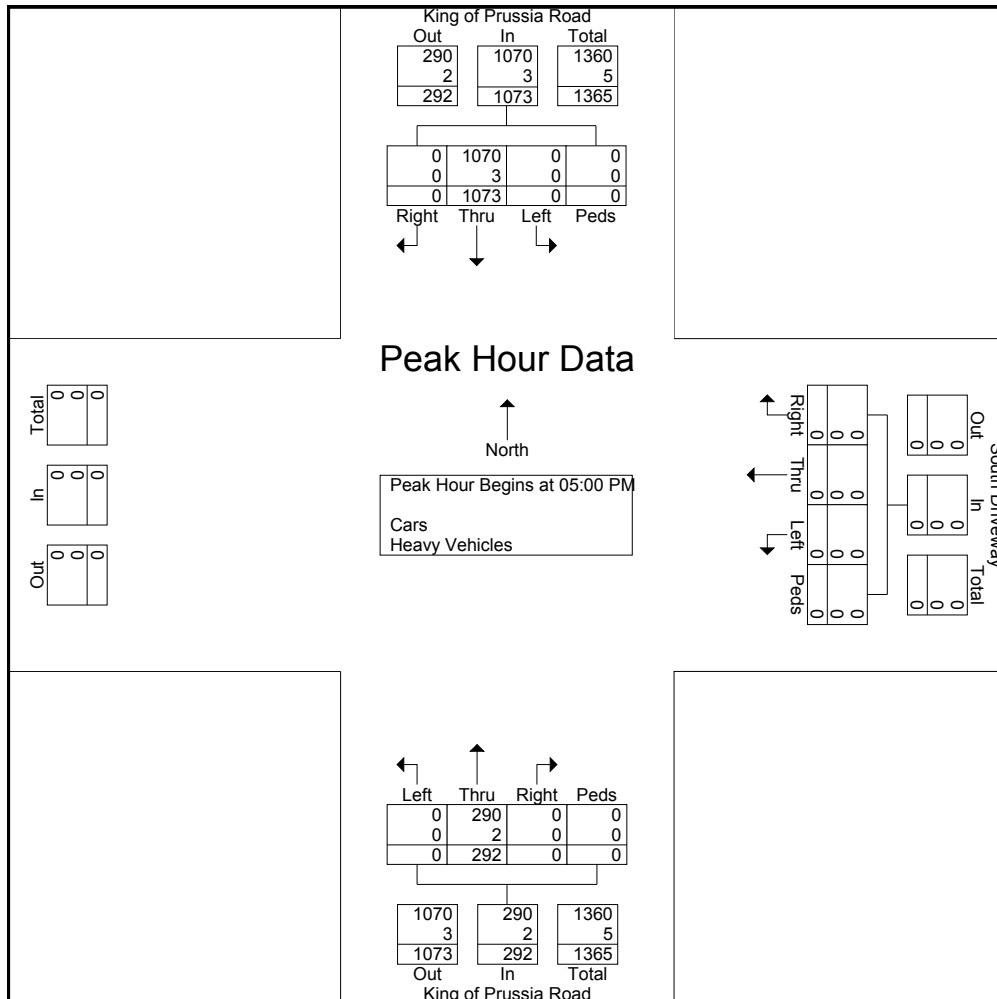
Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	South Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		App. Total	Left	Thru	Right	Peds	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	349	0	0	349	0	107	0	0	107	0	0	0	0	0	0	456
07:30 AM	0	292	0	0	292	0	112	0	0	112	0	0	0	0	0	0	404
07:45 AM	0	242	0	0	242	0	79	0	0	79	0	0	0	0	0	0	321
08:00 AM	0	261	0	0	261	0	68	0	0	68	0	0	0	0	0	0	329
Total Volume	0	1144	0	0	1144	0	366	0	0	366	0	0	0	0	0	0	1510
% App. Total	0	100	0	0		0	100	0	0			0	0	0	0		
PHF	.000	.819	.000	.000	.819	.000	.817	.000	.000	.817	.000	.000	.000	.000	.000	.000	.828
Cars	0	1126	0	0	1126	0	337	0	0	337	0	0	0	0	0	0	1463
% Cars	0	98.4	0	0	98.4	0	92.1	0	0	92.1	0	0	0	0	0	0	96.9
Heavy Vehicles	0	18	0	0	18	0	29	0	0	29	0	0	0	0	0	0	47
% Heavy Vehicles	0	1.6	0	0	1.6	0	7.9	0	0	7.9	0	0	0	0	0	0	3.1

# Pennoni Associates

Location: Montgomery County, PA  
 South Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: PG

File Name : SS1118-5  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	South Driveway Westbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		App. Total	Left	Thru	Right	Peds		App. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 05:00 PM																		
05:00 PM	0	67	0	0	67	0	287	0	0	287	0	0	0	0	0	0	0	354
05:15 PM	0	71	0	0	71	0	294	0	0	294	0	0	0	0	0	0	0	365
05:30 PM	0	58	0	0	58	0	272	0	0	272	0	0	0	0	0	0	0	330
05:45 PM	0	96	0	0	96	0	220	0	0	220	0	0	0	0	0	0	0	316
Total Volume	0	292	0	0	292	0	1073	0	0	1073	0	0	0	0	0	0	0	1365
% App. Total	0	100	0	0	100	0	100	0	0	100	0	0	0	0	0	0	0	100
PHF	.000	.760	.000	.000	.760	.000	.912	.000	.000	.912	.000	.000	.000	.000	.000	.000	.000	.935
Cars	0	290	0	0	290	0	1070	0	0	1070	0	0	0	0	0	0	0	1360
% Cars	0	99.3	0	0	99.3	0	99.7	0	0	99.7	0	0	0	0	0	0	0	99.6
Heavy Vehicles	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	0	5
% Heavy Vehicles	0	0.7	0	0	0.7	0	0.3	0	0	0.3	0	0	0	0	0	0	0	0.4





# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: 476NB Off/Rt. 30/ KOP Rd.  
 Date: Tuesday, November 24, 2015  
 Counter: ET / JT

File Name : SS1124-1  
 Site Code : 00000000  
 Start Date : 11/24/2015  
 Page No : 1

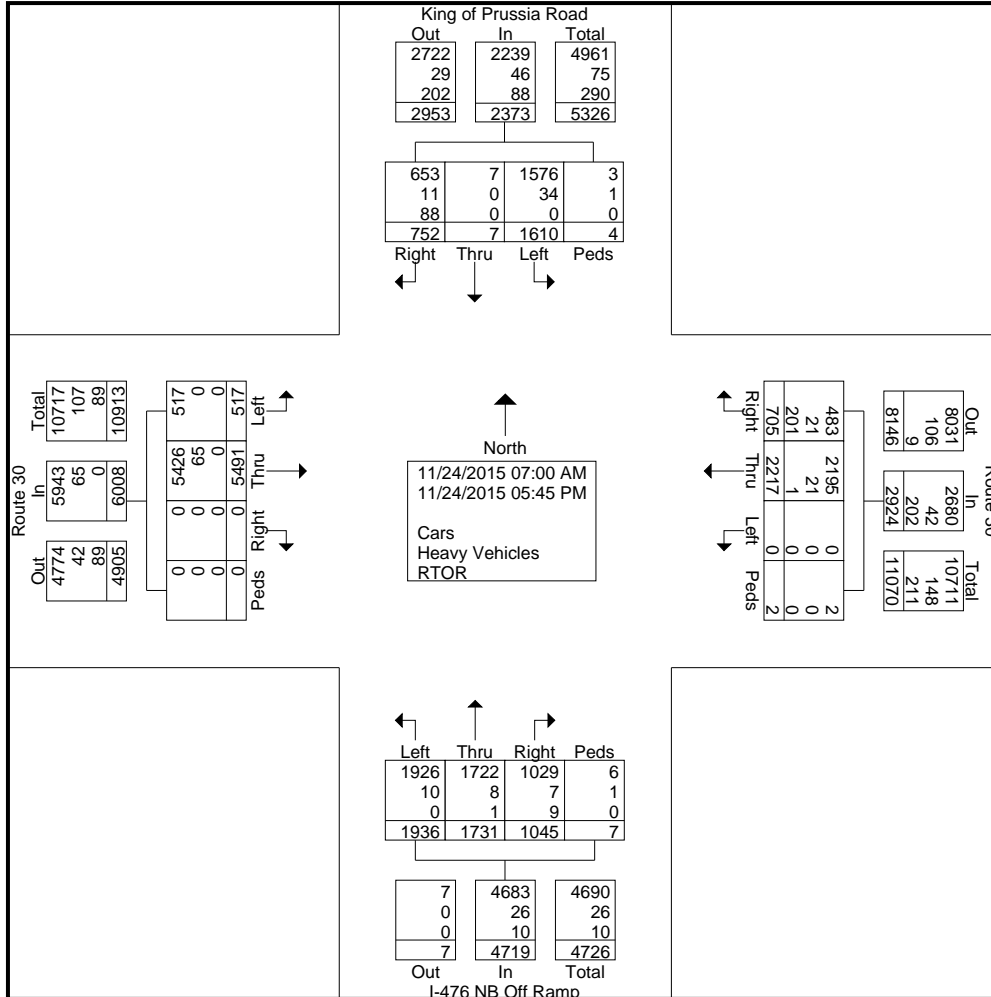
### Groups Printed- Cars - Heavy Vehicles - RTOR

Start Time	I-476 NB Off Ramp Northbound					King of Prussia Road Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	147	182	66	0	395	35	0	13	0	48	42	231	0	0	273	0	92	43	0	135	851
07:15 AM	170	186	68	0	424	59	0	42	0	101	78	278	0	0	356	0	103	110	0	213	1094
07:30 AM	192	173	85	0	450	82	0	30	0	112	29	325	0	0	354	0	148	58	0	206	1122
07:45 AM	216	153	88	0	457	58	0	16	0	74	18	321	0	0	339	0	145	53	0	198	1068
Total	725	694	307	0	1726	234	0	101	0	335	167	1155	0	0	1322	0	488	264	0	752	4135
08:00 AM	167	186	90	0	443	51	0	16	1	68	43	333	0	0	376	0	128	33	0	161	1048
08:15 AM	188	183	88	0	459	47	0	13	0	60	56	327	0	0	383	0	147	49	0	196	1098
08:30 AM	170	161	92	0	423	33	7	8	0	48	68	333	0	0	401	0	147	50	0	197	1069
08:45 AM	126	124	87	0	337	42	0	12	0	54	73	312	0	0	385	0	166	60	1	227	1003
Total	651	654	357	0	1662	173	7	49	1	230	240	1305	0	0	1545	0	588	192	1	781	4218
*** BREAK ***																					
04:00 PM	67	54	40	0	161	138	0	74	2	214	19	374	0	0	393	0	167	24	0	191	959
04:15 PM	80	52	42	1	175	114	0	59	0	173	21	383	0	0	404	0	149	29	0	178	930
04:30 PM	69	36	34	0	139	176	0	87	0	263	12	387	0	0	399	0	123	24	0	147	948
04:45 PM	77	45	55	0	177	125	0	83	1	209	12	378	0	0	390	0	135	27	0	162	938
Total	293	187	171	1	652	553	0	303	3	859	64	1522	0	0	1586	0	574	104	0	678	3775
05:00 PM	62	37	50	0	149	184	0	98	0	282	11	362	0	0	373	0	149	31	0	180	984
05:15 PM	73	49	45	0	167	180	0	87	0	267	16	394	0	0	410	0	151	39	0	190	1034
05:30 PM	77	43	62	0	182	164	0	64	0	228	10	392	0	0	402	0	124	32	1	157	969
05:45 PM	55	67	53	6	181	122	0	50	0	172	9	361	0	0	370	0	143	43	0	186	909
Total	267	196	210	6	679	650	0	299	0	949	46	1509	0	0	1555	0	567	145	1	713	3896
Grand Total	1936	1731	1045	7	4719	1610					5491	0	0	6008	0	2217					
Cars	1926	1722	1029	6	4683	1576	7	653	3	2239	517	5426	0	0	5943	0	2195	483	2	2680	15545
% Cars	99.5	99.5	98.5	85.7	99.2	97.9	100	86.8	75	94.4	100	98.8	0	0	98.9	0	99	68.5	100	91.7	97
Heavy Vehicles	10	8	7	1	26	34	0	11	1	46	0	65	0	0	65	0	21	21	0	42	179
% Heavy Vehicles	0.5	0.5	0.7	14.3	0.6	2.1	0	1.5	25	1.9	0	1.2	0	0	1.1	0	0.9	3	0	1.4	1.1
RTOR	0	1	9	0	10	0	0	88	0	88	0	0	0	0	0	0	1	201	0	202	300
% RTOR	0	0.1	0.9	0	0.2	0	0	11.7	0	3.7	0	0	0	0	0	0	0	28.5	0	6.9	1.9

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: 476NB Off/Rt. 30/ KOP Rd.  
 Date: Tuesday, November 24, 2015  
 Counter: ET / JT

File Name : SS1124-1  
 Site Code : 00000000  
 Start Date : 11/24/2015  
 Page No : 2

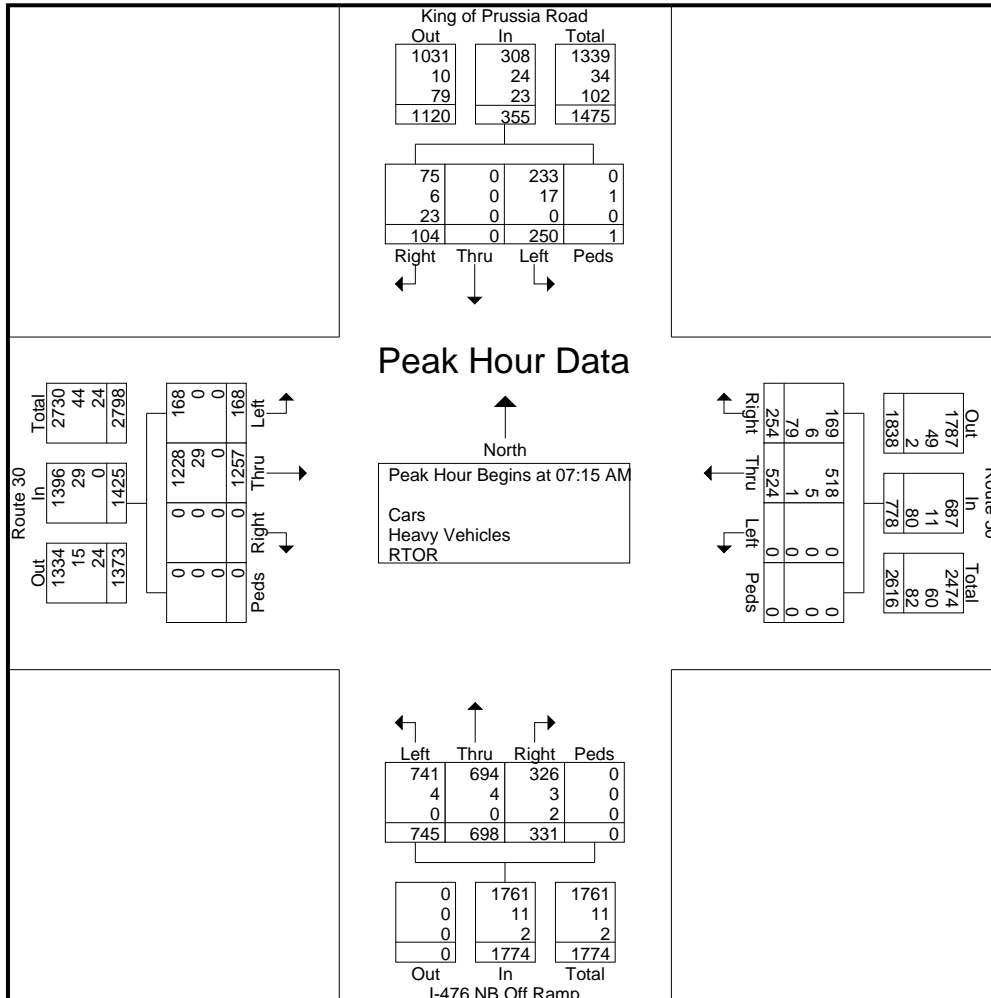


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: 476NB Off/Rt. 30/ KOP Rd.  
 Date: Tuesday, November 24, 2015  
 Counter: ET / JT

File Name : SS1124-1  
 Site Code : 00000000  
 Start Date : 11/24/2015  
 Page No : 3

Start Time	I-476 NB Off Ramp Northbound					King of Prussia Road Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	170	186	68	0	424	59	0	42	0	101	78	278	0	0	356	0	103	110	0	213	1094
07:30 AM	192	173	85	0	450	82	0	30	0	112	29	325	0	0	354	0	148	58	0	206	1122
07:45 AM	216	153	88	0	457	58	0	16	0	74	18	321	0	0	339	0	145	53	0	198	1068
08:00 AM	167	186	90	0	443	51	0	16	1	68	43	333	0	0	376	0	128	33	0	161	1048
Total Volume	745	698	331	0	1774	250	0	104	1	355	168	1257	0	0	1425	0	524	254	0	778	4332
% App. Total																					
PHF	.862	.938	.919	.000	.970	.762	.000	.619	.250	.792	.538	.944	.000	.000	.947	.000	.885	.577	.000	.913	.965
Cars	741	694	326	0	1761	233	0	75	0	308	168	1228	0	0	1396	0	518	169	0	687	4152
% Cars	99.5	99.4	98.5	0	99.3	93.2	0	72.1	0	86.8	100	97.7	0	0	98.0	0	98.9	66.5	0	88.3	95.8
Heavy Vehicles																					
% Heavy Vehicles	0.5	0.6	0.9	0	0.6	6.8	0	5.8	100	6.8	0	2.3	0	0	2.0	0	1.0	2.4	0	1.4	1.7
RTOR	0	0	2	0	2	0	0	23	0	23	0	0	0	0	0	0	1	79	0	80	105
% RTOR	0	0	0.6	0	0.1	0	0	22.1	0	6.5	0	0	0	0	0	0	0.2	31.1	0	10.3	2.4

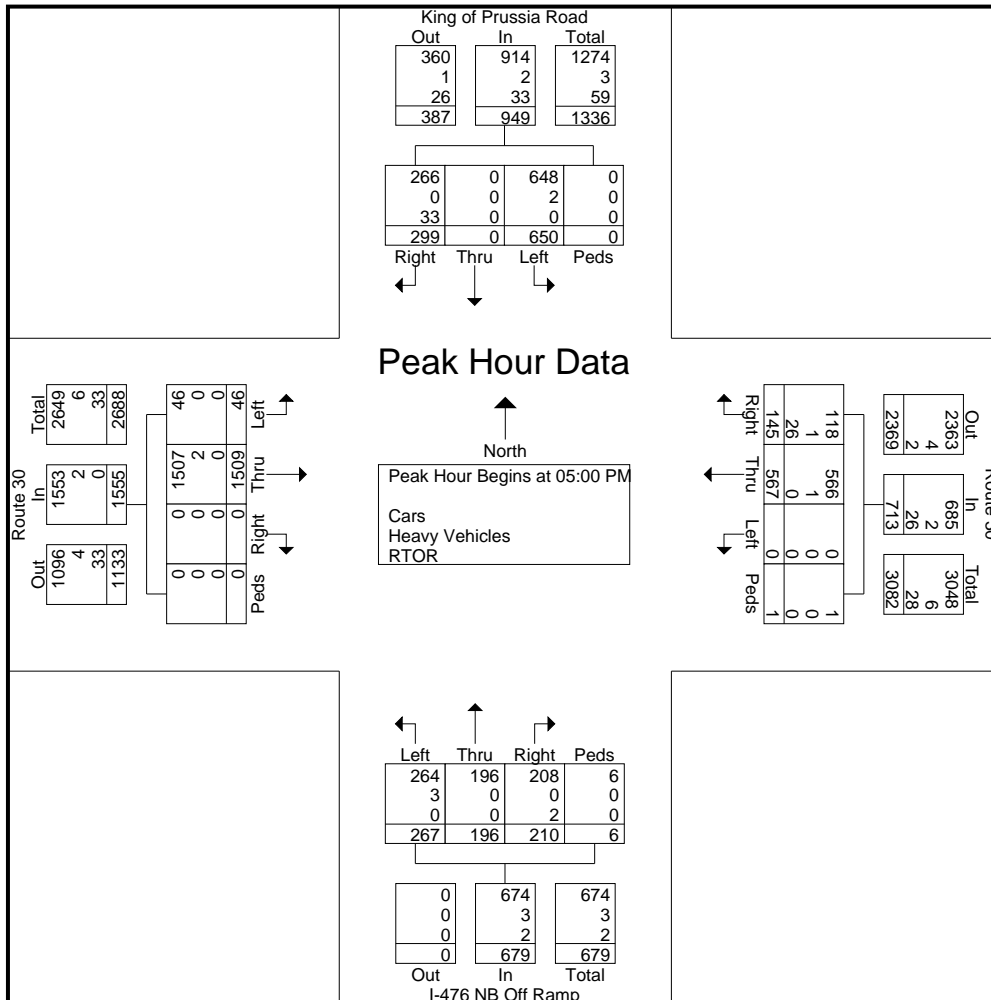


# Pennoni Associates

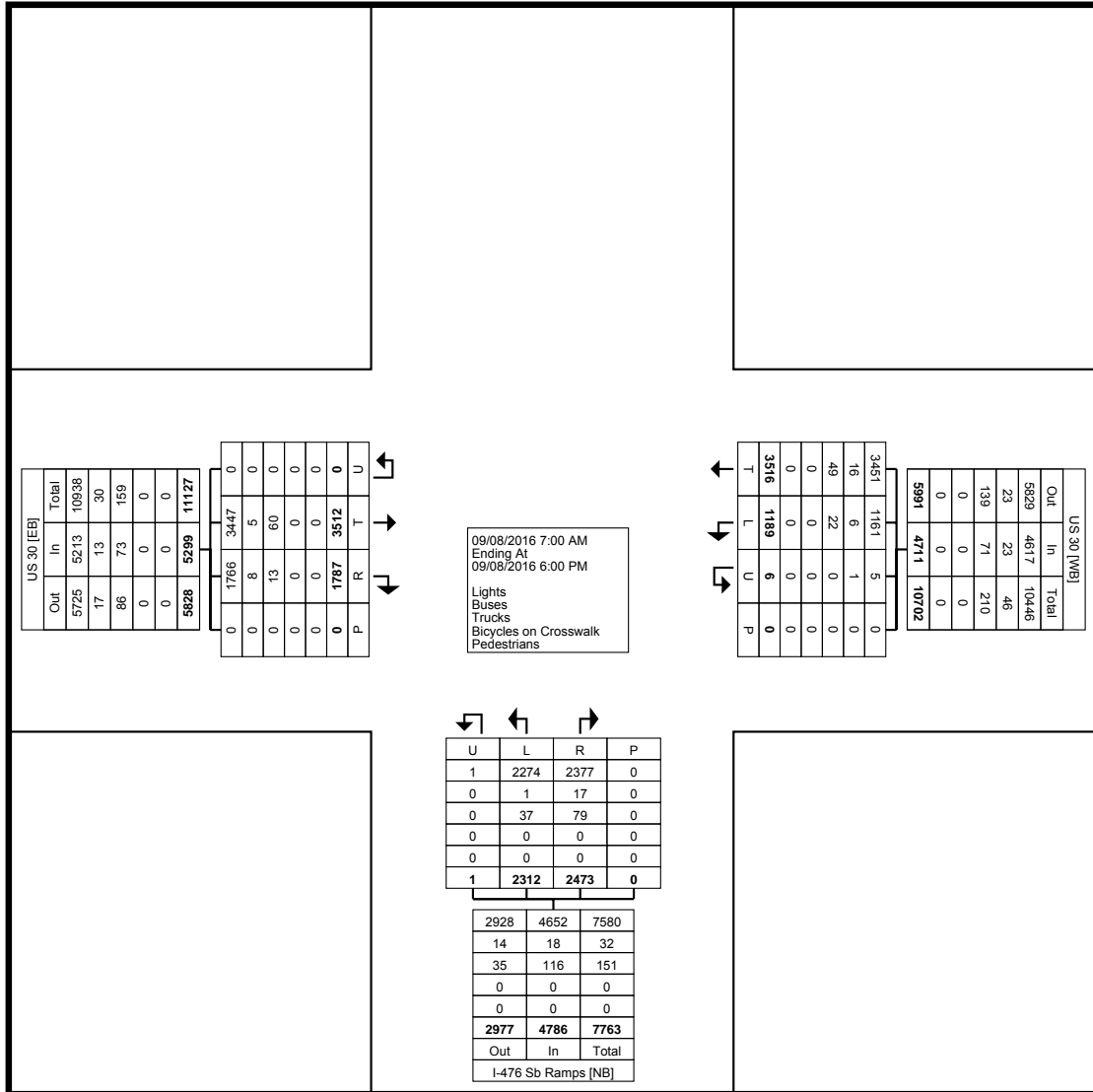
Location: Montgomery County, PA  
 Intersection: 476NB Off/Rt. 30/ KOP Rd.  
 Date: Tuesday, November 24, 2015  
 Counter: ET / JT

File Name : SS1124-1  
 Site Code : 00000000  
 Start Date : 11/24/2015  
 Page No : 4

Start Time	I-476 NB Off Ramp Northbound					King of Prussia Road Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	62	37	50	0	149	184	0	98	0	282	11	362	0	0	373	0	149	31	0	180	984
05:15 PM	73	49	45	0	167	180	0	87	0	267	16	394	0	0	410	0	151	39	0	190	1034
05:30 PM	77	43	62	0	182	164	0	64	0	228	10	392	0	0	402	0	124	32	1	157	969
05:45 PM	55	67	53	6	181	122	0	50	0	172	9	361	0	0	370	0	143	43	0	186	909
Total Volume	267	196	210	6	679	650	0	299	0	949	46	1509	0	0	1555	0	567	145	1	713	3896
% App. Total	.867	.731	.847	.250	.933	.883	.000	.763	.000	.841	.719	.957	.000	.000	.948	.000	.939	.843	.250	.938	.942
PHF	.867	.731	.847	.250	.933	.883	.000	.763	.000	.841	.719	.957	.000	.000	.948	.000	.939	.843	.250	.938	.942
Cars	264	196	208	6	674	648	0	266	0	914	46	1507	0	0	1553	0	566	118	1	685	3826
% Cars	98.9	100	99.0	100	99.3	99.7	0	89.0	0	96.3	100	99.9	0	0	99.9	0	99.8	81.4	100	96.1	98.2
Heavy Vehicles	1.1	0	0	0	0.4	0.3	0	0	0	0.2	0	0.1	0	0.1	0	0.2	0.7	0	0.3	0.2	
% Heavy Vehicles	1.1	0	0	0	0.4	0.3	0	0	0	0.2	0	0.1	0	0.1	0	0.2	0.7	0	0.3	0.2	
RTOR	0	0	2	0	2	0	0	33	0	33	0	0	0	0	0	0	0	26	0	26	61
% RTOR	0	0	1.0	0	0.3	0	0	11.0	0	3.5	0	0	0	0	0	0	0	17.9	0	3.6	1.6

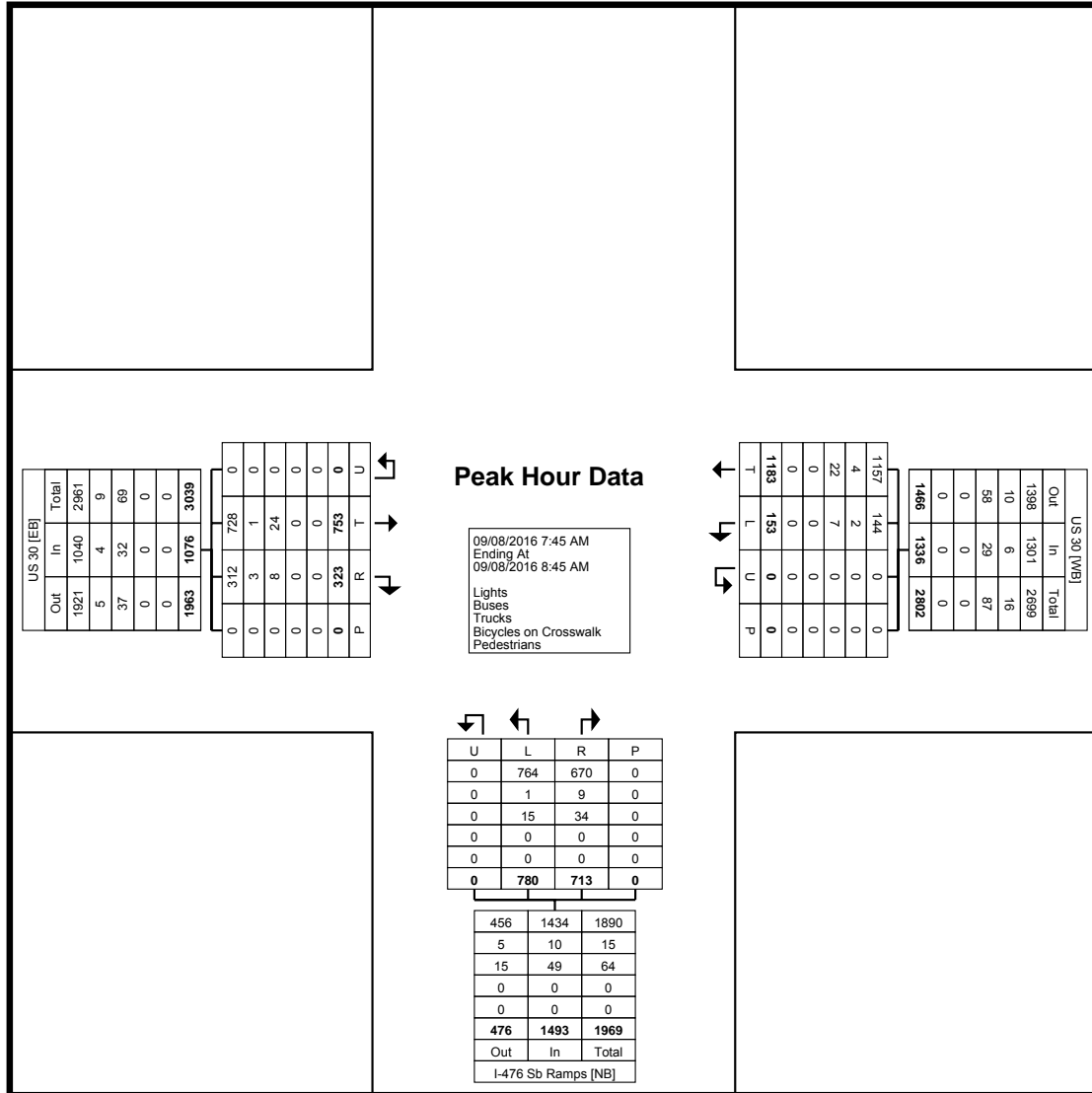






Turning Movement Data Plot

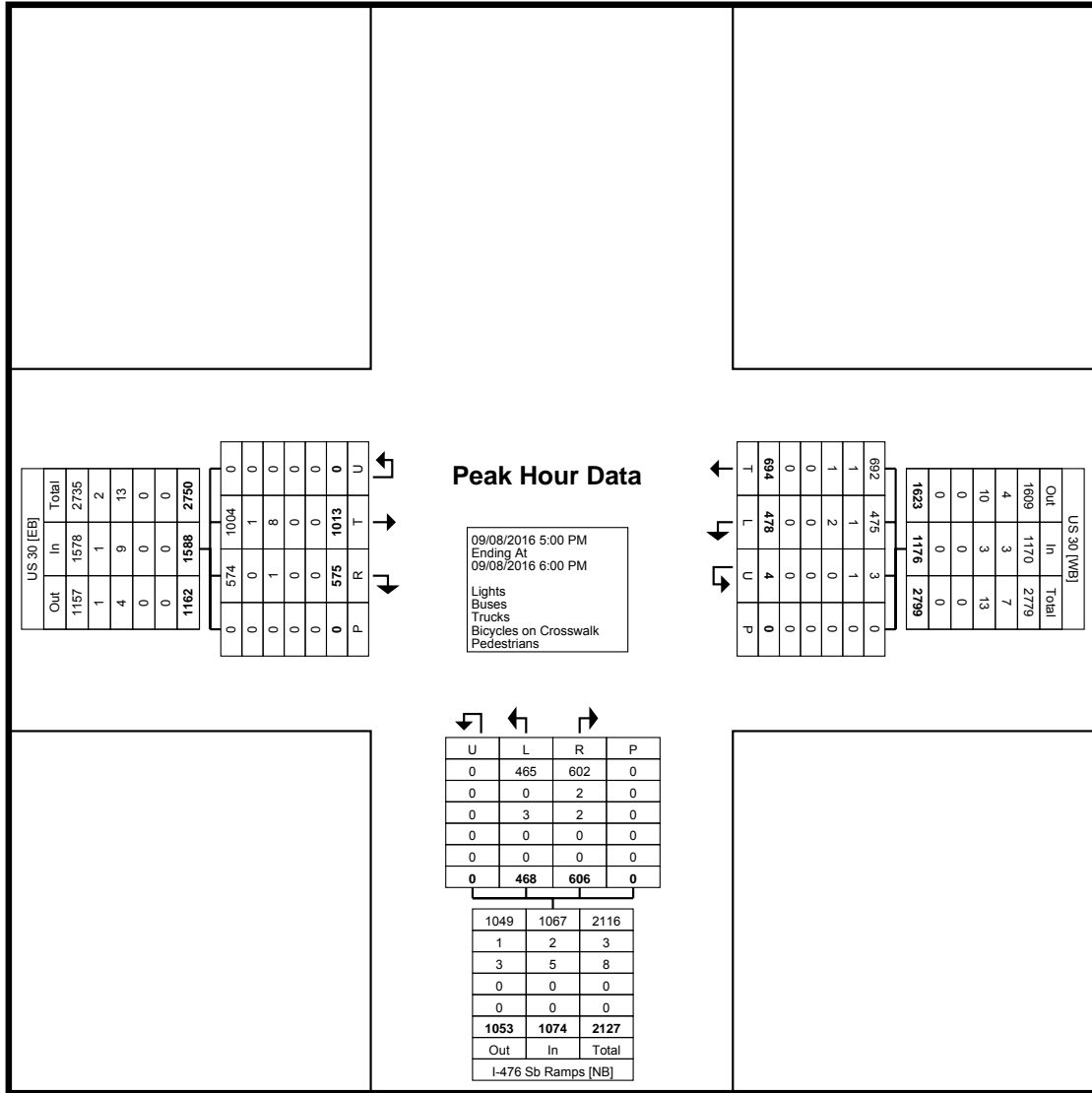




Turning Movement Peak Hour Data Plot (7:45 AM)







Turning Movement Peak Hour Data Plot (5:00 PM)

# APPENDIX D

Existing Condition Capacity Analysis Worksheets

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY






















145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



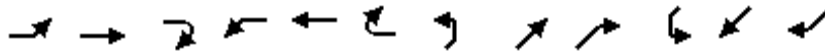
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	264	7	100	362	534	2	12	594	578
Future Volume (veh/h)	1	0	2	264	7	100	362	534	2	12	594	578
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1730	1853	1853	1773	1755	1808
Adj Flow Rate, veh/h	1	0	2	293	8	111	402	593	2	13	660	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	0	0	0	1	2
Cap, veh/h	303	0	357	406	23	326	448	1210	4	391	663	580
Arrive On Green	0.23	0.00	0.23	0.23	0.23	0.23	0.22	0.66	0.66	0.38	0.38	0.00
Sat Flow, veh/h	1293	0	1530	1396	101	1397	1648	1846	6	823	1755	1537
Grp Volume(v), veh/h	1	0	2	293	0	119	402	0	595	13	660	0
Grp Sat Flow(s),veh/h/ln	1293	0	1530	1396	0	1498	1648	0	1852	823	1755	1537
Q Serve(g_s), s	0.1	0.0	0.1	18.3	0.0	6.0	16.7	0.0	14.7	0.9	33.7	0.0
Cycle Q Clear(g_c), s	5.5	0.0	0.1	18.3	0.0	6.0	16.7	0.0	14.7	0.9	33.7	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	303	0	357	406	0	349	448	0	1214	391	663	580
V/C Ratio(X)	0.00	0.00	0.01	0.72	0.00	0.34	0.90	0.00	0.49	0.03	1.00	0.00
Avail Cap(c_a), veh/h	303	0	357	406	0	349	448	0	1214	391	663	580
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.17	0.17	0.00
Uniform Delay (d), s/veh	30.8	0.0	26.5	33.5	0.0	28.7	25.1	0.0	7.9	17.7	27.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	6.2	0.0	0.6	20.3	0.0	1.4	0.0	13.4	0.0
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	0.0	0.0	0.1	12.4	0.0	4.5	17.8	0.0	12.5	0.4	21.7	0.0
LnGrp Delay(d),s/veh	30.8	0.0	26.5	39.7	0.0	29.3	45.5	0.0	9.3	17.7	41.3	0.0
LnGrp LOS	C		C	D		C	D		A	B	D	
Approach Vol, veh/h		3			412			997			673	
Approach Delay, s/veh		27.9			36.7			23.9			40.8	
Approach LOS		C			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		64.0		26.0	25.0	39.0		26.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		58.0		20.0	19.0	33.0		20.0				
Max Q Clear Time (g_c+I1), s		16.7		20.8	19.2	36.2		8.0				
Green Ext Time (p_c), s		11.0		0.0	0.0	0.0		1.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			31.9									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	37	259	460	25	790	7	494	32	46	2	1	6
Future Volume (veh/h)	37	259	460	25	790	7	494	32	46	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	39	276	0	27	840	7	526	34	49	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	124	857	772	512	899	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	661	1714	1545	1068	1798	15	393	25	1520	0	97	194
Grp Volume(v), veh/h	39	276	0	27	0	847	560	0	49	9	0	0
Grp Sat Flow(s),veh/h/ln	661	1714	1545	1068	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	5.3	8.6	0.0	1.4	0.0	39.4	0.0	0.0	1.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	44.2	8.6	0.0	10.0	0.0	39.4	34.0	0.0	1.9	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	124	857	772	512	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.31	0.32	0.00	0.05	0.00	0.93	2.38	0.00	0.09	0.06	0.00	0.00
Avail Cap(c_a), veh/h	124	857	772	512	0	907	236	0	574	159	0	0
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)	0.72	0.72	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	41.6	13.4	0.0	16.4	0.0	21.1	33.6	0.0	18.0	21.6	0.0	0.0
Incr Delay (d2), s/veh	4.7	0.7	0.0	0.2	0.0	17.7	632.5	0.0	0.1	0.1	0.0	0.0
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	2.0	7.1	0.0	0.8	0.0	32.0	85.0	0.0	1.4	0.3	0.0	0.0
LnGrp Delay(d),s/veh	46.3	14.1	0.0	16.6	0.0	38.8	666.0	0.0	18.1	21.8	0.0	0.0
LnGrp LOS	D	B		B		D	F		B	C		
Approach Vol, veh/h		315			874			609			9	
Approach Delay, s/veh		18.1			38.1			613.9			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		46.7		36.0		41.4		36.0				
Green Ext Time (p_c), s		0.0		0.0		1.8		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				228.6								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/05/2018

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↖↗		↘↗	↖↗
Traffic Vol, veh/h	5	26	933	56	60	242
Future Vol, veh/h	5	26	933	56	60	242
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	6	30	1072	64	69	278

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1540	1132	0	0	1154
Stage 1	1122	-	-	-	-
Stage 2	418	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	128	206	-	-	539
Stage 1	314	-	-	-	-
Stage 2	669	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	110	201	-	-	535
Mov Cap-2 Maneuver	229	-	-	-	-
Stage 1	310	-	-	-	-
Stage 2	582	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.2	0	2.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	205	535
HCM Lane V/C Ratio	-	-	0.174	0.129
HCM Control Delay (s)	-	-	26.2	12.7
HCM Lane LOS	-	-	D	B
HCM 95th %tile Q(veh)	-	-	0.6	0.4

HCM 2010 TWSC  
 4: King of Prussia Rd & Northern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑			↑
Traffic Vol, veh/h	0	0	983	0	0	295
Future Vol, veh/h	0	0	983	0	0	295
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	0	0	1046	0	0	314

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1360	1046	0	-	-	-
Stage 1	1046	-	-	-	-	-
Stage 2	314	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	165	280	-	0	0	-
Stage 1	341	-	-	0	0	-
Stage 2	745	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	165	280	-	-	-	-
Mov Cap-2 Maneuver	274	-	-	-	-	-
Stage 1	341	-	-	-	-	-
Stage 2	745	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	-	-
HCM Lane V/C Ratio	-	-
HCM Control Delay (s)	-	0
HCM Lane LOS	-	A
HCM 95th %tile Q(veh)	-	-



Intersection												
Int Delay, s/veh	5.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	9	0	128	0	0	0	171	978	0	0	239	57
Future Vol, veh/h	9	0	128	0	0	0	171	978	0	0	239	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	164	0	0	0	219	1254	0	0	306	73

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	2035	2043	343				379	0	0	1262	0	0
Stage 1	343	343	-				-	-	-	-	-	-
Stage 2	1692	1700	-				-	-	-	-	-	-
Critical Hdwy	6.51	6.5	6.24				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.51	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	59	57	695				1191	-	-	558	-	-
Stage 1	699	641	-				-	-	-	-	-	-
Stage 2	156	149	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	23	0	695				1191	-	-	558	-	-
Mov Cap-2 Maneuver	23	0	-				-	-	-	-	-	-
Stage 1	699	0	-				-	-	-	-	-	-
Stage 2	61	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	53.4	1.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1191	-	-	238	558	-	-
HCM Lane V/C Ratio	0.184	-	-	0.738	-	-	-
HCM Control Delay (s)	8.7	0	-	53.4	0	-	-
HCM Lane LOS	A	A	-	F	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	5.1	0	-	-

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↗↘	↘↗	↑
Traffic Vol, veh/h	0	0	1144	0	0	366
Future Vol, veh/h	0	0	1144	0	0	366
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	0	0	1378	0	0	441



























Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1819	1378	0	0	1378
Stage 1	1378	-	-	-	-
Stage 2	441	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	86	179	-	-	504
Stage 1	236	-	-	-	-
Stage 2	653	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	86	179	-	-	504
Mov Cap-2 Maneuver	86	-	-	-	-
Stage 1	236	-	-	-	-
Stage 2	653	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	504
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0

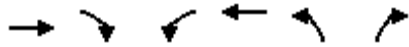
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 		 			 		
Traffic Volume (veh/h)	169	1262	0	0	526	255	748	701	332	251	0	104
Future Volume (veh/h)	169	1262	0	0	526	255	748	701	332	251	0	104
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	174	1301	0	0	542	0	771	723	342	259	0	107
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	282	1334	0	0	921	425	1660	690	586	363	0	0
Arrive On Green	0.06	0.27	0.00	0.00	0.54	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	259	
Grp Volume(v), veh/h	174	1301	0	0	542	0	771	723	342	259	57.1	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	5.7	42.5	0.0	0.0	11.8	0.0	16.7	43.0	19.8	8.0		
Cycle Q Clear(g_c), s	5.7	42.5	0.0	0.0	11.8	0.0	16.7	43.0	19.8	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	282	1334	0	0	921	425	1660	690	586	363		
V/C Ratio(X)	0.62	0.97	0.00	0.00	0.59	0.00	0.46	1.05	0.58	0.71		
Avail Cap(c_a), veh/h	451	1334	0	0	921	425	1660	690	586	363		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.92	0.92	0.00	0.00	0.94	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.1	39.7	0.0	0.0	21.2	0.0	17.4	33.5	26.4	50.7		
Incr Delay (d2), s/veh	2.0	18.4	0.0	0.0	2.6	0.0	0.2	47.6	1.5	6.4		
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		
%ile BackOfQ(95%),veh/ln	4.8	30.6	0.0	0.0	9.6	0.0	12.0	54.0	13.2	1.6		
LnGrp Delay(d),s/veh	52.1	58.1	0.0	0.0	23.8	0.0	17.6	81.1	27.9	57.1		
LnGrp LOS	D	E			C		B	F	C	E		
Approach Vol, veh/h		1475			542			1836				
Approach Delay, s/veh		57.4			23.8			44.5				
Approach LOS		E			C			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		14.4	34.6	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		45.0	19.2		8.2	14.3	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.0		0.2	6.8	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			47.2									
HCM 2010 LOS			D									
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/05/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	753	0	153	1183	780	713		
Future Volume (veh/h)	753	0	153	1183	780	713		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	768	0	156	1207	796	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2356	0	256	2117	945	431		
Arrive On Green	0.50	0.00	0.03	0.21	0.28	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	768	0	156	1207	796	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	10.7	0.0	5.4	35.3	24.8	0.0		
Cycle Q Clear(g_c), s	10.7	0.0	5.4	35.3	24.8	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2356	0	256	2117	945	431		
V/C Ratio(X)	0.33	0.00	0.61	0.57	0.84	0.00		
Avail Cap(c_a), veh/h	2356	0	317	2117	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.67	0.67	1.00	0.00		
Uniform Delay (d), s/veh	16.5	0.0	51.8	30.4	37.1	0.0		
Incr Delay (d2), s/veh	0.4	0.0	1.6	0.7	3.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.3	0.0	4.3	22.3	17.4	0.0		
LnGrp Delay(d),s/veh	16.9	0.0	53.4	31.1	40.1	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	768			1363	796			
Approach Delay, s/veh	16.9			33.7	40.1			
Approach LOS	B			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.2	13.9	59.9				73.8
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.3	7.9	13.2				37.8
Green Ext Time (p_c), s		3.0	0.1	15.0				10.5
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.0					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	535	1512	4	2	754	478	6	2	2	0	0	0
Future Volume (veh/h)	535	1512	4	2	754	478	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	557	1575	4	2	785	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	658	2843	7	18	2171	1010	21	7	22			
Arrive On Green	0.40	1.00	1.00	0.01	0.65	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	9	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	557	769	810	2	785	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	16.9	0.0	0.0	0.1	11.9	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	16.9	0.0	0.0	0.1	11.9	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	658	1389	1461	18	2171	1010	28	0	22			
V/C Ratio(X)	0.85	0.55	0.55	0.11	0.36	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2171	1010	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.25	0.25	0.25	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.5	0.0	0.0	53.9	8.9	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	1.4	0.4	0.4	2.6	0.5	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.0	0.3	0.3	0.1	9.5	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	32.9	0.4	0.4	56.5	9.4	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	A		E		E			
Approach Vol, veh/h		2136			787			10				
Approach Delay, s/veh		8.9			9.5			58.1				
Approach LOS		A			A			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			27.0	76.2		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2), s	6.0	2.5			19.4	14.4		2.7				
Green Ext Time (p_c), s	0.0	36.5			1.6	26.5		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	889	52	209	1434	431	91	367	82	95	130	105
Future Volume (veh/h)	137	889	52	209	1434	431	91	367	82	95	130	105
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	143	926	54	218	1494	449	95	382	85	99	135	109
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1382	81	297	1446	652	151	491	110	246	634	476
Arrive On Green	0.07	0.44	0.44	0.07	0.44	0.44	0.24	0.24	0.24	0.07	0.36	0.36
Sat Flow, veh/h	1657	3174	185	1632	3319	1497	454	2078	466	1609	1785	1339
Grp Volume(v), veh/h	143	482	498	218	1494	449	287	0	275	99	123	121
Grp Sat Flow(s),veh/h/ln	1657	1652	1706	1632	1660	1497	1492	0	1506	1609	1638	1486
Q Serve(g_s), s	5.1	25.6	25.6	8.0	47.9	26.6	18.2	0.0	18.7	4.8	5.8	6.3
Cycle Q Clear(g_c), s	5.1	25.6	25.6	8.0	47.9	26.6	20.0	0.0	18.7	4.8	5.8	6.3
Prop In Lane	1.00		0.11	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	720	743	297	1446	652	396	0	356	246	582	528
V/C Ratio(X)	0.77	0.67	0.67	0.73	1.03	0.69	0.73	0.00	0.77	0.40	0.21	0.23
Avail Cap(c_a), veh/h	186	720	743	297	1446	652	450	0	411	391	789	716
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	24.7	24.7	21.1	31.0	25.0	39.6	0.0	39.2	28.3	24.7	24.9
Incr Delay (d2), s/veh	17.6	4.9	4.8	9.1	32.7	5.9	5.0	0.0	7.6	1.1	0.2	0.2
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	6.7	18.5	18.9	6.2	51.2	17.7	13.6	0.0	13.3	3.9	4.7	4.7
LnGrp Delay(d),s/veh	42.6	29.6	29.5	30.2	63.7	30.9	44.6	0.0	46.9	29.4	24.9	25.1
LnGrp LOS	D	C	C	C	F	C	D		D	C	C	C
Approach Vol, veh/h		1123			2161			562			343	
Approach Delay, s/veh		31.2			53.5			45.7			26.3	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	52.9		44.1	13.0	52.9	13.1	31.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0		52.0	7.0	33.0	17.0	29.0				
Max Q Clear Time (g_c+1), s	10.5	28.1		8.3	7.6	50.4	7.3	22.0				
Green Ext Time (p_c), s	0.0	4.6		6.2	0.0	0.0	0.1	2.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				44.3								
HCM 2010 LOS				D								

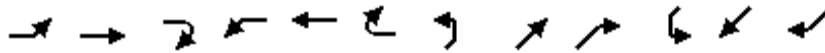
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	513	1	213	118	719	1	7	425	232
Future Volume (veh/h)	3	4	9	513	1	213	118	719	1	7	425	232
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1782	1872	1872	1800	1872	1872	1800	1800	1835
Adj Flow Rate, veh/h	3	4	10	558	1	232	128	782	1	8	462	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	387	167	419	596	3	581	382	976	1	209	696	603
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1166	457	1142	1408	7	1585	1714	1869	2	701	1800	1560
Grp Volume(v), veh/h	3	0	14	558	0	233	128	0	783	8	462	0
Grp Sat Flow(s),veh/h/ln	1166	0	1599	1408	0	1592	1714	0	1872	701	1800	1560
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.7	0.0	30.9	0.8	19.1	0.0
Cycle Q Clear(g_c), s	9.4	0.0	0.5	33.0	0.0	9.8	3.7	0.0	30.9	19.1	19.1	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	387	0	586	596	0	584	382	0	977	209	696	603
V/C Ratio(X)	0.01	0.00	0.02	0.94	0.00	0.40	0.33	0.00	0.80	0.04	0.66	0.00
Avail Cap(c_a), veh/h	387	0	586	596	0	584	398	0	977	209	696	603
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.94	0.94	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	29.7	0.0	21.1	15.4	0.0	17.7	30.3	22.8	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	22.4	0.0	0.4	0.5	0.0	6.9	0.3	4.6	0.0
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	0.1	0.0	0.4	24.4	0.0	7.8	3.2	0.0	24.7	0.3	15.3	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	52.1	0.0	21.6	15.9	0.0	24.5	30.6	27.4	0.0
LnGrp LOS	C		B	D		C	B		C	C	C	
Approach Vol, veh/h		17			791			911			470	
Approach Delay, s/veh		19.3			43.1			23.3			27.5	
Approach LOS		B			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.0		38.0	12.2	39.8		38.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0				
Max Q Clear Time (g_c+I1), s		32.9		35.5	6.2	21.6		11.9				
Green Ext Time (p_c), s		6.8		0.0	0.0	6.2		3.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			31.3									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	705	654	49	317	1	395	7	137	31	36	48
Future Volume (veh/h)	8	705	654	49	317	1	395	7	137	31	36	48
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	734	0	51	330	1	411	7	143	32	38	50
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	497	891	796	192	914	3	256	3	574	51	57	41
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1054	1782	1591	749	1829	6	466	8	1520	0	151	108
Grp Volume(v), veh/h	8	734	0	51	0	331	418	0	143	120	0	0
Grp Sat Flow(s),veh/h/ln	1054	1782	1591	749	0	1834	474	0	1520	258	0	0
Q Serve(g_s), s	0.4	31.5	0.0	5.6	0.0	9.9	0.0	0.0	5.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.8	31.5	0.0	37.1	0.0	9.9	34.0	0.0	5.8	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	497	891	796	192	0	917	259	0	574	148	0	0
V/C Ratio(X)	0.02	0.82	0.00	0.27	0.00	0.36	1.62	0.00	0.25	0.81	0.00	0.00
Avail Cap(c_a), veh/h	497	891	796	192	0	917	259	0	574	148	0	0
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)	0.21	0.21	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.6	19.1	0.0	34.9	0.0	13.7	33.2	0.0	19.2	23.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.9	0.0	3.3	0.0	1.1	294.7	0.0	0.2	27.4	0.0	0.0
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	0.2	18.8	0.0	2.4	0.0	9.0	49.6	0.0	4.4	5.6	0.0	0.0
LnGrp Delay(d),s/veh	16.6	21.1	0.0	38.2	0.0	14.8	328.0	0.0	19.5	50.8	0.0	0.0
LnGrp LOS	B	C		D		B	F		B	D		
Approach Vol, veh/h		742			382			561			120	
Approach Delay, s/veh		21.0			18.0			249.3			50.8	
Approach LOS		C			B			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		34.0		36.0		39.6		36.0				
Green Ext Time (p_c), s		5.1		0.0		2.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				93.3								
HCM 2010 LOS				F								



HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/05/2018

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	33	41	334	1	29	940
Future Vol, veh/h	33	41	334	1	29	940
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	39	48	393	1	34	1106

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1587	421	0	0	411
Stage 1	411	-	-	-	-
Stage 2	1176	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	120	602	-	-	1072
Stage 1	674	-	-	-	-
Stage 2	296	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	114	589	-	-	1063
Mov Cap-2 Maneuver	224	-	-	-	-
Stage 1	664	-	-	-	-
Stage 2	286	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.1	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	341	1063
HCM Lane V/C Ratio	-	-	0.255	0.032
HCM Control Delay (s)	-	-	19.1	8.5
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1	0.1

HCM 2010 TWSC  
4: King of Prussia Rd & Northern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑			↑
Traffic Vol, veh/h	0	0	269	0	0	1042
Future Vol, veh/h	0	0	269	0	0	1042
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	94	94	93	94	94	93
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	289	0	0	1120

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1409	289	0	-	-	-
Stage 1	289	-	-	-	-	-
Stage 2	1120	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	154	755	-	0	0	-
Stage 1	765	-	-	0	0	-
Stage 2	315	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	154	755	-	-	-	-
Mov Cap-2 Maneuver	257	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	315	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	-	-
HCM Lane V/C Ratio	-	-
HCM Control Delay (s)	-	0
HCM Lane LOS	-	A
HCM 95th %tile Q(veh)	-	-

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	5	0	40	0	0	0	23	270	0	0	1037	5
Future Vol, veh/h	5	0	40	0	0	0	23	270	0	0	1037	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
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	0	0	1	0
Mvmt Flow	5	0	43	0	0	0	24	287	0	0	1103	5

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	1442	1450	1106				1109	0	0	295	0	0
Stage 1	1106	1106	-				-	-	-	-	-	-
Stage 2	336	344	-				-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	147	132	258				637	-	-	1278	-	-
Stage 1	320	289	-				-	-	-	-	-	-
Stage 2	728	640	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	140	0	258				637	-	-	1278	-	-
Mov Cap-2 Maneuver	140	0	-				-	-	-	-	-	-
Stage 1	320	0	-				-	-	-	-	-	-
Stage 2	695	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.1	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	637	-	-	236	1278	-	-
HCM Lane V/C Ratio	0.038	-	-	0.203	-	-	-
HCM Control Delay (s)	10.9	0	-	24.1	0	-	-
HCM Lane LOS	B	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0	-	-

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↗↘	↘↗	↑
Traffic Vol, veh/h	0	0	292	0	0	1073
Future Vol, veh/h	0	0	292	0	0	1073
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	311	0	0	1141



























Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1452	311	0	0	311
Stage 1	311	-	-	-	-
Stage 2	1141	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	145	734	-	-	1261
Stage 1	748	-	-	-	-
Stage 2	307	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	145	734	-	-	1261
Mov Cap-2 Maneuver	145	-	-	-	-
Stage 1	748	-	-	-	-
Stage 2	307	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1261
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0

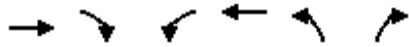
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 		 			 		
Traffic Volume (veh/h)	46	1515	0	0	569	146	268	197	211	652	0	300
Future Volume (veh/h)	46	1515	0	0	569	146	268	197	211	652	0	300
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	49	1612	0	0	605	0	285	210	224	694	0	319
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	127	1623	0	0	1361	633	1393	292	248	859	0	0
Arrive On Green	0.03	0.32	0.00	0.00	0.80	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	694	
Grp Volume(v), veh/h	49	1612	0	0	605	0	285	210	224	694	47.5	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	D	
Q Serve(g_s), s	1.6	52.5	0.0	0.0	6.1	0.0	6.0	12.3	16.0	23.0		
Cycle Q Clear(g_c), s	1.6	52.5	0.0	0.0	6.1	0.0	6.0	12.3	16.0	23.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	127	1623	0	0	1361	633	1393	292	248	859		
V/C Ratio(X)	0.39	0.99	0.00	0.00	0.44	0.00	0.20	0.72	0.90	0.81		
Avail Cap(c_a), veh/h	391	1623	0	0	1361	633	1393	292	248	859		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	52.3	37.1	0.0	0.0	7.4	0.0	19.8	43.6	45.1	41.7		
Incr Delay (d2), s/veh	1.7	19.6	0.0	0.0	1.0	0.0	0.1	8.4	32.9	5.8		
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		
%ile BackOfQ(95%),veh/ln	1.4	37.1	0.0	0.0	5.1	0.0	4.9	11.0	13.8	16.3		
LnGrp Delay(d),s/veh	54.0	56.7	0.0	0.0	8.3	0.0	19.8	52.0	78.0	47.5		
LnGrp LOS	D	E			A		B	D	E	D		
Approach Vol, veh/h		1661			605			719				
Approach Delay, s/veh		56.6			8.3			47.4				
Approach LOS		E			A			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		9.2	48.8	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.0	8.5		4.1	8.6	25.5	18.5				
Green Ext Time (p_c), s		0.0	0.8		0.0	18.4	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			45.1									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/05/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1013	0	478	694	606	468		
Future Volume (veh/h)	1013	0	478	694	606	468		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1034	0	488	708	618	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	2154	0	621	2331	742	355		
Arrive On Green	0.46	0.00	0.06	0.23	0.22	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1034	0	488	708	618	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	16.8	0.0	15.9	19.1	19.3	0.0		
Cycle Q Clear(g_c), s	16.8	0.0	15.9	19.1	19.3	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2154	0	621	2331	742	355		
V/C Ratio(X)	0.48	0.00	0.79	0.30	0.83	0.00		
Avail Cap(c_a), veh/h	2154	0	816	2331	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.85	0.85	1.00	0.00		
Uniform Delay (d), s/veh	20.8	0.0	49.4	20.6	40.9	0.0		
Incr Delay (d2), s/veh	0.8	0.0	3.2	0.3	5.5	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	1.9	0.0	11.8	13.6	14.6	0.0		
LnGrp Delay(d),s/veh	21.6	0.0	52.6	20.9	46.5	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1034			1196	618			
Approach Delay, s/veh	21.6			33.9	46.5			
Approach LOS	C			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.3	25.6	55.2				80.7
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	26.0	37.0				69.0
Max Q Clear Time (g_c+I1), s		21.8	18.4	19.3				21.6
Green Ext Time (p_c), s		1.5	1.1	11.1				18.3
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			32.1					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑		↔	↑↑	↔		↑	↔			
Traffic Volume (veh/h)	1049	1653	14	6	679	575	3	1	2	0	0	0
Future Volume (veh/h)	1049	1653	14	6	679	575	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1093	1722	15	6	707	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1018	2795	24	23	1832	852	18	6	18			
Arrive On Green	0.62	1.00	1.00	0.01	0.54	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3342	29	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1093	847	890	6	707	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	34.0	0.0	0.0	0.4	13.3	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	34.0	0.0	0.0	0.4	13.3	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1018	1376	1444	23	1832	852	24	0	18			
V/C Ratio(X)	1.07	0.62	0.62	0.26	0.39	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1018	1376	1444	109	1832	852	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.14	0.14	0.14	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.0	0.0	0.0	53.7	14.7	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	36.4	0.3	0.3	5.6	0.6	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	66.2	0.2	0.2	0.4	10.5	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	57.4	0.3	0.3	59.3	15.3	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		2830			713			6				
Approach Delay, s/veh		22.4			15.6			56.7				
Approach LOS		C			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			39.0	64.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			33.0	53.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			36.5	15.8		2.7				
Green Ext Time (p_c), s	0.0	40.2			0.0	26.1		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				21.1								
HCM 2010 LOS				C								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
10: Radnor Chester Rd.

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	1134	92	195	1029	124	80	208	139	404	441	212
Future Volume (veh/h)	118	1134	92	195	1029	124	80	208	139	404	441	212
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	122	1169	95	201	1061	128	82	214	143	416	455	219
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	252	1234	100	219	1315	587	147	341	231	330	851	406
Arrive On Green	0.07	0.39	0.39	0.08	0.39	0.39	0.25	0.25	0.25	0.08	0.38	0.38
Sat Flow, veh/h	1706	3190	259	1664	3352	1496	386	1348	914	1689	2221	1061
Grp Volume(v), veh/h	122	623	641	201	1061	128	215	0	224	416	345	329
Grp Sat Flow(s),veh/h/ln	1706	1703	1746	1664	1676	1496	1216	0	1432	1689	1690	1591
Q Serve(g_s), s	4.1	35.4	35.5	7.3	28.1	5.7	12.2	0.0	13.8	8.0	15.8	16.0
Cycle Q Clear(g_c), s	4.1	35.4	35.5	7.3	28.1	5.7	15.6	0.0	13.8	8.0	15.8	16.0
Prop In Lane	1.00		0.15	1.00		1.00	0.38		0.64	1.00		0.67
Lane Grp Cap(c), veh/h	252	659	676	219	1315	587	357	0	362	330	648	610
V/C Ratio(X)	0.48	0.95	0.95	0.92	0.81	0.22	0.60	0.00	0.62	1.26	0.53	0.54
Avail Cap(c_a), veh/h	278	659	676	219	1315	587	459	0	487	330	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.7	29.6	29.7	23.5	27.0	20.2	33.3	0.0	33.1	34.7	23.9	24.0
Incr Delay (d2), s/veh	1.4	24.1	24.1	38.6	5.4	0.9	1.6	0.0	1.7	139.9	0.7	0.7
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	3.7	28.6	29.2	9.6	20.1	4.5	9.4	0.0	9.5	32.7	12.0	11.5
LnGrp Delay(d),s/veh	22.2	53.7	53.7	62.2	32.4	21.0	34.9	0.0	34.8	174.7	24.6	24.7
LnGrp LOS	C	D	D	E	C	C	C		C	F	C	C
Approach Vol, veh/h		1386			1390			439			1090	
Approach Delay, s/veh		51.0			35.7			34.8			81.9	
Approach LOS		D			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	43.7		43.3	12.5	44.2	13.0	30.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	30.0	29.0		46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+19), s	19.8	37.9		18.3	6.6	30.6	10.5	17.6				
Green Ext Time (p_c), s	0.0	0.0		8.5	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				52.2								
HCM 2010 LOS				D								



# APPENDIX E

## Volume Development Worksheets

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



Volume Development Table

University of Pennsylvania Health Systems Weekday AM Traffic Volumes	m/vmt	m/vmt no	Count Data	2016 base	Existing Site Trips						2020 Base	2025 Base	2020 No Build	2025 No Build	New Trips						Total Trips	AM 2020 Build	AM 2025 Build				
					538 %	in vol	% 73	out vol	5/77 %	in vol					% 154	out vol											
																	0	0	0	0				0	0	0	0
King of Prussia Road (N/S) and Parking Drive/ Matsonford Road (E/W)	eb left	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	
	nb thru	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	eb right	3	2	2	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	2	2	2
	wb left	4	263	264	8	43	0	0	43	268	273	311	316	8	46	0	0	0	0	0	0	0	0	0	46	314	319
	wb thru	5	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	wb right	6	100	100	0	0	0	0	0	102	104	102	104	0	0	0	0	0	0	0	0	0	0	0	0	102	104
	nb left	7	12	12	0	0	0	0	0	12	12	12	12	0	0	0	0	0	0	0	0	0	0	0	12	12	
	nb thru	8	592	594	0	0	15	11	11	603	615	614	626	0	0	15	23	23	638	638	638	638	638	638	638	638	638
	nb right	9	576	578	0	0	8	6	6	587	598	593	604	0	0	8	12	12	589	589	589	589	589	589	589	589	589
	sb left	10	361	362	0	0	0	0	0	368	375	368	375	0	0	0	0	0	388	388	388	388	388	388	388	388	388
	sb thru	11	532	534	15	81	0	0	81	542	553	623	633	15	87	0	0	0	629	629	629	629	629	629	629	629	629
	sb right	12	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2	2	2	2	2	2	2	2
King of Prussia Road (E/W) and Radnor Chester Road (N/S)	eb left	1	37	37	0	0	0	0	38	38	38	38	0	0	0	0	0	38	38	38	38	38	38	38	38	38	
	nb thru	2	259	259	23	124	0	0	124	263	268	387	23	133	0	0	0	133	396	401	401	401	401	401	401	401	
	eb right	3	460	460	0	0	0	0	467	476	476	467	0	0	0	0	0	467	467	467	467	467	467	467	467	467	
	wb left	4	25	25	0	0	2	1	25	26	27	27	0	0	2	3	3	3	28	28	28	28	28	28	28	28	
	wb thru	5	790	790	0	0	23	17	17	802	817	819	834	0	0	23	35	35	837	837	837	837	837	837	837	837	
	wb right	6	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	7	7	7	7	7	7	7	7	
	nb left	7	494	494	0	0	0	0	0	502	511	502	511	0	0	0	0	0	502	502	502	502	502	502	502	502	
	nb thru	8	32	32	0	0	0	0	0	32	33	32	33	0	0	0	0	0	32	32	32	32	32	32	32	32	
	nb right	9	46	46	2	11	0	0	11	47	48	57	58	2	12	0	0	12	58	58	58	58	58	58	58	58	
	sb left	10	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2	2	2	2	2	2	2	
	sb thru	11	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	
	sb right	12	6	6	0	0	0	0	0	6	6	6	6	0	0	0	0	0	6	6	6	6	6	6	6	6	
King of Prussia Road (N/S) and Septia Driveway (W)	wb left	1	5	5	0	0	25	18	5	5	23	23	0	0	10	15	15	20	20	20	20	20	20	20	20	20	
	wb right	2	26	26	0	0	10	7	7	26	27	34	34	0	0	10	15	15	42	42	42	42	42	42	42	42	
	nb thru	3	933	933	0	0	15	11	11	947	965	958	976	0	0	15	23	23	970	970	970	970	970	970	970	970	
	nb right	4	56	56	25	135	0	0	135	57	58	191	192	10	58	0	0	58	115	115	115	115	115	115	115	115	
	sb left	5	60	60	10	54	0	0	54	61	62	115	116	15	87	0	0	87	147	147	147	147	147	147	147	147	
	sb thru	6	242	242	15	81	0	0	81	246	250	326	331	10	58	0	0	58	303	303	303	303	303	303	303	303	
	wb left	1	0	0	0	0	5	4	4	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	
	wb right	2	0	0	0	0	5	4	4	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	
	nb thru	3	983	983	25	135	10	7	142	998	1017	1140	1159	10	58	15	23	23	1079	1079	1079	1079	1079	1079	1079	1079	
	nb right	4	295	295	15	81	25	18	99	300	305	398	404	10	58	10	15	15	373	373	373	373	373	373	373	373	
	King of Prussia Road (N/S) and Ratder Road(E/W)	eb left	1	9	9	0	0	0	0	9	9	9	9	0	0	0	0	0	9	9	9	9	9	9	9	9	
		eb thru	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
eb right		3	128	128	0	0	0	0	0	130	133	130	133	0	0	0	0	0	130	130	130	130	130	130	130	130	
wb left		4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99	99	
wb thru		5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
wb right		6	170	171	0	0	0	0	0	173	177	173	177	0	0	0	0	0	173	173	173	173	173	173	173	173	
nb thru		7	974	978	25	135	10	7	142	993	1012	1134	1153	10	58	1	2	2	1052	1052	1052	1052	1052	1052	1052	1052	
nb right		8	0	0	5	27	0	0	27	0	0	27	27	64	369	0	0	369	369	369	369	369	369	369	369	369	
sb left		9	0	0	5	27	0	0	27	0	0	27	27	9	52	0	0	52	52	52	52	52	52	52	52	52	
sb thru		10	238	239	10	54	30	22	76	243	247	318	323	1	6	10	15	15	264	264	264	264	264	264	264	264	
sb right		11	57	57	0	0	0	0	0	58	59	58	59	0	0	0	0	0	58	58	58	58	58	58	58	58	
King of Prussia Road (N/S) and Southern Driveway (E/W)		wb left	1	0	0	0	0	45	33	0	0	33	33	0	0	1	2	2	2	2	2	2	2	2	2	2	
	wb thru	2	0	0	0	0	10	7	7	0	7	7	7	0	0	1	2	2	2	2	2	2	2	2	2		
	nb thru	3	1144	1144	30	161	0	0	161	1161	1184	1323	1345	74	427	0	0	427	1588	1588	1588	1588	1588	1588	1588	1588	
	nb right	4	0	0	45	242	0	0	242	0	0	242	242	1	6	0	0	6	6	6	6	6	6	6	6	6	
	sb left	5	0	0	10	54	0	0	54	0	0	54	54	1	6	0	0	6	6	6	6	6	6	6	6	6	
	sb thru	6	366	366	0	0	0	30	22	372	379	393	401	0	0	74	114	114	486	486	486	486	486	486	486	486	

Volume Development Table

University of Pennsylvania Health Systems Weekday AM Traffic Volumes		m/wmt	m/wmt no	Count Data	2016 base	Existing Site Trips				2020 Base	2025 Base	2020 No Build	2025 No Build	New Trips				Total Trips	AM 2020 Build	AM 2025 Build
						538 %	in vol	73 %	out vol					577 %	in vol	154 %	out vol			
Lancaster Avenue (E/W) and I-476 NB Off Ramps/ King of Prussia Road (N/S)	eb left	1	168	169	35	188	0	0	171	174	360	363	35	202	0	202	373	376		
	eb thru	2	1257	1262	0	0	0	0	1281	1306	1281	1306	0	0	0	0	1281	1306		
	wb thru	3	524	526	0	0	0	0	534	544	534	544	0	0	0	0	534	544		
	wb right	4	254	255	20	108	0	0	259	264	366	371	20	115	0	115	374	379		
	nb left	5	745	748	0	0	0	0	759	774	759	774	0	0	0	0	759	774		
	nb thru	6	698	701	20	108	0	0	711	725	819	833	20	115	0	115	827	840		
	nb right	7	331	332	0	0	0	0	337	344	337	344	0	0	0	0	337	344		
	sb left	8	250	251	0	0	40	29	255	260	284	289	0	0	40	62	316	321		
	sb right	9	104	104	0	0	35	26	106	108	132	134	0	0	35	54	160	162		
Lancaster Avenue (E/W) and I-476 SB Off Ramps (N/S)	eb thru	1	753	753	15	81	0	0	765	779	845	860	15	87	0	87	851	866		
	eb right	2	323	323	0	0	0	0	328	334	328	334	0	0	0	0	328	334		
	wb left	3	153	153	0	0	0	0	155	158	170	173	0	0	0	0	170	189		
	wb thru	4	1183	1183	0	0	15	11	1201	1224	1212	1235	0	0	15	23	1224	1247		
	nb left	5	780	780	0	0	0	0	792	807	792	807	0	0	0	0	792	807		
	nb thru	6	713	713	20	108	0	0	724	738	831	845	20	115	0	115	839	853		
	nb right	1	533	535	0	0	20	15	543	554	558	568	0	0	20	31	574	584		
	eb thru	2	1506	1512	0	0	20	15	1535	1564	1549	1579	0	0	20	31	1566	1595		
	eb right	3	4	4	0	0	0	0	4	4	4	4	0	0	0	0	4	4		
Lancaster Avenue (E/W) and Radnor Chester Road (N/S)	wb left	4	2	2	0	0	0	0	2	2	2	2	0	0	0	0	2	2		
	wb thru	5	751	754	20	108	0	0	765	780	873	888	20	115	0	115	881	895		
	wb right	6	476	478	0	0	0	0	485	494	485	494	0	0	0	0	485	494		
	nb left	7	6	6	0	0	0	0	6	6	6	6	0	0	0	0	6	6		
	nb thru	8	2	2	0	0	0	0	2	2	2	2	0	0	0	0	2	2		
	nb right	9	2	2	0	0	0	0	2	2	2	2	0	0	0	0	2	2		
	eb left	1	137	137	0	0	0	0	139	142	139	142	0	0	0	0	139	142		
	eb thru	2	889	889	15	81	0	0	903	920	983	1001	15	87	0	87	989	1006		
	eb right	3	52	52	0	0	0	0	53	54	53	54	0	0	0	0	53	54		
Lancaster Avenue (E/W) and Radnor Chester Road (N/S)	wb left	4	209	209	0	0	0	0	212	216	212	216	0	0	0	0	212	216		
	wb thru	5	1434	1434	0	0	15	11	1456	1484	1467	1495	0	0	15	23	1479	1507		
	wb right	6	431	431	0	0	0	0	438	446	438	446	0	0	0	0	438	446		
	nb left	7	91	91	0	0	0	0	92	94	92	94	0	0	0	0	92	94		
	nb thru	8	367	367	0	0	0	0	373	380	373	380	0	0	0	0	373	380		
	nb right	9	82	82	0	0	0	0	83	85	83	85	0	0	0	0	83	85		
	sb left	10	95	95	0	0	0	0	96	98	96	98	0	0	0	0	96	98		
	sb thru	11	130	130	0	0	0	0	132	135	132	135	0	0	0	0	132	135		
	sb right	12	105	105	0	0	0	0	107	109	107	109	0	0	0	0	107	109		

Volume Development Table

University of Pennsylvania Health Systems Weekday PM Traffic Volumes		m/wmt	m/wmt no	Count Data	2016 base	Existing Site Trips					2020 Base	2025 Base	2020 No Build	2025 No Build	New Trips					Total Trips	PM 2020 Build	PM 2025 Build		
						95 %	in vol	%	462 %	out vol					158 %	in vol	%	425 %	out vol					
King of Prussia Road (N/S) and Parking Drive/ Matsonford Road (E/W)	eb left	1	3	3	0	0	0	0	0	0	3	3	3	0	0	0	0	0	0	0	0	3	3	
	eb thru	2	4	4	0	0	0	0	0	0	4	4	4	0	0	0	0	0	0	0	0	4	4	
	eb right	3	9	9	0	0	0	0	0	0	9	9	9	0	0	0	0	0	0	0	0	9	9	
	wb left	4	513	513	8	8	0	0	8	521	531	528	538	8	13	0	0	0	0	0	0	13	533	543
	wb thru	5	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	
	wb right	6	212	213	0	0	0	0	0	216	220	216	220	0	0	0	0	0	0	0	0	216	216	
	nb left	10	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	0	0	0	7	7	
	nb thru	11	423	425	0	0	15	69	69	431	439	500	509	0	0	15	64	64	64	64	64	495	503	
	nb right	12	231	232	0	0	8	37	37	235	240	272	277	0	0	8	34	34	34	34	34	269	274	
	sb left	7	118	118	0	0	0	0	0	120	123	120	123	0	0	0	0	0	0	0	0	120	120	
	sb thru	8	716	719	15	14	0	0	14	730	744	744	758	15	24	0	0	24	24	24	24	753	767	
	sb right	9	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	
King of Prussia Road (E/W) and Radnor Chester Road (N/S)	eb left	1	8	8	0	0	0	0	8	8	8	8	8	0	0	0	0	0	0	0	0	8	8	
	eb thru	2	705	705	23	22	0	0	22	716	729	738	751	23	36	0	0	36	36	36	36	752	766	
	eb right	3	654	654	0	0	0	0	0	664	677	664	677	0	0	0	0	0	0	0	0	664	677	
	wb left	4	49	49	0	0	2	9	9	50	51	59	60	0	0	2	9	9	9	9	9	58	59	
	wb thru	5	317	317	0	0	23	106	106	322	328	428	434	0	0	23	98	98	98	98	98	420	426	
	wb right	6	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	
	nb left	7	395	395	0	0	0	0	0	401	409	401	409	0	0	0	0	0	0	0	0	401	409	
	nb thru	8	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	0	0	0	7	7	
	nb right	9	137	137	2	2	0	0	2	139	142	141	144	2	3	0	0	3	3	3	3	142	145	
	sb left	10	31	31	0	0	0	0	0	31	32	31	32	0	0	0	0	0	0	0	0	31	32	
	sb thru	11	36	36	0	0	0	0	0	37	37	37	37	0	0	0	0	0	0	0	0	37	37	
	sb right	12	48	48	0	0	0	0	0	49	50	49	50	0	0	0	0	0	0	0	0	49	50	
King of Prussia Road (N/S) and Sepia Driveway (W)	wb left	1	33	33	0	0	25	116	116	34	34	149	150	0	0	10	43	43	43	43	76	77		
	wb thru	2	41	41	0	0	10	46	46	42	42	88	89	0	0	10	43	43	43	43	84	85		
	wb right	3	334	334	0	0	15	69	69	339	346	408	415	0	0	15	64	64	64	64	403	409		
	nb left	4	1	1	25	24	0	0	24	1	25	25	25	10	16	0	0	16	16	16	16	17	17	
	nb thru	5	29	29	10	10	0	0	10	29	30	39	40	15	24	0	0	24	24	24	24	53	54	
	nb right	6	940	940	15	14	0	0	14	954	973	969	987	10	16	0	0	16	16	16	16	970	988	
	sb left	1	0	0	0	0	5	23	23	0	0	23	23	0	0	0	0	0	0	0	0	0	0	
	sb thru	2	0	0	0	0	5	23	23	0	0	23	23	0	0	0	0	0	0	0	0	0	0	
	sb right	3	269	269	25	24	10	46	70	273	278	343	348	10	16	15	64	64	64	64	80	353	358	
	nb left	4	1042	1042	15	14	25	116	130	1058	1078	1188	1208	10	16	10	43	43	43	43	58	1116	1136	
	King of Prussia Road (N/S) and Ratder Road(E/W)	eb left	1	5	5	0	0	0	0	5	5	5	5	5	0	0	0	0	0	0	0	5	5	
		eb thru	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
eb right		3	40	40	0	0	0	0	0	41	42	41	42	0	0	0	0	0	0	0	41	42		
wb left		4	0	0	0	0	0	0	0	0	0	0	0	0	0	64	272	272	272	272	272	272		
wb thru		5	0	0	0	0	0	0	0	0	0	0	0	0	0	14	60	60	60	60	60	60		
wb right		6	23	23	0	0	0	0	0	23	24	23	24	0	0	0	0	0	0	0	23	24		
nb left		7	269	270	25	24	10	46	70	274	279	344	349	10	16	1	4	4	4	4	20	294	299	
nb thru		8	0	0	5	5	0	0	5	0	0	5	5	64	101	0	0	101	101	101	101	101		
nb right		9	0	0	5	5	0	0	5	0	0	5	5	9	14	0	0	14	14	14	14	14		
sb left		10	1033	1037	10	10	30	139	148	1053	1073	1201	1221	1	2	10	43	43	43	43	44	1097	1117	
sb thru		11	5	5	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0	5	5		
sb right		12	0	0	0	0	45	208	208	0	0	208	208	0	0	1	4	4	4	4	4	4		
King of Prussia Road (N/S) and Southern Driveway (E/W)	wb left	1	0	0	0	0	10	46	46	0	0	46	46	0	0	1	4	4	4	4	4	4		
	wb thru	2	292	292	30	29	0	0	29	296	302	325	331	74	117	0	0	117	117	117	117	413	419	
	wb right	3	0	0	45	43	0	0	43	0	0	43	43	1	2	0	0	2	2	2	2	2		
	nb left	4	0	0	10	10	0	0	10	0	0	10	10	1	2	0	0	2	2	2	2	2		
	nb thru	5	0	0	0	0	30	139	139	1089	1110	1228	1249	0	0	74	315	315	315	315	1404	1425		
	nb right	6	1073	1073	0	0	0	0	0	1089	1110	1228	1249	0	0	74	315	315	315	315	1404	1425		

Volume Development Table

University of Pennsylvania Health Systems Weekday PM Traffic Volumes	m/wmt	m/wmt no	Count Data	2016 base	Existing Site Trips						2020 Base	2025 Base	2020 No Build	2025 No Build	New Trips						Total Trips	PM 2020 Build	PM 2025 Build
					95			462							158			425					
					%	in	out	%	in	out					%	in	out	%	in	out			
Lancaster Avenue (E/W) and I-476 NB Off Ramps/ King of Prussia Road (N/S)	eb left	1	46	46	35	33	0	33	47	48	80	81	35	55	0	0	55	102	103				
	eb thru	2	1509	1515	0	0	0	0	1538	1567	1538	1567	0	0	0	0	0	1538	1567				
	wb thru	3	567	569	0	0	0	0	578	589	578	589	0	0	0	0	0	578	589				
	wb right	4	145	146	20	19	0	19	148	151	167	170	20	32	0	0	32	179	182				
	nb left	5	267	268	0	0	0	0	272	277	272	277	0	0	0	0	0	272	277				
	nb thru	6	196	197	20	19	0	19	200	204	219	223	20	32	0	0	32	231	235				
	nb right	7	210	211	0	0	0	0	214	218	218	218	0	0	0	0	0	214	218				
	sb left	8	650	652	0	0	40	185	662	675	847	860	0	40	170	170	170	832	845				
	sb right	9	299	300	0	0	35	162	305	311	466	472	0	35	149	149	149	453	459				
Lancaster Avenue (E/W) and I-476 SB Off Ramps (N/S)	eb thru	1	1013	1013	15	14	0	14	1028	1048	1043	1062	15	24	0	0	24	1052	1072				
	eb right	2	575	575	0	0	0	0	584	595	584	595	0	0	0	0	0	584	595				
	wb left	3	478	478	0	0	20	92	485	495	578	587	0	0	20	85	85	570	580				
	wb thru	4	694	694	0	0	15	69	705	718	774	787	0	0	15	64	64	788	792				
	nb left	5	606	606	0	0	0	0	615	627	615	627	0	0	0	0	0	615	627				
	nb thru	6	468	468	20	19	0	19	475	484	494	503	20	32	0	0	32	507	516				
	nb right	7	1045	1049	0	0	20	92	1065	1085	1157	1178	0	0	20	85	85	1150	1170				
	sb left	8	1647	1653	0	0	20	92	1679	1711	1771	1803	0	0	20	85	85	1764	1796				
	sb right	9	14	14	0	0	0	0	14	15	14	14	15	0	0	0	0	14	15				
Lancaster Avenue (E/W) and Radnor Chester Road (N/S)	eb thru	1	118	118	0	0	0	0	120	122	120	122	0	0	0	0	0	120	122				
	eb right	2	1134	1134	15	14	0	14	1151	1173	1166	1188	15	24	0	0	24	1175	1197				
	wb left	3	92	92	0	0	0	0	93	95	93	95	0	0	0	0	0	93	95				
	wb thru	4	195	195	0	0	0	0	198	202	198	202	0	0	0	0	0	198	202				
	wb right	5	1029	1029	0	0	15	69	1045	1065	1114	1134	0	0	15	64	64	1108	1128				
	nb left	6	124	124	0	0	0	0	126	128	126	128	0	0	0	0	0	126	128				
	nb thru	7	80	80	0	0	0	0	81	83	81	83	0	0	0	0	0	81	83				
	nb right	8	208	208	0	0	0	0	211	215	211	215	0	0	0	0	0	211	215				
	sb left	9	139	139	0	0	0	0	141	144	141	144	0	0	0	0	0	141	144				
sb thru	10	404	404	0	0	0	0	410	418	410	418	0	0	0	0	0	410	418					
sb right	11	441	441	0	0	0	0	448	456	448	456	0	0	0	0	0	448	456					
sb thru	12	212	212	0	0	0	0	215	219	215	219	0	0	0	0	0	215	219					

# APPENDIX F

2020 and 2025 No Build Condition Capacity Analysis Worksheets

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD

RADNOR TOWNSHIP

DELAWARE COUNTY, PA






















UPHS1507





HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

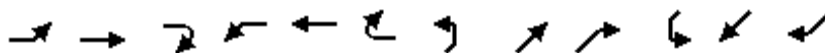
01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	311	7	102	368	623	2	12	614	593
Future Volume (veh/h)	1	0	2	311	7	102	368	623	2	12	614	593
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1730	1835	1853	1773	1755	1808
Adj Flow Rate, veh/h	1	0	2	346	8	113	409	692	2	13	682	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	333	0	391	437	25	357	392	1158	3	372	683	598
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1291	0	1530	1396	99	1398	1648	1829	5	750	1755	1537
Grp Volume(v), veh/h	1	0	2	346	0	121	409	0	694	13	682	0
Grp Sat Flow(s),veh/h/ln	1291	0	1530	1396	0	1497	1648	0	1834	750	1755	1537
Q Serve(g_s), s	0.1	0.0	0.1	22.1	0.0	5.9	17.0	0.0	20.1	1.0	34.9	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.1	22.1	0.0	5.9	17.0	0.0	20.1	1.0	34.9	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	391	437	0	383	392	0	1162	372	683	598
V/C Ratio(X)	0.00	0.00	0.01	0.79	0.00	0.32	1.04	0.00	0.60	0.03	1.00	0.00
Avail Cap(c_a), veh/h	333	0	391	437	0	383	392	0	1162	372	683	598
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.0	33.2	0.0	27.1	27.5	0.0	9.7	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	9.6	0.0	0.5	57.5	0.0	2.3	0.2	34.2	0.0
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	0.0	0.0	0.1	14.7	0.0	4.4	28.7	0.0	16.1	0.4	31.3	0.0
LnGrp Delay(d),s/veh	29.1	0.0	25.0	42.8	0.0	27.6	84.9	0.0	12.0	17.3	61.7	0.0
LnGrp LOS	C		C	D		C	F		B	B	E	
Approach Vol, veh/h		3			467			1103			695	
Approach Delay, s/veh		26.4			38.8			39.0			60.9	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		22.1		24.6	19.5	37.4		7.9				
Green Ext Time (p_c), s		12.1		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			45.7									
HCM 2010 LOS			D									

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	387	467	27	819	7	502	32	57	2	1	6
Future Volume (veh/h)	38	387	467	27	819	7	502	32	57	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	412	0	29	871	7	534	34	61	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	103	857	772	402	899	7	226	9	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	642	1714	1545	943	1799	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	412	0	29	0	878	568	0	61	9	0	0
Grp Sat Flow(s),veh/h/ln	642	1714	1545	943	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	3.3	14.2	0.0	1.9	0.0	42.2	0.0	0.0	2.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.2	0.0	16.1	0.0	42.2	34.0	0.0	2.3	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	103	857	772	402	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.39	0.48	0.00	0.07	0.00	0.97	2.41	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	103	857	772	402	0	907	236	0	574	159	0	0
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)	0.59	0.59	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.1	14.8	0.0	20.1	0.0	21.8	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	6.4	1.1	0.0	0.3	0.0	23.1	648.0	0.0	0.1	0.1	0.0	0.0
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	2.1	10.2	0.0	1.0	0.0	35.3	86.8	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	50.4	16.0	0.0	20.5	0.0	45.0	681.6	0.0	18.2	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		452			907			629			9	
Approach Delay, s/veh		19.0			44.2			617.3			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		44.2		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				218.9								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/05/2018

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	34	958	191	115	326
Future Vol, veh/h	23	34	958	191	115	326
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	26	39	1101	220	132	375

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1869	1238	0	0	1338
Stage 1	1228	-	-	-	-
Stage 2	641	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	80	177	-	-	455
Stage 1	279	-	-	-	-
Stage 2	528	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	56	173	-	-	451
Mov Cap-2 Maneuver	169	-	-	-	-
Stage 1	275	-	-	-	-
Stage 2	373	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.6	0	4.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	171	451
HCM Lane V/C Ratio	-	-	0.383	0.293
HCM Control Delay (s)	-	-	38.6	16.3
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.7	1.2

HCM 2010 TWSC  
 4: King of Prussia Rd & Northern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑			↑
Traffic Vol, veh/h	4	4	1140	0	0	398
Future Vol, veh/h	4	4	1140	0	0	398
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	4	4	1213	0	0	423

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1636	1213	0	-	-	-
Stage 1	1213	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	112	224	-	0	0	-
Stage 1	284	-	-	0	0	-
Stage 2	665	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	112	224	-	-	-	-
Mov Cap-2 Maneuver	222	-	-	-	-	-
Stage 1	284	-	-	-	-	-
Stage 2	665	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 223	-
HCM Lane V/C Ratio	- 0.038	-
HCM Control Delay (s)	- 21.8	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.1	-

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	9	0	130	0	0	0	173	1134	27	27	318	58
Future Vol, veh/h	9	0	130	0	0	0	173	1134	27	27	318	58
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	167	0	0	0	222	1454	35	35	408	74

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	2429	2454	445				482	0	0	1496	0	0
Stage 1	514	514	-				-	-	-	-	-	-
Stage 2	1915	1940	-				-	-	-	-	-	-
Critical Hdwy	6.51	6.5	6.24				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.51	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	33	31	609				1091	-	-	454	-	-
Stage 1	582	539	-				-	-	-	-	-	-
Stage 2	120	113	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	0	0	609				1091	-	-	454	-	-
Mov Cap-2 Maneuver	0	0	-				-	-	-	-	-	-
Stage 1	520	0	-				-	-	-	-	-	-
Stage 2	0	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	1.2	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1091	-	-	609	454	-	-
HCM Lane V/C Ratio	0.203	-	-	0.293	0.076	-	-
HCM Control Delay (s)	9.1	0	-	13.3	13.6	0	-
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0.8	-	-	1.2	0.2	-	-

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	5.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	33	7	1323	242	54	393
Future Vol, veh/h	33	7	1323	242	54	393
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	40	8	1594	292	65	473






















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2198	1594	0	0	1594
Stage 1	1594	-	-	-	-
Stage 2	604	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	50	133	-	-	417
Stage 1	185	-	-	-	-
Stage 2	550	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	42	133	-	-	417
Mov Cap-2 Maneuver	42	-	-	-	-
Stage 1	185	-	-	-	-
Stage 2	464	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	265	0	1.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	48	417
HCM Lane V/C Ratio	-	-	1.004	0.156
HCM Control Delay (s)	-	-	265	15.2
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	4.3	0.5

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	1281	0	0	534	366	759	819	337	284	0	132
Future Volume (veh/h)	360	1281	0	0	534	366	759	819	337	284	0	132
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	371	1321	0	0	551	0	782	844	347	293	0	136
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	293	
Grp Volume(v), veh/h	371	1321	0	0	551	0	782	844	347	293	63.9	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.1	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Cycle Q Clear(g_c), s	12.1	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.82	0.99	0.00	0.00	0.74	0.00	0.47	1.22	0.59	0.81		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.7	40.0	0.0	0.0	48.0	0.0	17.4	33.5	26.5	51.2		
Incr Delay (d2), s/veh	10.4	20.9	0.0	0.0	5.9	0.0	0.2	113.4	1.6	12.8		
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		
%ile BackOfQ(95%),veh/ln	10.1	31.5	0.0	0.0	13.5	0.0	12.2	76.7	13.3	3.1		
LnGrp Delay(d),s/veh	59.1	60.9	0.0	0.0	53.9	0.0	17.6	146.9	28.1	63.9		
LnGrp LOS	E	E			D		B	F	C	E		
Approach Vol, veh/h		1692			551			1973				
Approach Delay, s/veh		60.5			53.9			74.8				
Approach LOS		E			D			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		45.9	19.5		14.6	19.9	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.0		0.0	2.7	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			66.2									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/05/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	845	0	170	1212	792	831		
Future Volume (veh/h)	845	0	170	1212	792	831		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	862	0	173	1237	808	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2313	0	273	2104	957	436		
Arrive On Green	0.49	0.00	0.03	0.21	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	862	0	173	1237	808	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	12.5	0.0	5.9	36.3	25.1	0.0		
Cycle Q Clear(g_c), s	12.5	0.0	5.9	36.3	25.1	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2313	0	273	2104	957	436		
V/C Ratio(X)	0.37	0.00	0.63	0.59	0.84	0.00		
Avail Cap(c_a), veh/h	2313	0	317	2104	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.63	0.63	1.00	0.00		
Uniform Delay (d), s/veh	17.5	0.0	51.7	31.0	36.9	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.0	0.8	3.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.4	0.0	4.8	22.7	17.7	0.0		
LnGrp Delay(d),s/veh	18.0	0.0	53.8	31.8	40.0	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	862			1410	808			
Approach Delay, s/veh	18.0			34.5	40.0			
Approach LOS	B			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.6	14.5	58.9				73.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.6	8.4	15.0				38.8
Green Ext Time (p_c), s		3.0	0.1	14.9				10.3
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.3					
HCM 2010 LOS			C					



HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	558	1549	4	2	873	485	6	2	2	0	0	0
Future Volume (veh/h)	558	1549	4	2	873	485	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	581	1614	4	2	909	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	680	2843	7	18	2149	1000	21	7	22			
Arrive On Green	0.41	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	581	788	830	2	909	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	17.6	0.0	0.0	0.1	14.7	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	17.6	0.0	0.0	0.1	14.7	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	680	1389	1461	18	2149	1000	28	0	22			
V/C Ratio(X)	0.85	0.57	0.57	0.11	0.42	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2149	1000	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.17	0.17	0.17	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.8	0.0	0.0	53.9	9.7	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	1.0	0.3	0.3	2.6	0.6	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.9	0.2	0.2	0.1	11.2	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	31.8	0.3	0.3	56.5	10.3	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2199			911			10				
Approach Delay, s/veh		8.6			10.4			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			27.7	75.5		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			20.1	17.2		2.7				
Green Ext Time (p_c), s	0.0	41.4			1.6	27.3		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			9.3									
HCM 2010 LOS			A									
<b>Notes</b>												

# HCM 2010 Signalized Intersection Summary

## 10: Radnor Chester Rd






















01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	983	53	212	1467	438	92	373	83	96	132	107
Future Volume (veh/h)	139	983	53	212	1467	438	92	373	83	96	132	107
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	145	1024	55	221	1528	456	96	389	86	100	138	111
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1442	77	282	1501	677	151	497	111	215	606	453
Arrive On Green	0.07	0.45	0.45	0.07	0.45	0.45	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3190	171	1632	3319	1497	452	2080	464	1609	1787	1337
Grp Volume(v), veh/h	145	530	549	221	1528	456	292	0	279	100	126	123
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1489	0	1507	1609	1638	1487
Q Serve(g_s), s	5.0	28.5	28.5	8.0	49.7	26.4	18.6	0.0	19.1	5.0	6.0	6.6
Cycle Q Clear(g_c), s	5.0	28.5	28.5	8.0	49.7	26.4	20.3	0.0	19.1	5.0	6.0	6.6
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	747	773	282	1501	677	399	0	360	215	555	504
V/C Ratio(X)	0.78	0.71	0.71	0.78	1.02	0.67	0.73	0.00	0.78	0.47	0.23	0.25
Avail Cap(c_a), veh/h	186	747	773	282	1501	677	449	0	411	215	610	554
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	24.3	24.3	21.5	30.1	23.7	39.5	0.0	39.1	29.7	26.0	26.2
Incr Delay (d2), s/veh	18.9	5.7	5.5	13.5	27.9	5.3	5.3	0.0	8.0	1.6	0.2	0.3
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	5.8	20.3	20.8	7.4	51.4	17.4	13.8	0.0	13.6	4.1	5.0	4.9
LnGrp Delay(d),s/veh	43.8	30.0	29.8	35.0	58.0	29.0	44.7	0.0	47.1	31.3	26.2	26.5
LnGrp LOS	D	C	C	C	F	C	D		D	C	C	C
Approach Vol, veh/h		1224			2205			571			349	
Approach Delay, s/veh		31.5			49.7			45.9			27.8	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	54.7		42.3	13.0	54.7	11.0	31.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	45.0		40.0	7.0	45.0	5.0	29.0				
Max Q Clear Time (g_c+110), s	6.0	31.0		8.6	7.5	52.2	7.5	22.3				
Green Ext Time (p_c), s	0.0	12.7		6.0	0.0	0.0	0.0	2.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				42.3								
HCM 2010 LOS				D								

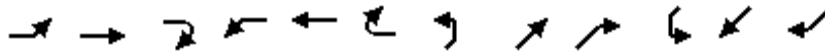
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	528	1	216	120	744	1	7	500	272
Future Volume (veh/h)	3	4	9	528	1	216	120	744	1	7	500	272
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	574	1	235	130	809	1	8	543	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	386	167	419	601	2	587	317	962	1	184	687	595
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1162	457	1142	1422	7	1601	1689	1841	2	677	1782	1544
Grp Volume(v), veh/h	3	0	14	574	0	236	130	0	810	8	543	0
Grp Sat Flow(s),veh/h/ln	1162	0	1599	1422	0	1608	1689	0	1844	677	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.8	0.0	33.7	0.9	24.2	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.5	33.0	0.0	9.8	3.8	0.0	33.7	21.8	24.2	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	586	601	0	590	317	0	963	184	687	595
V/C Ratio(X)	0.01	0.00	0.02	0.95	0.00	0.40	0.41	0.00	0.84	0.04	0.79	0.00
Avail Cap(c_a), veh/h	386	0	586	601	0	590	330	0	963	184	687	595
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	30.0	0.0	21.2	17.1	0.0	18.3	32.6	24.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	25.8	0.0	0.4	0.8	0.0	8.8	0.4	9.0	0.0
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	0.1	0.0	0.4	25.6	0.0	7.8	3.3	0.0	26.4	0.3	19.7	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	55.8	0.0	21.6	18.0	0.0	27.1	33.1	33.5	0.0
LnGrp LOS	C		B	E		C	B		C	C	C	
Approach Vol, veh/h		17			810			940			551	
Approach Delay, s/veh		19.3			45.9			25.9			33.5	
Approach LOS		B			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.0		38.0	12.3	39.7		38.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0				
Max Q Clear Time (g_c+I1), s		35.7		35.5	6.3	26.7		12.0				
Green Ext Time (p_c), s		6.2		0.0	0.0	4.2		3.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				34.6								
HCM 2010 LOS				C								

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	738	664	59	428	1	401	7	141	31	37	49
Future Volume (veh/h)	8	738	664	59	428	1	401	7	141	31	37	49
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	769	0	61	446	1	418	7	147	32	39	51
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	351	812	725	111	834	2	270	3	644	50	58	42
Arrive On Green	0.46	0.46	0.00	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	948	1782	1591	725	1830	4	453	8	1525	0	138	99
Grp Volume(v), veh/h	8	769	0	61	0	447	425	0	147	122	0	0
Grp Sat Flow(s),veh/h/ln	948	1782	1591	725	0	1834	460	0	1525	237	0	0
Q Serve(g_s), s	0.5	37.2	0.0	3.8	0.0	15.8	0.0	0.0	5.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.8	37.2	0.0	41.0	0.0	15.8	38.0	0.0	5.5	38.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.26		0.42
Lane Grp Cap(c), veh/h	351	812	725	111	0	836	274	0	644	151	0	0
V/C Ratio(X)	0.02	0.95	0.00	0.55	0.00	0.53	1.55	0.00	0.23	0.81	0.00	0.00
Avail Cap(c_a), veh/h	351	812	725	111	0	836	274	0	644	151	0	0
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)	0.14	0.14	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.2	23.5	0.0	44.0	0.0	17.6	31.5	0.0	16.6	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.6	0.0	18.3	0.0	2.4	266.2	0.0	0.2	27.2	0.0	0.0
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	0.3	21.9	0.0	3.7	0.0	13.3	48.6	0.0	4.2	5.5	0.0	0.0
LnGrp Delay(d),s/veh	23.2	28.1	0.0	62.4	0.0	20.1	297.7	0.0	16.8	49.3	0.0	0.0
LnGrp LOS	C	C		E		C	F		B	D		
Approach Vol, veh/h		777			508			572			122	
Approach Delay, s/veh		28.1			25.2			225.5			49.3	
Approach LOS		C			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		44.0		46.0		44.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		40.0		37.0		40.0		37.0				
Max Q Clear Time (g_c+I1), s		39.7		40.0		43.5		40.0				
Green Ext Time (p_c), s		0.2		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				85.7								
HCM 2010 LOS				F								

HCM 2010 TWSC  
3: King of Prussia Rd & Septa Driveway

01/03/2018

Intersection						
Int Delay, s/veh	17.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	149	88	408	25	39	969
Future Vol, veh/h	149	88	408	25	39	969
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	175	104	480	29	46	1140

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1746	522	0	0	526
Stage 1	512	-	-	-	-
Stage 2	1234	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	~ 96	526	-	-	969
Stage 1	606	-	-	-	-
Stage 2	277	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	~ 90	514	-	-	961
Mov Cap-2 Maneuver	200	-	-	-	-
Stage 1	597	-	-	-	-
Stage 2	263	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	120	0	0.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	259	961
HCM Lane V/C Ratio	-	-	1.077	0.048
HCM Control Delay (s)	-	-	120	8.9
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	11.5	0.1

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
4: King of Prussia Rd & Northern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑			↑
Traffic Vol, veh/h	23	23	343	0	0	1188
Future Vol, veh/h	23	23	343	0	0	1188
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	0	1	0	0	1
Mvmt Flow	25	25	369	0	0	1277

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1646	369	0	-	-	-
Stage 1	369	-	-	-	-	-
Stage 2	1277	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	111	681	-	0	0	-
Stage 1	704	-	-	0	0	-
Stage 2	264	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	111	681	-	-	-	-
Mov Cap-2 Maneuver	212	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	264	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 323	-
HCM Lane V/C Ratio	- 0.153	-
HCM Control Delay (s)	- 18.2	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.5	-

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	5	0	41	0	0	0	23	344	5	5	1201	5
Future Vol, veh/h	5	0	41	0	0	0	23	344	5	5	1201	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
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	0	0	1	0
Mvmt Flow	5	0	44	0	0	0	24	366	5	5	1278	5

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	1709	1719	1280				1283	0	0	379	0	0
Stage 1	1291	1291	-				-	-	-	-	-	-
Stage 2	418	428	-				-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	101	91	204				548	-	-	1191	-	-
Stage 1	260	236	-				-	-	-	-	-	-
Stage 2	669	588	-				-	-	-	-	-	-
Platoon blocked, %							-	-	-	-	-	-
Mov Cap-1 Maneuver	94	0	204				548	-	-	1191	-	-
Mov Cap-2 Maneuver	94	0	-				-	-	-	-	-	-
Stage 1	256	0	-				-	-	-	-	-	-
Stage 2	632	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.1	0.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	548	-	-	181	1191	-	-
HCM Lane V/C Ratio	0.045	-	-	0.27	0.004	-	-
HCM Control Delay (s)	11.9	0	-	32.1	8	0	-
HCM Lane LOS	B	A	-	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0	-	-

Intersection						
Int Delay, s/veh	83.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↑	↘	↑
Traffic Vol, veh/h	208	46	325	43	10	1228
Future Vol, veh/h	208	46	325	43	10	1228
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	221	49	346	46	11	1306

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1674	346	0	0	346
Stage 1	346	-	-	-	-
Stage 2	1328	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	~ 106	702	-	-	1224
Stage 1	721	-	-	-	-
Stage 2	250	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 105	702	-	-	1224
Mov Cap-2 Maneuver	~ 105	-	-	-	-
Stage 1	721	-	-	-	-
Stage 2	248	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	\$ 613.8	0	0.1
HCM LOS	F		






















Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	124	1224
HCM Lane V/C Ratio	-	-	2.179	0.009
HCM Control Delay (s)	-	-	\$ 613.8	8
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	22.7	0

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon



HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	1538	0	0	578	167	272	219	214	847	0	466
Future Volume (veh/h)	80	1538	0	0	578	167	272	219	214	847	0	466
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1800	1782	0	0	1782	1853	1782	1800	1800	1782	0	1872
Adj Flow Rate, veh/h	85	1636	0	0	615	0	289	233	228	901	0	496
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	192	1632	0	0	1282	597	1407	295	250	866	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.76	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3326	3475	0	0	3475	1575	3293	1800	1530	3293	901	
Grp Volume(v), veh/h	85	1636	0	0	615	0	289	233	228	901	85.8	
Grp Sat Flow(s),veh/h/ln	1663	1693	0	0	1693	1575	1646	1800	1530	1646	F	
Q Serve(g_s), s	2.7	53.0	0.0	0.0	7.6	0.0	6.1	13.7	16.1	24.0		
Cycle Q Clear(g_c), s	2.7	53.0	0.0	0.0	7.6	0.0	6.1	13.7	16.1	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	192	1632	0	0	1282	597	1407	295	250	866		
V/C Ratio(X)	0.44	1.00	0.00	0.00	0.48	0.00	0.21	0.79	0.91	1.04		
Avail Cap(c_a), veh/h	393	1632	0	0	1282	597	1407	295	250	866		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.88	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	51.1	37.2	0.0	0.0	9.2	0.0	19.8	44.2	45.2	44.2		
Incr Delay (d2), s/veh	1.4	21.5	0.0	0.0	1.1	0.0	0.1	13.6	34.1	41.6		
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		
%ile BackOfQ(95%),veh/ln	2.3	53.4	0.0	0.0	6.5	0.0	4.9	12.5	14.1	13.1		
LnGrp Delay(d),s/veh	52.5	58.8	0.0	0.0	10.3	0.0	19.8	57.8	79.3	85.8		
LnGrp LOS	D	F			B		B	E	E	F		
Approach Vol, veh/h		1721			615			750				
Approach Delay, s/veh		58.5			10.3			49.7				
Approach LOS		E			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		11.3	46.7	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.6		5.2	10.1	26.5	18.6				
Green Ext Time (p_c), s		0.0	0.8		0.1	17.8	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			55.6									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/03/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1043	0	578	774	615	494		
Future Volume (veh/h)	1043	0	578	774	615	494		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1064	0	590	790	628	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	1998	0	722	2322	751	359		
Arrive On Green	0.42	0.00	0.07	0.23	0.22	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1064	0	590	790	628	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	18.5	0.0	19.2	21.5	19.6	0.0		
Cycle Q Clear(g_c), s	18.5	0.0	19.2	21.5	19.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1998	0	722	2322	751	359		
V/C Ratio(X)	0.53	0.00	0.82	0.34	0.84	0.00		
Avail Cap(c_a), veh/h	1998	0	847	2322	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.76	0.76	1.00	0.00		
Uniform Delay (d), s/veh	23.6	0.0	48.9	21.7	40.8	0.0		
Incr Delay (d2), s/veh	1.0	0.0	4.2	0.3	5.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	2.9	0.0	13.7	14.8	14.8	0.0		
LnGrp Delay(d),s/veh	24.6	0.0	53.1	22.0	46.6	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1064			1380	628			
Approach Delay, s/veh	24.6			35.3	46.6			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.6	28.9	51.5				80.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.1	21.7	21.0				24.0
Green Ext Time (p_c), s		1.4	1.1	10.4				19.7
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			33.9					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕	↔		↕	↔			
Traffic Volume (veh/h)	1157	1771	14	6	708	584	3	1	2	0	0	0
Future Volume (veh/h)	1157	1771	14	6	708	584	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1205	1845	15	6	738	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1197	2797	23	23	1647	766	18	6	18			
Arrive On Green	0.73	1.00	1.00	0.01	0.49	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3344	27	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1205	906	954	6	738	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	40.0	0.0	0.0	0.4	15.7	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	40.0	0.0	0.0	0.4	15.7	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1197	1376	1444	23	1647	766	24	0	18			
V/C Ratio(X)	1.01	0.66	0.66	0.26	0.45	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1197	1376	1444	109	1647	766	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.0	0.0	0.0	53.7	18.6	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	9.4	0.2	0.2	5.6	0.9	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	33.7	0.2	0.2	0.4	12.1	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	24.4	0.2	0.2	59.3	19.4	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		3065			744			6				
Approach Delay, s/veh		9.7			19.8			56.7				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			45.0	58.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			39.0	47.0		6.0				
Max Q Clear Time (g_c+12.5), s	6.0	2.5			42.5	18.2		2.7				
Green Ext Time (p_c), s	0.0	45.7			0.0	22.9		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				11.8								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
10: Radnor Chester Rd.






















01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1166	93	198	1114	126	81	211	141	410	448	215
Future Volume (veh/h)	120	1166	93	198	1114	126	81	211	141	410	448	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	124	1202	96	204	1148	130	84	218	145	423	462	222
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	230	1220	97	209	1294	578	149	345	234	331	863	412
Arrive On Green	0.08	0.38	0.38	0.08	0.39	0.39	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3195	255	1664	3352	1496	385	1338	906	1689	2222	1060
Grp Volume(v), veh/h	124	640	658	204	1148	130	218	0	229	423	351	333
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1195	0	1433	1689	1690	1591
Q Serve(g_s), s	4.3	37.2	37.4	7.6	32.0	5.8	12.6	0.0	14.1	8.0	16.0	16.2
Cycle Q Clear(g_c), s	4.3	37.2	37.4	7.6	32.0	5.8	16.1	0.0	14.1	8.0	16.0	16.2
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	230	650	667	209	1294	578	359	0	370	331	656	618
V/C Ratio(X)	0.54	0.98	0.99	0.98	0.89	0.23	0.61	0.00	0.62	1.28	0.53	0.54
Avail Cap(c_a), veh/h	255	650	667	209	1294	578	453	0	487	331	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	30.6	30.7	24.3	28.7	20.6	33.1	0.0	32.7	34.5	23.6	23.7
Incr Delay (d2), s/veh	2.0	31.7	31.9	55.0	9.2	0.9	1.7	0.0	1.7	145.8	0.7	0.7
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	3.8	31.0	31.8	13.7	23.0	4.6	9.5	0.0	9.7	33.9	12.0	11.7
LnGrp Delay(d),s/veh	24.3	62.3	62.5	79.4	37.9	21.5	34.8	0.0	34.4	180.3	24.3	24.4
LnGrp LOS	C	E	E	E	D	C	C		C	F	C	C
Approach Vol, veh/h		1422			1482			447			1107	
Approach Delay, s/veh		59.1			42.2			34.6			83.9	
Approach LOS		E			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	43.2		43.8	12.6	43.6	13.0	30.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	29.0			46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+110), s	39.7			18.5	6.8	34.5	10.5	18.1				
Green Ext Time (p_c), s	0.0	0.0		8.7	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			57.2									
HCM 2010 LOS			E									

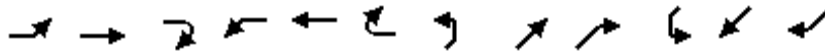
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	316	7	104	375	633	2	12	626	604
Future Volume (veh/h)	1	0	2	316	7	104	375	633	2	12	626	604
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	351	8	116	417	703	2	13	696	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	330	0	391	437	25	358	390	1152	3	370	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1287	0	1530	1396	97	1400	1639	1820	5	747	1764	1544
Grp Volume(v), veh/h	1	0	2	351	0	124	417	0	705	13	696	0
Grp Sat Flow(s),veh/h/ln	1287	0	1530	1396	0	1497	1639	0	1825	747	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.5	0.0	6.1	17.0	0.0	20.8	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.1	22.5	0.0	6.1	17.0	0.0	20.8	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	391	437	0	383	390	0	1156	370	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.80	0.00	0.32	1.07	0.00	0.61	0.04	1.01	0.00
Avail Cap(c_a), veh/h	330	0	391	437	0	383	390	0	1156	370	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	0.0	25.0	33.3	0.0	27.2	27.5	0.0	9.9	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.4	0.0	0.5	65.5	0.0	2.4	0.2	38.0	0.0
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	0.0	0.0	0.1	15.1	0.0	4.6	30.1	0.0	16.6	0.4	43.6	0.0
LnGrp Delay(d),s/veh	29.3	0.0	25.0	43.8	0.0	27.7	93.0	0.0	12.3	17.3	65.5	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			475			1122			709	
Approach Delay, s/veh		26.4			39.6			42.3			64.6	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		22.8		25.0	19.5	37.5		8.1				
Green Ext Time (p_c), s		12.4		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			48.5									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	392	476	27	834	7	511	33	58	2	1	6
Future Volume (veh/h)	38	392	476	27	834	7	511	33	58	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	417	0	29	887	7	544	35	62	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	92	857	772	399	900	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	632	1714	1545	939	1799	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	417	0	29	0	894	579	0	62	9	0	0
Grp Sat Flow(s),veh/h/ln	632	1714	1545	939	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	1.7	14.5	0.0	1.9	0.0	43.8	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.5	0.0	16.4	0.0	43.8	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	92	857	772	399	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.43	0.49	0.00	0.07	0.00	0.99	2.46	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	92	857	772	399	0	907	236	0	574	159	0	0
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)	0.57	0.57	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.7	14.9	0.0	20.3	0.0	22.2	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	8.3	1.1	0.0	0.4	0.0	26.7	668.6	0.0	0.1	0.1	0.0	0.0
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	2.2	10.4	0.0	1.0	0.0	37.1	89.2	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.0	16.0	0.0	20.6	0.0	48.9	702.2	0.0	18.2	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		457			923			641			9	
Approach Delay, s/veh		19.2			48.0			636.0			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		45.8		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				227.1								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/03/2018

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		P		Y	↑
Traffic Vol, veh/h	23	34	976	192	116	331
Future Vol, veh/h	23	34	976	192	116	331
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	26	39	1122	221	133	380

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1898	1259	0	0	1360
Stage 1	1249	-	-	-	-
Stage 2	649	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	77	172	-	-	446
Stage 1	273	-	-	-	-
Stage 2	524	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	53	168	-	-	442
Mov Cap-2 Maneuver	165	-	-	-	-
Stage 1	269	-	-	-	-
Stage 2	366	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	39.8	0	4.3
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	167	442
HCM Lane V/C Ratio	-	-	0.392	0.302
HCM Control Delay (s)	-	-	39.8	16.6
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.7	1.3

HCM 2010 TWSC  
 4: King of Prussia Rd & Northern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑			↑
Traffic Vol, veh/h	4	4	1159	0	0	404
Future Vol, veh/h	4	4	1159	0	0	404
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	4	4	1233	0	0	430

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1663	1233	0	-	-	-
Stage 1	1233	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	108	218	-	0	0	-
Stage 1	278	-	-	0	0	-
Stage 2	660	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	108	218	-	-	-	-
Mov Cap-2 Maneuver	217	-	-	-	-	-
Stage 1	278	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 217	-
HCM Lane V/C Ratio	- 0.039	-
HCM Control Delay (s)	- 22.3	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.1	-



Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	9	0	133	0	0	0	177	1153	27	27	323	59
Future Vol, veh/h	9	0	133	0	0	0	177	1153	27	27	323	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	171	0	0	0	227	1478	35	35	414	76

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	2470	2496	452				490	0	0	1521	0	0
Stage 1	521	521	-				-	-	-	-	-	-
Stage 2	1949	1975	-				-	-	-	-	-	-
Critical Hdwy	6.51	6.5	6.24				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.51	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	31	29	603				1084	-	-	445	-	-
Stage 1	578	535	-				-	-	-	-	-	-
Stage 2	115	109	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	0	0	603				1084	-	-	445	-	-
Mov Cap-2 Maneuver	0	0	-				-	-	-	-	-	-
Stage 1	515	0	-				-	-	-	-	-	-
Stage 2	0	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	1.2	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1084	-	-	603	445	-	-
HCM Lane V/C Ratio	0.209	-	-	0.302	0.078	-	-
HCM Control Delay (s)	9.2	0	-	13.5	13.8	0	-
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0.8	-	-	1.3	0.3	-	-

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	6.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	33	7	1345	242	54	401
Future Vol, veh/h	33	7	1345	242	54	401
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	40	8	1620	292	65	483



























Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	2233	1620	0	0	1620	0
Stage 1	1620	-	-	-	-	-
Stage 2	613	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	48	129	-	-	407	-
Stage 1	180	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	40	129	-	-	407	-
Mov Cap-2 Maneuver	40	-	-	-	-	-
Stage 1	180	-	-	-	-	-
Stage 2	457	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	298	0	1.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	45	407
HCM Lane V/C Ratio	-	-	1.071	0.16
HCM Control Delay (s)	-	-	298	15.5
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	4.5	0.6

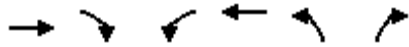
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 		 			 		
Traffic Volume (veh/h)	363	1306	0	0	544	371	774	833	344	289	0	134
Future Volume (veh/h)	363	1306	0	0	544	371	774	833	344	289	0	134
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	374	1346	0	0	561	0	798	859	355	298	0	138
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	298	
Grp Volume(v), veh/h	374	1346	0	0	561	0	798	859	355	298	65.3	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.2	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Cycle Q Clear(g_c), s	12.2	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.83	1.01	0.00	0.00	0.75	0.00	0.48	1.25	0.61	0.82		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.7	40.3	0.0	0.0	48.1	0.0	17.6	33.5	26.7	51.2		
Incr Delay (d2), s/veh	10.9	25.2	0.0	0.0	6.3	0.0	0.2	122.4	1.8	14.1		
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		
%ile BackOfQ(95%),veh/ln	10.1	44.9	0.0	0.0	13.7	0.0	12.5	79.8	13.8	3.3		
LnGrp Delay(d),s/veh	59.6	65.4	0.0	0.0	54.4	0.0	17.8	155.9	28.5	65.3		
LnGrp LOS	E	F			D		B	F	C	E		
Approach Vol, veh/h		1720			561			2012				
Approach Delay, s/veh		64.2			54.4			78.6				
Approach LOS		E			D			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		46.5	20.0		14.7	20.2	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.1		0.0	2.4	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			69.4									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/03/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	860	0	173	1235	807	845		
Future Volume (veh/h)	860	0	173	1235	807	845		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	878	0	177	1260	823	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2286	0	277	2089	972	443		
Arrive On Green	0.48	0.00	0.03	0.20	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	878	0	177	1260	823	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	13.0	0.0	6.1	37.2	25.6	0.0		
Cycle Q Clear(g_c), s	13.0	0.0	6.1	37.2	25.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2286	0	277	2089	972	443		
V/C Ratio(X)	0.38	0.00	0.64	0.60	0.85	0.00		
Avail Cap(c_a), veh/h	2286	0	317	2089	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.62	0.62	1.00	0.00		
Uniform Delay (d), s/veh	18.0	0.0	51.7	31.6	36.6	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.2	0.8	3.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.6	0.0	4.9	23.1	18.0	0.0		
LnGrp Delay(d),s/veh	18.5	0.0	53.9	32.4	39.9	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	878			1437	823			
Approach Delay, s/veh	18.5			35.0	39.9			
Approach LOS	B			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		37.1	14.6	58.2				72.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		28.1	8.6	15.5				39.7
Green Ext Time (p_c), s		3.0	0.1	14.9				9.9
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.7					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕	↔		↕	↔			
Traffic Volume (veh/h)	568	1579	4	2	888	494	6	2	2	0	0	0
Future Volume (veh/h)	568	1579	4	2	888	494	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1765	1800	1800	1800			
Adj Flow Rate, veh/h	592	1645	4	2	925	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	690	2843	7	18	2138	957	21	7	22			
Arrive On Green	0.42	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1500	1301	434	1345			
Grp Volume(v), veh/h	592	804	845	2	925	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1500	1735	0	1345			
Q Serve(g_s), s	17.9	0.0	0.0	0.1	15.2	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	17.9	0.0	0.0	0.1	15.2	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	690	1389	1461	18	2138	957	28	0	22			
V/C Ratio(X)	0.86	0.58	0.58	0.11	0.43	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2138	957	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.12	0.12	0.12	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.5	0.0	0.0	53.9	10.0	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.8	0.2	0.2	2.6	0.6	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.8	0.2	0.2	0.1	11.5	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	31.3	0.2	0.2	56.5	10.6	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2241			927			10				
Approach Delay, s/veh		8.4			10.7			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.1	75.2		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			20.4	17.7		2.7				
Green Ext Time (p_c), s	0.0	42.9			1.6	27.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	1001	54	216	1495	446	94	380	85	98	135	109
Future Volume (veh/h)	142	1001	54	216	1495	446	94	380	85	98	135	109
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	148	1043	56	225	1557	465	98	396	89	102	141	114
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	169	1472	79	267	1532	691	153	499	113	211	607	457
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3190	171	1632	3319	1497	453	2068	469	1609	1782	1341
Grp Volume(v), veh/h	148	540	559	225	1557	465	297	0	286	102	129	126
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1485	0	1506	1609	1638	1486
Q Serve(g_s), s	5.4	29.0	29.0	7.0	51.2	26.9	19.3	0.0	19.7	5.1	6.2	6.8
Cycle Q Clear(g_c), s	5.4	29.0	29.0	7.0	51.2	26.9	21.0	0.0	19.7	5.1	6.2	6.8
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	169	762	788	267	1532	691	401	0	363	211	557	506
V/C Ratio(X)	0.87	0.71	0.71	0.84	1.02	0.67	0.74	0.00	0.79	0.48	0.23	0.25
Avail Cap(c_a), veh/h	169	762	788	267	1532	691	444	0	407	211	590	535
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	23.9	23.9	25.6	29.9	23.4	39.8	0.0	39.4	30.0	26.2	26.4
Incr Delay (d2), s/veh	36.1	5.5	5.3	21.0	27.2	5.2	5.9	0.0	8.9	1.7	0.2	0.3
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	0.3	20.6	21.1	9.1	52.5	17.8	14.3	0.0	14.0	4.3	5.1	5.1
LnGrp Delay(d),s/veh	63.1	29.4	29.3	46.6	57.1	28.5	45.7	0.0	48.3	31.7	26.4	26.6
LnGrp LOS	E	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1247			2247			583			357	
Approach Delay, s/veh		33.3			50.1			47.0			28.0	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	2.0	56.2		42.8	12.0	56.2	11.0	31.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	47.0		39.0	6.0	47.0	5.0	29.0				
Max Q Clear Time (g_c+19), s	6.0	31.5		8.8	7.9	53.7	7.6	23.0				
Green Ext Time (p_c), s	0.0	14.0		6.2	0.0	0.0	0.0	2.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				43.2								
HCM 2010 LOS				D								

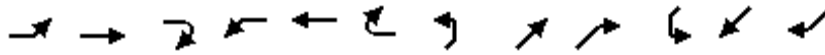
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	538	1	220	123	758	1	7	509	277
Future Volume (veh/h)	3	4	9	538	1	220	123	758	1	7	509	277
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	585	1	239	134	824	1	8	553	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	413	178	444	633	3	623	284	921	1	147	641	556
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.50	0.50	0.36	0.36	0.00
Sat Flow, veh/h	1158	457	1142	1422	7	1601	1689	1841	2	668	1782	1544
Grp Volume(v), veh/h	3	0	14	585	0	240	134	0	825	8	553	0
Grp Sat Flow(s),veh/h/ln	1158	0	1599	1422	0	1608	1689	0	1844	668	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	35.0	0.0	9.6	4.1	0.0	36.4	1.0	25.9	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.5	35.0	0.0	9.6	4.1	0.0	36.4	24.3	25.9	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	622	633	0	625	284	0	922	147	641	556
V/C Ratio(X)	0.01	0.00	0.02	0.92	0.00	0.38	0.47	0.00	0.90	0.05	0.86	0.00
Avail Cap(c_a), veh/h	413	0	622	633	0	625	292	0	922	147	641	556
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.9	0.0	17.0	28.5	0.0	19.8	18.9	0.0	20.4	36.8	26.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	19.5	0.0	0.4	1.2	0.0	13.0	0.7	14.3	0.0
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	0.1	0.0	0.4	24.8	0.0	7.7	3.6	0.0	29.3	0.4	21.7	0.0
LnGrp Delay(d),s/veh	22.9	0.0	17.0	47.9	0.0	20.1	20.2	0.0	33.4	37.5	41.0	0.0
LnGrp LOS	C		B	D		C	C		C	D	D	
Approach Vol, veh/h		17			825			959			561	
Approach Delay, s/veh		18.0			39.8			31.6			41.0	
Approach LOS		B			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0	12.6	37.4		40.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		44.0		34.0	7.0	31.0		34.0				
Max Q Clear Time (g_c+I1), s		38.4		37.5	6.6	28.4		11.8				
Green Ext Time (p_c), s		3.8		0.0	0.0	1.9		3.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			36.6									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	751	677	60	434	1	409	7	144	32	37	50
Future Volume (veh/h)	8	751	677	60	434	1	409	7	144	32	37	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	782	0	62	452	1	426	7	150	33	39	52
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	319	772	690	80	793	2	282	3	678	51	57	41
Arrive On Green	0.43	0.43	0.00	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	943	1782	1591	716	1830	4	455	7	1526	0	128	93
Grp Volume(v), veh/h	8	782	0	62	0	453	433	0	150	124	0	0
Grp Sat Flow(s),veh/h/ln	943	1782	1591	716	0	1834	463	0	1526	221	0	0
Q Serve(g_s), s	0.6	39.0	0.0	0.0	0.0	16.7	0.0	0.0	5.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.8	39.0	0.0	39.0	0.0	16.7	40.0	0.0	5.4	40.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	319	772	690	80	0	795	285	0	678	149	0	0
V/C Ratio(X)	0.03	1.01	0.00	0.77	0.00	0.57	1.52	0.00	0.22	0.83	0.00	0.00
Avail Cap(c_a), veh/h	319	772	690	80	0	795	285	0	678	149	0	0
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)	0.11	0.11	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.3	25.5	0.0	45.0	0.0	19.2	30.6	0.0	15.4	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	14.1	0.0	51.4	0.0	3.0	250.7	0.0	0.2	31.4	0.0	0.0
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	0.3	39.7	0.0	4.8	0.0	14.0	48.4	0.0	4.2	5.7	0.0	0.0
LnGrp Delay(d),s/veh	25.3	39.7	0.0	96.4	0.0	22.1	281.3	0.0	15.6	53.0	0.0	0.0
LnGrp LOS	C	F		F		C	F		B	D		
Approach Vol, veh/h		790			515			583			124	
Approach Delay, s/veh		39.5			31.1			212.9			53.0	
Approach LOS		D			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		44.0		46.0		44.0		46.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		38.0		39.0		38.0		39.0				
Max Q Clear Time (g_c+I1), s		41.5		42.0		41.5		42.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				88.4								
HCM 2010 LOS				F								



HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/03/2018

Intersection						
Int Delay, s/veh	18.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T		T	T
Traffic Vol, veh/h	150	89	415	25	40	987
Future Vol, veh/h	150	89	415	25	40	987
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	176	105	488	29	47	1161

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1777	530	0	0	535
Stage 1	520	-	-	-	-
Stage 2	1257	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	~ 92	521	-	-	961
Stage 1	601	-	-	-	-
Stage 2	270	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	~ 86	509	-	-	953
Mov Cap-2 Maneuver	195	-	-	-	-
Stage 1	592	-	-	-	-
Stage 2	256	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	132.3	0	0.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	253	953
HCM Lane V/C Ratio	-	-	1.111	0.049
HCM Control Delay (s)	-	-	132.3	9
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	12.2	0.2

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
 4: King of Prussia Rd & Northern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑			↑
Traffic Vol, veh/h	23	23	348	0	0	1208
Future Vol, veh/h	23	23	348	0	0	1208
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	0	1	0	0	1
Mvmt Flow	25	25	374	0	0	1299

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1673	374	0	-	-	-
Stage 1	374	-	-	-	-	-
Stage 2	1299	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	106	677	-	0	0	-
Stage 1	700	-	-	0	0	-
Stage 2	258	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	106	677	-	-	-	-
Mov Cap-2 Maneuver	207	-	-	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	258	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 317	-
HCM Lane V/C Ratio	- 0.156	-
HCM Control Delay (s)	- 18.4	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.5	-

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	5	0	42	0	0	0	24	349	5	5	1221	5
Future Vol, veh/h	5	0	42	0	0	0	24	349	5	5	1221	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
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	0	0	1	0
Mvmt Flow	5	0	45	0	0	0	26	371	5	5	1299	5

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	1737	1748	1302				1304	0	0	385	0	0
Stage 1	1312	1312	-				-	-	-	-	-	-
Stage 2	425	436	-				-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	97	87	198				538	-	-	1185	-	-
Stage 1	254	230	-				-	-	-	-	-	-
Stage 2	664	583	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	90	0	198				538	-	-	1185	-	-
Mov Cap-2 Maneuver	90	0	-				-	-	-	-	-	-
Stage 1	250	0	-				-	-	-	-	-	-
Stage 2	623	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33.4	0.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	538	-	-	176	1185	-	-
HCM Lane V/C Ratio	0.047	-	-	0.284	0.004	-	-
HCM Control Delay (s)	12	0	-	33.4	8.1	0	-
HCM Lane LOS	B	A	-	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0	-	-

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	87.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↘		↑	↑	↘	↑
Traffic Vol, veh/h	208	46	331	43	10	1249
Future Vol, veh/h	208	46	331	43	10	1249
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	221	49	352	46	11	1329

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1702	352	0	0	352
Stage 1	352	-	-	-	-
Stage 2	1350	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	~ 102	696	-	-	1218
Stage 1	716	-	-	-	-
Stage 2	244	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 101	696	-	-	1218
Mov Cap-2 Maneuver	~ 101	-	-	-	-
Stage 1	716	-	-	-	-
Stage 2	242	-	-	-	-






















Approach	WB	NB	SB
HCM Control Delay, s	647.9	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	120	1218
HCM Lane V/C Ratio	-	-	2.252	0.009
HCM Control Delay (s)	-	-	647.9	8
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	23.2	0

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

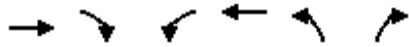
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	1567	0	0	589	170	277	223	218	860	0	472
Future Volume (veh/h)	81	1567	0	0	589	170	277	223	218	860	0	472
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	86	1667	0	0	627	0	295	237	232	915	0	502
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	181	1623	0	0	1305	607	1393	292	248	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.76	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	915	
Grp Volume(v), veh/h	86	1667	0	0	627	0	295	237	232	915	94.1	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	F	
Q Serve(g_s), s	2.8	53.0	0.0	0.0	7.5	0.0	6.3	14.1	16.6	24.0		
Cycle Q Clear(g_c), s	2.8	53.0	0.0	0.0	7.5	0.0	6.3	14.1	16.6	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	181	1623	0	0	1305	607	1393	292	248	858		
V/C Ratio(X)	0.48	1.03	0.00	0.00	0.48	0.00	0.21	0.81	0.94	1.07		
Avail Cap(c_a), veh/h	391	1623	0	0	1305	607	1393	292	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.87	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	51.4	37.2	0.0	0.0	8.9	0.0	19.8	44.4	45.4	44.2		
Incr Delay (d2), s/veh	1.7	28.0	0.0	0.0	1.1	0.0	0.1	15.9	40.0	49.9		
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		
%ile BackOfQ(95%),veh/ln	2.4	55.7	0.0	0.0	6.6	0.0	5.1	12.9	14.8	14.7		
LnGrp Delay(d),s/veh	53.1	65.2	0.0	0.0	10.0	0.0	19.9	60.3	85.4	94.1		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1753			627			764				
Approach Delay, s/veh		64.6			10.0			52.3				
Approach LOS		E			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		11.0	47.0	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.8		5.3	10.0	26.5	19.1				
Green Ext Time (p_c), s		0.0	0.8		0.1	18.2	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			60.5									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/03/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1062	0	587	787	627	503		
Future Volume (veh/h)	1062	0	587	787	627	503		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1084	0	599	803	640	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	1971	0	730	2311	762	364		
Arrive On Green	0.42	0.00	0.07	0.23	0.23	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1084	0	599	803	640	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	19.1	0.0	19.5	21.9	20.0	0.0		
Cycle Q Clear(g_c), s	19.1	0.0	19.5	21.9	20.0	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1971	0	730	2311	762	364		
V/C Ratio(X)	0.55	0.00	0.82	0.35	0.84	0.00		
Avail Cap(c_a), veh/h	1971	0	847	2311	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(l)	1.00	0.00	0.74	0.74	1.00	0.00		
Uniform Delay (d), s/veh	24.2	0.0	48.9	22.0	40.6	0.0		
Incr Delay (d2), s/veh	1.1	0.0	4.3	0.3	6.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	3.2	0.0	13.8	14.9	15.0	0.0		
LnGrp Delay(d),s/veh	25.3	0.0	53.2	22.3	46.7	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1084			1402	640			
Approach Delay, s/veh	25.3			35.5	46.7			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.9	29.1	50.9				80.1
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.5	22.0	21.6				24.4
Green Ext Time (p_c), s		1.4	1.1	10.2				20.2
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			34.3					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↑ ↘		↖ ↗	↑ ↘	↖ ↗		↑ ↘	↖ ↗			
Traffic Volume (veh/h)	1178	1803	15	6	721	595	3	1	2	0	0	0
Future Volume (veh/h)	1178	1803	15	6	721	595	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1227	1878	16	6	751	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1227	2795	24	23	1616	752	18	6	18			
Arrive On Green	0.75	1.00	1.00	0.01	0.48	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3343	28	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1227	923	971	6	751	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	41.0	0.0	0.0	0.4	16.4	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	41.0	0.0	0.0	0.4	16.4	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1227	1376	1444	23	1616	752	24	0	18			
V/C Ratio(X)	1.00	0.67	0.67	0.26	0.46	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1227	1376	1444	109	1616	752	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	14.0	0.0	0.0	53.7	19.3	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	7.6	0.2	0.2	5.6	1.0	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	11.2	0.2	0.2	0.4	12.4	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	21.6	0.2	0.2	59.3	20.3	0.0	56.9	0.0	56.2			
LnGrp LOS	C	A	A	E	C		E		E			
Approach Vol, veh/h		3121			757			6				
Approach Delay, s/veh		8.7			20.6			56.7				
Approach LOS		A			C			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			46.0	57.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			40.0	46.0		6.0				
Max Q Clear Time (g_c+12.5), s	12.5	2.5			43.5	18.9		2.7				
Green Ext Time (p_c), s	0.0	47.3			0.0	22.2		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				11.1								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
10: Radnor Chester Rd.

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	1188	95	202	1134	128	83	215	144	418	456	219
Future Volume (veh/h)	122	1188	95	202	1134	128	83	215	144	418	456	219
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	126	1225	98	208	1169	132	86	222	148	431	470	226
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	223	1201	96	205	1271	567	151	349	238	333	875	418
Arrive On Green	0.08	0.38	0.38	0.08	0.38	0.38	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3194	255	1664	3352	1496	383	1324	902	1689	2221	1061
Grp Volume(v), veh/h	126	652	671	208	1169	132	221	0	235	431	357	339
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1174	0	1434	1689	1690	1591
Q Serve(g_s), s	4.4	37.6	37.6	8.0	33.2	6.0	13.0	0.0	14.5	8.0	16.2	16.4
Cycle Q Clear(g_c), s	4.4	37.6	37.6	8.0	33.2	6.0	16.7	0.0	14.5	8.0	16.2	16.4
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	223	640	657	205	1271	567	360	0	379	333	666	627
V/C Ratio(X)	0.56	1.02	1.02	1.01	0.92	0.23	0.61	0.00	0.62	1.29	0.54	0.54
Avail Cap(c_a), veh/h	246	640	657	205	1271	567	447	0	488	333	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.9	31.2	31.2	25.5	29.6	21.1	32.9	0.0	32.4	34.3	23.3	23.3
Incr Delay (d2), s/veh	2.4	40.3	40.7	66.5	12.1	1.0	1.7	0.0	1.7	152.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	44.6	45.9	17.0	24.2	4.7	9.6	0.0	9.8	35.4	12.2	11.7
LnGrp Delay(d),s/veh	25.3	71.5	71.9	92.1	41.7	22.1	34.6	0.0	34.1	187.1	24.0	24.1
LnGrp LOS	C	F	F	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1449			1509			456			1127	
Approach Delay, s/veh		67.7			47.0			34.3			86.4	
Approach LOS		E			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	42.6		44.4	12.7	42.9	13.0	31.4				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+10), s	10.5	40.1		18.7	6.9	35.7	10.5	18.7				
Green Ext Time (p_c), s	0.0	0.0		8.9	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				62.1								
HCM 2010 LOS				E								



# APPENDIX G

## Trip Generation

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



The following is a description of the development of a trip generation rate for the proposed Penn Medicine mixed use medical facility at 145 King of Prussia Road. The development of the trip rate is based on the trips generated by the existing facilities.

The Institute of Transportation Engineers' Trip Generation Manual, 9<sup>th</sup> Edition describes a medical-dental office building as follows:

A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility.

For the AM Peak of the adjacent roadway, the Trip Generation Rate was derived based on 23 studies. For 22 of the 23 studies, the gross floor area of the buildings was less than 70,000 SF. For the PM Peak of the adjacent roadway, the Trip Generation Rate was derived based on 43 studies. For 41 of the 43 studies, the gross floor area of the buildings was less than 70,000 SF.

The proposed Penn Medicine facility for 145 King of Prussia Road has a gross floor area of 250,000 SF, more than triple the size of 90% of the facilities used by ITE to derive trip generation data. Therefore, the proposed facility is very different from those used to derive ITE trip generation data.

Furthermore, unlike private physician practices, the proposed Penn Medicine facility will include a number of treatment facilities that are uncommon in a typical medical office and that occupy a larger portion of the gross square floor area of the building, while not accommodating a larger number of patients. These facilities include ambulatory operating rooms, endoscopy rooms, chemotherapy treatment areas, radiological imaging rooms and radiation oncology treatment areas.

It is for these reasons, that the ITE trip generation is not appropriate to use for the proposed Penn Medicine site at 145 King of Prussia Road.

#### Proposed Trip Generation for 145 King of Prussia.

The following is a proposal for the development of a trip generation rate for the proposed 250,000 SF Penn Medicine mixed medical facility at 145 King of Prussia Road. The development of the trip rate is based on the trips generated by three existing ambulatory care facilities and it is for the peak hour of the adjacent street (King of Prussia Road) which, based on traffic counts, is 7:15-8:15 AM and 5:00–6:00 PM.

#### EXISTING RADNOR PENN MEDICINE

Penn currently operates an existing 171,000 square foot ambulatory care facility at 250 King of Prussia Road. The facility has 2 parking structures and multiple surface lots that provide 317 parking spaces. The facility also leases 41 parking spaces in the adjacent Radnor Court parking lot and there are 195 spaces available for employee parking at the lot located at 145 King of Prussia Road (near the Septa station). Traffic counts were performed at the parking lot driveways to

record the entry and exit trips generated by the existing Penn Medicine facility and develop a trip generation rate. The east side of the parking lot at 145 King of Prussia Road is also utilized by Septa employees and by commuters accessing the adjacent Septa station. In addition to the driveway counts, we counted the number of vehicles that parked near King of Prussia Road, and those that parked near the SEPTA facility. Based on these observations of the occupancy of the lot and the location of parked vehicles it is estimated that approximately 53% of the vehicles utilizing the lot are employees of the Penn Medicine mixed use facility. The following is a summary of trip data collected through driveway counts:

RADNOR PENN MEDICINE DRIVEWAY COUNTS

<u>Location</u>	<u>AM PEAK</u>		<u>PM PEAK</u>		<u>DAILY</u>	
	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>
On-Site Parking	215	91	83	119	2,134	2,134
Off-Site Parking	55	13	5	70	159	159
Total	270	104	88	189	2,293	2,293

The existing Penn Medicine ambulatory care facility is 171,000 SF with 165 exam or treatment rooms. For the purpose of this exercise, each exam room and each treatment room regardless of type will be considered a “patient position.” The top two floors (approximately 46,700 SF) of the existing Radnor Penn Medicine facility are general office. The trip generation for the office portion of the existing facility was calculated using the ITE Trip Generation Manual.

RADNOR PENN MEDICINE OFFICE TRIPS

<u>Land Use</u>	<u>Size</u>	<u>Daily Trips</u>	<u>Peak Hour Trips</u>		
			<u>Inbound</u>	<u>Outbound</u>	<u>Total</u>
Office (710)	46.7 ksf	515	64(AM) 12(PM)	9(AM) 58(PM)	73 70

The trips associated with the ambulatory care portion of the Radnor Penn Medicine facility were calculated using the driveway data and subtracting the calculated trips generated by the office portion of the development:

Total trips at Radnor (driveway + offsite) - ITE trip generation for office portion = Trips associated with medical practice (TAMP)

RADNOR PENN MEDICINE MEDICAL MIXED USE TRIPS

<u>Location</u>	<u>AM PEAK</u>		<u>PM PEAK</u>		<u>DAILY</u>	
	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>
Total recorded trips	270	104	88	189	2,293	2,293
Office Trips (ITE)	64	9	12	58	258	257
Remaining Trips (TAMP)	206	95	76	131	2,035	2,036

The trips generation rate for the ambulatory care portion of the Radnor Penn Medicine facility was calculated for the independent variable "patient positions" using the trips associated with medical practice (TAMP) and dividing by the number of patient positions:

TAMP/ patient positions = Trip generation rate per patient position

<u>Land Use</u>	<u>Size</u>	<u>Average Daily Trips Rate</u>	<u>Average Peak Hour Trip Rate</u>	
			<u>AM</u>	<u>PM</u>
Medical/Mixed Use	189 Patient Positions	21.54	1.59 (.68 in/.32 out)	1.09 (.37 in/.63 out)

Driveway counts were also conducted at the Valley Forge Penn Medicine ambulatory care facility located at 1001 Chesterbrook Blvd. in Berwyn PA. The Valley Forge Penn Medical Center has 149 exam or treatment rooms (patient positions) and all of the trips generated by the site are related to the medical uses. The recorded driveway trips are summarized below:

VALLEY FORGE PENN MEDICINE DRIVEWAY COUNTS

<u>Location</u>	<u>AM PEAK</u>		<u>PM PEAK</u>		<u>DAILY</u>	
	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>
Valley Forge Penn Medicine	88	8	14	58	638	638

The trip generation rates for the Valley Forge Penn Medicine ambulatory care facility was calculated using the collected driveway data for the independent variable "patient position" using the driveway data:

VALLEY FORGE PENN MEDICINE TRIPS

<u>Land Use</u>	<u>Size</u>	<u>Average Daily Trips Rate</u>	<u>Peak Hour Trip Rate</u>	
			<u>AM</u>	<u>PM</u>
Medical/Mixed Use	149 Patient Positions	8.56	0.64 (.92 in/.08 out)	0.48 (.20 in/.80 out)

Driveway counts were also conducted at the Fern Hill Medical Campus located at 915 Old Fern Hill Road in West Chester, PA. Fern Hill Medical Campus is 154,826 SF with 239 patient positions and all of the trips generated by the site are related to the medical uses. The recorded driveway trips are summarized below:

FERN HILL MEDICAL CAMPUS DRIVEWAY COUNTS

<u>Location</u>	<u>AM PEAK</u>		<u>PM PEAK</u>		<u>DAILY</u>	
	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>
Fern Hill Medical Campus	395	105	85	227	2382	2382

The trip generation rates for the ambulatory care facility mixed use/medical portion of the Fern Hill Medical Campus ambulatory care facility was calculated using the collected driveway data for the independent variable “patient positions” using the driveway data:

FERN HILL MEDICAL CAMPUS MIXED USE TRIPS

Independent Variable – Patient Positions

<u>Land Use</u>	<u>Size</u>	<u>Average Daily Trips Rate</u>	<u>Peak Hour Trip Rate</u>	
			<u>AM</u>	<u>PM</u>
Medical/Mixed Use	223 positions	21.36	2.24 (.79 in/.21 out)	1.40 (.27 in/.73 out)

The following is a comparison of the trip generation rates calculated for the Radnor Penn Medicine ambulatory care facility, the Valley Forge Penn Medicine ambulatory care facility, The Fern Hill ambulatory care facility and the average of the three:

COMPARISON OF CALCULATED TRIP RATES FOR MEDICAL MIXED USE

(Trips/Patient Position)

<u>Location</u>	<u>Avg. Daily Trip Rate</u>	<u>Peak Hour Trips Rates</u>	
		<u>AM</u>	<u>PM</u>
Radnor (124,300 SF/ 189 PP)	21.54	1.59 (.68 in/.32 out)	1.09 (.37 in/.63 out)
Valley Forge (88,300 SF/ 149 PP)	8.56	0.64 (.92 in/.08 out)	0.48 (.20 in/.80 out)
Fern Hill (154,826 SF/ 223 PP)	21.36	2.24 (.79 in/.21 out)	1.40 (.27 in/.73 out)
Average	18.02 (.50 in/.50 out)	1.60 (.77 in/.23 out)	1.06 (.29 in/.71 out)

PROPOSED PENN MEDICINE MEDICAL MIXED USE

The proposed 470,000 SF Penn Medicine development at 145 King of Prussia Road will have a 250,000 SF building dedicated to mixed medical use with 271 patient positions. The following is a comparison of the trips generated by the 250,000 SF medical portion of the site using patient positions as an independent variable:

<u>Method (Land Use)</u>	<u>Size</u>	<u>AM Rate</u>	<u>AM Trips</u>	<u>PM Rate</u>	<u>PM Trips</u>
Calculated - Medical Use (Trips/Patient Position) (Average Rate)	271 Patient Pos.	1.60	434	1.06	287

## Trip Generation Calculations Using Developed rates for Mixed Medical Use

Land Use Code	Size	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
Medical Mixed Use*	250,000 SF (271 PP)	Patient Positions	2,442	2,442	4,883	334	100	434	83	204	287
General Office Building (ITE Land Use 710)	150,000 SF	1,000 SF GFA	827	827	1,655	206	28	234	38	186	224
Hotel (ITE Land Use 310)	75,000 SF (120 rooms)	Rooms	490	490	980	38	26	64	37	35	72
<b>Total</b>			<b>3,759</b>	<b>3,759</b>	<b>7,518</b>	<b>577</b>	<b>154</b>	<b>731</b>	<b>158</b>	<b>425</b>	<b>583</b>

\* Trip generation calculated using calculated trip rates for Medical Mixed Use based on observations of similar facilities



# APPENDIX H

## Turn Lane Evaluation

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennonni
Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway			
Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized	Type of Analysis	
Posted Speed Limit (MPH):	35	Left or Right-Turn Lane Analysis?:	
Type of Terrain:	Rolling	Left Turn Lane	

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	177	0.0%	177
	Through	-	1071	2.0%	1104
	Right	Yes	369	0.0%	369
Opposing	Left	Yes	52	0.0%	52
	Through	-	268	9.0%	305
	Right	Yes	59	0.0%	59

Advancing Volume:	1650
Opposing Volume:	416
Left Turn Volume:	177

% Left Turns in Advancing Volume: 10.73%

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	177	0.0%	N/A
	Through	-	1069	2.0%	N/A
	Right	-	369	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 1

Warrant Met?: Yes

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Average # of Vehicles/Cycle:	4.0
Design Hour Volume of Turning Lane:	177		
Cycles Per Hour (Assumed):	40		
Cycles Per Hour (If Known):	40		

PennDOT Publication 46, Exhibit 11-6

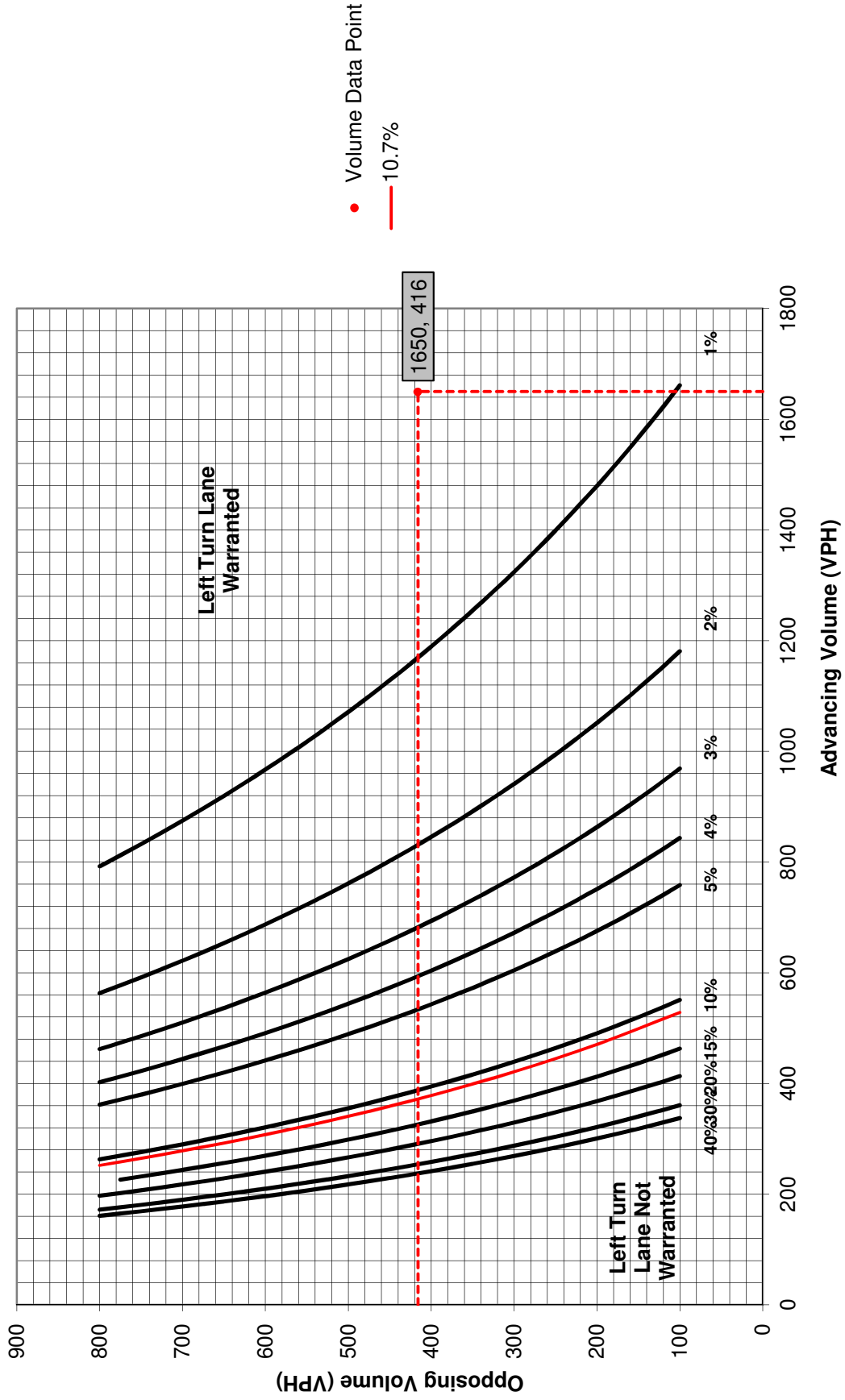
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	175	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	175	Feet

Additional Findings:  
N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
Intersection & Approach Description:		Agency/Company Name:	
King of Prussia Road NB at Raider Road/Site Driveway		Pennoni	
Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized	Type of Analysis	
Posted Speed Limit (MPH):	35	Left or Right-Turn Lane Analysis?:	
Type of Terrain:	Rolling	Left Turn Lane	

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes	24	0.0%	24	Advancing Volume: 429	
	Through	-	299	1.0%	304		Opposing Volume: 1136
	Right	Yes	101	0.0%	101		Left Turn Volume: 24
Opposing	Left	Yes	14	0.0%	14	% Left Turns in Advancing Volume: 5.59%	
	Through	-	1117	0.0%	1117		
	Right	Yes	5	0.0%	5		

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes	24	0.0%	N/A	Advancing Volume: N/A	
	Through	-	299	1.0%	N/A		Right Turn Volume: N/A
	Right	-	101	0.0%	N/A		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Average # of Vehicles/Cycle:	1.0
Design Hour Volume of Turning Lane:	24		
Cycles Per Hour (Assumed):	40		
Cycles Per Hour (If Known):	40		

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **75** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

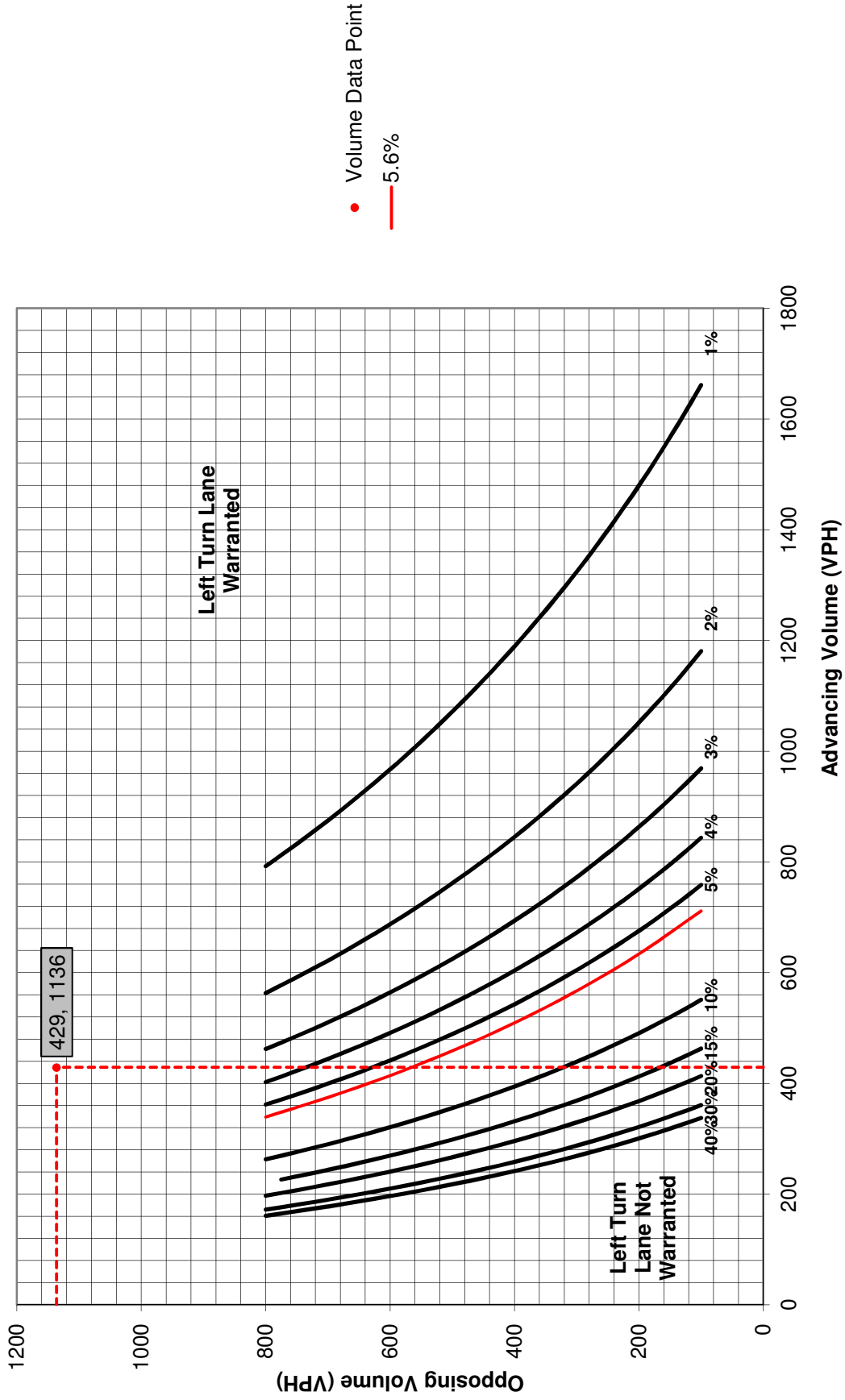
Required Left Turn Lane Storage Length: **75** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at Raider Road/Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	Type of Analysis
Posted Speed Limit (MPH): 35	
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	52	0.0%	52	Advancing Volume: 416	
	Through	-	268	9.0%	305		Opposing Volume: 1650
	Right	Yes	59	0.0%	59		Left Turn Volume: 52
Opposing	Left	Yes	177	0.0%	177	% Left Turns in Advancing Volume: 12.50%	
	Through	-	1071	2.0%	1104		
	Right	Yes	369	0.0%	369		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	52	0.0%	N/A	Advancing Volume: N/A	
	Through	-	268	9.0%	N/A		Right Turn Volume: N/A
	Right	-	59	0.0%	N/A		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized	
Design Hour Volume of Turning Lane: 52	
Cycles Per Hour (Assumed): 40	
Cycles Per Hour (If Known): 40	Average # of Vehicles/Cycle: 1.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **75** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

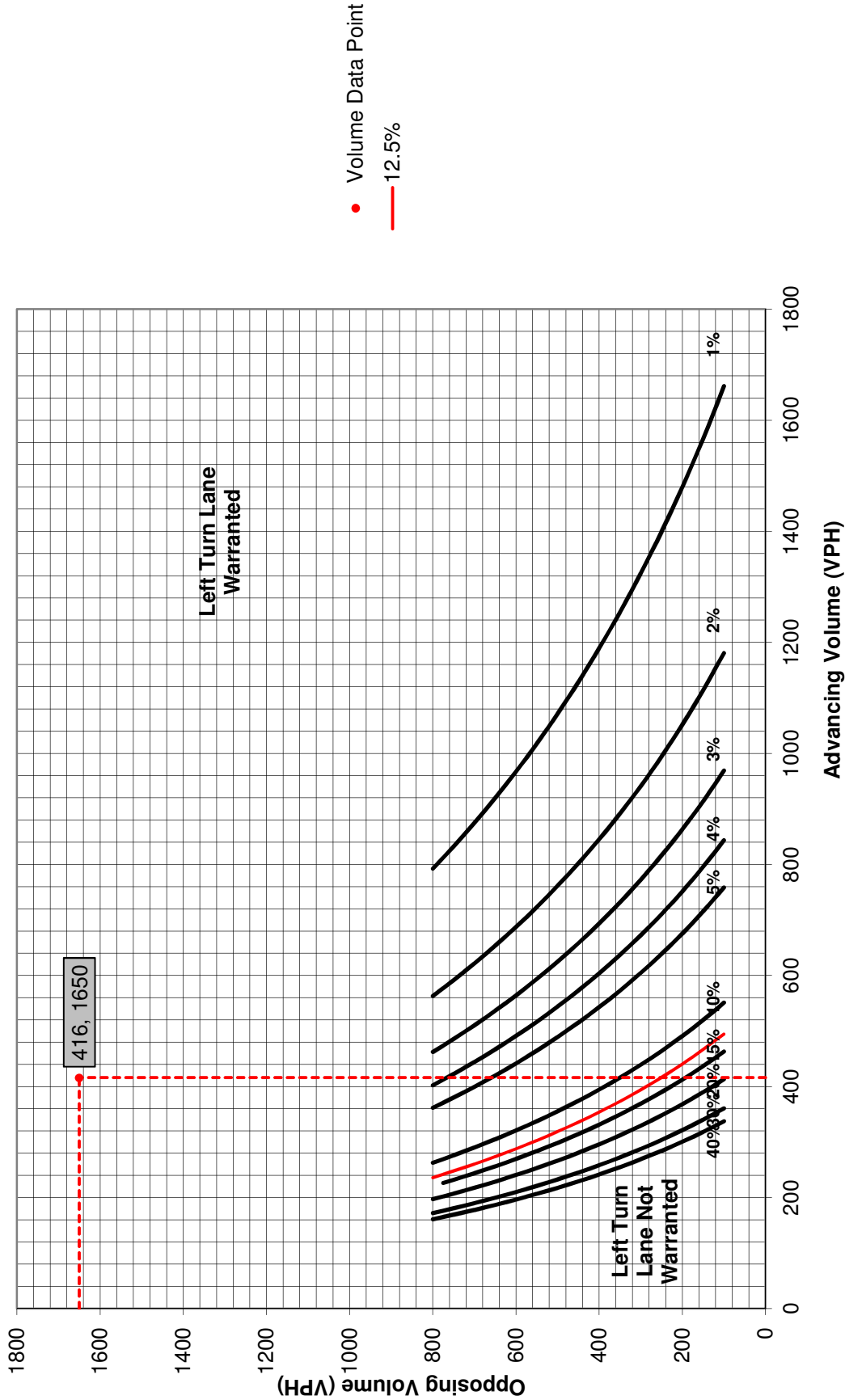
Required Left Turn Lane Storage Length: **75** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)





## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at Raider Road/Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	14	0.0%	14	Advancing Volume: 1152	
	Through	-	1117	0.0%	1133		Opposing Volume: 427
	Right	Yes	5	0.0%	5		Left Turn Volume: 14
Opposing	Left	Yes	24	0.0%	24	% Left Turns in Advancing Volume: 1.22%	
	Through	-	299	1.0%	304		
	Right	Yes	101	0.0%	99		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	14	0.0%	N/A	Advancing Volume: N/A	
	Through	-	1117	0.0%	N/A		Right Turn Volume: N/A
	Right	-	5	0.0%	N/A		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized	
Design Hour Volume of Turning Lane: 14	
Cycles Per Hour (Assumed): 40	
Cycles Per Hour (If Known): 40	Average # of Vehicles/Cycle: 1.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **75** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

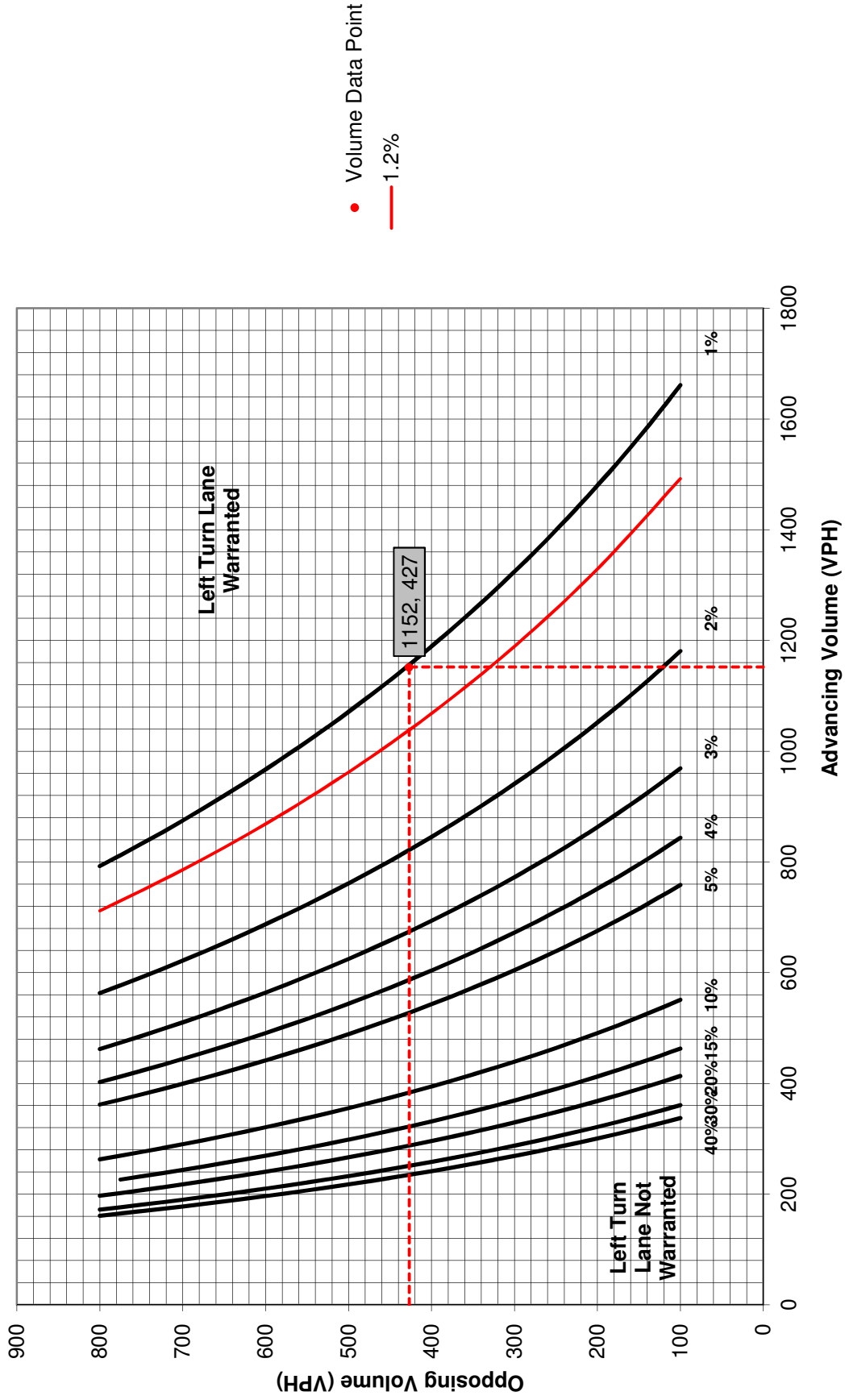
Required Left Turn Lane Storage Length: **75** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)



● Volume Data Point  
 — 1.2%

## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	Type of Analysis
Posted Speed Limit (MPH): 35	
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV	
Advancing	Left	Yes	177	0.0%	N/A
	Through	-	1071	2.0%	N/A
	Right	Yes	369	0.0%	N/A
Opposing	Left	Yes	52	0.0%	N/A
	Through	-	268	9.0%	N/A
	Right	Yes	59	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A

% Left Turns in Advancing Volume:	N/A
-----------------------------------	-----

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV	
Advancing	Left	Yes	177	0.0%	177
	Through	-	1069	2.0%	1102
	Right	-	369	0.0%	369

Advancing Volume:	1648
Right Turn Volume:	369

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure:	N/A
Warrant Met?:	N/A

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure:	Figure 9
Warrant Met?:	Yes

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	369
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40
Average # of Vehicles/Cycle:	9.0

#### PennDOT Publication 46, Exhibit 11-6

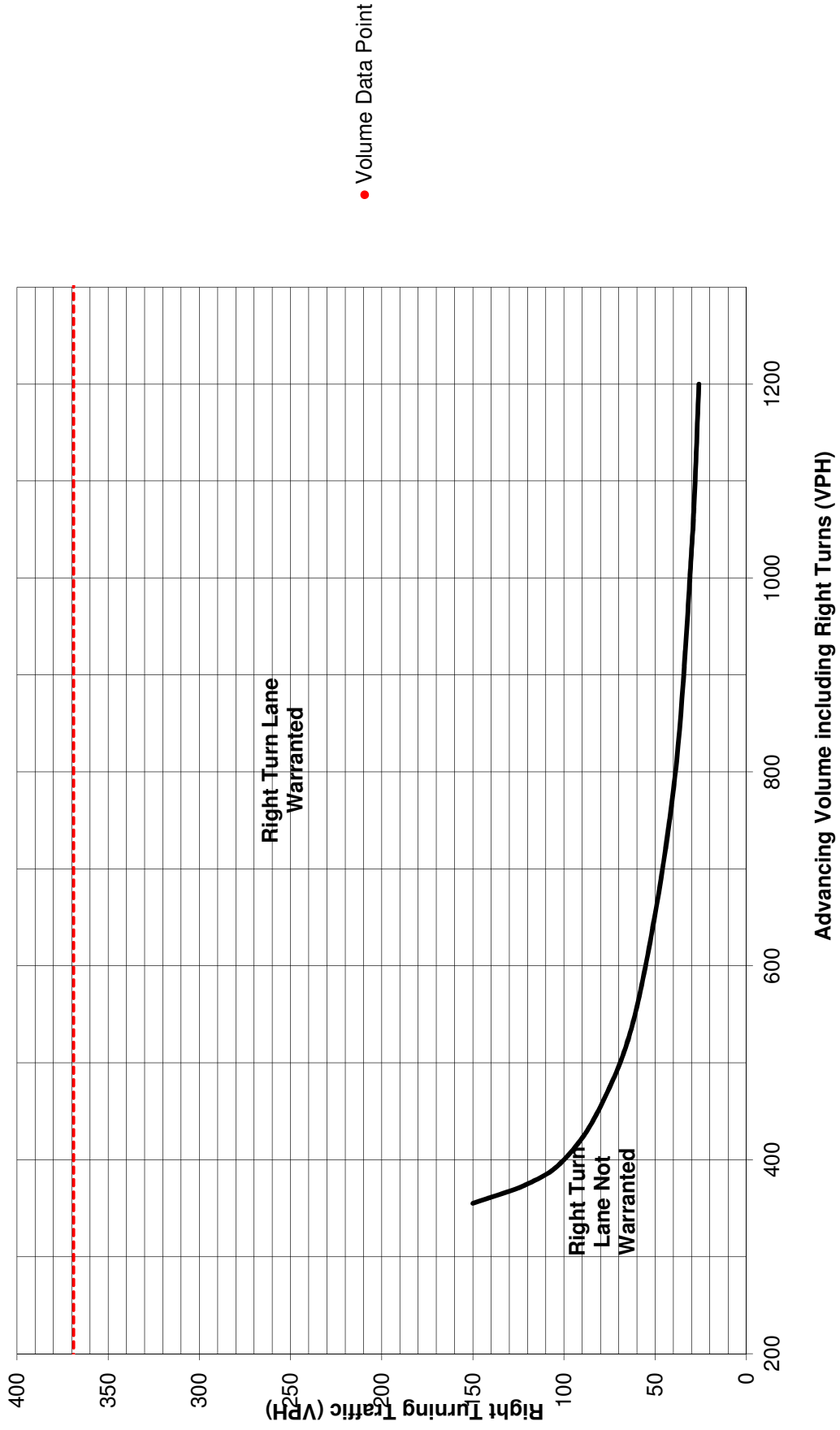
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	350	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	350	Feet

Additional Findings:	N/A
----------------------	-----

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways  
(40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	Type of Analysis
Posted Speed Limit (MPH): 35	
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	24	0.0%	N/A
	Through	-	299	1.0%	N/A
	Right	Yes	101	0.0%	N/A
Opposing	Left	Yes	14	0.0%	N/A
	Through	-	1117	0.0%	N/A
	Right	Yes	5	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A

% Left Turns in Advancing Volume:	N/A
-----------------------------------	-----

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	24	0.0%	24
	Through	-	299	1.0%	304
	Right	-	101	0.0%	101

Advancing Volume:	429
Right Turn Volume:	101

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure:	N/A
Warrant Met?:	N/A

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure:	Figure 9
Warrant Met?:	Yes

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	101
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40
Average # of Vehicles/Cycle:	3.0

#### PennDOT Publication 46, Exhibit 11-6

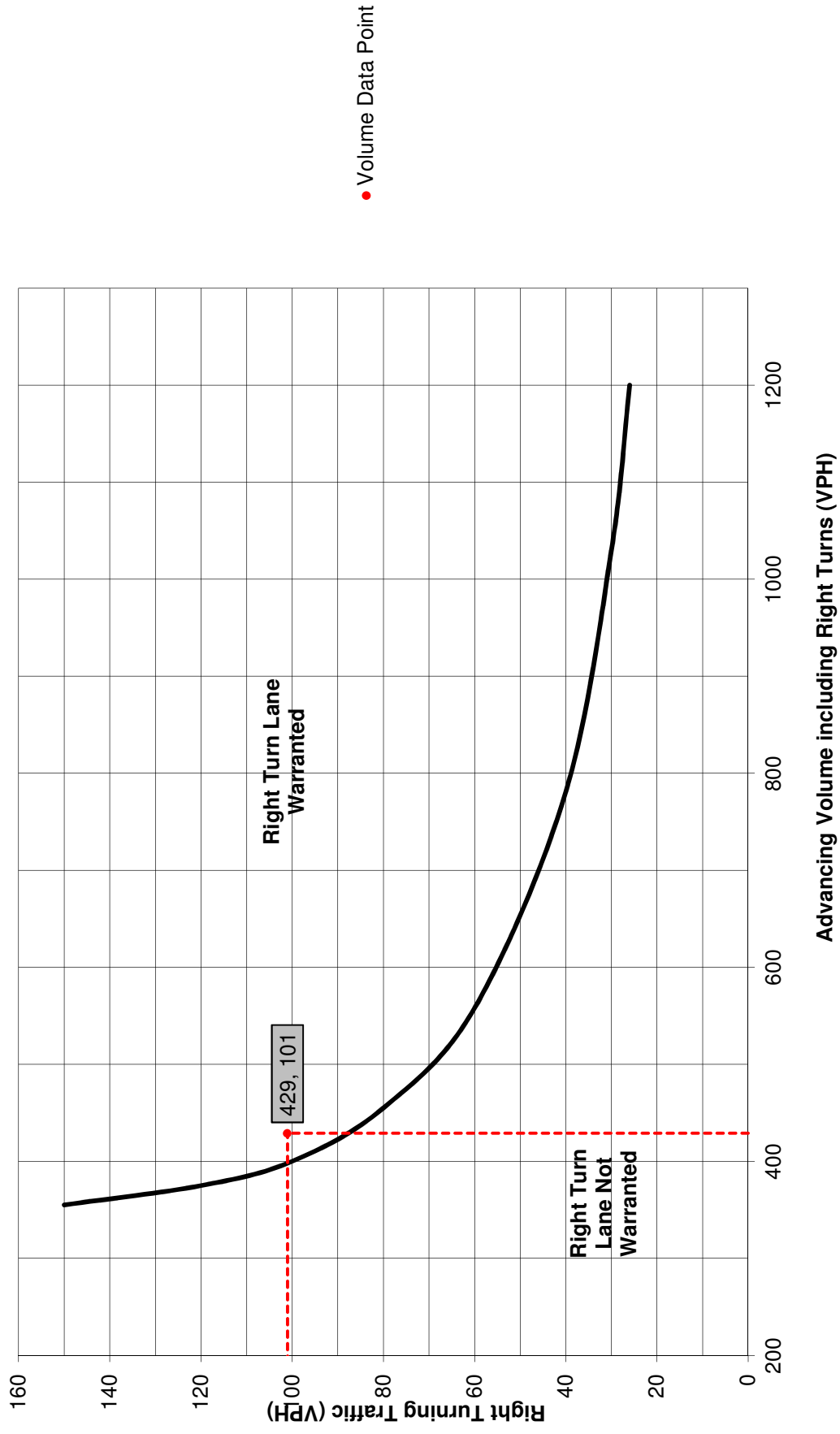
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	150	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	150	Feet

Additional Findings:	N/A
----------------------	-----

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Septa Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	Type of Analysis
Posted Speed Limit (MPH): 35	
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	149	9.0%	170	Advancing Volume: 497	
	Through	-	4.0%	327		Opposing Volume: 1134
	Right	Yes	0	0.0%		0
Opposing	Left	0	0.0%	0	% Left Turns in Advancing Volume: 34.21%	
	Through	-	2.0%	1018		
	Right	Yes	116	0.0%		116

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	149	9.0%	N/A	Advancing Volume: N/A	
	Through	-	4.0%	N/A		Right Turn Volume: N/A
	Right	-	0	5.0%		N/A

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 170	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 3.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **150** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

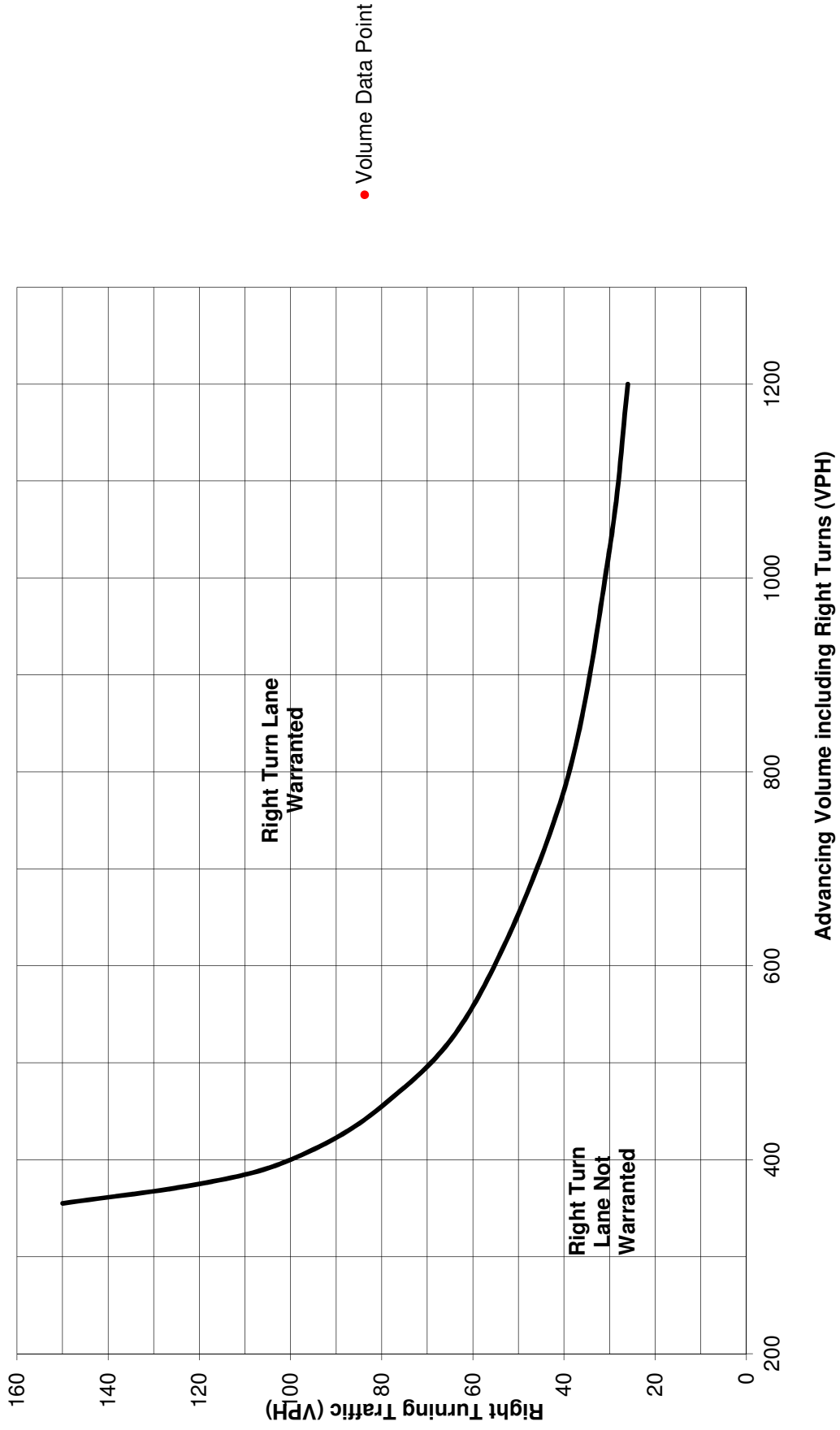
Required Left Turn Lane Storage Length: **150** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)





## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at Septa Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	Type of Analysis
Posted Speed Limit (MPH): 35	Left or Right-Turn Lane Analysis?: Left Turn Lane
Type of Terrain: Rolling	

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	54	10.0%	63	Advancing Volume: 1200	
	Through	988	10.0%	1137		Opposing Volume: 433
	Right	0	0.0%	0		Left Turn Volume: 63
Opposing	Left	0	0.0%	0	% Left Turns in Advancing Volume: 5.25%	
	Through	409	1.0%	416		
	Right	17	0.0%	17		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	54	10.0%	N/A	Advancing Volume: N/A	
	Through	988	0.0%	N/A		Right Turn Volume: N/A
	Right	0	0.0%	N/A		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 63	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 1.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **75** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

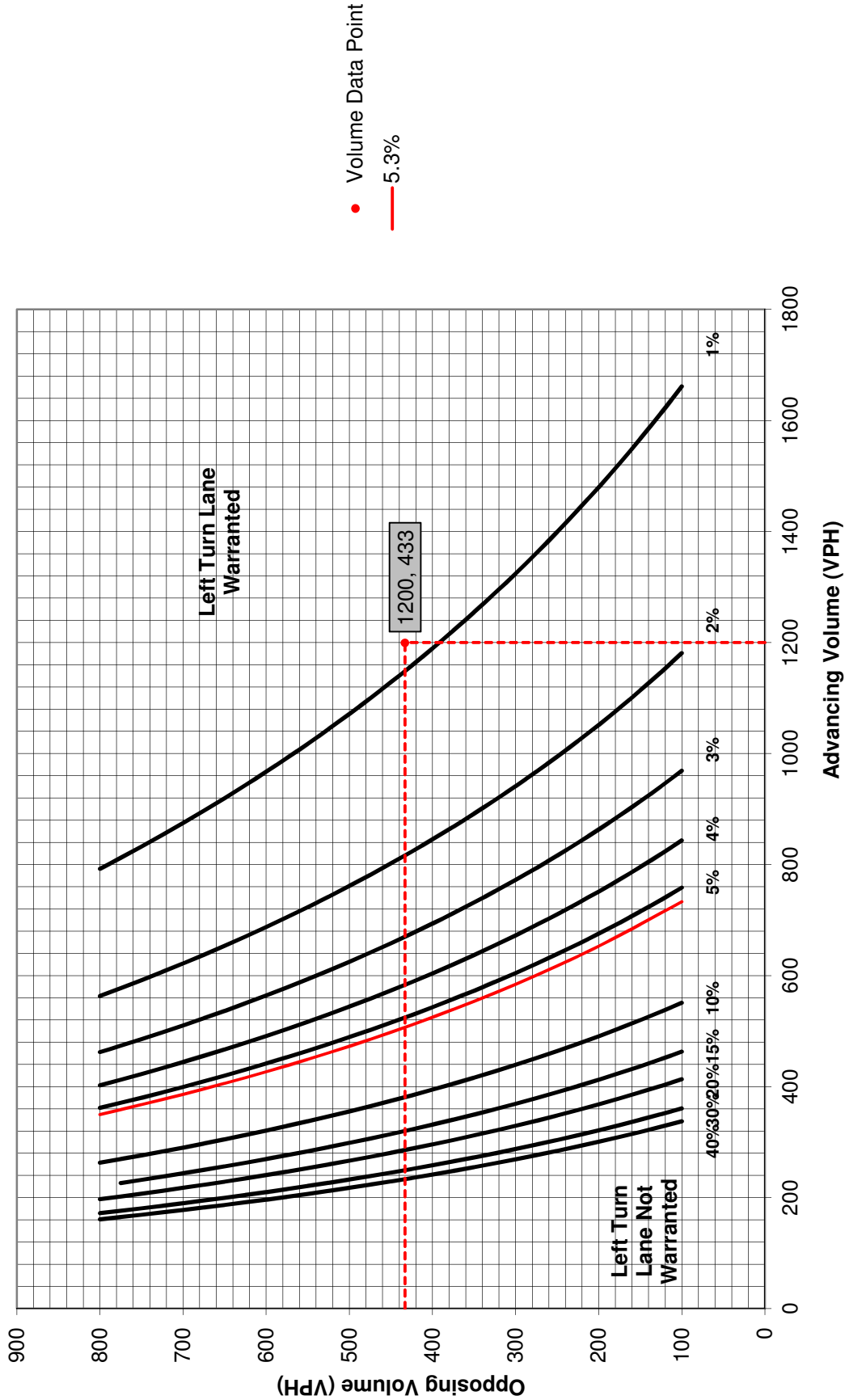
Required Left Turn Lane Storage Length: **75** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Septa Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	988	2.0%	N/A
	Right	Yes	116	0.0%	N/A
Opposing	Left	Yes	149	9.0%	N/A
	Through	-	308	4.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A

% Left Turns in Advancing Volume:	N/A
-----------------------------------	-----

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	988	2.0%	1018
	Right	-	116	0.0%	116

Advancing Volume:	1134
Right Turn Volume:	116

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure:	N/A
Warrant Met?:	N/A

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure:	Figure 9
Warrant Met?:	Yes

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	116
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	
Average # of Vehicles/Cycle:	2.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

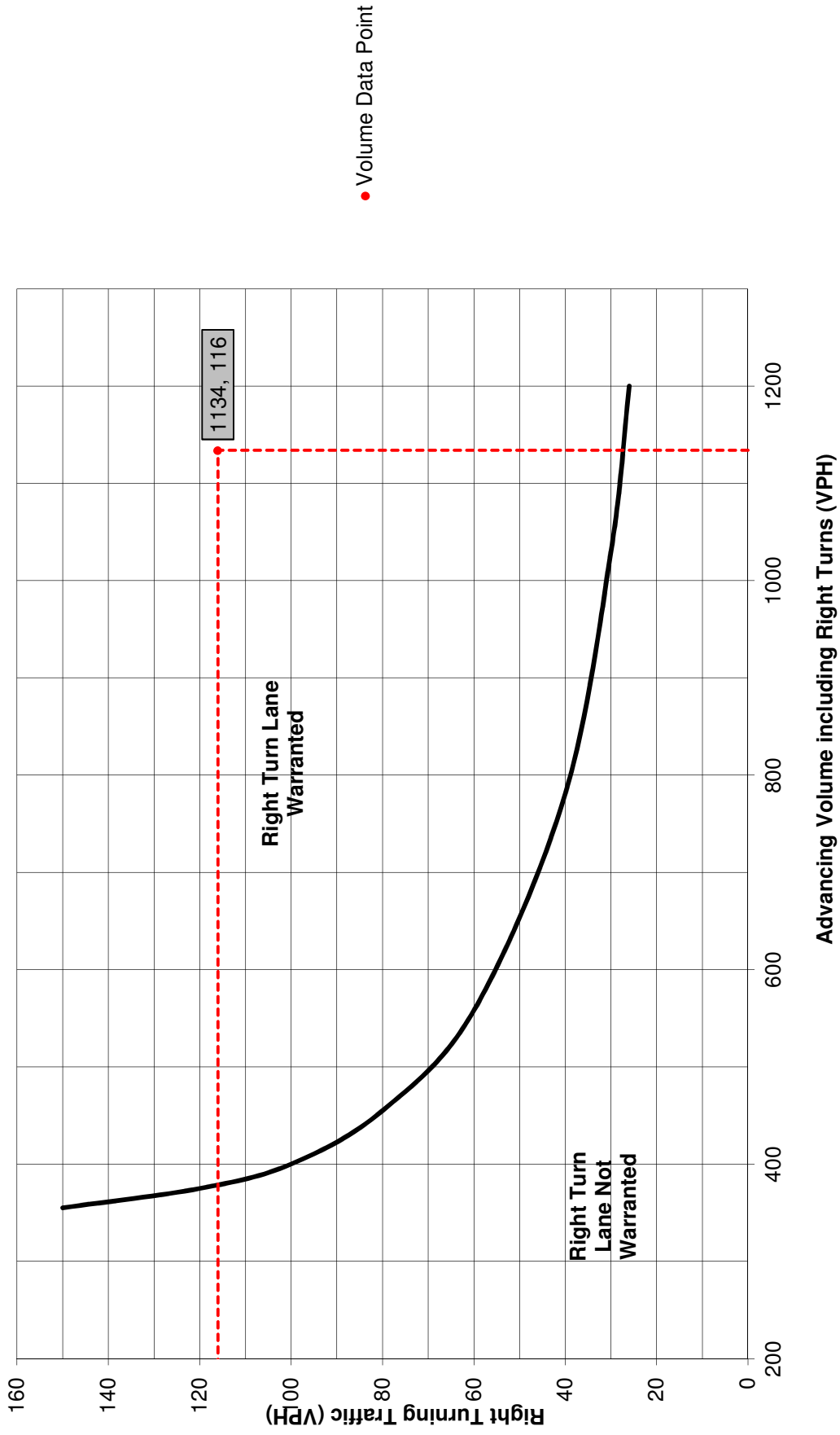
Right Turn Lane Storage Length, Condition A:	100	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	100	Feet

Additional Findings:

N/A
-----

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways  
(40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Septa Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	0	0.0%	N/A	Advancing Volume: N/A	
	Through	-	409	1.0%	N/A		Opposing Volume: N/A
	Right	Yes	17	0.0%	N/A		Left Turn Volume: N/A
Opposing	Left	Yes	54	9.0%	N/A	% Left Turns in Advancing Volume: N/A	
	Through	-	988	0.0%	N/A		
	Right	Yes	0	0.0%	N/A		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	0	0.0%	0	Advancing Volume: 433	
	Through	-	409	1.0%	416		Right Turn Volume: 17
	Right	-	17	0.0%	17		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 9**

Warrant Met?: **No**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 17	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: N/A

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: **N/A** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

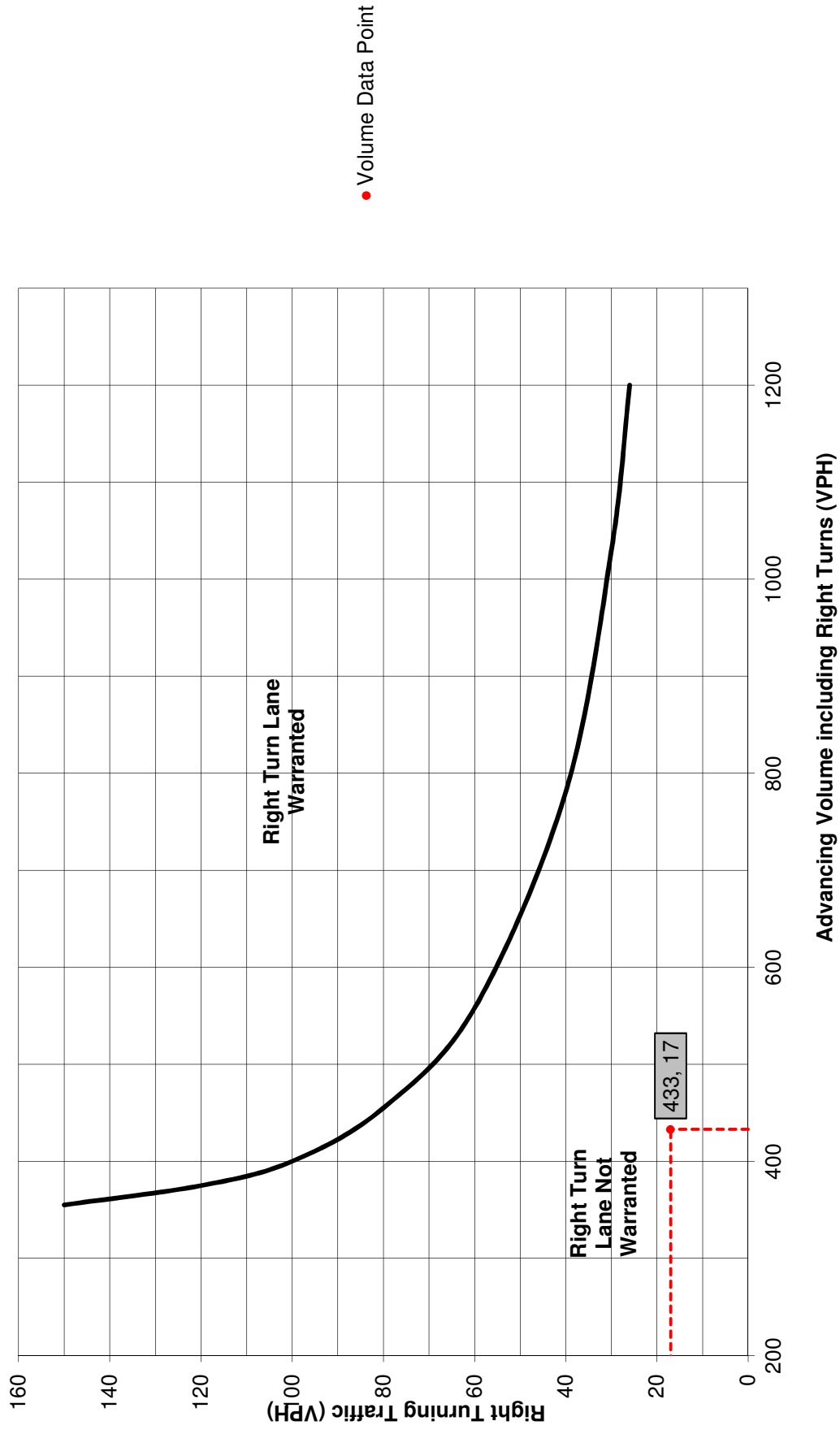
Required Right Turn Lane Storage Length: **N/A** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at South Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	Type of Analysis
Posted Speed Limit (MPH): 35	Left or Right-Turn Lane Analysis?: Left Turn Lane
Type of Terrain: Rolling	

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	6	0.0%	6	Advancing Volume: 544	
	Through	-	493	6.0%	538		Opposing Volume: 1642
	Right	Yes	0	0.0%	0		Left Turn Volume: 6
Opposing	Left	Yes	0	0.0%	0	% Left Turns in Advancing Volume: 1.10%	
	Through	-	1611	1.0%	1636		
	Right	Yes	6	0.0%	6		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	6	0.0%	N/A	Advancing Volume: N/A	
	Through	-	493	6.0%	N/A		Right Turn Volume: N/A
	Right	-	0	0.0%	N/A		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 6	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 1.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **75** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

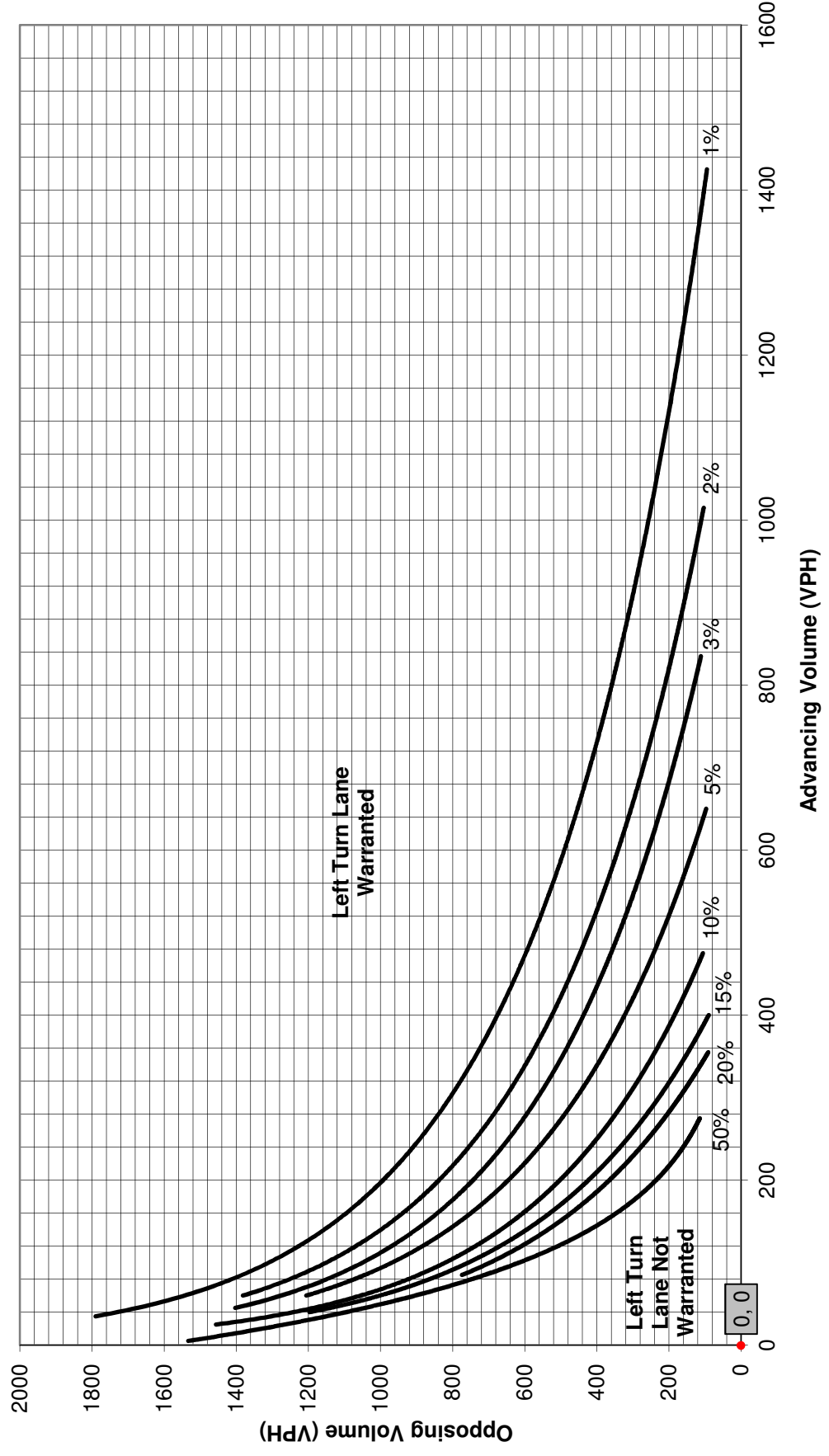
Required Left Turn Lane Storage Length: **75** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 7. Warrant for left turn lanes on four-lane, undivided highways**  
 (unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume) ● Volume Data Point





## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at South Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	2	0.0%	2
	Through	-	1425	0.0%	1425
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	419	1.0%	426
	Right	Yes	2	0.0%	2

Advancing Volume:	1427
Opposing Volume:	428
Left Turn Volume:	2

% Left Turns in Advancing Volume: 0.14%

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	2	0.0%	N/A
	Through	-	1425	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **No**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	2
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	
Average # of Vehicles/Cycle:	N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

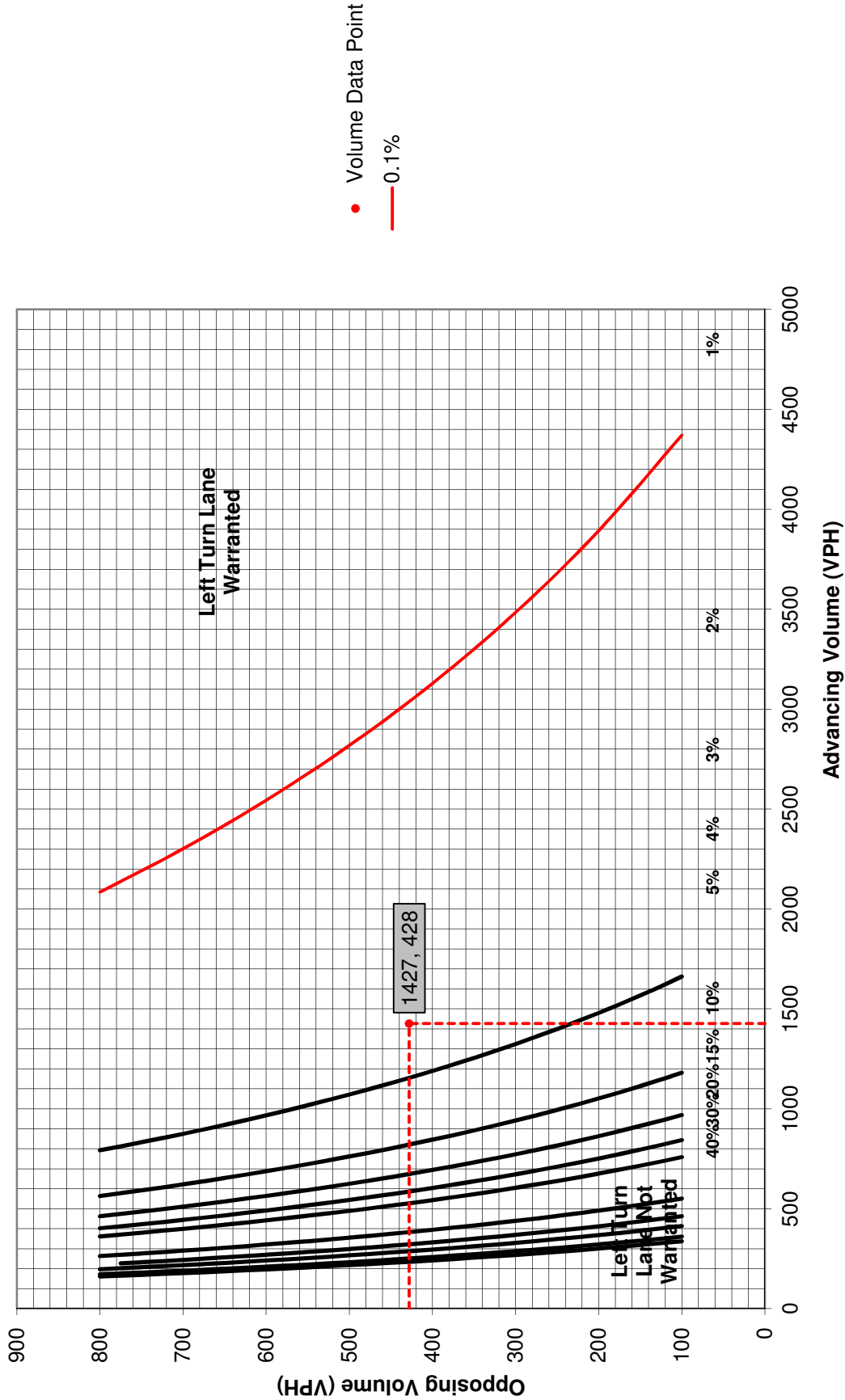
Left Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at South Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 2
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	1611	1.0%	N/A
	Right	Yes	6	0.0%	N/A
Opposing	Left	Yes	6	0.0%	N/A
	Through	-	493	6.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A

% Left Turns in Advancing Volume:	N/A
-----------------------------------	-----

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	1611	1.0%	1648
	Right	-	6	0.0%	6

Advancing Volume:	1654
Right Turn Volume:	6

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure:	N/A
Warrant Met?:	N/A

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure:	Figure 11
Warrant Met?:	No

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	6
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	
Average # of Vehicles/Cycle:	N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

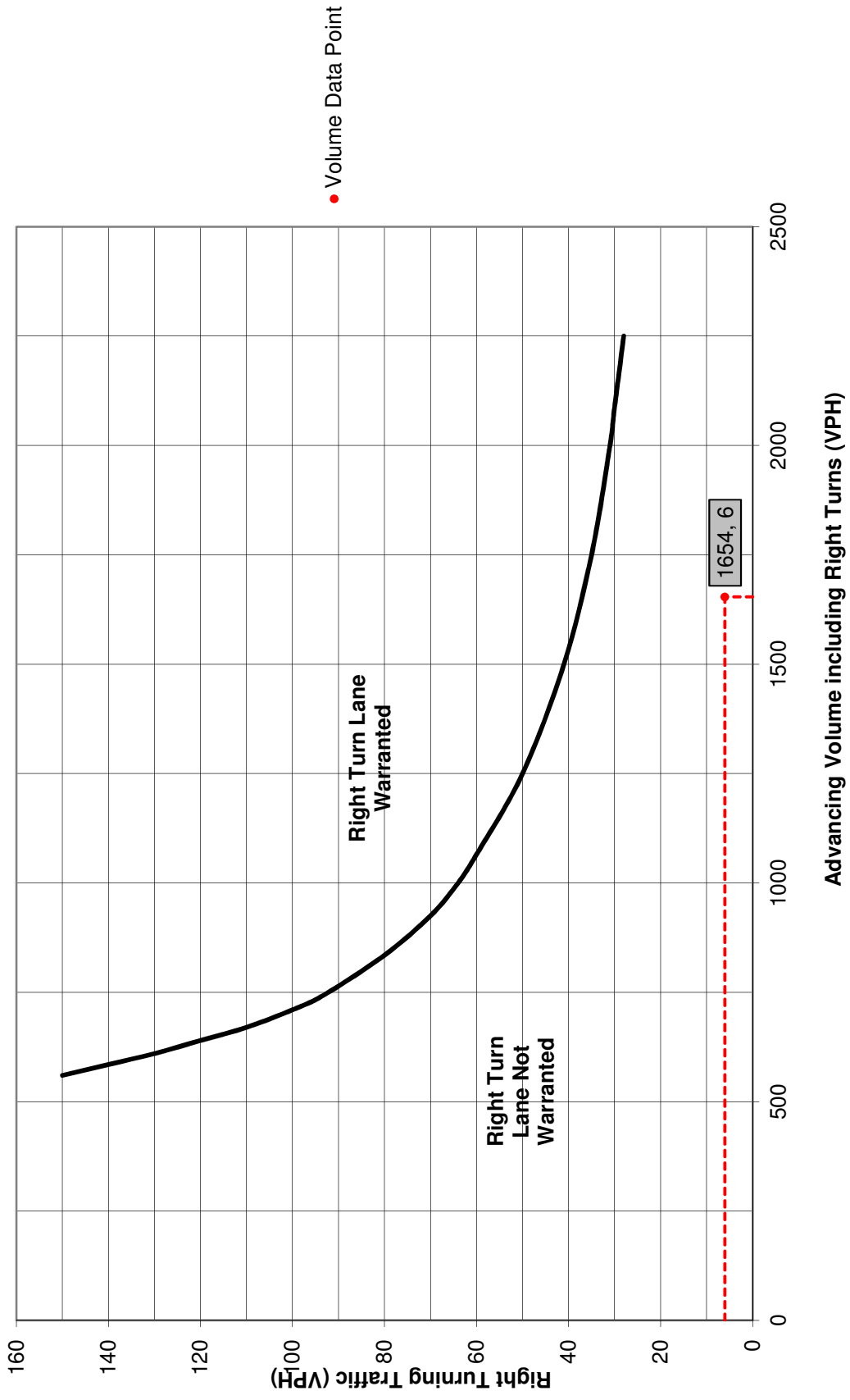
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A
-----

Additional Comments / Justifications:

Figure 11. Warrant for right turn lanes on four-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at South Site Driveway	
Analysis Period: 2020 Build	Number of Approach Lanes: 2
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	0	0.0%	N/A	Advancing Volume: N/A	
	Through	-	419	1.0%	N/A		Opposing Volume: N/A
	Right	Yes	2	0.0%	N/A		Left Turn Volume: N/A
Opposing	Left	Yes	2	0.0%	N/A	% Left Turns in Advancing Volume: N/A	
	Through	-	1425	0.0%	N/A		
	Right	Yes	0	0.0%	N/A		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	0	0.0%	0	Advancing Volume: 428	
	Through	-	419	1.0%	426		Right Turn Volume: 2
	Right	-	2	0.0%	2		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 11**

Warrant Met?: **No**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 2	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: N/A

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: **N/A** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

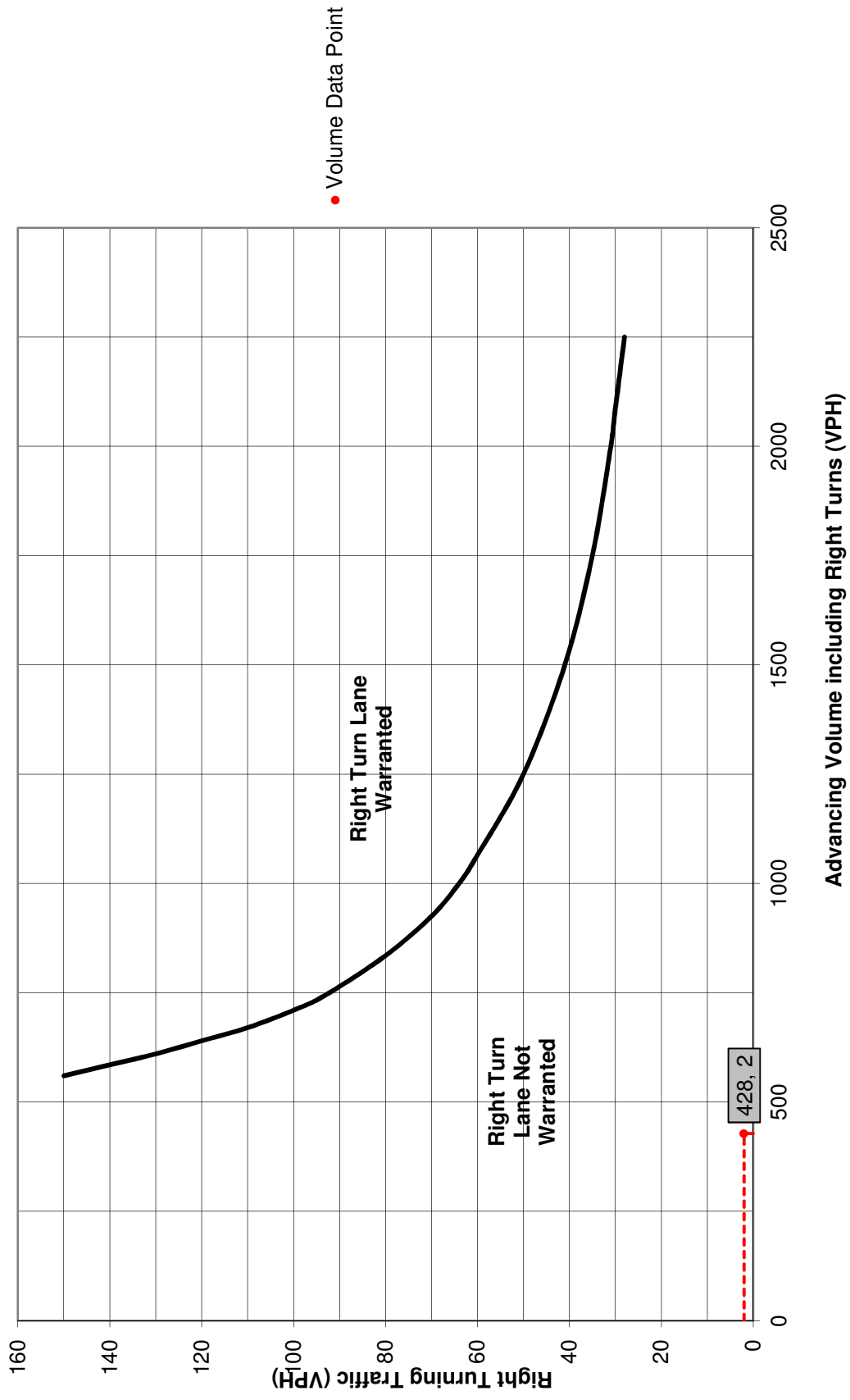
Required Right Turn Lane Storage Length: **N/A** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 11. Warrant for right turn lanes on four-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



# APPENDIX I

2020 and 2025 Build Condition without Improvements

Capacity Analysis Worksheets

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD

RADNOR TOWNSHIP

DELAWARE COUNTY, PA






















UPHS1507





HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

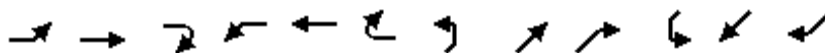
01/16/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Future Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	349	8	113	409	699	2	13	696	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	333	0	391	437	25	357	390	1152	3	371	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1291	0	1530	1396	99	1398	1639	1820	5	749	1764	1544
Grp Volume(v), veh/h	1	0	2	349	0	121	409	0	701	13	696	0
Grp Sat Flow(s),veh/h/ln	1291	0	1530	1396	0	1497	1639	0	1825	749	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.80	0.00	0.32	1.05	0.00	0.61	0.04	1.01	0.00
Avail Cap(c_a), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.0	33.3	0.0	27.1	27.5	0.0	9.8	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.1	0.0	0.5	59.2	0.0	2.4	0.2	38.0	0.0
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	0.0	0.0	0.1	15.0	0.0	4.4	28.9	0.0	16.3	0.4	43.6	0.0
LnGrp Delay(d),s/veh	29.1	0.0	25.0	43.4	0.0	27.6	86.7	0.0	12.2	17.3	65.5	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			470			1110			709	
Approach Delay, s/veh		26.4			39.3			39.6			64.6	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		22.6		24.8	19.5	37.5		7.9				
Green Ext Time (p_c), s		12.3		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				47.3								
HCM 2010 LOS				D								

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/16/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Future Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	421	0	30	890	7	534	34	62	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	90	857	772	395	900	7	226	9	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	630	1714	1545	935	1799	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	421	0	30	0	897	568	0	62	9	0	0
Grp Sat Flow(s),veh/h/ln	630	1714	1545	935	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	1.5	14.6	0.0	2.0	0.0	44.0	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.6	0.0	16.6	0.0	44.0	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	90	857	772	395	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.44	0.49	0.00	0.08	0.00	0.99	2.41	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	90	857	772	395	0	907	236	0	574	159	0	0
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)	0.58	0.58	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.8	14.9	0.0	20.4	0.0	22.3	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	8.9	1.2	0.0	0.4	0.0	27.4	648.0	0.0	0.1	0.1	0.0	0.0
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	2.2	10.5	0.0	1.0	0.0	37.6	86.8	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.7	16.1	0.0	20.8	0.0	49.7	681.6	0.0	18.2	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		461			927			630			9	
Approach Delay, s/veh		19.3			48.7			616.3			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		46.0		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				218.3								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/16/2018

Intersection						
Int Delay, s/veh	3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	42	970	115	147	303
Future Vol, veh/h	20	42	970	115	147	303
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	23	48	1115	132	169	348

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1886	1208	0	0	1264
Stage 1	1198	-	-	-	-
Stage 2	688	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	79	185	-	-	487
Stage 1	289	-	-	-	-
Stage 2	503	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	51	181	-	-	483
Mov Cap-2 Maneuver	162	-	-	-	-
Stage 1	285	-	-	-	-
Stage 2	326	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	39.3	0	5.4
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	174	483
HCM Lane V/C Ratio	-	-	0.41	0.35
HCM Control Delay (s)	-	-	39.3	16.4
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.8	1.6

HCM 2010 TWSC  
5: King of Prussia Rd & Raider Rd

01/16/2018

Intersection

Int Delay, s/veh 282.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	9	0	130	99	0	22	173	1052	369	52	264	58
Future Vol, veh/h	9	0	130	99	0	22	173	1052	369	52	264	58
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	167	127	0	28	222	1349	473	67	338	74

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	2552	2782	376	2629	2583	1593	413	0	0	1830	0	0
Stage 1	509	509	-	2037	2037	-	-	-	-	-	-	-
Stage 2	2043	2273	-	592	546	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	17	19	666	~ 16	26	133	1157	-	-	338	-	-
Stage 1	530	541	-	~ 75	101	-	-	-	-	-	-	-
Stage 2	69	77	-	496	521	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 11	14	666	~ 10	19	132	1157	-	-	338	-	-
Mov Cap-2 Maneuver	~ 11	14	-	~ 10	19	-	-	-	-	-	-	-
Stage 1	530	400	-	~ 75	100	-	-	-	-	-	-	-
Stage 2	54	76	-	275	386	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	240.2	\$ 4909.7	1	2.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1157	-	-	137	10	132	338	-	-
HCM Lane V/C Ratio	0.192	-	-	1.301	12.692	0.214	0.197	-	-
HCM Control Delay (s)	8.8	0	-	240.2	\$ 5992	39.5	18.2	0	-
HCM Lane LOS	A	A	-	F	F	E	C	A	-
HCM 95th %tile Q(veh)	0.7	-	-	11.1	17.4	0.8	0.7	-	-

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↗↘	↘↗	↑
Traffic Vol, veh/h	2	2	1588	6	6	486
Future Vol, veh/h	2	2	1588	6	6	486
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1913	7	7	586






















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2513	1913	0	0	1913
Stage 1	1913	-	-	-	-
Stage 2	600	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	32	86	-	-	314
Stage 1	129	-	-	-	-
Stage 2	552	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	31	86	-	-	314
Mov Cap-2 Maneuver	31	-	-	-	-
Stage 1	129	-	-	-	-
Stage 2	540	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	92.2	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	46	314
HCM Lane V/C Ratio	-	-	0.105	0.023
HCM Control Delay (s)	-	-	92.2	16.7
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	0.3	0.1

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/16/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Future Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	385	1321	0	0	551	0	782	853	347	326	0	165
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	326	
Grp Volume(v), veh/h	385	1321	0	0	551	0	782	853	347	326	75.9	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.6	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Cycle Q Clear(g_c), s	12.6	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.85	0.99	0.00	0.00	0.74	0.00	0.47	1.24	0.59	0.90		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.9	40.0	0.0	0.0	48.0	0.0	17.4	33.5	26.5	51.6		
Incr Delay (d2), s/veh	13.1	20.8	0.0	0.0	5.9	0.0	0.2	118.8	1.6	24.3		
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		
%ile BackOfQ(95%),veh/ln	10.5	31.4	0.0	0.0	13.5	0.0	12.2	78.5	13.3	5.0		
LnGrp Delay(d),s/veh	62.0	60.9	0.0	0.0	53.9	0.0	17.6	152.3	28.1	75.9		
LnGrp LOS	E	E			D		B	F	C	E		
Approach Vol, veh/h		1706			551			1982				
Approach Delay, s/veh		61.1			53.9			77.4				
Approach LOS		E			D			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		45.9	19.5		15.1	19.9	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.0		0.0	2.7	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			68.4									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/16/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	851	0	186	1224	792	839		
Future Volume (veh/h)	851	0	186	1224	792	839		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	868	0	190	1249	808	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2288	0	290	2104	957	436		
Arrive On Green	0.48	0.00	0.03	0.21	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	868	0	190	1249	808	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	12.8	0.0	6.5	36.7	25.1	0.0		
Cycle Q Clear(g_c), s	12.8	0.0	6.5	36.7	25.1	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2288	0	290	2104	957	436		
V/C Ratio(X)	0.38	0.00	0.66	0.59	0.84	0.00		
Avail Cap(c_a), veh/h	2288	0	317	2104	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.63	0.63	1.00	0.00		
Uniform Delay (d), s/veh	17.9	0.0	51.6	31.1	36.9	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.7	0.8	3.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.5	0.0	5.2	22.9	17.7	0.0		
LnGrp Delay(d),s/veh	18.4	0.0	54.4	31.9	40.0	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	868			1439	808			
Approach Delay, s/veh	18.4			34.9	40.0			
Approach LOS	B			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.6	15.1	58.3				73.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.6	9.0	15.3				39.2
Green Ext Time (p_c), s		3.0	0.1	14.8				10.1
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.6					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/16/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Future Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	598	1631	4	2	918	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	696	2843	7	18	2133	992	21	7	22			
Arrive On Green	0.42	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	598	797	838	2	918	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	696	1389	1461	18	2133	992	28	0	22			
V/C Ratio(X)	0.86	0.57	0.57	0.11	0.43	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2133	992	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.3	0.0	0.0	53.9	10.0	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.7	0.2	0.2	2.6	0.6	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.6	0.1	0.1	0.1	11.4	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.9	0.2	0.2	56.5	10.7	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2233			920			10				
Approach Delay, s/veh		8.4			10.8			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.2	75.0		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2), s	6.0	2.5			20.6	17.6		2.7				
Green Ext Time (p_c), s	0.0	42.2			1.6	27.5		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												



HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/16/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Future Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	145	1030	55	221	1541	456	96	389	86	100	138	111
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1381	74	266	1436	648	151	497	111	246	640	479
Arrive On Green	0.07	0.43	0.43	0.07	0.43	0.43	0.24	0.24	0.24	0.07	0.36	0.36
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	452	2080	464	1609	1787	1337
Grp Volume(v), veh/h	145	533	552	221	1541	456	292	0	279	100	126	123
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1489	0	1507	1609	1638	1487
Q Serve(g_s), s	5.2	29.7	29.7	8.0	47.6	27.3	18.6	0.0	19.1	4.8	5.9	6.4
Cycle Q Clear(g_c), s	5.2	29.7	29.7	8.0	47.6	27.3	20.3	0.0	19.1	4.8	5.9	6.4
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	715	740	266	1436	648	399	0	360	246	587	532
V/C Ratio(X)	0.78	0.75	0.75	0.83	1.07	0.70	0.73	0.00	0.78	0.41	0.21	0.23
Avail Cap(c_a), veh/h	186	715	740	266	1436	648	449	0	411	390	789	716
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	26.1	26.1	24.0	31.2	25.5	39.5	0.0	39.1	28.2	24.5	24.7
Incr Delay (d2), s/veh	18.9	7.0	6.8	19.6	45.9	6.3	5.3	0.0	8.0	1.1	0.2	0.2
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	6.0	21.2	21.8	8.0	55.6	18.1	13.8	0.0	13.6	4.0	4.8	4.8
LnGrp Delay(d),s/veh	43.9	33.1	32.9	43.5	77.1	31.8	44.7	0.0	47.1	29.3	24.7	24.9
LnGrp LOS	D	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1230			2218			571			349	
Approach Delay, s/veh		34.3			64.5			45.9			26.1	
Approach LOS		C			E			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	52.6		44.4	13.0	52.6	13.1	31.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0		52.0	7.0	33.0	17.0	29.0				
Max Q Clear Time (g_c+110), s	10.5	32.2		8.4	7.7	50.1	7.3	22.3				
Green Ext Time (p_c), s	0.0	0.7		6.3	0.0	0.0	0.1	2.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				50.5								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

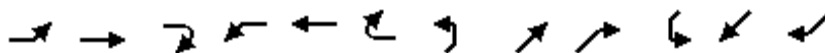
01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Future Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	579	1	235	130	818	1	8	538	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	386	167	419	601	2	587	321	962	1	178	687	595
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1162	457	1142	1422	7	1601	1689	1841	2	671	1782	1544
Grp Volume(v), veh/h	3	0	14	579	0	236	130	0	819	8	538	0
Grp Sat Flow(s),veh/h/ln	1162	0	1599	1422	0	1608	1689	0	1844	671	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	0.9	23.9	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	22.5	23.9	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	586	601	0	590	321	0	963	178	687	595
V/C Ratio(X)	0.01	0.00	0.02	0.96	0.00	0.40	0.41	0.00	0.85	0.04	0.78	0.00
Avail Cap(c_a), veh/h	386	0	586	601	0	590	334	0	963	178	687	595
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	30.1	0.0	21.2	17.0	0.0	18.5	33.2	24.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	27.6	0.0	0.4	0.8	0.0	9.4	0.4	7.3	0.0
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	0.1	0.0	0.4	26.1	0.0	7.8	3.3	0.0	27.1	0.3	18.4	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	57.7	0.0	21.6	17.8	0.0	27.8	33.6	31.6	0.0
LnGrp LOS	C		B	E		C	B		C	C	C	
Approach Vol, veh/h		17			815			949			546	
Approach Delay, s/veh		19.3			47.3			26.5			31.6	
Approach LOS		B			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.0		38.0	12.3	39.7		38.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0				
Max Q Clear Time (g_c+I1), s		36.4		35.5	6.3	26.4		12.0				
Green Ext Time (p_c), s		5.9		0.0	0.0	4.4		3.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				34.9								
HCM 2010 LOS				C								

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Future Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	783	0	60	438	1	418	7	148	32	39	51
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	357	812	725	101	834	2	270	3	644	50	58	42
Arrive On Green	0.46	0.46	0.00	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	955	1782	1591	715	1830	4	453	8	1525	0	138	99
Grp Volume(v), veh/h	8	783	0	60	0	439	425	0	148	122	0	0
Grp Sat Flow(s),veh/h/ln	955	1782	1591	715	0	1834	460	0	1525	237	0	0
Q Serve(g_s), s	0.5	38.4	0.0	2.6	0.0	15.4	0.0	0.0	5.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.5	38.4	0.0	41.0	0.0	15.4	38.0	0.0	5.6	38.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.26		0.42
Lane Grp Cap(c), veh/h	357	812	725	101	0	836	274	0	644	151	0	0
V/C Ratio(X)	0.02	0.96	0.00	0.60	0.00	0.53	1.55	0.00	0.23	0.81	0.00	0.00
Avail Cap(c_a), veh/h	357	812	725	101	0	836	274	0	644	151	0	0
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)	0.12	0.12	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.9	23.8	0.0	44.6	0.0	17.5	31.5	0.0	16.6	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.3	0.0	23.4	0.0	2.4	266.2	0.0	0.2	27.2	0.0	0.0
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	0.3	22.4	0.0	3.8	0.0	13.1	48.6	0.0	4.3	5.5	0.0	0.0
LnGrp Delay(d),s/veh	22.9	29.1	0.0	67.9	0.0	19.9	297.7	0.0	16.8	49.3	0.0	0.0
LnGrp LOS	C	C		E		B	F		B	D		
Approach Vol, veh/h		791			499			573			122	
Approach Delay, s/veh		29.0			25.7			225.1			49.3	
Approach LOS		C			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		44.0		46.0		44.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		40.0		37.0		40.0		37.0				
Max Q Clear Time (g_c+I1), s		40.9		40.0		43.5		40.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				86.0								
HCM 2010 LOS				F								

HCM 2010 TWSC  
3: King of Prussia Rd & Septa Driveway

01/11/2018

Intersection						
Int Delay, s/veh	4.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	76	84	403	17	53	970
Future Vol, veh/h	76	84	403	17	53	970
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	89	99	474	20	62	1141

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1769	511	0	0	511
Stage 1	501	-	-	-	-
Stage 2	1268	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	93	534	-	-	982
Stage 1	613	-	-	-	-
Stage 2	267	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	~ 86	522	-	-	974
Mov Cap-2 Maneuver	192	-	-	-	-
Stage 1	604	-	-	-	-
Stage 2	250	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.6	0	0.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	287	974
HCM Lane V/C Ratio	-	-	0.656	0.064
HCM Control Delay (s)	-	-	38.6	8.9
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	4.3	0.2

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

**Intersection**

Int Delay, s/veh 260.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	5	0	41	272	0	60	23	294	101	14	1097	5
Future Vol, veh/h	5	0	41	272	0	60	23	294	101	14	1097	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
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	0	0	1	0
Mvmt Flow	5	0	44	289	0	64	24	313	107	15	1167	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1646	1676	1170	1644	1625	374	1172	0	0	428	0	0
Stage 1	1199	1199	-	423	423	-	-	-	-	-	-	-
Stage 2	447	477	-	1221	1202	-	-	-	-	-	-	-
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	80	96	237	~ 81	103	677	603	-	-	1142	-	-
Stage 1	228	261	-	613	591	-	-	-	-	-	-	-
Stage 2	595	559	-	~ 222	260	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	67	87	237	~ 61	93	672	603	-	-	1142	-	-
Mov Cap-2 Maneuver	67	87	-	~ 61	93	-	-	-	-	-	-	-
Stage 1	216	251	-	577	556	-	-	-	-	-	-	-
Stage 2	510	526	-	~ 174	250	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.1	\$ 1493.4	0.6	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	603	-	-	186	61	672	1142	-	-
HCM Lane V/C Ratio	0.041	-	-	0.263	4.744	0.095	0.013	-	-
HCM Control Delay (s)	11.2	0	-	31.1	\$ 1820.4	10.9	8.2	0	-
HCM Lane LOS	B	A	-	D	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	31.9	0.3	0	-	-

**Notes**  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/11/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↘		↑	↗	↘	↑
Traffic Vol, veh/h	4	4	413	2	2	1404
Future Vol, veh/h	4	4	413	2	2	1404
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	439	2	2	1494






















Major/Minor	Minor1	Major1	Major2	Major2	Major2
Conflicting Flow All	1937	439	0	0	439
Stage 1	439	-	-	-	-
Stage 2	1498	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	73	622	-	-	1132
Stage 1	654	-	-	-	-
Stage 2	206	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	73	622	-	-	1132
Mov Cap-2 Maneuver	73	-	-	-	-
Stage 1	654	-	-	-	-
Stage 2	206	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	34.4	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	131	1132
HCM Lane V/C Ratio	-	-	0.065	0.002
HCM Control Delay (s)	-	-	34.4	8.2
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Future Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	109	1636	0	0	615	0	289	246	228	885	0	482
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	216	1623	0	0	1269	591	1393	292	248	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	885	
Grp Volume(v), veh/h	109	1636	0	0	615	0	289	246	228	885	83.2	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	F	
Q Serve(g_s), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	14.7	16.3	24.0		
Cycle Q Clear(g_c), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	14.7	16.3	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	216	1623	0	0	1269	591	1393	292	248	858		
V/C Ratio(X)	0.51	1.01	0.00	0.00	0.48	0.00	0.21	0.84	0.92	1.03		
Avail Cap(c_a), veh/h	391	1623	0	0	1269	591	1393	292	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.88	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.9	37.2	0.0	0.0	9.9	0.0	19.8	44.6	45.3	44.2		
Incr Delay (d2), s/veh	1.6	22.8	0.0	0.0	1.2	0.0	0.1	19.6	36.3	39.0		
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		
%ile BackOfQ(95%),veh/ln	3.0	53.6	0.0	0.0	6.8	0.0	5.0	13.7	14.4	12.4		
LnGrp Delay(d),s/veh	52.5	60.0	0.0	0.0	11.1	0.0	19.9	64.3	81.6	83.2		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1745			615			763				
Approach Delay, s/veh		59.6			11.1			52.6				
Approach LOS		E			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.6		6.0	10.5	26.5	18.8				
Green Ext Time (p_c), s		0.0	0.8		0.1	17.6	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			56.0									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1052	0	570	768	615	507		
Future Volume (veh/h)	1052	0	570	768	615	507		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1073	0	582	784	628	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	2009	0	714	2322	751	359		
Arrive On Green	0.43	0.00	0.07	0.23	0.22	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1073	0	582	784	628	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	18.6	0.0	19.0	21.3	19.6	0.0		
Cycle Q Clear(g_c), s	18.6	0.0	19.0	21.3	19.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2009	0	714	2322	751	359		
V/C Ratio(X)	0.53	0.00	0.81	0.34	0.84	0.00		
Avail Cap(c_a), veh/h	2009	0	847	2322	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(l)	1.00	0.00	0.76	0.76	1.00	0.00		
Uniform Delay (d), s/veh	23.5	0.0	48.9	21.6	40.8	0.0		
Incr Delay (d2), s/veh	1.0	0.0	4.1	0.3	5.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	2.9	0.0	13.5	14.7	14.8	0.0		
LnGrp Delay(d),s/veh	24.5	0.0	53.1	21.9	46.6	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1073			1366	628			
Approach Delay, s/veh	24.5			35.2	46.6			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.6	28.6	51.8				80.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.1	21.5	21.1				23.8
Green Ext Time (p_c), s		1.4	1.1	10.3				19.8
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			33.8					
HCM 2010 LOS			C					



# HCM 2010 Signalized Intersection Summary

## 9: Hillside Circuit & Lancaster Ave

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↕		↖ ↗	↕	↖ ↗		↕	↖ ↗			
Traffic Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Future Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1782	1800	1800	1800			
Adj Flow Rate, veh/h	1198	1838	15	6	751	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1197	2797	23	23	1647	737	18	6	18			
Arrive On Green	0.73	1.00	1.00	0.01	0.49	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3344	27	1714	3386	1515	1301	434	1345			
Grp Volume(v), veh/h	1198	903	950	6	751	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1515	1735	0	1345			
Q Serve(g_s), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1197	1376	1444	23	1647	737	24	0	18			
V/C Ratio(X)	1.00	0.66	0.66	0.26	0.46	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1197	1376	1444	109	1647	737	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.0	0.0	0.0	53.7	18.6	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	7.9	0.2	0.2	5.6	0.9	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	33.3	0.2	0.2	0.4	12.3	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	22.9	0.2	0.2	59.3	19.6	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		3051			757			6				
Approach Delay, s/veh		9.1			19.9			56.7				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			45.0	58.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			39.0	47.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			42.5	18.6		2.7				
Green Ext Time (p_c), s	0.0	45.8			0.0	22.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				11.3								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Future Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	124	1211	96	204	1142	130	84	218	145	423	462	222
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	231	1220	97	207	1294	578	149	345	234	331	863	412
Arrive On Green	0.08	0.38	0.38	0.08	0.39	0.39	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3197	253	1664	3352	1496	385	1338	906	1689	2222	1060
Grp Volume(v), veh/h	124	644	663	204	1142	130	218	0	229	423	351	333
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1195	0	1433	1689	1690	1591
Q Serve(g_s), s	4.3	37.6	37.8	7.8	31.7	5.8	12.6	0.0	14.1	8.0	16.0	16.2
Cycle Q Clear(g_c), s	4.3	37.6	37.8	7.8	31.7	5.8	16.1	0.0	14.1	8.0	16.0	16.2
Prop In Lane	1.00		0.14	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	231	650	667	207	1294	578	359	0	370	331	656	618
V/C Ratio(X)	0.54	0.99	0.99	0.98	0.88	0.23	0.61	0.00	0.62	1.28	0.53	0.54
Avail Cap(c_a), veh/h	256	650	667	207	1294	578	453	0	487	331	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	30.7	30.8	24.9	28.6	20.6	33.1	0.0	32.7	34.5	23.6	23.7
Incr Delay (d2), s/veh	1.9	33.2	33.4	57.6	8.9	0.9	1.7	0.0	1.7	145.8	0.7	0.7
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	3.8	31.5	32.5	13.8	22.8	4.6	9.5	0.0	9.7	33.9	12.0	11.7
LnGrp Delay(d),s/veh	24.2	63.9	64.2	82.5	37.5	21.5	34.8	0.0	34.4	180.3	24.3	24.4
LnGrp LOS	C	E	E	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1431			1476			447			1107	
Approach Delay, s/veh		60.6			42.3			34.6			83.9	
Approach LOS		E			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	43.2		43.8	12.6	43.6	13.0	30.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+110), s	11.0	40.1		18.5	6.8	34.2	10.5	18.1				
Green Ext Time (p_c), s	0.0	0.0		8.7	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				57.7								
HCM 2010 LOS				E								

HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

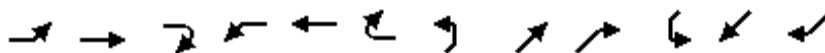
01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	319	7	104	375	639	2	12	638	611
Future Volume (veh/h)	1	0	2	319	7	104	375	639	2	12	638	611
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	354	8	116	417	710	2	13	709	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	330	0	391	437	25	358	390	1152	3	368	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1287	0	1530	1396	97	1400	1639	1820	5	742	1764	1544
Grp Volume(v), veh/h	1	0	2	354	0	124	417	0	712	13	709	0
Grp Sat Flow(s),veh/h/ln	1287	0	1530	1396	0	1497	1639	0	1825	742	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.8	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.1	22.8	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.81	0.00	0.32	1.07	0.00	0.62	0.04	1.03	0.00
Avail Cap(c_a), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	0.0	25.0	33.4	0.0	27.2	27.5	0.0	9.9	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	11.0	0.0	0.5	65.5	0.0	2.5	0.2	43.2	0.0
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	0.0	0.0	0.1	15.3	0.0	4.6	30.1	0.0	16.8	0.4	45.4	0.0
LnGrp Delay(d),s/veh	29.3	0.0	25.0	44.4	0.0	27.7	93.0	0.0	12.4	17.3	70.7	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			478			1129			722	
Approach Delay, s/veh		26.4			40.1			42.2			69.8	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		23.1		25.3	19.5	37.5		8.1				
Green Ext Time (p_c), s		12.6		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			50.3									
HCM 2010 LOS			D									

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Future Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	427	0	31	907	7	544	35	63	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	83	857	772	391	900	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	621	1714	1545	930	1800	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	427	0	31	0	914	579	0	63	9	0	0
Grp Sat Flow(s),veh/h/ln	621	1714	1545	930	0	1814	418	0	1520	290	0	0
Q Serve(g_s), s	0.5	14.9	0.0	2.1	0.0	45.0	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.9	0.0	17.0	0.0	45.0	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.48	0.50	0.00	0.08	0.00	1.01	2.46	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
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)	0.56	0.56	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.0	15.0	0.0	20.6	0.0	22.5	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	10.7	1.2	0.0	0.4	0.0	31.9	668.6	0.0	0.1	0.1	0.0	0.0
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	2.2	10.6	0.0	1.0	0.0	54.8	89.2	0.0	1.9	0.3	0.0	0.0
LnGrp Delay(d),s/veh	55.6	16.1	0.0	21.0	0.0	54.4	702.2	0.0	18.3	21.8	0.0	0.0
LnGrp LOS	E	B		C		F	F		B	C		
Approach Vol, veh/h		467			945			642			9	
Approach Delay, s/veh		19.5			53.3			635.1			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		47.0		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				226.5								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/11/2018

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T		Y	T
Traffic Vol, veh/h	21	42	988	116	149	308
Future Vol, veh/h	21	42	988	116	149	308
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	24	48	1136	133	171	354

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1918	1229	0	0	1286
Stage 1	1219	-	-	-	-
Stage 2	699	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	75	179	-	-	478
Stage 1	282	-	-	-	-
Stage 2	497	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	47	175	-	-	474
Mov Cap-2 Maneuver	157	-	-	-	-
Stage 1	278	-	-	-	-
Stage 2	317	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.4	0	5.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	169	474
HCM Lane V/C Ratio	-	-	0.428	0.361
HCM Control Delay (s)	-	-	41.4	16.8
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.9	1.6

HCM 2010 TWSC  
5: King of Prussia Rd & Raider Rd

01/11/2018

Intersection												
Int Delay, s/veh	313.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	9	0	133	99	0	22	177	1071	369	52	268	59
Future Vol, veh/h	9	0	133	99	0	22	177	1071	369	52	268	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	171	127	0	28	227	1373	473	67	344	76

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2593	2823	381	2671	2624	1618	419	0	0	1854	0	0
Stage 1	515	515	-	2071	2071	-	-	-	-	-	-	-
Stage 2	2078	2308	-	600	553	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	16	18	662	~ 15	24	129	1151	-	-	331	-	-
Stage 1	526	538	-	~ 72	97	-	-	-	-	-	-	-
Stage 2	66	74	-	491	518	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 10	13	662	~ 9	17	128	1151	-	-	331	-	-
Mov Cap-2 Maneuver	~ 10	13	-	~ 9	17	-	-	-	-	-	-	-
Stage 1	526	394	-	~ 72	96	-	-	-	-	-	-	-
Stage 2	51	74	-	267	380	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	287.6	\$ 5492.6	1	2.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1151	-	-	129	9	128	331	-	-
HCM Lane V/C Ratio	0.197	-	-	1.411	14.103	0.22	0.201	-	-
HCM Control Delay (s)	8.9	0	-	287.6	\$ 6704.1	40.9	18.6	0	-
HCM Lane LOS	A	A	-	F	F	E	C	A	-
HCM 95th %tile Q(veh)	0.7	-	-	12.2	17.5	0.8	0.7	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/11/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↙		↑	↗↘	↘↙	↑
Traffic Vol, veh/h	2	2	1611	6	6	493
Future Vol, veh/h	2	2	1611	6	6	493
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1941	7	7	594






















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2549	1941	0	0	1941
Stage 1	1941	-	-	-	-
Stage 2	608	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	30	83	-	-	306
Stage 1	124	-	-	-	-
Stage 2	547	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	29	83	-	-	306
Mov Cap-2 Maneuver	29	-	-	-	-
Stage 1	124	-	-	-	-
Stage 2	534	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	99	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	43	306
HCM Lane V/C Ratio	-	-	0.112	0.024
HCM Control Delay (s)	-	-	99	17
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	0.4	0.1

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	1306	0	0	544	379	774	840	344	321	0	162
Future Volume (veh/h)	376	1306	0	0	544	379	774	840	344	321	0	162
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	388	1346	0	0	561	0	798	866	355	331	0	167
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	331	
Grp Volume(v), veh/h	388	1346	0	0	561	0	798	866	355	331	78.5	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.7	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Cycle Q Clear(g_c), s	12.7	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.86	1.01	0.00	0.00	0.75	0.00	0.48	1.26	0.61	0.91		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.90	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.9	40.3	0.0	0.0	48.1	0.0	17.6	33.5	26.7	51.6		
Incr Delay (d2), s/veh	13.7	25.1	0.0	0.0	6.2	0.0	0.2	126.7	1.8	26.9		
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		
%ile BackOfQ(95%),veh/ln	10.6	44.9	0.0	0.0	13.7	0.0	12.5	81.3	13.8	5.4		
LnGrp Delay(d),s/veh	62.6	65.4	0.0	0.0	54.3	0.0	17.8	160.2	28.5	78.5		
LnGrp LOS	E	F			D		B	F	C	E		
Approach Vol, veh/h		1734			561			2019				
Approach Delay, s/veh		64.8			54.3			80.7				
Approach LOS		E			D			F				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		46.5	20.0		15.2	20.2	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.1		0.0	2.4	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			71.4									
HCM 2010 LOS			E									



# HCM 2010 Signalized Intersection Summary

## 8: I-476 SB Off Ramp & Lancaster Ave

01/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	866	0	189	1247	807	853		
Future Volume (veh/h)	866	0	189	1247	807	853		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	884	0	193	1272	823	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2263	0	293	2089	972	443		
Arrive On Green	0.48	0.00	0.03	0.20	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	884	0	193	1272	823	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	13.2	0.0	6.6	37.6	25.6	0.0		
Cycle Q Clear(g_c), s	13.2	0.0	6.6	37.6	25.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2263	0	293	2089	972	443		
V/C Ratio(X)	0.39	0.00	0.66	0.61	0.85	0.00		
Avail Cap(c_a), veh/h	2263	0	317	2089	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.62	0.62	1.00	0.00		
Uniform Delay (d), s/veh	18.4	0.0	51.6	31.7	36.6	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.8	0.8	3.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.8	0.0	5.3	23.3	18.0	0.0		
LnGrp Delay(d),s/veh	18.9	0.0	54.4	32.6	39.9	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	884			1465	823			
Approach Delay, s/veh	18.9			35.5	39.9			
Approach LOS	B			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		37.1	15.2	57.7				72.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		28.1	9.1	15.7				40.1
Green Ext Time (p_c), s		3.0	0.1	14.8				9.6
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			32.0					
HCM 2010 LOS			C					

# HCM 2010 Signalized Intersection Summary

## 9: Hillside Circuit & Lancaster Ave

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	583	1595	4	2	895	494	6	2	2	0	0	0
Future Volume (veh/h)	583	1595	4	2	895	494	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	607	1661	4	2	932	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	704	2843	7	18	2124	988	21	7	25			
Arrive On Green	0.43	1.00	1.00	0.01	0.63	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1513			
Grp Volume(v), veh/h	607	811	854	2	932	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1513			
Q Serve(g_s), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.1			
Cycle Q Clear(g_c), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.1			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	704	1389	1461	18	2124	988	28	0	25			
V/C Ratio(X)	0.86	0.58	0.58	0.11	0.44	0.00	0.28	0.00	0.08			
Avail Cap(c_a), veh/h	928	1389	1461	109	2124	988	110	0	96			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.0	0.0	0.0	53.9	10.2	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.7	0.2	0.2	2.6	0.7	0.0	5.4	0.0	1.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.7	0.1	0.1	0.1	11.7	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.7	0.2	0.2	56.5	10.9	0.0	58.8	0.0	54.7			
LnGrp LOS	C	A	A	E	B		E		D			
Approach Vol, veh/h		2272			934			10				
Approach Delay, s/veh		8.3			11.0			58.0				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.5	74.7		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2), s	12.6	2.5			20.9	18.0		2.6				
Green Ext Time (p_c), s	0.0	43.6			1.6	27.8		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Future Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	148	1048	56	225	1570	465	98	396	89	102	141	114
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	171	1461	78	264	1520	685	153	501	114	213	610	459
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	453	2069	469	1609	1782	1341
Grp Volume(v), veh/h	148	543	561	225	1570	465	297	0	286	102	129	126
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1485	0	1506	1609	1638	1486
Q Serve(g_s), s	5.3	29.2	29.2	7.0	50.4	26.9	19.1	0.0	19.5	5.1	6.2	6.7
Cycle Q Clear(g_c), s	5.3	29.2	29.2	7.0	50.4	26.9	20.8	0.0	19.5	5.1	6.2	6.7
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	171	756	782	264	1520	685	403	0	365	213	560	508
V/C Ratio(X)	0.87	0.72	0.72	0.85	1.03	0.68	0.74	0.00	0.78	0.48	0.23	0.25
Avail Cap(c_a), veh/h	171	756	782	264	1520	685	448	0	411	213	610	554
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	24.1	24.1	25.7	29.8	23.5	39.3	0.0	39.0	29.6	25.8	26.0
Incr Delay (d2), s/veh	34.3	5.8	5.6	22.3	32.1	5.3	5.7	0.0	8.6	1.7	0.2	0.3
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	0.1	20.7	21.3	9.1	53.6	17.8	14.1	0.0	13.9	4.2	5.1	5.1
LnGrp Delay(d),s/veh	60.6	29.8	29.7	48.0	61.9	28.8	45.0	0.0	47.6	31.2	26.0	26.3
LnGrp LOS	E	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1252			2260			583			357	
Approach Delay, s/veh		33.4			53.7			46.2			27.6	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	2.0	55.4		42.6	12.0	55.4	11.0	31.6				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	46.0		40.0	6.0	46.0	5.0	29.0				
Max Q Clear Time (g_c+1/3), s	19.5	31.7		8.7	7.8	52.9	7.6	22.8				
Green Ext Time (p_c), s	0.0	13.1		6.2	0.0	0.0	0.0	2.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				44.9								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

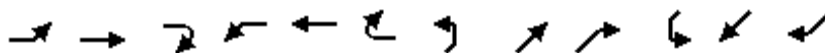
01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Future Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	590	1	239	134	834	1	8	547	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	413	178	444	633	3	623	288	921	1	141	641	556
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.50	0.50	0.36	0.36	0.00
Sat Flow, veh/h	1158	457	1142	1422	7	1601	1689	1841	2	661	1782	1544
Grp Volume(v), veh/h	3	0	14	590	0	240	134	0	835	8	547	0
Grp Sat Flow(s),veh/h/ln	1158	0	1599	1422	0	1608	1689	0	1844	661	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	1.0	25.5	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	25.2	25.5	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	622	633	0	625	288	0	922	141	641	556
V/C Ratio(X)	0.01	0.00	0.02	0.93	0.00	0.38	0.46	0.00	0.91	0.06	0.85	0.00
Avail Cap(c_a), veh/h	413	0	622	633	0	625	296	0	922	141	641	556
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.79	0.79	0.00
Uniform Delay (d), s/veh	22.9	0.0	17.0	28.6	0.0	19.8	18.8	0.0	20.6	37.6	26.6	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	20.8	0.0	0.4	1.2	0.0	14.1	0.6	11.1	0.0
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	0.1	0.0	0.4	25.2	0.0	7.7	3.6	0.0	30.2	0.4	20.0	0.0
LnGrp Delay(d),s/veh	22.9	0.0	17.0	49.4	0.0	20.1	19.9	0.0	34.7	38.2	37.7	0.0
LnGrp LOS	C		B	D		C	B		C	D	D	
Approach Vol, veh/h		17			830			969			555	
Approach Delay, s/veh		18.0			40.9			32.6			37.7	
Approach LOS		B			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0	12.6	37.4		40.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		44.0		34.0	7.0	31.0		34.0				
Max Q Clear Time (g_c+I1), s		39.3		37.5	6.6	28.0		11.8				
Green Ext Time (p_c), s		3.4		0.0	0.0	2.2		3.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			36.6									
HCM 2010 LOS			D									

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Future Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	798	0	61	444	1	426	7	151	33	39	52
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	325	772	690	80	793	2	282	3	678	51	57	41
Arrive On Green	0.43	0.43	0.00	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	950	1782	1591	705	1830	4	455	7	1526	0	128	93
Grp Volume(v), veh/h	8	798	0	61	0	445	433	0	151	124	0	0
Grp Sat Flow(s),veh/h/ln	950	1782	1591	705	0	1834	463	0	1526	221	0	0
Q Serve(g_s), s	0.6	39.0	0.0	0.0	0.0	16.3	0.0	0.0	5.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.4	39.0	0.0	39.0	0.0	16.3	40.0	0.0	5.5	40.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	325	772	690	80	0	795	285	0	678	149	0	0
V/C Ratio(X)	0.02	1.03	0.00	0.76	0.00	0.56	1.52	0.00	0.22	0.83	0.00	0.00
Avail Cap(c_a), veh/h	325	772	690	80	0	795	285	0	678	149	0	0
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)	0.09	0.09	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.0	25.5	0.0	45.0	0.0	19.1	30.6	0.0	15.4	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	19.9	0.0	49.4	0.0	2.8	250.7	0.0	0.2	31.4	0.0	0.0
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	0.3	41.5	0.0	4.7	0.0	13.8	48.4	0.0	4.2	5.7	0.0	0.0
LnGrp Delay(d),s/veh	25.0	45.4	0.0	94.4	0.0	21.9	281.3	0.0	15.6	53.0	0.0	0.0
LnGrp LOS	C	F		F		C	F		B	D		
Approach Vol, veh/h		806			506			584			124	
Approach Delay, s/veh		45.2			30.7			212.6			53.0	
Approach LOS		D			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		44.0		46.0		44.0		46.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		38.0		39.0		38.0		39.0				
Max Q Clear Time (g_c+I1), s		41.5		42.0		41.5		42.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				90.4								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/11/2018

**Intersection**

Int Delay, s/veh 4.4

**Movement** WBL WBR NBT NBR SBL SBT

Lane Configurations	W	W	N	N	S	S
Traffic Vol, veh/h	77	85	409	17	54	988
Future Vol, veh/h	77	85	409	17	54	988
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	91	100	481	20	64	1162

**Major/Minor** Minor1 Major1 Major2

Conflicting Flow All	1799	518	0	0	518	0
Stage 1	508	-	-	-	-	-
Stage 2	1291	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	~ 89	529	-	-	976	-
Stage 1	608	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 82	517	-	-	968	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	599	-	-	-	-	-
Stage 2	242	-	-	-	-	-

**Approach** WB NB SB

HCM Control Delay, s	41.4	0	0.5
HCM LOS	E		

**Minor Lane/Major Mvmt** NBT NBRWBLn1 SBL SBT

Capacity (veh/h)	-	-	280	968	-
HCM Lane V/C Ratio	-	-	0.681	0.066	-
HCM Control Delay (s)	-	-	41.4	9	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	4.5	0.2	-

**Notes**

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

**Intersection**

Int Delay, s/veh 278.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	5	0	42	272	0	60	24	299	101	14	1117	5
Future Vol, veh/h	5	0	42	272	0	60	24	299	101	14	1117	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
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	0	0	1	0
Mvmt Flow	5	0	45	289	0	64	26	318	107	15	1188	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1676	1706	1191	1674	1654	380	1194	0	0	434	0	0
Stage 1	1221	1221	-	431	431	-	-	-	-	-	-	-
Stage 2	455	485	-	1243	1223	-	-	-	-	-	-	-
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	76	92	231	~ 77	99	671	592	-	-	1136	-	-
Stage 1	222	255	-	607	586	-	-	-	-	-	-	-
Stage 2	589	555	-	~ 216	254	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	64	83	231	~ 57	89	667	592	-	-	1136	-	-
Mov Cap-2 Maneuver	64	83	-	~ 57	89	-	-	-	-	-	-	-
Stage 1	209	245	-	568	548	-	-	-	-	-	-	-
Stage 2	502	519	-	~ 167	244	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.3	\$ 1622.6	0.6	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	592	-	-	181	57	667	1136	-	-
HCM Lane V/C Ratio	0.043	-	-	0.276	5.077	0.096	0.013	-	-
HCM Control Delay (s)	11.4	0	-	32.3	1978.1	11	8.2	0	-
HCM Lane LOS	B	A	-	D	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	32.4	0.3	0	-	-

**Notes**  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/11/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↗↘	↘↗	↑
Traffic Vol, veh/h	4	4	419	2	2	1425
Future Vol, veh/h	4	4	419	2	2	1425
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	446	2	2	1516

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1966	446	0	0	446
Stage 1	446	-	-	-	-
Stage 2	1520	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	70	617	-	-	1125
Stage 1	649	-	-	-	-
Stage 2	201	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	70	617	-	-	1125
Mov Cap-2 Maneuver	70	-	-	-	-
Stage 1	649	-	-	-	-
Stage 2	201	-	-	-	-






















Approach	WB	NB	SB
HCM Control Delay, s	35.6	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	126	1125
HCM Lane V/C Ratio	-	-	0.068	0.002
HCM Control Delay (s)	-	-	35.6	8.2
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	0.2	0



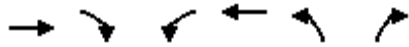
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Future Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	110	1667	0	0	627	0	295	250	232	899	0	488
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	217	1623	0	0	1268	590	1393	292	248	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	899	
Grp Volume(v), veh/h	110	1667	0	0	627	0	295	250	232	899	88.1	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	F	
Q Serve(g_s), s	3.6	53.0	0.0	0.0	8.2	0.0	6.3	15.0	16.6	24.0		
Cycle Q Clear(g_c), s	3.6	53.0	0.0	0.0	8.2	0.0	6.3	15.0	16.6	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	217	1623	0	0	1268	590	1393	292	248	858		
V/C Ratio(X)	0.51	1.03	0.00	0.00	0.49	0.00	0.21	0.86	0.94	1.05		
Avail Cap(c_a), veh/h	391	1623	0	0	1268	590	1393	292	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.86	0.86	0.00	0.00	0.86	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.9	37.2	0.0	0.0	10.0	0.0	19.8	44.8	45.4	44.2		
Incr Delay (d2), s/veh	1.6	27.9	0.0	0.0	1.2	0.0	0.1	21.6	40.0	43.9		
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		
%ile BackOfQ(95%),veh/ln	3.0	55.7	0.0	0.0	6.8	0.0	5.1	14.1	14.8	9.4		
LnGrp Delay(d),s/veh	52.4	65.2	0.0	0.0	11.2	0.0	19.9	66.3	85.4	88.1		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1777			627			777				
Approach Delay, s/veh		64.4			11.2			54.4				
Approach LOS		E			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.8		6.1	10.7	26.5	19.1				
Green Ext Time (p_c), s		0.0	0.8		0.1	17.8	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			59.5									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1072	0	580	782	627	516		
Future Volume (veh/h)	1072	0	580	782	627	516		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1094	0	592	798	640	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	1980	0	724	2311	762	364		
Arrive On Green	0.42	0.00	0.07	0.23	0.23	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1094	0	592	798	640	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	19.3	0.0	19.3	21.8	20.0	0.0		
Cycle Q Clear(g_c), s	19.3	0.0	19.3	21.8	20.0	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1980	0	724	2311	762	364		
V/C Ratio(X)	0.55	0.00	0.82	0.35	0.84	0.00		
Avail Cap(c_a), veh/h	1980	0	847	2311	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.75	0.75	1.00	0.00		
Uniform Delay (d), s/veh	24.1	0.0	48.9	22.0	40.6	0.0		
Incr Delay (d2), s/veh	1.1	0.0	4.2	0.3	6.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.3	0.0	13.7	14.9	15.0	0.0		
LnGrp Delay(d),s/veh	25.3	0.0	53.1	22.3	46.7	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1094			1390	640			
Approach Delay, s/veh	25.3			35.4	46.7			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.9	28.9	51.1				80.1
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.5	21.8	21.8				24.3
Green Ext Time (p_c), s		1.4	1.1	10.1				20.3
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			34.2					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↑ ↘		↖ ↗	↑ ↑	↖		↑ ↘	↖			
Traffic Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Future Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1219	1871	16	6	765	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1227	2795	24	23	1616	752	18	6	18			
Arrive On Green	0.75	1.00	1.00	0.01	0.48	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3342	29	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1219	919	968	6	765	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1227	1376	1444	23	1616	752	24	0	18			
V/C Ratio(X)	0.99	0.67	0.67	0.26	0.47	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1227	1376	1444	109	1616	752	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	13.9	0.0	0.0	53.7	19.4	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	6.3	0.2	0.2	5.6	1.0	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	20.4	0.2	0.2	0.4	12.7	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	20.1	0.2	0.2	59.3	20.4	0.0	56.9	0.0	56.2			
LnGrp LOS	C	A	A	E	C		E		E			
Approach Vol, veh/h		3106			771			6				
Approach Delay, s/veh		8.0			20.7			56.7				
Approach LOS		A			C			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			46.0	57.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			40.0	46.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			42.4	19.3		2.7				
Green Ext Time (p_c), s	0.0	47.4			0.0	22.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				10.6								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Future Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	126	1234	98	208	1163	132	86	222	148	431	470	226
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	224	1202	95	205	1271	567	151	349	238	333	875	418
Arrive On Green	0.08	0.38	0.38	0.08	0.38	0.38	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3196	253	1664	3352	1496	383	1324	902	1689	2221	1061
Grp Volume(v), veh/h	126	656	676	208	1163	132	221	0	235	431	357	339
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1174	0	1434	1689	1690	1591
Q Serve(g_s), s	4.4	37.6	37.6	8.0	33.0	6.0	13.0	0.0	14.5	8.0	16.2	16.4
Cycle Q Clear(g_c), s	4.4	37.6	37.6	8.0	33.0	6.0	16.7	0.0	14.5	8.0	16.2	16.4
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	224	640	657	205	1271	567	360	0	379	333	666	627
V/C Ratio(X)	0.56	1.03	1.03	1.01	0.92	0.23	0.61	0.00	0.62	1.29	0.54	0.54
Avail Cap(c_a), veh/h	247	640	657	205	1271	567	447	0	488	333	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	31.2	31.2	25.5	29.5	21.1	32.9	0.0	32.4	34.3	23.3	23.3
Incr Delay (d2), s/veh	2.4	42.1	42.6	66.5	11.7	1.0	1.7	0.0	1.7	152.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	45.2	46.5	17.0	24.1	4.7	9.6	0.0	9.8	35.4	12.2	11.7
LnGrp Delay(d),s/veh	25.2	73.3	73.8	92.1	41.2	22.1	34.6	0.0	34.1	187.1	24.0	24.1
LnGrp LOS	C	F	F	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1458			1503			456			1127	
Approach Delay, s/veh		69.4			46.6			34.3			86.4	
Approach LOS		E			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	42.6		44.4	12.7	42.9	13.0	31.4				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+110), s	10.5	40.1		18.7	6.9	35.5	10.5	18.7				
Green Ext Time (p_c), s	0.0	0.0		8.9	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				62.5								
HCM 2010 LOS				E								

# APPENDIX J

## Signal Warrant Evaluation

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



# TRAFFIC SIGNAL WARRANT ANALYSIS

## TRAFFIC VOLUMES SUMMARIES

### King of Prussia & Raider Manual Count

Manual Traffic Counts

Start Time	KOP Rd NB	KOP Rd SB	Raider Rd
	Left/Thru	Thru/Right	EB Left/Right
7:00 AM	1,123	268	166
8:00 AM	1,171	235	25
4:00 PM	342	819	69
5:00 PM	292	1,038	48

### Mixed Use Weekday Trips

Land Use :	Variable:	AM			PM			WEEKDAY		
		Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting	Total
Mixed Use Weekday Trips	475,000 SF	571	148	719	158	425	583	3,759	3,759	7,518

Start Time	Mixed Use Entering Trips		Mixed Use Exiting Trips	
	Est. % Daily	Trips	Est. % Daily	Trips
7:00 AM	11.4%	428	2.4%	89
8:00 AM	15.2%	571	3.9%	148
4:00 PM	4.2%	158	11.3%	425
5:00 PM	3.2%	119	8.5%	319

For the purposes of this evaluation, the 8 AM and 4 PM hours were the peak hours for the AM and PM peak periods respectively. For 7-8 AM and 5-6 PM, a 50% reduction was taken from the trips from the peak periods to obtain these trips for entering and exiting vehicles.

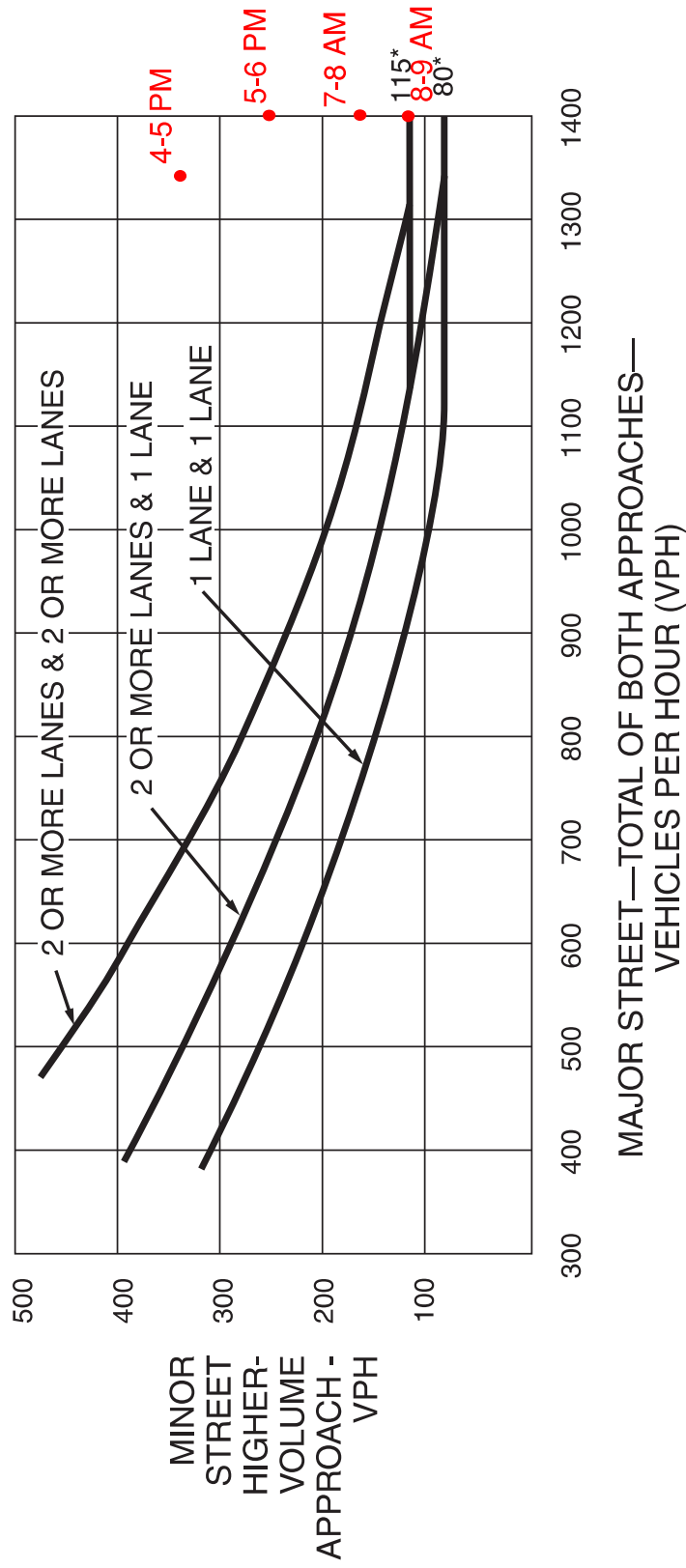
Start Time	King of Prussia Rd						Site Driveway/Raider Rd	
	King of Prussia Rd NB Left/Thru (Existing)	King of Prussia Rd NB Right <sup>1</sup> (Proposed)	King of Prussia Rd Site NB Thru <sup>2</sup> (Proposed)	King of Prussia Rd SB Thru/Right (Existing)	King of Prussia SB left <sup>3</sup> (Proposed)	King of Prussia Site SB Thru <sup>4</sup> (Proposed)	Raider Road	Site Driveway <sup>5</sup>
7:00 AM	1,123	274	44	268	39	13	166	69
8:00 AM	1,171	365	59	235	51	21	25	115
4:00 PM	342	101	20	819	14	44	69	332
5:00 PM	292	76	15	1,038	11	33	48	249

- <sup>1</sup> Aprox. 64% of entering site trips
- <sup>2</sup> Aprox. 10 % of entering trips + 1% of exiting trips
- <sup>3</sup> Aprox. 9% of entering site trips
- <sup>4</sup> Aprox. 1 % of entering trips + 10% of exiting trips
- <sup>5</sup> Aprox. 78 % of exiting trips

### King of Prussia Rd & Site Driveway/Raider Road Warrant Volumes

Start Time	Major Street		Minor Streets		Minor Street	Major Street	4 Hr Warrant Met	Peak Hr Warrant Met
	King of Prussia Rd NB Left/Thru/Right	King of Prussia Rd SB Left/Thru/Right	Raider Road	Site Driveway				
7:00 AM	1,441	320	166	69	166	1,760	Y	Y
8:00 AM	1,595	307	25	115	115	1,902	Y	Y
4:00 PM	463	877	69	332	332	1,340	Y	Y
5:00 PM	383	1,082	48	249	249	1,465	Y	Y

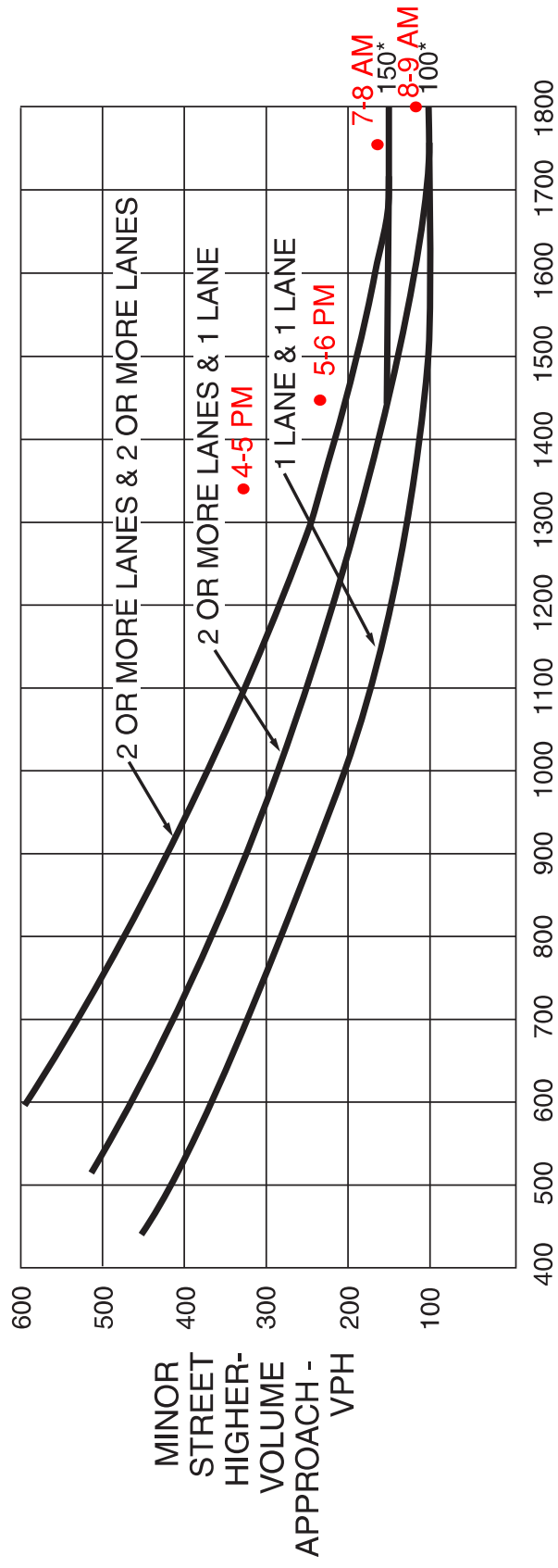
**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.



Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

# TRAFFIC SIGNAL WARRANT ANALYSIS

## TRAFFIC VOLUMES SUMMARIES

### King of Prussia & Septa Driveway Count

Manual Traffic Counts

Start Time	KOP Rd NB	KOP Rd SB	Septa Driveway
	Thru/Right	Left/Thru	WB Left/Right
7:00 AM	936	303	23
8:00 AM	1,012	231	25
4:00 PM	358	773	73
5:00 PM	335	970	74

### Mixed Use Weekday Trips

Land Use :	Variable:	AM			PM			WEEKDAY		
		Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting	Total
Mixed Use Weekday Trips	475,000 SF	571	148	719	158	425	583	3,759	3,759	7,518

Start Time	Mixed Use Entering Trips		Mixed Use Exiting Trips	
	Est. % Daily Entering	Trips	Est. % Daily Exiting	Trips
7:00 AM	11.4%	428	2.4%	89
8:00 AM	15.2%	571	3.9%	148
4:00 PM	4.2%	158	11.3%	425
5:00 PM	3.2%	119	8.5%	319

For the purposes of this evaluation, the 8 AM and 4 PM hours were the peak hours for the AM and PM peak periods respectively. For 7-8 AM and 5-6 PM, a reduction was taken from the trips from the peak periods to obtain these trips for entering and exiting vehicles.

Start Time	King of Prussia Rd						Site Driveway
	King of Prussia Rd NB Thru/Right (Existing)	King of Prussia Rd NB Right <sup>1</sup> (Proposed)	King of Prussia Rd Site NB Thru <sup>2</sup> (Proposed)	King of Prussia Rd SB Left/Thru (Existing)	King of Prussia SB Left <sup>3</sup> (Proposed)	King of Prussia Site SB Thru <sup>4</sup> (Proposed)	Site Driveway <sup>5</sup>
7:00 AM	936	43	13	303	64	43	41
8:00 AM	1,012	57	22	231	86	57	55
4:00 PM	358	16	64	773	24	16	158
5:00 PM	335	12	48	970	18	12	138

<sup>1</sup> Aprox. 10% of entering site trips

<sup>2</sup> Aprox. 15% of exiting trips

<sup>3</sup> Aprox. 15% of entering site trips

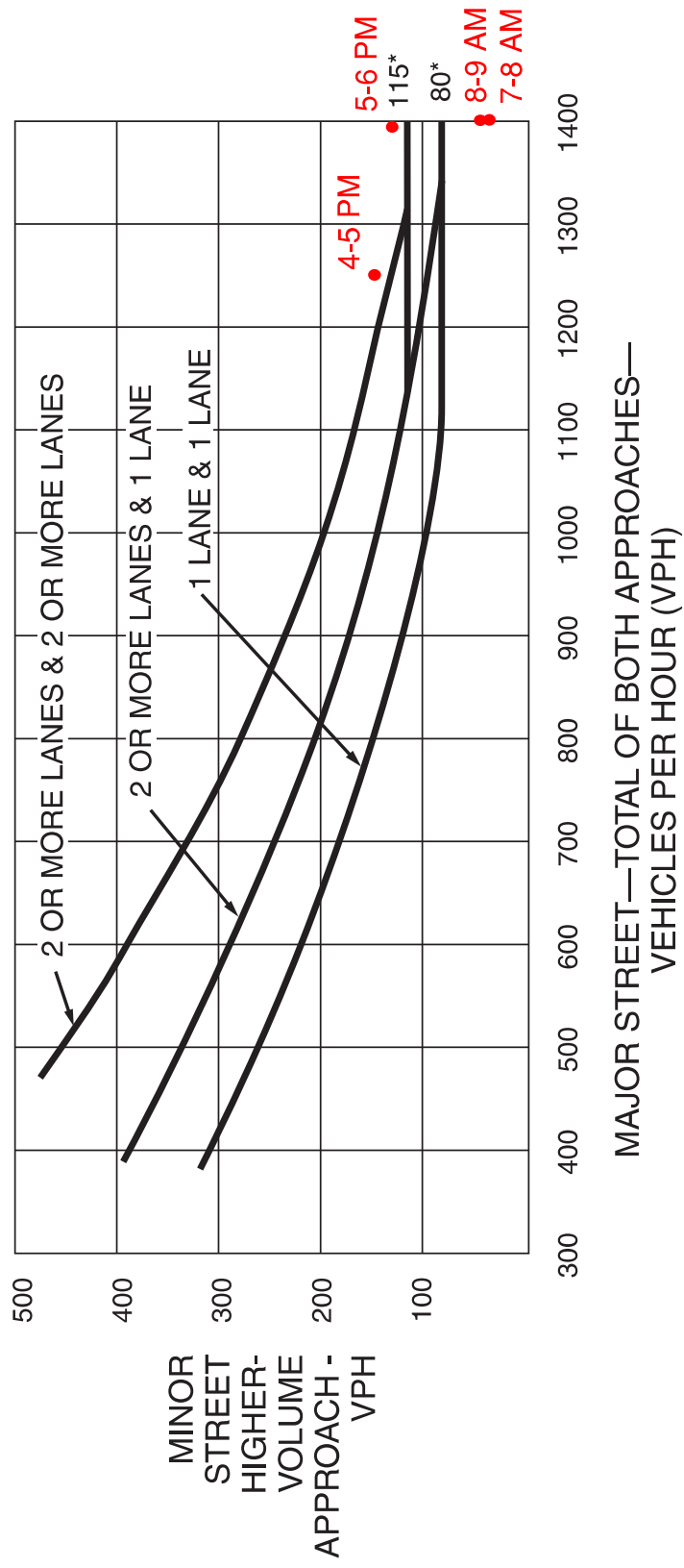
<sup>4</sup> Aprox. 10% of entering trips

<sup>5</sup> Aprox. 20% of exiting trips

### King of Prussia Rd & Septa Driveway Warrant Volumes

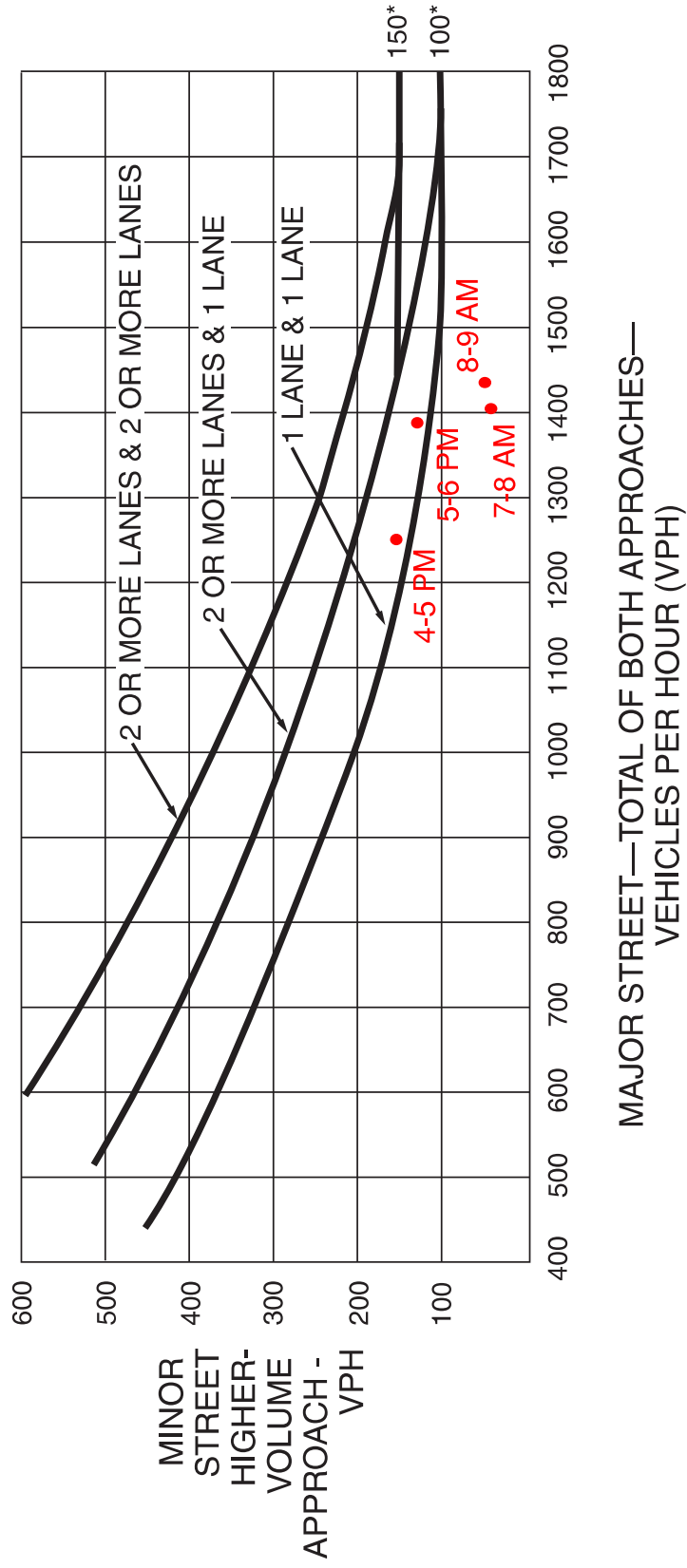
Start Time	Major Street		Minor Street	Minor Street	Major Street	4 Hr Warrant Met	Peak Hr Warrant Met
	King of Prussia Rd NB Left/Thru/Right	King of Prussia Rd SB Left/Thru/Right	Septa Driveway				
7:00 AM	992	410	41	41	1,402	N	N
8:00 AM	1,091	374	55	55	1,465	N	N
4:00 PM	438	813	158	158	1,250	Y	Y
5:00 PM	395	1,000	138	138	1,394	Y	Y

**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

# APPENDIX K

## Left Turn Phase Evaluation

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



# LEFT TURN SIGNALIZATION

COUNTY: Delaware County  
MUNICIPALITY: Radnor Twp

INTERSECTION: King of Prussia Road and Raider Road/Site Driveway  
YEAR: 2020 Build Conditions

Time	Left Turn				Opposing		Calculated Conflict Factor	Meet Warrants?
	Direction	Exclusive Lane	Volume	Per Cycle	Through Volume	Number of Lanes		
AM PEAK	EB	N	9	0.23	0	1	0	No
	WB	N	99	2.48	0	1	0	No
	NB	Y	173	4.33	264	1	45,672	No
	SB	Y	52	1.30	1052	1	54,704	Yes
PM PEAK	EB	N	5	0.13	0	1	0	No
	WB	N	272	6.8	0	1	0	No
	NB	Y	23	0.575	1097	1	25,231	No
	SB	Y	14	0.35	294	1	4,116	No

Comments: A conflict factor of 50,000 is required for advanced left turn phasing for 2 - one hour periods

AM Peak Cycle Length (seconds): 90  
Midday Peak Cycle Length (seconds): 90  
PM Peak Cycle Length (seconds): 90

**Conflict Factors:**

1.1 Protected/Permitted Left Turn Phase

- A. Without separate turning lanes
  - 1 opposing lane; CF = 35,000
  - 2 opposing lanes; CF = 45,000
- B. With separate turning lane
  - 1 opposing lane; CF = 50,000
  - 2 opposing lanes; CF = 65,000

1.2 Protected/Prohibited Left Turn Phase

- (must have a separate turning lane)
- 1 opposing lane; CF = 67,500
  - 2 opposing lanes; CF = 90,000

Calculations completed in accordance with PennDOT Publication 149, Chapter 3

# LEFT TURN SIGNALIZATION

COUNTY: Delaware County  
MUNICIPALITY: Radnor Twp

INTERSECTION: King of Prussia Road and Raider Road/Site Driveway  
YEAR: 2025 Build Conditions

Time	Left Turn				Opposing		Calculated Conflict Factor	Meet Warrants?
	Direction	Exclusive Lane	Volume	Per Cycle	Through Volume	Number of Lanes		
AM PEAK	EB	N	9	0.23	0	1	0	No
	WB	N	99	2.48	0	1	0	No
	NB	Y	177	4.43	268	1	47,436	No
	SB	Y	52	1.30	1071	1	55,692	Yes
PM PEAK	EB	N	5	0.13	0	1	0	No
	WB	N	272	6.8	0	1	0	No
	NB	Y	24	0.6	1117	1	26,808	No
	SB	Y	14	0.35	299	1	4,186	No

Comments: A conflict factor of 50,000 is required for advanced left turn phasing for 2 - one hour periods

AM Peak Cycle Length (seconds): 90  
Midday Peak Cycle Length (seconds): 90  
PM Peak Cycle Length (seconds): 90

**Conflict Factors:**

1.1 Protected/Permitted Left Turn Phase

- A. Without separate turning lanes
  - 1 opposing lane; CF = 35,000
  - 2 opposing lanes; CF = 45,000
- B. With separate turning lane
  - 1 opposing lane; CF = 50,000
  - 2 opposing lanes; CF = 65,000

1.2 Protected/Prohibited Left Turn Phase

- (must have a separate turning lane)
- 1 opposing lane; CF = 67,500
  - 2 opposing lanes; CF = 90,000

Calculations completed in accordance with PennDOT Publication 149, Chapter 3



# APPENDIX L

## Pedestrian and Vehicle Clearance Calculations

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD

RADNOR TOWNSHIP

DELAWARE COUNTY, PA

UPHS1507



# 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/s<sup>2</sup>)
- 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	
King of Prussia Road SB	SB	35	-2	75	3.8	1.9	5.7		
King of Prussia Road NB	NB	35	2	75	3.5	1.9	5.4		
Raider Road	EB	25	-2	60	3.0	2.2	5.2		
Site Driveway	WB	25	2	60	2.8	2.2	5.0		
Left-Turn Movement Phases									
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments	
King of Prussia Road SB	SB	35	-2	60	3.8	1.6	5.4		
King of Prussia Road NB	NB	35	2	60	3.5	1.6	5.1		

## PEDESTRIAN INTERVALS

### Assumptions and Calibration Inputs

<p><b>Walk Interval<sup>1</sup></b> (<math>T_w</math>, seconds)</p> $T_w = \left( \frac{1}{2} \frac{L}{S_w} \right) + 3$
<p><b>Pedestrian Change Interval</b> (<math>T_{pc}</math>, seconds)</p> $T_{pc} = \frac{L}{S_w}$
<p><b>Minimum Duration</b> (<math>T_w + T_{pc}</math>, seconds)</p> $(T_w + T_{pc})_{\min} = \frac{(L+6)}{3}$

*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 Interval<sup>2</sup>**  
( $T_p$ , 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 <sub>w</sub>	T <sub>pc</sub>	(T <sub>w</sub> +T <sub>pc</sub> ) <sub>min</sub>	T <sub>p</sub>	Comments
Crossing of N King of Prussia	Yes	45	9.5	12.9	17.0	N/A	Using 6 sec. M and 13 sec FH
Crossing of S. King of Prussia	Yes	45	9.5	12.9	17.0	N/A	Using 6 sec. M and 13 sec FH
Crossing Raider Road	Yes	30	7.3	8.6	12.0	N/A	
Crossing Site Driveway	Yes	30	7.3	8.6	12.0	N/A	

# APPENDIX M

2020 and 2025 Build Condition with Improvements

Capacity Analysis Worksheets

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD

RADNOR TOWNSHIP






















DELAWARE COUNTY, PA

UPHS1507



HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

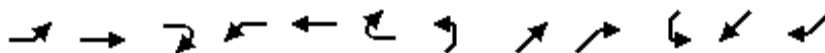
01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Future Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	349	8	113	409	699	2	13	696	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	333	0	391	437	25	357	390	1152	3	371	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1291	0	1530	1396	99	1398	1639	1820	5	749	1764	1544
Grp Volume(v), veh/h	1	0	2	349	0	121	409	0	701	13	696	0
Grp Sat Flow(s),veh/h/ln	1291	0	1530	1396	0	1497	1639	0	1825	749	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.80	0.00	0.32	1.05	0.00	0.61	0.04	1.01	0.00
Avail Cap(c_a), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.0	33.3	0.0	27.1	27.5	0.0	9.8	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.1	0.0	0.5	59.2	0.0	2.4	0.2	38.0	0.0
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	0.0	0.0	0.1	15.0	0.0	4.4	28.9	0.0	16.3	0.4	43.6	0.0
LnGrp Delay(d),s/veh	29.1	0.0	25.0	43.4	0.0	27.6	86.7	0.0	12.2	17.3	65.5	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			470			1110			709	
Approach Delay, s/veh		26.4			39.3			39.6			64.6	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		22.6		24.8	19.5	37.5		7.9				
Green Ext Time (p_c), s		12.3		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				47.3								
HCM 2010 LOS				D								

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Future Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1716	1809	1628	1809
Adj Flow Rate, veh/h	40	421	0	30	890	7	534	34	62	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	8	0	0	0
Cap, veh/h	90	857	772	395	900	7	226	9	537	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	630	1714	1545	935	1799	14	393	25	1422	0	97	194
Grp Volume(v), veh/h	40	421	0	30	0	897	568	0	62	9	0	0
Grp Sat Flow(s),veh/h/ln	630	1714	1545	935	0	1813	418	0	1422	290	0	0
Q Serve(g_s), s	1.5	14.6	0.0	2.0	0.0	44.0	0.0	0.0	2.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.6	0.0	16.6	0.0	44.0	34.0	0.0	2.6	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	90	857	772	395	0	907	236	0	537	159	0	0
V/C Ratio(X)	0.44	0.49	0.00	0.08	0.00	0.99	2.41	0.00	0.12	0.06	0.00	0.00
Avail Cap(c_a), veh/h	90	857	772	395	0	907	236	0	537	159	0	0
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)	0.58	0.58	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.8	14.9	0.0	20.4	0.0	22.3	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	8.9	1.2	0.0	0.4	0.0	27.4	648.0	0.0	0.1	0.1	0.0	0.0
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	2.2	10.5	0.0	1.0	0.0	37.6	86.8	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.7	16.1	0.0	20.8	0.0	49.7	681.6	0.0	18.3	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		461			927			630			9	
Approach Delay, s/veh		19.3			48.7			616.3			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		46.0		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				218.3								
HCM 2010 LOS				F								



HCM 2010 TWSC  
3: King of Prussia Rd & Septa Driveway

01/11/2018

**Intersection**

Int Delay, s/veh 3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	42	970	115	147	303
Future Vol, veh/h	20	42	970	115	147	303
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	23	48	1115	132	169	348

**Major/Minor**

	Minor1	Major1	Major2		
Conflicting Flow All	1886	1208	0	0	1264
Stage 1	1198	-	-	-	-
Stage 2	688	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	79	185	-	-	487
Stage 1	289	-	-	-	-
Stage 2	503	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	51	181	-	-	483
Mov Cap-2 Maneuver	162	-	-	-	-
Stage 1	285	-	-	-	-
Stage 2	326	-	-	-	-

**Approach**





















	WB	NB	SB
HCM Control Delay, s	39.3	0	5.4
HCM LOS	E		

**Minor Lane/Major Mvmt**

	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	174	483
HCM Lane V/C Ratio	-	-	0.41	0.35
HCM Control Delay (s)	-	-	39.3	16.4
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.8	1.6

HCM 2010 Signalized Intersection Summary  
5: King of Prussia Rd & Raider Rd

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	130	99	0	22	173	1052	369	52	264	58
Future Volume (veh/h)	9	0	130	99	0	22	173	1052	369	52	264	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1872	1792	1872	1800	1800	1800	1800	1765	1800	1800	1664	1800
Adj Flow Rate, veh/h	12	0	167	127	0	28	222	1349	473	67	338	74
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	0	0	10	10
Cap, veh/h	54	10	264	259	0	283	677	1233	1063	84	923	202
Arrive On Green	0.19	0.00	0.19	0.19	0.00	0.19	0.70	0.70	0.70	0.70	0.70	0.70
Sat Flow, veh/h	50	52	1424	1238	0	1530	988	1765	1521	260	1321	289
Grp Volume(v), veh/h	179	0	0	127	0	28	222	1349	473	67	0	412
Grp Sat Flow(s),veh/h/ln	1526	0	0	1238	0	1530	988	1765	1521	260	0	1611
Q Serve(g_s), s	1.2	0.0	0.0	2.9	0.0	1.3	9.9	60.0	11.7	0.0	0.0	8.9
Cycle Q Clear(g_c), s	9.2	0.0	0.0	12.1	0.0	1.3	18.3	60.0	11.7	60.0	0.0	8.9
Prop In Lane	0.07		0.93	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	327	0	0	259	0	283	677	1233	1063	84	0	1125
V/C Ratio(X)	0.55	0.00	0.00	0.49	0.00	0.10	0.33	1.09	0.45	0.80	0.00	0.37
Avail Cap(c_a), veh/h	400	0	0	318	0	356	677	1233	1063	84	0	1125
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.3	0.0	0.0	34.1	0.0	29.1	8.8	12.9	5.7	42.9	0.0	5.2
Incr Delay (d2), s/veh	1.4	0.0	0.0	1.4	0.0	0.2	1.3	55.4	1.4	53.7	0.0	0.9
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	7.3	0.0	0.0	5.4	0.0	1.0	5.3	85.3	9.0	5.1	0.0	7.5
LnGrp Delay(d),s/veh	33.7	0.0	0.0	35.5	0.0	29.2	10.1	68.4	7.0	96.6	0.0	6.2
LnGrp LOS	C			D		C	B	F	A	F		A
Approach Vol, veh/h		179			155			2044			479	
Approach Delay, s/veh		33.7			34.4			47.9			18.8	
Approach LOS		C			C			D			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		65.0		20.9		65.0		20.9				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		59.0		19.0		59.0		19.0				
Max Q Clear Time (g_c+I1), s		62.5		11.2		62.5		14.1				
Green Ext Time (p_c), s		0.0		1.1		0.0		0.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				41.4								
HCM 2010 LOS				D								

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	1588	6	6	486
Future Vol, veh/h	2	2	1588	6	6	486
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	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1913	7	7	586





















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2517	960	0	0	1920
Stage 1	1917	-	-	-	-
Stage 2	600	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	27	261	-	-	312
Stage 1	103	-	-	-	-
Stage 2	552	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	26	261	-	-	312
Mov Cap-2 Maneuver	26	-	-	-	-
Stage 1	103	-	-	-	-
Stage 2	540	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	90.2	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	47	312
HCM Lane V/C Ratio	-	-	0.103	0.023
HCM Control Delay (s)	-	-	90.2	16.8
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	0.3	0.1

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Future Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1782	1665	0	1748
Adj Flow Rate, veh/h	385	1321	0	0	551	0	782	853	347	326	0	165
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	481	1365	0	0	746	344	1630	890	361	362	0	0
Arrive On Green	0.10	0.27	0.00	0.00	0.07	0.00	0.50	0.38	0.38	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	2330	944	3077	326	
Grp Volume(v), veh/h	385	1321	0	0	551	0	782	613	587	326	75.9	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1676	1598	1539	E	
Q Serve(g_s), s	12.5	43.0	0.0	0.0	17.4	0.0	17.4	39.2	39.5	8.0		
Cycle Q Clear(g_c), s	12.5	43.0	0.0	0.0	17.4	0.0	17.4	39.2	39.5	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.59	1.00		
Lane Grp Cap(c), veh/h	481	1365	0	0	746	344	1630	640	610	362		
V/C Ratio(X)	0.80	0.97	0.00	0.00	0.74	0.00	0.48	0.96	0.96	0.90		
Avail Cap(c_a), veh/h	481	1365	0	0	746	344	1630	640	610	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.1	39.2	0.0	0.0	48.0	0.0	18.1	33.1	33.2	51.6		
Incr Delay (d2), s/veh	8.3	16.4	0.0	0.0	5.9	0.0	0.2	25.4	27.3	24.3		
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		
%ile BackOfQ(95%),veh/ln	10.1	30.3	0.0	0.0	13.5	0.0	12.5	30.4	29.6	5.0		
LnGrp Delay(d),s/veh	56.3	55.6	0.0	0.0	53.9	0.0	18.3	58.5	60.5	75.9		
LnGrp LOS	E	E			D		B	E	E	E		
Approach Vol, veh/h		1706			551			1982				
Approach Delay, s/veh		55.8			53.9			43.2				
Approach LOS		E			D			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		50.0	60.0		21.0	29.0	13.0	47.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		44.0	41.0		15.0	23.0	7.0	41.0				
Max Q Clear Time (g_c+I1), s		45.5	19.9		15.0	19.9	10.5	41.7				
Green Ext Time (p_c), s		0.0	3.0		0.0	2.7	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			51.5									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↘↘	↑↑	↘↘	↗		
Traffic Volume (veh/h)	851	0	186	1224	792	839		
Future Volume (veh/h)	851	0	186	1224	792	839		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	868	0	190	1249	808	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2288	0	290	2104	957	436		
Arrive On Green	0.48	0.00	0.03	0.21	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	868	0	190	1249	808	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	12.8	0.0	6.5	36.7	25.1	0.0		
Cycle Q Clear(g_c), s	12.8	0.0	6.5	36.7	25.1	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2288	0	290	2104	957	436		
V/C Ratio(X)	0.38	0.00	0.66	0.59	0.84	0.00		
Avail Cap(c_a), veh/h	2288	0	317	2104	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.63	0.63	1.00	0.00		
Uniform Delay (d), s/veh	17.9	0.0	51.6	31.1	36.9	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.7	0.8	3.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.5	0.0	5.2	23.0	17.7	0.0		
LnGrp Delay(d),s/veh	18.4	0.0	54.4	31.9	40.0	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	868			1439	808			
Approach Delay, s/veh	18.4			34.9	40.0			
Approach LOS	B			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.6	15.1	58.3				73.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.6	9.0	15.3				39.2
Green Ext Time (p_c), s		3.0	0.1	14.8				10.1
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.6					
HCM 2010 LOS			C					

# HCM 2010 Signalized Intersection Summary

## 9: Hillside Circuit & Lancaster Ave

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗		↖ ↗	↖ ↗			
Traffic Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Future Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.90			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	598	1631	4	2	918	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	696	2843	7	18	2133	992	21	7	22			
Arrive On Green	0.42	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1375			
Grp Volume(v), veh/h	598	797	838	2	918	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1375			
Q Serve(g_s), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	696	1389	1461	18	2133	992	28	0	22			
V/C Ratio(X)	0.86	0.57	0.57	0.11	0.43	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2133	992	110	0	87			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.3	0.0	0.0	53.9	10.0	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.6	0.2	0.1	2.6	0.6	0.0	5.4	0.0	1.7			
Initial Q Delay(d3),s/veh	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	0.1	0.1	0.1	11.4	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.9	0.2	0.1	56.5	10.7	0.0	58.8	0.0	55.0			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2233			920			10				
Approach Delay, s/veh		8.4			10.8			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.2	75.0		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2), s	6.0	2.5			20.6	17.6		2.7				
Green Ext Time (p_c), s	0.0	42.2			1.6	27.5		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Future Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	145	1030	55	221	1541	456	96	389	86	100	138	111
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1381	74	266	1436	648	151	497	111	246	640	479
Arrive On Green	0.07	0.43	0.43	0.07	0.43	0.43	0.24	0.24	0.24	0.07	0.36	0.36
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	452	2080	464	1609	1787	1337
Grp Volume(v), veh/h	145	533	552	221	1541	456	292	0	279	100	126	123
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1489	0	1507	1609	1638	1487
Q Serve(g_s), s	5.2	29.7	29.7	8.0	47.6	27.3	18.6	0.0	19.1	4.8	5.9	6.4
Cycle Q Clear(g_c), s	5.2	29.7	29.7	8.0	47.6	27.3	20.3	0.0	19.1	4.8	5.9	6.4
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	715	740	266	1436	648	399	0	360	246	587	532
V/C Ratio(X)	0.78	0.75	0.75	0.83	1.07	0.70	0.73	0.00	0.78	0.41	0.21	0.23
Avail Cap(c_a), veh/h	186	715	740	266	1436	648	449	0	411	390	789	716
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	26.1	26.1	24.0	31.2	25.5	39.5	0.0	39.1	28.2	24.5	24.7
Incr Delay (d2), s/veh	18.9	7.0	6.8	19.6	45.9	6.3	5.3	0.0	8.0	1.1	0.2	0.2
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	6.0	21.2	21.8	8.0	55.6	18.1	13.8	0.0	13.6	4.0	4.8	4.8
LnGrp Delay(d),s/veh	43.9	33.1	32.9	43.5	77.1	31.8	44.7	0.0	47.1	29.3	24.7	24.9
LnGrp LOS	D	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1230			2218			571			349	
Approach Delay, s/veh		34.3			64.5			45.9			26.1	
Approach LOS		C			E			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	52.6		44.4	13.0	52.6	13.1	31.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0		52.0	7.0	33.0	17.0	29.0				
Max Q Clear Time (g_c+110), s	11.0	32.2		8.4	7.7	50.1	7.3	22.3				
Green Ext Time (p_c), s	0.0	0.7		6.3	0.0	0.0	0.1	2.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				50.5								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

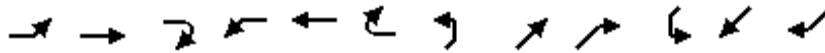
01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Future Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	579	1	235	130	818	1	8	538	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	386	167	419	601	2	587	321	962	1	178	687	595
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1162	457	1142	1422	7	1601	1689	1841	2	671	1782	1544
Grp Volume(v), veh/h	3	0	14	579	0	236	130	0	819	8	538	0
Grp Sat Flow(s),veh/h/ln	1162	0	1599	1422	0	1608	1689	0	1844	671	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	0.9	23.9	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	22.5	23.9	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	586	601	0	590	321	0	963	178	687	595
V/C Ratio(X)	0.01	0.00	0.02	0.96	0.00	0.40	0.41	0.00	0.85	0.04	0.78	0.00
Avail Cap(c_a), veh/h	386	0	586	601	0	590	334	0	963	178	687	595
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	30.1	0.0	21.2	17.0	0.0	18.5	33.2	24.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	27.6	0.0	0.4	0.8	0.0	9.4	0.4	7.3	0.0
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	0.1	0.0	0.4	26.1	0.0	7.8	3.3	0.0	27.1	0.3	18.4	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	57.7	0.0	21.6	17.8	0.0	27.8	33.6	31.6	0.0
LnGrp LOS	C		B	E		C	B		C	C	C	
Approach Vol, veh/h		17			815			949			546	
Approach Delay, s/veh		19.3			47.3			26.5			31.6	
Approach LOS		B			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.0		38.0	12.3	39.7		38.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0				
Max Q Clear Time (g_c+I1), s		36.4		35.5	6.3	26.4		12.0				
Green Ext Time (p_c), s		5.9		0.0	0.0	4.4		3.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			34.9									
HCM 2010 LOS			C									



HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Future Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	783	0	60	438	1	418	7	148	32	39	51
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	357	812	725	101	834	2	270	3	644	50	58	42
Arrive On Green	0.46	0.46	0.00	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	955	1782	1591	715	1830	4	453	8	1525	0	138	99
Grp Volume(v), veh/h	8	783	0	60	0	439	425	0	148	122	0	0
Grp Sat Flow(s),veh/h/ln	955	1782	1591	715	0	1834	460	0	1525	237	0	0
Q Serve(g_s), s	0.5	38.4	0.0	2.6	0.0	15.4	0.0	0.0	5.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.5	38.4	0.0	41.0	0.0	15.4	38.0	0.0	5.6	38.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.26		0.42
Lane Grp Cap(c), veh/h	357	812	725	101	0	836	274	0	644	151	0	0
V/C Ratio(X)	0.02	0.96	0.00	0.60	0.00	0.53	1.55	0.00	0.23	0.81	0.00	0.00
Avail Cap(c_a), veh/h	357	812	725	101	0	836	274	0	644	151	0	0
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)	0.12	0.12	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.9	23.8	0.0	44.6	0.0	17.5	31.5	0.0	16.6	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.3	0.0	23.4	0.0	2.4	266.2	0.0	0.2	27.2	0.0	0.0
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	0.3	22.4	0.0	3.8	0.0	13.1	48.6	0.0	4.3	5.5	0.0	0.0
LnGrp Delay(d),s/veh	22.9	29.1	0.0	67.9	0.0	19.9	297.7	0.0	16.8	49.3	0.0	0.0
LnGrp LOS	C	C		E		B	F		B	D		
Approach Vol, veh/h		791			499			573			122	
Approach Delay, s/veh		29.0			25.7			225.1			49.3	
Approach LOS		C			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		44.0		46.0		44.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		40.0		37.0		40.0		37.0				
Max Q Clear Time (g_c+I1), s		40.9		40.0		43.5		40.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				86.0								
HCM 2010 LOS				F								

HCM 2010 TWSC  
3: King of Prussia Rd & Septa Driveway

01/11/2018

Intersection						
Int Delay, s/veh	4.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T		T	T
Traffic Vol, veh/h	76	84	403	17	53	970
Future Vol, veh/h	76	84	403	17	53	970
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	89	99	474	20	62	1141

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1769	511	0	0	511
Stage 1	501	-	-	-	-
Stage 2	1268	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	93	534	-	-	982
Stage 1	613	-	-	-	-
Stage 2	267	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	~ 86	522	-	-	974
Mov Cap-2 Maneuver	192	-	-	-	-
Stage 1	604	-	-	-	-
Stage 2	250	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.6	0	0.5
HCM LOS	E		






















Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	287	974
HCM Lane V/C Ratio	-	-	0.656	0.064
HCM Control Delay (s)	-	-	38.6	8.9
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	4.3	0.2

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

# HCM 2010 Signalized Intersection Summary

## 5: King of Prussia Rd & Raider Rd

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	41	272	0	60	23	294	101	14	1097	5
Future Volume (veh/h)	5	0	41	272	0	60	23	294	101	14	1097	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1872	1872	1872	1800	1800	1800	1800	1782	1800	1800	1782	1800
Adj Flow Rate, veh/h	5	0	44	289	0	64	24	313	107	15	1167	5
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	1	0	0	1	1
Cap, veh/h	59	21	319	396	0	340	95	1188	1014	664	1182	5
Arrive On Green	0.22	0.00	0.22	0.22	0.00	0.22	0.67	0.67	0.67	0.67	0.67	0.67
Sat Flow, veh/h	67	96	1434	1384	0	1530	486	1782	1521	980	1773	8
Grp Volume(v), veh/h	49	0	0	289	0	64	24	313	107	15	0	1172
Grp Sat Flow(s),veh/h/ln	1597	0	0	1384	0	1530	486	1782	1521	980	0	1781
Q Serve(g_s), s	0.0	0.0	0.0	15.6	0.0	3.1	2.8	6.4	2.3	0.6	0.0	57.7
Cycle Q Clear(g_c), s	2.2	0.0	0.0	17.8	0.0	3.1	60.0	6.4	2.3	7.0	0.0	57.7
Prop In Lane	0.10		0.90	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	399	0	0	396	0	340	95	1188	1014	664	0	1187
V/C Ratio(X)	0.12	0.00	0.00	0.73	0.00	0.19	0.25	0.26	0.11	0.02	0.00	0.99
Avail Cap(c_a), veh/h	399	0	0	396	0	340	95	1188	1014	664	0	1187
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	0.0	33.9	0.0	28.4	44.1	6.1	5.4	7.5	0.0	14.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	6.8	0.0	0.3	6.3	0.5	0.2	0.1	0.0	23.2
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	1.8	0.0	0.0	12.3	0.0	2.4	1.4	6.0	1.8	0.3	0.0	45.1
LnGrp Delay(d),s/veh	28.2	0.0	0.0	40.7	0.0	28.7	50.5	6.6	5.6	7.5	0.0	37.8
LnGrp LOS	C			D		C	D	A	A	A		D
Approach Vol, veh/h		49			353			444				1187
Approach Delay, s/veh		28.2			38.5			8.7				37.5
Approach LOS		C			D			A				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		65.0		25.0		65.0		25.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		59.0		19.0		59.0		19.0				
Max Q Clear Time (g_c+I1), s		62.5		4.2		59.7		19.8				
Green Ext Time (p_c), s		0.0		1.4		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				31.1								
HCM 2010 LOS				C								

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↕		↔	↕
Traffic Vol, veh/h	4	4	413	2	2	1404
Future Vol, veh/h	4	4	413	2	2	1404
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	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	439	2	2	1494





















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1938	221	0	0	441
Stage 1	440	-	-	-	-
Stage 2	1498	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	65	789	-	-	1130
Stage 1	622	-	-	-	-
Stage 2	206	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	65	789	-	-	1130
Mov Cap-2 Maneuver	65	-	-	-	-
Stage 1	622	-	-	-	-
Stage 2	206	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	37.3	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	120	1130
HCM Lane V/C Ratio	-	-	0.071	0.002
HCM Control Delay (s)	-	-	37.3	8.2
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Future Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	109	1636	0	0	615	0	289	246	228	885	0	477
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.95
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	216	1623	0	0	1269	591	1393	278	247	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1697	1511	3260	885	
Grp Volume(v), veh/h	109	1636	0	0	615	0	289	245	229	885	83.2	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1693	1515	1630	F	
Q Serve(g_s), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	15.6	16.3	24.0		
Cycle Q Clear(g_c), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	15.6	16.3	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	216	1623	0	0	1269	591	1393	277	248	858		
V/C Ratio(X)	0.51	1.01	0.00	0.00	0.48	0.00	0.21	0.89	0.92	1.03		
Avail Cap(c_a), veh/h	391	1623	0	0	1269	591	1393	277	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.88	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.9	37.2	0.0	0.0	9.9	0.0	19.8	45.0	45.3	44.2		
Incr Delay (d2), s/veh	1.6	22.8	0.0	0.0	1.2	0.0	0.1	27.1	36.8	39.0		
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		
%ile BackOfQ(95%),veh/ln	3.0	53.6	0.0	0.0	6.8	0.0	5.0	14.4	14.4	12.4		
LnGrp Delay(d),s/veh	52.5	60.0	0.0	0.0	11.1	0.0	19.9	72.1	82.1	83.2		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1745			615			763				
Approach Delay, s/veh		59.6			11.1			55.3				
Approach LOS		E			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.6		6.0	10.5	26.5	18.3				
Green Ext Time (p_c), s		0.0	0.8		0.1	17.6	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			56.5									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1052	0	570	768	615	507		
Future Volume (veh/h)	1052	0	570	768	615	507		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1073	0	582	784	628	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.97	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	2009	0	714	2322	751	359		
Arrive On Green	0.43	0.00	0.07	0.23	0.22	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1073	0	582	784	628	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	18.6	0.0	19.0	21.3	19.6	0.0		
Cycle Q Clear(g_c), s	18.6	0.0	19.0	21.3	19.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2009	0	714	2322	751	359		
V/C Ratio(X)	0.53	0.00	0.81	0.34	0.84	0.00		
Avail Cap(c_a), veh/h	2009	0	847	2322	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(l)	1.00	0.00	0.77	0.77	1.00	0.00		
Uniform Delay (d), s/veh	23.5	0.0	48.9	21.6	40.8	0.0		
Incr Delay (d2), s/veh	1.0	0.0	4.1	0.3	5.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	2.9	0.0	13.5	14.7	14.8	0.0		
LnGrp Delay(d),s/veh	24.5	0.0	53.1	21.9	46.6	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1073			1366	628			
Approach Delay, s/veh	24.5			35.2	46.6			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.6	28.6	51.8				80.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.1	21.5	21.1				23.8
Green Ext Time (p_c), s		1.4	1.1	10.3				19.8
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			33.8					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑		↔	↑↑	↔		↑	↔			
Traffic Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Future Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1198	1838	15	6	751	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1197	2797	23	23	1647	766	18	6	18			
Arrive On Green	0.73	1.00	1.00	0.01	0.49	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3344	27	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1198	903	950	6	751	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1197	1376	1444	23	1647	766	24	0	18			
V/C Ratio(X)	1.00	0.66	0.66	0.26	0.46	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1197	1376	1444	109	1647	766	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.0	0.0	0.0	53.7	18.6	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	7.9	0.2	0.2	5.6	0.9	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	33.3	0.2	0.2	0.4	12.3	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	22.9	0.2	0.2	59.3	19.6	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		3051			757			6				
Approach Delay, s/veh		9.1			19.9			56.7				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			45.0	58.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			39.0	47.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			42.5	18.6		2.7				
Green Ext Time (p_c), s	0.0	45.8			0.0	22.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				11.3								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd

01/11/2018
























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Future Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	124	1211	96	204	1142	130	84	218	145	423	462	222
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	215	1284	102	187	1347	601	149	345	234	331	863	412
Arrive On Green	0.06	0.40	0.40	0.06	0.40	0.40	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3197	253	1664	3352	1496	385	1338	906	1689	2222	1060
Grp Volume(v), veh/h	124	644	663	204	1142	130	218	0	229	423	351	333
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1195	0	1433	1689	1690	1591
Q Serve(g_s), s	4.2	36.4	36.6	6.0	30.9	5.7	12.6	0.0	14.1	8.0	16.0	16.2
Cycle Q Clear(g_c), s	4.2	36.4	36.6	6.0	30.9	5.7	16.1	0.0	14.1	8.0	16.0	16.2
Prop In Lane	1.00		0.14	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	215	684	702	187	1347	601	359	0	370	331	656	618
V/C Ratio(X)	0.58	0.94	0.94	1.09	0.85	0.22	0.61	0.00	0.62	1.28	0.53	0.54
Avail Cap(c_a), veh/h	215	684	702	187	1347	601	453	0	487	331	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	28.8	28.8	26.9	27.1	19.6	33.1	0.0	32.7	34.5	23.6	23.7
Incr Delay (d2), s/veh	3.8	22.8	22.8	91.2	6.8	0.8	1.7	0.0	1.7	145.8	0.7	0.7
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	3.9	28.9	29.6	12.9	22.0	4.5	9.5	0.0	9.7	33.9	12.0	11.7
LnGrp Delay(d),s/veh	25.9	51.5	51.6	118.0	33.9	20.4	34.8	0.0	34.4	180.3	24.3	24.4
LnGrp LOS	C	D	D	F	C	C	C		C	F	C	C
Approach Vol, veh/h		1431			1476			447			1107	
Approach Delay, s/veh		49.4			44.4			34.6			83.9	
Approach LOS		D			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	1.0	45.2		43.8	11.0	45.2	13.0	30.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	3.0	31.0		46.0	5.0	31.0	7.0	33.0				
Max Q Clear Time (g_c+1/3), s	3.5	38.9		18.5	6.7	33.4	10.5	18.1				
Green Ext Time (p_c), s	0.0	0.0		8.7	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				54.8								
HCM 2010 LOS				D								



HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

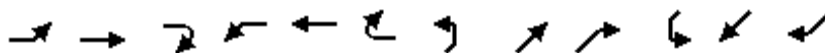
01/16/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	318	7	104	375	639	2	12	638	611
Future Volume (veh/h)	1	0	2	318	7	104	375	639	2	12	638	611
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	353	8	116	417	710	2	13	709	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	330	0	391	437	25	358	390	1152	3	368	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1287	0	1530	1396	97	1400	1639	1820	5	742	1764	1544
Grp Volume(v), veh/h	1	0	2	353	0	124	417	0	712	13	709	0
Grp Sat Flow(s),veh/h/ln	1287	0	1530	1396	0	1497	1639	0	1825	742	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.7	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.1	22.7	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.81	0.00	0.32	1.07	0.00	0.62	0.04	1.03	0.00
Avail Cap(c_a), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	0.0	25.0	33.4	0.0	27.2	27.5	0.0	9.9	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.8	0.0	0.5	65.5	0.0	2.5	0.2	43.2	0.0
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	0.0	0.0	0.1	15.2	0.0	4.6	30.1	0.0	16.8	0.4	45.4	0.0
LnGrp Delay(d),s/veh	29.3	0.0	25.0	44.2	0.0	27.7	93.0	0.0	12.4	17.3	70.7	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			477			1129			722	
Approach Delay, s/veh		26.4			39.9			42.2			69.8	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		23.1		25.2	19.5	37.5		8.1				
Green Ext Time (p_c), s		12.6		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			50.2									
HCM 2010 LOS			D									

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/16/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Future Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	427	0	31	907	7	544	35	63	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	83	857	772	391	900	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	621	1714	1545	930	1800	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	427	0	31	0	914	579	0	63	9	0	0
Grp Sat Flow(s),veh/h/ln	621	1714	1545	930	0	1814	418	0	1520	290	0	0
Q Serve(g_s), s	0.5	14.9	0.0	2.1	0.0	45.0	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.9	0.0	17.0	0.0	45.0	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.48	0.50	0.00	0.08	0.00	1.01	2.46	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
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)	0.56	0.56	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.0	15.0	0.0	20.6	0.0	22.5	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	10.7	1.2	0.0	0.4	0.0	31.9	668.6	0.0	0.1	0.1	0.0	0.0
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	2.2	10.6	0.0	1.0	0.0	54.8	89.2	0.0	1.9	0.3	0.0	0.0
LnGrp Delay(d),s/veh	55.7	16.1	0.0	21.0	0.0	54.4	702.2	0.0	18.3	21.8	0.0	0.0
LnGrp LOS	E	B		C		F	F		B	C		
Approach Vol, veh/h		467			945			642			9	
Approach Delay, s/veh		19.5			53.3			635.1			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		47.0		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				226.5								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/16/2018

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T		T	T
Traffic Vol, veh/h	21	42	988	116	149	308
Future Vol, veh/h	21	42	988	116	149	308
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	24	48	1136	133	171	354

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1918	1229	0	0	1286
Stage 1	1219	-	-	-	-
Stage 2	699	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	75	179	-	-	478
Stage 1	282	-	-	-	-
Stage 2	497	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	47	175	-	-	474
Mov Cap-2 Maneuver	157	-	-	-	-
Stage 1	278	-	-	-	-
Stage 2	317	-	-	-	-





















Approach	WB	NB	SB
HCM Control Delay, s	41.4	0	5.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	169	474
HCM Lane V/C Ratio	-	-	0.428	0.361
HCM Control Delay (s)	-	-	41.4	16.8
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.9	1.6

# HCM 2010 Signalized Intersection Summary

## 5: King of Prussia Rd & Raider Rd

01/16/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	133	99	0	22	177	1071	369	52	268	59
Future Volume (veh/h)	9	0	133	99	0	22	177	1071	369	52	268	59
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1800	1792	1800	1800	1800	1800	1800	1765	1800	1800	1664	1800
Adj Flow Rate, veh/h	12	0	171	127	0	28	227	1373	473	67	344	76
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	0	0	10	10
Cap, veh/h	54	10	267	259	0	287	662	1229	1059	84	919	203
Arrive On Green	0.19	0.00	0.19	0.19	0.00	0.19	0.70	0.70	0.70	0.70	0.70	0.70
Sat Flow, veh/h	49	51	1427	1233	0	1530	981	1765	1521	254	1319	291
Grp Volume(v), veh/h	183	0	0	127	0	28	227	1373	473	67	0	420
Grp Sat Flow(s),veh/h/ln	1527	0	0	1233	0	1530	981	1765	1521	254	0	1610
Q Serve(g_s), s	1.2	0.0	0.0	2.9	0.0	1.3	10.7	60.0	11.8	0.0	0.0	9.2
Cycle Q Clear(g_c), s	9.5	0.0	0.0	12.4	0.0	1.3	19.9	60.0	11.8	60.0	0.0	9.2
Prop In Lane	0.07		0.93	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	331	0	0	259	0	287	662	1229	1059	84	0	1122
V/C Ratio(X)	0.55	0.00	0.00	0.49	0.00	0.10	0.34	1.12	0.45	0.80	0.00	0.37
Avail Cap(c_a), veh/h	398	0	0	314	0	355	662	1229	1059	84	0	1122
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.3	0.0	0.0	34.1	0.0	29.0	9.4	13.1	5.8	43.1	0.0	5.4
Incr Delay (d2), s/veh	1.4	0.0	0.0	1.4	0.0	0.1	1.4	64.2	1.4	54.2	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	7.5	0.0	0.0	5.4	0.0	1.0	5.6	91.1	9.0	5.1	0.0	7.8
LnGrp Delay(d),s/veh	33.7	0.0	0.0	35.6	0.0	29.1	10.9	77.2	7.1	97.2	0.0	6.3
LnGrp LOS	C			D		C	B	F	A	F		A
Approach Vol, veh/h		183			155			2073			487	
Approach Delay, s/veh		33.7			34.4			54.0			18.8	
Approach LOS		C			C			D			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		65.0		21.1		65.0		21.1				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		59.0		19.0		59.0		19.0				
Max Q Clear Time (g_c+I1), s		62.0		11.5		62.0		14.4				
Green Ext Time (p_c), s		0.0		1.1		0.0		0.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			45.7									
HCM 2010 LOS			D									

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↕		↔	↕
Traffic Vol, veh/h	2	2	1611	6	6	493
Future Vol, veh/h	2	2	1611	6	6	493
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	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1941	7	7	594





















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2553	974	0	0	1948
Stage 1	1945	-	-	-	-
Stage 2	608	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	26	255	-	-	304
Stage 1	100	-	-	-	-
Stage 2	547	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	25	255	-	-	304
Mov Cap-2 Maneuver	25	-	-	-	-
Stage 1	100	-	-	-	-
Stage 2	534	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	92.2	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	46	304
HCM Lane V/C Ratio	-	-	0.105	0.024
HCM Control Delay (s)	-	-	92.2	17.1
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	0.3	0.1

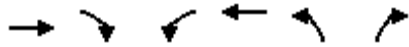
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/16/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	1306	0	0	544	379	774	837	344	321	0	162
Future Volume (veh/h)	376	1306	0	0	544	379	774	837	344	321	0	162
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1782	1665	0	1748
Adj Flow Rate, veh/h	388	1346	0	0	561	0	798	863	355	331	0	167
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	481	1365	0	0	746	344	1630	886	363	362	0	0
Arrive On Green	0.10	0.27	0.00	0.00	0.07	0.00	0.50	0.38	0.38	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	2322	951	3077	331	
Grp Volume(v), veh/h	388	1346	0	0	561	0	798	622	596	331	78.5	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1676	1597	1539	E	
Q Serve(g_s), s	12.6	44.2	0.0	0.0	17.7	0.0	17.8	40.1	40.5	8.0		
Cycle Q Clear(g_c), s	12.6	44.2	0.0	0.0	17.7	0.0	17.8	40.1	40.5	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.60	1.00		
Lane Grp Cap(c), veh/h	481	1365	0	0	746	344	1630	640	610	362		
V/C Ratio(X)	0.81	0.99	0.00	0.00	0.75	0.00	0.49	0.97	0.98	0.91		
Avail Cap(c_a), veh/h	481	1365	0	0	746	344	1630	640	610	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.90	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.1	39.6	0.0	0.0	48.1	0.0	18.2	33.4	33.5	51.6		
Incr Delay (d2), s/veh	8.6	19.7	0.0	0.0	6.3	0.0	0.2	28.5	30.8	26.9		
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		
%ile BackOfQ(95%),veh/ln	10.2	31.6	0.0	0.0	13.7	0.0	12.7	31.5	30.8	5.4		
LnGrp Delay(d),s/veh	56.7	59.3	0.0	0.0	54.4	0.0	18.4	62.0	64.3	78.5		
LnGrp LOS	E	E			D		B	E	E	E		
Approach Vol, veh/h		1734			561			2016				
Approach Delay, s/veh		58.7			54.4			45.4				
Approach LOS		E			D			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		50.0	60.0		21.0	29.0	13.0	47.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		44.0	41.0		15.0	23.0	7.0	41.0				
Max Q Clear Time (g_c+I1), s		46.7	20.3		15.1	20.2	10.5	42.6				
Green Ext Time (p_c), s		0.0	3.0		0.0	2.4	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			53.8									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/16/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	863	0	189	1247	807	853		
Future Volume (veh/h)	863	0	189	1247	807	853		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	881	0	193	1272	823	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2263	0	293	2089	972	443		
Arrive On Green	0.48	0.00	0.03	0.20	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	881	0	193	1272	823	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	13.1	0.0	6.6	37.6	25.6	0.0		
Cycle Q Clear(g_c), s	13.1	0.0	6.6	37.6	25.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2263	0	293	2089	972	443		
V/C Ratio(X)	0.39	0.00	0.66	0.61	0.85	0.00		
Avail Cap(c_a), veh/h	2263	0	317	2089	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.62	0.62	1.00	0.00		
Uniform Delay (d), s/veh	18.3	0.0	51.6	31.7	36.6	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.8	0.8	3.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.8	0.0	5.3	23.4	18.0	0.0		
LnGrp Delay(d),s/veh	18.9	0.0	54.4	32.6	39.9	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	881			1465	823			
Approach Delay, s/veh	18.9			35.5	39.9			
Approach LOS	B			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		37.1	15.2	57.7				72.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		28.1	9.1	15.6				40.1
Green Ext Time (p_c), s		3.0	0.1	14.9				9.6
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			32.0					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/16/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	584	1595	4	2	895	494	6	2	2	0	0	0
Future Volume (veh/h)	584	1595	4	2	895	494	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	608	1661	4	2	932	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	705	2843	7	18	2123	988	21	7	22			
Arrive On Green	0.43	1.00	1.00	0.01	0.63	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	608	811	854	2	932	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	705	1389	1461	18	2123	988	28	0	22			
V/C Ratio(X)	0.86	0.58	0.58	0.11	0.44	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2123	988	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.0	0.0	0.0	53.9	10.2	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.7	0.2	0.2	2.6	0.7	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.8	0.1	0.1	0.1	11.7	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.6	0.2	0.2	56.5	10.9	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2273			934			10				
Approach Delay, s/veh		8.3			11.0			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.5	74.7		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2), s	12.6	2.5			20.9	18.0		2.7				
Green Ext Time (p_c), s	0.0	43.6			1.6	27.8		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												



HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/16/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Future Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	148	1048	56	225	1570	465	98	396	89	102	141	114
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	171	1461	78	264	1520	685	153	501	114	213	610	459
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	453	2069	469	1609	1782	1341
Grp Volume(v), veh/h	148	543	561	225	1570	465	297	0	286	102	129	126
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1485	0	1506	1609	1638	1486
Q Serve(g_s), s	5.3	29.2	29.2	7.0	50.4	26.9	19.1	0.0	19.5	5.1	6.2	6.7
Cycle Q Clear(g_c), s	5.3	29.2	29.2	7.0	50.4	26.9	20.8	0.0	19.5	5.1	6.2	6.7
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	171	756	782	264	1520	685	403	0	365	213	560	508
V/C Ratio(X)	0.87	0.72	0.72	0.85	1.03	0.68	0.74	0.00	0.78	0.48	0.23	0.25
Avail Cap(c_a), veh/h	171	756	782	264	1520	685	448	0	411	213	610	554
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	24.1	24.1	25.7	29.8	23.5	39.3	0.0	39.0	29.6	25.8	26.0
Incr Delay (d2), s/veh	34.3	5.8	5.6	22.3	32.1	5.3	5.7	0.0	8.6	1.7	0.2	0.3
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	0.1	20.7	21.3	9.1	53.6	17.8	14.1	0.0	13.9	4.2	5.1	5.1
LnGrp Delay(d),s/veh	60.6	29.8	29.7	48.0	61.9	28.8	45.0	0.0	47.6	31.2	26.0	26.3
LnGrp LOS	E	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1252			2260			583			357	
Approach Delay, s/veh		33.4			53.7			46.2			27.6	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	2.0	55.4		42.6	12.0	55.4	11.0	31.6				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	46.0		40.0	6.0	46.0	5.0	29.0				
Max Q Clear Time (g_c+19), s	19.5	31.7		8.7	7.8	52.9	7.6	22.8				
Green Ext Time (p_c), s	0.0	13.1		6.2	0.0	0.0	0.0	2.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				44.9								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

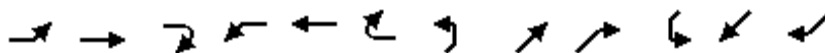
01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Future Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1853
Adj Flow Rate, veh/h	3	4	10	590	1	239	134	834	1	8	547	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	0
Cap, veh/h	413	178	444	633	3	623	288	921	1	141	641	567
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.50	0.50	0.36	0.36	0.00
Sat Flow, veh/h	1158	457	1142	1422	7	1601	1689	1841	2	661	1782	1575
Grp Volume(v), veh/h	3	0	14	590	0	240	134	0	835	8	547	0
Grp Sat Flow(s),veh/h/ln	1158	0	1599	1422	0	1608	1689	0	1844	661	1782	1575
Q Serve(g_s), s	0.2	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	1.0	25.5	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	25.2	25.5	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	622	633	0	625	288	0	922	141	641	567
V/C Ratio(X)	0.01	0.00	0.02	0.93	0.00	0.38	0.46	0.00	0.91	0.06	0.85	0.00
Avail Cap(c_a), veh/h	413	0	622	633	0	625	296	0	922	141	641	567
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.80	0.80	0.00
Uniform Delay (d), s/veh	22.9	0.0	17.0	28.6	0.0	19.8	18.8	0.0	20.6	37.6	26.6	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	20.8	0.0	0.4	1.2	0.0	14.1	0.6	11.1	0.0
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	0.1	0.0	0.4	25.2	0.0	7.7	3.6	0.0	30.2	0.4	20.0	0.0
LnGrp Delay(d),s/veh	22.9	0.0	17.0	49.4	0.0	20.1	19.9	0.0	34.7	38.2	37.7	0.0
LnGrp LOS	C		B	D		C	B		C	D	D	
Approach Vol, veh/h		17			830			969			555	
Approach Delay, s/veh		18.0			40.9			32.6			37.7	
Approach LOS		B			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0	12.6	37.4		40.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		44.0		34.0	7.0	31.0		34.0				
Max Q Clear Time (g_c+I1), s		39.3		37.5	6.6	28.0		11.8				
Green Ext Time (p_c), s		3.4		0.0	0.0	2.2		3.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				36.6								
HCM 2010 LOS				D								

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Future Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	798	0	61	444	1	426	7	151	33	39	52
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	325	772	690	80	793	2	282	3	685	51	57	41
Arrive On Green	0.43	0.43	0.00	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	950	1782	1591	705	1830	4	455	7	1540	0	129	93
Grp Volume(v), veh/h	8	798	0	61	0	445	433	0	151	124	0	0
Grp Sat Flow(s),veh/h/ln	950	1782	1591	705	0	1834	463	0	1540	222	0	0
Q Serve(g_s), s	0.6	39.0	0.0	0.0	0.0	16.3	0.0	0.0	5.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.4	39.0	0.0	39.0	0.0	16.3	40.0	0.0	5.4	40.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	325	772	690	80	0	795	285	0	685	149	0	0
V/C Ratio(X)	0.02	1.03	0.00	0.76	0.00	0.56	1.52	0.00	0.22	0.83	0.00	0.00
Avail Cap(c_a), veh/h	325	772	690	80	0	795	285	0	685	149	0	0
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)	0.09	0.09	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.0	25.5	0.0	45.0	0.0	19.1	30.6	0.0	15.4	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	19.9	0.0	49.4	0.0	2.8	250.7	0.0	0.2	30.9	0.0	0.0
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/lr0.3	41.5	0.0	4.7	0.0	13.8	48.4	0.0	4.2	5.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	25.0	45.4	0.0	94.4	0.0	21.9	281.3	0.0	15.6	52.5	0.0	0.0
LnGrp LOS	C	F		F		C	F		B	D		
Approach Vol, veh/h		806			506			584			124	
Approach Delay, s/veh		45.2			30.7			212.6			52.5	
Approach LOS		D			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		44.0		46.0		44.0		46.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		38.0		39.0		38.0		39.0				
Max Q Clear Time (g_c+I1), s		41.5		42.0		41.5		42.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				90.4								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/11/2018

**Intersection**

Int Delay, s/veh 4.4

**Movement** WBL WBR NBT NBR SBL SBT

Lane Configurations	↖ ↗		↖ ↗		↖ ↗	↑
Traffic Vol, veh/h	76	85	409	17	54	988
Future Vol, veh/h	76	85	409	17	54	988
Conflicting Peds, #/hr	10	2	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	89	100	481	20	64	1162

**Major/Minor** Minor1 Major1 Major2

Conflicting Flow All	1807	510	0	0	518	0
Stage 1	508	-	-	-	-	-
Stage 2	1299	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	~ 88	535	-	-	976	-
Stage 1	608	-	-	-	-	-
Stage 2	258	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	~ 80	527	-	-	974	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	599	-	-	-	-	-
Stage 2	239	-	-	-	-	-

**Approach** WB NB SB

HCM Control Delay, s	41	0	0.5
HCM LOS	E		

**Minor Lane/Major Mvmt** NBT NBRWBLn1 SBL SBT

Capacity (veh/h)	-	-	280	974	-
HCM Lane V/C Ratio	-	-	0.676	0.065	-
HCM Control Delay (s)	-	-	41	9	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	4.5	0.2	-






















**Notes**

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

# HCM 2010 Signalized Intersection Summary

## 5: King of Prussia Rd & Raider Rd

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	42	272	0	60	24	299	101	14	1117	5
Future Volume (veh/h)	5	0	42	272	0	60	24	299	101	14	1117	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1800	1782	1800	1800	1782	1800
Adj Flow Rate, veh/h	5	0	45	289	0	64	26	318	107	15	1188	5
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	1	0	0	1	1
Cap, veh/h	58	20	307	396	0	340	80	1188	1018	661	1182	5
Arrive On Green	0.22	0.00	0.22	0.22	0.00	0.22	0.67	0.67	0.67	0.67	0.67	0.67
Sat Flow, veh/h	63	91	1382	1383	0	1530	477	1782	1527	977	1773	7
Grp Volume(v), veh/h	50	0	0	289	0	64	26	318	107	15	0	1193
Grp Sat Flow(s),veh/h/ln	1536	0	0	1383	0	1530	477	1782	1527	977	0	1781
Q Serve(g_s), s	0.0	0.0	0.0	15.5	0.0	3.1	0.0	6.5	2.3	0.6	0.0	60.0
Cycle Q Clear(g_c), s	2.3	0.0	0.0	17.8	0.0	3.1	60.0	6.5	2.3	7.1	0.0	60.0
Prop In Lane	0.10		0.90	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	385	0	0	396	0	340	80	1188	1018	661	0	1187
V/C Ratio(X)	0.13	0.00	0.00	0.73	0.00	0.19	0.32	0.27	0.11	0.02	0.00	1.00
Avail Cap(c_a), veh/h	385	0	0	396	0	340	80	1188	1018	661	0	1187
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	0.0	33.9	0.0	28.4	45.0	6.1	5.4	7.5	0.0	15.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	6.7	0.0	0.3	10.5	0.6	0.2	0.1	0.0	27.3
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	1.8	0.0	0.0	12.3	0.0	2.4	1.6	6.1	1.8	0.3	0.0	68.4
LnGrp Delay(d),s/veh	28.3	0.0	0.0	40.6	0.0	28.7	55.5	6.6	5.6	7.6	0.0	42.3
LnGrp LOS	C			D		C	E	A	A	A		F
Approach Vol, veh/h		50			353			451				1208
Approach Delay, s/veh		28.3			38.5			9.2				41.9
Approach LOS		C			D			A				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		65.0		25.0		65.0		25.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		59.0		19.0		59.0		19.0				
Max Q Clear Time (g_c+I1), s		62.0		4.3		62.0		19.8				
Green Ext Time (p_c), s		0.0		1.4		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				33.8								
HCM 2010 LOS				C								

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	419	2	2	1425
Future Vol, veh/h	4	4	419	2	2	1425
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	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	446	2	2	1516





















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1967	224	0	0	448
Stage 1	447	-	-	-	-
Stage 2	1520	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	63	786	-	-	1123
Stage 1	617	-	-	-	-
Stage 2	201	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	63	786	-	-	1123
Mov Cap-2 Maneuver	63	-	-	-	-
Stage 1	617	-	-	-	-
Stage 2	201	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.2	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	117	1123
HCM Lane V/C Ratio	-	-	0.073	0.002
HCM Control Delay (s)	-	-	38.2	8.2
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Future Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	110	1667	0	0	627	0	295	250	232	899	0	488
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	216	1623	0	0	1270	591	1393	277	248	858	0	0
Arrive On Green	0.07	0.48	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1695	1513	3260	899	
Grp Volume(v), veh/h	110	1667	0	0	627	0	295	250	232	899	88.1	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1693	1515	1630	F	
Q Serve(g_s), s	3.5	53.0	0.0	0.0	8.2	0.0	6.3	15.9	16.7	24.0		
Cycle Q Clear(g_c), s	3.5	53.0	0.0	0.0	8.2	0.0	6.3	15.9	16.7	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	216	1623	0	0	1270	591	1393	277	248	858		
V/C Ratio(X)	0.51	1.03	0.00	0.00	0.49	0.00	0.21	0.90	0.94	1.05		
Avail Cap(c_a), veh/h	391	1623	0	0	1270	591	1393	277	248	858		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.86	0.86	0.00	0.00	0.86	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	49.7	28.5	0.0	0.0	10.0	0.0	19.8	45.1	45.4	44.2		
Incr Delay (d2), s/veh	1.6	27.9	0.0	0.0	1.2	0.0	0.1	30.0	40.3	43.9		
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		
%ile BackOfQ(95%),veh/ln	3.0	55.6	0.0	0.0	6.9	0.0	5.1	14.8	14.9	9.4		
LnGrp Delay(d),s/veh	51.3	56.4	0.0	0.0	11.2	0.0	19.9	75.1	85.7	88.1		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1777			627			777				
Approach Delay, s/veh		56.1			11.2			57.3				
Approach LOS		E			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.8		6.0	10.7	26.5	18.7				
Green Ext Time (p_c), s		0.0	0.8		0.1	17.8	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			56.5									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1072	0	580	782	627	516		
Future Volume (veh/h)	1072	0	580	782	627	516		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1764	0	1800	1800	1818	1891		
Adj Flow Rate, veh/h	1105	0	598	806	646	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	1	0	1	1	1	1		
Cap, veh/h	2036	0	707	2328	767	367		
Arrive On Green	0.42	0.00	0.28	0.91	0.23	0.00		
Sat Flow, veh/h	5134	0	3326	3510	3359	1607		
Grp Volume(v), veh/h	1105	0	598	806	646	0		
Grp Sat Flow(s),veh/h/ln	1606	0	1663	1710	1679	1607		
Q Serve(g_s), s	18.9	0.0	18.6	3.6	20.2	0.0		
Cycle Q Clear(g_c), s	18.9	0.0	18.6	3.6	20.2	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2036	0	707	2328	767	367		
V/C Ratio(X)	0.54	0.00	0.85	0.35	0.84	0.00		
Avail Cap(c_a), veh/h	2036	0	847	2328	916	438		
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.75	0.75	1.00	0.00		
Uniform Delay (d), s/veh	23.8	0.0	37.8	1.8	40.5	0.0		
Incr Delay (d2), s/veh	1.0	0.0	5.3	0.3	6.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	3.4	0.0	13.4	3.0	15.2	0.0		
LnGrp Delay(d),s/veh	24.8	0.0	43.0	2.1	46.7	0.0		
LnGrp LOS	C		D	A	D			
Approach Vol, veh/h	1105			1404	646			
Approach Delay, s/veh	24.8			19.6	46.7			
Approach LOS	C			B	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		30.1	28.4	51.5				79.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.7	21.1	21.4				6.1
Green Ext Time (p_c), s		1.4	1.2	10.4				23.1
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			27.0					
HCM 2010 LOS			C					



# HCM 2010 Signalized Intersection Summary

## 9: Hillside Circuit & Lancaster Ave

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↕		↖ ↗	↕	↖ ↗		↕	↖ ↗			
Traffic Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Future Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.90			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1219	1871	16	6	765	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1227	2795	24	23	1616	752	18	6	19			
Arrive On Green	0.75	1.00	1.00	0.01	0.48	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3342	29	1714	3386	1575	1301	434	1375			
Grp Volume(v), veh/h	1219	919	968	6	765	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1375			
Q Serve(g_s), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1227	1376	1443	23	1616	752	24	0	19			
V/C Ratio(X)	0.99	0.67	0.67	0.26	0.47	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1227	1376	1443	109	1616	752	110	0	87			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	13.9	0.0	0.0	53.7	19.4	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	6.3	0.2	0.2	5.6	1.0	0.0	3.3	0.0	2.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	20.4	0.2	0.2	0.4	12.7	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	20.1	0.2	0.2	59.3	20.4	0.0	56.9	0.0	56.0			
LnGrp LOS	C	A	A	E	C		E		E			
Approach Vol, veh/h		3106			771			6				
Approach Delay, s/veh		8.0			20.7			56.6				
Approach LOS		A			C			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			46.0	57.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			40.0	46.0		6.0				
Max Q Clear Time (g_c+12.5), s	6.0	2.5			42.4	19.3		2.7				
Green Ext Time (p_c), s	0.0	47.4			0.0	22.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				10.6								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Future Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	126	1234	98	208	1163	132	86	222	148	431	470	226
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	207	1204	95	205	1330	593	151	348	237	332	874	417
Arrive On Green	0.06	0.38	0.38	0.08	0.40	0.40	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3196	253	1664	3352	1496	382	1323	902	1689	2221	1061
Grp Volume(v), veh/h	126	656	676	208	1163	132	221	0	235	431	357	339
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1172	0	1434	1689	1690	1591
Q Serve(g_s), s	4.5	37.7	37.7	8.0	32.1	5.8	13.0	0.0	14.5	8.0	16.2	16.4
Cycle Q Clear(g_c), s	4.5	37.7	37.7	8.0	32.1	5.8	16.8	0.0	14.5	8.0	16.2	16.4
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	207	641	658	205	1330	593	359	0	378	332	665	626
V/C Ratio(X)	0.61	1.02	1.03	1.01	0.87	0.22	0.61	0.00	0.62	1.30	0.54	0.54
Avail Cap(c_a), veh/h	207	641	658	205	1330	593	446	0	488	332	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.2	31.2	31.2	25.5	27.9	20.0	33.0	0.0	32.5	34.3	23.3	23.4
Incr Delay (d2), s/veh	5.1	41.6	42.1	66.5	8.2	0.9	1.7	0.0	1.7	154.0	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.3	45.1	46.4	17.0	22.8	4.6	9.6	0.0	9.8	35.3	12.2	11.7
LnGrp Delay(d),s/veh	28.3	72.8	73.3	92.2	36.1	20.8	34.7	0.0	34.1	188.3	24.0	24.1
LnGrp LOS	C	F	F	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1458			1503			456			1127	
Approach Delay, s/veh		69.2			42.5			34.4			86.9	
Approach LOS		E			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	42.7		44.3	11.0	44.7	13.0	31.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	29.0		46.0	5.0	31.0	7.0	33.0				
Max Q Clear Time (g_c+110), s	10.5	40.2		18.7	7.0	34.6	10.5	18.8				
Green Ext Time (p_c), s	0.0	0.0		8.9	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				61.3								
HCM 2010 LOS				E								

# Crash Data Summary Report

## UNIVERSITY OF PENNSYLVANIA HEALTH SYSTEMS

LANCASTER AVENUE & KING OF PRUSSIA ROAD  
RADNOR, PENNSYLVANIA



**James P. Markham, PE**

Pennsylvania Professional Engineer License No. PE061283

### Prepared For:

University of Pennsylvania Health System  
3400 Civic Center Boulevard  
Philadelphia, PA 19104

February 2018  
UPHS 1507



PARTNERS FOR WHAT'S POSSIBLE

[pennoni.com](http://pennoni.com)



# TABLE OF CONTENTS

<b>EXISTING CRASH HISTORY .....</b>	<b>1</b>
<b>REPORTABLE CRASH DATA.....</b>	<b>1</b>
<b>REPORTABLE CRASH SUMMARY .....</b>	<b>2</b>
<b>REPORTABLE CRASH SUMMARY TABLES .....</b>	<b>2</b>
<i>Table 1 Crash Year Summary .....</i>	<i>2</i>
<i>Table 2 Collision Type.....</i>	<i>2</i>
<i>Table 3 Crash Severity Level.....</i>	<i>3</i>
<i>Table 4 Vehicle Type.....</i>	<i>3</i>
<i>Table 5 Driver Actions .....</i>	<i>4</i>
<i>Table 6 Road Condition.....</i>	<i>4</i>
<i>Table 7 Illumination.....</i>	<i>5</i>
<i>Table 8 Weather .....</i>	<i>5</i>
<b>REPORTABLE CRASH RATE.....</b>	<b>6</b>
<b>NON-REPORTABLE CRASH DATA .....</b>	<b>6</b>
<b>NON-REPORTABLE CRASH SUMMARY .....</b>	<b>7</b>
<b>NON-REPORTABLE CRASH SUMMARY TABLES.....</b>	<b>7</b>
<i>Table 9 Crash Year Summary .....</i>	<i>7</i>
<i>Table 10 Collision Type .....</i>	<i>7</i>
<b>CRASH EVALUATION.....</b>	<b>8</b>

## APPENDICES

### Appendix A – 2011-2015 Crash Data



## Existing Crash History

Crash histories, engineering extracts, summary and resume pages for the length of the study area were requested. The accident data represents the five-year period from January 2011 to December 2015 and is the most recent data available from The Pennsylvania Department of Transportation (PennDOT) and the Radnor Police Department at the time of preparation of this report. The study area focuses on King of Prussia Road from Matsonford Road (SR 1038) to the Southern Driveway and Lancaster Avenue (SR 0030) from I-476 NB On Ramp/Hillside Circle to Radnor Chester Road (SR 1021) in the Township of Radnor in Delaware County. The study area includes six intersections: King of Prussia Road at Matsonford Road, King of Prussia at Radnor Chester Road, SR 0030 at I-476 SB Off Ramp, SR 0030 at I-476 NB Off Ramp/King of Prussia Road, SR 0030 at I-476 NB On Ramp/Hillside Circle and SR 0030 at Radnor Chester Road. PennDOT was able to provide information for the following segments:

- SR 1021 from Segments/Offsets 0060/1041 to 0060/1321 in Delaware County
- SR 1021 from Segments/Offsets 0050/2631 to 0060/0100 in Delaware County
- SR 0030 from Segments/Offsets 0070/0339 to 0070/0672 in Delaware County and Segments/Offsets 0010/1220 to 0010/1320
- SR 0030 from Segments/Offsets 0060/1604 to 0060/2243, from Segments/Offsets 0250/0000 to 0250/0232 and from Segments/Offsets 0500/1239 to 0500/1560 in Delaware County
- SR 0030 from Segments/Offsets 0070/0986 to 0070/1372 and from Segments/Offsets 0750/0000 to 0750/0226 in Delaware County
- SR 0030 in Delaware County (entire local section) – no cluster
- SR 0030 from Segments/Offsets 0050/2604 to 0060/0100 in Delaware County

The engineering extract summary classifies accident data into various categories. Crashes are classified as either reportable or non-reportable. A reportable crash is an incident that occurs on a highway or traffic way that is open to the public by right, involves at least one motor vehicle in transport, and involves either Injury to or death of any person and/or damage to any vehicle to the extent that it cannot be driven under its own power and therefore requires towing. Accidents are broken down by available information such as year, collision type, level of severity, driver actions, vehicle types, roadway conditions, lighting conditions and weather. For each category, data is presented by number of vehicles per year and by the percentage of total vehicles in the time frame.

A total of eighty-seven (87) reportable crashes and seventy-one (71) non-reportable crashes within the study limits for the five-year study period. The crash data for this project is broken down by all the study intersections along King of Prussia Road and along Lancaster Avenue. Midblock locations are not included in the study.

## Reportable Crash Data

Analysis of the reportable crashes is based on PennDOT's CDART Crash Summary sheet. Crashes were generally distributed evenly between the years 2011 and 2015. There were six collision types that occurred in the study area at the various intersections, with angle collisions making up 39% of all crashes, occurring primarily at or near intersections. Rear-end collisions are particularly high as well with 28 crashes (32%) which is most likely caused by the higher travel speeds along Lancaster Avenue (SR 0030).

The second highest collision type is rear end (32% of all crashes). Within the study area, the highest concentration of pedestrian accidents (2) occurred at the intersections of King of Prussia Road & Matsonford Road (SR 1038) and King of Prussia Road & Radnor Chester Road (SR 1021)

Refer to Tables 1 through 8 of the Reportable Crash Summary for specific crash totals and attributes within the study area.

# Reportable Crash Summary

## Reportable Crash Summary Tables

Table 1 Crash Year Summary

Year	King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp		Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps		Lancaster Avenue (SR 0030 & I-476 NB On Ramp/Hillside Circle		Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)	
	Total	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
2011	19	25%	5	26%	2	18%	1	17%	5	26%	4	17%
2012	14	25%	2	11%	1	9%	2	33%	3	16%	4	17%
2013	19	38%	1	5%	1	9%	2	33%	6	32%	6	25%
2014	15	0%	6	32%	4	36%	0	0%	1	5%	4	17%
2015	20	13%	5	26%	3	27%	1	17%	4	21%	6	25%
<b>Total</b>	<b>87</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>11</b>	<b>100%</b>	<b>6</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>24</b>	<b>100%</b>

Table 2 Collision Type

Collision Type	King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp		Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps		Lancaster Avenue (SR 0030 & I-476 NB On Ramp/Hillside Circle		Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)	
	Total	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
Hit Fixed Object	12	0%	6	32%	2	18%	1	17%	1	5%	2	8%
Angle	34	25%	7	37%	4	36%	0	0%	9	47%	12	50%
Same Direction SS	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Rear End	28	45%	3	16%	5	45%	5	83%	5	26%	6	25%
Non Coll	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Opposite Direction SS	2	0%	1	5%	0	0%	0	0%	1	5%	0	0%
Pedestrian	2	13%	1	5%	0	0%	0	0%	0	0%	0	0%
Head on Collision	9	13%	1	5%	0	0%	0	0%	3	16%	4	17%
Backing	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
<b>Total</b>	<b>87</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>11</b>	<b>100%</b>	<b>6</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>24</b>	<b>100%</b>



**Table 3 Crash Severity Level**

Crash Severity Level	Crash Severity Level	King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp		Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps		Lancaster Avenue (SR 0030 & I-476 NB On Ramp/Hillside Circle		Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)	
		TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
Major	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Moderate	2	0	0%	1	5%	0	0%	1	17%	0	0%	0	0%
Minor	7	2	25%	1	5%	0	0%	2	33%	1	5%	1	4%
UNK Severity	17	2	25%	2	11%	2	18%	0	0%	5	26%	6	25%
UNK If Injured	1	0	0%	0	0%	0	0%	0	0%	0	0%	1	4%
PDO	60	4	50%	15	79%	9	82%	3	50%	13	68%	16	67%
<b>Total</b>	<b>87</b>	<b>8</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>11</b>	<b>100%</b>	<b>6</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>24</b>	<b>100%</b>

**Table 4 Vehicle Type**

Crash Severity Count	Crash Severity Count	King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp		Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps		Lancaster Avenue (SR 0030 & I-476 NB On Ramp/Hillside Circle		Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)	
		TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
Fatalities	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Major	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Moderate	2	0	0%	1	25%	0	0%	1	33%	0	0%	0	0%
Minor	7	2	50%	1	25%	0	0%	2	67%	1	17%	1	14%
UNK Severity	17	2	50%	2	50%	2	100%	0	0%	5	83%	6	86%
UNK If Injured	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
<b>Total</b>	<b>26</b>	<b>4</b>	<b>100%</b>	<b>4</b>	<b>100%</b>	<b>2</b>	<b>100%</b>	<b>3</b>	<b>100%</b>	<b>6</b>	<b>100%</b>	<b>7</b>	<b>100%</b>

**Table 5 Driver Actions**

Driver Actions	King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp		Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps		Lancaster Avenue (SR 0030 & I-476 NB On Ramp/Hillside Circle		Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)	
	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
No Contributing Action	82	50%	12	36%	16	62%	4	36%	23	48%	19	35%
Unknown	3	0%	2	6%	0	0%	0	0%	0	0%	1	2%
Improper/ Careless Turn	25	19%	6	18%	2	8%	0	0%	3	6%	11	20%
Too Fast for Condition	10	0%	0	0%	3	12%	1	9%	2	4%	4	7%
Other Improper Driving	10	0%	4	12%	2	8%	2	18%	0	0%	2	4%
Careless Pass/ LN Change	4	0%	0	0%	0	0%	0	0%	4	8%	0	0%
Tailgating	5	13%	0	0%	0	0%	0	0%	2	4%	1	2%
Affected Physical Condition	6	0%	0	0%	0	0%	1	9%	2	4%	3	6%
Running Red Light	20	0%	3	9%	1	4%	0	0%	9	19%	7	13%
Careless Parking/ Unpark	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Careless/ Illegal Backing	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Driver Inexperienced	2	0%	1	3%	0	0%	0	0%	0	0%	1	2%
Driver Was Distracted	16	6%	4	12%	2	8%	3	27%	3	6%	3	6%
Others	5	13%	1	3%	0	0%	0	0%	0	0%	2	4%
<b>TOTAL</b>	<b>188</b>	<b>100%</b>	<b>33</b>	<b>100%</b>	<b>26</b>	<b>100%</b>	<b>11</b>	<b>100%</b>	<b>48</b>	<b>100%</b>	<b>54</b>	<b>100%</b>

**Table 6 Road Condition**

Road Condition	King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp		Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps		Lancaster Avenue (SR 0030 & I-476 NB On Ramp/Hillside Circle		Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)	
	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
Dry	70	63%	18	95%	7	64%	3	50%	15	79%	22	92%
Wet	14	38%	1	5%	2	18%	3	50%	3	16%	2	8%
Snow	2	0%	0	0%	1	9%	0	0%	1	5%	0	0%
Ice Patch	1	0%	0	0%	1	9%	0	0%	0	0%	0	0%
Other	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
<b>Total</b>	<b>87</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>11</b>	<b>100%</b>	<b>6</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>24</b>	<b>100%</b>

**Table 7 Illumination**

Illumination	King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp		Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps		Lancaster Avenue (SR 0030 & I-476 NB On Ramp/Hillside Circle		Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)		
	Total	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
Daylight	56	8	100%	17	89%	5	45%	3	50%	9	47%	14	58%
Dark	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Dawn	1	0	0%	0	0%	1	9%	0	0%	0	0%	0	0%
Street Lights	30	0	0%	2	11%	5	45%	3	50%	10	53%	10	42%
<b>Total</b>	<b>87</b>	<b>8</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>11</b>	<b>100%</b>	<b>6</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>24</b>	<b>100%</b>

**Table 8 Weather**

Weather	King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp		Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps		Lancaster Avenue (SR 0030 & I-476 NB On Ramp/Hillside Circle		Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)		
	Total	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
Clear	72	6	75%	18	95%	7	64%	4	67%	15	79%	22	92%
Rain	10	2	25%	1	5%	2	18%	2	33%	1	5%	2	8%
Rain/ Fog	2	0	0%	0	0%	0	0%	0	0%	2	11%	0	0%
Snow	3	0	0%	0	0%	2	18%	0	0%	1	5%	0	0%
Unclear	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
<b>Total</b>	<b>87</b>	<b>8</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>11</b>	<b>100%</b>	<b>6</b>	<b>100%</b>	<b>19</b>	<b>100%</b>	<b>24</b>	<b>100%</b>

## Reportable Crash Rate

$$\text{Crash Rate} = (548 \times N) / (L \times \text{ADT})$$

Where: 548 = Conversion Factor  
N = number of crashes per section of roadway  
L = length of roadway section in miles  
ADT = average daily traffic

Compare the study area crash rate to corresponding statewide rates found in the Statewide Homogenous Report for 2011-2015, obtained from the PennDOT Traffic Safety Unit (See **Appendix A**).

### **Lancaster Avenue (SR 0030) from Radnor Chester Road (SR 1021) to I-476 NB On Ramp/Hillside Circle and King of Prussia Road from Lancaster Avenue (SR 0030) to Matsonford Road (SR 1038)**

N = 87 crashes  
L = 1.42 miles  
ADT: WB = 15,314 vpd (From PennDOT ITMS - Seg 0061, Offset 0000)  
SB = 15,644 vpd (From PennDOT ITMS - Seg 0080, Offset 0000)  
TOTAL = 30,958 vpd

**2011-2015 Statewide Average for Urban NFAC Divided (0-99 ft width) ADT 0 - 99,999 = 1.91 crashes per million**

$$\text{SR 0030 Crash Rate} = (548 \times 87) / (1.42 \times 30,958) = \mathbf{1.08 < 1.91}$$

The crash rate was calculated for the entire length of the study corridor along SR 0030 and King of Prussia Road. This method was used because there are no statewide crash rates to compare to individual intersections. The crash rate calculated for the study area is lower than the Statewide Average for Urban NFAC Divided highways with 0-99 ft width and ADT of 0 to 99,000 VPD.

## Non-Reportable Crash Data

Crash data at the study intersections was requested from the Radnor Police Department. They Radnor Police Department provided crash data for non-reportable crashes at the intersections of King of Prussia Road & Matsonford Road (SR 1038), King of Prussia Road & Radnor Chester Road (SR 1021), and Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp. Crashes were present in all 5 year evaluated, primarily distributed between the years 2012 and 2015. There were four collision types that occurred in the study area at the intersections, with rear-end and same direction side-swipe making up approximately 89% of the total crashes. The remaining 11% of the crashes were composed of angle crashes (8%) and fixed object crashes (3%).

Refer to Tables 9 and 10 of the Non-Reportable Crash Summary for specific crash totals.

# Non-Reportable Crash Summary

## Non-Reportable Crash Summary Tables

**Table 9 Crash Year Summary**

Year	Year		King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp	
	Total	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
2011	5	7%	0	0%	0	0%	5	11%
2012	16	23%	3	19%	4	50%	9	19%
2013	12	17%	2	13%	2	25%	8	17%
2014	23	32%	7	44%	2	25%	14	30%
2015	15	21%	4	25%	0	0%	11	23%
<b>Total</b>	<b>71</b>	<b>100%</b>	<b>16</b>	<b>100%</b>	<b>8</b>	<b>100%</b>	<b>47</b>	<b>100%</b>

**Table 10 Collision Type**

Collision Type	Collision Type		King of Prussia Road & Matsonford Road (SR 1038)		King of Prussia Road & Radnor Chester Road (SR 1021)		Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp	
	Total	(%)	TOT.	(%)	TOT.	(%)	TOT.	(%)
Hit Fixed Object	2	3%	1	6%	1	13%	0	0%
Angle	6	8%	3	19%	2	25%	1	2%
Same Direction SS	19	27%	2	13%	3	38%	14	30%
Rear End	44	62%	10	63%	2	25%	32	68%
Non Coll	0	0%	0	0%	0	0%	0	0%
Opposite Direction SS	0	0%	0	0%	0	0%	0	0%
Pedestrian	0	0%	0	0%	0	0%	0	0%
Head on Collision	0	0%	0	0%	0	0%	0	0%
Backing	0	0%	0	0%	0	0%	0	0%
<b>Total</b>	<b>71</b>	<b>100%</b>	<b>16</b>	<b>100%</b>	<b>8</b>	<b>100%</b>	<b>47</b>	<b>100%</b>

## Crash Evaluation

Based on the historical crash data included in this report, the highest frequency of reported crashes at the study intersections are angle crashes (32) followed by rear end (28). The highest frequency of non-reported crashes at the study intersections are rear end (44) followed by same direction sideswipe (19). At each of the study intersections, the number of correctable crash incidents (reportable and non-reportable) in a rolling 12 month analysis period was evaluated. The following is the summary of the evaluation of correctable crashes:

### King of Prussia Road & Matsonford Road (SR 1038)

- 6 correctable crashes from 2011-2015
- Maximum 3 correctable crashes in a 12 month period (April 2011-April 2012, October 2011-October 2012)

### King of Prussia Road & Radnor Chester Road (SR 1021)

- 10 correctable crashes from 2011-2015
- Maximum 4 correctable crashes in a 12 month period (February 2014-February 2015)

### Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp

- 5 correctable crashes from 2011-2015
- Maximum 4 correctable crashes in a 12 month period (December 2014-December 2015)

### Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps

- 0 correctable crashes from 2011-2015

### Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circle

- 12 correctable crashes from 2011-2015
- Maximum 6 correctable crashes in a 12 month period (December 2012-December 2013)

### Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)

- 15 correctable crashes from 2011-2015
- Maximum 5 correctable crashes in a 12 month period (September 2011-September 2012, March 2012-March 2013, July 2012- July 2013, March 2103-March 2014, May 2013-May 2014, September 2013-September 2014)

A graphic of the correctable crashes is provided in **Appendix A**.

The only intersection with 5 or more correctable crashes in a 12 month period is Lancaster Avenue & I-476 NB On Ramp/Hillside Circle. A closer look at the crashes indicates that the 5 correctable crashes in a 12 month period at Lancaster Avenue & I-476 NB On-Ramp/Hillside Circle involve several different combinations of vehicular movements and that 3 of the crashes involved a vehicle running a red light and 1 involved an illegal U-turn. Due to the varied nature of the 5 correctable crashes observed in a 12 month period, there are no intersection improvements recommended to mitigate the crashes.

In general, it is recommended that the existing yellow and all-red times at all study intersections should be re-evaluated in accordance to current PennDOT standards. Typically, a warranted increase in the yellow change interval or all red clearance interval can result in a reduction in rear end crashes and could reduce instances of vehicles running red lights.

# APPENDIX A

2011-2015 Crash Data

**CRASH DATA SUMMARY REPORT**

**UNIVERSITY OF PENNSYLVANIA HEALTH  
SYSTEMS**





**SR 1021 ATSR 1038 IN RADNOR TWP IN DELAWARE CO LOG 17381-01**



Sorted by County, Route, Segment, Offset

Date Range: 1/1/2011 to 12/31/2015

Area of Interest:

(In County 23 On State Route 1021(P) Between Segment 0060 Offset 1041 and Segment 0060 Offset 1321) or (In County 23 On State Route 1038(P) Between Segment 0010 Offset 0 and Segment 0010 Offset 195)

USER ID/QUERY ID:  
jporemba / 002016052602Z

DIST	CO	COUNTY	ROUTE	BEG SEG	END SEG	END OFF	LENGTH	TOTAL CRASHES	SELECT CRASHES	SELECT ATAL COUNT	SELECT INJ COUNT	RATIO	SELECT CONCENTRATION (PER 1000 FT)	AVG ADT	SELECT RASH RATE
06	23	DELAWARE	1021	0060	0060	1221	0	8	8	0	5	100.0%	1.0	15710	
06	23	DELAWARE	1038	0010	0010	0	0	8	8	0	5	100.0%	1.0	9733	

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa.

C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

Print Date: 5/26/2016

Page 1 of 2

**SR 1021 ATSR 1038 IN RADNOR TWP IN DELAWARE CO LOG 17381-01**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526027

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 1021(P) Between Segment 0060 Offset 1041 and Segment 0060 Offset 1321) or

Interest: (In County 23 On State Route 1038(P) Between Segment 0010 Offset 0 and Segment 0010 Offset 195)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
1	<a href="#">2011036613</a>	23 04/01/2011	FRI 07:30	DAYLIGHT	WET	RAIN	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: OTHER WEATHER CONDITIONS T-INT 1021/0060/1221 1038/0010/0000 VEH: 1 SUV TRAVELING SOUTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
2	<a href="#">2011107105</a>	23 10/13/2011	THR 08:29	DAYLIGHT	WET	RAIN	0	2	0	2	MINOR INJURY
ENV RDWY FACTORS: NONE T-INT 1021/0060/1221 1038/0010/0000 VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
3	<a href="#">2012017731</a>	23 02/15/2012	WED 07:53	DAYLIGHT	DRY	CLEAR	0	1	0	3	MINOR INJURY
ENV RDWY FACTORS: NONE T-INT 1021/0060/1221 1038/0010/0000 VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TAILGATING TOO FAST FOR CONDITIONS VEH: 2 SUV TRAVELING NORTH IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 3 SUV TRAVELING NORTH IN RIGHT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION											
4	<a href="#">2012090466</a>	23 09/12/2012	WED 08:49	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: GLARE T-INT 1021/0060/1221 1038/0010/0000 VEH: 1 AUTOMOBILE TRAVELING SOUTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING NORTH IN OTHER FWD MOVING LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
5	<a href="#">2013029062</a>	23 02/26/2013	TUE 07:33	DAYLIGHT	DRY	CLEAR	0	1	0	2	UNK SEVERITY
ENV RDWY FACTORS: NONE T-INT 1021/0060/1221 1038/0010/0000 VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS VEH: 2 SUV TRAVELING NORTH IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											

**SR 1021 ATSR 1038 IN RADNOR TWP IN DELAWARE CO LOG 17381-01**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526027

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 1021(P) Between Segment 0060 Offset 1041 and Segment 0060 Offset 1321) or

Interest: (In County 23 On State Route 1038(P) Between Segment 0010 Offset 0 and Segment 0010 Offset 195)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
6	<a href="#">2013067962</a>	23 07/03/2013	WED 18:25	DAYLIGHT	WET	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END 4WAY 1021/0060/1221 1038/0010/0000 ----- VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TAILGATING ----- VEH: 2 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: SUDDEN SLOWING / STOPPING											
7	<a href="#">2013120337</a>	23 11/19/2013	TUE 14:26	DAYLIGHT	DRY	CLEAR	0	1	1	1	UNK SEVERITY
ENV RDWY FACTORS: NONE PEDESTRIAN OTHR 1021/0060/1221 1038/0010/0000 ----- VEH: 1 SUV TRAVELING IN OTHER GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION ----- VEH: 2 VEH EVENTS: HIT UNIT 01											
8	<a href="#">2015104287</a>	23 10/05/2015	MON 09:40	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END T-INT 1021/0060/1221 1038/0010/0000 ----- VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE CHANGING LANES OR MERGING VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED ----- VEH: 2 VAN TRAVELING NORTH IN RIGHT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											

---

## SR 1021 ATSR 1038 IN RADNOR TWP IN DELAWARE CO LOG 17381-01

Sorted by County, Route, Segment, Offset

### NOTES:

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

### REPORT PARAMETERS:

Query ID: [0020160526027](#)

User ID: jporemba

Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0060 Offset 1041 and Segment 0060 Offset 1321) or (In County 23 On State Route 1038(P) Between Segment 0010 Offset 0 and Segment 0010 Offset 195)

Date Range: 1/1/2011 to 12/31/2015

Criteria:

**SR 1021 ATSR 1038 IN RADNOR TWP IN DELAWARE CO LOG 17381-01**



USER ID/QUERY ID:  
jporambar\_0020160526027

Date Range: 1/1/2011 to 12/31/2015  
Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0060 Offset 1041 and Segment 0060 Offset 1321) or (In County 23 On State Route 1038(P) Between Segment 0010 Offset 0 and Segment 0010 Offset 195)

**MONTH OF YEAR**

	FEB	APR	JUL	SEP	OCT	NOV
CRASHES	2	1	1	1	2	1
PCT	25%	13%	13%	13%	25%	13%
TOTAL	8					8
	25%	13%	13%	13%	25%	13%
	100%				100%	100%

**DAY OF WEEK**

	MON	TUE	WED	THR	FRI
CRASHES	1	2	3	1	1
PCT	13%	25%	38%	13%	13%
TOTAL	8				8
	13%	25%	38%	13%	13%
	100%				100%

**HOUR OF DAY**

	07	08	09	14	18
CRASHES	3	2	1	1	1
PCT	38%	25%	13%	13%	13%
TOTAL	8				8
	38%	25%	13%	13%	13%
	100%				100%

**YEAR**

YEAR	CRASHES	PCT
2011	2	25%
2012	2	25%
2013	3	38%
2015	1	13%
TOTAL	8	100%

**COLLISION TYPE**

	CRASHES	PCT
REAR END	4	50%
ANGLE	2	25%
HEAD ON	1	13%
PEDESTRIAN	1	13%
TOTAL	8	100%

**CRASH SEVERITY LEVEL**

	CRASHES	PCT
MINOR	2	25%
UNK SEVERITY	2	25%
PDO	4	50%
TOTAL	8	100%

**SEVERITY COUNT**

	PERSONS
FATALITIES	0
MAJOR	0
MODERATE	0
MINOR	2
UNK SEVERITY	3
UNK IF INJURED	0

**DRIVER ACTIONS**

	ACTIONS	PCT
NO CONTRIBUTING ACTION	8	47%
IMPROPER/CARELESS TURN	3	18%
TAILGATING	2	12%
DRIVER WAS DISTRACTED	1	6%
OTHER IMPROPER DRIVING	1	6%
SUDDEN SLOWING/STOP	1	6%
TOO FAST FOR CONDITION	1	6%
TOTAL	17	100%

**VEHICLE TYPE**

	VEHICLES	PCT
AUTOMOBILE	10	63%
SUV	5	31%
VAN	1	6%
TOTAL	16	100%

**ROAD CONDITION**

	CRASHES	PCT
DRY	5	63%
WET	3	38%
TOTAL	8	100%

**ILLUMINATION**

	CRASHES	PCT
DAYLIGHT	8	100%
TOTAL	8	100%

**WEATHER**

	CRASHES	PCT
CLEAR	6	75%
RAIN	2	25%
TOTAL	8	100%

**ENVIR/ROADWAY FACTORS**

	FACTORS	PCT
NONE	6	75%
GLARE	1	13%
OTHER WEATHER COND	1	13%
TOTAL	8	100%

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

CDART - CRASH SUMMARY REPORT (09-06)

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**REPORT PARAMETERS:**

Query ID: [002016052602Z](#)  
User ID: jporemba  
Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0060 Offset 1041 and Segment 0060 Offset 1321) or (In County 23 On State Route 1038(P) Between Segment 0010 Offset 0 and Segment 0010 Offset 195)  
Date Range: 1/1/2011 to 12/31/2015  
Criteria:



# SR 1021 AT KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-02

Sorted by County, Route, Segment, Offset

Date Range: 1/1/2011 to 12/31/2015

Area of Interest:

(In County 23 On State Route 1021(P) Between Segment 0050 Offset 2631 and Segment 0060 Offset 100)

USER ID/QUERY ID:  
jporemba / 0020160526028

DIST	CO	COUNTY	ROUTE	BEG SEG	END SEG	BEG OFF	END OFF	LENGTH	TOTAL CRASHES	SELECT CRASHES	SELECT ATAL COUNT	SELECT INJ COUNT	RATIO	SELECT CONCENTRATION (PER 1000 FT)	ADT	AVG SELECT RATE
06	23	DELAWARE	1021	0050	0060	2672	0060	13	19	19	0	5	100.0%	263.9	10258	74.43

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

Print Date: 5/26/2016

Page 1 of 2

<u>DIST</u>	<u>CO</u>	<u>COUNTY</u>	<u>ROUTE</u>	<u>BEG</u>	<u>END</u>	<u>BEG</u>	<u>END</u>	<u>LENGTH</u>	<u>TOTAL</u>	<u>SELECT</u>	<u>SELECT</u>	<u>SELECT</u>	<u>SELECT</u>	<u>SELECT</u>	<u>SELECT</u>	<u>AVG</u>	<u>SELECT</u>
				<u>OFF</u>	<u>SEG</u>	<u>OFF</u>	<u>SEG</u>		<u>CRASHES</u>	<u>CRASHES</u>	<u>ATL</u>	<u>INJ</u>	<u>RATIO</u>	<u>CONCENTRATION</u>	<u>ADT</u>	<u>RASH</u>	<u>RATE</u>
										<u>COUNT</u>	<u>COUNT</u>	<u>COUNT</u>		<u>(PER 1000 FT)</u>			

**SR 1021 AT KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-02**

**NOTES:**

- The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.  
Complete data years
- Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**QUERY PARAMETERS:**

**Note:** This report includes data for state roads only

Query ID: 0020160526028

User ID: jporemba

Min Crashes: 5 Crashes

Cluster:

Tolerance: 1000 ft

Max Gap: 0 ft

Min Ratio: 0 %

Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0050 Offset 2631 and Segment 0060 Offset 100)

Date: 1/1/2011 to 12/31/2015

Criteria: STATE\_ROAD



**SR 1021 AT KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-02**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526028

Date Range: 1/1/2011 to 12/31/2015

Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0050 Offset 2631 and Segment 0060 Offset 100)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
1	<a href="#">2012118611</a>	23 11/26/2012	MON 10:42	DAYLIGHT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY HIT FIXED OBJ
ENV RDWY FACTORS: NONE MIDB 1021/0050/2672 VEH: 1 LARGE TRUCK TRAVELING NORTH IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT OTHER FIXED OBJECT DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS										
2	<a href="#">2011003801</a>	23 01/04/2011	TUE 06:48	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY ANGLE
ENV RDWY FACTORS: NONE Y-INT 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 HIT CURB HIT TREE OR SHRUBBERY DVR ACTIONS: RUNNING RED LIGHT VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 HIT CURB HIT TREE OR SHRUBBERY DVR ACTIONS: NO CONTRIBUTING ACTION										
3	<a href="#">2011036602</a>	23 03/29/2011	TUE 08:15	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY REAR-END
ENV RDWY FACTORS: NONE Y-INT 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS VEH: 2 VAN TRAVELING NORTH IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
4	<a href="#">2011071073</a>	23 07/14/2011	THR 14:54	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY ANGLE
ENV RDWY FACTORS: NONE Y-INT 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: RUNNING RED LIGHT VEH: 2 SUV TRAVELING WEST IN LEFT OF TRAFFICWAY GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
5	<a href="#">2011131693</a>	23 12/14/2011	WED 17:14	STREET LT	DRY	CLEAR	0	1	1 1	MODERATE INJURY PEDESTRIAN
ENV RDWY FACTORS: NONE T-INT 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING SOUTH IN OTHER FWD MOVING LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 VEH EVENTS: STRUCK BY UNIT 01										

**SR 1021 AT KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-02**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526028

Date Range: 1/1/2011 to 12/31/2015

Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0050 Offset 2631 and Segment 0060 Offset 100)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
6	<a href="#">2014049230</a>	23 05/14/2014	WED 14:24	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE T-INT 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: UNKNOWN VEH: 2 AUTOMOBILE TRAVELING SOUTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: UNKNOWN										
7	<a href="#">2014081381</a>	23 08/21/2014	THR 11:59	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE T-INT 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT VEH: 2 SUV TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
8	<a href="#">2014107874</a>	23 10/28/2014	TUE 13:09	DAYLIGHT	DRY	CLEAR	0	2	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE ANGLE 4WAY 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING EAST IN RIGHT LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
9	<a href="#">2015053380</a>	23 05/01/2015	FRI 01:06	STREET LT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: NONE HIT FIXED OBJ OTHR 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 LARGE TRUCK TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT OTHER FIXED OBJECT DVR ACTIONS: FAILURE TO RESPOND TO TCD OTHER IMPROPER DRIV ACTIONS										
10	<a href="#">2013085092</a>	23 08/19/2013	MON 13:50	DAYLIGHT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: NONE HIT FIXED OBJ MIDB 1021/0060/0009 VEH: 1 SMALL TRUCK TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT OTHER FIXED OBJECT DVR ACTIONS: FAILURE TO RESPOND TO TCD										
11	<a href="#">2015115454</a>	23 11/03/2015	TUE 09:38	DAYLIGHT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: NONE HIT FIXED OBJ MIDB 1021/0060/0009 VEH: 1 SMALL TRUCK TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT CONCRETE / LONGIT BARRIER DVR ACTIONS: FAILURE TO RESPOND TO TCD										

**SR 1021 AT KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-02**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526028

Date Range: 1/1/2011 to 12/31/2015

Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0050 Offset 2631 and Segment 0060 Offset 100)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
12	<a href="#">2011023989</a>	23 02/25/2011	FRI 11:55	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY OPP DIR SIDESW
ENV RDWY FACTORS: NONE 4WAY 1021/0060/0013 N RADNOR CHESTER RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN ONCOMING TRAFFIC LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 SMALL TRUCK TRAVELING SOUTH IN OTHER FWD MOVING LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
13	<a href="#">2012019428</a>	23 02/16/2012	THR 09:19	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY ANGLE
ENV RDWY FACTORS: NONE T-INT 1021/0060/0013 RADNOR CHESTER RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN OTHER IMPROPER DRIV ACTIONS VEH: 2 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
14	<a href="#">2014093129</a>	23 09/23/2014	TUE 09:29	DAYLIGHT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY HIT FIXED OBJ
ENV RDWY FACTORS: NONE OTHR 1021/0060/0013 RADNOR CHESTER RD VEH: 1 AUTOMOBILE TRAVELING WEST IN OTHER GOING STRAIGHT VEH EVENTS: HIT OTHER FIXED OBJECT DVR ACTIONS: DRIVER WAS DISTRACTED										
15	<a href="#">2014119057</a>	23 11/17/2014	MON 15:33	DAYLIGHT	WET	RAIN	0	1	0 2	MINOR INJURY REAR-END
ENV RDWY FACTORS: NONE 4WAY 1021/0060/0013 N RADNOR CHESTER RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
16	<a href="#">2014130298</a>	23 12/15/2014	MON 14:40	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY REAR-END
ENV RDWY FACTORS: NONE T-INT 1021/0060/0013 RADNOR CHESTER RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
17	<a href="#">2015068907</a>	23 06/22/2015	MON 19:29	DAYLIGHT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY HIT FIXED OBJ
ENV RDWY FACTORS: NONE T-INT 1021/0060/0013 N RADNOR CHESTER RD VEH: 1 AUTOMOBILE TRAVELING SOUTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT CURB DVR ACTIONS: DRIVER INEXPERIENCED										

**SR 1021 AT KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-02**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

Date Range: 1/1/2011 to 12/31/2015

jporemba/ 0020160526028

Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0050 Offset 2631 and Segment 0060 Offset 100)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
18	<a href="#">2015091877</a>	23 09/03/2015	THR 16:10	DAYLIGHT	DRY	CLEAR	0	1	0	2	UNK SEVERITY
ENV RDWY FACTORS: NONE MULT 1021/0060/0013 RADNOR CHESTER RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING SOUTH IN OTHER FWD MOVING LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
19	<a href="#">2015101856</a>	23 09/18/2015	FRI 12:09	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 1021/0060/0013 N RADNOR CHESTER RD VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											

---

## SR 1021 AT KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-02

Sorted by County, Route, Segment, Offset

### NOTES:

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

### REPORT PARAMETERS:

Query ID: [0020160526028](#)

User ID: jporemba

Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0050 Offset 2631 and Segment 0060 Offset 100)

Date Range: 1/1/2011 to 12/31/2015

Criteria:

# SR 1021 AT KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-02



Date Range: 1/1/2011 to 12/31/2015  
 Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0050 Offset 2631 and Segment 0060 Offset 100)

USER ID/QUERY ID:  
 jporombal\_0020160526028

## MONTH OF YEAR

	JAN	FEB	MAR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CRASHES	1	2	1	2	1	1	2	3	1	3	2
PCT	5%	11%	5%	11%	5%	5%	11%	16%	5%	16%	11%
	19										100%

## DAY OF WEEK

	MON	TUE	WED	THR	FRI
CRASHES	5	5	2	4	3
PCT	26%	26%	11%	21%	16%
	100%				100%

## HOUR OF DAY

	01	06	08	09	10	11	12	13	14	15	16	17	19
CRASHES	1	1	1	3	1	2	1	2	3	1	1	1	1
PCT	5%	5%	5%	16%	5%	11%	5%	11%	16%	5%	5%	5%	5%
	100%												100%

## YEAR

YEAR	CRASHES	PCT
2011	5	26%
2012	2	11%
2013	1	5%
2014	6	32%
2015	5	26%
TOTAL	19	100%

## COLLISION TYPE

	CRASHES	PCT
ANGLE	7	37%
HIT FIX OBJ	6	32%
REAR END	3	16%
HEAD ON	1	5%
OPP DIR SS	1	5%
PEDESTRIAN	1	5%
TOTAL	19	100%

## CRASH SEVERITY LEVEL

	CRASHES	PCT
MODERATE	1	5%
MINOR	1	5%
UNK SEVERITY	2	11%
PDO	15	79%
TOTAL	19	100%

## SEVERITY COUNT

	PERSONS
FATALITIES	0
MAJOR	0
MODERATE	1
MINOR	1
UNK SEVERITY	3
UNK IF INJURED	0

## DRIVER ACTIONS

	ACTIONS	PCT
NO CONTRIBUTING ACTION	11	33%
IMPROPER/CARELESS TURN	5	15%
DRIVER WAS DISTRACTED	4	12%
OTHER IMPROPER DRIVING	4	12%
FAILURE TO RESPOND TCD	3	9%
RUNNING RED LIGHT	3	9%
UNKNOWN	2	6%
DRIVER INEXPERIENCED	1	3%
TOTAL	33	100%

## VEHICLE TYPE

	VEHICLES	PCT
AUTOMOBILE	19	61%
SUV	6	19%
SMALL TRUCK	3	10%
LARGE TRUCK	2	6%
VAN	1	3%
TOTAL	31	100%

## ROAD CONDITION

	CRASHES	PCT
DRY	18	95%
WET	1	5%
TOTAL	19	100%

## ILLUMINATION

	CRASHES	PCT
DAYLIGHT	17	89%
STREET LIGHTS	2	11%
TOTAL	19	100%

## WEATHER

	CRASHES	PCT
CLEAR	18	95%
RAIN	1	5%
TOTAL	19	100%

## ENVIR/ROADWAY FACTORS

	FACTORS	PCT
NONE	19	100%
TOTAL	19	100%

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

CDART - CRASH SUMMARY REPORT (09-06)

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**REPORT PARAMETERS:**

Query ID: [0020160526028](#)

User ID: jporemba

Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0050 Offset 2631 and Segment 0060 Offset 100)

Date Range: 1/1/2011 to 12/31/2015

Criteria:



# SR 30 AT SR 476 OFF RAMP / KING OF PRUSSIA RD IN DELAWARE CO LOG 17381-03

Sorted by County, Route, Segment, Offset

Date Range: 1/1/2011 to 12/31/2015

USER ID/QUERY ID:  
jporemba / 0020160526029

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0070 Offset 339 and Segment 0070 Offset 672) or (In County 23 On State Route 8039(P) Between Segment 0010 Offset 1220 and Segment 0010 Offset 1320)  
Offset 339 and Segment 0071 Offset 672) or (In County 23 On State Route 8039(P) Between Segment 0010 Offset 1220 and Segment 0010 Offset 1320)

DIST	CO	COUNTY	ROUTE	BEG SEG	END SEG	BEG OFF	END OFF	LENGTH	TOTAL CRASHES	SELECT CRASHES	SELECT ATAL COUNT	SELECT INJ COUNT	RATIO	SELECT CONCENTRATION (PER 1000 FT)	AVG ADT	SELECT RASH RATE
06	23	DELAWARE	0030	0070	0070	340	440	100	13	13	0	4	100.0%	130.0	15301	24.58
06	23	DELAWARE	0030	0071	0071	439	439	0	10	10	0	3	100.0%	1.0	8918	
06	23	DELAWARE	8039	0010	0010	1320	1320	0	16	11	0	3	68.8%	1.0	8204	

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

Print Date: 5/26/2016

Page 1 of 2



**SR 30 AT SR 476 OFF RAMP / KING OF PRUSSIA RD IN DELAWARE CO LOG 17381-03**

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete. Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.  
Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015
- 3

**QUERY PARAMETERS:**

**Note:** This report includes data for state roads only

Query ID: [0020160526029](#)

User ID: jporemba

Min Crashes: 5 Crashes

Cluster:

Tolerance: 1000 ft

Max Gap: 0 ft

Min Ratio: 0 %

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0070 Offset 339 and Segment 0070 Offset 672) or (In County 23 On State Route 0030(S) Between Segment 0071 Offset 339 and Segment 0071 Offset 672) or (In County 23 On State Route 8039(P) Between Segment 0010 Offset 1220 and Segment 0010 Offset 1320)

Date: 1/1/2011 to 12/31/2015

Criteria:

STATE\_ROAD

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

**SR 30 AT SR 476 OFF RAMP / KING OF PRUSSIA RD IN DELAWARE CO LOG 17381-03**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526029

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0070 Offset 339 and Segment 0070 Offset 672) or (In

Interest: County 23 On State Route 0030(S) Between Segment 0071 Offset 339 and Segment 0071 Offset 672) or (In County 23 On State Route 8039(P) Between Segment 0010 Offset 1220 and Segment 0010 Offset 1320)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
1	<a href="#">2011052504</a>	23 05/23/2011	MON 10:07	DAYLIGHT	DRY	CLEAR	0	1	0	2	MINOR INJURY
ENV RDWY FACTORS: NONE REAR-END											
MIDB 0030/0070/0340											
VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: PROCEED W/O CLEARANCE											
VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 01											
DVR ACTIONS: NO CONTRIBUTING ACTION											
2	<a href="#">2013082405</a>	23 08/10/2013	SAT 21:12	STREET LT	DRY	CLEAR	0	0	0	3	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END											
MIDB 0030/0070/0340											
VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS											
VEH: 2 SUV TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 01 STRUCK BY UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 3 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 02											
DVR ACTIONS: NO CONTRIBUTING ACTION											
3	<a href="#">2011015432</a>	23 01/26/2011	WED 06:09	STREET LT	SNOW	SNOW	0	0	0	3	PROP DMG ONLY
ENV RDWY FACTORS: SLIPPERY ROAD (ICE/SNOW) OTHER WEATHER CONDITIONS HIT FIXED OBJ											
4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD											
VEH: 1 SMALL TRUCK TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT											
VEH EVENTS: HIT UNIT 02 STRUCK BY UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 2 AUTOMOBILE TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT											
VEH EVENTS: HIT CURB STRUCK BY UNIT 01											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 3 AUTOMOBILE TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT											
VEH EVENTS: HIT UNIT 01											
DVR ACTIONS: NO CONTRIBUTING ACTION											
4	<a href="#">2011128066</a>	23 12/06/2011	TUE 11:32	DAYLIGHT	WET	RAIN	0	1	0	2	UNK SEVERITY
ENV RDWY FACTORS: NONE REAR-END											
4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD											
VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: DRIVER WAS DISTRACTED											
VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 01											
DVR ACTIONS: NO CONTRIBUTING ACTION											

**SR 30 AT SR 476 OFF RAMP / KING OF PRUSSIA RD IN DELAWARE CO LOG 17381-03**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

Date Range: 1/1/2011 to 12/31/2015

jporemba/ 0020160526029

Area of (In County 23 On State Route 0030(P) Between Segment 0070 Offset 339 and Segment 0070 Offset 672) or (In

Interest: County 23 On State Route 0030(S) Between Segment 0071 Offset 339 and Segment 0071 Offset 672) or (In County 23 On State Route 8039(P) Between Segment 0010 Offset 1220 and Segment 0010 Offset 1320)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
5	<a href="#">2012055204</a>	23 06/01/2012	FRI 16:53	DAYLIGHT	DRY	CLEAR	0	2	0	3	UNK SEVERITY
ENV RDWY FACTORS: NONE REAR-END											
4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD											
VEH: 1 VAN TRAVELING NORTH IN LEFT TURN LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: SPEEDING TOO FAST FOR CONDITIONS											
VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 3 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: STRUCK BY UNIT 02											
DVR ACTIONS: NO CONTRIBUTING ACTION											
6	<a href="#">2013009054</a>	23 01/16/2013	WED 21:00	STREET LT	DRY	CLEAR	0	0	0	4	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END											
4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD											
VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: DRIVER WAS DISTRACTED TAILGATING											
VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 3 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 02 HIT UNIT 04											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 4 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
7	<a href="#">2014029660</a>	23 03/06/2014	THR 13:39	DAYLIGHT	DRY	CLEAR	0	0	0	3	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END											
4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD											
VEH: 1 AUTOMOBILE TRAVELING EAST IN OTHER FWD MOVING LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: TOO FAST FOR CONDITIONS											
VEH: 2 SUV TRAVELING EAST IN OTHER FWD MOVING LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 3 SUV TRAVELING EAST IN OTHER FWD MOVING LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 02											
DVR ACTIONS: NO CONTRIBUTING ACTION											
8	<a href="#">2014097357</a>	23 09/26/2014	FRI 05:48	DAWN	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END											
4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD											
VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS											
VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 01											
DVR ACTIONS: NO CONTRIBUTING ACTION											

**SR 30 AT SR 476 OFF RAMP / KING OF PRUSSIA RD IN DELAWARE CO LOG 17381-03**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526029

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0070 Offset 339 and Segment 0070 Offset 672) or (In

Interest: County 23 On State Route 0030(S) Between Segment 0071 Offset 339 and Segment 0071 Offset 672) or (In

County 23 On State Route 8039(P) Between Segment 0010 Offset 1220 and Segment 0010 Offset 1320)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
9	<a href="#">2014100281</a>	23 10/12/2014	SUN 22:29	STREET LT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT CURB DVR ACTIONS: IMPROPER/CARELESS TURN ALC TEST: 99 HIT FIXED OBJ										
10	<a href="#">2014123898</a>	23 12/08/2014	MON 17:48	STREET LT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ONRM 0030/0070/0440 8039/0010/1320 VEH: 1 SUV TRAVELING NORTH IN OTHER CHANGING LANES OR MERGING VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN FAILURE TO RESPOND TO TCD IMPROPER ENTRANCE TO HIGHWAY VEH: 2 VAN TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION ANGLE										
11	<a href="#">2015010866</a>	23 01/24/2015	SAT 20:28	STREET LT	ICE PATCH	SNOW	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: OTHER WEATHER CONDITIONS 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: SUDDEN SLOWING / STOPPING VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION ANGLE										
12	<a href="#">2015052147</a>	23 04/22/2015	WED 14:59	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TOO FAST FOR CONDITIONS VEH: 2 SMALL TRUCK TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION ANGLE										
13	<a href="#">2015058902</a>	23 05/21/2015	THR 12:04	DAYLIGHT	WET	RAIN	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: RUNNING RED LIGHT ANGLE										

---

## SR 30 AT SR 476 OFF RAMP / KING OF PRUSSIA RD IN DELAWARE CO LOG 17381-03

Sorted by County, Route, Segment, Offset

### NOTES:

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

### REPORT PARAMETERS:

Query ID: [0020160526029](#)

User ID: jporemba

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0070 Offset 339 and Segment 0070 Offset 672) or (In County 23 On State Route 0030(S) Between Segment 0071 Offset 339 and Segment 0071 Offset 672) or (In County 23 On State Route 8039(P) Between Segment 0010 Offset 1220 and Segment 0010 Offset 1320)

Date Range: 1/1/2011 to 12/31/2015

Criteria:

# SR 30 AT SR 476 OFF RAMP / KING OF PRUSSIA RD IN DELAWARE CO LOG 17381-03



USER\_ID/QUERY ID:  
jporombal\_0020160526029

Date Range: 1/1/2011 to 12/31/2015  
 Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0070 Offset 339 and Segment 0070 Offset 672) or (In County 23 On State Route 0030(S) Between Segment 0071 Offset 339 and Segment 0071 Offset 672) or (In County 23 On State Route 8039(P) Between Segment 0010 Offset 1220 and Segment 0010 Offset 1320)

## MONTH OF YEAR

	JAN	MAR	APR	MAY	JUN	AUG	SEP	OCT	DEC
CRASHES	3	1	1	2	1	1	1	1	2
PCT	23%	8%	8%	15%	8%	8%	8%	8%	15%

## DAY OF WEEK

	SUN	MON	TUE	WED	THR	FRI	SAT
CRASHES	1	2	1	3	2	2	2
PCT	8%	15%	8%	23%	15%	15%	15%

## HOUR OF DAY

	05	06	10	11	12	13	14	16	17	20	21	22
CRASHES	1	1	1	1	1	1	1	1	1	1	2	1
PCT	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	15%	8%

## YEAR

YEAR	CRASHES	PCT
2011	3	23%
2012	1	8%
2013	2	15%
2014	4	31%
2015	3	23%
TOTAL	13	100%

## COLLISION TYPE

	CRASHES	PCT
REAR END	7	54%
ANGLE	4	31%
HIT FIX OBJ	2	15%
TOTAL	13	100%

## CRASH SEVERITY LEVEL

	CRASHES	PCT
MINOR	1	8%
UNK SEVERITY	2	15%
PDO	10	77%
TOTAL	13	100%

## SEVERITY COUNT

	PERSONS
FATALITIES	0
MAJOR	0
MODERATE	0
MINOR	1
UNK SEVERITY	3
UNK IF INJURED	0

## DRIVER ACTIONS

	ACTIONS	PCT
NO CONTRIBUTING ACTION	19	54%
TOO FAST FOR CONDITION	3	9%
DRIVER WAS DISTRACTED	2	6%
IMPROPER/CARELESS TURN	2	6%
OTHER IMPROPER DRIVING	2	6%
FAILURE TO RESPOND TCD	1	3%
IMPROPER ENTRANCE HWY	1	3%
PROCEED W/O CLEARANCE	1	3%
RUNNING RED LIGHT	1	3%
SPEEDING	1	3%
SUDDEN SLOWING/STOP	1	3%
TAILGATING	1	3%
TOTAL	35	100%

## VEHICLE TYPE

	VEHICLES	PCT
AUTOMOBILE	21	68%
SUV	6	19%
SMALL TRUCK	2	6%
VAN	2	6%
TOTAL	31	100%

## ROAD CONDITION

	CRASHES	PCT
DRY	9	69%
WET	2	15%
ICE PATCH	1	8%
SNOW	1	8%
TOTAL	13	100%

## ILLUMINATION

	CRASHES	PCT
DAYLIGHT	6	46%
STREET LIGHTS	6	46%
DAWN	1	8%
TOTAL	13	100%

## WEATHER

	CRASHES	PCT
CLEAR	9	69%
RAIN	2	15%
SNOW	2	15%
TOTAL	13	100%

## ENVIR/ROADWAY FACTORS

	FACTORS	PCT
NONE	11	79%
OTHER WEATHER COND	2	14%
SLIPPERY ICE/SNOW	1	7%
TOTAL	14	100%

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

CDART - CRASH SUMMARY REPORT (09-06)

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**REPORT PARAMETERS:**

Query ID: [0020160526029](#)  
User ID: jporemba  
Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0070 Offset 339 and Segment 0070 Offset 672) or (In County 23 On State Route 0030(S) Between Segment 0071 Offset 339 and Segment 0071 Offset 672) or (In County 23 On State Route 8039(P) Between Segment 0010 Offset 1220 and Segment 0010 Offset 1320)  
Date Range: 1/1/2011 to 12/31/2015  
Criteria:

**SR 30 AT SR 476 SB ON / OFF RAMPS IN RADNOR TWP IN DELAWARE CO LOG 17381-04**



Sorted by County, Route, Segment, Offset

Date Range: 1/1/2011 to 12/31/2015

Area of Interest:

(In County 23 On State Route 0030(P) Between Segment 0060 Offset 1604 and Segment 0060 Offset 2243) or (In County 23 On State Route 0030(S) Between Segment 0061 Offset 1604 and Segment 0061 Offset 2243) or (In County 23 On State Route 8039(P) Between Segment 0250 Offset 0 and Segment 0250 Offset 232) or (In County 23 On State Route 8039(P) Between Segment 0260 Offset 0 and Segment 0260 Offset 210) or (In County 23 On State Route 8039(P) Between Segment 0500 Offset 1239 and Segment 0500 Offset 15...**See more details at the end of the report**

USER ID/QUERY ID:  
jporemba / 0020160526033

DIST	CO	COUNTY	ROUTE	BEG SEG	BEG OFF	END SEG	END OFF	LENGTH	TOTAL CRASHES	SELECT CRASHES	SELECT ATAL COUNT	SELECT INJ COUNT	SELECT RATIO	SELECT CONCENTRATION (PER 1000 FT)	AVG SELECT ADT	SELECT RASH RATE
06	23	DELAWARE	0030	0060	1604	0060	1913	309	10	10	0	4	100.0%	32.4	10517	8.90
06	23	DELAWARE	0030	0061	1850	0061	2172	322	8	8	0	4	100.0%	24.8	8918	8.06
06	23	DELAWARE	8039	0250	0	0250	0	0	16	5	0	4	31.3%	1.0	7320	
06	23	DELAWARE	8039	0500	1386	0500	1560	174	25	8	0	3	32.0%	46.0	10820	12.29

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa.

C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

Print Date: 5/26/2016

Page 1 of 2



**SR 30 AT SR 476 SB ON / OFF RAMPS IN RADNOR TWP IN DELAWARE CO LOG 17381-04**

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.  
Complete data years
- 3 Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**QUERY PARAMETERS:**

**Note:** This report includes data for state roads only

Query ID: [0020160526033](#)

User ID: jporemba

Min Crashes: 5 Crashes

Cluster:

Tolerance: 1000 ft

Max Gap: 0 ft

Min Ratio: 0 %

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0060 Offset 1604 and Segment 0060 Offset 2243) or (In County 23 On State Route 0030(S) Between Segment 0061 Offset 1604 and Segment 0061 Offset 2243) or (In County 23 On State Route 8039(P) Between Segment 0250 Offset 0 and Segment 0250 Offset 232) or (In County 23 On State Route 8039(P) Between Segment 0260 Offset 0 and Segment 0260 Offset 210) or (In County 23 On State Route 8039(P) Between Segment 0500 Offset 1239 and Segment 0500 Offset 1560)

Date: 1/1/2011 to 12/31/2015

Criteria:

STATE\_ROAD

**SR 30 AT SR 476 SB ON / OFF RAMPS IN RADNOR TWP IN DELAWARE CO LOG 17381-04**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526033

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0060 Offset 1604 and Segment 0060 Offset 2243) or  
 Interest: (In County 23 On State Route 0030(S) Between Segment 0061 Offset 1604 and Segment 0061 Offset 2243) or  
 (In County 23 On State Route 8039(P) Between Segment 0250 Offset 0 and Segment 0250 Offset 232) or (In  
 County 23 On Sta...**See more details at the end of the report**

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
1	<a href="#">2012029607</a>	23 03/15/2012	THR 19:42	DARK	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END MIDB 0030/0060/1604 VEH: 1 SUV TRAVELING EAST IN LEFT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: HIT UNIT 02 DVR ACTIONS: UNKNOWN VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT TURN LANE SLOWING OR STOPPING IN LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
2	<a href="#">2013061942</a>	23 06/12/2013	WED 17:17	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END T-INT 0030/0060/1704 8039/0260/0000 VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: AFFECTED BY PHYSICAL COND VEH: 2 SMALL TRUCK TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
3	<a href="#">2011022833</a>	23 02/24/2011	THR 21:15	STREET LT	WET	RAIN	0	1	0	2	MINOR INJURY
ENV RDWY FACTORS: OTHER WEATHER CONDITIONS REAR-END 4WAY 0030/0060/1874 0030/0061/1870 8039/0250/0000 8039/0500/1560 VEH: 1 VAN TRAVELING EAST IN OTHER FWD MOVING LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 AUTOMOBILE TRAVELING EAST IN OTHER FWD MOVING LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
4	<a href="#">2013072874</a>	23 07/12/2013	FRI 10:12	DAYLIGHT	DRY	CLEAR	0	1	0	2	MINOR INJURY
ENV RDWY FACTORS: NONE REAR-END T-INT 0030/0060/1874 0030/0061/1880 8039/0250/0000 VEH: 1 SMALL TRUCK TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS											
5	<a href="#">2014111723</a>	23 11/05/2014	WED 14:30	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END OFRM 0030/0060/1874 8039/0250/0000 VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE CHANGING LANES OR MERGING VEH EVENTS: HIT UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS VEH: 2 AUTOMOBILE TRAVELING EAST IN OTHER FWD MOVING LANE SLOWING OR STOPPING IN LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											

**SR 30 AT SR 476 SB ON / OFF RAMPS IN RADNOR TWP IN DELAWARE CO LOG 17381-04**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526033

Date Range: 1/1/2011 to 12/31/2015

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0060 Offset 1604 and Segment 0060 Offset 2243) or (In County 23 On State Route 0030(S) Between Segment 0061 Offset 1604 and Segment 0061 Offset 2243) or (In County 23 On State Route 8039(P) Between Segment 0250 Offset 0 and Segment 0250 Offset 232) or (In County 23 On Sta...**See more details at the end of the report**

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
6	<a href="#">2015079167</a>	23 07/23/2015	THR 23:30	STREET LT	DRY	CLEAR	0	2	0 2	MODERATE INJURY
ENV RDWY FACTORS: NONE REAR-END 4WAY 0030/0060/1874 0030/0061/1850 8039/0250/0000 VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT ALC TEST: 99 VEH EVENTS: HIT UNIT 02 DVR ACTIONS: AFFECTED BY PHYSICAL COND DRIVER WAS DISTRACTED VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
7	<a href="#">2011128093</a>	23 12/11/2011	SUN 10:57	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END OFRM 0030/0060/1913 0030/0061/1880 8039/0500/1560 VEH: 1 SUV TRAVELING EAST IN ONE LANE ROAD GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED PROCEED W/O CLEARANCE VEH: 2 VAN TRAVELING EAST IN ONE LANE ROAD STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
8	<a href="#">2012023494</a>	23 03/01/2012	THR 08:20	DAYLIGHT	WET	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: OTHER ENVIRONMENTAL FACTOR HIT FIXED OBJ T-INT 0030/0060/1913 0030/0061/1880 8039/0250/0000 8039/0500/1560 VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT TURN LANE GOING STRAIGHT VEH EVENTS: HIT CURB HIT TRAFFIC ISLAND / CHANNELIZATION HIT TRAFFIC SIGN DVR ACTIONS: TOO FAST FOR CONDITIONS										
9	<a href="#">2013002065</a>	23 12/07/2012	FRI 22:26	STREET LT	WET	RAIN	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: UNKNOWN REAR-END T-INT 0030/0060/1913 0030/0061/1880 8039/0500/1560 VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 SUV TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
10	<a href="#">2013042940</a>	23 04/14/2013	SUN 13:30	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE SAME DIR SIDESW OFRM 0030/0060/1913 0030/0061/1880 8039/0500/1560 VEH: 1 AUTOMOBILE TRAVELING EAST IN ONE LANE ROAD PASSING/OVERTAKING VEH VEH EVENTS: HIT UNIT 02 DVR ACTIONS: CARELESS PASS OR LANE CHANGE IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING SOUTH IN ONE LANE ROAD STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										

**SR 30 AT SR 476 SB ON / OFF RAMPS IN RADNOR TWP IN DELAWARE CO LOG 17381-04**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526033

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0060 Offset 1604 and Segment 0060 Offset 2243) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0061 Offset 1604 and Segment 0061 Offset 2243) or  
(In County 23 On State Route 8039(P) Between Segment 0250 Offset 0 and Segment 0250 Offset 232) or (In

County 23 On Sta...**See more details at the end of the report**

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
11	<a href="#">2012055605</a>	23 05/17/2012	THR 17:35	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END MIDB 0030/0061/2172 ----- VEH: 1 SUV TRAVELING WEST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED ----- VEH: 2 SUV TRAVELING WEST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
12	<a href="#">2015062927</a>	23 06/15/2015	MON 11:40	DAYLIGHT	DRY	CLEAR	0	1	0	2	MINOR INJURY
ENV RDWY FACTORS: NONE REAR-END OFRM 0030/0500/1339 8039/0500/1450 ----- VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION ----- VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: HIT UNIT 01 DVR ACTIONS: DRIVER WAS DISTRACTED											
13	<a href="#">2011066459</a>	23 06/21/2011	TUE 08:33	DAYLIGHT	DRY	CLEAR	0	1	0	2	MINOR INJURY
ENV RDWY FACTORS: NONE REAR-END MIDB 8039/0500/1386 ----- VEH: 1 SUV TRAVELING EAST IN OTHER FWD MOVING LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TAILGATING ----- VEH: 2 AUTOMOBILE TRAVELING EAST IN OTHER FWD MOVING LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
14	<a href="#">2011047403</a>	23 05/05/2011	THR 09:34	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END MIDB 8039/0500/1471 ----- VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT TURN LANE SLOWING OR STOPPING IN LANE VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TOO FAST FOR CONDITIONS ----- VEH: 2 LARGE TRUCK TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											

---

## SR 30 AT SR 476 SB ON / OFF RAMPS IN RADNOR TWP IN DELAWARE CO LOG 17381-04

Sorted by County, Route, Segment, Offset

### NOTES:

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

### REPORT PARAMETERS:

Query ID: [0020160526033](#)

User ID: jporemba

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0060 Offset 1604 and Segment 0060 Offset 2243) or (In County 23 On State Route 0030(S) Between Segment 0061 Offset 1604 and Segment 0061 Offset 2243) or (In County 23 On State Route 8039(P) Between Segment 0250 Offset 0 and Segment 0250 Offset 232) or (In County 23 On State Route 8039(P) Between Segment 0260 Offset 0 and Segment 0260 Offset 210) or (In County 23 On State Route 8039(P) Between Segment 0500 Offset 1239 and Segment 0500 Offset 1560)

Date Range: 1/1/2011 to 12/31/2015

Criteria:

# SR 30 AT SR 476 SB ON / OFF RAMPS IN RADNOR TWP IN DELAWARE CO LOG 17381-04



Date Range: 1/1/2011 to 12/31/2015

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0060 Offset 1604 and Segment 0060 Offset 2243) or (In County 23 On State Route 0030(S) Between Segment 0061 Offset 1604 and Segment 0061 Offset 2243) or (In County 23 On State Route 8039(P) Between Segment 0250 Offset 0 and Segment 0250 Offset 232) or (In County 23 On State Route 8039(P) Between Segment 0260 Offset 0 and Segment 0260 Offset 210)...**See more details at the end of the report**

USER ID/QUERY ID:  
jporambar\_0020160526033

## MONTH OF YEAR

	FEB	MAR	APR	MAY	JUN	JUL	NOV	DEC
CRASHES	1	2	1	2	3	2	1	2
PCT	7%	14%	7%	14%	21%	14%	7%	14%
	14							100%

## DAY OF WEEK

	SUN	MON	TUE	WED	THR	FRI
CRASHES	2	1	1	2	6	2
PCT	14%	7%	7%	14%	43%	14%
	14				100%	

## HOUR OF DAY

	08	09	10	11	13	14	17	19	21	22	23
CRASHES	2	1	2	1	1	1	2	1	1	1	1
PCT	14%	7%	14%	7%	7%	7%	14%	7%	7%	7%	7%
	14										100%

## YEAR

	CRASHES	PCT
2011	4	29%
2012	4	29%
2013	3	21%
2014	1	7%
2015	2	14%
TOTAL	14	100%

## COLLISION TYPE

	CRASHES	PCT
REAR END	12	86%
HIT FIX OBJ	1	7%
SAME DIR SS	1	7%
TOTAL	14	100%

## CRASH SEVERITY LEVEL

	CRASHES	PCT
MODERATE	1	7%
MINOR	4	29%
PDO	9	64%
TOTAL	14	100%

## SEVERITY COUNT

	FATALITIES	MAJOR	MODERATE	MINOR	UNK SEVERITY	UNK IF INJURED
	0	0	1	4	1	0

## DRIVER ACTIONS

	ACTIONS	PCT
NO CONTRIBUTING ACTION	12	40%
DRIVER WAS DISTRACTED	6	20%
OTHER IMPROPER DRIVING	3	10%
AFFECTED PHYSICAL COND	2	7%
TOO FAST FOR CONDITION	2	7%
CARELESS PASS/IN CHNG	1	3%
IMPROPER/CARELESS TURN	1	3%
PROCEED W/O CLEARANCE	1	3%
TAILGATING	1	3%
UNKNOWN	1	3%
TOTAL	30	100%

## VEHICLE TYPE

	VEHICLES	PCT
AUTOMOBILE	16	59%
SUV	6	22%
SMALL TRUCK	2	7%
VAN	2	7%
LARGE TRUCK	1	4%
TOTAL	27	100%

## ROAD CONDITION

	CRASHES	PCT
DRY	11	79%
WET	3	21%
TOTAL	14	100%

## ILLUMINATION

	CRASHES	PCT
DAYLIGHT	10	71%
STREET LIGHTS	3	21%
DARK	1	7%
TOTAL	14	100%

## WEATHER

	CRASHES	PCT
CLEAR	12	86%
RAIN	2	14%
TOTAL	14	100%

## ENVIR/ROADWAY FACTORS

	FACTORS	PCT
NONE	11	79%
OTHER ENVIR FACTOR	1	7%
OTHER WEATHER COND	1	7%
UNKNOWN	1	7%
TOTAL	14	100%

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

CDART - CRASH SUMMARY REPORT (09-06)

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete. Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**REPORT PARAMETERS:**

Query ID: [0020160526033](#)  
User ID: jporemba  
Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0060 Offset 1604 and Segment 0060 Offset 2243) or (In County 23 On State Route 0030(S) Between Segment 0061 Offset 1604 and Segment 0061 Offset 2243) or (In County 23 On State Route 8039(P) Between Segment 0250 Offset 0 and Segment 0250 Offset 232) or (In County 23 On State Route 8039(P) Between Segment 0260 Offset 0 and Segment 0260 Offset 210) or (In County 23 On State Route 8039(P) Between Segment 0500 Offset 1239 and Segment 0500 Offset 1560)  
Date Range: 1/1/2011 to 12/31/2015  
Criteria:



# SR 30 AT SR 476 NB ON RAMP IN DELAWARE CO LOG 17381-05

Sorted by County, Route, Segment, Offset

Date Range: 1/1/2011 to 12/31/2015

Area of Interest:

(In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or (In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)

USER ID/QUERY ID:  
jporemba / 0020160526037

DIST	CO	COUNTY	ROUTE	BEG SEG	END SEG	BEG OFF	END OFF	LENGTH	TOTAL CRASHES	SELECT CRASHES	SELECT ATAL COUNT	SELECT INJ COUNT	SELECT RATIO	SELECT CONCENTRATION (PER 1000 FT)	AVG SELECT ADT	SELECT RASH RATE
06	23	DELAWARE	0030	0070	0070	900	1122	222	17	17	0	8	100.0%	76.6	15301	14.48
06	23	DELAWARE	0030	0071	0071	1092	1129	37	17	17	0	8	100.0%	459.5	8918	149.06
06	23	DELAWARE	8039	0750	0750	0	126	126	23	18	0	7	78.3%	142.9	11552	35.78

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

Print Date: 5/26/2016

Page 1 of 2



**SR 30 AT SR 476 NB ON RAMP IN DELAWARE CO LOG 17381-05**

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete. Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.  
Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015
- 3

**QUERY PARAMETERS:**

**Note:** This report includes data for state roads only

Query ID: [0020160526037](#)

User ID: jporemba

Min Crashes: 5 Crashes

Cluster:

Tolerance: 1000 ft

Max Gap: 0 ft

Min Ratio: 0 %

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or (In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)

Date: 1/1/2011 to 12/31/2015

Criteria:

STATE\_ROAD

SR 30 AT SR 476 NB ON RAMP

IN DELAWARE CO LOG 17381-05



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526037

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or

(In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
1	<a href="#">2011004395</a>	23 01/01/2011	SAT 22:07	STREET LT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE 4WAY 0030/0070/0900 0030/0071/1092 8039/0750/0000 HILLSIDE CR ----- VEH: 1 SUV TRAVELING WEST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION ----- VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: IMPROPER/CARELESS TURN											
2	<a href="#">2011029843</a>	23 02/26/2011	SAT 19:33	STREET LT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE 4WAY 0030/0070/0900 0030/0071/1092 8039/0750/0000 HILLSIDE CR ----- VEH: 1 SUV TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT ----- VEH: 2 VAN TRAVELING EAST IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
3	<a href="#">2011107224</a>	23 10/21/2011	FRI 11:14	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END 4WAY 0030/0070/1086 0030/0071/1092 8039/0750/0000 HILLSIDE CR ----- VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT TURN LANE CHANGING LANES OR MERGING VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: CARELESS PASS OR LANE CHANGE ----- VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
4	<a href="#">2012017122</a>	23 02/13/2012	MON 22:27	STREET LT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE T-INT 0030/0070/1086 0030/0071/1092 8039/0750/0000 ----- VEH: 1 AUTOMOBILE TRAVELING NORTH IN ONCOMING TRAFFIC LANE TURNING LEFT ON RED VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: RUNNING RED LIGHT ----- VEH: 2 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
5	<a href="#">2013059764</a>	23 06/06/2013	THR 09:10	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE HEAD-ON ONRM 0030/0070/1086 8039/0750/0000 ----- VEH: 1 SMALL TRUCK TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT ON RED VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: RUNNING RED LIGHT ----- VEH: 2 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											

**SR 30 AT SR 476 NB ON RAMP**

**IN DELAWARE CO LOG 17381-05**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

Date Range: 1/1/2011 to 12/31/2015

jporemba/ 0020160526037

Area of (In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or

(In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
6	<a href="#">2014121151</a>	23 12/02/2014	TUE 19:09	STREET LT	WET	RAIN	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0070/1086 0030/0071/1092 8039/0750/0000 VEH: 1 AUTOMOBILE TRAVELING WEST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT VEH: 2 AUTOMOBILE TRAVELING WEST IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
7	<a href="#">2015059860</a>	23 06/05/2015	FRI 12:23	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0070/1086 0030/0071/1092 8039/0750/0000 VEH: 1 AUTOMOBILE TRAVELING WEST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TOO FAST FOR CONDITIONS TAILGATING VEH: 2 SMALL TRUCK TRAVELING WEST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
8	<a href="#">2011117065</a>	23 11/11/2011	FRI 23:55	STREET LT	DRY	CLEAR	0	1	0	2	UNK SEVERITY
ENV RDWY FACTORS: NONE 4WAY 0030/0070/1122 0030/0071/1092 8039/0750/0000 HILLSIDE CR VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE TURNING LEFT ON RED VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: RUNNING RED LIGHT TURNING FROM WRONG LANE IMPROPER/CARELESS TURN VEH: 2 SMALL TRUCK TRAVELING WEST IN RIGHT OF TRAFFICWAY GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
9	<a href="#">2012028970</a>	23 03/18/2012	SUN 00:03	STREET LT	DRY	CLEAR	0	0	0	3	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0070/1122 0030/0071/1092 8039/0750/0000 HILLSIDE CR VEH: 1 SUV TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 3 AUTOMOBILE TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION											

SR 30 AT SR 476 NB ON RAMP

IN DELAWARE CO LOG 17381-05



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526037

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or

(In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
10	<a href="#">2012123971</a>	23 12/08/2012	SAT 18:10	STREET LT	WET	RAIN/FOG	0	2	0	4	UNK SEVERITY
ENV RDWY FACTORS: NONE ANGLE											
4WAY 0030/0070/1122 0030/0071/1129 8039 RAMP RD HILLSIDE CR											
VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE CHANGING LANES OR MERGING											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: CARELESS PASS OR LANE CHANGE											
VEH: 2 SUV TRAVELING EAST IN LEFT LANE GOING STRAIGHT											
VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 3 AUTOMOBILE TRAVELING EAST IN LEFT TURN LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 02 HIT UNIT 04											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 4 AUTOMOBILE TRAVELING EAST IN LEFT TURN LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
11	<a href="#">2013030295</a>	23 03/12/2013	TUE 16:44	DAYLIGHT	WET	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE											
4WAY 0030/0070/1122 0030/0071/1092 8039/0750/0000 HILLSIDE CR											
VEH: 1 AUTOMOBILE TRAVELING WEST IN LEFT LANE MAKING A U-TURN											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: MAKING ILLEGAL U-TURN RUNNING RED LIGHT DRIVER WAS DISTRACTED											
VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT											
VEH EVENTS: STRUCK BY UNIT 01											
DVR ACTIONS: NO CONTRIBUTING ACTION											
12	<a href="#">2013053756</a>	23 05/24/2013	FRI 14:37	DAYLIGHT	DRY	CLEAR	0	0	0	3	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END											
4WAY 0030/0070/1122 0030/0071/1092 8039/0750/0000 HILLSIDE CR											
VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: TAILGATING											
VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 3 AUTOMOBILE TRAVELING EAST IN RIGHT LANE SLOWING OR STOPPING IN LANE											
VEH EVENTS: STRUCK BY UNIT 02											
DVR ACTIONS: NO CONTRIBUTING ACTION											
13	<a href="#">2013094065</a>	23 09/07/2013	SAT 21:05	STREET LT	DRY	CLEAR	0	2	0	2	UNK SEVERITY
ENV RDWY FACTORS: NONE ANGLE											
4WAY 0030/0070/1122 0030/0071/1092 8039/0750/0000 HILLSIDE CR											
VEH: 1 AUTOMOBILE TRAVELING WEST IN LEFT LANE GOING STRAIGHT ALC TEST: 99											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: AFFECTED BY PHYSICAL COND RUNNING RED LIGHT											
VEH: 2 SUV TRAVELING EAST IN LEFT TURN LANE TURNING LEFT											
VEH EVENTS: STRUCK BY UNIT 01											
DVR ACTIONS: NO CONTRIBUTING ACTION											

SR 30 AT SR 476 NB ON RAMP

IN DELAWARE CO LOG 17381-05



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526037

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or

(In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
14	<a href="#">2013103712</a>	23 10/03/2013	THR 12:21	DAYLIGHT	DRY	CLEAR	0	1	0	2	MINOR INJURY
ENV RDWY FACTORS: NONE ANGLE 4WAY 0030/0070/1122 0030/0071/1092 8039/0750/0000 HILLSIDE CR ----- VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE CHANGING LANES OR MERGING VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: CARELESS PASS OR LANE CHANGE ----- VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
15	<a href="#">2013116026</a>	23 11/15/2013	FRI 19:16	STREET LT	DRY	CLEAR	0	0	0	3	PROP DMG ONLY
ENV RDWY FACTORS: NONE HEAD-ON MULT 0030/0070/1122 0030/0071/1092 8039/0750/0000 HILLSIDE CR ----- VEH: 1 SUV TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT SPEEDING DRIVER WAS DISTRACTED ----- VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION ----- VEH: 3 AUTOMOBILE TRAVELING EAST IN LEFT LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION											
16	<a href="#">2015010901</a>	23 01/25/2015	SUN 19:28	STREET LT	DRY	CLEAR	0	2	0	2	UNK SEVERITY
ENV RDWY FACTORS: NONE OPP DIR SIDESW 4WAY 0030/0070/1122 0030/0071/1092 8039/0750/0000 HILLSIDE CR ----- VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: AFFECTED BY PHYSICAL COND ----- VEH: 2 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
17	<a href="#">2015104123</a>	23 10/10/2015	SAT 08:55	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE 4WAY 0030/0070/1122 0030/0071/1092 8039/0750/0000 HILLSIDE CR ----- VEH: 1 SUV TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT ----- VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
18	<a href="#">2015002900</a>	23 01/06/2015	TUE 09:00	DAYLIGHT	SNOW	SNOW	0	0	0	1	PROP DMG ONLY
ENV RDWY FACTORS: SLIPPERY ROAD (ICE/SNOW) OTHER ENVIRONMENTAL FACTOR HIT FIXED OBJ ONRM 0030/0071/1092 8039/0750/0000 ----- VEH: 1 AUTOMOBILE TRAVELING WEST IN ONE LANE ROAD NEGOTIATING CURVE - RIGHT VEH EVENTS: HIT CURB DVR ACTIONS: IMPROPER/CARELESS TURN											

**SR 30 AT SR 476 NB ON RAMP**

**IN DELAWARE CO LOG 17381-05**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

Date Range: 1/1/2011 to 12/31/2015

jporemba/ 0020160526037

Area of (In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or

(In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
19	<a href="#">2011093842</a>	23 09/14/2011	WED 16:20	DAYLIGHT	DRY	CLEAR	0	1	0	2	UNK SEVERITY
ENV RDWY FACTORS: NONE										REAR-END	
Y-INT 8039/0750/0126 8039 TO 8039/0750 RD											

VEH: 1 LARGE TRUCK TRAVELING NORTH IN ONE LANE ROAD CHANGING LANES OR MERGING

VEH EVENTS: HIT UNIT 02

DVR ACTIONS: PROCEED W/O CLEARANCE

VEH: 2 AUTOMOBILE TRAVELING NORTH IN ONE LANE ROAD GOING STRAIGHT

VEH EVENTS: STRUCK BY UNIT 01

DVR ACTIONS: NO CONTRIBUTING ACTION

Sorted by County, Route, Segment, Offset

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**REPORT PARAMETERS:**

Query ID: [0020160526037](#)

User ID: jporemba

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or (In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)

Date Range: 1/1/2011 to 12/31/2015

Criteria:

**SR 30 AT SR 476 NB ON RAMP**

**IN DELAWARE CO LOG 17381-05**



Date Range: 1/1/2011 to 12/31/2015

USER ID/QUERY ID:

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or (In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)

jporemba/0020160526037

**MONTH OF YEAR**

	JAN	FEB	MAR	MAY	JUN	SEP	OCT	NOV	DEC
CRASHES	3	2	2	1	2	2	3	2	2
PCT	16%	11%	11%	5%	11%	11%	16%	11%	11%

**DAY OF WEEK**

	SUN	MON	TUE	WED	THR	FRI	SAT
CRASHES	2	1	3	1	2	5	5
PCT	11%	5%	16%	5%	11%	26%	26%

**HOUR OF DAY**

	00	08	09	11	12	14	16	18	19	21	22	23
CRASHES	1	1	2	1	2	1	2	1	4	1	2	1
PCT	5%	5%	11%	5%	11%	5%	11%	5%	21%	5%	11%	5%

**YEAR**

YEAR	CRASHES	PCT
2011	5	26%
2012	3	16%
2013	6	32%
2014	1	5%
2015	4	21%
TOTAL	19	100%

**COLLISION TYPE**

	CRASHES	PCT
ANGLE	9	47%
REAR END	5	26%
HEAD ON	3	16%
HIT FIX OBJ	1	5%
OPP DIR SS	1	5%
TOTAL	19	100%

**CRASH SEVERITY LEVEL**

	CRASHES	PCT
MINOR	1	5%
UNK SEVERITY	5	26%
PDO	13	68%
TOTAL	19	100%

**SEVERITY COUNT**

	PERSONS
FATALITIES	0
MAJOR	0
MODERATE	0
MINOR	1
UNK SEVERITY	8
UNK IF INJURED	0

**DRIVER ACTIONS**

	ACTIONS	PCT
NO CONTRIBUTING ACTION	23	44%
RUNNING RED LIGHT	9	17%
AFFECTED PHYSICAL COND	3	6%
CARELESS PASS/LN CHNG	3	6%
DRIVER WAS DISTRACTED	3	6%
IMPROPER/CARELESS TURN	3	6%
TAILGATING	2	4%
TURN FROM WRONG LANE	2	4%
MAKING ILLEGAL U-TURN	1	2%
PROCEED W/O CLEARANCE	1	2%
SPEEDING	1	2%
TOO FAST FOR CONDITION	1	2%
TOTAL	52	100%

**VEHICLE TYPE**

	VEHICLES	PCT
AUTOMOBILE	30	71%
SUV	7	17%
SMALL TRUCK	3	7%
LARGE TRUCK	1	2%
VAN	1	2%
TOTAL	42	100%

**ROAD CONDITION**

	CRASHES	PCT
DRY	15	79%
WET	3	16%
SNOW	1	5%
TOTAL	19	100%

**ILLUMINATION**

	CRASHES	PCT
STREET LIGHTS	10	53%
DAYLIGHT	9	47%
TOTAL	19	100%

**WEATHER**

	CRASHES	PCT
CLEAR	16	84%
RAIN	1	5%
RAIN/FOG	1	5%
SNOW	1	5%
TOTAL	19	100%

**ENVIR/ROADWAY FACTORS**

	FACTORS	PCT
NONE	18	90%
OTHER ENVIR FACTOR	1	5%
SLIPPERY ICE/SNOW	1	5%
TOTAL	20	100%

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.



CDART - CRASH SUMMARY REPORT (09-06)

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**REPORT PARAMETERS:**

Query ID: [0020160526037](#)  
User ID: jporemba  
Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0070 Offset 986 and Segment 0070 Offset 1372) or (In County 23 On State Route 0030(S) Between Segment 0071 Offset 986 and Segment 0071 Offset 1372) or (In County 23 On State Route 8039(P) Between Segment 0750 Offset 0 and Segment 0750 Offset 226)  
Date Range: 1/1/2011 to 12/31/2015  
Criteria:

# KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-06



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526038

Date Range: 1/1/2011 to 12/31/2015

Area of Interest: Imported Crash Numbers

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
1	<a href="#">2011015432</a>	23 01/26/2011	WED 06:09	STREET LT	SNOW	SNOW	0	0	0	3	PROP DMG ONLY
ENV RDWY FACTORS: SLIPPERY ROAD (ICE/SNOW) OTHER WEATHER CONDITIONS HIT FIXED OBJ 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 SMALL TRUCK TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 STRUCK BY UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 2 AUTOMOBILE TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT CURB STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 3 AUTOMOBILE TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
2	<a href="#">2011128066</a>	23 12/06/2011	TUE 11:32	DAYLIGHT	WET	RAIN	0	1	0	2	UNK SEVERITY
ENV RDWY FACTORS: NONE REAR-END 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
3	<a href="#">2012055204</a>	23 06/01/2012	FRI 16:53	DAYLIGHT	DRY	CLEAR	0	2	0	3	UNK SEVERITY
ENV RDWY FACTORS: NONE REAR-END 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 VAN TRAVELING NORTH IN LEFT TURN LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: SPEEDING TOO FAST FOR CONDITIONS VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 3 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION											
4	<a href="#">2013009054</a>	23 01/16/2013	WED 21:00	STREET LT	DRY	CLEAR	0	0	0	4	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED TAILGATING VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 3 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 02 HIT UNIT 04 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 4 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION											

# KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-06



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

Date Range: 1/1/2011 to 12/31/2015

jporemba/ 0020160526038

Area of Interest: Imported Crash Numbers

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
5	<a href="#">2014029660</a>	23 03/06/2014	THR 13:39	DAYLIGHT	DRY	CLEAR	0	0	0	3	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING EAST IN OTHER FWD MOVING LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TOO FAST FOR CONDITIONS VEH: 2 SUV TRAVELING EAST IN OTHER FWD MOVING LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 3 SUV TRAVELING EAST IN OTHER FWD MOVING LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION											
6	<a href="#">2014097357</a>	23 09/26/2014	FRI 05:48	DAWN	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
7	<a href="#">2014100281</a>	23 10/12/2014	SUN 22:29	STREET LT	DRY	CLEAR	0	0	0	1	PROP DMG ONLY
ENV RDWY FACTORS: NONE HIT FIXED OBJ 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT ALC TEST: 99 VEH EVENTS: HIT CURB DVR ACTIONS: IMPROPER/CARELESS TURN											
8	<a href="#">2015010866</a>	23 01/24/2015	SAT 20:28	STREET LT	ICE PATCH	SNOW	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: OTHER WEATHER CONDITIONS ANGLE 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: SUDDEN SLOWING / STOPPING VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											
9	<a href="#">2015052147</a>	23 04/22/2015	WED 14:59	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TOO FAST FOR CONDITIONS VEH: 2 SMALL TRUCK TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION											

**KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-06**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

Date Range: 1/1/2011 to 12/31/2015

jporemba/ 0020160526038

Area of Interest: Imported Crash Numbers

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
10	<a href="#">2015058902</a>	23 05/21/2015	THR 12:04	DAYLIGHT	WET	RAIN	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE 4WAY 0030/0070/0440 0030/0071/0439 8039/0010/1320 KING OF PRUSSIA RD ----- VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION ----- VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: RUNNING RED LIGHT										
11	<a href="#">2011003801</a>	23 01/04/2011	TUE 06:48	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE Y-INT 1021/0060/0000 KING OF PRUSSIA RD ----- VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 HIT CURB HIT TREE OR SHRUBBERY DVR ACTIONS: RUNNING RED LIGHT ----- VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 HIT CURB HIT TREE OR SHRUBBERY DVR ACTIONS: NO CONTRIBUTING ACTION										
12	<a href="#">2011036602</a>	23 03/29/2011	TUE 08:15	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END Y-INT 1021/0060/0000 KING OF PRUSSIA RD ----- VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS ----- VEH: 2 VAN TRAVELING NORTH IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
13	<a href="#">2011071073</a>	23 07/14/2011	THR 14:54	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE Y-INT 1021/0060/0000 KING OF PRUSSIA RD ----- VEH: 1 SUV TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: RUNNING RED LIGHT ----- VEH: 2 SUV TRAVELING WEST IN LEFT OF TRAFFICWAY GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
14	<a href="#">2011131693</a>	23 12/14/2011	WED 17:14	STREET LT	DRY	CLEAR	0	1	1 1	MODERATE INJURY
ENV RDWY FACTORS: NONE PEDESTRIAN T-INT 1021/0060/0000 KING OF PRUSSIA RD ----- VEH: 1 SUV TRAVELING SOUTH IN OTHER FWD MOVING LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN ----- VEH: 2 VEH EVENTS: STRUCK BY UNIT 01										

# KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-06



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526038

Date Range: 1/1/2011 to 12/31/2015

Area of Interest: Imported Crash Numbers

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
15	<a href="#">2014049230</a>	23 05/14/2014	WED 14:24	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE T-INT 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: UNKNOWN VEH: 2 AUTOMOBILE TRAVELING SOUTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: UNKNOWN										
16	<a href="#">2014081381</a>	23 08/21/2014	THR 11:59	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE T-INT 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT VEH: 2 SUV TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
17	<a href="#">2014107874</a>	23 10/28/2014	TUE 13:09	DAYLIGHT	DRY	CLEAR	0	2	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE ANGLE 4WAY 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 SUV TRAVELING EAST IN RIGHT LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
18	<a href="#">2015053380</a>	23 05/01/2015	FRI 01:06	STREET LT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: NONE HIT FIXED OBJ OTHR 1021/0060/0000 KING OF PRUSSIA RD VEH: 1 LARGE TRUCK TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT OTHER FIXED OBJECT DVR ACTIONS: FAILURE TO RESPOND TO TCD OTHER IMPROPER DRIV ACTIONS										
19	<a href="#">2011029232</a>	23 03/08/2011	TUE 11:11	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE SAME DIR SIDESW MIDB KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE PASSING/OVERTAKING VEH VEH EVENTS: HIT UNIT 02 DVR ACTIONS: CARELESS PASS OR LANE CHANGE OVER/UNDER COMPENSATE CURVE DRIVER INEXPERIENCED										
20	<a href="#">2011072359</a>	23 07/14/2011	THR 16:30	DAYLIGHT	DRY	CLEAR	0	1	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE SAME DIR SIDESW MIDB KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: HIT UNIT 02 DVR ACTIONS: SUDDEN SLOWING / STOPPING TURNING FROM WRONG LANE VEH: 2 MOTORCYCLE TRAVELING SOUTH IN RIGHT TURN LANE PASSING/OVERTAKING VEH VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: CARELESS PASS OR LANE CHANGE PASSING IN NO PASSING ZONE										

# KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-06



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526038

Date Range: 1/1/2011 to 12/31/2015

Area of Interest: Imported Crash Numbers

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
21	<a href="#">2011129477</a>	23 12/13/2011	TUE 15:15	DAYLIGHT	DRY	CLEAR	0	1	1 1	MODERATE INJURY PEDESTRIAN
ENV RDWY FACTORS: NONE MIDB KING OF PRUSSIA RD VEH: 1 VEH EVENTS: HIT UNIT 02										
VEH: 2 SUV TRAVELING NORTH IN RIGHT LANE AVOIDING VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
22	<a href="#">2012011367</a>	23 01/24/2012	TUE 08:01	DAYLIGHT	DRY	CLEAR	0	1	0 1	MODERATE INJURY HIT FIXED OBJ
ENV RDWY FACTORS: NONE MIDB KING OF PRUSSIA RD VEH: 1 SUV TRAVELING NORTH IN RIGHT OF TRAFFICWAY GOING STRAIGHT VEH EVENTS: HIT CONCRETE / LONGIT BARRIER OVERTURN/ROLL OVER DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS										
23	<a href="#">2012014289</a>	23 02/02/2012	THR 14:45	DAYLIGHT	DRY	CLEAR	0	1	0 2	UNK SEVERITY ANGLE
ENV RDWY FACTORS: NONE MIDB KING OF PRUSSIA RD VEH: 1 SUV TRAVELING WEST IN RIGHT LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 02 OVERTURN/ROLL OVER DVR ACTIONS: IMPROPER ENTRANCE TO HIGHWAY										
VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
24	<a href="#">2012032834</a>	23 03/29/2012	THR 19:11	DUSK	DRY	CLEAR	0	0	0 2	PROP DMG ONLY HEAD-ON
ENV RDWY FACTORS: NONE MIDB KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING WEST IN RIGHT LANE AVOIDING VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVING WRONG SIDE OF ROAD SPEEDING										
VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
25	<a href="#">2012054410</a>	23 05/31/2012	THR 15:03	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY ANGLE
ENV RDWY FACTORS: NONE MIDB KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: PROCEED W/O CLEARANCE										
VEH: 2 SUV TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
26	<a href="#">2012060181</a>	23 06/13/2012	WED 02:30	STREET LT	WET	RAIN	0	0	0 1	PROP DMG ONLY HIT FIXED OBJ
ENV RDWY FACTORS: DEER IN ROADWAY MIDB KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE NEGOTIATING CURVE - LEFT VEH EVENTS: HIT OTHER FIXED OBJECT HIT TREE OR SHRUBBERY DVR ACTIONS: TOO FAST FOR CONDITIONS										

# KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-06



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

Date Range: 1/1/2011 to 12/31/2015

jporemba/ 0020160526038

Area of Interest: Imported Crash Numbers

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
27	<a href="#">2012132089</a>	23 12/29/2012	SAT 11:15	DAYLIGHT	SNOW	SNOW	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: SLIPPERY ROAD (ICE/SNOW) <span style="float:right">HIT FIXED OBJ</span> MIDB KING OF PRUSSIA RD VEH: 1 SMALL TRUCK TRAVELING SOUTH IN ONCOMING TRAFFIC LANE NEGOTIATING CURVE - LEFT VEH EVENTS: HIT EMBANKMENT DVR ACTIONS: TOO FAST FOR CONDITIONS										
28	<a href="#">2013030700</a>	23 03/13/2013	WED 22:05	STREET LT	DRY	CLEAR	0	1	1 1	MODERATE INJURY
ENV RDWY FACTORS: NONE <span style="float:right">PEDESTRIAN</span> MIDB KING OF PRUSSIA RD VEH: 1 SUV TRAVELING SOUTH IN OTHER FWD MOVING LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 VEH EVENTS: STRUCK BY UNIT 01										
29	<a href="#">2014073177</a>	23 07/22/2014	TUE 09:30	DAYLIGHT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: NONE <span style="float:right">HIT FIXED OBJ</span> MIDB KING OF PRUSSIA RD VEH: 1 LARGE TRUCK TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT BRIDGE RAIL DVR ACTIONS: DRIVER WAS DISTRACTED										
30	<a href="#">2014097519</a>	23 09/20/2014	SAT 16:45	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE <span style="float:right">ANGLE</span> MIDB KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN OTHER MAKING A U-TURN VEH EVENTS: HIT UNIT 02 DVR ACTIONS: MAKING ILLEGAL U-TURN VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE NEGOTIATING CURVE - LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
31	<a href="#">2014109294</a>	23 11/02/2014	SUN 16:25	DAYLIGHT	DRY	CLEAR	0	1	1 1	UNK SEVERITY
ENV RDWY FACTORS: NONE <span style="float:right">PEDESTRIAN</span> MIDB KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 VEH EVENTS: STRUCK BY UNIT 01										
32	<a href="#">2014119647</a>	23 11/20/2014	THR 06:02	DAWN	DRY	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: NONE <span style="float:right">HIT FIXED OBJ</span> MIDB KING OF PRUSSIA RD VEH: 1 LARGE TRUCK TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT OTHER FIXED OBJECT DVR ACTIONS: FAILURE TO RESPOND TO TCD										

**KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-06**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

Date Range: 1/1/2011 to 12/31/2015

jporemba/ 0020160526038

Area of Interest: Imported Crash Numbers

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
33	<a href="#">2015019503</a>	23 02/14/2015	SAT 22:48	DARK	SNOW	SNOW	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: WINDY CONDITIONS SLIPPERY ROAD (ICE/SNOW) HIT FIXED OBJ MIDB KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE NEGOTIATING CURVE - RIGHT VEH EVENTS: HIT FENCE OR WALL DVR ACTIONS: OVER/UNDER COMPENSATE CURVE TOO FAST FOR CONDITIONS										
34	<a href="#">2015060932</a>	23 06/09/2015	TUE 12:05	DAYLIGHT	DRY	CLEAR	0	1	0 3	UNK SEVERITY
ENV RDWY FACTORS: NONE ANGLE MIDB KING OF PRUSSIA RD VEH: 1 SUV TRAVELING NORTH IN RIGHT LANE NEGOTIATING CURVE - RIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS VEH: 2 AUTOMOBILE TRAVELING NORTH IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 3 AUTOMOBILE TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION										
35	<a href="#">2015113575</a>	23 11/03/2015	TUE 08:43	DAYLIGHT	DRY	CLEAR	0	1	1 1	UNK SEVERITY
ENV RDWY FACTORS: NONE PEDESTRIAN MIDB KING OF PRUSSIA RD VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 VEH EVENTS: STRUCK BY UNIT 01										



---

## **KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-06**

Sorted by County, Route, Segment, Offset

### **NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

### **REPORT PARAMETERS:**

Query ID: [0020160526038](#)

User ID: jporemba

Area of Interest: Imported Crash Numbers

Date Range: 1/1/2011 to 12/31/2015

Criteria:

# KING OF PRUSSIA RD IN RADNOR TWP IN DELAWARE CO LOG 17381-06



USER ID/QUERY ID:  
jporombal\_0020160526038

Date Range: 1/1/2011 to 12/31/2015  
Area of Interest: Imported Crash Numbers

## MONTH OF YEAR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CRASHES	5	2	5	1	4	3	3	1	2	2	3	4
PCT	14%	6%	14%	3%	11%	9%	9%	3%	6%	6%	9%	11%
	35											35
	100%											100%

## DAY OF WEEK

	SUN	TUE	WED	THR	FRI	SAT
CRASHES	2	10	7	9	3	4
PCT	6%	29%	20%	26%	9%	11%
	22					35
	9%	9%	3%	3%	3%	100%

## HOUR OF DAY

	01	02	05	06	08	09	11	12	13	14	15	16	17	19	20	21	22
CRASHES	1	1	1	3	3	1	4	2	2	4	2	4	1	1	1	1	3
PCT	3%	3%	3%	9%	9%	3%	11%	6%	6%	11%	6%	11%	3%	3%	3%	3%	9%
	35																35
	100%																100%

## YEAR

YEAR	CRASHES	PCT
2011	9	26%
2012	7	20%
2013	2	6%
2014	10	29%
2015	7	20%
TOTAL	35	100%

## COLLISION TYPE

	CRASHES	PCT
ANGLE	12	34%
HIT FIX OBJ	9	26%
REAR END	6	17%
PEDESTRIAN	5	14%
SAME DIR SS	2	6%
HEAD ON	1	3%
TOTAL	35	100%

## CRASH SEVERITY LEVEL

	CRASHES	PCT
MODERATE	4	11%
UNK SEVERITY	8	23%
PDO	23	66%
TOTAL	35	100%

## SEVERITY COUNT

	PERSONS
FATALITIES	0
MAJOR	0
MODERATE	4
MINOR	0
UNK SEVERITY	10
UNK IF INJURED	0

## DRIVER ACTIONS

	ACTIONS	PCT
NO CONTRIBUTING ACTION	27	38%
TOO FAST FOR CONDITION	6	8%
DRIVER WAS DISTRACTED	5	7%
OTHER IMPROPER DRIVING	5	7%
IMPROPER/CARELESS TURN	4	6%
RUNNING RED LIGHT	4	6%
CARELESS PASS/LN CHNG	2	3%
FAILURE TO RESPOND TCD	2	3%
OVER/UNDER COMP CURVE	2	3%
SPEEDING	2	3%
SUDDEN SLOWING/STOP	2	3%
UNKNOWN	2	3%
OTHERS	8	11%
TOTAL	71	100%

## VEHICLE TYPE

	VEHICLES	PCT
AUTOMOBILE	37	60%
SUV	16	26%
SMALL TRUCK	3	5%
LARGE TRUCK	3	5%
VAN	2	3%
MOTORCYCLE	1	2%
TOTAL	62	100%

## ROAD CONDITION

	CRASHES	PCT
DRY	28	80%
SNOW	3	9%
WET	3	9%
ICE PATCH	1	3%
TOTAL	35	100%

## ILLUMINATION

	CRASHES	PCT
DAYLIGHT	23	66%
STREET LIGHTS	8	23%
DAWN	2	6%
DARK	1	3%
DUSK	1	3%
TOTAL	35	100%

## WEATHER

	CRASHES	PCT
CLEAR	28	80%
SNOW	4	11%
RAIN	3	9%
TOTAL	35	100%

## ENVIR/ROADWAY FACTORS

	FACTORS	PCT
NONE	30	81%
SLIPPERY ICE/SNOW	3	8%
OTHER WEATHER COND	2	5%
DEER IN ROADWAY	1	3%
WINDY CONDITIONS	1	3%
TOTAL	37	100%

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

CDART - CRASH SUMMARY REPORT (09-06)

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
  
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
  
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**REPORT PARAMETERS:**

Query ID: [0020160526038](#)

User ID: jporemba

Area of Interest: Imported Crash Numbers

Date Range: 1/1/2011 to 12/31/2015

Criteria:

**SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07**



Sorted by County, Route, Segment, Offset

Date Range: 1/1/2011 to 12/31/2015

USER ID/QUERY ID:  
jporemba / 0020160526039

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or (In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

DIST	CO	COUNTY	ROUTE	BEG SEG	END SEG	BEG OFF	END OFF	LENGTH	TOTAL CRASHES	SELECT CRASHES	SELECT ATAL COUNT	SELECT INJ COUNT	SELECT RATIO	SELECT CONCENTRATION (PER 1000 FT)	AVG ADT	SELECT RASH RATE
06	23	DELAWARE	0030	0050	0060	2681	0060	75	28	28	0	12	100.0%	285.7	9960	82.99
06	23	DELAWARE	0030	0061	0	0	100	100	25	25	0	11	100.0%	250.0	8918	81.10
06	23	DELAWARE	1021	0050	0050	259	0050	259	24	24	0	9	100.0%	1.0	10258	

**IMPORTANT:** This traffic engineering and safety study is confidential pursuant to 75 Pa.

C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

Print Date: 5/26/2016

Page 1 of 2

**SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07**

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete. Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**QUERY PARAMETERS:**

**Note:** This report includes data for state roads only

Query ID: [0020160526039](#)

User ID: jporemba

Min Crashes: 5 Crashes

Cluster:

Tolerance: 1000 ft

Max Gap: 0 ft

Min Ratio: 0 %

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or (In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

Date: 1/1/2011 to 12/31/2015

Criteria:

STATE\_ROAD

**SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526039

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or  
 Interest: (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or  
 (In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
1	<a href="#">2014100608</a>	23 10/09/2014	THR 17:01	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE MIDB 0030/0050/2681 VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TAILGATING OTHER IMPROPER DRIV ACTIONS VEH: 2 SUV TRAVELING EAST IN LEFT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
2	<a href="#">2014062065</a>	23 06/17/2014	TUE 17:38	DAYLIGHT	DRY	CLEAR	0	2	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE MIDB 0030/0050/2682 VEH: 1 SUV TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
3	<a href="#">2014078169</a>	23 08/11/2014	MON 21:41	STREET LT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE MIDB 0030/0050/2695 VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 SMALL TRUCK TRAVELING EAST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
4	<a href="#">2011019718</a>	23 02/10/2011	THR 12:32	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: GLARE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 LARGE TRUCK TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT VEH: 2 SMALL TRUCK TRAVELING NORTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
5	<a href="#">2011036761</a>	23 04/01/2011	FRI 18:50	DAYLIGHT	DRY	CLEAR	0	1	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING WEST IN LEFT TURN LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 HIT CURB HIT ROADWAY EQUIPMENT DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS RUNNING RED LIGHT FAILURE TO RESPOND TO TCD VEH: 2 AUTOMOBILE TRAVELING WEST IN LEFT TURN LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										

**SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526039

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or

(In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
6	<a href="#">2011050003</a>	23 05/14/2011	SAT 00:50	STREET LT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING WEST IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT CURB HIT OTHER FIXED OBJECT DVR ACTIONS: SPEEDING										
7	<a href="#">2011091662</a>	23 09/09/2011	FRI 20:10	STREET LT	DRY	CLEAR	0	3	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING WEST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
8	<a href="#">2012003024</a>	23 01/02/2012	MON 12:14	DAYLIGHT	DRY	CLEAR	0	1	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING WEST IN LEFT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TAILGATING VEH: 2 AUTOMOBILE TRAVELING WEST IN LEFT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
9	<a href="#">2012032841</a>	23 03/29/2012	THR 18:25	DAYLIGHT	DRY	CLEAR	0	1	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING SOUTH IN LEFT LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN DRIVER WAS DISTRACTED VEH: 2 SUV TRAVELING NORTH IN LEFT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
10	<a href="#">2012067566</a>	23 07/03/2012	TUE 07:01	DAYLIGHT	DRY	CLEAR	0	1	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 VAN TRAVELING SOUTH IN ONCOMING TRAFFIC LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										

**SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526039

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or

(In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
11	<a href="#">2012087179</a>	23 08/22/2012	WED 11:58	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING WEST IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
12	<a href="#">2013034250</a>	23 03/26/2013	TUE 13:04	DAYLIGHT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT VEH: 2 SMALL TRUCK TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
13	<a href="#">2013052453</a>	23 05/10/2013	FRI 07:15	DAYLIGHT	DRY	CLEAR	0	0	0 1	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 SUV TRAVELING WEST IN RIGHT TURN LANE TURNING RIGHT VEH EVENTS: HIT CURB HIT TREE OR SHRUBBERY DVR ACTIONS: AFFECTED BY PHYSICAL COND IMPROPER/CARELESS TURN HIT FIXED OBJ										
14	<a href="#">2013052446</a>	23 05/21/2013	TUE 22:56	STREET LT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 SUV TRAVELING WEST IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
15	<a href="#">2013085980</a>	23 08/13/2013	TUE 07:45	DAYLIGHT	WET	RAIN	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TOO FAST FOR CONDITIONS VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION REAR-END										



**SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526039

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or

(In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY	
16	<a href="#">2013091740</a>	23 09/10/2013	TUE 07:18	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE											
4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259											
VEH: 1 VAN TRAVELING SOUTH IN LEFT TURN LANE TURNING LEFT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: IMPROPER/CARELESS TURN											
VEH: 2 SUV TRAVELING EAST IN RIGHT TURN LANE GOING STRAIGHT											
VEH EVENTS: STRUCK BY UNIT 01 HIT UTILITY POLE HIT TREE OR SHRUBBERY											
DVR ACTIONS: DRIVER INEXPERIENCED TOO FAST FOR CONDITIONS											
17	<a href="#">2013102797</a>	23 10/06/2013	SUN 17:04	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE											
4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259											
VEH: 1 AUTOMOBILE TRAVELING SOUTH IN LEFT TURN LANE TURNING LEFT											
VEH EVENTS: STRUCK BY UNIT 02											
DVR ACTIONS: RUNNING RED LIGHT PROCEED W/O CLEARANCE AFFECTED BY PHYSICAL COND											
VEH: 2 SUV TRAVELING WEST IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 01											
DVR ACTIONS: NO CONTRIBUTING ACTION											
18	<a href="#">2014035918</a>	23 03/26/2014	WED 14:09	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE											
4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259											
VEH: 1 SUV TRAVELING EAST IN LEFT TURN LANE TURNING LEFT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: IMPROPER/CARELESS TURN DRIVER WAS DISTRACTED											
VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: STRUCK BY UNIT 01											
DVR ACTIONS: NO CONTRIBUTING ACTION											
19	<a href="#">2014057160</a>	23 05/28/2014	WED 20:34	STREET LT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
ENV RDWY FACTORS: NONE ANGLE											
4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259											
VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: RUNNING RED LIGHT DRIVER WAS DISTRACTED											
VEH: 2 VAN TRAVELING EAST IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: STRUCK BY UNIT 01											
DVR ACTIONS: DRIVER WAS DISTRACTED											
20	<a href="#">2015007025</a>	23 12/19/2014	FRI 11:59	DAYLIGHT	DRY	CLEAR	0	0	0	3	PROP DMG ONLY
ENV RDWY FACTORS: NONE REAR-END											
T-INT 0030/0060/0000 0030/0061/0000 1021/0050/0259											
VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: HIT UNIT 02											
DVR ACTIONS: TOO FAST FOR CONDITIONS											
VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT											
VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03											
DVR ACTIONS: NO CONTRIBUTING ACTION											
VEH: 3 AUTOMOBILE TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE											
VEH EVENTS: STRUCK BY UNIT 02											
DVR ACTIONS: NO CONTRIBUTING ACTION											

**SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526039

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or  
 Interest: (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or  
 (In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
21	<a href="#">2014130128</a>	23 12/23/2014	TUE 21:26	STREET LT	WET	RAIN	0	0	0 2	UNK IF INJURED
ENV RDWY FACTORS: NONE REAR-END 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: SUDDEN SLOWING / STOPPING VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: SUDDEN SLOWING / STOPPING										
22	<a href="#">2015039120</a>	23 03/16/2015	MON 23:01	STREET LT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE HEAD-ON 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 SUV TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT AFFECTED BY PHYSICAL COND VEH: 2 SUV TRAVELING SOUTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
23	<a href="#">2015039127</a>	23 03/16/2015	MON 23:01	STREET LT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE HEAD-ON 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 SUV TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: RUNNING RED LIGHT VEH: 2 SUV TRAVELING SOUTH IN ONCOMING TRAFFIC LANE TURNING LEFT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
24	<a href="#">2015102027</a>	23 10/05/2015	MON 11:40	DAYLIGHT	DRY	CLEAR	0	1	0 3	UNK SEVERITY
ENV RDWY FACTORS: NONE REAR-END 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 SUV TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: DRIVER WAS DISTRACTED VEH: 2 AUTOMOBILE TRAVELING WEST IN RIGHT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03 DVR ACTIONS: UNKNOWN VEH: 3 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: NO CONTRIBUTING ACTION										
25	<a href="#">2015115891</a>	23 11/07/2015	SAT 19:47	STREET LT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE HEAD-ON 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 SMALL TRUCK TRAVELING SOUTH IN LEFT TURN LANE TURNING LEFT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 VAN TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: IMPROPER/CARELESS TURN										

**SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07**



Sorted by County, Route, Segment, Offset

USER ID/QUERY ID:

jporemba/ 0020160526039

Date Range: 1/1/2011 to 12/31/2015

Area of (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or

Interest: (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or

(In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

CRN	CO DATE	DAY TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
26	<a href="#">2015124064</a>	23 11/24/2015	TUE 20:03	STREET LT	DRY	CLEAR	0	0	0 2	PROP DMG ONLY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING SOUTH IN LEFT TURN LANE MAKING A U-TURN VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: IMPROPER/CARELESS TURN VEH: 2 AUTOMOBILE TRAVELING EAST IN LEFT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
27	<a href="#">2015127441</a>	23 11/24/2015	TUE 17:47	STREET LT	DRY	CLEAR	0	1	0 2	MINOR INJURY
ENV RDWY FACTORS: NONE 4WAY 0030/0060/0000 0030/0061/0000 1021/0050/0259 VEH: 1 AUTOMOBILE TRAVELING WEST IN RIGHT TURN LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS VEH: 2 AUTOMOBILE TRAVELING WEST IN OTHER FWD MOVING LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										
28	<a href="#">2013044282</a>	23 04/18/2013	THR 17:01	DAYLIGHT	DRY	CLEAR	0	1	0 4	MINOR INJURY
ENV RDWY FACTORS: NONE MIDB 0030/0060/0075 VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT VEH EVENTS: HIT UNIT 02 DVR ACTIONS: TOO FAST FOR CONDITIONS VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 3 AUTOMOBILE TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 02 HIT UNIT 04 DVR ACTIONS: NO CONTRIBUTING ACTION VEH: 4 SUV TRAVELING EAST IN RIGHT LANE STOPPED IN TRAFFIC LANE VEH EVENTS: STRUCK BY UNIT 03 DVR ACTIONS: NO CONTRIBUTING ACTION										
29	<a href="#">2015082601</a>	23 08/12/2015	WED 11:25	DAYLIGHT	DRY	CLEAR	0	2	0 2	UNK SEVERITY
ENV RDWY FACTORS: NONE MIDB 0030/0061/0100 VEH: 1 SUV TRAVELING WEST IN LEFT LANE GOING STRAIGHT VEH EVENTS: STRUCK BY UNIT 02 DVR ACTIONS: OTHER IMPROPER DRIV ACTIONS VEH: 2 SUV TRAVELING WEST IN LEFT LANE SLOWING OR STOPPING IN LANE VEH EVENTS: HIT UNIT 01 DVR ACTIONS: NO CONTRIBUTING ACTION										

---

## SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07

Sorted by County, Route, Segment, Offset

### NOTES:

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

### REPORT PARAMETERS:

Query ID: [0020160526039](#)

User ID: jporemba

Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or (In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

Date Range: 1/1/2011 to 12/31/2015

Criteria:

# SR 1021 AT SR 30 IN RADNOR TWP IN DELAWARE CO LOG 17381-07



USER ID/QUERY ID:  
jporambar\_0020160526039

Date Range: 1/1/2011 to 12/31/2015  
 Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or (In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)

## MONTH OF YEAR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CRASHES	1	1	5	2	4	1	1	4	2	3	3	2
PCT	3%	3%	17%	7%	14%	3%	3%	14%	7%	10%	10%	7%
TOTAL	29	29	29	29	29	29	29	29	29	29	29	29
PCT	3%	3%	17%	7%	14%	3%	3%	14%	7%	10%	10%	7%

## DAY OF WEEK

	SUN	MON	TUE	WED	THUR	FRI	SAT
CRASHES	1	5	9	4	4	4	2
PCT	3%	17%	31%	14%	14%	14%	7%
TOTAL	29	29	29	29	29	29	29
PCT	3%	17%	31%	14%	14%	14%	7%

## HOUR OF DAY

	00	07	11	12	13	14	17	18	19	20	21	22	23
CRASHES	1	4	4	2	1	1	5	2	1	3	2	1	2
PCT	3%	14%	14%	7%	3%	3%	17%	7%	3%	10%	7%	3%	7%
TOTAL	29	29	29	29	29	29	29	29	29	29	29	29	29
PCT	3%	14%	14%	7%	3%	3%	17%	7%	3%	10%	7%	3%	7%

## YEAR

YEAR	CRASHES	PCT
2011	4	14%
2012	4	14%
2013	7	24%
2014	7	24%
2015	7	24%
TOTAL	29	100%

## COLLISION TYPE

	CRASHES	PCT
ANGLE	12	41%
REAR END	11	38%
HEAD ON	4	14%
HIT FIX OBJ	2	7%
TOTAL	29	100%

## CRASH SEVERITY LEVEL

	CRASHES	PCT
MINOR	2	7%
UNK SEVERITY	8	28%
UNK IF INJURED	1	3%
PDO	18	62%
TOTAL	29	100%

## SEVERITY COUNT

	PERSONS
FATALITIES	0
MAJOR	0
MODERATE	0
MINOR	2
UNK SEVERITY	12
UNK IF INJURED	2

## DRIVER ACTIONS

	ACTIONS	PCT
NO CONTRIBUTING ACTION	26	37%
IMPROPER/CARELESS TURN	11	15%
RUNNING RED LIGHT	7	10%
DRIVER WAS DISTRACTED	6	8%
OTHER IMPROPER DRIVING	5	7%
TOO FAST FOR CONDITION	4	6%
AFFECTED PHYSICAL COND	3	4%
SUDDEN SLOWING/STOP	2	3%
TAILGATING	2	3%
DRIVER INEXPERIENCED	1	1%
FAILURE TO RESPOND TCD	1	1%
PROCEED W/O CLEARANCE	1	1%
OTHERS	2	3%
TOTAL	71	100%

## VEHICLE TYPE

	VEHICLES	PCT
AUTOMOBILE	35	58%
SUV	16	27%
SMALL TRUCK	4	7%
VAN	4	7%
LARGE TRUCK	1	2%
TOTAL	60	100%

## ROAD CONDITION

	CRASHES	PCT
DRY	27	93%
WET	2	7%
TOTAL	29	100%

## ILLUMINATION

	CRASHES	PCT
DAYLIGHT	18	62%
STREET LIGHTS	11	38%
TOTAL	29	100%

## WEATHER

	CRASHES	PCT
CLEAR	27	93%
RAIN	2	7%
TOTAL	29	100%

## ENVIR/ROADWAY FACTORS

	FACTORS	PCT
NONE	28	97%
GLARE	1	3%
TOTAL	29	100%

CDART - CRASH SUMMARY REPORT (09-06)

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
  
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.
  
- 3 Complete data years  
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**REPORT PARAMETERS:**

Query ID: [0020160526039](#)  
User ID: jporemba  
Area of Interest: (In County 23 On State Route 0030(P) Between Segment 0050 Offset 2604 and Segment 0060 Offset 100) or (In County 23 On State Route 0030(S) Between Segment 0051 Offset 2604 and Segment 0061 Offset 100) or (In County 23 On State Route 1021(P) Between Segment 0050 Offset 159 and Segment 0050 Offset 359)  
Date Range: 1/1/2011 to 12/31/2015  
Criteria:

**SR 1021 ATSR 1038 IN RADNOR TWP IN DELAWARE CO LOG 17381-01**

**NOTES:**

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:
- 2 2016 crash records are incomplete  
Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.  
Complete data years
- 3 Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

**QUERY PARAMETERS:**

**Note:** This report includes data for state roads only

[002016052602Z](#)

Query ID: jpoembra  
User ID:

Min Crashes: 5 Crashes

Cluster:

Tolerance: 1000 ft

Max Gap: 0 ft

Min Ratio: 0 %

Area of Interest: (In County 23 On State Route 1021(P) Between Segment 0060 Offset 1041 and Segment 0060 Offset 1321) or (In County 23 On State Route 1038(P) Between Segment 0010 Offset 0 and Segment 0010 Offset 195)

Date: 1/1/2011 to 12/31/2015

Criteria:

STATE\_ROAD

Summary of Crash Data  
 Non-Reportable Crashes 2011-2015  
 Provided by Radnor Police Department

ID	CRASH DATE	CRASH DAY OF WEEK	CRASH LOCATION	CRASH TIME	CRASH TYPE	CRASH YEAR	EPDO	TOTAL VEHICLES INVOLVED
120004604	4/17/2012	tuesday	King of Prussia Road and Randor-Chester Road	5:37 PM	Same Direction - Rear End	2012	PDO	2
120007396	6/22/2012	friday	King of Prussia Road and Randor-Chester Road	7:57 AM	Same Direction - Side Swipe	2012	PDO	2
120009390	7/20/2012	friday	King of Prussia Road and Randor-Chester Road	8:41 AM	Other	2012	PDO	-
120015299	12/21/2012	friday	King of Prussia Road and Randor-Chester Road	5:20 PM	Same Direction - Side Swipe	2012	PDO	2
130001341	1/29/2013	tuesday	King of Prussia Road and Randor-Chester Road	7:11 PM	Angle	2013	PDO	2
130005524	4/30/2013	tuesday	King of Prussia Road and Randor-Chester Road	10:49 AM	Same Direction - Side Swipe	2013	PDO	2
140002296	2/17/2014	monday	King of Prussia Road and Randor-Chester Road	11:13 AM	Angle	2014	PDO	2
140014295	11/5/2014	wednesday	King of Prussia Road and Randor-Chester Road	4:25 PM	Same Direction - Rear End	2014	PDO	2
120002825	3/7/2012	wednesday	King of Prussia Road and Matsonford Road	5:09 PM	Angle	2012	PDO	2
120004603	4/17/2012	tuesday	King of Prussia Road and Matsonford Road	1:06 PM	Same Direction - Side Swipe	2012	PDO	2
120004815	4/23/2012	monday	King of Prussia Road and Matsonford Road	11:01 AM	Same Direction - Rear End	2012	PDO	2
130010609	8/15/2013	thursday	King of Prussia Road and Matsonford Road	12:54 PM	Same Direction - Rear End	2013	PDO	2
130012191	9/14/2013	saturday	King of Prussia Road and Matsonford Road	2:31 PM	Fixed Object	2013	PDO	1
140005031	4/15/2014	tuesday	King of Prussia Road and Matsonford Road	5:21 PM	Same Direction - Rear End	2014	PDO	2
140005468	4/25/2014	friday	King of Prussia Road and Matsonford Road	8:29 PM	Angle	2014	PDO	2
140005545	4/27/2014	sunday	King of Prussia Road and Matsonford Road	4:54 PM	Same Direction - Rear End	2014	PDO	2
140010198	8/8/2014	friday	King of Prussia Road and Matsonford Road	5:21 PM	Same Direction - Rear End	2014	PDO	2
140014571	11/12/2014	wednesday	King of Prussia Road and Matsonford Road	8:07 AM	Same Direction - Rear End	2014	PDO	2
140015227	11/26/2014	wednesday	King of Prussia Road and Matsonford Road	4:11 PM	Same Direction - Side Swipe	2014	PDO	2
140016297	12/23/2014	tuesday	King of Prussia Road and Matsonford Road	3:43 PM	Same Direction - Rear End	2014	PDO	2
150000748	1/19/2015	monday	King of Prussia Road and Matsonford Road	2:07 PM	Angle	2015	PDO	2
150002479	2/26/2015	thursday	King of Prussia Road and Matsonford Road	5:59 PM	Same Direction - Rear End	2015	PDO	2
150013829	10/14/2015	wednesday	King of Prussia Road and Matsonford Road	3:15 PM	Same Direction - Rear End	2015	PDO	2
150016829	12/16/2015	wednesday	King of Prussia Road and Matsonford Road	1:29 PM	Same Direction - Rear End	2015	PDO	2
110010448	10/3/2011	monday	King of Prussia Road and Lancaster Ave	5:36 PM	Same Direction - Rear End	2011	PDO	2
110010774	10/13/2011	thursday	King of Prussia Road and Lancaster Ave	9:01 AM	Same Direction - Side Swipe	2011	PDO	2
110011440	10/28/2011	friday	King of Prussia Road and Lancaster Ave	8:47 AM	Same Direction - Side Swipe	2011	PDO	2
110011737	10/3/2011	thursday	King of Prussia Road and Lancaster Ave	2:44 PM	Same Direction - Rear End	2011	PDO	2
110013591	12/24/2011	saturday	King of Prussia Road and Lancaster Ave	3:15 PM	Same Direction - Side Swipe	2011	PDO	2
120000690	1/18/2012	wednesday	King of Prussia Road and Lancaster Ave	2:55 PM	Same Direction - Rear End	2012	PDO	2
120001850	2/14/2012	tuesday	King of Prussia Road and Lancaster Ave	8:28 AM	Same Direction - Rear End	2012	PDO	2
120003830	3/28/2012	wednesday	King of Prussia Road and Lancaster Ave	12:35 PM	Same Direction - Side Swipe	2012	PDO	2
120005827	5/16/2012	wednesday	King of Prussia Road and Lancaster Ave	6:12 PM	Same Direction - Side Swipe	2012	PDO	2
120007197	6/17/2012	sunday	King of Prussia Road and Lancaster Ave	1:54 PM	Angle	2012	PDO	2
120009974	8/23/2012	thursday	King of Prussia Road and Lancaster Ave	6:53 AM	Same Direction - Rear End	2012	PDO	2
120011465	9/25/2012	tuesday	King of Prussia Road and Lancaster Ave	6:04 PM	Same Direction - Rear End	2012	PDO	2
120012119	10/10/2012	wednesday	King of Prussia Road and Lancaster Ave	8:21 PM	Same Direction - Side Swipe	2012	PDO	2
120014203	11/26/2012	monday	King of Prussia Road and Lancaster Ave	3:03 PM	Same Direction - Rear End	2012	PDO	2
130001591	2/2/2013	saturday	King of Prussia Road and Lancaster Ave	5:00 PM	Same Direction - Rear End	2013	PDO	2
130003216	3/10/2013	sunday	King of Prussia Road and Lancaster Ave	11:00 AM	Same Direction - Rear End	2013	PDO	2
130004699	4/12/2013	friday	King of Prussia Road and Lancaster Ave	7:57 AM	Same Direction - Rear End	2013	PDO	2
130005420	4/27/2013	saturday	King of Prussia Road and Lancaster Ave	4:50 PM	Same Direction - Side Swipe	2013	PDO	2
130012350	9/17/2013	tuesday	King of Prussia Road and Lancaster Ave	2:35 PM	Same Direction - Rear End	2013	PDO	2
130012642	9/23/2013	monday	King of Prussia Road and Lancaster Ave	7:29 AM	Same Direction - Rear End	2013	PDO	2
130013745	10/13/2013	sunday	King of Prussia Road and Lancaster Ave	2:45 PM	Same Direction - Rear End	2013	PDO	2
130015296	11/14/2013	thursday	King of Prussia Road and Lancaster Ave	2:15 PM	Same Direction - Rear End	2013	PDO	2
140001681	2/5/2014	wednesday	King of Prussia Road and Lancaster Ave	11:46 AM	Same Direction - Rear End	2014	PDO	2
140002731	2/25/2014	tuesday	King of Prussia Road and Lancaster Ave	9:41 PM	Same Direction - Rear End	2014	PDO	2
140002732	2/25/2014	tuesday	King of Prussia Road and Lancaster Ave	9:32 PM	Same Direction - Side Swipe	2014	PDO	2
140003332	3/11/2014	tuesday	King of Prussia Road and Lancaster Ave	12:40 PM	Same Direction - Side Swipe	2014	PDO	2
140005014	4/15/2014	tuesday	King of Prussia Road and Lancaster Ave	10:40 AM	Same Direction - Rear End	2014	PDO	2
140006210	5/12/2014	monday	King of Prussia Road and Lancaster Ave	8:03 AM	Same Direction - Rear End	2014	PDO	2
140006265	5/13/2014	tuesday	King of Prussia Road and Lancaster Ave	12:25 PM	Same Direction - Side Swipe	2014	PDO	2
140008858	7/10/2014	thursday	King of Prussia Road and Lancaster Ave	12:00 PM	Same Direction - Rear End	2014	PDO	2
140008859	7/10/2014	thursday	King of Prussia Road and Lancaster Ave	12:05 PM	Same Direction - Rear End	2014	PDO	2
140011757	9/11/2014	thursday	King of Prussia Road and Lancaster Ave	8:17 AM	Same Direction - Rear End	2014	PDO	2
140012035	9/17/2014	wednesday	King of Prussia Road and Lancaster Ave	11:26 AM	Same Direction - Rear End	2014	PDO	2
140013587	10/21/2014	tuesday	King of Prussia Road and Lancaster Ave	4:10 PM	Same Direction - Side Swipe	2014	PDO	2
140014332	11/6/2014	thursday	King of Prussia Road and Lancaster Ave	7:15 PM	Same Direction - Rear End	2014	PDO	2
140016012	12/16/2014	tuesday	King of Prussia Road and Lancaster Ave	2:15 PM	Same Direction - Rear End	2014	PDO	2
150003342	3/16/2015	monday	King of Prussia Road and Lancaster Ave	7:32 AM	Same Direction - Rear End	2015	PDO	2
150005953	5/5/2015	tuesday	King of Prussia Road and Lancaster Ave	2:53 PM	Same Direction - Rear End	2015	PDO	2
150008261	6/22/2015	monday	King of Prussia Road and Lancaster Ave	8:20 AM	Same Direction - Rear End	2015	PDO	2
150009413	7/16/2015	thursday	King of Prussia Road and Lancaster Ave	5:57 PM	Same Direction - Side Swipe	2015	PDO	2
150013320	10/3/2015	saturday	King of Prussia Road and Lancaster Ave	10:54 PM	Same Direction - Rear End	2015	PDO	2
150013336	10/4/2015	sunday	King of Prussia Road and Lancaster Ave	1:10 PM	Same Direction - Side Swipe	2015	PDO	3
150013866	10/15/2015	thursday	King of Prussia Road and Lancaster Ave	2:15 PM	Same Direction - Rear End	2015	PDO	2
150014308	10/24/2015	saturday	King of Prussia Road and Lancaster Ave	12:53 PM	Same Direction - Rear End	2015	PDO	2
150014876	11/5/2015	thursday	King of Prussia Road and Lancaster Ave	2:04 PM	Same Direction - Rear End	2015	PDO	2
150015723	11/21/2015	wednesday	King of Prussia Road and Lancaster Ave	2:40 AM	Same Direction - Rear End	2015	PDO	2
150016944	12/18/2015	friday	King of Prussia Road and Lancaster Ave	3:40 PM	Same Direction - Side Swipe	2015	PDO	2



# Correctable Crashes

## Rolling 12 Month Total

### King of Prussia Road & Matsonford Road (SR 1038)

Date	Type
4/1/2011	Angle
10/13/2011	Angle
3/7/2012	Angle
9/12/2012	Head On
4/25/2014	Angle
1/19/2015	Angle

### King of Prussia Road & Radnor Chester Road (SR 1021)

Date	Type
1/4/2011	Angle
7/14/2011	Angle
2/16/2012	Angle
1/29/2013	Angle
2/17/2014	Angle
5/14/2014	Angle
8/21/2014	Angle
10/28/2014	Angle
9/3/2015	Head On
9/18/2015	Angle

### Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp

Date	Type
6/17/2012	Angle
12/8/2014	Angle
1/24/2015	Angle
4/22/2015	Angle
5/21/2015	Angle

### Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circle

Date	Type
1/1/2011	Angle
2/26/2011	Angle
11/11/2011	Head On
2/13/2012	Angle
12/8/2012	Angle
6/6/2013	Head On
3/12/2013	Angle
9/7/2013	Angle
10/3/2013	Angle
11/15/2013	Head On
12/2/2014	Angle
10/10/2015	Angle

### Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)

Date	Type
2/10/2011	Angle
9/9/2011	Head On
3/29/2012	Angle
7/3/2012	Angle
8/22/2012	Angle
3/26/2013	Angle
5/21/2013	Angle
9/10/2013	Angle
10/6/2013	Angle
3/26/2013	Angle
5/28/2014	Angle
3/16/2015	Head On
11/7/2015	Head On
11/24/2015	Angle
11/24/2015	Angle

February 1, 2018 (revised 2/6/18)

UPHS1504

Radnor Township  
Attn: Mr. Robert Zienkowski  
301 Iven Ave.  
Wayne, PA 19087

**RE: PRELIMINARY LAND DEVELOPMENT APPLICATION – ORDINANCE REQUIRING A LIST OF LEVEL OF SERVICE C IMPROVEMENTS  
PENN MEDICINE AT RADNOR  
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA**

Dear Mr. Zienkowski:

To this point we have been requesting a waiver from the Subdivision and Land Development Ordinance (SALDO) §255-20.B(5)(d)[6] which states:

**[a]**

All streets and/or intersections showing a Level of Service below C shall be considered deficient, and specific recommendations for the elimination of these problems shall be listed. This listing of recommended improvements shall include, but not be limited to, the following elements: internal circulation design, site access location and design, external street and intersection design and improvements and traffic signal installation and operation, including signal timing and transit-design improvements.

**[b]**

Existing and/or future public transportation service shall also be addressed. A listing of all actions to be undertaken to increase present public transportation usage and improve service, if applicable, shall be included.

**[c]**

The listing of recommended improvements for both streets and transit shall include, for each improvement, the party responsible for the improvement, the cost and funding of the improvement and the completion date for the improvement.

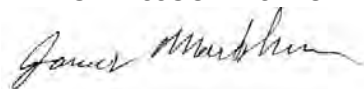
Based on discussions with Amy Kaminski, PE, the Township Traffic Engineer, we believe we can provide this information and therefore no longer require this waiver. Below is the list of improvements that elevate the level of service of the study intersections to a Level of Service C, along with the costs, and the party responsible:

Intersection	Work Necessary to Achieve LOS C	Responsible Party	Order of Magnitude Cost	Funding Source	Notes
<i>King of Prussia Road &amp; Matsonford Road (SR 1038)</i>	Add 1 NB through lane on King of Prussia Road	PennDOT	\$1,800,000	unknown/not funded	
<i>King of Prussia Road &amp; Radnor Chester Road (SR 1021)</i>	Add 1 NB through lane on King of Prussia Road /Add 1 EB left turn lane to Radnor-Chester Road	PennDOT	\$2,600,000	unknown/not funded	
<i>King of Prussia Road &amp; SEPTA Station Driveway</i>	Add 1 NB through lane on King of Prussia Road	Radnor	\$800,000	unknown/not funded	
<i>King of Prussia Road &amp; Existing Raider Road/Site Driveway</i>	Add 1 NB through lane on King of Prussia Road	Penn Medicine	\$800,000	private funds	
<i>Lancaster Avenue (SR 0030) &amp; King of Prussia Road/I-476 NB Off Ramp</i>	Add 1 NB through lane on I-476 NB Off Ramp (for total of 3) /Add 2 NB right turn lanes on I-476 /Add 1 EB left turn lane on Lancaster Avenue /Add 1 EB through lane on Lancaster Avenue /Add 1 SB left turn lane on King of Prussia RoadNB Off Ramp /Add 1 WB through lane on Lancaster Avenue	PennDOT	\$90,000,000	unknown/not funded	includes replacing highway bridges
<i>Lancaster Avenue (SR 0030) &amp; I-476 SB On/Off Ramps</i>	Add 1 WB through lane on Lancaster Ave	PennDOT	\$2,000,000	unknown/not funded	
<i>Lancaster Avenue (SR 0030) &amp; Radnor Chester Road (SR 1021)</i>	Add 1 EB through lane on Lancaster Avenue /Add 1 WB through lane on Lancaster Avenue	PennDOT	\$3,000,000	unknown/not funded	

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (215) 254-7733 or [jmarkham@pennoni.com](mailto:jmarkham@pennoni.com) .

Sincerely,

**PENNONI ASSOCIATES INC.**



James Markham, PE  
Regional Transportation Principal  
Associate Vice President

cc: Stephen Norcini, PE, Radnor Township  
Amy Kaminski, PE, Gilmore & Associates, Inc.  
Roger Phillips, PE, Gannett Fleming, Inc.  
Pat Dorris, The Trustees of the University of Pennsylvania Health Systems  
David Falcone, Saul Ewing Arnstein & Lehr LLP  
Mike Kissinger, PE, Pennoni

February 02, 2018

UPHS 1507

Ms. Amy Kaminski PE PTOE  
Gilmore & Associates  
65 E. Butler Avenue, Suite 100  
New Britain, PA 18901

**RE: CRASH DATA SUMMARY REPORT, 145 KING OF PRUSSIA ROAD**

Dear Amy:

In response to Township comments, Pennoni has prepared a crash data summary under a separate cover for 5 years of historical data and included information regarding non-reportable crashes obtained from the Radnor Township Police Department.

The crash summary includes an evaluation of the correctable reportable and non-reportable crash incidents in a rolling 12 month period at each intersection. The only intersection with 5 or more correctable crashes in a 12 month period is Lancaster Avenue & I-476 NB On-Ramp/Hillside Circle.

The 5 correctable crashes in a 12 month period at Lancaster Avenue & I-476 NB On-Ramp/Hillside Circle involve several different combinations of vehicular movements with 3 of the crashes involved a vehicle running a red light and 1 involving an illegal U-turn. Due to the varied nature of the 5 correctable crashes observed in a 12 month period, there are no intersection improvements recommended to mitigate the crashes. The only recommendation resulting from the evaluation of the crash data is that the existing yellow and all-red times at all study intersections be re-evaluated in accordance to current PennDOT standards. Typically a warranted increase in the yellow change interval or the all red clearance interval can result in a reduction of rear end crashes and could reduce instances of vehicles running red lights.

Attached for your review is the Crash Data Summary Report. Should you have any questions or need additional information please do not hesitate to contact me at (215) 254-7733 or [jmarkham@pennoni.com](mailto:jmarkham@pennoni.com).

Sincerely,

**PENNONI**



James P. Markham, PE  
Associate Vice President

Cc:

Pat Dorris, Penn Medicine  
Dave Falcone, Saul Ewing  
Mike Kissinger, Pennoni

# TRAFFIC IMPACT STUDY

## MIXED MEDICAL FACILITY

145 King of Prussia Road  
Radnor Township  
Delaware County, Pennsylvania



**James P. Markham, PE**

Pennsylvania Professional Engineer License No. PE061283

### Prepared For:

**University of Pennsylvania Health System**  
3400 Civic Center Boulevard  
Philadelphia, PA 19104



September 2017  
Revised January 2018  
Revised April 2018  
UPHS 1507



PARTNERS FOR WHAT'S POSSIBLE

[pennoni.com](http://pennoni.com)



**TRAFFIC IMPACT STUDY**  
**TABLE OF CONTENTS**

EXECUTIVE SUMMARY .....	i
INTRODUCTION .....	1
EXISTING CONDITIONS .....	3
2020 AND 2025 NO-BUILD TRAFFIC CONDITIONS .....	9
DEVELOPMENT TRAFFIC.....	19
2020 and 2025 BUILD TRAFFIC CONDITIONS WITHOUT IMPROVEMENTS .....	23
2020 and 2025 BUILD TRAFFIC CONDITIONS WITH IMPROVEMENTS.....	38
CONCLUSIONS AND RECOMMENDATIONS .....	49

**LIST OF TABLES**

TABLE 1: 2016 EXISTING CONDITIONS SUMMARY TABLE .....	7
TABLE 2: EXISTING SITE TRIP GENERATION .....	9
TABLE 3: 2020 NO-BUILD CONDITIONS SUMMARY TABLE.....	13
TABLE 4: 2025 NO-BUILD CONDITION SUMMARY TABLE .....	17
TABLE 5: TRIP GENERATION RATES.....	20
TABLE 6: PROPOSED SITE TRIP GENERATION.....	21
TABLE 7: NET TRIP COMPARISON.....	21
TABLE 8: 2020 BUILD CONDITION SUMMARY TABLE .....	26
TABLE 9: 2025 BUILD CONDITION SUMMARY TABLE.....	32
TABLE 10: CAPACITY VS ANTICIPATED TRAFFIC VOLUME .....	36
TABLE 11: 2020 BUILD CONDITIONS WITH IMPROVEMENTS SUMMARY TABLE .....	41
TABLE 12: 2025 BUILD CONDITIONS WITH IMPROVEMENTS SUMMARY TABLE .....	45

**LIST OF FIGURES**

- FIGURE 1: PROJECT LOCATION
- FIGURE 2: SITE PLAN
- FIGURE 3: EXISTING 2016 WEEKDAY PEAK HOUR TRAFFIC VOLUMES
- FIGURE 4: EXISTING SITE TRIP DISTRIBUTION
- FIGURE 5: EXISTING SITE TRIPS (CALCULATED)
- FIGURE 6: 2020 NO-BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES
- FIGURE 7: 2025 NO-BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES
- FIGURE 8: PROPOSED SITE TRIP DISTRIBUTION
- FIGURE 9: PROPOSED SITE TRIPS
- FIGURE 10: 2020 BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES
- FIGURE 11: 2025 BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES

**LIST OF APPENDICES**

- APPENDIX A: LEVEL OF SERVICE CRITERIA
- APPENDIX B: EXISTING SIGNAL PERMIT PLANS / TIMING DIRECTIVES
- APPENDIX C: TRAFFIC COUNT AND GAP DATA
- APPENDIX D: EXISTING CONDITION CAPACITY ANALYSIS WORKSHEETS
- APPENDIX E: VOLUME DEVELOPMENT WORKSHEETS
- APPENDIX F: 2020 and 2025 NO-BUILD CONDITION CAPACITY ANALYSIS WORKSHEETS
- APPENDIX G: TRIP GENERATION
- APPENDIX H: TURN LANE EVALUATION
- APPENDIX I: 2020 AND 2025 BUILD CONDITION WITHOUT IMPROVEMENTS QUEUE AND CAPACITY ANALYSIS WORKSHEETS
- APPENDIX J: SIGNAL WARRANT EVALUATION
- APPENDIX K: LEFT TURN PHASE EVALUATION
- APPENDIX L: PEDESTRIAN AND VEHICLE CLEARANCE CALCULATIONS
- APPENDIX M: 2020 AND 2025 BUILD CONDITION WITH IMPROVEMENTS QUEUE AND CAPACITY ANALYSIS WORKSHEETS



# Traffic Impact Study

## 145 King of Prussia Road

---

### EXECUTIVE SUMMARY

This document summarizes the results of an evaluation of traffic impacts associated with the proposed University of Pennsylvania Health Systems site located at 145 King of Prussia Road in Radnor Township, Delaware County, Pennsylvania.

The site currently is vacated and located on the east side of King of Prussia Road between the existing Southern driveway and existing Septa/Northern driveway. The proposed site will be comprised of a 250,000 square foot mixed medical use building, a 150,000 square foot general office building, and a 75,000 square foot, 120 room hotel. The proposed development is anticipated to be constructed and occupied by 2020.

Turning movement counts, including heavy vehicles and pedestrian counts, were conducted between the hours of 7:00 – 9:00A.M. and 4:00 – 6:00 P.M. at the following intersections:

1. King of Prussia Road & Matsonford Road (SR 1038) – November 18, 2015
2. King of Prussia Road & Radnor Chester Road (SR 1021) – April 27, 2016
3. King of Prussia Road & SEPTA Station Driveway– September 15, 2016
4. King of Prussia Road & Existing Northern Site Driveway – April 27, 2016
5. King of Prussia Road & Existing Raider Road/Site Driveway – November 18, 2015
6. King of Prussia Road & Existing Southern Site Driveway – April 27, 2016
7. Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp– November 18, 2015
8. Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps – September 15, 2016
9. Lancaster Avenue (SR 0030) & I-476 NB On Ramp Hillside Circle – November 18, 2015
10. Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021) – April 27, 2016

The performance of the study intersections was evaluated under existing, no-build, and build conditions through a qualitative measure of operating conditions called Levels of Service. Levels of Service (LOS) are determined through analysis procedures outlined in the 2010 Highway Capacity Manual (Transportation Research Board, Washington, D.C.). The Levels of Service were obtained using *Synchro 9* and the 2016 existing, 2020 no-build, and 2020 build conditions and were evaluated to identify impacts to the study area. The need for additional mitigations is based on the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies*.

As the existing space was previously approved and could be occupied by a tenant without additional approvals, trips for the existing site were calculated and applied to the existing traffic to develop the future “no build” conditions. The traffic volumes for the existing site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The existing site trips are based upon the ITE Land Use Codes 710 “General Office” utilizing the square footage of the building as the independent variable. The trip calculations result in a total of **611 (538 entering and 73 exiting)** and **557 (95 entering and 462 exiting)** new trips generated by the site during the morning and afternoon peak hours, respectively.

The proposed mixed-use site will be located at 145 King of Prussia Road between the existing Southern Driveway and the shared SEPTA/Site Driveway. The proposed site will have three driveways along King of Prussia Drive at the location of the of the existing entry driveways. The existing driveway across from Raider Road will become a full access driveway. The southern driveway will primarily be for accessing the loading area.

The traffic volumes for the hotel and general office components of the proposed site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The *ITE Trip Generation Manual* defines a trip as a “single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site.”

## Traffic Impact Study

### 145 King of Prussia Road

---

The proposed Penn Medicine mixed medical use portion of the development will have a gross floor area of 250,000 SF, more than triple the size of 90% of the facilities used by ITE to derive trip generation data. Also, unlike private physician practices used to generate the ITE rates, the proposed Penn Medicine mixed medical use facility will include several treatment facilities that are uncommon in a typical medical office and that occupy a larger portion of the gross square floor area of the building, while not accommodating a larger number of patients. These facilities include ambulatory operating rooms, endoscopy rooms, chemotherapy treatment areas, radiological imaging rooms and radiation oncology treatment areas. Therefore, the proposed facility is very different from those used to derive ITE trip generation data. It is for these reasons that the ITE trip generation is not appropriate to use for the proposed Penn Medicine building and a trip generation rate was developed based on an evaluation of three existing mixed medical use facilities for the peak hour of the adjacent street which, based on traffic counts, is 7:15-8:15 AM and 5:00–6:00 PM.

The following existing mixed medical use facilities were evaluated to develop trip generation rates:

- 171,000 square foot facility at 250 King of Prussia Rd in Radnor PA
- 83,000 square foot facility at 1001 Chesterbrook Blvd. in Berwyn PA
- 154,826 square foot facility at 915 Old Fern Hill Road in West Chester, PA

Based on driveway counts and data regarding the number of patient positions at each facility, average weekday, AM and PM trip generation rates and entry/exit distributions were developed and presented to Radnor Township for review and approval.

The trip calculations result in a total of **731** (577 entering and **154** exiting) and **583** (158 entering and **425** exiting) new trips generated to the site during the morning and afternoon peak hours, respectively. The proposed site will generate approximately 90% more net trips over the course of a whole day than the existing land use “general office building” but only generates approximately 20% more net trips in the AM peak period and approximately 5% more net trips during the PM peak period.

An analysis was conducted to determine whether left turn lanes or a right turn lane into the site from are warranted. Based on the standard worksheets in the Chapter 11 Appendix of PennDOT Publication 46, the warrants for left turn lanes on King of Prussia Road and a northbound right turn lane into the site at the intersection of King of Prussia Road and Raider Road/Site Driveway are met, along with a southbound left turn lane from King of Prussia Road into the Septa Station Driveway.

Traffic Signal warrant requirements were evaluated at the unsignalized intersections of King of Prussia Road & Raider Road/Site Driveway and King of Prussia Road & Septa Station Driveway using the manual counts and generated site trips. From the signal warrant analysis, it was determined that the 4-Hour and Peak Hour signal warrants were satisfied at the intersection of King of Prussia Road & Raider Road/Site Driveway. Evaluation of the left turn signalization warrants for the northbound and southbound left turn lanes on King of Prussia Road at Raider Road and the proposed site driveway indicate that the left turn movements from King of Prussia Road should be controlled with permitted phases.

Vehicular and pedestrian clearances were calculated for the proposed signal at King of Prussia Road and Raider Road/site driveway based on PennDOT policies.

Operations of the study intersections during the AM and PM peak hours were evaluated for the build configuration of the proposed development in the proposed build year of 2020 and the horizon year of 2025 with the optimized timings from the no-build condition.

Under the 2020 and 2025 no-build configuration, all the study intersections operate at an acceptable LOS D or better except for the following locations:

#### King of Prussia Road & Radnor-Chester Road (SR 1021)

- In 2020 the overall intersection operates at a LOS F (218.9 seconds of delay) during the AM peak hour and LOS F (85.7 seconds of delay) during the PM peak hour.
- In 2025 the overall intersection operates at a LOS F (227.1 seconds of delay) during the AM peak hour and LOS F (88.4 seconds of delay) during the PM peak hour.

## Traffic Impact Study

### 145 King of Prussia Road

---

#### King of Prussia Road & South Site Driveway

- In 2020 the overall intersection operates at a LOS F (83.9 seconds of delay) during the PM peak hour.
- In 2025 the overall intersection operates at a LOS F (87.3 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

- In 2020 the overall intersection operates at a LOS E (66.2 seconds of delay) during the AM peak hour and LOS E (55.6 seconds of delay) during the PM peak hour.
- In 2025 the overall intersection operates at a LOS E (69.4 seconds of delay) during the AM peak hour and LOS E (60.5 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & Radnor Chester Road

- Overall Intersection operates at a LOS E (57.2 seconds of delay) during the PM peak hour in 2020.
- Overall Intersection operates at a LOS E (62.1 seconds of delay) during the PM peak hour in 2025.

Based on the anticipated Level of Service for the exiting movements from the site via the SEPTA Driveway and south site driveway to King of Prussia Road a gap study was performed at both locations. The gap study was conducted from 7:00-9:00 AM and 4:00-6:00 PM on April 27, 2016. Based on the peak hour gap analysis, it is anticipated that sufficient gaps are available to accommodate the anticipated traffic from the site at the two locations.

As required by 255-20.B(5)(d)(6)(a) of the Radnor Township Subdivision and Land Development Ordinance, additional off-site improvements would be necessary to achieve LOS C at all of the off-site intersections. Based on Synchro analysis, Lancaster Avenue would require significant intersection upgrades including widening to provide additional through lanes and providing additional dedicated turn lanes on most approaches. The King of Prussia Road intersections at Radnor-Chester Road and Matsonford Road would require two through lanes in each direction on King of Prussia Road and dual turn lanes on the minor approaches. Due to physical constraints at most of the project intersections, including the SEPTA Rail Bridge on King of Prussia Road and the I-476 Bridges on Lancaster Avenue, the necessary improvements are not feasible and are not proposed by the applicant.

The Intersection LOS and delay under no-build conditions was compared to the 2020 and 2025 build conditions. The comparison indicated that there are no changes in overall intersection LOS at existing signalized intersections between the no-build and build conditions because of the trips generated by the proposed site. In conjunction with the proposed development the following roadway improvements are recommended:

- At King of Prussia Road and Matsonford Road/Park Driveway:
  - Modify AM signal timings to shift 3 seconds from the SB King of Prussia Road lead phase to the NB/SB King of Prussia phase (1 second) and the EB/WB Matsonford Road/Park Driveway Phase (2 seconds).
- At King of Prussia Road and Radnor-Chester Road:
  - Modify PM signal timings to shift 6 seconds from the EB/WB King of Prussia Road phase to the NB/SB Radnor Chester Road phase.
- At King of Prussia Road and Septa Station Driveway:
  - Restripe southbound King of Prussia Road to provide a dedicated left turn lane.
- At King of Prussia Road and Raider Road/Site Driveway:
  - Provide left turn lanes on both approaches of King of Prussia Road
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road.
  - Install an actuated traffic signal coordinated with the signal at King of Prussia Road & Radnor-Chester Road.
- At King of Prussia Road and South Site Driveway:
  - Restripe northbound King of Prussia Road to provide shared through/right turn lane.

## Traffic Impact Study

### 145 King of Prussia Road

---

- Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
- At Lancaster Avenue and NB Off Ramps/King of Prussia Road:
  - Restripe northbound I-76 off-ramp at Lancaster Avenue to provide shared through/right turn lane
- At Lancaster Avenue and I-476 SB Off Ramp:
  - Modify PM signal timings to shift 1 second from the EB/WB Lancaster Avenue phase to the WB Lancaster Avenue lead phase.
- At Lancaster Avenue and I-476 NB On Ramp/Hillside Circuit:
  - Modify PM signal timings to shift 7 second from the EB/WB Lancaster Avenue phase to the EB Lancaster Avenue lead phase.
- At Lancaster Avenue and Radnor-Chester Road:
  - Modify AM signal timings to shift 12 seconds from the southbound Radnor-Chester Road lead phase and 1 second from the Lancaster Avenue Phase lead left phase to the EB/WB Lancaster Avenue EB/WB Phase.

The additional improvements result in the overall intersection LOS at Lancaster Avenue and I-476 NB Off Ramp/King of Prussia Road improving from LOS E to LOS D during the AM peak hour in both 2020 and 2025. Striping the additional NB thru lane improves the approach from LOS E to LOS D and the through movement from LOS F to LOS E during the AM peak hour in 2020 and 2025.

Under the build Conditions with the identified improvements implemented, all the study intersections maintain existing levels of service between the no-build and build conditions and operate at overall LOS D or better except for those that operate at LOS E or F under no-build conditions and the Raider Road intersection which operates at A LOS E during the PM peak hour.

Based on the comparison of the Intersection LOS and delay under no-build conditions and build conditions with the identified mitigation measures, the intersections meet the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies* at all the study intersections. The Levels of Service exhibited are not a result of, nor is the need for additional mitigation measures triggered as a result of the trips generated by the proposed site.

In addition to the improvements identified within the is TIS, a bus shelter is to be constructed on King of Prussia Road southeast of the SEPTA Driveway to the extent that it is approved by SEPTA and the University of Pennsylvania Health System will partner with the Township to install a Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review:

- Route 30 & I-476 Northbound Ramps
- Route 30 & I-476/King of Prussia Road
- Route 30 & I-476 Southbound Ramps.
- Route 30 & Radnor-Chester Road.
- Route 30 & Radnor Financial Center Eastern Driveway
- Route 30 & Radnor Financial Center Western Driveway
- King of Prussia Road & Radnor-Chester Road.
- King of Prussia Road & Matsonford Road.
- Matsonford Road & South Centennial Drive.
- Matsonford Road & North Centennial Drive
- King of Prussia Road & Raider Road.
- Radnor Chester and Raider Road
- Radnor Chester and Radnor Financial Center

# Traffic Impact Study

## 145 King of Prussia Road

---

### INTRODUCTION

This document summarizes the results of an evaluation of traffic impacts associated with the proposed University of Pennsylvania Health Systems site located at 145 King of Prussia Road in Radnor Township, Delaware County, Pennsylvania.

The site currently is vacated and located on the east side of King of Prussia Road between the existing Southern driveway and existing Northern driveway. The proposed site will be comprised of a 250,000 square foot mixed medical use building with 130,000 square foot of clinical space and 120,000 square feet of ambulatory care space, a 150,000 square foot general office building, and a 75,000 square foot, 120 room hotel. The proposed development is anticipated to be constructed and occupied in 2020. The overall project area is shown in **Figure 1**. A site plan of the proposed development is illustrated in **Figure 2**.

### **Study Area (Traffic Impact Area)**

The peak traffic periods evaluated on the adjacent roadway network are: morning (7:00 am to 9:00 am) and late afternoon (4:00 pm to 6:00 pm) periods on a typical weekday when school is in session.

The following intersections were selected for study:

1. King of Prussia Road & Matsonford Road (SR 1038)
2. King of Prussia Road & Radnor Chester Road (SR 1021)
3. King of Prussia Road & SEPTA Station Driveway
4. King of Prussia Road & Existing Northern Site Driveway
5. King of Prussia Road & Existing Raider Road/Site Driveway
6. King of Prussia Road & Existing Southern Site Driveway
7. Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp
8. Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps
9. Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circle
10. Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)

### **Study Contents**

Specific elements included in this assessment are:

- An inventory of the roadway facilities in the vicinity of this project, including the existing physical and traffic operating characteristics.
- Manual turning movement counts performed at the study intersections during weekday morning and afternoon peak traffic hours.
- Calculation of vehicular trip generation for the proposed development within the study area based on trip generation rates contained in the Institute of Transportation Engineers (ITE) manual entitle *Trip Generation*, An ITE Information Report (9<sup>th</sup> Edition, 2012).
- Gap study of the existing site driveways
- Distribution of development-generated traffic onto the study area roadways in accordance with current travel patterns.
- Assessment of Existing (2016), Opening Year (2020), and Horizon Year (2025) traffic conditions based on



FIGURE 1  
PROJECT LOCATION

SOUTHEASTERN PENNSYLVANIA  
TRANSPORTATION AUTHORITY

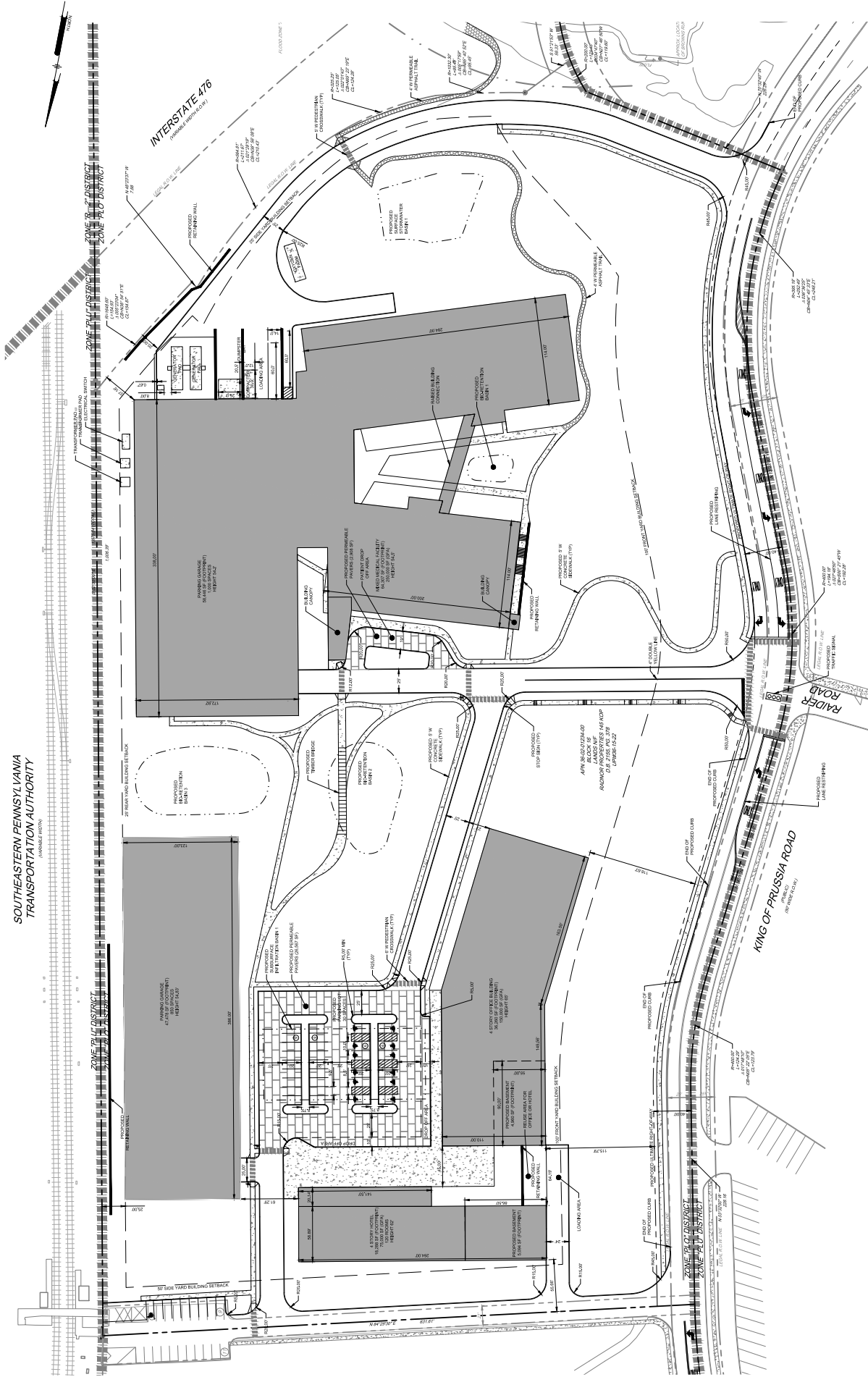


FIGURE 2  
SITE PLAN



## Traffic Impact Study

### 145 King of Prussia Road

---

capacity and level of service analyses performed at the study intersections.

#### Study Methodology

The analysis was conducted in accordance with guidelines presented in Pennsylvania Department of Transportation (PennDOT) Policies and Procedures for Transportation Impact Studies, dated January 28, 2009. As required, three analysis years are considered: existing baseline traffic conditions, opening year analysis and design horizon year analysis (5 years after the opening year). The opening year and horizon year analyses include an assessment of the operational conditions of the study intersections under “no-build” and “build” scenarios. Mitigation is assessed for intersections that experience an overall level of service drop and delay increase of more than ten (10) seconds from the “no-build” to “build” conditions.

The performance of the study intersections for each analysis scenario was evaluated through a qualitative measure of operating conditions called Levels of Service (LOS). Six levels of Service (LOS) are defined with letter designations from ‘A’ to ‘F’, with Level of Service ‘A’ representing delays up to ten seconds and Level of Service ‘F’ indicating delays exceeding eighty seconds. Level of Service ‘C’ or better is considered acceptable, with a threshold of Level of Service ‘D’ in urban areas. Levels of Service are determined through analysis procedures outlined in the 2010 Highway Capacity Manual (Transportation Research Board, Washington, D.C.).

Levels of Service for signalized intersections are based on average delay experienced by motorists passing the intersection. The delay is based on the results of the capacity analysis (rate of demand flow to capacity) and other important variables such as quality of progression, cycle length, and ratio of green time.

Levels of Service for unsignalized intersections are defined in terms of delay to vehicles entering from the side road and turning left from a major road. Delay is a function of the capacity of the approach and degree of saturation. The capacity is based on the distribution of gaps in the major street traffic stream, driver judgment in selecting a gap through which to execute the desired maneuver, and follow-up time required by each driver in a queue. The Level of Service Criteria for signalized and unsignalized intersections is provided in **APPENDIX A**.

The operational analyses of the study intersections under all conditions were performed using the Synchro 9 software. Chapter 10 of PennDOT Publication 46 provides Pennsylvania default values to be utilized in the HCM 2010 Level of Service analysis. The following default values were used for signalized intersections: base saturation flow rate of 1800 passenger cars per hour per lane (suburban); an extension of effective green time of 3.5 seconds, and a start-up lost time of 2.5 seconds.



# Traffic Impact Study

## 145 King of Prussia Road

---

### EXISTING CONDITIONS

#### Existing Roadway Facilities

The following roadways within the immediate vicinity of the project site were evaluated as part of this study:

- **Lancaster Avenue (SR 0030)** is an east-west oriented Principal Arterial Highway. Within the study area, Lancaster Avenue is 90' wide and designated two-way. There are two travel lanes in each direction with separate eastbound and westbound left turn lanes at the two study intersections. The posted speed limit on Lancaster Avenue is 35 mph.
- **King of Prussia Road** is a north-south oriented local roadway with sidewalk on the western side of the roadway. Within the study area, King of Prussia Road is 40' wide with one lane of travel in each direction. The posted speed limit on King of Prussia Road is 35 mph.
- **Matsonford Road (SR 1038)** is an east-west oriented minor arterial roadway. Within the study area, Matsonford Road is 50' wide with one lane of traffic in each direction and a westbound left turn lane. The posted speed limit on Matsonford Road is 40 mph.
- **Radnor Chester Road (SR 1021)** is a north-south oriented minor arterial roadway. Within the study area, Radnor Chester Road is 25' wide with one lane of traffic in each direction. The posted speed limit on Radnor Chester Road is 35 mph.
- **Raider Road** is an east-west oriented local roadway. Within the study area, Raider Road is 30' wide with one lane of traffic in each direction with sidewalk on the southern side. The speed limit on Raider Road is not posted but is assumed to be 25 mph.

#### Existing Intersections

The following existing intersections were analyzed for existing and future capacity restraints as part of this study:

- **King of Prussia Road & Matsonford Road (SR 1038)/Driveway.** The intersection of King of Prussia Road and Matsonford Road is a four-legged signalized intersection operating on a three-phase traffic signal with a southbound lead. Matsonford Road has a left turn lane and a through/right lane in each direction. Northbound King of Prussia Road has one left turn lane, one through lane, and one yield controlled right turn lane. The southbound approach of King of Prussia Road has a left turn lane and a southbound through/right turn lane.
- **King of Prussia Road & Radnor-Chester Road (SR 1021).** The intersection of King of Prussia Road and Radnor-Chester Road is a four-legged signalized intersection operating on a two-phase timing with a 90 second cycle length. Radnor-Chester Road provides one eastbound through/left turn lane and one eastbound right turn lane along with one westbound lane. Radnor-Chester Road contains one northbound left turn lane and one northbound through/right turn lane along with one southbound left turn lane, one southbound through lane and one southbound right turn lane.
- **King of Prussia Road & SEPTA Station Driveway.** The intersection of King of Prussia Road and the SEPTA Station Driveway is a three-legged stop-controlled intersection with stop control on the SEPTA Station Driveway. Northbound King of Prussia Road has one lane. Southbound King of Prussia Road has one through lane and one left turn lane. The driveway has one lane in each direction.

## Traffic Impact Study

### 145 King of Prussia Road

---

- **King of Prussia Road & Northern Site Exit Driveway** The intersection of Lancaster Avenue and the site's northern driveway is a three-legged stop-controlled intersection with stop control on the driveway. King of Prussia Road contains one lane in each direction with a center two-way left turn lane. Raider Road has one lane in each direction. The site driveway is a one lane exit driveway.
- **King of Prussia Road & Raider Road/ Entry Driveway.** The intersection of King of Prussia Road and Raider Road is a three-legged unsignalized intersection with stop-control on Raider Road. King of Prussia Road contains one lane in each direction with a center two-way left turn lane. Raider Road has one lane in each direction. The site driveway is a one lane entry driveway.
- **King of Prussia Road & Southern Site Driveway.** The intersection of King of Prussia Road and the sites southern driveway is a three-legged stop-controlled intersection with stop control on the driveway. Northbound King of Prussia Road has one lane. Southbound King of Prussia Road has one through lane and one left turn lane. The driveway has one lane in each direction.
- **Lancaster Avenue (SR 0030) & King of Prussia Road /I-476 NB Off Ramp.** The intersection of Lancaster Avenue and I-476 NB off-ramps/King of Prussia Road is a four-legged signalized intersection. Lancaster Avenue has two eastbound left turn lanes and two eastbound through lanes. Westbound Lancaster Avenue has two through lanes and one channelized right turn lane. The I-476 NB off-ramp contains two left turn lanes, one through lane, and one right turn lane. Southbound King of Prussia Road has two left turn lanes and one right turn lane.
- **Lancaster Avenue (SR 0030) & I-476 SB on/off-ramps.** The intersection of Lancaster Avenue and I-476 on/off-ramps is a three-legged intersection with a three-phase traffic signal. Westbound Lancaster Avenue has two through lanes and two left turn lanes. Eastbound Lancaster Avenue has two through lanes and one eastbound channelized right turn lane. The I-476 SB off-ramp has two northbound left turn lanes and one channelized right turn lane.
- **Lancaster Avenue (SR 0030) & I-476 NB On Ramps/Hillside Circle.** The intersection of Lancaster Avenue and I-476 off-ramps is a four-legged signalized intersection. Westbound Lancaster Avenue has one left turn lane, two through lanes, and one right turn lane. Eastbound Lancaster Avenue has two left turn lanes, one through lane, and one through/right turn lane. Hillside Circle has one northbound through/left turn lane and one northbound right turn lane.
- **Lancaster Avenue (SR 0030) & Radnor-Chester Road (SR 1021).** The intersection of Lancaster Avenue and Radnor-Chester Road four-legged signalized intersection. Eastbound Lancaster Avenue has one left turn lane, two through lanes, and one right turn lane. Westbound Lancaster Avenue has one left turn lane, one through lane, and one through/right turn lane. Northbound Radnor-Chester Road has one left turn lane, one through lane, and one through/right turn lane. Southbound Radnor-Chester Road has one left/through lane, one through/right lane.

Signal plans and timings Signal for the study area intersections were obtained PennDOT and are provided in **APPENDIX B**.

### Pedestrian Access

King of Prussia Road has sidewalk on both sides of the roadway from the Matsonford Road to the SEPTA station driveway. Sidewalk is provided on the west side of King of Prussia Road from the SEPTA station driveway to Lancaster Avenue. Crosswalks with ADA compliant crosswalks are provided at each of the signalized intersections on King of Prussia Road. There is an unsignalized midblock crosswalk approximately 400' south of Matsonford Road.

Sidewalk is provided on the north side of Lancaster Avenue east of King of Prussia Road. There is no sidewalk provided on Lancaster Avenue west of King of Prussia Road.

### Transit Facilities

Transit facilities are present within the study area including, Septa Regional Rail and Septa Bus Routes. The site is located

## Traffic Impact Study

### 145 King of Prussia Road

---

adjacent to the Radnor Train Station which is serviced by Norristown High Speed Line and the Paoli-Thorndale Regional Rail Line. Several bus routes run adjacent to the site including the 105 and 106 lines on King of Prussia Road.

### Data Collection

Turning movement counts, including heavy vehicles and pedestrian counts, were conducted between the hours of 7:00 – 9:00 A.M. and 4:00 – 6:00 P.M. at the following intersections:

1. King of Prussia Road & Matsonford Road (SR 1038) – November 18, 2015
2. King of Prussia Road & Radnor Chester Road (SR 1021) – April 27, 2016
3. King of Prussia Road & Existing Northern Site Driveway – April 27, 2016
4. King of Prussia Road & Existing Raider Road/Site Driveway – November 18, 2015
5. King of Prussia Road & Existing Southern Site Driveway – April 27, 2016
6. Lancaster Avenue (SR 0030) & King of Prussia Road / I-476 NB Off Ramp– November 18, 2015
7. Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps – September 15, 2016
8. Lancaster Avenue (SR 0030) & I-476 NB On Ramp Hillside Circle – November 18, 2015
9. Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021) – April 27, 2016

A gap study was also performed for the existing site driveways on April 27, 2016 between the hours of 7:00 – 9:00 A.M. and 4:00 – 6:00 P.M.

The existing traffic volumes are shown on **FIGURE 3**.

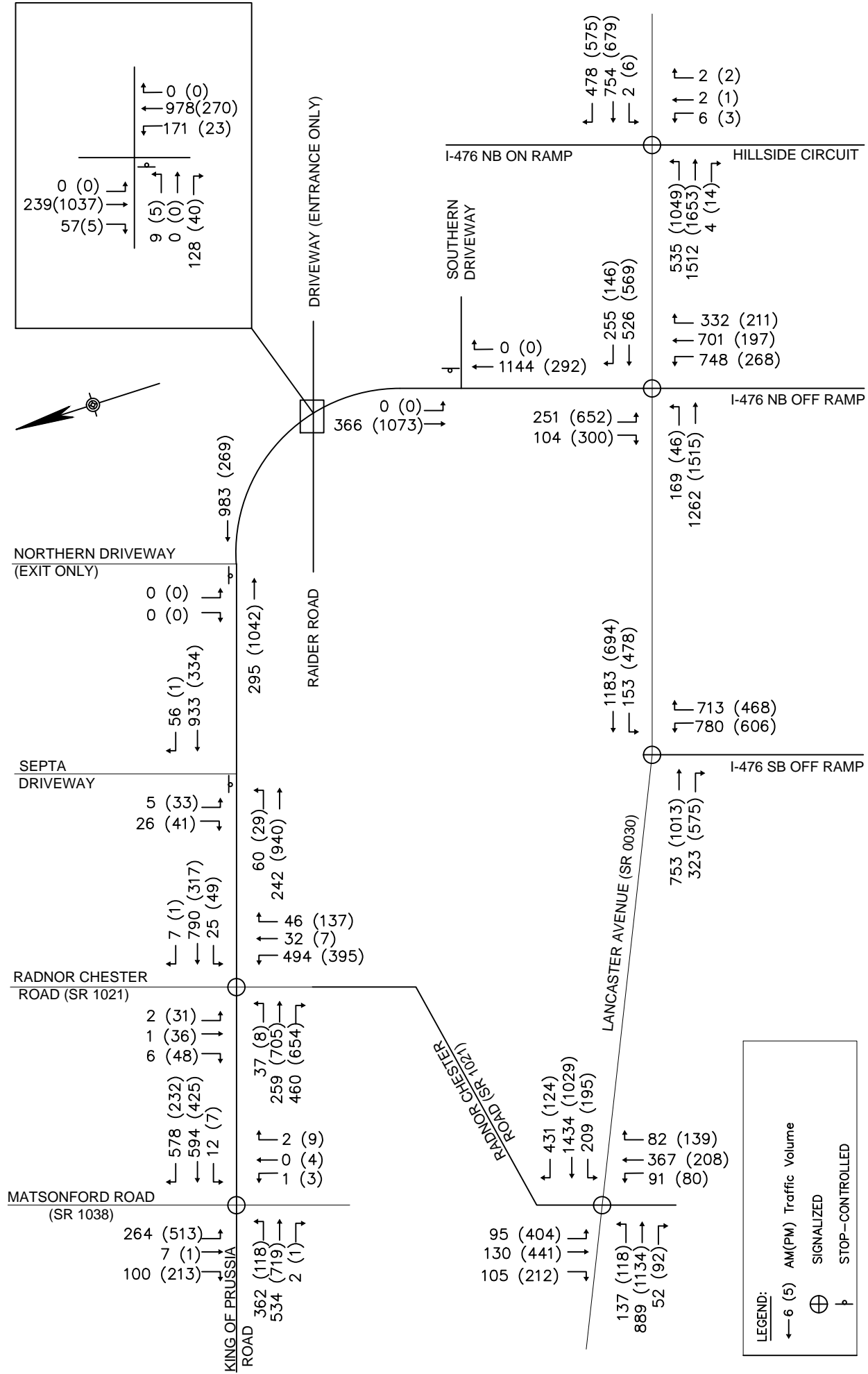
The count and gap study data is provided in **APPENDIX C**.

### Existing Levels of Service/Queue Analysis

The operational analyses of the study intersections under all conditions were performed using the *Synchro/Simtraffic* Version 9.0 software. Chapter 10 of *PennDOT Publication 46* provides Pennsylvania default values to be utilized in the HCM 2010 Level of Service analysis.

Under the existing conditions, all of the study intersections operate at an overall Level of Service D or better, with all movements operating at Level of Service D or better during the AM and PM peak hours besides the following locations:

- King of Prussia Road & Radnor Chester Road
  - Northbound approach operates at a LOS F during the AM and PM peak hours with 613.9 and 249.3 seconds of delay, respectively.
  - Northbound left/through movement operates at a LOS F during the AM and PM peak hours with 666.0 and 328.0 seconds of delay, respectively.
  - The overall intersection operates at a LOS F during the AM peak hour (228.6 seconds of delay) and at a LOS F during the PM peak hour (93.3 seconds of delay).
- King of Prussia Road & Raider Road
  - Eastbound movement operates at a LOS F (53.4 seconds of delay) during the AM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road
  - Eastbound approach operates at a LOS E (57.4 seconds of delay) during the AM peak hour.
  - Eastbound through operates at a LOS E (58.1 seconds of delay) during the AM peak hour.
  - Northbound through movement operates at LOS F (81.1 seconds of delay) during the AM peak hour.
  - Northbound right movement operates at LOS E (78.0 seconds of delay) during the PM peak hour.



**LEGEND:**

- ← 6 (5) AM(PM) Traffic Volume
- ⊕ SIGNALIZED
- ⊥ STOP-CONTROLLED

**FIGURE 3**  
**EXISTING 2016 WEEKDAY**  
**PEAK HOUR TRAFFIC VOLUMES**



## Traffic Impact Study

### 145 King of Prussia Road

---

- Southbound approach movement operates at a LOS E (57.1 seconds of delay) during the AM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit
  - Eastbound left movement operates at a LOS E (57.4 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS E during the AM and PM peak hours with 56.5 and 59.3 seconds of delay, respectively.
  - Northbound approach operates at a LOS E during the AM and PM peak hours with 58.1 and 56.7 seconds of delay, respectively.
  - Northbound through/left movement operates at a LOS E during the AM and PM peak hours with 58.8 and 56.9 seconds of delay, respectively.
  - Northbound right movement operates at a LOS E during the AM and PM peak hours with 55.1 and 56.2 seconds of delay, respectively.
- Lancaster Avenue (SR 0030) & Radnor Chester Road
  - Westbound left operates at LOS E (62.2 seconds of delay) during the PM peak hour.
  - Westbound thru operates at LOS E (63.7 seconds of delay) during the AM peak hour.
  - Southbound approach operates at a LOS F (81.9 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (174.7 seconds of delay) during the PM peak hour.

In the existing conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 345' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 60' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 925' and 40' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 40' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 128' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 505' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 143' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 232' and 138' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 658' during the PM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the existing conditions analysis are summarized in **TABLE 1**. Detailed outputs of the 2016 existing conditions analysis are provided in **APPENDIX D**.

Table 1 – 2016 Existing Conditions Summary Table

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		27.9	C	-	19.3	B	-
	(EB Left)	50'	30.8	C	0	24.5	C	3
	(EB Thru/Right)	50'	26.5	C	3	18.2	B	10
	WB Approach	-	36.7	D	-	43.1	D	-
	(WB Left)	550'	39.7	D	310	52.1	D	610
	(WB Thru/Right)	950'	29.3	C	113	21.6	C	195
	SB Approach	-	23.9	C	-	23.3	C	-
	(SB Left)	100'	45.5	D	445	15.9	B	80
	(SB Thru/Right)	1000'+	9.3	A	313	24.5	C	618
	NB Approach	-	40.8	D	-	27.5	C	-
	(NB Left)	130'	17.7	B	10	30.6	C	8
(NB Thru)	1150'	41.3	D	543	27.4	C	382	
<b>Overall</b>	-	<b>31.9</b>	<b>C</b>	-	<b>31.3</b>	<b>C</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	18.1	B	-	21.0	C	-
	(EB Left)	75'	46.3	D	50	16.6	B	5
	(EB Thru)	1200'	14.1	B	178	21.1	C	470
	WB Approach	-	38.1	D	-	18.0	B	-
	(WB Left)	160'	16.6	B	20	38.2	D	60
	(WB Thru/Right)	1100'	38.8	D	800	14.8	B	225
	NB Approach	-	613.9	F	-	249.3	F	-
	(NB Left/Thru)	1200'	666.0	F	2125	328.0	F	1240
	(NB Right)	280'	18.1	B	35	19.5	B	110
SB Approach	100'	21.8	C	8	50.8	D	140	
<b>Overall</b>	-	<b>228.6</b>	<b>F</b>	-	<b>93.3</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	26.2	D	73	19.1	C	25
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	2.5	A	90	0.3	A	3
	<b>Overall</b>	-	<b>1.2</b>	<b>A</b>	-	<b>1.2</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	0.0	A	0	0.0	A	0
	NB Approach	280'	0.0	A	0	0.0	A	0
	SB Approach	380'	0.0	A	0	0.0	A	0
	<b>Overall</b>	-	<b>0.0</b>	<b>A</b>	-	<b>0.0</b>	<b>A</b>	-
King of Prussia Road (N/S) & Raider Road/Driveway (E)	EB Approach	500'	53.4	F	128	24.1	C	18
	NB Approach	550'	1.3	A	18	0.9	A	3
	SB Approach	280'	0.0	A	0	0.0	A	0
	<b>Overall</b>	-	<b>5.6</b>	<b>A</b>	-	<b>1.0</b>	<b>A</b>	-
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	0.0	A	0	0.0	A	0
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.0	A	0	0.0	A	0
	(SB Left)	75'	0.0	A	-	0.0	A	-
	<b>Overall</b>	-	<b>0.0</b>	<b>A</b>	-	<b>0.0</b>	<b>A</b>	-

Table 1 – 2016 Existing Conditions Summary Table (Cont.)

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	57.4	E	-	56.6	E	-
	(EB Left)	800'	52.1	D	120	54.0	D	35
	(EB Thru)	800'	58.1	E	765	56.7	E	928
	WB Approach	600'	23.8	C	240	8.3	A	128
	NB Approach	-	44.5	D	-	47.4	D	-
	(NB Left)	500'	17.6	B	300	19.8	B	123
	(NB Thru)	1900'	81.1	F	1350	52.0	D	275
	(NB Right)	500'	27.9	C	330	78.0	E	345
	SB Approach	500'	57.1	E	32	47.5	D	407
<b>Overall</b>	-	<b>47.2</b>	<b>D</b>	-	<b>45.1</b>	<b>D</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	16.9	B	208	21.6	C	298
	WB Approach	-	33.7	C	-	33.9	C	-
	(WB Left)	600'	53.4	D	108	52.6	D	295
	(WB Thru)	800'	31.1	C	556	20.9	C	340
	NB Approach	1000'+	40.1	D	435	46.5	D	365
	<b>Overall</b>	-	<b>31.0</b>	<b>C</b>	-	<b>32.1</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.9	A	-	22.4	C	-
	(EB Left)	400'	32.9	C	250	57.4	E	905
	(EB Thru/Right)	600'	0.4	A	8	0.3	A	5
	WB Approach	-	9.5	A	-	15.6	B	-
	(WB Left)	100'	56.5	E	3	59.3	E	10
	(WB Thru/Right)	750'	9.4	A	238	15.3	B	263
	NB Approach	-	58.1	E	-	56.7	E	-
	(NB Left/Thru)	750'	58.8	E	13	56.9	E	8
	(NB Right)	50'	55.1	E	3	56.2	E	3
<b>Overall</b>	-	<b>9.2</b>	<b>A</b>	-	<b>21.1</b>	<b>C</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	31.2	C	-	51.0	D	-
	(EB Left)	260'	42.6	D	143	22.2	C	93
	(EB Thru)	750'	29.6	C	473	53.7	D	730
	WB Approach	-	53.5	D	-	35.7	D	-
	(WB Left)	340'	30.2	C	155	62.2	E	240
	(WB Thru)	1800'	63.7	E	1280	32.4	C	503
	(WB Right)	300'	30.9	C	443	21.0	C	113
	NB Approach	-	45.7	D	-	34.8	C	-
	(NB Left/Thru)	1000'+	44.6	D	340	34.9	C	235
	(NB Thru/Right)	100	46.9	D	332	34.8	C	238
	SB Approach	-	26.3	C	-	81.9	F	-
	(SB Left)	160'	29.4	C	98	174.7	F	818
	(SB Thru)	350'	25.1	C	118	24.7	C	300
<b>Overall</b>	-	<b>44.3</b>	<b>D</b>	-	<b>52.2</b>	<b>D</b>	-	

# Traffic Impact Study

## 145 King of Prussia Road

### 2020 and 2025 “NO-BUILD” TRAFFIC CONDITIONS

Operations of the study intersections during the AM and PM peak hours were evaluated for the no-build configuration without the proposed development in the proposed build year 2020 and the horizon year 2025.

#### No-Build Traffic Volumes

In order to account for general traffic growth in the area, an annual background growth rate is applied to existing traffic volumes on the study area roadways. An annual background growth rate of 0.38% per year has been previously established by PennDOT’s *Bureau of Planning and Research* for urban, non-interstate roadways in the study area.

The existing 427,109 SF office/research and development space is currently vacant with access provided via four driveways along King of Prussia Road. As the existing space was previously approved and could be occupied by a tenant without additional approvals, trips for the existing site were calculated and applied to the existing traffic to develop the future “no-build” conditions.

The traffic volumes for the existing site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The existing site trips are based upon the ITE Land Use Codes 710 “General Office” utilizing the square footage of the building as the independent variable. The trip calculations result in a total of **611** (**538** entering and **73** exiting) and **557** (**95** entering and **462** exiting) new trips generated to the site during the morning and afternoon peak hours, respectively. **TABLE 2** summarizes the trip calculation for the existing site during the weekday morning and weekday afternoon peak hours.

**Table 2 – Existing Site Trip Generation**

Land Use Code	Size	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
General Office Building (ITE Land Use 710)	427,110 SF	1,000 SF GFA	1,979	1,978	3,957	538	73	611	95	462	557
<b>Total</b>			<b>1,979</b>	<b>1,978</b>	<b>3,957</b>	<b>538</b>	<b>73</b>	<b>611</b>	<b>95</b>	<b>462</b>	<b>557</b>

The trip distribution of the existing site based on the proposed location along King of Prussia Road and the existing traffic patterns on the surrounding roadway network. The estimated distribution of the site traffic is:

- To/From King of Prussia Road northbound - 25%
- To/From King of Prussia Road southbound - 75%

The trip distribution and volumes generated at the proposed site are provided in **FIGURES 4 and 5**. The 2020 and 2025 no-build Traffic volumes are illustrated in **FIGURES 6 and 7**. Traffic volumes development tables are provided in **APPENDIX E**.

Signal timing adjustments were made for future no-build conditions to optimize the intersection performance minimizing the overall intersection delay where possible. The following timing adjustments were made:

- At King of Prussia Road and Matsonford Road/Park Driveway:
  - Modify AM signal timings to shift 3 seconds from the SB King of Prussia Road lead phase to the NB/SB King of Prussia phase (1 second) and the EB/WB Matsonford Road/Park Driveway Phase (2 seconds).
- At King of Prussia Road and Radnor-Chester Road:



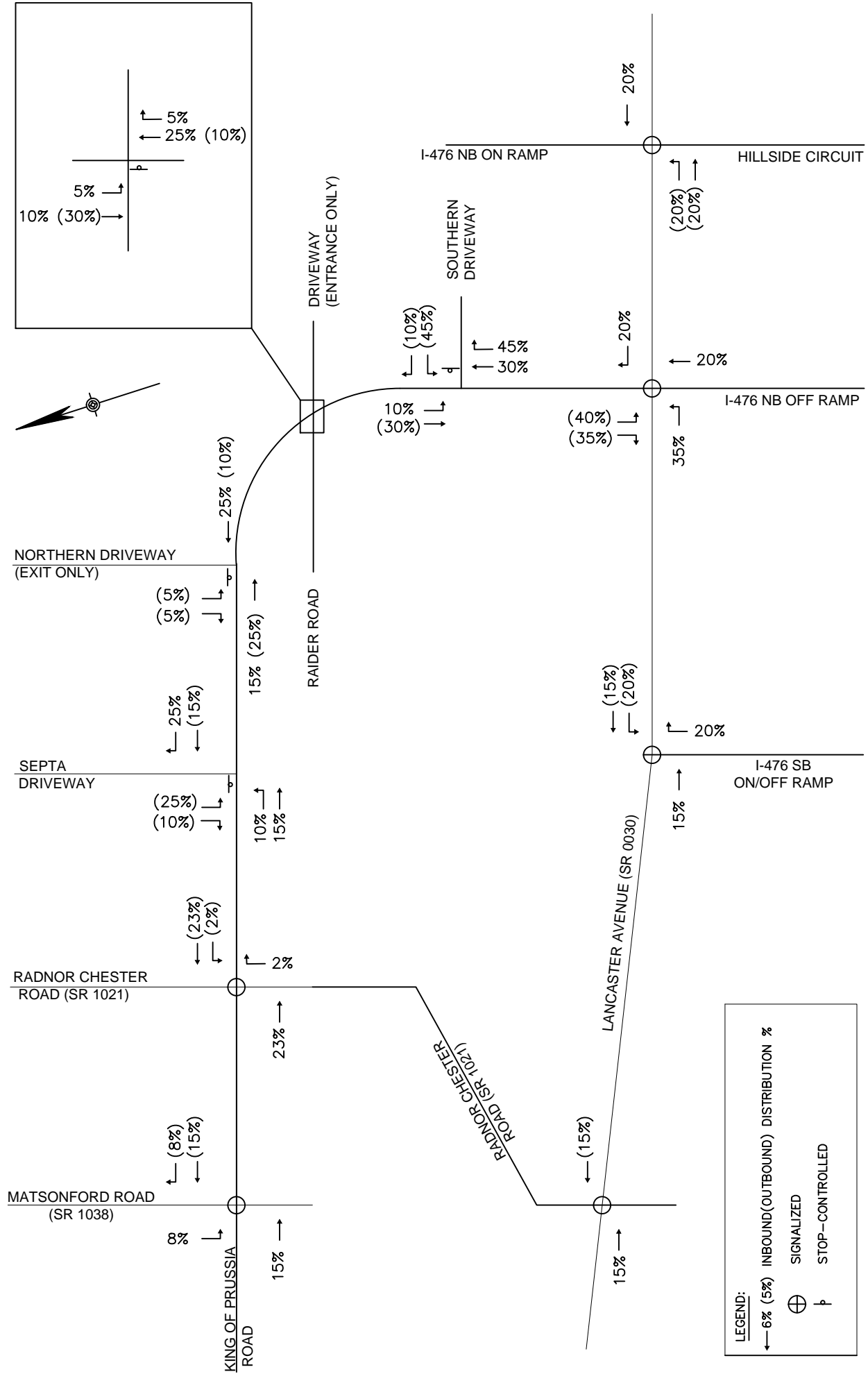
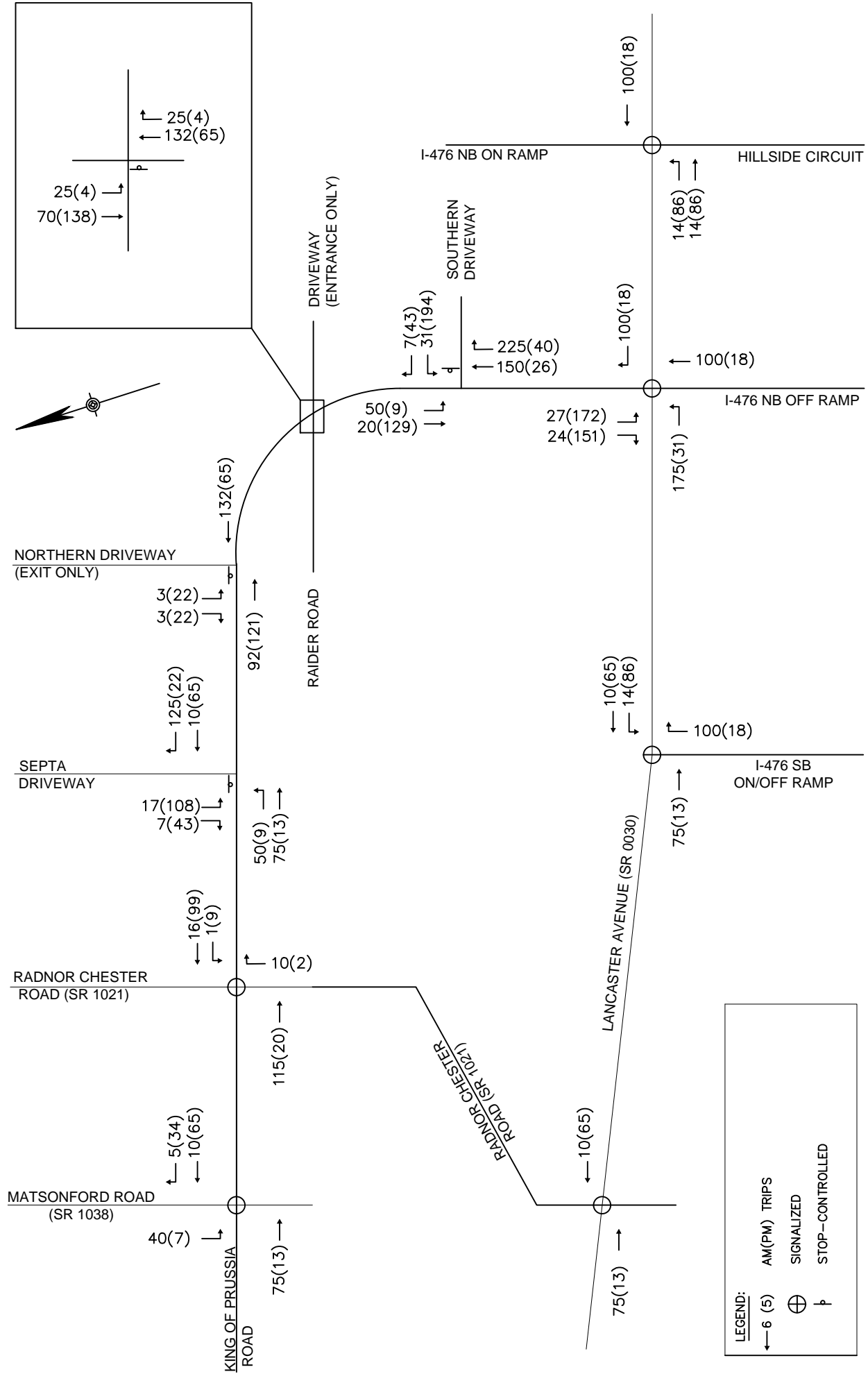


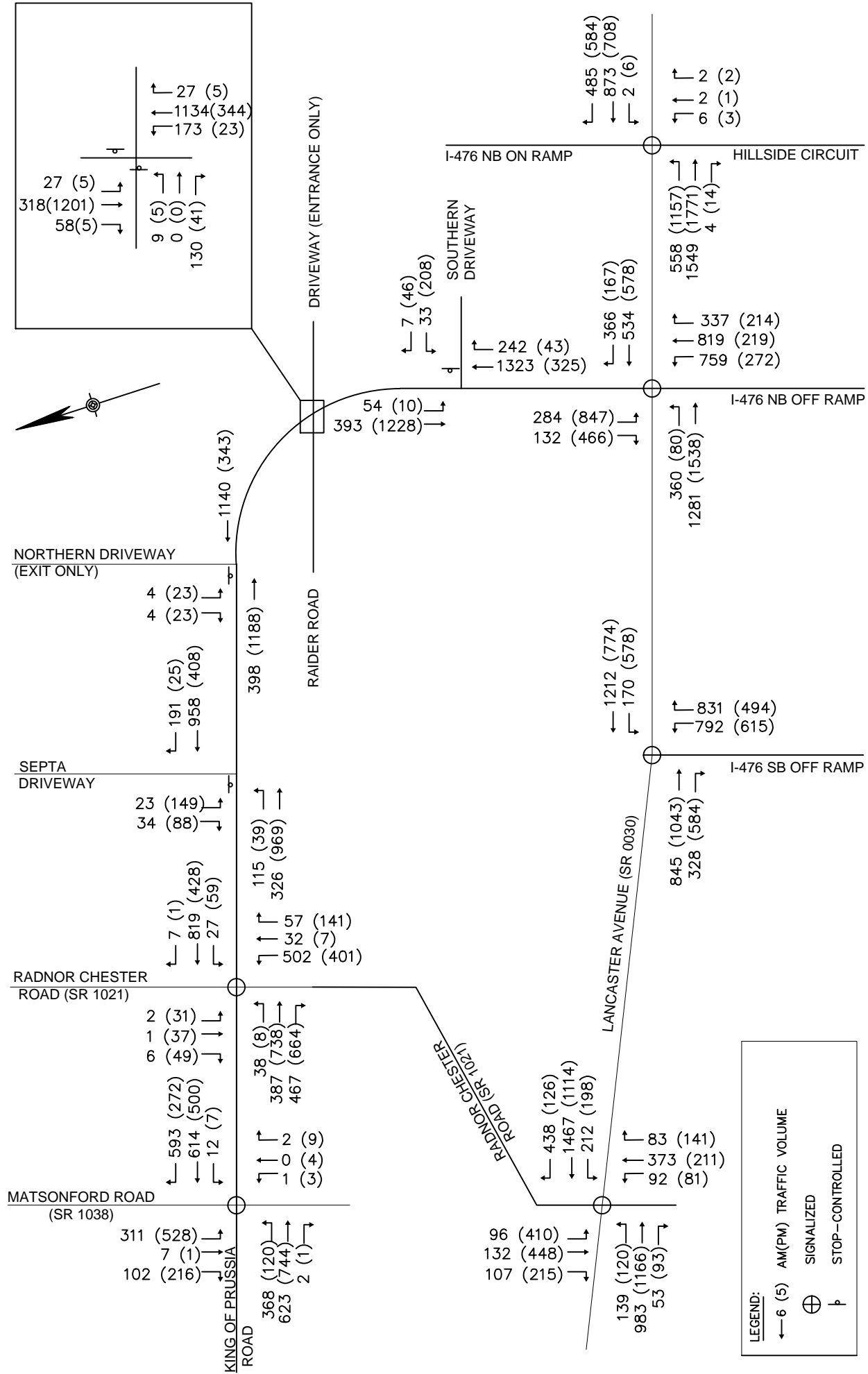
FIGURE 4  
EXISTING SITE TRIP DISTRIBUTION





**FIGURE 5  
EXISTING SITE TRIPS  
(CALCULATED)**



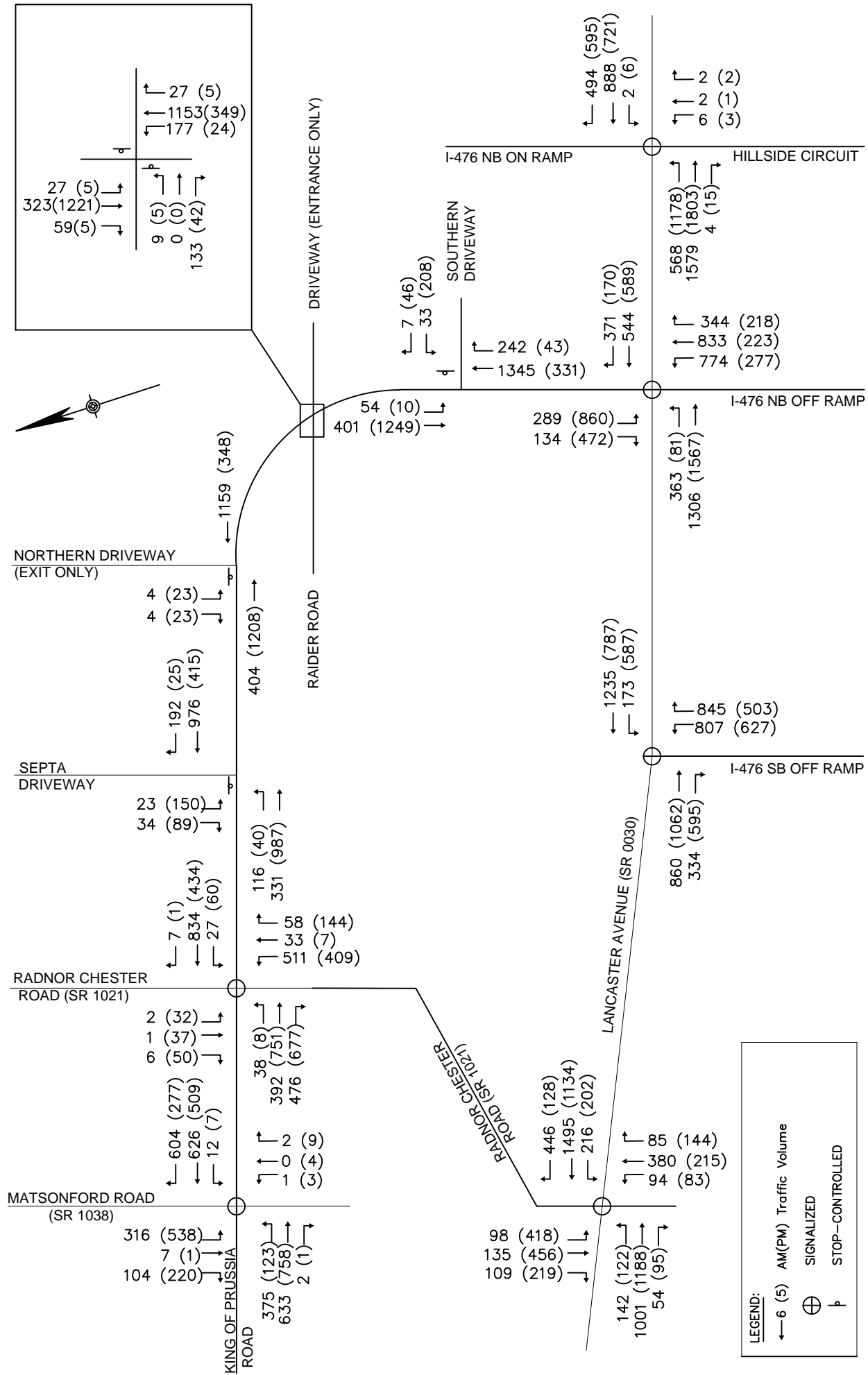


**LEGEND:**

- ← 6 (5) AM(PM) TRAFFIC VOLUME
- ⊕ SIGNALIZED
- ⊔ STOP-CONTROLLED

**FIGURE 6**  
**2020 NO-BUILD WEEKDAY**  
**PEAK HOUR TRAFFIC VOLUMES**





**FIGURE 7**  
 2025 NO-BUILD WEEKDAY  
 PEAK HOUR TRAFFIC VOLUMES



## Traffic Impact Study

### 145 King of Prussia Road

---

- Modify PM signal timings to shift 4 seconds from the EB/WB King of Prussia Road phase to the NB/SB Radnor Chester Road phase.
- At Lancaster Avenue and I-476 SB Off Ramp:
  - Modify PM signal timings to shift 1 second from the EB/WB Lancaster Avenue phase to the WB Lancaster Avenue lead phase.
- At Lancaster Avenue and I-476 NB On Ramp/Hillside Circuit:
  - Modify PM signal timings to shift 6 seconds from the EB/WB Lancaster Avenue phase to the EB Lancaster Avenue lead phase.
- At Lancaster Avenue and Radnor-Chester Road:
  - Modify AM signal timings to shift 12 seconds from the southbound Radnor-Chester Road lead phase to the EB/WB Lancaster Avenue Phase.

### 2020 No-Build Levels of Service Analysis

Operations of the study intersections during the AM and PM peak hours were evaluated for the no-build configuration of the proposed development in the proposed build year of 2020. The signal timing adjustments were made for future no-build conditions to minimizing the overall intersection delay where possible. Under the 2020 no-build Conditions, all the study intersections and movements operate at an acceptable LOS D or better besides the following locations:

- King of Prussia Road & Matsonford Road
  - Westbound left movement operates at a LOS E (55.8 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (84.9 seconds of delay) during the AM peak hour.
  - Northbound approach movement operates at LOS E (60.9 seconds of delay) during the AM peak hour.
  - Northbound thru movement operates at LOS E (61.7 seconds of delay) during the AM peak hour.
- King of Prussia Road & Radnor Chester Road
  - Overall intersection LOS of F (218.9 seconds of delay) during the AM peak hour and LOS F (85.7 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS E (62.4 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS F (617.3 seconds of delay) during the AM peak hour and at a LOS F (225.5 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS F (681.6 seconds of delay) during the AM peak hour and a LOS E (297.7 seconds of delay) during the PM peak hour.
- King of Prussia and SEPTA Driveway
  - Westbound approach movement operates at a LOS E (38.6 seconds of delay) during the AM peak hour and at LOS F (120.0 seconds of delay) during the PM peak hour.
- King of Prussia and Southern Driveway
  - Overall intersection LOS of F (83.9 seconds of delay) during the PM peak hour.
  - Westbound approach movement operates at a LOS F (265.0 seconds of delay) during the AM peak hour and at a LOS F (613.8 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road
  - Overall intersection LOS of E (66.2 seconds of delay) during the AM peak hour and LOS E (55.6 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (60.5 seconds of delay) during the AM peak hour and at a LOS E (58.5 seconds of delay) during the PM peak hour.
  - Eastbound left movement operates at a LOS E (59.1 seconds of delay) during the AM peak hour.
  - Eastbound through movement operates at a LOS E (60.9 seconds of delay) during the AM peak hour and at a LOS E (58.8 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (74.8 seconds of delay) during the AM peak hour.

## Traffic Impact Study

### 145 King of Prussia Road

---

- Northbound through movement operates at a LOS F (146.9 seconds of delay) during the AM peak hour and a LOS E (57.8 seconds of delay) during the PM peak hour.
- Northbound right movement operates at a LOS E (79.3 seconds of delay) during the PM peak hour.
- Southbound approach movement operates at a LOS E (63.9 seconds of delay) during the AM peak hour and at a LOS F (85.8 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit
  - Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and at a LOS E (59.3 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (58.1 seconds of delay) during the AM peak hour and at a LOS E (56.7 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and at a LOS E (56.9 seconds of delay) during the PM peak hour
  - Northbound right movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour and at a LOS E (56.2 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & Radnor Chester Road
  - Overall intersection operates at a LOS E (57.2 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (59.1 seconds of delay) during the PM peak hour.
  - Eastbound through movement operates at a LOS E (62.5 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS E (79.4 seconds of delay) during the PM peak hour.
  - Westbound thru movement operates at a LOS E (58.0 seconds of delay) during the AM peak hour.
  - Southbound approach movement operates at a LOS F (83.9 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (180.3 seconds of delay) during the PM peak hour.

In the 2020 no-build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 618' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 90' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200' by 970' and 15' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 38' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 535' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 17' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 442' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 45' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 2' during the PM peak period.

## Traffic Impact Study

### 145 King of Prussia Road

---

- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 135' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 240' and 142' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 688' during the PM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the no-build conditions analysis are summarized in **TABLE 3**. Detailed outputs of the 2020 no-build conditions analysis are provided in **APPENDIX F**.

**Table 3 – 2020 No-Build Conditions Summary Table**

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	19.3	B	-
	(EB Left)	50'	29.1	C	0	24.5	C	3
	(EB Thru/Right)	50'	25.0	C	3	18.2	B	10
	WB Approach	-	38.8	D	-	45.9	D	-
	(WB Left)	550'	42.8	D	368	55.8	E	640
	(WB Thru/Right)	950'	27.6	C	110	21.6	C	195
	SB Approach	-	39.0	D	-	25.9	C	-
	(SB Left)	100'	84.9	F	718	18.0	B	83
	(SB Thru/Right)	1000'+	12.0	B	403	27.1	C	660
	NB Approach	-	60.9	E	-	33.5	C	-
	(NB Left)	130'	17.3	B	10	33.1	C	8
	(NB Thru)	1150'	61.7	E	785	33.5	C	492
<b>Overall</b>	-	<b>45.7</b>	<b>D</b>	-	<b>34.6</b>	<b>C</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.0	B	-	28.1	C	-
	(EB Left)	75'	50.4	D	53	23.2	C	8
	(EB Thru)	1200'	16.0	B	255	28.1	C	548
	WB Approach	-	44.2	D	-	25.2	C	-
	(WB Left)	160'	20.5	C	25	62.4	E	93
	(WB Thru/Right)	1100'	45.0	D	883	20.1	C	333
	NB Approach	-	617.3	F	-	225.5	F	-
	(NB Left/Thru)	1200'	681.6	F	2170	297.7	F	1215
	(NB Right)	280'	18.2	B	45	16.8	B	105
	SB Approach	100'	21.8	C	8	49.3	D	138
<b>Overall</b>	-	<b>218.9</b>	<b>F</b>	-	<b>85.7</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	38.6	E	43	120.0	F	288
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.2	A	30	0.3	A	3
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>17.1</b>	<b>C</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	21.8	C	3	18.2	C	13
	NB Approach	280'	0.0	A	0	0.0	A	0
	SB Approach	380	0.0	A	0	0.0	A	0
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	<b>0.5</b>	<b>A</b>	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.3	B	30	32.1	D	25
	NB Approach	550'	1.2	A	20	0.7	A	3
	SB Approach	280	0.9	A	5	0.0	A	0
	<b>Overall</b>	-	<b>2.0</b>	<b>A</b>	-	<b>1.1</b>	<b>A</b>	-
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	265.0	F	108	613.8	F	567
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.1	A	-
	(SB Left)	75'	15.2	C	13	8.0	A	0
	<b>Overall</b>	-	<b>5.6</b>	<b>A</b>	-	<b>83.9</b>	<b>F</b>	-



Table 3 – 2020 No-Build Conditions Summary Table (Cont.)

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	60.5	E	-	58.5	E	-
	(EB Left)	800'	59.1	E	252	52.5	D	58
	(EB Thru)	800'	60.9	E	787	58.8	E	1335
	WB Approach	600'	53.9	D	338	10.3	B	163
	NB Approach	-	74.8	E	-	49.7	D	-
	(NB Left)	500'	17.6	B	305	19.8	B	123
	(NB Thru)	1900'	146.9	F	1917	57.8	E	313
	(NB Right)	500'	28.1	C	335	79.3	E	353
	SB Approach	500'	63.9	E	78	85.8	F	328
	<b>Overall</b>	-	<b>66.2</b>	<b>E</b>	-	<b>55.6</b>	<b>E</b>	-
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.0	B	235	24.6	C	323
	WB Approach	-	34.5	C	-	35.3	D	-
	(WB Left)	600'	53.8	D	120	53.1	D	342
	(WB Thru)	800'	31.8	C	568	22.0	C	370
	NB Approach	1000'+	40.0	D	443	46.6	D	370
	<b>Overall</b>	-	<b>31.3</b>	<b>C</b>	-	<b>33.9</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.6	A	-	9.7	A	-
	(EB Left)	400'	31.8	C	248	24.4	C	842
	(EB Thru/Right)	600'	0.3	A	5	0.2	A	5
	WB Approach	-	10.4	B	-	19.8	B	-
	(WB Left)	100'	56.5	E	3	59.3	E	10
	(WB Thru/Right)	750'	10.3	B	280	19.4	B	303
	NB Approach	-	58.1	E	-	56.7	E	-
	(NB Left/Thru)	750'	58.8	E	13	56.9	E	8
	(NB Right)	50'	55.1	E	3	56.2	E	3
<b>Overall</b>	-	<b>9.3</b>	<b>A</b>	-	<b>11.8</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	31.5	C	-	59.1	E	-
	(EB Left)	260'	43.8	D	145	24.3	C	95'
	(EB Thru)	750'	30.0	C	520	62.5	E	795
	WB Approach	-	49.7	D	-	42.2	D	-
	(WB Left)	340'	35.0	C	185	79.4	E	342
	(WB Thru)	1800'	58.0	E	1285	37.9	D	575
	(WB Right)	300'	29.0	C	435	21.5	C	115
	NB Approach	-	45.9	D	-	34.6	C	-
	(NB Left/Thru)	1000'+	44.7	D	345	34.8	C	238
	(NB Thru/Right)	100	47.1	D	340	34.4	C	242
	SB Approach	-	27.8	C	-	83.9	F	-
	(SB Left)	160'	31.3	C	103	180.3	F	848
	(SB Thru)	350'	26.5	C	125	24.4	C	300
<b>Overall</b>	-	<b>42.3</b>	<b>D</b>	-	<b>57.2</b>	<b>E</b>	-	

#### 2025 No-Build Levels of Service Analysis

Operations of the study intersections during the AM and PM peak hours were evaluated for the no-build configuration of the proposed development in the proposed build year of 2020. The signal timing adjustments were made for future no-build conditions to minimizing the overall intersection delay where possible. Under the 2025 no-build Conditions, all the study intersections and movements operate at an acceptable LOS D or better besides the following locations:

- King of Prussia Road & Matsonford Road
  - Northbound approach movement operates at a LOS E (64.6 seconds of delay) during the AM peak hour.
  - Southbound left movement operates at a LOS F (93.0 seconds of delay) during the AM peak hour.
  - Northbound thru movement operates at a LOS E (65.5 seconds of delay) during the AM peak hour.
- King of Prussia Road & Radnor Chester Road
  - Overall intersection LOS of F (227.1 seconds of delay) during the AM peak hour and LOS F (88.4 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS F (96.4 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS F (636.0 seconds of delay) during the AM peak hour and at a LOS F (212.9 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS F (702.2 seconds of delay) during the AM peak hour and a LOS E (281.3 seconds of delay) during the PM peak hour.
- King of Prussia and SEPTA Driveway
  - Westbound approach movement operates at a LOS E (39.8 seconds of delay) during the AM peak hour and at a LOS F (132.3 seconds of delay) during the PM peak hour.
- King of Prussia and Southern Driveway
  - Overall intersection LOS of F (87.3 seconds of delay) during the PM peak hour.
  - Westbound approach movement operates at a LOS F (298.0 seconds of delay) during the AM peak hour and at a LOS F (647.9 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road
  - Overall intersection LOS of E (69.4 seconds of delay) during the AM peak hour and at a LOS E (60.5 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (64.2 seconds of delay) during the AM peak hour and at a LOS E (64.6 seconds of delay) during the PM peak hour.
  - Eastbound left movement operates at a LOS E (59.6 seconds of delay) during the AM peak hour.
  - Eastbound through movement operates at a LOS E (65.4 seconds of delay) during the AM peak hour and at a LOS E (65.2 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (78.6 seconds of delay) during the AM peak hour.
  - Northbound through movement operates at a LOS F (155.9 seconds of delay) during the AM peak hour and a LOS E (60.3 seconds of delay) during the PM peak hour.
  - Northbound right movement operates at a LOS E (85.4 seconds of delay) during the PM peak hour.
  - Southbound approach movement operates at a LOS E (65.3 seconds of delay) during the AM peak hour and at a LOS F (94.1 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit
  - Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and at a LOS E (59.3 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (58.1 seconds of delay) during the AM peak hour and at a LOS E (56.7 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and at a LOS E (56.9 seconds of delay) during the PM peak hour.
  - Northbound right movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour and at a LOS E (56.2 seconds of delay) during the PM peak hour.

## Traffic Impact Study

### 145 King of Prussia Road

---

- Lancaster Avenue (SR 0030) & Radnor Chester Road
  - Overall intersection LOS of E (62.1 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (67.7 seconds of delay) during the PM peak hour.
  - Eastbound left movement operates at a LOS E (63.1 seconds of delay) during the AM peak hour.
  - Eastbound through movement operates at a LOS E (71.9 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS F (92.1 seconds of delay) during the PM peak hour.
  - Westbound through movement operates at a LOS E (57.1 seconds of delay) during the AM peak hour.
  - Southbound approach movement operates at a LOS F (86.4 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (187.1 seconds of delay) during the PM peak hour.

In the 2025 no-build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

In the 2020 no-build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 653' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 70' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 20' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200' by 1030' and 10' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 43' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 323' and 593' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 95' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 130' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 398' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 85' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 413' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 250' and 145' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 725' during the PM peak period.

# Traffic Impact Study

## 145 King of Prussia Road

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the no-build conditions analysis are summarized in **TABLE 4**. Detailed outputs of the 2025 no-build conditions analysis are provided in **APPENDIX F**.

**Table 4 – 2025 No-Build Conditions Summary Table**

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	18.0	B	-
	(EB Left)	50'	29.3	C	0	22.9	C	3
	(EB Thru/Right)	50'	25.0	C	3	17.0	B	10
	WB Approach		39.6	D	-	39.8	D	-
	(WB Left)	550'	43.8	D	378	47.9	D	620
	(WB Thru/Right)	950'	27.7	C	115	20.1	C	193
	SB Approach		42.3	D	-	31.6	C	-
	(SB Left)	100'	93.0	F	753	20.2	C	90
	(SB Thru/Right)	1000'+	12.2	B	415	33.4	C	733
	NB Approach		64.6	E	-	41.0	D	-
	(NB Left)	130'	17.3	B	10	37.5	D	10
(NB Thru)	1150'	65.5	F	1090	41.0	D	542	
<b>Overall</b>			48.5	D	-	36.6	D	-
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach		19.2	B	-	39.5	D	-
	(EB Left)	75'	53.0	D	63	25.3	C	8
	(EB Thru)	1200'	16.0	B	260	39.7	D	992
	WB Approach		48.0	D	-	31.1	C	-
	(WB Left)	160'	20.6	C	25	96.4	F	120
	(WB Thru/Right)	1100'	48.9	D	928	22.1	C	350
	NB Approach		636.0	F	-	212.9	F	-
	(NB Left/Thru)	1200'	702.2	F	2230	281.3	F	1210
	(NB Right)	280'	18.2	B	45	15.6	B	105
SB Approach	100'	21.8	C	8	53.0	D	143	
<b>Overall</b>			227.1	F	-	88.4	F	-
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	39.8	E	43	132.3	F	305
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.3	A	33	0.3	A	5
	<b>Overall</b>		2.5	A	-	18.7	C	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	22.3	C	3	18.4	C	13
	NB Approach	280'	0.0	A	0	0.0	A	0
	SB Approach	380'	0.0	A	0	0.0	A	0
	<b>Overall</b>		0.1	A	-	0.5	A	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.5	B	33	33.4	D	28
	NB Approach	550'	1.2	A	20	0.8	A	3
	SB Approach	280'	0.9	A	8	0.0	A	0
	<b>Overall</b>		2.1	A	-	1.1	A	-
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	298.0	F	113	647.9	F	580
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.1	A	-
	(SB Left)	75'	15.5	C	15	8.0	A	0
	<b>Overall</b>		6.1	A	-	87.3	F	-

Table 4 – 2025 No-Build Conditions Summary Table (Cont.)

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.2	E	-	64.6	E	-
	(EB Left)	800'	59.6	E	253	53.1	D	60
	(EB Thru)	800'	65.4	E	1123	65.2	F	1393
	WB Approach	600'	54.4	D	345	10.0	A	165
	NB Approach	-	78.6	E	-	52.3	D	-
	(NB Left)	500'	17.8	B	313	19.9	B	128
	(NB Thru)	1900'	155.9	F	1995	60.3	E	323
	(NB Right)	500'	28.5	C	345	85.4	F	370
	SB Approach	500'	65.3	E	83	94.1	F	368
<b>Overall</b>	-	<b>69.4</b>	<b>E</b>	-	<b>60.5</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.5	B	240	25.3	C	330
	WB Approach	-	35.0	C	-	35.5	D	-
	(WB Left)	600'	53.9	D	123	53.2	D	345
	(WB Thru)	800'	32.4	C	578	22.3	C	372
	NB Approach	1000'+	39.9	D	450	46.7	D	375
	<b>Overall</b>	-	<b>31.7</b>	<b>C</b>	-	<b>34.3</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.4	A	-	8.7	A	-
	(EB Left)	400'	31.3	C	245	21.6	C	530
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	10.7	B	-	20.6	C	-
	(WB Left)	100'	56.5	E	3	59.3	E	10
	(WB Thru/Right)	750'	10.6	B	288	20.3	C	310
	NB Approach	-	58.1	E	-	56.7	E	-
	(NB Left/Thru)	750'	58.8	E	13	56.9	E	8
	(NB Right)	50'	55.1	E	3	56.2	E	3
<b>Overall</b>	-	<b>9.2</b>	<b>A</b>	-	<b>11.1</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	33.3	C	-	67.7	E	-
	(EB Left)	260'	63.1	E	258	25.3	C	98
	(EB Thru)	750'	29.4	C	528	71.9	E	1148
	WB Approach	-	50.1	D	-	47.0	D	-
	(WB Left)	340'	46.6	D	228	92.1	F	425
	(WB Thru)	1800'	57.1	E	1313	41.7	D	605
	(WB Right)	300'	28.5	C	713	22.1	C	118
	NB Approach	-	47.0	D	-	34.3	C	-
	(NB Left/Thru)	1000'+	45.7	D	357	34.6	C	240
	(NB Thru/Right)	100	48.3	D	350	34.1	C	245
	SB Approach	-	28.0	C	-	86.4	F	-
	(SB Left)	160'	31.7	C	115	187.1	F	885
	(SB Thru)	350'	26.6	C	128	24.1	C	305
<b>Overall</b>	-	<b>43.2</b>	<b>D</b>	-	<b>62.1</b>	<b>E</b>	-	

# Traffic Impact Study

## 145 King of Prussia Road

---

### DEVELOPMENT TRAFFIC

#### Project Description

The proposed mixed-use site will be located at 145 King of Prussia Road between the existing Southern Driveway and the shared SEPTA/Site Driveway. The proposed site will have three full access driveways along King of Prussia Drive at the location of the of the existing entry driveways. The existing driveway across from Raider Road will become a 2-lane full access driveway. The southern driveway will primarily be for accessing the loading area. The proposed facility is anticipated to be constructed and occupied in 2020.

The following assumptions regarding the square footage and other parameters about the site were provided by the University of Pennsylvania Health Systems:

- 250,000 square foot mixed medical use building with 271 patient positions
- 150,000 square foot general office building
- 120 room hotel

**Figure 2** is a Site Plan of the proposed development.

#### Site Access

Access to the site will be provided through 3 full access driveways. The primary site driveway will be a full access driveway located on King of Prussia Drive across from Raider Road. A second driveway will be located on the north side of the site and accessed via the existing SEPTA driveway on King of Prussia Drive. The third site driveway provides access to loading areas and is located at the southern corner of the site on King of Prussia Road approximately 500' north of Lancaster Avenue (SR 0030). The site driveways are shown on the Site Plan illustrated in **Figure 2**.

#### Public Transit

University of Pennsylvania Health Systems (UPHS) promotes public transportation and tax incentive programs for commuting costs at all of its City and suburban locations and encourages the use of public transportation options by staff and patients. UPHS educates its employees on programs like Transportation Reimbursement Incentive Program (TRIP) that allow commuting costs to be paid with pre-tax dollars and offers discounts on SEPTA travel and new employees to Penn Medicine Radnor receive are public transportation options around the campus during a new employee orientation. UPHS also uses its website to inform patients of opportunities to use public transportation to and from their facilities.

#### Trip Generation

The traffic volumes for the hotel and general office components of the proposed site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The *ITE Trip Generation Manual* defines a trip as a "single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site."

The traffic volumes for the hotel and office portions of the site proposed site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9<sup>th</sup> Edition, 2012). The expected trip generation for the site is based upon the following ITE Land Use Codes utilizing the square footage of the building as the independent variable:

- 310 "Hotel"

## Traffic Impact Study 145 King of Prussia Road

- 710 “General Office”

The Institute of Transportation Engineers’ Trip Generation Manual, 9<sup>th</sup> Edition states: “A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility.” The AM and PM ITE Trip Generation Rate for a medical-dental office are derived based on 64 studies, of which 63 had buildings with a gross floor area of less than 70,000 SF.

The proposed Penn Medicine mixed medical use portion of the development will have a gross floor area of 250,000 SF, more than triple the size of 90% of the facilities used by ITE to derive trip generation data. Also, unlike private physician practices used to generate the ITE rates, the proposed Penn Medicine mixed medical use facility will include several treatment facilities that are uncommon in a typical medical office and that occupy a larger portion of the gross square floor area of the building, while not accommodating a larger number of patients. These facilities include ambulatory operating rooms, endoscopy rooms, chemotherapy treatment areas, radiological imaging rooms and radiation oncology treatment areas. Therefore, the proposed facility is very different from those used to derive ITE trip generation data.

It is for these reasons that the ITE trip generation is not appropriate to use for the proposed Penn Medicine building and a trip generation rate was developed based on an evaluation of three existing mixed medical use facilities for the peak hour of the adjacent street which, based on traffic counts, is 7:15-8:15 AM and 5:00–6:00 PM.

The following existing mixed medical use facilities were evaluated to develop trip generation rates:

- 171,000 square foot facility at 250 King of Prussia Rd in Radnor PA
- 83,000 square foot facility at 1001 Chesterbrook Blvd. in Berwyn PA
- 154,826 square foot facility at 915 Old Fern Hill Road in West Chester, PA

Based on driveway counts and data regarding the number of patient positions at each facility average weekday, AM and PM trip generation rates and entry/exit distributions were developed and approved by Radnor Township. The following are the developed trip generation rates for a mixed medical use facility and the rates used for the general office and hotel land uses:

**Table 5 –Trip Generation Rates**

Land Use Code	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
		Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out
Medical Mixed Use*	Patient Positions	18.02	50%	50%	1.60	77%	23%	1.06	29%	71%

\* Trip generation calculated using calculated trip rates for Medical Mixed Use based on observations of similar facilities

Land Use Code	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
		Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out
General Office	KSF	11.03	50%	50%	1.56	88%	12%	1.49	17%	83%

Land Use Code	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
		Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out
Hotel	Rooms	8.17	50%	50%	0.53	59%	41%	0.60	51%	49%

## Traffic Impact Study 145 King of Prussia Road

The proposed development is a mixed-use site and internal trips were calculated using the methodology outlined in the ITE Trip Generation Handbook.

The trip calculations result in a total of **731** (577 entering and 154 exiting) and **583** (158 entering and 425 exiting) new trips generated to the site during the morning and afternoon peak hours, respectively. **TABLE 6** summarizes the calculated peak hour trips to/from the proposed development during the weekday morning and weekday afternoon peak hours.

**Table 6 –Proposed Site Trip Generation**

Land Use Code	Size	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
Medical Mixed Use*	250,000 SF (271 PP)	Patient Positions	2,442	2,442	4,883	334	100	434	83	204	287
General Office Building (ITE Land Use 710)	150,000 SF	1,000 SF GFA	827	827	1,655	206	28	234	38	186	224
Hotel (ITE Land Use 310)	75,000 SF (120 rooms)	Rooms	490	490	980	38	26	64	37	35	72
<b>Total</b>			<b>3,759</b>	<b>3,759</b>	<b>7,518</b>	<b>577</b>	<b>154</b>	<b>731</b>	<b>158</b>	<b>425</b>	<b>583</b>

The trip generation calculations and the Letter to Radnor Township outlining the development of the trip generation rates for the mixed medical use facility are provided in **APPENDIX G**.

The proposed site will generate approximately 90% more net trips over the course of a whole day than the existing land use “general office building” but only generates approximately 20% more net trips in the AM peak period and approximately 5% more net trips during the PM peak period. The comparison of the net trips generated by the existing land use versus the proposed is illustrated in **TABLE 7**.

**Table 7 –Net Trip Comparison**

Land Use	Size	Net Trips		
		Weekday	AM Peak Hour	PM Peak Hour
Existing General Office Building	427,110 SF	3,957	611	557
Proposed Mixed Use (Mixed Medical/ Hotel/General Office )	475,000 SF	7,518	731	583
Difference	Volume	<b>3,561</b>	<b>120</b>	<b>26</b>
	% Difference	<b>90.0%</b>	<b>19.6%</b>	<b>4.7%</b>

### Trip Distribution and Assignment

The trip distribution of the University of Pennsylvania Health Systems medical-dental office, general office building, and hotel were based on the proposed location along King of Prussia Road and the existing traffic patterns on the surrounding roadway network. The proposed site will have 3 driveways along King of Prussia Road with the primary driveway located across from Raider Road. The estimated distribution of the site traffic is:

To/From the north on King of Prussia Road northbound	25%
To/From south on King of Prussia Road southbound	75%



The trip distribution and volumes generated at the proposed site are provided in **Figures 8 and 9**.

#### Build Traffic Volumes

The traffic volumes generated by the proposed development were added to the 2020 and 2025 base traffic volumes to provide the 2020 and 2025 build traffic volumes. The peak hour traffic volumes are illustrated in **Figures 10 and 11** and traffic volumes development tables are provided in **APPENDIX E**.

#### Turn Lane Warrant Assessment

An analysis was conducted at the proposed site driveways using the 2025 build volumes to determine whether left turn lanes or a right turn lane into the site from are warranted. Based on the standard worksheets in the Chapter 11 Appendix of PennDOT Publication 46, the following turn lanes at site driveways are warranted during both the AM and PM peak periods:

##### King of Prussia Road & Septa Driveway

- Left turn lane from SB King of Prussia Road into the Septa Driveway.

##### King of Prussia Road & Raider Road

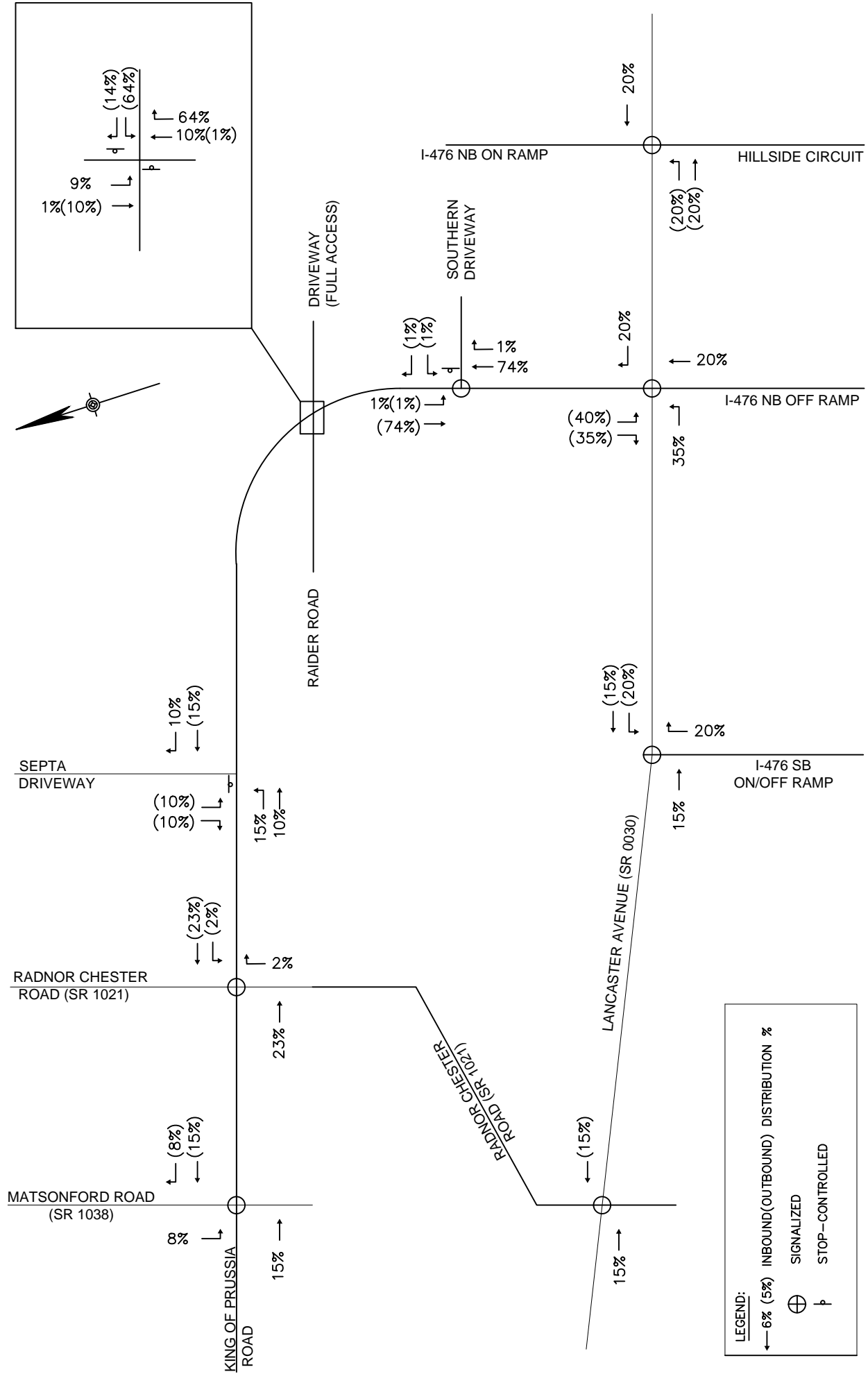
- Left turn lane from SB King of Prussia Road into the Site Driveway.
- Left turn lane from NB King of Prussia Road into Raider Road.
- Right turn lane from NB King of Prussia Road into the Site Driveway.

The turn lanes warranted in both the AM and PM Peak periods are being recommended as mitigation measures to the proposed development.

Although the southbound left turn lane from King of Prussia Drive to the Southern Driveway is only warranted in the AM peak period, it is an existing condition. Therefore, the dedicated left lane on southbound King of Prussia Road is proposed to remain. The dedicated left turn lane is formed from an area that would otherwise be a median gore and provides storage for left turning delivery trucks into the site, thus providing a clear lane for through traffic on King of Prussia Road.

A northbound right turn lane from King of Prussia Drive to the Septa is only warranted during the AM peak period and is not being recommended as a mitigation measure.

The detailed turn lane warrant analysis for the driveway entries is provided in **APPENDIX H**.

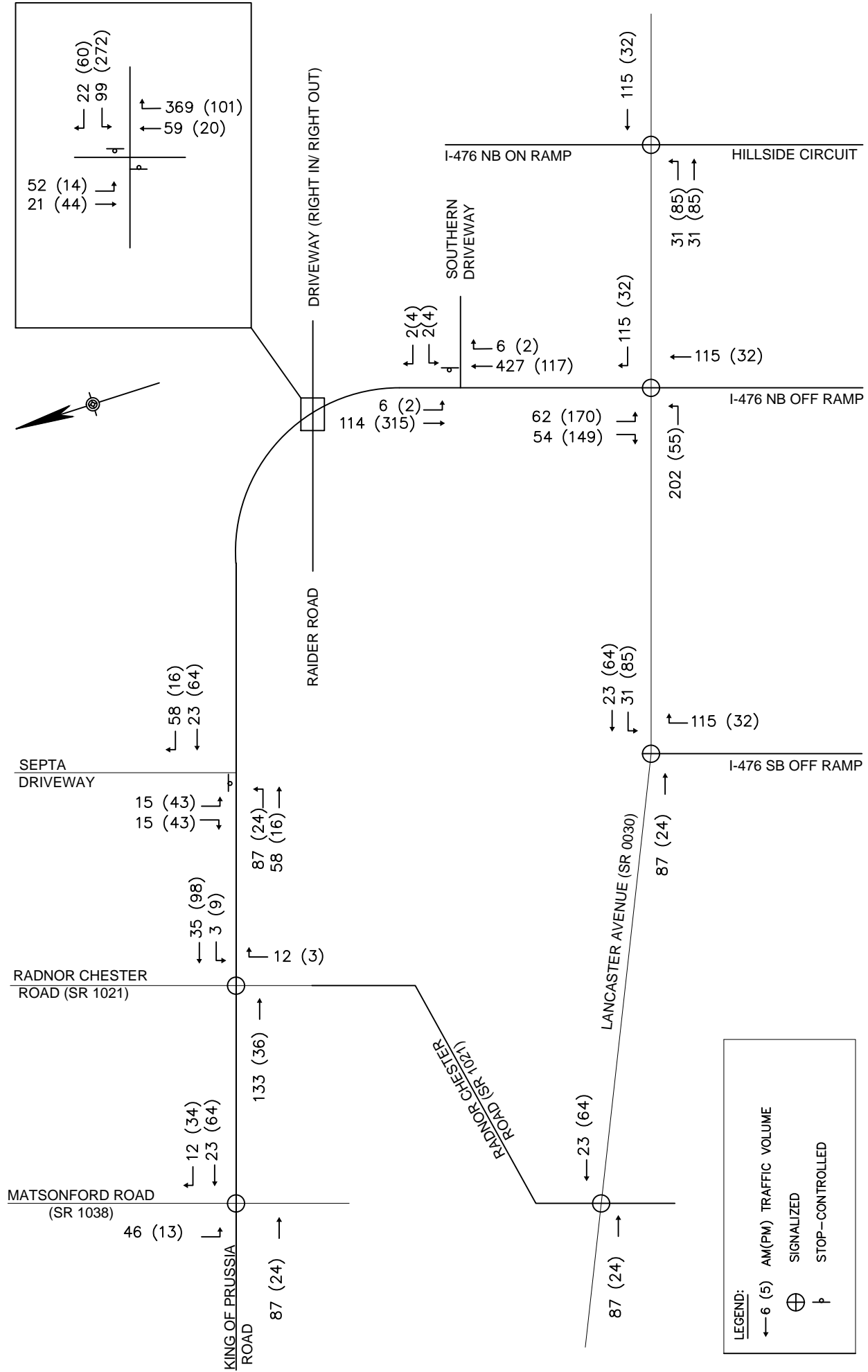


**LEGEND:**

- ← 6% (5%) INBOUND (OUTBOUND) DISTRIBUTION %
- ⊕ SIGNALIZED
- T STOP-CONTROLLED

FIGURE 8 PROPOSED SITE TRIP DISTRIBUTION



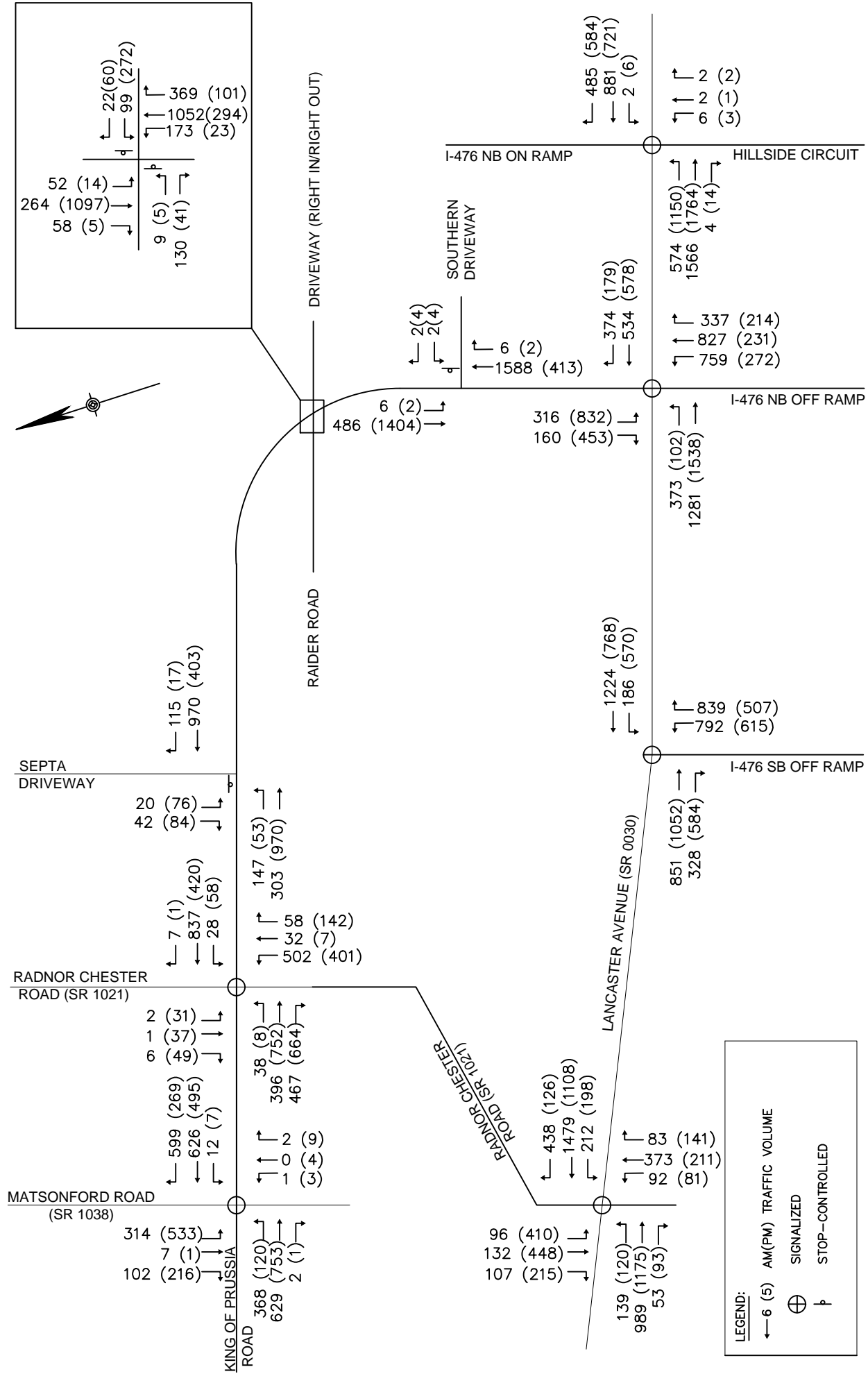


**LEGEND:**

- ←-6 (5) AM(PM) TRAFFIC VOLUME
- ⊕ SIGNALIZED
- ⊥ STOP-CONTROLLED

FIGURE 9  
PROPOSED SITE TRIPS



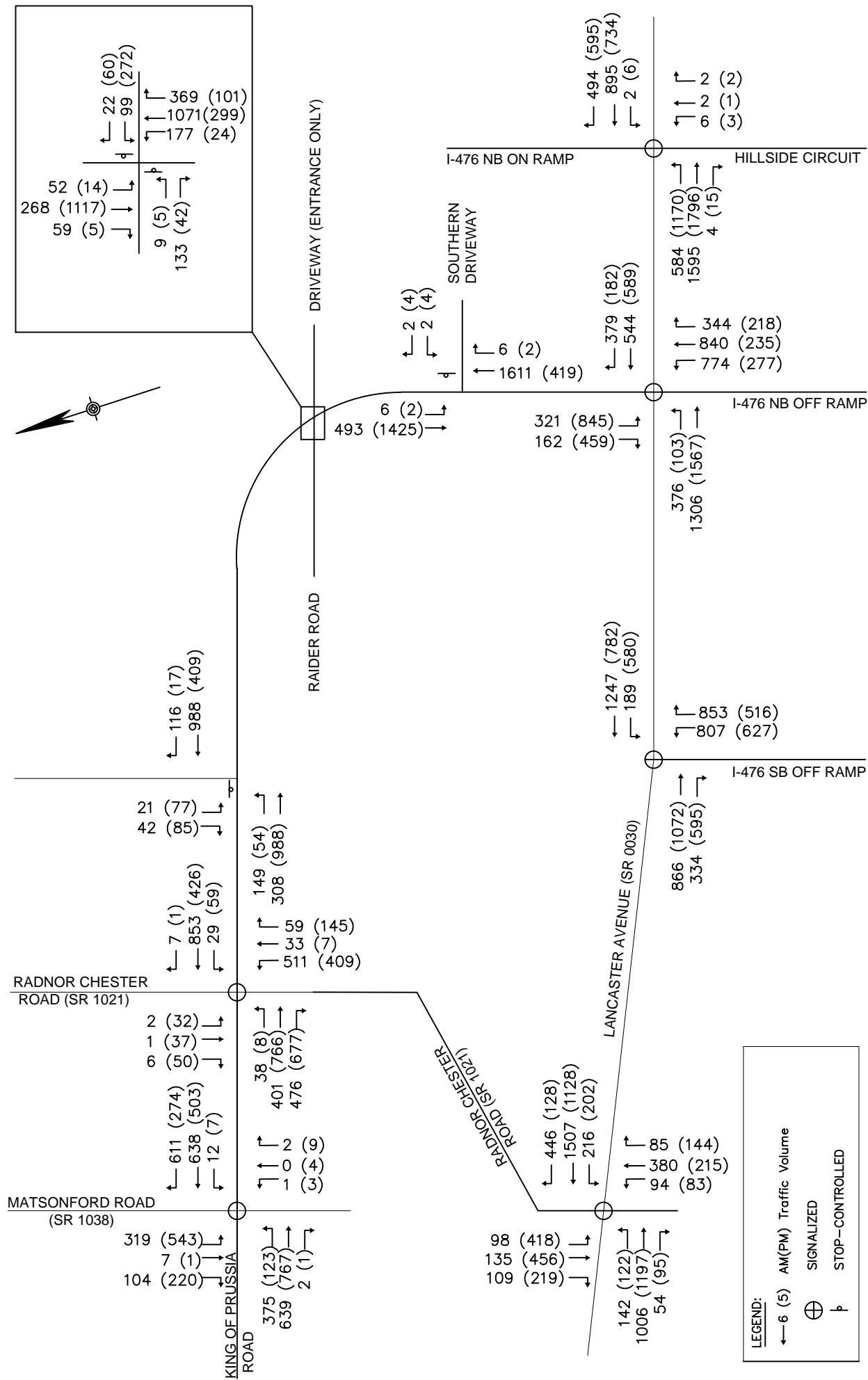


**LEGEND:**

- ← 6 (5) AM (PM) TRAFFIC VOLUME
- ⊕ SIGNALIZED
- ⊥ STOP-CONTROLLED

**FIGURE 10**  
**2020 BUILD WEEKDAY**  
**PEAK HOUR TRAFFIC VOLUMES**





**FIGURE 11**  
**2025 BUILD WEEKDAY**  
**PEAK HOUR TRAFFIC VOLUMES**



### 2020 and 2025 “BUILD” TRAFFIC CONDITIONS WITHOUT MITIGATION

Operations of the study intersections during the AM and PM peak hours were evaluated for the build configuration of the proposed development in the proposed build year of 2020 and the horizon year of 2025 with the optimized timings from the no-build condition.

#### **2020 Build Levels of Service**

Under the 2020 build configuration without any improvements, all the study intersections and movements operate at an acceptable LOS D or better except for the following locations:

##### King of Prussia Road & Matsonford Road (SR 1038)

- Southbound left movement operates at a LOS F (86.7 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS E (57.7 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at LOS E (64.6 seconds of delay) during the AM peak hour.
- Northbound thru movement operates at LOS E (65.5 seconds of delay) during the AM peak hour.

##### King of Prussia Road & Radnor-Chester Road (SR 1021)

- Overall intersection operates at a LOS F (218.4 seconds of delay) during the AM peak hour and LOS F (86.0 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS E (67.9 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS F (616.3 seconds of delay) during the AM peak hour and at a LOS F (225.1 seconds of delay) during the PM peak hour.
- Northbound through/left movement operates at a LOS F (681.6 seconds of delay) during the AM peak hour and a LOS F (297.7 seconds of delay) during the PM peak hour.

##### King of Prussia Road & Septa Driveway

- Westbound approach movement operates at a LOS E (39.3 seconds of delay) during the AM peak hour and LOS E (38.6 seconds of delay) during the PM peak hour.

##### King of Prussia Road & Raider Road

- The intersection operates at a LOS F (282.8 seconds of delay) during the AM peak hour and at a LOS F (260.3 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS F (240.2 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS F (5992.0 seconds of delay) during the AM peak hour and at LOS F (1820.4 seconds of delay) during the PM peak hour.
- Westbound thru/right movement operates at a LOS E (39.5 seconds of delay) during the AM peak hour.

##### King of Prussia Road & Southern Driveway

- Westbound approach movement operates at LOS F (92.2 seconds of delay) during the AM peak hour.

##### Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

- Overall intersection operates at a LOS E (68.4 seconds of delay) during the AM peak hour and at a LOS E (56.0 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (61.1 seconds of delay) during the AM peak hour and at LOS E (59.6 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (62.0 seconds of delay) during the AM peak hour.
- Eastbound through movement operates at a LOS E (60.9 seconds of delay) during the AM peak hour and at LOS E (60.0 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS E (77.4 seconds of delay) during the AM peak hour.
- Northbound through movement operates at a LOS F (152.3 seconds of delay) during the AM peak hour and at a LOS E (64.3 seconds of delay) during the PM peak hour.

## Traffic Impact Study

### 145 King of Prussia Road

---

- Northbound right operates at a LOS F (81.6 seconds of delay) during the PM peak hour.
- Southbound approach movement operates at a LOS E (75.9 seconds of delay) during the AM peak hour and at a LOS F (83.2 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit

- Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and a LOS E (59.3 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS E (58.1 seconds of delay) during the AM peak hour and a LOS E (56.7 seconds of delay) during the PM peak hour.
- Northbound left/through movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and a LOS E (56.9 seconds of delay) during the PM peak hour.
- Northbound right movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour and at LOS E (56.2 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & Radnor Chester Road

- Overall Intersection operates at a LOS E (57.7 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (60.6 seconds of delay) during the PM peak hour.
- Eastbound thru movement operates at a LOS E (63.9 seconds of delay) during the PM peak hour.
- Westbound approach movement operates at LOS E (64.5 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS F (82.5 seconds of delay) during the PM peak hour.
- Westbound through movement operates at a LOS E (77.1 seconds of delay) during the AM peak hour
- Southbound approach movement operates at a LOS F (83.9 seconds of delay) during the PM peak hour.
- Southbound left movement operates at a LOS F (180.3 seconds of delay) during the PM peak hour.

In the 2020 build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 622' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 103' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 970' and 15' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 38' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound lefts at the intersection of King of Prussia Road & Raider Road exceeds the available storage length of 500' by 298' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 540' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 62' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 433' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 63' during the PM peak period.

## Traffic Impact Study

### 145 King of Prussia Road

---

- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 5' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 153' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 240' and 143' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 728' during the PM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the build conditions analysis are summarized in **TABLE 8**. Detailed outputs of the 2020 build conditions analysis are provided in **APPENDIX I**.



Table 8 – 2020 Build Conditions Summary Table

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.1	C	0	29.1	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	39.3	D	-	39.3	D	-
	(WB Left)	550'	43.4	D	375	43.4	D	375
	(WB Thru/Right)	950'	27.6	C	110	27.6	C	110
	SB Approach	-	39.6	D	-	49.5	D	-
	(SB Left)	100'	86.7	F	722	86.7	F	722
	(SB Thru/Right)	1000'+	12.2	B	198	8.3	A	408
	NB Approach	-	64.6	E	-	64.6	E	-
(NB Left)	130'	17.1	B	10	17.1	B	10	
(NB Thru)	1150'	65.5	E	1090	65.5	E	1090	
<b>Overall</b>	-	<b>47.3</b>	<b>D</b>	-	<b>52.5</b>	<b>D</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.0	B	-	19.6	B	-
	(EB Left)	75'	50.4	D	53	55.1	E	55
	(EB Thru)	1200'	16.0	B	255	16.3	B	270
	WB Approach	-	44.2	D	-	48.7	D	-
	(WB Left)	160'	20.5	C	25	20.8	C	25
	(WB Thru/Right)	1100'	45.0	D	883	49.7	D	940
	NB Approach	-	617.3	F	-	616.3	F	-
	(NB Left/Thru)	1200'	681.6	F	2170	681.6	F	2170
	(NB Right)	280'	18.2	B	45	18.2	B	45
	SB Approach	100'	21.8	C	8	21.8	C	8
<b>Overall</b>	-	<b>218.9</b>	<b>F</b>	-	<b>218.4</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	38.6	E	43	39.3	E	45
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.2	A	30	5.4	A	40
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>3.0</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	21.8	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.3	B	30	240.2	F	278
	WB Approach	500'	-	-	-	4909.7	F	-
	(WB Left)	500'	-	-	-	5992.0	F	435
	(WB Thru/Right)	500'	-	-	-	39.5	E	20
	NB Approach	550'	1.2	A	20	1.0	A	0
	SB Approach	660'	0.9	A	5	2.5	A	18
<b>Overall</b>	-	<b>2.0</b>	<b>A</b>	-	<b>282.8</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	265.0	F	108	92.2	F	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.2	C	13	16.7	C	3
	<b>Overall</b>	-	<b>5.6</b>	<b>A</b>	-	<b>0.2</b>	<b>A</b>	-

Table 8 – 2020 Build Conditions Summary Table (Cont.)

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	60.5	E	-	61.1	E	-
	(EB Left)	800'	59.1	E	252	62.0	E	263
	(EB Thru)	800'	60.9	E	787	60.9	E	785
	WB Approach	600'	53.9	D	338	53.9	D	338
	NB Approach	-	74.8	E	-	77.4	E	-
	(NB Left)	500'	17.6	B	305	17.6	B	305
	(NB Thru)	1900'	146.9	F	1917	152.3	F	1962
	(NB Right)	500'	28.1	C	335	28.1	C	333
	SB Approach	500'+	63.9	E	78	75.9	E	125
<b>Overall</b>	-	<b>66.2</b>	<b>E</b>	-	<b>68.4</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.0	B	235	18.4	B	238
	WB Approach	-	34.5	C	-	34.9	C	-
	(WB Left)	600'	53.8	D	120	54.4	D	130
	(WB Thru)	800'	31.8	C	568	31.9	C	573
	NB Approach	1000'+	40.0	D	443	40.0	D	443
<b>Overall</b>	-	<b>31.3</b>	<b>C</b>	-	<b>31.6</b>	<b>C</b>	-	
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.6	A	-	8.4	A	-
	(EB Left)	400'	31.8	C	248	30.9	C	240
	(EB Thru/Right)	600'	0.3	A	5	0.2	A	3
	WB Approach	-	10.4	B	-	10.8	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.3	B	280	10.7	B	285
	NB Approach	-	58.1	E	-	58.1	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	55.1	E	3
<b>Overall</b>	-	<b>9.3</b>	<b>A</b>	-	<b>9.2</b>	<b>A</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	31.5	C	-	34.3	C	-
	(EB Left)	260'	43.8	D	145	43.9	D	150
	(EB Thru)	750'	30.0	C	520	33.1	C	545
	WB Approach	-	49.7	D	-	64.5	E	-
	(WB Left)	340'	35.0	C	185	43.5	D	200
	(WB Thru)	1800'	58.0	E	1285	77.1	E	1390
	(WB Right)	300'	29.0	C	435	31.8	C	453
	NB Approach	-	45.9	D	-	45.9	D	-
	(NB Left/Thru)	1000'+	44.7	D	345	44.7	D	345
	(NB Thru/Right)	100	47.1	D	340	47.1	D	340
	SB Approach	-	27.8	C	-	26.1	C	-
	(SB Left)	160'	31.3	C	103	29.3	C	100
(SB Thru)	350'	26.5	C	125	24.9	C	120	
<b>Overall</b>	-	<b>42.3</b>	<b>D</b>	-	<b>50.5</b>	<b>D</b>	-	

Table 8 – 2020 Build Conditions Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		19.3	B	-	19.3	B	-
	(EB Left)	50'	24.5	C	3	24.5	C	3
	(EB Thru/Right)	50'	18.2	B	10	18.2	B	10
	WB Approach	-	45.9	D	-	47.3	D	-
	(WB Left)	550'	55.8	E	640	57.7	E	653
	(WB Thru/Right)	950'	21.6	C	195	21.6	C	195
	SB Approach	-	25.9	C	-	26.5	C	-
	(SB Left)	100'	18.0	B	83	17.8	B	83
	(SB Thru/Right)	1000'+	27.1	C	660	27.8	C	678
	NB Approach	-	33.5	C	-	31.6	C	-
(NB Left)	130'	33.1	C	8	33.6	C	8	
(NB Thru)	1150'	33.5	C	492	31.6	C	460	
<b>Overall</b>	-	<b>34.6</b>	<b>C</b>	-	<b>34.9</b>	<b>C</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	28.1	C	-	29.0	C	-
	(EB Left)	75'	23.2	C	8	22.9	C	8
	(EB Thru)	1200'	28.1	C	548	29.1	C	560
	WB Approach	-	25.2	C	-	25.7	C	-
	(WB Left)	160'	62.4	E	93	67.9	E	95
	(WB Thru/Right)	1100'	20.1	C	333	19.9	B	328
	NB Approach	-	225.5	F	-	225.1	F	-
	(NB Left/Thru)	1200'	297.7	F	1215	297.7	F	1215
	(NB Right)	280'	16.8	B	105	16.8	B	108
SB Approach	100'	49.3	D	138	49.3	D	138	
<b>Overall</b>	-	<b>85.7</b>	<b>F</b>	-	<b>86.0</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	120.0	F	288	38.6	E	108
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	0.3	A	3	0.5	A	5
	<b>Overall</b>	-	<b>17.1</b>	<b>C</b>	-	<b>4.2</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	18.2	C	3	-	-	13
	NB Approach	280'	0.0	A	0	-	-	0
	SB Approach	380'	0.0	A	0	-	-	0
	<b>Overall</b>	-	<b>0.5</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	32.1	D	25	31.1	D	25
	WB Approach	500'	-	-	-	1493.4	F	-
	(WB Left)	500'	-	-	-	1820.4	F	798
	(WB Thru/Right)	500'	-	-	-	10.9	B	8
	NB Approach	550'	0.7	A	3	0.6	A	3
	SB Approach	660'	0.0	A	0	0.1	A	0
<b>Overall</b>	-	<b>1.1</b>	<b>A</b>	-	<b>260.3</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	613.8	F	567	34.4	D	5
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.1	A	-	0.0	A	-
	(SB Left)	75'	8.0	A	0	8.2	A	0
	<b>Overall</b>	-	<b>83.9</b>	<b>F</b>	-	<b>0.2</b>	<b>A</b>	-

Table 8 – 2020 Build Conditions Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	58.5	E	-	59.6	E	-
	(EB Left)	800'	52.5	D	58	52.5	D	75
	(EB Thru)	800'	58.8	E	1335	60.0	E	1340
	WB Approach	600'	10.3	B	163	11.1	B	170
	NB Approach	-	49.7	D	-	52.6	D	-
	(NB Left)	500'	19.8	B	123	19.9	B	125
	(NB Thru)	1900'	57.8	E	313	64.3	E	343
	(NB Right)	500'	79.3	E	353	81.6	F	360
	SB Approach	500'+	85.8	F	328	83.2	F	310
<b>Overall</b>	-	<b>55.6</b>	<b>E</b>	-	<b>56.0</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	24.6	C	323	24.5	C	323
	WB Approach	-	35.3	D	-	35.2	D	-
	(WB Left)	600'	53.1	D	342	53.1	D	338
	(WB Thru)	800'	22.0	C	370	21.9	C	368
	NB Approach	1000'+	46.6	D	370	46.6	D	370
	<b>Overall</b>	-	<b>33.9</b>	<b>C</b>	-	<b>33.8</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	9.7	A	-	9.1	A	-
	(EB Left)	400'	24.4	C	842	22.9	C	833
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	19.8	B	-	19.9	B	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	19.4	B	303	19.6	B	308
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
<b>Overall</b>	-	<b>11.8</b>	<b>B</b>	-	<b>11.3</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	59.1	E	-	60.6	E	-
	(EB Left)	260'	24.3	C	95	24.2	C	95
	(EB Thru)	750'	62.5	E	795	63.9	E	813
	WB Approach	-	42.2	D	-	42.3	D	-
	(WB Left)	340'	79.4	E	342	82.5	F	345
	(WB Thru)	1800'	37.9	D	575	37.5	D	570
	(WB Right)	300'	21.5	C	115	21.5	C	115
	NB Approach	-	34.6	C	-	34.6	C	-
	(NB Left/Thru)	1000'+	34.8	C	238	34.8	C	238
	(NB Thru/Right)	100	34.4	C	242	34.4	C	243
	SB Approach	-	83.9	F	-	83.9	F	-
	(SB Left)	160'	180.3	F	848	180.3	F	848
	(SB Thru)	350'	24.4	C	300	24.4	C	300
<b>Overall</b>	-	<b>57.2</b>	<b>E</b>	-	<b>57.7</b>	<b>E</b>	-	

### 2025 Build Levels of Service

Under the 2025 build configuration with identified improvements, all the study intersections and movements operate at an acceptable LOS D or better except for the following locations:

#### King of Prussia Road & Matsonford Road (SR 1038)

- Southbound left movement operates at a LOS F (93.0 seconds of delay) during the AM peak hour.
- Northbound approach movement operates at a LOS E (69.8 seconds of delay) during the AM peak hour.
- Northbound thru movement operates at a LOS E (70.7 seconds of delay) during the AM peak hour.

#### King of Prussia Road & Radnor-Chester Road (SR 1021)

- Overall intersection operates at a LOS F (226.5 seconds of delay) during the AM peak hour and LOS F (90.4 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (55.6 seconds of delay) during the AM peak hour.
- Eastbound thru movement operates at a LOS F (45.4 seconds of delay) during the PM peak hour.
- Westbound left movement operates at a LOS F (94.4 seconds of delay) during the PM peak hour.
- Westbound thru/right movement operates at a LOS F (54.4 seconds of delay) during the AM peak hour.
- Northbound approach movement operates at a LOS F (635.1 seconds of delay) during the AM peak hour and at a LOS F (212.6 seconds of delay) during the PM peak hour.
- Northbound through/left movement operates at a LOS F (702.2 seconds of delay) during the AM peak hour and a LOS F (281.3 seconds of delay) during the PM peak hour.

#### King of Prussia Road & Septa Driveway

- Westbound approach movement operates at a LOS E (41.4 seconds of delay) during the AM peak hour and at a LOS E (41.4 seconds of delay) during the PM peak hour.

#### King of Prussia Road & Raider Road

- The intersection operates at a LOS F (313.4 seconds of delay) during the AM peak hour and at LOS F (278.8 seconds of delay) during the PM peak hour.
- The eastbound approach operates at a LOS F (287.6 seconds of delay) during the AM peak hour.
- The westbound approach operates at a LOS F (5492.6 seconds of delay) during the AM peak hour and at LOS F (1622.6 seconds of delay) during the PM peak hour.
- Westbound left movement operates at a LOS F (6704.1 seconds of delay) during the AM peak hour and at LOS F (1978.1 seconds of delay) during the PM peak hour.
- Westbound thru/right movement operates at a LOS E (40.9 seconds of delay) during the AM peak hour.

#### King of Prussia Road & Southern Driveway

- Westbound approach movement operates at LOS F (99.0 seconds of delay) during the AM peak hour.

#### Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

- Overall intersection operates at a LOS E (71.4 seconds of delay) during the AM peak hour and a LOS E (59.5 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (64.8 seconds of delay) during the AM peak hour and at a LOS E (64.4 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (62.6 seconds of delay) during the AM peak hour.
- Eastbound through movement operates at a LOS E (65.4 seconds of delay) during the AM peak hour and at a LOS E (65.2 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS F (80.7 seconds of delay) during the AM peak hour.
- Northbound thru movement operates at a LOS F (160.2 seconds of delay) during the AM peak hour and at a LOS E (66.3 seconds of delay) during the PM peak hour.
- Northbound right operates at a LOS F (85.4 seconds of delay) during the PM peak hour.
- Southbound approach movement operates at a LOS E (78.5 seconds of delay) during the AM peak hour and at a LOS F (88.1 seconds of delay) during the PM peak hour.

## Traffic Impact Study

### 145 King of Prussia Road

---

#### Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit

- Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and a LOS E (59.3 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS E (58.0 seconds of delay) during the AM peak hour and a LOS E (56.7 seconds of delay) during the PM peak hour.
- Northbound left/through movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and a LOS E (56.9 seconds of delay) during the PM peak hour.
- Northbound right movement operates at a LOS E (56.2 seconds of delay) during the PM peak hour.

#### Lancaster Avenue (SR 0030) & Radnor Chester Road

- Overall Intersection operates at a LOS E (62.5 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (69.4 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (60.6 seconds of delay) during the AM peak hour.
- Eastbound through movement operates at a LOS E (73.8 seconds of delay) during the PM peak hour.
- Westbound left movement operates at a LOS F (92.1 seconds of delay) during the PM peak hour.
- Westbound through movement operates at a LOS E (61.9 seconds of delay) during the AM peak hour.
- Southbound approach movement operates at a LOS F (86.4 seconds of delay) during the PM peak hour.
- Southbound left movement operates at a LOS F (187.1 seconds of delay) during the PM peak hour.

In the 2025 build conditions, the estimated 95<sup>th</sup> percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95<sup>th</sup> percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 652' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 80' during the PM peak period.
- The reported 95<sup>th</sup> percentile queues for westbound thru/right lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1100 by 270' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 1030' and 10' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 43' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound lefts at the intersection of King of Prussia Road & Raider Road exceeds the available storage length of 500' by 310' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 325' and 593' during the AM and PM peak periods, respectively.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 132' during the AM peak period.
- The reported 95<sup>th</sup> percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 110' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 413' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 85' during the PM peak period.

# Traffic Impact Study

## 145 King of Prussia Road

- The reported 95<sup>th</sup> percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 145' during the AM peak period.
- The reported 95<sup>th</sup> percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 248' and 145' during the AM and PM peak periods respectively.
- The reported 95<sup>th</sup> percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 725' during the PM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the build conditions analysis are summarized in **TABLE 9**. Detailed outputs of the 2025 build conditions analysis are provided in **APPENDIX I**.

**Table 9 – 2025 Build Conditions Summary Table**

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.3	C	0	29.3	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	39.6	D	-	40.1	D	-
	(WB Left)	550'	43.8	D	378	44.4	D	383
	(WB Thru/Right)	950'	27.7	C	115	27.7	C	115
	SB Approach	-	42.3	D	-	42.2	D	-
	(SB Left)	100'	93.0	F	753	93.0	F	752
	(SB Thru/Right)	1000'+	12.2	B	415	12.4	B	420
	NB Approach	-	64.6	E	-	69.8	E	-
	(NB Left)	130'	17.3	B	10	17.3	B	10
(NB Thru)	1150'	65.5	F	1090	70.7	F	1135	
<b>Overall</b>	-	<b>48.5</b>	<b>D</b>	-	<b>50.3</b>	<b>D</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.2	B	-	19.5	B	-
	(EB Left)	75'	53.0	D	63	55.6	E	55
	(EB Thru)	1200'	16.0	B	260	16.1	B	265
	WB Approach	-	48.0	D	-	53.3	D	-
	(WB Left)	160'	20.6	C	25	21.0	C	25
	(WB Thru/Right)	1100'	48.9	D	928	54.4	F	1370
	NB Approach	-	636.0	F	-	635.1	F	-
	(NB Left/Thru)	1200'	702.2	F	2230	702.2	F	2230
(NB Right)	280'	18.2	B	45	18.3	B	48	
SB Approach	100'	21.8	C	8	21.8	C	8	
<b>Overall</b>	-	<b>227.1</b>	<b>F</b>	-	<b>226.5</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	39.8	E	43	41.4	E	48
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.3	A	33	5.5	A	40
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>3.2</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	22.3	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.5	B	33	287.6	F	305
	WB Approach	500'	-	-	-	5492.6	F	-
	(WB Left)	500'	-	-	-	6704.1	F	438
	(WB Thru/Right)	500'	-	-	-	40.9	E	20
	NB Approach	550'	1.2	A	20	1.0	A	0
	SB Approach	660'	0.9	A	8	2.6	A	18
<b>Overall</b>	-	<b>2.1</b>	<b>A</b>	-	<b>313.4</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	298.0	F	113	99.0	F	10
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.5	C	15	17.0	C	3
	<b>Overall</b>	-	<b>6.1</b>	<b>A</b>	-	<b>0.2</b>	<b>A</b>	-

Table 9 – 2025 Build Conditions Summary Table (Cont.)

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.2	E	-	64.8	E	-
	(EB Left)	800'	59.6	E	253	62.6	E	265
	(EB Thru)	800'	65.4	E	1123	65.4	F	1125
	WB Approach	600'	54.4	D	345	54.3	D	343
	NB Approach	-	78.6	E	-	80.7	F	-
	(NB Left)	500'	17.8	B	313	17.8	B	313
	(NB Thru)	1900'	155.9	F	1995	160.2	F	2032
	(NB Right)	500'	28.5	C	345	28.5	C	345
	SB Approach	500'+	65.3	E	83	78.5	E	135
<b>Overall</b>	-	<b>69.4</b>	<b>E</b>	-	<b>71.4</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.5	B	240	18.9	B	245
	WB Approach	-	35.0	C	-	35.5	D	-
	(WB Left)	600'	53.9	D	123	54.4	D	133
	(WB Thru)	800'	32.4	C	578	32.6	C	583
	NB Approach	1000'+	39.9	D	450	39.9	D	450
	<b>Overall</b>	-	<b>31.7</b>	<b>C</b>	-	<b>32.0</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.4	A	-	8.3	A	-
	(EB Left)	400'	31.3	C	245	30.7	C	243
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	3
	WB Approach	-	10.7	B	-	11.0	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.6	B	288	10.9	B	293
	NB Approach	-	58.1	E	-	58.0	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	54.7	D	3
<b>Overall</b>	-	<b>9.2</b>	<b>A</b>	-	<b>9.2</b>	<b>A</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	33.3	C	-	33.4	C	-
	(EB Left)	260'	63.1	E	258	60.6	E	252
	(EB Thru)	750'	29.4	C	528	29.8	C	532
	WB Approach	-	50.1	D	-	53.7	D	-
	(WB Left)	340'	46.6	D	228	48.0	D	228
	(WB Thru)	1800'	57.1	E	1313	61.9	E	1340
	(WB Right)	300'	28.5	C	713	28.8	C	445
	NB Approach	-	47.0	D	-	46.2	D	-
	(NB Left/Thru)	1000'+	45.7	D	357	45.0	D	353
	(NB Thru/Right)	100	48.3	D	350	47.6	D	348
	SB Approach	-	28.0	C	-	27.6	C	-
	(SB Left)	160'	31.7	C	115	31.2	C	105
	(SB Thru)	350'	26.6	C	128	26.3	C	128
<b>Overall</b>	-	<b>43.2</b>	<b>D</b>	-	<b>44.9</b>	<b>D</b>	-	



Table 9 – 2025 Build Conditions Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.6	E	-	64.4	E	-
	(EB Left)	800'	53.1	D	60	52.4	D	75
	(EB Thru)	800'	65.2	F	1393	65.2	F	1393
	WB Approach	600'	10.0	A	165	11.2	B	170
	NB Approach	-	52.3	D	-	54.4	D	-
	(NB Left)	500'	19.9	B	128	19.9	B	128
	(NB Thru)	1900'	60.3	E	323	66.3	E	353
	(NB Right)	500'	85.4	F	370	85.4	F	370
	SB Approach	500'+	94.1	F	368	88.1	F	235
<b>Overall</b>	-	<b>60.5</b>	<b>E</b>	-	<b>59.5</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	25.3	C	330	25.3	C	333
	WB Approach	-	35.5	D	-	35.4	D	-
	(WB Left)	600'	53.2	D	345	53.1	D	343
	(WB Thru)	800'	22.3	C	372	22.3	C	373
	NB Approach	1000'+	46.7	D	375	46.7	D	375
	<b>Overall</b>	-	<b>34.3</b>	<b>C</b>	-	<b>34.2</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.7	A	-	8.0	A	-
	(EB Left)	400'	21.6	C	530	20.1	C	510
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	20.6	C	-	20.7	C	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	20.3	C	310	20.4	C	318
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
<b>Overall</b>	-	<b>11.1</b>	<b>B</b>	-	<b>10.6</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	67.7	E	-	69.4	E	-
	(EB Left)	260'	25.3	C	98	25.2	C	98
	(EB Thru)	750'	71.9	E	1148	73.8	E	1163
	WB Approach	-	47.0	D	-	46.6	D	-
	(WB Left)	340'	92.1	F	425	92.1	F	425
	(WB Thru)	1800'	41.7	D	605	41.2	D	603
	(WB Right)	300'	22.1	C	118	22.1	C	118
	NB Approach	-	34.3	C	-	34.3	C	-
	(NB Left/Thru)	1000'+	34.6	C	240	34.6	C	240
	(NB Thru/Right)	100	34.1	C	245	34.1	C	245
	SB Approach	-	86.4	F	-	86.4	F	-
	(SB Left)	160'	187.1	F	885	187.1	F	885
	(SB Thru)	350'	24.1	C	305	24.1	C	305
<b>Overall</b>	-	<b>62.1</b>	<b>E</b>	-	<b>62.5</b>	<b>E</b>	-	

Table 9 – 2025 Build Conditions Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.6	E	-	64.4	E	-
	(EB Left)	800'	53.1	D	60	52.4	D	75
	(EB Thru)	800'	65.2	F	1393	65.2	F	1393
	WB Approach	600'	10.0	A	165	11.2	B	170
	NB Approach	-	52.3	D	-	54.4	D	-
	(NB Left)	500'	19.9	B	128	19.9	B	128
	(NB Thru)	1900'	60.3	E	323	66.3	E	353
	(NB Right)	500'	85.4	F	370	85.4	F	370
	SB Approach	500'+	94.1	F	368	88.1	F	235
<b>Overall</b>	-	<b>60.5</b>	<b>E</b>	-	<b>59.5</b>	<b>E</b>	-	
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	25.3	C	330	25.3	C	333
	WB Approach	-	35.5	D	-	35.4	D	-
	(WB Left)	600'	53.2	D	345	53.1	D	343
	(WB Thru)	800'	22.3	C	372	22.3	C	373
	NB Approach	1000'+	46.7	D	375	46.7	D	375
<b>Overall</b>	-	<b>34.3</b>	<b>C</b>	-	<b>34.2</b>	<b>C</b>	-	
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.7	A	-	8.0	A	-
	(EB Left)	400'	21.6	C	530	20.1	C	510
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	20.6	C	-	20.7	C	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	20.3	C	310	20.4	C	318
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
(NB Right)	50'	56.2	E	3	56.2	E	3	
<b>Overall</b>	-	<b>11.1</b>	<b>B</b>	-	<b>10.6</b>	<b>B</b>	-	
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	67.7	E	-	69.4	E	-
	(EB Left)	260'	25.3	C	98	25.2	C	98
	(EB Thru)	750'	71.9	E	1148	73.3	E	1163
	WB Approach	-	47.0	D	-	46.6	D	-
	(WB Left)	340'	92.1	F	425	92.1	F	425
	(WB Thru)	1800'	41.7	D	605	41.2	D	603
	(WB Right)	300'	22.1	C	118	22.1	C	118
	NB Approach	-	34.3	C	-	34.3	C	-
	(NB Left/Thru)	1000'+	34.6	C	240	34.6	C	240
	(NB Thru/Right)	100	34.1	C	245	34.1	C	245
	SB Approach	-	86.4	F	-	86.4	F	-
	(SB Left)	160'	187.1	F	885	187.1	F	885
(SB Thru)	350'	24.1	C	305	24.1	C	305	
<b>Overall</b>	-	<b>62.1</b>	<b>E</b>	-	<b>62.5</b>	<b>E</b>	-	

# Traffic Impact Study

## 145 King of Prussia Road

### Gap Analysis

Based on the anticipated Level of Service for the exiting movements from the site via the SEPTA Driveway and south site driveway to King of Prussia Road a gap study was performed at both locations. The gap study was conducted from 7:00-9:00 AM and 4:00-6:00 PM on April 27, 2016.

Based on the weekday AM and PM peak hour gap analysis, it is anticipated that sufficient gaps are available to accommodate the anticipated traffic from the site at the two locations. The summary of the available gaps compared to the anticipated exiting traffic is shown in **TABLE 10**. The gap data is provided in **APPENDIX C**.

**Table 10 – Capacity vs Anticipated Traffic Volume**

#### King of Prussia Road and SEPTA Driveway

Peak Hour	Existing Capacity per Field Data fo Left Turns <sup>1</sup>	Existing Capacity per Field Data for RightTurns <sup>1</sup>	2020 Anticipated Traffic Volume		2025 Anticipated Traffic Volume	
			Left	Right	Left	Right
Weekday AM	59	149	20	42	21	42
Weekday PM	104	733	76	84	77	85

#### King of Prussia Road and Southern Driveway

Peak Hour	Existing Capacity per Field Data fo Left Turns <sup>1</sup>	Existing Capacity per Field Data for RightTurns <sup>1</sup>	2020 Anticipated Traffic Volume		2025 Anticipated Traffic Volume	
			Left	Right	Left	Right
Weekday AM	33	75	2	2	2	2
Weekday PM	80	654	4	4	4	4

1. Gap Data provided in Appendix C

### Comparison of No Build versus Build without mitigation

A comparison of the performance of the study intersections under no-build conditions and build conditions was evaluated to identify impacts to the study area and the need for additional mitigation area based on the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies* which are that overall intersection LOS should be no worse than no-build Year overall intersection LOS. If the overall intersection LOS drops, mitigation will be required if the overall intersection delay increases by more than 10 seconds.

#### King of Prussia Road & Matsonford Road (SR 1038)

Under the 2020 and 2025 build conditions, the overall intersection and approaches maintain the no-build condition LOS in both the AM and PM peak periods. The overall intersection delay increase between no-build and build condition is less than 7 seconds for both peak periods in 2020 and 2025.

#### King of Prussia Road & Radnor-Chester Road (SR 1021)

Under the 2020 and 2025 build conditions, the overall intersection and approaches maintain the no-build condition LOS in both the AM and PM peak periods. The overall intersection delay increase between no-build and Build condition is less than 2 seconds for both peak periods in 2020 and 2025.

#### King of Prussia Road & SEPTA Driveway

Under the 2020 and 2025 build conditions, the intersection does not experience a worsening of LOS under the build conditions in either the AM or PM peak periods.

## Traffic Impact Study

### 145 King of Prussia Road

---

#### King of Prussia Road & Raider Road/Site Driveway

Under the 2020 and 2025 No-Build conditions the intersection is stop controlled with the north approach being an in only driveway. Under the 2020 and 2025 Build conditions without mitigation the intersection will remain stop-controlled with the north approach being a 2-lane full access site driveway. The unsignalized intersection operates with significant increase in delay and at an overall LOS F during the AM and PM peak periods in both the 2020 and 2025 Build conditions.

#### King of Prussia Road & Southern Driveway

Under the 2020 and 2025 Build conditions, the intersection operates at the same overall LOS as under the no-build conditions in the AM peak period. Under the 2020 and 2025 build PM peak period condition, the southern driveway experiences a significant reduction in traffic and thus improved LOS. The reduced traffic is because the southern driveway will primarily be used for deliveries.

#### Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. The overall intersection delay increase between no-build and build condition is less than 3 seconds in both peak periods in 2020 and 2025.

#### Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. There is very little change in overall intersection delay between no-build and build conditions in either peak period in 2020 and 2025.

#### Lancaster Avenue (SR 0030) & I-476 SB Off Ramps

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. There is less than 1 second change in overall intersection delay between no-build and build condition in either peak period in 2020 and 2025.

#### Lancaster Avenue (SR 0030) & Radnor Chester Road

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. The overall intersection delay increase between no-build and build condition is less than 8 seconds in all both peak periods in 2020 and 2025.

Based on the comparison of the Intersection LOS and delay under no build conditions and build conditions and using the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies*, the need for additional mitigation measures at most of the study intersections is not triggered because of the trips generated by the proposed site. However, the unsignalized intersection of King of Prussia Road & Raider Road/Site Driveway exhibits a significant increase in overall intersection delay will be mitigated through the installation of a traffic signal.

2020 and 2025 “BUILD” TRAFFIC CONDITIONS WITH MITIGATION

**Improvements to Achieve LOS C per SLDO Requirements and Mitigate Intersections**

As required by 255-20.B(5)(d)(6)(a) of the Radnor Township Subdivision and Land Development Ordinance, additional off-site improvements would be necessary to achieve LOS C at all of the off-site intersections. Based on Synchro analysis, Lancaster Avenue would require significant intersection upgrades including widening to provide additional through lanes and providing additional dedicated turn lanes on most approaches. The King of Prussia Road intersections at Radnor-Chester Road and Matsonford Road would require two lanes in each direction on King of Prussia Road and dual turn lanes on the minor approaches. Due to physical constraints at most of the project intersections, including the SEPTA Rail Bridge on King of Prussia Road and the I-476 Bridges on Lancaster Avenue, the necessary improvements are not feasible and are not proposed by the applicant.

The intersection of King of Prussia Road & Raider Road/Site Driveway exhibits a significant increase in overall intersection delay because of proposed site traffic. To mitigate the intersection, it is proposed that the intersection be signalized, and left turn lanes be added on both approaches of King of Prussia Road.

The following additional improvements are proposed:

- Restripe northbound I-476 off-ramp at Lancaster Avenue to provide a shared through/right turn lane
- Restripe northbound King of Prussia Road at the southern site driveway to provide a shared through/right turn lane
- Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
- Construct a southbound King of Prussia Road left turn lane into the Septa Driveway.

**Signal Warrant Assessment**

Signal warrant analyses were conducted for the intersections of King of Prussia Road and Raider Road/Site Driveway and King of Prussia Road and Septa Station Driveway using the warrants set forth in FHWA’s Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition. Based on the MUTCD requirements for intersections warranting a signal, MUTCD Warrants 2 and 3 are applicable to the intersections King of Prussia Road and Raider Road/Site Driveway and King of Prussia Road and Septa Station Driveway.

King of Prussia Road and Raider Road/Site Driveway

Warrant 2 – Four Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-1 of the MUTCD. For the intersection of King of Prussia Road and Raider Road/Site Driveway, an Urban 2 or more major lanes and 1 minor lane curve is used for the Warrant 2 analysis. As illustrated on Table 4C-1 provided in **APPENDIX J**, four of the plotted points exceed the four-hour warrant curve using the combination of manual count data and trip generation data. Therefore, for the purposes of this analysis, **Warrant 2 is satisfied**.

Warrant 3 – Peak Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-3 of the MUTCD. For the intersection of King of Prussia Road and Raider Road/Site Driveway, an Urban 2 major lanes and 1 minor lane curve is used for the Warrant 3 analysis. As illustrated on Table 4C-3 provided in **APPENDIX J**, four of the plotted points exceed the peak hour warrant curve using the combination of manual count data and trip generation data. Therefore, for the purposes of this analysis, **Warrant 3 is satisfied**.

King of Prussia Road and Septa Station Driveway

Warrant 2 – Four Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-1 of the MUTCD. For the intersection of King of Prussia Road

## Traffic Impact Study

### 145 King of Prussia Road

---

and Septa Station Driveway, an Urban 2 major lanes and 1 minor lane curve is used for the Warrant 2 analysis. As illustrated on Table 4C-1 provided in **APPENDIX J**, only two of the plotted points exceed the four-hour warrant curve using the combination of manual count data and trip generation data. Therefore, for the purposes of this analysis, **Warrant 2 is not satisfied**.

Warrant 3 – Peak Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-3 of the MUTCD. For the intersection of King of Prussia Road and Septa Station Driveway, an Urban 2 major lanes and 1 minor lane curve is used for the Warrant 3 analysis. As illustrated on Table 4C-3 provided in **APPENDIX J**, four of the plotted points exceed the peak hour warrant curve using the combination of manual count data and trip generation data. Therefore, for the purposes of this analysis, **Warrant 3 is satisfied**.

As both Warrant 2 and Warrant 3 are satisfied at the intersection of King of Prussia Road and Raider Road/Site Driveway, a traffic signal is proposed at the intersection as a mitigation measure.

At the King of Prussia Road and Septa Station Driveway warrant 3 is satisfied during the PM peak period but Warrant 2 was not met. Typically, a traffic signal is not considered if Warrant 3 is the only warrant that can be met. Therefore, a traffic signal was not proposed as a mitigation measure at the intersection.

The warrant volume analysis worksheet and MUTCD Figures are provided in **APPENDIX J**.

#### Left Turn Signalization Warrant Assessment

Left turn signalization warrants were performed for the northbound and southbound left turns from King of Prussia Road at Raider Road. The results indicate that neither the northbound or southbound left turns meet warrants for protected/permitted or protected/prohibited phasing based on calculated conflict. However, there is insufficient sight distance for permitted left turns into the site from the southbound left turn lane. The southbound left turn into the proposed site will be provided a protected/prohibited left turn phase. The northbound left turn movement will utilize the same protected left turn phase and be permitted during the King of Prussia through phase. The warrant worksheet and sight distance evaluation are provided in **APPENDIX K**.

#### Vehicular and Pedestrian Clearances

Estimated vehicular and pedestrian clearances were calculated for the proposed signal at King of Prussia Road and Raider Road/site driveway based on PennDOT policies. The yellow and all-red times determined from these calculations were used for the future build scenario traffic analyses. The policies and the results of the calculations are provided in **APPENDIX L**. It is anticipated that the pedestrian and vehicular clearances will be refined during the development of an approved traffic signal plan.

#### 2020 and 2025 Build Levels of Service with Mitigation Improvements

Operations of the study intersections during the AM and PM peak hours were evaluated for the build configuration of the proposed development in the proposed build year of 2020 and the horizon year of 2025 with the with the implementation of the identified mitigations.

Under the build conditions with the identified improvements implemented the following changes occur to overall and approach LOS:

##### 2020

- At King of Prussia Road and Raider Road/Site Driveway:
  - Overall PM intersection operation improves from an overall LOS F (282.8 seconds of delay) to LOS D (41.4 seconds of delay) during the AM peak hour and from overall LOS F (260.3 seconds of delay) to LOS E (56.2 seconds of delay) during the PM peak hour.

## Traffic Impact Study

### 145 King of Prussia Road

---

- Westbound approach improves from LOS F (4909.7 seconds of delay) to LOS D (37.4 seconds of delay) during the AM peak hour and from LOS F (1493.4 seconds of delay) to LOS C (38.1 seconds of delay) during the PM peak hour.
- Eastbound improves from LOS F (240.2 seconds of delay) to LOS D (37.0 seconds of delay) during the AM peak hour.
- At Lancaster Avenue and I-476 NB Off Ramp/King of Prussia Road:
  - Overall intersection operation improves from LOS E (68.4 seconds of delay) to LOS D (51.5 seconds of delay) during the AM peak hour.
  - Northbound approach improves from LOS E (74.8 seconds of delay) to LOS D (43.2 seconds of delay) during the AM peak hour.
  - NB Through movement improves from LOS F (152.3 seconds of delay) to LOS E (58.5 seconds of delay) during the AM peak hour

Under the 2020 build conditions with the identified improvements implemented the following changes will occur to the reported 95<sup>th</sup> percentile queues:

- The reported 95<sup>th</sup> percentile queue for northbound approach at the intersection of King of Prussia Road & Raider Road will increase to 1210' during the AM peak period. This will extend through the southern site driveway to the intersection of Lancaster Avenue.
- The reported 95<sup>th</sup> percentile queue for westbound left at the intersection of King of Prussia Road & Raider Road will be reduced from 795' to 290' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road will be reduced from 1962' to 740' during the AM peak period.

#### 2025

- At King of Prussia Road and Raider Road/Site Driveway:
  - Overall intersection operation improves from an overall LOS F (313.4 seconds of delay) to LOS D (50.2 seconds of delay) during the AM peak hour and from overall LOS F (278.8 seconds of delay) to LOS E (63.6 seconds of delay) during the PM peak hour.
  - Westbound approach improves from LOS F (5492.6 seconds of delay) to LOS D (37.4 seconds of delay) during the AM peak hour and from LOS F (1622.6 seconds of delay) to LOS C (36.3 seconds of delay) during the PM peak hour.
  - Eastbound improves from LOS F (287.6 seconds of delay) to LOS C (37.4 seconds of delay) during the AM peak hour.
- At Lancaster Avenue and I-476 NB Off Ramp/King of Prussia Road:
  - Overall intersection operation improves from LOS E (71.4 seconds of delay) to LOS D (53.8 seconds of delay) during the AM peak hour.
  - Northbound approach improves from LOS F (80.7 seconds of delay) to LOS D (45.4 seconds of delay) during the AM peak hour.
  - NB Through movement improves from LOS F (160.2 seconds of delay) to LOS E (62.0 seconds of delay) during the AM peak hour.

Under the 2025 build conditions with the identified improvements implemented the following changes will occur to the reported 95<sup>th</sup> percentile queues:

- The reported 95<sup>th</sup> percentile queue for northbound approach at the intersection of King of Prussia Road & Raider Road will increase to 1209' during the AM peak period. This will extend through the southern site driveway to the intersection of Lancaster Avenue.

## Traffic Impact Study

### 145 King of Prussia Road

---

- The reported 95<sup>th</sup> percentile queue for westbound left at the intersection of King of Prussia Road & Raider Road will be reduced from 810' to 290' during the PM peak period.
- The reported 95<sup>th</sup> percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road will be reduced from 2032' to 770' during the AM peak period.

A summary of the Delays, LOS, and 95<sup>th</sup> Percentile Queues for the build conditions analysis are summarized in **TABLE 11** and **TABLE 12**. Detailed outputs of the 2025 build conditions analysis are provided in **APPENDIX M**.



Table 11 – 2020 Build Conditions with Improvements Summary Table

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue(ft)	Delay (Secs)	LOS	95th % Queue(ft)
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.1	C	0	29.1	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	38.8	D	-	39.3	D	-
	(WB Left)	550'	42.8	D	368	43.4	D	375
	(WB Thru/Right)	950'	27.6	C	110	27.6	C	110
	SB Approach	-	39.0	D	-	39.6	D	-
	(SB Left)	100'	84.9	F	718	86.7	F	723
	(SB Thru/Right)	1000'+	12.0	B	403	12.2	B	158
	NB Approach	-	60.9	E	-	64.6	E	-
	(NB Left)	130'	17.3	B	10	17.3	B	10
(NB Thru)	1150'	61.7	E	785	65.5	E	1090	
<b>Overall</b>	-	<b>45.7</b>	<b>D</b>	-	<b>47.3</b>	<b>D</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.0	B	-	19.3	B	-
	(EB Left)	160'	50.4	D	53	53.7	D	55
	(EB Thru)	1200'	16.0	B	255	16.1	B	263
	WB Approach	-	44.2	D	-	48.7	D	-
	(WB Left)	100'	20.5	C	25	20.8	C	25
	(WB Thru/Right)	1100'	45.0	D	883	49.7	D	940
	NB Approach	-	617.3	F	-	616.3	F	-
	(NB Left/Thru)	1200'	681.6	F	2170	681.6	F	2170
	(NB Right)	280'	18.2	B	45	18.3	B	45
SB Approach	100'	21.8	C	8	21.8	C	8	
<b>Overall</b>	-	<b>218.9</b>	<b>F</b>	-	<b>218.3</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	38.6	E	43	44.4	E	45
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.2	A	30	5.4	A	40
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>3.2</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	21.8	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.3	B	30	37.0	D	173
	WB Approach	-	-	-	-	37.4	D	-
	(WB Left)	100'	-	-	-	38.5	D	128
	(WB Thru/Right)	500'	-	-	-	32.4	C	25
	NB Approach	-	1.2	A	20	57.8	E	-
	(NB Left)	170'	-	-	-	6.4	A	83
	(NB Thru)	550'	-	-	-	82.7	F	1210
	(NB Right)	350'	-	-	-	10.9	B	248
	SB Approach	-	0.9	A	5	15.4	B	-
	(SB Left)	130'	-	-	-	47.6	D	73
(SB Thru)	660'	-	-	-	10.2	B	215	
<b>Overall</b>	-	<b>2.0</b>	<b>A</b>	-	<b>41.4</b>	<b>D</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	265.0	F	108	90.2	F	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.2	C	13	16.8	C	3
	<b>Overall</b>	-	<b>5.6</b>	<b>A</b>	-	<b>0.2</b>	<b>A</b>	-

Table 11 – 2020 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue(ft)	Delay (Secs)	LOS	95th % Queue(ft)
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	60.5	E	-	55.8	E	-
	(EB Left)	800'	59.1	E	252	56.3	E	253
	(EB Thru)	800'	60.9	E	787	55.6	E	758
	WB Approach	600'	53.9	D	338	53.9	D	338
	NB Approach	-	74.8	E	-	43.2	D	-
	(NB Left)	500'	17.6	B	305	18.3	B	313
	(NB Thru)	1900'	146.9	F	1917	58.5	E	760
	(NB Right)	500'	28.1	C	335	60.5	E	740
	SB Approach	500'+	63.9	E	78	75.9	E	125
	<b>Overall</b>	-	<b>66.2</b>	<b>E</b>	-	<b>51.5</b>	<b>D</b>	-
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.0	B	235	18.4	B	238
	WB Approach	-	34.5	C	-	34.9	C	-
	(WB Left)	600'	53.8	D	120	54.4	D	130
	(WB Thru)	800'	31.8	C	568	31.9	C	575
	NB Approach	1000'+	40.0	D	443	40.0	D	443
	<b>Overall</b>	-	<b>31.3</b>	<b>C</b>	-	<b>31.6</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.6	A	-	8.4	A	-
	(EB Left)	400'	31.8	C	248	30.9	C	240
	(EB Thru/Right)	600'	0.3	A	5	0.2	A	5
	WB Approach	-	10.4	B	-	10.8	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.3	B	280	10.7	B	285
	NB Approach	-	58.1	E	-	58.1	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	55.0	D	3
	<b>Overall</b>	-	<b>9.3</b>	<b>A</b>	-	<b>9.2</b>	<b>A</b>	-
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	31.5	C	-	33.5	C	-
	(EB Left)	260'	43.8	D	145	43.8	D	150
	(EB Thru)	750'	30.0	C	520	32.2	C	538
	WB Approach	-	49.7	D	-	60.6	E	-
	(WB Left)	340'	35.0	C	185	41.1	D	198
	(WB Thru)	1800'	58.0	E	1285	72.1	E	1365
	(WB Right)	300'	29.0	C	435	31.0	C	448
	NB Approach	-	45.9	D	-	47.3	D	-
	(NB Left/Thru)	1000'+	44.7	D	345	45.9	D	350
	(NB Thru/Right)	100	47.1	D	340	48.7	D	345
	SB Approach	-	27.8	C	-	26.5	C	-
	(SB Left)	160'	31.3	C	103	29.8	C	100
	(SB Thru)	350'	26.5	C	125	25.3	C	123
	<b>Overall</b>	-	<b>42.3</b>	<b>D</b>	-	<b>48.5</b>	<b>D</b>	-

Table 11 – 2020 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue(ft)	Delay (Secs)	LOS	95th % Queue (ft)
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		19.3	B	-	19.3	B	-
	(EB Left)	50'	24.5	C	3	24.5	C	3
	(EB Thru/Right)	50'	18.2	B	10	18.2	B	10
	WB Approach	-	45.9	D	-	47.3	D	-
	(WB Left)	550'	55.8	E	640	57.7	E	653
	(WB Thru/Right)	950'	21.6	C	195	21.6	C	195
	SB Approach	-	25.9	C	-	26.5	C	-
	(SB Left)	100'	18.0	B	83	17.8	B	83
	(SB Thru/Right)	1000'+	27.1	C	660	27.8	C	678
	NB Approach	-	33.5	C	-	31.6	C	-
(NB Left)	130'	33.1	C	8	33.6	C	8	
(NB Thru)	1150'	33.5	C	492	31.6	C	460	
<b>Overall</b>	-	<b>34.6</b>	<b>C</b>	-	<b>34.9</b>	<b>C</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	28.1	C	-	28.9	C	-
	(EB Left)	160'	23.2	C	8	15.3	B	5
	(EB Thru)	1200'	28.1	C	548	29.1	C	560
	WB Approach	-	25.2	C	-	9.8	A	-
	(WB Left)	100'	62.4	E	93	47.4	D	95
	(WB Thru/Right)	1100'	20.1	C	333	4.7	A	90
	NB Approach	-	225.5	F	-	225.1	F	-
	(NB Left/Thru)	1200'	297.7	F	1215	297.7	F	1215
	(NB Right)	280'	16.8	B	105	16.8	B	108
SB Approach	100'	49.3	D	138	49.3	D	138	
<b>Overall</b>	-	<b>85.7</b>	<b>F</b>	-	<b>82.0</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	120.0	F	288	49.6	E	128
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	0.3	A	3	0.5	A	5
	<b>Overall</b>	-	<b>17.1</b>	<b>C</b>	-	<b>5.3</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	18.2	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.5</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	32.1	D	25	27.9	C	43
	WB Approach	-	-	-	-	36.3	D	-
	(WB Left)	100'	-	-	-	38.1	D	290
	(WB Thru/Right)	500'	-	-	-	28.4	C	58
	NB Approach	-	0.7	A	3	10.4	B	-
	(NB Left)	170'	-	-	-	22.6	C	18
	(NB Thru)	550'	-	-	-	10.1	B	178
	(NB Right)	350'	-	-	-	8.6	A	55
	SB Approach	-	0.0	A	0	80.5	F	-
	(SB Left)	130'	-	-	-	47.9	D	18
(SB Thru)	660'	-	-	-	80.9	F	1925	
<b>Overall</b>	-	<b>1.1</b>	<b>A</b>	-	<b>56.2</b>	<b>E</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	613.8	F	567	37.3	E	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.1	A	-	0.0	A	-
	(SB Left)	75'	8.0	A	0	8.2	A	0
	<b>Overall</b>	-	<b>83.9</b>	<b>F</b>	-	<b>0.2</b>	<b>A</b>	-

Table 11 – 2020 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue(ft)	Delay (Secs)	LOS	95th % Queue (ft)
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	58.5	E	-	59.6	E	-
	(EB Left)	800'	52.5	D	58	52.5	D	75
	(EB Thru)	800'	58.8	E	1335	60.0	E	1340
	WB Approach	600'	10.3	B	163	11.1	B	170
	NB Approach	-	49.7	D	-	55.3	E	-
	(NB Left)	500'	19.8	B	123	19.9	B	125
	(NB Thru)	1900'	57.8	E	313	72.1	E	360
	(NB Right)	500'	79.3	E	353	82.1	F	360
	SB Approach	500'+	85.8	F	328	83.2	E	310
	<b>Overall</b>	-	<b>55.6</b>	<b>E</b>	-	<b>56.5</b>	<b>E</b>	-
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	24.6	C	323	24.5	C	323
	WB Approach	-	35.3	D	-	35.2	D	-
	(WB Left)	600'	53.1	D	342	53.1	D	338
	(WB Thru)	800'	22.0	C	370	21.9	C	368
	NB Approach	1000'+	46.6	D	370	46.6	D	370
	<b>Overall</b>	-	<b>33.9</b>	<b>C</b>	-	<b>33.8</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	9.7	A	-	9.1	A	-
	(EB Left)	400'	24.4	C	842	22.9	C	833
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	19.8	B	-	19.9	B	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	19.4	B	303	19.6	B	308
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
	<b>Overall</b>	-	<b>11.8</b>	<b>B</b>	-	<b>11.3</b>	<b>B</b>	-
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	59.1	E	-	41.1	D	-
	(EB Left)	260'	24.3	C	107	23.2	C	90
	(EB Thru)	750'	62.5	E	795	42.8	D	690
	WB Approach	-	42.2	D	-	38.1	D	-
	(WB Left)	340'	79.4	E	342	94.1	F	295
	(WB Thru)	1800'	37.9	D	575	30.3	C	528
	(WB Right)	300'	21.5	C	115	19.0	B	108
	NB Approach	-	34.6	C	-	37.6	D	-
	(NB Left/Thru)	1000'+	34.8	C	238	38.3	D	245
	(NB Thru/Right)	100	34.4	C	242	37.0	D	250
	SB Approach	-	83.9	F	-	102.9	F	-
	(SB Left)	160'	180.3	F	848	227.2	F	945
	(SB Thru)	350'	24.4	C	300	26.2	C	310
	<b>Overall</b>	-	<b>57.2</b>	<b>E</b>	-	<b>55.1</b>	<b>E</b>	-

Table 12 – 2025 Build Conditions with Improvements Summary Table

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue(ft)	Delay (Secs)	LOS	95th % Queue(ft)
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.3	C	0	29.3	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	39.6	D	-	39.9	D	-
	(WB Left)	550'	43.8	D	378	44.2	D	380
	(WB Thru/Right)	950'	27.7	C	115	27.7	C	115
	SB Approach	-	42.3	D	-	42.2	D	-
	(SB Left)	100'	93.0	F	753	93.0	F	753
	(SB Thru/Right)	1000'+	12.2	B	415	12.4	B	420
	NB Approach	-	64.6	E	-	69.8	E	-
(NB Left)	130'	17.3	B	10	17.3	B	10	
(NB Thru)	1150'	65.5	F	1090	70.7	E	1135	
<b>Overall</b>	-	<b>48.5</b>	<b>D</b>	-	<b>50.2</b>	<b>D</b>	-	
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.2	B	-	19.5	B	-
	(EB Left)	160'	53.0	D	63	55.7	E	55
	(EB Thru)	1200'	16.0	B	260	16.1	B	265
	WB Approach	-	48.0	D	-	68.2	E	-
	(WB Left)	100'	20.6	C	25	33.3	C	33
	(WB Thru/Right)	1100'	48.9	D	928	69.4	F	1338
	NB Approach	-	636.0	F	-	635.1	F	-
	(NB Left/Thru)	1200'	702.2	F	2230	702.2	F	2230
	(NB Right)	280'	18.2	B	45	18.3	B	48
SB Approach	100'	21.8	C	8	21.8	C	8	
<b>Overall</b>	-	<b>227.1</b>	<b>F</b>	-	<b>233.4</b>	<b>F</b>	-	
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	39.8	E	43	47.6	E	48
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.3	A	33	5.5	A	40
	<b>Overall</b>	-	<b>2.5</b>	<b>A</b>	-	<b>3.4</b>	<b>A</b>	-
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	22.3	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	<b>0.1</b>	<b>A</b>	-	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.5	B	33	37.4	D	178
	WB Approach	-	-	-	-	37.7	D	-
	(WB Left)	100'	-	-	-	38.8	D	128
	(WB Thru/Right)	500'	-	-	-	32.5	C	25
	NB Approach	-	1.2	A	20	60.3	E	-
	(NB Left)	170'	-	-	-	6.5	A	82
	(NB Thru)	550'	-	-	-	86.3	F	1209
	(NB Right)	350'	-	-	-	10.6	B	248
	SB Approach	-	0.9	A	8	15.6	B	-
	(SB Left)	130'	-	-	-	49.8	D	75
(SB Thru)	660'	-	-	-	10.2	B	218	
<b>Overall</b>	-	<b>2.1</b>	<b>A</b>	-	<b>50.2</b>	<b>D</b>	-	
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	298.0	F	113	92.2	F	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.5	C	15	17.1	C	3
	<b>Overall</b>	-	<b>6.1</b>	<b>A</b>	-	<b>0.2</b>	<b>A</b>	-

Table 12 – 2025 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue(ft)	Delay (Secs)	LOS	95th % Queue(ft)
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.2	E	-	58.7	E	-
	(EB Left)	800'	59.6	E	253	56.7	E	253
	(EB Thru)	800'	65.4	E	1123	59.3	E	790
	WB Approach	600'	54.4	D	345	54.4	D	343
	NB Approach	-	78.6	E	-	45.4	D	-
	(NB Left)	500'	17.8	B	313	18.4	B	318
	(NB Thru)	1900'	155.9	F	1995	62.0	E	787
	(NB Right)	500'	28.5	C	345	64.3	E	770
	SB Approach	500'+	65.3	E	83	78.5	E	135
	<b>Overall</b>	-	<b>69.4</b>	<b>E</b>	-	<b>53.8</b>	<b>D</b>	-
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.5	B	462	18.9	B	245
	WB Approach	-	35.0	C	-	35.5	D	-
	(WB Left)	600'	53.9	D	123	54.4	D	133
	(WB Thru)	800'	32.4	C	578	32.6	C	585
	NB Approach	1000'+	39.9	D	450	39.9	D	450
	<b>Overall</b>	-	<b>31.7</b>	<b>C</b>	-	<b>32.0</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.4	A	-	8.3	A	-
	(EB Left)	400'	31.3	C	245	30.6	C	243
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	3
	WB Approach	-	10.7	B	-	11.0	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.6	B	288	10.9	B	293
	NB Approach	-	58.1	E	-	58.1	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
(NB Right)	50'	55.1	E	3	55.1	E	3	
	<b>Overall</b>	-	<b>9.2</b>	<b>A</b>	-	<b>9.2</b>	<b>A</b>	-
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	33.3	C	-	32.8	C	-
	(EB Left)	260'	63.1	E	258	60.8	E	253
	(EB Thru)	750'	29.4	C	28	29.1	C	525
	WB Approach	-	50.1	D	-	50.5	D	-
	(WB Left)	340'	46.6	D	228	45.3	D	225
	(WB Thru)	1800'	57.1	E	1313	57.9	F	1320
	(WB Right)	300'	28.5	C	713	28.1	C	440
	NB Approach	-	47.0	D	-	47.6	D	-
	(NB Left/Thru)	1000'+	45.7	D	357	46.1	D	358
	(NB Thru/Right)	100	48.3	D	350	49.1	D	353
	SB Approach	-	28.0	C	-	28.1	C	-
(SB Left)	160'	31.7	C	115	31.8	C	108	
(SB Thru)	350'	26.6	C	128	26.7	C	128	
	<b>Overall</b>	-	<b>43.2</b>	<b>D</b>	-	<b>43.3</b>	<b>D</b>	-

Table 12 – 2025 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		18.0	B	-	18.0	B	-
	(EB Left)	50'	22.9	C	3	22.9	C	3
	(EB Thru/Right)	50'	17.0	B	10	17.0	B	10
	WB Approach	-	39.8	D	-	40.9	D	-
	(WB Left)	550'	47.9	D	620	49.4	D	638
	(WB Thru/Right)	950'	20.1	C	193	20.1	C	193
	SB Approach	-	31.6	C	-	32.6	C	-
	(SB Left)	100'	20.2	C	90	19.9	B	90
	(SB Thru/Right)	1000'+	33.4	C	733	34.7	C	756
	NB Approach	-	41.0	D	-	37.7	D	-
(NB Left)	130'	37.5	D	10	38.2	D	8	
(NB Thru)	1150'	41.0	D	542	37.7	D	200	
<b>Overall</b>	-	-	<b>36.6</b>	<b>D</b>	-	<b>36.6</b>	<b>D</b>	-
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	39.5	D	-	45.2	D	-
	(EB Left)	160'	25.3	C	8	23.1	C	8
	(EB Thru)	1200'	39.7	D	992	45.4	D	1037
	WB Approach	-	31.1	C	-	25.1	C	-
	(WB Left)	100'	96.4	F	120	88.0	F	118
	(WB Thru/Right)	1100'	22.1	C	350	16.5	B	300
	NB Approach	-	212.9	F	-	212.6	F	-
	(NB Left/Thru)	1200'	281.3	F	1210	281.3	F	1210
	(NB Right)	280'	15.6	B	105	15.6	B	105
SB Approach	100'	53.0	D	143	52.5	D	143	
<b>Overall</b>	-	-	<b>88.4</b>	<b>F</b>	-	<b>89.0</b>	<b>F</b>	-
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	132.3	F	305	54.8	F	138
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	0.3	A	5	0.5	A	5
	<b>Overall</b>	-	-	<b>18.7</b>	<b>C</b>	-	<b>5.7</b>	<b>A</b>
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	18.4	C	13	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380'	0.0	A	0	-	-	-
	<b>Overall</b>	-	-	<b>0.5</b>	<b>A</b>	-	-	-
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	33.4	D	28	28.0	C	43
	WB Approach	500'	-	-	-	36.3	D	-
	(WB Left)	500'	-	-	-	38.1	D	290
	(WB Thru/Right)	500'	-	-	-	28.4	C	58
	NB Approach	550'	0.8	A	3	10.6	B	-
	(NB Left)	75'	-	-	-	22.3	C	18
	(NB Thru)	550'	-	-	-	10.3	B	183
	(NB Right)	550'	-	-	-	8.8	A	55
	SB Approach	550'	0.0	A	0	92.8	F	-
	(SB Left)	75'	-	-	-	46.3	D	18
(SB Thru)	660'	-	-	-	93.4	F	2060	
<b>Overall</b>	-	-	<b>1.1</b>	<b>A</b>	-	<b>63.6</b>	<b>E</b>	-
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	647.9	F	580	38.2	E	5
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.1	A	-	0.0	A	-
	(SB Left)	75'	8.0	A	0	8.2	A	0
	<b>Overall</b>	-	-	<b>87.3</b>	<b>F</b>	-	<b>0.2</b>	<b>A</b>

Table 12 – 2025 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.6	E	-	47.8	D	-
	(EB Left)	800'	53.1	D	60	50.2	D	75
	(EB Thru)	800'	65.2	F	1393	47.7	F	1373
	WB Approach	600'	10.0	A	165	39.8	D	342
	NB Approach	-	52.3	D	-	57.3	E	-
	(NB Left)	500'	19.9	B	128	19.9	B	128
	(NB Thru)	1900'	60.3	E	323	75.1	E	356
	(NB Right)	500'	85.4	F	370	85.7	F	373
	SB Approach	500'+	94.1	F	368	88.1	F	235
	<b>Overall</b>	-	<b>60.5</b>	<b>E</b>	-	<b>57.3</b>	<b>E</b>	-
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	25.3	C	330	24.4	C	333
	WB Approach	-	35.5	D	-	15.9	B	-
	(WB Left)	600'	53.2	D	345	36.9	D	323
	(WB Thru)	800'	22.3	C	372	0.3	A	5
	NB Approach	1000'+	46.7	D	375	46.7	D	380
	<b>Overall</b>	-	<b>34.3</b>	<b>C</b>	-	<b>25.2</b>	<b>C</b>	-
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.7	A	-	8.0	A	-
	(EB Left)	400'	21.6	C	530	20.1	C	833
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	20.6	C	-	20.7	C	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	20.3	C	310	20.4	C	308
	NB Approach	-	56.7	E	-	56.6	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.0	E	3
	<b>Overall</b>	-	<b>11.1</b>	<b>B</b>	-	<b>10.6</b>	<b>B</b>	-
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach	-	67.7	E	-	54.9	D	-
	(EB Left)	260'	25.3	C	98	25.3	C	100
	(EB Thru)	750'	71.9	E	1148	57.6	E	1448
	WB Approach	-	47.0	D	-	37.3	D	-
	(WB Left)	340'	92.1	F	425	79.1	E	348
	(WB Thru)	1800'	41.7	D	605	31.9	C	545
	(WB Right)	300'	22.1	C	118	19.4	B	110
	NB Approach	-	34.3	C	-	37.5	D	-
	(NB Left/Thru)	1000'+	34.6	C	240	38.4	D	250
	(NB Thru/Right)	100	34.1	C	245	36.7	D	255
	SB Approach	-	86.4	F	-	106.2	F	-
	(SB Left)	160'	187.1	F	885	236.0	F	982
(SB Thru)	350'	24.1	C	305	25.9	C	303	
	<b>Overall</b>	-	<b>62.1</b>	<b>E</b>	-	<b>60.1</b>	<b>E</b>	-



**CONCLUSIONS & RECOMMENDATIONS**

The proposed 475,000 square foot development located at 145 King of Prussia Road in Radnor Township, Delaware County, Pennsylvania is expected to generate a total of **731 (577 entering and 154 exiting)** and **583 (158 entering and 425 exiting)** new trips generated by the site during the morning and afternoon peak hours, respectively. Access to the site will be provided through 3 full access driveways. The primary site driveway will be a full access driveway located on King of Prussia Drive across from Raider Road. A second driveway will be located on the north side of the site and accessed via the existing Septa driveway on King of Prussia Road. The third site driveway provides access to loading areas and is located at the southern corner of the site on King of Prussia Road approximately 550' north of Lancaster Avenue (SR 0030).

In conjunction with the proposed development the following roadway improvements are recommended:

- At King of Prussia Road and Matsonford Road/Park Driveway:
  - Modify AM signal timings to shift 3 seconds from the SB King of Prussia Road lead phase to the NB/SB King of Prussia phase (1 second) and the EB/WB Matsonford Road/Park Driveway Phase (2 seconds).
- At King of Prussia Road and Radnor-Chester Road:
  - Modify PM signal timings to shift 6 seconds from the EB/WB King of Prussia Road phase to the NB/SB Radnor Chester Road phase.
- At King of Prussia Road and Raider Road/Site Driveway:
  - Provide left turn lanes on both approaches of King of Prussia Road
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road.
  - Install an actuated traffic signal coordinated with the signal at King of Prussia Road & Radnor-Chester Road.
- At King of Prussia Road and South Site Driveway:
  - Restripe northbound King of Prussia Road at the southern site driveway to provide shared through/right turn lane.
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
- At Lancaster Avenue and NB Off Ramps/King of Prussia Road:
  - Restripe northbound I-76 off-ramp at Lancaster Avenue to provide shared through/right turn lane
- At Lancaster Avenue and I-476 SB Off Ramp:
  - Modify PM signal timings to shift 1 second from the EB/WB Lancaster Avenue phase to the WB Lancaster Avenue lead phase.
- At Lancaster Avenue and I-476 NB On Ramp/Hillside Circuit:
  - Modify PM signal timings to shift 7 second from the EB/WB Lancaster Avenue phase to the EB Lancaster Avenue lead phase.
- At Lancaster Avenue and Radnor-Chester Road:
  - Modify AM signal timings to shift 12 seconds from the southbound Radnor-Chester Road lead phase and 1 second from the Lancaster Avenue Phase lead left phase to the EB/WB Lancaster Avenue EB/WB Phase.

Under the build Conditions with the identified improvements implemented, all of the study intersections maintain existing levels of service between the no-build and build conditions and operate at overall LOS D or better with the exception of those that operate at LOS E or F under no-build conditions.

## Traffic Impact Study

### 145 King of Prussia Road

---

Under the build Conditions with the identified improvements implemented, all the study intersections maintain existing levels of service between the no-build and build conditions and operate at overall LOS D or better except for those that operate at LOS E or F under no-build conditions and the Raider Road intersection which operates at A LOS E during the PM peak hour.

Based on the comparison of the Intersection LOS and delay under no-build conditions and build conditions with the identified mitigation measures, the intersections meet the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies* at all the study intersections. The Levels of Service exhibited are not a result of, nor is the need for additional mitigation measures triggered because of the trips generated by the proposed site.

In addition to the improvements identified within the is TIS, a bus shelter is to be constructed on King of Prussia Road southeast of the SEPTA Driveway to the extent that it is approved by SEPTA and the University of Pennsylvania Health System will partner with the Township to install a Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review:

- Route 30 & I-476 Northbound Ramps
- Route 30 & I-476/King of Prussia Road
- Route 30 & I-476 Southbound Ramps.
- Route 30 & Radnor-Chester Road.
- Route 30 & Radnor Financial Center Eastern Driveway
- Route 30 & Radnor Financial Center Western Driveway
- King of Prussia Road & Radnor-Chester Road.
- King of Prussia Road & Matsonford Road.
- Matsonford Road & South Centennial Drive.
- Matsonford Road & North Centennial Drive
- King of Prussia Road & Raider Road.
- Radnor Chester and Raider Road
- Radnor Chester and Radnor Financial Center

# APPENDIX

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



# APPENDIX A

## Level of Service Criteria

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



## LEVEL OF SERVICE

Level of Service is a term used to describe vehicle operator satisfaction with the driving experience. Research has determined that operator satisfaction is based primarily on travel speed and delay. In urban environments these factors, travel speed and delay, are primarily controlled by the operation of intersections.

By utilizing models to simulate the flow of traffic at intersections, the average delay experienced by vehicles can be estimated. These models consider such factors as traffic volumes, roadway geometry, traffic control, and driver behavior. Levels of Service designations are based on a comparison of the average delays calculated by the models with perceived acceptable delays.

The following tables illustrate the guidelines used for designated Levels of Service at intersections:

Level of Service Criteria  
for Signalized Intersections<sup>(1)</sup>

Level of Service	Control Delay (Seconds per Vehicle)
A	≤ 10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	> 80

<sup>(1)</sup> Exhibit 18-4, Level of Service from Control Delay (2010 HCM)

Level of Service Criteria  
for Unsignalized Intersections<sup>(2)</sup>

Level of Service	Control Delay (Seconds per Vehicle)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	> 50

<sup>(2)</sup> Table Exhibit 19-1, Level of Service Criteria for TWSC and AWSC intersections (2010 HCM)





# APPENDIX B

Existing Signal Permit Plans/Timing Directives

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507





# TRAFFIC SIGNAL SYSTEM PERMIT PLAN

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	DELAWARE	0030	CUR-1	3 OF 4

REVISIONS	DATE	BY

### GENERAL NOTES

NO MODIFICATIONS TO THIS INSTALLATION ARE PERMITTED UNLESS APPROVED BY THE ENGINEER OR 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 OF THE SYSTEM PERMIT DRAWING, ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.

TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL. SUSPENSION LEVEL SHALL BE LOWER LEVEL AND PERSONAL COMPUTER BOARD, SHALL BE 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 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 TAPERS.

BEFORE 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.

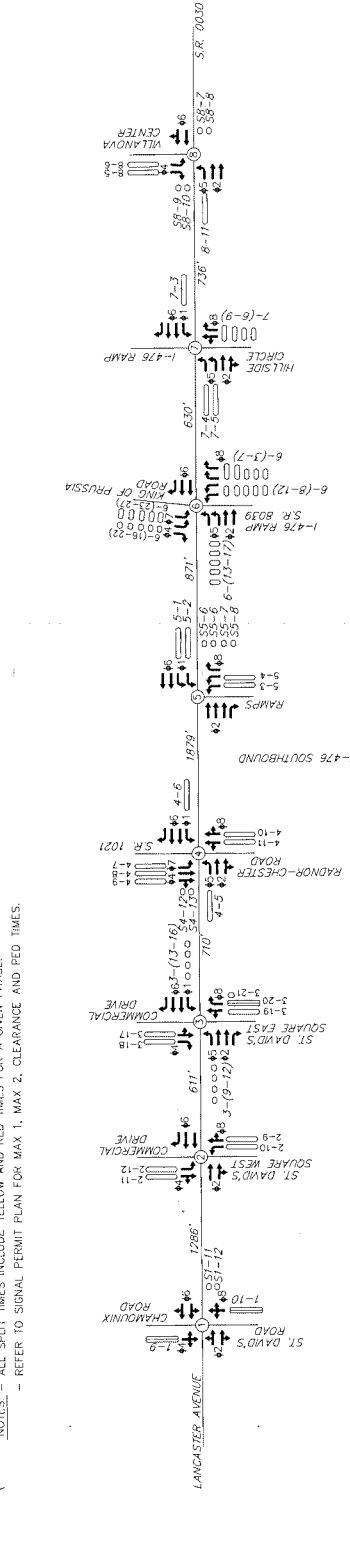
THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS IT IS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL ACT UPON PRECAUTION OF DAMAGE TO UNDERGROUND UTILITIES EFFECTIVE DATE MARCH 29, 2007.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED INSTALLATION SHALL 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.

CONCRETE INSTALLED IN BERMHOUSING ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED AND JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH FEDERAL SPECIFICATIONS TO 800-8600 SERIES.

- ### SYSTEM NOTES
- PROGRAM TO BE SELECTED BY CLOSED LOOP SYSTEM (TIME OF DAY) OR TBC BACKUP.
  - OFFSETS ARE REFERENCED TO THE BEGINNING OF YELLOW ON LANCASTER AVENUE.
  - SYSTEM LIMITS : LANCASTER AVENUE (8 INTERSECTIONS) FROM ST. DAVID'S RD TO VILLANOVA CENTER.
  - PRIMARY COORDINATION: FIBER OPTIC CABLE.
  - SECONDARY COORDINATION: TBC (DEFAULT TO BACKUP TBC).



### CYCLE/SPLIT/OFFSET

Program 1 = Intersections

Intersections	File #	Master	1	2	3	4	5	6	7	8	Cycle	Offset
LANCASTER AVE & ST. DAVID'S/CHAMOUNIX RD	0981	Master	56	24	24	36	20	60	20	24	60	20
LANCASTER AVE & ST. DAVID'S SQUARE WEST	0062	Master	82	38	38	82	35	120	43	35	120	43
LANCASTER AVE & ST. DAVID'S SQUARE EAST	0062	Master	68	39	39	65	120	39	120	39	120	35
LANCASTER AVE & RADNOR-CHESTER RD	0063	Master	54	52	52	14 (LEAD)	54	13 (LEAD)	54	13 (LEAD)	54	22
LANCASTER AVE & 1-476 SOUTHBOUND RAMP	2530	Master	42	48 (LEAD)	48 (LEAD)	20 (LEAD)	58	52	110	52	110	65
LANCASTER AVE & 1-476 RAMP/HILLSIDE CIRCLE	2531	Master	86	25	25	17 (LEAD)	68	12	110	12	110	76
LANCASTER AVE & VILLANOVA CENTER	3416	Master	85	25	25	13 (LEAD)	58	12	96	12	96	66

### CYCLE/SPLIT/OFFSET

Program 2 = Intersections

Intersections	File #	Master	1	2	3	4	5	6	7	8	Cycle	Offset
LANCASTER AVE & ST. DAVID'S/CHAMOUNIX RD	0981	Master	72	38	38	72	110	15	12	38	110	15
LANCASTER AVE & ST. DAVID'S SQUARE WEST	0062	Master	67	43	43	67	110	5	12	43	110	5
LANCASTER AVE & ST. DAVID'S SQUARE EAST	0062	Master	46	25 (LEAD)	25 (LEAD)	33	110	5	12	33	110	5
LANCASTER AVE & RADNOR-CHESTER RD	0063	Master	39	52	52	23 (LEAD)	35	13 (LEAD)	35	13 (LEAD)	35	110
LANCASTER AVE & 1-476 SOUTHBOUND RAMP	2530	Master	28	28 (LEAD)	28 (LEAD)	36	96	6.3	5	30	96	6.3
LANCASTER AVE & 1-476 RAMP/HILLSIDE CIRCLE	2531	Master	50	24 (LEAD)	24 (LEAD)	18 (LEAD)	32	2.4 (LEAD)	22	2.4 (LEAD)	32	96
LANCASTER AVE & VILLANOVA CENTER	3416	Master	72	28	28	13 (LEAD)	58	1.5	8	12	96	1.5

### CYCLE/SPLIT/OFFSET

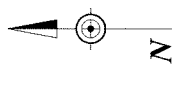
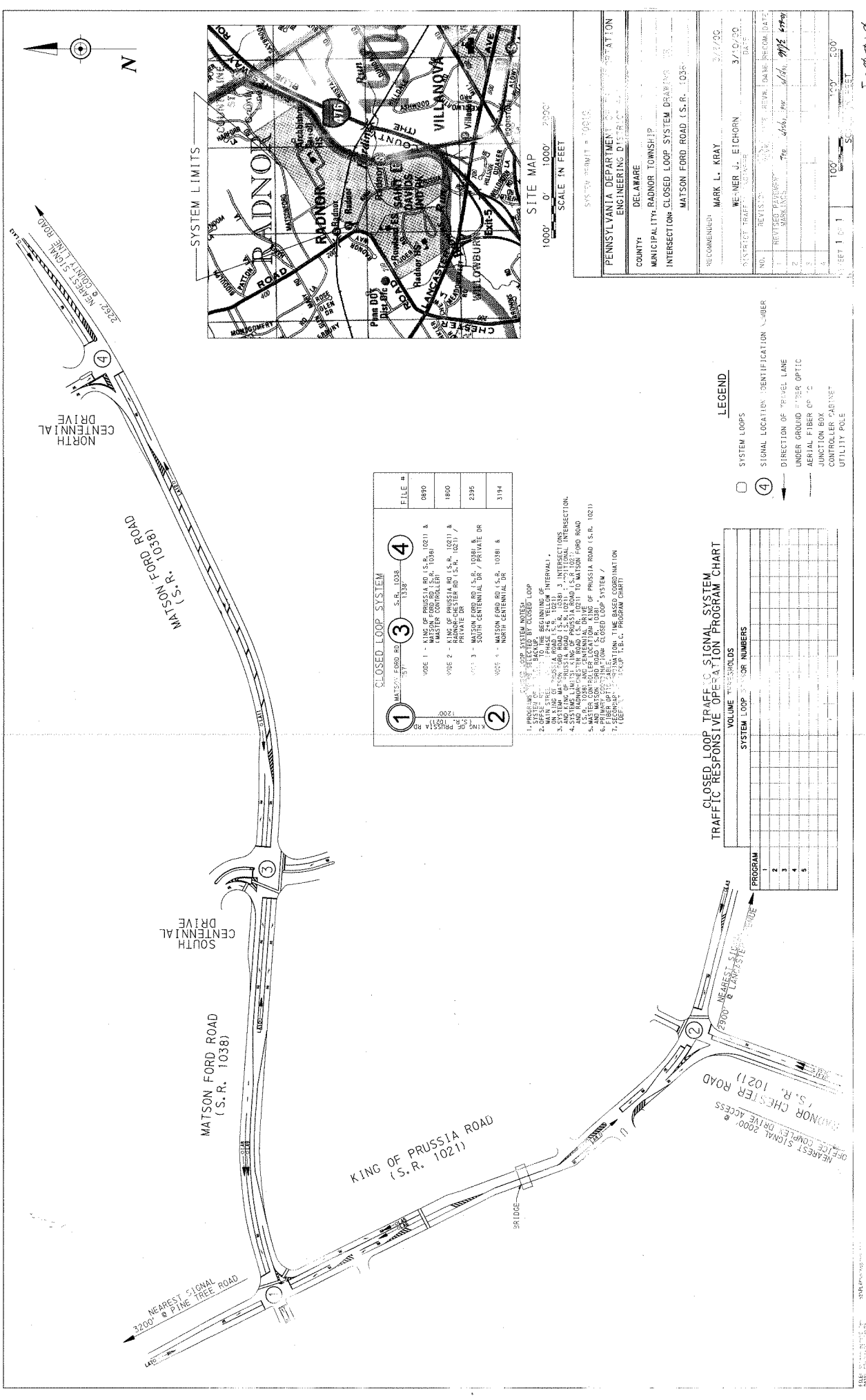
Program 3 = Intersections

Intersections	File #	Master	1	2	3	4	5	6	7	8	Cycle	Offset
LANCASTER AVE & ST. DAVID'S/CHAMOUNIX RD	0981	Master	71	29	29	71	100	66	6	29	100	66
LANCASTER AVE & ST. DAVID'S SQUARE WEST	0062	Master	67	33	33	67	100	12	4	33	100	12
LANCASTER AVE & ST. DAVID'S SQUARE EAST	0062	Master	45	16 (LEAD)	16 (LEAD)	48	100	12	4	16 (LEAD)	100	12
LANCASTER AVE & RADNOR-CHESTER RD	0063	Master	35	52	52	14 (LEAD)	75	0	0	13 (LEAD)	75	0
LANCASTER AVE & 1-476 SOUTHBOUND RAMP	2530	Master	58	29 (LEAD)	29 (LEAD)	40	110	88	2.3	35	110	51
LANCASTER AVE & 1-476 RAMP/HILLSIDE CIRCLE	2531	Master	86	12 (LEAD)	12 (LEAD)	40	99	8.8	1.7	23	110	8.8
LANCASTER AVE & VILLANOVA CENTER	3416	Master	85	25	25	13 (LEAD)	72	8.3	1.7	12	110	8.3

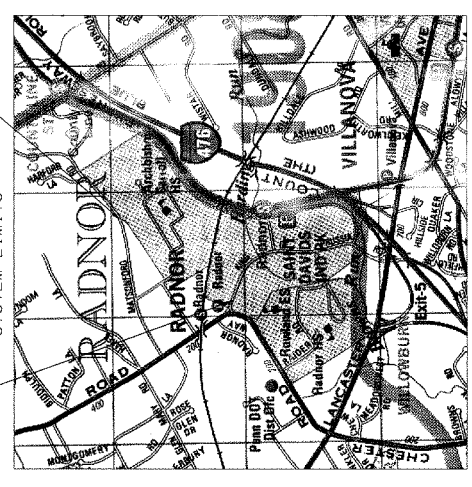
### LEGEND

- SYSTEM DETECTOR - LOOP NO. Y
- INTERSECTION X - LOOP NO. Y
- DETECTOR, INTERSECTION X - LOOP NO. Y
- PHASE

SCALE: NOT TO SCALE



SYSTEM LIMITS



1000' 0' 1000' 2000'  
SCALE IN FEET

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION	
COUNTY	DELAWARE
MUNICIPALITY	RADNOR TOWNSHIP
INTERSECTION	CLOSED LOOP SYSTEM DRAWING
	MATSON FORD ROAD (S.R. 1038)
RECOMMENDED BY	MARK L. KRAY
DATE	3/17/90
DESIGNED BY	WEINER J. ETCHORN
DATE	3/10/90
NO.	1
REVISION	REVISED FOR THE PRELIM. DATE
2	REVISIONS
3	REVISIONS
4	REVISIONS
5	REVISIONS
6	REVISIONS
7	REVISIONS
8	REVISIONS
9	REVISIONS
10	REVISIONS
11	REVISIONS
12	REVISIONS
13	REVISIONS
14	REVISIONS
15	REVISIONS
16	REVISIONS
17	REVISIONS
18	REVISIONS
19	REVISIONS
20	REVISIONS
21	REVISIONS
22	REVISIONS
23	REVISIONS
24	REVISIONS
25	REVISIONS
26	REVISIONS
27	REVISIONS
28	REVISIONS
29	REVISIONS
30	REVISIONS
31	REVISIONS
32	REVISIONS
33	REVISIONS
34	REVISIONS
35	REVISIONS
36	REVISIONS
37	REVISIONS
38	REVISIONS
39	REVISIONS
40	REVISIONS
41	REVISIONS
42	REVISIONS
43	REVISIONS
44	REVISIONS
45	REVISIONS
46	REVISIONS
47	REVISIONS
48	REVISIONS
49	REVISIONS
50	REVISIONS
51	REVISIONS
52	REVISIONS
53	REVISIONS
54	REVISIONS
55	REVISIONS
56	REVISIONS
57	REVISIONS
58	REVISIONS
59	REVISIONS
60	REVISIONS
61	REVISIONS
62	REVISIONS
63	REVISIONS
64	REVISIONS
65	REVISIONS
66	REVISIONS
67	REVISIONS
68	REVISIONS
69	REVISIONS
70	REVISIONS
71	REVISIONS
72	REVISIONS
73	REVISIONS
74	REVISIONS
75	REVISIONS
76	REVISIONS
77	REVISIONS
78	REVISIONS
79	REVISIONS
80	REVISIONS
81	REVISIONS
82	REVISIONS
83	REVISIONS
84	REVISIONS
85	REVISIONS
86	REVISIONS
87	REVISIONS
88	REVISIONS
89	REVISIONS
90	REVISIONS
91	REVISIONS
92	REVISIONS
93	REVISIONS
94	REVISIONS
95	REVISIONS
96	REVISIONS
97	REVISIONS
98	REVISIONS
99	REVISIONS
100	REVISIONS

FILE #	DESCRIPTION
0890	1 - MATSON FORD RD (S.R. 1038) & KING OF PRUSSIA RD (S.R. 1021) & PRIVATE TR
1800	2 - MATSON FORD RD (S.R. 1038) & PRIVATE TR
2385	3 - MATSON FORD RD (S.R. 1038) & PRIVATE TR
3194	4 - MATSON FORD RD (S.R. 1038) & NORTH CENTENNIAL TR

**CLOSED LOOP SYSTEM**

1 - PROGRAMS TO BE SELECTED BY CLOSED LOOP

2 - OPERATIONAL

3 - MAIN STREET

4 - MAIN STREET

5 - MAIN STREET

6 - MAIN STREET

7 - MAIN STREET

8 - MAIN STREET

9 - MAIN STREET

10 - MAIN STREET

11 - MAIN STREET

12 - MAIN STREET

13 - MAIN STREET

14 - MAIN STREET

15 - MAIN STREET

16 - MAIN STREET

17 - MAIN STREET

18 - MAIN STREET

19 - MAIN STREET

20 - MAIN STREET

21 - MAIN STREET

22 - MAIN STREET

23 - MAIN STREET

24 - MAIN STREET

25 - MAIN STREET

26 - MAIN STREET

27 - MAIN STREET

28 - MAIN STREET

29 - MAIN STREET

30 - MAIN STREET

31 - MAIN STREET

32 - MAIN STREET

33 - MAIN STREET

34 - MAIN STREET

35 - MAIN STREET

36 - MAIN STREET

37 - MAIN STREET

38 - MAIN STREET

39 - MAIN STREET

40 - MAIN STREET

41 - MAIN STREET

42 - MAIN STREET

43 - MAIN STREET

44 - MAIN STREET

45 - MAIN STREET

46 - MAIN STREET

47 - MAIN STREET

48 - MAIN STREET

49 - MAIN STREET

50 - MAIN STREET

51 - MAIN STREET

52 - MAIN STREET

53 - MAIN STREET

54 - MAIN STREET

55 - MAIN STREET

56 - MAIN STREET

57 - MAIN STREET

58 - MAIN STREET

59 - MAIN STREET

60 - MAIN STREET

61 - MAIN STREET

62 - MAIN STREET

63 - MAIN STREET

64 - MAIN STREET

65 - MAIN STREET

66 - MAIN STREET

67 - MAIN STREET

68 - MAIN STREET

69 - MAIN STREET

70 - MAIN STREET

71 - MAIN STREET

72 - MAIN STREET

73 - MAIN STREET

74 - MAIN STREET

75 - MAIN STREET

76 - MAIN STREET

77 - MAIN STREET

78 - MAIN STREET

79 - MAIN STREET

80 - MAIN STREET

81 - MAIN STREET

82 - MAIN STREET

83 - MAIN STREET

84 - MAIN STREET

85 - MAIN STREET

86 - MAIN STREET

87 - MAIN STREET

88 - MAIN STREET

89 - MAIN STREET

90 - MAIN STREET

91 - MAIN STREET

92 - MAIN STREET

93 - MAIN STREET

94 - MAIN STREET

95 - MAIN STREET

96 - MAIN STREET

97 - MAIN STREET

98 - MAIN STREET

99 - MAIN STREET

100 - MAIN STREET

**LEGEND**

○ SYSTEM LOOPS

④ SIGNAL LOCATION IDENTIFICATION NUMBER

→ DIRECTION OF TRAVEL LANE

— UNDERGROUND FIBER OPTIC

— AERIAL FIBER OPTIC

— JUNCTION BOX

— CONTROLLER PASTURE

— UTILITY POLE

**CLOSED LOOP TRAFFIC RESPONSIVE OPERATION PROGRAM CHART**

PROGRAM	VOLUME	PERIODS	SYSTEM LOOP	FOR NUMBERS
1				
2				
3				
4				
5				

DATE: 3/17/90

DRAWN BY: [Name]

SCALE: 1" = 100'

PROJECT: [Project Name]

SHEET: 1 OF 1

I-10-10

# GENERAL NOTES

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

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, REMOVAL OF OBSTRUCTIONS, AND REPAIRS TO THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE TO BE INSTALLED IN ACCORDANCE WITH THE SIGNAL AND PAVEMENT MAINTENANCE MANUAL, PUBLISHED BY THE DEPARTMENT OF TRANSPORTATION, AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS AND SUPPORT POLES TO BE SET BACK FROM THE EDGE OF THE SHOULDER EQUIVALENT TO THE CLEARANCE HORIZONTALLY OF 2 FEET. 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 HAVE 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 DEVICES SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PERMITTEE.

CURSING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

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

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLETES WITH THE PROVISIONS OF THE UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS WHICH IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS SHALL BE SUBMITTED TO THE DISTRICT TRAFFIC ENGINEER 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, IN ACCORDANCE WITH STATE SPECIFICATIONS 10-8000 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION  
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE

MUNICIPALITY: RAONOR TOWNSHIP

INTERSECTION: LANCASTER AVENUE (S.R. 0030) & KING OF PRUSSIA ROAD/476 RAMP (S.R. 8039)

REVIEWED: \_\_\_\_\_ DATE: \_\_\_\_\_

DESIGNED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

RECOMMENDED BY: PAUL LUTZ

DATE: 11/24/08

LOUIS R. BELMONT, P.E.

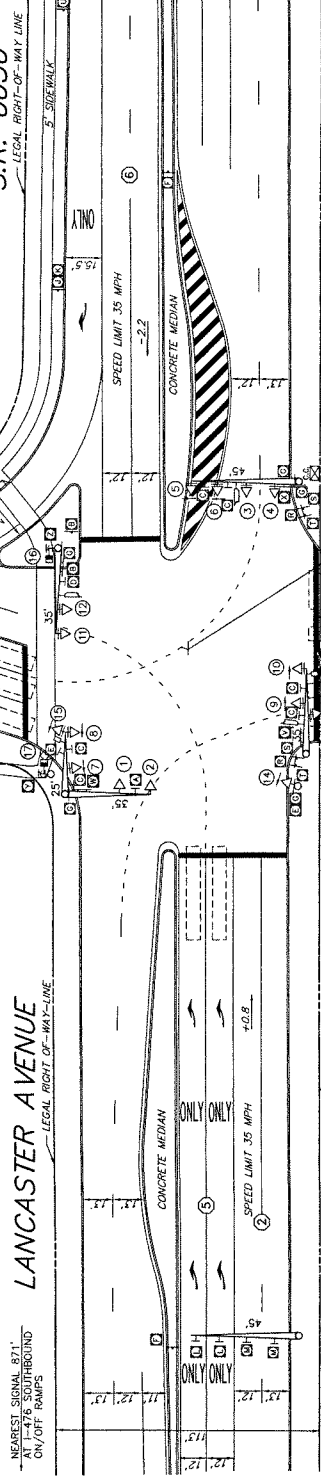
NO.	REVISION	DATE	BY	CHKD.	DATE	BY	CHKD.
1	AS-BUILT DRAWING	11/27/12	ML	ML	11/27/12	ML	ML
2							
3							
4							
5							
6							
7							
8							
9							

SYSTEM PERMIT #-0071

SHEET 2 OF 3 PERMIT # 63-2530 FILE # 2530

PLAN SYMBOL NUMBER	SIZE	REMARKS
1	25X38	NO TURNS
2	24X24	RIGHT TURN
3	24X24	LEFT TURN
4	30X36	NO TURN ON RED
5	30X36	RIGHT TURN SIGNAL
6	30X36	RIGHT TURN SIGNAL
7	30X36	RIGHT TURN SIGNAL
8	30X36	RIGHT TURN SIGNAL
9	30X36	RIGHT TURN SIGNAL
10	30X36	RIGHT TURN SIGNAL
11	30X36	RIGHT TURN SIGNAL
12	30X36	RIGHT TURN SIGNAL
13	30X36	RIGHT TURN SIGNAL
14	30X36	RIGHT TURN SIGNAL
15	30X36	RIGHT TURN SIGNAL
16	30X36	RIGHT TURN SIGNAL
17	30X36	RIGHT TURN SIGNAL
18	30X36	RIGHT TURN SIGNAL
19	30X36	RIGHT TURN SIGNAL
20	30X36	RIGHT TURN SIGNAL
21	30X36	RIGHT TURN SIGNAL
22	30X36	RIGHT TURN SIGNAL
23	30X36	RIGHT TURN SIGNAL
24	30X36	RIGHT TURN SIGNAL
25	30X36	RIGHT TURN SIGNAL
26	30X36	RIGHT TURN SIGNAL
27	30X36	RIGHT TURN SIGNAL
28	30X36	RIGHT TURN SIGNAL
29	30X36	RIGHT TURN SIGNAL
30	30X36	RIGHT TURN SIGNAL
31	30X36	RIGHT TURN SIGNAL
32	30X36	RIGHT TURN SIGNAL
33	30X36	RIGHT TURN SIGNAL
34	30X36	RIGHT TURN SIGNAL
35	30X36	RIGHT TURN SIGNAL
36	30X36	RIGHT TURN SIGNAL
37	30X36	RIGHT TURN SIGNAL
38	30X36	RIGHT TURN SIGNAL
39	30X36	RIGHT TURN SIGNAL
40	30X36	RIGHT TURN SIGNAL
41	30X36	RIGHT TURN SIGNAL
42	30X36	RIGHT TURN SIGNAL
43	30X36	RIGHT TURN SIGNAL
44	30X36	RIGHT TURN SIGNAL
45	30X36	RIGHT TURN SIGNAL
46	30X36	RIGHT TURN SIGNAL
47	30X36	RIGHT TURN SIGNAL
48	30X36	RIGHT TURN SIGNAL
49	30X36	RIGHT TURN SIGNAL
50	30X36	RIGHT TURN SIGNAL
51	30X36	RIGHT TURN SIGNAL
52	30X36	RIGHT TURN SIGNAL
53	30X36	RIGHT TURN SIGNAL
54	30X36	RIGHT TURN SIGNAL
55	30X36	RIGHT TURN SIGNAL
56	30X36	RIGHT TURN SIGNAL
57	30X36	RIGHT TURN SIGNAL
58	30X36	RIGHT TURN SIGNAL
59	30X36	RIGHT TURN SIGNAL
60	30X36	RIGHT TURN SIGNAL
61	30X36	RIGHT TURN SIGNAL
62	30X36	RIGHT TURN SIGNAL
63	30X36	RIGHT TURN SIGNAL
64	30X36	RIGHT TURN SIGNAL
65	30X36	RIGHT TURN SIGNAL
66	30X36	RIGHT TURN SIGNAL
67	30X36	RIGHT TURN SIGNAL
68	30X36	RIGHT TURN SIGNAL
69	30X36	RIGHT TURN SIGNAL
70	30X36	RIGHT TURN SIGNAL
71	30X36	RIGHT TURN SIGNAL
72	30X36	RIGHT TURN SIGNAL
73	30X36	RIGHT TURN SIGNAL
74	30X36	RIGHT TURN SIGNAL
75	30X36	RIGHT TURN SIGNAL
76	30X36	RIGHT TURN SIGNAL
77	30X36	RIGHT TURN SIGNAL
78	30X36	RIGHT TURN SIGNAL
79	30X36	RIGHT TURN SIGNAL
80	30X36	RIGHT TURN SIGNAL
81	30X36	RIGHT TURN SIGNAL
82	30X36	RIGHT TURN SIGNAL
83	30X36	RIGHT TURN SIGNAL
84	30X36	RIGHT TURN SIGNAL
85	30X36	RIGHT TURN SIGNAL
86	30X36	RIGHT TURN SIGNAL
87	30X36	RIGHT TURN SIGNAL
88	30X36	RIGHT TURN SIGNAL
89	30X36	RIGHT TURN SIGNAL
90	30X36	RIGHT TURN SIGNAL
91	30X36	RIGHT TURN SIGNAL
92	30X36	RIGHT TURN SIGNAL
93	30X36	RIGHT TURN SIGNAL
94	30X36	RIGHT TURN SIGNAL
95	30X36	RIGHT TURN SIGNAL
96	30X36	RIGHT TURN SIGNAL
97	30X36	RIGHT TURN SIGNAL
98	30X36	RIGHT TURN SIGNAL
99	30X36	RIGHT TURN SIGNAL
100	30X36	RIGHT TURN SIGNAL

S.R. 0030  
LEGAL RIGHT-OF-WAY LINE



OPERATION NOTES:  
 1. G IF FOLLOWED BY 2+5  
 2. G IF FOLLOWED BY 3+6  
 3. G IF FOLLOWED BY 4+7  
 4. G IF FOLLOWED BY 4+8  
 5. G IF FOLLOWED BY 2+5 OR 4+8  
 6. G IF FOLLOWED BY 2+5  
 7. G IF FOLLOWED BY 2+6

SIGNAL INDICATIONS  
 12" LENS 12" LENS 12" LENS 11" SYMBOLS  
 16.17  
 14.15, 5.6, 7.3, 10.15, 4.11, 2

NEAREST SIGNAL 650' AT 1276 1/2' HILLSIDE LANE/ HILLSIDE CIRCLE

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

LEGAL RIGHT-OF-WAY LINE FOR LIMITED ACCESS

PHASE	INTERVAL	2+5	3+7	3+8	4+7	4+8
1	15	1	1	1	1	1
2	15	1	1	1	1	1
3	15	1	1	1	1	1
4	15	1	1	1	1	1
5	15	1	1	1	1	1
6	15	1	1	1	1	1
7	15	1	1	1	1	1
8	15	1	1	1	1	1
9	15	1	1	1	1	1
10	15	1	1	1	1	1
11	15	1	1	1	1	1
12	15	1	1	1	1	1
13	15	1	1	1	1	1
14	15	1	1	1	1	1
15	15	1	1	1	1	1
16	15	1	1	1	1	1
17	15	1	1	1	1	1
18	15	1	1	1	1	1
19	15	1	1	1	1	1
20	15	1	1	1	1	1
21	15	1	1	1	1	1
22	15	1	1	1	1	1
23	15	1	1	1	1	1
24	15	1	1	1	1	1
25	15	1	1	1	1	1
26	15	1	1	1	1	1
27	15	1	1	1	1	1
28	15	1	1	1	1	1
29	15	1	1	1	1	1
30	15	1	1	1	1	1
31	15	1	1	1	1	1
32	15	1	1	1	1	1
33	15	1	1	1	1	1
34	15	1	1	1	1	1
35	15	1	1	1	1	1
36	15	1	1	1	1	1
37	15	1	1	1	1	1
38	15	1	1	1	1	1
39	15	1	1	1	1	1
40	15	1	1	1	1	1
41	15	1	1	1	1	1
42	15	1	1	1	1	1
43	15	1	1	1	1	1
44	15	1	1	1	1	1
45	15	1	1	1	1	1
46	15	1	1	1	1	1
47	15	1	1	1	1	1
48	15	1	1	1	1	1
49	15	1	1	1	1	1
50	15	1	1	1	1	1
51	15	1	1	1	1	1
52	15	1	1	1	1	1
53	15	1	1	1	1	1
54	15	1	1	1	1	1
55	15	1	1	1	1	1
56	15	1	1	1	1	1
57	15	1	1	1	1	1
58	15	1	1	1	1	1
59	15	1	1	1	1	1
60	15	1	1	1	1	1
61	15	1	1	1	1	1
62	15	1	1	1	1	1
63	15	1	1	1	1	1
64	15	1	1	1	1	1
65	15	1	1	1	1	1
66	15	1	1	1	1	1
67	15	1	1	1	1	1
68	15	1	1	1	1	1
69	15	1	1	1	1	1
70	15	1	1	1	1	1
71	15	1	1	1	1	1
72	15	1	1	1	1	1
73	15	1	1	1	1	1
74	15	1	1	1	1	1
75	15	1	1	1	1	1
76	15	1	1	1	1	1
77	15	1	1	1	1	1
78	15	1	1	1	1	1
79	15	1	1	1	1	1
80	15	1	1	1	1	1
81	15	1	1	1	1	1
82	15	1	1	1	1	1
83	15	1	1	1	1	1
84	15	1	1	1	1	1
85	15	1	1	1	1	1
86	15	1	1	1	1	1
87	15	1	1	1	1	1
88	15	1	1	1	1	1
89	15	1	1	1	1	1
90	15	1	1	1	1	1
91	15	1	1	1	1	1
92	15	1	1	1	1	1
93	15	1	1	1	1	1
94	15	1	1	1	1	1
95	15	1	1	1	1	1
96	15	1	1	1	1	1
97	15	1	1	1	1	1
98	15	1	1	1	1	1
99	15	1	1	1	1	1
100	15	1	1	1	1	1

NEAREST SIGNAL 871' AT 476 SOUTHBOUND ON/OFF RAMP

LANCASTER AVENUE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

LEGAL RIGHT-OF-WAY LINE

**GENERAL NOTES**

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

ALL MAINTENANCE WORK INCLUDING REPAIRS TO THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND FAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION 11-1.111. POST MOUNTED SIGNALS SHALL BE INSTALLED ON THE SIGNAL MAST. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALITY OF 2 FEET. SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM CLEARANCE HORIZONTALITY OF 14 FEET. 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 SIGNAL SHALL BE 10 FEET.

EXACT LOCATION OF SIGNALS SHALL BE DETERMINED PRIOR TO INSTALLATION OF THE SIGNALS BY REPRESENTATIVE OF PERMITTEE.

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

WORK TO INSTALL THIS INSTALLATION SHALL CONSENT WITH THE SIGNALS 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 IT IS APPROVED BY THE DEPARTMENT OF TRANSPORTATION LATEST AMENDMENT TO ACT 267, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST BE IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REQUIRING EXCAVATION. CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 6 INCHES DEEP SHALL BE PROTECTED BY A CONCRETE CURB OR PACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8600 SERIES.

**SYSTEM PERMIT # 0071**

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION  
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE

MUNICIPALITY: RAONOR TOWNSHIP

INTERSECTION: LANCASTER AVENUE (S.R. 0030) & KING OF PRUSSIA RD / -476 RAMP (S.R. 8039)

REVISIONS:

NO.	DATE	BY	REASON
1	AS-BUILT DRAWING	MM	1/5/2012
2			
3			
4			
5			
6			
7			
8			

RECOMMENDED:

DATE: 11/24/08

PAUL LUITZ

DATE: 11/24/08

LOUIS R. BELMONTÉ, P.E.

DATE: 11/24/08

LOUIS R. BELMONTÉ, P.E.

DATE: 11/24/08

LOUIS R. BELMONTÉ, P.E.

DATE: 11/24/08

LOUIS R. BELMONTÉ, P.E.

DATE: 11/24/08

LOUIS R. BELMONTÉ, P.E.

DATE: 11/24/08

LOUIS R. BELMONTÉ, P.E.

DATE: 11/24/08

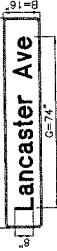
LOUIS R. BELMONTÉ, P.E.

DATE: 11/24/08

**SIGN DETAILS**  
NOT TO SCALE

FONT: CLEARVIEW ONE

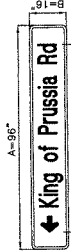
A=50'



SIGN IY

8" UPPER CASE

6" LOWER CASE

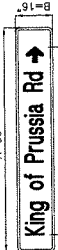


A=96'

SIGN IY

8" UPPER CASE

6" LOWER CASE



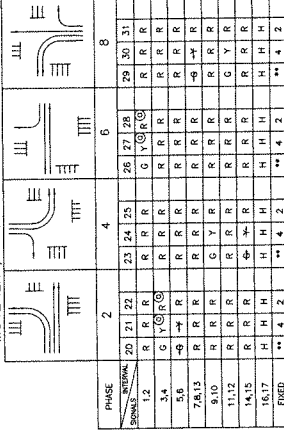
A=96'

SIGN IY

8" UPPER CASE

6" LOWER CASE

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



•• 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.

⊙ G WHEN RETURNING TO NORMAL OPERATION

**EMERGENCY PRE-EMPTION NOTES:**

- CONTROLLED TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE SOUTHBOUND APPROACH OF KING OF PRUSSIA ROAD AND THE NORTHBOUND APPROACH OF THE I-476 RAMP AND THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVE WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND OPERATION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE RED CLEARANCE INTERVALS, ACCORDINGLY, THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE RED CLEARANCE INTERVALS, ACCORDINGLY, THEN THE GREEN INTERVAL OF THE PRE-EMPTED PHASE SHALL FOLLOW.
- IF SIGNAL HAS BEEN COVERED BY PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN RED AND FOLLOWED BY THE "RED HAND" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE GOING INTO EMERGENCY PRE-EMPTION.
- 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, 6 OR 8 IN RETURNING TO NORMAL OPERATION PHASE 2, 4, 6 INTERVAL 4 SHALL FOLLOW.
- NORMAL GREEN PHASE PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED.
- PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.









# APPENDIX C

Traffic Count and Gap Data

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Northbound Left from Major**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps	
7:00 AM	6	2	4	4	3	3	2	3	2	2	0	2	2	0	11	38	285	323
7:15 AM	24	9	1	5	2	0	3	4	0	0	1	1	1	1	9	37	233	270
7:30 AM	19	6	3	3	2	3	4	4	0	0	1	0	0	1	7	34	236	270
7:45 AM	7	1	4	5	3	3	3	1	2	2	0	0	2	10	36	269	305	
8:00 AM	8	3	4	4	3	2	5	2	2	2	2	2	2	8	39	264	303	
8:15 AM	7	4	1	2	0	4	2	1	3	4	0	0	2	12	36	289	325	
8:30 AM	10	4	2	0	2	2	2	2	0	3	2	2	2	9	30	309	339	
8:45 AM	11	6	4	2	6	2	2	2	4	2	0	1	3	9	43	268	311	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	56	14	11	8	7	5	1	1	2	1	1	0	1	0	51	108	159	
4:15 PM	42	15	10	5	5	3	1	2	1	2	1	1	1	2	48	133	181	
4:30 PM	68	17	15	5	6	1	0	0	0	0	2	1	0	0	47	67	114	
4:45 PM	73	19	14	6	6	2	3	1	1	0	0	0	1	1	51	95	146	
5:00 PM	88	13	8	4	2	1	1	0	0	1	0	0	0	0	28	32	60	
5:15 PM	81	17	4	2	1	4	1	2	0	0	3	0	0	0	30	63	93	
5:30 PM	84	25	18	5	0	2	1	3	1	0	0	0	0	0	54	58	112	
5:45 PM	50	21	17	10	2	3	1	1	3	0	0	0	0	2	53	103	156	
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AM Peak	58	19	12	17	10	8	15	11	4	4	4	1	5	6	146	1002	1148	
PM Peak	303	76	47	21	5	10	4	6	4	4	1	3	0	0	165	256	421	

**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Southbound Left from Major**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps	
7:00 AM	44	9	9	2	3	2	3	2	1	2	1	1	3	0	5	41	166	207
7:15 AM	84	14	11	3	1	2	0	0	0	2	0	0	0	0	2	37	88	125
7:30 AM	95	5	8	3	0	2	1	0	0	0	0	0	0	0	1	19	38	57
7:45 AM	108	15	4	2	1	1	0	0	1	0	0	0	1	0	0	25	28	53
8:00 AM	107	16	5	3	2	0	0	2	1	0	0	0	0	1	1	30	41	71
8:15 AM	107	16	4	1	2	1	1	0	1	0	0	0	0	0	0	25	25	50
8:30 AM	90	16	5	4	3	0	2	0	2	0	0	1	0	1	34	71	105	
8:45 AM	76	15	5	2	4	3	2	2	1	0	0	0	0	0	34	71	105	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	7	10	9	2	2	6	1	2	1	3	2	5	5	54	240	294	
4:15 PM	14	9	5	8	3	2	5	1	1	2	4	1	1	7	49	239	288	
4:30 PM	26	5	4	5	5	3	1	2	0	2	0	0	0	12	39	261	300	
4:45 PM	18	11	8	4	4	0	0	2	2	2	2	1	1	10	46	237	283	
5:00 PM	12	3	5	1	2	3	5	4	3	3	3	1	0	7	38	285	323	
5:15 PM	17	5	4	1	3	5	2	2	1	2	5	1	1	7	38	260	298	
5:30 PM	9	5	7	6	2	3	3	3	3	3	3	1	3	7	48	262	310	
5:45 PM	12	8	5	7	5	2	4	2	0	1	2	1	3	7	47	249	296	
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	394	50	28	11	4	5	1	2	5	2	0	0	1	4	111	195	306	
PM Peak	50	21	21	15	12	13	14	11	7	9	11	3	8	28	171	1056	1227	

**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Eastbound Right from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps
7:00 AM	6	2	4	4	3	3	2	3	4	2	0	2	2	11	36	162	198
7:15 AM	24	9	1	5	2	0	3	4	4	0	1	1	1	9	28	132	160
7:30 AM	19	6	3	3	2	3	4	4	4	0	0	0	1	7	28	134	162
7:45 AM	7	1	4	5	3	3	3	1	1	2	0	2	2	10	35	151	186
8:00 AM	8	3	4	4	3	2	5	2	2	2	2	2	2	8	36	146	182
8:15 AM	7	4	1	2	0	4	2	1	1	3	4	2	1	12	32	166	198
8:30 AM	10	4	2	0	2	2	2	2	2	0	3	2	0	9	26	183	209
8:45 AM	11	6	4	2	6	2	2	2	4	2	0	1	3	9	37	150	187
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	56	14	11	8	7	5	1	1	2	1	1	0	1	0	38	44	82
4:15 PM	42	15	10	5	5	3	1	2	1	2	1	1	1	2	34	64	98
4:30 PM	68	17	15	5	6	1	0	0	0	0	2	1	0	0	28	25	53
4:45 PM	73	19	14	6	6	2	3	1	1	0	0	0	1	1	34	37	71
5:00 PM	88	13	8	4	2	1	1	0	0	1	0	0	0	0	17	9	26
5:15 PM	81	17	4	2	1	4	1	2	0	0	3	0	0	0	16	29	45
5:30 PM	84	25	18	5	0	2	1	3	1	0	0	0	0	0	29	18	47
5:45 PM	50	21	17	10	2	3	1	1	1	3	0	0	0	2	37	42	79
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	58	19	12	17	10	8	15	11	4	4	4	1	5	6	127	563	690
PM Peak	303	76	47	21	5	10	4	6	4	4	1	3	0	2	99	98	197

**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Westbound Right from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps	
7:00 AM	44	9	11	2	3	2	3	2	2	1	2	1	0	0	5	33	86	119
7:15 AM	84	14	11	3	1	2	0	0	0	3	2	0	0	2	24	41	41	65
7:30 AM	95	5	8	3	0	2	1	0	0	0	0	0	0	1	15	15	15	30
7:45 AM	108	15	4	2	1	1	0	0	1	1	0	0	1	0	10	12	12	22
8:00 AM	107	16	5	3	2	0	0	2	1	0	0	0	0	1	13	19	19	32
8:15 AM	107	16	4	1	2	1	1	0	1	0	0	0	0	0	9	9	9	18
8:30 AM	90	16	5	4	3	0	2	0	2	0	0	1	0	1	17	32	32	49
8:45 AM	76	15	5	2	4	3	2	2	1	0	0	2	0	0	19	31	31	50
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	7	10	9	2	2	6	1	2	1	1	3	2	5	46	125	125	171
4:15 PM	14	9	5	8	3	2	5	1	1	2	4	1	1	7	39	130	130	169
4:30 PM	26	5	4	5	5	3	1	2	0	2	0	0	0	12	34	148	148	182
4:45 PM	18	11	8	4	4	0	0	2	2	2	2	1	1	10	36	130	130	166
5:00 PM	12	3	5	1	2	3	5	4	3	3	3	1	0	7	34	164	164	198
5:15 PM	17	5	4	1	3	5	2	2	1	2	5	1	1	7	34	146	146	180
5:30 PM	9	5	7	6	2	3	3	3	3	3	3	3	3	7	42	139	139	181
5:45 PM	12	8	5	7	5	2	4	2	2	1	2	1	3	7	37	137	137	174
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	394	50	28	11	4	5	1	2	5	2	2	0	1	4	62	87	87	149
PM Peak	50	21	21	15	12	13	14	11	7	9	11	3	8	28	147	586	586	733



Study Name King of Prussia Rd/Septa Driveway  
 Start Date 04/27/2016  
 Start Time 7:00 AM

Through Traffic on Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (6.5 sec)	Follow-up Gaps (4.0 sec)	Total Gaps	
7:00 AM	41	13	11	7	7	6	1	1	1	3	1	0	0	0	2	35	35	70
7:15 AM	88	13	4	1	2	1	2	0	0	0	1	0	0	0	1	12	12	24
7:30 AM	92	7	6	1	1	1	0	0	0	0	0	0	0	0	0	8	2	10
7:45 AM	102	9	3	3	0	0	0	0	0	0	0	0	1	0	5	8	4	9
8:00 AM	97	10	4	2	1	1	0	1	1	1	0	0	0	0	0	8	6	14
8:15 AM	100	14	2	1	0	1	1	1	0	0	0	0	0	0	6	6	5	11
8:30 AM	100	19	5	3	0	0	2	0	2	1	0	0	0	0	10	13	13	23
8:45 AM	82	17	5	3	4	3	0	0	1	1	1	0	0	0	15	16	16	31
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	70	16	13	9	5	2	0	2	0	0	0	0	0	0	30	10	40	40
4:15 PM	56	21	12	6	3	3	4	1	2	0	0	0	0	0	26	18	44	44
4:30 PM	79	13	13	2	3	1	0	0	0	1	1	0	0	0	20	10	30	30
4:45 PM	92	21	14	5	2	0	1	1	0	0	0	0	1	1	22	15	37	37
5:00 PM	69	14	6	3	2	1	2	0	0	0	0	0	0	0	13	6	19	19
5:15 PM	87	14	5	3	1	4	2	1	0	0	0	0	0	0	13	11	24	24
5:30 PM	95	20	14	4	3	1	0	2	0	0	0	0	0	0	20	8	28	28
5:45 PM	60	18	17	7	3	2	2	0	2	1	0	0	0	0	29	17	46	46
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	379	39	17	7	4	3	2	1	1	1	1	0	0	1	33	24	57	57
PM Peak	311	66	42	17	9	8	6	3	2	1	1	0	0	0	75	42	117	117

**Study Name King of Prussia Rd/Septa Driveway**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Left from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 31.6	Critical Gaps (7.1 sec)	Follow-up Gaps (3.5 sec)	Total Gaps
7:00 AM	41	13	11	7	7	6	1	1	3	1	0	0	0	2	31	40	71
7:15 AM	88	13	4	1	2	1	2	0	0	1	0	0	0	1	10	15	25
7:30 AM	92	7	6	1	1	1	0	0	0	0	0	0	0	0	7	2	9
7:45 AM	102	9	3	3	0	0	0	0	0	0	0	0	1	0	5	5	10
8:00 AM	97	10	4	2	1	1	0	1	1	0	0	0	0	0	8	7	15
8:15 AM	100	14	2	1	0	1	1	1	0	0	0	0	0	0	4	5	9
8:30 AM	100	19	5	3	0	0	2	0	2	1	0	0	0	0	9	14	23
8:45 AM	82	17	5	3	4	3	0	0	1	1	1	0	0	0	13	17	30
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	70	16	13	9	5	2	0	2	0	0	0	0	0	0	24	10	34
4:15 PM	56	21	12	6	3	3	4	1	2	0	0	0	0	0	21	20	41
4:30 PM	79	13	13	2	3	1	0	0	1	1	1	0	0	0	16	12	28
4:45 PM	92	21	14	5	2	0	1	1	0	0	0	0	1	1	15	16	31
5:00 PM	69	14	6	3	2	1	2	0	0	0	0	0	0	0	7	18	24
5:15 PM	87	14	5	3	1	4	2	1	0	0	0	0	0	0	12	12	24
5:30 PM	95	20	14	4	3	1	0	2	0	0	0	0	0	0	15	8	23
5:45 PM	60	18	17	7	3	2	2	0	2	1	0	0	0	0	23	16	39
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	379	39	17	7	4	3	2	1	1	1	0	0	1	1	30	29	59
PM Peak	311	66	42	17	9	8	6	3	2	1	0	0	0	0	61	43	104

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Northbound Left from Major**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps	
7:00 AM	4	3	2	6	4	1	1	2	1	2	0	0	0	1	11	34	308	342
7:15 AM	17	10	9	5	6	3	3	1	0	1	0	0	0	1	9	47	237	284
7:30 AM	10	8	3	0	3	2	2	0	0	1	0	0	0	1	12	34	279	313
7:45 AM	9	0	3	5	2	2	4	0	0	3	1	2	0	0	9	31	282	313
8:00 AM	10	2	2	5	3	4	3	4	2	0	0	0	0	3	11	39	289	328
8:15 AM	4	3	4	2	1	3	0	3	2	2	3	0	0	4	10	34	283	317
8:30 AM	6	3	3	1	3	0	3	2	2	2	2	0	1	10	31	310	341	
8:45 AM	12	6	1	4	2	5	1	4	5	0	1	1	1	9	40	276	316	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	55	16	10	12	4	5	3	1	1	0	2	1	1	0	0	53	103	156
4:15 PM	30	19	10	5	5	2	1	2	1	1	2	2	1	2	52	135	187	
4:30 PM	56	12	13	4	2	1	3	0	0	1	0	2	0	2	39	102	141	
4:45 PM	35	10	13	8	6	4	1	3	0	0	0	0	1	0	48	117	165	
5:00 PM	73	16	4	3	2	1	0	0	0	0	0	1	0	0	27	26	53	
5:15 PM	65	14	5	1	1	3	2	1	1	2	1	0	0	1	30	70	100	
5:30 PM	69	24	13	9	1	3	0	3	0	0	0	0	0	0	52	53	105	
5:45 PM	57	23	13	6	5	1	1	3	2	0	0	0	0	2	54	92	146	
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	46	20	17	15	14	11	10	4	10	3	2	0	0	5	41	151	1087	1238
PM Peak	264	77	35	19	9	8	3	7	3	2	1	1	0	3	163	241	404	

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Southbound Left from Major**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps	
7:00 AM	50	11	5	2	6	1	2	0	0	4	0	0	0	1	3	37	117	154
7:15 AM	86	8	9	3	0	1	0	0	0	0	0	0	0	0	0	21	40	40
7:30 AM	114	4	1	1	0	2	0	0	0	0	0	0	0	0	0	8	11	19
7:45 AM	127	13	2	0	1	0	0	0	0	1	0	0	0	0	16	16	10	26
8:00 AM	102	10	5	6	3	1	1	1	0	1	0	0	0	1	27	27	54	81
8:15 AM	96	12	5	2	3	1	2	0	1	0	0	1	1	1	26	26	55	81
8:30 AM	85	12	7	5	4	2	1	1	3	0	0	1	1	1	36	36	95	131
8:45 AM	72	10	8	5	2	2	2	1	3	1	1	0	1	1	36	36	94	130
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	14	7	4	2	3	4	2	1	3	3	1	4	5	52	52	219	271
4:15 PM	19	1	6	2	1	4	4	9	3	0	0	1	1	7	39	259	288	288
4:30 PM	30	9	6	5	2	2	2	2	1	1	1	3	0	8	41	221	262	262
4:45 PM	20	6	6	3	1	3	4	1	3	3	1	0	0	9	40	230	270	270
5:00 PM	14	5	5	1	8	1	3	5	3	5	1	0	1	6	43	245	288	288
5:15 PM	22	5	4	3	6	3	4	2	0	3	3	2	1	6	42	246	288	288
5:30 PM	16	8	5	1	3	2	5	2	3	2	2	3	1	5	42	219	261	261
5:45 PM	17	9	8	2	5	2	3	3	1	2	4	1	0	6	46	223	269	269
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	429	35	17	10	4	4	1	1	0	2	0	0	0	1	72	94	166	166
PM Peak	69	27	22	7	22	8	15	12	7	12	10	6	3	23	173	933	1106	1106

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Eastbound Right from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps
7:00 AM	4	3	2	6	4	1	1	2	1	2	0	0	1	11	30	182	212
7:15 AM	17	10	9	5	6	3	3	1	0	1	0	0	1	9	37	131	168
7:30 AM	10	8	3	0	3	2	2	0	0	1	0	0	1	12	26	166	192
7:45 AM	9	0	3	5	2	2	4	0	0	3	2	0	0	9	30	165	195
8:00 AM	10	2	2	5	3	4	3	4	2	0	0	0	3	11	37	162	199
8:15 AM	4	3	4	2	1	3	0	3	2	2	3	0	4	10	32	165	197
8:30 AM	6	3	3	1	3	0	3	2	2	2	2	0	1	10	29	185	214
8:45 AM	12	6	1	4	2	5	1	4	5	0	1	1	1	9	33	160	193
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	55	16	10	12	4	5	3	1	1	0	2	1	0	0	36	39	75
4:15 PM	30	19	10	5	5	2	1	2	1	1	2	1	1	2	33	63	96
4:30 PM	56	12	13	4	2	1	3	0	0	1	0	2	0	2	28	47	75
4:45 PM	35	10	13	8	6	4	1	3	0	0	0	0	0	2	36	50	86
5:00 PM	73	16	4	3	2	1	0	0	0	0	0	1	0	0	10	9	19
5:15 PM	65	14	5	1	1	3	2	1	1	2	1	0	0	1	17	33	50
5:30 PM	69	24	13	9	1	3	0	3	0	0	0	0	0	0	27	17	44
5:45 PM	57	23	13	6	5	1	1	3	2	0	0	0	0	2	31	38	69
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	46	20	17	15	14	11	10	4	10	3	2	0	5	41	130	624	754
PM Peak	264	77	35	19	9	8	3	7	3	2	1	1	0	3	85	97	182

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Westbound Right from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps	
7:00 AM	50	11	5	2	6	1	2	0	0	2	4	0	0	1	3	24	61	85
7:15 AM	86	8	9	3	0	1	0	0	0	0	0	0	0	0	0	13	3	16
7:30 AM	114	4	1	1	0	2	0	0	0	0	0	0	0	0	0	4	4	8
7:45 AM	127	13	2	0	1	0	0	0	0	1	1	0	0	0	0	4	5	9
8:00 AM	102	10	5	6	3	1	1	1	0	0	1	0	0	1	18	18	24	42
8:15 AM	96	12	5	2	3	1	2	0	1	0	0	1	1	1	16	16	24	40
8:30 AM	85	12	7	5	4	2	1	1	3	0	0	1	1	1	26	26	44	70
8:45 AM	72	10	8	5	2	2	2	1	3	1	1	0	1	1	26	26	44	70
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	16	14	7	4	2	3	4	2	1	3	3	3	1	4	38	38	118	156
9:30 AM	19	1	6	2	1	4	4	9	3	0	0	1	1	7	38	38	142	180
9:45 AM	30	9	6	5	2	2	2	2	1	1	1	3	0	8	33	33	123	156
10:00 AM	20	6	6	3	1	3	4	1	3	3	3	1	0	9	33	33	126	159
10:15 AM	14	5	5	1	8	1	3	5	3	5	5	1	0	6	38	38	136	174
10:30 AM	22	5	4	3	6	3	4	2	0	3	3	3	2	6	36	36	135	171
10:45 AM	16	8	5	1	3	2	5	2	3	2	2	3	1	5	34	34	118	152
11:00 AM	17	9	8	2	5	2	3	3	3	1	2	4	1	6	36	36	121	157
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	429	35	17	10	4	4	1	1	0	2	2	0	0	1	39	39	36	75
PM Peak	69	27	22	7	22	8	15	12	7	12	10	6	3	23	144	144	510	654

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Through Traffic on Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (6.5 sec)	Follow-up Gaps (4.0 sec)	Total Gaps	
7:00 AM	48	17	6	2	6	0	4	2	1	2	0	0	0	1	1	24	34	58
7:15 AM	77	7	6	2	0	0	0	0	0	0	0	0	0	0	0	7	0	7
7:30 AM	102	3	3	1	0	1	0	0	0	0	0	0	0	0	0	3	1	4
7:45 AM	108	12	1	1	0	0	0	0	1	0	0	0	0	0	0	2	3	5
8:00 AM	94	11	6	7	1	1	0	0	1	1	0	0	0	0	15	8	23	
8:15 AM	90	13	6	2	2	2	1	0	0	0	1	0	1	0	14	13	27	
8:30 AM	93	13	6	6	7	2	2	0	0	0	0	0	0	1	21	15	36	
8:45 AM	79	15	7	9	3	0	1	3	0	0	2	0	0	0	25	17	42	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00 PM	62	23	9	9	1	2	3	0	0	1	1	0	0	0	19	15	34	
4:15 PM	43	18	10	5	7	7	2	2	0	1	0	0	0	0	30	21	51	
4:30 PM	66	16	12	4	3	0	1	0	0	0	1	0	0	1	18	10	28	
4:45 PM	47	16	12	3	4	2	2	0	1	0	1	0	0	1	21	22	43	
5:00 PM	63	11	3	3	0	1	0	0	0	0	0	1	0	0	5	5	10	
5:15 PM	68	12	3	4	0	2	2	1	0	1	0	0	1	0	13	13	26	
5:30 PM	81	22	9	5	2	0	1	0	0	0	0	0	0	0	13	4	17	
5:45 PM	78	23	11	3	2	2	1	0	1	1	0	0	0	0	18	12	30	
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AM Peak	381	33	16	11	1	2	0	0	2	1	0	0	0	0	27	12	39	
PM Peak	290	68	26	15	4	5	4	1	1	2	0	1	1	0	49	34	83	

**Study Name King of Prussia Rd South Driveway Gap**  
**Start Date 04/27/2016**  
**Start Time 7:00 AM**

**Left from Minor**

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (7.1 sec)	Follow-up Gaps (3.5 sec)	Total Gaps
7:00 AM	48	17	6	2	6	0	4	2	1	2	0	0	0	1	23	39	62
7:15 AM	77	7	6	2	0	0	0	0	0	0	0	0	0	0	4	0	4
7:30 AM	102	3	3	1	0	1	0	0	0	0	0	0	0	0	2	1	3
7:45 AM	108	12	1	1	0	0	0	0	1	0	0	0	0	0	2	3	5
8:00 AM	94	11	6	7	1	1	0	0	0	1	0	0	0	0	13	8	21
8:15 AM	90	13	6	2	2	2	1	0	0	0	1	0	0	0	11	14	25
8:30 AM	93	13	6	6	7	2	2	0	0	0	0	0	0	1	20	15	35
8:45 AM	79	15	7	9	3	0	1	3	0	0	2	0	0	0	19	19	38
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	62	23	9	9	1	2	3	0	0	1	1	0	0	0	18	17	35
9:30 AM	43	18	10	5	7	7	2	2	0	1	0	0	0	0	29	51	22
9:45 AM	66	16	12	4	3	0	1	0	0	0	1	0	0	1	14	12	26
10:00 AM	47	16	12	3	4	2	2	0	1	0	1	0	0	1	15	24	39
10:15 AM	63	11	3	3	0	1	0	0	0	0	0	1	0	0	5	5	10
10:30 AM	68	12	3	4	0	2	2	1	0	1	0	0	1	0	13	16	29
10:45 AM	81	22	9	5	2	0	1	0	0	0	0	0	0	0	9	4	13
11:00 AM	78	23	11	3	2	2	1	0	1	1	0	0	0	0	15	13	28
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	381	33	16	11	1	2	0	0	2	1	0	0	0	0	21	12	33
PM Peak	290	68	26	15	4	5	4	1	1	2	0	1	1	0	42	38	80





www.TSTData.com  
184 Baker Rd

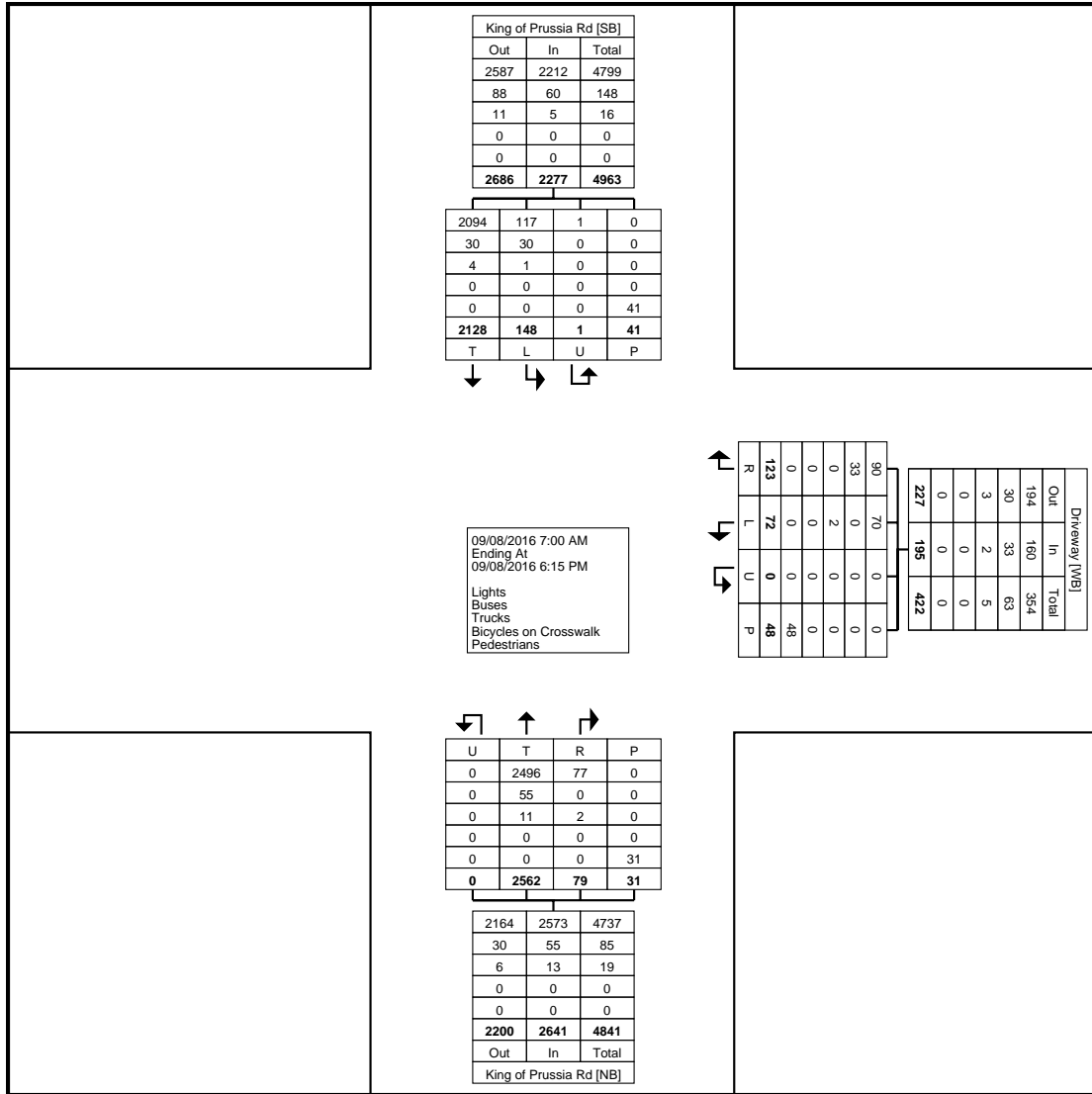
Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Montgomery County, PA  
King of Prussia Rd/Driveway (Septa)  
Thursday, September 8, 2016  
Location: 40.041752, -  
75.355913

Count Name: King of Prussia Rd  
/ Driveway  
Site Code:  
Start Date: 09/08/2016  
Page No: 1

### Turning Movement Data

Start Time	King of Prussia Rd Southbound					Driveway Westbound					King of Prussia Rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	49	13	0	3	62	2	1	0	5	3	5	204	0	2	209	274
7:15 AM	97	13	0	5	110	5	1	0	3	6	12	245	0	0	257	373
7:30 AM	51	14	0	5	65	8	2	0	2	10	11	210	0	0	221	296
7:45 AM	52	14	0	1	66	4	0	0	3	4	13	236	0	2	249	319
Hourly Total	249	54	0	14	303	19	4	0	13	23	41	895	0	4	936	1262
8:00 AM	42	19	0	6	61	9	2	0	2	11	20	242	0	0	262	334
8:15 AM	44	9	0	3	53	5	1	0	1	6	10	246	0	0	256	315
8:30 AM	49	9	0	5	58	5	0	0	2	5	4	224	0	0	228	291
8:45 AM	54	5	0	3	59	3	0	0	1	3	3	263	0	0	266	328
Hourly Total	189	42	0	17	231	22	3	0	6	25	37	975	0	0	1012	1268
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	194	7	0	2	201	11	6	0	1	17	0	94	0	2	94	312
4:15 PM	164	5	0	1	169	9	4	0	0	13	0	89	0	0	89	271
4:30 PM	201	6	0	0	207	16	14	0	17	30	0	98	0	18	98	335
4:45 PM	191	5	0	1	196	5	8	0	3	13	0	77	0	0	77	286
Hourly Total	750	23	0	4	773	41	32	0	21	73	0	358	0	20	358	1204
5:00 PM	285	11	0	5	296	14	21	0	2	35	1	73	0	0	74	405
5:15 PM	221	6	1	0	228	8	5	0	4	13	0	90	0	7	90	331
5:30 PM	227	8	0	1	235	12	7	0	1	19	0	85	0	0	85	339
5:45 PM	207	4	0	0	211	7	0	0	1	7	0	86	0	0	86	304
Hourly Total	940	29	1	6	970	41	33	0	8	74	1	334	0	7	335	1379
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	2128	148	1	41	2277	123	72	0	48	195	79	2562	0	31	2641	5113
Approach %	93.5	6.5	0.0	-	-	63.1	36.9	0.0	-	-	3.0	97.0	0.0	-	-	-
Total %	41.6	2.9	0.0	-	44.5	2.4	1.4	0.0	-	3.8	1.5	50.1	0.0	-	51.7	-
Lights	2094	117	1	-	2212	90	70	0	-	160	77	2496	0	-	2573	4945
% Lights	98.4	79.1	100.0	-	97.1	73.2	97.2	-	-	82.1	97.5	97.4	-	-	97.4	96.7
Buses	30	30	0	-	60	33	0	0	-	33	0	55	0	-	55	148
% Buses	1.4	20.3	0.0	-	2.6	26.8	0.0	-	-	16.9	0.0	2.1	-	-	2.1	2.9
Trucks	4	1	0	-	5	0	2	0	-	2	2	11	0	-	13	20
% Trucks	0.2	0.7	0.0	-	0.2	0.0	2.8	-	-	1.0	2.5	0.4	-	-	0.5	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	41	-	-	-	-	48	-	-	-	-	31	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Turning Movement Data Plot



www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Montgomery County, PA  
King of Prussia Rd/Driveway (Septa)  
Thursday, September 8, 2016  
Location: 40.041752, -  
75.355913

Count Name: King of Prussia Rd / Driveway  
Site Code:  
Start Date: 09/08/2016  
Page No: 3

### Turning Movement Peak Hour Data (7:15 AM)

Start Time	King of Prussia Rd Southbound					Driveway Westbound					King of Prussia Rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:15 AM	97	13	0	5	110	5	1	0	3	6	12	245	0	0	257	373
7:30 AM	51	14	0	5	65	8	2	0	2	10	11	210	0	0	221	296
7:45 AM	52	14	0	1	66	4	0	0	3	4	13	236	0	2	249	319
8:00 AM	42	19	0	6	61	9	2	0	2	11	20	242	0	0	262	334
<b>Total</b>	<b>242</b>	<b>60</b>	<b>0</b>	<b>17</b>	<b>302</b>	<b>26</b>	<b>5</b>	<b>0</b>	<b>10</b>	<b>31</b>	<b>56</b>	<b>933</b>	<b>0</b>	<b>2</b>	<b>989</b>	<b>1322</b>
Approach %	80.1	19.9	0.0	-	-	83.9	16.1	0.0	-	-	5.7	94.3	0.0	-	-	-
Total %	18.3	4.5	0.0	-	22.8	2.0	0.4	0.0	-	2.3	4.2	70.6	0.0	-	74.8	-
PHF	0.624	0.789	0.000	-	0.686	0.722	0.625	0.000	-	0.705	0.700	0.952	0.000	-	0.944	0.886
Lights	231	47	0	-	278	15	5	0	-	20	56	910	0	-	966	1264
% Lights	95.5	78.3	-	-	92.1	57.7	100.0	-	-	64.5	100.0	97.5	-	-	97.7	95.6
Buses	10	12	0	-	22	11	0	0	-	11	0	20	0	-	20	53
% Buses	4.1	20.0	-	-	7.3	42.3	0.0	-	-	35.5	0.0	2.1	-	-	2.0	4.0
Trucks	1	1	0	-	2	0	0	0	-	0	0	3	0	-	3	5
% Trucks	0.4	1.7	-	-	0.7	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	17	-	-	-	-	10	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-





www.TSTData.com  
184 Baker Rd

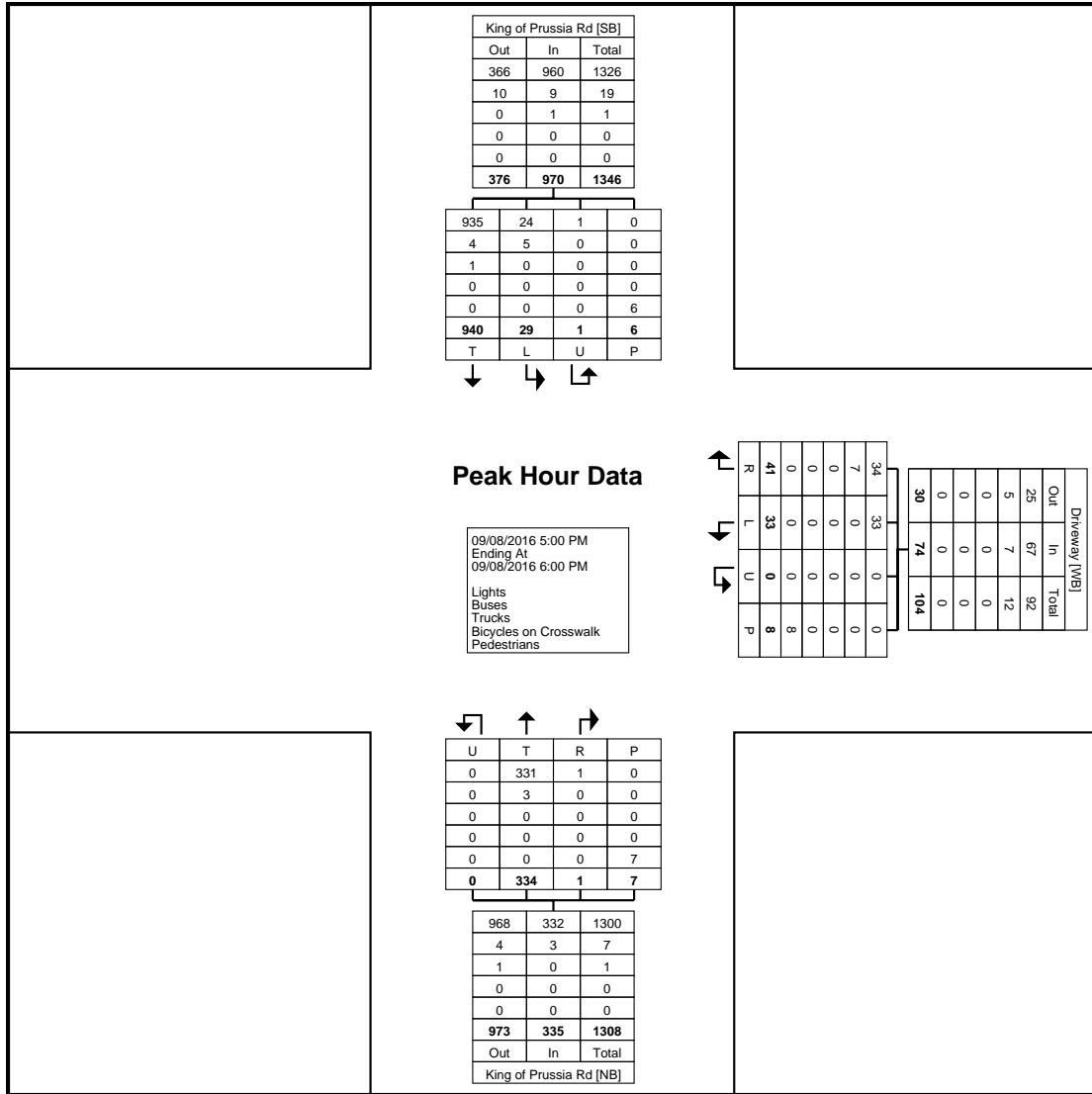
Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Montgomery County, PA  
King of Prussia Rd/Driveway (Septa)  
Thursday, September 8, 2016  
Location: 40.041752, -  
75.355913

Count Name: King of Prussia Rd / Driveway  
Site Code:  
Start Date: 09/08/2016  
Page No: 5

### Turning Movement Peak Hour Data (5:00 PM)

Start Time	King of Prussia Rd Southbound					Driveway Westbound					King of Prussia Rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
5:00 PM	285	11	0	5	296	14	21	0	2	35	1	73	0	0	74	405
5:15 PM	221	6	1	0	228	8	5	0	4	13	0	90	0	7	90	331
5:30 PM	227	8	0	1	235	12	7	0	1	19	0	85	0	0	85	339
5:45 PM	207	4	0	0	211	7	0	0	1	7	0	86	0	0	86	304
<b>Total</b>	<b>940</b>	<b>29</b>	<b>1</b>	<b>6</b>	<b>970</b>	<b>41</b>	<b>33</b>	<b>0</b>	<b>8</b>	<b>74</b>	<b>1</b>	<b>334</b>	<b>0</b>	<b>7</b>	<b>335</b>	<b>1379</b>
<b>Approach %</b>	<b>96.9</b>	<b>3.0</b>	<b>0.1</b>	<b>-</b>	<b>-</b>	<b>55.4</b>	<b>44.6</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>0.3</b>	<b>99.7</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total %</b>	<b>68.2</b>	<b>2.1</b>	<b>0.1</b>	<b>-</b>	<b>70.3</b>	<b>3.0</b>	<b>2.4</b>	<b>0.0</b>	<b>-</b>	<b>5.4</b>	<b>0.1</b>	<b>24.2</b>	<b>0.0</b>	<b>-</b>	<b>24.3</b>	<b>-</b>
<b>PHF</b>	<b>0.825</b>	<b>0.659</b>	<b>0.250</b>	<b>-</b>	<b>0.819</b>	<b>0.732</b>	<b>0.393</b>	<b>0.000</b>	<b>-</b>	<b>0.529</b>	<b>0.250</b>	<b>0.928</b>	<b>0.000</b>	<b>-</b>	<b>0.931</b>	<b>0.851</b>
<b>Lights</b>	<b>935</b>	<b>24</b>	<b>1</b>	<b>-</b>	<b>960</b>	<b>34</b>	<b>33</b>	<b>0</b>	<b>-</b>	<b>67</b>	<b>1</b>	<b>331</b>	<b>0</b>	<b>-</b>	<b>332</b>	<b>1359</b>
<b>% Lights</b>	<b>99.5</b>	<b>82.8</b>	<b>100.0</b>	<b>-</b>	<b>99.0</b>	<b>82.9</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>90.5</b>	<b>100.0</b>	<b>99.1</b>	<b>-</b>	<b>-</b>	<b>99.1</b>	<b>98.5</b>
<b>Buses</b>	<b>4</b>	<b>5</b>	<b>0</b>	<b>-</b>	<b>9</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>7</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>-</b>	<b>3</b>	<b>19</b>
<b>% Buses</b>	<b>0.4</b>	<b>17.2</b>	<b>0.0</b>	<b>-</b>	<b>0.9</b>	<b>17.1</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>9.5</b>	<b>0.0</b>	<b>0.9</b>	<b>-</b>	<b>-</b>	<b>0.9</b>	<b>1.4</b>
<b>Trucks</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0</b>	<b>1</b>
<b>% Trucks</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>-</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>0.1</b>
<b>Bicycles on Crosswalk</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>-</b>
<b>% Bicycles on Crosswalk</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0</b>	<b>-</b>	<b>-</b>
<b>Pedestrians</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>6</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>8</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>7</b>	<b>-</b>	<b>-</b>
<b>% Pedestrians</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>



Turning Movement Peak Hour Data Plot (5:00 PM)



Montgomery County, PA  
 King of Prussia Rd Northern  
 Driveway  
 Wednesday, April 27, 2016  
 Location: 40.0417473175836, -  
 75.3559260070324

www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: King of Prussia  
 Rd/North Driveway  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 1

**Combined Direction**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Total
7:00 AM	41	13	11	7	7	6	1	1	3	1	0	0	0	2	93
7:15 AM	88	13	4	1	2	1	2	0	0	1	0	0	0	1	113
7:30 AM	92	7	6	1	1	1	0	0	0	0	0	0	0	0	108
7:45 AM	102	9	3	3	0	0	0	0	0	0	0	0	1	0	118
8:00 AM	97	10	4	2	1	1	0	1	1	0	0	0	0	0	117
8:15 AM	100	14	2	1	0	1	1	1	0	0	0	0	0	0	120
8:30 AM	100	19	5	3	0	0	2	0	2	1	0	0	0	0	132
8:45 AM	82	17	5	3	4	3	0	0	1	1	1	0	0	0	117
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	70	16	13	9	5	2	0	2	0	0	0	0	0	0	117
4:15 PM	56	21	12	6	3	3	4	1	2	0	0	0	0	0	108
4:30 PM	79	13	13	2	3	1	0	0	0	1	1	0	0	0	113
4:45 PM	92	21	14	5	2	0	1	1	0	0	0	0	1	1	138
5:00 PM	69	14	6	3	2	1	2	0	0	0	0	0	0	0	97
5:15 PM	87	14	5	3	1	4	2	1	0	0	0	0	0	0	117
5:30 PM	95	20	14	4	3	1	0	2	0	0	0	0	0	0	139
5:45 PM	60	18	17	7	3	2	2	0	2	1	0	0	0	0	112
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1310	239	134	60	37	27	17	10	11	6	2	0	2	4	1859
Total %	70.5	12.9	7.2	3.2	2.0	1.5	0.9	0.5	0.6	0.3	0.1	0.0	0.1	0.2	100.0



Montgomery County, PA  
 King of Prussia Rd Northern  
 Driveway  
 Wednesday, April 27, 2016  
 Location: 40.0417473175836, -  
 75.3559260070324

www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: King of Prussia  
 Rd/North Driveway  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 2

**Southbound (Southbound)**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Total
7:00 AM	6	2	4	4	3	3	2	3	2	0	2	2	0	11	44
7:15 AM	24	9	1	5	2	0	3	4	0	1	1	1	1	9	61
7:30 AM	19	6	3	3	2	3	4	4	0	1	0	0	1	7	53
7:45 AM	7	1	4	5	3	3	3	1	2	0	0	2	2	10	43
8:00 AM	8	3	4	4	3	2	5	2	2	2	0	2	2	8	47
8:15 AM	7	4	1	2	0	4	2	1	3	4	0	2	1	12	43
8:30 AM	10	4	2	0	2	2	2	2	0	3	2	2	0	9	40
8:45 AM	11	6	4	2	6	2	2	2	4	2	0	1	3	9	54
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	56	14	11	8	7	5	1	1	2	1	1	0	1	0	108
4:15 PM	42	15	10	5	5	3	1	2	1	2	2	1	1	2	92
4:30 PM	68	17	15	5	6	1	0	0	0	0	2	1	0	0	115
4:45 PM	73	19	14	6	6	2	3	1	1	0	0	0	1	1	127
5:00 PM	88	13	8	4	2	1	1	0	0	1	0	0	0	0	118
5:15 PM	81	17	4	2	1	4	1	2	0	0	3	0	0	0	115
5:30 PM	84	25	18	5	0	2	1	3	1	0	0	0	0	0	139
5:45 PM	50	21	17	10	2	3	1	1	3	0	0	0	0	2	110
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>634</b>	<b>176</b>	<b>120</b>	<b>70</b>	<b>50</b>	<b>40</b>	<b>32</b>	<b>29</b>	<b>21</b>	<b>17</b>	<b>13</b>	<b>14</b>	<b>13</b>	<b>80</b>	<b>1309</b>
<b>Total %</b>	<b>48.4</b>	<b>13.4</b>	<b>9.2</b>	<b>5.3</b>	<b>3.8</b>	<b>3.1</b>	<b>2.4</b>	<b>2.2</b>	<b>1.6</b>	<b>1.3</b>	<b>1.0</b>	<b>1.1</b>	<b>1.0</b>	<b>6.1</b>	<b>100.0</b>





www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Montgomery County, PA  
King of Prussia Rd Northern  
Driveway  
Wednesday, April 27, 2016  
Location: 40.0417473175836, -  
75.3559260070324

Count Name: King of Prussia  
Rd/North Driveway  
Site Code:  
Start Date: 04/27/2016  
Page No: 3

**Northbound (Northbound)**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Total
7:00 AM	44	9	9	2	3	2	3	2	1	2	1	3	0	5	86
7:15 AM	84	14	11	3	1	2	0	0	3	2	0	0	0	2	122
7:30 AM	95	5	8	3	0	2	1	0	0	0	0	0	0	1	115
7:45 AM	108	15	4	2	1	1	0	0	1	0	0	0	1	0	133
8:00 AM	107	16	5	3	2	0	0	2	1	0	0	0	0	1	137
8:15 AM	107	16	4	1	2	1	1	0	1	0	0	0	0	0	133
8:30 AM	90	16	5	4	3	0	2	0	2	0	0	1	0	1	124
8:45 AM	76	15	5	2	4	3	2	2	1	0	0	2	0	0	112
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	7	10	9	2	2	6	1	2	1	3	2	5	5	71
4:15 PM	14	9	5	8	3	2	5	1	1	2	4	1	1	7	63
4:30 PM	26	5	4	5	5	3	1	2	0	2	0	0	0	12	65
4:45 PM	18	11	8	4	4	0	0	2	2	2	2	1	1	10	65
5:00 PM	12	3	5	1	2	3	5	4	3	3	1	0	1	7	50
5:15 PM	17	5	4	1	3	5	2	2	1	2	5	1	1	7	56
5:30 PM	9	5	7	6	2	3	3	3	3	3	3	1	3	7	58
5:45 PM	12	8	5	7	5	2	4	2	0	1	2	1	3	7	59
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>835</b>	<b>159</b>	<b>99</b>	<b>61</b>	<b>42</b>	<b>31</b>	<b>35</b>	<b>23</b>	<b>22</b>	<b>20</b>	<b>21</b>	<b>13</b>	<b>16</b>	<b>72</b>	<b>1449</b>
<b>Total %</b>	<b>57.6</b>	<b>11.0</b>	<b>6.8</b>	<b>4.2</b>	<b>2.9</b>	<b>2.1</b>	<b>2.4</b>	<b>1.6</b>	<b>1.5</b>	<b>1.4</b>	<b>1.4</b>	<b>0.9</b>	<b>1.1</b>	<b>5.0</b>	<b>100.0</b>





www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Count Name: King of Prussia Rd  
South Driveway Gap  
Site Code:  
Start Date: 04/27/2016  
Page No: 1

Montgomery County, PA  
King of Prussia Rd South  
Driveway  
Wednesday, April 27, 2016  
Location: 40.0399194154879, -  
75.3558924794197

**Combined Direction**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Total
7:00 AM	48	17	6	2	6	0	4	2	1	2	0	0	1	1	90
7:15 AM	77	7	6	2	0	0	0	0	0	0	0	0	0	0	92
7:30 AM	102	3	3	1	0	1	0	0	0	0	0	0	0	0	110
7:45 AM	108	12	1	1	0	0	0	0	1	0	0	0	0	0	123
8:00 AM	94	11	6	7	1	1	0	0	1	1	0	0	0	0	122
8:15 AM	90	13	6	2	2	2	1	0	0	0	1	0	1	0	118
8:30 AM	93	13	6	6	7	2	2	0	0	0	0	0	0	1	130
8:45 AM	79	15	7	9	3	0	1	3	0	0	2	0	0	0	119
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	62	23	9	9	1	2	3	0	0	1	1	0	0	0	111
4:15 PM	43	18	10	5	7	7	2	2	0	1	0	0	0	0	95
4:30 PM	66	16	12	4	3	0	1	0	0	0	1	0	0	1	104
4:45 PM	47	16	12	3	4	2	2	0	1	0	1	0	0	1	89
5:00 PM	63	11	3	3	0	1	0	0	0	0	0	1	0	0	82
5:15 PM	68	12	3	4	0	2	2	1	0	1	0	0	1	0	94
5:30 PM	81	22	9	5	2	0	1	0	0	0	0	0	0	0	120
5:45 PM	78	23	11	3	2	2	1	0	1	1	0	0	0	0	122
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1199</b>	<b>232</b>	<b>110</b>	<b>66</b>	<b>38</b>	<b>22</b>	<b>20</b>	<b>8</b>	<b>5</b>	<b>7</b>	<b>6</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>1721</b>
<b>Total %</b>	<b>69.7</b>	<b>13.5</b>	<b>6.4</b>	<b>3.8</b>	<b>2.2</b>	<b>1.3</b>	<b>1.2</b>	<b>0.5</b>	<b>0.3</b>	<b>0.4</b>	<b>0.3</b>	<b>0.1</b>	<b>0.2</b>	<b>0.2</b>	<b>100.0</b>



www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Count Name: King of Prussia Rd  
South Driveway Gap  
Site Code:  
Start Date: 04/27/2016  
Page No: 2

Montgomery County, PA  
King of Prussia Rd South  
Driveway  
Wednesday, April 27, 2016  
Location: 40.0399194154879, -  
75.3558924794197

**Southbound (Southbound)**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Total
7:00 AM	4	3	2	6	4	1	1	2	1	2	0	0	1	11	38
7:15 AM	17	10	9	5	6	3	1	0	3	1	0	0	1	9	65
7:30 AM	10	8	3	0	3	2	2	0	2	1	0	0	1	12	44
7:45 AM	9	0	3	5	2	2	4	0	3	1	2	0	0	9	40
8:00 AM	10	2	2	5	3	4	3	4	2	0	0	0	3	11	49
8:15 AM	4	3	4	2	1	3	0	3	1	2	3	0	4	10	40
8:30 AM	6	3	3	1	3	0	3	2	2	2	2	0	1	10	38
8:45 AM	12	6	1	4	2	5	1	4	5	0	1	1	1	9	52
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	55	16	10	12	4	5	3	1	1	0	2	1	0	0	110
4:15 PM	30	19	10	5	5	2	1	2	1	1	2	2	1	2	83
4:30 PM	56	12	13	4	2	1	3	0	0	1	0	2	0	2	96
4:45 PM	35	10	13	8	6	4	1	3	0	0	0	1	0	2	83
5:00 PM	73	16	4	3	2	1	0	0	0	0	0	1	0	0	100
5:15 PM	65	14	5	1	1	3	2	1	1	2	1	0	0	1	97
5:30 PM	69	24	13	9	1	3	0	3	0	0	0	0	0	0	122
5:45 PM	57	23	13	6	5	1	1	3	2	0	0	0	0	2	113
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	512	169	108	76	50	40	26	28	24	13	13	8	13	90	1170
Total %	43.8	14.4	9.2	6.5	4.3	3.4	2.2	2.4	2.1	1.1	1.1	0.7	1.1	7.7	100.0



www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Count Name: King of Prussia Rd  
South Driveway Gap  
Site Code:  
Start Date: 04/27/2016  
Page No: 3

Montgomery County, PA  
King of Prussia Rd South  
Driveway  
Wednesday, April 27, 2016  
Location: 40.0399194154879, -  
75.3558924794197

**Northbound (Northbound)**

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Total
7:00 AM	50	11	5	2	6	1	2	0	2	4	0	0	1	3	87
7:15 AM	86	8	9	3	0	1	0	0	0	0	0	0	0	0	107
7:30 AM	114	4	1	1	0	2	0	0	0	0	0	0	0	0	122
7:45 AM	127	13	2	0	1	0	0	0	0	1	0	0	0	0	144
8:00 AM	102	10	5	6	3	1	1	1	0	1	0	0	0	1	131
8:15 AM	96	12	5	2	3	1	2	0	1	0	0	1	1	0	124
8:30 AM	85	12	7	5	4	2	1	1	3	0	0	1	1	1	123
8:45 AM	72	10	8	5	2	2	2	1	3	1	1	0	1	1	109
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	14	7	4	2	3	4	2	1	3	3	1	4	5	69
4:15 PM	19	1	6	2	1	4	4	9	3	0	0	1	1	7	58
4:30 PM	30	9	6	5	2	2	2	2	1	1	1	3	0	8	72
4:45 PM	20	6	6	3	1	3	4	1	3	3	1	0	0	9	60
5:00 PM	14	5	5	1	8	1	3	5	3	5	1	0	1	6	58
5:15 PM	22	5	4	3	6	3	4	2	0	3	3	2	1	6	64
5:30 PM	16	8	5	1	3	2	5	2	3	2	2	3	1	5	58
5:45 PM	17	9	8	2	5	2	3	3	1	2	4	1	0	6	63
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>886</b>	<b>137</b>	<b>89</b>	<b>45</b>	<b>47</b>	<b>30</b>	<b>37</b>	<b>29</b>	<b>24</b>	<b>26</b>	<b>16</b>	<b>13</b>	<b>12</b>	<b>58</b>	<b>1449</b>
<b>Total %</b>	<b>61.1</b>	<b>9.5</b>	<b>6.1</b>	<b>3.1</b>	<b>3.2</b>	<b>2.1</b>	<b>2.6</b>	<b>2.0</b>	<b>1.7</b>	<b>1.8</b>	<b>1.1</b>	<b>0.9</b>	<b>0.8</b>	<b>4.0</b>	<b>100.0</b>





www.TSTData.com  
184 Baker Rd

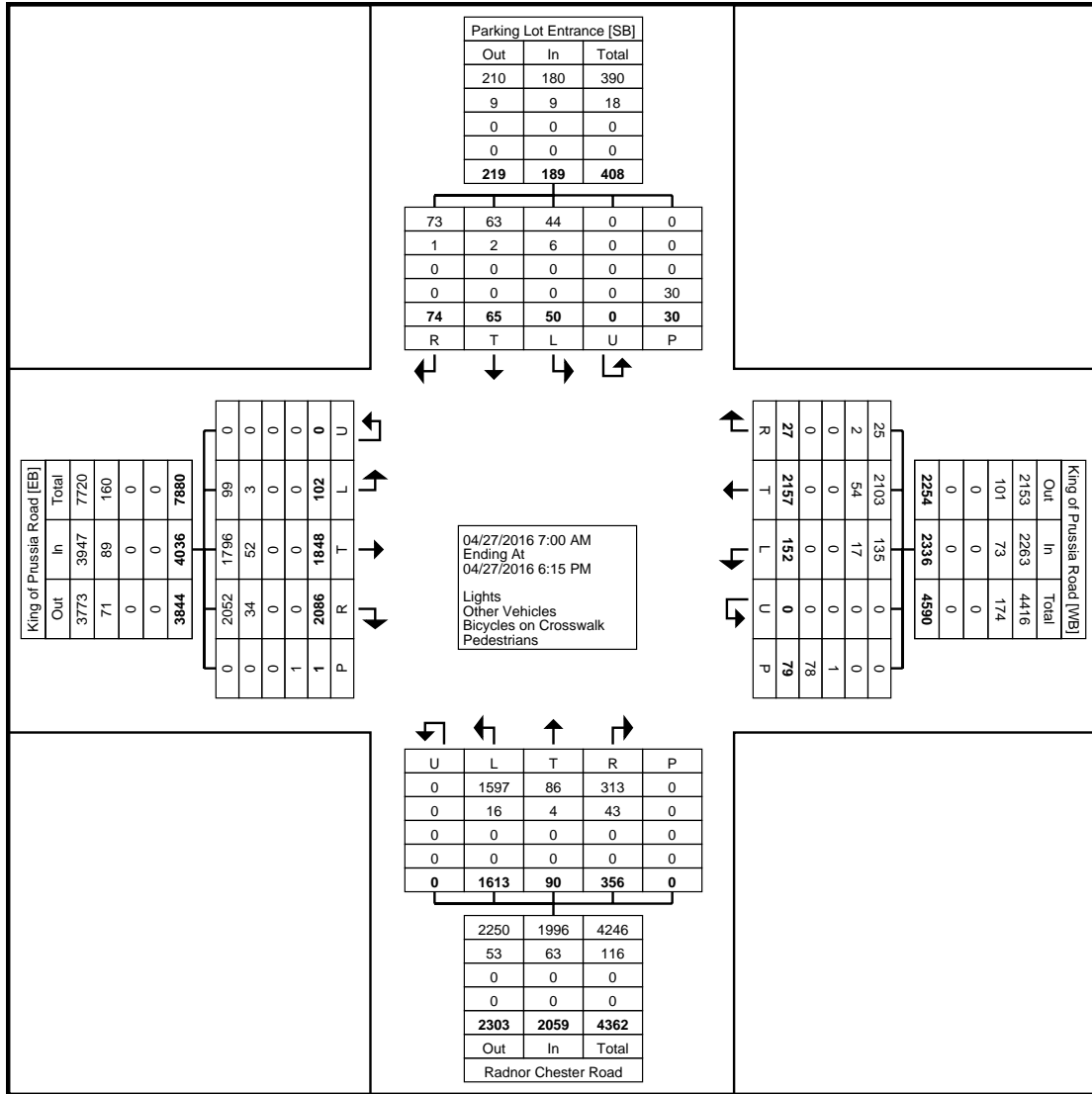
Montgomery County, PA  
Radnor-Chester Rd-King of Prussia Rd  
Wednesday, April 27, 2016  
Location: 40.0436560224454, -75.3591030836105

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Count Name: Radnor Chester Rd/King of Prussia Rd  
Site Code:  
Start Date: 04/27/2016  
Page No: 1

### Turning Movement Data

Start Time	Parking Lot Entrance Southbound							King of Prussia Road Westbound							Radnor Chester Road Northbound							King of Prussia Road Eastbound						Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	0	0	3	0	0	3	3	1	0	149	10	0	4	160	12	1	10	58	0	0	81	69	35	5	0	0	109	353
7:15 AM	1	0	1	0	0	2	2	3	0	193	3	0	15	199	4	8	3	82	0	0	97	101	108	4	0	0	213	511
7:30 AM	2	0	0	0	0	2	2	0	0	204	5	0	2	209	5	7	5	141	0	0	158	102	86	9	0	0	197	566
7:45 AM	1	0	1	0	0	1	2	1	0	206	10	0	6	217	13	3	9	118	0	0	143	138	65	9	0	0	212	574
Hourly Total	4	0	5	0	0	8	9	5	0	752	28	0	27	785	34	19	27	399	0	0	479	410	294	27	0	0	731	2004
8:00 AM	1	0	0	1	0	0	2	2	0	192	5	0	4	199	5	2	6	117	0	0	130	103	57	4	0	0	164	495
8:15 AM	1	1	0	1	0	0	3	4	0	188	5	0	7	197	8	6	12	118	0	0	144	117	51	15	0	0	183	527
8:30 AM	1	1	1	0	0	3	3	5	0	192	11	0	1	208	11	4	12	119	0	0	146	104	54	18	0	0	176	533
8:45 AM	2	0	2	2	0	6	6	9	0	172	9	0	5	190	10	7	13	110	0	0	140	111	67	17	0	0	195	531
Hourly Total	5	2	3	4	0	9	14	20	0	744	30	0	17	794	34	19	43	464	0	0	560	435	229	54	0	0	718	2086
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0	0	2
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0	0	2
4:00 PM	1	2	2	3	0	0	8	0	0	91	11	0	2	102	21	12	0	108	0	0	141	148	142	4	0	0	294	545
4:15 PM	0	1	3	0	0	0	4	0	0	88	10	0	3	98	13	7	4	94	0	0	118	156	147	2	0	0	305	525
4:30 PM	2	4	9	9	0	2	24	0	0	92	13	0	6	105	21	14	5	83	0	0	123	138	161	6	0	0	305	557
4:45 PM	1	5	6	5	0	1	17	0	0	83	11	0	4	94	18	15	2	93	0	0	128	150	160	2	0	0	312	551
Hourly Total	4	12	20	17	0	3	53	0	0	354	45	0	15	399	73	48	11	378	0	0	510	592	610	14	0	0	1216	2178
5:00 PM	18	3	13	14	0	6	48	0	0	73	18	0	10	91	19	8	3	109	0	0	139	145	193	2	0	0	340	618
5:15 PM	8	4	7	7	0	1	26	0	0	85	13	0	1	98	21	19	0	85	0	0	125	168	183	2	0	0	353	602
5:30 PM	5	4	10	5	0	3	24	1	0	76	7	0	7	84	29	8	2	108	0	0	147	191	169	2	0	1	362	617
5:45 PM	2	3	7	3	0	0	15	1	0	73	11	0	2	85	16	8	4	69	0	0	97	144	170	1	0	0	315	512
Hourly Total	33	14	37	29	0	10	113	2	0	307	49	0	20	358	85	43	9	371	0	0	508	648	715	7	0	1	1370	2349
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
Grand Total	46	28	65	50	0	30	189	27	0	2157	152	0	79	2336	227	129	90	1613	0	0	2059	2086	1848	102	0	1	4036	8620
Approach %	24.3	14.8	34.4	26.5	0.0	-	-	1.2	0.0	92.3	6.5	0.0	-	-	11.0	6.3	4.4	78.3	0.0	-	-	51.7	45.8	2.5	0.0	-	-	-
Total %	0.5	0.3	0.8	0.6	0.0	-	2.2	0.3	0.0	25.0	1.8	0.0	-	27.1	2.6	1.5	1.0	18.7	0.0	-	23.9	24.2	21.4	1.2	0.0	-	46.8	-
Lights	46	27	63	44	0	-	180	25	0	2103	135	0	-	2263	197	116	86	1597	0	-	1996	2052	1796	99	0	-	3947	8386
% Lights	100.0	96.4	96.9	88.0	-	-	95.2	92.6	-	97.5	88.8	-	-	96.9	86.8	89.9	95.6	99.0	-	-	96.9	98.4	97.2	97.1	-	-	97.8	97.3
Other Vehicles	0	1	2	6	0	-	9	2	0	54	17	0	-	73	30	13	4	16	0	-	63	34	52	3	0	-	89	234
% Other Vehicles	0.0	3.6	3.1	12.0	-	-	4.8	7.4	-	2.5	11.2	-	-	3.1	13.2	10.1	4.4	1.0	-	-	3.1	1.6	2.8	2.9	-	-	2.2	2.7
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	30	-	-	-	-	-	-	78	-	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	98.7	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Turning Movement Data Plot





www.TSTData.com  
184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
610-466-1469  
Serving Transportation Professionals Since 1995

Montgomery County, PA  
Radnor-Chester Rd-King of Prussia Rd  
Wednesday, April 27, 2016  
Location: 40.0436560224454, -75.3591030836105

Count Name: Radnor Chester Rd/King of Prussia Rd  
Site Code:  
Start Date: 04/27/2016  
Page No: 3

### Turning Movement Peak Hour Data (7:30 AM)

Start Time	Parking Lot Entrance Southbound							King of Prussia Road Westbound							Radnor Chester Road Northbound							King of Prussia Road Eastbound							Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
7:30 AM	2	0	0	0	0	2	2	0	0	204	5	0	2	209	5	7	5	141	0	0	158	102	86	9	0	0	197	566	
7:45 AM	1	0	1	0	0	1	2	1	0	206	10	0	6	217	13	3	9	118	0	0	143	138	65	9	0	0	212	574	
8:00 AM	1	0	0	1	0	0	2	2	0	192	5	0	4	199	5	2	6	117	0	0	130	103	57	4	0	0	164	495	
8:15 AM	1	1	0	1	0	0	3	4	0	188	5	0	7	197	8	6	12	118	0	0	144	117	51	15	0	0	183	527	
<b>Total</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>9</b>	<b>7</b>	<b>0</b>	<b>790</b>	<b>25</b>	<b>0</b>	<b>19</b>	<b>822</b>	<b>31</b>	<b>18</b>	<b>32</b>	<b>494</b>	<b>0</b>	<b>0</b>	<b>575</b>	<b>460</b>	<b>259</b>	<b>37</b>	<b>0</b>	<b>0</b>	<b>756</b>	<b>2162</b>	
Approach %	55.6	11.1	11.1	22.2	0.0	-	-	0.9	0.0	96.1	3.0	0.0	-	-	5.4	3.1	5.6	85.9	0.0	-	-	60.8	34.3	4.9	0.0	-	-	-	
Total %	0.2	0.0	0.0	0.1	0.0	-	0.4	0.3	0.0	36.5	1.2	0.0	-	38.0	1.4	0.8	1.5	22.8	0.0	-	26.6	21.3	12.0	1.7	0.0	-	35.0	-	
PHF	0.625	0.250	0.250	0.500	0.000	-	0.750	0.438	0.000	0.959	0.625	0.000	-	0.947	0.596	0.643	0.667	0.876	0.000	-	0.910	0.833	0.753	0.617	0.000	-	0.892	0.942	
Lights	5	1	1	1	0	-	8	6	0	776	23	0	-	805	28	18	32	490	0	-	568	446	246	37	0	-	729	2110	
% Lights	100.0	100.0	100.0	50.0	-	-	88.9	85.7	-	98.2	92.0	-	-	97.9	90.3	100.0	100.0	99.2	-	-	98.8	97.0	95.0	100.0	-	-	96.4	97.6	
Other Vehicles	0	0	0	1	0	-	1	1	0	14	2	0	-	17	3	0	0	4	0	-	7	14	13	0	0	-	27	52	
% Other Vehicles	0.0	0.0	0.0	50.0	-	-	11.1	14.3	-	1.8	8.0	-	-	2.1	9.7	0.0	0.0	0.8	-	-	1.2	3.0	5.0	0.0	-	-	3.6	2.4	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	-	19	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	





Montgomery County, PA  
 Radnor-Chester Rd-King of Prussia Rd  
 Wednesday, April 27, 2016  
 Location: 40.0436560224454, -75.3591030836105

www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: Radnor Chester Rd/King of Prussia Rd  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 5

### Turning Movement Peak Hour Data (4:45 PM)

Start Time	Parking Lot Entrance Southbound							King of Prussia Road Westbound							Radnor Chester Road Northbound							King of Prussia Road Eastbound							Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
4:45 PM	1	5	6	5	0	1	17	0	0	83	11	0	4	94	18	15	2	93	0	0	128	150	160	2	0	0	312	551	
5:00 PM	18	3	13	14	0	6	48	0	0	73	18	0	10	91	19	8	3	109	0	0	139	145	193	2	0	0	340	618	
5:15 PM	8	4	7	7	0	1	26	0	0	85	13	0	1	98	21	19	0	85	0	0	125	168	183	2	0	0	353	602	
5:30 PM	5	4	10	5	0	3	24	1	0	76	7	0	7	84	29	8	2	108	0	0	147	191	169	2	0	1	362	617	
Total	32	16	36	31	0	11	115	1	0	317	49	0	22	367	87	50	7	395	0	0	539	654	705	8	0	1	1367	2388	
Approach %	27.8	13.9	31.3	27.0	0.0	-	-	0.3	0.0	86.4	13.4	0.0	-	-	16.1	9.3	1.3	73.3	0.0	-	-	47.8	51.6	0.6	0.0	-	-	-	
Total %	1.3	0.7	1.5	1.3	0.0	-	4.8	0.0	0.0	13.3	2.1	0.0	-	15.4	3.6	2.1	0.3	16.5	0.0	-	22.6	27.4	29.5	0.3	0.0	-	57.2	-	
PHF	0.44 4	0.800	0.692	0.554	0.000	-	0.599	0.250	0.000	0.932	0.681	0.000	-	0.936	0.750	0.658	0.583	0.906	0.000	-	0.917	0.856	0.913	1.000	0.000	-	0.944	0.966	
Lights	32	15	35	30	0	-	112	0	0	313	43	0	-	356	84	48	6	393	0	-	531	651	700	8	0	-	1359	2358	
% Lights	100.0	93.8	97.2	96.8	-	-	97.4	0.0	-	98.7	87.8	-	-	97.0	96.6	96.0	85.7	99.5	-	-	98.5	99.5	99.3	100.0	-	-	99.4	98.7	
Other Vehicles	0	1	1	1	0	-	3	1	0	4	6	0	-	11	3	2	1	2	0	-	8	3	5	0	0	-	8	30	
% Other Vehicles	0.0	6.3	2.8	3.2	-	-	2.6	100.0	-	1.3	12.2	-	-	3.0	3.4	4.0	14.3	0.5	-	-	1.5	0.5	0.7	0.0	-	-	0.6	1.3	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	4.5	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	
Pedestrians	-	-	-	-	-	11	-	-	-	-	-	-	21	-	-	-	-	-	-	0	-	-	-	-	-	1	-	-	
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	95.5	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	





Montgomery County, PA  
 Radnor-Chester Rd/Lancaster Ave  
 Wednesday, April 27, 2016  
 Location: 40.0394916465948, -75.3656798601151

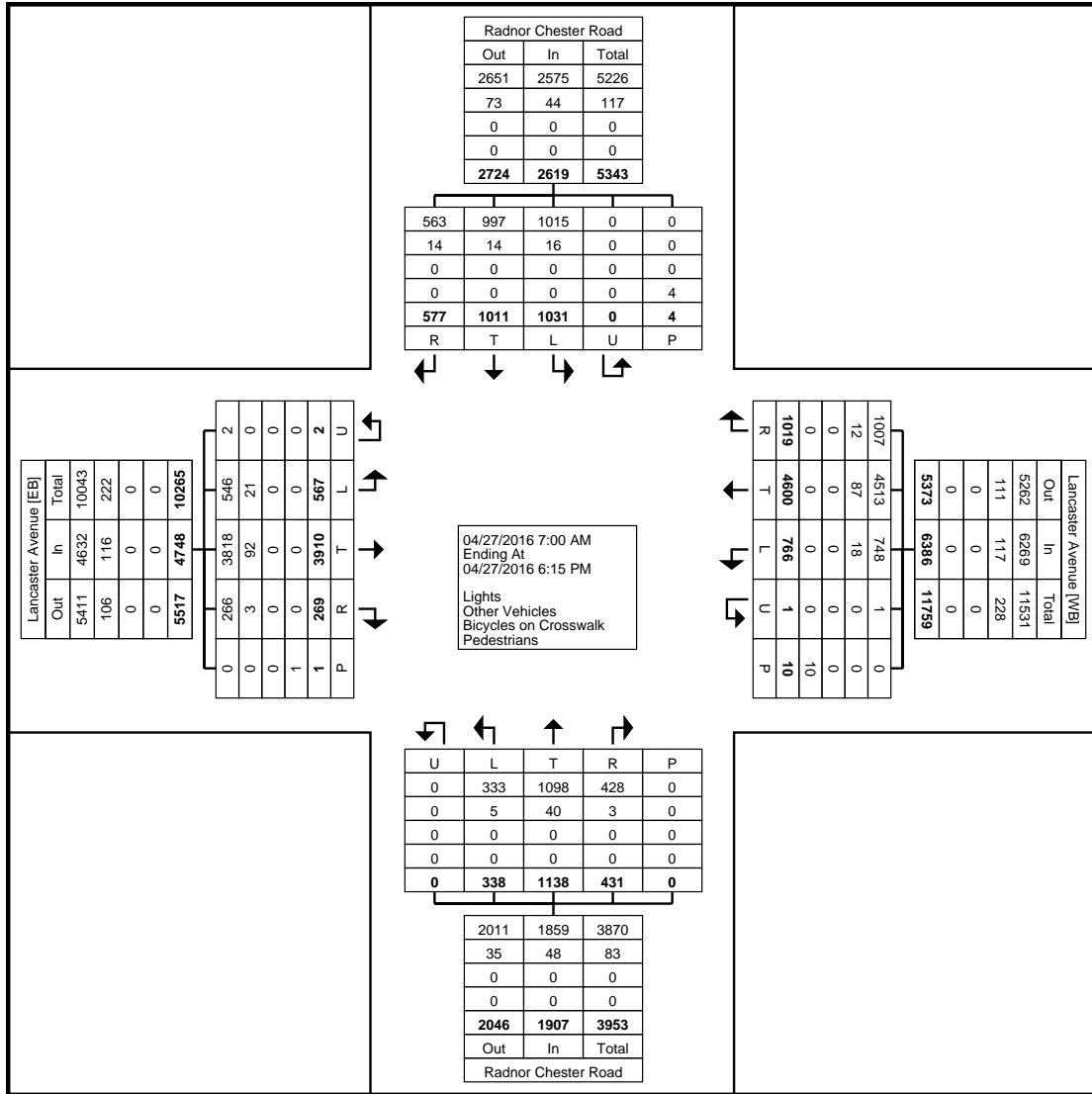
www.TSTData.com  
 184 Baker Rd

Coatesville, Pennsylvania, United States 19320  
 610-466-1469  
 Serving Transportation Professionals Since 1995

Count Name: Radnor Chester Rd/Lancaster Ave  
 Site Code:  
 Start Date: 04/27/2016  
 Page No: 1

### Turning Movement Data

Start Time	Radnor Chester Road Southbound							Lancaster Avenue Westbound							Radnor Chester Road Northbound							Lancaster Avenue Eastbound							Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	11	6	17	42	0	0	76	42	1	211	43	0	4	297	14	0	73	16	0	0	103	8	0	171	41	0	0	220	696
7:15 AM	30	2	40	24	0	0	96	63	0	334	49	0	1	446	16	0	118	10	0	0	144	7	0	247	49	1	0	304	990
7:30 AM	30	2	41	36	0	0	109	89	1	331	56	0	0	477	20	0	118	20	0	0	158	7	1	207	33	0	0	248	992
7:45 AM	28	1	39	27	0	1	95	109	0	378	56	0	0	543	22	0	70	24	0	0	116	17	0	249	33	0	0	299	1053
Hourly Total	99	11	137	129	0	1	376	303	2	1254	204	0	5	1763	72	0	379	70	0	0	521	39	1	874	156	1	0	1071	3731
8:00 AM	22	4	29	13	0	0	68	118	0	338	53	0	0	509	25	1	74	21	0	0	121	18	1	199	36	0	0	254	952
8:15 AM	16	2	21	19	0	0	58	114	0	387	44	0	0	545	14	0	105	26	0	0	145	8	0	234	35	0	0	277	1025
8:30 AM	14	2	27	32	0	0	75	97	0	306	35	0	0	438	23	0	110	34	0	0	167	16	0	195	38	0	0	249	929
8:45 AM	20	4	31	24	0	0	79	130	0	361	48	0	0	539	16	0	82	22	0	0	120	3	0	191	39	0	0	233	971
Hourly Total	72	12	108	88	0	0	280	459	0	1392	180	0	0	2031	78	1	371	103	0	0	553	45	1	819	148	0	0	1013	3877
9:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3
4:00 PM	40	8	66	120	0	0	234	26	1	210	41	0	0	278	43	0	39	21	0	0	103	23	2	272	31	0	0	328	943
4:15 PM	29	7	83	101	0	0	220	37	0	206	44	0	0	287	31	1	52	20	0	0	104	24	0	301	36	0	0	361	972
4:30 PM	42	3	101	103	0	0	249	30	2	210	40	0	0	282	31	2	45	16	0	0	94	21	0	279	37	0	1	337	962
4:45 PM	47	0	102	97	0	0	246	34	0	237	50	0	0	321	32	0	51	24	0	0	107	22	0	286	34	0	0	342	1016
Hourly Total	158	18	352	421	0	0	949	127	3	863	175	0	0	1168	137	3	187	81	0	0	408	90	2	1138	138	0	1	1368	3893
5:00 PM	51	2	122	98	0	1	273	23	0	254	43	0	2	320	48	0	46	24	0	0	118	25	0	299	30	0	0	354	1065
5:15 PM	50	2	118	98	0	1	268	30	0	241	52	0	1	323	35	0	60	12	0	0	107	12	0	279	30	1	0	322	1020
5:30 PM	60	0	99	111	0	1	270	37	0	297	50	1	0	385	24	0	51	20	0	0	95	33	0	270	24	0	0	327	1077
5:45 PM	37	5	75	86	0	0	203	32	3	297	62	0	2	394	33	0	44	28	0	0	105	21	0	230	41	0	0	292	994
Hourly Total	198	9	414	393	0	3	1014	122	3	1089	207	1	5	1422	140	0	201	84	0	0	425	91	0	1078	125	1	0	1295	4156
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Total	527	50	1011	1031	0	4	2619	1011	8	4600	766	1	10	6386	427	4	1138	338	0	0	1907	265	4	3910	567	2	1	4748	15660
Approach %	20.1	1.9	38.6	39.4	0.0	-	-	15.8	0.1	72.0	12.0	0.0	-	-	22.4	0.2	59.7	17.7	0.0	-	-	5.6	0.1	82.4	11.9	0.0	-	-	-
Total %	3.4	0.3	6.5	6.6	0.0	-	16.7	6.5	0.1	29.4	4.9	0.0	-	40.8	2.7	0.0	7.3	2.2	0.0	-	12.2	1.7	0.0	25.0	3.6	0.0	-	30.3	-
Lights	515	48	997	1015	0	-	2575	1000	7	4513	748	1	-	6269	424	4	1098	333	0	-	1859	262	4	3818	546	2	-	4632	15335
% Lights	97.7	96.0	98.6	98.4	-	-	98.3	98.9	87.5	98.1	97.7	100.0	-	98.2	99.3	100.0	96.5	98.5	-	-	97.5	98.9	100.0	97.6	96.3	100.0	-	97.6	97.9
Other Vehicles	12	2	14	16	0	-	44	11	1	87	18	0	-	117	3	0	40	5	0	-	48	3	0	92	21	0	-	116	325
% Other Vehicles	2.3	4.0	1.4	1.6	-	-	1.7	1.1	12.5	1.9	2.3	0.0	-	1.8	0.7	0.0	3.5	1.5	-	-	2.5	1.1	0.0	2.4	3.7	0.0	-	2.4	2.1
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	-	10	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



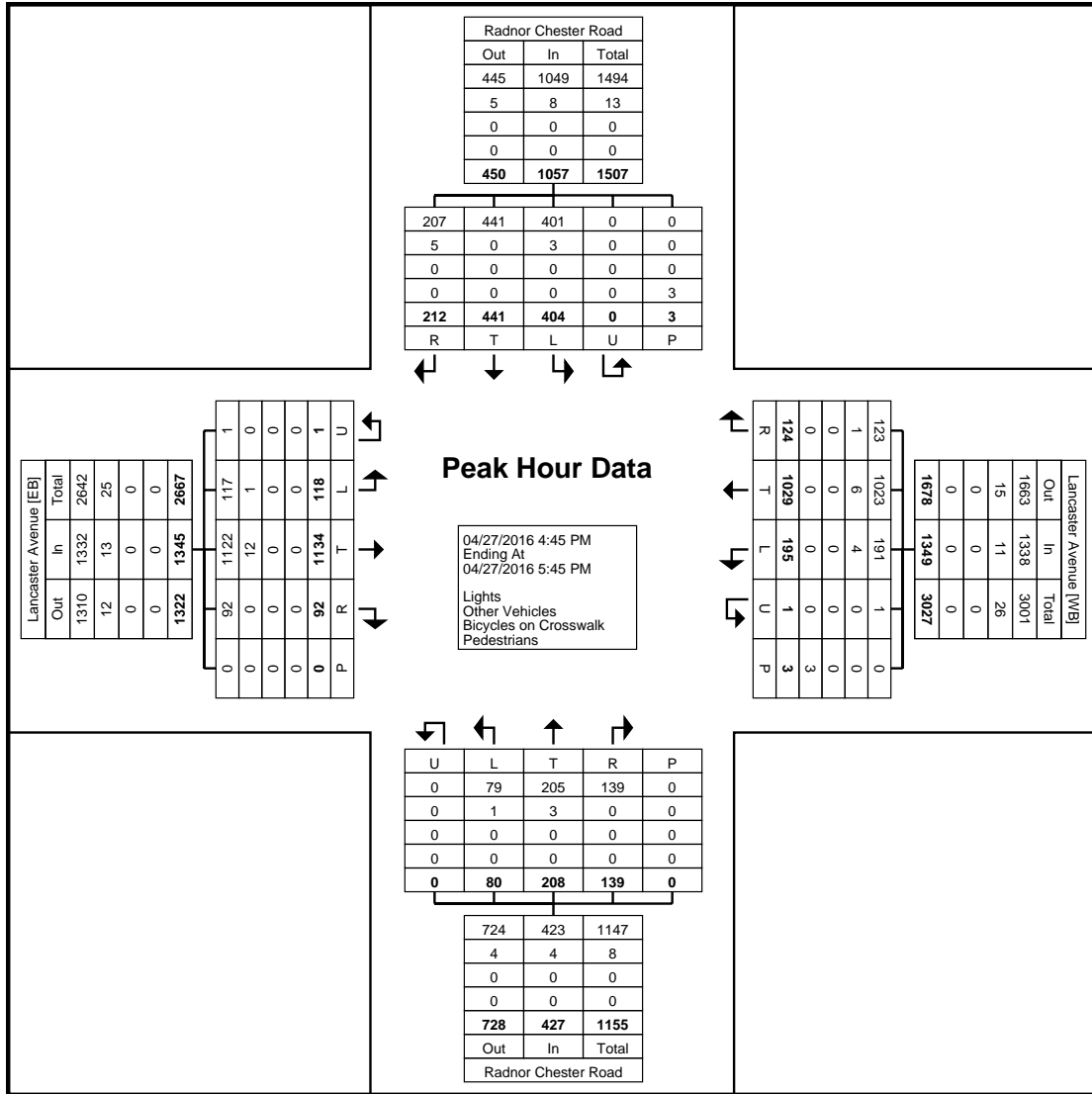
Turning Movement Data Plot











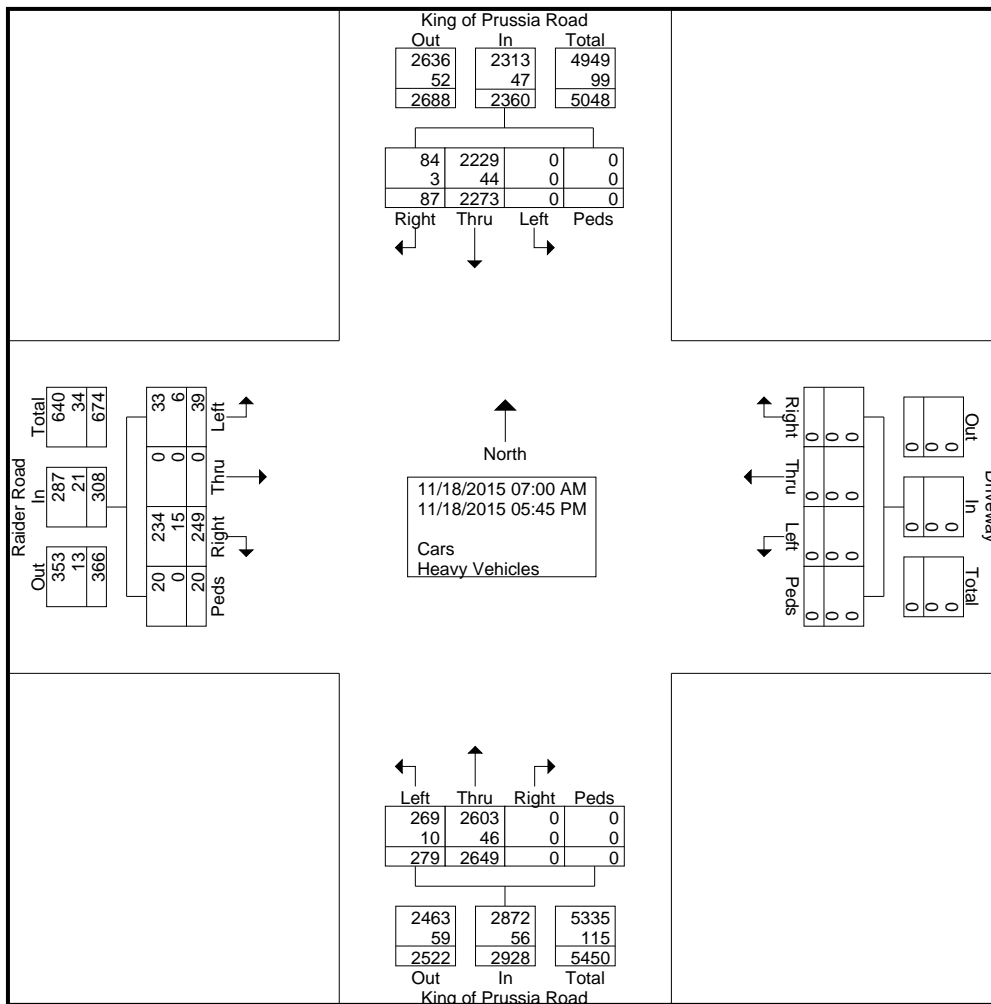
Turning Movement Peak Hour Data Plot (4:45 PM)



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Raider Rd  
 Date: Wednesday, November 18, 2015  
 Counter: PB

File Name : SS1118-1  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 2



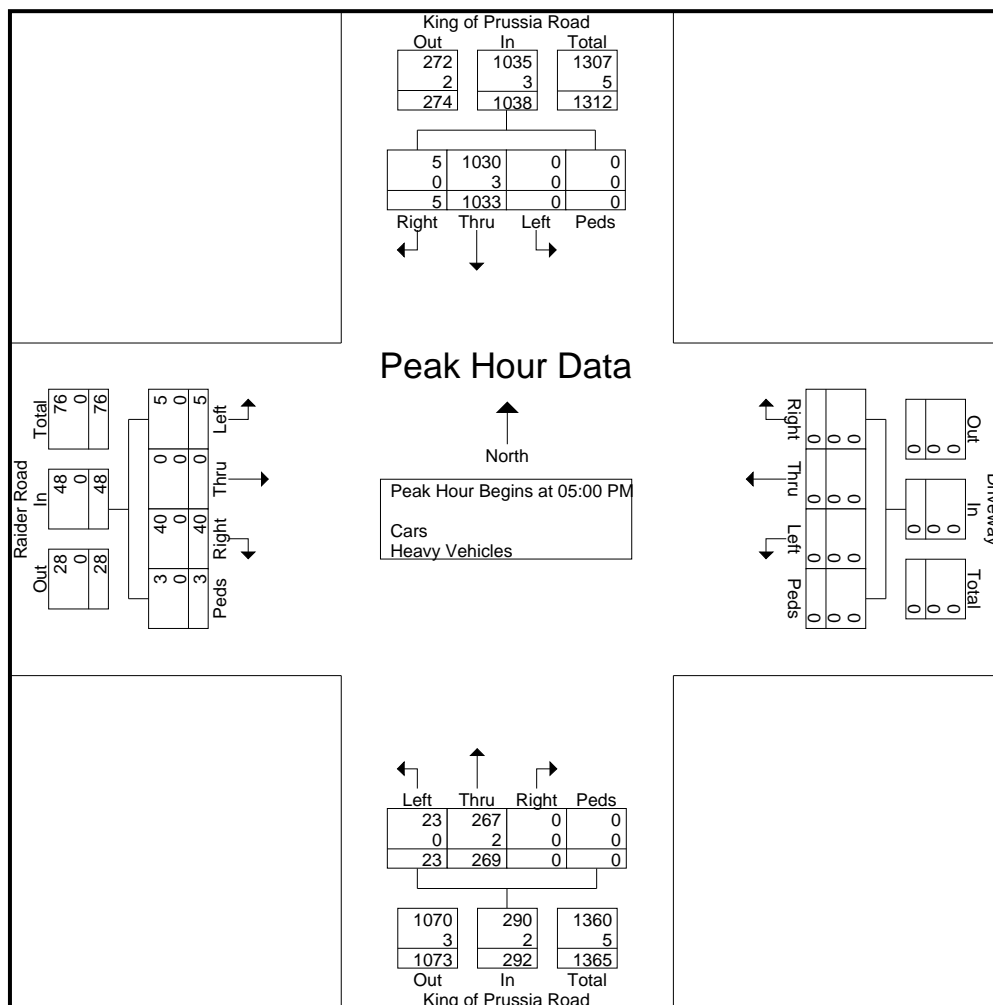


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Raider Rd  
 Date: Wednesday, November 18, 2015  
 Counter: PB

File Name : SS1118-1  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Raider Road Eastbound					Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	<b>9</b>										<b>3</b>	<b>14</b>	<b>2</b>	<b>19</b>	0	0	0	0	0	0	359
05:15 PM	3	68	0	0	71	0	<b>281</b>	1	0	<b>282</b>	1	0	13	1	15	0	0	0	0	0	<b>368</b>
05:30 PM	5	53	0	0	58	0	263	0	0	263	1	0	9	0	10	0	0	0	0	0	331
05:45 PM	6	<b>90</b>	0	0	<b>96</b>	0	216	<b>4</b>													
Total Volume	23	269	0	0	292	0	1033	5	0	1038	5	0	40	3	48	0	0	0	0	0	1378
% App. Total	7.9	92.1	0	0		0	99.5	0.5	0		10.4	0	83.3	6.2		0	0	0	0		
PHF	.639	.747	.000	.000	.760	.000	.919	.313	.000	.920	.417	.000	.714	.375	.632	.000	.000	.000	.000	.000	.936
Cars	23	267	0	0	290	0	1030				100	0	100	100	100	0	0	0	0	0	99.6
% Cars	100	99.3	0	0	99.3	0	99.7	100	0	99.7	100	0	100	100	100	0	0	0	0	0	
Heavy Vehicles	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	5
% Heavy Vehicles	0	0.7	0	0	0.7	0	0.3	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0.4



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Matson Ford Rd  
 Date: Wednesday, November 18, 2015  
 Tech: RZ

File Name : SS1118-2  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 1

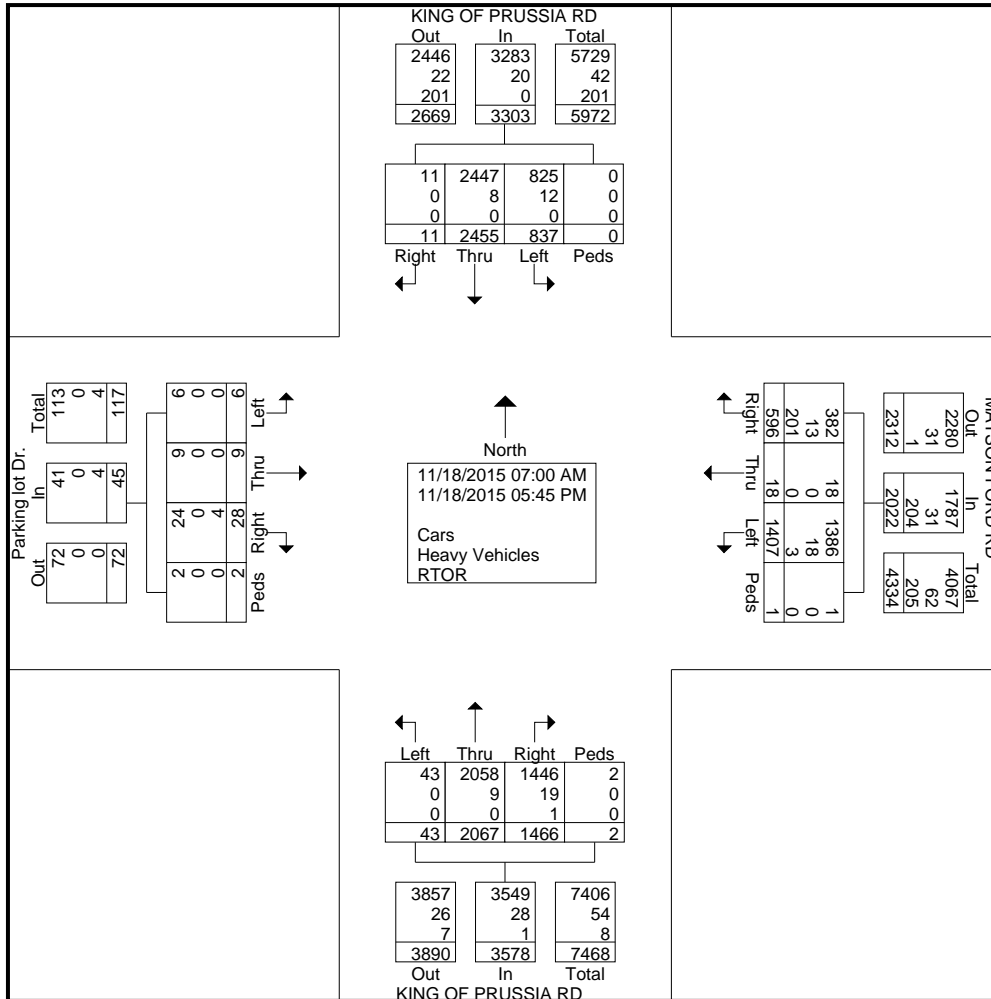
### Groups Printed- Cars - Heavy Vehicles - RTOR

Start Time	KING OF PRUSSIA RD Northbound					KING OF PRUSSIA RD Southbound					Parking lot Dr. Eastbound					MATSON FORD RD Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	2	113	91	0	206	53	91	0	0	144	0	0	0	0	0	38	0	6	0	44	394
07:15 AM	2	123	133	0	258	80	144	0	0	224	0	0	0	0	0	51	0	22	0	73	555
07:30 AM	1	153	178	0	332	104	124	0	0	228	0	0	0	0	0	84	1	34	0	119	679
07:45 AM	4	162	139	0	305	95	136	1	0	232	0	0	0	0	0	75	1	26	0	102	639
<b>Total</b>	<b>9</b>	<b>551</b>	<b>541</b>	<b>0</b>	<b>1101</b>	<b>332</b>	<b>495</b>	<b>1</b>	<b>0</b>	<b>828</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>248</b>	<b>2</b>	<b>88</b>	<b>0</b>	<b>338</b>	<b>2267</b>
08:00 AM	5	154	126	0	285	82	128	1	0	211	1	0	2	0	3	53	5	18	1	77	576
08:15 AM	8	142	104	0	254	79	126	0	0	205	0	1	4	0	5	64	3	15	0	82	546
08:30 AM	4	170	127	0	301	67	136	4	0	207	0	0	2	0	2	56	1	10	0	67	577
08:45 AM	5	144	132	0	281	60	136	3	0	199	0	2	0	0	2	84	2	35	0	121	603
<b>Total</b>	<b>22</b>	<b>610</b>	<b>489</b>	<b>0</b>	<b>1121</b>	<b>288</b>	<b>526</b>	<b>8</b>	<b>0</b>	<b>822</b>	<b>1</b>	<b>3</b>	<b>8</b>	<b>0</b>	<b>12</b>	<b>257</b>	<b>11</b>	<b>78</b>	<b>1</b>	<b>347</b>	<b>2302</b>
*** BREAK ***																					
04:00 PM	2	145	40	0	187	22	157	0	0	179	1	0	4	0	5	89	0	56	0	145	516
04:15 PM	1	122	44	0	167	22	193	0	0	215	0	1	4	0	5	80	1	39	0	120	507
04:30 PM	1	123	64	0	188	18	169	1	0	188	1	0	3	0	4	110	2	70	0	182	562
04:45 PM	1	93	57	0	151	37	199	0	0	236	0	1	0	0	1	112	1	53	0	166	554
<b>Total</b>	<b>5</b>	<b>483</b>	<b>205</b>	<b>0</b>	<b>693</b>	<b>99</b>	<b>718</b>	<b>1</b>	<b>0</b>	<b>818</b>	<b>2</b>	<b>2</b>	<b>11</b>	<b>0</b>	<b>15</b>	<b>391</b>	<b>4</b>	<b>218</b>	<b>0</b>	<b>613</b>	<b>2139</b>
05:00 PM	3	106	56	2	167	27	172	1	0	200	2	2	2	2	8	126	0	57	0	183	558
05:15 PM	1	108	74	0	183	35	183	0	0	218	1	0	1	0	2	150	1	56	0	207	610
05:30 PM	0	101	51	0	152	18	172	0	0	190	0	1	1	0	2	130	0	65	0	195	539
05:45 PM	3	108	50	0	161	38	189	0	0	227	0	1	5	0	6	105	0	34	0	139	533
<b>Total</b>	<b>7</b>	<b>423</b>	<b>231</b>	<b>2</b>	<b>663</b>	<b>118</b>	<b>716</b>	<b>1</b>	<b>0</b>	<b>835</b>	<b>3</b>	<b>4</b>	<b>9</b>	<b>2</b>	<b>18</b>	<b>511</b>	<b>1</b>	<b>212</b>	<b>0</b>	<b>724</b>	<b>2240</b>
<b>Grand Total</b>	<b>43</b>	<b>2067</b>	<b>1466</b>	<b>2</b>	<b>3578</b>	<b>837</b>	<b>2455</b>	<b>11</b>	<b>0</b>	<b>3303</b>	<b>6</b>	<b>9</b>	<b>28</b>	<b>2</b>	<b>45</b>	<b>1407</b>	<b>18</b>	<b>596</b>	<b>1</b>	<b>2022</b>	<b>8948</b>
<b>Apprch %</b>	<b>1.2</b>	<b>57.8</b>	<b>41</b>	<b>0.1</b>		<b>25.3</b>	<b>74.3</b>	<b>0.3</b>	<b>0</b>		<b>13.3</b>	<b>20</b>	<b>62.2</b>	<b>4.4</b>		<b>69.6</b>	<b>0.9</b>	<b>29.5</b>	<b>0</b>		
<b>Total %</b>	<b>0.5</b>	<b>23.1</b>	<b>16.4</b>	<b>0</b>	<b>40</b>	<b>9.4</b>	<b>27.4</b>	<b>0.1</b>	<b>0</b>	<b>36.9</b>	<b>0.1</b>	<b>0.1</b>	<b>0.3</b>	<b>0</b>	<b>0.5</b>	<b>15.7</b>	<b>0.2</b>	<b>6.7</b>	<b>0</b>	<b>22.6</b>	
<b>Cars</b>	<b>43</b>	<b>2058</b>	<b>1446</b>	<b>2</b>	<b>3549</b>	<b>825</b>	<b>2447</b>	<b>11</b>	<b>0</b>	<b>3283</b>	<b>6</b>	<b>9</b>	<b>24</b>	<b>2</b>	<b>41</b>	<b>1386</b>	<b>18</b>	<b>382</b>	<b>1</b>	<b>1787</b>	<b>8660</b>
<b>% Cars</b>	<b>100</b>	<b>99.6</b>	<b>98.6</b>	<b>100</b>	<b>99.2</b>	<b>98.6</b>	<b>99.7</b>	<b>100</b>	<b>0</b>	<b>99.4</b>	<b>100</b>	<b>100</b>	<b>85.7</b>	<b>100</b>	<b>91.1</b>	<b>98.5</b>	<b>100</b>	<b>64.1</b>	<b>100</b>	<b>88.4</b>	<b>96.8</b>
<b>Heavy Vehicles</b>	<b>0</b>	<b>0.4</b>	<b>1.3</b>	<b>0</b>	<b>0.8</b>	<b>1.4</b>	<b>0.3</b>	<b>0</b>	<b>0</b>	<b>0.6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1.3</b>	<b>0</b>	<b>2.2</b>	<b>0</b>	<b>1.5</b>	<b>0.9</b>
<b>% Heavy Vehicles</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>201</b>	<b>0</b>	<b>204</b>	<b>209</b>
<b>RTOR</b>	<b>0</b>	<b>0</b>	<b>0.1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14.3</b>	<b>0</b>	<b>8.9</b>	<b>0.2</b>	<b>0</b>	<b>33.7</b>	<b>0</b>	<b>10.1</b>	<b>2.3</b>
<b>% RTOR</b>	<b>0</b>	<b>0</b>	<b>0.1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14.3</b>	<b>0</b>	<b>8.9</b>	<b>0.2</b>	<b>0</b>	<b>33.7</b>	<b>0</b>	<b>10.1</b>	<b>2.3</b>

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Matson Ford Rd  
 Date: Wednesday, November 18, 2015  
 Tech: RZ

File Name : SS1118-2  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 2





# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Matson Ford Rd  
 Date: Wednesday, November 18, 2015  
 Tech: RZ

File Name : SS1118-2  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 3

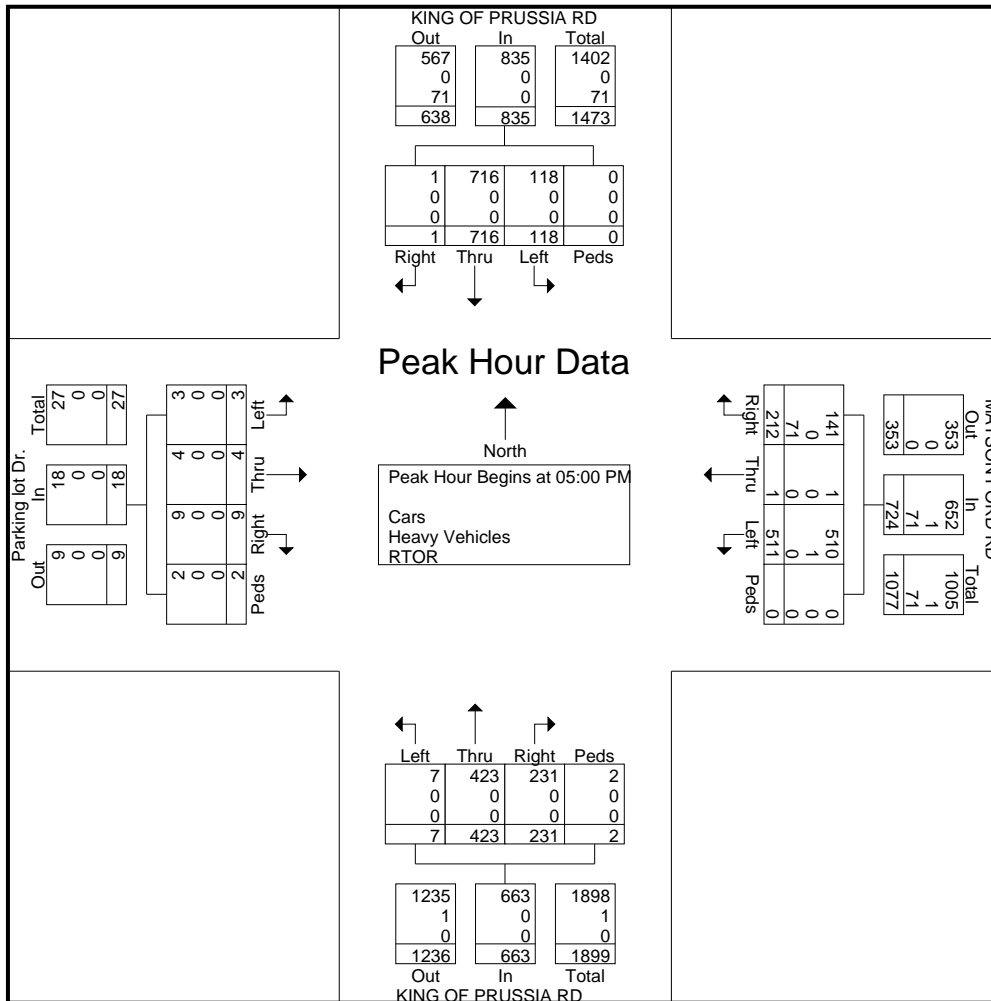
Start Time	KING OF PRUSSIA RD Northbound					KING OF PRUSSIA RD Southbound					Parking lot Dr. Eastbound					MATSON FORD RD Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	2	123	133	0	258	80	<b>144</b>														
<b>07:30 AM</b>	<b>1</b>	<b>153</b>	<b>178</b>	<b>0</b>	<b>332</b>	<b>104</b>	124	0	0	228	0	0	0	0	0	<b>84</b>	<b>1</b>	<b>34</b>	<b>0</b>	<b>119</b>	<b>679</b>
07:45 AM	4	<b>162</b>	139	0	305	95	136	<b>1</b>		<b>232</b>	0	0	0	0	0	75	1	26	0	102	639
08:00 AM	<b>5</b>										<b>1</b>		<b>2</b>	0	<b>3</b>	53	<b>5</b>	18	<b>1</b>		
Total Volume	12	592	576	0	1180	361	532	2	0	895	1	0	2	0	3	263	7	100	1	371	2449
% App. Total	1	50.2	48.8	0		40.3	59.4	0.2	0		33.3	0	66.7	0		70.9	1.9	27	0.3		
PHF	.600	.914	.809	.000	.889	.868	.924	.500	.000	.964	.250	.000	.250	.000	.250	.783	.350	.735	.250	.779	.902
Cars	12	588	568	0	1168	352	529	2	0	883	1	0	2	0	3	250	7	46	1	304	2358
% Cars	100	99.3	98.6	0	99.0	97.5	99.4	100	0	98.7	100	0	100	0	100	95.1	100	46.0	100	81.9	96.3
Heavy Vehicles	0	4	7	0	11	9	3	0	0	12	0	0	0	0	0	10	0	9	0	19	42
% Heavy Vehicles	0	0.7	1.2	0	0.9	2.5	0.6	0	0	1.3	0	0	0	0	0	3.8	0	9.0	0	5.1	1.7
RTOR	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	3	0	45	0	48	49
% RTOR	0	0	0.2	0	0.1	0	0	0	0	0	0	0	0	0	0	1.1	0	45.0	0	12.9	2.0

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/Matson Ford Rd  
 Date: Wednesday, November 18, 2015  
 Tech: RZ

File Name : SS1118-2  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	KING OF PRUSSIA RD Northbound					KING OF PRUSSIA RD Southbound					Parking lot Dr. Eastbound					MATSON FORD RD Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	3			2				1			2	2			8	126	0	57	0	183	558
05:15 PM	1	108	74		183	35	183	0	0	218	1	0	1	0	2	150	1	56	0	207	610
05:30 PM	0	101	51	0	152	18	172	0	0	190	0	1	1	0	2	130	0	65			
<b>05:45 PM</b>	<b>3</b>	<b>108</b>	<b>50</b>	<b>0</b>	<b>161</b>	<b>38</b>	<b>189</b>	<b>0</b>	<b>0</b>	<b>227</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>0</b>	<b>6</b>	<b>105</b>	<b>0</b>	<b>34</b>	<b>0</b>	<b>139</b>	<b>533</b>
Total Volume	7	423	231	2	663	118	716	1	0	835	3	4	9	2	18	511	1	212	0	724	2240
% App. Total	1.1	63.8	34.8	0.3		14.1	85.7	0.1	0		16.7	22.2	50	11.1		70.6	0.1	29.3	0		
PHF	.583	.979	.780	.250	.906	.776	.947	.250	.000	.920	.375	.500	.450	.250	.563	.852	.250	.815	.000	.874	.918
Cars	7	423	231	2	663	118	716	1	0	835	3	4	9	2	18	510	1	141	0	652	2168
% Cars	100	100	100	100	100	100	100	100	0	100	100	100	100	100	100	99.8	100	66.5	0	90.1	96.8
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0.1	0.0
RTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	0	71	71
% RTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33.5	0	9.8	3.2



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: I476 NB Ramp/Route 30  
 Date: Wednesday, November 18, 2015  
 Counter: ET/JT

File Name : SS1118-3  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 1

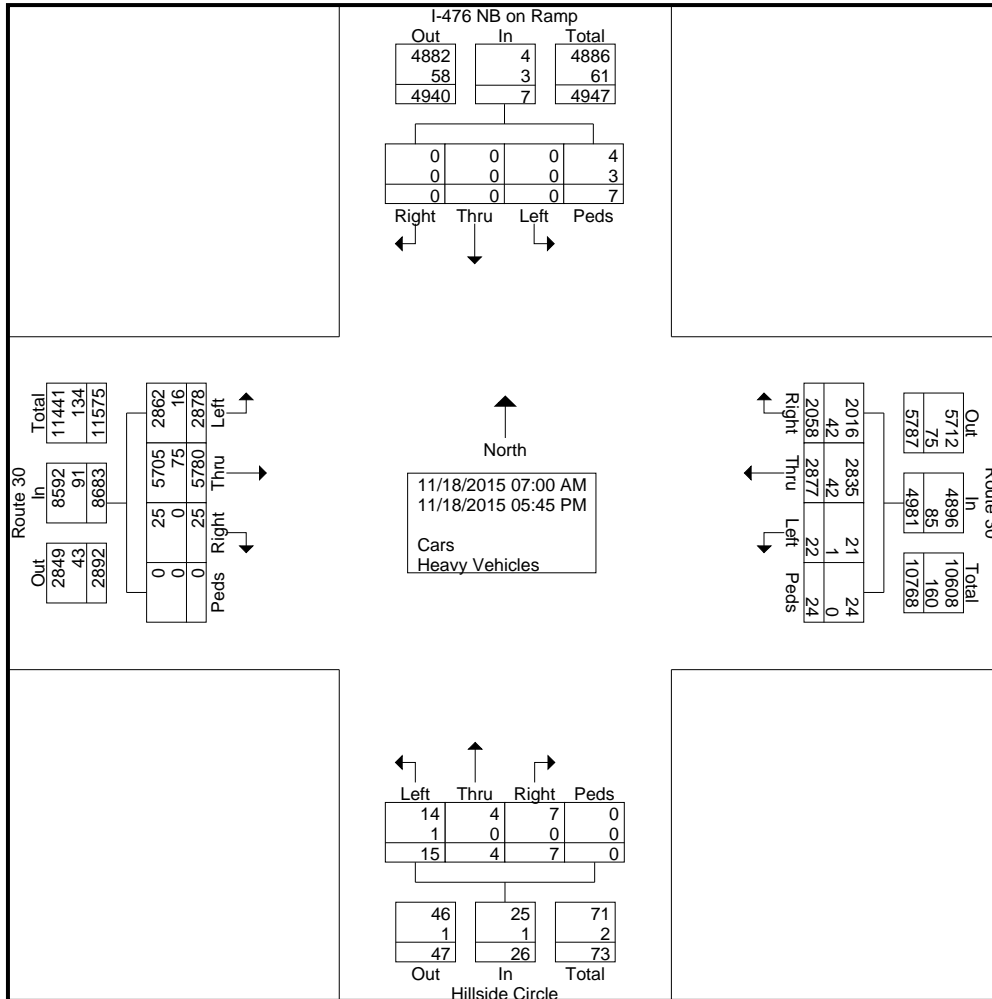
### Groups Printed- Cars - Heavy Vehicles

Start Time	Hillside Circle Northbound					I-476 NB on Ramp Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	1	0	0	0	1	0	0	0	0	0	88	243	0	0	331	2	137	89	0	228	560
07:15 AM	3	0	0	0	3	0	0	0	0	0	108	306	1	0	415	0	211	100	0	311	729
07:30 AM	1	0	0	0	1	0	0	0	2	2	152	404	1	0	557	0	157	126	11	294	854
07:45 AM	1	2	2	0	5	0	0	0	0	0	121	404	2	0	527	0	200	128	0	328	860
<b>Total</b>	<b>6</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>469</b>	<b>1357</b>	<b>4</b>	<b>0</b>	<b>1830</b>	<b>2</b>	<b>705</b>	<b>443</b>	<b>11</b>	<b>1161</b>	<b>3003</b>
08:00 AM	1	0	0	0	1	0	0	0	0	0	152	392	0	0	544	2	183	122	0	307	852
08:15 AM	0	0	0	0	0	0	0	0	0	0	117	318	2	0	437	0	188	126	4	318	755
08:30 AM	1	0	1	0	2	0	0	0	0	0	137	359	0	0	496	7	229	122	0	358	856
08:45 AM	3	0	1	0	4	0	0	0	0	0	108	372	1	0	481	0	197	92	0	289	774
<b>Total</b>	<b>5</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>514</b>	<b>1441</b>	<b>3</b>	<b>0</b>	<b>1958</b>	<b>9</b>	<b>797</b>	<b>462</b>	<b>4</b>	<b>1272</b>	<b>3237</b>
*** BREAK ***																					
04:00 PM	0	0	0	0	0	0	0	0	2	2	202	281	1	0	484	3	161	153	0	317	803
04:15 PM	0	0	1	0	1	0	0	0	0	0	216	354	1	0	571	1	159	140	0	300	872
04:30 PM	1	1	0	0	2	0	0	0	0	0	214	343	2	0	559	1	195	142	0	338	899
04:45 PM	0	0	0	0	0	0	0	0	1	1	218	357	0	0	575	0	184	145	0	329	905
<b>Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>850</b>	<b>1335</b>	<b>4</b>	<b>0</b>	<b>2189</b>	<b>5</b>	<b>699</b>	<b>580</b>	<b>0</b>	<b>1284</b>	<b>3479</b>
05:00 PM	0	0	0	0	0	0	0	0	0	0	270	376	1	0	647	1	165	147	3	316	963
05:15 PM	0	0	0	0	0	0	0	0	0	0	269	400	2	0	671	1	188	179	2	370	1041
05:30 PM	1	0	0	0	1	0	0	0	0	0	251	450	0	0	701	1	139	132	0	272	974
05:45 PM	2	1	2	0	5	0	0	0	2	2	255	421	11	0	687	3	184	115	4	306	1000
<b>Total</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1045</b>	<b>1647</b>	<b>14</b>	<b>0</b>	<b>2706</b>	<b>6</b>	<b>676</b>	<b>573</b>	<b>9</b>	<b>1264</b>	<b>3978</b>
<b>Grand Total</b>	<b>15</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>26</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>7</b>	<b>2878</b>	<b>5780</b>	<b>25</b>	<b>0</b>	<b>8683</b>	<b>22</b>	<b>2877</b>	<b>2058</b>	<b>24</b>	<b>4981</b>	<b>13697</b>
<b>Apprch %</b>	<b>57.7</b>	<b>15.4</b>	<b>26.9</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>100</b>		<b>33.1</b>	<b>66.6</b>	<b>0.3</b>	<b>0</b>		<b>0.4</b>	<b>57.8</b>	<b>41.3</b>	<b>0.5</b>		
<b>Total %</b>	<b>0.1</b>	<b>0</b>	<b>0.1</b>	<b>0</b>	<b>0.2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.1</b>	<b>0.1</b>	<b>21</b>	<b>42.2</b>	<b>0.2</b>	<b>0</b>	<b>63.4</b>	<b>0.2</b>	<b>21</b>	<b>15</b>	<b>0.2</b>	<b>36.4</b>	
<b>Cars</b>	<b>14</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>2862</b>	<b>5705</b>	<b>25</b>	<b>0</b>	<b>8592</b>	<b>21</b>	<b>2835</b>	<b>2016</b>	<b>24</b>	<b>4896</b>	<b>13517</b>
<b>% Cars</b>	<b>93.3</b>	<b>100</b>	<b>100</b>	<b>0</b>	<b>96.2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>57.1</b>	<b>57.1</b>	<b>99.4</b>	<b>98.7</b>	<b>100</b>	<b>0</b>	<b>99</b>	<b>95.5</b>	<b>98.5</b>	<b>98</b>	<b>100</b>	<b>98.3</b>	<b>98.7</b>
<b>Heavy Vehicles</b>																					
<b>% Heavy Vehicles</b>	<b>6.7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3.8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>42.9</b>	<b>42.9</b>	<b>0.6</b>	<b>1.3</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>4.5</b>	<b>1.5</b>	<b>2</b>	<b>0</b>	<b>1.7</b>	<b>1.3</b>

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: I476 NB Ramp/Route 30  
 Date: Wednesday, November 18, 2015  
 Counter: ET/JT

File Name : SS1118-3  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 2

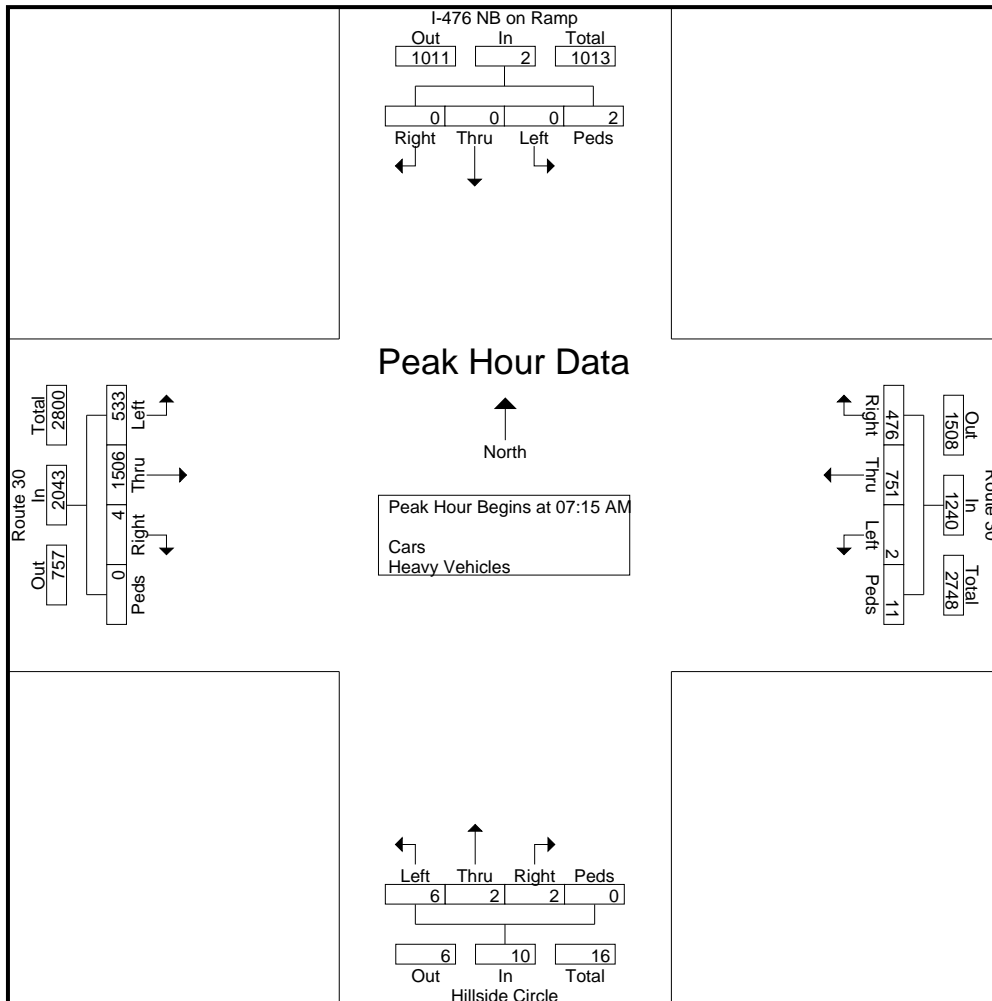


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: I476 NB Ramp/Route 30  
 Date: Wednesday, November 18, 2015  
 Counter: ET/JT

File Name : SS1118-3  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 3

Start Time	Hillside Circle Northbound					I-476 NB on Ramp Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	3															211 100 0 311					729
07:30 AM	1	0	0	0	1	0	0	0	2	2	152	404			557	0	157	126	11		
<b>07:45 AM</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>5</b>	0	0	0	0	0	121	404	2	0	527	0	200	<b>128</b>	<b>0</b>	<b>328</b>	<b>860</b>
08:00 AM	1	0	0	0	1	0	0	0	0	0	152	392	0	0	544	2					
Total Volume	6	2	2	0	10	0	0	0	2	2	533	1506	4	0	2043	2	751	476	11	1240	3295
% App. Total																					
PHF	.500	.250	.250	.000	.500	.000	.000	.000	.250	.250	.877	.932	.500	.000	.917	.250	.890	.930	.250	.945	.958

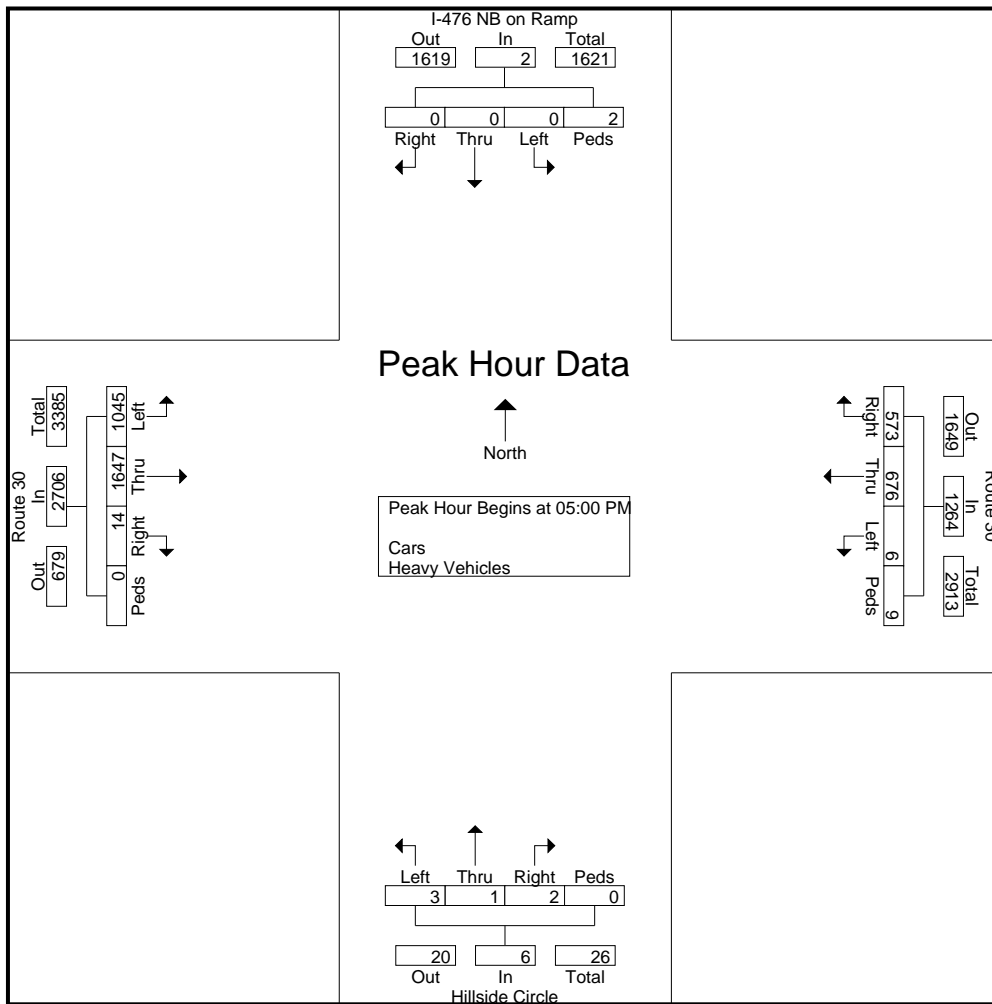


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: I476 NB Ramp/Route 30  
 Date: Wednesday, November 18, 2015  
 Counter: ET/JT

File Name : SS1118-3  
 Site Code : 00000000  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	Hillside Circle Northbound					I-476 NB on Ramp Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 05:00 PM																						
05:00 PM	0	0	0	0	0	0	0	0	0	0	270											
05:15 PM	0	0	0	0	0	0	0	0	0	0	269	400	2	0	671	1	188	179	2	370	1041	
05:30 PM	1	0	0	0	1	0	0	0	0	0	251	450			701	1	139	132	0	272	974	
05:45 PM	2	1	2		5	0	0	0	2	2	255	421	11	0	687	3			4			
Total Volume	3	1	2	0	6	0	0	0	2	2	1045	1647	14	0	2706	6	676	573	9	1264	3978	
% App. Total																						
PHF	.375	.250	.250	.000	.300	.000	.000	.000	.250	.250	.968	.915	.318	.000	.965	.500	.899	.800	.563	.854	.955	



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/North Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: ACB

File Name : ss1118-4  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 1

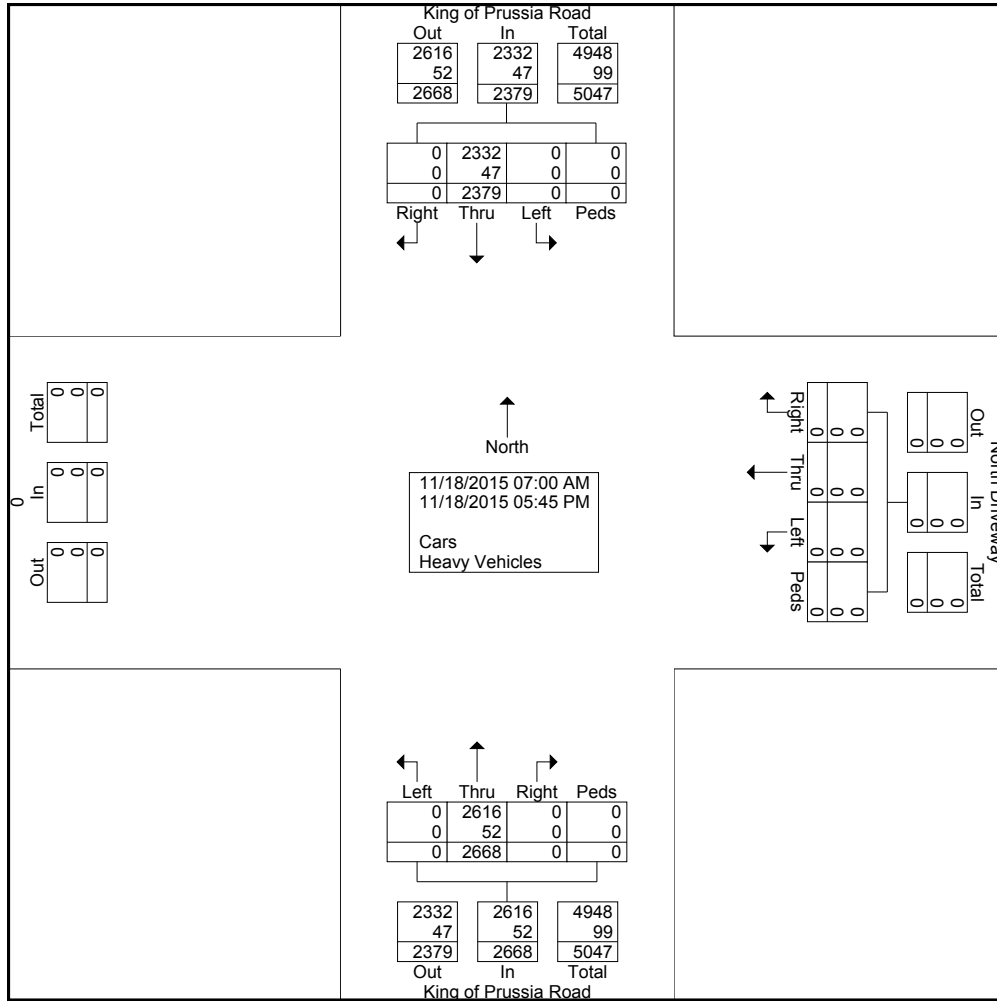
### Groups Printed- Cars - Heavy Vehicles

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	North Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	196	0	0	196	0	38	0	0	38	0	0	0	0	0	0	234
07:15 AM	0	221	0	0	221	0	83	0	0	83	0	0	0	0	0	0	304
07:30 AM	0	266	0	0	266	0	74	0	0	74	0	0	0	0	0	0	340
07:45 AM	0	239	0	0	239	0	73	0	0	73	0	0	0	0	0	0	312
Total	0	922	0	0	922	0	268	0	0	268	0	0	0	0	0	0	1190
08:00 AM	0	257	0	0	257	0	65	0	0	65	0	0	0	0	0	0	322
08:15 AM	0	298	0	0	298	0	55	0	0	55	0	0	0	0	0	0	353
08:30 AM	0	292	0	0	292	0	54	0	0	54	0	0	0	0	0	0	346
08:45 AM	0	306	0	0	306	0	61	0	0	61	0	0	0	0	0	0	367
Total	0	1153	0	0	1153	0	235	0	0	235	0	0	0	0	0	0	1388
04:00 PM	0	92	0	0	92	0	193	0	0	193	0	0	0	0	0	0	285
04:15 PM	0	86	0	0	86	0	202	0	0	202	0	0	0	0	0	0	288
04:30 PM	0	73	0	0	73	0	228	0	0	228	0	0	0	0	0	0	301
04:45 PM	0	73	0	0	73	0	211	0	0	211	0	0	0	0	0	0	284
Total	0	324	0	0	324	0	834	0	0	834	0	0	0	0	0	0	1158
05:00 PM	0	58	0	0	58	0	276	0	0	276	0	0	0	0	0	0	334
05:15 PM	0	68	0	0	68	0	283	0	0	283	0	0	0	0	0	0	351
05:30 PM	0	53	0	0	53	0	263	0	0	263	0	0	0	0	0	0	316
05:45 PM	0	90	0	0	90	0	220	0	0	220	0	0	0	0	0	0	310
Total	0	269	0	0	269	0	1042	0	0	1042	0	0	0	0	0	0	1311
Grand Total	0	2668	0	0	2668	0	2379	0	0	2379	0	0	0	0	0	0	5047
Apprch %	0	100	0	0		0	100	0	0		0	0	0	0	0		
Total %	0	52.9	0	0	52.9	0	47.1	0	0	47.1	0	0	0	0	0	0	
Cars	0	2616	0	0	2616	0	2332	0	0	2332	0	0	0	0	0	0	4948
% Cars	0	98.1	0	0	98.1	0	98	0	0	98	0	0	0	0	0	0	98
Heavy Vehicles	0	52	0	0	52	0	47	0	0	47	0	0	0	0	0	0	99
% Heavy Vehicles	0	1.9	0	0	1.9	0	2	0	0	2	0	0	0	0	0	0	2

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/North Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: ACB

File Name : ss1118-4  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 2



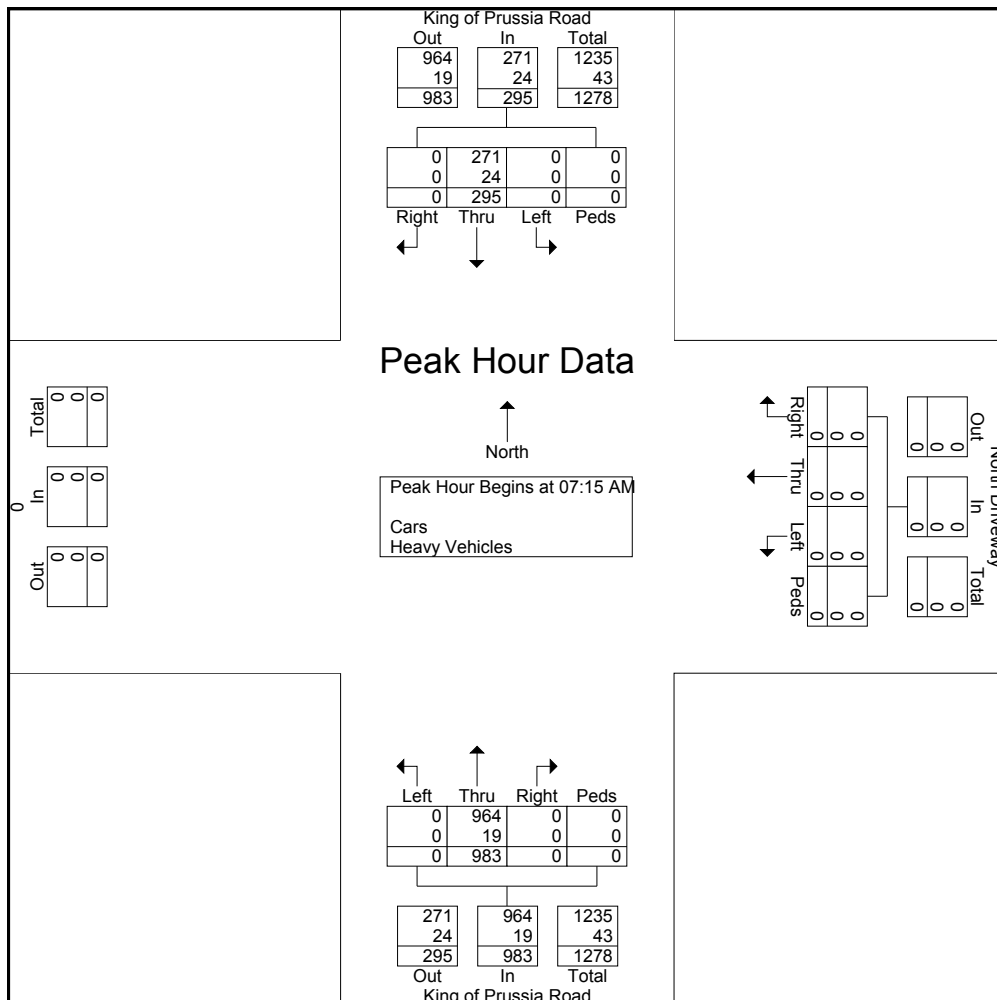


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/North Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: ACB

File Name : ss1118-4  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 3

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	North Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		App. Total	Left	Thru	Right	Peds	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	221	0	0	221	0	83	0	0	83	0	0	0	0	0	0	304
07:30 AM	0	266	0	0	266	0	74	0	0	74	0	0	0	0	0	0	340
07:45 AM	0	239	0	0	239	0	73	0	0	73	0	0	0	0	0	0	312
08:00 AM	0	257	0	0	257	0	65	0	0	65	0	0	0	0	0	0	322
Total Volume	0	983	0	0	983	0	295	0	0	295	0	0	0	0	0	0	1278
% App. Total	0	100	0	0		0	100	0	0		0	0	0	0	0		
PHF	.000	.924	.000	.000	.924	.000	.889	.000	.000	.889	.000	.000	.000	.000	.000	.000	.940
Cars	0	964	0	0	964	0	271	0	0	271	0	0	0	0	0	0	1235
% Cars	0	98.1	0	0	98.1	0	91.9	0	0	91.9	0	0	0	0	0	0	96.6
Heavy Vehicles	0	19	0	0	19	0	24	0	0	24	0	0	0	0	0	0	43
% Heavy Vehicles	0	1.9	0	0	1.9	0	8.1	0	0	8.1	0	0	0	0	0	0	3.4



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: K of P Rd/North Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: ACB

File Name : ss1118-4  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	North Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	58	0	0	58	0	276	0	0	276	0	0	0	0	0	0	334
05:15 PM	0	68	0	0	68	0	283	0	0	283	0	0	0	0	0	0	351
05:30 PM	0	53	0	0	53	0	263	0	0	263	0	0	0	0	0	0	316
05:45 PM	0	90	0	0	90	0	220	0	0	220	0	0	0	0	0	0	310
Total Volume	0	269	0	0	269	0	1042	0	0	1042	0	0	0	0	0	0	1311
% App. Total	0	100	0	0		0	100	0	0		0	0	0	0	0		
PHF	.000	.747	.000	.000	.747	.000	.920	.000	.000	.920	.000	.000	.000	.000	.000	.000	.934
Cars	0	267	0	0	267	0	1039	0	0	1039	0	0	0	0	0	0	1306
% Cars	0	99.3	0	0	99.3	0	99.7	0	0	99.7	0	0	0	0	0	0	99.6
Heavy Vehicles	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	5
% Heavy Vehicles	0	0.7	0	0	0.7	0	0.3	0	0	0.3	0	0	0	0	0	0	0.4

# Pennoni Associates

Location: Montgomery County, PA  
 South Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: PG

File Name : SS1118-5  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 1

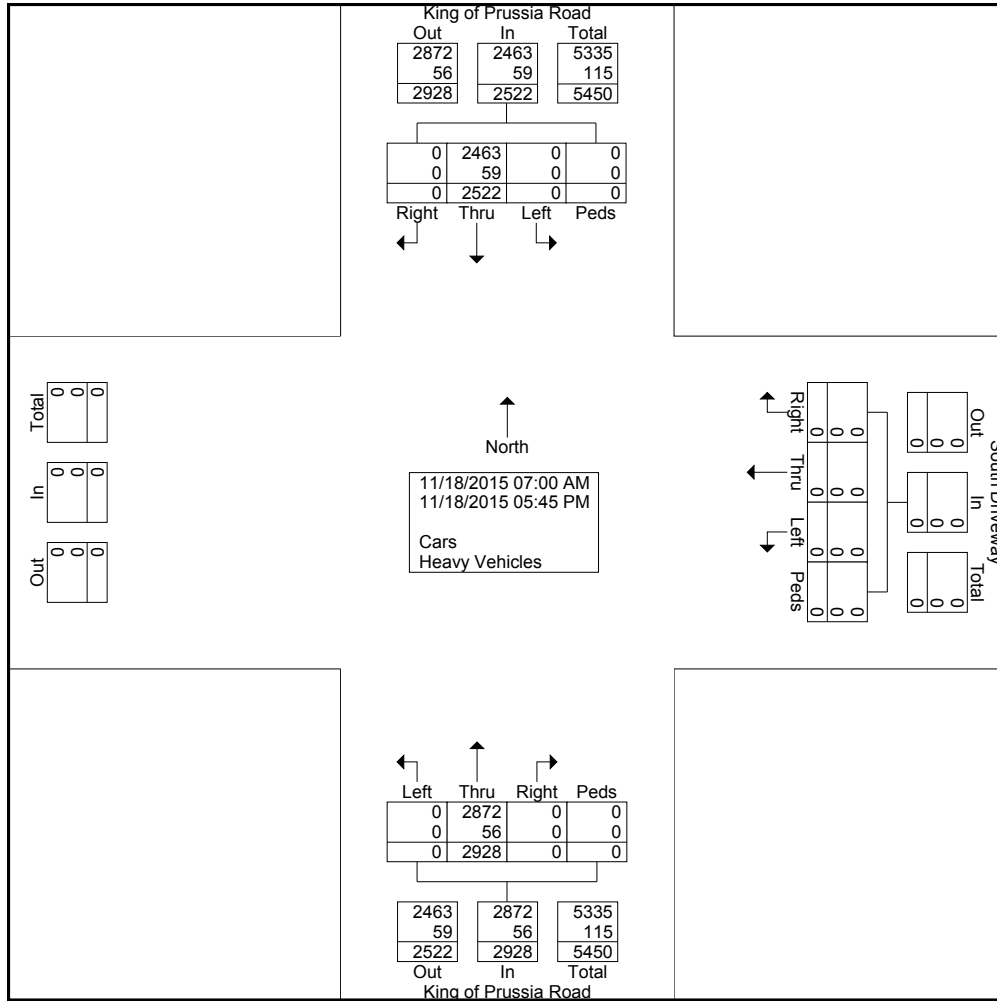
### Groups Printed- Cars - Heavy Vehicles

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	South Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	240	0	0	240	0	47	0	0	47	0	0	0	0	0	0	287
07:15 AM	0	349	0	0	349	0	107	0	0	107	0	0	0	0	0	0	456
07:30 AM	0	292	0	0	292	0	112	0	0	112	0	0	0	0	0	0	404
07:45 AM	0	242	0	0	242	0	79	0	0	79	0	0	0	0	0	0	321
Total	0	1123	0	0	1123	0	345	0	0	345	0	0	0	0	0	0	1468
08:00 AM	0	261	0	0	261	0	68	0	0	68	0	0	0	0	0	0	329
08:15 AM	0	301	0	0	301	0	60	0	0	60	0	0	0	0	0	0	361
08:30 AM	0	296	0	0	296	0	54	0	0	54	0	0	0	0	0	0	350
08:45 AM	0	313	0	0	313	0	61	0	0	61	0	0	0	0	0	0	374
Total	0	1171	0	0	1171	0	243	0	0	243	0	0	0	0	0	0	1414
04:00 PM	0	94	0	0	94	0	198	0	0	198	0	0	0	0	0	0	292
04:15 PM	0	90	0	0	90	0	202	0	0	202	0	0	0	0	0	0	292
04:30 PM	0	74	0	0	74	0	243	0	0	243	0	0	0	0	0	0	317
04:45 PM	0	84	0	0	84	0	218	0	0	218	0	0	0	0	0	0	302
Total	0	342	0	0	342	0	861	0	0	861	0	0	0	0	0	0	1203
05:00 PM	0	67	0	0	67	0	287	0	0	287	0	0	0	0	0	0	354
05:15 PM	0	71	0	0	71	0	294	0	0	294	0	0	0	0	0	0	365
05:30 PM	0	58	0	0	58	0	272	0	0	272	0	0	0	0	0	0	330
05:45 PM	0	96	0	0	96	0	220	0	0	220	0	0	0	0	0	0	316
Total	0	292	0	0	292	0	1073	0	0	1073	0	0	0	0	0	0	1365
Grand Total	0	2928	0	0	2928	0	2522	0	0	2522	0	0	0	0	0	0	5450
Apprch %	0	100	0	0		0	100	0	0		0	0	0	0	0		
Total %	0	53.7	0	0	53.7	0	46.3	0	0	46.3	0	0	0	0	0	0	
Cars	0	2872	0	0	2872	0	2463	0	0	2463	0	0	0	0	0	0	5335
% Cars	0	98.1	0	0	98.1	0	97.7	0	0	97.7	0	0	0	0	0	0	97.9
Heavy Vehicles	0	56	0	0	56	0	59	0	0	59	0	0	0	0	0	0	115
% Heavy Vehicles	0	1.9	0	0	1.9	0	2.3	0	0	2.3	0	0	0	0	0	0	2.1

# Pennoni Associates

Location: Montgomery County, PA  
 South Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: PG

File Name : SS1118-5  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 2



# Pennoni Associates

Location: Montgomery County, PA  
 South Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: PG

File Name : SS1118-5  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 3

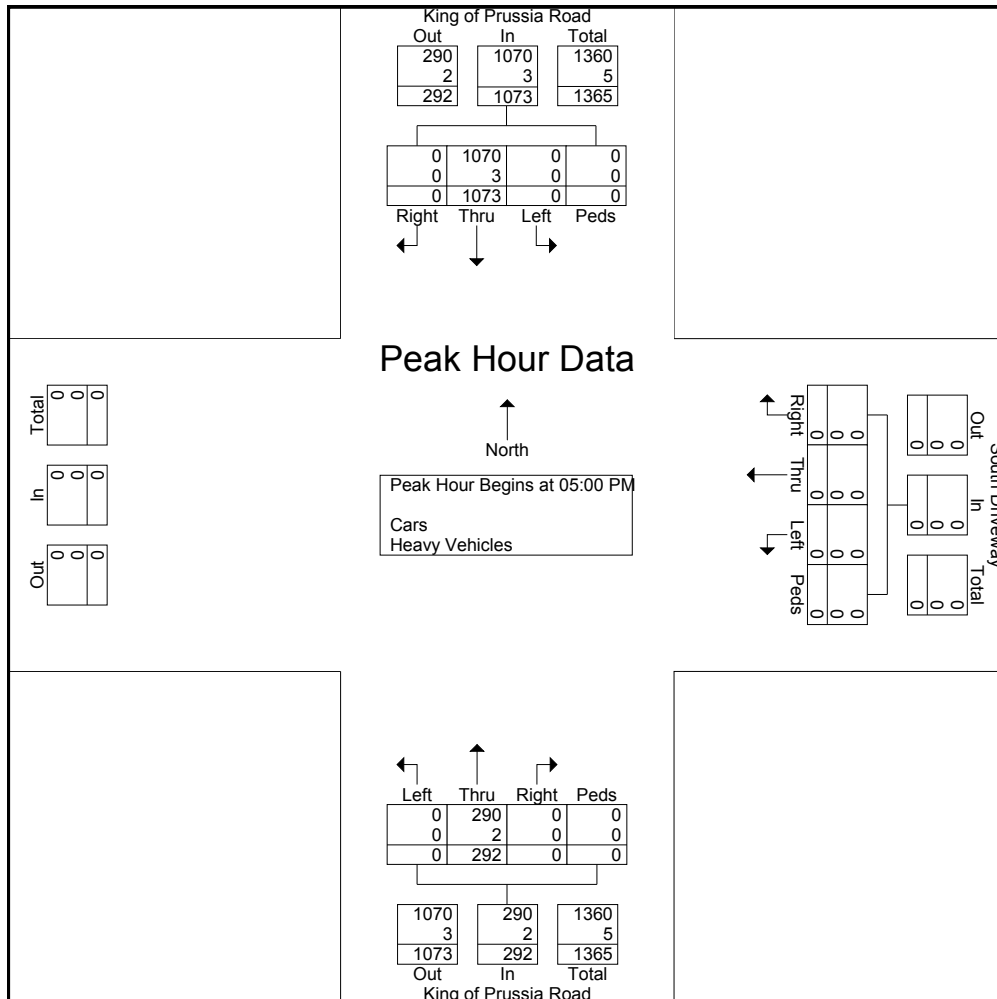
Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	South Driveway Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		App. Total	Left	Thru	Right	Peds	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	349	0	0	349	0	107	0	0	107	0	0	0	0	0	0	456
07:30 AM	0	292	0	0	292	0	112	0	0	112	0	0	0	0	0	0	404
07:45 AM	0	242	0	0	242	0	79	0	0	79	0	0	0	0	0	0	321
08:00 AM	0	261	0	0	261	0	68	0	0	68	0	0	0	0	0	0	329
Total Volume	0	1144	0	0	1144	0	366	0	0	366	0	0	0	0	0	0	1510
% App. Total	0	100	0	0		0	100	0	0		0	0	0	0	0	0	
PHF	.000	.819	.000	.000	.819	.000	.817	.000	.000	.817	.000	.000	.000	.000	.000	.000	.828
Cars	0	1126	0	0	1126	0	337	0	0	337	0	0	0	0	0	0	1463
% Cars	0	98.4	0	0	98.4	0	92.1	0	0	92.1	0	0	0	0	0	0	96.9
Heavy Vehicles	0	18	0	0	18	0	29	0	0	29	0	0	0	0	0	0	47
% Heavy Vehicles	0	1.6	0	0	1.6	0	7.9	0	0	7.9	0	0	0	0	0	0	3.1

# Pennoni Associates

Location: Montgomery County, PA  
 South Driveway  
 Date: Wednesday, November 18, 2015  
 Counter: PG

File Name : SS1118-5  
 Site Code :  
 Start Date : 11/18/2015  
 Page No : 4

Start Time	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	South Driveway Westbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		App. Total	Left	Thru	Right	Peds		App. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 05:00 PM																		
05:00 PM	0	67	0	0	67	0	287	0	0	287	0	0	0	0	0	0	0	354
05:15 PM	0	71	0	0	71	0	294	0	0	294	0	0	0	0	0	0	0	365
05:30 PM	0	58	0	0	58	0	272	0	0	272	0	0	0	0	0	0	0	330
05:45 PM	0	96	0	0	96	0	220	0	0	220	0	0	0	0	0	0	0	316
Total Volume	0	292	0	0	292	0	1073	0	0	1073	0	0	0	0	0	0	0	1365
% App. Total	0	100	0	0	100	0	100	0	0	100	0	0	0	0	0	0	0	100
PHF	.000	.760	.000	.000	.760	.000	.912	.000	.000	.912	.000	.000	.000	.000	.000	.000	.000	.935
Cars	0	290	0	0	290	0	1070	0	0	1070	0	0	0	0	0	0	0	1360
% Cars	0	99.3	0	0	99.3	0	99.7	0	0	99.7	0	0	0	0	0	0	0	99.6
Heavy Vehicles	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	0	5
% Heavy Vehicles	0	0.7	0	0	0.7	0	0.3	0	0	0.3	0	0	0	0	0	0	0	0.4



# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: 476NB Off/Rt. 30/ KOP Rd.  
 Date: Tuesday, November 24, 2015  
 Counter: ET / JT

File Name : SS1124-1  
 Site Code : 00000000  
 Start Date : 11/24/2015  
 Page No : 1

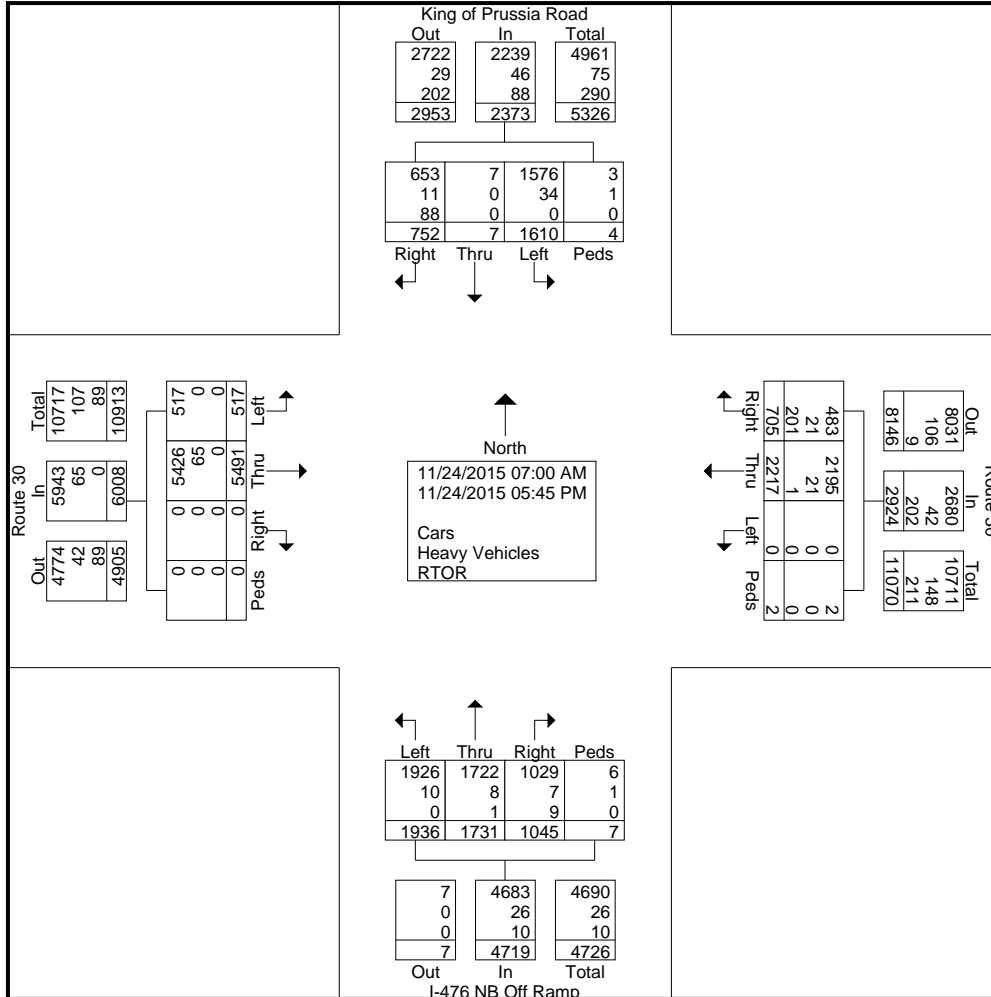
### Groups Printed- Cars - Heavy Vehicles - RTOR

Start Time	I-476 NB Off Ramp Northbound					King of Prussia Road Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	147	182	66	0	395	35	0	13	0	48	42	231	0	0	273	0	92	43	0	135	851
07:15 AM	170	186	68	0	424	59	0	42	0	101	78	278	0	0	356	0	103	110	0	213	1094
07:30 AM	192	173	85	0	450	82	0	30	0	112	29	325	0	0	354	0	148	58	0	206	1122
07:45 AM	216	153	88	0	457	58	0	16	0	74	18	321	0	0	339	0	145	53	0	198	1068
<b>Total</b>	<b>725</b>	<b>694</b>	<b>307</b>	<b>0</b>	<b>1726</b>	<b>234</b>	<b>0</b>	<b>101</b>	<b>0</b>	<b>335</b>	<b>167</b>	<b>1155</b>	<b>0</b>	<b>0</b>	<b>1322</b>	<b>0</b>	<b>488</b>	<b>264</b>	<b>0</b>	<b>752</b>	<b>4135</b>
08:00 AM	167	186	90	0	443	51	0	16	1	68	43	333	0	0	376	0	128	33	0	161	1048
08:15 AM	188	183	88	0	459	47	0	13	0	60	56	327	0	0	383	0	147	49	0	196	1098
08:30 AM	170	161	92	0	423	33	7	8	0	48	68	333	0	0	401	0	147	50	0	197	1069
08:45 AM	126	124	87	0	337	42	0	12	0	54	73	312	0	0	385	0	166	60	1	227	1003
<b>Total</b>	<b>651</b>	<b>654</b>	<b>357</b>	<b>0</b>	<b>1662</b>	<b>173</b>	<b>7</b>	<b>49</b>	<b>1</b>	<b>230</b>	<b>240</b>	<b>1305</b>	<b>0</b>	<b>0</b>	<b>1545</b>	<b>0</b>	<b>588</b>	<b>192</b>	<b>1</b>	<b>781</b>	<b>4218</b>
*** BREAK ***																					
04:00 PM	67	54	40	0	161	138	0	74	2	214	19	374	0	0	393	0	167	24	0	191	959
04:15 PM	80	52	42	1	175	114	0	59	0	173	21	383	0	0	404	0	149	29	0	178	930
04:30 PM	69	36	34	0	139	176	0	87	0	263	12	387	0	0	399	0	123	24	0	147	948
04:45 PM	77	45	55	0	177	125	0	83	1	209	12	378	0	0	390	0	135	27	0	162	938
<b>Total</b>	<b>293</b>	<b>187</b>	<b>171</b>	<b>1</b>	<b>652</b>	<b>553</b>	<b>0</b>	<b>303</b>	<b>3</b>	<b>859</b>	<b>64</b>	<b>1522</b>	<b>0</b>	<b>0</b>	<b>1586</b>	<b>0</b>	<b>574</b>	<b>104</b>	<b>0</b>	<b>678</b>	<b>3775</b>
05:00 PM	62	37	50	0	149	184	0	98	0	282	11	362	0	0	373	0	149	31	0	180	984
05:15 PM	73	49	45	0	167	180	0	87	0	267	16	394	0	0	410	0	151	39	0	190	1034
05:30 PM	77	43	62	0	182	164	0	64	0	228	10	392	0	0	402	0	124	32	1	157	969
05:45 PM	55	67	53	6	181	122	0	50	0	172	9	361	0	0	370	0	143	43	0	186	909
<b>Total</b>	<b>267</b>	<b>196</b>	<b>210</b>	<b>6</b>	<b>679</b>	<b>650</b>	<b>0</b>	<b>299</b>	<b>0</b>	<b>949</b>	<b>46</b>	<b>1509</b>	<b>0</b>	<b>0</b>	<b>1555</b>	<b>0</b>	<b>567</b>	<b>145</b>	<b>1</b>	<b>713</b>	<b>3896</b>
<b>Grand Total</b>	<b>1936</b>	<b>1731</b>	<b>1045</b>	<b>7</b>	<b>4719</b>	<b>1610</b>					<b>5491</b>	<b>0</b>	<b>0</b>	<b>6008</b>	<b>0</b>	<b>2217</b>					
<b>Cars</b>	<b>1926</b>	<b>1722</b>	<b>1029</b>	<b>6</b>	<b>4683</b>	<b>1576</b>	<b>7</b>	<b>653</b>	<b>3</b>	<b>2239</b>	<b>517</b>	<b>5426</b>	<b>0</b>	<b>0</b>	<b>5943</b>	<b>0</b>	<b>2195</b>	<b>483</b>	<b>2</b>	<b>2680</b>	<b>15545</b>
<b>% Cars</b>	<b>99.5</b>	<b>99.5</b>	<b>98.5</b>	<b>85.7</b>	<b>99.2</b>	<b>97.9</b>	<b>100</b>	<b>86.8</b>	<b>75</b>	<b>94.4</b>	<b>100</b>	<b>98.8</b>	<b>0</b>	<b>0</b>	<b>98.9</b>	<b>0</b>	<b>99</b>	<b>68.5</b>	<b>100</b>	<b>91.7</b>	<b>97</b>
<b>Heavy Vehicles</b>	<b>10</b>	<b>8</b>	<b>7</b>	<b>1</b>	<b>26</b>	<b>34</b>	<b>0</b>	<b>11</b>	<b>1</b>	<b>46</b>	<b>0</b>	<b>65</b>	<b>0</b>	<b>0</b>	<b>65</b>	<b>0</b>	<b>21</b>	<b>21</b>	<b>0</b>	<b>42</b>	<b>179</b>
<b>% Heavy Vehicles</b>	<b>0.5</b>	<b>0.5</b>	<b>0.7</b>	<b>14.3</b>	<b>0.6</b>	<b>2.1</b>	<b>0</b>	<b>1.5</b>	<b>25</b>	<b>1.9</b>	<b>0</b>	<b>1.2</b>	<b>0</b>	<b>0</b>	<b>1.1</b>	<b>0</b>	<b>0.9</b>	<b>3</b>	<b>0</b>	<b>1.4</b>	<b>1.1</b>
<b>RTOR</b>	<b>0</b>	<b>1</b>	<b>9</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>88</b>	<b>0</b>	<b>88</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>201</b>	<b>0</b>	<b>202</b>	<b>300</b>
<b>% RTOR</b>	<b>0</b>	<b>0.1</b>	<b>0.9</b>	<b>0</b>	<b>0.2</b>	<b>0</b>	<b>0</b>	<b>11.7</b>	<b>0</b>	<b>3.7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28.5</b>	<b>0</b>	<b>6.9</b>	<b>1.9</b>

# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: 476NB Off/Rt. 30/ KOP Rd.  
 Date: Tuesday, November 24, 2015  
 Counter: ET / JT

File Name : SS1124-1  
 Site Code : 00000000  
 Start Date : 11/24/2015  
 Page No : 2



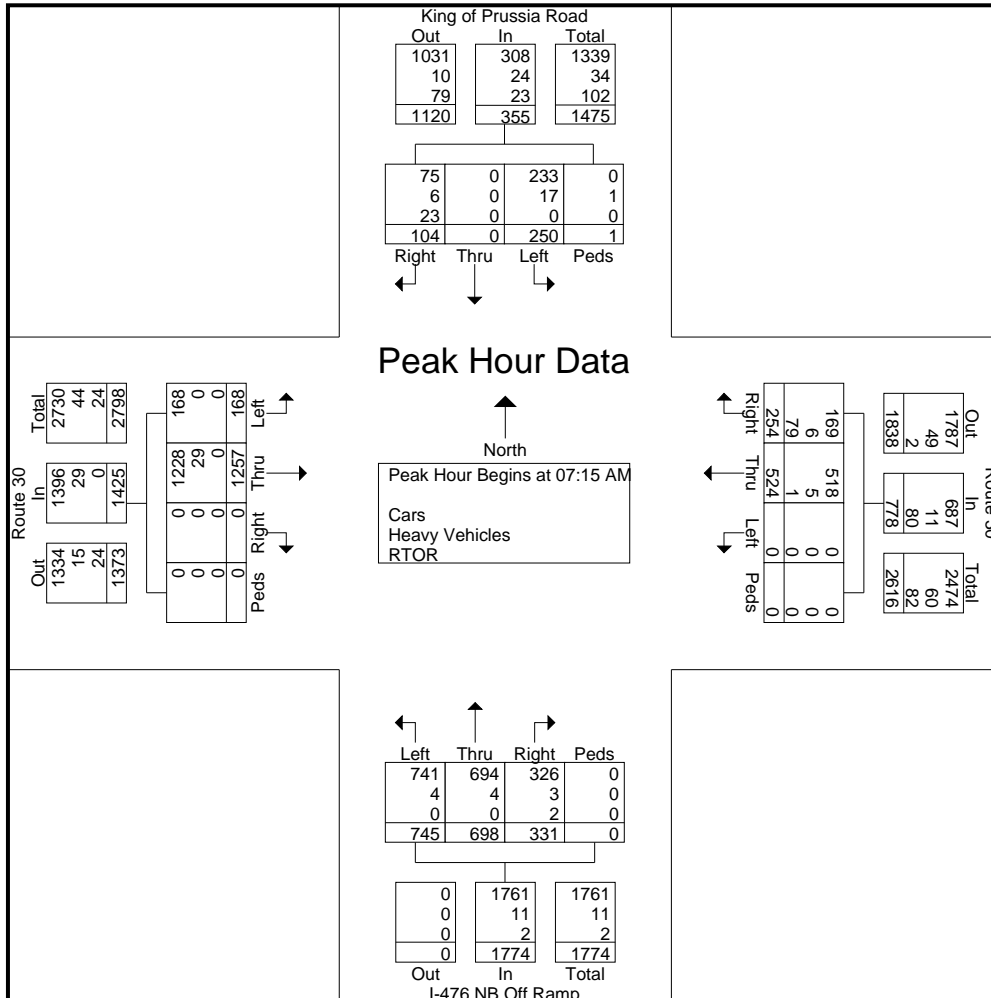


# Pennoni Associates

Location: Montgomery County, PA  
 Intersection: 476NB Off/Rt. 30/ KOP Rd.  
 Date: Tuesday, November 24, 2015  
 Counter: ET / JT

File Name : SS1124-1  
 Site Code : 00000000  
 Start Date : 11/24/2015  
 Page No : 3

Start Time	I-476 NB Off Ramp Northbound					King of Prussia Road Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	170	186	68	0	424	59	0	42	0	101	78	278	0	0	356	0	103	110	0	213	1094
07:30 AM	192	173	85	0	450	82	0	30	0	112	29	325	0	0	354	0	148	58	0	206	1122
07:45 AM	216	153	88	0	457	58	0	16	0	74	18	321	0	0	339	0	145	53	0	198	1068
08:00 AM	167	186	90	0	443	51	0	16	1	68	43	333	0	0	376	0	128	33	0	161	1048
Total Volume	745	698	331	0	1774	250	0	104	1	355	168	1257	0	0	1425	0	524	254	0	778	4332
% App. Total																					
PHF	.862	.938	.919	.000	.970	.762	.000	.619	.250	.792	.538	.944	.000	.000	.947	.000	.885	.577	.000	.913	.965
Cars	741	694	326	0	1761	233	0	75	0	308	168	1228	0	0	1396	0	518	169	0	687	4152
% Cars	99.5	99.4	98.5	0	99.3	93.2	0	72.1	0	86.8	100	97.7	0	0	98.0	0	98.9	66.5	0	88.3	95.8
Heavy Vehicles																					
% Heavy Vehicles	0.5	0.6	0.9	0	0.6	6.8	0	5.8	100	6.8	0	2.3	0	0	2.0	0	1.0	2.4	0	1.4	1.7
RTOR	0	0	2	0	2	0	0	23	0	23	0	0	0	0	0	0	1	79	0	80	105
% RTOR	0	0	0.6	0	0.1	0	0	22.1	0	6.5	0	0	0	0	0	0	0.2	31.1	0	10.3	2.4

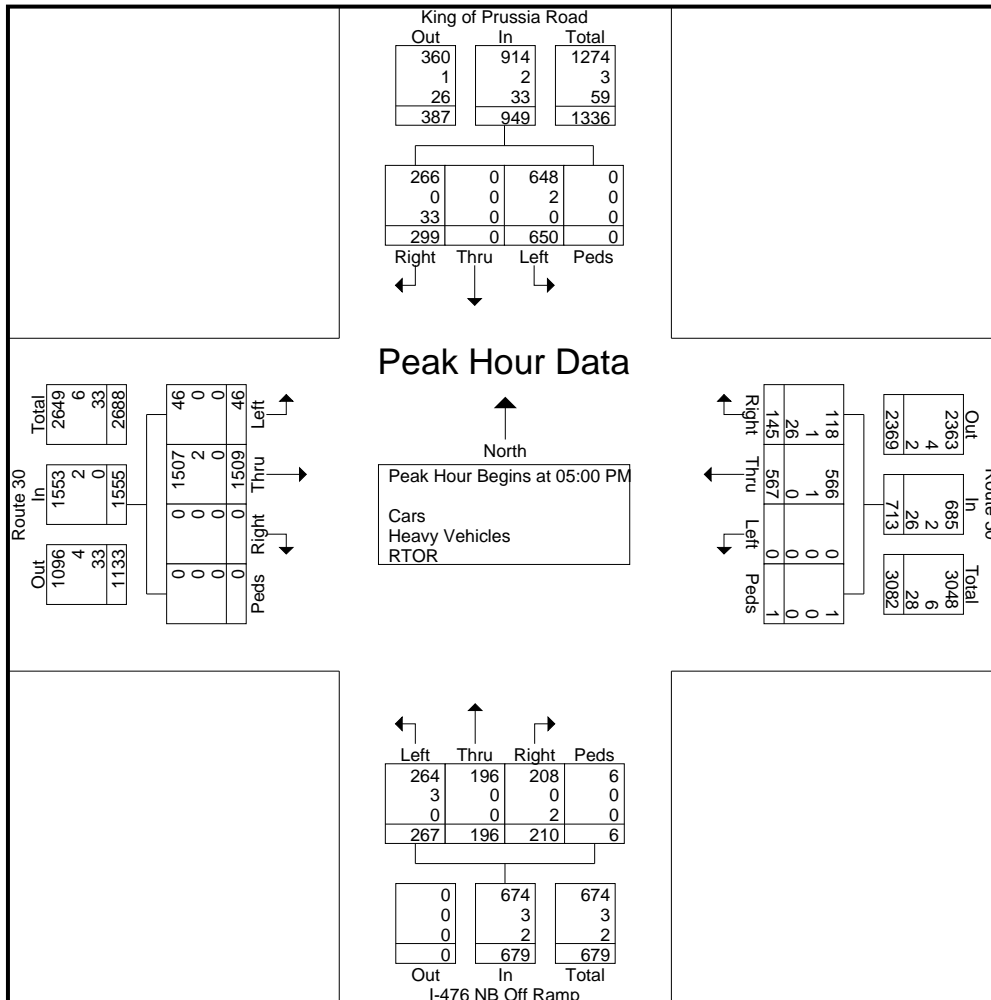


# Pennoni Associates

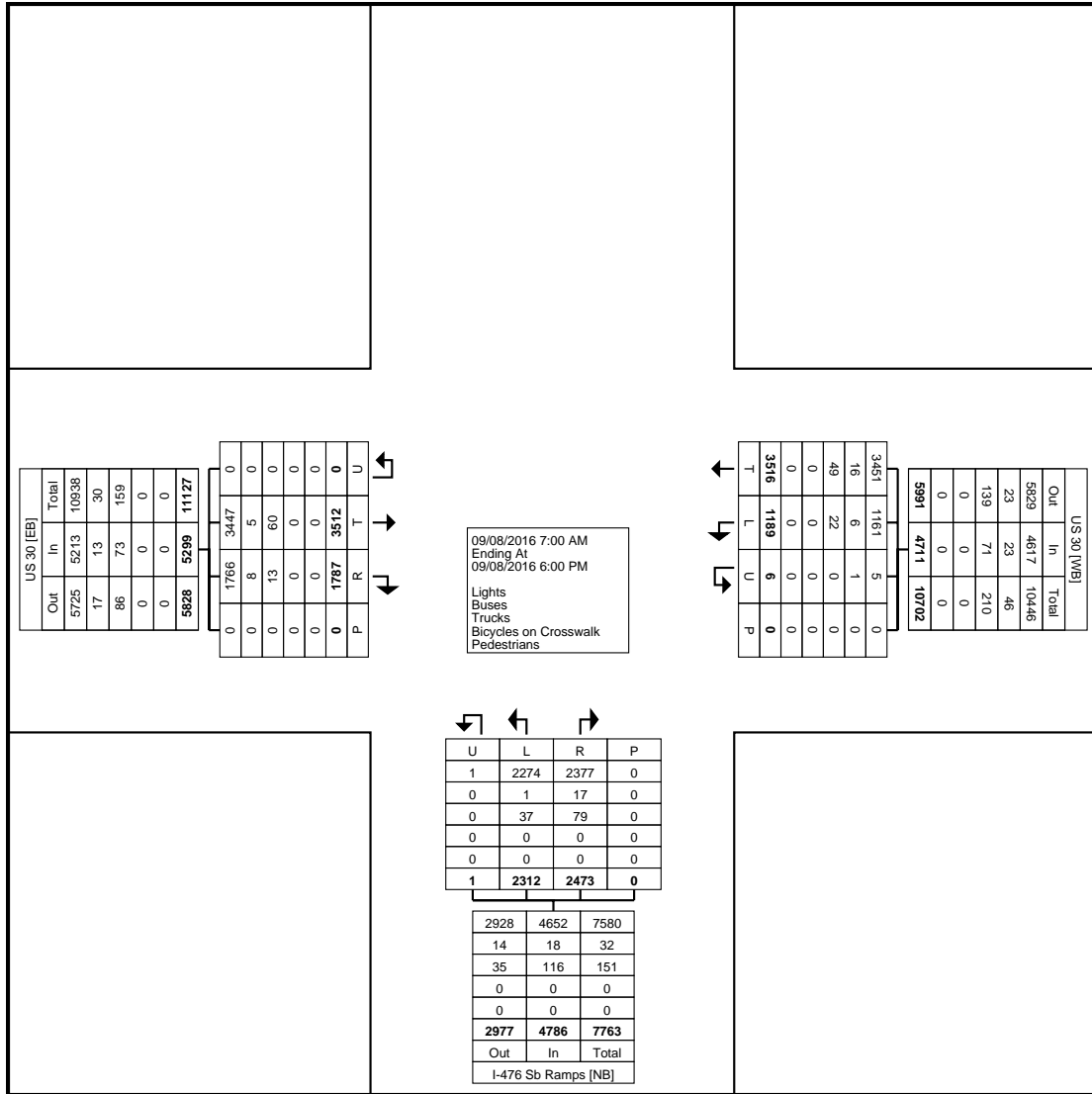
Location: Montgomery County, PA  
 Intersection: 476NB Off/Rt. 30/ KOP Rd.  
 Date: Tuesday, November 24, 2015  
 Counter: ET / JT

File Name : SS1124-1  
 Site Code : 00000000  
 Start Date : 11/24/2015  
 Page No : 4

Start Time	I-476 NB Off Ramp Northbound					King of Prussia Road Southbound					Route 30 Eastbound					Route 30 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	62	37	50	0	149	184	0	98	0	282	11	362	0	0	373	0	149	31	0	180	984
05:15 PM	73	49	45	0	167	180	0	87	0	267	16	394	0	0	410	0	151	39	0	190	1034
05:30 PM	77	43	62	0	182	164	0	64	0	228	10	392	0	0	402	0	124	32	1	157	969
05:45 PM	55	67	53	6	181	122	0	50	0	172	9	361	0	0	370	0	143	43	0	186	909
Total Volume	267	196	210	6	679	650	0	299	0	949	46	1509	0	0	1555	0	567	145	1	713	3896
% App. Total	.867	.731	.847	.250	.933	.883	.000	.763	.000	.841	.719	.957	.000	.000	.948	.000	.939	.843	.250	.938	.942
PHF	.867	.731	.847	.250	.933	.883	.000	.763	.000	.841	.719	.957	.000	.000	.948	.000	.939	.843	.250	.938	.942
Cars	264	196	208	6	674	648	0	266	0	914	46	1507	0	0	1553	0	566	118	1	685	3826
% Cars	98.9	100	99.0	100	99.3	99.7	0	89.0	0	96.3	100	99.9	0	0	99.9	0	99.8	81.4	100	96.1	98.2
Heavy Vehicles	1.1	0	0	0	0.4	0.3	0	0	0	0.2	0	0.1	0	0	0.1	0	0.2	0.7	0	0.3	0.2
% Heavy Vehicles	1.1	0	0	0	0.4	0.3	0	0	0	0.2	0	0.1	0	0	0.1	0	0.2	0.7	0	0.3	0.2
RTOR	0	0	2	0	2	0	0	33	0	33	0	0	0	0	0	0	0	26	0	26	61
% RTOR	0	0	1.0	0	0.3	0	0	11.0	0	3.5	0	0	0	0	0	0	0	17.9	0	3.6	1.6

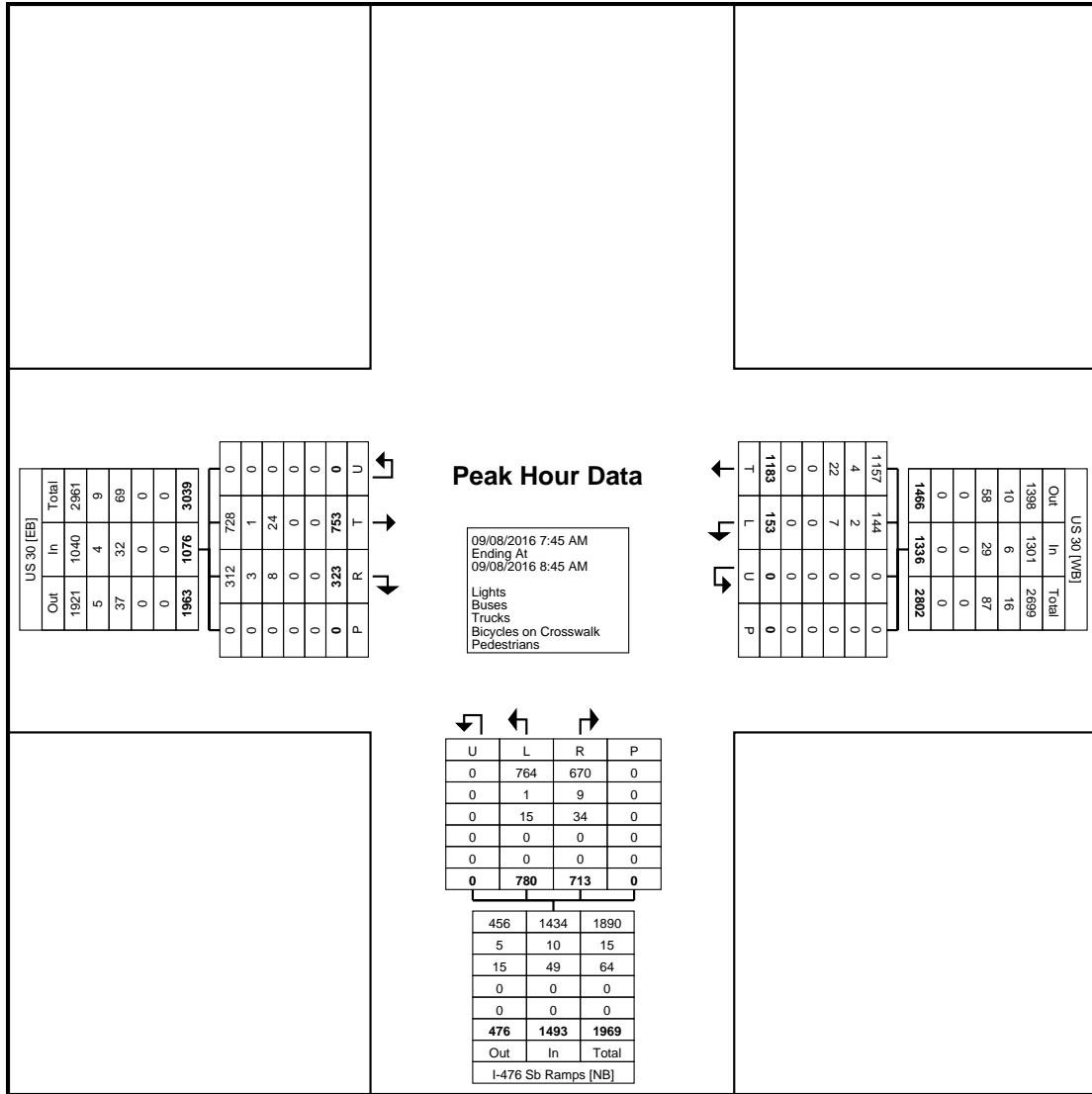






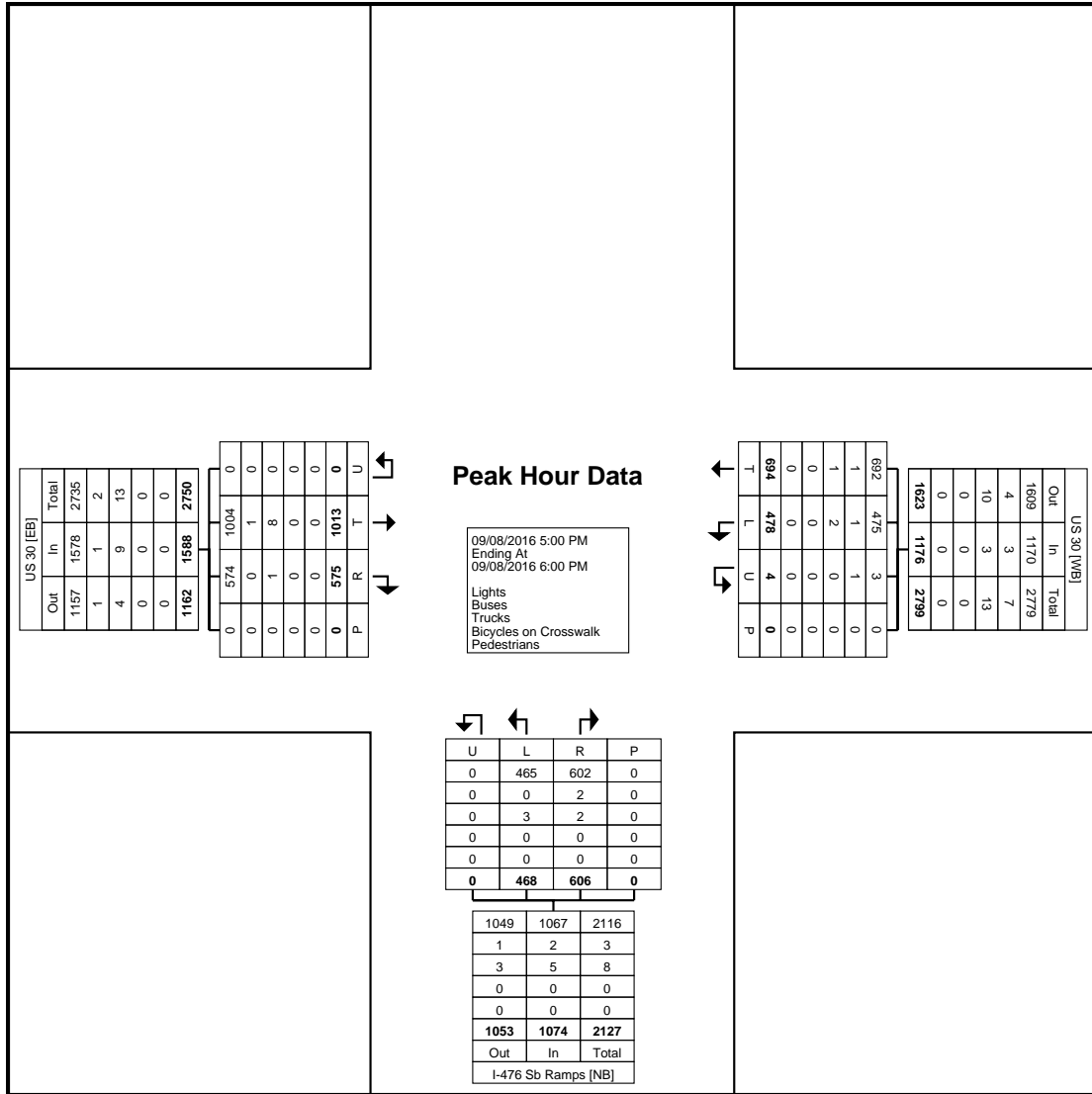
Turning Movement Data Plot





Turning Movement Peak Hour Data Plot (7:45 AM)





Turning Movement Peak Hour Data Plot (5:00 PM)



# APPENDIX D

Existing Condition Capacity Analysis Worksheets

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY






















145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



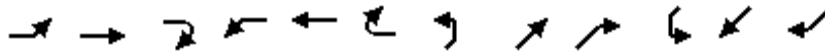
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	264	7	100	362	534	2	12	594	578
Future Volume (veh/h)	1	0	2	264	7	100	362	534	2	12	594	578
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1730	1853	1853	1773	1755	1808
Adj Flow Rate, veh/h	1	0	2	293	8	111	402	593	2	13	660	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	0	0	0	1	2
Cap, veh/h	303	0	357	406	23	326	448	1210	4	391	663	580
Arrive On Green	0.23	0.00	0.23	0.23	0.23	0.23	0.22	0.66	0.66	0.38	0.38	0.00
Sat Flow, veh/h	1293	0	1530	1396	101	1397	1648	1846	6	823	1755	1537
Grp Volume(v), veh/h	1	0	2	293	0	119	402	0	595	13	660	0
Grp Sat Flow(s),veh/h/ln	1293	0	1530	1396	0	1498	1648	0	1852	823	1755	1537
Q Serve(g_s), s	0.1	0.0	0.1	18.3	0.0	6.0	16.7	0.0	14.7	0.9	33.7	0.0
Cycle Q Clear(g_c), s	5.5	0.0	0.1	18.3	0.0	6.0	16.7	0.0	14.7	0.9	33.7	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	303	0	357	406	0	349	448	0	1214	391	663	580
V/C Ratio(X)	0.00	0.00	0.01	0.72	0.00	0.34	0.90	0.00	0.49	0.03	1.00	0.00
Avail Cap(c_a), veh/h	303	0	357	406	0	349	448	0	1214	391	663	580
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.17	0.17	0.00
Uniform Delay (d), s/veh	30.8	0.0	26.5	33.5	0.0	28.7	25.1	0.0	7.9	17.7	27.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	6.2	0.0	0.6	20.3	0.0	1.4	0.0	13.4	0.0
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	0.0	0.0	0.1	12.4	0.0	4.5	17.8	0.0	12.5	0.4	21.7	0.0
LnGrp Delay(d),s/veh	30.8	0.0	26.5	39.7	0.0	29.3	45.5	0.0	9.3	17.7	41.3	0.0
LnGrp LOS	C		C	D		C	D		A	B	D	
Approach Vol, veh/h		3			412			997			673	
Approach Delay, s/veh		27.9			36.7			23.9			40.8	
Approach LOS		C			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		64.0		26.0	25.0	39.0		26.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		58.0		20.0	19.0	33.0		20.0				
Max Q Clear Time (g_c+I1), s		16.7		20.8	19.2	36.2		8.0				
Green Ext Time (p_c), s		11.0		0.0	0.0	0.0		1.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			31.9									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	37	259	460	25	790	7	494	32	46	2	1	6
Future Volume (veh/h)	37	259	460	25	790	7	494	32	46	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	39	276	0	27	840	7	526	34	49	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	124	857	772	512	899	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	661	1714	1545	1068	1798	15	393	25	1520	0	97	194
Grp Volume(v), veh/h	39	276	0	27	0	847	560	0	49	9	0	0
Grp Sat Flow(s),veh/h/ln	661	1714	1545	1068	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	5.3	8.6	0.0	1.4	0.0	39.4	0.0	0.0	1.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	44.2	8.6	0.0	10.0	0.0	39.4	34.0	0.0	1.9	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	124	857	772	512	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.31	0.32	0.00	0.05	0.00	0.93	2.38	0.00	0.09	0.06	0.00	0.00
Avail Cap(c_a), veh/h	124	857	772	512	0	907	236	0	574	159	0	0
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)	0.72	0.72	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	41.6	13.4	0.0	16.4	0.0	21.1	33.6	0.0	18.0	21.6	0.0	0.0
Incr Delay (d2), s/veh	4.7	0.7	0.0	0.2	0.0	17.7	632.5	0.0	0.1	0.1	0.0	0.0
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	2.0	7.1	0.0	0.8	0.0	32.0	85.0	0.0	1.4	0.3	0.0	0.0
LnGrp Delay(d),s/veh	46.3	14.1	0.0	16.6	0.0	38.8	666.0	0.0	18.1	21.8	0.0	0.0
LnGrp LOS	D	B		B		D	F		B	C		
Approach Vol, veh/h		315			874			609			9	
Approach Delay, s/veh		18.1			38.1			613.9			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		46.7		36.0		41.4		36.0				
Green Ext Time (p_c), s		0.0		0.0		1.8		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				228.6								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/05/2018

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	5	26	933	56	60	242
Future Vol, veh/h	5	26	933	56	60	242
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	6	30	1072	64	69	278

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1540	1132	0	0	1154
Stage 1	1122	-	-	-	-
Stage 2	418	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	128	206	-	-	539
Stage 1	314	-	-	-	-
Stage 2	669	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	110	201	-	-	535
Mov Cap-2 Maneuver	229	-	-	-	-
Stage 1	310	-	-	-	-
Stage 2	582	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.2	0	2.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	205	535
HCM Lane V/C Ratio	-	-	0.174	0.129
HCM Control Delay (s)	-	-	26.2	12.7
HCM Lane LOS	-	-	D	B
HCM 95th %tile Q(veh)	-	-	0.6	0.4

HCM 2010 TWSC  
 4: King of Prussia Rd & Northern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑			↑
Traffic Vol, veh/h	0	0	983	0	0	295
Future Vol, veh/h	0	0	983	0	0	295
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	0	0	1046	0	0	314

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1360	1046	0	-	-	-
Stage 1	1046	-	-	-	-	-
Stage 2	314	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	165	280	-	0	0	-
Stage 1	341	-	-	0	0	-
Stage 2	745	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	165	280	-	-	-	-
Mov Cap-2 Maneuver	274	-	-	-	-	-
Stage 1	341	-	-	-	-	-
Stage 2	745	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	-	-
HCM Lane V/C Ratio	-	-
HCM Control Delay (s)	-	0
HCM Lane LOS	-	A
HCM 95th %tile Q(veh)	-	-

Intersection												
Int Delay, s/veh	5.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	9	0	128	0	0	0	171	978	0	0	239	57
Future Vol, veh/h	9	0	128	0	0	0	171	978	0	0	239	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	164	0	0	0	219	1254	0	0	306	73

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	2035	2043	343				379	0	0	1262	0	0
Stage 1	343	343	-				-	-	-	-	-	-
Stage 2	1692	1700	-				-	-	-	-	-	-
Critical Hdwy	6.51	6.5	6.24				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.51	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	59	57	695				1191	-	-	558	-	-
Stage 1	699	641	-				-	-	-	-	-	-
Stage 2	156	149	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	23	0	695				1191	-	-	558	-	-
Mov Cap-2 Maneuver	23	0	-				-	-	-	-	-	-
Stage 1	699	0	-				-	-	-	-	-	-
Stage 2	61	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	53.4	1.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1191	-	-	238	558	-	-
HCM Lane V/C Ratio	0.184	-	-	0.738	-	-	-
HCM Control Delay (s)	8.7	0	-	53.4	0	-	-
HCM Lane LOS	A	A	-	F	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	5.1	0	-	-

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↗↘	↘↗	↑
Traffic Vol, veh/h	0	0	1144	0	0	366
Future Vol, veh/h	0	0	1144	0	0	366
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	0	0	1378	0	0	441

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1819	1378	0	0	1378
Stage 1	1378	-	-	-	-
Stage 2	441	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	86	179	-	-	504
Stage 1	236	-	-	-	-
Stage 2	653	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	86	179	-	-	504
Mov Cap-2 Maneuver	86	-	-	-	-
Stage 1	236	-	-	-	-
Stage 2	653	-	-	-	-






















Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	504
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0



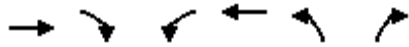
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	1262	0	0	526	255	748	701	332	251	0	104
Future Volume (veh/h)	169	1262	0	0	526	255	748	701	332	251	0	104
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	174	1301	0	0	542	0	771	723	342	259	0	107
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	282	1334	0	0	921	425	1660	690	586	363	0	0
Arrive On Green	0.06	0.27	0.00	0.00	0.54	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	259	
Grp Volume(v), veh/h	174	1301	0	0	542	0	771	723	342	259	57.1	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	5.7	42.5	0.0	0.0	11.8	0.0	16.7	43.0	19.8	8.0		
Cycle Q Clear(g_c), s	5.7	42.5	0.0	0.0	11.8	0.0	16.7	43.0	19.8	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	282	1334	0	0	921	425	1660	690	586	363		
V/C Ratio(X)	0.62	0.97	0.00	0.00	0.59	0.00	0.46	1.05	0.58	0.71		
Avail Cap(c_a), veh/h	451	1334	0	0	921	425	1660	690	586	363		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.92	0.92	0.00	0.00	0.94	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.1	39.7	0.0	0.0	21.2	0.0	17.4	33.5	26.4	50.7		
Incr Delay (d2), s/veh	2.0	18.4	0.0	0.0	2.6	0.0	0.2	47.6	1.5	6.4		
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		
%ile BackOfQ(95%),veh/ln	4.8	30.6	0.0	0.0	9.6	0.0	12.0	54.0	13.2	1.6		
LnGrp Delay(d),s/veh	52.1	58.1	0.0	0.0	23.8	0.0	17.6	81.1	27.9	57.1		
LnGrp LOS	D	E			C		B	F	C	E		
Approach Vol, veh/h		1475			542			1836				
Approach Delay, s/veh		57.4			23.8			44.5				
Approach LOS		E			C			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		14.4	34.6	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		45.0	19.2		8.2	14.3	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.0		0.2	6.8	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			47.2									
HCM 2010 LOS			D									
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/05/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	753	0	153	1183	780	713		
Future Volume (veh/h)	753	0	153	1183	780	713		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	768	0	156	1207	796	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2356	0	256	2117	945	431		
Arrive On Green	0.50	0.00	0.03	0.21	0.28	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	768	0	156	1207	796	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	10.7	0.0	5.4	35.3	24.8	0.0		
Cycle Q Clear(g_c), s	10.7	0.0	5.4	35.3	24.8	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2356	0	256	2117	945	431		
V/C Ratio(X)	0.33	0.00	0.61	0.57	0.84	0.00		
Avail Cap(c_a), veh/h	2356	0	317	2117	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.67	0.67	1.00	0.00		
Uniform Delay (d), s/veh	16.5	0.0	51.8	30.4	37.1	0.0		
Incr Delay (d2), s/veh	0.4	0.0	1.6	0.7	3.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.3	0.0	4.3	22.3	17.4	0.0		
LnGrp Delay(d),s/veh	16.9	0.0	53.4	31.1	40.1	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	768			1363	796			
Approach Delay, s/veh	16.9			33.7	40.1			
Approach LOS	B			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.2	13.9	59.9				73.8
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.3	7.9	13.2				37.8
Green Ext Time (p_c), s		3.0	0.1	15.0				10.5
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.0					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	535	1512	4	2	754	478	6	2	2	0	0	0
Future Volume (veh/h)	535	1512	4	2	754	478	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	557	1575	4	2	785	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	658	2843	7	18	2171	1010	21	7	22			
Arrive On Green	0.40	1.00	1.00	0.01	0.65	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	9	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	557	769	810	2	785	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	16.9	0.0	0.0	0.1	11.9	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	16.9	0.0	0.0	0.1	11.9	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	658	1389	1461	18	2171	1010	28	0	22			
V/C Ratio(X)	0.85	0.55	0.55	0.11	0.36	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2171	1010	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.25	0.25	0.25	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.5	0.0	0.0	53.9	8.9	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	1.4	0.4	0.4	2.6	0.5	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.0	0.3	0.3	0.1	9.5	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	32.9	0.4	0.4	56.5	9.4	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	A		E		E			
Approach Vol, veh/h		2136			787			10				
Approach Delay, s/veh		8.9			9.5			58.1				
Approach LOS		A			A			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			27.0	76.2		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			19.4	14.4		2.7				
Green Ext Time (p_c), s	0.0	36.5			1.6	26.5		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	889	52	209	1434	431	91	367	82	95	130	105
Future Volume (veh/h)	137	889	52	209	1434	431	91	367	82	95	130	105
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	143	926	54	218	1494	449	95	382	85	99	135	109
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1382	81	297	1446	652	151	491	110	246	634	476
Arrive On Green	0.07	0.44	0.44	0.07	0.44	0.44	0.24	0.24	0.24	0.07	0.36	0.36
Sat Flow, veh/h	1657	3174	185	1632	3319	1497	454	2078	466	1609	1785	1339
Grp Volume(v), veh/h	143	482	498	218	1494	449	287	0	275	99	123	121
Grp Sat Flow(s),veh/h/ln	1657	1652	1706	1632	1660	1497	1492	0	1506	1609	1638	1486
Q Serve(g_s), s	5.1	25.6	25.6	8.0	47.9	26.6	18.2	0.0	18.7	4.8	5.8	6.3
Cycle Q Clear(g_c), s	5.1	25.6	25.6	8.0	47.9	26.6	20.0	0.0	18.7	4.8	5.8	6.3
Prop In Lane	1.00		0.11	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	720	743	297	1446	652	396	0	356	246	582	528
V/C Ratio(X)	0.77	0.67	0.67	0.73	1.03	0.69	0.73	0.00	0.77	0.40	0.21	0.23
Avail Cap(c_a), veh/h	186	720	743	297	1446	652	450	0	411	391	789	716
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	24.7	24.7	21.1	31.0	25.0	39.6	0.0	39.2	28.3	24.7	24.9
Incr Delay (d2), s/veh	17.6	4.9	4.8	9.1	32.7	5.9	5.0	0.0	7.6	1.1	0.2	0.2
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	6.7	18.5	18.9	6.2	51.2	17.7	13.6	0.0	13.3	3.9	4.7	4.7
LnGrp Delay(d),s/veh	42.6	29.6	29.5	30.2	63.7	30.9	44.6	0.0	46.9	29.4	24.9	25.1
LnGrp LOS	D	C	C	C	F	C	D		D	C	C	C
Approach Vol, veh/h		1123			2161			562			343	
Approach Delay, s/veh		31.2			53.5			45.7			26.3	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	52.9		44.1	13.0	52.9	13.1	31.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0		52.0	7.0	33.0	17.0	29.0				
Max Q Clear Time (g_c+1), s	10.5	28.1		8.3	7.6	50.4	7.3	22.0				
Green Ext Time (p_c), s	0.0	4.6		6.2	0.0	0.0	0.1	2.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				44.3								
HCM 2010 LOS				D								

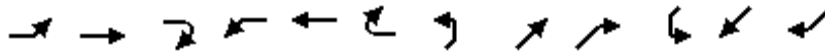
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	513	1	213	118	719	1	7	425	232
Future Volume (veh/h)	3	4	9	513	1	213	118	719	1	7	425	232
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1782	1872	1872	1800	1872	1872	1800	1800	1835
Adj Flow Rate, veh/h	3	4	10	558	1	232	128	782	1	8	462	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	387	167	419	596	3	581	382	976	1	209	696	603
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1166	457	1142	1408	7	1585	1714	1869	2	701	1800	1560
Grp Volume(v), veh/h	3	0	14	558	0	233	128	0	783	8	462	0
Grp Sat Flow(s),veh/h/ln	1166	0	1599	1408	0	1592	1714	0	1872	701	1800	1560
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.7	0.0	30.9	0.8	19.1	0.0
Cycle Q Clear(g_c), s	9.4	0.0	0.5	33.0	0.0	9.8	3.7	0.0	30.9	19.1	19.1	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	387	0	586	596	0	584	382	0	977	209	696	603
V/C Ratio(X)	0.01	0.00	0.02	0.94	0.00	0.40	0.33	0.00	0.80	0.04	0.66	0.00
Avail Cap(c_a), veh/h	387	0	586	596	0	584	398	0	977	209	696	603
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.94	0.94	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	29.7	0.0	21.1	15.4	0.0	17.7	30.3	22.8	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	22.4	0.0	0.4	0.5	0.0	6.9	0.3	4.6	0.0
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	0.1	0.0	0.4	24.4	0.0	7.8	3.2	0.0	24.7	0.3	15.3	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	52.1	0.0	21.6	15.9	0.0	24.5	30.6	27.4	0.0
LnGrp LOS	C		B	D		C	B		C	C	C	
Approach Vol, veh/h		17			791			911			470	
Approach Delay, s/veh		19.3			43.1			23.3			27.5	
Approach LOS		B			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.0		38.0	12.2	39.8		38.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0				
Max Q Clear Time (g_c+I1), s		32.9		35.5	6.2	21.6		11.9				
Green Ext Time (p_c), s		6.8		0.0	0.0	6.2		3.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			31.3									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	705	654	49	317	1	395	7	137	31	36	48
Future Volume (veh/h)	8	705	654	49	317	1	395	7	137	31	36	48
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	734	0	51	330	1	411	7	143	32	38	50
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	497	891	796	192	914	3	256	3	574	51	57	41
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1054	1782	1591	749	1829	6	466	8	1520	0	151	108
Grp Volume(v), veh/h	8	734	0	51	0	331	418	0	143	120	0	0
Grp Sat Flow(s),veh/h/ln	1054	1782	1591	749	0	1834	474	0	1520	258	0	0
Q Serve(g_s), s	0.4	31.5	0.0	5.6	0.0	9.9	0.0	0.0	5.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.8	31.5	0.0	37.1	0.0	9.9	34.0	0.0	5.8	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	497	891	796	192	0	917	259	0	574	148	0	0
V/C Ratio(X)	0.02	0.82	0.00	0.27	0.00	0.36	1.62	0.00	0.25	0.81	0.00	0.00
Avail Cap(c_a), veh/h	497	891	796	192	0	917	259	0	574	148	0	0
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)	0.21	0.21	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.6	19.1	0.0	34.9	0.0	13.7	33.2	0.0	19.2	23.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.9	0.0	3.3	0.0	1.1	294.7	0.0	0.2	27.4	0.0	0.0
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	0.2	18.8	0.0	2.4	0.0	9.0	49.6	0.0	4.4	5.6	0.0	0.0
LnGrp Delay(d),s/veh	16.6	21.1	0.0	38.2	0.0	14.8	328.0	0.0	19.5	50.8	0.0	0.0
LnGrp LOS	B	C		D		B	F		B	D		
Approach Vol, veh/h		742			382			561			120	
Approach Delay, s/veh		21.0			18.0			249.3			50.8	
Approach LOS		C			B			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		34.0		36.0		39.6		36.0				
Green Ext Time (p_c), s		5.1		0.0		2.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				93.3								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/05/2018

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	33	41	334	1	29	940
Future Vol, veh/h	33	41	334	1	29	940
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	39	48	393	1	34	1106

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1587	421	0	0	411
Stage 1	411	-	-	-	-
Stage 2	1176	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	120	602	-	-	1072
Stage 1	674	-	-	-	-
Stage 2	296	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	114	589	-	-	1063
Mov Cap-2 Maneuver	224	-	-	-	-
Stage 1	664	-	-	-	-
Stage 2	286	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.1	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	341	1063
HCM Lane V/C Ratio	-	-	0.255	0.032
HCM Control Delay (s)	-	-	19.1	8.5
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1	0.1

HCM 2010 TWSC  
 4: King of Prussia Rd & Northern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑			↑
Traffic Vol, veh/h	0	0	269	0	0	1042
Future Vol, veh/h	0	0	269	0	0	1042
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	94	94	93	94	94	93
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	289	0	0	1120

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1409	289	0	-	-	-
Stage 1	289	-	-	-	-	-
Stage 2	1120	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	154	755	-	0	0	-
Stage 1	765	-	-	0	0	-
Stage 2	315	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	154	755	-	-	-	-
Mov Cap-2 Maneuver	257	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	315	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	-	-
HCM Lane V/C Ratio	-	-
HCM Control Delay (s)	-	0
HCM Lane LOS	-	A
HCM 95th %tile Q(veh)	-	-



Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	5	0	40	0	0	0	23	270	0	0	1037	5
Future Vol, veh/h	5	0	40	0	0	0	23	270	0	0	1037	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
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	0	0	1	0
Mvmt Flow	5	0	43	0	0	0	24	287	0	0	1103	5

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	1442	1450	1106				1109	0	0	295	0	0
Stage 1	1106	1106	-				-	-	-	-	-	-
Stage 2	336	344	-				-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	147	132	258				637	-	-	1278	-	-
Stage 1	320	289	-				-	-	-	-	-	-
Stage 2	728	640	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	140	0	258				637	-	-	1278	-	-
Mov Cap-2 Maneuver	140	0	-				-	-	-	-	-	-
Stage 1	320	0	-				-	-	-	-	-	-
Stage 2	695	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.1	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	637	-	-	236	1278	-	-
HCM Lane V/C Ratio	0.038	-	-	0.203	-	-	-
HCM Control Delay (s)	10.9	0	-	24.1	0	-	-
HCM Lane LOS	B	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0	-	-

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↘		↑	↗	↘	↑
Traffic Vol, veh/h	0	0	292	0	0	1073
Future Vol, veh/h	0	0	292	0	0	1073
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	311	0	0	1141



























Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1452	311	0	0	311	0
Stage 1	311	-	-	-	-	-
Stage 2	1141	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	145	734	-	-	1261	-
Stage 1	748	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	145	734	-	-	1261	-
Mov Cap-2 Maneuver	145	-	-	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	307	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1261
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0

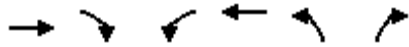
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 		 			 		
Traffic Volume (veh/h)	46	1515	0	0	569	146	268	197	211	652	0	300
Future Volume (veh/h)	46	1515	0	0	569	146	268	197	211	652	0	300
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	49	1612	0	0	605	0	285	210	224	694	0	319
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	127	1623	0	0	1361	633	1393	292	248	859	0	0
Arrive On Green	0.03	0.32	0.00	0.00	0.80	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	694	
Grp Volume(v), veh/h	49	1612	0	0	605	0	285	210	224	694	47.5	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	D	
Q Serve(g_s), s	1.6	52.5	0.0	0.0	6.1	0.0	6.0	12.3	16.0	23.0		
Cycle Q Clear(g_c), s	1.6	52.5	0.0	0.0	6.1	0.0	6.0	12.3	16.0	23.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	127	1623	0	0	1361	633	1393	292	248	859		
V/C Ratio(X)	0.39	0.99	0.00	0.00	0.44	0.00	0.20	0.72	0.90	0.81		
Avail Cap(c_a), veh/h	391	1623	0	0	1361	633	1393	292	248	859		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	52.3	37.1	0.0	0.0	7.4	0.0	19.8	43.6	45.1	41.7		
Incr Delay (d2), s/veh	1.7	19.6	0.0	0.0	1.0	0.0	0.1	8.4	32.9	5.8		
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		
%ile BackOfQ(95%),veh/ln	1.4	37.1	0.0	0.0	5.1	0.0	4.9	11.0	13.8	16.3		
LnGrp Delay(d),s/veh	54.0	56.7	0.0	0.0	8.3	0.0	19.8	52.0	78.0	47.5		
LnGrp LOS	D	E			A		B	D	E	D		
Approach Vol, veh/h		1661			605			719				
Approach Delay, s/veh		56.6			8.3			47.4				
Approach LOS		E			A			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		9.2	48.8	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.0	8.5		4.1	8.6	25.5	18.5				
Green Ext Time (p_c), s		0.0	0.8		0.0	18.4	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			45.1									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/05/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1013	0	478	694	606	468		
Future Volume (veh/h)	1013	0	478	694	606	468		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1034	0	488	708	618	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	2154	0	621	2331	742	355		
Arrive On Green	0.46	0.00	0.06	0.23	0.22	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1034	0	488	708	618	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	16.8	0.0	15.9	19.1	19.3	0.0		
Cycle Q Clear(g_c), s	16.8	0.0	15.9	19.1	19.3	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2154	0	621	2331	742	355		
V/C Ratio(X)	0.48	0.00	0.79	0.30	0.83	0.00		
Avail Cap(c_a), veh/h	2154	0	816	2331	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.85	0.85	1.00	0.00		
Uniform Delay (d), s/veh	20.8	0.0	49.4	20.6	40.9	0.0		
Incr Delay (d2), s/veh	0.8	0.0	3.2	0.3	5.5	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	1.9	0.0	11.8	13.6	14.6	0.0		
LnGrp Delay(d),s/veh	21.6	0.0	52.6	20.9	46.5	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1034			1196	618			
Approach Delay, s/veh	21.6			33.9	46.5			
Approach LOS	C			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.3	25.6	55.2				80.7
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	26.0	37.0				69.0
Max Q Clear Time (g_c+11), s		21.8	18.4	19.3				21.6
Green Ext Time (p_c), s		1.5	1.1	11.1				18.3
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			32.1					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	1049	1653	14	6	679	575	3	1	2	0	0	0
Future Volume (veh/h)	1049	1653	14	6	679	575	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1093	1722	15	6	707	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1018	2795	24	23	1832	852	18	6	18			
Arrive On Green	0.62	1.00	1.00	0.01	0.54	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3342	29	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1093	847	890	6	707	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	34.0	0.0	0.0	0.4	13.3	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	34.0	0.0	0.0	0.4	13.3	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1018	1376	1444	23	1832	852	24	0	18			
V/C Ratio(X)	1.07	0.62	0.62	0.26	0.39	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1018	1376	1444	109	1832	852	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.14	0.14	0.14	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.0	0.0	0.0	53.7	14.7	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	36.4	0.3	0.3	5.6	0.6	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	66.2	0.2	0.2	0.4	10.5	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	57.4	0.3	0.3	59.3	15.3	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		2830			713			6				
Approach Delay, s/veh		22.4			15.6			56.7				
Approach LOS		C			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			39.0	64.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			33.0	53.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			36.5	15.8		2.7				
Green Ext Time (p_c), s	0.0	40.2			0.0	26.1		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				21.1								
HCM 2010 LOS				C								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd.

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	1134	92	195	1029	124	80	208	139	404	441	212
Future Volume (veh/h)	118	1134	92	195	1029	124	80	208	139	404	441	212
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	122	1169	95	201	1061	128	82	214	143	416	455	219
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	252	1234	100	219	1315	587	147	341	231	330	851	406
Arrive On Green	0.07	0.39	0.39	0.08	0.39	0.39	0.25	0.25	0.25	0.08	0.38	0.38
Sat Flow, veh/h	1706	3190	259	1664	3352	1496	386	1348	914	1689	2221	1061
Grp Volume(v), veh/h	122	623	641	201	1061	128	215	0	224	416	345	329
Grp Sat Flow(s),veh/h/ln	1706	1703	1746	1664	1676	1496	1216	0	1432	1689	1690	1591
Q Serve(g_s), s	4.1	35.4	35.5	7.3	28.1	5.7	12.2	0.0	13.8	8.0	15.8	16.0
Cycle Q Clear(g_c), s	4.1	35.4	35.5	7.3	28.1	5.7	15.6	0.0	13.8	8.0	15.8	16.0
Prop In Lane	1.00		0.15	1.00		1.00	0.38		0.64	1.00		0.67
Lane Grp Cap(c), veh/h	252	659	676	219	1315	587	357	0	362	330	648	610
V/C Ratio(X)	0.48	0.95	0.95	0.92	0.81	0.22	0.60	0.00	0.62	1.26	0.53	0.54
Avail Cap(c_a), veh/h	278	659	676	219	1315	587	459	0	487	330	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.7	29.6	29.7	23.5	27.0	20.2	33.3	0.0	33.1	34.7	23.9	24.0
Incr Delay (d2), s/veh	1.4	24.1	24.1	38.6	5.4	0.9	1.6	0.0	1.7	139.9	0.7	0.7
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	3.7	28.6	29.2	9.6	20.1	4.5	9.4	0.0	9.5	32.7	12.0	11.5
LnGrp Delay(d),s/veh	22.2	53.7	53.7	62.2	32.4	21.0	34.9	0.0	34.8	174.7	24.6	24.7
LnGrp LOS	C	D	D	E	C	C	C		C	F	C	C
Approach Vol, veh/h		1386			1390			439			1090	
Approach Delay, s/veh		51.0			35.7			34.8			81.9	
Approach LOS		D			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	43.7		43.3	12.5	44.2	13.0	30.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	30.0	29.0		46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+19), s	19.8	37.9		18.3	6.6	30.6	10.5	17.6				
Green Ext Time (p_c), s	0.0	0.0		8.5	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				52.2								
HCM 2010 LOS				D								

# APPENDIX E

## Volume Development Worksheets

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507







Volume Development Table

University of Pennsylvania Health Systems Weekday AM Traffic Volumes	m/wmt	m/wmt no	Count Data	2016 base	Existing Site Trips						2020 Base	2025 Base	2020 No Build	2025 No Build	New Trips						Total Trips	AM 2020 Build	AM 2025 Build
					538			73							154			577					
					%	in	out	%	in	out					%	in	out	%	in	out			
Lancaster Avenue (E/W) and I-476 NB Off Ramps/ King of Prussia Road (N/S)	eb left	1	168	169	35	188	0	188	0	171	174	360	363	35	202	0	202	373	376				
	eb thru	2	1257	1262	0	0	0	0	1281	1306	1281	1306	0	0	0	0	0	1281	1306				
	wb thru	3	524	526	0	0	0	0	534	544	534	544	0	0	0	0	0	534	544				
	wb right	4	254	255	20	108	0	108	259	264	366	371	20	115	0	0	0	374	379				
	nb left	5	745	748	0	0	0	0	759	774	759	774	0	0	0	0	0	759	774				
	nb thru	6	698	701	20	108	0	108	711	725	819	833	20	115	0	0	0	827	840				
	nb right	7	331	332	0	0	0	0	337	344	337	344	0	0	0	0	0	337	344				
	sb left	8	250	251	0	0	40	29	255	260	284	289	0	0	40	62	0	316	321				
	sb right	9	104	104	0	0	35	26	106	108	132	134	0	0	35	54	0	160	162				
Lancaster Avenue (E/W) and I-476 SB Off Ramps (N/S)	eb thru	1	753	753	15	81	0	81	765	779	845	860	15	87	0	0	0	851	866				
	eb right	2	323	323	0	0	0	0	328	334	328	334	0	0	0	0	0	328	334				
	wb left	3	153	153	0	0	20	15	155	158	170	173	0	0	20	0	0	186	189				
	wb thru	4	1183	1183	0	0	15	11	1201	1224	1212	1235	0	0	15	23	0	1224	1247				
	nb left	5	780	780	0	0	0	0	792	807	792	807	0	0	0	0	0	792	807				
	nb thru	6	713	713	20	108	0	108	724	738	831	845	20	115	0	0	0	839	853				
	nb right	1	533	535	0	0	20	15	543	554	558	568	0	0	20	31	0	574	584				
	eb thru	2	1506	1512	0	0	20	15	1535	1564	1549	1579	0	0	20	31	0	1566	1595				
	eb right	3	4	4	0	0	0	0	4	4	4	4	0	0	0	0	0	4	4				
Lancaster Avenue (E/W) and Radnor Chester Road (N/S)	wb left	4	2	2	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2				
	wb thru	5	751	754	20	108	0	108	765	780	873	888	20	115	0	0	0	881	895				
	wb right	6	476	478	0	0	0	0	485	494	485	494	0	0	0	0	0	485	494				
	nb left	7	6	6	0	0	0	0	6	6	6	6	0	0	0	0	0	6	6				
	nb thru	8	2	2	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2				
	nb right	9	2	2	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2				
	eb left	1	137	137	0	0	0	0	139	142	139	142	0	0	0	0	0	139	142				
	eb thru	2	889	889	15	81	0	81	903	920	983	1001	15	87	0	0	0	989	1006				
	eb right	3	52	52	0	0	0	0	53	54	53	54	0	0	0	0	0	53	54				
Lancaster Avenue (E/W) and Radnor Chester Road (N/S)	wb left	4	209	209	0	0	0	0	212	216	212	216	0	0	0	0	0	212	216				
	wb thru	5	1434	1434	0	0	15	11	1456	1484	1467	1495	0	0	15	23	0	1479	1507				
	wb right	6	431	431	0	0	0	0	438	446	438	446	0	0	0	0	0	438	446				
	nb left	7	91	91	0	0	0	0	92	94	92	94	0	0	0	0	0	92	94				
	nb thru	8	367	367	0	0	0	0	373	380	373	380	0	0	0	0	0	373	380				
	nb right	9	82	82	0	0	0	0	83	85	83	85	0	0	0	0	0	83	85				
	sb left	10	95	95	0	0	0	0	96	98	96	98	0	0	0	0	0	96	98				
	sb thru	11	130	130	0	0	0	0	132	135	132	135	0	0	0	0	0	132	135				
	sb right	12	105	105	0	0	0	0	107	109	107	109	0	0	0	0	0	107	109				

Volume Development Table

University of Pennsylvania Health Systems Weekday PM Traffic Volumes		m/vmt	m/vmt no	Count Data	2016 base	Existing Site Trips					2020 Base	2025 Base	2020 No Build	2025 No Build	New Trips					Total Trips	PM 2020 Build	PM 2025 Build		
						95 %	in vol	462 %	out vol	158 %					in vol	425 %	out vol							
King of Prussia Road (N/S) and Parking Drive/ Matsonford Road (E/W)	eb left	1	3	3	0	0	0	0	0	0	3	3	3	0	0	0	0	0	0	0	0	3	3	
	eb thru	2	4	4	0	0	0	0	0	0	4	4	4	0	0	0	0	0	0	0	0	4	4	
	eb right	3	9	9	0	0	0	0	0	0	9	9	9	0	0	0	0	0	0	0	0	9	9	
	wb left	4	513	513	8	8	0	0	8	521	531	528	538	8	13	0	0	0	0	0	0	13	533	543
	wb thru	5	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1
	wb right	6	212	213	0	0	0	0	0	216	220	216	220	0	0	0	0	0	0	0	0	216	216	220
	nb left	10	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	0	0	0	7	7	7
	nb thru	11	423	425	0	0	15	69	37	431	439	500	509	0	0	15	64	0	0	0	0	495	503	503
	nb right	12	231	232	0	0	8	37	0	235	240	272	277	0	0	8	34	0	0	0	0	269	274	274
	sb left	7	118	118	0	0	0	0	0	120	123	120	123	0	0	0	0	0	0	0	0	120	120	123
	sb thru	8	716	719	15	14	0	0	14	730	744	744	758	15	24	0	0	0	0	0	0	24	753	767
sb right	9	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	
King of Prussia Road (E/W) and Radnor Chester Road (N/S)	eb left	1	8	8	0	0	0	0	8	8	8	8	0	0	0	0	0	0	0	0	0	8	8	
	eb thru	2	705	705	23	22	0	0	22	716	729	738	751	23	36	0	0	0	0	0	0	36	752	766
	eb right	3	654	654	0	0	0	0	0	664	677	664	677	0	0	0	0	0	0	0	0	664	677	677
	wb left	4	49	49	0	0	2	9	9	50	51	59	60	0	0	2	9	0	0	0	0	9	58	59
	wb thru	5	317	317	0	0	23	106	106	322	328	428	434	0	0	23	98	0	0	0	0	98	420	426
	wb right	6	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1
	nb left	7	395	395	0	0	0	0	0	401	409	401	409	0	0	0	0	0	0	0	0	401	409	409
	nb thru	8	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	0	0	0	7	7	7
	nb right	9	137	137	2	2	0	0	2	139	142	141	144	2	3	0	0	0	0	0	0	3	142	145
	sb left	10	31	31	0	0	0	0	0	31	32	31	32	0	0	0	0	0	0	0	0	31	31	32
	sb thru	11	36	36	0	0	0	0	0	37	37	37	37	0	0	0	0	0	0	0	0	37	37	37
	sb right	12	48	48	0	0	0	0	0	49	50	49	50	0	0	0	0	0	0	0	0	49	50	50
King of Prussia Road (N/S) and Sepia Driveway (W)	wb left	1	33	33	0	0	25	116	116	34	149	150	150	0	0	10	43	0	0	0	0	43	76	77
	wb thru	2	41	41	0	0	10	46	46	42	42	88	89	0	0	10	43	0	0	0	0	84	85	
	wb right	3	334	334	0	0	15	69	69	339	346	408	415	0	0	15	64	0	0	0	0	403	409	
	nb left	4	1	1	25	24	0	0	24	1	25	25	25	10	16	0	0	0	0	0	0	16	17	17
	nb thru	5	29	29	10	10	0	0	10	29	30	39	40	15	24	0	0	0	0	0	0	24	53	54
	nb right	6	940	940	15	14	0	0	14	954	973	969	987	10	16	0	0	0	0	0	0	16	970	988
	sb left	1	0	0	0	0	5	23	23	0	0	23	23	0	0	0	0	0	0	0	0	0	0	0
	sb thru	2	0	0	0	0	5	23	23	0	0	23	23	0	0	0	0	0	0	0	0	0	0	0
	sb right	3	269	269	25	24	10	46	70	273	278	343	348	10	16	15	64	0	0	0	0	80	353	358
	nb left	4	1042	1042	15	14	25	116	130	1058	1078	1188	1208	10	16	10	43	0	0	0	0	58	1116	1136
	King of Prussia Road (N/S) and Ratder Road(E/W)	eb left	1	5	5	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0	0	0	5	5
		eb thru	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
eb right		3	40	40	0	0	0	0	0	41	42	41	42	0	0	0	0	0	0	0	0	41	42	
wb left		4	0	0	0	0	0	0	0	0	0	0	0	0	0	64	272	0	0	0	0	272	272	
wb thru		5	0	0	0	0	0	0	0	0	0	0	0	0	0	14	60	0	0	0	0	60	60	
wb right		6	23	23	0	0	0	0	0	23	24	23	24	0	0	0	0	0	0	0	0	23	24	
nb left		7	269	270	25	24	10	46	70	274	279	344	349	10	16	1	4	0	0	0	0	20	294	299
nb thru		8	0	0	5	5	0	0	5	0	0	5	5	64	101	0	0	0	0	0	0	101	101	
nb right		9	0	0	5	5	0	0	5	0	0	5	5	9	14	0	0	0	0	0	0	14	14	
sb left		10	1033	1037	10	10	30	139	148	1053	1073	1201	1221	1	2	10	43	0	0	0	0	44	1097	1117
sb thru		11	5	5	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0	0	5	5	
sb right		12	0	0	0	0	45	208	208	0	0	208	208	0	0	1	4	0	0	0	0	4	4	
King of Prussia Road (N/S) and Southern Driveway (E/W)	wb left	1	0	0	0	0	10	46	46	0	0	46	46	0	0	1	4	0	0	0	0	4	4	
	wb thru	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	wb right	3	292	292	30	29	0	0	29	296	302	325	331	74	117	0	0	0	0	0	0	117	413	419
	nb left	4	0	0	45	43	0	0	43	0	0	43	43	1	2	0	0	0	0	0	0	2	2	
	nb thru	5	0	0	10	10	0	0	10	0	0	10	10	1	2	0	0	0	0	0	0	2	2	
	nb right	6	1073	1073	0	0	30	139	139	1089	1110	1228	1249	0	0	74	315	0	0	0	0	315	1404	1425

Volume Development Table

University of Pennsylvania Health Systems Weekday PM Traffic Volumes		m/vmt	m/vmt no	Count Data	2016 base	Existing Site Trips				2020 Base	2025 Base	2020 No Build	2025 No Build	New Trips				Total Trips	PM 2020 Build	PM 2025 Build	
						%	in	out	%					in	out	%	in				out
Lancaster Avenue (E/W) and I-476 NB Off Ramps/ King of Prussia Road (N/S)		nb left	1	46	46	35	33	0	0	33	47	80	81	35	55	0	0	55	102	103	
		eb thru	2	1509	1515	0	0	0	0	0	1538	1538	1538	1567	0	0	0	0	1538	1567	
		wb thru	3	567	569	0	0	0	0	0	578	589	578	589	0	0	0	0	578	589	
		wb right	4	145	146	20	19	0	0	19	148	151	167	170	20	32	0	0	32	179	182
		nb left	5	267	268	0	0	0	0	0	272	277	272	277	0	0	0	0	272	277	
		nb thru	6	196	197	20	19	0	0	19	200	204	219	223	20	32	0	0	32	231	235
		nb right	7	210	211	0	0	0	0	0	214	218	218	218	0	0	0	0	214	218	
		sb left	8	650	652	0	0	40	185	185	662	675	847	860	0	0	40	170	170	832	845
		sb right	9	299	300	0	0	35	162	162	305	311	466	472	0	0	35	149	149	453	459
Lancaster Avenue (E/W) and I-476 SB Off Ramps (N/S)		eb thru	1	1013	1013	15	14	0	0	14	1028	1043	1062	15	24	0	0	24	1052	1072	
		eb right	2	575	575	0	0	0	0	0	584	584	584	595	0	0	0	0	584	595	
		wb left	3	478	478	0	0	20	92	92	485	495	578	587	0	0	20	85	570	580	
		wb thru	4	694	694	0	0	15	69	69	705	718	774	787	0	0	15	64	768	782	
		nb left	5	606	606	0	0	0	0	0	615	627	615	627	0	0	0	0	615	627	
		nb right	6	468	468	20	19	0	0	19	475	484	494	503	20	32	0	0	32	507	516
Lancaster Avenue (E/W) and I-476 NB On Ramp/ Hillside Circuit (N/S)		eb left	1	1045	1049	0	0	20	92	92	1065	1157	1178	0	0	20	85	85	1150	1170	
		eb thru	2	1647	1653	0	0	20	92	92	1679	1771	1803	0	0	20	85	85	1764	1796	
		eb right	3	14	14	0	0	0	0	0	14	15	14	15	0	0	0	0	14	15	
		wb left	4	6	6	0	0	0	0	0	6	6	6	6	0	0	0	0	6	6	
		wb thru	5	676	679	20	19	0	0	19	689	702	708	721	20	32	0	0	32	721	734
		wb right	6	573	575	0	0	0	0	0	584	595	584	595	0	0	0	0	584	595	
		nb left	7	3	3	0	0	0	0	0	3	3	3	3	0	0	0	0	3	3	
		nb thru	8	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	
		nb right	9	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	2	2	
Lancaster Avenue (E/W) and Radnor Chester Road (N/S)		eb left	1	118	118	0	0	0	0	120	122	120	122	0	0	0	0	0	120	122	
		eb thru	2	1134	1134	15	14	0	0	14	1151	1166	1188	15	24	0	0	24	1175	1197	
		eb right	3	92	92	0	0	0	0	0	93	93	93	95	0	0	0	0	93	95	
		wb left	4	195	195	0	0	0	0	0	198	202	198	202	0	0	0	0	198	202	
		wb thru	5	1029	1029	0	0	15	69	69	1045	1065	1114	1134	0	0	15	64	64	1108	1128
		wb right	6	124	124	0	0	0	0	0	126	128	126	128	0	0	0	0	126	128	
		nb left	7	80	80	0	0	0	0	0	81	83	81	83	0	0	0	0	81	83	
		nb thru	8	208	208	0	0	0	0	0	211	215	211	215	0	0	0	0	211	215	
		nb right	9	139	139	0	0	0	0	0	141	144	141	144	0	0	0	0	141	144	
		sb left	10	404	404	0	0	0	0	0	410	418	410	418	0	0	0	0	410	418	
		sb thru	11	441	441	0	0	0	0	0	448	456	448	456	0	0	0	0	448	456	
		sb right	12	212	212	0	0	0	0	0	215	219	215	219	0	0	0	0	215	219	

# APPENDIX F

2020 and 2025 No Build Condition Capacity Analysis Worksheets

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD

RADNOR TOWNSHIP






















DELAWARE COUNTY, PA

UPHS1507



HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

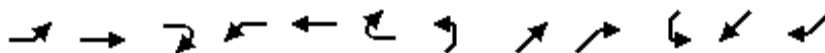
01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	311	7	102	368	623	2	12	614	593
Future Volume (veh/h)	1	0	2	311	7	102	368	623	2	12	614	593
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1730	1835	1853	1773	1755	1808
Adj Flow Rate, veh/h	1	0	2	346	8	113	409	692	2	13	682	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	333	0	391	437	25	357	392	1158	3	372	683	598
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1291	0	1530	1396	99	1398	1648	1829	5	750	1755	1537
Grp Volume(v), veh/h	1	0	2	346	0	121	409	0	694	13	682	0
Grp Sat Flow(s),veh/h/ln	1291	0	1530	1396	0	1497	1648	0	1834	750	1755	1537
Q Serve(g_s), s	0.1	0.0	0.1	22.1	0.0	5.9	17.0	0.0	20.1	1.0	34.9	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.1	22.1	0.0	5.9	17.0	0.0	20.1	1.0	34.9	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	391	437	0	383	392	0	1162	372	683	598
V/C Ratio(X)	0.00	0.00	0.01	0.79	0.00	0.32	1.04	0.00	0.60	0.03	1.00	0.00
Avail Cap(c_a), veh/h	333	0	391	437	0	383	392	0	1162	372	683	598
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.0	33.2	0.0	27.1	27.5	0.0	9.7	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	9.6	0.0	0.5	57.5	0.0	2.3	0.2	34.2	0.0
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	0.0	0.0	0.1	14.7	0.0	4.4	28.7	0.0	16.1	0.4	31.3	0.0
LnGrp Delay(d),s/veh	29.1	0.0	25.0	42.8	0.0	27.6	84.9	0.0	12.0	17.3	61.7	0.0
LnGrp LOS	C		C	D		C	F		B	B	E	
Approach Vol, veh/h		3			467			1103			695	
Approach Delay, s/veh		26.4			38.8			39.0			60.9	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		22.1		24.6	19.5	37.4		7.9				
Green Ext Time (p_c), s		12.1		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			45.7									
HCM 2010 LOS			D									

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	387	467	27	819	7	502	32	57	2	1	6
Future Volume (veh/h)	38	387	467	27	819	7	502	32	57	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	412	0	29	871	7	534	34	61	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	103	857	772	402	899	7	226	9	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	642	1714	1545	943	1799	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	412	0	29	0	878	568	0	61	9	0	0
Grp Sat Flow(s),veh/h/ln	642	1714	1545	943	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	3.3	14.2	0.0	1.9	0.0	42.2	0.0	0.0	2.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.2	0.0	16.1	0.0	42.2	34.0	0.0	2.3	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	103	857	772	402	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.39	0.48	0.00	0.07	0.00	0.97	2.41	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	103	857	772	402	0	907	236	0	574	159	0	0
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)	0.59	0.59	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.1	14.8	0.0	20.1	0.0	21.8	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	6.4	1.1	0.0	0.3	0.0	23.1	648.0	0.0	0.1	0.1	0.0	0.0
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	2.1	10.2	0.0	1.0	0.0	35.3	86.8	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	50.4	16.0	0.0	20.5	0.0	45.0	681.6	0.0	18.2	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		452			907			629			9	
Approach Delay, s/veh		19.0			44.2			617.3			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		44.2		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				218.9								
HCM 2010 LOS				F								



HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/05/2018

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	34	958	191	115	326
Future Vol, veh/h	23	34	958	191	115	326
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	26	39	1101	220	132	375

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1869	1238	0	0	1338
Stage 1	1228	-	-	-	-
Stage 2	641	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	80	177	-	-	455
Stage 1	279	-	-	-	-
Stage 2	528	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	56	173	-	-	451
Mov Cap-2 Maneuver	169	-	-	-	-
Stage 1	275	-	-	-	-
Stage 2	373	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.6	0	4.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	171	451
HCM Lane V/C Ratio	-	-	0.383	0.293
HCM Control Delay (s)	-	-	38.6	16.3
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.7	1.2

HCM 2010 TWSC  
 4: King of Prussia Rd & Northern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑			↑
Traffic Vol, veh/h	4	4	1140	0	0	398
Future Vol, veh/h	4	4	1140	0	0	398
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	4	4	1213	0	0	423

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1636	1213	0	-	-	-
Stage 1	1213	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	112	224	-	0	0	-
Stage 1	284	-	-	0	0	-
Stage 2	665	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	112	224	-	-	-	-
Mov Cap-2 Maneuver	222	-	-	-	-	-
Stage 1	284	-	-	-	-	-
Stage 2	665	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 223	-
HCM Lane V/C Ratio	- 0.038	-
HCM Control Delay (s)	- 21.8	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.1	-

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	9	0	130	0	0	0	173	1134	27	27	318	58
Future Vol, veh/h	9	0	130	0	0	0	173	1134	27	27	318	58
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	167	0	0	0	222	1454	35	35	408	74

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	2429	2454	445				482	0	0	1496	0	0
Stage 1	514	514	-				-	-	-	-	-	-
Stage 2	1915	1940	-				-	-	-	-	-	-
Critical Hdwy	6.51	6.5	6.24				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.51	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	33	31	609				1091	-	-	454	-	-
Stage 1	582	539	-				-	-	-	-	-	-
Stage 2	120	113	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	0	0	609				1091	-	-	454	-	-
Mov Cap-2 Maneuver	0	0	-				-	-	-	-	-	-
Stage 1	520	0	-				-	-	-	-	-	-
Stage 2	0	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	1.2	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1091	-	-	609	454	-	-
HCM Lane V/C Ratio	0.203	-	-	0.293	0.076	-	-
HCM Control Delay (s)	9.1	0	-	13.3	13.6	0	-
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0.8	-	-	1.2	0.2	-	-

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/05/2018

Intersection						
Int Delay, s/veh	5.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	33	7	1323	242	54	393
Future Vol, veh/h	33	7	1323	242	54	393
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	40	8	1594	292	65	473






















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2198	1594	0	0	1594
Stage 1	1594	-	-	-	-
Stage 2	604	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	50	133	-	-	417
Stage 1	185	-	-	-	-
Stage 2	550	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	42	133	-	-	417
Mov Cap-2 Maneuver	42	-	-	-	-
Stage 1	185	-	-	-	-
Stage 2	464	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	265	0	1.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	48	417
HCM Lane V/C Ratio	-	-	1.004	0.156
HCM Control Delay (s)	-	-	265	15.2
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	4.3	0.5

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	1281	0	0	534	366	759	819	337	284	0	132
Future Volume (veh/h)	360	1281	0	0	534	366	759	819	337	284	0	132
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	371	1321	0	0	551	0	782	844	347	293	0	136
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	293	
Grp Volume(v), veh/h	371	1321	0	0	551	0	782	844	347	293	63.9	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.1	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Cycle Q Clear(g_c), s	12.1	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.82	0.99	0.00	0.00	0.74	0.00	0.47	1.22	0.59	0.81		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.7	40.0	0.0	0.0	48.0	0.0	17.4	33.5	26.5	51.2		
Incr Delay (d2), s/veh	10.4	20.9	0.0	0.0	5.9	0.0	0.2	113.4	1.6	12.8		
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		
%ile BackOfQ(95%),veh/ln	10.1	31.5	0.0	0.0	13.5	0.0	12.2	76.7	13.3	3.1		
LnGrp Delay(d),s/veh	59.1	60.9	0.0	0.0	53.9	0.0	17.6	146.9	28.1	63.9		
LnGrp LOS	E	E			D		B	F	C	E		
Approach Vol, veh/h		1692			551			1973				
Approach Delay, s/veh		60.5			53.9			74.8				
Approach LOS		E			D			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		45.9	19.5		14.6	19.9	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.0		0.0	2.7	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			66.2									
HCM 2010 LOS			E									

# HCM 2010 Signalized Intersection Summary

## 8: I-476 SB Off Ramp & Lancaster Ave

01/05/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	845	0	170	1212	792	831		
Future Volume (veh/h)	845	0	170	1212	792	831		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	862	0	173	1237	808	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2313	0	273	2104	957	436		
Arrive On Green	0.49	0.00	0.03	0.21	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	862	0	173	1237	808	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	12.5	0.0	5.9	36.3	25.1	0.0		
Cycle Q Clear(g_c), s	12.5	0.0	5.9	36.3	25.1	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2313	0	273	2104	957	436		
V/C Ratio(X)	0.37	0.00	0.63	0.59	0.84	0.00		
Avail Cap(c_a), veh/h	2313	0	317	2104	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.63	0.63	1.00	0.00		
Uniform Delay (d), s/veh	17.5	0.0	51.7	31.0	36.9	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.0	0.8	3.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.4	0.0	4.8	22.7	17.7	0.0		
LnGrp Delay(d),s/veh	18.0	0.0	53.8	31.8	40.0	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	862			1410	808			
Approach Delay, s/veh	18.0			34.5	40.0			
Approach LOS	B			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.6	14.5	58.9				73.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.6	8.4	15.0				38.8
Green Ext Time (p_c), s		3.0	0.1	14.9				10.3
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.3					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	558	1549	4	2	873	485	6	2	2	0	0	0
Future Volume (veh/h)	558	1549	4	2	873	485	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	581	1614	4	2	909	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	680	2843	7	18	2149	1000	21	7	22			
Arrive On Green	0.41	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	581	788	830	2	909	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	17.6	0.0	0.0	0.1	14.7	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	17.6	0.0	0.0	0.1	14.7	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	680	1389	1461	18	2149	1000	28	0	22			
V/C Ratio(X)	0.85	0.57	0.57	0.11	0.42	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2149	1000	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.17	0.17	0.17	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.8	0.0	0.0	53.9	9.7	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	1.0	0.3	0.3	2.6	0.6	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.9	0.2	0.2	0.1	11.2	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	31.8	0.3	0.3	56.5	10.3	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2199			911			10				
Approach Delay, s/veh		8.6			10.4			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			27.7	75.5		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			20.1	17.2		2.7				
Green Ext Time (p_c), s	0.0	41.4			1.6	27.3		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			9.3									
HCM 2010 LOS			A									
<b>Notes</b>												

# HCM 2010 Signalized Intersection Summary

## 10: Radnor Chester Rd

01/05/2018
























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	983	53	212	1467	438	92	373	83	96	132	107
Future Volume (veh/h)	139	983	53	212	1467	438	92	373	83	96	132	107
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	145	1024	55	221	1528	456	96	389	86	100	138	111
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1442	77	282	1501	677	151	497	111	215	606	453
Arrive On Green	0.07	0.45	0.45	0.07	0.45	0.45	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3190	171	1632	3319	1497	452	2080	464	1609	1787	1337
Grp Volume(v), veh/h	145	530	549	221	1528	456	292	0	279	100	126	123
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1489	0	1507	1609	1638	1487
Q Serve(g_s), s	5.0	28.5	28.5	8.0	49.7	26.4	18.6	0.0	19.1	5.0	6.0	6.6
Cycle Q Clear(g_c), s	5.0	28.5	28.5	8.0	49.7	26.4	20.3	0.0	19.1	5.0	6.0	6.6
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	747	773	282	1501	677	399	0	360	215	555	504
V/C Ratio(X)	0.78	0.71	0.71	0.78	1.02	0.67	0.73	0.00	0.78	0.47	0.23	0.25
Avail Cap(c_a), veh/h	186	747	773	282	1501	677	449	0	411	215	610	554
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	24.3	24.3	21.5	30.1	23.7	39.5	0.0	39.1	29.7	26.0	26.2
Incr Delay (d2), s/veh	18.9	5.7	5.5	13.5	27.9	5.3	5.3	0.0	8.0	1.6	0.2	0.3
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	5.8	20.3	20.8	7.4	51.4	17.4	13.8	0.0	13.6	4.1	5.0	4.9
LnGrp Delay(d),s/veh	43.8	30.0	29.8	35.0	58.0	29.0	44.7	0.0	47.1	31.3	26.2	26.5
LnGrp LOS	D	C	C	C	F	C	D		D	C	C	C
Approach Vol, veh/h		1224			2205			571			349	
Approach Delay, s/veh		31.5			49.7			45.9			27.8	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	54.7		42.3	13.0	54.7	11.0	31.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	45.0		40.0	7.0	45.0	5.0	29.0				
Max Q Clear Time (g_c+1), s	6.0	31.0		8.6	7.5	52.2	7.5	22.3				
Green Ext Time (p_c), s	0.0	12.7		6.0	0.0	0.0	0.0	2.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				42.3								
HCM 2010 LOS				D								



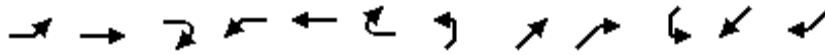
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	528	1	216	120	744	1	7	500	272
Future Volume (veh/h)	3	4	9	528	1	216	120	744	1	7	500	272
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	574	1	235	130	809	1	8	543	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	386	167	419	601	2	587	317	962	1	184	687	595
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1162	457	1142	1422	7	1601	1689	1841	2	677	1782	1544
Grp Volume(v), veh/h	3	0	14	574	0	236	130	0	810	8	543	0
Grp Sat Flow(s),veh/h/ln	1162	0	1599	1422	0	1608	1689	0	1844	677	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.8	0.0	33.7	0.9	24.2	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.5	33.0	0.0	9.8	3.8	0.0	33.7	21.8	24.2	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	586	601	0	590	317	0	963	184	687	595
V/C Ratio(X)	0.01	0.00	0.02	0.95	0.00	0.40	0.41	0.00	0.84	0.04	0.79	0.00
Avail Cap(c_a), veh/h	386	0	586	601	0	590	330	0	963	184	687	595
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	30.0	0.0	21.2	17.1	0.0	18.3	32.6	24.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	25.8	0.0	0.4	0.8	0.0	8.8	0.4	9.0	0.0
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	0.1	0.0	0.4	25.6	0.0	7.8	3.3	0.0	26.4	0.3	19.7	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	55.8	0.0	21.6	18.0	0.0	27.1	33.1	33.5	0.0
LnGrp LOS	C		B	E		C	B		C	C	C	
Approach Vol, veh/h		17			810			940			551	
Approach Delay, s/veh		19.3			45.9			25.9			33.5	
Approach LOS		B			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.0		38.0	12.3	39.7		38.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0				
Max Q Clear Time (g_c+I1), s		35.7		35.5	6.3	26.7		12.0				
Green Ext Time (p_c), s		6.2		0.0	0.0	4.2		3.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			34.6									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	738	664	59	428	1	401	7	141	31	37	49
Future Volume (veh/h)	8	738	664	59	428	1	401	7	141	31	37	49
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	769	0	61	446	1	418	7	147	32	39	51
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	351	812	725	111	834	2	270	3	644	50	58	42
Arrive On Green	0.46	0.46	0.00	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	948	1782	1591	725	1830	4	453	8	1525	0	138	99
Grp Volume(v), veh/h	8	769	0	61	0	447	425	0	147	122	0	0
Grp Sat Flow(s),veh/h/ln	948	1782	1591	725	0	1834	460	0	1525	237	0	0
Q Serve(g_s), s	0.5	37.2	0.0	3.8	0.0	15.8	0.0	0.0	5.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.8	37.2	0.0	41.0	0.0	15.8	38.0	0.0	5.5	38.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.26		0.42
Lane Grp Cap(c), veh/h	351	812	725	111	0	836	274	0	644	151	0	0
V/C Ratio(X)	0.02	0.95	0.00	0.55	0.00	0.53	1.55	0.00	0.23	0.81	0.00	0.00
Avail Cap(c_a), veh/h	351	812	725	111	0	836	274	0	644	151	0	0
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)	0.14	0.14	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.2	23.5	0.0	44.0	0.0	17.6	31.5	0.0	16.6	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.6	0.0	18.3	0.0	2.4	266.2	0.0	0.2	27.2	0.0	0.0
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	0.3	21.9	0.0	3.7	0.0	13.3	48.6	0.0	4.2	5.5	0.0	0.0
LnGrp Delay(d),s/veh	23.2	28.1	0.0	62.4	0.0	20.1	297.7	0.0	16.8	49.3	0.0	0.0
LnGrp LOS	C	C		E		C	F		B	D		
Approach Vol, veh/h		777			508			572			122	
Approach Delay, s/veh		28.1			25.2			225.5			49.3	
Approach LOS		C			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		44.0		46.0		44.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		40.0		37.0		40.0		37.0				
Max Q Clear Time (g_c+I1), s		39.7		40.0		43.5		40.0				
Green Ext Time (p_c), s		0.2		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			85.7									
HCM 2010 LOS			F									

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/03/2018

**Intersection**

Int Delay, s/veh 17.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖ ↗		↖ ↗		↖ ↗	↖ ↗
Traffic Vol, veh/h	149	88	408	25	39	969
Future Vol, veh/h	149	88	408	25	39	969
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	175	104	480	29	46	1140

**Major/Minor**

	Minor1	Major1	Major2		
Conflicting Flow All	1746	522	0	0	526
Stage 1	512	-	-	-	-
Stage 2	1234	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	~ 96	526	-	-	969
Stage 1	606	-	-	-	-
Stage 2	277	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	~ 90	514	-	-	961
Mov Cap-2 Maneuver	200	-	-	-	-
Stage 1	597	-	-	-	-
Stage 2	263	-	-	-	-

**Approach**

	WB	NB	SB
HCM Control Delay, s	120	0	0.3
HCM LOS	F		

**Minor Lane/Major Mvmt**

	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	259	961
HCM Lane V/C Ratio	-	-	1.077	0.048
HCM Control Delay (s)	-	-	120	8.9
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	11.5	0.1

**Notes**

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
4: King of Prussia Rd & Northern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑			↑
Traffic Vol, veh/h	23	23	343	0	0	1188
Future Vol, veh/h	23	23	343	0	0	1188
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	0	1	0	0	1
Mvmt Flow	25	25	369	0	0	1277

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1646	369	0	-	-	-
Stage 1	369	-	-	-	-	-
Stage 2	1277	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	111	681	-	0	0	-
Stage 1	704	-	-	0	0	-
Stage 2	264	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	111	681	-	-	-	-
Mov Cap-2 Maneuver	212	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	264	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 323	-
HCM Lane V/C Ratio	- 0.153	-
HCM Control Delay (s)	- 18.2	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.5	-

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	5	0	41	0	0	0	23	344	5	5	1201	5
Future Vol, veh/h	5	0	41	0	0	0	23	344	5	5	1201	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
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	0	0	1	0
Mvmt Flow	5	0	44	0	0	0	24	366	5	5	1278	5

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	1709	1719	1280				1283	0	0	379	0	0
Stage 1	1291	1291	-				-	-	-	-	-	-
Stage 2	418	428	-				-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	101	91	204				548	-	-	1191	-	-
Stage 1	260	236	-				-	-	-	-	-	-
Stage 2	669	588	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	94	0	204				548	-	-	1191	-	-
Mov Cap-2 Maneuver	94	0	-				-	-	-	-	-	-
Stage 1	256	0	-				-	-	-	-	-	-
Stage 2	632	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.1	0.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	548	-	-	181	1191	-	-
HCM Lane V/C Ratio	0.045	-	-	0.27	0.004	-	-
HCM Control Delay (s)	11.9	0	-	32.1	8	0	-
HCM Lane LOS	B	A	-	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0	-	-

Intersection						
Int Delay, s/veh	83.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↑	↘	↑
Traffic Vol, veh/h	208	46	325	43	10	1228
Future Vol, veh/h	208	46	325	43	10	1228
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	221	49	346	46	11	1306

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1674	346	0	0	346
Stage 1	346	-	-	-	-
Stage 2	1328	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	~ 106	702	-	-	1224
Stage 1	721	-	-	-	-
Stage 2	250	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 105	702	-	-	1224
Mov Cap-2 Maneuver	~ 105	-	-	-	-
Stage 1	721	-	-	-	-
Stage 2	248	-	-	-	-






















Approach	WB	NB	SB
HCM Control Delay, s	\$ 613.8	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	124	1224
HCM Lane V/C Ratio	-	-	2.179	0.009
HCM Control Delay (s)	-	-	\$ 613.8	8
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	22.7	0

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	1538	0	0	578	167	272	219	214	847	0	466
Future Volume (veh/h)	80	1538	0	0	578	167	272	219	214	847	0	466
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1800	1782	0	0	1782	1853	1782	1800	1800	1782	0	1872
Adj Flow Rate, veh/h	85	1636	0	0	615	0	289	233	228	901	0	496
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	192	1632	0	0	1282	597	1407	295	250	866	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.76	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3326	3475	0	0	3475	1575	3293	1800	1530	3293	901	
Grp Volume(v), veh/h	85	1636	0	0	615	0	289	233	228	901	85.8	
Grp Sat Flow(s),veh/h/ln	1663	1693	0	0	1693	1575	1646	1800	1530	1646	F	
Q Serve(g_s), s	2.7	53.0	0.0	0.0	7.6	0.0	6.1	13.7	16.1	24.0		
Cycle Q Clear(g_c), s	2.7	53.0	0.0	0.0	7.6	0.0	6.1	13.7	16.1	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	192	1632	0	0	1282	597	1407	295	250	866		
V/C Ratio(X)	0.44	1.00	0.00	0.00	0.48	0.00	0.21	0.79	0.91	1.04		
Avail Cap(c_a), veh/h	393	1632	0	0	1282	597	1407	295	250	866		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.88	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	51.1	37.2	0.0	0.0	9.2	0.0	19.8	44.2	45.2	44.2		
Incr Delay (d2), s/veh	1.4	21.5	0.0	0.0	1.1	0.0	0.1	13.6	34.1	41.6		
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		
%ile BackOfQ(95%),veh/ln	2.3	53.4	0.0	0.0	6.5	0.0	4.9	12.5	14.1	13.1		
LnGrp Delay(d),s/veh	52.5	58.8	0.0	0.0	10.3	0.0	19.8	57.8	79.3	85.8		
LnGrp LOS	D	F			B		B	E	E	F		
Approach Vol, veh/h		1721			615			750				
Approach Delay, s/veh		58.5			10.3			49.7				
Approach LOS		E			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		11.3	46.7	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.6		5.2	10.1	26.5	18.6				
Green Ext Time (p_c), s		0.0	0.8		0.1	17.8	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			55.6									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/03/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1043	0	578	774	615	494		
Future Volume (veh/h)	1043	0	578	774	615	494		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1064	0	590	790	628	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	1998	0	722	2322	751	359		
Arrive On Green	0.42	0.00	0.07	0.23	0.22	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1064	0	590	790	628	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	18.5	0.0	19.2	21.5	19.6	0.0		
Cycle Q Clear(g_c), s	18.5	0.0	19.2	21.5	19.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1998	0	722	2322	751	359		
V/C Ratio(X)	0.53	0.00	0.82	0.34	0.84	0.00		
Avail Cap(c_a), veh/h	1998	0	847	2322	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.76	0.76	1.00	0.00		
Uniform Delay (d), s/veh	23.6	0.0	48.9	21.7	40.8	0.0		
Incr Delay (d2), s/veh	1.0	0.0	4.2	0.3	5.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	2.9	0.0	13.7	14.8	14.8	0.0		
LnGrp Delay(d),s/veh	24.6	0.0	53.1	22.0	46.6	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1064			1380	628			
Approach Delay, s/veh	24.6			35.3	46.6			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.6	28.9	51.5				80.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.1	21.7	21.0				24.0
Green Ext Time (p_c), s		1.4	1.1	10.4				19.7
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			33.9					
HCM 2010 LOS			C					



HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑		↔	↑↑	↔		↑	↔			
Traffic Volume (veh/h)	1157	1771	14	6	708	584	3	1	2	0	0	0
Future Volume (veh/h)	1157	1771	14	6	708	584	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1205	1845	15	6	738	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1197	2797	23	23	1647	766	18	6	18			
Arrive On Green	0.73	1.00	1.00	0.01	0.49	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3344	27	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1205	906	954	6	738	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	40.0	0.0	0.0	0.4	15.7	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	40.0	0.0	0.0	0.4	15.7	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1197	1376	1444	23	1647	766	24	0	18			
V/C Ratio(X)	1.01	0.66	0.66	0.26	0.45	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1197	1376	1444	109	1647	766	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.0	0.0	0.0	53.7	18.6	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	9.4	0.2	0.2	5.6	0.9	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	33.7	0.2	0.2	0.4	12.1	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	24.4	0.2	0.2	59.3	19.4	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		3065			744			6				
Approach Delay, s/veh		9.7			19.8			56.7				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			45.0	58.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			39.0	47.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			42.5	18.2		2.7				
Green Ext Time (p_c), s	0.0	45.7			0.0	22.9		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				11.8								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
10: Radnor Chester Rd.






















01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1166	93	198	1114	126	81	211	141	410	448	215
Future Volume (veh/h)	120	1166	93	198	1114	126	81	211	141	410	448	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	124	1202	96	204	1148	130	84	218	145	423	462	222
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	230	1220	97	209	1294	578	149	345	234	331	863	412
Arrive On Green	0.08	0.38	0.38	0.08	0.39	0.39	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3195	255	1664	3352	1496	385	1338	906	1689	2222	1060
Grp Volume(v), veh/h	124	640	658	204	1148	130	218	0	229	423	351	333
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1195	0	1433	1689	1690	1591
Q Serve(g_s), s	4.3	37.2	37.4	7.6	32.0	5.8	12.6	0.0	14.1	8.0	16.0	16.2
Cycle Q Clear(g_c), s	4.3	37.2	37.4	7.6	32.0	5.8	16.1	0.0	14.1	8.0	16.0	16.2
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	230	650	667	209	1294	578	359	0	370	331	656	618
V/C Ratio(X)	0.54	0.98	0.99	0.98	0.89	0.23	0.61	0.00	0.62	1.28	0.53	0.54
Avail Cap(c_a), veh/h	255	650	667	209	1294	578	453	0	487	331	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	30.6	30.7	24.3	28.7	20.6	33.1	0.0	32.7	34.5	23.6	23.7
Incr Delay (d2), s/veh	2.0	31.7	31.9	55.0	9.2	0.9	1.7	0.0	1.7	145.8	0.7	0.7
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	3.8	31.0	31.8	13.7	23.0	4.6	9.5	0.0	9.7	33.9	12.0	11.7
LnGrp Delay(d),s/veh	24.3	62.3	62.5	79.4	37.9	21.5	34.8	0.0	34.4	180.3	24.3	24.4
LnGrp LOS	C	E	E	E	D	C	C		C	F	C	C
Approach Vol, veh/h		1422			1482			447			1107	
Approach Delay, s/veh		59.1			42.2			34.6			83.9	
Approach LOS		E			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	43.2		43.8	12.6	43.6	13.0	30.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	29.0			46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+110), s	39.7			18.5	6.8	34.5	10.5	18.1				
Green Ext Time (p_c), s	0.0	0.0		8.7	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				57.2								
HCM 2010 LOS				E								

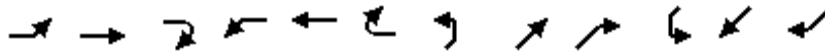
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	316	7	104	375	633	2	12	626	604
Future Volume (veh/h)	1	0	2	316	7	104	375	633	2	12	626	604
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	351	8	116	417	703	2	13	696	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	330	0	391	437	25	358	390	1152	3	370	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1287	0	1530	1396	97	1400	1639	1820	5	747	1764	1544
Grp Volume(v), veh/h	1	0	2	351	0	124	417	0	705	13	696	0
Grp Sat Flow(s),veh/h/ln	1287	0	1530	1396	0	1497	1639	0	1825	747	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.5	0.0	6.1	17.0	0.0	20.8	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.1	22.5	0.0	6.1	17.0	0.0	20.8	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	391	437	0	383	390	0	1156	370	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.80	0.00	0.32	1.07	0.00	0.61	0.04	1.01	0.00
Avail Cap(c_a), veh/h	330	0	391	437	0	383	390	0	1156	370	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	0.0	25.0	33.3	0.0	27.2	27.5	0.0	9.9	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.4	0.0	0.5	65.5	0.0	2.4	0.2	38.0	0.0
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	0.0	0.0	0.1	15.1	0.0	4.6	30.1	0.0	16.6	0.4	43.6	0.0
LnGrp Delay(d),s/veh	29.3	0.0	25.0	43.8	0.0	27.7	93.0	0.0	12.3	17.3	65.5	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			475			1122			709	
Approach Delay, s/veh		26.4			39.6			42.3			64.6	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		22.8		25.0	19.5	37.5		8.1				
Green Ext Time (p_c), s		12.4		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			48.5									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	392	476	27	834	7	511	33	58	2	1	6
Future Volume (veh/h)	38	392	476	27	834	7	511	33	58	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	417	0	29	887	7	544	35	62	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	92	857	772	399	900	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	632	1714	1545	939	1799	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	417	0	29	0	894	579	0	62	9	0	0
Grp Sat Flow(s),veh/h/ln	632	1714	1545	939	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	1.7	14.5	0.0	1.9	0.0	43.8	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.5	0.0	16.4	0.0	43.8	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	92	857	772	399	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.43	0.49	0.00	0.07	0.00	0.99	2.46	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	92	857	772	399	0	907	236	0	574	159	0	0
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)	0.57	0.57	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.7	14.9	0.0	20.3	0.0	22.2	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	8.3	1.1	0.0	0.4	0.0	26.7	668.6	0.0	0.1	0.1	0.0	0.0
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	2.2	10.4	0.0	1.0	0.0	37.1	89.2	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.0	16.0	0.0	20.6	0.0	48.9	702.2	0.0	18.2	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		457			923			641			9	
Approach Delay, s/veh		19.2			48.0			636.0			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		45.8		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				227.1								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/03/2018

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		P		Y	↑
Traffic Vol, veh/h	23	34	976	192	116	331
Future Vol, veh/h	23	34	976	192	116	331
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	26	39	1122	221	133	380

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1898	1259	0	0	1360
Stage 1	1249	-	-	-	-
Stage 2	649	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	77	172	-	-	446
Stage 1	273	-	-	-	-
Stage 2	524	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	53	168	-	-	442
Mov Cap-2 Maneuver	165	-	-	-	-
Stage 1	269	-	-	-	-
Stage 2	366	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	39.8	0	4.3
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	167	442
HCM Lane V/C Ratio	-	-	0.392	0.302
HCM Control Delay (s)	-	-	39.8	16.6
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.7	1.3

HCM 2010 TWSC  
 4: King of Prussia Rd & Northern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑			↑
Traffic Vol, veh/h	4	4	1159	0	0	404
Future Vol, veh/h	4	4	1159	0	0	404
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	4	4	1233	0	0	430

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1663	1233	0	-	-	-
Stage 1	1233	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	108	218	-	0	0	-
Stage 1	278	-	-	0	0	-
Stage 2	660	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	108	218	-	-	-	-
Mov Cap-2 Maneuver	217	-	-	-	-	-
Stage 1	278	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 217	-
HCM Lane V/C Ratio	- 0.039	-
HCM Control Delay (s)	- 22.3	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.1	-

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	9	0	133	0	0	0	177	1153	27	27	323	59
Future Vol, veh/h	9	0	133	0	0	0	177	1153	27	27	323	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	171	0	0	0	227	1478	35	35	414	76

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	2470	2496	452				490	0	0	1521	0	0
Stage 1	521	521	-				-	-	-	-	-	-
Stage 2	1949	1975	-				-	-	-	-	-	-
Critical Hdwy	6.51	6.5	6.24				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.51	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	31	29	603				1084	-	-	445	-	-
Stage 1	578	535	-				-	-	-	-	-	-
Stage 2	115	109	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	0	0	603				1084	-	-	445	-	-
Mov Cap-2 Maneuver	0	0	-				-	-	-	-	-	-
Stage 1	515	0	-				-	-	-	-	-	-
Stage 2	0	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	1.2	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1084	-	-	603	445	-	-
HCM Lane V/C Ratio	0.209	-	-	0.302	0.078	-	-
HCM Control Delay (s)	9.2	0	-	13.5	13.8	0	-
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0.8	-	-	1.3	0.3	-	-

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	6.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	33	7	1345	242	54	401
Future Vol, veh/h	33	7	1345	242	54	401
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	40	8	1620	292	65	483

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	2233	1620	0	0	1620	0
Stage 1	1620	-	-	-	-	-
Stage 2	613	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	48	129	-	-	407	-
Stage 1	180	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	40	129	-	-	407	-
Mov Cap-2 Maneuver	40	-	-	-	-	-
Stage 1	180	-	-	-	-	-
Stage 2	457	-	-	-	-	-



























Approach	WB	NB	SB
HCM Control Delay, s	298	0	1.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	45	407
HCM Lane V/C Ratio	-	-	1.071	0.16
HCM Control Delay (s)	-	-	298	15.5
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	4.5	0.6



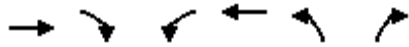
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 		 			 		
Traffic Volume (veh/h)	363	1306	0	0	544	371	774	833	344	289	0	134
Future Volume (veh/h)	363	1306	0	0	544	371	774	833	344	289	0	134
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	374	1346	0	0	561	0	798	859	355	298	0	138
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	298	
Grp Volume(v), veh/h	374	1346	0	0	561	0	798	859	355	298	65.3	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.2	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Cycle Q Clear(g_c), s	12.2	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.83	1.01	0.00	0.00	0.75	0.00	0.48	1.25	0.61	0.82		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.7	40.3	0.0	0.0	48.1	0.0	17.6	33.5	26.7	51.2		
Incr Delay (d2), s/veh	10.9	25.2	0.0	0.0	6.3	0.0	0.2	122.4	1.8	14.1		
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		
%ile BackOfQ(95%),veh/ln	10.1	44.9	0.0	0.0	13.7	0.0	12.5	79.8	13.8	3.3		
LnGrp Delay(d),s/veh	59.6	65.4	0.0	0.0	54.4	0.0	17.8	155.9	28.5	65.3		
LnGrp LOS	E	F			D		B	F	C	E		
Approach Vol, veh/h		1720			561			2012				
Approach Delay, s/veh		64.2			54.4			78.6				
Approach LOS		E			D			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		46.5	20.0		14.7	20.2	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.1		0.0	2.4	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			69.4									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/03/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	860	0	173	1235	807	845		
Future Volume (veh/h)	860	0	173	1235	807	845		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	878	0	177	1260	823	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2286	0	277	2089	972	443		
Arrive On Green	0.48	0.00	0.03	0.20	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	878	0	177	1260	823	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	13.0	0.0	6.1	37.2	25.6	0.0		
Cycle Q Clear(g_c), s	13.0	0.0	6.1	37.2	25.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2286	0	277	2089	972	443		
V/C Ratio(X)	0.38	0.00	0.64	0.60	0.85	0.00		
Avail Cap(c_a), veh/h	2286	0	317	2089	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.62	0.62	1.00	0.00		
Uniform Delay (d), s/veh	18.0	0.0	51.7	31.6	36.6	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.2	0.8	3.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.6	0.0	4.9	23.1	18.0	0.0		
LnGrp Delay(d),s/veh	18.5	0.0	53.9	32.4	39.9	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	878			1437	823			
Approach Delay, s/veh	18.5			35.0	39.9			
Approach LOS	B			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		37.1	14.6	58.2				72.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		28.1	8.6	15.5				39.7
Green Ext Time (p_c), s		3.0	0.1	14.9				9.9
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.7					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	568	1579	4	2	888	494	6	2	2	0	0	0
Future Volume (veh/h)	568	1579	4	2	888	494	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1765	1800	1800	1800			
Adj Flow Rate, veh/h	592	1645	4	2	925	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	690	2843	7	18	2138	957	21	7	22			
Arrive On Green	0.42	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1500	1301	434	1345			
Grp Volume(v), veh/h	592	804	845	2	925	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1500	1735	0	1345			
Q Serve(g_s), s	17.9	0.0	0.0	0.1	15.2	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	17.9	0.0	0.0	0.1	15.2	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	690	1389	1461	18	2138	957	28	0	22			
V/C Ratio(X)	0.86	0.58	0.58	0.11	0.43	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2138	957	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.12	0.12	0.12	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.5	0.0	0.0	53.9	10.0	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.8	0.2	0.2	2.6	0.6	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.8	0.2	0.2	0.1	11.5	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	31.3	0.2	0.2	56.5	10.6	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2241			927			10				
Approach Delay, s/veh		8.4			10.7			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.1	75.2		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2g), s	12.6	2.5			20.4	17.7		2.7				
Green Ext Time (p_c), s	0.0	42.9			1.6	27.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	1001	54	216	1495	446	94	380	85	98	135	109
Future Volume (veh/h)	142	1001	54	216	1495	446	94	380	85	98	135	109
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	148	1043	56	225	1557	465	98	396	89	102	141	114
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	169	1472	79	267	1532	691	153	499	113	211	607	457
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3190	171	1632	3319	1497	453	2068	469	1609	1782	1341
Grp Volume(v), veh/h	148	540	559	225	1557	465	297	0	286	102	129	126
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1485	0	1506	1609	1638	1486
Q Serve(g_s), s	5.4	29.0	29.0	7.0	51.2	26.9	19.3	0.0	19.7	5.1	6.2	6.8
Cycle Q Clear(g_c), s	5.4	29.0	29.0	7.0	51.2	26.9	21.0	0.0	19.7	5.1	6.2	6.8
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	169	762	788	267	1532	691	401	0	363	211	557	506
V/C Ratio(X)	0.87	0.71	0.71	0.84	1.02	0.67	0.74	0.00	0.79	0.48	0.23	0.25
Avail Cap(c_a), veh/h	169	762	788	267	1532	691	444	0	407	211	590	535
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	23.9	23.9	25.6	29.9	23.4	39.8	0.0	39.4	30.0	26.2	26.4
Incr Delay (d2), s/veh	36.1	5.5	5.3	21.0	27.2	5.2	5.9	0.0	8.9	1.7	0.2	0.3
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	0.3	20.6	21.1	9.1	52.5	17.8	14.3	0.0	14.0	4.3	5.1	5.1
LnGrp Delay(d),s/veh	63.1	29.4	29.3	46.6	57.1	28.5	45.7	0.0	48.3	31.7	26.4	26.6
LnGrp LOS	E	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1247			2247			583			357	
Approach Delay, s/veh		33.3			50.1			47.0			28.0	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	2.0	56.2		42.8	12.0	56.2	11.0	31.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	47.0		39.0	6.0	47.0	5.0	29.0				
Max Q Clear Time (g_c+19), s	6.0	31.5		8.8	7.9	53.7	7.6	23.0				
Green Ext Time (p_c), s	0.0	14.0		6.2	0.0	0.0	0.0	2.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				43.2								
HCM 2010 LOS				D								

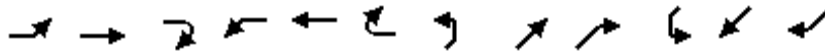
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	538	1	220	123	758	1	7	509	277
Future Volume (veh/h)	3	4	9	538	1	220	123	758	1	7	509	277
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	585	1	239	134	824	1	8	553	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	413	178	444	633	3	623	284	921	1	147	641	556
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.50	0.50	0.36	0.36	0.00
Sat Flow, veh/h	1158	457	1142	1422	7	1601	1689	1841	2	668	1782	1544
Grp Volume(v), veh/h	3	0	14	585	0	240	134	0	825	8	553	0
Grp Sat Flow(s),veh/h/ln	1158	0	1599	1422	0	1608	1689	0	1844	668	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	35.0	0.0	9.6	4.1	0.0	36.4	1.0	25.9	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.5	35.0	0.0	9.6	4.1	0.0	36.4	24.3	25.9	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	622	633	0	625	284	0	922	147	641	556
V/C Ratio(X)	0.01	0.00	0.02	0.92	0.00	0.38	0.47	0.00	0.90	0.05	0.86	0.00
Avail Cap(c_a), veh/h	413	0	622	633	0	625	292	0	922	147	641	556
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.9	0.0	17.0	28.5	0.0	19.8	18.9	0.0	20.4	36.8	26.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	19.5	0.0	0.4	1.2	0.0	13.0	0.7	14.3	0.0
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	0.1	0.0	0.4	24.8	0.0	7.7	3.6	0.0	29.3	0.4	21.7	0.0
LnGrp Delay(d),s/veh	22.9	0.0	17.0	47.9	0.0	20.1	20.2	0.0	33.4	37.5	41.0	0.0
LnGrp LOS	C		B	D		C	C		C	D	D	
Approach Vol, veh/h		17			825			959			561	
Approach Delay, s/veh		18.0			39.8			31.6			41.0	
Approach LOS		B			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0	12.6	37.4		40.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		44.0		34.0	7.0	31.0		34.0				
Max Q Clear Time (g_c+I1), s		38.4		37.5	6.6	28.4		11.8				
Green Ext Time (p_c), s		3.8		0.0	0.0	1.9		3.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				36.6								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	751	677	60	434	1	409	7	144	32	37	50
Future Volume (veh/h)	8	751	677	60	434	1	409	7	144	32	37	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	782	0	62	452	1	426	7	150	33	39	52
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	319	772	690	80	793	2	282	3	678	51	57	41
Arrive On Green	0.43	0.43	0.00	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	943	1782	1591	716	1830	4	455	7	1526	0	128	93
Grp Volume(v), veh/h	8	782	0	62	0	453	433	0	150	124	0	0
Grp Sat Flow(s),veh/h/ln	943	1782	1591	716	0	1834	463	0	1526	221	0	0
Q Serve(g_s), s	0.6	39.0	0.0	0.0	0.0	16.7	0.0	0.0	5.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.8	39.0	0.0	39.0	0.0	16.7	40.0	0.0	5.4	40.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	319	772	690	80	0	795	285	0	678	149	0	0
V/C Ratio(X)	0.03	1.01	0.00	0.77	0.00	0.57	1.52	0.00	0.22	0.83	0.00	0.00
Avail Cap(c_a), veh/h	319	772	690	80	0	795	285	0	678	149	0	0
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)	0.11	0.11	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.3	25.5	0.0	45.0	0.0	19.2	30.6	0.0	15.4	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	14.1	0.0	51.4	0.0	3.0	250.7	0.0	0.2	31.4	0.0	0.0
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	0.3	39.7	0.0	4.8	0.0	14.0	48.4	0.0	4.2	5.7	0.0	0.0
LnGrp Delay(d),s/veh	25.3	39.7	0.0	96.4	0.0	22.1	281.3	0.0	15.6	53.0	0.0	0.0
LnGrp LOS	C	F		F		C	F		B	D		
Approach Vol, veh/h		790			515			583			124	
Approach Delay, s/veh		39.5			31.1			212.9			53.0	
Approach LOS		D			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		44.0		46.0		44.0		46.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		38.0		39.0		38.0		39.0				
Max Q Clear Time (g_c+I1), s		41.5		42.0		41.5		42.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				88.4								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/03/2018

Intersection						
Int Delay, s/veh	18.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T		T	T
Traffic Vol, veh/h	150	89	415	25	40	987
Future Vol, veh/h	150	89	415	25	40	987
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	176	105	488	29	47	1161

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1777	530	0	0	535
Stage 1	520	-	-	-	-
Stage 2	1257	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	~ 92	521	-	-	961
Stage 1	601	-	-	-	-
Stage 2	270	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	~ 86	509	-	-	953
Mov Cap-2 Maneuver	195	-	-	-	-
Stage 1	592	-	-	-	-
Stage 2	256	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	132.3	0	0.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	253	953
HCM Lane V/C Ratio	-	-	1.111	0.049
HCM Control Delay (s)	-	-	132.3	9
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	12.2	0.2

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
4: King of Prussia Rd & Northern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑			↑
Traffic Vol, veh/h	23	23	348	0	0	1208
Future Vol, veh/h	23	23	348	0	0	1208
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	0	1	0	0	1
Mvmt Flow	25	25	374	0	0	1299

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1673	374	0	-	-	-
Stage 1	374	-	-	-	-	-
Stage 2	1299	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	106	677	-	0	0	-
Stage 1	700	-	-	0	0	-
Stage 2	258	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	106	677	-	-	-	-
Mov Cap-2 Maneuver	207	-	-	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	258	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 317	-
HCM Lane V/C Ratio	- 0.156	-
HCM Control Delay (s)	- 18.4	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.5	-



Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	5	0	42	0	0	0	24	349	5	5	1221	5
Future Vol, veh/h	5	0	42	0	0	0	24	349	5	5	1221	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	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	-
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	0	0	1	0
Mvmt Flow	5	0	45	0	0	0	26	371	5	5	1299	5

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	1737	1748	1302				1304	0	0	385	0	0
Stage 1	1312	1312	-				-	-	-	-	-	-
Stage 2	425	436	-				-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	97	87	198				538	-	-	1185	-	-
Stage 1	254	230	-				-	-	-	-	-	-
Stage 2	664	583	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	90	0	198				538	-	-	1185	-	-
Mov Cap-2 Maneuver	90	0	-				-	-	-	-	-	-
Stage 1	250	0	-				-	-	-	-	-	-
Stage 2	623	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33.4	0.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	538	-	-	176	1185	-	-
HCM Lane V/C Ratio	0.047	-	-	0.284	0.004	-	-
HCM Control Delay (s)	12	0	-	33.4	8.1	0	-
HCM Lane LOS	B	A	-	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0	-	-

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/03/2018

Intersection						
Int Delay, s/veh	87.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↘		↑	↑	↘	↑
Traffic Vol, veh/h	208	46	331	43	10	1249
Future Vol, veh/h	208	46	331	43	10	1249
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	221	49	352	46	11	1329

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1702	352	0	0	352
Stage 1	352	-	-	-	-
Stage 2	1350	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	~ 102	696	-	-	1218
Stage 1	716	-	-	-	-
Stage 2	244	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 101	696	-	-	1218
Mov Cap-2 Maneuver	~ 101	-	-	-	-
Stage 1	716	-	-	-	-
Stage 2	242	-	-	-	-






















Approach	WB	NB	SB
HCM Control Delay, s	647.9	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	120	1218
HCM Lane V/C Ratio	-	-	2.252	0.009
HCM Control Delay (s)	-	-	647.9	8
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	23.2	0

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

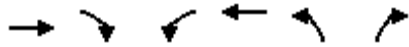
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	1567	0	0	589	170	277	223	218	860	0	472
Future Volume (veh/h)	81	1567	0	0	589	170	277	223	218	860	0	472
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	86	1667	0	0	627	0	295	237	232	915	0	502
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	181	1623	0	0	1305	607	1393	292	248	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.76	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	915	
Grp Volume(v), veh/h	86	1667	0	0	627	0	295	237	232	915	94.1	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	F	
Q Serve(g_s), s	2.8	53.0	0.0	0.0	7.5	0.0	6.3	14.1	16.6	24.0		
Cycle Q Clear(g_c), s	2.8	53.0	0.0	0.0	7.5	0.0	6.3	14.1	16.6	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	181	1623	0	0	1305	607	1393	292	248	858		
V/C Ratio(X)	0.48	1.03	0.00	0.00	0.48	0.00	0.21	0.81	0.94	1.07		
Avail Cap(c_a), veh/h	391	1623	0	0	1305	607	1393	292	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.87	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	51.4	37.2	0.0	0.0	8.9	0.0	19.8	44.4	45.4	44.2		
Incr Delay (d2), s/veh	1.7	28.0	0.0	0.0	1.1	0.0	0.1	15.9	40.0	49.9		
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		
%ile BackOfQ(95%),veh/ln	2.4	55.7	0.0	0.0	6.6	0.0	5.1	12.9	14.8	14.7		
LnGrp Delay(d),s/veh	53.1	65.2	0.0	0.0	10.0	0.0	19.9	60.3	85.4	94.1		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1753			627			764				
Approach Delay, s/veh		64.6			10.0			52.3				
Approach LOS		E			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		11.0	47.0	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.8		5.3	10.0	26.5	19.1				
Green Ext Time (p_c), s		0.0	0.8		0.1	18.2	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			60.5									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/03/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1062	0	587	787	627	503		
Future Volume (veh/h)	1062	0	587	787	627	503		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1084	0	599	803	640	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	1971	0	730	2311	762	364		
Arrive On Green	0.42	0.00	0.07	0.23	0.23	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1084	0	599	803	640	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	19.1	0.0	19.5	21.9	20.0	0.0		
Cycle Q Clear(g_c), s	19.1	0.0	19.5	21.9	20.0	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1971	0	730	2311	762	364		
V/C Ratio(X)	0.55	0.00	0.82	0.35	0.84	0.00		
Avail Cap(c_a), veh/h	1971	0	847	2311	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.74	0.74	1.00	0.00		
Uniform Delay (d), s/veh	24.2	0.0	48.9	22.0	40.6	0.0		
Incr Delay (d2), s/veh	1.1	0.0	4.3	0.3	6.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	3.2	0.0	13.8	14.9	15.0	0.0		
LnGrp Delay(d),s/veh	25.3	0.0	53.2	22.3	46.7	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1084			1402	640			
Approach Delay, s/veh	25.3			35.5	46.7			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.9	29.1	50.9				80.1
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.5	22.0	21.6				24.4
Green Ext Time (p_c), s		1.4	1.1	10.2				20.2
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			34.3					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕		↖	↕↕	↗		↕	↗			
Traffic Volume (veh/h)	1178	1803	15	6	721	595	3	1	2	0	0	0
Future Volume (veh/h)	1178	1803	15	6	721	595	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1227	1878	16	6	751	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1227	2795	24	23	1616	752	18	6	18			
Arrive On Green	0.75	1.00	1.00	0.01	0.48	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3343	28	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1227	923	971	6	751	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	41.0	0.0	0.0	0.4	16.4	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	41.0	0.0	0.0	0.4	16.4	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1227	1376	1444	23	1616	752	24	0	18			
V/C Ratio(X)	1.00	0.67	0.67	0.26	0.46	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1227	1376	1444	109	1616	752	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	14.0	0.0	0.0	53.7	19.3	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	7.6	0.2	0.2	5.6	1.0	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	11.2	0.2	0.2	0.4	12.4	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	21.6	0.2	0.2	59.3	20.3	0.0	56.9	0.0	56.2			
LnGrp LOS	C	A	A	E	C		E		E			
Approach Vol, veh/h		3121			757			6				
Approach Delay, s/veh		8.7			20.6			56.7				
Approach LOS		A			C			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			46.0	57.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			40.0	46.0		6.0				
Max Q Clear Time (g_c+12.5), s	12.5	2.5			43.5	18.9		2.7				
Green Ext Time (p_c), s	0.0	47.3			0.0	22.2		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				11.1								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
10: Radnor Chester Rd.

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	1188	95	202	1134	128	83	215	144	418	456	219
Future Volume (veh/h)	122	1188	95	202	1134	128	83	215	144	418	456	219
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	126	1225	98	208	1169	132	86	222	148	431	470	226
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	223	1201	96	205	1271	567	151	349	238	333	875	418
Arrive On Green	0.08	0.38	0.38	0.08	0.38	0.38	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3194	255	1664	3352	1496	383	1324	902	1689	2221	1061
Grp Volume(v), veh/h	126	652	671	208	1169	132	221	0	235	431	357	339
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1174	0	1434	1689	1690	1591
Q Serve(g_s), s	4.4	37.6	37.6	8.0	33.2	6.0	13.0	0.0	14.5	8.0	16.2	16.4
Cycle Q Clear(g_c), s	4.4	37.6	37.6	8.0	33.2	6.0	16.7	0.0	14.5	8.0	16.2	16.4
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	223	640	657	205	1271	567	360	0	379	333	666	627
V/C Ratio(X)	0.56	1.02	1.02	1.01	0.92	0.23	0.61	0.00	0.62	1.29	0.54	0.54
Avail Cap(c_a), veh/h	246	640	657	205	1271	567	447	0	488	333	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.9	31.2	31.2	25.5	29.6	21.1	32.9	0.0	32.4	34.3	23.3	23.3
Incr Delay (d2), s/veh	2.4	40.3	40.7	66.5	12.1	1.0	1.7	0.0	1.7	152.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	44.6	45.9	17.0	24.2	4.7	9.6	0.0	9.8	35.4	12.2	11.7
LnGrp Delay(d),s/veh	25.3	71.5	71.9	92.1	41.7	22.1	34.6	0.0	34.1	187.1	24.0	24.1
LnGrp LOS	C	F	F	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1449			1509			456			1127	
Approach Delay, s/veh		67.7			47.0			34.3			86.4	
Approach LOS		E			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	42.6		44.4	12.7	42.9	13.0	31.4				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+1), s	10.5	40.1		18.7	6.9	35.7	10.5	18.7				
Green Ext Time (p_c), s	0.0	0.0		8.9	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				62.1								
HCM 2010 LOS				E								

# APPENDIX G

Trip Generation

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507





The following is a description of the development of a trip generation rate for the proposed Penn Medicine mixed use medical facility at 145 King of Prussia Road. The development of the trip rate is based on the trips generated by the existing facilities.

The Institute of Transportation Engineers' Trip Generation Manual, 9<sup>th</sup> Edition describes a medical-dental office building as follows:

A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility.

For the AM Peak of the adjacent roadway, the Trip Generation Rate was derived based on 23 studies. For 22 of the 23 studies, the gross floor area of the buildings was less than 70,000 SF. For the PM Peak of the adjacent roadway, the Trip Generation Rate was derived based on 43 studies. For 41 of the 43 studies, the gross floor area of the buildings was less than 70,000 SF.

The proposed Penn Medicine facility for 145 King of Prussia Road has a gross floor area of 250,000 SF, more than triple the size of 90% of the facilities used by ITE to derive trip generation data. Therefore, the proposed facility is very different from those used to derive ITE trip generation data.

Furthermore, unlike private physician practices, the proposed Penn Medicine facility will include a number of treatment facilities that are uncommon in a typical medical office and that occupy a larger portion of the gross square floor area of the building, while not accommodating a larger number of patients. These facilities include ambulatory operating rooms, endoscopy rooms, chemotherapy treatment areas, radiological imaging rooms and radiation oncology treatment areas.

It is for these reasons, that the ITE trip generation is not appropriate to use for the proposed Penn Medicine site at 145 King of Prussia Road.

#### Proposed Trip Generation for 145 King of Prussia.

The following is a proposal for the development of a trip generation rate for the proposed 250,000 SF Penn Medicine mixed medical facility at 145 King of Prussia Road. The development of the trip rate is based on the trips generated by three existing ambulatory care facilities and it is for the peak hour of the adjacent street (King of Prussia Road) which, based on traffic counts, is 7:15-8:15 AM and 5:00–6:00 PM.

#### EXISTING RADNOR PENN MEDICINE

Penn currently operates an existing 171,000 square foot ambulatory care facility at 250 King of Prussia Road. The facility has 2 parking structures and multiple surface lots that provide 317 parking spaces. The facility also leases 41 parking spaces in the adjacent Radnor Court parking lot and there are 195 spaces available for employee parking at the lot located at 145 King of Prussia Road (near the Septa station). Traffic counts were performed at the parking lot driveways to

record the entry and exit trips generated by the existing Penn Medicine facility and develop a trip generation rate. The east side of the parking lot at 145 King of Prussia Road is also utilized by Septa employees and by commuters accessing the adjacent Septa station. In addition to the driveway counts, we counted the number of vehicles that parked near King of Prussia Road, and those that parked near the SEPTA facility. Based on these observations of the occupancy of the lot and the location of parked vehicles it is estimated that approximately 53% of the vehicles utilizing the lot are employees of the Penn Medicine mixed use facility. The following is a summary of trip data collected through driveway counts:

RADNOR PENN MEDICINE DRIVEWAY COUNTS

<u>Location</u>	<u>AM PEAK</u>		<u>PM PEAK</u>		<u>DAILY</u>	
	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>
On-Site Parking	215	91	83	119	2,134	2,134
Off-Site Parking	55	13	5	70	159	159
Total	270	104	88	189	2,293	2,293

The existing Penn Medicine ambulatory care facility is 171,000 SF with 165 exam or treatment rooms. For the purpose of this exercise, each exam room and each treatment room regardless of type will be considered a “patient position.” The top two floors (approximately 46,700 SF) of the existing Radnor Penn Medicine facility are general office. The trip generation for the office portion of the existing facility was calculated using the ITE Trip Generation Manual.

RADNOR PENN MEDICINE OFFICE TRIPS

<u>Land Use</u>	<u>Size</u>	<u>Daily Trips</u>	<u>Peak Hour Trips</u>		
			<u>Inbound</u>	<u>Outbound</u>	<u>Total</u>
Office (710)	46.7 ksf	515	64(AM) 12(PM)	9(AM) 58(PM)	73 70

The trips associated with the ambulatory care portion of the Radnor Penn Medicine facility were calculated using the driveway data and subtracting the calculated trips generated by the office portion of the development:

Total trips at Radnor (driveway + offsite) - ITE trip generation for office portion = Trips associated with medical practice (TAMP)

RADNOR PENN MEDICINE MEDICAL MIXED USE TRIPS

<u>Location</u>	<u>AM PEAK</u>		<u>PM PEAK</u>		<u>DAILY</u>	
	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>
Total recorded trips	270	104	88	189	2,293	2,293
Office Trips (ITE)	64	9	12	58	258	257
Remaining Trips (TAMP)	206	95	76	131	2,035	2,036

The trips generation rate for the ambulatory care portion of the Radnor Penn Medicine facility was calculated for the independent variable "patient positions" using the trips associated with medical practice (TAMP) and dividing by the number of patient positions:

TAMP/ patient positions = Trip generation rate per patient position

<u>Land Use</u>	<u>Size</u>	<u>Average Daily Trips Rate</u>	<u>Average Peak Hour Trip Rate</u>	
			<u>AM</u>	<u>PM</u>
Medical/Mixed Use	189 Patient Positions	21.54	1.59 (.68 in/.32 out)	1.09 (.37 in/.63 out)

Driveway counts were also conducted at the Valley Forge Penn Medicine ambulatory care facility located at 1001 Chesterbrook Blvd. in Berwyn PA. The Valley Forge Penn Medical Center has 149 exam or treatment rooms (patient positions) and all of the trips generated by the site are related to the medical uses. The recorded driveway trips are summarized below:

VALLEY FORGE PENN MEDICINE DRIVEWAY COUNTS

<u>Location</u>	<u>AM PEAK</u>		<u>PM PEAK</u>		<u>DAILY</u>	
	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>
Valley Forge Penn Medicine	88	8	14	58	638	638

The trip generation rates for the Valley Forge Penn Medicine ambulatory care facility was calculated using the collected driveway data for the independent variable "patient position" using the driveway data:

VALLEY FORGE PENN MEDICINE TRIPS

<u>Land Use</u>	<u>Size</u>	<u>Average Daily Trips Rate</u>	<u>Peak Hour Trip Rate</u>	
			<u>AM</u>	<u>PM</u>
Medical/Mixed Use	149 Patient Positions	8.56	0.64 (.92 in/.08 out)	0.48 (.20 in/.80 out)

Driveway counts were also conducted at the Fern Hill Medical Campus located at 915 Old Fern Hill Road in West Chester, PA. Fern Hill Medical Campus is 154,826 SF with 239 patient positions and all of the trips generated by the site are related to the medical uses. The recorded driveway trips are summarized below:

FERN HILL MEDICAL CAMPUS DRIVEWAY COUNTS

<u>Location</u>	<u>AM PEAK</u>		<u>PM PEAK</u>		<u>DAILY</u>	
	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>	<u>IN</u>	<u>OUT</u>
Fern Hill Medical Campus	395	105	85	227	2382	2382

The trip generation rates for the ambulatory care facility mixed use/medical portion of the Fern Hill Medical Campus ambulatory care facility was calculated using the collected driveway data for the independent variable “patient positions” using the driveway data:

FERN HILL MEDICAL CAMPUS MIXED USE TRIPS

Independent Variable – Patient Positions

<u>Land Use</u>	<u>Size</u>	<u>Average Daily Trips Rate</u>	<u>Peak Hour Trip Rate</u>	
			<u>AM</u>	<u>PM</u>
Medical/Mixed Use	223 positions	21.36	2.24 (.79 in/.21 out)	1.40 (.27 in/.73 out)

The following is a comparison of the trip generation rates calculated for the Radnor Penn Medicine ambulatory care facility, the Valley Forge Penn Medicine ambulatory care facility, The Fern Hill ambulatory care facility and the average of the three:

COMPARISON OF CALCULATED TRIP RATES FOR MEDICAL MIXED USE

(Trips/Patient Position)

<u>Location</u>	<u>Avg. Daily Trip Rate</u>	<u>Peak Hour Trips Rates</u>	
		<u>AM</u>	<u>PM</u>
Radnor (124,300 SF/ 189 PP)	21.54	1.59 (.68 in/.32 out)	1.09 (.37 in/.63 out)
Valley Forge (88,300 SF/ 149 PP)	8.56	0.64 (.92 in/.08 out)	0.48 (.20 in/.80 out)
Fern Hill (154,826 SF/ 223 PP)	21.36	2.24 (.79 in/.21 out)	1.40 (.27 in/.73 out)
Average	18.02 (.50 in/.50 out)	1.60 (.77 in/.23 out)	1.06 (.29 in/.71 out)

PROPOSED PENN MEDICINE MEDICAL MIXED USE

The proposed 470,000 SF Penn Medicine development at 145 King of Prussia Road will have a 250,000 SF building dedicated to mixed medical use with 271 patient positions. The following is a comparison of the trips generated by the 250,000 SF medical portion of the site using patient positions as an independent variable:

<u>Method (Land Use)</u>	<u>Size</u>	<u>AM Rate</u>	<u>AM Trips</u>	<u>PM Rate</u>	<u>PM Trips</u>
Calculated - Medical Use (Trips/Patient Position) (Average Rate)	271 Patient Pos.	1.60	434	1.06	287

## Trip Generation Calculations Using Developed rates for Mixed Medical Use

Land Use Code	Size	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
Medical Mixed Use*	250,000 SF (271 PP)	Patient Positions	2,442	2,442	4,883	334	100	434	83	204	287
General Office Building (ITE Land Use 710)	150,000 SF	1,000 SF GFA	827	827	1,655	206	28	234	38	186	224
Hotel (ITE Land Use 310)	75,000 SF (120 rooms)	Rooms	490	490	980	38	26	64	37	35	72
<b>Total</b>			<b>3,759</b>	<b>3,759</b>	<b>7,518</b>	<b>577</b>	<b>154</b>	<b>731</b>	<b>158</b>	<b>425</b>	<b>583</b>

\* Trip generation calculated using calculated trip rates for Medical Mixed Use based on observations of similar facilities

# APPENDIX H

## Turn Lane Evaluation

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507





## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	Type of Analysis
Posted Speed Limit (MPH): 35	
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV	
Advancing	Left	Yes	177	0.0%	177
	Through	-	1071	2.0%	1104
	Right	Yes	369	0.0%	369
Opposing	Left	Yes	52	0.0%	52
	Through	-	268	9.0%	305
	Right	Yes	59	0.0%	59

Advancing Volume:	1650
Opposing Volume:	416
Left Turn Volume:	177

% Left Turns in Advancing Volume: 10.73%

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV	
Advancing	Left	Yes	177	0.0%	N/A
	Through	-	1069	2.0%	N/A
	Right	-	369	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	177
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40
Average # of Vehicles/Cycle:	4.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **175** Feet

Condition B: **N/A** Feet

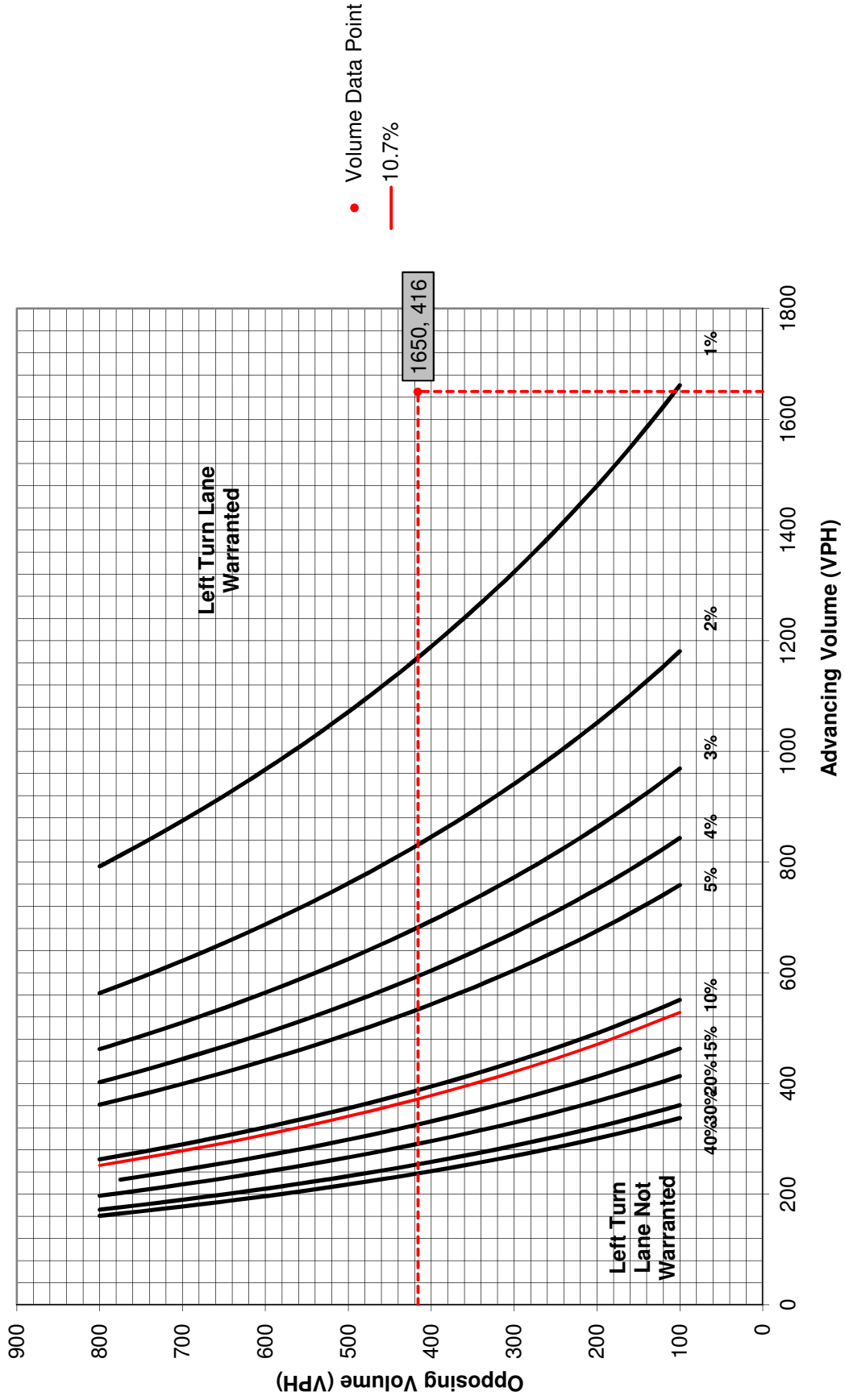
Condition C: **N/A** Feet

Required Left Turn Lane Storage Length: **175** Feet

Additional Findings:  
N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	Type of Analysis
Posted Speed Limit (MPH): 35	
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	24	0.0%	24	Advancing Volume: 429	
	Through	-	299	1.0%	304		Opposing Volume: 1136
	Right	Yes	101	0.0%	101		Left Turn Volume: 24
Opposing	Left	Yes	14	0.0%	14	% Left Turns in Advancing Volume: 5.59%	
	Through	-	1117	0.0%	1117		
	Right	Yes	5	0.0%	5		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	24	0.0%	N/A	Advancing Volume: N/A	
	Through	-	299	1.0%	N/A		Right Turn Volume: N/A
	Right	-	101	0.0%	N/A		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized	
Design Hour Volume of Turning Lane: 24	
Cycles Per Hour (Assumed): 40	
Cycles Per Hour (If Known): 40	Average # of Vehicles/Cycle: 1.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **75** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

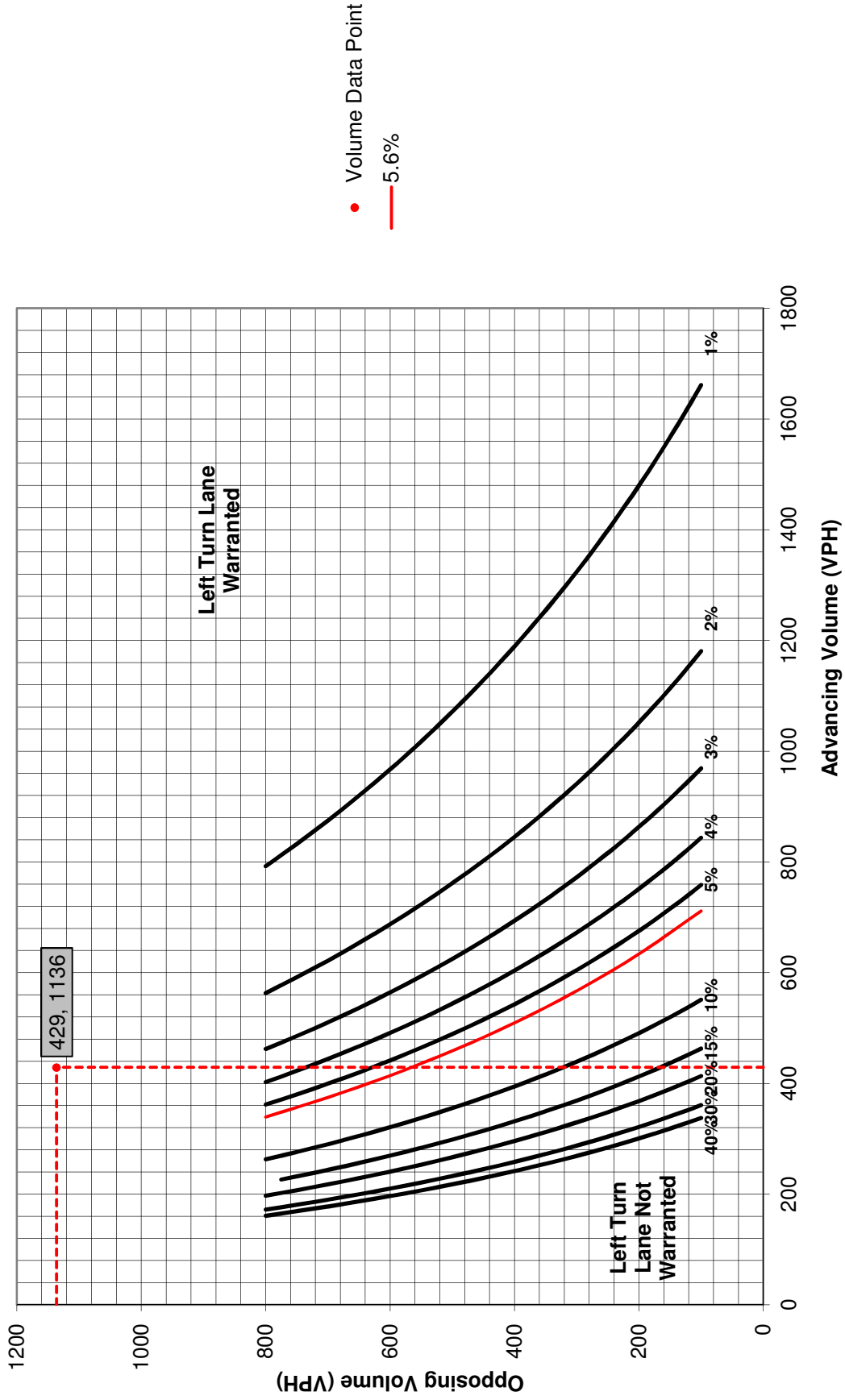
Required Left Turn Lane Storage Length: **75** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at Raider Road/Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	52	0.0%	52
	Through	-	268	9.0%	305
	Right	Yes	59	0.0%	59
Opposing	Left	Yes	177	0.0%	177
	Through	-	1071	2.0%	1104
	Right	Yes	369	0.0%	369

Advancing Volume:	416	
Opposing Volume:	1650	
Left Turn Volume:	52	
% Left Turns in Advancing Volume:		12.50%

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	52	0.0%	N/A
	Through	-	268	9.0%	N/A
	Right	-	59	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

### TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <b>Figure 1</b>	Applicable Warrant Figure: <b>N/A</b>
Warrant Met?: <b>Yes</b>	Warrant Met?: <b>N/A</b>

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized	
Design Hour Volume of Turning Lane: 52	
Cycles Per Hour (Assumed): 40	
Cycles Per Hour (If Known): 40	Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	75	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	75	Feet

Additional Findings:  
N/A

Additional Comments / Justifications:



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at Raider Road/Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV	
Advancing	Left	Yes	14	0.0%	14	Advancing Volume: 1152
	Through	-	1117	0.0%	1133	Opposing Volume: 427
	Right	Yes	5	0.0%	5	Left Turn Volume: 14
Opposing	Left	Yes	24	0.0%	24	
	Through	-	299	1.0%	304	
	Right	Yes	101	0.0%	99	% Left Turns in Advancing Volume: 1.22%

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV	
Advancing	Left	Yes	14	0.0%	N/A	Advancing Volume: N/A
	Through	-	1117	0.0%	N/A	Right Turn Volume: N/A
	Right	-	5	0.0%	N/A	

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized	
Design Hour Volume of Turning Lane: 14	
Cycles Per Hour (Assumed): 40	
Cycles Per Hour (If Known): 40	Average # of Vehicles/Cycle: 1.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **75** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

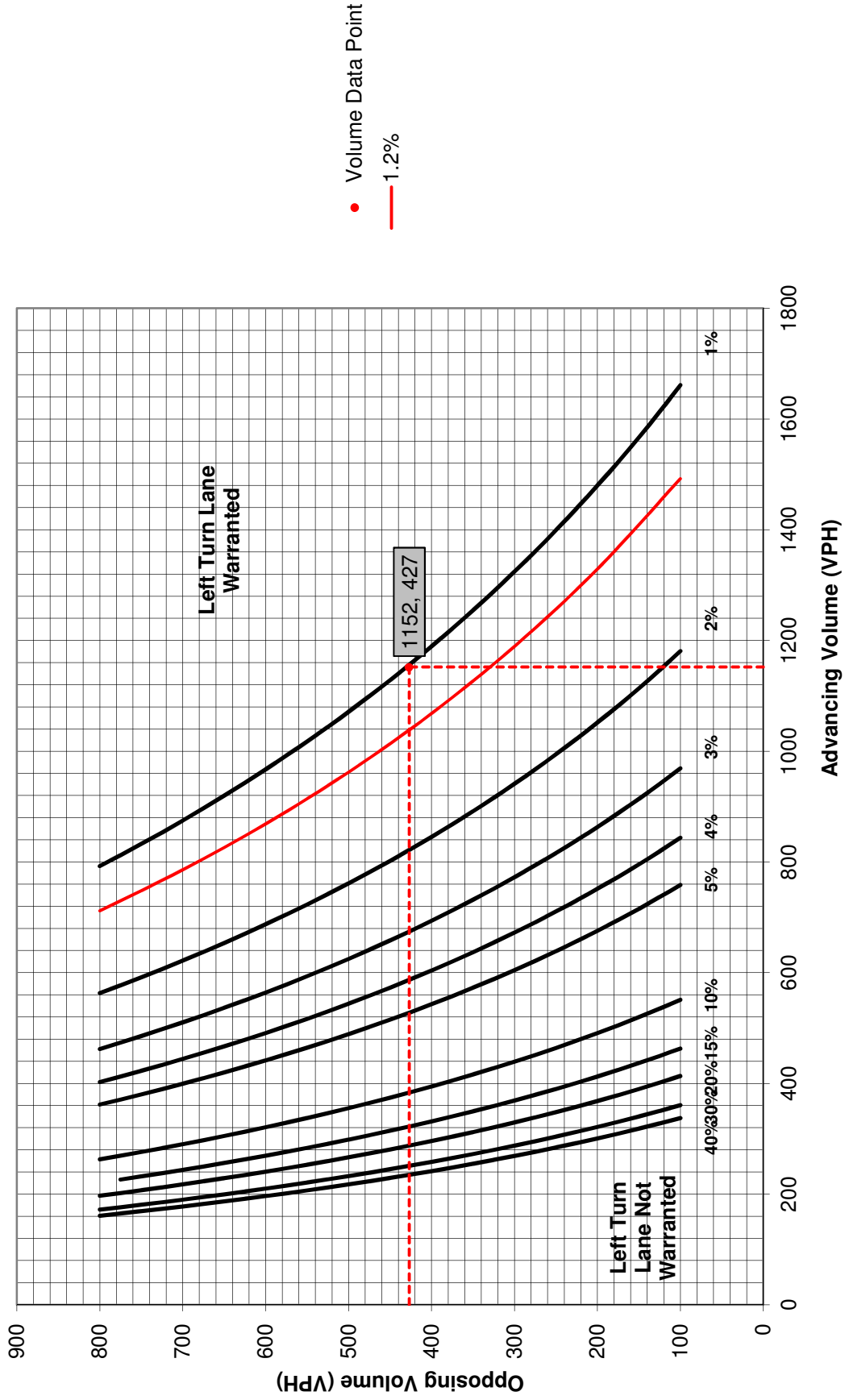
Required Left Turn Lane Storage Length: **75** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)





## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	177	0.0%	N/A
	Through	-	1071	2.0%	N/A
	Right	Yes	369	0.0%	N/A
Opposing	Left	Yes	52	0.0%	N/A
	Through	-	268	9.0%	N/A
	Right	Yes	59	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A

% Left Turns in Advancing Volume:	N/A
-----------------------------------	-----

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	177	0.0%	177
	Through	-	1069	2.0%	1102
	Right	-	369	0.0%	369

Advancing Volume:	1648
Right Turn Volume:	369

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure:	N/A
Warrant Met?:	N/A

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure:	Figure 9
Warrant Met?:	Yes

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	369
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40
Average # of Vehicles/Cycle:	9.0

#### PennDOT Publication 46, Exhibit 11-6

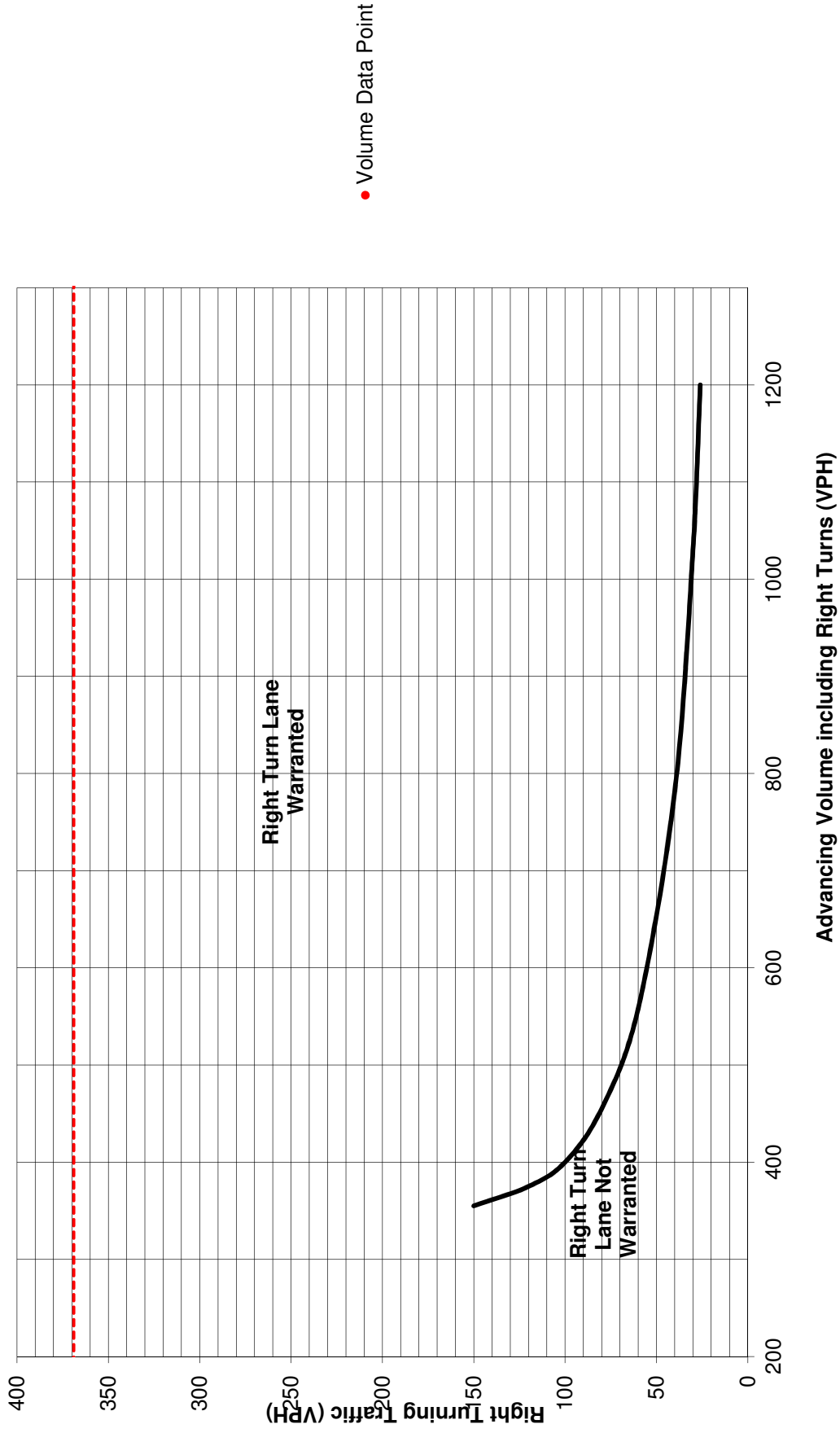
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	350	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	350	Feet

Additional Findings:	N/A
----------------------	-----

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways  
(40 mph or lower speeds, unsignalized and signalized intersections)**



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: <input type="text" value="Radnor Township"/>	Analysis Date: <input type="text" value="11/30/2016"/>
County: <input type="text" value="Delaware County"/>	Conducted By: <input type="text" value="SDS"/>
PennDOT Engineering District: <input type="text" value="6"/>	Checked By: <input type="text" value="ACB"/>
	Agency/Company Name: <input type="text" value="Pennoni"/>
Intersection & Approach Description: <input type="text" value="King of Prussia Road NB at Raider Road/Site Driveway"/>	
Analysis Period: <input type="text" value="2025 Build"/>	Number of Approach Lanes: <input type="text" value="1"/>
Design Hour: <input type="text" value="PM Peak Hour"/>	Undivided or Divided Highway: <input type="text" value="Undivided"/>
Intersection Control: <input type="text" value="Signalized"/>	
Posted Speed Limit (MPH): <input type="text" value="35"/>	Type of Analysis: <input type="text" value="Right Turn Lane"/>
Type of Terrain: <input type="text" value="Rolling"/>	Left or Right-Turn Lane Analysis?: <input type="text" value="Right Turn Lane"/>

### VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	24	0.0%	N/A
	Through	-	299	1.0%	N/A
	Right	Yes	101	0.0%	N/A
Opposing	Left	Yes	14	0.0%	N/A
	Through	-	1117	0.0%	N/A
	Right	Yes	5	0.0%	N/A

Advancing Volume:

Opposing Volume:

Left Turn Volume:

% Left Turns in Advancing Volume:

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	24	0.0%	24
	Through	-	299	1.0%	304
	Right	-	101	0.0%	101

Advancing Volume:

Right Turn Volume:

### TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <input type="text" value="N/A"/>	Applicable Warrant Figure: <input type="text" value="Figure 9"/>
Warrant Met?: <input type="text" value="N/A"/>	Warrant Met?: <input type="text" value="Yes"/>

### TURN LANE LENGTH CALCULATIONS

Intersection Control: <input type="text" value="Signalized"/>	
Design Hour Volume of Turning Lane: <input type="text" value="101"/>	
Cycles Per Hour (Assumed): <input type="text" value="40"/>	
Cycles Per Hour (If Known): <input type="text" value="40"/>	Average # of Vehicles/Cycle: <input type="text" value="3.0"/>

PennDOT Publication 46, Exhibit 11-6

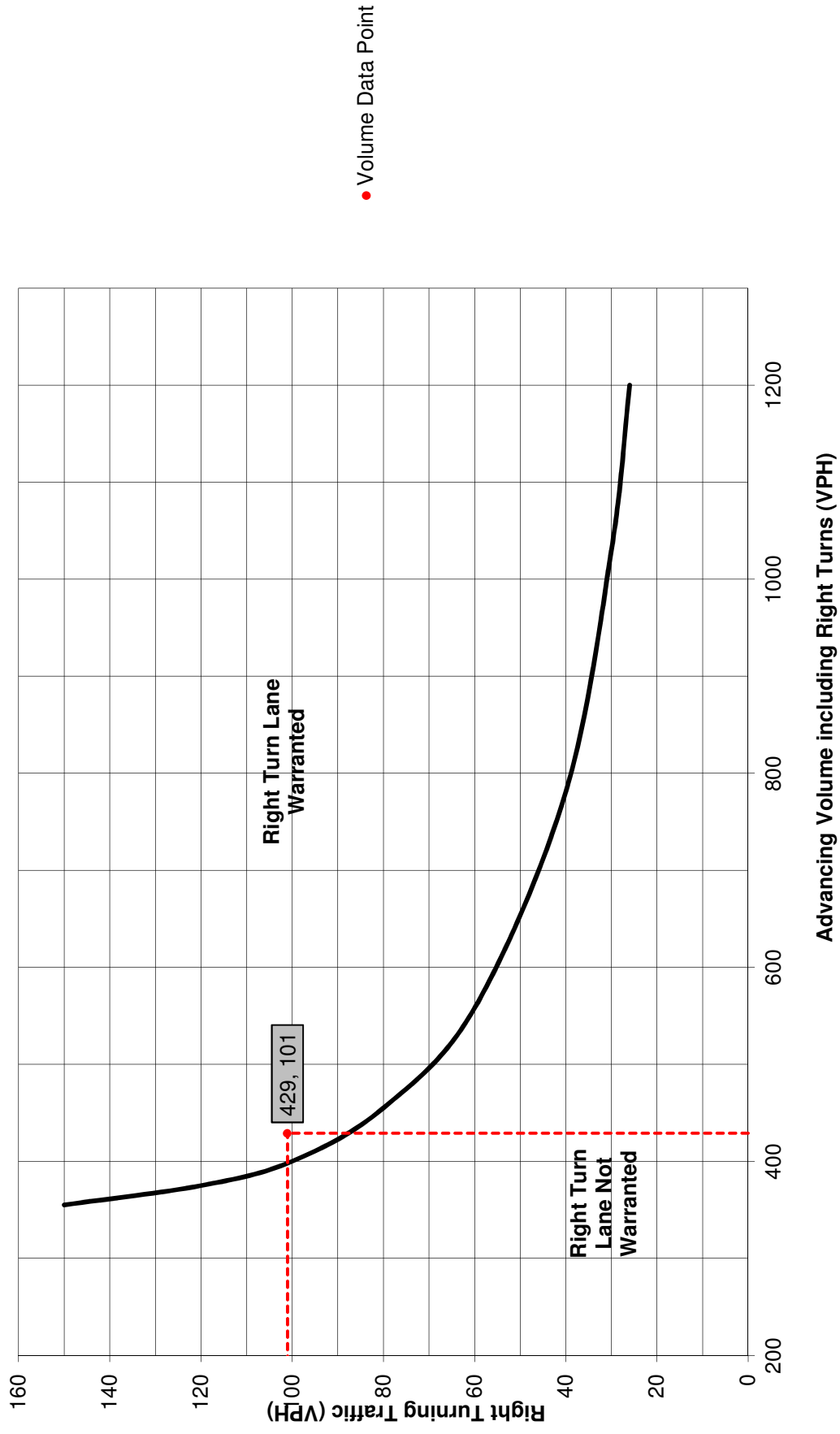
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	<input type="text" value="150"/>	Feet
Condition B:	<input type="text" value="N/A"/>	Feet
Condition C:	<input type="text" value="N/A"/>	Feet
Required Right Turn Lane Storage Length:	<input type="text" value="150"/>	Feet

Additional Findings:

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways  
(40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Septa Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	Type of Analysis
Posted Speed Limit (MPH): 35	
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	149	9.0%	170	Advancing Volume: 497	
	Through	-	4.0%	327		Opposing Volume: 1134
	Right	Yes	0	0.0%		0
Opposing	Left	0	0.0%	0	% Left Turns in Advancing Volume: 34.21%	
	Through	-	2.0%	1018		
	Right	Yes	116	0.0%		116

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	149	9.0%	N/A	Advancing Volume: N/A	
	Through	-	4.0%	N/A		Right Turn Volume: N/A
	Right	-	0	5.0%		N/A

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 170	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 3.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **150** Feet

Condition B: **N/A** Feet

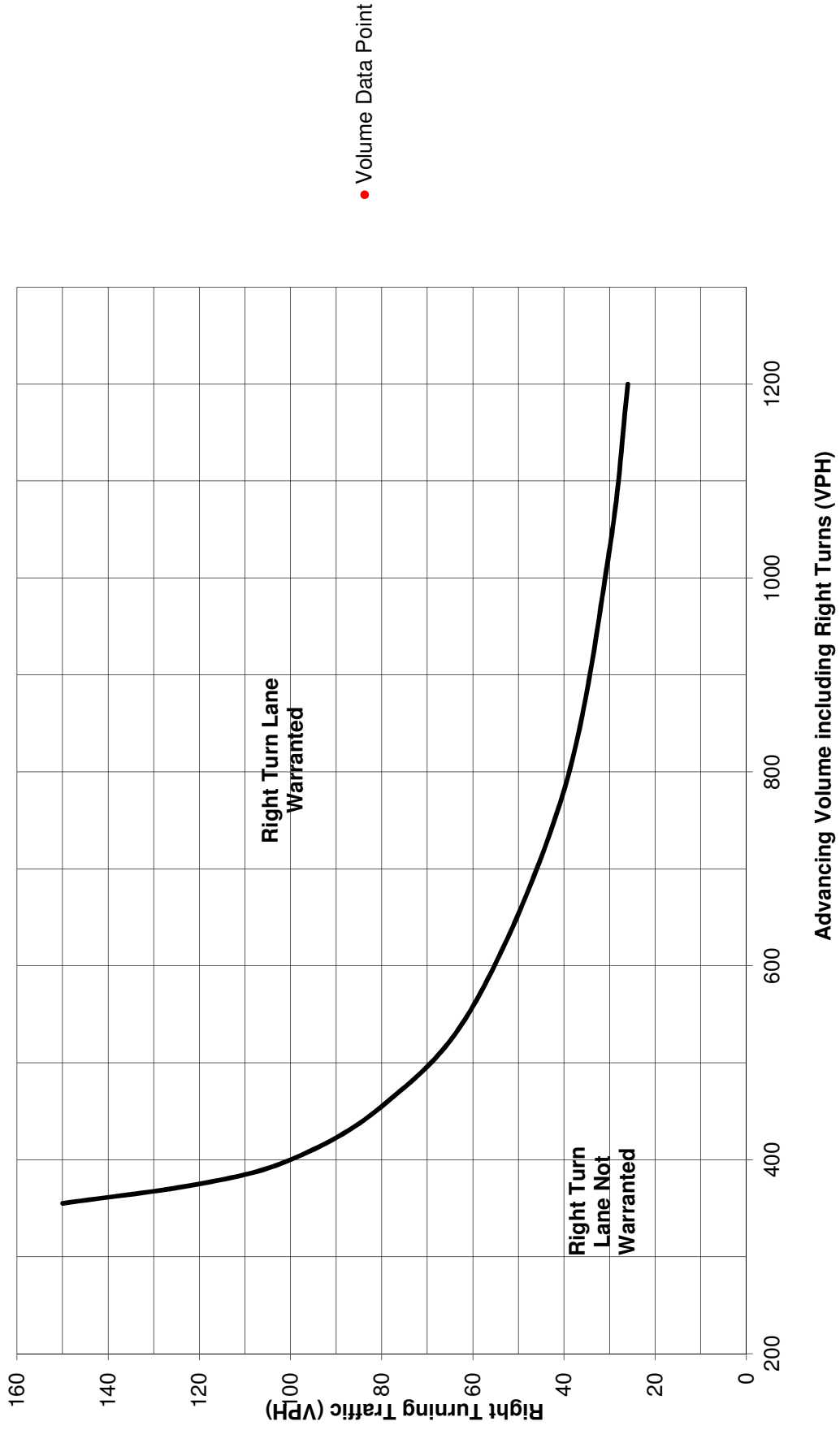
Condition C: **N/A** Feet

Required Left Turn Lane Storage Length: **150** Feet

Additional Findings:  
N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at Septa Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	Type of Analysis
Posted Speed Limit (MPH): 35	Left or Right-Turn Lane Analysis?: Left Turn Lane
Type of Terrain: Rolling	

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	54	10.0%	63	Advancing Volume: 1200	
	Through	988	10.0%	1137		Opposing Volume: 433
	Right	0	0.0%	0		Left Turn Volume: 63
Opposing	Left	0	0.0%	0	% Left Turns in Advancing Volume: 5.25%	
	Through	409	1.0%	416		
	Right	17	0.0%	17		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	54	10.0%	N/A	Advancing Volume: N/A	
	Through	988	0.0%	N/A		Right Turn Volume: N/A
	Right	0	0.0%	N/A		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 63	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 1.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **75** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

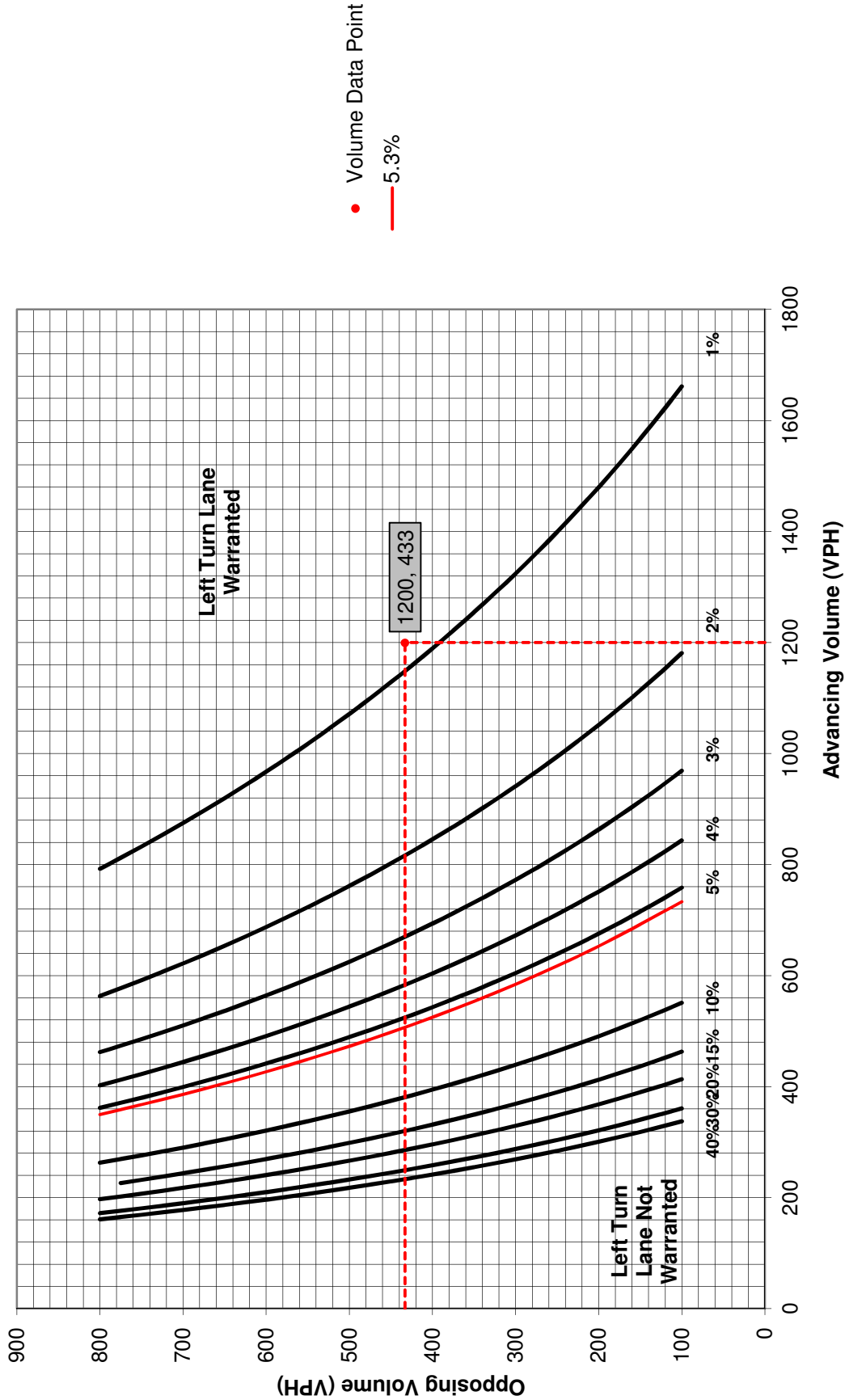
Required Left Turn Lane Storage Length: **75** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)





## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennonni
Intersection & Approach Description: King of Prussia Road NB at Septa Driveway			
Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized	Type of Analysis	
Posted Speed Limit (MPH):	35	Left or Right-Turn Lane Analysis?: Right Turn Lane	
Type of Terrain:	Rolling		

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	988	2.0%	N/A
	Right	Yes	116	0.0%	N/A
Opposing	Left	Yes	149	9.0%	N/A
	Through	-	308	4.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A

% Left Turns in Advancing Volume:	N/A
-----------------------------------	-----

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	988	2.0%	1018
	Right	-	116	0.0%	116

Advancing Volume:	1134
Right Turn Volume:	116

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure:	N/A
Warrant Met?:	N/A

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure:	Figure 9
Warrant Met?:	Yes

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized	Average # of Vehicles/Cycle:	2.0
Design Hour Volume of Turning Lane:	116		
Cycles Per Hour (Assumed):	60		
Cycles Per Hour (If Known):			

PennDOT Publication 46, Exhibit 11-6

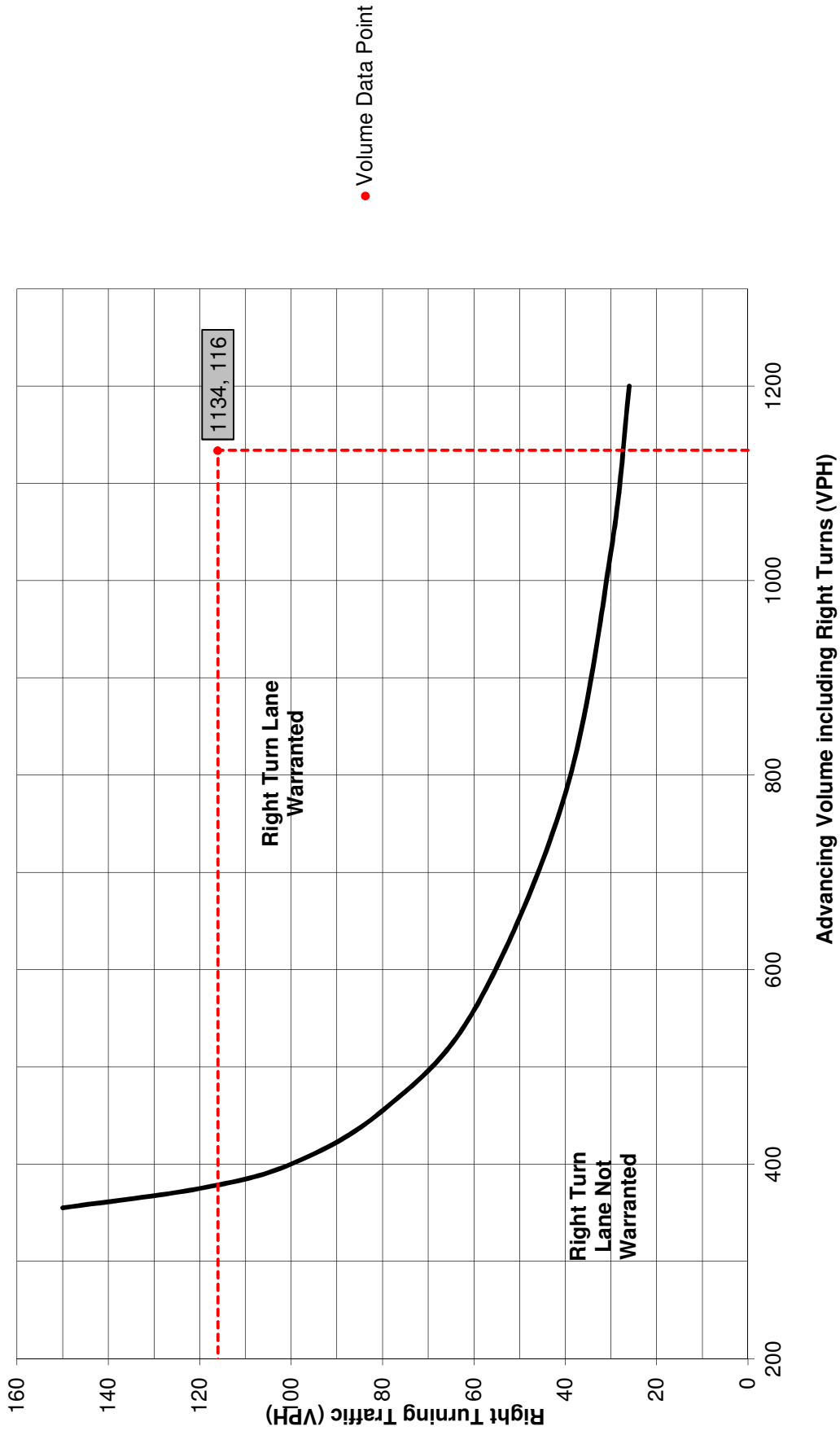
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	100	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	100	Feet

Additional Findings:	N/A
----------------------	-----

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways  
(40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at Septa Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	409	1.0%	N/A
	Right	Yes	17	0.0%	N/A
Opposing	Left	Yes	54	9.0%	N/A
	Through	-	988	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A

% Left Turns in Advancing Volume:	N/A
-----------------------------------	-----

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	409	1.0%	416
	Right	-	17	0.0%	17

Advancing Volume:	433
Right Turn Volume:	17

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure:	N/A
Warrant Met?:	N/A

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure:	Figure 9
Warrant Met?:	No

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	17
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	
Average # of Vehicles/Cycle:	N/A

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

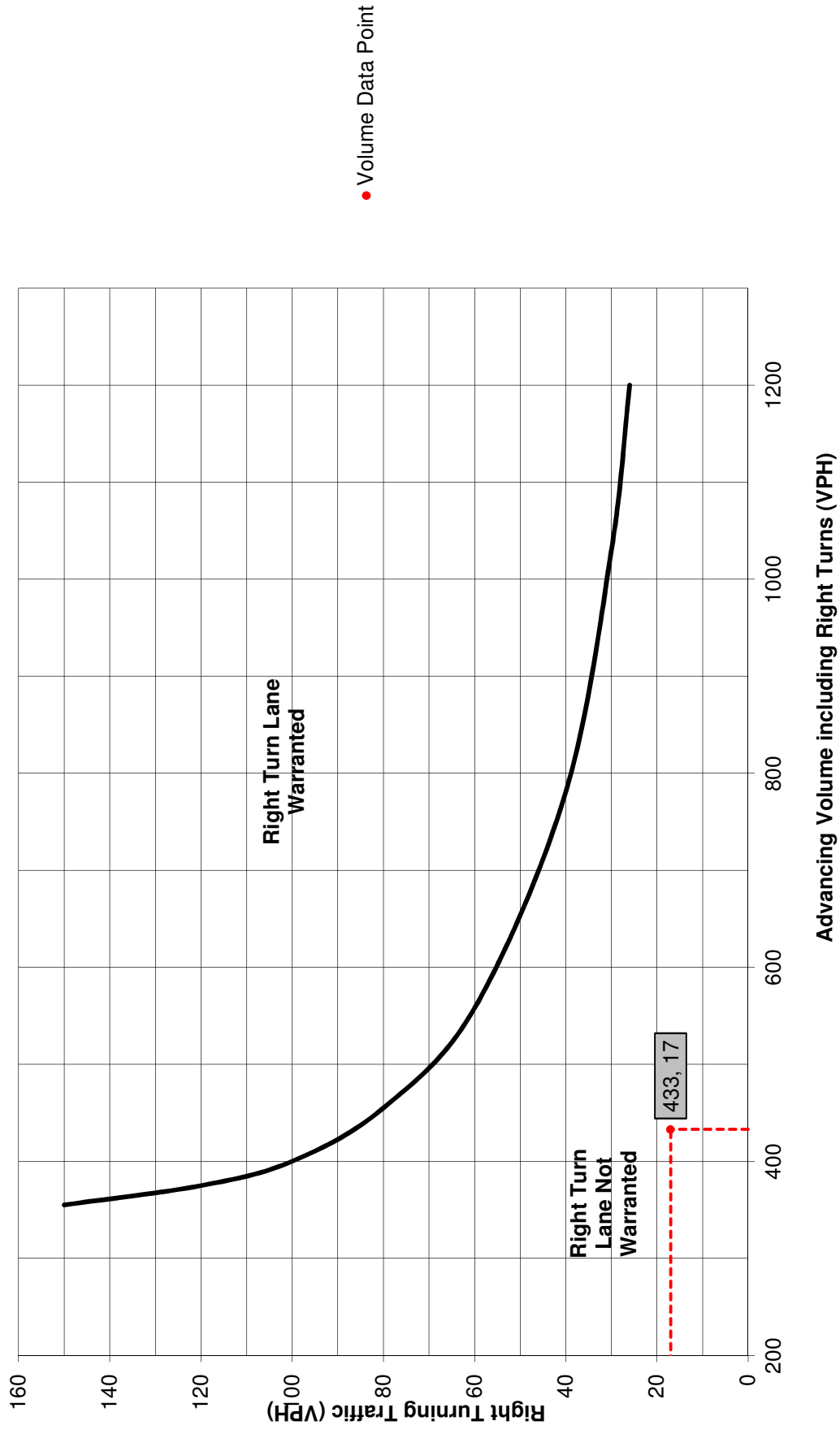
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A
-----

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at South Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	Type of Analysis
Posted Speed Limit (MPH): 35	
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	6	0.0%	6	Advancing Volume: 544	
	Through	-	493	6.0%	538		Opposing Volume: 1642
	Right	Yes	0	0.0%	0		Left Turn Volume: 6
Opposing	Left	Yes	0	0.0%	0	% Left Turns in Advancing Volume: 1.10%	
	Through	-	1611	1.0%	1636		
	Right	Yes	6	0.0%	6		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	6	0.0%	N/A	Advancing Volume: N/A	
	Through	-	493	6.0%	N/A		Right Turn Volume: N/A
	Right	-	0	0.0%	N/A		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 6	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 1.0

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **75** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

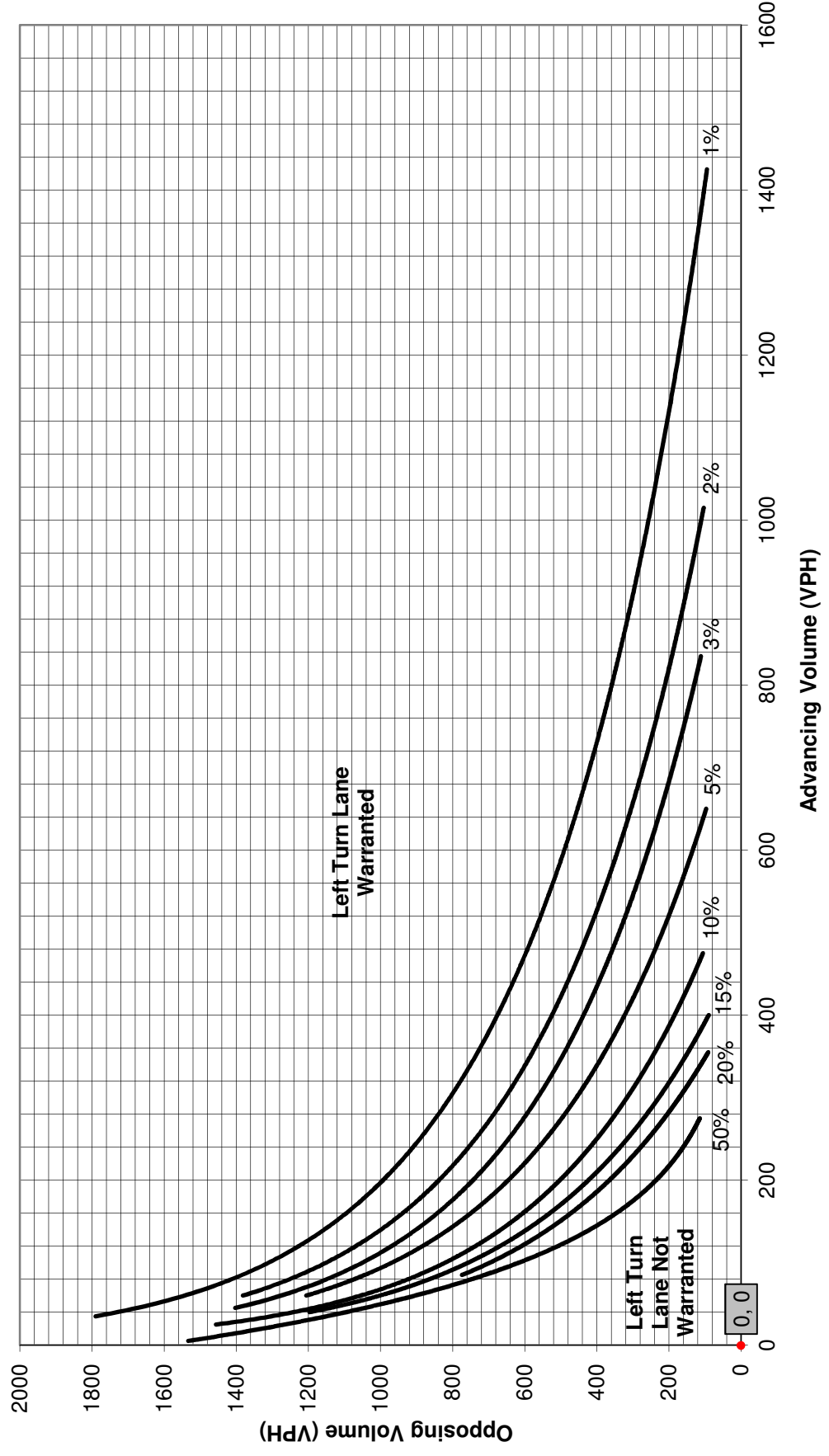
Required Left Turn Lane Storage Length: **75** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 7. Warrant for left turn lanes on four-lane, undivided highways**  
 (unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume) • Volume Data Point



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road SB at South Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Left Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	2	0.0%	2	Advancing Volume: 1427	
	Through	-	1425	0.0%	1425		Opposing Volume: 428
	Right	Yes	0	0.0%	0		Left Turn Volume: 2
Opposing	Left	Yes	0	0.0%	0	% Left Turns in Advancing Volume: 0.14%	
	Through	-	419	1.0%	426		
	Right	Yes	2	0.0%	2		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	2	0.0%	N/A	Advancing Volume: N/A	
	Through	-	1425	0.0%	N/A		Right Turn Volume: N/A
	Right	-	0	0.0%	N/A		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **No**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 2	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: N/A

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **N/A** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

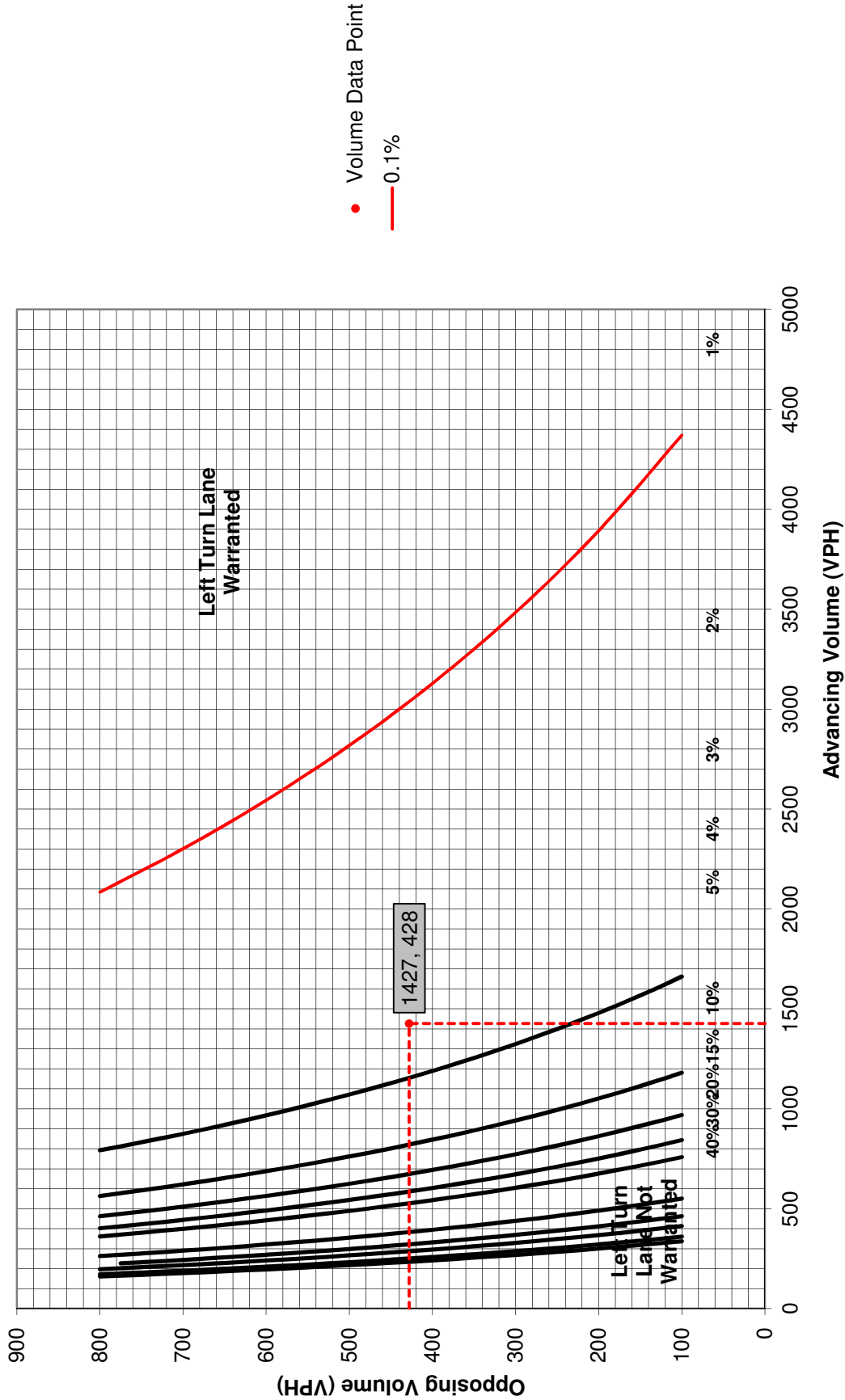
Required Left Turn Lane Storage Length: **N/A** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

**Figure 1. Warrant for left turn lanes on two-lane roadways**  
 (speeds to 35 mph, unsignalized and signalized intersections)  
 (L = % Left Turns in Advancing Volume)





## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at South Site Driveway	
Analysis Period: 2025 Build	Number of Approach Lanes: 2
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	0	0.0%	N/A	Advancing Volume: N/A	
	Through	-	1611	1.0%	N/A		Opposing Volume: N/A
	Right	Yes	6	0.0%	N/A		Left Turn Volume: N/A
Opposing	Left	Yes	6	0.0%	N/A	% Left Turns in Advancing Volume: N/A	
	Through	-	493	6.0%	N/A		
	Right	Yes	0	0.0%	N/A		

#### Right Turn Lane Volume Calculations

Movement	Include?	Volume	% Trucks	PCEV			
Advancing	Left	Yes	0	0.0%	0	Advancing Volume: 1654	
	Through	-	1611	1.0%	1648		Right Turn Volume: 6
	Right	-	6	0.0%	6		

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 11**

Warrant Met?: **No**

### TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 6	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: N/A

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: **N/A** Feet

Condition B: **N/A** Feet

Condition C: **N/A** Feet

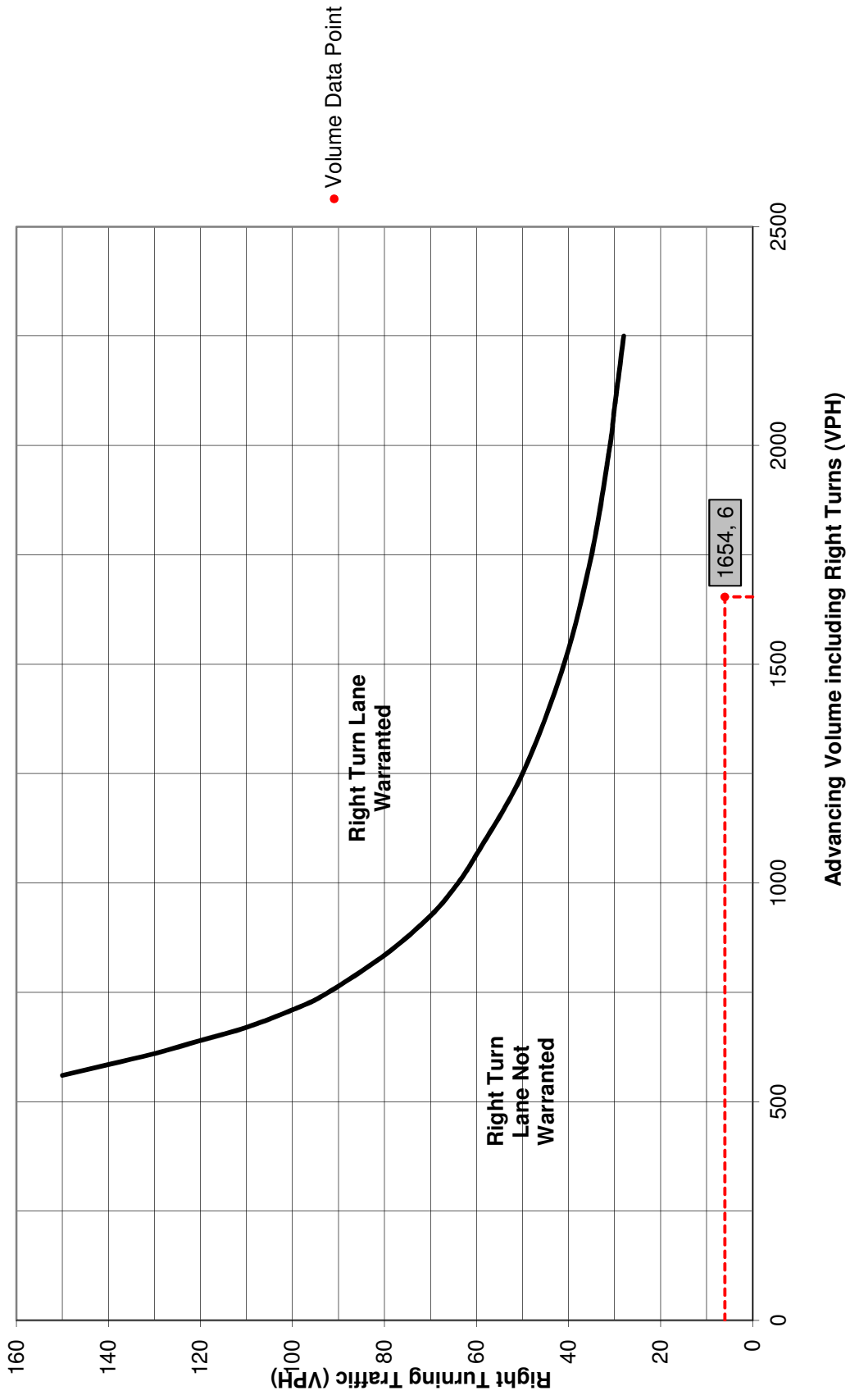
Required Right Turn Lane Storage Length: **N/A** Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 11. Warrant for right turn lanes on four-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



## Turn Lane Warrant and Length Analysis Workbook

### STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township	Analysis Date: 11/30/2016
County: Delaware County	Conducted By: SDS
PennDOT Engineering District: 6	Checked By: ACB
	Agency/Company Name: Pennoni
Intersection & Approach Description: King of Prussia Road NB at South Site Driveway	
Analysis Period: 2020 Build	Number of Approach Lanes: 2
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	
Posted Speed Limit (MPH): 35	Type of Analysis
Type of Terrain: Rolling	Left or Right-Turn Lane Analysis?: Right Turn Lane

### VOLUME CALCULATIONS

#### Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	419	1.0%	N/A
	Right	Yes	2	0.0%	N/A
Opposing	Left	Yes	2	0.0%	N/A
	Through	-	1425	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A

% Left Turns in Advancing Volume:	N/A
-----------------------------------	-----

#### Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	419	1.0%	426
	Right	-	2	0.0%	2

Advancing Volume:	428
Right Turn Volume:	2

### TURN LANE WARRANT FINDINGS

#### Left Turn Lane Warrant Findings

Applicable Warrant Figure:	N/A
Warrant Met?:	N/A

#### Right Turn Lane Warrant Findings

Applicable Warrant Figure:	Figure 11
Warrant Met?:	No

### TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized	Average # of Vehicles/Cycle:	N/A
Design Hour Volume of Turning Lane:	2		
Cycles Per Hour (Assumed):	60		
Cycles Per Hour (If Known):			

#### PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

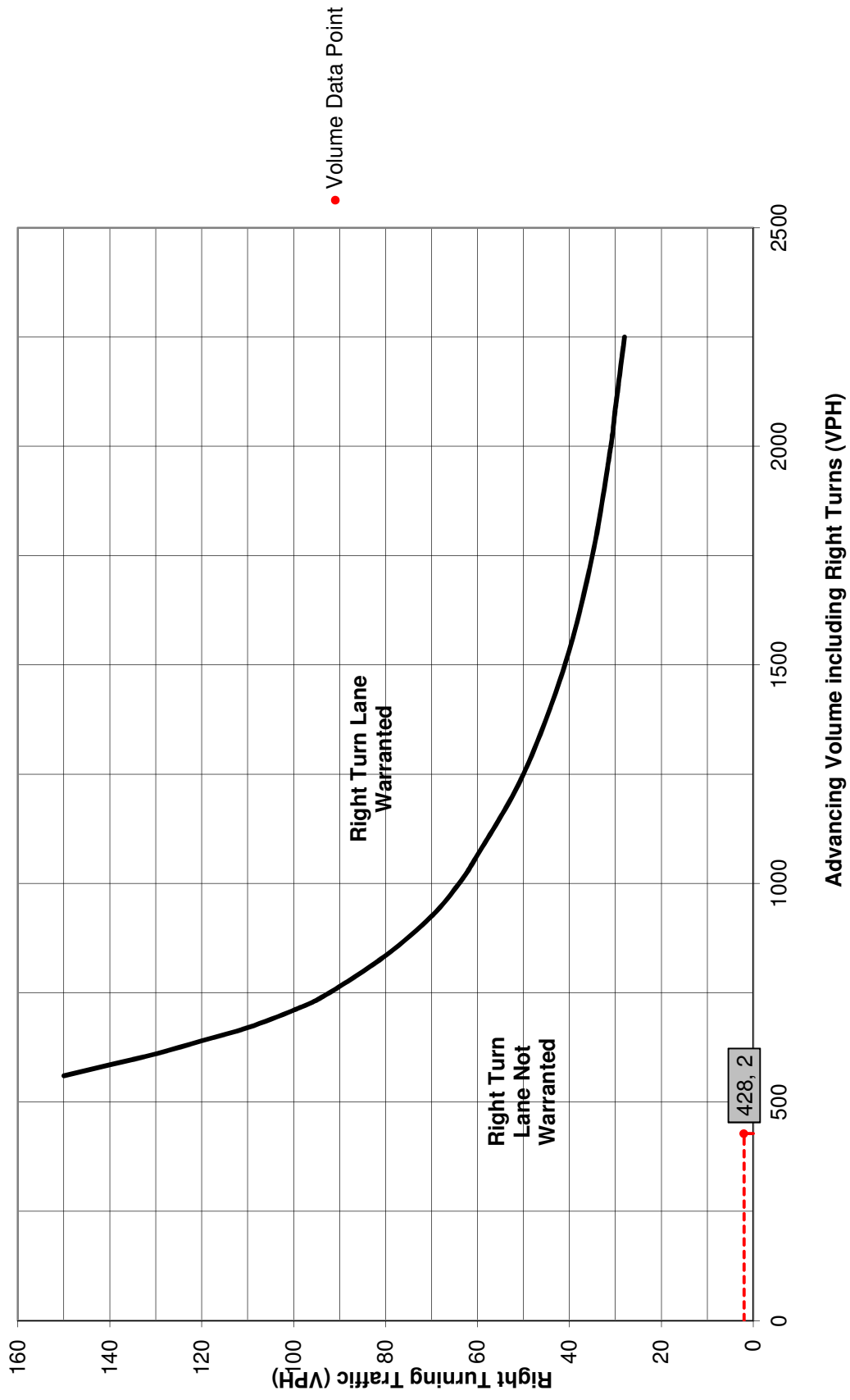
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A
-----

Additional Comments / Justifications:

Figure 11. Warrant for right turn lanes on four-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



# APPENDIX I

2020 and 2025 Build Condition without Improvements

Capacity Analysis Worksheets

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD

RADNOR TOWNSHIP






















DELAWARE COUNTY, PA

UPHS1507



HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

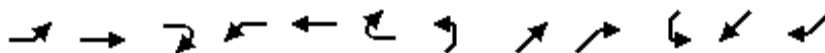
01/16/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Future Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	349	8	113	409	699	2	13	696	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	333	0	391	437	25	357	390	1152	3	371	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1291	0	1530	1396	99	1398	1639	1820	5	749	1764	1544
Grp Volume(v), veh/h	1	0	2	349	0	121	409	0	701	13	696	0
Grp Sat Flow(s),veh/h/ln	1291	0	1530	1396	0	1497	1639	0	1825	749	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.80	0.00	0.32	1.05	0.00	0.61	0.04	1.01	0.00
Avail Cap(c_a), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.0	33.3	0.0	27.1	27.5	0.0	9.8	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.1	0.0	0.5	59.2	0.0	2.4	0.2	38.0	0.0
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	0.0	0.0	0.1	15.0	0.0	4.4	28.9	0.0	16.3	0.4	43.6	0.0
LnGrp Delay(d),s/veh	29.1	0.0	25.0	43.4	0.0	27.6	86.7	0.0	12.2	17.3	65.5	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			470			1110			709	
Approach Delay, s/veh		26.4			39.3			39.6			64.6	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		22.6		24.8	19.5	37.5		7.9				
Green Ext Time (p_c), s		12.3		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				47.3								
HCM 2010 LOS				D								

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/16/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Future Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	421	0	30	890	7	534	34	62	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	90	857	772	395	900	7	226	9	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	630	1714	1545	935	1799	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	421	0	30	0	897	568	0	62	9	0	0
Grp Sat Flow(s),veh/h/ln	630	1714	1545	935	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	1.5	14.6	0.0	2.0	0.0	44.0	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.6	0.0	16.6	0.0	44.0	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	90	857	772	395	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.44	0.49	0.00	0.08	0.00	0.99	2.41	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	90	857	772	395	0	907	236	0	574	159	0	0
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)	0.58	0.58	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.8	14.9	0.0	20.4	0.0	22.3	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	8.9	1.2	0.0	0.4	0.0	27.4	648.0	0.0	0.1	0.1	0.0	0.0
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	2.2	10.5	0.0	1.0	0.0	37.6	86.8	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.7	16.1	0.0	20.8	0.0	49.7	681.6	0.0	18.2	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		461			927			630			9	
Approach Delay, s/veh		19.3			48.7			616.3			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		46.0		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				218.3								
HCM 2010 LOS				F								



HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/16/2018

**Intersection**

Int Delay, s/veh 3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	42	970	115	147	303
Future Vol, veh/h	20	42	970	115	147	303
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	23	48	1115	132	169	348

**Major/Minor**

	Minor1	Major1	Major2		
Conflicting Flow All	1886	1208	0	0	1264
Stage 1	1198	-	-	-	-
Stage 2	688	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	79	185	-	-	487
Stage 1	289	-	-	-	-
Stage 2	503	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	51	181	-	-	483
Mov Cap-2 Maneuver	162	-	-	-	-
Stage 1	285	-	-	-	-
Stage 2	326	-	-	-	-

**Approach**

	WB	NB	SB
HCM Control Delay, s	39.3	0	5.4
HCM LOS	E		

**Minor Lane/Major Mvmt**

	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	174	483
HCM Lane V/C Ratio	-	-	0.41	0.35
HCM Control Delay (s)	-	-	39.3	16.4
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.8	1.6

HCM 2010 TWSC  
5: King of Prussia Rd & Raider Rd

01/16/2018

**Intersection**

Int Delay, s/veh 282.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	9	0	130	99	0	22	173	1052	369	52	264	58
Future Vol, veh/h	9	0	130	99	0	22	173	1052	369	52	264	58
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	167	127	0	28	222	1349	473	67	338	74

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	2552	2782	376	2629	2583	1593	413	0	0	1830	0	0
Stage 1	509	509	-	2037	2037	-	-	-	-	-	-	-
Stage 2	2043	2273	-	592	546	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	17	19	666	~ 16	26	133	1157	-	-	338	-	-
Stage 1	530	541	-	~ 75	101	-	-	-	-	-	-	-
Stage 2	69	77	-	496	521	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 11	14	666	~ 10	19	132	1157	-	-	338	-	-
Mov Cap-2 Maneuver	~ 11	14	-	~ 10	19	-	-	-	-	-	-	-
Stage 1	530	400	-	~ 75	100	-	-	-	-	-	-	-
Stage 2	54	76	-	275	386	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	240.2	\$ 4909.7	1	2.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1157	-	-	137	10	132	338	-	-
HCM Lane V/C Ratio	0.192	-	-	1.301	12.692	0.214	0.197	-	-
HCM Control Delay (s)	8.8	0	-	240.2	\$ 5992	39.5	18.2	0	-
HCM Lane LOS	A	A	-	F	F	E	C	A	-
HCM 95th %tile Q(veh)	0.7	-	-	11.1	17.4	0.8	0.7	-	-

**Notes**

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↗↘	↘↗	↑
Traffic Vol, veh/h	2	2	1588	6	6	486
Future Vol, veh/h	2	2	1588	6	6	486
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1913	7	7	586






















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2513	1913	0	0	1913
Stage 1	1913	-	-	-	-
Stage 2	600	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	32	86	-	-	314
Stage 1	129	-	-	-	-
Stage 2	552	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	31	86	-	-	314
Mov Cap-2 Maneuver	31	-	-	-	-
Stage 1	129	-	-	-	-
Stage 2	540	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	92.2	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	46	314
HCM Lane V/C Ratio	-	-	0.105	0.023
HCM Control Delay (s)	-	-	92.2	16.7
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	0.3	0.1

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/16/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Future Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	385	1321	0	0	551	0	782	853	347	326	0	165
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	326	
Grp Volume(v), veh/h	385	1321	0	0	551	0	782	853	347	326	75.9	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.6	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Cycle Q Clear(g_c), s	12.6	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.85	0.99	0.00	0.00	0.74	0.00	0.47	1.24	0.59	0.90		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.9	40.0	0.0	0.0	48.0	0.0	17.4	33.5	26.5	51.6		
Incr Delay (d2), s/veh	13.1	20.8	0.0	0.0	5.9	0.0	0.2	118.8	1.6	24.3		
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		
%ile BackOfQ(95%),veh/ln	10.5	31.4	0.0	0.0	13.5	0.0	12.2	78.5	13.3	5.0		
LnGrp Delay(d),s/veh	62.0	60.9	0.0	0.0	53.9	0.0	17.6	152.3	28.1	75.9		
LnGrp LOS	E	E			D		B	F	C	E		
Approach Vol, veh/h		1706			551			1982				
Approach Delay, s/veh		61.1			53.9			77.4				
Approach LOS		E			D			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		45.9	19.5		15.1	19.9	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.0		0.0	2.7	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			68.4									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/16/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	851	0	186	1224	792	839		
Future Volume (veh/h)	851	0	186	1224	792	839		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	868	0	190	1249	808	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2288	0	290	2104	957	436		
Arrive On Green	0.48	0.00	0.03	0.21	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	868	0	190	1249	808	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	12.8	0.0	6.5	36.7	25.1	0.0		
Cycle Q Clear(g_c), s	12.8	0.0	6.5	36.7	25.1	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2288	0	290	2104	957	436		
V/C Ratio(X)	0.38	0.00	0.66	0.59	0.84	0.00		
Avail Cap(c_a), veh/h	2288	0	317	2104	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.63	0.63	1.00	0.00		
Uniform Delay (d), s/veh	17.9	0.0	51.6	31.1	36.9	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.7	0.8	3.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.5	0.0	5.2	22.9	17.7	0.0		
LnGrp Delay(d),s/veh	18.4	0.0	54.4	31.9	40.0	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	868			1439	808			
Approach Delay, s/veh	18.4			34.9	40.0			
Approach LOS	B			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.6	15.1	58.3				73.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.6	9.0	15.3				39.2
Green Ext Time (p_c), s		3.0	0.1	14.8				10.1
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.6					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/16/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↗		↖	↖↗	↖		↖	↖			
Traffic Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Future Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	598	1631	4	2	918	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	696	2843	7	18	2133	992	21	7	22			
Arrive On Green	0.42	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	598	797	838	2	918	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	696	1389	1461	18	2133	992	28	0	22			
V/C Ratio(X)	0.86	0.57	0.57	0.11	0.43	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2133	992	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.3	0.0	0.0	53.9	10.0	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.7	0.2	0.2	2.6	0.6	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.6	0.1	0.1	0.1	11.4	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.9	0.2	0.2	56.5	10.7	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2233			920			10				
Approach Delay, s/veh		8.4			10.8			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.2	75.0		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2), s	6.0	2.5			20.6	17.6		2.7				
Green Ext Time (p_c), s	0.0	42.2			1.6	27.5		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/16/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Future Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	145	1030	55	221	1541	456	96	389	86	100	138	111
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1381	74	266	1436	648	151	497	111	246	640	479
Arrive On Green	0.07	0.43	0.43	0.07	0.43	0.43	0.24	0.24	0.24	0.07	0.36	0.36
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	452	2080	464	1609	1787	1337
Grp Volume(v), veh/h	145	533	552	221	1541	456	292	0	279	100	126	123
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1489	0	1507	1609	1638	1487
Q Serve(g_s), s	5.2	29.7	29.7	8.0	47.6	27.3	18.6	0.0	19.1	4.8	5.9	6.4
Cycle Q Clear(g_c), s	5.2	29.7	29.7	8.0	47.6	27.3	20.3	0.0	19.1	4.8	5.9	6.4
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	715	740	266	1436	648	399	0	360	246	587	532
V/C Ratio(X)	0.78	0.75	0.75	0.83	1.07	0.70	0.73	0.00	0.78	0.41	0.21	0.23
Avail Cap(c_a), veh/h	186	715	740	266	1436	648	449	0	411	390	789	716
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	26.1	26.1	24.0	31.2	25.5	39.5	0.0	39.1	28.2	24.5	24.7
Incr Delay (d2), s/veh	18.9	7.0	6.8	19.6	45.9	6.3	5.3	0.0	8.0	1.1	0.2	0.2
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	6.0	21.2	21.8	8.0	55.6	18.1	13.8	0.0	13.6	4.0	4.8	4.8
LnGrp Delay(d),s/veh	43.9	33.1	32.9	43.5	77.1	31.8	44.7	0.0	47.1	29.3	24.7	24.9
LnGrp LOS	D	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1230			2218			571			349	
Approach Delay, s/veh		34.3			64.5			45.9			26.1	
Approach LOS		C			E			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	52.6		44.4	13.0	52.6	13.1	31.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0		52.0	7.0	33.0	17.0	29.0				
Max Q Clear Time (g_c+110), s	11.0	32.2		8.4	7.7	50.1	7.3	22.3				
Green Ext Time (p_c), s	0.0	0.7		6.3	0.0	0.0	0.1	2.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				50.5								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

01/11/2018

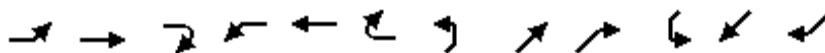
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Future Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	579	1	235	130	818	1	8	538	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	386	167	419	601	2	587	321	962	1	178	687	595
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1162	457	1142	1422	7	1601	1689	1841	2	671	1782	1544
Grp Volume(v), veh/h	3	0	14	579	0	236	130	0	819	8	538	0
Grp Sat Flow(s),veh/h/ln	1162	0	1599	1422	0	1608	1689	0	1844	671	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	0.9	23.9	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	22.5	23.9	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	586	601	0	590	321	0	963	178	687	595
V/C Ratio(X)	0.01	0.00	0.02	0.96	0.00	0.40	0.41	0.00	0.85	0.04	0.78	0.00
Avail Cap(c_a), veh/h	386	0	586	601	0	590	334	0	963	178	687	595
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	30.1	0.0	21.2	17.0	0.0	18.5	33.2	24.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	27.6	0.0	0.4	0.8	0.0	9.4	0.4	7.3	0.0
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	0.1	0.0	0.4	26.1	0.0	7.8	3.3	0.0	27.1	0.3	18.4	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	57.7	0.0	21.6	17.8	0.0	27.8	33.6	31.6	0.0
LnGrp LOS	C		B	E		C	B		C	C	C	
Approach Vol, veh/h		17			815			949			546	
Approach Delay, s/veh		19.3			47.3			26.5			31.6	
Approach LOS		B			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.0		38.0	12.3	39.7		38.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0				
Max Q Clear Time (g_c+I1), s		36.4		35.5	6.3	26.4		12.0				
Green Ext Time (p_c), s		5.9		0.0	0.0	4.4		3.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				34.9								
HCM 2010 LOS				C								



# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Future Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	783	0	60	438	1	418	7	148	32	39	51
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	357	812	725	101	834	2	270	3	644	50	58	42
Arrive On Green	0.46	0.46	0.00	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	955	1782	1591	715	1830	4	453	8	1525	0	138	99
Grp Volume(v), veh/h	8	783	0	60	0	439	425	0	148	122	0	0
Grp Sat Flow(s),veh/h/ln	955	1782	1591	715	0	1834	460	0	1525	237	0	0
Q Serve(g_s), s	0.5	38.4	0.0	2.6	0.0	15.4	0.0	0.0	5.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.5	38.4	0.0	41.0	0.0	15.4	38.0	0.0	5.6	38.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.26		0.42
Lane Grp Cap(c), veh/h	357	812	725	101	0	836	274	0	644	151	0	0
V/C Ratio(X)	0.02	0.96	0.00	0.60	0.00	0.53	1.55	0.00	0.23	0.81	0.00	0.00
Avail Cap(c_a), veh/h	357	812	725	101	0	836	274	0	644	151	0	0
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)	0.12	0.12	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.9	23.8	0.0	44.6	0.0	17.5	31.5	0.0	16.6	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.3	0.0	23.4	0.0	2.4	266.2	0.0	0.2	27.2	0.0	0.0
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	0.3	22.4	0.0	3.8	0.0	13.1	48.6	0.0	4.3	5.5	0.0	0.0
LnGrp Delay(d),s/veh	22.9	29.1	0.0	67.9	0.0	19.9	297.7	0.0	16.8	49.3	0.0	0.0
LnGrp LOS	C	C		E		B	F		B	D		
Approach Vol, veh/h		791			499			573			122	
Approach Delay, s/veh		29.0			25.7			225.1			49.3	
Approach LOS		C			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		44.0		46.0		44.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		40.0		37.0		40.0		37.0				
Max Q Clear Time (g_c+I1), s		40.9		40.0		43.5		40.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				86.0								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/11/2018

Intersection						
Int Delay, s/veh	4.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	76	84	403	17	53	970
Future Vol, veh/h	76	84	403	17	53	970
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	89	99	474	20	62	1141

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1769	511	0	0	511
Stage 1	501	-	-	-	-
Stage 2	1268	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	93	534	-	-	982
Stage 1	613	-	-	-	-
Stage 2	267	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	~ 86	522	-	-	974
Mov Cap-2 Maneuver	192	-	-	-	-
Stage 1	604	-	-	-	-
Stage 2	250	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.6	0	0.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	287	974
HCM Lane V/C Ratio	-	-	0.656	0.064
HCM Control Delay (s)	-	-	38.6	8.9
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	4.3	0.2

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

**Intersection**

Int Delay, s/veh 260.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	5	0	41	272	0	60	23	294	101	14	1097	5
Future Vol, veh/h	5	0	41	272	0	60	23	294	101	14	1097	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
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	0	0	1	0
Mvmt Flow	5	0	44	289	0	64	24	313	107	15	1167	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1646	1676	1170	1644	1625	374	1172	0	0	428	0	0
Stage 1	1199	1199	-	423	423	-	-	-	-	-	-	-
Stage 2	447	477	-	1221	1202	-	-	-	-	-	-	-
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	80	96	237	~ 81	103	677	603	-	-	1142	-	-
Stage 1	228	261	-	613	591	-	-	-	-	-	-	-
Stage 2	595	559	-	~ 222	260	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	67	87	237	~ 61	93	672	603	-	-	1142	-	-
Mov Cap-2 Maneuver	67	87	-	~ 61	93	-	-	-	-	-	-	-
Stage 1	216	251	-	577	556	-	-	-	-	-	-	-
Stage 2	510	526	-	~ 174	250	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.1	\$ 1493.4	0.6	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	603	-	-	186	61	672	1142	-	-
HCM Lane V/C Ratio	0.041	-	-	0.263	4.744	0.095	0.013	-	-
HCM Control Delay (s)	11.2	0	-	31.1	\$ 1820.4	10.9	8.2	0	-
HCM Lane LOS	B	A	-	D	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	31.9	0.3	0	-	-

**Notes**  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/11/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↙		↑	↗↘	↘	↑
Traffic Vol, veh/h	4	4	413	2	2	1404
Future Vol, veh/h	4	4	413	2	2	1404
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	439	2	2	1494






















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1937	439	0	0	439
Stage 1	439	-	-	-	-
Stage 2	1498	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	73	622	-	-	1132
Stage 1	654	-	-	-	-
Stage 2	206	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	73	622	-	-	1132
Mov Cap-2 Maneuver	73	-	-	-	-
Stage 1	654	-	-	-	-
Stage 2	206	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	34.4	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	131	1132
HCM Lane V/C Ratio	-	-	0.065	0.002
HCM Control Delay (s)	-	-	34.4	8.2
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Future Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	109	1636	0	0	615	0	289	246	228	885	0	482
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	216	1623	0	0	1269	591	1393	292	248	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	885	
Grp Volume(v), veh/h	109	1636	0	0	615	0	289	246	228	885	83.2	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	F	
Q Serve(g_s), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	14.7	16.3	24.0		
Cycle Q Clear(g_c), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	14.7	16.3	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	216	1623	0	0	1269	591	1393	292	248	858		
V/C Ratio(X)	0.51	1.01	0.00	0.00	0.48	0.00	0.21	0.84	0.92	1.03		
Avail Cap(c_a), veh/h	391	1623	0	0	1269	591	1393	292	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.88	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.9	37.2	0.0	0.0	9.9	0.0	19.8	44.6	45.3	44.2		
Incr Delay (d2), s/veh	1.6	22.8	0.0	0.0	1.2	0.0	0.1	19.6	36.3	39.0		
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		
%ile BackOfQ(95%),veh/ln	3.0	53.6	0.0	0.0	6.8	0.0	5.0	13.7	14.4	12.4		
LnGrp Delay(d),s/veh	52.5	60.0	0.0	0.0	11.1	0.0	19.9	64.3	81.6	83.2		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1745			615			763				
Approach Delay, s/veh		59.6			11.1			52.6				
Approach LOS		E			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.6		6.0	10.5	26.5	18.8				
Green Ext Time (p_c), s		0.0	0.8		0.1	17.6	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			56.0									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1052	0	570	768	615	507		
Future Volume (veh/h)	1052	0	570	768	615	507		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1073	0	582	784	628	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	2009	0	714	2322	751	359		
Arrive On Green	0.43	0.00	0.07	0.23	0.22	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1073	0	582	784	628	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	18.6	0.0	19.0	21.3	19.6	0.0		
Cycle Q Clear(g_c), s	18.6	0.0	19.0	21.3	19.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2009	0	714	2322	751	359		
V/C Ratio(X)	0.53	0.00	0.81	0.34	0.84	0.00		
Avail Cap(c_a), veh/h	2009	0	847	2322	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.76	0.76	1.00	0.00		
Uniform Delay (d), s/veh	23.5	0.0	48.9	21.6	40.8	0.0		
Incr Delay (d2), s/veh	1.0	0.0	4.1	0.3	5.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	2.9	0.0	13.5	14.7	14.8	0.0		
LnGrp Delay(d),s/veh	24.5	0.0	53.1	21.9	46.6	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1073			1366	628			
Approach Delay, s/veh	24.5			35.2	46.6			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.6	28.6	51.8				80.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.1	21.5	21.1				23.8
Green Ext Time (p_c), s		1.4	1.1	10.3				19.8
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			33.8					
HCM 2010 LOS			C					

# HCM 2010 Signalized Intersection Summary

## 9: Hillside Circuit & Lancaster Ave

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑		↔	↑↑	↔		↑	↔			
Traffic Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Future Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1782	1800	1800	1800			
Adj Flow Rate, veh/h	1198	1838	15	6	751	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1197	2797	23	23	1647	737	18	6	18			
Arrive On Green	0.73	1.00	1.00	0.01	0.49	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3344	27	1714	3386	1515	1301	434	1345			
Grp Volume(v), veh/h	1198	903	950	6	751	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1515	1735	0	1345			
Q Serve(g_s), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1197	1376	1444	23	1647	737	24	0	18			
V/C Ratio(X)	1.00	0.66	0.66	0.26	0.46	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1197	1376	1444	109	1647	737	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.0	0.0	0.0	53.7	18.6	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	7.9	0.2	0.2	5.6	0.9	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	88.3	0.2	0.2	0.4	12.3	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	22.9	0.2	0.2	59.3	19.6	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		3051			757			6				
Approach Delay, s/veh		9.1			19.9			56.7				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			45.0	58.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			39.0	47.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			42.5	18.6		2.7				
Green Ext Time (p_c), s	0.0	45.8			0.0	22.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				11.3								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
10: Radnor Chester Rd

01/11/2018
























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖		↗		↖	↗	
Traffic Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Future Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	124	1211	96	204	1142	130	84	218	145	423	462	222
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	231	1220	97	207	1294	578	149	345	234	331	863	412
Arrive On Green	0.08	0.38	0.38	0.08	0.39	0.39	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3197	253	1664	3352	1496	385	1338	906	1689	2222	1060
Grp Volume(v), veh/h	124	644	663	204	1142	130	218	0	229	423	351	333
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1195	0	1433	1689	1690	1591
Q Serve(g_s), s	4.3	37.6	37.8	7.8	31.7	5.8	12.6	0.0	14.1	8.0	16.0	16.2
Cycle Q Clear(g_c), s	4.3	37.6	37.8	7.8	31.7	5.8	16.1	0.0	14.1	8.0	16.0	16.2
Prop In Lane	1.00		0.14	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	231	650	667	207	1294	578	359	0	370	331	656	618
V/C Ratio(X)	0.54	0.99	0.99	0.98	0.88	0.23	0.61	0.00	0.62	1.28	0.53	0.54
Avail Cap(c_a), veh/h	256	650	667	207	1294	578	453	0	487	331	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	30.7	30.8	24.9	28.6	20.6	33.1	0.0	32.7	34.5	23.6	23.7
Incr Delay (d2), s/veh	1.9	33.2	33.4	57.6	8.9	0.9	1.7	0.0	1.7	145.8	0.7	0.7
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	3.8	31.5	32.5	13.8	22.8	4.6	9.5	0.0	9.7	33.9	12.0	11.7
LnGrp Delay(d),s/veh	24.2	63.9	64.2	82.5	37.5	21.5	34.8	0.0	34.4	180.3	24.3	24.4
LnGrp LOS	C	E	E	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1431			1476			447			1107	
Approach Delay, s/veh		60.6			42.3			34.6			83.9	
Approach LOS		E			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	43.2		43.8	12.6	43.6	13.0	30.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+110), s	11.0	40.1		18.5	6.8	34.2	10.5	18.1				
Green Ext Time (p_c), s	0.0	0.0		8.7	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				57.7								
HCM 2010 LOS				E								



HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

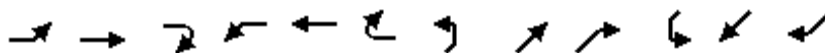
01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	319	7	104	375	639	2	12	638	611
Future Volume (veh/h)	1	0	2	319	7	104	375	639	2	12	638	611
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	354	8	116	417	710	2	13	709	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	330	0	391	437	25	358	390	1152	3	368	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1287	0	1530	1396	97	1400	1639	1820	5	742	1764	1544
Grp Volume(v), veh/h	1	0	2	354	0	124	417	0	712	13	709	0
Grp Sat Flow(s),veh/h/ln	1287	0	1530	1396	0	1497	1639	0	1825	742	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.8	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.1	22.8	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.81	0.00	0.32	1.07	0.00	0.62	0.04	1.03	0.00
Avail Cap(c_a), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	0.0	25.0	33.4	0.0	27.2	27.5	0.0	9.9	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	11.0	0.0	0.5	65.5	0.0	2.5	0.2	43.2	0.0
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	0.0	0.0	0.1	15.3	0.0	4.6	30.1	0.0	16.8	0.4	45.4	0.0
LnGrp Delay(d),s/veh	29.3	0.0	25.0	44.4	0.0	27.7	93.0	0.0	12.4	17.3	70.7	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			478			1129			722	
Approach Delay, s/veh		26.4			40.1			42.2			69.8	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		23.1		25.3	19.5	37.5		8.1				
Green Ext Time (p_c), s		12.6		0.0	0.0	0.0		1.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			50.3									
HCM 2010 LOS			D									

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Future Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	427	0	31	907	7	544	35	63	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	83	857	772	391	900	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	621	1714	1545	930	1800	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	427	0	31	0	914	579	0	63	9	0	0
Grp Sat Flow(s),veh/h/ln	621	1714	1545	930	0	1814	418	0	1520	290	0	0
Q Serve(g_s), s	0.5	14.9	0.0	2.1	0.0	45.0	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.9	0.0	17.0	0.0	45.0	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.48	0.50	0.00	0.08	0.00	1.01	2.46	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
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)	0.56	0.56	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.0	15.0	0.0	20.6	0.0	22.5	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	10.7	1.2	0.0	0.4	0.0	31.9	668.6	0.0	0.1	0.1	0.0	0.0
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	2.2	10.6	0.0	1.0	0.0	54.8	89.2	0.0	1.9	0.3	0.0	0.0
LnGrp Delay(d),s/veh	55.6	16.1	0.0	21.0	0.0	54.4	702.2	0.0	18.3	21.8	0.0	0.0
LnGrp LOS	E	B		C		F	F		B	C		
Approach Vol, veh/h		467			945			642			9	
Approach Delay, s/veh		19.5			53.3			635.1			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		47.0		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				226.5								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/11/2018

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	42	988	116	149	308
Future Vol, veh/h	21	42	988	116	149	308
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	24	48	1136	133	171	354

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1918	1229	0	0	1286
Stage 1	1219	-	-	-	-
Stage 2	699	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	75	179	-	-	478
Stage 1	282	-	-	-	-
Stage 2	497	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	47	175	-	-	474
Mov Cap-2 Maneuver	157	-	-	-	-
Stage 1	278	-	-	-	-
Stage 2	317	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.4	0	5.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	169	474
HCM Lane V/C Ratio	-	-	0.428	0.361
HCM Control Delay (s)	-	-	41.4	16.8
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	1.9	1.6

HCM 2010 TWSC  
5: King of Prussia Rd & Raider Rd

01/11/2018

Intersection												
Int Delay, s/veh	313.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	9	0	133	99	0	22	177	1071	369	52	268	59
Future Vol, veh/h	9	0	133	99	0	22	177	1071	369	52	268	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	171	127	0	28	227	1373	473	67	344	76

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	2593	2823	381	2671	2624	1618	419	0	0	1854	0	0
Stage 1	515	515	-	2071	2071	-	-	-	-	-	-	-
Stage 2	2078	2308	-	600	553	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	16	18	662	~ 15	24	129	1151	-	-	331	-	-
Stage 1	526	538	-	~ 72	97	-	-	-	-	-	-	-
Stage 2	66	74	-	491	518	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 10	13	662	~ 9	17	128	1151	-	-	331	-	-
Mov Cap-2 Maneuver	~ 10	13	-	~ 9	17	-	-	-	-	-	-	-
Stage 1	526	394	-	~ 72	96	-	-	-	-	-	-	-
Stage 2	51	74	-	267	380	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	287.6	\$ 5492.6	1	2.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1151	-	-	129	9	128	331	-	-
HCM Lane V/C Ratio	0.197	-	-	1.411	14.103	0.22	0.201	-	-
HCM Control Delay (s)	8.9	0	-	287.6	\$ 6704.1	40.9	18.6	0	-
HCM Lane LOS	A	A	-	F	F	E	C	A	-
HCM 95th %tile Q(veh)	0.7	-	-	12.2	17.5	0.8	0.7	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/11/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↙		↑	↗↘	↘↙	↑
Traffic Vol, veh/h	2	2	1611	6	6	493
Future Vol, veh/h	2	2	1611	6	6	493
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1941	7	7	594






















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2549	1941	0	0	1941
Stage 1	1941	-	-	-	-
Stage 2	608	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	30	83	-	-	306
Stage 1	124	-	-	-	-
Stage 2	547	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	29	83	-	-	306
Mov Cap-2 Maneuver	29	-	-	-	-
Stage 1	124	-	-	-	-
Stage 2	534	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	99	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	43	306
HCM Lane V/C Ratio	-	-	0.112	0.024
HCM Control Delay (s)	-	-	99	17
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	0.4	0.1

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	1306	0	0	544	379	774	840	344	321	0	162
Future Volume (veh/h)	376	1306	0	0	544	379	774	840	344	321	0	162
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	388	1346	0	0	561	0	798	866	355	331	0	167
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	331	
Grp Volume(v), veh/h	388	1346	0	0	561	0	798	866	355	331	78.5	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.7	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Cycle Q Clear(g_c), s	12.7	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.86	1.01	0.00	0.00	0.75	0.00	0.48	1.26	0.61	0.91		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.90	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.9	40.3	0.0	0.0	48.1	0.0	17.6	33.5	26.7	51.6		
Incr Delay (d2), s/veh	13.7	25.1	0.0	0.0	6.2	0.0	0.2	126.7	1.8	26.9		
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		
%ile BackOfQ(95%),veh/ln	10.6	44.9	0.0	0.0	13.7	0.0	12.5	81.3	13.8	5.4		
LnGrp Delay(d),s/veh	62.6	65.4	0.0	0.0	54.3	0.0	17.8	160.2	28.5	78.5		
LnGrp LOS	E	F			D		B	F	C	E		
Approach Vol, veh/h		1734			561			2019				
Approach Delay, s/veh		64.8			54.3			80.7				
Approach LOS		E			D			F				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0				
Max Q Clear Time (g_c+I1), s		46.5	20.0		15.2	20.2	10.5	45.5				
Green Ext Time (p_c), s		0.0	3.1		0.0	2.4	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			71.4									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	866	0	189	1247	807	853		
Future Volume (veh/h)	866	0	189	1247	807	853		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	884	0	193	1272	823	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2263	0	293	2089	972	443		
Arrive On Green	0.48	0.00	0.03	0.20	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	884	0	193	1272	823	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	13.2	0.0	6.6	37.6	25.6	0.0		
Cycle Q Clear(g_c), s	13.2	0.0	6.6	37.6	25.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2263	0	293	2089	972	443		
V/C Ratio(X)	0.39	0.00	0.66	0.61	0.85	0.00		
Avail Cap(c_a), veh/h	2263	0	317	2089	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.62	0.62	1.00	0.00		
Uniform Delay (d), s/veh	18.4	0.0	51.6	31.7	36.6	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.8	0.8	3.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.8	0.0	5.3	23.3	18.0	0.0		
LnGrp Delay(d),s/veh	18.9	0.0	54.4	32.6	39.9	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	884			1465	823			
Approach Delay, s/veh	18.9			35.5	39.9			
Approach LOS	B			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		37.1	15.2	57.7				72.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		28.1	9.1	15.7				40.1
Green Ext Time (p_c), s		3.0	0.1	14.8				9.6
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			32.0					
HCM 2010 LOS			C					

# HCM 2010 Signalized Intersection Summary

## 9: Hillside Circuit & Lancaster Ave

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↔		↔	↑↑	↔		↔	↔			
Traffic Volume (veh/h)	583	1595	4	2	895	494	6	2	2	0	0	0
Future Volume (veh/h)	583	1595	4	2	895	494	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	607	1661	4	2	932	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	704	2843	7	18	2124	988	21	7	25			
Arrive On Green	0.43	1.00	1.00	0.01	0.63	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1513			
Grp Volume(v), veh/h	607	811	854	2	932	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1513			
Q Serve(g_s), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.1			
Cycle Q Clear(g_c), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.1			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	704	1389	1461	18	2124	988	28	0	25			
V/C Ratio(X)	0.86	0.58	0.58	0.11	0.44	0.00	0.28	0.00	0.08			
Avail Cap(c_a), veh/h	928	1389	1461	109	2124	988	110	0	96			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.0	0.0	0.0	53.9	10.2	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.7	0.2	0.2	2.6	0.7	0.0	5.4	0.0	1.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.7	0.1	0.1	0.1	11.7	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.7	0.2	0.2	56.5	10.9	0.0	58.8	0.0	54.7			
LnGrp LOS	C	A	A	E	B		E		D			
Approach Vol, veh/h		2272			934			10				
Approach Delay, s/veh		8.3			11.0			58.0				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.5	74.7		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2), s	12.6	2.5			20.9	18.0		2.6				
Green Ext Time (p_c), s	0.0	43.6			1.6	27.8		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												



HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Future Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	148	1048	56	225	1570	465	98	396	89	102	141	114
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	171	1461	78	264	1520	685	153	501	114	213	610	459
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	453	2069	469	1609	1782	1341
Grp Volume(v), veh/h	148	543	561	225	1570	465	297	0	286	102	129	126
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1485	0	1506	1609	1638	1486
Q Serve(g_s), s	5.3	29.2	29.2	7.0	50.4	26.9	19.1	0.0	19.5	5.1	6.2	6.7
Cycle Q Clear(g_c), s	5.3	29.2	29.2	7.0	50.4	26.9	20.8	0.0	19.5	5.1	6.2	6.7
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	171	756	782	264	1520	685	403	0	365	213	560	508
V/C Ratio(X)	0.87	0.72	0.72	0.85	1.03	0.68	0.74	0.00	0.78	0.48	0.23	0.25
Avail Cap(c_a), veh/h	171	756	782	264	1520	685	448	0	411	213	610	554
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	24.1	24.1	25.7	29.8	23.5	39.3	0.0	39.0	29.6	25.8	26.0
Incr Delay (d2), s/veh	34.3	5.8	5.6	22.3	32.1	5.3	5.7	0.0	8.6	1.7	0.2	0.3
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	0.1	20.7	21.3	9.1	53.6	17.8	14.1	0.0	13.9	4.2	5.1	5.1
LnGrp Delay(d),s/veh	60.6	29.8	29.7	48.0	61.9	28.8	45.0	0.0	47.6	31.2	26.0	26.3
LnGrp LOS	E	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1252			2260			583			357	
Approach Delay, s/veh		33.4			53.7			46.2			27.6	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	2.0	55.4		42.6	12.0	55.4	11.0	31.6				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	46.0		40.0	6.0	46.0	5.0	29.0				
Max Q Clear Time (g_c+1/3), s	19.5	31.7		8.7	7.8	52.9	7.6	22.8				
Green Ext Time (p_c), s	0.0	13.1		6.2	0.0	0.0	0.0	2.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				44.9								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

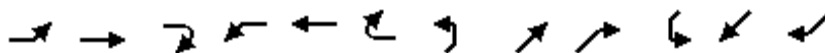
01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Future Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	590	1	239	134	834	1	8	547	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	413	178	444	633	3	623	288	921	1	141	641	556
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.50	0.50	0.36	0.36	0.00
Sat Flow, veh/h	1158	457	1142	1422	7	1601	1689	1841	2	661	1782	1544
Grp Volume(v), veh/h	3	0	14	590	0	240	134	0	835	8	547	0
Grp Sat Flow(s),veh/h/ln	1158	0	1599	1422	0	1608	1689	0	1844	661	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	1.0	25.5	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	25.2	25.5	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	622	633	0	625	288	0	922	141	641	556
V/C Ratio(X)	0.01	0.00	0.02	0.93	0.00	0.38	0.46	0.00	0.91	0.06	0.85	0.00
Avail Cap(c_a), veh/h	413	0	622	633	0	625	296	0	922	141	641	556
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.79	0.79	0.00
Uniform Delay (d), s/veh	22.9	0.0	17.0	28.6	0.0	19.8	18.8	0.0	20.6	37.6	26.6	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	20.8	0.0	0.4	1.2	0.0	14.1	0.6	11.1	0.0
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	0.1	0.0	0.4	25.2	0.0	7.7	3.6	0.0	30.2	0.4	20.0	0.0
LnGrp Delay(d),s/veh	22.9	0.0	17.0	49.4	0.0	20.1	19.9	0.0	34.7	38.2	37.7	0.0
LnGrp LOS	C		B	D		C	B		C	D	D	
Approach Vol, veh/h		17			830			969			555	
Approach Delay, s/veh		18.0			40.9			32.6			37.7	
Approach LOS		B			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0	12.6	37.4		40.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		44.0		34.0	7.0	31.0		34.0				
Max Q Clear Time (g_c+I1), s		39.3		37.5	6.6	28.0		11.8				
Green Ext Time (p_c), s		3.4		0.0	0.0	2.2		3.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				36.6								
HCM 2010 LOS				D								

# HCM 2010 Signalized Intersection Summary

## 2: Radnor Chester Rd & King of Prussia Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Future Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	798	0	61	444	1	426	7	151	33	39	52
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	325	772	690	80	793	2	282	3	678	51	57	41
Arrive On Green	0.43	0.43	0.00	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	950	1782	1591	705	1830	4	455	7	1526	0	128	93
Grp Volume(v), veh/h	8	798	0	61	0	445	433	0	151	124	0	0
Grp Sat Flow(s),veh/h/ln	950	1782	1591	705	0	1834	463	0	1526	221	0	0
Q Serve(g_s), s	0.6	39.0	0.0	0.0	0.0	16.3	0.0	0.0	5.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.4	39.0	0.0	39.0	0.0	16.3	40.0	0.0	5.5	40.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	325	772	690	80	0	795	285	0	678	149	0	0
V/C Ratio(X)	0.02	1.03	0.00	0.76	0.00	0.56	1.52	0.00	0.22	0.83	0.00	0.00
Avail Cap(c_a), veh/h	325	772	690	80	0	795	285	0	678	149	0	0
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)	0.09	0.09	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.0	25.5	0.0	45.0	0.0	19.1	30.6	0.0	15.4	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	19.9	0.0	49.4	0.0	2.8	250.7	0.0	0.2	31.4	0.0	0.0
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	0.3	41.5	0.0	4.7	0.0	13.8	48.4	0.0	4.2	5.7	0.0	0.0
LnGrp Delay(d),s/veh	25.0	45.4	0.0	94.4	0.0	21.9	281.3	0.0	15.6	53.0	0.0	0.0
LnGrp LOS	C	F		F		C	F		B	D		
Approach Vol, veh/h		806			506			584			124	
Approach Delay, s/veh		45.2			30.7			212.6			53.0	
Approach LOS		D			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		44.0		46.0		44.0		46.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		38.0		39.0		38.0		39.0				
Max Q Clear Time (g_c+I1), s		41.5		42.0		41.5		42.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				90.4								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

01/11/2018

**Intersection**

Int Delay, s/veh 4.4

**Movement** WBL WBR NBT NBR SBL SBT

Lane Configurations	W	W	N	N	S	S
Traffic Vol, veh/h	77	85	409	17	54	988
Future Vol, veh/h	77	85	409	17	54	988
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	91	100	481	20	64	1162

**Major/Minor** Minor1 Major1 Major2

Conflicting Flow All	1799	518	0	0	518	0
Stage 1	508	-	-	-	-	-
Stage 2	1291	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	~ 89	529	-	-	976	-
Stage 1	608	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 82	517	-	-	968	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	599	-	-	-	-	-
Stage 2	242	-	-	-	-	-

**Approach** WB NB SB

HCM Control Delay, s	41.4	0	0.5
HCM LOS	E		

**Minor Lane/Major Mvmt** NBT NBRWBLn1 SBL SBT

Capacity (veh/h)	-	-	280	968	-
HCM Lane V/C Ratio	-	-	0.681	0.066	-
HCM Control Delay (s)	-	-	41.4	9	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	4.5	0.2	-

**Notes**

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

**Intersection**

Int Delay, s/veh 278.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	5	0	42	272	0	60	24	299	101	14	1117	5
Future Vol, veh/h	5	0	42	272	0	60	24	299	101	14	1117	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
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	0	0	1	0
Mvmt Flow	5	0	45	289	0	64	26	318	107	15	1188	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1676	1706	1191	1674	1654	380	1194	0	0	434	0	0
Stage 1	1221	1221	-	431	431	-	-	-	-	-	-	-
Stage 2	455	485	-	1243	1223	-	-	-	-	-	-	-
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	76	92	231	~ 77	99	671	592	-	-	1136	-	-
Stage 1	222	255	-	607	586	-	-	-	-	-	-	-
Stage 2	589	555	-	~ 216	254	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	64	83	231	~ 57	89	667	592	-	-	1136	-	-
Mov Cap-2 Maneuver	64	83	-	~ 57	89	-	-	-	-	-	-	-
Stage 1	209	245	-	568	548	-	-	-	-	-	-	-
Stage 2	502	519	-	~ 167	244	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.3	\$ 1622.6	0.6	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	592	-	-	181	57	667	1136	-	-
HCM Lane V/C Ratio	0.043	-	-	0.276	5.077	0.096	0.013	-	-
HCM Control Delay (s)	11.4	0	-	32.3	1978.1	11	8.2	0	-
HCM Lane LOS	B	A	-	D	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	32.4	0.3	0	-	-

**Notes**  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

01/11/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↗↘	↘↗	↑
Traffic Vol, veh/h	4	4	419	2	2	1425
Future Vol, veh/h	4	4	419	2	2	1425
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	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	446	2	2	1516






















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1966	446	0	0	446
Stage 1	446	-	-	-	-
Stage 2	1520	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	70	617	-	-	1125
Stage 1	649	-	-	-	-
Stage 2	201	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	70	617	-	-	1125
Mov Cap-2 Maneuver	70	-	-	-	-
Stage 1	649	-	-	-	-
Stage 2	201	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	35.6	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	126	1125
HCM Lane V/C Ratio	-	-	0.068	0.002
HCM Control Delay (s)	-	-	35.6	8.2
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	0.2	0

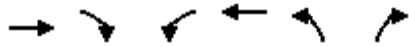
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

01/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Future Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	110	1667	0	0	627	0	295	250	232	899	0	488
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	217	1623	0	0	1268	590	1393	292	248	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	899	
Grp Volume(v), veh/h	110	1667	0	0	627	0	295	250	232	899	88.1	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	F	
Q Serve(g_s), s	3.6	53.0	0.0	0.0	8.2	0.0	6.3	15.0	16.6	24.0		
Cycle Q Clear(g_c), s	3.6	53.0	0.0	0.0	8.2	0.0	6.3	15.0	16.6	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	217	1623	0	0	1268	590	1393	292	248	858		
V/C Ratio(X)	0.51	1.03	0.00	0.00	0.49	0.00	0.21	0.86	0.94	1.05		
Avail Cap(c_a), veh/h	391	1623	0	0	1268	590	1393	292	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.86	0.86	0.00	0.00	0.86	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.9	37.2	0.0	0.0	10.0	0.0	19.8	44.8	45.4	44.2		
Incr Delay (d2), s/veh	1.6	27.9	0.0	0.0	1.2	0.0	0.1	21.6	40.0	43.9		
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		
%ile BackOfQ(95%),veh/ln	3.0	55.7	0.0	0.0	6.8	0.0	5.1	14.1	14.8	9.4		
LnGrp Delay(d),s/veh	52.4	65.2	0.0	0.0	11.2	0.0	19.9	66.3	85.4	88.1		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1777			627			777				
Approach Delay, s/veh		64.4			11.2			54.4				
Approach LOS		E			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.8		6.1	10.7	26.5	19.1				
Green Ext Time (p_c), s		0.0	0.8		0.1	17.8	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			59.5									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

01/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1072	0	580	782	627	516		
Future Volume (veh/h)	1072	0	580	782	627	516		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1094	0	592	798	640	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	1980	0	724	2311	762	364		
Arrive On Green	0.42	0.00	0.07	0.23	0.23	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1094	0	592	798	640	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	19.3	0.0	19.3	21.8	20.0	0.0		
Cycle Q Clear(g_c), s	19.3	0.0	19.3	21.8	20.0	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1980	0	724	2311	762	364		
V/C Ratio(X)	0.55	0.00	0.82	0.35	0.84	0.00		
Avail Cap(c_a), veh/h	1980	0	847	2311	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.75	0.75	1.00	0.00		
Uniform Delay (d), s/veh	24.1	0.0	48.9	22.0	40.6	0.0		
Incr Delay (d2), s/veh	1.1	0.0	4.2	0.3	6.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.3	0.0	13.7	14.9	15.0	0.0		
LnGrp Delay(d),s/veh	25.3	0.0	53.1	22.3	46.7	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1094			1390	640			
Approach Delay, s/veh	25.3			35.4	46.7			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.9	28.9	51.1				80.1
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.5	21.8	21.8				24.3
Green Ext Time (p_c), s		1.4	1.1	10.1				20.3
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			34.2					
HCM 2010 LOS			C					



HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↕		↖ ↗	↕	↖ ↗		↕	↖ ↗			
Traffic Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Future Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1219	1871	16	6	765	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1227	2795	24	23	1616	752	18	6	18			
Arrive On Green	0.75	1.00	1.00	0.01	0.48	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3342	29	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1219	919	968	6	765	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1227	1376	1444	23	1616	752	24	0	18			
V/C Ratio(X)	0.99	0.67	0.67	0.26	0.47	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1227	1376	1444	109	1616	752	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	13.9	0.0	0.0	53.7	19.4	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	6.3	0.2	0.2	5.6	1.0	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	20.4	0.2	0.2	0.4	12.7	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	20.1	0.2	0.2	59.3	20.4	0.0	56.9	0.0	56.2			
LnGrp LOS	C	A	A	E	C		E		E			
Approach Vol, veh/h		3106			771			6				
Approach Delay, s/veh		8.0			20.7			56.7				
Approach LOS		A			C			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			46.0	57.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			40.0	46.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			42.4	19.3		2.7				
Green Ext Time (p_c), s	0.0	47.4			0.0	22.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				10.6								
HCM 2010 LOS				B								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd

01/11/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Future Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	126	1234	98	208	1163	132	86	222	148	431	470	226
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	224	1202	95	205	1271	567	151	349	238	333	875	418
Arrive On Green	0.08	0.38	0.38	0.08	0.38	0.38	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3196	253	1664	3352	1496	383	1324	902	1689	2221	1061
Grp Volume(v), veh/h	126	656	676	208	1163	132	221	0	235	431	357	339
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1174	0	1434	1689	1690	1591
Q Serve(g_s), s	4.4	37.6	37.6	8.0	33.0	6.0	13.0	0.0	14.5	8.0	16.2	16.4
Cycle Q Clear(g_c), s	4.4	37.6	37.6	8.0	33.0	6.0	16.7	0.0	14.5	8.0	16.2	16.4
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	224	640	657	205	1271	567	360	0	379	333	666	627
V/C Ratio(X)	0.56	1.03	1.03	1.01	0.92	0.23	0.61	0.00	0.62	1.29	0.54	0.54
Avail Cap(c_a), veh/h	247	640	657	205	1271	567	447	0	488	333	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	31.2	31.2	25.5	29.5	21.1	32.9	0.0	32.4	34.3	23.3	23.3
Incr Delay (d2), s/veh	2.4	42.1	42.6	66.5	11.7	1.0	1.7	0.0	1.7	152.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	45.2	46.5	17.0	24.1	4.7	9.6	0.0	9.8	35.4	12.2	11.7
LnGrp Delay(d),s/veh	25.2	73.3	73.8	92.1	41.2	22.1	34.6	0.0	34.1	187.1	24.0	24.1
LnGrp LOS	C	F	F	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1458			1503			456			1127	
Approach Delay, s/veh		69.4			46.6			34.3			86.4	
Approach LOS		E			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	42.6		44.4	12.7	42.9	13.0	31.4				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0				
Max Q Clear Time (g_c+110), s	10.5	40.1		18.7	6.9	35.5	10.5	18.7				
Green Ext Time (p_c), s	0.0	0.0		8.9	0.0	0.0	0.0	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				62.5								
HCM 2010 LOS				E								

# APPENDIX J

## Signal Warrant Evaluation

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



# TRAFFIC SIGNAL WARRANT ANALYSIS

## TRAFFIC VOLUMES SUMMARIES

### King of Prussia & Raider Manual Count

Manual Traffic Counts

Start Time	KOP Rd NB Left/Thru	KOP Rd SB Thru/Right	Raider Rd EB Left/Right
7:00 AM	1,123	268	166
8:00 AM	1,171	235	25
4:00 PM	342	819	69
5:00 PM	292	1,038	48

### Mixed Use Weekday Trips

Land Use :	Variable:	AM			PM			WEEKDAY		
		Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting	Total
Mixed Use Weekday Trips	475,000 SF	571	148	719	158	425	583	3,759	3,759	7,518

Start Time	Mixed Use Entering Trips		Mixed Use Exiting Trips	
	Est. % Daily Entering	Trips	Est. % Daily Exiting	Trips
7:00 AM	11.4%	428	2.4%	89
8:00 AM	15.2%	571	3.9%	148
4:00 PM	4.2%	158	11.3%	425
5:00 PM	3.2%	119	8.5%	319

For the purposes of this evaluation, the 8 AM and 4 PM hours are the peak hours for the AM and PM peak periods respectively. For 7-8 AM and 5-6 PM, a reduction was taken from the peak period trips to obtain these trips for entering and exiting vehicles.

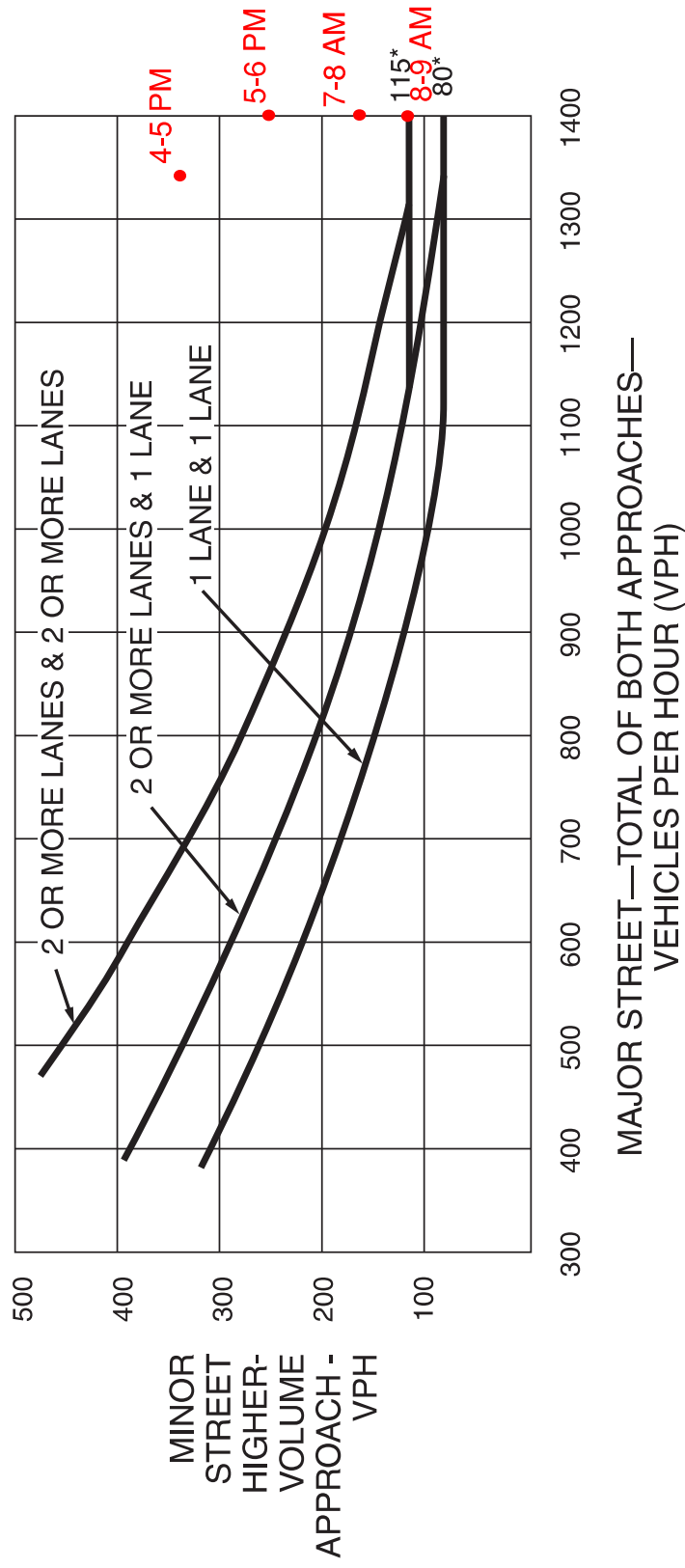
Start Time	King of Prussia Rd						Site Driveway/Raider Rd	
	King of Prussia Rd NB Left/Thru (Existing)	King of Prussia Rd NB Right <sup>1</sup> (Proposed)	King of Prussia Rd Site NB Thru <sup>2</sup> (Proposed)	King of Prussia Rd SB Thru/Right (Existing)	King of Prussia SB left <sup>3</sup> (Proposed)	King of Prussia Site SB Thru <sup>4</sup> (Proposed)	Raider Road	Site Driveway <sup>5</sup>
7:00 AM	1,123	274	44	268	39	13	166	69
8:00 AM	1,171	365	59	235	51	21	25	115
4:00 PM	342	101	20	819	14	44	69	332
5:00 PM	292	76	15	1,038	11	33	48	249

- <sup>1</sup> Aprox. 64% of entering site trips
- <sup>2</sup> Aprox. 10% of entering trips + 1% of exiting trips
- <sup>3</sup> Aprox. 9% of entering site trips
- <sup>4</sup> Aprox. 1% of entering trips + 10% of exiting trips
- <sup>5</sup> Aprox. 78% of exiting trips

### King of Prussia Rd & Site Driveway/Raider Road Warrant Volumes

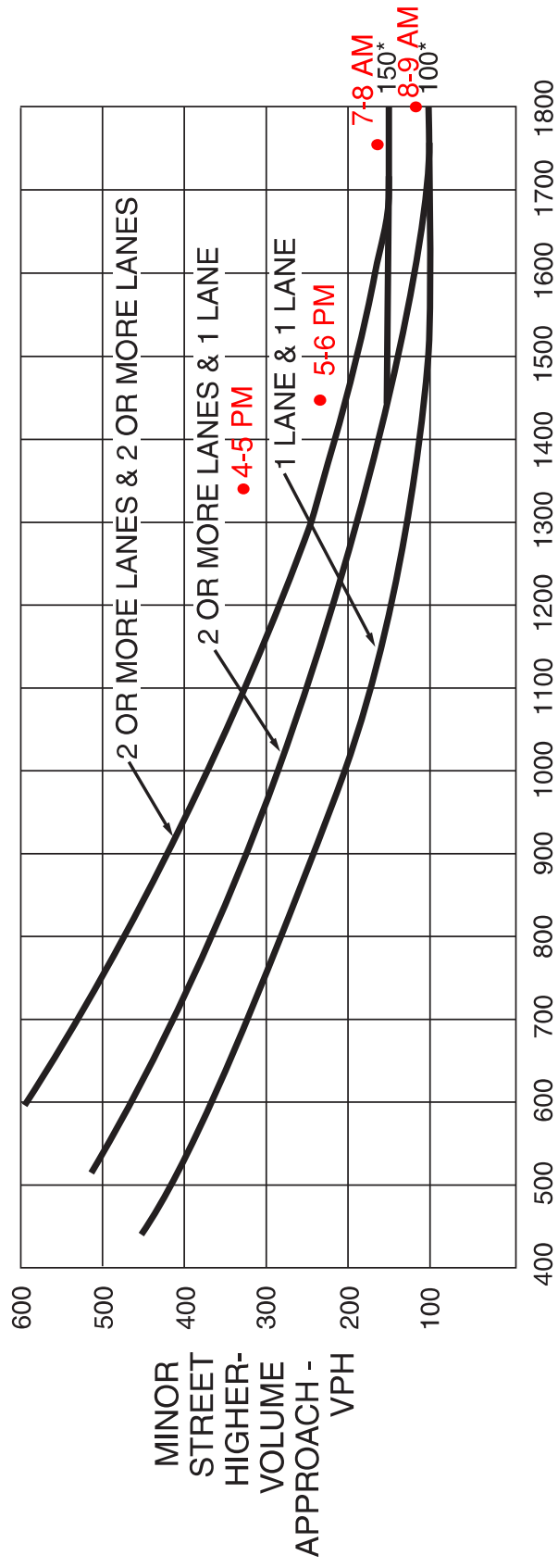
Start Time	Major Street		Minor Streets		Minor Street	Major Street	4 Hr Warrant Met	Peak Hr Warrant Met
	King of Prussia Rd NB Left/Thru/Right	King of Prussia Rd SB Left/Thru/Right	Raider Road	Site Driveway				
7:00 AM	1,441	320	166	69	166	1,760	Y	Y
8:00 AM	1,595	307	25	115	115	1,902	Y	Y
4:00 PM	463	877	69	332	332	1,340	Y	Y
5:00 PM	383	1,082	48	249	249	1,465	Y	Y

**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

# TRAFFIC SIGNAL WARRANT ANALYSIS

## TRAFFIC VOLUMES SUMMARIES

### King of Prussia & Septa Driveway Count

Manual Traffic Counts

Start Time	KOP Rd NB	KOP Rd SB	Septa
	Thru/Right	Left/Thru	Driveway WB Left/Right
7:00 AM	936	303	23
8:00 AM	1,012	231	25
4:00 PM	358	773	73
5:00 PM	335	970	74

### Mixed Use Weekday Trips

Land Use :	Variable:	AM			PM			WEEKDAY		
		Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting	Total
Mixed Use Weekday Trips	475,000 SF	571	148	719	158	425	583	3,759	3,759	7,518

Start Time	Mixed Use Entering Trips		Mixed Use Exiting Trips	
	Est. % Daily Entering	Trips	Est. % Daily Exiting	Trips
7:00 AM	11.4%	428	2.4%	89
8:00 AM	15.2%	571	3.9%	148
4:00 PM	4.2%	158	11.3%	425
5:00 PM	3.2%	119	8.5%	319

For the purposes of this evaluation, the 8 AM and 4 PM hours are the peak hours for the AM and PM peak periods respectively. For 7-8 AM and 5-6 PM, a reduction was taken from the peak period trips to obtain these trips for entering and exiting vehicles.

Start Time	King of Prussia Rd						Site Driveway
	King of Prussia Rd NB Thru/Right (Existing)	King of Prussia Rd NB Right <sup>1</sup> (Proposed)	King of Prussia Rd Site NB Thru <sup>2</sup> (Proposed)	King of Prussia Rd SB Left/Thru (Existing)	King of Prussia SB Left <sup>3</sup> (Proposed)	King of Prussia Site SB Thru <sup>4</sup> (Proposed)	Site Driveway <sup>5</sup>
7:00 AM	936	43	13	303	64	43	41
8:00 AM	1,012	57	22	231	86	57	55
4:00 PM	358	16	64	773	24	16	158
5:00 PM	335	12	48	970	18	12	138

<sup>1</sup> Aprox. 10% of entering site trips

<sup>2</sup> Aprox. 15% of exiting trips

<sup>3</sup> Aprox. 15% of entering site trips

<sup>4</sup> Aprox. 10% of entering trips

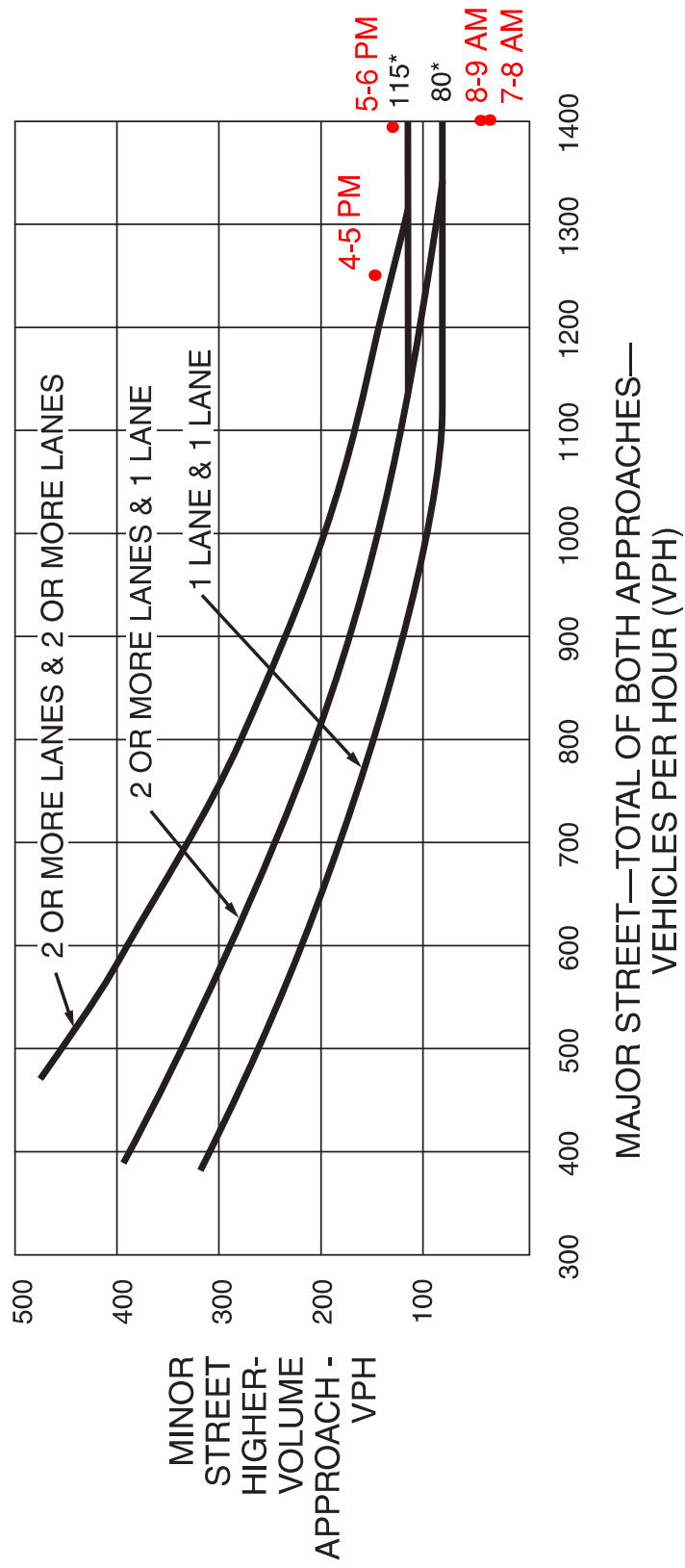
<sup>5</sup> Aprox. 20% of exiting trips

### King of Prussia Rd & Septa Driveway Warrant Volumes

Start Time	Major Street		Minor Street	Minor Street	Major Street	4 Hr Warrant Met	Peak Hr Warrant Met
	King of Prussia Rd NB Left/Thru/Right	King of Prussia Rd SB Left/Thru/Right	Septa Driveway				
7:00 AM	992	410	41	41	1,402	N	N
8:00 AM	1,091	374	55	55	1,465	N	N
4:00 PM	438	813	158	158	1,250	Y	N
5:00 PM	395	1,000	138	138	1,394	Y	N

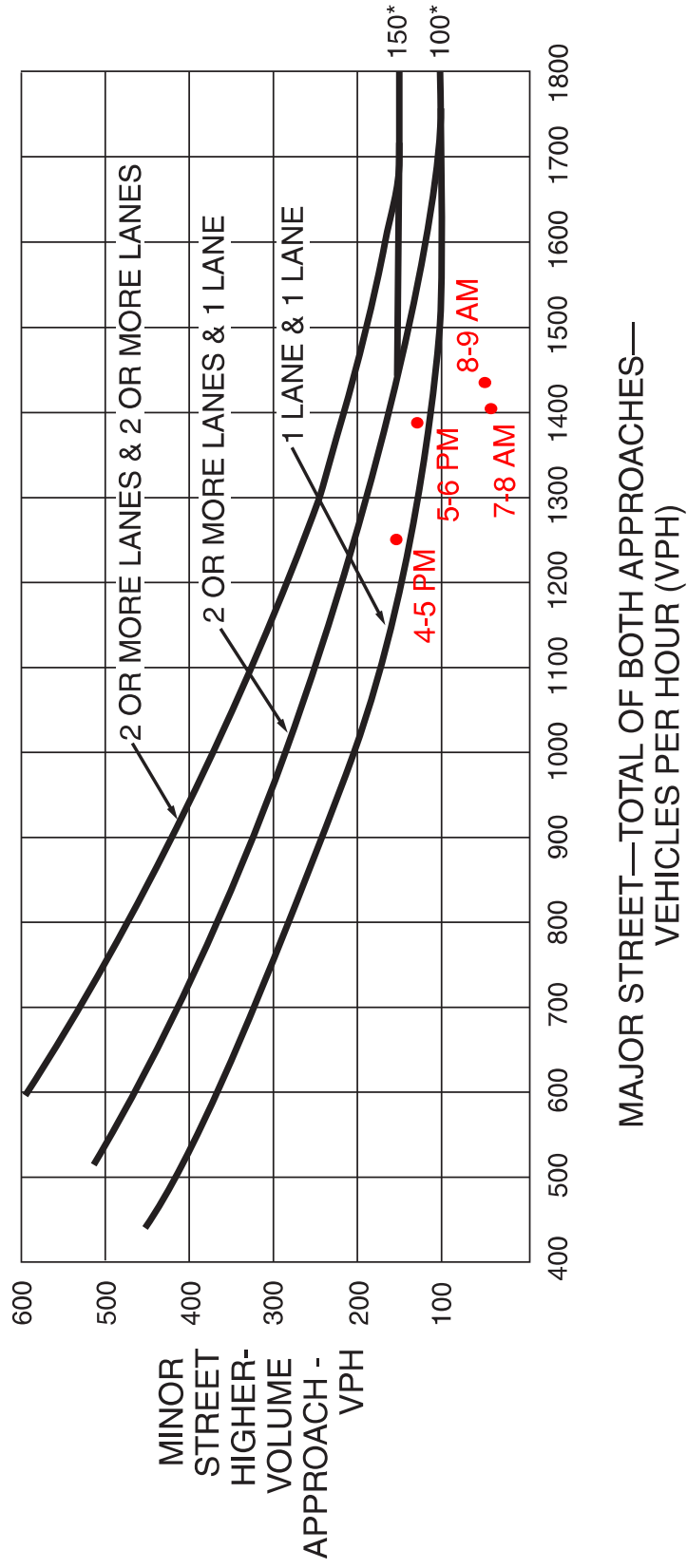


**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

# APPENDIX K

## Left Turn Phase Evaluation

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD  
RADNOR TOWNSHIP  
DELAWARE COUNTY, PA

UPHS1507



# LEFT TURN SIGNALIZATION

COUNTY: Delaware County  
MUNICIPALITY: Radnor Twp

INTERSECTION: King of Prussia Road and Raider Road/Site Driveway  
YEAR: 2020 Build Conditions

Time	Left Turn				Opposing		Calculated Conflict Factor	Meet Warrants?
	Direction	Exclusive Lane	Volume	Per Cycle	Through Volume	Number of Lanes		
AM PEAK	EB	N	9	0.23	0	1	0	No
	WB	N	99	2.48	0	1	0	No
	NB	Y	173	4.33	264	1	45,672	No
	SB	Y	52	1.30	1052	1	54,704	Yes
PM PEAK	EB	N	5	0.13	0	1	0	No
	WB	N	272	6.8	0	1	0	No
	NB	Y	23	0.575	1097	1	25,231	No
	SB	Y	14	0.35	294	1	4,116	No

Comments: A conflict factor of 50,000 is required for advanced left turn phasing for 2 - one hour periods

AM Peak Cycle Length (seconds): 90  
Midday Peak Cycle Length (seconds): 90  
PM Peak Cycle Length (seconds): 90

**Conflict Factors:**

1.1 Protected/Permitted Left Turn Phase

- A. Without separate turning lanes
  - 1 opposing lane; CF = 35,000
  - 2 opposing lanes; CF = 45,000
- B. With separate turning lane
  - 1 opposing lane; CF = 50,000
  - 2 opposing lanes; CF = 65,000

1.2 Protected/Prohibited Left Turn Phase

- (must have a separate turning lane)
- 1 opposing lane; CF = 67,500
  - 2 opposing lanes; CF = 90,000

Calculations completed in accordance with PennDOT Publication 149, Chapter 3

# LEFT TURN SIGNALIZATION

COUNTY: Delaware County  
MUNICIPALITY: Radnor Twp

INTERSECTION: King of Prussia Road and Raider Road/Site Driveway  
YEAR: 2025 Build Conditions

Time	Left Turn				Opposing		Calculated Conflict Factor	Meet Warrants?
	Direction	Exclusive Lane	Volume	Per Cycle	Through Volume	Number of Lanes		
AM PEAK	EB	N	9	0.23	0	1	0	No
	WB	N	99	2.48	0	1	0	No
	NB	Y	177	4.43	268	1	47,436	No
	SB	Y	52	1.30	1071	1	55,692	Yes
PM PEAK	EB	N	5	0.13	0	1	0	No
	WB	N	272	6.8	0	1	0	No
	NB	Y	24	0.6	1117	1	26,808	No
	SB	Y	14	0.35	299	1	4,186	No

Comments: A conflict factor of 50,000 is required for advanced left turn phasing for 2 - one hour periods

AM Peak Cycle Length (seconds): 90  
Midday Peak Cycle Length (seconds): 90  
PM Peak Cycle Length (seconds): 90

**Conflict Factors:**

1.1 Protected/Permitted Left Turn Phase

- A. Without separate turning lanes
  - 1 opposing lane; CF = 35,000
  - 2 opposing lanes; CF = 45,000
- B. With separate turning lane
  - 1 opposing lane; CF = 50,000
  - 2 opposing lanes; CF = 65,000

1.2 Protected/Prohibited Left Turn Phase

- (must have a separate turning lane)
- 1 opposing lane; CF = 67,500
  - 2 opposing lanes; CF = 90,000

Calculations completed in accordance with PennDOT Publication 149, Chapter 3







# APPENDIX L

## Pedestrian and Vehicle Clearance Calculations

### TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD

RADNOR TOWNSHIP

DELAWARE COUNTY, PA

UPHS1507



**STUDY LOCATION AND ANALYSIS INFORMATION**

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

Analysis Date: 11/30/2016  
 Conducted By: SDS  
 Checked By: ACB  
 Agency/Company Name: Pennoni

Intersection Description: King of Prussia Road / Raider Road/Site Driveway

**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)
King of Prussia Road NB	NB	3.8	4	2	2	4	2
King of Prussia Road SB	SB	3.5	4	1.9	2	4	2
Raider Road EB	EB	3	4	2.3	2	4	2
Site Driveway WB	WB	3.5	4	2.4	2	4	2
King of Prussia Road SB	NB	3.8	4	1.9	2	4	2
King of Prussia Road NB	SB	3.5	4	1.9	2	4	2

Additional Comments/Justifications:

**Pedestrian Interval Findings**

WITH PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Walk Interval, T <sub>w</sub>	User Defined Walk Interval, T <sub>w</sub>	Calculated Ped. Change Interval, T <sub>pc</sub>	User Defined Ped. Change Interval, T <sub>pc</sub>	Greater than (T <sub>w</sub> +T <sub>pc</sub> ) <sub>min</sub> ?	To Be Implemented	
							T <sub>w</sub> (s)	T <sub>pc</sub> (s)
	Crossing of N King of Prussia	9.3	6	12.6	17	Yes	6	17
	Crossing of S. King of Prussia	11.3	6	16.6	17	Yes	6	17
	Crossing Raider Road	7.9	7	9.8	21	Yes	7	21
	Crossing Site Driveway	13.3	7	20.6	21	Yes	7	21

WITHOUT PEDESTRIAN SIGNALS	Calculated Min. Green Interval, T <sub>p</sub>
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/s<sup>2</sup>)
- $g$  = 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	
King of Prussia Road NB	NB	35	-2	80	3.8	2.0	5.8		
King of Prussia Road SB	SB	35	2	75	3.5	1.9	5.4		
Raider Road EB	EB	25	-2	63	3.0	2.3	5.3		
Site Driveway WB	WB	25	-8	66	3.5	2.4	5.9		
Left-Turn Movement Phases									
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments	
King of Prussia Road SB	NB	35	-2	73	3.8	1.9	5.7		
King of Prussia Road NB	SB	35	2	77	3.5	1.9	5.4		

## PEDESTRIAN INTERVALS

### Assumptions and Calibration Inputs

<p><b>Walk Interval<sup>1</sup></b> (<math>T_w</math>, seconds)</p> $T_w = \left( \frac{1}{2} \frac{L}{S_w} \right) + 3$
<p><b>Pedestrian Change Interval</b> (<math>T_{pc}</math>, seconds)</p> $T_{pc} = \frac{L}{S_w}$
<p><b>Minimum Duration</b> (<math>T_w + T_{pc}</math>)<sub>min</sub>, seconds)</p> $(T_w + T_{pc})_{min} = \frac{(L+6)}{3}$

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 Interval<sup>2</sup>**  
( $T_p$ , 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 <sub>w</sub>	T <sub>pc</sub>	(T <sub>w</sub> +T <sub>pc</sub> ) <sub>min</sub>	T <sub>p</sub>	Comments
Crossing of N King of Prussia	Yes	44	9.3	12.6	16.7	N/A	Using 6 sec. M and 17 sec FH
Crossing of S. King of Prussia	Yes	58	11.3	16.6	21.4	N/A	Using 6 sec. M and 17 sec FH
Crossing Raider Road	Yes	34	7.9	9.8	13.4	N/A	Using 7 sec. M and 21 sec FH
Crossing Site Driveway	Yes	72	13.3	20.6	26.0	N/A	Using 7 sec. M and 21 sec FH



# APPENDIX M

2020 and 2025 Build Condition with Improvements

Capacity Analysis Worksheets

## TRAFFIC IMPACT STUDY

### MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD

RADNOR TOWNSHIP

DELAWARE COUNTY, PA






















UPHS1507





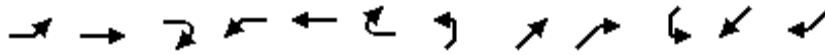
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

04/06/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Future Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	349	8	113	409	699	2	13	696	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	333	0	391	437	25	357	390	1152	3	371	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1291	0	1530	1396	99	1398	1639	1820	5	749	1764	1544
Grp Volume(v), veh/h	1	0	2	349	0	121	409	0	701	13	696	0
Grp Sat Flow(s),veh/h/ln	1291	0	1530	1396	0	1497	1639	0	1825	749	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.80	0.00	0.32	1.05	0.00	0.61	0.04	1.01	0.00
Avail Cap(c_a), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.0	33.3	0.0	27.1	27.5	0.0	9.8	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.1	0.0	0.5	59.2	0.0	2.4	0.2	38.0	0.0
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	0.0	0.0	0.1	15.0	0.0	4.4	28.9	0.0	16.3	0.4	43.6	0.0
LnGrp Delay(d),s/veh	29.1	0.0	25.0	43.4	0.0	27.6	86.7	0.0	12.2	17.3	65.5	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			470			1110			709	
Approach Delay, s/veh		26.4			39.3			39.6			64.6	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		22.6		24.8	19.5	37.5		7.9				
Green Ext Time (p_c), s		5.4		0.0	0.0	0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				47.3								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

04/06/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Future Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1716	1809	1628	1809
Adj Flow Rate, veh/h	40	421	0	30	890	7	534	34	62	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	8	0	0	0
Cap, veh/h	90	857	772	395	900	7	226	9	537	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	630	1714	1545	935	1799	14	393	25	1422	0	97	194
Grp Volume(v), veh/h	40	421	0	30	0	897	568	0	62	9	0	0
Grp Sat Flow(s),veh/h/ln	630	1714	1545	935	0	1813	418	0	1422	290	0	0
Q Serve(g_s), s	1.5	14.6	0.0	2.0	0.0	44.0	0.0	0.0	2.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.6	0.0	16.6	0.0	44.0	34.0	0.0	2.6	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	90	857	772	395	0	907	236	0	537	159	0	0
V/C Ratio(X)	0.44	0.49	0.00	0.08	0.00	0.99	2.41	0.00	0.12	0.06	0.00	0.00
Avail Cap(c_a), veh/h	90	857	772	395	0	907	236	0	537	159	0	0
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)	0.58	0.58	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.8	14.9	0.0	20.4	0.0	22.3	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	8.9	1.2	0.0	0.4	0.0	27.4	648.0	0.0	0.1	0.1	0.0	0.0
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	2.2	10.5	0.0	1.0	0.0	37.6	86.8	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.7	16.1	0.0	20.8	0.0	49.7	681.6	0.0	18.3	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		461			927			630			9	
Approach Delay, s/veh		19.3			48.7			616.3			21.8	
Approach LOS		B			D			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		46.0		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				218.3								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

04/06/2018

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↙		↘		↘	↗
Traffic Vol, veh/h	20	42	970	115	147	303
Future Vol, veh/h	20	42	970	115	147	303
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	23	48	1115	132	169	348

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1886	1208	0	0	1264
Stage 1	1198	-	-	-	-
Stage 2	688	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	79	185	-	-	487
Stage 1	289	-	-	-	-
Stage 2	503	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	50	181	-	-	480
Mov Cap-2 Maneuver	129	-	-	-	-
Stage 1	185	-	-	-	-
Stage 2	502	-	-	-	-






















Approach	WB	NB	SB
HCM Control Delay, s	44.4	0	5.4
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	160	480
HCM Lane V/C Ratio	-	-	0.445	0.352
HCM Control Delay (s)	-	-	44.4	16.5
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	2	1.6

# HCM 2010 Signalized Intersection Summary

## 5: King of Prussia Rd & Raider Rd

04/06/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	130	99	0	22	173	1052	369	52	264	58
Future Volume (veh/h)	9	0	130	99	0	22	173	1052	369	52	264	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1872	1792	1872	1800	1800	1800	1800	1765	1800	1800	1664	1800
Adj Flow Rate, veh/h	10	0	149	114	0	25	199	1209	424	60	303	67
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	0	0	10	10
Cap, veh/h	50	8	230	235	0	246	701	1083	933	101	799	177
Arrive On Green	0.16	0.00	0.16	0.16	0.00	0.16	0.07	0.61	0.61	0.06	0.61	0.61
Sat Flow, veh/h	47	49	1431	1258	0	1530	1714	1765	1520	1714	1318	292
Grp Volume(v), veh/h	159	0	0	114	0	25	199	1209	424	60	0	370
Grp Sat Flow(s),veh/h/ln	1527	0	0	1258	0	1530	1714	1765	1520	1714	0	1610
Q Serve(g_s), s	1.3	0.0	0.0	2.5	0.0	1.3	3.9	55.2	13.5	3.1	0.0	10.6
Cycle Q Clear(g_c), s	8.7	0.0	0.0	11.2	0.0	1.3	3.9	55.2	13.5	3.1	0.0	10.6
Prop In Lane	0.06		0.94	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	288	0	0	235	0	246	701	1083	933	101	0	976
V/C Ratio(X)	0.55	0.00	0.00	0.48	0.00	0.10	0.28	1.12	0.45	0.59	0.00	0.38
Avail Cap(c_a), veh/h	415	0	0	341	0	374	701	1083	933	114	0	976
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.4	0.0	0.0	36.9	0.0	32.2	6.2	17.4	9.3	41.3	0.0	9.1
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.5	0.0	0.2	0.2	65.3	1.6	6.3	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	6.9	0.0	0.0	5.1	0.0	1.0	3.3	83.0	9.9	2.9	0.0	8.6
LnGrp Delay(d),s/veh	37.0	0.0	0.0	38.5	0.0	32.4	6.4	82.7	10.9	47.6	0.0	10.2
LnGrp LOS	D			D		C	A	F	B	D		B
Approach Vol, veh/h		159			139			1832				430
Approach Delay, s/veh		37.0			37.4			57.8				15.4
Approach LOS		D			D			E				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.3	60.2		19.5	11.0	59.5		19.5				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	46.0		21.0	5.0	46.0		21.0				
Max Q Clear Time (g_c+I1), s	5.6	57.7		10.7	6.4	12.6		13.2				
Green Ext Time (p_c), s	0.0	0.0		0.6	0.0	2.4		0.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				48.3								
HCM 2010 LOS				D								

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

04/06/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↕		↔	↕
Traffic Vol, veh/h	2	2	1588	6	6	486
Future Vol, veh/h	2	2	1588	6	6	486
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	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1913	7	7	586





















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2517	960	0	0	1920
Stage 1	1917	-	-	-	-
Stage 2	600	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	27	261	-	-	312
Stage 1	103	-	-	-	-
Stage 2	552	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	26	261	-	-	312
Mov Cap-2 Maneuver	26	-	-	-	-
Stage 1	101	-	-	-	-
Stage 2	552	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	90.2	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	47	312
HCM Lane V/C Ratio	-	-	0.103	0.023
HCM Control Delay (s)	-	-	90.2	16.8
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	0.3	0.1

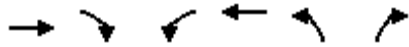
HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

04/06/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Future Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1782	1665	0	1748
Adj Flow Rate, veh/h	385	1321	0	0	551	0	782	853	347	326	0	165
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	481	1365	0	0	746	344	1630	890	361	362	0	0
Arrive On Green	0.10	0.27	0.00	0.00	0.07	0.00	0.50	0.38	0.38	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	2330	944	3077	326	
Grp Volume(v), veh/h	385	1321	0	0	551	0	782	613	587	326	75.9	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1676	1598	1539	E	
Q Serve(g_s), s	12.5	43.0	0.0	0.0	17.4	0.0	17.4	39.2	39.5	8.0		
Cycle Q Clear(g_c), s	12.5	43.0	0.0	0.0	17.4	0.0	17.4	39.2	39.5	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.59	1.00		
Lane Grp Cap(c), veh/h	481	1365	0	0	746	344	1630	640	610	362		
V/C Ratio(X)	0.80	0.97	0.00	0.00	0.74	0.00	0.48	0.96	0.96	0.90		
Avail Cap(c_a), veh/h	481	1365	0	0	746	344	1630	640	610	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.1	39.2	0.0	0.0	48.0	0.0	18.1	33.1	33.2	51.6		
Incr Delay (d2), s/veh	8.3	16.4	0.0	0.0	5.9	0.0	0.2	25.4	27.3	24.3		
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		
%ile BackOfQ(95%),veh/ln	10.1	30.3	0.0	0.0	13.5	0.0	12.5	30.4	29.6	5.0		
LnGrp Delay(d),s/veh	56.3	55.6	0.0	0.0	53.9	0.0	18.3	58.5	60.5	75.9		
LnGrp LOS	E	E			D		B	E	E	E		
Approach Vol, veh/h		1706			551			1982				
Approach Delay, s/veh		55.8			53.9			43.2				
Approach LOS		E			D			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		50.0	60.0		21.0	29.0	13.0	47.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		44.0	41.0		15.0	23.0	7.0	41.0				
Max Q Clear Time (g_c+I1), s		45.5	19.9		15.0	19.9	10.5	41.7				
Green Ext Time (p_c), s		0.0	3.0		0.0	1.1	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			51.5									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

04/06/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	851	0	186	1224	792	839		
Future Volume (veh/h)	851	0	186	1224	792	839		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	868	0	190	1249	808	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2288	0	290	2104	957	436		
Arrive On Green	0.48	0.00	0.03	0.21	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	868	0	190	1249	808	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	12.8	0.0	6.5	36.7	25.1	0.0		
Cycle Q Clear(g_c), s	12.8	0.0	6.5	36.7	25.1	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2288	0	290	2104	957	436		
V/C Ratio(X)	0.38	0.00	0.66	0.59	0.84	0.00		
Avail Cap(c_a), veh/h	2288	0	317	2104	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.63	0.63	1.00	0.00		
Uniform Delay (d), s/veh	17.9	0.0	51.6	31.1	36.9	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.7	0.8	3.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.5	0.0	5.2	23.0	17.7	0.0		
LnGrp Delay(d),s/veh	18.4	0.0	54.4	31.9	40.0	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	868			1439	808			
Approach Delay, s/veh	18.4			34.9	40.0			
Approach LOS	B			C	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.6	15.1	58.3				73.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.6	9.0	15.3				39.2
Green Ext Time (p_c), s		3.0	0.1	6.0				7.0
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			31.6					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

04/06/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↔		↔	↕↕	↔		↕	↔			
Traffic Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Future Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.90			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	598	1631	4	2	918	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	696	2843	7	18	2133	992	21	7	22			
Arrive On Green	0.42	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1375			
Grp Volume(v), veh/h	598	797	838	2	918	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1375			
Q Serve(g_s), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	696	1389	1461	18	2133	992	28	0	22			
V/C Ratio(X)	0.86	0.57	0.57	0.11	0.43	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2133	992	110	0	87			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.3	0.0	0.0	53.9	10.0	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.6	0.2	0.1	2.6	0.6	0.0	5.4	0.0	1.7			
Initial Q Delay(d3),s/veh	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	0.1	0.1	0.1	11.4	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.9	0.2	0.1	56.5	10.7	0.0	58.8	0.0	55.0			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2233			920			10				
Approach Delay, s/veh		8.4			10.8			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.2	75.0		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2), s	12.6	2.5			20.6	17.6		2.7				
Green Ext Time (p_c), s	0.0	20.2			1.6	7.6		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												



HCM 2010 Signalized Intersection Summary  
10: Radnor Chester Rd






















04/06/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Future Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	145	1030	55	221	1541	456	96	389	86	100	138	111
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1398	75	270	1454	656	149	485	108	240	631	472
Arrive On Green	0.07	0.44	0.44	0.07	0.44	0.44	0.23	0.23	0.23	0.07	0.35	0.35
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	453	2079	464	1609	1787	1337
Grp Volume(v), veh/h	145	533	552	221	1541	456	292	0	279	100	126	123
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1489	0	1506	1609	1638	1487
Q Serve(g_s), s	5.2	29.5	29.5	8.0	48.2	27.1	18.8	0.0	19.2	4.9	5.9	6.4
Cycle Q Clear(g_c), s	5.2	29.5	29.5	8.0	48.2	27.1	20.5	0.0	19.2	4.9	5.9	6.4
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	724	749	270	1454	656	391	0	351	240	578	525
V/C Ratio(X)	0.78	0.74	0.74	0.82	1.06	0.70	0.75	0.00	0.80	0.42	0.22	0.24
Avail Cap(c_a), veh/h	186	724	749	270	1454	656	449	0	411	384	789	716
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	25.6	25.6	23.3	30.9	25.0	40.1	0.0	39.7	28.6	24.9	25.1
Incr Delay (d2), s/veh	18.9	6.6	6.4	17.8	41.2	6.0	5.8	0.0	9.0	1.1	0.2	0.2
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	6.0	20.9	21.5	7.9	54.6	17.9	14.0	0.0	13.8	4.0	4.9	4.8
LnGrp Delay(d),s/veh	43.8	32.2	32.0	41.1	72.1	31.0	45.9	0.0	48.7	29.8	25.1	25.3
LnGrp LOS	D	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1230			2218			571			349	
Approach Delay, s/veh		33.5			60.6			47.3			26.5	
Approach LOS		C			E			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	53.2		43.8	13.0	53.2	13.2	30.6				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0		52.0	7.0	33.0	17.0	29.0				
Max Q Clear Time (g_c+110), s	10.5	32.0		8.4	7.7	50.7	7.4	22.5				
Green Ext Time (p_c), s	0.0	0.7		1.5	0.0	0.0	0.1	2.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				48.5								
HCM 2010 LOS				D								

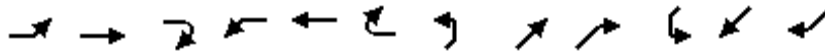
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

04/06/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Future Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	579	1	235	130	818	1	8	538	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	386	167	419	601	2	587	321	962	1	178	687	595
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1162	457	1142	1422	7	1601	1689	1841	2	671	1782	1544
Grp Volume(v), veh/h	3	0	14	579	0	236	130	0	819	8	538	0
Grp Sat Flow(s),veh/h/ln	1162	0	1599	1422	0	1608	1689	0	1844	671	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	0.9	23.9	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	22.5	23.9	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	586	601	0	590	321	0	963	178	687	595
V/C Ratio(X)	0.01	0.00	0.02	0.96	0.00	0.40	0.41	0.00	0.85	0.04	0.78	0.00
Avail Cap(c_a), veh/h	386	0	586	601	0	590	334	0	963	178	687	595
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	30.1	0.0	21.2	17.0	0.0	18.5	33.2	24.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	27.6	0.0	0.4	0.8	0.0	9.4	0.4	7.3	0.0
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	0.1	0.0	0.4	26.1	0.0	7.8	3.3	0.0	27.1	0.3	18.4	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	57.7	0.0	21.6	17.8	0.0	27.8	33.6	31.6	0.0
LnGrp LOS	C		B	E		C	B		C	C	C	
Approach Vol, veh/h		17			815			949			546	
Approach Delay, s/veh		19.3			47.3			26.5			31.6	
Approach LOS		B			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.0		38.0	12.3	39.7		38.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0				
Max Q Clear Time (g_c+I1), s		36.4		35.5	6.3	26.4		12.0				
Green Ext Time (p_c), s		4.0		0.0	0.0	1.8		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				34.9								
HCM 2010 LOS				C								

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

04/06/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Future Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.98	1.00		0.98
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	783	0	60	438	1	418	7	148	32	39	51
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	481	812	725	101	834	2	270	3	644	50	58	42
Arrive On Green	0.46	0.46	0.00	0.91	0.91	0.91	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	955	1782	1591	715	1830	4	453	8	1525	0	138	99
Grp Volume(v), veh/h	8	783	0	60	0	439	425	0	148	122	0	0
Grp Sat Flow(s),veh/h/ln	955	1782	1591	715	0	1834	460	0	1525	237	0	0
Q Serve(g_s), s	0.4	38.4	0.0	2.6	0.0	3.7	0.0	0.0	5.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.6	38.4	0.0	41.0	0.0	3.7	38.0	0.0	5.6	38.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.26		0.42
Lane Grp Cap(c), veh/h	481	812	725	101	0	836	274	0	644	151	0	0
V/C Ratio(X)	0.02	0.96	0.00	0.60	0.00	0.53	1.55	0.00	0.23	0.81	0.00	0.00
Avail Cap(c_a), veh/h	481	812	725	101	0	836	274	0	644	151	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.12	0.12	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.2	23.8	0.0	24.1	0.0	2.3	31.5	0.0	16.6	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.3	0.0	23.4	0.0	2.4	266.2	0.0	0.2	27.2	0.0	0.0
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	0.2	22.4	0.0	3.8	0.0	3.6	48.6	0.0	4.3	5.5	0.0	0.0
LnGrp Delay(d),s/veh	15.3	29.1	0.0	47.4	0.0	4.7	297.7	0.0	16.8	49.3	0.0	0.0
LnGrp LOS	B	C		D		A	F		B	D		
Approach Vol, veh/h		791			499			573			122	
Approach Delay, s/veh		28.9			9.8			225.1			49.3	
Approach LOS		C			A			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		44.0		46.0		44.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		40.0		37.0		40.0		37.0				
Max Q Clear Time (g_c+I1), s		40.9		40.0		43.5		40.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				82.0								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

04/06/2018

Intersection						
Int Delay, s/veh	5.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↙		↗		↘	↗
Traffic Vol, veh/h	76	84	403	17	53	970
Future Vol, veh/h	76	84	403	17	53	970
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	89	99	474	20	62	1141

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1768	511	0	0	511
Stage 1	501	-	-	-	-
Stage 2	1267	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	93	534	-	-	982
Stage 1	613	-	-	-	-
Stage 2	267	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 86	522	-	-	968
Mov Cap-2 Maneuver	165	-	-	-	-
Stage 1	566	-	-	-	-
Stage 2	266	-	-	-	-





















Approach	WB	NB	SB
HCM Control Delay, s	49.6	0	0.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	257	968
HCM Lane V/C Ratio	-	-	0.732	0.064
HCM Control Delay (s)	-	-	49.6	9
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	5.1	0.2

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 Signalized Intersection Summary  
5: King of Prussia Rd & Raider Rd

04/06/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	41	272	0	60	23	294	101	14	1097	5
Future Volume (veh/h)	5	0	41	272	0	60	23	294	101	14	1097	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1872	1872	1872	1800	1800	1800	1800	1782	1800	1800	1782	1800
Adj Flow Rate, veh/h	5	0	42	280	0	62	24	303	104	14	1131	5
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
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	0	1	0	0	1	1
Cap, veh/h	61	22	322	400	0	345	136	1040	887	42	1022	5
Arrive On Green	0.23	0.00	0.23	0.23	0.00	0.23	0.03	0.58	0.58	0.02	0.58	0.58
Sat Flow, veh/h	73	97	1427	1386	0	1530	1714	1782	1520	1714	1773	8
Grp Volume(v), veh/h	47	0	0	280	0	62	24	303	104	14	0	1136
Grp Sat Flow(s),veh/h/ln	1597	0	0	1386	0	1530	1714	1782	1520	1714	0	1781
Q Serve(g_s), s	0.0	0.0	0.0	14.9	0.0	2.9	0.5	7.7	2.8	0.7	0.0	51.9
Cycle Q Clear(g_c), s	2.1	0.0	0.0	17.0	0.0	2.9	0.5	7.7	2.8	0.7	0.0	51.9
Prop In Lane	0.11		0.89	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	404	0	0	400	0	345	136	1040	887	42	0	1027
V/C Ratio(X)	0.12	0.00	0.00	0.70	0.00	0.18	0.18	0.29	0.12	0.34	0.00	1.11
Avail Cap(c_a), veh/h	434	0	0	426	0	374	197	1040	887	114	0	1027
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.8	0.0	0.0	33.4	0.0	28.1	22.0	9.4	8.4	43.2	0.0	19.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	4.7	0.0	0.2	0.6	0.7	0.3	4.7	0.0	61.9
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	1.7	0.0	0.0	11.6	0.0	2.3	0.7	7.0	2.2	0.7	0.0	77.0
LnGrp Delay(d),s/veh	27.9	0.0	0.0	38.1	0.0	28.4	22.6	10.1	8.6	47.9	0.0	80.9
LnGrp LOS	C			D		C	C	B	A	D		F
Approach Vol, veh/h		47			342			431			1150	
Approach Delay, s/veh		27.9			36.3			10.4			80.5	
Approach LOS		C			D			B			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	57.5		25.3	7.8	56.9		25.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	46.0		21.0	5.0	46.0		21.0				
Max Q Clear Time (g_c+I1), s	3.2	10.2		4.1	3.0	53.9		19.0				
Green Ext Time (p_c), s	0.0	2.2		0.2	0.0	0.0		0.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				56.2								
HCM 2010 LOS				E								

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

04/06/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↕		↔	↕
Traffic Vol, veh/h	4	4	413	2	2	1404
Future Vol, veh/h	4	4	413	2	2	1404
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	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	439	2	2	1494





















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1938	221	0	0	441
Stage 1	440	-	-	-	-
Stage 2	1498	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	65	789	-	-	1130
Stage 1	622	-	-	-	-
Stage 2	206	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	65	789	-	-	1130
Mov Cap-2 Maneuver	65	-	-	-	-
Stage 1	621	-	-	-	-
Stage 2	206	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	37.3	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	120	1130
HCM Lane V/C Ratio	-	-	0.071	0.002
HCM Control Delay (s)	-	-	37.3	8.2
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

04/06/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Future Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	109	1636	0	0	615	0	289	246	228	885	0	477
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.95
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	216	1623	0	0	1269	591	1393	278	247	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1697	1511	3260	885	
Grp Volume(v), veh/h	109	1636	0	0	615	0	289	245	229	885	83.2	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1693	1515	1630	F	
Q Serve(g_s), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	15.6	16.3	24.0		
Cycle Q Clear(g_c), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	15.6	16.3	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	216	1623	0	0	1269	591	1393	277	248	858		
V/C Ratio(X)	0.51	1.01	0.00	0.00	0.48	0.00	0.21	0.89	0.92	1.03		
Avail Cap(c_a), veh/h	391	1623	0	0	1269	591	1393	277	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.88	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.9	37.2	0.0	0.0	9.9	0.0	19.8	45.0	45.3	44.2		
Incr Delay (d2), s/veh	1.6	22.8	0.0	0.0	1.2	0.0	0.1	27.1	36.8	39.0		
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		
%ile BackOfQ(95%),veh/ln	3.0	53.6	0.0	0.0	6.8	0.0	5.0	14.4	14.4	12.4		
LnGrp Delay(d),s/veh	52.5	60.0	0.0	0.0	11.1	0.0	19.9	72.1	82.1	83.2		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1745			615			763				
Approach Delay, s/veh		59.6			11.1			55.3				
Approach LOS		E			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.6		6.0	10.5	26.5	18.3				
Green Ext Time (p_c), s		0.0	0.8		0.1	4.2	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			56.5									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

04/06/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1052	0	570	768	615	507		
Future Volume (veh/h)	1052	0	570	768	615	507		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891		
Adj Flow Rate, veh/h	1073	0	582	784	628	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.97	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	1	2	1	1		
Cap, veh/h	2009	0	714	2322	751	359		
Arrive On Green	0.43	0.00	0.07	0.23	0.22	0.00		
Sat Flow, veh/h	5035	0	3326	3476	3359	1607		
Grp Volume(v), veh/h	1073	0	582	784	628	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607		
Q Serve(g_s), s	18.6	0.0	19.0	21.3	19.6	0.0		
Cycle Q Clear(g_c), s	18.6	0.0	19.0	21.3	19.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2009	0	714	2322	751	359		
V/C Ratio(X)	0.53	0.00	0.81	0.34	0.84	0.00		
Avail Cap(c_a), veh/h	2009	0	847	2322	916	438		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.77	0.77	1.00	0.00		
Uniform Delay (d), s/veh	23.5	0.0	48.9	21.6	40.8	0.0		
Incr Delay (d2), s/veh	1.0	0.0	4.1	0.3	5.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	2.9	0.0	13.5	14.7	14.8	0.0		
LnGrp Delay(d),s/veh	24.5	0.0	53.1	21.9	46.6	0.0		
LnGrp LOS	C		D	C	D			
Approach Vol, veh/h	1073			1366	628			
Approach Delay, s/veh	24.5			35.2	46.6			
Approach LOS	C			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.6	28.6	51.8				80.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.1	21.5	21.1				23.8
Green Ext Time (p_c), s		1.4	1.1	6.4				6.3
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			33.8					
HCM 2010 LOS			C					



HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

04/06/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↕		↖ ↗	↕	↖ ↗		↕	↖ ↗			
Traffic Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Future Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1198	1838	15	6	751	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1197	2797	23	23	1647	766	18	6	18			
Arrive On Green	0.73	1.00	1.00	0.01	0.49	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3344	27	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1198	903	950	6	751	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1197	1376	1444	23	1647	766	24	0	18			
V/C Ratio(X)	1.00	0.66	0.66	0.26	0.46	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1197	1376	1444	109	1647	766	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.0	0.0	0.0	53.7	18.6	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	7.9	0.2	0.2	5.6	0.9	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	88.3	0.2	0.2	0.4	12.3	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	22.9	0.2	0.2	59.3	19.6	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		3051			757			6				
Approach Delay, s/veh		9.1			19.9			56.7				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			45.0	58.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			39.0	47.0		6.0				
Max Q Clear Time (g_c+12), s	6.0	2.5			42.5	18.6		2.7				
Green Ext Time (p_c), s	0.0	27.6			0.0	5.5		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay					11.3							
HCM 2010 LOS					B							
<b>Notes</b>												

# HCM 2010 Signalized Intersection Summary

## 10: Radnor Chester Rd






















04/06/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Future Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	124	1211	96	204	1142	130	84	218	145	423	462	222
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	229	1350	107	201	1416	632	138	309	214	306	817	390
Arrive On Green	0.06	0.42	0.42	0.06	0.42	0.42	0.24	0.24	0.24	0.08	0.37	0.37
Sat Flow, veh/h	1706	3197	253	1664	3352	1497	371	1302	902	1689	2222	1060
Grp Volume(v), veh/h	124	644	663	204	1142	130	216	0	231	423	351	333
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1497	1141	0	1434	1689	1690	1591
Q Serve(g_s), s	4.1	35.1	35.3	6.0	29.8	5.5	13.9	0.0	14.6	8.0	16.6	16.8
Cycle Q Clear(g_c), s	4.1	35.1	35.3	6.0	29.8	5.5	17.9	0.0	14.6	8.0	16.6	16.8
Prop In Lane	1.00		0.14	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	229	719	738	201	1416	632	321	0	341	306	621	585
V/C Ratio(X)	0.54	0.90	0.90	1.01	0.81	0.21	0.67	0.00	0.68	1.38	0.56	0.57
Avail Cap(c_a), veh/h	229	719	738	201	1416	632	439	0	488	306	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.6	26.8	26.9	27.0	25.3	18.3	35.8	0.0	34.6	35.1	25.2	25.3
Incr Delay (d2), s/veh	2.6	16.0	16.0	67.0	5.0	0.7	2.5	0.0	2.3	192.1	0.8	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.6	26.9	27.6	11.8	21.1	4.3	9.8	0.0	10.0	37.8	12.4	11.9
LnGrp Delay(d),s/veh	23.2	42.8	42.8	94.1	30.3	19.0	38.3	0.0	37.0	227.2	26.0	26.2
LnGrp LOS	C	D	D	F	C	B	D		D	F	C	C
Approach Vol, veh/h		1431			1476			447			1107	
Approach Delay, s/veh		41.1			38.1			37.6			102.9	
Approach LOS		D			D			D			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	1.0	47.2		41.8	11.0	47.2	13.0	28.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	31.0		46.0	5.0	31.0	7.0	33.0				
Max Q Clear Time (g_c+1/3), s	5.0	37.6		19.1	6.6	32.3	10.5	19.9				
Green Ext Time (p_c), s	0.0	0.0		4.5	0.0	0.0	0.0	2.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				55.1								
HCM 2010 LOS				E								

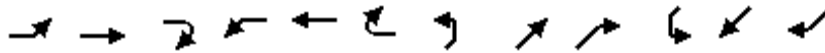
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

04/09/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	318	7	104	375	639	2	12	638	611
Future Volume (veh/h)	1	0	2	318	7	104	375	639	2	12	638	611
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	353	8	116	417	710	2	13	709	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	330	0	391	437	25	358	390	1152	3	368	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1287	0	1530	1396	97	1400	1639	1820	5	742	1764	1544
Grp Volume(v), veh/h	1	0	2	353	0	124	417	0	712	13	709	0
Grp Sat Flow(s),veh/h/ln	1287	0	1530	1396	0	1497	1639	0	1825	742	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.7	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.1	22.7	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.81	0.00	0.32	1.07	0.00	0.62	0.04	1.03	0.00
Avail Cap(c_a), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	0.0	25.0	33.4	0.0	27.2	27.5	0.0	9.9	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.8	0.0	0.5	65.5	0.0	2.5	0.2	43.2	0.0
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	0.0	0.0	0.1	15.2	0.0	4.6	30.1	0.0	16.8	0.4	45.4	0.0
LnGrp Delay(d),s/veh	29.3	0.0	25.0	44.2	0.0	27.7	93.0	0.0	12.4	17.3	70.7	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			477			1129			722	
Approach Delay, s/veh		26.4			39.9			42.2			69.8	
Approach LOS		C			D			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0				
Max Q Clear Time (g_c+I1), s		23.1		25.2	19.5	37.5		8.1				
Green Ext Time (p_c), s		5.5		0.0	0.0	0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				50.2								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

04/09/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Future Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.97	1.00		0.97
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
Adj Sat Flow, veh/h/ln	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	427	0	31	907	7	544	35	63	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	83	857	772	391	900	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.17	0.17	0.17	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	621	1714	1545	930	1800	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	427	0	31	0	914	579	0	63	9	0	0
Grp Sat Flow(s),veh/h/ln	621	1714	1545	930	0	1814	418	0	1520	290	0	0
Q Serve(g_s), s	0.5	14.9	0.0	2.7	0.0	45.0	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.9	0.0	17.6	0.0	45.0	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.48	0.50	0.00	0.08	0.00	1.01	2.46	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.56	0.56	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.0	15.0	0.0	32.9	0.0	37.6	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	10.7	1.2	0.0	0.4	0.0	31.9	668.6	0.0	0.1	0.1	0.0	0.0
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	2.2	10.6	0.0	1.3	0.0	55.1	89.2	0.0	1.9	0.3	0.0	0.0
LnGrp Delay(d),s/veh	55.7	16.1	0.0	33.3	0.0	69.4	702.2	0.0	18.3	21.8	0.0	0.0
LnGrp LOS	E	B		C		F	F		B	C		
Approach Vol, veh/h		467			945			642			9	
Approach Delay, s/veh		19.5			68.2			635.1			21.8	
Approach LOS		B			E			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0				
Max Q Clear Time (g_c+I1), s		47.5		36.0		47.0		36.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				233.4								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

04/09/2018

Intersection						
Int Delay, s/veh	3.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	42	988	116	149	308
Future Vol, veh/h	21	42	988	116	149	308
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	24	48	1136	133	171	354





















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1918	1230	0	0	1286
Stage 1	1220	-	-	-	-
Stage 2	698	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398
Pot Cap-1 Maneuver	75	179	-	-	478
Stage 1	282	-	-	-	-
Stage 2	497	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	47	175	-	-	471
Mov Cap-2 Maneuver	124	-	-	-	-
Stage 1	177	-	-	-	-
Stage 2	496	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	47.6	0	5.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	154	471
HCM Lane V/C Ratio	-	-	0.47	0.364
HCM Control Delay (s)	-	-	47.6	16.9
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	2.2	1.6

HCM 2010 Signalized Intersection Summary  
5: King of Prussia Rd & Raider Rd

04/09/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	133	99	0	22	177	1071	369	52	268	59
Future Volume (veh/h)	9	0	133	99	0	22	177	1071	369	52	268	59
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1800	1793	1800	1800	1800	1800	1800	1765	1800	1800	1664	1800
Adj Flow Rate, veh/h	10	0	153	114	0	25	203	1231	424	60	308	68
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	0	0	10	10
Cap, veh/h	50	8	228	230	0	244	692	1092	941	94	801	177
Arrive On Green	0.16	0.00	0.16	0.16	0.00	0.16	0.07	0.62	0.62	0.06	0.61	0.61
Sat Flow, veh/h	46	48	1433	1254	0	1530	1714	1765	1520	1714	1319	291
Grp Volume(v), veh/h	163	0	0	114	0	25	203	1231	424	60	0	376
Grp Sat Flow(s),veh/h/ln	1527	0	0	1254	0	1530	1714	1765	1520	1714	0	1610
Q Serve(g_s), s	1.7	0.0	0.0	2.5	0.0	1.3	3.9	55.7	13.3	3.1	0.0	10.8
Cycle Q Clear(g_c), s	9.0	0.0	0.0	11.5	0.0	1.3	3.9	55.7	13.3	3.1	0.0	10.8
Prop In Lane	0.06		0.94	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	286	0	0	230	0	244	692	1092	941	94	0	978
V/C Ratio(X)	0.57	0.00	0.00	0.50	0.00	0.10	0.29	1.13	0.45	0.64	0.00	0.38
Avail Cap(c_a), veh/h	415	0	0	337	0	374	692	1092	941	114	0	978
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.6	0.0	0.0	37.2	0.0	32.3	6.2	17.1	9.1	41.6	0.0	9.0
Incr Delay (d2), s/veh	1.8	0.0	0.0	1.7	0.0	0.2	0.2	69.2	1.6	8.1	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	7.1	0.0	0.0	5.1	0.0	1.0	3.3	85.8	9.9	3.0	0.0	8.7
LnGrp Delay(d),s/veh	37.4	0.0	0.0	38.8	0.0	32.5	6.5	86.3	10.6	49.8	0.0	10.2
LnGrp LOS	D			D		C	A	F	B	D		B
Approach Vol, veh/h		163			139			1858				436
Approach Delay, s/veh		37.4			37.7			60.3				15.6
Approach LOS		D			D			E				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	60.7		19.3	11.0	59.7		19.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	46.0		21.0	5.0	46.0		21.0				
Max Q Clear Time (g_c+I1), s	5.1	57.7		11.0	5.9	12.8		13.5				
Green Ext Time (p_c), s	0.0	0.0		0.6	0.0	2.5		0.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			50.2									
HCM 2010 LOS			D									
<b>Notes</b>												

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

04/09/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	1611	6	6	493
Future Vol, veh/h	2	2	1611	6	6	493
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	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1941	7	7	594





















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2553	974	0	0	1948
Stage 1	1945	-	-	-	-
Stage 2	608	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	26	255	-	-	304
Stage 1	100	-	-	-	-
Stage 2	547	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	25	255	-	-	304
Mov Cap-2 Maneuver	25	-	-	-	-
Stage 1	98	-	-	-	-
Stage 2	547	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	92.2	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	46	304
HCM Lane V/C Ratio	-	-	0.105	0.024
HCM Control Delay (s)	-	-	92.2	17.1
HCM Lane LOS	-	-	F	C
HCM 95th %tile Q(veh)	-	-	0.3	0.1

HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

04/09/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	1306	0	0	544	379	774	837	344	321	0	162
Future Volume (veh/h)	376	1306	0	0	544	379	774	837	344	321	0	162
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1756	0	0	1800	1854	1764	1764	1782	1665	0	1748
Adj Flow Rate, veh/h	388	1346	0	0	561	0	798	863	355	331	0	167
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
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	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	481	1365	0	0	746	344	1630	886	363	362	0	0
Arrive On Green	0.10	0.27	0.00	0.00	0.07	0.00	0.50	0.38	0.38	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	2322	951	3077	331	
Grp Volume(v), veh/h	388	1346	0	0	561	0	798	622	596	331	78.5	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1676	1597	1539	E	
Q Serve(g_s), s	12.6	44.2	0.0	0.0	17.7	0.0	17.8	40.1	40.5	8.0		
Cycle Q Clear(g_c), s	12.6	44.2	0.0	0.0	17.7	0.0	17.8	40.1	40.5	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.60	1.00		
Lane Grp Cap(c), veh/h	481	1365	0	0	746	344	1630	640	610	362		
V/C Ratio(X)	0.81	0.99	0.00	0.00	0.75	0.00	0.49	0.97	0.98	0.91		
Avail Cap(c_a), veh/h	481	1365	0	0	746	344	1630	640	610	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.90	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.1	39.6	0.0	0.0	48.1	0.0	18.2	33.4	33.5	51.6		
Incr Delay (d2), s/veh	8.6	19.7	0.0	0.0	6.3	0.0	0.2	28.5	30.8	26.9		
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		
%ile BackOfQ(95%),veh/ln	10.2	31.6	0.0	0.0	13.7	0.0	12.7	31.5	30.8	5.4		
LnGrp Delay(d),s/veh	56.7	59.3	0.0	0.0	54.4	0.0	18.4	62.0	64.3	78.5		
LnGrp LOS	E	E			D		B	E	E	E		
Approach Vol, veh/h		1734			561			2016				
Approach Delay, s/veh		58.7			54.4			45.4				
Approach LOS		E			D			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		50.0	60.0		21.0	29.0	13.0	47.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		44.0	41.0		15.0	23.0	7.0	41.0				
Max Q Clear Time (g_c+I1), s		46.7	20.3		15.1	20.2	10.5	42.6				
Green Ext Time (p_c), s		0.0	3.0		0.0	1.0	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			53.8									
HCM 2010 LOS			D									



HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

04/09/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	863	0	189	1247	807	853		
Future Volume (veh/h)	863	0	189	1247	807	853		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785		
Adj Flow Rate, veh/h	881	0	193	1272	823	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98		
Percent Heavy Veh, %	3	0	6	2	2	7		
Cap, veh/h	2263	0	293	2089	972	443		
Arrive On Green	0.48	0.00	0.03	0.20	0.29	0.00		
Sat Flow, veh/h	5035	0	3169	3476	3326	1517		
Grp Volume(v), veh/h	881	0	193	1272	823	0		
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517		
Q Serve(g_s), s	13.1	0.0	6.6	37.6	25.6	0.0		
Cycle Q Clear(g_c), s	13.1	0.0	6.6	37.6	25.6	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2263	0	293	2089	972	443		
V/C Ratio(X)	0.39	0.00	0.66	0.61	0.85	0.00		
Avail Cap(c_a), veh/h	2263	0	317	2089	1421	648		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.62	0.62	1.00	0.00		
Uniform Delay (d), s/veh	18.3	0.0	51.6	31.7	36.6	0.0		
Incr Delay (d2), s/veh	0.5	0.0	2.8	0.8	3.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	9.8	0.0	5.3	23.4	18.0	0.0		
LnGrp Delay(d),s/veh	18.9	0.0	54.4	32.6	39.9	0.0		
LnGrp LOS	B		D	C	D			
Approach Vol, veh/h	881			1465	823			
Approach Delay, s/veh	18.9			35.5	39.9			
Approach LOS	B			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		37.1	15.2	57.7				72.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		28.1	9.1	15.6				40.1
Green Ext Time (p_c), s		3.0	0.1	6.0				6.8
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			32.0					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

04/09/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↔		↔	↕↕	↔		↕	↔			
Traffic Volume (veh/h)	584	1595	4	2	895	494	6	2	2	0	0	0
Future Volume (veh/h)	584	1595	4	2	895	494	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	608	1661	4	2	932	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	705	2843	7	18	2123	988	21	7	22			
Arrive On Green	0.43	1.00	1.00	0.01	0.63	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	608	811	854	2	932	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	705	1389	1461	18	2123	988	28	0	22			
V/C Ratio(X)	0.86	0.58	0.58	0.11	0.44	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2123	988	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.0	0.0	0.0	53.9	10.2	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.7	0.2	0.2	2.6	0.7	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.8	0.1	0.1	0.1	11.7	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.6	0.2	0.2	56.5	10.9	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2273			934			10				
Approach Delay, s/veh		8.3			11.0			58.1				
Approach LOS		A			B			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.2	97.0			28.5	74.7		6.8				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0				
Max Q Clear Time (g_c+1/2), s	6.0	2.5			20.9	18.0		2.7				
Green Ext Time (p_c), s	0.0	21.1			1.6	7.8		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				9.2								
HCM 2010 LOS				A								
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd






















04/09/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Future Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	148	1048	56	225	1570	465	98	396	89	102	141	114
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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	4	2	1	1	1	1	6	3	3
Cap, veh/h	171	1478	79	268	1538	693	151	489	111	208	600	452
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	454	2067	469	1609	1782	1341
Grp Volume(v), veh/h	148	543	561	225	1570	465	297	0	286	102	129	126
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1485	0	1506	1609	1638	1486
Q Serve(g_s), s	5.3	28.9	28.9	7.0	51.0	26.6	19.3	0.0	19.7	5.1	6.2	6.8
Cycle Q Clear(g_c), s	5.3	28.9	28.9	7.0	51.0	26.6	21.0	0.0	19.7	5.1	6.2	6.8
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	171	765	792	268	1538	693	395	0	356	208	551	500
V/C Ratio(X)	0.87	0.71	0.71	0.84	1.02	0.67	0.75	0.00	0.80	0.49	0.23	0.25
Avail Cap(c_a), veh/h	171	765	792	268	1538	693	448	0	411	208	610	554
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	23.6	23.6	25.0	29.5	23.0	39.9	0.0	39.5	30.0	26.3	26.4
Incr Delay (d2), s/veh	34.3	5.5	5.3	20.3	28.4	5.1	6.2	0.0	9.6	1.8	0.2	0.3
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	0.1	20.5	21.0	9.0	52.8	17.6	14.3	0.0	14.1	4.3	5.1	5.1
LnGrp Delay(d),s/veh	60.8	29.1	28.9	45.3	57.9	28.1	46.1	0.0	49.1	31.8	26.5	26.7
LnGrp LOS	E	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1252			2260			583			357	
Approach Delay, s/veh		32.8			50.5			47.6			28.1	
Approach LOS		C			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	2.0	56.0		42.0	12.0	56.0	11.0	31.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	46.0		40.0	6.0	46.0	5.0	29.0				
Max Q Clear Time (g_c+19.5), s	19.5	31.4		8.8	7.8	53.5	7.6	23.0				
Green Ext Time (p_c), s	0.0	6.2		1.5	0.0	0.0	0.0	2.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				43.3								
HCM 2010 LOS				D								

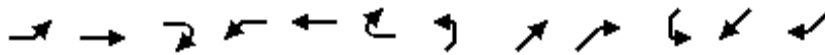
HCM 2010 Signalized Intersection Summary  
 1: King of Prussia Rd & Parking Drive/Matsonford Rd

04/09/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Future Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Number	3	8	18	7	4	14	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1853
Adj Flow Rate, veh/h	3	4	10	590	1	239	134	834	1	8	547	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	0
Cap, veh/h	413	178	444	633	3	623	288	921	1	141	641	567
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.50	0.50	0.36	0.36	0.00
Sat Flow, veh/h	1158	457	1142	1422	7	1601	1689	1841	2	661	1782	1575
Grp Volume(v), veh/h	3	0	14	590	0	240	134	0	835	8	547	0
Grp Sat Flow(s),veh/h/ln	1158	0	1599	1422	0	1608	1689	0	1844	661	1782	1575
Q Serve(g_s), s	0.2	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	1.0	25.5	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	25.2	25.5	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	622	633	0	625	288	0	922	141	641	567
V/C Ratio(X)	0.01	0.00	0.02	0.93	0.00	0.38	0.46	0.00	0.91	0.06	0.85	0.00
Avail Cap(c_a), veh/h	413	0	622	633	0	625	296	0	922	141	641	567
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.80	0.80	0.00
Uniform Delay (d), s/veh	22.9	0.0	17.0	28.6	0.0	19.8	18.8	0.0	20.6	37.6	26.6	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	20.8	0.0	0.4	1.2	0.0	14.1	0.6	11.1	0.0
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	0.1	0.0	0.4	25.2	0.0	7.7	3.6	0.0	30.2	0.4	20.0	0.0
LnGrp Delay(d),s/veh	22.9	0.0	17.0	49.4	0.0	20.1	19.9	0.0	34.7	38.2	37.7	0.0
LnGrp LOS	C		B	D		C	B		C	D	D	
Approach Vol, veh/h		17			830			969			555	
Approach Delay, s/veh		18.0			40.9			32.6			37.7	
Approach LOS		B			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		50.0		40.0	12.6	37.4		40.0				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		44.0		34.0	7.0	31.0		34.0				
Max Q Clear Time (g_c+I1), s		39.3		37.5	6.6	28.0		11.8				
Green Ext Time (p_c), s		2.4		0.0	0.0	1.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				36.6								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
 2: Radnor Chester Rd & King of Prussia Rd

04/09/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Future Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
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		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	798	0	61	444	1	426	7	151	33	39	52
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
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, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	353	772	690	80	793	2	282	3	685	51	57	41
Arrive On Green	0.43	0.43	0.00	0.58	0.58	0.58	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	950	1782	1591	705	1830	4	455	7	1540	0	129	93
Grp Volume(v), veh/h	8	798	0	61	0	445	433	0	151	124	0	0
Grp Sat Flow(s),veh/h/ln	950	1782	1591	705	0	1834	463	0	1540	222	0	0
Q Serve(g_s), s	0.5	39.0	0.0	0.0	0.0	13.7	0.0	0.0	5.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	13.7	39.0	0.0	39.0	0.0	13.7	40.0	0.0	5.4	40.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	353	772	690	80	0	795	285	0	685	149	0	0
V/C Ratio(X)	0.02	1.03	0.00	0.76	0.00	0.56	1.52	0.00	0.22	0.83	0.00	0.00
Avail Cap(c_a), veh/h	353	772	690	80	0	795	285	0	685	149	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.1	25.5	0.0	38.6	0.0	13.7	30.6	0.0	15.4	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	19.9	0.0	49.4	0.0	2.8	250.7	0.0	0.2	30.9	0.0	0.0
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	0.3	41.5	0.0	4.7	0.0	12.0	48.4	0.0	4.2	5.7	0.0	0.0
LnGrp Delay(d),s/veh	23.1	45.4	0.0	88.0	0.0	16.5	281.3	0.0	15.6	52.5	0.0	0.0
LnGrp LOS	C	F		F		B	F		B	D		
Approach Vol, veh/h		806			506			584			124	
Approach Delay, s/veh		45.2			25.1			212.6			52.5	
Approach LOS		D			C			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		44.0		46.0		44.0		46.0				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		38.0		39.0		38.0		39.0				
Max Q Clear Time (g_c+I1), s		41.5		42.0		41.5		42.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				89.0								
HCM 2010 LOS				F								

HCM 2010 TWSC  
 3: King of Prussia Rd & Septa Driveway

04/09/2018

Intersection						
Int Delay, s/veh	5.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	76	85	409	17	54	988
Future Vol, veh/h	76	85	409	17	54	988
Conflicting Peds, #/hr	10	2	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	89	100	481	20	64	1162

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1808	510	0	0	518
Stage 1	508	-	-	-	-
Stage 2	1300	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353
Pot Cap-1 Maneuver	~ 88	535	-	-	976
Stage 1	608	-	-	-	-
Stage 2	258	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	~ 80	527	-	-	962
Mov Cap-2 Maneuver	156	-	-	-	-
Stage 1	559	-	-	-	-
Stage 2	256	-	-	-	-






















Approach	WB	NB	SB
HCM Control Delay, s	54.8	0	0.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	248	962
HCM Lane V/C Ratio	-	-	0.764	0.066
HCM Control Delay (s)	-	-	54.8	9
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	5.5	0.2

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 2010 Signalized Intersection Summary  
5: King of Prussia Rd & Raider Rd

04/09/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	42	272	0	60	24	299	101	14	1117	5
Future Volume (veh/h)	5	0	42	272	0	60	24	299	101	14	1117	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1800	1782	1800	1800	1782	1800
Adj Flow Rate, veh/h	5	0	43	280	0	62	25	308	104	14	1152	5
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
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	0	1	0	0	1	1
Cap, veh/h	59	21	310	400	0	345	143	1035	886	47	1013	4
Arrive On Green	0.23	0.00	0.23	0.23	0.00	0.23	0.04	0.58	0.58	0.03	0.57	0.57
Sat Flow, veh/h	68	92	1376	1385	0	1530	1714	1782	1526	1714	1773	8
Grp Volume(v), veh/h	48	0	0	280	0	62	25	308	104	14	0	1157
Grp Sat Flow(s),veh/h/ln	1535	0	0	1385	0	1530	1714	1782	1526	1714	0	1781
Q Serve(g_s), s	0.0	0.0	0.0	14.8	0.0	2.9	0.5	7.9	2.8	0.7	0.0	51.4
Cycle Q Clear(g_c), s	2.2	0.0	0.0	17.0	0.0	2.9	0.5	7.9	2.8	0.7	0.0	51.4
Prop In Lane	0.10		0.90	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	390	0	0	400	0	345	143	1035	886	47	0	1017
V/C Ratio(X)	0.12	0.00	0.00	0.70	0.00	0.18	0.17	0.30	0.12	0.30	0.00	1.14
Avail Cap(c_a), veh/h	419	0	0	427	0	374	194	1035	886	114	0	1017
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.9	0.0	0.0	33.4	0.0	28.2	21.7	9.6	8.5	42.9	0.0	19.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	4.7	0.0	0.2	0.6	0.7	0.3	3.4	0.0	74.1
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	1.7	0.0	0.0	11.6	0.0	2.3	0.7	7.3	2.2	0.7	0.0	82.4
LnGrp Delay(d),s/veh	28.0	0.0	0.0	38.1	0.0	28.4	22.3	10.3	8.8	46.3	0.0	93.4
LnGrp LOS	C			D		C	C	B	A	D		F
Approach Vol, veh/h		48			342			437			1171	
Approach Delay, s/veh		28.0			36.3			10.6			92.8	
Approach LOS		C			D			B			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	57.2		25.3	8.3	56.4		25.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	46.0		21.0	5.0	46.0		21.0				
Max Q Clear Time (g_c+I1), s	2.7	9.9		4.2	2.5	53.4		19.0				
Green Ext Time (p_c), s	0.0	2.2		0.2	0.0	0.0		0.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				63.6								
HCM 2010 LOS				E								
<b>Notes</b>												

HCM 2010 TWSC  
6: King of Prussia Rd & Southern Driveway

04/09/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	419	2	2	1425
Future Vol, veh/h	4	4	419	2	2	1425
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	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	446	2	2	1516

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1967	224	0	0	448
Stage 1	447	-	-	-	-
Stage 2	1520	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	63	786	-	-	1123
Stage 1	617	-	-	-	-
Stage 2	201	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	63	786	-	-	1123
Mov Cap-2 Maneuver	63	-	-	-	-
Stage 1	616	-	-	-	-
Stage 2	201	-	-	-	-





















Approach	WB	NB	SB
HCM Control Delay, s	38.2	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	117	1123
HCM Lane V/C Ratio	-	-	0.073	0.002
HCM Control Delay (s)	-	-	38.2	8.2
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	0.2	0



HCM 2010 Signalized Intersection Summary  
 7: I-476 Off Ramp/King of Prussia Rd & Lancaster Ave

04/09/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Future Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	110	1667	0	0	627	0	295	250	232	899	0	488
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	214	1623	0	0	1271	591	1393	277	248	858	0	0
Arrive On Green	0.09	0.64	0.00	0.00	0.12	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1695	1513	3260	899	
Grp Volume(v), veh/h	110	1667	0	0	627	0	295	250	232	899	88.1	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1693	1515	1630	F	
Q Serve(g_s), s	3.5	53.0	0.0	0.0	18.8	0.0	6.3	15.9	16.7	24.0		
Cycle Q Clear(g_c), s	3.5	53.0	0.0	0.0	18.8	0.0	6.3	15.9	16.7	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	214	1623	0	0	1271	591	1393	277	248	858		
V/C Ratio(X)	0.51	1.03	0.00	0.00	0.49	0.00	0.21	0.90	0.94	1.05		
Avail Cap(c_a), veh/h	391	1623	0	0	1271	591	1393	277	248	858		
HCM Platoon Ratio	1.33	1.33	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.86	0.86	0.00	0.00	0.86	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.6	19.8	0.0	0.0	38.6	0.0	19.8	45.1	45.4	44.2		
Incr Delay (d2), s/veh	1.6	27.9	0.0	0.0	1.2	0.0	0.1	30.0	40.3	43.9		
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		
%ile BackOfQ(95%),veh/ln	3.0	54.9	0.0	0.0	13.7	0.0	5.1	14.8	14.9	9.4		
LnGrp Delay(d),s/veh	50.2	47.7	0.0	0.0	39.8	0.0	19.9	75.1	85.7	88.1		
LnGrp LOS	D	F			D		B	E	F	F		
Approach Vol, veh/h		1777			627			777				
Approach Delay, s/veh		47.8			39.8			57.3				
Approach LOS		D			D			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		58.0	52.0		12.1	45.9	29.0	23.0				
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0				
Max Q Clear Time (g_c+I1), s		55.5	8.8		6.0	21.3	26.5	18.7				
Green Ext Time (p_c), s		0.0	0.8		0.1	3.3	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			57.3									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary  
 8: I-476 SB Off Ramp & Lancaster Ave

04/09/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑		↵↵	↑↑	↵↵	↵		
Traffic Volume (veh/h)	1072	0	580	782	627	516		
Future Volume (veh/h)	1072	0	580	782	627	516		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1764	0	1800	1800	1818	1891		
Adj Flow Rate, veh/h	1105	0	598	806	646	0		
Adj No. of Lanes	3	0	2	2	2	1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	1	0	1	1	1	1		
Cap, veh/h	2059	0	691	2328	767	367		
Arrive On Green	0.43	0.00	0.42	1.00	0.23	0.00		
Sat Flow, veh/h	5134	0	3326	3510	3359	1607		
Grp Volume(v), veh/h	1105	0	598	806	646	0		
Grp Sat Flow(s),veh/h/ln	1606	0	1663	1710	1679	1607		
Q Serve(g_s), s	18.8	0.0	18.0	0.0	20.2	0.0		
Cycle Q Clear(g_c), s	18.8	0.0	18.0	0.0	20.2	0.0		
Prop In Lane		0.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2059	0	691	2328	767	367		
V/C Ratio(X)	0.54	0.00	0.87	0.35	0.84	0.00		
Avail Cap(c_a), veh/h	2059	0	847	2328	916	438		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.75	0.75	1.00	0.00		
Uniform Delay (d), s/veh	23.4	0.0	30.7	0.0	40.5	0.0		
Incr Delay (d2), s/veh	1.0	0.0	6.2	0.3	6.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.3	0.0	12.9	0.2	15.2	0.0		
LnGrp Delay(d),s/veh	24.4	0.0	36.9	0.3	46.7	0.0		
LnGrp LOS	C		D	A	D			
Approach Vol, veh/h	1105			1404	646			
Approach Delay, s/veh	24.4			15.9	46.7			
Approach LOS	C			B	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		30.1	27.9	52.0				79.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+11), s		22.7	20.5	21.3				2.5
Green Ext Time (p_c), s		1.4	1.3	6.6				6.6
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			25.2					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary  
 9: Hillside Circuit & Lancaster Ave

04/09/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕		↖	↕↕	↗		↕	↗			
Traffic Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Future Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.90			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1219	1871	16	6	765	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1227	2795	24	23	1616	752	18	6	19			
Arrive On Green	0.75	1.00	1.00	0.01	0.48	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3342	29	1714	3386	1575	1301	434	1375			
Grp Volume(v), veh/h	1219	919	968	6	765	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1375			
Q Serve(g_s), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1227	1376	1443	23	1616	752	24	0	19			
V/C Ratio(X)	0.99	0.67	0.67	0.26	0.47	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1227	1376	1443	109	1616	752	110	0	87			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	13.9	0.0	0.0	53.7	19.4	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	6.3	0.2	0.2	5.6	1.0	0.0	3.3	0.0	2.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	20.4	0.2	0.2	0.4	12.7	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	20.1	0.2	0.2	59.3	20.4	0.0	56.9	0.0	56.0			
LnGrp LOS	C	A	A	E	C		E		E			
Approach Vol, veh/h		3106			771			6				
Approach Delay, s/veh		8.0			20.7			56.6				
Approach LOS		A			C			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.5	97.0			46.0	57.5		6.5				
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	80.0			40.0	46.0		6.0				
Max Q Clear Time (g_c+12.5), s	6.0	2.5			42.4	19.3		2.7				
Green Ext Time (p_c), s	0.0	29.0			0.0	5.6		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			10.6									
HCM 2010 LOS			B									
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Radnor Chester Rd

04/09/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Future Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	126	1234	98	208	1163	132	86	222	148	431	470	226
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
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, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	221	1270	101	213	1399	624	139	312	218	307	828	395
Arrive On Green	0.06	0.40	0.40	0.08	0.42	0.42	0.24	0.24	0.24	0.08	0.37	0.37
Sat Flow, veh/h	1706	3196	253	1664	3352	1496	368	1287	898	1689	2221	1061
Grp Volume(v), veh/h	126	656	676	208	1163	132	219	0	237	431	357	339
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1118	0	1435	1689	1690	1591
Q Serve(g_s), s	4.3	37.8	38.0	7.7	31.0	5.6	14.3	0.0	15.0	8.0	16.8	17.0
Cycle Q Clear(g_c), s	4.3	37.8	38.0	7.7	31.0	5.6	18.6	0.0	15.0	8.0	16.8	17.0
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	221	677	694	213	1399	624	322	0	348	307	630	593
V/C Ratio(X)	0.57	0.97	0.97	0.98	0.83	0.21	0.68	0.00	0.68	1.41	0.57	0.57
Avail Cap(c_a), veh/h	221	677	694	213	1399	624	433	0	488	307	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.8	29.6	29.6	24.3	26.0	18.6	35.7	0.0	34.3	34.8	24.9	25.0
Incr Delay (d2), s/veh	3.5	28.0	28.3	54.9	5.9	0.8	2.7	0.0	2.3	201.1	0.8	0.9
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	4.0	30.8	31.6	13.9	21.8	4.4	10.0	0.0	10.2	39.3	12.6	12.1
LnGrp Delay(d),s/veh	25.3	57.6	57.9	79.1	31.9	19.4	38.4	0.0	36.7	236.0	25.7	25.9
LnGrp LOS	C	E	E	E	C	B	D		D	F	C	C
Approach Vol, veh/h		1458			1503			456			1127	
Approach Delay, s/veh		54.9			37.3			37.5			106.2	
Approach LOS		D			D			D			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	44.7		42.3	11.0	46.7	13.0	29.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	30	29.0		46.0	5.0	31.0	7.0	33.0				
Max Q Clear Time (g_c+110), s	30	40.3		19.3	6.8	33.5	10.5	20.6				
Green Ext Time (p_c), s	0.0	0.0		4.6	0.0	0.0	0.0	2.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				60.1								
HCM 2010 LOS				E								

**RESOLUTION NO. 2018-41**

**A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE  
COUNTY, PENNSYLVANIA, AUTHORIZING MELIORA  
DESIGN TO PROVIDE STORMWATER ANALYSIS AND  
GREEN INFRASTRUCTURE DESIGN FOR PROJECTS  
UPSTREAM OF THE NORTH WAYNE FIELD BASIN**

*WHEREAS*, the Radnor Township Board of Commissioners requested during the 2018 Budget process that stormwater management projects, upstream of the North Wayne Field Basin be evaluated.

*WHEREAS*, Meliora Design, Incorporated, has submitted a cost proposal for stormwater analysis and green infrastructure design, for projects upstream of the North Wayne Field Basin, in the amount of \$48,980

*NOW, THEREFORE*, be it *RESOLVED* by the Board of Commissioners of Radnor Township does hereby authorize Meliora Design, Incorporated, to Provide Stormwater Analysis and Green Infrastructure Design for Projects Upstream of the North Wayne Field Basin, at a cost of \$48,980.

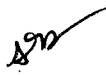
*SO RESOLVED* this 14th day of May, A.D., 2018

**RADNOR TOWNSHIP**

By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

ATTEST: \_\_\_\_\_  
Robert A. Zienkowski  
Manager/Secretary

**Radnor Township**  
**PROPOSED LEGISLATION**

DATE: April 16<sup>th</sup>, 2018  
TO: Radnor Township Board of Commissioners  
FROM: Stephen F. Norcini, P.E., Township Engineer   
CC: Robert A. Zienkowski, Township Manager  
William M. White, Assistant Township Manager/Finance Director

LEGISLATION: **Resolution #2018-41: Authorizing Meliora Design to Provide Stormwater Analysis and Green Infrastructure Design for Projects Upstream of the North Wayne Field Basin**

---

LEGISLATIVE HISTORY: Currently, the North Wayne Field Basin is in the design phase for cleaning and repair. I anticipate this project bidding shortly. During the budget process last year, the Board of Commissioners requested that projects upstream of the North Wayne Field Basin be evaluated, to possibly reduce stormwater runoff to that facility. The proposal before the Board of Commissioners is to provide services for this purpose.

PURPOSE AND EXPLANATION: Meliora Design, Incorporated, has submitted a proposal (please see attached) to analyze projects to reduce runoff to the North Wayne Field Basin. Meliora will perform infiltration testing, meet with the Commissioners, staff, and the residents, and ultimately provide design for five projects.

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners approval, Meliora Design, Incorporated will complete the work within 70 days. At that point, meetings with the various stakeholders will be scheduled. If the Board of Commissioners wishes to implement any or all of these projects, staff would initiate the bidding process.

FISCAL IMPACT: The cost proposed for this work is \$48,980, which will be funded by the 04 Stormwater Fund. The proposal is within the budgeted amount listed in the budget.

**Recommendation: Staff respectfully requests that the Board of Commissioners authorize Meliora Design to Provide Stormwater Analysis and Green Infrastructure Design for Projects Upstream of the North Wayne Field Basin, at a cost of \$48,980.**

Enclosure: Meliora Design, Incorporated Proposal

April 16, 2018

Mr. Stephen F. Norcini  
Township Engineer  
Radnor Township  
301 Iven Avenue  
Wayne, PA 19087

RE: North Wayne Basin – Stormwater Analysis and Green Infrastructure Design Documentation

Dear Mr. Norcini:

Meliora Design is pleased to submit this proposal to provide Professional Design and Consulting Services for the North Wayne Basin Stormwater Analysis and Green Infrastructure Design Documentation. This work effort will identify and evaluate five (5) viable Green Infrastructure projects in the North Wayne Basin drainage area, and develop these designs to a Design Development, or pre-Construction document level.

## Project Understanding and Work Tasks

Previous work efforts by CH2 provided a high level hydrologic analysis of the flooding conditions downstream of the North Wayne Basin, and evaluated several scenarios for stormwater management options. This effort will focus on identifying and developing viable, effective, and constructible Green Infrastructure (GI) solutions upstream of the North Wayne Basin. We will provide a detailed analysis of the volume, flow rate, and pollutant reduction benefits of these GI measures within the drainage area to the North Wayne Basin. This study will not focus on demonstrating flood reductions through models but instead the use of GI practices to provide a downstream reduction in stormwater runoff volume. Upon Township approval, five Green Infrastructure projects will be documented to a "Design Development" level including the following tasks:

1. Brief review of CH2 Analysis to understand previous works in the study area.
2. Compilation of Drainage Area Base Maps to include existing utilities based on Township information and PA One Call documents, as well as right-of-way information, soils, etc.
3. Site Visits to evaluate opportunities and constraints, and to identify potential GI locations, types, and sizes.
4. Quantification of stormwater benefits (volume reduction, flow rate reduction into basin, and Pollutant Reduction benefit for PRP). Development of initial Concept Costs.
5. Meeting with Radnor Township to review the findings and recommendations.
6. Infiltration testing at up to five locations.
7. Design Documentation level plans for five GI installations.
8. Meeting with Township to review documentation.
9. Two Public Meetings including powerpoint presentation for public documentation.

If five feasible GI projects cannot be identified, work will be billed on a Time and Materials not to exceed basis.

### Tangible Work Products:

- Working base to include utilities, ROWs, soils, etc.
- Site evaluation GI opportunities
- Quantified stormwater benefits (volume reduction, flow rate reduction into basin, and Pollutant Reduction benefits) for PRP for each GI project.

- Two (2) Township meetings
- Design Documentation level plans for five (5) GI projects, suitable for survey confirmation and Construction Documentation (not in this scope).

All work products will be provided in hard copy and digital format.

We appreciate the opportunity to undertake this effort. If you have any questions or concerns, we can be reached at 610-933-0123, or MicheleA@Melioradesign.com and March@Melioradesign.com.

Sincerely yours,



Michele C. Adams, PE, LEED AP  
Principal



Marc B. Henderson, PE  
Project Manager



Radnor Township North Wayne Green Infrastructure Feasibility and Design  
 Meliora Detailed Fee Estimate  
 Prepared for Steve Norcini  
 April 16, 2018

Meliora Design - Fee Estimate - Detailed

Title	Principal	Senior Engineer	Water Resources Engineer	Total Hours	Total Fee
Billing Rate	\$195.00	\$135.00	\$95.00		
<b>1 Green Infrastructure Feasibility Analysis and Design</b>					
				0	\$ -
Brief review of previous study within proposed area	2	4	4	10	\$ 1,310
Compilation of base map to include existing utilities (One Call) and conditions		4	16	20	\$ 2,060
Site Visits to evaluate opportunities and constraints; Identify potential GI locations, types, and sizes.		16	16	32	\$ 3,680
Quantification of stormwater volume reduction, peak rate reduction from sub-watershed, and pollutant reduction for identified GI opportunities. Develop initial Concept cost estimate for construction.	4	16	32	52	\$ 5,980
Two (2) Meetings with Township to review opportunities and constraints, and proposed GI locations, sizes, construction costs, and recommendations.	4	8	4	16	\$ 2,240
Coordination of Infiltration Testing Five (5) locations			8	8	\$ 760
Design Documentation of five (5) GI installations.	8	40	120	168	\$ 18,360
Public Meetings (2)	4	8		12	\$ 1,860
				0	\$ -
				0	\$ -
<b>Green Infrastructure Feasibility Analysis and Design Hours</b>	<b>22</b>	<b>96</b>	<b>200</b>	<b>318</b>	
<b>Green Infrastructure Feasibility Analysis and Design Total</b>	<b>\$ 4,290</b>	<b>\$ 12,960</b>	<b>\$ 19,000</b>		<b>\$ 36,250</b>
<b>Project Hours Total</b>	<b>22</b>	<b>96</b>	<b>200</b>	<b>318</b>	
<b>Project Labor Total</b>	<b>\$ 4,290</b>	<b>\$ 12,960</b>	<b>\$ 19,000</b>		<b>\$ 36,250</b>
<b>Reimbursables</b>					
	Expense Estimated at	2%	of fee (includes mileage, printing, etc.)		\$ 730
<b>Subconsultants</b>					
	Geotechnical Investigation				\$ 12,000
	<b>Subconsultants Subtotal</b>				<b>\$ 12,000</b>
<b>Total Fee</b>					<b>\$ 48,980</b>

**RESOLUTION NO. 2018-40**

**A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE  
COUNTY, PENNSYLVANIA, AUTHORIZING MELIORA  
DESIGN TO PROVIDE BASIN RETROFIT  
EVALUATIONS, AS PART OF THE TOWNSHIP'S MS4  
POLLUTION REDUCTION PLAN**

*WHEREAS*, the Pennsylvania Department of Environmental Protection mandates that municipalities, including Radnor Township, comply with the Municipal Separate Storm Sewer System (MS4) requirements.

*WHEREAS*, as part of said compliance, stream sediment loading must be reduced

*WHEREAS*, a Pollution Reduction Plan (PRP) was created to conform with the DEP requirements

*WHEREAS*, as part of the PRP, existing stormwater management basins are to be evaluated for retrofit to reduce sediment loading

*WHEREAS*, Meliora Design, Incorporated, has submitted a cost proposal for basin retrofit evaluation for a cost of \$34,045

*NOW, THEREFORE*, be it *RESOLVED* by the Board of Commissioners of Radnor Township does hereby authorize Meliora Design, Incorporated, to Provide Basin Retrofit Evaluations, as Part of the Township's MS4 Pollution Reduction Plan, for \$34,045.

*SO RESOLVED* this 14th day of May, A.D., 2018

**RADNOR TOWNSHIP**

By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

ATTEST: \_\_\_\_\_  
Robert A. Zienkowski  
Manager/Secretary

**Radnor Township**  
**PROPOSED LEGISLATION**

DATE: April 16<sup>th</sup>, 2018  
TO: Radnor Township Board of Commissioners  
FROM: Stephen F. Norcini, P.E., Township Engineer *SN*  
CC: Robert A. Zienkowski, Township Manager  
William M. White, Assistant Township Manager/Finance Director

LEGISLATION: **Resolution #2018-40: Authorizing Meliora Design to Provide Basin Retrofit Evaluations, as Part of the Township's MS4 Pollution Reduction Plan**

---

LEGISLATIVE HISTORY: As part of the Department of Environmental Protection's (DEP) MS4 requirements, Radnor Township was required to submit a Pollution Reduction Plan (PRP) to reduce sediment loading in various streams within the Township. In 2017, staff came before the Board of Commissioners to present the PRP plan, which was approved, and subsequently submitted to the DEP.

PURPOSE AND EXPLANATION: Based on the submitted approved PRP Plan, we are to evaluate existing stormwater management basins in the Township for possible retrofit. The proposal before the Board of Commissioners is to authorize Meliora Design, Incorporated, to evaluate nine existing basins as potential candidates for retrofit. Their proposal includes meeting with Commissioners and staff, Homeowner's Associations that own the basins, determining basin ownership, field assessments, and sketches. The proposal is attached for your information.

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners approval, Meliora Design, Incorporated will complete the work within 70 days. At that point, meetings with the various stakeholders will be scheduled. As noted in the SW Fund five-year plan, the basin retrofit evaluation is to occur in 2018, with implementation in 2019.

FISCAL IMPACT: The cost proposed for this work is \$34,045, which will be funded by the 04 Stormwater Fund. The proposal is within the budgeted amount listed in the budget.

**Recommendation: Staff respectfully requests that the Board of Commissioners authorize Meliora Design to Provide Basin Retrofit Evaluations, as Part of the Township's MS4 Pollution Reduction Plan, for \$34,045.**

Enclosure: Meliora Design, Incorporated Proposal

# MELIORA DESIGN

---

Civil, Water Resources, and Structural Engineering

Meliora (mel/ee/or/ah): Latin for "always better"

April 16, 2018

Mr. Stephen F. Norcini  
Township Engineer  
Radnor Township  
301 Iven Avenue  
Wayne, PA 19087

RE: Detention Basin Retrofit – Site Evaluations, Outreach, and Concept Documentation

Dear Mr. Norcini:

Meliora Design is pleased to submit this proposal to provide Professional Design and Consulting Services for the Concept Designs to retrofit existing detention basins.

## Project Understanding and Work Tasks

The Radnor Township PRP identifies nine (9) existing detention basins as potential retrofit candidates, and several additional basins have since been identified as potential candidates. This proposal includes the work effort associated with developing Concept Plans for fifteen (15) detention basins, including the following tasks:

1. Confirmation of basin parcel ownership (15 basins).
2. A Draft notification letter to basin owners, to be sent from Radnor Township to each property owner.
3. Site Visits to each basin to confirm existing conditions and feasibility for basin retrofit.
4. Meeting with Radnor Township to review the findings of the field assessments and identify basins that are feasible retrofit candidates.
5. Concept Designs for each basin identified as suitable for retrofitting, including proposed basin modifications, planting intent (height, color, etc.), revised PRP pollutant reduction benefit, and updated Concept Construction Cost. Plans will be developed based on existing basin construction plans (where available), or GIS topography and aerial photography when plans are not available. Upon approval from the Township, the Concept Designs for three of the most feasible basins will be completed to Construction Documentation level for bidding and construction.
6. Meeting with Township to review proposed Concept Plans, including recommendations for phasing.
7. Meeting with each HOA or property owner to present the proposed plan. We have assumed 12 HOA meetings, as three developments each have two basins.
8. Three Public Meetings related to the proposed basin retrofits and recommendations. We will develop a powerpoint presentation for use at the HOA and public meetings, and for the township web site.

For Tasks 5, 6, and 7, we have provided a Fee Estimate that includes fifteen basins. If all fifteen basins are not feasible retrofit candidates, work will be billed on a Time and Materials not to exceed basis.

### Tangible Work Products:

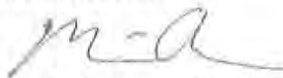
- Confirmation of basin ownership
- Draft owner notification letter
- Site evaluation of 15 basins

- Concept documentation for up to 15 basin retrofits, including updated PRP value, updated Concept Construction Estimate, and basin diagram/rendering to communicate proposed retrofit and planting aesthetic.
- Construction Documents for three (3) basins
- Two (2) Township meetings
- Three (3) Public Meetings
- Up to 12 HOA Presentations

All work products will be provided in hard copy and digital format.

We look forward to supporting Radnor Township in this next phase of the MS4 compliance effort and appreciate the opportunity to complete this project. If you have any questions or concerns, we can be reached at 610-933-0123, or [MicheleA@Melioradesign.com](mailto:MicheleA@Melioradesign.com) and [March@Melioradesign.com](mailto:March@Melioradesign.com).

Sincerely yours,



Michele C. Adams, PE, LEED AP  
Principal



Marc B. Henderson, PE  
Project Manager

Radnor Township MS4 - Basin Evaluation and Concept Confirmation  
 Mellora Detailed Fee Estimate  
 Prepared for Steve Norcini  
 April 16, 2018

Mellora Design - Fee Estimate - Detailed								
Title	Principal	Senior Engineer	Water Resources Engineer	Landscape Architect	Cad Technician	Total Hours	Total Fee	
Billing Rate	\$195.00	\$135.00	\$95.00	\$105.00	\$85.00			
<b>1 Basin Evaluations</b>						0	\$ -	
Draft letter for property owner notification			1			1	\$ 95	
Confirm parcel ownership of basins (assume 15)			8			8	\$ 760	
Coordination of material for site evaluations (base plans, etc.)		2	8			10	\$ 1,030	
Site visit and evaluation; written documentation, assume 4 basins per day; total 15 basins in 4 days			32		32	64	\$ 5,760	
Review basin assessment findings with Township and provide recommendations for retrofit candidates	4	8	4			16	\$ 2,240	
Concept Design, revised construction cost, and PRP quantification for 12 basins. Construction documentation for three (3) basins (Cornerstone and Haviland).		8	90		60	158	\$ 14,730	
Review Concept Design with Township		4	4			8	\$ 920	
Presentation to each HOA - assume 12 HOAs, approx. 2 hours each		26	26			52	\$ 5,980	
Public Meetings (3)	4	8				12	\$ 1,860	
						0	\$ -	
<b>Basin Evaluations Hours</b>	<b>8</b>	<b>56</b>	<b>173</b>	<b>0</b>	<b>92</b>	<b>329</b>		
<b>Basin Evaluations Total</b>	<b>\$ 1,560</b>	<b>\$ 7,560</b>	<b>\$ 16,435</b>	<b>\$ -</b>	<b>\$ 7,820</b>		<b>\$ 33,375</b>	
<b>Project Hours Total</b>	<b>8</b>	<b>56</b>	<b>173</b>	<b>0</b>	<b>92</b>	<b>329</b>		
<b>Project Labor Total</b>	<b>\$ 1,560</b>	<b>\$ 7,560</b>	<b>\$ 16,435</b>	<b>\$ -</b>	<b>\$ 7,820</b>		<b>\$ 33,375</b>	
<b>Reimbursables</b>								
Expense Estimated at	2%	of fee (includes mileage, printing, etc.)					\$ 670	
<b>Total Fee</b>								<b>\$ 34,045</b>

---

# RADNOR TOWNSHIP

## ENGINEERING DEPARTMENT

---

### Memorandum

To: Radnor Township Board of Commissioners

From: Stephen F. Norcini, PE, Township Engineer *SFN*

CC: Robert A. Zienkowski, Township Manager  
William M. White, Assistant Township Manager/Finance Director

Date: May 9th, 2018

---

**Re: 111 Walnut Avenue, GP 18-022, Requesting a Waiver of 245-22 of the Radnor Township Stormwater Management Ordinance**

---

The applicant's engineer was before the Board of Commissioners at the regularly scheduled April 23<sup>rd</sup>, 2018 meeting, with a waiver request on behalf of the applicant. At that time, the Board of Commissioners tabled the request, asking the applicant to come back to the Board regarding what can be done in lieu of meeting the infiltration requirements of the Ordinance.

The applicant performed infiltration testing on the property, and the soils on site did not allow any infiltration. Due to this situation, the applicant is unable to meet the groundwater recharge (infiltration requirement) of the Township's Stormwater Management Ordinance. The 2005 Stormwater Management Ordinance states "*If the minimum of 0.50 inch of infiltration requirement cannot be achieved, a waiver from Section 405, Groundwater Recharge, would be required from the Municipality*". The applicant is proposing a bio-retention facility in lieu of the groundwater recharge system.

Enclosure: Review letter, grading permit application



# Gannett Fleming

*Excellence Delivered **As Promised***

**Date:** April 12, 2018

**To:** Stephen Norcini, P.E. – Township Engineer

**From:** Roger Phillips, PE

**RE:** 111 Walnut Avenue – Stormwater Waiver Request  
Grading Permit Application – GP 18-022

---

The applicant has submitted a grading permit for the removal of 129 SF of existing walkways, and the construction of a 468 SF building addition and 1,022 SF of patio and walkways in the rear of the home.

The applicant is requesting a waiver of §245-22 of the Township's Stormwater Management Ordinance which requires the maximizing of the ground water recharge capacity of the area being developed.

The applicant has performed percolation testing at two (2) locations on the site. The required infiltration is not feasible due to the infiltration testing results of zero inches per hour. Additionally, ground water was encountered at a depth of 5 feet from existing grade. The applicant is proposing a rain garden to provide volume reduction and achieve water quality requirements.

The applicant has requested to appear before the Board of Commissioners to request a waiver from the above-mentioned section of the Ordinance and the implementation of the above mentioned stormwater system.

The applicant has already received approval from the Historical Architecture Review Board for the proposed construction.

In addition to the waiver request, the applicant must address the following item(s) prior to the issuance of the Grading Permit:

1. The applicant must address the remaining grading permit review comments per the Gannett Fleming email dated April 10, 2018.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.

Roger A. Phillips, P.E.  
Senior Project Manager





April 5, 2018

Mr. Steve Norcini, PE  
Township Engineer  
Radnor Township  
301 Iven Avenue  
Wayne, PA 19087-5297

**RE: 111 Walnut Avenue  
Radnor Township, Delaware County**

**Our File # 17-266**

Dear Steve:

On behalf of Suraj and Jane Puttannia, we are requesting a waiver from sections §245-22, Groundwater Recharge of the Radnor Township Stormwater Management ordinance.

Percolation testing at the site performed as part of the application produced zero infiltration rates. In order to satisfy the requirements for water quality and volume control, a rain garden was designed for the lot. The rain garden provides the required volume reduction and provides the means to achieve the required water quality.

The improvements at 111 Walnut Avenue are under review as part of a grading permit submitted in March 2017. A flood study was conducted last fall and reviewed by Roger. The Zoning Board ruled on the issue under Appeal #3004. The applicant has also been before the Historic Commission and received their approval for renovations.

I have included a copy of the plans with this waiver request. Please let me know if you have any questions or need any additional information.

Very truly yours,  
**MOMENEE, INC.**

*Linda R. Layer*

Linda R. Layer, P.E.

Enclosures  
17-266 L02\_Waiver Request'

111 WHIMBY  
GP 18-022

**Impervious Surface**

Complete the impervious surface table (required).

**Zoning**

Complete All Yellow Fields							
Cover Type	Existing Area (square feet)	Percentage of existing impervious surface area of your lot	Area of Impervious Removed (square feet)	Area of Added Impervious Cover (square feet)	Total Area (square feet)	Percentage of total impervious surface of your lot as proposed	
Building	2,237 SF				468 SF		2,705 SF
Walkway/sidewalk	304 SF			129 SF	609 SF		784 SF
Patio, decks					413 SF		413 SF
Driveway	604 SF						604 SF
Other							
<b>Total</b>	<b>3,145 SF</b>	<b>11.44 %</b>	<b>129 SF</b>	<b>1,490 SF</b>	<b>4,506 SF</b>	<b>12.96 %</b>	

Place a check in the box of the Zoning District applicable to your lot. (required)

Zoning Table							
Zoning District	Maximum Impervious Cover (%)		Zoning District	Maximum Impervious Cover (%)		Zoning District	Maximum Impervious Cover (%)
R-1	22		CO-2,3 stories	50		GH-CR	95
R-2	30	X	C-1	60		GH-BC	50
R-3	35		C-2	70		GH-OS	15
R-4	40		C-3	65		WBOD	NA
R-5 Semi/2 family detached	40		PI	45		PB	55
R-5 Multi Dwelling	36		PA	50		PLO	55
R-6	70		GH-N	60		FC	NA
R-1A	30		GH-GA	80		PLU	45

**Submission Requirements**

For all projects:

1. Completed Application
2. Plan requirements
  - a. Scale
  - b. Tree protection fence (if applicable)
  - c. Erosion & Sedimentation Control
  - d. All existing and proposed structures, with dimensions
  - e. All impervious surfaces
  - f. Retaining wall height if over 4' in height (if applicable)
  - g. Location of utilities
  - h. Property lines with metes and bounds
  - i. Location of onsite sewer system (if applicable)
  - j. Trees (if within 25' of construction disturbance)
    - i. Location of all trees over 6" DBH
    - ii. DBH of all trees over 6" DBH
    - iii. Common and Latin name of trees
    - iv. Size and type of compensatory trees (if applicable)

For all projects that have greater than 500 square feet of new or additional impervious coverage, the following is also required:

3. Plan Requirements
  - a. Existing and proposed 2' contours
  - b. Zoning data
  - c. Calculated 100 year flood plain
  - d. Signed and sealed by a Pennsylvania registered Professional Engineer or Land Surveyor
4. Ground water recharge calculations
5. Stormwater Management calculations

<b><u>To be Completed by Radnor Township</u></b>	
<b>Submission Date:</b>	<u>3/5/10</u>
<b>Final Approval Date:</b>	_____
<b>Permit Number:</b>	<u>18-022</u>
<b>Shade Tree Approval Date:</b>	_____
<b>Zoning Approval:</b>	_____
	<b>Zoning Officer</b>
<b>Grading Permit Approval:</b>	_____
	<b>Township Engineer</b>

TO BE COMPLETED BY APPLICANT

Property Owner(s) Suraj and Jane Puttannia c/o Aaron Boyd, Gardner/Fox Architects

Address of Property 111 Walnut Avenue Wayne, PA 19087

Phone Number 610-525-8305 x 267 Email aboyd@gardnerfox.com

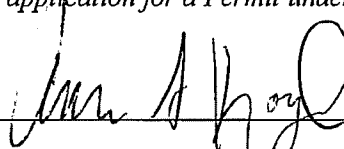
Engineer/Surveyor Kevin Momenee, PE, PLS Momenee Associates, Inc.

Phone Number 610-527-3030 Email llayer@momenee.com

Brief Description of the Project: Construction of a new building addition and related site improvements

New Patio and Rain Garden to manage stormwater runoff

*The undersigned hereby makes application for a Permit under Chapter 175 and any amendments there of:*

Signature of Applicant  3/14/2018  
AARON S. BOYD, GARDNER/FOX

**Please note the following requirements:**

1. Submit five (5) copies of the plan set with your application
2. Plans are to be no larger than 24" x 36", and shall be folded
3. Shade Tree Commission: If your project meets any of the following requirements, you will be required to attend the Shade Tree Commission Meeting, as well as submit an additional 8 (eight) sets of plans:
  - a. Any clearing activity which proposes the removal of six (6) or more trees with a Diameter at Breast Height (DBH) of 6" or greater
  - b. Grading in excess of 200 cubic yards, excavation in excess of 60 cubic yards
  - c. Grading for parking lots of 5 or more cars
  - d. Removal of a Heritage Tree (30"DBH or greater) in a non-emergency situation.
  - e. Forestry management and practices
  - f. Swimming pool permits
  - g. The Shade Tree Commission shall review, if directed by the Township Engineer, applications submitted to the Township for the following: Demolition permits on any building lot whereby the proposed work may impact or cause the removal of trees; and Commercial tree removal.
4. Stormwater Calculations:
  - a. Replacement of impervious surface is considered "new" impervious
  - b. There is no credit for the removal of impervious surface







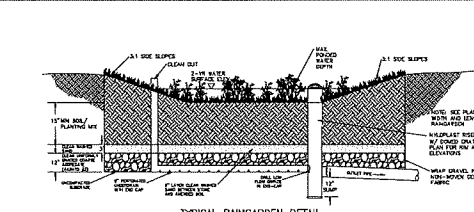
**OPERATION AND MAINTENANCE SPECIFICATIONS**

1. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
2. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
3. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
4. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
5. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
6. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
7. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
8. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
9. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
10. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.

**STORMWATER MANAGEMENT FACILITY MAINTENANCE PLAN**

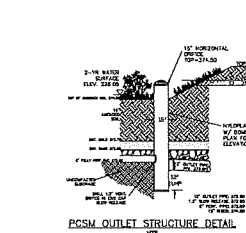
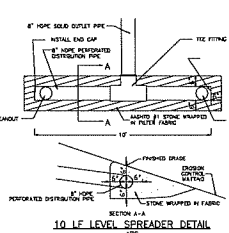
The stormwater management facility shall be maintained in accordance with the design and construction specifications. The operator shall maintain the facility at all times to be in accordance with the design and construction specifications.

1. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
2. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
3. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
4. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
5. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
6. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
7. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
8. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
9. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
10. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.



**NTS**

ITEM	DESCRIPTION	QUANTITY	UNIT
1	1.5\"/>		



**OPERATION AND MAINTENANCE NOTES FOR RAIN GARDENS**

1. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
2. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
3. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
4. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
5. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
6. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
7. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
8. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
9. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
10. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.

**CONSTRUCTION SPECIFICATIONS**

1. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
2. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
3. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
4. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
5. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
6. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
7. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
8. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
9. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.
10. THE OPERATOR SHALL MAINTAIN THE RAIN GARDEN AT ALL TIMES TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.

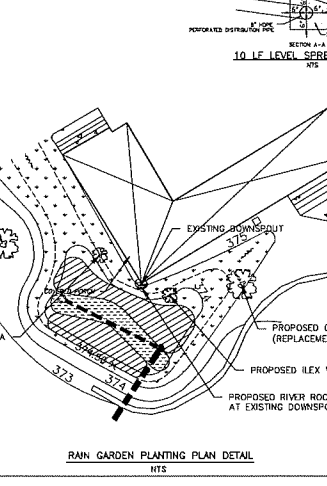
**PROPOSED MAGNOLIA VIRGINIANA (REPLACEMENT TREE)**

**PROPOSED CORNUS SERICEA**

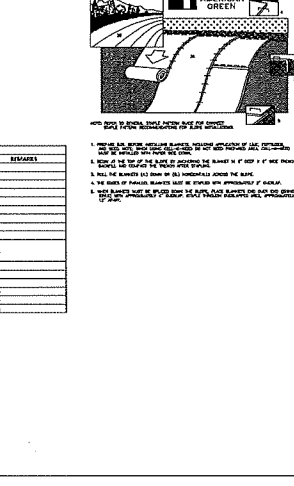
**PROPOSED CORNUS FLORIDA (REPLACEMENT TREE)**

**PROPOSED ILEX VERTICILLATA**

**PROPOSED RIVER ROCK AT EXISTING DOWNSPOUT LOCATION**



PLANT	QTY	REFERENCE	COMMENTS	SIZE	REMARKS
MAGNOLIA VIRGINIANA	1	1	1	12\"/>	
CORNUS SERICEA	1	1	1	12\"/>	
CORNUS FLORIDA	1	1	1	12\"/>	
ILEX VERTICILLATA	1	1	1	12\"/>	



**CONSTRUCTION DETAILS**

**111 WALNUT AVENUE**

**PROPOSED CONSTRUCTION**

**PROPOSED PLANTING**

**PROPOSED ROCK**

**MIMMENSEE, INC.**

**111 WALNUT AVENUE**

**PROPOSED CONSTRUCTION**

**PROPOSED PLANTING**

**PROPOSED ROCK**

**FILE NO: 17-268**

**SHEET 4 of 4**

**DATE: FEBRUARY 26, 2019**

**SCALE: AS NOTED**



Discussion and possible  
motion to have SWMAC  
deliberate modifications to  
the Banbury/Francis  
Stormwater Project with  
input from the neighbors in  
that area

Discussion: *Wayne*  
Business District Cleaning

**RESOLUTION NO. 2018-58**  
**A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE**  
**COUNTY, PENNSYLVANIA, REJECTING THE SOLE**  
**SEALED BID FOR THE WAYNE BUSINESS DISTRICT**  
**CLEANING CONTRACT, CONTRACT #B-18-002**

*WHEREAS*, Sealed bids were received for the above referenced project, of the funding was discussed at the April 23<sup>rd</sup>, 2018, regularly scheduled Board of Commissioners meeting.

*WHEREAS*, It was determined by staff, and with concurrence of the Solicitor, that the sole bidder for the project, GDI Services, Incorporated, submitted a non-responsive bid

*NOW, THEREFORE*, be it *RESOLVED* by the Board of Commissioners of Radnor Township does hereby Reject the Sole Sealed Bid for the Wayne Business District Cleaning Contract, Contract #B-18-002, from GDI Services, Incorporated.

*SO RESOLVED* this 14<sup>th</sup> Day of May, A.D., 2018

**RADNOR TOWNSHIP**

By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

ATTEST: \_\_\_\_\_  
Robert A. Zienkowski  
Manager/Secretary

**Radnor Township**  
**PROPOSED LEGISLATION**

DATE: May 8, 2018

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer *sfN*

CC: Robert A. Zienkowski, Township Manager  
William M. White, Assistant Township Manager/Finance Director

LEGISLATION: **Resolution #2018-58:** Rejecting the Sole Sealed Bid for the Wayne Business District Cleaning Contract, Contract #B-18-002

---

LEGISLATIVE HISTORY: Sealed bids were received for the above referenced project, of the funding was discussed at the April 23<sup>rd</sup>, 2018, regularly scheduled Board of Commissioners meeting.

PURPOSE AND EXPLANATION: It was determined by staff, and with concurrence of the Solicitor, that the sole bidder for the project, GDI Services, Incorporated, submitted a non-responsive bid.

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners approval of the Resolution, the bid will be rejected and the bidder notified.

FISCAL IMPACT: There is no fiscal impact associated with rejecting the bid.

Recommendation: *I respectfully request that the Board of Commissioners* Reject the Sole Sealed Bid for the Wayne Business District Cleaning Contract, Contract #B-18-002, from GDI Services, Incorporated.

**RESOLUTION NO. 2018-55**  
**A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE**  
**COUNTY, PENNSYLVANIA, AWARDED CONTRACT #B-**  
**18-003, REPAIR OF THE PEDESTRIAN TRUSS BRIDGE IN**  
**SKUNK HOLLOW PARK**

*WHEREAS*, the pedestrian truss bridge over Little Darby Creek, in Skunk Hollow Park, is in need of repair

*WHEREAS*, plans, specifications, and bidding documents have been created, in order to make repairs to the pedestrian bridge

*WHEREAS*, sealed bids were received based upon the above referenced bidding documents

*NOW, THEREFORE*, be it *RESOLVED* by the Board of Commissioners of Radnor Township does hereby award of Contract #B-18-003, Repair of the Pedestrian Truss Bridge in Skunk Hollow Park, to Professional Construction Contractors in the amount of \$23,940.

*SO RESOLVED* this 14<sup>th</sup> day of May, A.D., 2018

**RADNOR TOWNSHIP**

By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

ATTEST: \_\_\_\_\_  
Robert A. Zienkowski  
Manager/Secretary

# Radnor Township

## PROPOSED LEGISLATION

**DATE:** May 7, 2018

**TO:** Radnor Township Board of Commissioners

**FROM:** Stephen F. Norcini, P.E., Township Engineer 

**CC:** Robert A. Zienkowski, Township Manager  
William R. White, Assistant Township Manager & Finance Director  
Tammy L. Cohen, Director of Recreation and Community Programming  
Stephen J. McNelis, Interim Director of Public Works

**LEGISLATION:** **Resolution #2018-55 - Awarding Contract #B-18-003, Repair of the Pedestrian Truss Bridge in Skunk Hollow Park**

---

**LEGISLATIVE HISTORY:** The Board of Commissioners authorized the receipt of sealed bids for this project on March 12<sup>th</sup>, 2018, via Resolution 2018-34.

**PURPOSE AND EXPLANATION:** Located in Skunk Hollow Park, the Pedestrian Bridge over Little Darby Creek has been damaged for some time. After a structural investigation, the number of pedestrians that may cross has been limited, and signs posted to that affect. Structural repair drawings have been prepared by Meliora Design, Incorporated, with the other documents prepared by Engineering Department staff. Sealed bids were received through Penn BID, as follows:

1. Professional Construction Contractors	\$23,940
2. General Civil Company	\$68,660

**Implementation Schedule:** Pending Board of Commissioners authorization, the contractor will be notified. Upon receipt of the appropriate bonds, a Notice To Proceed will be issued. It is anticipated that the work will be completed in ninety days.

**Fiscal Impact:** This work will be funded by account #5180901H-48113, Skunk Hollow Improvements.

**Recommended Action:** *I respectfully request the Board of Commissioners award of Contract #B-18-003, Repair of the Pedestrian Truss Bridge in Skunk Hollow Park, to Professional Construction Contractors in the amount of \$23,940.*

**RESOLUTION NO. 2018-56**

**A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE  
COUNTY, PENNSYLVANIA, AUTHORIZING MELIORA  
DESIGN TO PROVIDE DESIGN SERVICES AND BIDDING  
DOCUMENTS FOR THE HARFORD TRAIL**

*WHEREAS*, there is need for the re-establishment of a path from the Radnor Elementary School to Harford Park and the Creutzberg Center

*WHEREAS*, design and bidding documents are required to re-establish a path

*WHEREAS*, Meliora Design, Incorporated, has submitted a cost proposal to provide the aforementioned design services and bidding documents

*WHEREAS*, Meliora Design, Incorporated, has submitted a cost proposal said work in the amount of \$21,220

*NOW, THEREFORE*, be it *RESOLVED* by the Board of Commissioners of Radnor Township does hereby authorize Meliora Design, Incorporated, to Provide Design Services and Bidding Documents for the Harford Trail, in the amount of \$21,220

*SO RESOLVED* this 14<sup>th</sup> day of May, A.D., 2018

**RADNOR TOWNSHIP**

By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

ATTEST: \_\_\_\_\_  
Robert A. Zienkowski  
Manager/Secretary

**Radnor Township**  
**PROPOSED LEGISLATION**

DATE: April 16<sup>th</sup>, 2018  
TO: Radnor Township Board of Commissioners  
FROM: Stephen F. Norcini, P.E., Township Engineer *SFN*  
CC: Robert A. Zienkowski, Township Manager  
William M. White, Assistant Township Manager/Finance Director

LEGISLATION: **Resolution #2018-56: Authorizing Meliora Design, Incorporated to Provide Design and Bidding Documents for the Harford Trail**

---

LEGISLATIVE HISTORY: This project was approved as part of the Bond Issue.

PURPOSE AND EXPLANATION: Previously, pedestrians had the ability to access Harford Park and the Creutzberg Center via a path/driveway that went from the Radnor Elementary School into the Park. This allowed a person to access the Park and Creutzberg Center from the Reginal Rail Station, and from various surrounding neighborhoods. When construction was completed on the two-lot subdivision by the Park, the driveway was repaved, and this access was blocked off (of which they had the ability to do). When this occurred, the Township fielded emails and phone calls regarding the loss of this path. Meliora Design, Incorporated, has submitted a proposal (please see attached) to provide a design and bidding documents to re-institute a path in this area, once again opening pedestrian access to Harford Park and the Creutzberg Center.

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners approval, Meliora Design, Incorporated will complete the work in sixty days. At that point, meetings with the various stakeholders will be scheduled.

FISCAL IMPACT: The cost proposed for this work is \$21,220, to be funded by account (Bond Fund) 5185401H-48110.

*Recommendation: Staff respectfully requests the Board of Commissioners Authorize Meliora Design, Incorporated to Provide Design and Bidding Documents for the Harford Trail, for the cost of \$21,220.*

Enclosure: Meliora Design, Incorporated Proposal



May 7, 2018

Mr. Stephen F. Norcini  
Township Engineer  
Radnor Township  
301 Iven Avenue  
Wayne, PA 19087

RE: Radnor Harford Park Trail Design and Documentation Proposal

Dear Mr. Norcini:

Meliora Design is pleased to submit this proposal to provide Professional Design and Consulting Services for the Radnor Harford Park Trail.

### Project Understanding and Work Tasks

It is our understanding that Radnor Township would like to establish a defined "soft" trail from Hares Lane near the Radnor Elementary School to Harford Park, a distance of approximately 1400 linear feet. The trail is to be a "soft" surface trail of wood chips or similar material. There are site constraints related to topography and slope, proximity to private property, and existing drainage elements. The work effort includes determining the preferred location and required grading for the new trail, followed by engineering documentation of plans and specifications suitable for bidding and construction. Our initial site visit indicated that there were areas where grading and tree disturbance may present a challenge to trail construction. We have also included time for a meeting with the property owners, and a presentation at the BOC. The proposed work includes the following tasks:

1. Kickoff Meeting and detailed site evaluation to confirm conditions.
2. Initial analysis of location options, including analysis of grading and drainage issues and constructability. A preferred location will be determined.
3. Two review meetings with Township.
4. One meeting with adjacent property owners, to be held at Township or location TBD.
5. Attendance at one BOC Meeting. We will develop a powerpoint presentation for use at the BOC meeting, and for the township web site.

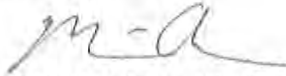
### Tangible Work Products:

- Kickoff Meeting and site evaluation
- Construction Documents including Layout, Demolition and Tree Protection, Erosion & Sediment Control, Grading and Stormwater management, and associated details and specifications
- Two (2) Township meetings
- One property owner meeting
- 1 BOC Presentation

All work products will be provided in hard copy and digital format.

We look forward to supporting Radnor Township. If you have any questions or concerns, we can be reached at 610-933-0123, or MicheleA@Melioradesign.com and March@Melioradesign.com.

Sincerely yours,



Michele C. Adams, PE, LEED AP  
Principal



Marc B. Henderson, PE  
Project Manager

Radnor Harford Trail  
 Meliora Detailed Fee Estimate  
 Prepared for Steve Norcini  
 May 7, 2018

**Meliora Design - Fee Estimate - Summary**

1	Site Analysis and Trail Documentation	Hours	Labor	Expenses	Total Fee
	<b>Site Analysis and Trail Documentation Total</b>	170	\$ 18,030	\$ 370	\$ 18,400
2	Meetings and Presentations				
	<b>Meetings and Presentations Total</b>	24	\$ 2,760	\$ 60	\$ 2,820
Totals		Hours	Labor	Expenses	Total Fee
	<b>Totals</b>	194	\$ 20,790	\$ 430	\$ 21,220

Radnor Harford Trail  
 Meliora Detailed Fee Estimate  
 Prepared for Steve Norcini  
 May 7, 2018

Meliora Design - Fee Estimate - Detailed						
Title	Principal	Senior Engineer	Water Resources Engineer	Cad Technician	Total Hours	Total Fee
Billing Rate	\$195.00	\$135.00	\$95.00	\$85.00		
<b>1 Site Analysis and Trail Documentation</b>						
Kickoff Meeting and Site visit		6	6		0	\$ -
Route mapping and identification of location and grading options	2	16	32	16	12	\$ 1,380
Construction cost estimate		4	8		66	\$ 6,950
Detailed Construction Documents and specifications, including two (2) submissions to Township at 50% and 100%.		24	40	16	12	\$ 1,300
					80	\$ 8,400
					0	\$ -
<b>Site Analysis and Trail Documentation Hours</b>	<b>2</b>	<b>50</b>	<b>86</b>	<b>32</b>	<b>170</b>	
<b>Site Analysis and Trail Documentation Total</b>	<b>\$ 390</b>	<b>\$ 6,750</b>	<b>\$ 8,170</b>	<b>\$ 2,720</b>		<b>\$ 18,030</b>
<b>2 Meetings and Presentations</b>						
Review Initial concept location with Radnor		2	2		4	\$ 460
Property Owner Meeting to discuss location, required grading,		4	8		12	\$ 1,300
Review Plans and cost with Township		2	2		4	\$ 460
BOC Meeting presentation		4			4	\$ 540
					0	\$ -
<b>Meetings and Presentations Hours</b>	<b>0</b>	<b>12</b>	<b>12</b>	<b>0</b>	<b>24</b>	
<b>Meetings and Presentations Total</b>	<b>\$ -</b>	<b>\$ 1,620</b>	<b>\$ 1,140</b>	<b>\$ -</b>		<b>\$ 2,760</b>
<b>Project Hours Total</b>	<b>2</b>	<b>62</b>	<b>98</b>	<b>32</b>	<b>194</b>	
<b>Project Labor Total</b>	<b>\$ 390</b>	<b>\$ 8,370</b>	<b>\$ 9,310</b>	<b>\$ 2,720</b>		<b>\$ 20,790</b>
<b>Reimbursables</b>						
	Expense Estimated at	2%	of fee (includes mileage, printing, etc.)			\$ 430
<b>Total Fee</b>						<b>\$ 21,220</b>

APPROXIMATE 1400 FT. TRAIL  
ALIGNMENT PER FIELD VISIT



SCALE 1" = 250'-

**RESOLUTION NO. 2018-59**  
**A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE**  
**COUNTY, PENNSYLVANIA, AUTHORIZING GILMORE &**  
**ASSOCIATES, INCORPORATED TO PERFORM THE**  
**COUNTY LINE ROAD CORRIDOR STUDY, IN**  
**PARTNERSHIP WITH LOWER MERION TOWNSHIP**

*WHEREAS*, there are areas of traffic issues along the stretch of County Line Road from Lancaster Avenue to Landover Road.

*WHEREAS*, this corridor is shared by Lower Merion and Radnor Townships

*WHEREAS*, a cost proposal has been received by Gilmore & Associates, Incorporated, to perform said County Line Corridor Study, in the amount of \$47,800

*WHEREAS*. Lower Merion Township had approved funding in the amount of \$22,705 in partnership with Radnor Township

*NOW, THEREFORE*, be it *RESOLVED* by the Board of Commissioners of Radnor Township does hereby authorize Gilmore & Associates, Incorporated to Perform the County Line Road Corridor Study, at a cost of \$47,800, in Partnership with Lower Merion Township, for a cost to Radnor Township of \$22,705.

*SO RESOLVED* this 14<sup>th</sup> Day of May, A.D., 2018

**RADNOR TOWNSHIP**


By: \_\_\_\_\_  
Name: Lisa Borowski  
Title: President

ATTEST: \_\_\_\_\_  
Robert A. Zienkowski  
Manager/Secretary

**Radnor Township**  
**PROPOSED LEGISLATION**

**DATE:** May 8, 2018

**TO:** Radnor Township Board of Commissioners

**FROM:** Stephen F. Norcini, P.E., Township Engineer 

**CC:** Robert A. Zienkowski, Township Manager  
William R. White, Assistant Township Manager & Finance Director  
Christopher Flanagan, Deputy Superintendent of Police

**LEGISLATION:** **Resolution #2018-59 – Authorizing Gilmore & Associates, Incorporated to Perform the County Line Road Corridor Study, in Partnership with Lower Merion Township**

---

**LEGISLATIVE HISTORY:** This legislation has not been before the Board of Commissioners previously.

**PURPOSE AND EXPLANATION:** The County Line Corridor, from Lancaster Avenue to Landover Road, has had many traffic issues. The impetus for the study was meeting with residents and Lower Merion Township representatives regarding accidents at the intersection of Montrose & County Line Road. Upon further research, I noted the traffic issues we have at 5 Points, Lancaster Avenue, Conestoga/Glenbrook, Thomas Avenue, and many side streets. It seemed prudent to review the entire corridor, noting deficiencies and possible remedies. The results of the study could be a road map for future traffic improvement capital projects. The cost for the study is \$47,800. The Lower Merion Board of Commissioners has already passed a resolution funding \$22,705 of the study. Radnor Township would fund the same (\$22,705), and Haverford Township has been contacted regarding funding \$2,390, for the Landover & County Line Intersection (I have not heard back yet as of this writing).

**Implementation Schedule:** Pending Board of Commissioners approval, a purchase order will be processed, and work will begin immediately.

**Fiscal Impact:** This work will be funded by the Traffic Capital Improvement Plan, for \$22,705.

**Recommended Action:** I respectfully request the Board of Commissioners authorize Gilmore & Associates, Incorporated to Perform the County Line Road Corridor Study, in Partnership with Lower Merion Township, for a cost to Radnor Township of \$22,705.

Enclosure: Gilmore & Associates Cost Proposal



**SERVICES AGREEMENT**

**File No. 16-11060.02**

**County Line Road (S.R. 1001) Corridor Analysis  
Radnor Township, Delaware County, Pennsylvania  
Lower Merion Township, Montgomery County, Pennsylvania**

This Agreement is made on **February 26, 2018** by and between: **Radnor Township, (CLIENT)**, and **Gilmore & Associates, Inc., Attn: Amy B. Kaminski, P.E., PTOE (ENGINEER)**. The parties agree as follows:

**1. Scope of Services: ENGINEER agrees to provide the following Services:**

**A. Task 1: Study Initiation and Project Management**

- a. This service agreement serves as a scope of work to be considered by both Radnor Township and Lower Merion Township and includes a kick off meeting prior to initiation of work to discuss the scope of work, the study objectives, anticipated schedule, corridor conditions/issues and related concerns with both municipalities prior to initiating the study upon notice to proceed.
- b. Monthly progress reports will be provided to Radnor Township and Lower Merion Township identifying work performed to date and ongoing efforts.

**B. Task 2: Data Collection**

- a. County Line Road Corridor Study includes the following intersections within Radnor Township and Lower Merion Township at County Line Road and:
  - i. Lancaster Avenue (S.R. 0030)/McDonald's Driveway
  - ii. Montrose Avenue
  - iii. S. Roberts Road
  - iv. Conestoga Road (S.R. 1019)/Thomas Avenue/Glenbrook Avenue
  - v. S. Warner Avenue
  - vi. Old Lancaster Road
  - vii. Mondella Avenue
  - viii. Lindsay Avenue
  - ix. S. Bryn Mawr Avenue (S.R. 1032/S.R. 3038)/Haverford Road (S.R. 1001)/W. Railroad Avenue (S.R. 3047)/Glenbrook Avenue
  - x. Haverford Road and County Line Road/Landover Road
- b. Conduct a site visit of the study corridor intersections and obtain field photographs of each intersection and along the corridor. Additional photographs will be obtained where problems exist such as lack of sight distance, turning conflicts, etc.).
- c. G&A has access to AM and PM traffic counts at several of the above listed intersections, but will

**BUILDING ON A FOUNDATION OF EXCELLENCE**

65 E. Butler Avenue | Suite 100 | New Britain, PA 18901 | 215-345-4330 | 215-345-8606  
508 Corporate Drive West | Langhorne, PA 19047 | 215-369-3955 | 215-345-8606  
184 W. Main Street | Suite 300 | Trappe, PA 19426 | 610-489-4949 | 610-489-8447  
425 McFarlan Road | Suite 102 | Kennett Square, PA 19348 | 610-444-9006 | 610-444-7292  
5100 Tilghman Street | Suite 150 | Allentown, PA 18104 | 610-366-8064 | 610-366-0433  
One Penn Center at Suburban Station | 1617 JFK Boulevard | Suite 425 | Philadelphia, PA 19103 | 215-687-4246 | 215-564-1780  
[www.gilmore-assoc.com](http://www.gilmore-assoc.com)



conduct additional intersection turning movement counts to resolve missing information. Counts include vehicular, bicycle and pedestrian counts at the following locations along County Line Road (S.R. 1001) and cover the AM (7-9 AM) and PM (4-6 PM) and Saturday (11AM -2PM) peak hours as noted below. NOTE: Traffic Counts will be obtained while Schools (including Higher Education Schools) are in session during a non-holiday week/weekend.

- i. Lancaster Avenue (S.R. 0030)/McDonald's Driveway- Signalized All MTM's
  - ii. Montrose Avenue – Unsignalized; Saturday MTM's
  - iii. S. Roberts Road – Unsignalized; Saturday MTM's
  - iv. Conestoga Road (S.R. 1019)/Thomas Avenue/Glenbrook Avenue- Signalized; Saturday MTM's
  - v. S. Warner Avenue – Unsignalized; All MTM's
  - vi. Old Lancaster Road- Unsignalized; All MTM's
  - vii. Mondella Avenue – Unsignalized; All MTM's
  - viii. Lindsay Avenue – Signalized; All MTM's
  - ix. S. Bryn Mawr Avenue (S.R. 1032/S.R. 3038)/Haverford Road (S.R. 1001)/W. Railroad Avenue (S.R. 3047)/Glenbrook Avenue – Signalized; All MTM's
  - x. Haverford Road and County Line Road/Landover Road – Signalized; All MTM's
- d. Obtain 3 years of historical detailed crash records (reportable and non-reportable) from PennDOT, Radnor Township and Lower Merion Township. The crash records will be reviewed for causal factors and mitigation along the corridor and at the studied intersections.
- e. Obtain most recent Traffic Signal Permit Plans from PennDOT/Townships for the signalized intersections at:
- i. Lancaster Avenue (File #64-0452)
  - ii. Conestoga Road (S.R. 1019)/Thomas Avenue/Glenbrook Avenue (File #63-1907)
  - iii. Lindsay Avenue (File #63-1030)
  - iv. S. Bryn Mawr Avenue/Haverford Road/W. Railroad Avenue/Glenbrook Avenue (File #63-0472)
  - v. Haverford Road (S.R. 1001 and County Line Road/Landover Road (S.R. 1009) (File #63-0557)
- f. Obtain average daily traffic (ADT) data and 85<sup>th</sup> percentile speed data along County Line Road at the following locations:
- i. Between Montrose Avenue and S. Roberts Road
  - ii. Between Roberts Road and Thomas Avenue
  - iii. Midpoint between Old Lancaster Road and Mondella Avenue

### C. Task 3: Transportation Evaluation

- a. Conduct an existing capacity analysis of the study intersections utilizing Synchro 10 software to determine the level of service (LOS), delay and queue lengths along the approaches (HCM methodology).
- b. Perform a sight distance evaluation at unsignalized intersections and along the corridor to identify potential safety concerns.
- c. Prepare sketch plan of County Line Road Corridor, sidewalks and ADA facilities utilizing Google Street view and site visit notes. Project does not include survey work or detailed plans; however, the following information will be included in the sketch plans:
  - i. Locations of Pedestrian Generators (schools, parks, transit stations, churches)

- ii. Location of Existing Sidewalks (and connections leading to minor cross streets)
  - iii. Parking facilities/Parking Structures
  - iv. Cartway widths
  - v. Right-of-Way (based on existing signal permit plans; G&A will make a concerted effort to obtain the Right-of-Way plans for County Line Road from PennDOT District 6 Right-of-Way Unit.
  - vi. Turn lane lengths/transitions (where applicable)
  - vii. Note existing pavement markings and lane widths (by color, line type and width)
  - viii. Posted speed limit and 85<sup>th</sup> Percentile Speed information
  - ix. Average Daily Traffic Counts at three (3) noted locations
  - x. AM, PM and Saturday Peak Hour Turning Movement Counts (Pedestrian, Vehicular and Bicycle counts at each intersection)
- d. Provide a comprehensive analysis at each intersection and along the corridor to develop potential improvements. Analysis includes:
- i. Perform a field investigation to note potential improvements related to pavement markings, signage and other noted traffic concerns.
  - ii. Review turning movements at minor cross streets to identify presence of cut through traffic and intersection traffic operations
  - iii. Review corridor traffic signal coordination/traffic adaptive system
  - iv. Review crash records for causal factors and mitigation; including development of Crash Diagrams to assist in this effort.
  - v. Review pedestrian accommodations
- e. Identify safety improvements based on comprehensive analysis to improve traffic flow and improve vehicular and pedestrian safety. Conceptual Cost Estimates will be developed for recommended improvements. Improvements include but are not limited to:
- i. Roadway diets
  - ii. Pedestrian improvements
  - iii. Cut-Through Traffic mitigation
  - iv. Turn restrictions
  - v. Altering directional traffic flow
  - vi. Signal Improvements
  - vii. Crash Mitigation Measures

**D. Task 4: Reports**

G&A will provide a comprehensive report summarizing the findings of the analysis.

**1. Draft Report**

- a. Report will include a sketch of the existing conditions, traffic volume figures, level of service information, approach delays and queue lengths and crash diagrams, where appropriate along with a discussion of the various concerns raised by stakeholders and noted during existing conditions evaluation.
- b. Deficiencies/Safety Concerns will be identified and mitigation measures proposed for the evaluated intersections and corridor including but not limited to items discussed in item "B.k." above.

- c. Conceptual Cost Estimates for mitigation measures will be provided to assist decision makers in evaluating potential improvements and potential grant opportunities will be identified.
- d. Assumes one electronic Draft Report will be provided to Radnor Township and Lower Merion Township.
- e. Following receipt of Draft Report submission; both Radnor Township and Lower Merion Township will provide comments to be incorporated in Final Report within one week of receipt.

2. Final Report

- a. Draft Report will be revised based on feedback received from both Radnor Township and Lower Merion Township; any conflicts in feedback will be resolved to the satisfaction of both Radnor Township and Lower Merion Township by the same and final notes will be transmitted to Gilmore & Associates, Inc. within 2 weeks of receipt of the Draft Report to be incorporated in the Final Report.
- b. Assumes one Final Report submission in both electronic format (to Radnor Township, Lower Merion Township, and a courtesy copy to PennDOT) and hard copies (2 total copies) to Radnor Township and Lower Merion Township.

E. Task 5: Meetings

G&A assumes the following meetings:

- 1. Kickoff meeting with Radnor Township and Lower Merion Township immediately following Notice to Proceed.
- 2. Meeting with Radnor Township following preparation of Final Report to present report to Township Board of Commissioners.
- 3. One meeting with Lower Merion Township following preparation of Final Report to present report to Township Board of Commissioners.

F. Task 6: Administrative Services

G&A will provide monthly progress reports to Radnor Township and Lower Merion Township through email and provide monthly invoices to Radnor Township.

G. Conditions of Scope of Services

The Scope of Services contained within this contract includes all of the services that we anticipate being necessary to prepare a comprehensive report for Radnor Township and Lower Merion Township. We strive to be as thorough as possible in our submissions. However, field conditions, changes in reviewer opinions, policies, and/or requirements, client desires, etc. may change, therefore requiring additional revisions to our initial submission. Since these items are not under our control, revisions for the same are not included in this contract. It is assumed that any additional work will be performed during the implementation of the preliminary/final engineering phase based on recommendations provided in the report. If additional work is requested, G&A will provide a scope and estimate for additional services.

2. **Compensation: CLIENT** agrees to pay **ENGINEER:**

Fee based upon hourly rates of those individuals performing services. The Estimated Fee for services as outlined above is \$47,800.00. Client to pay all review/application fees to reviewing agencies.

*(The amounts set forth as the "Estimated Fee" for services performed shall constitute the Engineer's opinion of the effort required to complete the project as the Engineer understands it to be defined at the time of execution of this document. It is understood by Client that the actual fee for services performed may exceed the amount(s) set forth above as "Compensation." This fee is void if agreement is not signed by both parties within thirty (30) days from the date of this agreement.)*

3. The Services shall be performed on the following schedule:

Services to commence upon execution of this Services Agreement by client and to continue until project completion.

- 4. This Agreement shall include the Gilmore & Associates, Inc. Standard Terms and Conditions that are attached to this document.
- 5. The individuals executing this Agreement below agree they are authorized to enter into this Agreement on behalf of **CLIENT** and **ENGINEER**, respectively, and **CLIENT** and **ENGINEER** agree to be bound by the terms and conditions of this Agreement.

**Client's Authorized Representative:**

\_\_\_\_\_  
Print & Date

\_\_\_\_\_  
Authorized Signature

**Accounts Payable Billing Address:**

\_\_\_\_\_  
Email Address

\_\_\_\_\_  
Phone Number

\_\_\_\_\_  
Address  same as mailing address

**Gilmore & Associates, Inc.'s Authorized Representative:**

\_\_\_\_\_  
Print & Date

\_\_\_\_\_  
Authorized Signature

# GILMORE & ASSOCIATES, INC. - STANDARD TERMS AND CONDITIONS

## 1. DUTIES AND RESPONSIBILITIES

1.1 The Engineer (throughout these Terms and Conditions, Engineer shall include Gilmore & Associates, Inc. and its subconsultants) agrees to provide only those professional services specifically and expressly set forth in the Scope of Services portion of this Agreement. Unless specifically set forth in the Scope of Services, Engineer shall not provide any construction phase services including, but not limited to, the construction phase observation of any contractor's work. Under no circumstances shall Engineer have control over, or be in charge of, nor be responsible for, construction means, methods, techniques, sequences or procedures in connection with the work or for the contractor(s)'s safety programs or procedures at the site.

1.2 In the event that the Engineer and Client have not executed this Agreement, the Client's authorization to Engineer to proceed with the performance of the services set forth herein shall constitute acceptance by the Client of these Terms and Conditions.

## 2. UNDERGROUND UTILITIES AND STRUCTURES

2.1 Client agrees to advise Engineer in writing of known or suspected utilities or other underground structures or features which could affect the services to be provided and shall provide all drawings in its possession which identify underground utilities, structures or features.

2.2 Client agrees to release Engineer from any liability to Client and to hold Engineer harmless in accordance with Paragraph 11.1 where subterranean utility lines and other underground structures or features which were not identified to Engineer as required by Paragraph 2.1 have been damaged.

## 3. RESTRICTIONS ON USE OF DOCUMENTS

3.1 It is understood and agreed that all drawings, sketches, specifications and other documents in any form, including CADD disks, prepared under this Agreement (collectively "Documents") are instruments of Engineer's services and, as such, are, and shall remain, the property of Engineer, whether the project for which they are intended is executed or not. Client shall, upon payment of all fees and reimbursable expenses due Engineer under this Agreement, be permitted to retain reproducible copies of the final versions of those Documents necessary for the execution of the Project ("Deliverables") for information and reference only in connection with the project for which the Documents were prepared. The Documents are prepared for use on this Project only and are not appropriate for use on any other project, for additions to this Project, for completion of this Project by others (unless Engineer is adjudged in default) or for any purpose other than as defined by the Scope of Services, except by agreement in writing with the appropriate compensation to Engineer. Any use of the Documents or the information or data contained therein, in violation of this subparagraph or any alteration or modification of such Documents or the information or data contained therein, without the express written consent of Engineer is expressly prohibited. Such prohibited use is at the sole risk of the user and Engineer is released from any liability for damages arising from such use.

3.2 Client agrees that any Documents in Client's possession shall not be used and shall be returned promptly to Engineer, if Client is in default under this Agreement. Client agrees that Engineer may obtain injunctive relief to enforce this subparagraph.

## 3A. ACCEPTANCE, OWNERSHIP AND USE OF ELECTRONIC APPLICATIONS (This provision shall apply only to any GIS System included in Exhibit "A").

3A.1 Ownership and Use - It is understood and agreed that any and all map graphics, databases, reports, drawings, computer files, field data, notes or other documents, whether in printed form or in machine readable format created or prepared by Engineer under this Agreement are instruments of Engineer's services and, as such, are, and shall remain, the property of Engineer. However, at the end of the acceptance periods defined in Subparagraphs 3A.2 or 3A.3 and the payment of all fees and expenses due under this Agreement, Client shall have an irrevocable, non-exclusive license to use those components of the electronic applications including the map graphics and databases described in Exhibit "A" ("Deliverables") which have been delivered by Engineer pursuant to Subparagraphs 3A.2 and/or 3A.3.

3A.2 Acceptance Period for Interim Components - Upon receipt of each component part of the electronic application and the map graphics and databases at Client's facility, Client shall have a period of fifteen (15) calendar days (unless otherwise noted in Exhibit A) to review and approve the component application including the map graphics and databases. Engineer shall correct any deficiencies brought to its attention by Client at the conclusion of that fifteen (15) calendar day period. Upon the correction of any such deficiencies, Engineer shall not be responsible for making any further changes, revisions or corrections to that component of the electronic applications including the map graphics and databases and is released from liability for any deficiencies contained therein.

3A.3 Acceptance Period for Final Delivery - Upon completion of the installation of all of the electronic applications and the map graphics and databases required by this Agreement at Client's facility, Client shall have a period of fifteen (15) calendar days (unless otherwise noted in Exhibit A) to review and approve the overall operation of the applications including the map graphics and databases. This final review and approval shall not include a re-review of the individual components reviewed and approved by Client pursuant to Subparagraph 3A.2. Engineer shall correct any deficiencies in the overall operation of the applications brought to its attention by Client at the conclusion of that fifteen (15) calendar day period. Upon the correction of any such deficiencies, Engineer shall not be responsible for making any further changes, revisions or corrections to any of the electronic applications including the map graphics and databases and is released from liability for any deficiencies contained therein.

3A.4 Modification of Deliverables - Any changes, modifications, deletions or additions made to the electronic applications including the map graphics and/or databases by

Client or any consultants retained by it (other than Engineer) are made at Client's sole risk and Engineer shall not have any liability for, and the Client releases Engineer from any claims or damages resulting from, such changes, modifications, deletions or additions.

## 4. STANDARD OF CARE

4.1 In performing the services required by this Agreement, Engineer shall use that degree of usual and customary professional skill and care ordinarily exercised by members of its profession under similar circumstances practicing in the same or similar locality. The standard of care shall exclusively be judged as of the time the services are rendered and not according to later standards. Engineer makes no expressed or implied warranty beyond its commitment to conform to this standard.

## 5. OBSERVATION SERVICES

5.1 If expressly required under the Scope of Services, Engineer shall visit the site at the intervals set forth in the Scope of Services to become generally familiar with the progress and quality of that portion of the work for which Engineer prepared the Deliverables to determine in general if such work is being performed in a manner indicating that such work when completed will be in accordance with the Deliverables. Engineer shall not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of such work. On the basis of on-site observations as a design professional, Engineer shall keep client informed of the progress and quality of the work. Engineer's services do not include supervision or direction of the actual work of the contractor(s), their employees, agents or subcontractors. Client agrees to notify the contractor(s) accordingly. The contractor(s) shall also be informed by Client that neither the presence of Engineer's field representative nor the observation by the Engineer shall excuse the contractor(s) for defects or omissions in his work.

5.2 Under no circumstances shall Engineer have control over, or be in charge of, nor shall it be responsible for, construction means, methods, techniques, sequences or procedures in connection with the work or for the contractor(s)'s safety programs or procedures at the site. Engineer shall not be responsible for any contractor's schedules or failure to carry out the work in accordance with the Deliverables. Engineer shall not have control over or charge of acts or omissions of any contractor, subcontractor, or their agents or employees, or of any other persons performing portions of the work.

5.3 It is further understood that the contractor(s) will be solely and completely responsible for working conditions on the job site, including safety of all persons and property during the performances of the work, and that these requirements will apply continuously and not be limited to normal working hours. Any observations at the site as set forth in Paragraph 5.1 by Engineer is not intended to include review of the adequacy of the contractor(s)'s safety measures at the construction site. The Engineer will not be held responsible for any contractor's failure to observe or comply with the Occupational Health and Safety Act of 1970 (including subsequent amendments), and regulations or standards promulgated thereunder, or any state, county, or municipal law or regulation of similar import or intent.

## 6. TERMINATION, SUSPENSION

6.1 This Agreement may be terminated by either party upon seven days written notice should the other party fail substantially to perform in accordance with its terms. This Agreement may be terminated by the Client upon at least seven (7) days written notice to Engineer in the event that the Project is permanently abandoned. In the event of any termination that is not the fault of Engineer, Engineer will be compensated for all services performed up to the time written notice of termination is actually received by Engineer, together with reimbursable expenses then due and reasonable Termination Expenses directly associated with the termination.

6.2 In the event of termination or suspension for more than three (3) months which occurs prior to completion of all services contemplated by the Agreement, the Engineer may complete such analyses and records as are necessary to complete his files and may also complete a report on the services performed up to the date of receipt of written notice of termination or suspension. Termination Expenses provided for above shall include all fees and costs incurred by Engineer in reporting, completed data, completing such analyses, records and reports.

## 7. INVOICES, PAYMENTS

7.1 Engineer will submit invoices to Client monthly and a final invoice upon completion of services.

7.2 Client shall promptly review Engineer's invoices. Any right to withhold payment based on errors or discrepancies in the invoice is waived if not identified in writing to Engineer within seven (7) days of Client's receipt of invoice. Any research required by Engineer in order to respond to questions raised regarding invoices shall be billable to Client at Engineer's standard hourly rates, if such questions are not raised within such seven (7) day period.

7.3 Payment is due upon presentation of invoice and is past due fifteen (15) days from invoice date. Client agrees to pay a service charge of one and one-half (1 ½) percent per month (18% per annum) or fraction thereof on past due payments under this Agreement.

7.4 Timely payment to the Engineer in accordance with the Terms and Conditions of this Agreement is a material consideration of this Agreement. Therefore, the Client's failure to make payments in accordance with this Agreement shall constitute substantial nonperformance and a cause for termination by Engineer. If the Client fails to make payment when due Engineer for services and expenses, the Engineer may, at its option and without prejudice to its right to terminate as described above, upon seven days written notice to the Client, suspend performance under this Agreement. Unless payment in full is received by the Engineer within seven (7) days of the date of the notice, the suspension shall take effect without further notice. Suspensions for

# GILMORE & ASSOCIATES, INC. - STANDARD TERMS AND CONDITIONS

subsequent failures to pay invoices shall not require prior notice by the Engineer. In the event of a suspension of performance, the Engineer shall have no liability to the Client for delay or damages caused the Client because of such suspension of performance. The Client shall hold harmless, indemnify, and defend the Engineer for claims that arise due to any suspension.

7.5 It is further agreed that in the event a lien or suit is filed to enforce payment under this agreement, the Engineer will be reimbursed by the Client for all court costs and reasonable attorney's fees in addition to accrued service charges.

7.6 Unless the compensation identified in this Agreement is specifically identified as a lump sum, the amounts set forth as the "Estimated Fee" shall constitute the Engineer's best estimate of the effort required to complete the project as the Engineer understands it to be defined. For those projects involving conceptual or process development work, activities often are not fully definable in the initial planning. In any event, as the project progresses, the facts developed may dictate a change in direction, additional effort, or suspension of effort, which may alter the scope. The Engineer will inform the Client of such situation so that negotiations relating to a change in scope and an adjustment to the time of performance can be accomplished as required. If such change, additional effort, or suspension of effort results in an increase or decrease in the cost of or time required for performance of the services, whether or not changed by any change order, an equitable adjustment shall be made and this Agreement modified accordingly.

## 8. ASSIGNS

8.1 Neither the Client nor the Engineer may delegate, assign, or sublet, or transfer his duties or interest (including any claims that arise here) in this Agreement without written consent of the other party. Such consent shall not be unreasonably withheld.

## 9. LIMITATIONS ON REMEDIES

9.1 The Client shall promptly (within 24 hours) report to Engineer any defects or suspected defects in Engineer's services of which Client becomes aware, so that Engineer may take measures to minimize the consequences of such defect. Client warrants that Client will impose a similar notification requirement on all contractors retained by Client and shall require all subcontracts at any level to contain a like requirement. Engineer shall be liable for correcting defects in its services caused by its negligence. However, the failure by Client, and the Client's contractors or subcontractors to notify Engineer of such defects in a timely fashion shall relieve Engineer of the costs of remedying the defects above the sum such remedy would have cost had prompt notification been given.

9.2 If, due to Engineer's negligent error, any required item or component of the Project is omitted from the Documents, Engineer shall not be responsible for paying the cost to add such item or component to the extent that such item or component would have been otherwise necessary to the Project or otherwise adds value or betterment to the Project. Engineer shall only be liable to the extent such costs would have been avoided had engineer not been negligent. In no event, will Engineer be responsible for any cost or expense that provides betterment, upgrade or enhancement of the Project. Client's sole and exclusive remedy for such negligent omissions where no otherwise avoidable costs are incurred by Client is for Engineer to perform services necessary to correct omission without charge to Client; provided that where Engineer's fees or reimbursable expenses would have been higher had the omitted item or component been included prior to construction, Engineer shall be entitled to such increased fees and reimbursable expenses.

9.3 Notwithstanding any other provision of this Agreement, neither party shall be liable to the other for any consequential damages incurred due to the fault of the other party, regardless of the nature of the fault or whether it was committed by Client or Engineer, their employees, agents, consultants or subcontractors. Consequential damages include, but are not limited to, loss of use and loss of profit.

9.4 Engineer's liability for any damages due to breach of contract, error, omission, professional negligence or any other theory of liability will be limited to an amount not to exceed three times the engineer's fees under this agreement. Such limitation shall apply to the aggregate of all claims that may be brought against engineer and its subconsultants. If the client prefers not to limit the engineer's professional liability to this sum, the engineer will waive this limitation upon the client's request provided that the client agrees to pay an additional consideration for this waiver.

9.5 It is understood that the Engineer shall not be held responsible for any errors or omissions on the part of contractor, including, but not limited to, the contractor's failure to adhere to the plans and specifications regardless of whether or not the Engineer is performing observational services. This provision shall be included in the contract between the Client and his contractor(s) for this project.

## 10. DISPUTE RESOLUTION

10.1 All claims, disputes, and other matters in question between the Engineer and the Client arising out of, or relating to, this Agreement or the breach thereof or the services rendered by Engineer ("Dispute"), shall be resolved as follows:

10.2 A written demand for non-binding mediation, which shall specify in detail the facts of the Dispute and the relief requested, shall be submitted, within a reasonable time after the basis for the Dispute has arisen, to the party against whom the claim is brought. If the Dispute cannot be resolved by the parties within ten (10) days, the demand shall be submitted to "ADR Options" or such mediation service as the parties shall otherwise agree to retain, for good faith non-binding mediation. The Mediator's fee shall be shared equally by the parties. The party initiating the Dispute shall be liable for any filing fee.

10.3 Any Dispute between the parties that is not fully resolved by mediation within 60 days of submission to the mediation service shall be decided by litigation in a court of competent jurisdiction.

10.4 In no event shall the demand for mediation be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

10.5 In the event that Client institutes suit against the Engineer because of any Dispute and if such suit is dropped or dismissed, or if the Engineer otherwise prevails, Client agrees to reimburse the Engineer, or pay directly, any and all costs and any and all other expenses of defense, immediately following dropping or dismissal of the case or immediately upon judgment being rendered on behalf of the Engineer.

10.6 The signatories to this Agreement, agree to be, and to remain at all times, and for all purposes, without regard for any business address they may now or hereafter assume, subject to the exclusive jurisdiction of the several Courts of Common Pleas of Bucks County, Pennsylvania for all causes of action, if any, which may arise under, or incident to, the application, breach, enforcement, interpretation, performance or nonperformance of this Agreement. This Agreement and the rights and obligations of the parties hereto shall be controlled by the laws of the Commonwealth of Pennsylvania.

## 11. INDEMNIFICATION

11.1 To the fullest extent permitted by law, Client shall indemnify and save harmless Engineer, their subsidiaries, affiliates, officers, employees and subconsultants or such other individuals or entities who may have assisted the Engineer in the rendering of its services in connection with the Project (along with each of their shareholders, directors, officers, partners and employees) from and against any and all manner of demands, claims, liabilities, costs and expenses, including, without limitation, reasonable attorney's fees and any other defense costs arising out of any negligent conduct or breach of any provision of this Agreement by Client or any individual or entity for whose acts Client is responsible.

## 12. ENVIRONMENTAL

12.1 Where the scope of basic services includes storm water pollution prevention (SWPP), sedimentation or erosion control plans, specifications, procedures or related construction observation or administrative field functions, Client acknowledges that such services proposed or performed by G & A are not guaranteed to provide complete SWPP, sedimentation or erosion control, capture all run off or siltation, that any physical work is to be constructed and maintained by the Client's contractor or others and that G & A has no control over the ultimate effectiveness of any such work or procedures. Except to the extent that there were errors or omissions in the services provided by G & A, Client agrees to indemnify and hold G & A harmless from and against all claims, costs, liabilities or damages whatsoever arising from any storm water pollution, erosion, sedimentation, or discharge of silt or other deleterious substances into any waterway, wetland or woodland and any resulting charges, fines, legal action, cleanup or related costs.

## 13. WARRANTY OF AUTHORITY TO SIGN

13.1 The person signing this contract warrants they have authority to sign as, or on behalf of, the Client for whom or for whose benefit that Engineer's services are rendered. If such person does not have such authority, he agrees that he is personally liable for all breaches of this contract and that in any action against him for breach of such warranty a reasonable attorney fee shall be included in any judgment rendered.

## 14. CHOICE OF LAW

14.1 This contract will be construed in accordance with the laws of the Commonwealth of Pennsylvania.

## 15. SEVERABILITY

15.1 In the event that any provisions herein shall be deemed invalid or unenforceable, the other provisions hereof shall remain in the full force and effect, and binding upon the parties hereto.

## 16. REFERENCES

16.1 Client agrees that Engineer has authority to utilize its name as a Client and general description of the project work or service performed as references to other Clients.

## 17. INTEGRATION

17.1 There are no understandings or agreements concerning this project except as expressly stated herein.

## 18. VALIDITY

18.1 It is understood that if this Agreement is not executed by Client or accepted as set forth in Paragraph 1.2 within thirty (30) days of the date of the Agreement, Engineer reserves the right to revise or withdraw this Agreement.

## 19. THIRD PARTY BENEFICIARIES

19.1 Nothing contained in this Agreement shall create a contractual relationship with a cause of action in favor of a third party against either the Client or the Engineer.

## 20. WAIVER OF SUBROGATION

20.1 Except to the extent that such waiver would invalidate the applicable insurance coverage, the Client and Engineer waive all rights against each other and against the contractors, consultants, agents and employees of the other for damages, but only to the extent covered by property insurance during construction, except such rights as they may have to the proceeds of such insurance. Client and Engineer each shall require similar waivers from their contractors, consultants and agents.