

Mr. Koch commented on the employees utilizing the property and questioned the earned income tax of said employees.

John Miller-Simard, representative of Amazon, provided an overview of the proposed use. Ed Mullin noted the applicant's uncertainty relative to earned income tax.

Keenan Holliman, representative of Amazon, commented on peak trip times and daily operations at the proposed site.

Mr. Holsonback commented on the noise generated from the proposed use and utilization of the parking spaces closest to the building first. Ed Mullin noted the applicant would be agreeable to utilizing the parking spaces closest to the building first. Ms. Greenawalt also commented on the noise generated from the proposed use.

Mr. Koch commented on the direction of travel the vehicles will take from the proposed site, to their distribution center. Ed Mullin noted the best direction of travel was being reviewed by the applicants traffic engineer, and all traffic will be turning left onto Morris Road when departing the proposed site.

Mr. Andorn commented on the amount of space to be used by the applicant and parking relative to the leased interior space. Ed Mullin noted the proposed parking spaces would be dedicated for exclusive use by the applicant.

Chair Sherr commented on the maintenance of the vehicles. Keenan Holliman noted that no maintenance of the vehicles would occur at the proposed site.

Mr. Koch commented on the noise study being conducted. Chair Sherr commented on buffers relative to adjoining properties. Ed Mullin noted a noise study was being conducted and that improvements would be made, to the satisfaction of the Township, to the berm on the property line closest to Berks Road.

Mr. Holsonback commented on the residential properties neighboring the proposed site.

Joe Nolan, Township Engineer, provided an overview of his January 10, 2020 review letter.

Frank Wells, Worcester, commented on the noise generated from the property and site improvements proposed.

Ms. Greenawalt commented on the trips generated from the property and the destination of the vehicles departing the site.

Mr. Andorn commented on the proposed parking spaces to be used by the applicant. Jeff Dezort, engineer for the applicant, commented on the parking space calculations.

Mr. Koch motioned to table the review of the application until a traffic study was completed by the applicant. Mr. Holsonback seconded the motion. By unanimous vote the motion was approved.

Chair Sherr noted the Planning Commission will hold a special meeting on Thursday, February 13, 2020, at 6:30 PM.

3. October 24, 2019 Meeting Minutes – Mr. Koch motioned to approve the October 24, 2019 second by Mr. Holsonback. By motion was approved, with Mr. Andorn abstaining.
4. February 27, Planning Commission Meeting Agenda – At its February 27 meeting The Planning Commission may review the Meadowood Senior Living application (LD 2020-01) and the application for 2578 Morris – Mazz Properties, LLC (LD 2019-04).

Andrew Raquet, Asst. Zoning Officer, provided an overview of the applications that may reviewed at the Planning Commission’s February 27 meeting.

Chair Sherr commented on the Comprehensive Plan update.

PUBLIC COMMENT

- There was no public comment.

ADJOURNMENT

There being no further business before the Planning Commission, Chair Sherr adjourned the meeting at 8:22 PM.

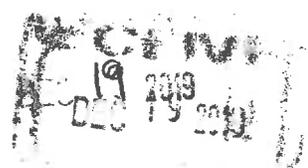
Respectfully Submitted:

Andrew R. Raquet
Asst. Zoning Officer; Codes Clerk

ERECTED INTO A TOWNSHIP IN 1733
TOWNSHIP OF WORCESTER
AT THE CENTER POINT OF MONTGOMERY COUNTY
PENNSYLVANIA

1721 Valley Forge Road
P.O. Box 767
Worcester, PA 19490

Phone (610) 584-1410
Fax (610) 584-8901



THIS SECTION COMPLETED ONLY BY TOWNSHIP:
APPEAL NO.: CVA 2019-03 DATE FILED: 12/19/19, 2019



APPLICATION: **BOARD OF SUPERVISORS**
 ZONING HEARING BOARD

1. Date of Application: _____

2. Classification of Appeal (Check one or more, if applicable):
- a. Appeal from the Zoning Officer's Determination
 - b. Request for Variance
 - c. Request for Special Exception
 - d. Challenges to the Validity of Zoning Ordinance or Map
 - e. Request for Conditional Use Hearing
 - f. Request for Amendment to Zoning Map
 - g. Request for Zoning Ordinance Amendment
 - h. Request for a Curative Amendment
 - i. Request for other relief within the Jurisdiction of the Zoning Hearing Board as established in Section 909.1(a) of the Pennsylvania Municipalities Code

3. Applicant:

- a. Name: DIV-AR Property LP
- b. Mailing address: 1420 US Highway 206, Suite 200
Bedminster, NJ 07921
- c. Telephone number: 908-254-3123
- d. State whether owner of legal title, owner of equitable title, or tenant with the permission of owner legal title: Owner of legal title
(REQUIRED)

Please attach Deed to prove ownership, an Agreement of Sale to prove equitable ownership, or an Affidavit allowing Tenant to apply for necessary relief.

4. Applicant's attorney, if any:

- a. Name: J. Edmund Mullin, Esquire
- b. Address: PO Box 1479, 375 Morris Road
Lansdale, PA 19446
- c. Telephone number: 215-661-0400

5. Property Details:
- a. Present Zoning Classification: IR Industrial Research District
 - b. Present Land Use: Manufacturing, Industrial and Research facilities
 - c. Location (Street Address): 2750 Morris Road, Lansdale, PA 19446
 - d. Parcel #: 67-00-02512-00-4
 - e. Lot Dimensions:
 - (1) Area: 84.25 AC
 - (2) Frontage: 1,580.96 ft
 - (3) Depth: 2,436.79 ft irregular
 - f. Circle all that apply in regards to the above specified property:
 - Public Water Public Sewer
 - ~~Private Well~~ ~~Private Septic~~
 - g. Size, construction, and use of existing improvements; use of land, if unimproved: **(Please submit as an attachment)**
6. Proposed Use(s):
- a. Proposed use(s) and construction: Please provide size, construction and proposed use(s). **(Please submit as an attachment)**
7. Legal grounds for appeal (Cite specific sections of Pennsylvania Municipalities Planning Code, Zoning Ordinance, Subdivision Regulations, and/ or other Acts or Ordinances). All sections that apply must be listed in which relief is required and an explanation provided. **(Please submit as an attachment)**
8. Has any previous appeal been filed concerning the subject matter of this appeal?
 Yes No
- If yes: specify: **(Please submit as an attachment)**
9. Challenges please list requested issues of fact or interpretation: **(Please submit as an attachment)**
10. Worcester Township to provide the list of names and addresses of all property within 500 feet of the perimeter of the subject property. **(REQUIRED: SECTION 150-224)**

CERTIFICATION

I (We) hereby certify that the above information is true and correct to the best of my (our) knowledge, information or belief.



 Signature

KURT R. PADAVANO
 Authorized Representative

 Printed Name

 Signature

 Printed Name

COMMONWEALTH OF PENNSYLVANIA:

COUNTY OF _____ : SS

The undersigned, being duly sworn according to law, deposes and says the he/she is the above names applicant, that he/she is authorized to and does take this affidavit on behalf of the owner, and foregoing facts are true and correct.



Applicant

Applicant

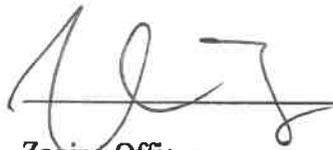
Sworn to and subscribed before me this 16th day of December, 2019



Notary Public

HEATHER RELLA
NOTARY PUBLIC OF NEW JERSEY
Comm. # 50080810
My Commission Expires 4/17/2023

Date Received: 12/19/19



Zoning Officer

DIV-AR Property LP
Application – Conditional Use

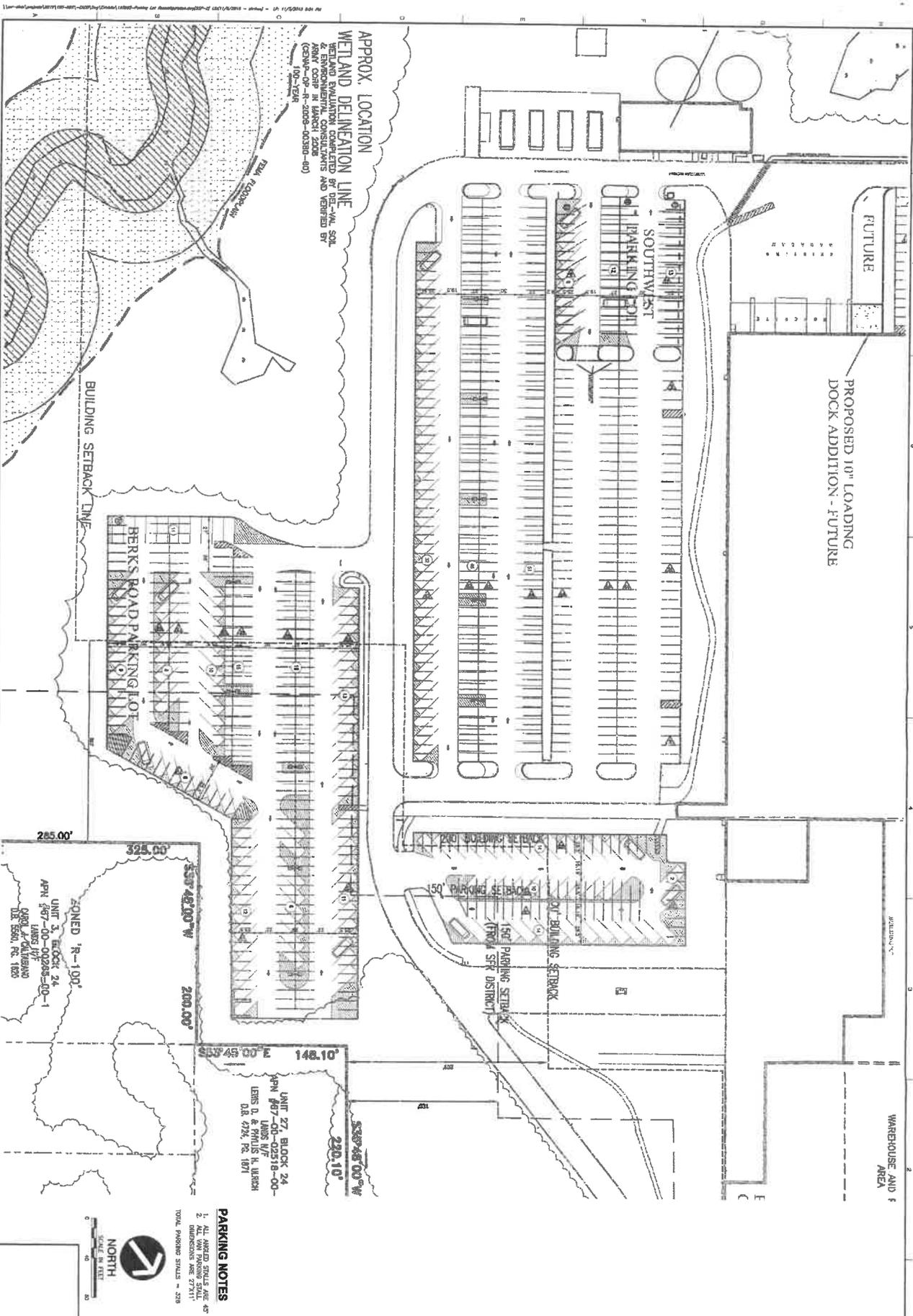
Legal grounds for conditional use:

Section 150-134.2(d) of the Worcester Township Zoning Ordinance states that a building or a combination of buildings may be erected or used and a lot may be used or occupied, for any of the following purposes and no other:

- d. Any other legitimate use not otherwise permitted expressly or by implication elsewhere in this Zoning Code when authorized as a conditional use by the Board of Supervisors and after the imposition of conditions designed to eliminate (to the extent reasonably possible) adverse effects upon neighboring properties and the general public health, safety and welfare.

The proposed use is a parking lot to accommodate up to 300 delivery vans and 311 automobiles within an area already striped for 611 vehicles. The area will be restriped in accordance with the plan attached to this application.

Parking lot is not permitted as a use anywhere in the Worcester Township Zoning Ordinance. It is mentioned in C Commercial as being permitted when accessory to a permitted use, and none of those uses are permitted in the IR District. Accordingly, the use is permitted as not otherwise permitted expressly or by implication elsewhere in the Zoning Ordinance.



APPROX. WETLAND DELINEATION LINE
 WETLAND EVALUATION COMPLETED BY DUE-VALE SOIL
 REMED. CONSULTANTS AND VERIFIED BY
 (GENV-02-R-2008-00380-00)
 100-YEAR

BUILDING SETBACK LINE

BERKS ROAD PARKING LOT

SOUTH WEST

FUTURE
PROPOSED 10' LOADING DOCK ADDITION - FUTURE

WAREHOUSE AND AREA

255.00'
 325.00'
 537'45"00" W
 200.00'
 ZONED R-100
 UNIT 3, BLOCK 24
 APRN 867-00-00288-00-1
 JESSA W
 1885 W
 OBERLIN, OH 44027
 D.B. 5501, P.C. 1820

537'45"00" E 148.10'
 220.10'
 538'48"00" W
 UNIT 27, BLOCK 24
 APRN 867-00-02518-00-1
 LENS D, JESSA W, H. WURCH
 D.B. 4224, P.C. 1871

PARKING NOTES

1. ALL WAREHOUSE AREAS ARE 45' HIGH.
2. DIMENSIONS ARE 27'X11'.
3. TOTAL PARKING SPACES = 228



SSP-2	PARKING LOT RECONFIGURATION	
	DATE: NOVEMBER 2018	DRAWN BY: ZLB
	DESIGNED BY: JWB	CHECKED BY: JWB
	APPROVED BY: (SIGNATURE ON FILE)	DATE: 11/15/18

amazon
 2750 MORRIS ROAD
 LANDSDALE, PA 19446

CEC
Civil & Environmental Consultants, Inc.
 6890 Morshahr Blvd. - Cincinnati, OH 45150
 613-885-0226 - 800-779-6614
 www.cec.com

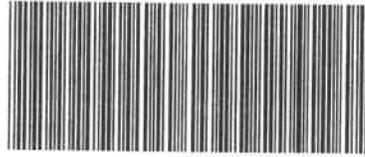
REVISION RECORD	
NO.	DESCRIPTION



**RECORDER OF DEEDS
MONTGOMERY COUNTY**
Nancy J. Becker

One Montgomery Plaza
Swede and Airy Streets ~ Suite 303
P.O. Box 311 ~ Norristown, PA 19404
Office: (610) 278-3289 ~ Fax: (610) 278-3869

DEED BK 5928 PG 00358 to 00366
INSTRUMENT # : 2014062116
RECORDED DATE: 09/18/2014 11:05:24 AM



3121654-0014K

MONTGOMERY COUNTY ROD

OFFICIAL RECORDING COVER PAGE

Page 1 of 9

Document Type: Deed
Document Date: 09/16/2014
Reference Info:

Transaction #: 3108180 - 6 Doc(s)
Document Page Count: 8
Operator Id: sford

RETURN TO: (Simplifile)
Prestige Abstract Corporation
100 South Broad Street
Philadelphia, PA 19110

PAID BY:
PRESTIGE ABSTRACT CORPORATION

*** PROPERTY DATA:**

Parcel ID #: 67-00-02512-00-4
Address: 2750 MORRIS RD

PA
Municipality: Worcester Township (100%)
School District: Methacton

*** ASSOCIATED DOCUMENT(S):**

CONSIDERATION/SECURED AMT:
\$18,300,000.00

DEED BK 5928 PG 00358 to 00366
Recorded Date: 09/18/2014 11:05:24 AM

FEES / TAXES:

Recording Fee:Deed	\$95.00
Additional Pages Fee	\$8.00
Affordable Housing Pages	\$16.00
State RTT	\$183,000.00
Worcester Township RTT	\$91,500.00
Methacton School District RTT	\$91,500.00
Total:	\$366,119.00

I hereby CERTIFY that
this document is
recorded in the
Recorder of Deeds
Office in Montgomery
County, Pennsylvania.



Nancy J. Becker

Nancy J. Becker
Recorder of Deeds

PLEASE DO NOT DETACH
THIS PAGE IS NOW PART OF THIS LEGAL DOCUMENT

NOTE: If document data differs from cover sheet, document data always supersedes.
*COVER PAGE DOES NOT INCLUDE ALL DATA, PLEASE SEE INDEX AND DOCUMENT FOR ANY ADDITIONAL INFORMATION.

Prepared by:

Matthew J. Swett, Esquire
Pepper Hamilton LLP
3000 Two Logan Square
18th and Arch Streets
Philadelphia, PA 19103
215.981.4788

Return to:

Stephanie Zirpoli, Esquire
Ballard Spahr LLP
1735 Market Street, 51st Floor
Philadelphia, PA 19103
215.864.8715

MONTGOMERY COUNTY COMMISSIONERS REGISTRY
67-00-02512-00-4 WORCESTER TOWNSHIP
2750 MORRIS RD
MORRIS ROAD INVESTORS LP \$15.00
B 024 L U 069 3341 09/18/2014 JD

Parcel Number: 67-00-02512-004

SPECIAL WARRANTY DEED

THIS INDENTURE made the 16TH day of September, 2014, between MORRIS ROAD INVESTORS, L.P., a Pennsylvania limited partnership ("Grantor"), of the one part, and DIV-AR PROPERTY LP, a Delaware limited partnership ("Grantee"), of the other part.

WITNESSETH, that the said Grantor for and in consideration of the sum of Eighteen Million Three Hundred Thousand Dollars (\$18,300,000.00) lawful money of the United States of America, well and truly paid by the said Grantee, at or before the sealing and delivery hereof, the receipt whereof is hereby acknowledged, has granted, bargained and sold, released and confirmed, and by these presents does grant, bargain and sell, release and confirm unto the said Grantee, and its successors and assigns, the land as more fully described in Exhibit "A" attached hereto and made a part hereof and known as 2750 Morris Road, Lansdale, Worcester Township, Montgomery County, Philadelphia, Pennsylvania.

BEING the same premises that Visteon Systems, LLC, a Delaware limited liability company, successor by merger to Ford Electronics and Refrigeration Corporation, a Delaware corporation, by Special Warranty Deed dated November 11, 2005 and recorded December 12, 2005 with the Montgomery County Recorder of Deeds in Deed Book 5582, Page 1680, conveyed unto Morris Road Investors, L.P., the Grantor herein, and that Visteon Systems, LLC, a Delaware limited liability company, successor by merger to Ford Electronics and Refrigeration Corporation, a Delaware corporation, by Quit Claim Deed dated November 11, 2005 and recorded December 12, 2005 with the Montgomery County Recorder of Deeds in Deed Book 5582, Page 1688, conveyed unto Morris Road Investors, L.P., the Grantor herein.

UNDER AND SUBJECT to all currently valid and binding agreements, easements and restrictions of record.

TOGETHER with all and singular the buildings, improvements, ways, streets, alleys, driveways, passages, waters, water-courses, rights, liberties, privileges, hereditaments and appurtenances whatsoever unto the hereby granted premises belonging, or in anywise appertaining, and the reversions and remainders, rents, issues and profits thereof; and all the estate, right, title, interest, use, trust, property, possession, claim and demand whatsoever of the said Grantor as well at law as in equity, of, in, and to the same, including all inchoate rights, including, without limitation, inchoate rights of adverse possession.

TO HAVE AND TO HOLD the said lot or piece of ground described with the buildings and improvements thereon erected, hereditaments and premises hereby granted, or mentioned and intended so to be, with the appurtenances unto the said Grantee, and its successors and assigns to and for the only proper use and behoof of the said Grantee, and its successors and assigns, forever.

UNDER AND SUBJECT as aforesaid.

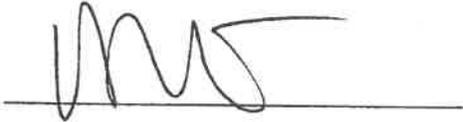
AND the said Grantor, for itself and its successors and assigns, does covenant, promise and agree, to and with the said Grantee, and its successors and assigns, by these presents, that the said Grantor and its successors and assigns, all and singular the hereditaments and premises hereby granted or mentioned and intended so to be, with the appurtenances, unto the said Grantee, and its successors and assigns, against the said Grantor, and its successors and assigns, and against all and every person or persons whomsoever lawfully claiming or to claim the same or any part thereof, by, from or under the said Grantor shall and will **SPECIALLY WARRANT** and forever **DEFEND**.

IN WITNESS WHEREOF, the party of the first part has hereunto set its hand and seal.
Dated the day and year first above written.

Witness:

MORRIS ROAD INVESTORS, L.P., a
Pennsylvania limited partnership

By: Bergen Morris Road, LLC,
its general partner



By: 
Name: _____
Title: **Barry Howard**
Chairman of the Board

CERTIFICATE OF RESIDENCE

The undersigned hereby certifies that the address of the within Grantee is

1041 U.S. Highway 202/206
Bridgewater, NJ 08807

For Grantee

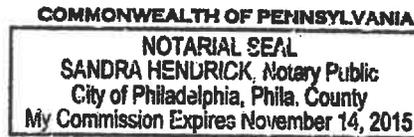
COMMONWEALTH OF PENNSYLVANIA :
 : SS
 COUNTY OF PHILADELPHIA :

On this, the 16th day of September, 2014, before me, the undersigned officer, personally appeared Barry Howard, who acknowledged himself to be the Chairman of the Board of BERGEN MORRIS ROAD, LLC, general partner of MORRIS ROAD INVESTORS, L.P., and that he, as such officer being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the limited liability company as the general partner of the limited partnership by himself as such officer.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Sandra Hendrick

 Notary Public



IN WITNESS WHEREOF, the party of the first part has hereunto set its hand and seal.
Dated the day and year first above written.

Witness:

**MORRIS ROAD INVESTORS, L.P., a
Pennsylvania limited partnership**

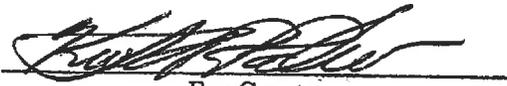
By: Bergen Morris Road, LLC,
its general partner

By: _____
Name: _____
Title: _____

CERTIFICATE OF RESIDENCE

The undersigned hereby certifies that the address of the within Grantee is

1041 U.S. Highway 202/206
Bridgewater, NJ 08807



For Grantee
Kurt R. Padavano

EXHIBIT A
Legal Description

ALL THAT CERTAIN tract or land with the improvements erected thereon,

SITUATE in Worcester Township, Montgomery County, Pennsylvania, bounded and described in accordance with an AL T A/ACSM Land Title Survey prepared by Control Point Associates, Inc. dated 9/27/2005 and last revised 11/14/2005 (file No. CPO5112), as follows:

BEGINNING at the intersection of the title line in the bed of Schultz Road (A.K.A. L.R. 46130, 33 foot wide legal right-of-way), with the southwesterly required right-of-way line of Morris Road (A.K.A. L.R. 46159, 33 foot wide legal right-of-way), and from said point of beginning running, thence;

The following eight (8) courses and distances along the southwesterly required right-of-way line of Morris Road:

1. South 53 degrees 27 minutes 48 seconds East, a distance of 152.27 feet to a point, thence;
2. North 36 degrees 32 minutes 12 seconds East, a distance of 5.00 feet to a point, thence;
3. South 53 degrees 27 minutes 48 seconds East, a distance of 300.00 feet to a point, thence;
4. South 36 degrees 32 minutes 12 seconds West, a distance of 5.00 feet to a point, thence;
5. South 53 degrees 27 minutes 48 seconds East, a distance of 350.00 feet to a point, thence;
6. North 36 degrees 32 minutes 12 seconds East, a distance of 5.00 feet to a point, thence;
7. South 53 degrees 27 minutes 48 seconds East, a distance of 359.38 feet to a point, thence;
8. South 54 degrees 00 minutes 00 seconds East, a distance of 561.50 feet to a point, thence;

The following two (2) courses and distances along the dividing line between Unit 69, Block 24, lands now or formerly Ford Electronics and Refrigeration Corporation and Unit 2, Block 24, lands now or formerly Jung Hee Shun:

9. South 35 degrees 48 minutes 00 seconds West, a distance of 354.41 feet to a point, thence;
10. South 53 degrees 42 minutes 00 seconds East, a distance of 175.00 feet to a point, thence;

The following two (2) courses and distances along the dividing line between Unit 69, Block 24 and Unit 27, Block 24, lands now or formerly Ulrich:

11. South 35 degrees 48 minutes 00 seconds West, a distance of 220.10 feet to a point, thence;
12. South 53 degrees 45 minutes 00 seconds East, a distance of 148.10 feet to a point, thence;

The following two (2) courses and distances along the dividing line between Unit 69, Block 24 and Unit 3, Block 24, lands now or formerly Caltabiano:

13. South 36 degrees 48 minutes 00 seconds West, a distance of 200.00 feet to a point, thence;
14. South 53 degrees 32 minutes 00 seconds East, a distance of 325.00 feet to a point on the centerline of Berks Road (A.K.A. T-379, 33 foot wide legal right-of-way), thence;

The following two (2) courses and distances along the centerline of Berks Road and title line:

15. South 36 degrees 48 minutes 00 seconds West, a distance of 458.88 feet to a point, thence;
16. South 37 degrees 07 minutes 00 seconds West, a distance of 1,205.40 feet to a point, thence;
17. Along the dividing line between Unit 69, Block 24 and Unit 5, Block 24, lands now or formerly Detwiler, North 54 degrees 20 minutes 00 seconds West, a distance of 227.05 feet to a point on the easterly required right-of-way line of the Northeast Extension of the Pennsylvania Turnpike, thence;

The following thirteen (13) courses and distances along the easterly required right-of-way line of the Northeast Extension of the Pennsylvania Turnpike:

18. North 17 degrees 50 minutes 15 seconds West, a distance of 240.00 feet to a point, thence;
19. North 14 degrees 01 minute 25 seconds West, a distance of 150.33 feet to a point, thence;
20. North 17 degrees 50 minutes 15 seconds West, a distance of 200.00 feet to a point, thence;
21. North 25 degrees 25 minutes 55 seconds West, a distance of 151.33 feet to a point, thence;
22. North 17 degrees 50 minutes 15 seconds West, a distance of 300.00 feet to a point, thence;
23. North 14 degrees 01 minute 25 seconds West, a distance of 150.33 feet to a point, thence;
24. North 17 degrees 50 minutes 15 seconds West, a distance of 161.36 feet to a point of curvature, thence;
25. Along the arc of a circle curving to the left, having a radius of 11,569.19 feet, a central angle of 00 degrees 11 minutes 36 seconds, an arc length of 39.01 feet, a chord bearing North 17 degrees 56 minutes 03 seconds West and a chord distance of 39.01 feet to a point of tangency, thence;

26. North 22 degrees 18 minutes 33 seconds West, a distance of 151.73 feet to a point, thence;
27. Along the arc of a circle curving to the left, having a radius of 11,559.19 feet, a central angle of 02 degrees 30 minutes 00 seconds, an arc length of 504.36 feet, a chord bearing North 20 degrees 01 minute 51 seconds West and a chord distance of 504.32 feet to a point, thence;
28. North 17 degrees 45 minutes 07 seconds West, a distance of 151.73 feet to a point, thence;
29. Along the arc of a circle curving to the left, having a radius of 11,569.19 feet, a central angle of 01 degrees 30 minutes 02 seconds, an arc length of 302.99 feet, a chord bearing North 22 degrees 43 minutes 01 seconds West and a chord distance of 302.98 feet to a point, thence;
30. North 23 degrees 05 minutes 20 seconds West, a distance of 101.86 feet to a point on the centerline of Schultz Road, thence;
31. Along the centerline of Schultz Road and title line, North 37 degrees 29 minutes 00 seconds East, a distance of 968.99 feet to the point and place of beginning.

CONTAINING 3,790,359 square feet or 87.015 acres.

EXCEPTING THEREOUT AND THEREFROM all that certain parcel as set forth in Notice of Condemnation in Deed Book 5891 Page 2803 and Declaration of Taking in Deed Book 5891 Page 2804.

BEING PARCEL NUMBER: 67-00-02512-004



4259 W. Swamp Road
Suite 410
Doylestown, PA 18902

www.cksengineers.com
215.340.0600

January 10, 2020
Ref: # 7535

Worcester Township
PO Box 767
Worcester, PA 19490-0767

Attention: Tommy Ryan, Township Manager

Reference: 2750 Morris Road - Conditional Use Application - Amazon Parking

Dear Mr. Ryan:

I have completed my review of the Application for Conditional Use submitted by Advanced Realty Management on behalf of Amazon in conjunction with utilizing excess parking spaces on the property for Amazon delivery vehicles and employee parking. The Conditional Use Application was filed on December 19, 2019 and also included a one (1) sheet plan which was prepared by CEC Inc., of Cincinnati, Ohio on behalf of Amazon. The sheet is labeled "Drawing No. SSP - 2 "Parking Lot Reconfiguration".

The Conditional Use Application is requesting that Amazon be permitted to park delivery vans and employee vehicles on a portion of the existing parking lot currently not being utilized by the property owner. The proposed parking areas are designated on the plan as "Southwest Parking Lot", and the "Berks Road Parking Lot". The proposal is to park 326 delivery vans on the property. Amazon employees would arrive at the parking lot in their personal vehicles and switch to their assigned delivery vans. From there, the delivery vans will drive to a warehouse location in Towamencin Township, and be loaded for the drivers to proceed with deliveries. At the end of the driver's shift, excess packages would be dropped off at the Towamencin warehouse before returning the van to the Morris Road parking areas. Employees would then drive home in their personal vehicles.

As part of this proposed use, Amazon is proposing to re-stripe the existing parking lots to accommodate their delivery vans and employee vehicles. The proposed re-striping of both parking lots is shown on the parking lot reconfiguration plan. Due to the size of the delivery vans, all parking spaces are dimensioned at 11' x 27', which is larger than the township standard of 10' x 20'.

In conjunction with this Conditional Use Application, I visited the site on January 3, 2020. I walked the entire lot area and took numerous photographs of some physical features around the parking lots. Base on my evaluation of the site and an understanding of the proposed use, I offer the following comments:

January 10, 2020

Ref: # 7535

Page 2

1. There are three (3) missing light posts within the Berks Road Parking Lot that need to be replaced. The actual concrete bases are present, but there is no light post on the base. These three light posts should be reinstalled to match the existing lighting fixtures.
2. The applicant should verify the operation of all light fixtures in the designated parking areas. Also, a determination should be made as how the lighting will be controlled. Will it be on for 24 hours, or just during the hours of operation?
3. The plan submitted with the application shows the location of the lighting fixtures within the existing parking areas. However, there are numerous light fixtures on the property that are not shown. Specifically, the two (2) light fixtures at the south end of the Berks Road parking lot are not shown. In addition, there are numerous lights along the access road which will pass between the two (2) parking areas. These lights should also be shown since they would be illuminated during evening hours in conjunction with this project.
4. During my site visit, there were sixty-two (62) cars parked in a portion of the southwest parking lot. Upon further discussion with the applicant at our recent meeting, it was determined that the four parking lanes on the north side of the parking lot are to remain designated for the existing employees of the building adjacent to the parking lot. These existing areas will have adequate capacity to handle the existing parking need of the current employees.
5. There are numerous areas in the parking lots that are in need of repair. There is significant pot hole in the entrance road to the south parking lot and numerous portions of the parking lots are "alligatored" and in poor condition. There is concern that once there is an increase in traffic flow and parking in these areas, the condition of the parking areas will deteriorate further. It is suggested that these areas be identified and spot repairs be made to improve the condition of the parking lot.
6. The applicant should indicate how the existing parking lot will be re-striped. Is there going to be a new surface coating over the entire lot, or will the existing lines be eradicated before the new line striping is placed?
7. A summary table should be added to the parking lot reconfiguration plan to summarize the parking of the entire parcel. Information from the last approved land development plan contains the most recent parking requirements and parking information. This should be added to the existing plan along with the modification of parking spaces as required for this proposed project. This table should verify that this proposed project will not reduce the overall number of parking spaces required by zoning and the original approval of this parcel.

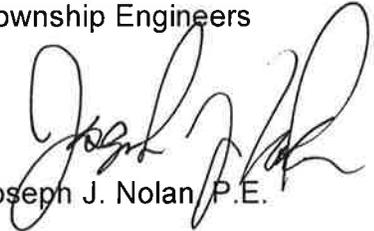
January 10, 2020
Ref: # 7535
Page 3

8. The applicant should place traffic control signs and markings throughout the parking lots and access roads to control traffic flow through the entire site. The Township's traffic consultant should approve the signage and directional information provided by the applicant.
9. There is a discrepancy between the number of new parking spaces identified on the plan (326) and some of the information provided in the conditional use application. The applicant should review these numbers and verify which set of numbers are correct and make certain that these numbers are use consistent throughout the application and on the plan.
10. The Township's traffic engineer will be submitting a separate review letter in conjunction with traffic and traffic conditions on and around the property. His letter should also be a part of the Conditional Use Record and any comments should be considered accordingly .

The above represents all comments on my review of the Conditional Use Application. Included with this letter is a series of photographs that were taken around the property to assist in understanding some of the comments set forth in my letter

Please contact me if you have any questions or need additional assistance on this project.

Very truly yours,
CKS ENGINEERS, INC.
Township Engineers


Joseph J. Nolan, P.E.

JJN/paf
Enclosure

cc: Robert Brant, Esq., Township Solicitor
J. Edmund Mullin, Esq.
DIV-AR Property, LP.
Jeffrey T. DeZort, P.E., CESCO
File





















McMAHON ASSOCIATES, INC.
425 Commerce Drive, Suite 200
Fort Washington, PA 19034
p 215-283-9444 | f 215-283-9446

January 9, 2020

Mr. Tommy Ryan
Township Manager
Worcester Township
1721 Valley Forge Road
P.O. Box 767
Worcester, PA 19490

PRINCIPALS
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Jason T. Adams, P.E., PTOE
Christopher K. Bauer, P.E., PTOE

FOUNDER
Joseph W. McMahan, P.E.

RE: **Traffic Review #1**
2750 Morris Road – Amazon Proposed Parking Facility
Worcester Township, Montgomery County, PA
McMahon Project No. 819940.11

Dear Tommy:

Per the request of the Township, McMahon Associates, Inc. (McMahon) has prepared this review letter, which summarizes our initial review of the proposed off-site parking facility for Amazon vans and drivers to be located at 2750 Morris Road (S.R. 2001) in Worcester Township, Montgomery County, PA. It is our understanding at this time that the proposed off-site parking facility will be located in a portion of the existing, underutilized 611 space eastern parking lot at 2750 Morris Road (S.R. 2001) and will be used to accommodate up to 150 delivery vans and 125 employee vehicles (numbers to be further confirmed by Amazon) designated to/from the existing Amazon facility located in Towamencin Township, Montgomery County, PA. Access to the site for use of its parking spaces will be provided via the existing, signalized full-movement driveway to Morris Road (S.R. 2001), as well as the existing, unsignalized left-in/right-out only driveway to Schultz Road.

The following documents were reviewed and/or referenced in preparation of our traffic review:

- Memorandum for 2750 Morris Road, Lansdale, PA Proposed Parking, prepared by Dilworth Paxson, LLP, dated October 22, 2019.
- Traffic Assessment Memorandum – 2750 Morris Road Parking Facility, prepared by NV5 Engineering, dated October 29, 2019.
- Zoning Determination Letter for 2750 Morris Road, dated November 13, 2019.
- Parking Lot Reconfiguration Drawing No. SSP-2, prepared by CEC Civil & Environmental Consultants, Inc., dated November 2019.

Based on our review of the submitted documents noted above, and attending a staff/consultants meeting at the Township on January 8, 2020 to discuss technical items about the project, McMahon offers the following comments for consideration by the Township and action by the applicant:

1. The applicant should have a qualified, professional transportation engineer complete a Traffic Impact Assessment (TIA) for this site in order to evaluate the access and efficiency of adjacent signal operations near the site in order to effectively accommodate the additional traffic at this location for the Amazon off-site parking operations. The study should be sure to include an evaluation and analysis of existing conditions and opening year conditions then of the site, both without and with the additional traffic for the Amazon off-site parking facility at least during the combined commuter peak/site peak weekday morning (6:45 AM to 9:15 AM) and commuter peak/site peak weekday afternoon (4:00 PM to 6:30 PM) peak hours at the existing site access intersections with Morris Road (S.R. 2001) and Schultz Road, as well as at the site adjacent signalized intersection of Morris Road (S.R. 2001) and Schultz Road. Since access to the off-site parking facility will be provided via a state road, the results of the TIA and signal evaluation will need to be prepared in accordance with PennDOT guidelines also, and provided to PennDOT for review and approvals if improvements are to be implemented to mitigate, optimize and accommodate the new trips being generated.
2. The traffic signal at Morris Road (S.R. 2001) and the 2750 Morris Road site access is currently in flash mode. The applicant must provide details in the TIA on whether this traffic signal is proposed to remain in flash mode or if the intent is to have it return to becoming a fully-functional traffic signal once the additional Amazon vehicles are utilizing this new off-site facility location. Our expectation is that the applicant may prefer the latter for its operations and best functioning of the intersections, if signal warrants, which must also be evaluated, can be met.
3. PennDOT must approve any modifications to either traffic signal permit plan along Morris Road (S.R. 2001), as well as the Township, and this includes any changes if required by PennDOT to bring any intersection into better ADA conformance. A PennDOT TE-160 form must also be completed by the applicant for approval by the Board of Supervisors by resolution for any signal modifications.
4. The applicant's engineer must also evaluate the existing auxiliary turn lane lengths at the site access intersections with Morris Road (S.R. 2001) and Schultz Road to determine if the existing turn bay lengths are adequate to accommodate the increase in traffic expected with the off-site parking facility, especially since site operations may bring platoons of vans to/from the site and these lanes.
5. The traffic assessment memo states that up to 150 parking spaces will be provided for delivery vans at the off-site parking facility and that the off-site parking facility is expected to generate approximately 228 delivery van trips per day which equates to 114 delivery vans. The applicant must clarify the number of delivery vans that are expected to be parked at the off-site facility, as well as employee vehicles to confirm the proposed parking.
6. The applicant provided a preliminary plan sheet that was discussed at the January 8, 2020 technical meeting which indicated where the Amazon delivery van and employee vehicle parking will be located in the existing parking lot at 2750 Morris Road (S.R. 2001). The plan submission must also include all directional and regulatory signing to improve circulation and safety, pavement markings, and pedestrian accommodations for the parking areas to be utilized and for the outer circulation drive for the site.

7. An overall plan of the site should be provided showing the circulation pattern of both employee vehicles and Amazon vans from and to the proposed off-site parking lot. While the applicant has indicated that vans may exit onto Schultz Road to access the traffic signal at Morris Road, there is more possibility that the employee vehicles will want to use the site access to/from Morris Road when arriving and departing from their work shifts at this lot. The TIA should account for this in its use of the access points to/from Morris Road.
8. Currently the building at 2750 Morris Road (S.R. 2001) is not fully occupied (i.e., approximately 68,000 sf being vacant), nor are the parking areas being used at full capacity. There may be more parking than required on the site itself, but it is unknown whether the location of vacant parking for the vacancy(s) will be sufficient and ideal. Therefore, the applicant must provide details on how the proposed Amazon delivery van and employee vehicle parking will be accommodated on the 2750 Morris Road (S.R. 2001) property if the existing building at 2750 Morris Road (S.R. 2001) is redeveloped, or the building space operates at full capacity in the future.
9. We request that the applicant and traffic engineer for the project prepare a narrative in the Transportation Impact Assessment (TIA) regarding the onsite operations of Amazon employees and vans, how vans are deployed to/from the distribution warehouse, and how and where these operations will be managed on the off-site location at 2750 Morris Road. The applicant's traffic engineer should drive the expected routes to and from this site and the proposed Amazon facility in Towamencin Township **during the AM and PM peak commuter hours**, and comment on how the traffic associated with the use of this off-site parking facility may impact major off-site intersections operations during these times along the expected travel routes.
10. The applicant must provide and confirm the available and necessary sight distance measurements for the unsignalized driveway along Schultz Road as required by **Section 130-16.E(5) of the Subdivision and Land Development Ordinance**. While this driveway is an existing access, the sight distance to the left for vehicles exiting the site, and looking ahead for vehicles entering the site must be confirmed, and must be no less than PennDOT minimum safe stopping sight distances. Otherwise, alterations to achieve the necessary sight distance will be required, especially since the site may also be used for the education of children as one of its tenants. The access must have all the signage necessary to prevent prohibited movements, so if signs are missing that should be there, they should be replaced.
11. Since Morris Road (S.R. 2001) is a State roadway, a State Highway Occupancy Permit (HOP) will be required for any modifications to the Morris Road (S.R. 2001) frontage within the right-of-way. The Township and our office must be copied on all plan submissions and correspondence between the applicant and PennDOT and invited to any and all meetings between these parties.
12. The Memorandum dated October 29, 2019, prepared by the NV5 transportation consultants and submitted for Township review, indicates on page 4 of 5, under item #2 and #3 under the **Preliminary Traffic Review Findings** that:

"The parking facility is expected to generate 456 trips per day with a maximum of 80 trips from 5:00-6:00pm. The site is subject to Traffic Impact Fees assessed by Worc(h)ester Township. The fee is assessed on the new PM peak hour trips at the rate of \$3,977/trip. Based on available information, a maximum fee of \$318,160 could be assessed."

According to the Township's Roadway Sufficiency Analysis, the proposed off-site parking facility for Amazon vans and van drivers is located in Transportation Service Area North, which indeed has a corresponding transportation impact fee of \$3,977 per "new" weekday afternoon peak hour trip. The use on the property is viewed as a new outparcel-like use, operating its business from the parking lot outside the existing building. Thus, the applicant will be required to pay a Transportation Impact Fee in accordance with the Township's Transportation Impact Fee Ordinance, and with final determination by the Township Solicitor and Board of Supervisors. Based on trip generation information provided in the traffic assessment memorandum, the off-site parking facility is projected to generate approximately 80 total "new" trips during the weekday afternoon peak hour, which results in a **transportation impact fee of \$318,160**. However, the requested TIA must verify the afternoon peak hour trips, as we understand it may now vary from the memo.

13. In all subsequent submissions, the applicant's engineer must provide a response letter that describes how each specific review comment has been addressed, where each can be found in the plan set or materials, as opposed to providing general responses. This will aid in the detailed review and subsequent review timeframes.

We trust that this review letter responds to your request. If you or the Township have any questions, or require clarification, please contact me or Chad Dixon, AICP.

Sincerely,



Casey A. Moore, P.E
Executive Vice President – Corporate Operations

CAM/CED/BMJ
Attachment

cc: Joseph Nolan, P.E., CKS Engineers (Township Engineer)
Robert Brant, Esq. (Township Solicitor)
J. Edmund Mullin, Esq. (Hamburg, Rubin, Mullin, Maxwell & Lupin, PC)
Gina Gilgo, P.E. (NV5 Engineering)
Jeff DeZort, P.E. (CESO, Inc.)
Greg Richardson, P.E. (Traffic Planning & Design)
John Miller-Simard (Amazon)
Kurt Padavano (Advance Realty Management, Inc.)



January 21, 2020

Mr. Tommy Ryan, Manager
Worcester Township
1721 Valley Forge Road, Box 767
Worcester, Pennsylvania 19490

Re: MCPC #19-0007-002
Plan Name: 2750 Morris Road – Building “D” South
(1 lot comprising 81.01 acres)
Situates: Moore Road and Schultz Road
Worcester Township

Dear Mr. Ryan:

We have reviewed the above-referenced conditional use application as you requested on January 1, 2020. We forward this letter as a report of our review.

BACKGROUND

The Applicant, DIV-AR Property LP, is seeking conditional use approval to utilize an existing parking lot for vans, trucks and employee parking totaling 611 spaces. The proposal includes the restriping of several spaces to angled parking, to increase parking capacity. The lot will be used not as accessory to the building on the lot, but to the Amazon complex in Towamencin Township, with no loading or off-loading of merchandise or deliveries proposed at this site.

RECOMMENDATION

The Montgomery County Planning Commission (MCPC) generally supports the Applicant’s proposal; however, in the course of our review we have identified issues which the Township may wish to consider prior to final approval. Our comments are as follows:

REVIEW COMMENTS

TRANSPORTATION

1. Traffic Impact Study. A Traffic Impact Study was not submitted with this application for review, but we presume one has been submitted to the Township. Such a study should consider the timing of trips, especially if there will be significant off-peak traffic predicted.



2. Parking Capacity. The Applicant should document on the plans the existing capacity of all parking on the site and certify that the required parking, according to the existing occupied and vacant building space as per the Zoning Code, is maintained on the lot.
3. Designated Routes. The Township may wish to work with the Applicant to identify specific routes from the Towamencin facility to this parking lot, in order to reduce cut-through traffic through residential areas. In addition, such identification would indicate which roads and intersections would most be affected by the increase in trips in this part of the Township, refining the Traffic Impact Study results.

CONCLUSION

We wish to reiterate that MCPC generally supports the Applicant's proposal, but we believe that our suggested revisions will better achieve the Township's planning objectives.

Please note that the review comments and recommendations contained in this report are advisory to the municipality and final disposition for the approval of any proposal will be made by the municipality.

Should the governing body approve a final plat of this proposal, the Applicant must present the plan to our office for seal and signature prior to recording with the Recorder of Deeds office. A paper copy bearing the municipal seal and signature of approval must be supplied for our files.

Sincerely,



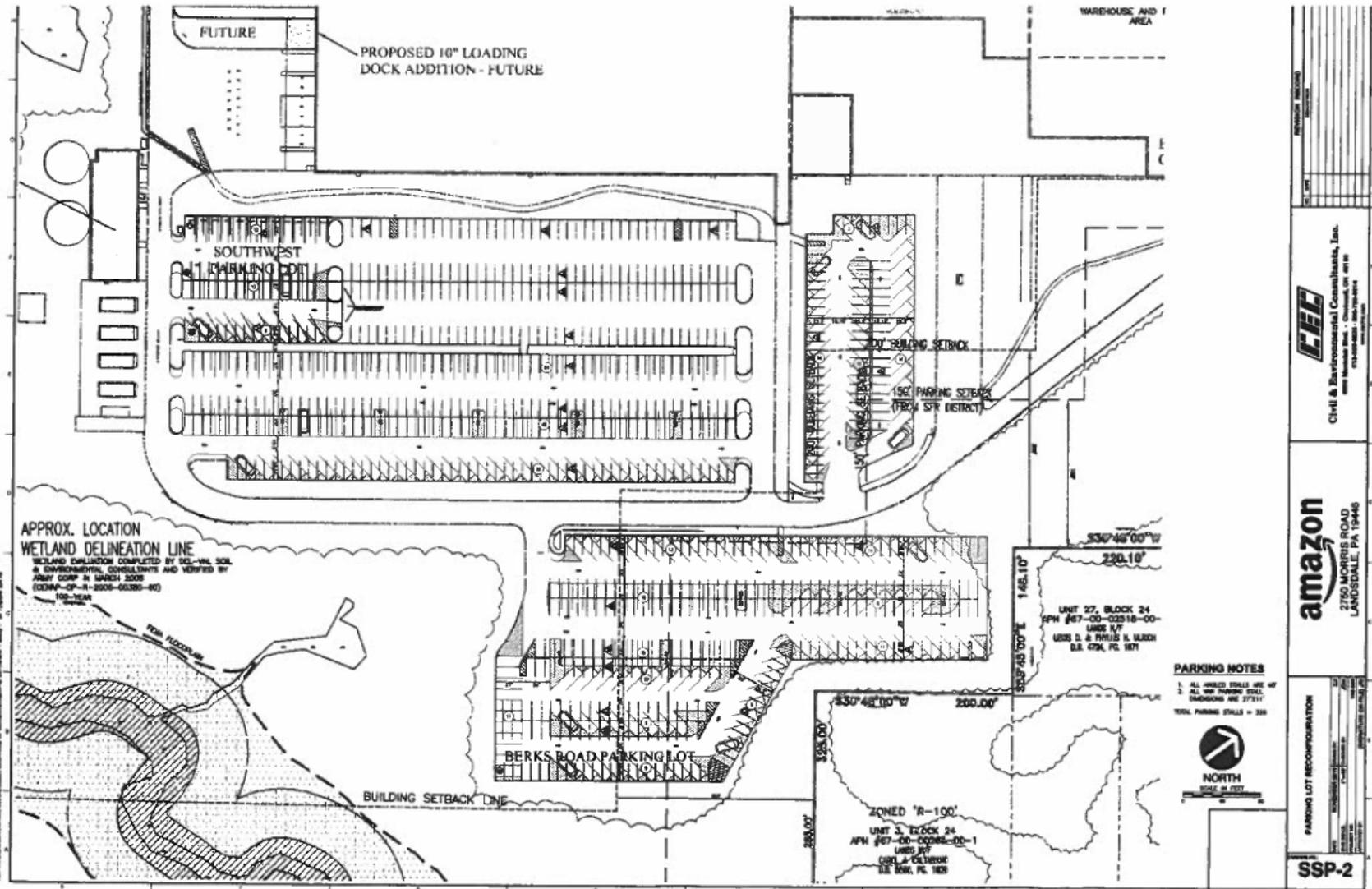
Brian J. Olszak, Senior Planner
bolszak@montcopa.org - 610-278-3737

c: DIV-AR Property LP, Applicant
J. Edmund Mullin, Applicant's Representative
Andrew R. Raquet, Asst. Township Zoning Officer

Attachments: 1. Reduced copy of plan
2. Aerial Map

APPENDIX

Attachment 1: Reduced Copy of Plan





TRAFFIC PLANNING AND DESIGN, INC.

WWW.TRAFFICPD.COM

February 5, 2020

Mr. Tommy Ryan, Mgr.
Worcester Township
1721 Valley Forge Road
P.O. Box 767
Worcester, PA 19490

RE: RESPONSE LETTER – TRAFFIC REVIEW #1
2750 Morris Road – Amazon Proposed Parking Facility
Worcester Township, Montgomery County, PA
TPD Job #ARMI.00001
McMahon Project #819940.11

Dear Mr. Ryan:

This letter pertains to the Proposed Off-Site Parking Facility for Amazon located at 2750 Morris Road (S.R. 2001) in Worcester Township, Montgomery County, PA. Traffic Planning and Design, Inc. (TPD) has prepared this response letter to address the Traffic Review comments prepared by McMahon Associates, on behalf of the township, in a letter dated January 9, 2020 (attached for reference). For the discussion below, the review comments are shown in italic type, with the corresponding TPD response shown in bold type:

REVIEW COMMENTS

- 1. The applicant should have a qualified, professional transportation engineer complete a Traffic Impact Assessment (TIA) for this site in order to evaluate the access and efficiency of adjacent signal operations near the site in order to effectively accommodate the additional traffic at this location for the Amazon off-site parking operations. The study should be sure to include an evaluation and analysis of existing conditions and opening year conditions then of the site, both without and with the additional traffic for the Amazon off-site parking facility at least during the combined commuter peak/site peak weekday morning (6:45 AM to 9:15 AM) and commuter peak/site peak weekday afternoon (4:00 PM to 6:30 PM) peak hours at the existing site access intersections with Morris Road (S.R. 2001) and Schultz Road, as well as at the site adjacent signalized intersection of Morris Road (S.R. 2001) and Schultz Road. Since access to the off-site parking facility will be provided via a state road, the results of the TIA and signal evaluation will need to be prepared in accordance with PennDOT guidelines also, and provided to PennDOT for review and approvals if improvements are to be implemented to mitigate, optimize and accommodate the new trips being generated.*

RESPONSE: Will Comply

2. *The traffic signal at Morris Road (S.R. 2001) and the 2750 Morris Road site access is currently in flash mode. The applicant must provide details in the TIA on whether this traffic signal is proposed to remain in flash mode or if the intent is to have it return to becoming a fully-functional traffic signal once the additional Amazon vehicles are utilizing this new off-site facility location. Our expectation is that the applicant may prefer the latter for its operations and best functioning of the intersections, if signal warrants, which must also be evaluated, can be met.*

RESPONSE: Will Comply – A Traffic Signal Warrant Analysis is provided in the TIS. The results of this analysis show that signal actuation is not warranted under 2025 Projected Conditions. Therefore, signalization is not assumed in the TIS.

3. *PennDOT must approve any modifications to either traffic signal permit plan along Morris Road (S.R. 2001), as well as the Township, and this includes any changes if required by PennDOT to bring any intersection into better ADA conformance. A PennDOT TE-160 form must also be completed by the applicant for approval by the Board of Supervisors by resolution for any signal modifications.*

RESPONSE: So Noted/Will Comply. Traffic signal timings are recommended in the TIA to mitigate existing deficiencies and the impact of the proposed use.

4. *The applicant's engineer must also evaluate the existing auxiliary turn lane lengths at the site access intersections with Morris Road (S.R. 2001) and Schultz Road to determine if the existing turn bay lengths are adequate to accommodate the increase in traffic expected with the off-site parking facility, especially since site operations may bring platoons of vans to/from the site and these lanes.*

RESPONSE: Will Comply – The analyses in the TIA have accounted for the increase in the number of vans and their associated vehicle lengths.

5. *The traffic assessment memo states that up to 150 parking spaces will be provided for delivery vans at the off-site parking facility and that the off-site parking facility is expected to generate approximately 228 delivery van trips per day which equates to 114 delivery vans. The applicant must clarify the number of delivery vans that are expected to be parked at the off-site facility, as well as employee vehicles to confirm the proposed parking.*

RESPONSE: Will Comply – The TIA provides the projected number of vans and employees based on the most recent site plans.

6. *The applicant provided a preliminary plan sheet that was discussed at the January 8, 2020 technical meeting which indicated where the Amazon delivery van and employee vehicle parking will be located in the existing parking lot at 2750 Morris Road (S.R. 2001). The plan submission must also include all directional and regulatory signing to improve circulation and safety, pavement markings, and pedestrian accommodations for the parking areas to be utilized and for the outer circulation drive for the site.*

RESPONSE: Will Comply – The requested plan(s) will be provided under separate cover by the Applicant's site engineer. Appendix A of the TIA includes reduced size plans.

7. *An overall plan of the site should be provided showing the circulation pattern of both employee vehicles and Amazon vans from and to the proposed off-site parking lot. While the applicant has indicated that vans may exit onto Schultz Road to access the traffic signal at Morris Road, there is more possibility that the employee vehicles will want to use the site access to/from Morris Road when arriving and departing from their work shifts at this lot. The TIA should account for this in its use of the access points to/from Morris Road.*

RESPONSE: Will Comply – see response to Comment 6.

8. *Currently the building at 2750 Morris Road (S.R. 2001) is not fully occupied (i.e., approximately 68,000 sf being vacant), nor are the parking areas being used at full capacity. There may be more parking than required on the site itself, but it is unknown whether the location of vacant parking for the vacancy(s) will be sufficient and ideal. Therefore, the applicant must provide details on how the proposed Amazon delivery van and employee vehicle parking will be accommodated on the 2750 Morris Road (S.R. 2001) property if the existing building at 2750 Morris Road (S.R. 2001) is redeveloped, or the building space operates at full capacity in the future.*

RESPONSE: Will Comply – The TIA accounts for the vacant space in future (no build) conditions.

9. *We request that the applicant and traffic engineer for the project prepare a narrative in the Transportation Impact Assessment (TIA) regarding the onsite operations of Amazon employees and vans, how vans are deployed to/from the distribution warehouse, and how and where these operations will be managed on the off-site location at 2750 Morris Road. The applicant's traffic engineer should drive the expected routes to and from this site and the proposed Amazon facility in Towamencin Township during the AM and PM peak commuter hours, and comment on how the traffic associated with the use of this off-site parking facility may impact major off-site intersections operations during these times along the expected travel routes.*

RESPONSE: As requested, the TIA includes a discussion regarding the proposed on-site operations, peak hours of operations, and expected routes of travel for the vans and employee vehicles (See Appendix A).

10. *The applicant must provide and confirm the available and necessary sight distance measurements for the unsignalized driveway along Schultz Road as required by Section 130-16.E(5) of the Subdivision and Land Development Ordinance. While this driveway is an existing access, the sight distance to the left for vehicles exiting the site, and looking ahead for vehicles entering the site must be confirmed, and must be no less than PennDOT minimum safe stopping sight distances. Otherwise, alterations to achieve the necessary sight distance will be required, especially since the site may also be used for the education of children as one of its tenants. The access must have all the signage necessary to prevent prohibited movements, so if signs are missing that should be there, they should be replaced.*

RESPONSE: The TIA includes a sight distance analysis for each of the existing driveways that will be utilized by the proposed use.

11. *Since Morris Road (S.R. 2001) is a State roadway, a State Highway Occupancy Permit (HOP) will be required for any modifications to the Morris Road (S.R. 2001) frontage within the right-of-way. The Township and our office must be copied on all plan submissions and correspondence between the applicant and PennDOT and invited to any and all meetings between these parties.*

RESPONSE: So Noted/Will Comply.

12. *The Memorandum dated October 29, 2019, prepared by the NV5 transportation consultants and submitted for Township review, indicates on page 4 of 5, under item #2 and #3 under the Preliminary Traffic Review Findings that:*

"The parking facility is expected to generate 456 trips per day with a maximum of 80 trips from 5:00-6:00pm. The site is subject to Traffic Impact Fees assed by Worc(h)ester Township. The fee is assessed on the new PM peak hour trips at the rate of \$3,977/trip. Based on available information, a maximum fee of \$318,160 could be assessed."

According to the Township's Roadway Sufficiency Analysis, the proposed off-site parking facility for Amazon vans and van drivers is located in Transportation Service Area North, which indeed has a corresponding transportation impact fee of \$3,977 per "new" weekday afternoon peak hour trip. The use on the property is viewed as a new outparcel-like use, operating its business from the parking lot outside the existing building. Thus, the applicant will be required to pay a Transportation Impact Fee in accordance with the Township's Transportation Impact Fee Ordinance, and with final determination by the Township Solicitor and Board of Supervisors. Based on trip generation information provided in the traffic assessment memorandum, the off-site parking facility is projected to generate approximately 80 total "new" trips during the weekday afternoon peak hour, which results in a transportation impact fee of \$318,160. However, the requested TIA must verify the afternoon peak hour trips, as we understand it may now vary from the memo.

RESPONSE: So Noted. The Applicant respectfully requests the ability to further negotiate this impact fee at a later date.

13. *In all subsequent submissions, the applicant's engineer must provide a response letter that describes how each specific review comment has been addressed, where each can be found in the plan set or materials, as opposed to providing general responses. This will aid in the detailed review and subsequent review timeframes.*

RESPONSE: So noted/Will Comply.

We trust that these responses adequately address the traffic-related comments. If you require additional information, please feel free to contact us.

Sincerely,

TRAFFIC PLANNING AND DESIGN, INC.



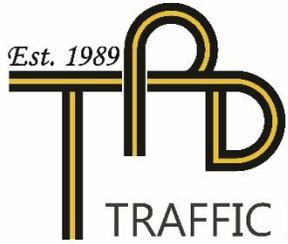
Robert G. Richardson, P.E.

Executive Vice President

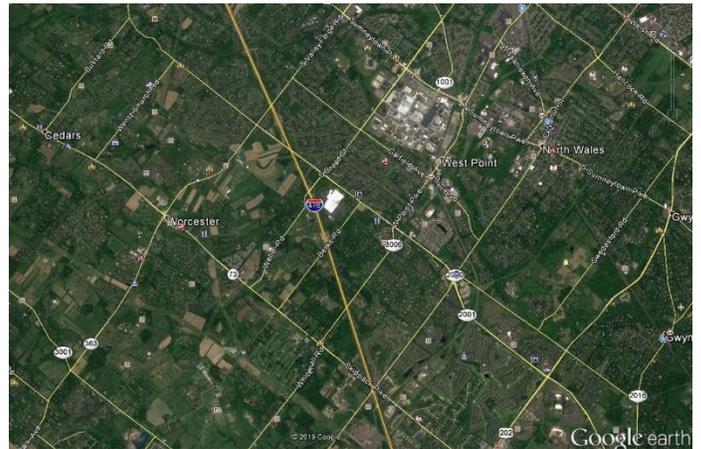
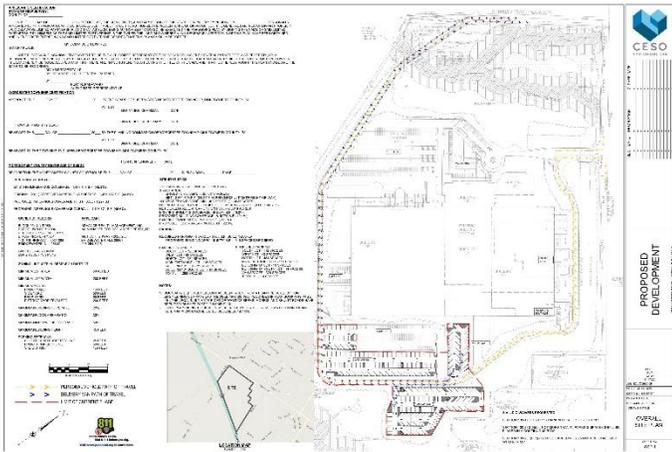
grichardson@trafficpd.com

Attachment: 01/09/2020 McMahan Review Letter

cc: Casey Moore, P.E. – McMahan Associates
Joe Nolan, P.E. – CKS Associates
Kimberley David, Esq. - Amazon
Edmund Mullin, Esq. - HRMML
Kurt Padavano – Advance Real Estate Management
Jeff De Zort, P.E. - CESO
TPD File



TRAFFIC PLANNING AND DESIGN, INC.



Amazon Parking Facility
Transportation Impact Assessment
Worcester Township, Montgomery County, PA

For Submission To:
Worcester Township, Montgomery County, PA

AMAZON PARKING FACILITY DEVELOPMENT TRANSPORTATION IMPACT ASSESSMENT

FOR SUBMISSION TO:

Worcester Township, Montgomery County, PA

Prepared For:

Amazon.com c/o

Advance Realty Management, Inc.

Mr. Kurt R. Padavano

1420 U.S. Route 206

Suite 200

Bedminster, NJ 07921

February 5, 2020

TPD # ARMI.00001

Prepared By:

Traffic Planning and Design, Inc.

Sanatoga Commons

2500 East High Street, Suite 650

Pottstown, Pennsylvania 19464

Phone: (610) 326-3100

Fax: (610) 326-9410

E-mail: TPD@TrafficPD.com

Web Site: www.trafficpd.com



Greg Richardson, P.E.

Executive Vice President

Pennsylvania License Number 044727

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EXECUTIVE SUMMARY

The purpose of this study is to examine the potential traffic impact associated with the Proposed Amazon Parking Facility on the roadway network in Worcester Township, Montgomery County, Pennsylvania. Based on this evaluation, the following conclusions were reached:

- The Proposed Site is located at 2750 Morris Road, on the southeastern quadrant of the intersection of Morris Road (SR 2001) and South Broad Street (SR 2002)/Schultz Road. The Existing Site consists of a total of 667,019 sf of warehouse/office space, of which approximately 68,000 sf was vacant at the time this study was performed.
- The Proposed Site will consist of an off-site parking facility for an existing Amazon Facility located in Towamencin Township (to the northwest at 2001 Gehman Road). A portion of the existing parking field at the 2750 Morris Road property will be utilized to stage Amazon delivery vans and employee vehicles
- The site will be served by two (2) existing driveway locations as follows:
 - One (1) Full-Access Driveway to Morris Road (SR 2001). **The access is signalized. However, the signal is not currently activated and operates in a flashing yellow/red mode.**
 - One (1) Left-in/Right-out Driveway to Schultz Road. **All truck traffic is limited to this driveway location.**
- The measured sight distances at the existing site driveways exceed PennDOT Desirable Sight Distance Criteria.
- The Proposed Amazon Parking Facility will generate 96 new trips during the weekday A.M. peak hour and 96 new trips during the weekday P.M. peak hour.
- Under all projected (build) conditions with the development of the proposed site and with site-related recommendations outline in **Table II**, all study area intersections will satisfy PennDOT ILOS Standards.
- It is TPD's opinion that the auxiliary turn lanes that are provided at the existing driveways and study area intersections will be adequate to accommodate the traffic associated with the Proposed Amazon Parking Facility.
- It is TPD's opinion that, based on the results of the signal warrant analysis contained in this TIA, PennDOT would not permit signal activation at Morris Road (SR 2001) and the Existing Driveway, with the Proposed Amazon Parking Facility at this time.

- Levels of Service (LOS) for the study area intersections have been summarized in matrix form. **Table I** details the overall intersection LOS for each study area intersection:

TABLE I
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Peak Hour	2019 Exist	2025		Satisfied ILOS Standards?
			Base	Proj. ¹	
Morris Road (SR 2001) & Schultz Road/ Broad Street	AM Peak	C (24.1)	C (23.6)	C (25.1)	Yes
	PM Peak	F (133.3)	D (37.0)	D (38.2)	
Morris Road (SR 2001) & Eastern Driveway	AM Peak	A (0.4)	A (0.4)	A (0.5)	Yes
	PM Peak	A (0.8)	A (0.9)	A (1.2)	
Schultz Road & Eastern Driveway	AM Peak	A (1.2)	A (1.3)	A (3.3)	Yes
	PM Peak	A (2.1)	A (2.3)	A (3.8)	

*Exist. = Existing Condition, Base = No-Build scenario, Proj. = Build scenario
1 = With Site-Related Recommendations*

- Site-related recommendations are summarized in **Table II**:

TABLE II
RECOMMENDATIONS

Location	Recommendation
Morris Road (SR 2001) & Schultz Road/South Broad Street	Optimization of Traffic Signal Timings



INTRODUCTION

Traffic Planning and Design, Inc. (TPD) has completed a Transportation Impact Assessment (TIA) for a proposed Amazon Parking Facility in Worcester Township, Montgomery County, Pennsylvania. The Proposed Site is located at 2750 Morris Road, on the southeastern quadrant of the intersection of Morris Road (SR 2001) and South Broad Street (SR 2002)/Schultz Road, as shown in **Figure 1**. The Existing Site consists of a total of 667,019 sf of warehouse/office space, of which approximately 118,000 sf was vacant at the time this study was performed (only 68,000 sf being actively marketed as warehouse). As shown in **Figure 2**, the Proposed Site will consist of an off-site parking facility for an existing Amazon Facility in Towamencin Township (to the northwest at 2001 Gehman Road). A portion of the existing parking area will be utilized to stage Amazon delivery vans and employee vehicles. Based on information provided by the Applicant, a summary of the operation of the Proposed Site are as follows:

- The Proposed Site will house approximately 280 delivery vans
- 326 spaces will be assigned the proposed operations
- The first two waves of approximately 24 drivers each (48 total) will arrive at the Property around 6:00 A.M., park their personal vehicles and exchange them for delivery vans. The drivers will then enter the on-site office building to attend a safety briefing. Once the safety briefing has concluded, each of the two waves will be dispatched in an orderly fashion to exit the Property at Schultz Road driveway en-route to the operations station located at 2001 Gehman Road in Towamencin Township.
- Once at the operations station (Towamencin), the drivers will pick up their packages, load them into their delivery vans and begin driving their scheduled delivery routes.
- Approximately 24 additional drivers will arrive at the Property each half hour and repeat the same process described above - parking in newly opened parking stalls and continuing the flow of delivery vans exiting the Property as personal vehicles enter.
- In the evening, the delivery vans will return to the property to close out their delivery routes, return their delivery vans and pick up their personal vehicles. The drivers will return to the Property at various times between 3:00 P.M. and 10:00 P.M. (depending on their route length, traffic and how many packages they were scheduled to deliver).
- In addition to the planned organized flow of traffic at the Property, an Amazon Safety Coordinator ("ASC") will be on-site at the Property from 5:45 A.M. until the last delivery van has been returned to the Property (approximately 10:00 P.M.) Among other things, the ASC's job is to remain in communication with the operations station (usually via radio) to monitor the number of delivery vans exiting the property at any one time. If there is unexpected heavy traffic at either the Property or the Operations Station, the ASC will adjust the timing of the waves to facilitate the organized and safe flow of all traffic.
- All delivery van maintenance (e.g. washing and minor repairs) will be conducted at an off-site location where such activities are permitted pursuant to the local zoning code.

Specific Operational Details and Site Plans were provided by the Project Team and are included in **Appendix A**.

This report has been prepared in accordance with PennDOT's *Policies and Procedures for Transportation Impact Studies*, found in PennDOT's Publication 282, Appendix A, dated July, 2017. The Scope of the TIA was based on a review letter prepared by McMahan Associates, dated January 9, 2020. Project Correspondence is included in **Appendix B**.



EXISTING ROADWAY NETWORK

A field review of the existing roadway system in the study area was conducted. The existing roadway characteristics within the study area are summarized in **Table 1**. Photographs of the study area intersections are included in **Appendix C**.

TABLE 1
 ROADWAY CHARACTERISTICS WITHIN STUDY AREA

Roadway	State Route	Functional Classification/ Roadway Type	Predominant Directional Orientation	Average Daily Traffic ¹	Posted Speed Limit
Morris Road	State (SR 2001)	Minor Arterial	East-West	13,741	45 mph
Broad Street	State (SR 2002)	Urban Collector	North-South	11,408	40 mph
Schultz Road	Township	Local Road	North-South	--	45 mph

¹ = PennDOT TIRe Website (January 2020)

Bicycle and Pedestrian Facilities

Based on observations during field visits:

Morris Road (SR 2001) & Schultz Road/ Broad Street - Pedestrian ramps, pedestrian push buttons, sidewalks, or bicycle lanes are not provided at the intersection. There is a crosswalk on the northern leg of the intersection.

Morris Road (SR 2001) & Site Driveway – Pedestrian ramps, pedestrian push buttons, sidewalks, or bicycle lanes are not provided at the intersection. Pedestrians are prohibited from crossing the intersection legs via signage.

Schultz Road & Site Driveway – Pedestrian ramps, pedestrian push buttons, sidewalks, or bicycle lanes are not provided at the intersection.

Mass Transit Facilities

Montgomery County is provided with public transportation by the Southeastern Pennsylvania Transportation Authority (SEPTA). However there are no fixed routes which have stops in the vicinity of the site. Train service is provided approximately 3.0 miles away from the proposed site at the North Wales and Pennbrook stations on the SEPTA Lansdale-Doylestown Regional Rail Line.

Crash Data Investigation

Crash data were obtained from PennDOT for the study area intersections. PennDOT defines a reportable crash as follows, "A reportable (crash) is one in which an injury or fatality occurs or if at least one of the vehicles involved requires towing from the scene." Reportable crashes were tabulated for the five-year time period beginning 01/01/2014 and ending 12/31/2018. For a given intersection, PennDOT considers a crash occurrence of 5 reportable, correctable crashes over a continuous twelve-month period during the past five years to be a threshold value, above which the intersection design should be reviewed to examine if corrective measures can be taken to enhance safety. The number of reportable crashes at the study area intersections is shown in **Table 2**.



TABLE 2
 PENNDOT TOTAL REPORTABLE CRASH DATA

Study Area Intersection	Total Number of Reportable Crashes				
	2014	2015	2016	2017	2018
Morris Road (SR 2001) & Schultz Road/ Broad Street	2	3	0	1	1
Morris Road (SR 2001) & Site Driveway	0	0	1	0	0
Schultz Road & Site Driveway	0	0	0	0	0

Based on a review of the crash data in **Table 2**, there were no twelve-month periods during the past five years where 5 or more crashes occurred.

EXISTING TRAFFIC CONDITIONS

Manual traffic counts were conducted on 15-minute intervals during the weekday morning (6:00 A.M. to 12:00 P.M.) and weekday evening (3:00 to 7:00 P.M.) peak periods. Data pertaining to heavy vehicles, pedestrians and transit vehicles were observed during the manual counts. Peak hours and count dates for the study area intersections are identified in **Table 3**.

TABLE 3
 MANUAL TRAFFIC COUNT INFORMATION¹

Intersection	Date of Traffic Counts	Time Period	Intersection Peak Hour ²
Morris Road (SR 2001) & South Broad Street (SR 2002)/ Schultz Road	Tuesday, January 14, 2020	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:30 to 5:30 P.M.
Morris Road (SR 2001) & Site Driveway		Weekday A.M.	7:30 to 8:30 A.M.
		Weekday P.M.	4:30 to 5:30 P.M.
Schultz Road & Site Driveway		Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.

¹ = Schools confirmed to be in session

² = Peak Hour consists of the four consecutive 15-minute intervals where the highest traffic volumes occur

2020 Existing Condition traffic volumes for the weekday A.M. and weekday P.M. peak hours are illustrated in **Figures 3-4**. Manual Traffic Count Data sheets are provided in **Appendix D**.

BASE (NO-BUILD) CONDITIONS

A background growth factor for the roadways in the study area was developed based on growth factors for August 2019 to July 2020 obtained from the PennDOT Bureau of Planning and Research (BPR). The PennDOT BPR suggests using a background growth trend factor of 0.28% per year in Montgomery County for urban non-interstate roadways. As such, the background growth factor was applied annually to yield an overall growth percentage of 1.41% (0.28% per year, compounded over 5 years) for the 2025 opening year.

As stated above, the Existing Site consists of a total of 667,019 sf of warehouse/office space, of which approximately 68,000 sf was vacant at the time this study was performed. It is TPD's understanding that the 68,000 sf are being actively marketed as warehouse. Therefore, TPD conservatively generated trips utilizing rates which were calculated using the existing square footage and driveway counts. These site-specific rates



were compared to ITE Data for Warehouse and found to be higher (conservative) and were therefore, utilized. The trip distribution/trip generation calculations for the Existing Site Vacancies can be found in **Appendix E**.

The additional traffic volumes due to background growth and existing vacancy trip generations were added to the existing traffic data to produce the 2025 base (no-build) traffic volumes as shown in **Figures 5-6**.

SCHEDULED ROADWAY IMPROVEMENTS

Based on a review of the PennDOT 12-Year Plan and the DVRPC Transportation Improvement Program (TIP), there are no planned roadway improvements in the vicinity of the proposed site.

SITE ACCESS

The site will be served by two (2) existing driveway locations as follows:

- One (1) Full-Access Driveway to Morris Road (SR 2001). **The access is signalized. However, the signal is not currently activated and operates in a flashing yellow/red mode.**
- One (1) Left-in/Right-out Driveway to Schultz Road. **All truck traffic is limited to this driveway location.**

Sight Distance Analysis

A sight distance analysis was prepared for the existing site driveways on Morris Road and Schultz Road, respectively. In general, recommended safe sight distances depend upon the posted speed limit and roadway grades. The existing sight distances at the proposed driveways were measured in accordance with PennDOT Publication 282 Highway Occupancy Permit Guidelines and compared to PennDOT's desirable sight distance standard, which is identified in 67 PA Code Chapter 441.8(h), "Access to and Occupancy of Highways by Driveways and Local Roads." In addition, measured sight distances at the proposed driveways were compared to PennDOT's safe stopping sight distance standard, which is calculated by the following equation:

$$SSSD = 1.47VT + V^2/[30(f \pm g)]$$

SSSD = safe stopping sight distance (acceptable sight distance)
V = Vehicle Speed
T = Perception Reaction Time of Driver (2.5 seconds)
f = Coefficient of Friction for Wet Pavements
g = Percent of Roadway Grade Divided by 100

Table 4 shows the measured, desirable, acceptable (SSSD), and required sight distances at the existing site driveways for vehicles entering and exiting the site.



TABLE 4
 SIGHT DISTANCE ANALYSIS – EXISTING SCHULTZ ROAD DRIVEWAY

	Direction	Posted Speed Limit (mph)	Sight Distances (feet)			
			Grade ¹ (%)	DES ²	SSSD ²	EXIST
Schultz Road Driveway						
Exiting Movement	To the left	45	+1	635	376	650+
Entering Left Turns	Approaching same direction	45	-2	N/A	398	500+
	Approaching opposite direction	45	+1	445	376	600+
Morris Road Driveway						
Exiting Movement	To the left	45	-2	635	398	650+
	To the right	45	+3	570	364	600+
Entering Left Turns	Approaching same direction	45	+3	N/A	364	600+
	Approaching opposite direction	45	-2	445	398	650+

DES = PennDOT Desirable Sight Distance
 SSSD = PennDOT Acceptable Sight Distance
 EXIST = Existing (measured) Sight Distance

1 = Roadway Grade Approaching Driveway
 2 = Based on the posted speed

As shown in **Table 4** above, the measured sight distances at the existing site driveways exceed PennDOT Desirable Sight Distance Criteria.

TRIP GENERATION

The site-specific trip generation for the Proposed Amazon Parking Facility were obtained directly from the memorandum titled *Traffic Assessment – Update*, prepared by NV5, and dated February 4, 2020. A copy of this memorandum is included in **Appendix F**.

The site-specific trip generation is shown on the first table of that memorandum and is summarized in **Table 5** below.

TABLE 5
 TRIP GENERATION – PROPOSED AMAZON PARKING FACILITY

Peak Hour	Total	Delivery Vans			Employee Vehicles		
		Total	Enter	Exit	Total	Enter	Exit
Weekday A.M.	96	48	0	48	48	48	0
Weekday P.M.	96	48	48	0	48	0	48

Based on the information contained in Table 5, the Proposed Amazon Parking Facility will generate 96 new trips during the weekday A.M. peak hour and 96 new trips during the weekday P.M. peak hour.

TRIP DISTRIBUTION

The distribution and assignment of new trips generated by the proposed development was based upon the location of the Amazon Facility in Towamencin Township, the existing traffic patterns in the Study Area, and the use restrictions of the driveway on Schultz Road. Based on this evaluation, the new trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 6**.



TABLE 6
 TRIP DISTRIBUTION PERCENTAGES – NEW TRIPS

Direction - To/From	Assignment - To/From ¹	Distribution Percentage			
		Ingress		Egress	
		Passenger Car %	Delivery Van % ²	Passenger Car %	Delivery Van % ²
Weekday A.M. Peak Hour					
East	via Morris Road	36%	--	--	--
West	via Morris Road	34%	--	--	100%
North	via Broad Street	25%	--	--	--
South	via Schultz Road	5%	--	--	--
Weekday P.M. Peak Hour					
East	via Morris Road	--	36% (39%)	36%	--
West	via Morris Road	--	34% (36%)	34%	--
North	via Schultz Road	--	25% (25%)	25%	--
South	via Broad Street	--	5% ¹ (0%)	5%	--

¹ = Cannot Enter/Exit to/from the south via Schultz Road. (Assignment % re-routed to/from East/West Morris Road)

² = Delivery Vans to utilize the Schultz Road driveway only

The distribution of site-generated trips for the proposed development during the weekday A.M. and P.M. peak hours are shown in **Figures 7-8**. Trip Assignment figures are included in **Appendix G**.

PROJECTED (BUILD) CONDITION TRAFFIC VOLUMES

The site-generated trips for the proposed development were added to the base (no-build) conditions to develop respective projected (build) condition traffic volumes, as shown in **Figures 9-10**. Volume development spreadsheets are contained in **Appendix H**.

LEVELS OF SERVICE FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS criteria is stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in **Table 7**. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).



TABLE 7
 LEVEL OF SERVICE CRITERIA
 UNSIGNALIZED AND SIGNALIZED INTERSECTIONS ¹

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

¹Obtained from Exhibits 18-4 and 19-1 of the Transportation Research Board's Highway Capacity Manual 2010

CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday A.M. and P.M. peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the *Highway Capacity Manual (HCM) 6th Edition* using *Synchro 10* software, a Trafficware product.

The following conditions were analyzed, as applicable:

- 2020 Existing conditions;
- 2025 Base conditions (Build-out year without development);
- 2025 Projected conditions (Build-out year with development).

It should be noted that based on methodologies contained in Chapter 10 of PennDOT's Publication 46, TPD adjusted the following 2010 HCM default values in the *Synchro 10* capacity analysis. These adjustments were made at the signalized intersections within the study area for all time periods based on the study area location being classified as Suburban:

- Base saturation flow rates for signalized intersections. The saturation flow rate was changed from the default value of 1900 to 1800 based on Exhibit 10-9.
- Start-up lost time and extension of effective green time for signalized intersections. The startup lost time was changed from the default value of 2.0 seconds to 2.5 seconds. Based on the total clearance time (yellow plus all-red time) being greater than 5 seconds, the extension of green time was changed from the default value of 2 seconds to 3.5 seconds. These adjusted values are based on Exhibit 10-10.
- Critical and Follow-Up Gap times were adjusted relative to the difference between default and PA Default values contained in Exhibits 10-11 and 10-12. Critical/Follow-Up calculation tables are included in **Appendix I**.

In addition, capacity analyses were conducted at the proposed site driveway intersections under the projected conditions. The capacity analysis worksheets are included in **Appendix J**. The PennDOT-approved signal plans are included in **Appendix K**.

PennDOT's Transportation Impact Study Guidelines outlined in PennDOT's *Policies and Procedures for Transportation Impact Studies*, found in PennDOT's Publication 282, Appendix A, dated July, 2017 contain the following criteria regarding levels of service:

- Page 29 of the Guidelines state that if evaluation of the With Development Horizon Year Scenario to the Without Development Horizon Year Scenario indicates that the overall intersection level of service has dropped, the applicant will be required to mitigate the level of service 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.

- Page 29 of the Guidelines state that for mitigation scenarios, applicants are expected to mitigate the overall intersection LOS to the original Without Development LOS; the 10-second delay variance is not applied to mitigation scenarios. Applicants may be required to address available storage and queue lengths at critical movements or approaches even if the overall LOS requirements are met.
- Page 31 of the Guidelines state that if signalization is the preferred alternative for mitigation, overall intersection LOS C in rural areas and LOS D in urban areas is acceptable.
- Page 31 of the Guidelines states new signalized or unsignalized intersection established to serve as access to the development shall be designed to operate at minimum LOS C for rural areas, and minimum LOS D for urban areas.

Based on PennDOT Standards, in order to determine the true impact of the Proposed Site, signal timings were optimized under base (future no build) conditions. Those timings were then utilized under projected (future build) condition.

Based on the Signal Warrant Analysis summarized later in this TIA, it is TPD’s opinion that PennDOT will not permit activation of the existing signal at Morris Road (SR 2001) and the Existing Site Driveway under 2025 Projected Conditions. Therefore, TPD continued to analyze this intersection as a TWSC intersection throughout this TIA.

LEVELS OF SERVICE IN THE STUDY AREA

Level of service (LOS) matrices for the study area intersections are shown in **Table 8**.

TABLE 8
 LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday A.M.			Weekday P.M.		
		2020 Exist	2025		2020 Exist	2025	
			Base	Proj. ¹		Base	Proj. ¹
Morris Road (SR 2001) & Schultz Road/ Broad Street	EBL	C	C	C	B	C	C
	EBTR	B	B	B	B	B	C
	WBL	B	B	B	A	B	B
	WBTR	C	C	C	B	C	D
	NBL	C	C	C	D	C	C
	NBTR	D	D	D	D	C	C
	SBL	C	C	C	F (86.4)	C	C
	SBTR	C	C	D	F (455.9)	E	E
	ILOS	C (24.1)	C (23.6)	C (25.1)	F (133.3)	D (37.0)	D (38.2)
Morris Road (SR 2001) & Eastern Driveway	WBL	B	B	B	B	B	A
	NBL	A	A	A	B	B	C
	NBR	C	C	C	B	B	B
	ILOS	A (0.4)	A (0.4)	A (0.5)	A (0.8)	A (0.9)	A (1.2)
Schultz Road & Western Driveway	WBR	A	B	B	A	A	A
	SBL	A	A	A	A	A	A
	ILOS	A (1.2)	A (1.3)	A (3.3)	A (2.1)	A (2.3)	A (3.8)

Exist. = Existing Condition, Base = No-Build scenario, Proj. = Build scenario
 1 = Projected conditions with site-related recommendations



As shown in **Table 8**, under all projected (build) conditions with the development of the proposed site and with site-related recommendations outlined in **Table 11** all study area intersections will satisfy PennDOT ILOS Standards.

95TH PERCENTILE QUEUE ANALYSIS

Queue analyses were conducted at the study area intersections using *Synchro 10* software. For this analysis, the 95th percentile queue is defined as the queue length that is exceeded in 5% of the signal cycles. As an example, for a signal with a 90-second cycle, this means that the 95th percentile queue length will be exceeded during 2 of the 40 signal cycles that occur during the peak hour. The queue analysis results are summarized in **Table 9**.

TABLE 9
 95TH PERCENTILE QUEUE ANALYSIS

Intersection	Movement	Available Storage	Weekday A.M.			Weekday P.M.		
			2020 Exist	2025		2020 Exist	2025	
				Base	Proj. ¹		Base	Proj. ¹
Morris Road (SR 2001) & Schultz Road/ South Broad Street	EBL	235'	165'	160'	168'	30'	48'	50'
	EBTR	--	195'	195'	203'	85'	133'	148'
	WBL	240'	<25'	<25'	<25'	<25'	<25'	<25'
	WBTR	--	368'	360'	368'	305'	455'	478'
	NBL	160'	<25'	<25'	68'	53'	43'	48'
	NBTR	--	113'	113'	115'	85'	63'	75'
	SBL	250'	118'	128'	138'	250'	183'	185'
Morris Road (SR 2001) & Eastern Driveway	SBTR	--	78'	80'	105'	1298'	523'	542'
	WBL	250'	<25'	<25'	<25'	<25'	<25'	<25'
	NBL	--	--	--	<25'	<25'	<25'	<25'
Schultz Road & Western Driveway	NBR	--	<25'	<25'	<25'	<25'	<25'	<25'
	WBR	--	<25'	<25'	<25'	<25'	<25'	<25'
Schultz Road & Western Driveway	SBL	200'	<25'	<25'	<25'	<25'	<25'	<25'

Base = No-Build scenario, Proj. = Build scenario
 1 = With Site-Related Recommendations

Queue analysis worksheets are included with the capacity analysis worksheets provided in the **Appendix J**.

AUXILIARY TURN LANE WARRANT ANALYSIS

Methodology

TPD evaluated auxiliary turn lane warrants at the site access intersections. The warrant analysis methodology contained within Chapter 11 of PennDOT's *Publication 46*, Section 11.17 and Strike-Off Letter 470-08-07 was utilized for this evaluation.

Findings

Table 10 summarizes the results of the auxiliary turn lane analysis at the site access intersections.



TABLE 10
 AUXILIARY TURN LANE ANALYSIS SUMMARY

Intersection	Auxiliary Lane	Warrant Satisfied?	Required Lane Length	Existing Lane Length
Morris Road (SR 2001) & Site Driveway	WB Left-Turn Lane	Yes	125'	250'
	EB Right-Turn Lane	Yes	125'	200'+
Schultz Road & Site Driveway	SB Left-Turn Lane	No	--	200'

Therefore, it is TPD's opinion that the auxiliary turn lanes that are provided at the existing driveways will be adequate with the Proposed Amazon Parking Facility and proposed vans. The calculations for the auxiliary turn lane warrants are included in **Appendix L**.

SIGNAL WARRANT ANALYSIS

As requested by McMahon Associates, TPD performed a Signal Warrant Analysis at the intersection of Morris Road (SR 2001) and the Existing Site Driveway. To do so, TPD developed 9-hours of future traffic volumes by using a K-Factor evaluation of the Manual Counts and applying those factors to 2025 Projected Condition peak hour traffic volumes. Major applicable signal warrants contained in the 2009 MUTCD and PennDOT Publication 46/412, were evaluated. Based on this evaluation, TPD determined the following:

Morris Road (SR 2001) & Existing Site Driveway

- Warrant 1 – (Eight-Hour Vehicular Volume)
 - 0 unique hours met under Condition A – **Not Satisfied**
 - 2 unique hours met under Condition B – **Not Satisfied**
- Warrant 2 – (Four-Hour Vehicular Volume)
 - Figure 4C-2 – 2 unique hours met – **Not Satisfied**
- Warrant 3 – (Peak Hour Volume)
 - Figure 4C-4 - 1 unique hours met – **Not Satisfied**
- Warrant 4 – (Pedestrian Volume)
 - Criterion A – Figure 4C-6 - 0 hours met – **Not satisfied**
 - Criterion B – Figure 4C-8 - 0 hours met – **Not satisfied**
- Warrant 7 – (Crash Experience) – **Not satisfied**

It is TPD's opinion that, based on the results above, PennDOT would not permit re-activation of the signal at this intersection under 2025 Projected Conditions. Signal Warrants are included in **Appendix M**.



RECOMMENDATIONS

TPD has made the following recommendations in relation to the Proposed Amazon Parking Facility in Worcester Township, as outlined in **Table 11**:

TABLE 11
 RECOMMENDATIONS

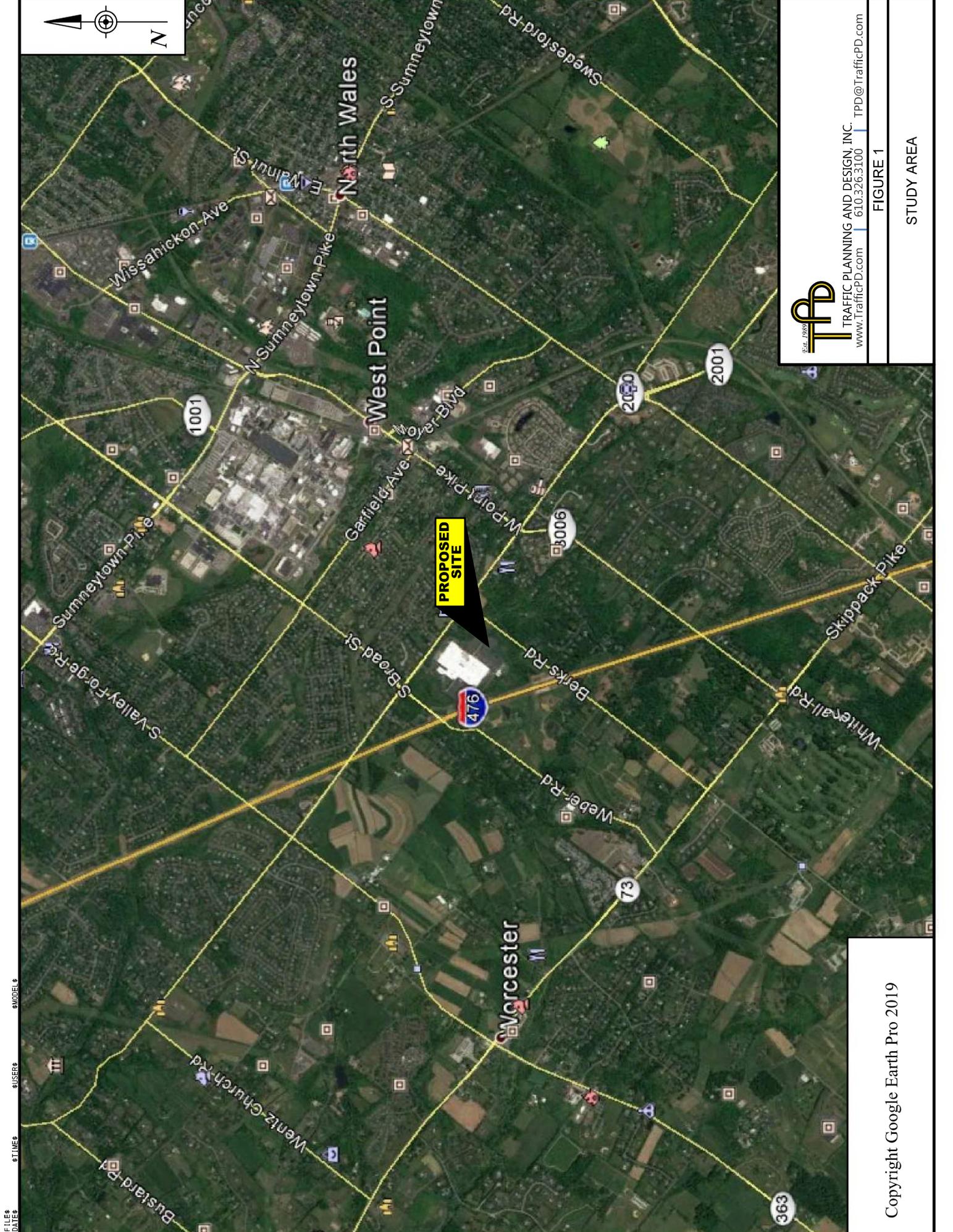
Location	Recommendation
Morris Road (SR 2001) & Schultz Road/South Broad Street	Optimization of Traffic Signal Timings

CONCLUSIONS

Based on the results of the transportation impact study, TPD offers the following conclusions:

Based on this evaluation, the following conclusions were reached:

- The Proposed Site is located at 2750 Morris Road, on the southeastern quadrant of the intersection of Morris Road (SR 2001) and South Broad Street (SR 2002)/Schultz Road. The Existing Site consists of a total of 667,019 sf of warehouse/office space, of which approximately 68,000 sf was vacant at the time this study was performed.
- The Proposed Site will consist of an off-site parking facility for an existing Amazon Facility located in Towamencin Township (to the northwest at 2001 Gehman Road). A portion of the existing parking field at the 2750 Morris Road property will be utilized to stage Amazon delivery vans and employee vehicles
- The site will be served by two (2) existing driveway locations as follows:
 - One (1) Full-Access Driveway to Morris Road (SR 2001). **The access is signalized. However, the signal is not currently activated and operates in a flashing yellow/red mode.**
 - One (1) Left-in/Right-out Driveway to Schultz Road. **All truck traffic is limited to this driveway location.**
- The measured sight distances at the existing site driveways exceed PennDOT Desirable Sight Distance Criteria.
- The Proposed Amazon Parking Facility will generate 96 new trips during the weekday A.M. peak hour and 96 new trips during the weekday P.M. peak hour.
- Under all projected (build) conditions with the development of the proposed site and with site-related recommendations outline in Table II, all study area intersections will satisfy PennDOT ILOS Standards.
- It is TPD’s opinion that the auxiliary turn lanes that are provided at the existing driveways and study area intersections will be adequate to accommodate the traffic associated with the Proposed Amazon Parking Facility.
- It is TPD’s opinion that, based on the results of the signal warrant analysis contained in this TIA, PennDOT would not permit signal activation at Morris Road (SR 2001) and the Existing Driveway, with the Proposed Amazon Parking Facility at this time.



\$FILE \$DATE \$TIMES \$SUBSE \$MODEL \$

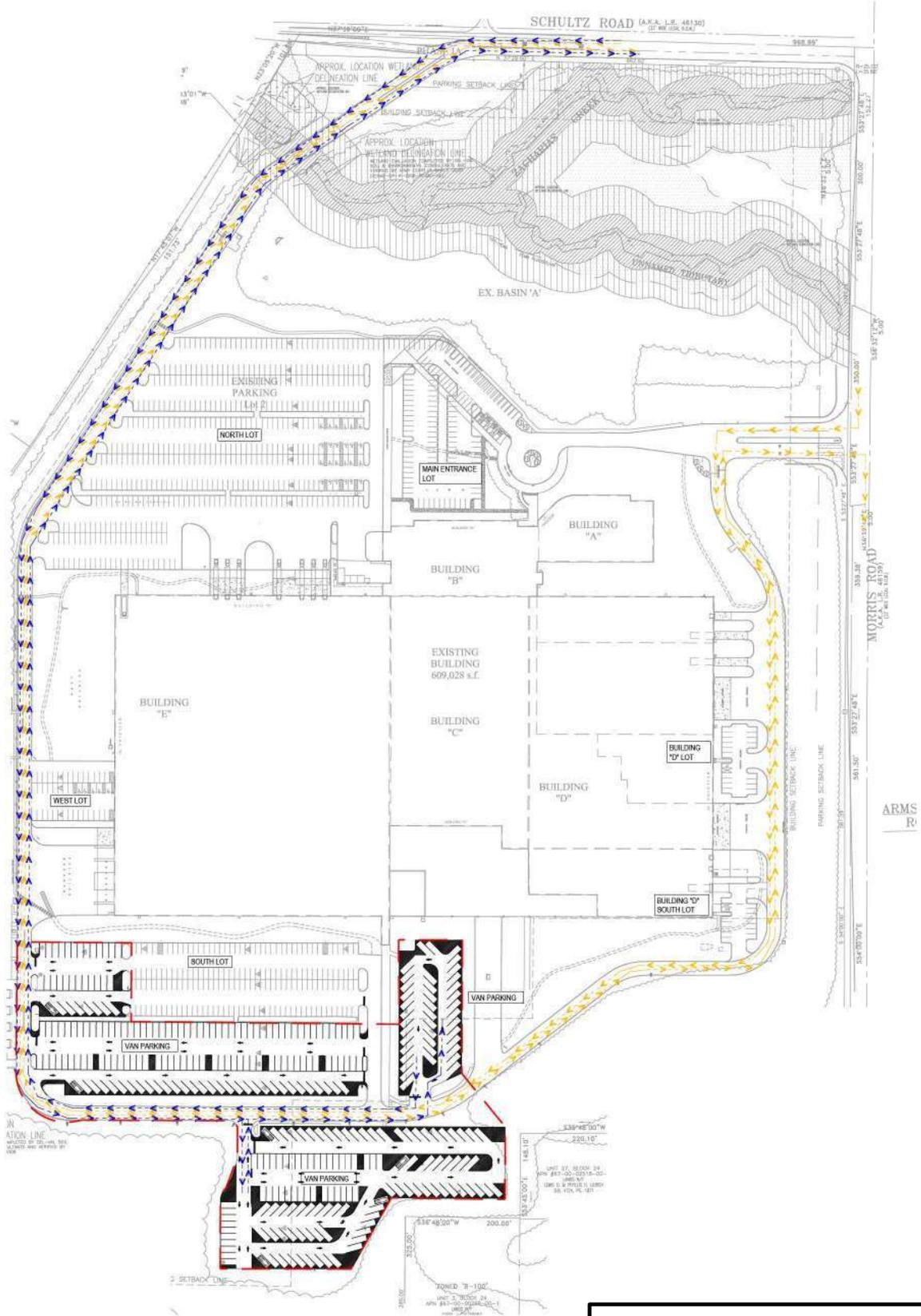




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FIGURE 1
 STUDY AREA

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\$FILES \$SUBSETS \$TIMES \$MODEL \$



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FIGURE 2

SUBJECT SITE

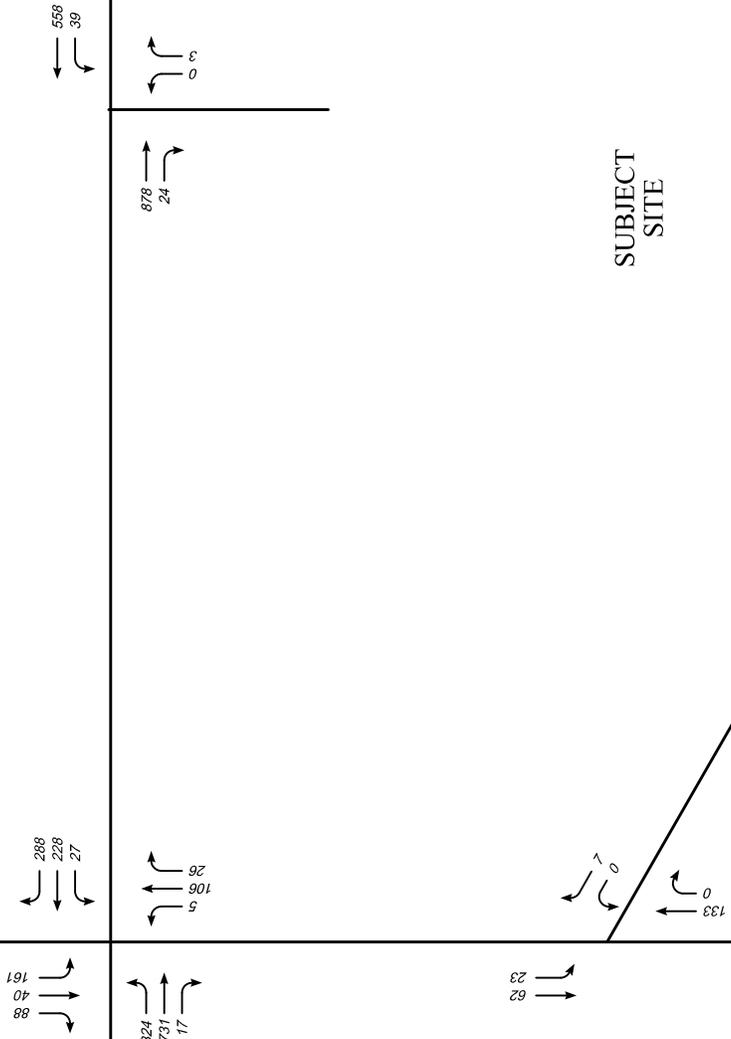
SOUTH BROAD STREET

MORRIS ROAD

MORRIS ROAD

SCHULTZ ROAD

SUBJECT SITE

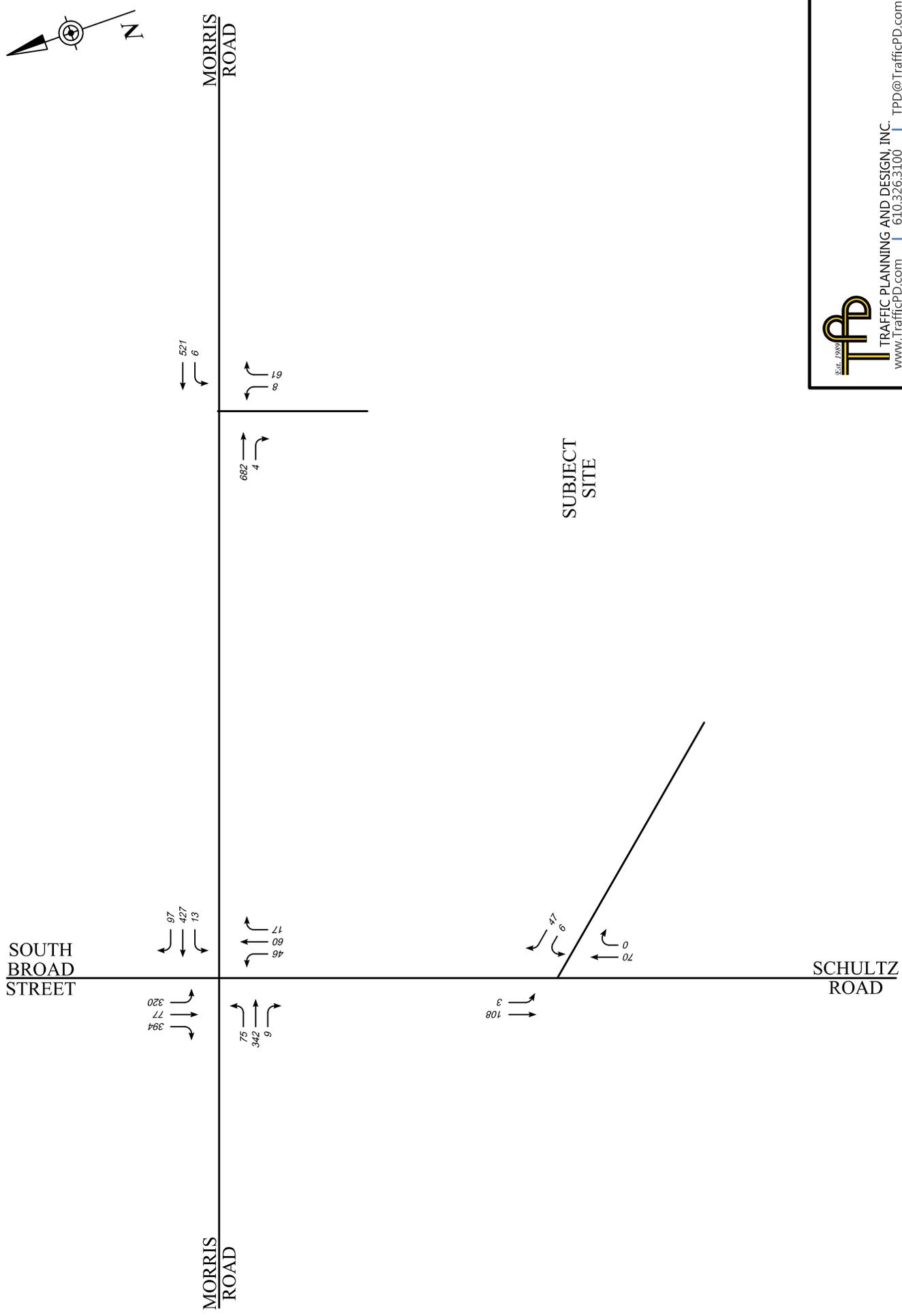


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FIGURE 3

2020 EXISTING CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES

KEY:
SCHEMATIC DRAWING: NOT TO SCALE



TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

FIGURE 4

2020 EXISTING CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES

KEY:
SCHEMATIC DRAWING: NOT TO SCALE

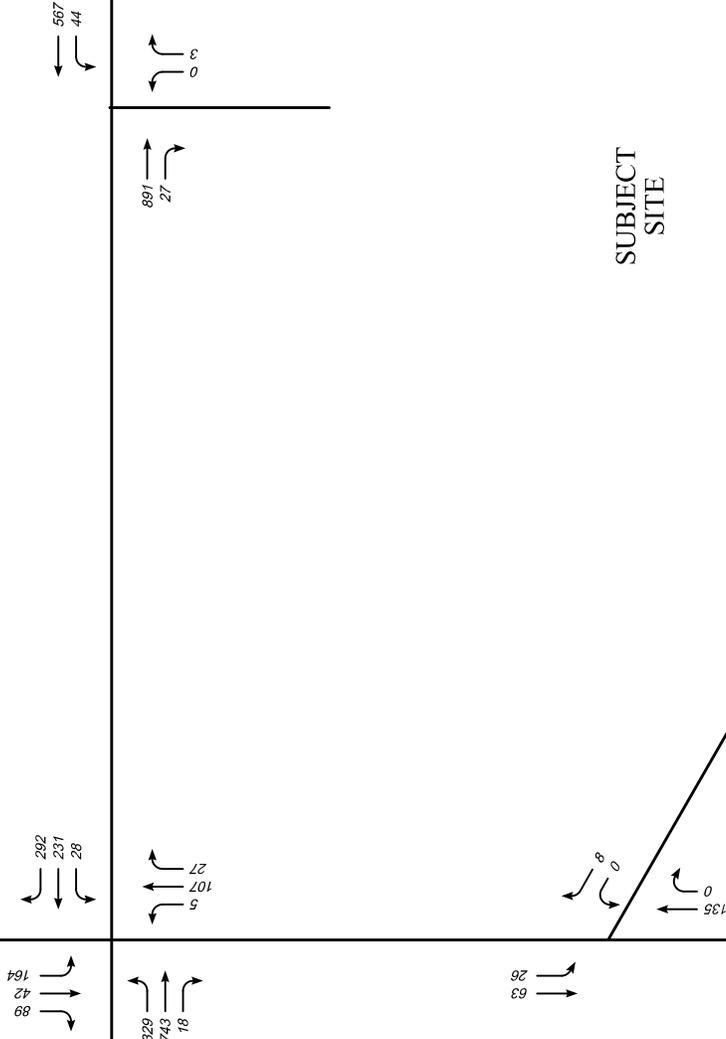
SOUTH
BROAD
STREET

MORRIS
ROAD

MORRIS
ROAD

SCHULTZ
ROAD

SUBJECT
SITE

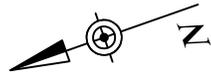
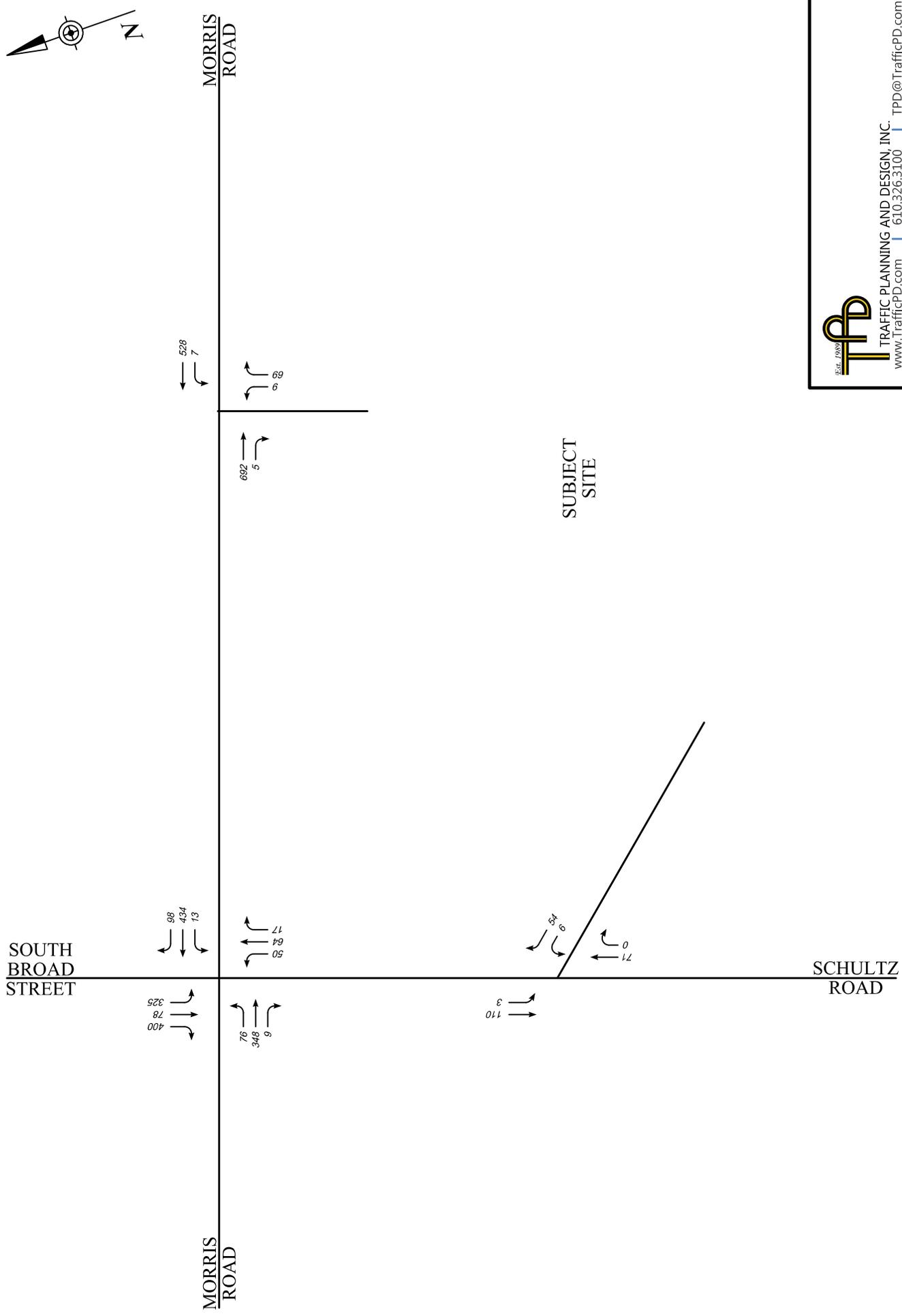


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FIGURE 5

2025 BASE (NO-BUILD) CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES

KEY:
SCHEMATIC DRAWING: NOT TO SCALE



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FIGURE 6

2025 BASE (NO-BUILD) CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES

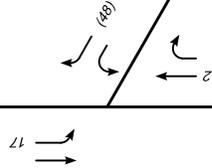
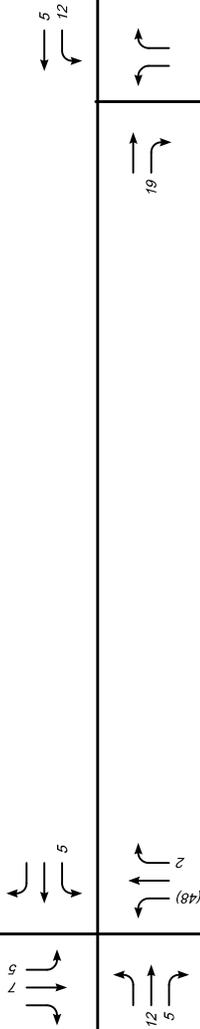
KEY:
SCHEMATIC DRAWING: NOT TO SCALE

SOUTH
BROAD
STREET

MORRIS
ROAD

MORRIS
ROAD

SCHULTZ
ROAD



SUBJECT
SITE
ENTER: 48 (0)
EXIT: 0 (48)



TRAFFIC PLANNING AND DESIGN, INC.
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FIGURE 7

AMAZON PARKING FACILITY
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION
PASSENGER CAR (DELIVERY VAN)

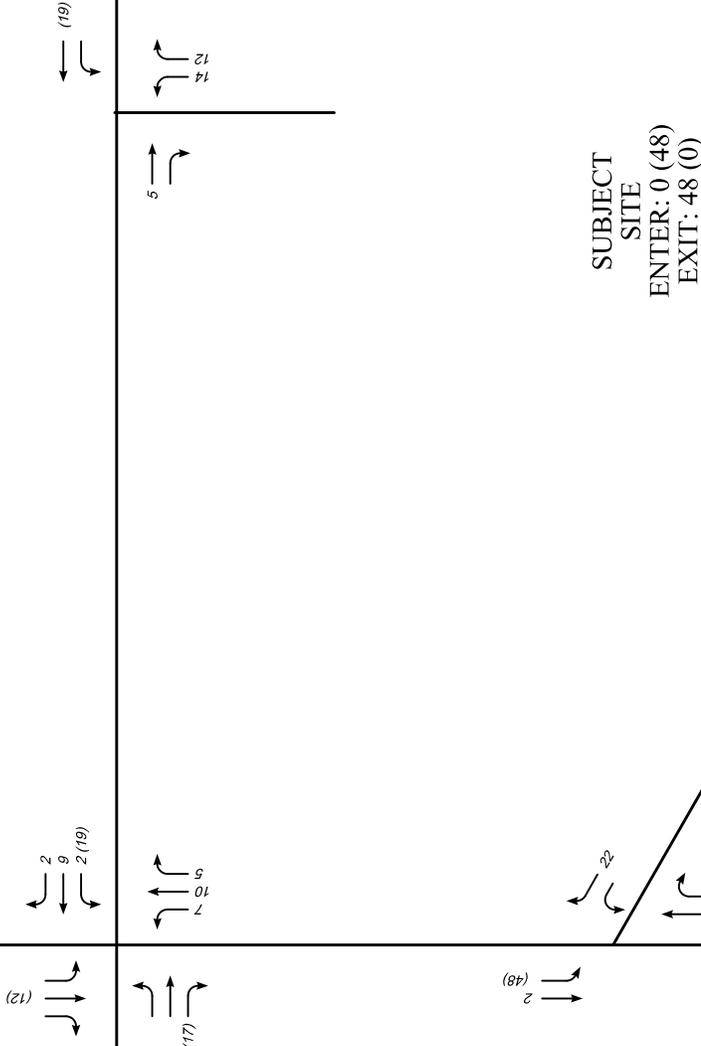
KEY:
SCHEMATIC DRAWING: NOT TO SCALE

SOUTH
BROAD
STREET

MORRIS
ROAD

MORRIS
ROAD

SCHULTZ
ROAD



SUBJECT
SITE
ENTER: 0 (48)
EXIT: 48 (0)



TRAFFIC PLANNING AND DESIGN, INC.
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FIGURE 8

AMAZON PARKING FACILITY
WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION
PASSENGER CAR (DELIVERY VAN)

KEY:
SCHEMATIC DRAWING: NOT TO SCALE

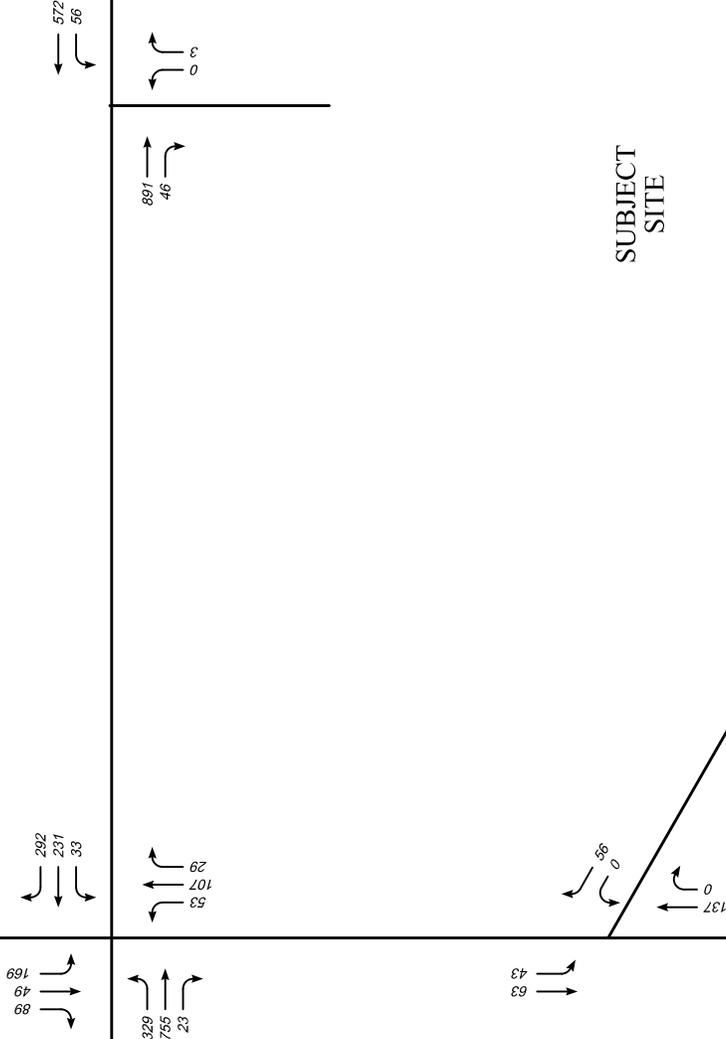
SOUTH BROAD STREET

MORRIS ROAD

MORRIS ROAD

SCHULTZ ROAD

SUBJECT SITE

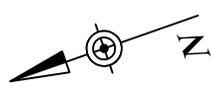


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FIGURE 9

2025 PROJECTED (BUILD) CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES

KEY:
SCHEMATIC DRAWING: NOT TO SCALE



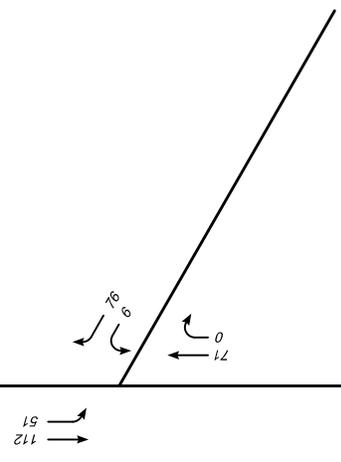
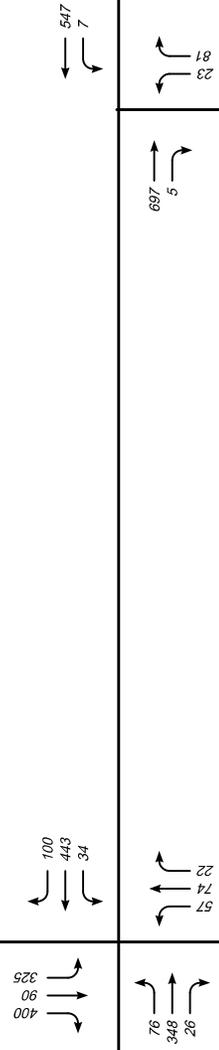
SOUTH
BROAD
STREET

MORRIS
ROAD

MORRIS
ROAD

SCHULTZ
ROAD

SUBJECT
SITE



TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

FIGURE 10

2025 PROJECTED (BUILD) CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES

KEY:
SCHEMATIC DRAWING: NOT TO SCALE

APPENDIX A

OPERATIONAL DETAILS/SITE PLANS

Amazon Logistics Operational Narrative – DPH6 P1 (2750 Morris Road, Lansdale, PA)

Safety is Amazon's first priority. We aim to be good neighbors in the communities where we operate and to minimally impact traffic. Accordingly, our operational plan for 2750 Morris Road (the "Property") follows.

In the morning, approximately 280 delivery vans will be parked at the Property in 326 11x27 parking stalls. At 6 a.m., the first two waves of approximately 24 drivers each (48 total) will arrive at the Property, park their personal vehicles and exchange them for delivery vans. The drivers will then enter the onsite office building (complete with full restroom and comfort facilities) to attend a safety briefing. Once the safety briefing has concluded, each of the two waves will be dispatched in an orderly fashion to exit the Property at Schultz Road en route to our operations station located at 2001 Gehman Road in Harleysville, PA (the "Operations Station"). Once at the Operations Station, the drivers will pick up their packages, load them into their delivery vans and begin driving their scheduled delivery routes.

Approximately 24 additional drivers will arrive at the Property each half hour and repeat the same process described above - parking in newly opened parking stalls and continuing the flow of delivery vans exiting the Property as personal vehicles enter. In the evening, the delivery vans will return to the Property to close out their delivery routes, return their delivery vans and pick up their personal vehicles. The drivers will return to the Property at various times between 3 p.m. and 10 p.m. (depending on their route length, traffic and how many packages they were scheduled to deliver).

In addition to the planned organized flow of traffic at the Property, an Amazon Safety Coordinator ("ASC") will be onsite at the Property from 5:45 a.m. until the last delivery van has been returned to the Property (approximately 10 p.m.) Among other things, the ASC's job is to remain in communication with the Operations Station (usually via radio) to monitor the number of delivery vans exiting the Property at any one time. If there is unexpectedly heavy traffic at either the Property or the Operations Station, the ASC will adjust the timing of the waves to facilitate the organized and safe flow of all traffic.

All delivery van maintenance (e.g. washing and minor repairs) will be conducted at an offsite location where such activities are permitted pursuant to the local zoning code.

APPENDIX B

PROJECT CORRESPONDENCE



McMAHON ASSOCIATES, INC.
425 Commerce Drive, Suite 200
Fort Washington, PA 19034
p 215-283-9444 | f 215-283-9446

PRINCIPALS

Joseph J. DeSantis, P.E., PTOE
John S. DePalma
Casey A. Moore, P.E.
Gary R. McNaughton, P.E., PTOE
Christopher J. Williams, P.E.

ASSOCIATES

John J. Mitchell, P.E.
R. Trent Ebersole, P.E.
Matthew M. Kozsuch, P.E.
Maureen Chlebek, P.E., PTOE
Dean A. Carr, P.E.
Jason T. Adams, P.E., PTOE
Christopher K. Bauer, P.E., PTOE

FOUNDER

Joseph W. McMahon, P.E.

January 9, 2020

Mr. Tommy Ryan
Township Manager
Worcester Township
1721 Valley Forge Road
P.O. Box 767
Worcester, PA 19490

RE: **Traffic Review #1**
2750 Morris Road – Amazon Proposed Parking Facility
Worcester Township, Montgomery County, PA
McMahon Project No. 819940.11

Dear Tommy:

Per the request of the Township, McMahon Associates, Inc. (McMahon) has prepared this review letter, which summarizes our initial review of the proposed off-site parking facility for Amazon vans and drivers to be located at 2750 Morris Road (S.R. 2001) in Worcester Township, Montgomery County, PA. It is our understanding at this time that the proposed off-site parking facility will be located in a portion of the existing, underutilized 611 space eastern parking lot at 2750 Morris Road (S.R. 2001) and will be used to accommodate up to 150 delivery vans and 125 employee vehicles (numbers to be further confirmed by Amazon) designated to/from the existing Amazon facility located in Towamencin Township, Montgomery County, PA. Access to the site for use of its parking spaces will be provided via the existing, signalized full-movement driveway to Morris Road (S.R. 2001), as well as the existing, unsignalized left-in/right-out only driveway to Schultz Road.

The following documents were reviewed and/or referenced in preparation of our traffic review:

- Memorandum for 2750 Morris Road, Lansdale, PA Proposed Parking, prepared by Dilworth Paxson, LLP, dated October 22, 2019.
- Traffic Assessment Memorandum – 2750 Morris Road Parking Facility, prepared by NV5 Engineering, dated October 29, 2019.
- Zoning Determination Letter for 2750 Morris Road, dated November 13, 2019.
- Parking Lot Reconfiguration Drawing No. SSP-2, prepared by CEC Civil & Environmental Consultants, Inc., dated November 2019.

Based on our review of the submitted documents noted above, and attending a staff/consultants meeting at the Township on January 8, 2020 to discuss technical items about the project, McMahon offers the following comments for consideration by the Township and action by the applicant:

1. The applicant should have a qualified, professional transportation engineer complete a Traffic Impact Assessment (TIA) for this site in order to evaluate the access and efficiency of adjacent signal operations near the site in order to effectively accommodate the additional traffic at this location for the Amazon off-site parking operations. The study should be sure to include an evaluation and analysis of existing conditions and opening year conditions then of the site, both without and with the additional traffic for the Amazon off-site parking facility at least during the combined commuter peak/site peak weekday morning (6:45 AM to 9:15 AM) and commuter peak/site peak weekday afternoon (4:00 PM to 6:30 PM) peak hours at the existing site access intersections with Morris Road (S.R. 2001) and Schultz Road, as well as at the site adjacent signalized intersection of Morris Road (S.R. 2001) and Schultz Road. Since access to the off-site parking facility will be provided via a state road, the results of the TIA and signal evaluation will need to be prepared in accordance with PennDOT guidelines also, and provided to PennDOT for review and approvals if improvements are to be implemented to mitigate, optimize and accommodate the new trips being generated.
2. The traffic signal at Morris Road (S.R. 2001) and the 2750 Morris Road site access is currently in flash mode. The applicant must provide details in the TIA on whether this traffic signal is proposed to remain in flash mode or if the intent is to have it return to becoming a fully-functional traffic signal once the additional Amazon vehicles are utilizing this new off-site facility location. Our expectation is that the applicant may prefer the latter for its operations and best functioning of the intersections, if signal warrants, which must also be evaluated, can be met.
3. PennDOT must approve any modifications to either traffic signal permit plan along Morris Road (S.R. 2001), as well as the Township, and this includes any changes if required by PennDOT to bring any intersection into better ADA conformance. A PennDOT TE-160 form must also be completed by the applicant for approval by the Board of Supervisors by resolution for any signal modifications.
4. The applicant's engineer must also evaluate the existing auxiliary turn lane lengths at the site access intersections with Morris Road (S.R. 2001) and Schultz Road to determine if the existing turn bay lengths are adequate to accommodate the increase in traffic expected with the off-site parking facility, especially since site operations may bring platoons of vans to/from the site and these lanes.
5. The traffic assessment memo states that up to 150 parking spaces will be provided for delivery vans at the off-site parking facility and that the off-site parking facility is expected to generate approximately 228 delivery van trips per day which equates to 114 delivery vans. The applicant must clarify the number of delivery vans that are expected to be parked at the off-site facility, as well as employee vehicles to confirm the proposed parking.
6. The applicant provided a preliminary plan sheet that was discussed at the January 8, 2020 technical meeting which indicated where the Amazon delivery van and employee vehicle parking will be located in the existing parking lot at 2750 Morris Road (S.R. 2001). The plan submission must also include all directional and regulatory signing to improve circulation and safety, pavement markings, and pedestrian accommodations for the parking areas to be utilized and for the outer circulation drive for the site.

7. An overall plan of the site should be provided showing the circulation pattern of both employee vehicles and Amazon vans from and to the proposed off-site parking lot. While the applicant has indicated that vans may exit onto Schultz Road to access the traffic signal at Morris Road, there is more possibility that the employee vehicles will want to use the site access to/from Morris Road when arriving and departing from their work shifts at this lot. The TIA should account for this in its use of the access points to/from Morris Road.
8. Currently the building at 2750 Morris Road (S.R. 2001) is not fully occupied (i.e., approximately 68,000 sf being vacant), nor are the parking areas being used at full capacity. There may be more parking than required on the site itself, but it is unknown whether the location of vacant parking for the vacancy(s) will be sufficient and ideal. Therefore, the applicant must provide details on how the proposed Amazon delivery van and employee vehicle parking will be accommodated on the 2750 Morris Road (S.R. 2001) property if the existing building at 2750 Morris Road (S.R. 2001) is redeveloped, or the building space operates at full capacity in the future.
9. We request that the applicant and traffic engineer for the project prepare a narrative in the Transportation Impact Assessment (TIA) regarding the onsite operations of Amazon employees and vans, how vans are deployed to/from the distribution warehouse, and how and where these operations will be managed on the off-site location at 2750 Morris Road. The applicant's traffic engineer should drive the expected routes to and from this site and the proposed Amazon facility in Towamencin Township **during the AM and PM peak commuter hours**, and comment on how the traffic associated with the use of this off-site parking facility may impact major off-site intersections operations during these times along the expected travel routes.
10. The applicant must provide and confirm the available and necessary sight distance measurements for the unsignalized driveway along Schultz Road as required by **Section 130-16.E(5) of the Subdivision and Land Development Ordinance**. While this driveway is an existing access, the sight distance to the left for vehicles exiting the site, and looking ahead for vehicles entering the site must be confirmed, and must be no less than PennDOT minimum safe stopping sight distances. Otherwise, alterations to achieve the necessary sight distance will be required, especially since the site may also be used for the education of children as one of its tenants. The access must have all the signage necessary to prevent prohibited movements, so if signs are missing that should be there, they should be replaced.
11. Since Morris Road (S.R. 2001) is a State roadway, a State Highway Occupancy Permit (HOP) will be required for any modifications to the Morris Road (S.R. 2001) frontage within the right-of-way. The Township and our office must be copied on all plan submissions and correspondence between the applicant and PennDOT and invited to any and all meetings between these parties.
12. The Memorandum dated October 29, 2019, prepared by the NV5 transportation consultants and submitted for Township review, indicates on page 4 of 5, under item #2 and #3 under the **Preliminary Traffic Review Findings** that:

"The parking facility is expected to generate 456 trips per day with a maximum of 80 trips from 5:00-6:00pm. The site is subject to Traffic Impact Fees assed by Worc(h)ester Township. The fee is assessed on the new PM peak hour trips at the rate of \$3,977/trip. Based on available information, a maximum fee of \$318,160 could be assessed."

According to the Township's Roadway Sufficiency Analysis, the proposed off-site parking facility for Amazon vans and van drivers is located in Transportation Service Area North, which indeed has a corresponding transportation impact fee of \$3,977 per "new" weekday afternoon peak hour trip. The use on the property is viewed as a new outparcel-like use, operating its business from the parking lot outside the existing building. Thus, the applicant will be required to pay a Transportation Impact Fee in accordance with the Township's Transportation Impact Fee Ordinance, and with final determination by the Township Solicitor and Board of Supervisors. Based on trip generation information provided in the traffic assessment memorandum, the off-site parking facility is projected to generate approximately 80 total "new" trips during the weekday afternoon peak hour, which results in a **transportation impact fee of \$318,160**. However, the requested TIA must verify the afternoon peak hour trips, as we understand it may now vary from the memo.

13. In all subsequent submissions, the applicant's engineer must provide a response letter that describes how each specific review comment has been addressed, where each can be found in the plan set or materials, as opposed to providing general responses. This will aid in the detailed review and subsequent review timeframes.

We trust that this review letter responds to your request. If you or the Township have any questions, or require clarification, please contact me or Chad Dixson, AICP.

Sincerely,



Casey A. Moore, P.E
Executive Vice President – Corporate Operations

CAM/CED/BMJ
Attachment

cc: Joseph Nolan, P.E., CKS Engineers (Township Engineer)
Robert Brant, Esq. (Township Solicitor)
J. Edmund Mullin, Esq. (Hamburg, Rubin, Mullin, Maxwell & Lupin, PC)
Gina Gilgo, P.E. (NV5 Engineering)
Jeff DeZort, P.E. (CESO, Inc.)
Greg Richardson, P.E. (Traffic Planning & Design)
John Miller-Simard (Amazon)
Kurt Padavano (Advance Realty Management, Inc.)

APPENDIX C

STUDY AREA PHOTOGRAPHS



Direction / Road: EB Morris Rd
Approach / Departure: Approach
Distance: 50 feet



Direction / Road: EB Morris Rd
Approach / Departure: Approach
Distance: 200 feet



Direction / Road: WB Morris Rd
Approach / Departure: Approach
Distance: 50 feet



Direction / Road: WB Morris Rd
Approach / Departure: Approach
Distance: 200 feet



Direction / Road: NB Schultz Rd
Approach / Departure: Approach
Distance: 50 feet



Direction / Road: NB Schultz Rd
Approach / Departure: Approach
Distance: 200 feet



Direction / Road: SB Broad St
Approach / Departure: Approach
Distance: 50 feet



Direction / Road: SB Broad St
Approach / Departure: Approach
Distance: 200 feet



Direction / Road: WB Morris Rd
Approach / Departure: Approach
Distance: 50 feet



Direction / Road: EB Morris Rd
Approach / Departure: Approach
Distance: 50 feet



Direction / Road: NB Schultz Rd
Approach / Departure: Approach
Distance: 50 feet



Direction / Road: NB Schultz Rd
Approach / Departure: Approach
Distance: 200 feet



Direction / Road: Proposed Driveway – Looking Out
Approach / Departure: _____
Distance: _____



Direction / Road: Proposed Driveway – Looking In
Approach / Departure: _____
Distance: _____



Direction / Road: Proposed Driveway – Looking Right
Approach / Departure: _____
Distance: _____



Direction / Road: Proposed Driveway – Looking Left
Approach / Departure: _____
Distance: _____

APPENDIX D

MANUAL COUNT PRINTOUTS



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

Count Name: Morris Road and
 Broad Street-Schultz Road
 Site Code:
 Start Date: 01/14/2020
 Page No: 1

Counter:: Mio
 Counted By:: Mio
 Weather:: Clear

Turning Movement Data

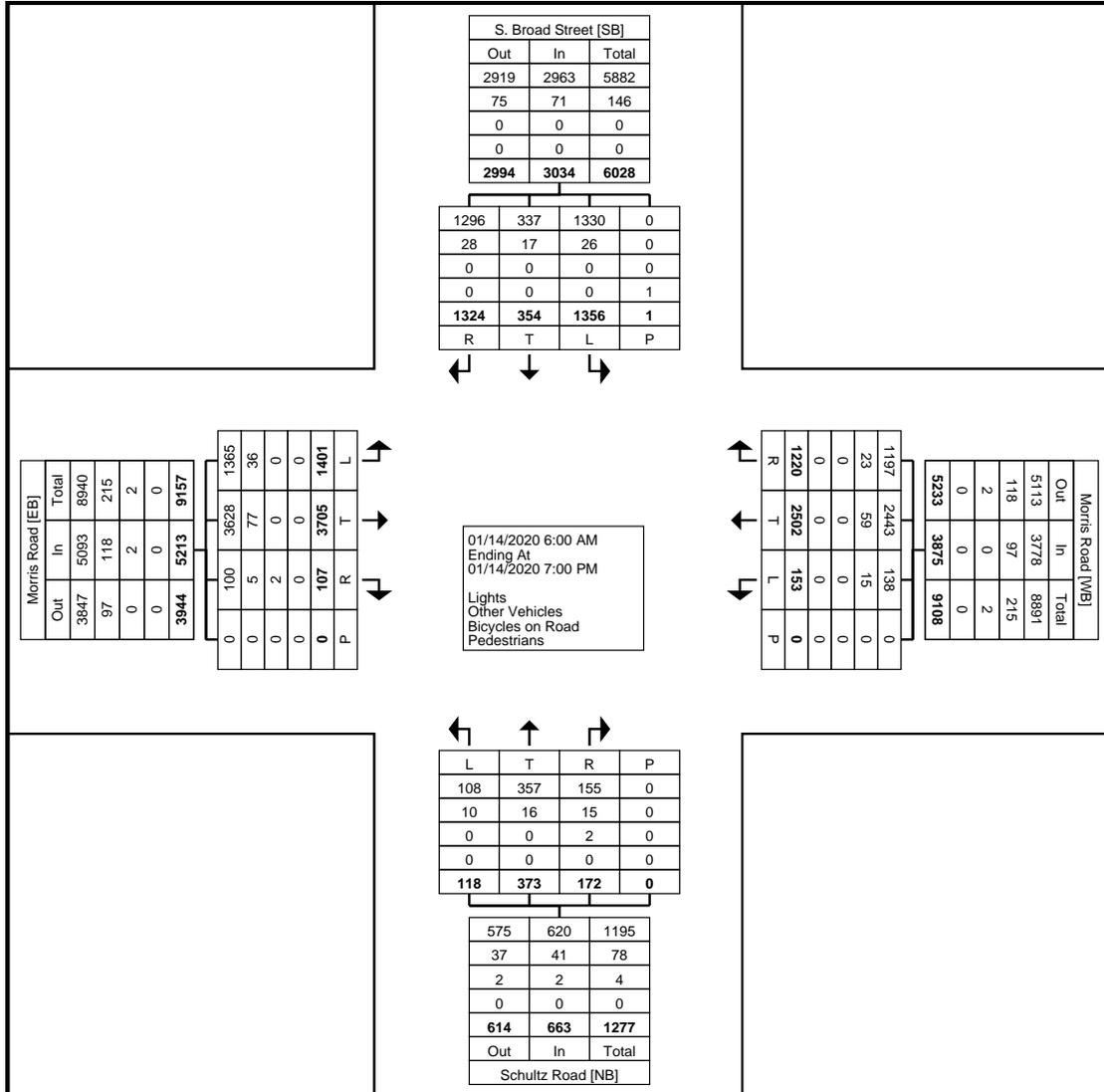
Start Time	Morris Road Eastbound						Morris Road Westbound						Schultz Road Northbound						S. Broad Street Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
6:00 AM	40	87	0	1	0	128	1	20	23	0	0	44	0	2	0	0	0	2	11	3	12	5	0	31	205
6:15 AM	69	96	2	1	0	168	0	37	32	5	0	74	0	3	3	0	0	6	24	6	11	7	0	48	296
6:30 AM	64	160	5	3	0	232	1	50	36	0	0	87	2	9	1	0	0	12	38	8	7	6	0	59	390
6:45 AM	71	173	6	2	0	252	4	54	50	15	0	123	2	11	3	1	0	17	46	6	13	8	0	73	465
Hourly Total	244	516	13	7	0	780	6	161	141	20	0	328	4	25	7	1	0	37	119	23	43	26	0	211	1356
7:00 AM	79	187	3	2	0	271	4	39	42	8	0	93	3	12	4	1	0	20	38	7	13	9	0	67	451
7:15 AM	89	183	4	0	0	276	3	45	49	9	0	106	1	20	3	2	0	26	34	6	16	11	0	67	475
7:30 AM	79	173	4	0	0	256	5	49	76	15	0	145	2	24	6	1	0	33	44	11	15	4	0	74	508
7:45 AM	80	163	2	4	0	249	13	58	62	7	0	140	2	45	7	1	0	55	39	14	15	6	0	74	518
Hourly Total	327	706	13	6	0	1052	25	191	229	39	0	484	8	101	20	5	0	134	155	38	59	30	0	282	1952
8:00 AM	76	212	2	1	0	291	6	76	67	3	0	152	0	17	1	5	0	23	44	9	14	7	1	74	540
8:15 AM	79	158	5	3	0	245	6	64	54	6	0	130	1	11	5	1	0	18	42	11	17	10	0	80	473
8:30 AM	73	162	1	1	0	237	6	61	46	5	0	118	0	14	4	0	0	18	54	15	34	2	0	105	478
8:45 AM	61	150	2	0	0	213	2	57	51	4	0	114	0	12	7	4	0	23	24	10	8	6	0	48	398
Hourly Total	289	682	10	5	0	986	20	258	218	18	0	514	1	54	17	10	0	82	164	45	73	25	1	307	1889
9:00 AM	51	129	0	1	0	181	2	60	29	5	0	96	1	14	23	0	0	38	32	11	13	7	0	63	378
9:15 AM	30	107	2	1	0	140	2	51	33	0	0	86	1	4	7	1	0	13	20	9	5	7	0	41	280
9:30 AM	35	92	3	0	0	130	3	47	18	1	0	69	1	8	8	2	0	19	24	4	6	5	0	39	257
9:45 AM	26	80	1	0	0	107	2	51	20	2	0	75	1	6	3	0	0	10	16	4	13	5	0	38	230
Hourly Total	142	408	6	2	0	558	9	209	100	8	0	326	4	32	41	3	0	80	92	28	37	24	0	181	1145
10:00 AM	26	82	0	0	0	108	5	37	13	2	0	57	0	3	2	0	0	5	21	8	10	1	0	40	210
10:15 AM	18	72	1	0	0	91	2	38	16	1	0	57	2	2	2	0	0	6	21	3	8	4	0	36	190
10:30 AM	24	47	2	0	0	73	6	43	18	2	0	69	2	6	0	1	0	9	20	5	21	4	0	50	201
10:45 AM	17	64	4	0	0	85	3	47	14	1	0	65	0	2	4	1	0	7	14	7	18	7	0	46	203
Hourly Total	85	265	7	0	0	357	16	165	61	6	0	248	4	13	8	2	0	27	76	23	57	16	0	172	804
11:00 AM	15	66	1	0	0	82	3	36	13	5	0	57	4	5	3	3	0	15	17	5	11	9	0	42	196
11:15 AM	17	67	1	1	0	86	2	56	14	3	0	75	1	6	1	1	0	9	16	9	10	6	0	41	211
11:30 AM	20	66	1	0	0	87	1	56	14	3	0	74	2	6	2	0	0	10	26	7	11	7	0	51	222
11:45 AM	22	58	1	0	0	81	5	50	13	7	0	75	1	2	1	2	0	6	22	7	14	3	0	46	208
Hourly Total	74	257	4	1	0	336	11	198	54	18	0	281	8	19	7	6	0	40	81	28	46	25	0	180	837
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	24	63	6	0	0	93	6	109	26	2	0	143	5	11	1	1	0	18	78	20	72	6	0	176	430
4:15 PM	17	82	2	2	0	103	8	124	17	0	0	149	9	15	1	2	0	27	55	12	93	11	0	171	450
4:30 PM	19	83	0	0	0	102	1	102	19	2	0	124	10	12	3	5	0	30	96	12	103	10	0	221	477
4:45 PM	19	88	4	0	0	111	5	111	21	3	0	140	11	21	1	2	0	35	77	27	65	12	0	181	467
Hourly Total	79	316	12	2	0	409	20	446	83	7	0	556	35	59	6	10	0	110	306	71	333	39	0	749	1824
5:00 PM	16	81	1	1	0	99	3	105	23	2	0	133	16	11	1	2	0	30	76	16	93	7	0	192	454
5:15 PM	21	90	3	0	0	114	4	109	25	2	0	140	9	16	2	1	0	28	71	22	91	13	0	197	479
5:30 PM	24	80	3	0	0	107	4	100	23	1	0	128	13	13	0	1	0	27	61	19	95	8	0	183	445
5:45 PM	21	77	3	0	0	101	12	131	23	1	0	167	4	5	5	3	0	17	49	12	43	6	0	110	395
Hourly Total	82	328	10	1	0	421	23	445	94	6	0	568	42	45	8	7	0	102	257	69	322	34	0	682	1773
6:00 PM	20	61	0	0	0	81	9	127	27	3	0	166	6	4	8	1	0	19	32	11	38	8	0	89	355
6:15 PM	15	56	0	1	0	72	9	117	32	7	0	165	1	7	0	1	0	9	38	8	24	2	0	72	318
6:30 PM	25	60	1	0	0	86	2	100	27	4	0	133	4	12	1	2	0	19	20	2	27	9	0	58	296
6:45 PM	19	50	5	1	0	75	3	85	17	1	0	106	1	2	0	1	0	4	16	8	22	5	0	51	236
Hourly Total	79	227	6	2	0	314	23	429	103	15	0	570	12	25	9	5	0	51	106	29	111	24	0	270	1205
Grand Total	1401	3705	81	26	0	5213	153	2502	1083	137	0	3875	118	373	123	49	0	663	1356	354	1081	243	1	3034	12785
Approach %	26.9	71.1	1.6	0.5	-	-	3.9	64.6	27.9	3.5	-	-	17.8	56.3	18.6	7.4	-	-	44.7	11.7	35.6	8.0	-	-	-
Total %	11.0	29.0	0.6	0.2	-	40.8	1.2	19.6	8.5	1.1	-	30.3	0.9	2.9	1.0	0.4	-	5.2	10.6	2.8	8.5	1.9	-	23.7	-
Lights	1365	3628	74	26	-	5093	138	2443	1061	136	-	3778	108	357	109	46	-	620	1330	337	1057	239	-	2963	12454
% Lights	97.4	97.9	91.4	100.0	-	97.7	90.2	97.6	98.0	99.3	-	97.5	91.5	95.7	88.6	93.9	-	93.5	98.1	95.2	97.8	98.4	-	97.7	97.4
Other Vehicles	36	77	5	0	-	118	15	59	22	1	-	97	10	16	13	2	-	41	26	17	24	4	-	71	327
% Other Vehicles	2.6	2.1	6.2	0.0	-	2.3	9.8	2.4	2.0	0.7	-	2.5	8.5	4.3	10.6	4.1	-	6.2	1.9	4.8	2.2	1.6	-	2.3	2.6
Bicycles on Road	0	0	2	0	-	2	0	0	0	0	-	0	0	0	1	1	-	2	0	0	0	0	-	0	4
% Bicycles on Road	0.0	0.0	2.5	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.8	2.0	-	0.3	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	1	-	-



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Count Name: Morris Road and
 Broad Street-Schultz Road
 Site Code:
 Start Date: 01/14/2020
 Page No: 3



Turning Movement Data Plot



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Counter:: Mio
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 Weather:: Clear

Count Name: Morris Road and
 Broad Street-Schultz Road
 Site Code:
 Start Date: 01/14/2020
 Page No: 4

Turning Movement Peak Hour Data (7:15 AM)

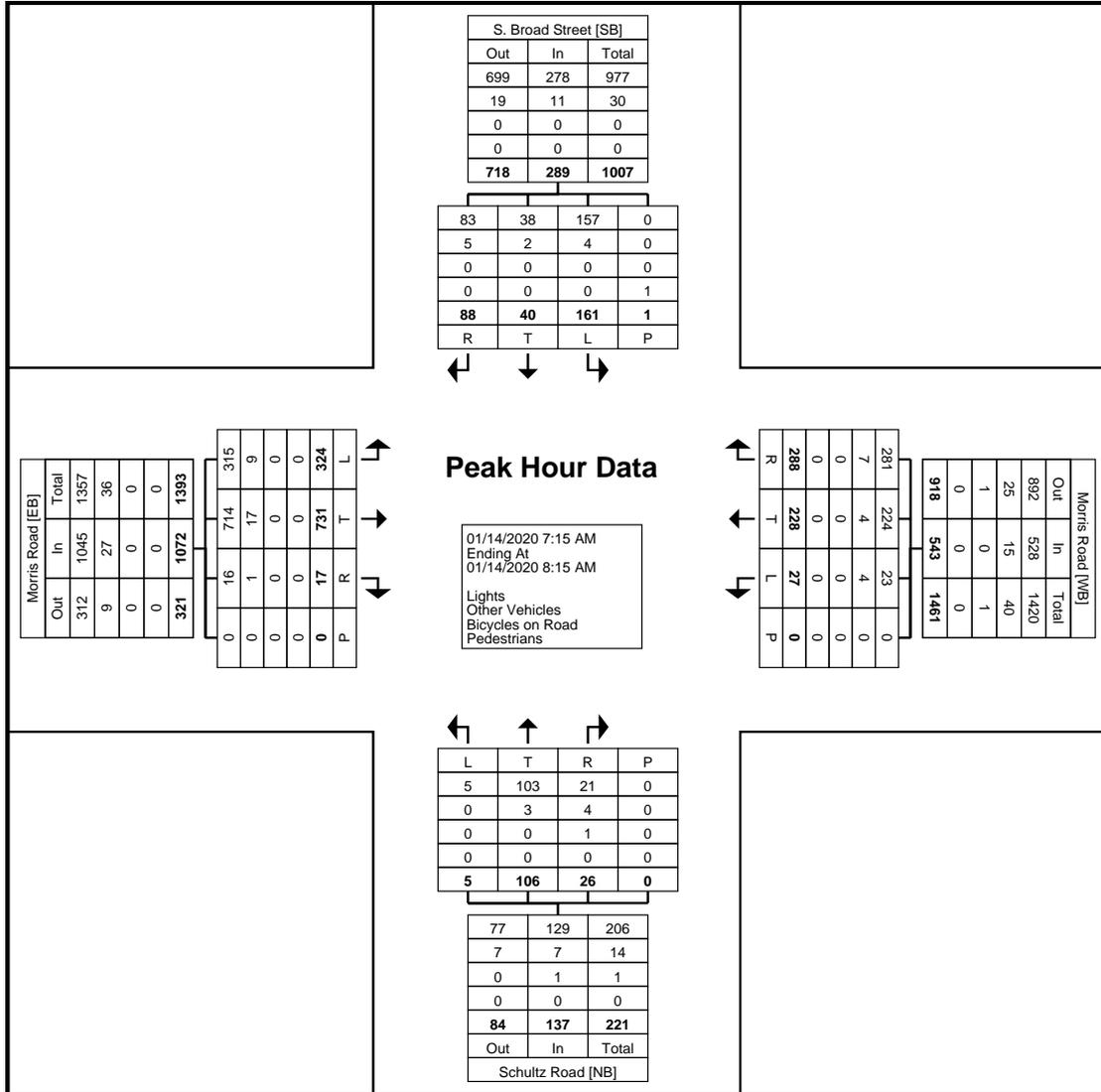
Start Time	Morris Road Eastbound						Morris Road Westbound						Schultz Road Northbound						S. Broad Street Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:15 AM	89	183	4	0	0	276	3	45	49	9	0	106	1	20	3	2	0	26	34	6	16	11	0	67	475
7:30 AM	79	173	4	0	0	256	5	49	76	15	0	145	2	24	6	1	0	33	44	11	15	4	0	74	508
7:45 AM	80	163	2	4	0	249	13	58	62	7	0	140	2	45	7	1	0	55	39	14	15	6	0	74	518
8:00 AM	76	212	2	1	0	291	6	76	67	3	0	152	0	17	1	5	0	23	44	9	14	7	1	74	540
Total	324	731	12	5	0	1072	27	228	254	34	0	543	5	106	17	9	0	137	161	40	60	28	1	289	2041
Approach %	30.2	68.2	1.1	0.5	-	-	5.0	42.0	46.8	6.3	-	-	3.6	77.4	12.4	6.6	-	-	55.7	13.8	20.8	9.7	-	-	-
Total %	15.9	35.8	0.6	0.2	-	52.5	1.3	11.2	12.4	1.7	-	26.6	0.2	5.2	0.8	0.4	-	6.7	7.9	2.0	2.9	1.4	-	14.2	-
PHF	0.910	0.862	0.750	0.313	-	0.921	0.519	0.750	0.836	0.567	-	0.893	0.625	0.589	0.607	0.450	-	0.623	0.915	0.714	0.938	0.636	-	0.976	0.945
Lights	315	714	11	5	-	1045	23	224	247	34	-	528	5	103	13	8	-	129	157	38	55	28	-	278	1980
% Lights	97.2	97.7	91.7	100.0	-	97.5	85.2	98.2	97.2	100.0	-	97.2	100.0	97.2	76.5	88.9	-	94.2	97.5	95.0	91.7	100.0	-	96.2	97.0
Other Vehicles	9	17	1	0	-	27	4	4	7	0	-	15	0	3	4	0	-	7	4	2	5	0	-	11	60
% Other Vehicles	2.8	2.3	8.3	0.0	-	2.5	14.8	1.8	2.8	0.0	-	2.8	0.0	2.8	23.5	0.0	-	5.1	2.5	5.0	8.3	0.0	-	3.8	2.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	1	-	1	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	11.1	-	0.7	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Count Name: Morris Road and
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 Start Date: 01/14/2020
 Page No: 5

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 Weather:: Clear



Turning Movement Peak Hour Data Plot (7:15 AM)



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Count Name: Morris Road and
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 Site Code:
 Start Date: 01/14/2020
 Page No: 6

Counter:: Mio
 Counted By:: Mio
 Weather:: Clear

Turning Movement Peak Hour Data (4:30 PM)

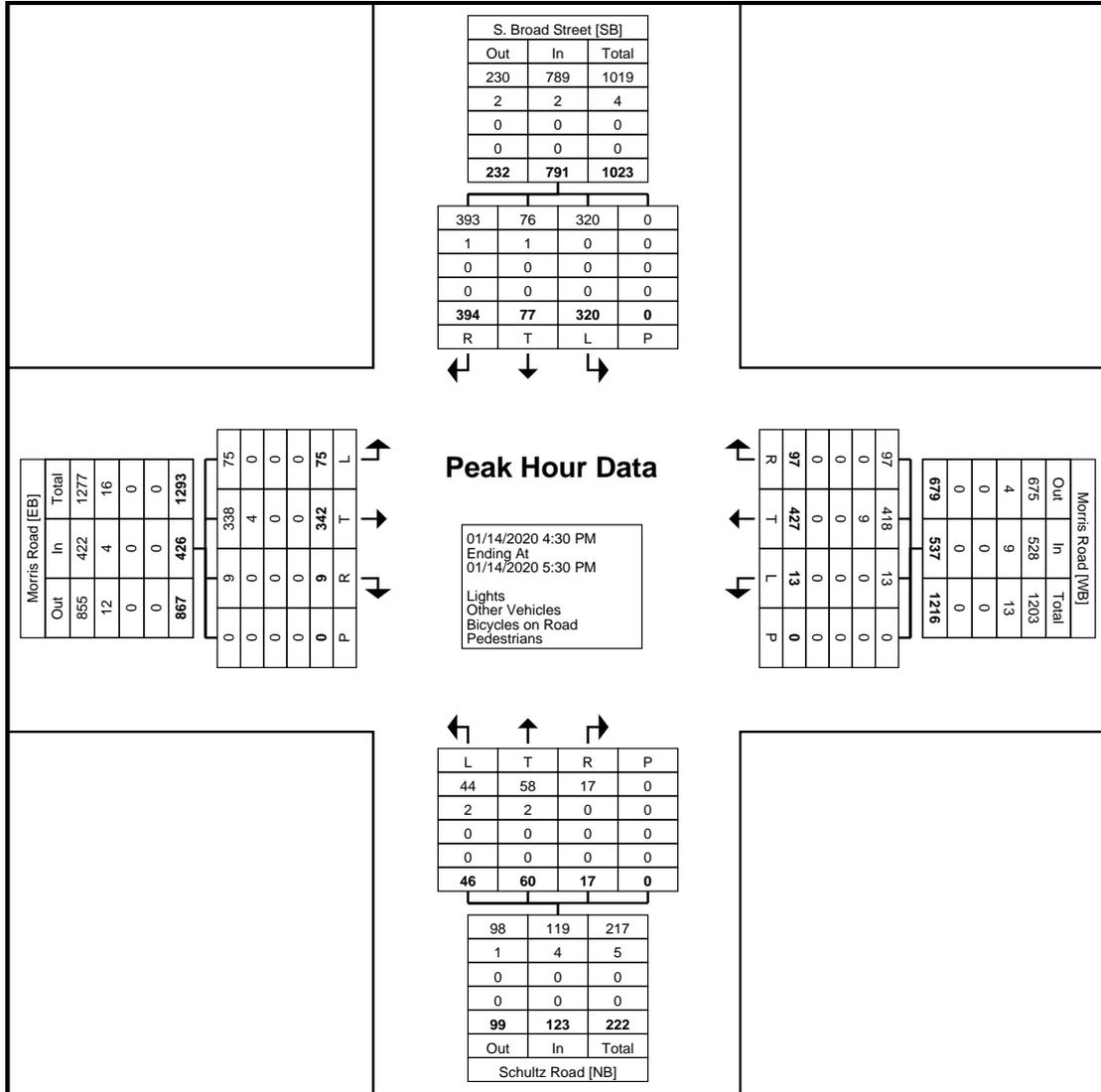
Start Time	Morris Road Eastbound						Morris Road Westbound						Schultz Road Northbound						S. Broad Street Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
4:30 PM	19	83	0	0	0	102	1	102	19	2	0	124	10	12	3	5	0	30	96	12	103	10	0	221	477
4:45 PM	19	88	4	0	0	111	5	111	21	3	0	140	11	21	1	2	0	35	77	27	65	12	0	181	467
5:00 PM	16	81	1	1	0	99	3	105	23	2	0	133	16	11	1	2	0	30	76	16	93	7	0	192	454
5:15 PM	21	90	3	0	0	114	4	109	25	2	0	140	9	16	2	1	0	28	71	22	91	13	0	197	479
Total	75	342	8	1	0	426	13	427	88	9	0	537	46	60	7	10	0	123	320	77	352	42	0	791	1877
Approach %	17.6	80.3	1.9	0.2	-	-	2.4	79.5	16.4	1.7	-	-	37.4	48.8	5.7	8.1	-	-	40.5	9.7	44.5	5.3	-	-	-
Total %	4.0	18.2	0.4	0.1	-	22.7	0.7	22.7	4.7	0.5	-	28.6	2.5	3.2	0.4	0.5	-	6.6	17.0	4.1	18.8	2.2	-	42.1	-
PHF	0.893	0.950	0.500	0.250	-	0.934	0.650	0.962	0.880	0.750	-	0.959	0.719	0.714	0.583	0.500	-	0.879	0.833	0.713	0.854	0.808	-	0.895	0.980
Lights	75	338	8	1	-	422	13	418	88	9	-	528	44	58	7	10	-	119	320	76	351	42	-	789	1858
% Lights	100.0	98.8	100.0	100.0	-	99.1	100.0	97.9	100.0	100.0	-	98.3	95.7	96.7	100.0	100.0	-	96.7	100.0	98.7	99.7	100.0	-	99.7	99.0
Other Vehicles	0	4	0	0	-	4	0	9	0	0	-	9	2	2	0	0	-	4	0	1	1	0	-	2	19
% Other Vehicles	0.0	1.2	0.0	0.0	-	0.9	0.0	2.1	0.0	0.0	-	1.7	4.3	3.3	0.0	0.0	-	3.3	0.0	1.3	0.3	0.0	-	0.3	1.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Counter:: Mio
 Counted By:: Mio
 Weather:: Clear

Count Name: Morris Road and
 Broad Street-Schultz Road
 Site Code:
 Start Date: 01/14/2020
 Page No: 7



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



Traffic Planning and Design, Inc
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 Suite 650
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Count Name: Morris Road and Private Driveway
 Site Code:
 Start Date: 01/14/2020
 Page No: 1

Counter:: Mio
 Counted By:: Mio
 Weather:: Clear

Turning Movement Data

Start Time	Morris Road Eastbound				Morris Road Westbound				Driveway Northbound				Int. Total
	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	
6:00 AM	95	2	0	97	0	38	0	38	0	0	0	0	135
6:15 AM	118	4	0	122	1	70	0	71	0	0	0	0	193
6:30 AM	193	5	0	198	5	95	0	100	0	0	0	0	298
6:45 AM	208	5	0	213	10	118	0	128	2	1	0	3	344
Hourly Total	614	16	0	630	16	321	0	337	2	1	0	3	970
7:00 AM	219	6	0	225	6	94	0	100	0	0	0	0	325
7:15 AM	226	10	0	236	10	113	0	123	0	0	0	0	359
7:30 AM	212	3	0	215	8	136	1	144	0	1	0	1	360
7:45 AM	214	7	0	221	8	151	0	159	0	1	0	1	381
Hourly Total	871	26	0	897	32	494	1	526	0	2	0	2	1425
8:00 AM	245	7	0	252	9	136	0	145	0	0	0	0	397
8:15 AM	207	7	0	214	14	135	0	149	0	1	0	1	364
8:30 AM	216	8	0	224	19	116	0	135	0	1	0	1	360
8:45 AM	180	7	0	187	6	113	0	119	1	0	0	1	307
Hourly Total	848	29	0	877	48	500	0	548	1	2	0	3	1428
9:00 AM	179	4	0	183	5	99	0	104	0	0	0	0	287
9:15 AM	133	1	0	134	7	83	0	90	0	0	0	0	224
9:30 AM	128	3	0	131	1	70	0	71	1	0	0	1	203
9:45 AM	108	2	0	110	3	78	0	81	0	1	0	1	192
Hourly Total	548	10	0	558	16	330	0	346	1	1	0	2	906
10:00 AM	97	0	0	97	3	57	0	60	1	0	0	1	158
10:15 AM	86	1	0	87	2	54	0	56	0	2	0	2	145
10:30 AM	83	4	0	87	0	68	0	68	0	0	0	0	155
10:45 AM	74	1	0	75	0	66	0	66	0	2	0	2	143
Hourly Total	340	6	0	346	5	245	0	250	1	4	0	5	601
11:00 AM	89	0	0	89	2	58	0	60	0	0	0	0	149
11:15 AM	92	3	0	95	0	70	0	70	5	0	0	5	170
11:30 AM	84	2	0	86	1	76	0	77	0	0	0	0	163
11:45 AM	85	2	0	87	2	67	0	69	2	2	0	4	160
Hourly Total	350	7	0	357	5	271	0	276	7	2	0	9	642
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	144	0	0	144	0	133	0	133	4	10	0	14	291
4:15 PM	133	0	0	133	2	154	0	156	2	3	0	5	294
4:30 PM	186	1	0	187	1	120	0	121	1	11	0	12	320
4:45 PM	167	1	0	168	0	142	0	142	2	19	0	21	331
Hourly Total	630	2	0	632	3	549	0	552	9	43	0	52	1236
5:00 PM	155	1	0	156	3	129	0	132	3	21	0	24	312
5:15 PM	174	1	0	175	2	130	0	132	2	10	0	12	319
5:30 PM	144	1	0	145	1	134	0	135	3	6	0	9	289
5:45 PM	133	0	0	133	1	157	0	158	2	4	0	6	297
Hourly Total	606	3	0	609	7	550	0	557	10	41	0	51	1217
6:00 PM	111	2	0	113	0	164	0	164	2	6	0	8	285
6:15 PM	92	0	0	92	1	161	0	162	0	5	0	5	259
6:30 PM	79	0	0	79	1	128	0	129	0	2	0	2	210
6:45 PM	78	0	0	78	0	110	0	110	0	2	0	2	190
Hourly Total	360	2	0	362	2	563	0	565	2	15	0	17	944
Grand Total	5167	101	0	5268	134	3823	1	3957	33	111	0	144	9369
Approach %	98.1	1.9	-	-	3.4	96.6	-	-	22.9	77.1	-	-	-
Total %	55.1	1.1	-	56.2	1.4	40.8	-	42.2	0.4	1.2	-	1.5	-
Lights	5050	95	-	5145	130	3729	-	3859	32	107	-	139	9143
% Lights	97.7	94.1	-	97.7	97.0	97.5	-	97.5	97.0	96.4	-	96.5	97.6
Other Vehicles	116	6	-	122	4	92	-	96	1	3	-	4	222
% Other Vehicles	2.2	5.9	-	2.3	3.0	2.4	-	2.4	3.0	2.7	-	2.8	2.4
Bicycles on Road	1	0	-	1	0	2	-	2	0	1	-	1	4
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.1	-	0.1	0.0	0.9	-	0.7	0.0
Pedestrians	-	-	0	-	-	-	1	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	100.0	-	-	-	-	-	-



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Count Name: Morris Road and
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 Site Code:
 Start Date: 01/14/2020
 Page No: 3

Counter:: Mio
 Counted By:: Mio
 Weather:: Clear

Turning Movement Peak Hour Data (7:30 AM)

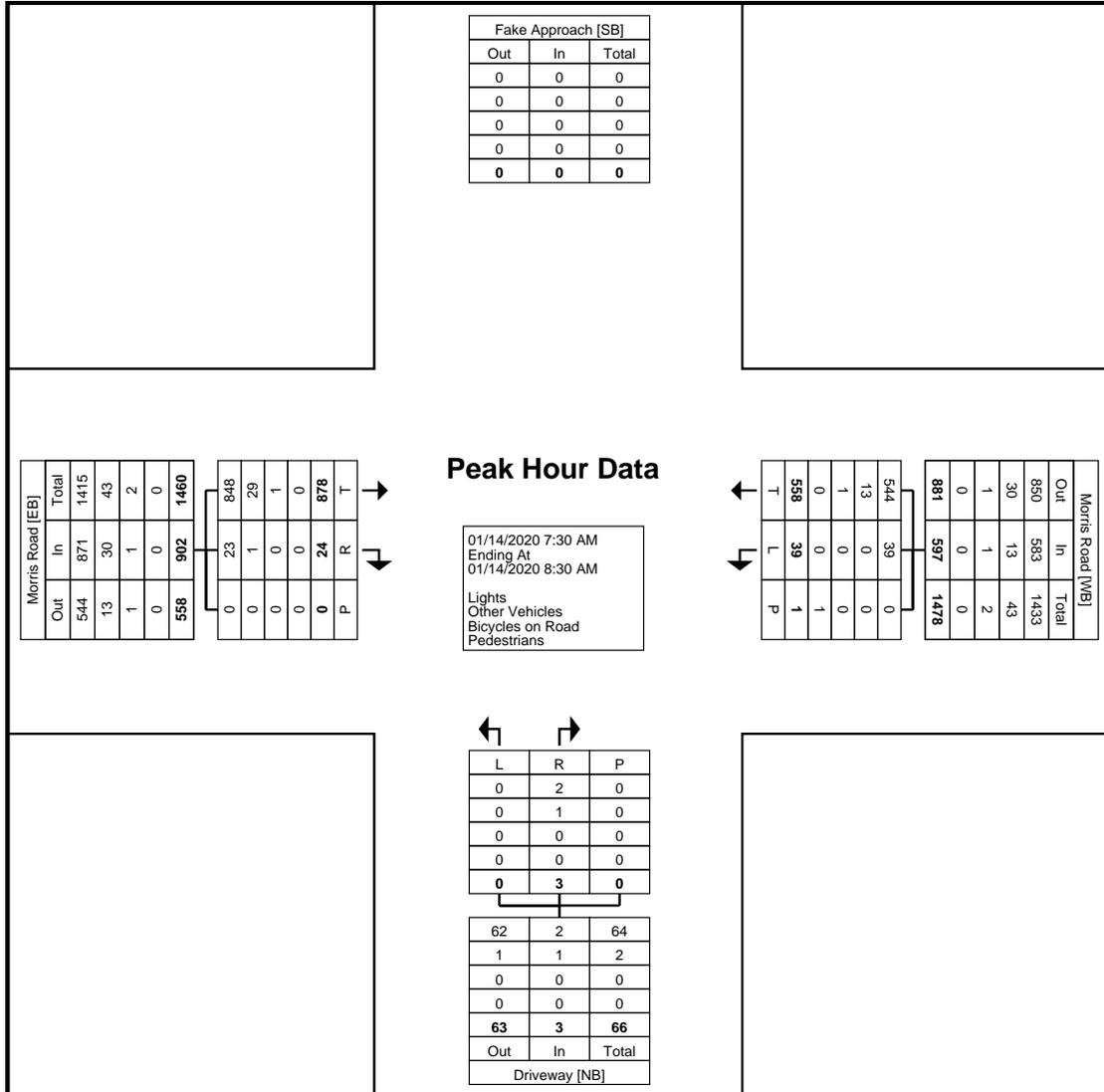
Start Time	Morris Road Eastbound				Morris Road Westbound				Driveway Northbound				Int. Total
	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	
7:30 AM	212	3	0	215	8	136	1	144	0	1	0	1	360
7:45 AM	214	7	0	221	8	151	0	159	0	1	0	1	381
8:00 AM	245	7	0	252	9	136	0	145	0	0	0	0	397
8:15 AM	207	7	0	214	14	135	0	149	0	1	0	1	364
Total	878	24	0	902	39	558	1	597	0	3	0	3	1502
Approach %	97.3	2.7	-	-	6.5	93.5	-	-	0.0	100.0	-	-	-
Total %	58.5	1.6	-	60.1	2.6	37.2	-	39.7	0.0	0.2	-	0.2	-
PHF	0.896	0.857	-	0.895	0.696	0.924	-	0.939	0.000	0.750	-	0.750	0.946
Lights	848	23	-	871	39	544	-	583	0	2	-	2	1456
% Lights	96.6	95.8	-	96.6	100.0	97.5	-	97.7	-	66.7	-	66.7	96.9
Other Vehicles	29	1	-	30	0	13	-	13	0	1	-	1	44
% Other Vehicles	3.3	4.2	-	3.3	0.0	2.3	-	2.2	-	33.3	-	33.3	2.9
Bicycles on Road	1	0	-	1	0	1	-	1	0	0	-	0	2
% Bicycles on Road	0.1	0.0	-	0.1	0.0	0.2	-	0.2	-	0.0	-	0.0	0.1
Pedestrians	-	-	0	-	-	-	1	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	100.0	-	-	-	-	-	-



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 Weather:: Clear

Count Name: Morris Road and
 Private Driveway
 Site Code:
 Start Date: 01/14/2020
 Page No: 4



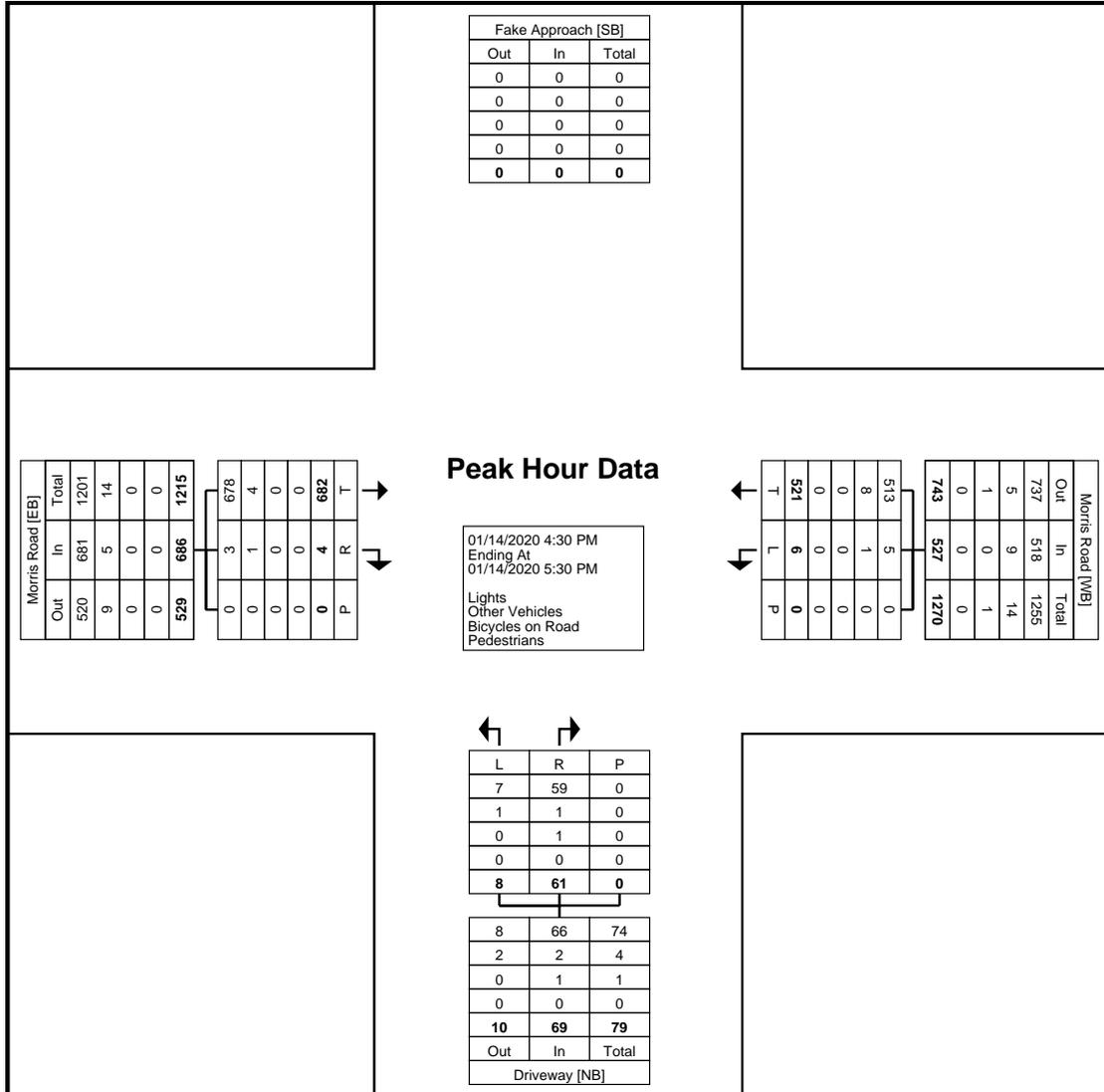
Turning Movement Peak Hour Data Plot (7:30 AM)



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Counter:: Mio
 Counted By:: Mio
 Weather:: Clear

Count Name: Morris Road and Private Driveway
 Site Code:
 Start Date: 01/14/2020
 Page No: 6



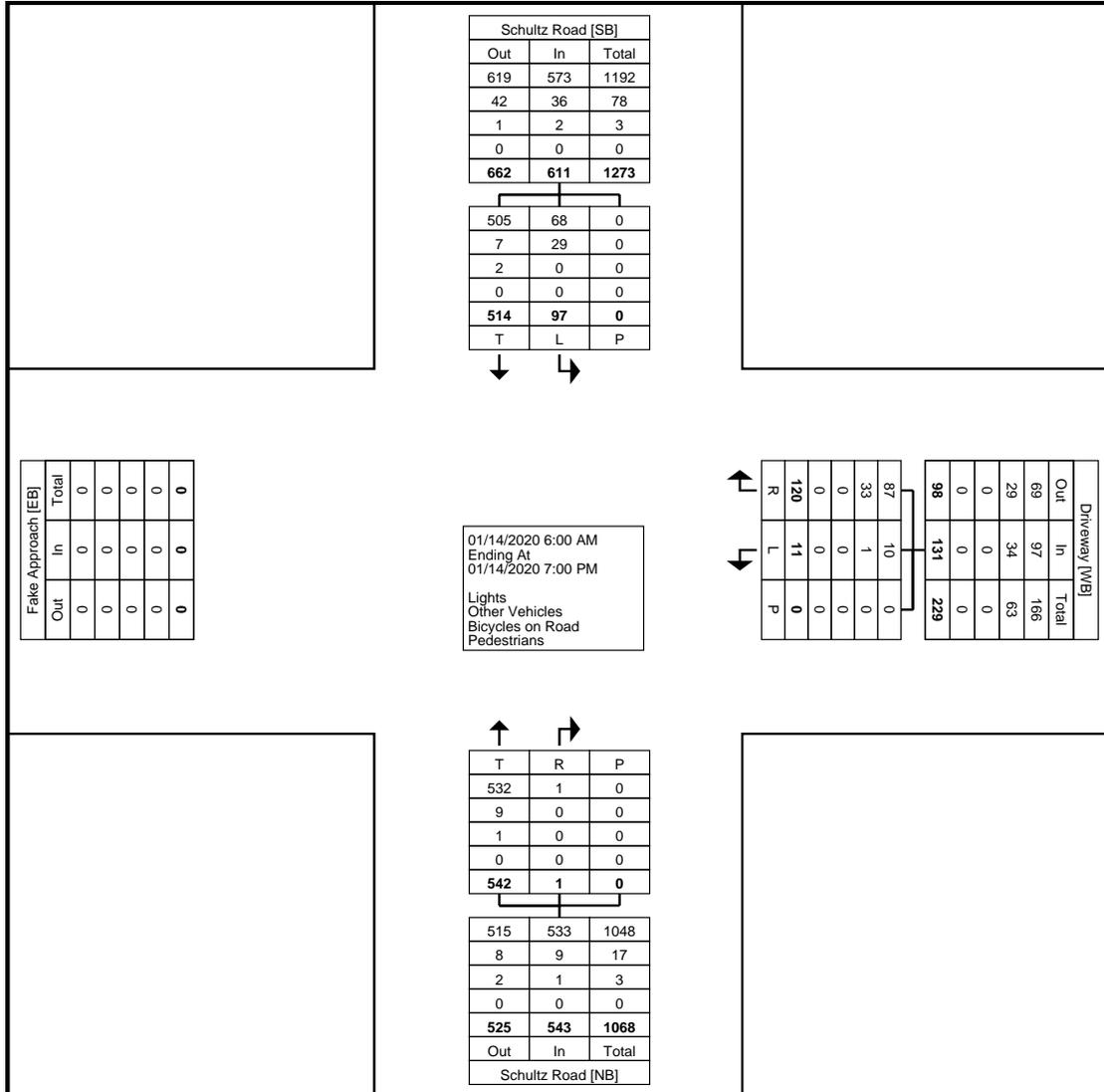
Turning Movement Peak Hour Data Plot (4:30 PM)



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Count Name: Schultz Road and Private Driveway
 Site Code:
 Start Date: 01/14/2020
 Page No: 2

Counter:: Mio
 Counted By:: Mio
 Weather:: Clear



Turning Movement Data Plot

APPENDIX E

EXISTING SITE VACANCY

TRIP GENERATION/TRIP DISTRIBUTIONS



Est. 1989

TRAFFIC PLANNING AND DESIGN, INC.
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JOB ARMI.01
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE Existing Site Vacancies

Total Building Size (Existing Site) = 667.019 Ksf
Vacancies → Being Marketed = -68 Ksf
→ To Remain Vacant = -50 Ksf

Building Operating During Counts = 549.019 Ksf

Counts

AM Trip Gen →

Drive	ENT	EX	TOT
Morris	63	3	66
Schultz	23	7	30
TOTAL	86	10	96

$$\frac{96 \text{ trips}}{549.019 \text{ Ksf}} = \text{0.175 trips/Ksf}$$

@ 90% Enter

AM Vacancy Being Marketed → 68 Ksf × 0.175 =
12 trips @ 90% Enter =

Enter = 11 | Exit = 1



Est. 1989

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JOB ARMI.01

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE Existing Site Vacancies

PM Trip Gen →

Drive	Ent	Ex	TOT
Morris	10	69	79
Schultz	3	53	56
TOTAL	13	122	135

$$\frac{135 \text{ trips}}{549.019 \text{ Ksf}} = \boxed{0.246 \text{ trips/Ksf}}$$

@ 10% Enter

PM Vacancy Being Marketed → 68 Ksf × 0.246 =
17 trips @ 10% Ent =

Enter = 2	Exit = 15
-----------	-----------

Comparison - 68 Ksf being marketed as warehouse

ITE 150 → AM Rate = 0.17 (x) < $\frac{0.175 (x)}{*}$

PM Rate = 0.19 (x) < $\frac{0.246 (x)}{*}$

* Utilizing site-specific data calculated above

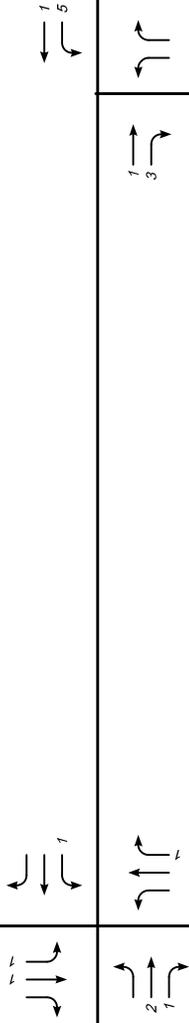
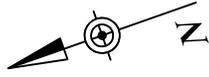
SOUTH
BROAD
STREET

MORRIS
ROAD

MORRIS
ROAD

SCHULTZ
ROAD

SUBJECT
SITE



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FIGURE E-1

EXISTING SITE VACANCY
WEEKDAY AM PEAK HOUR
NEAR-BY TRIP DISTRIBUTION

KEY:
SCHEMATIC DRAWING: NOT TO SCALE

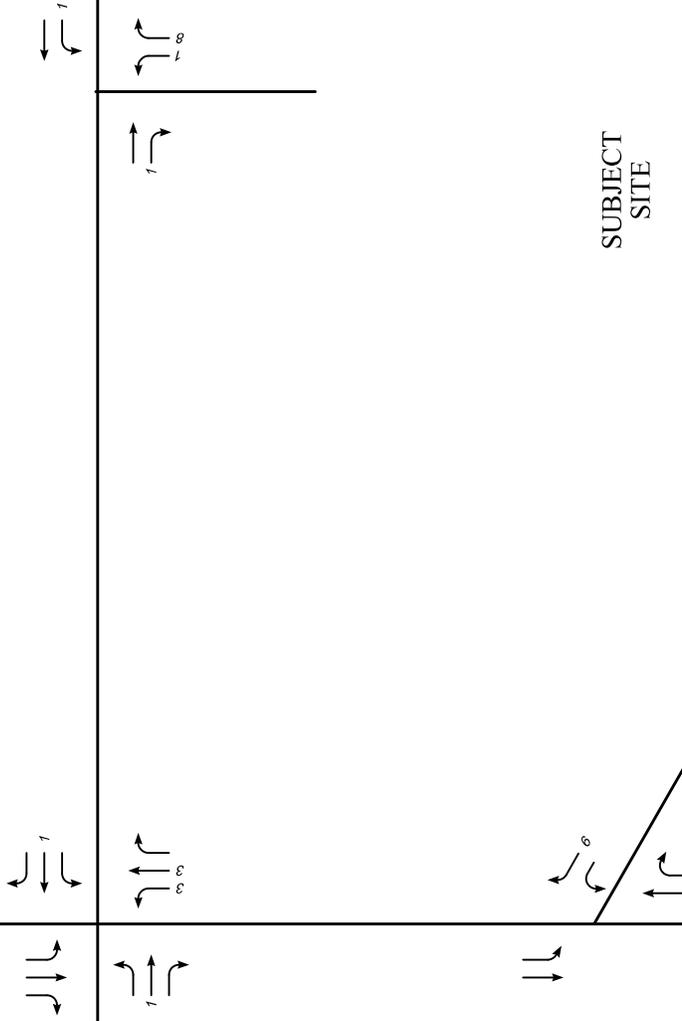
SOUTH
BROAD
STREET

MORRIS
ROAD

MORRIS
ROAD

SCHULTZ
ROAD

SUBJECT
SITE



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FIGURE E-2

EXISTING SITE VACANCY
WEEKDAY PM PEAK HOUR
NEAR-BY TRIP DISTRIBUTION

KEY:
SCHEMATIC DRAWING: NOT TO SCALE

APPENDIX F
TRAFFIC ASSESSMENT MEMORANDUM

MEMORANDUM

To: Al Patel, Amazon

From: Gina Gilgo, PE (gina.gilgo@NV5.com)

cc: John Karnowski, PE, PTOE, AICP (John.Karnowski@NV5.com)

Date: February 4, 2020

Re: Traffic Assessment - Update
DPH6_P1 Parking Facility
2750 Morris Road
Lansdale, Pennsylvania 19446

PRELIMINARY TRAFFIC REVIEW

This memo conveys the findings of our Preliminary Traffic Review for a proposed offsite Parking Facility in Lansdale, Pennsylvania. The purpose of this review is to evaluate the existing transportation infrastructure and access needs of the Parking Facility and make preliminary recommendations to accommodate the site traffic. This traffic review is based on current available information, which may be subject to change.

Site Description

The site is a proposed Parking Facility located southeast of the intersection of Morris and Schultz Roads. It is intended to provide off-site parking for a proposed Amazon Facility in Harleysville, an approximately 5-mile drive from the site. The site is already developed with industrial/research building(s) and associated parking. The site plan proposed for the parking layout (see Attachment A) will accommodate 278 delivery vans and 278 automobiles within an area already paved and striped for parking passenger vehicles. Access to the site is currently available via driveways on Morris Road and Schultz Road.

The proposed Parking Facility will generate the following vehicle trips:

Delivery Vehicles

- 480 trips per day
- Departing in two waves (6:15 AM – 10:15 AM & 11:45 AM – 12:45 PM) and Returning beginning at 3:00 PM
- Maximum of 48 trips departing in a single hour and 48 returning in a different single hour.

Cars

- 480 trips per day
- Arriving in two waves (6:00 AM – 10:00 AM & 11:30 AM – 12:30 PM). Drivers exit the parking facility after returning the vans at the end of their shifts, beginning at 3:00 PM
- Maximum of 48 trips arriving in a single hour and 48 leaving in a different single hour.

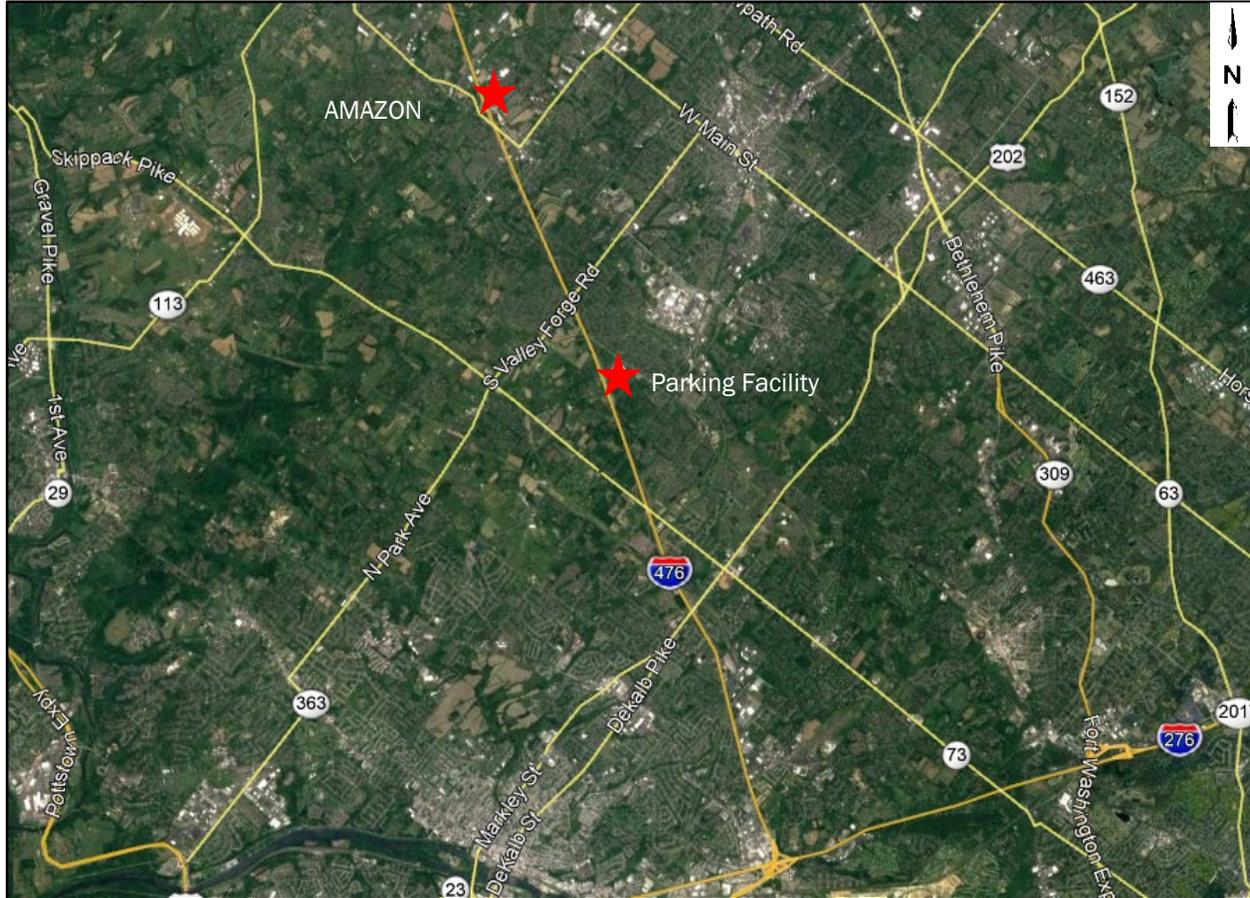
The Parking Facility is expected to generate 960 trips per day. About 40% of those trips will occur during typical morning (7am – 9am) and evening (4pm – 6pm) peak periods of travel. The table below summarizes the peak hour of site traffic expected during the typical peak commuting periods.

Peak Period	Duration	Parking Facility Trips		
		Entering	Exiting	Total
Morning Peak	7:45 – 8:45 AM	48	48	96
Evening Peak	5:00 – 6:00 PM	48	48	96

Transportation Network

The parking facility is connected to the surrounding area and the proposed Amazon Facility in Harleysville via a grid network. The most likely route between the facilities includes Morris Road, Valley Forge Road, Sumneytown Pike, Forty Foot Road, Detwiler Road and Gehman Road. There is access to I-476 near the proposed Amazon Facility, but no other interchanges near the proposed parking facility. The following vicinity and study area maps further illustrate the transportation network for the subject site.

Project Vicinity Map

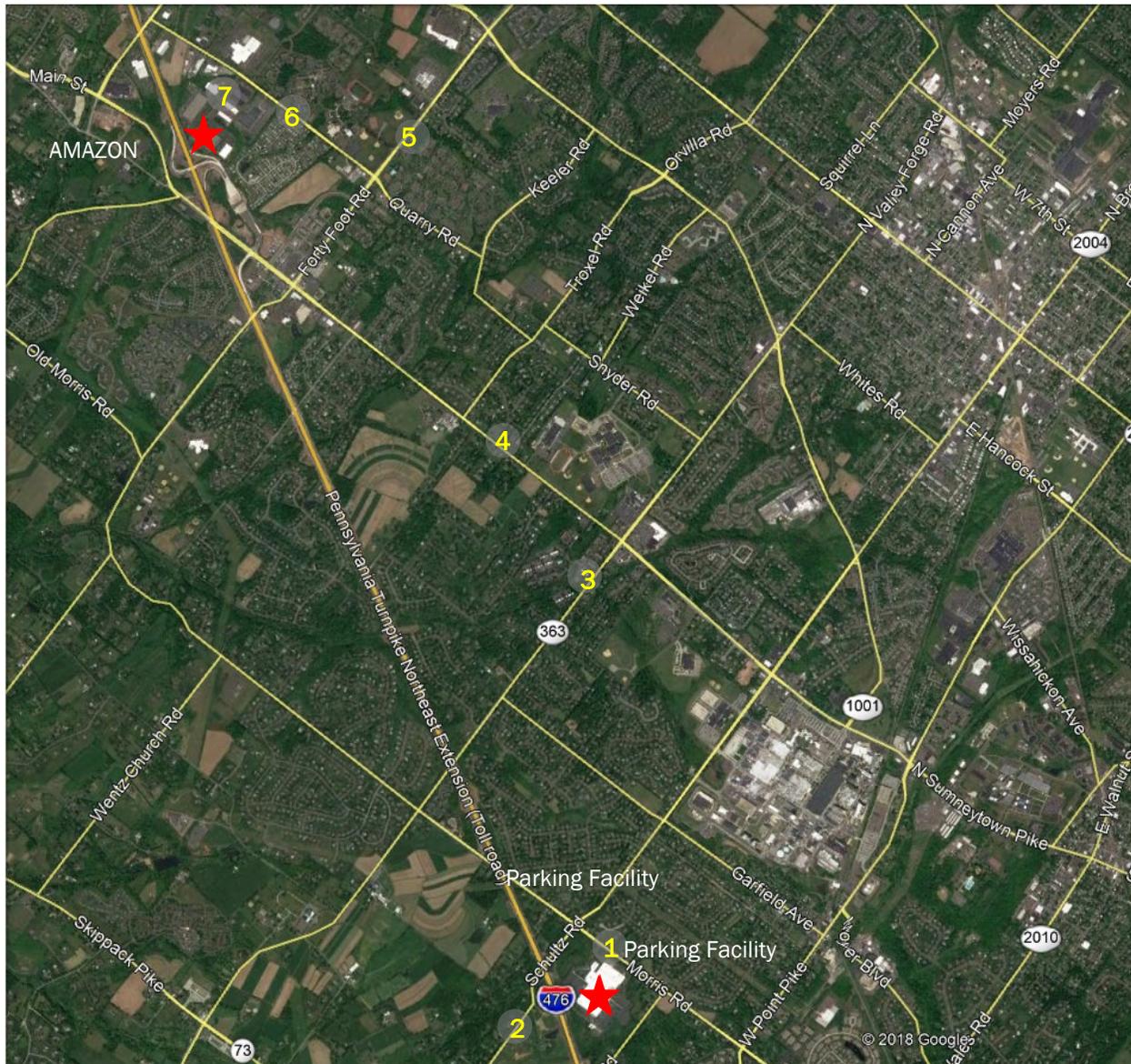


The following table summarizes information on the existing roadway facilities. The Average Annual Daily Traffic (AADT) volume, which is the average number of vehicles two-way passing at a given location, is also included in the table and each corresponding count location is illustrated on the study area map.

Map #	Route	Responsibility	Cross Section	Speed Limit	Sidewalk	AADT ¹
1	Morris Road/SR 2001	State	2 to 3-lane	45 mph	No	14,000
2	Schultz Road	Montgomery County	2-lane undivided	45 mph	No	NA
3	Valley Forge Road/SR 363	State	2-lane undivided	45 mph	No	12,000
4	Sumneytown Road	Montgomery County	2-lane undivided to 5-lane	35 mph	No	20,000
5	Forty Foot Road/SR 463	State	5-lane	35 mph	Yes	18,000
6	Detwiler Road/T378	Towamencin Township	3-lane	45 mph	Partial	NA
7	Gehman Rd/T401	Towamencin Township	2-lane undivided	NA	Yes	NA

¹Average Annual Daily Traffic in vehicles per day; Source: PennDot.gov

Study Area Map



Site Access

The proposed Parking Facility can be accessed via single driveways on Morris Road and Schultz Road. The driveway at Morris Road is signalized while the driveway at Schultz Road is stop controlled. Schultz Road is also signalized at its intersection with Morris Road. The driveway at Morris Road has full access with right and left-turn lanes from Morris Road and separate left and right-turn lanes from the site. Right turns from Schultz Road and left turns from the driveway are prohibited at the site's western entrance. This would not affect van travel to and from the AMAZON Facility but may result in slightly longer trips for drivers accessing the site from the southwest.

Truck Restrictions

There are no truck restrictions along the likely route between the facilities.

Pedestrian and Bicycle Accommodations

There are no sidewalks or bicycle provisions in the vicinity of the proposed Parking Facility.

Schools

Gwynedd Square Elementary School and Corpus Christi School are about 1.5 miles north of the site along a portion of Sumneytown Road that is easily avoidable. North Penn High School is midway between the proposed Amazon Facility and the Parking Facility along Sumneytown Road, but the alternative route passes by Nash Elementary School on Bustard Road and Bustard Road is a narrow two-lane road that is less desirable for travel between the two sites.

Transit Service

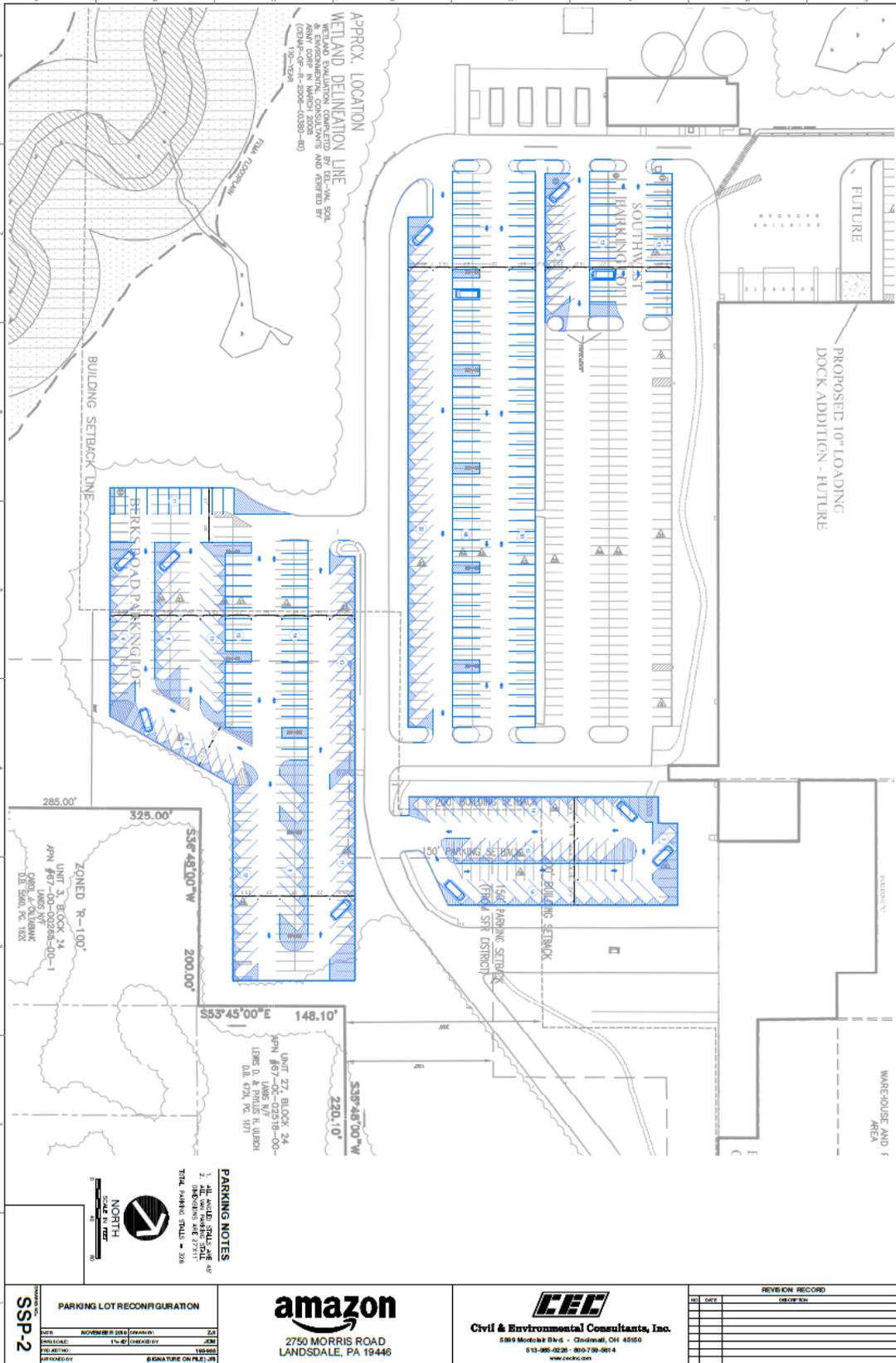
Local transit service is not available near the proposed Parking Facility, but Southeastern Pennsylvania Transportation Authority's Lansdale/Doylestown Regional Rail's North Wales Station is about three miles from the site. Regional Rail provides service between the area and greater Philadelphia roughly between 6:00 AM and 6:00 PM daily.

Preliminary Traffic Review Findings

Aerial imagery, traffic count data, and the current site plan were evaluated to determine traffic operations of the proposed Parking Facility. Based on our preliminary traffic review, we have identified the following:

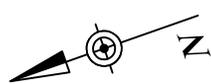
1. The parking facility is expected to generate 960 trips per day with a maximum of 96 trips from 5:00 – 6:00 PM.
2. Traffic in the vicinity of the site and along the most likely route between the site and the proposed Amazon Facility typically experiences moderate delays during peak periods and periodically throughout the day. The most notable delays occur at the intersection Valley Forge Road and Sumneytown Road. Current AADTs on the area roadways indicate that spare capacity is available to accommodate the Parking Facility traffic.
3. The site has very good access, including full movement signalized access at Morris Road and directional, stopped controlled access at Schultz Road.

Attachment A: Site Plan



APPENDIX G

TRIP ASSIGNMENT FIGURES



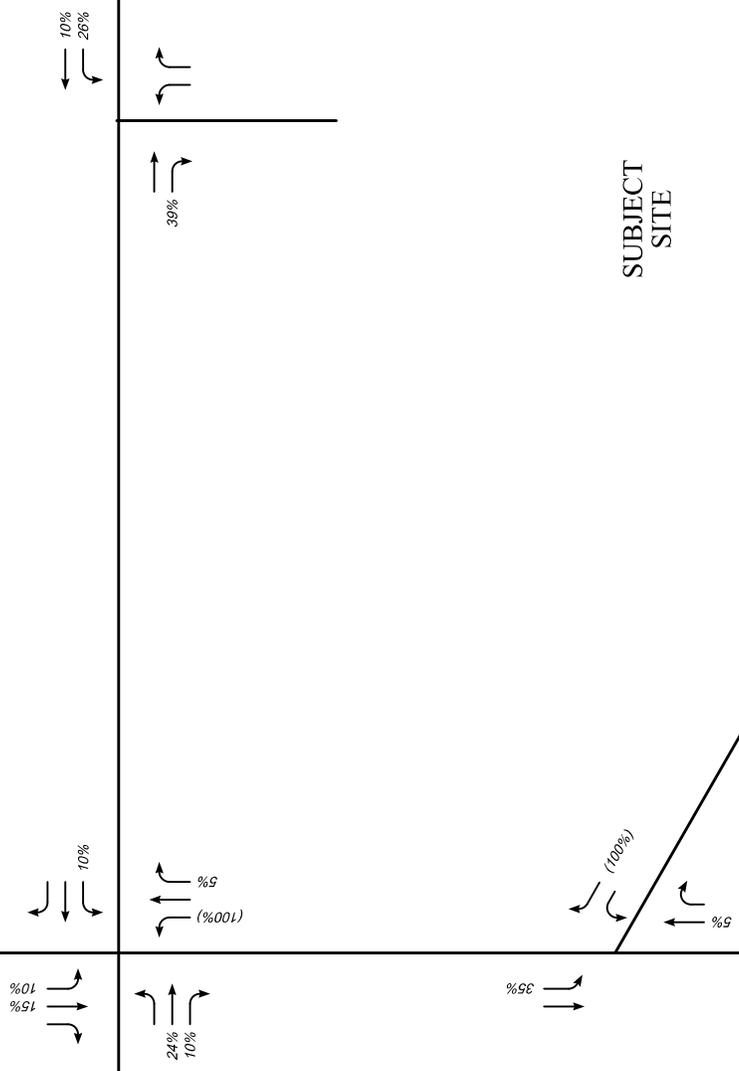
SOUTH
BROAD
STREET

MORRIS
ROAD

MORRIS
ROAD

SCHULTZ
ROAD

SUBJECT
SITE

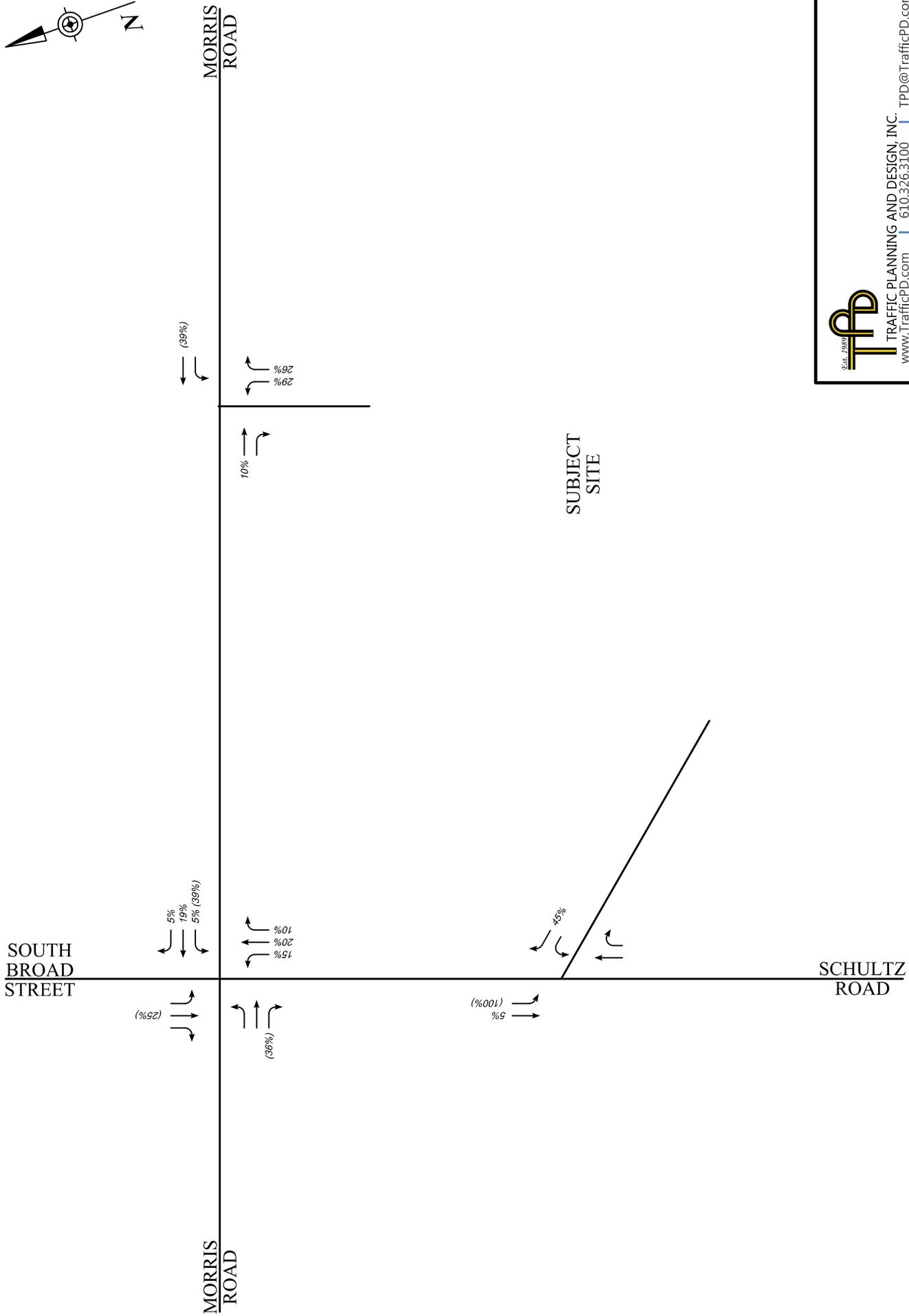


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FIGURE G-1

AMAZON PARKING FACILITY
WEEKDAY AM PEAK HOUR
TRIP ASSIGNMENT
PASSENGER CAR (DELIVERY VAN)

KEY:
SCHEMATIC DRAWING: NOT TO SCALE



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FIGURE G-2

AMAZON PARKING FACILITY
 WEEKDAY PM PEAK HOUR
 TRIP ASSIGNMENT
 PASSENGER CAR (DELIVERY VAN)

KEY:
SCHEMATIC DRAWING: NOT TO SCALE

APPENDIX H

VOLUME DEVELOPMENT SPREADSHEETS

TPD# ARMI.00001
 2/4/2020
 Traffic Volumes Worksheet
 Intersection:
 Synchro Node:

Morris Road & Schultz Road/South Broad Street									
1	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2020 Existing Counts	324	731	17	27	228	288	5	106	26	161	40	88	2041
Balancing													0
Existing Volumes (Balanced)	324	731	17	27	228	288	5	106	26	161	40	88	2041
Base growth (0.28% compounded for 5 yrs)	5	10	0	0	3	4	0	1	0	2	1	1	27
Existing Site Vacancies (68ksf)		2	1	1					1	1	1		7
2025 Base Volumes	329	743	18	28	231	292	5	107	27	164	42	89	2075

Employee Vehicles
 ENTER = 48
 EXIT =

Delivery Vans
 ENTER =
 EXIT = 48

Trip Assignment % - Employee Vehicles - Enter		24.0%	10.0%	10.0%					5.0%	10.0%	15.0%		
Trip Assignment % - Employee Vehicles - Exit													
Trip Assignment % - Delivery Vans - Enter													
Trip Assignment % - Delivery Vans - Exit							100.0%						
Employee Vehicle Trips		12	5	5					2	5	7		36
Delivery Van Trips							(48)						48
Total Trip Distributions	0	12	5	5	0	0	48	0	2	5	7	0	84

2025 Projected Volumes	329	755	23	33	231	292	53	107	29	169	49	89	2159
------------------------	-----	-----	----	----	-----	-----	----	-----	----	-----	----	----	------

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2019 Existing Counts	75	342	9	13	427	97	46	60	17	320	77	394	1877
Balancing													0
Existing Volumes (Balanced)	75	342	9	13	427	97	46	60	17	320	77	394	1877
Base growth (0.28% compounded for 5 yrs)	1	5	0	0	6	1	1	1	0	5	1	6	27
Existing Site Vacancies (68ksf)		1			1		3	3					8
2025 Base Volumes	76	348	9	13	434	98	50	64	17	325	78	400	1912

Employee Vehicles
 ENTER =
 EXIT = 48

Delivery Vans
 ENTER = 48
 EXIT =

Trip Assignment % - Employee Vehicles - Enter				5.0%	19.0%	5.0%	15.0%	20.0%	10.0%				
Trip Assignment % - Employee Vehicles - Exit													
Trip Assignment % - Delivery Vans - Enter			36.0%	39.0%							25.0%		
Trip Assignment % - Delivery Vans - Exit													
Employee Vehicle Trips				2	9	2	7	10	5				35
Delivery Van Trips			(17)	(19)						(12)			48
Total Trip Distributions	0	0	17	21	9	2	7	10	5	0	12	0	83

2025 Projected Volumes	76	348	26	34	443	100	57	74	22	325	90	400	1995
------------------------	----	-----	----	----	-----	-----	----	----	----	-----	----	-----	------

TPD# ARMI.00001
 2/4/2020
 Traffic Volumes Worksheet

Intersection:

Morris Road & Existing Site Driveway

Synchro Node:

2 Adjacent Intersections: West 0 East 0 North 0 South 0

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2020 Existing Counts		878	24	39	558		0		3				1502
Balancing													0
Existing Volumes (Balanced)		878	24	39	558		0		3				1502
Base growth (0.28% compounded for 5 yrs)		12			8								20
Existing Site Vacancies (68ksf)		1	3	5	1								10
2025 Base Volumes		891	27	44	567		0		3				1532

Employee Vehicles
 ENTER = 48
 EXIT =

Delivery Vans
 ENTER =
 EXIT = 48

Trip Assignment % - Employee Vehicles - Enter			39.0%	26.0%	10.0%								
Trip Assignment % - Employee Vehicles - Exit													
Trip Assignment % - Delivery Vans - Enter													
Trip Assignment % - Delivery Vans - Exit													
Employee Vehicle Trips			19	12	5								36
Delivery Van Trips													0
Total Trip Distributions		0	19	12	5		0		0				36
2025 Projected Volumes		891	46	56	572		0		3				1568

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2019 Existing Counts		682	4	6	521		8		61				1282
Balancing													0
Existing Volumes (Balanced)		682	4	6	521		8		61				1282
Base growth (0.28% compounded for 5 yrs)		10			7								17
Existing Site Vacancies (68ksf)			1	1			1		8				11
2025 Base Volumes		692	5	7	528		9		69				1310

Employee Vehicles
 ENTER =
 EXIT = 48

Delivery Vans
 ENTER = 48
 EXIT =

Trip Assignment % - Employee Vehicles - Enter													
Trip Assignment % - Employee Vehicles - Exit		10.0%					29.0%		26.0%				
Trip Assignment % - Delivery Vans - Enter					39.0%								
Trip Assignment % - Delivery Vans - Exit													
Employee Vehicle Trips		5					14		12				31
Delivery Van Trips					(19)								19
Total Trip Distributions		5	0	0	19		14		12				50
2025 Projected Volumes		697	5	7	547		23		81				1360

TPD# ARMI.00001
 2/4/2020
 Traffic Volumes Worksheet
 Intersection:
 Synchro Node:

Schultz Road & Existing Site Driveway									
3	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2020 Existing Counts						7		133	0	23	62		225
Balancing													0
Existing Volumes (Balanced)						7		133	0	23	62		225
Base growth (0.28% compounded for 5 yrs)								2			1		3
Existing Site Vacancies (68ksf)						1				3			4
2025 Base Volumes						8		135	0	26	63		232

Employee Vehicles
 ENTER = 48
 EXIT =

Delivery Vans
 ENTER =
 EXIT = 48

Trip Assignment % - Employee Vehicles - Enter								5.0%		35.0%			
Trip Assignment % - Employee Vehicles - Exit													
Trip Assignment % - Delivery Vans - Enter													
Trip Assignment % - Delivery Vans - Exit						100.0%							
Employee Vehicle Trips								2		17			19
Delivery Van Trips						(48)							48
Total Trip Distributions						48		2	0	17	0		67
2025 Projected Volumes						56		137	0	43	63		299

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2019 Existing Counts				6		47		70	0	3	108		234
Balancing													0
Existing Volumes (Balanced)				6		47		70	0	3	108		234
Base growth (0.28% compounded for 5 yrs)						1		1			2		4
Existing Site Vacancies (68ksf)						6							6
2025 Base Volumes				6		54		71	0	3	110		244

Employee Vehicles
 ENTER =
 EXIT = 48

Delivery Vans
 ENTER = 48
 EXIT =

Trip Assignment % - Employee Vehicles - Enter													
Trip Assignment % - Employee Vehicles - Exit						45.0%					5.0%		
Trip Assignment % - Delivery Vans - Enter										100.0%			
Trip Assignment % - Delivery Vans - Exit													
Employee Vehicle Trips						22					2		24
Delivery Van Trips										(48)			48
Total Trip Distributions						22		0	0	48	2		72
2025 Projected Volumes				6		76		71	0	51	112		316

APPENDIX I

CRITICAL/FOLLOW-UP GAP DATA

**CRITICAL HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT
BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46**

$$t_{c,x} = t_{c,base} + t_{c,HV} * P_{HV} + t_{c,G} * G - t_{3,LT}$$

where:

- $t_{c,x}$ = critical headway for movement x (s)
- $t_{c,base}$ = base critical headway from Chapter 10 of PennDOT Publication 46
- $t_{c,HV}$ = adjustment factor for heavy vehicles (1.0 for major streets with one lane in each direction; 2.0 for major streets with two or three lanes in each direction) (s)
- P_{HV} = proportion of heavy vehicles for movement (expressed as a decimal; e.g., $P_{HV}=0.02$ for 2% heavy vehicles)
- $t_{c,G}$ = adjustment factor for grade (0.1 for Movement 9 and 12; 0.2 for Movements 7,8,10, and 11) (s)
- G = percent grade (expressed as an integer; e.g., $G=-2$ for a 2% downhill grade)
- $t_{c,base}$ = adjustment factor for intersection geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

LEFT TURN FROM MAJOR ROADWAY - TWO LANES ($t_{c,base} = 4.3$)																					
GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
5	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
6	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
7	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
8	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
10	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	

LEFT TURN FROM MINOR ROADWAY - TWO LANES - 4-LEG INTERSECTION ($t_{c,base} = 7.1$)																					
GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
1	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
2	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
3	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
4	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
5	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
6	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
7	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
8	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
9	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
10	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2

THROUGH TRAFFIC ON MINOR ROADWAY - TWO LANES ($t_{c,base} = 6.5$)																					
GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
1	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
2	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
3	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
4	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
5	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
6	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
7	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
8	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
9	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
10	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6

RIGHT TURN FROM MINOR ROADWAY - TWO LANES ($t_{c,base} = 6.2$)																					
GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
1	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
2	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
3	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
4	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
5	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
6	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
7	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
8	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
9	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
10	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3

**CRITICAL HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT
BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46**

$$t_{c,x} = t_{c,base} + t_{c,HV} * P_{HV} + t_{c,G} * G - t_{3,LT}$$

where:

$t_{c,x}$ = critical headway for movement x (s)

$t_{c,base}$ = base critical headway from Chapter 10 of PennDOT Publication 46

$t_{c,HV}$ = adjustment factor for heavy vehicles (1.0 for major streets with one lane in each direction;
2.0 for major streets with two or three lanes in each direction) (s)

P_{HV} = proportion of heavy vehicles for movement (expressed as a decimal; e.g., $P_{HV}=0.02$ for 2% heavy vehicles)

$t_{c,G}$ = adjustment factor for grade (0.1 for Movement 9 and 12; 0.2 for Movements 7,8,10, and 11) (s)

G = percent grade (expressed as an integer; e.g., G= -2 for a 2% downhill grade)

$t_{c,base}$ = adjustment factor for intersection geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

LEFT TURN FROM MAJOR ROADWAY - TWO LANES ($t_{c,base} = 4.3$)																					
GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
5	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
6	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
7	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
8	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
10	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	

LEFT TURN FROM MINOR ROADWAY - TWO LANES - 3-LEG INTERSECTION ($t_{c,base} = 7.1$)																					
GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
1	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
2	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
3	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
4	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
5	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
6	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
7	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
8	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
9	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
10	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5

RIGHT TURN FROM MINOR ROADWAY - TWO LANES ($t_{c,base} = 6.2$)																					
GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
1	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
2	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
3	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
4	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
5	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
6	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
7	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
8	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
9	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
10	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3

APPENDIX J

CAPACITY ANALYSES

2020 EXISTING CONDITIONS

1: Schultz Road/South Broad Street & Morris Road

2020 EXISTING CONDITIONS

Timing Plan: AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	324	731	17	27	228	288	5	106	26	161	40	88
Future Volume (vph)	324	731	17	27	228	288	5	106	26	161	40	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	13	11	13	12	12	13	12	11	12	12
Grade (%)		2%			1%			-2%				3%
Storage Length (ft)	235		300	240		0	160		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		1.00	0.98	
Frt		0.997			0.916			0.971			0.897	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1534	3306	0	1430	1662	0	1727	1727	0	1581	1481	0
Flt Permitted	0.151			0.343			0.671			0.504		
Satd. Flow (perm)	244	3306	0	516	1662	0	1220	1727	0	837	1481	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			80			13			93	
Link Speed (mph)		45			45			45			40	
Link Distance (ft)		1104			664			337			329	
Travel Time (s)		16.7			10.1			5.1			5.6	
Confl. Peds. (#/hr)										1		1
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	2%	6%	15%	2%	2%	0%	3%	15%	3%	5%	6%
Adj. Flow (vph)	341	769	18	28	240	303	5	112	27	169	42	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	341	787	0	28	543	0	5	139	0	169	135	0
Turn Type	pm+pt	NA										
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	22.0		9.0	22.0		9.0	20.0		9.0	20.0	
Total Split (s)	18.0	28.0		18.0	28.0		14.0	20.0		14.0	20.0	
Total Split (%)	22.5%	35.0%		22.5%	35.0%		17.5%	25.0%		17.5%	25.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

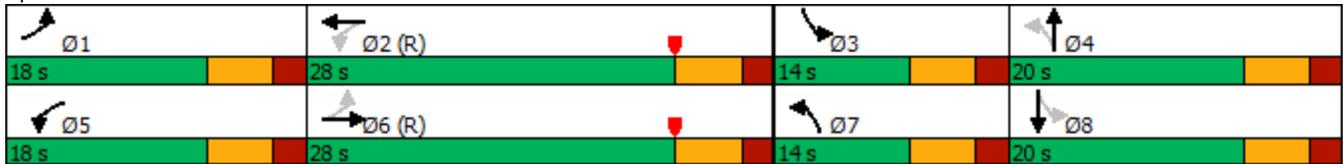
Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80

Offset: 15 (19%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Splits and Phases: 1: Schultz Road/South Broad Street & Morris Road



1: Schultz Road/South Broad Street & Morris Road

2020 EXISTING CONDITIONS

Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	324	731	17	27	228	288	5	106	26	161	40	88
Future Volume (veh/h)	324	731	17	27	228	288	5	106	26	161	40	88
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1750	1820	1584	1837	1766	1875	1905	1832	1708	1680	1680
Adj Flow Rate, veh/h	341	769	13	28	240	267	5	112	18	169	42	64
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	2	2	15	2	2	0	3	3	3	5	5
Cap, veh/h	439	1665	28	342	295	328	257	172	28	326	122	186
Arrive On Green	0.16	0.50	0.49	0.03	0.37	0.36	0.02	0.11	0.09	0.11	0.20	0.19
Sat Flow, veh/h	1653	3345	57	1508	794	884	1785	1598	257	1626	599	913
Grp Volume(v), veh/h	341	382	400	28	0	507	5	0	130	169	0	106
Grp Sat Flow(s),veh/h/ln	1653	1662	1739	1508	0	1678	1785	0	1855	1626	0	1512
Q Serve(g_s), s	9.1	12.0	12.0	0.9	0.0	21.8	0.2	0.0	5.4	6.9	0.0	4.8
Cycle Q Clear(g_c), s	9.1	12.0	12.0	0.9	0.0	21.8	0.2	0.0	5.4	6.9	0.0	4.8
Prop In Lane	1.00		0.03	1.00		0.53	1.00		0.14	1.00		0.60
Lane Grp Cap(c), veh/h	439	827	866	342	0	624	257	0	199	326	0	308
V/C Ratio(X)	0.78	0.46	0.46	0.08	0.00	0.81	0.02	0.00	0.65	0.52	0.00	0.34
Avail Cap(c_a), veh/h	446	827	866	539	0	624	429	0	348	326	0	308
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.1	13.1	13.1	14.5	0.0	22.9	30.8	0.0	34.3	25.4	0.0	27.6
Incr Delay (d2), s/veh	8.3	1.9	1.8	0.1	0.0	11.1	0.0	0.0	3.6	1.4	0.0	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	6.6	7.5	7.8	0.5	0.0	14.7	0.1	0.0	4.5	4.7	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.5	15.0	14.9	14.6	0.0	34.0	30.8	0.0	37.9	26.9	0.0	28.2
LnGrp LOS	C	B	B	B	A	C	C	A	D	C	A	C
Approach Vol, veh/h		1123			535			135				275
Approach Delay, s/veh		17.5			33.0			37.7				27.4
Approach LOS		B			C			D				C
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	34.7	14.0	13.6	7.6	44.8	6.3	21.3				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	12.0	22.0	8.0	14.0	12.0	22.0	8.0	14.0				
Max Q Clear Time (g_c+I1), s	11.6	23.8	9.4	7.4	3.4	14.5	2.7	6.8				
Green Ext Time (p_c), s	0.1	0.0	0.0	0.2	0.0	1.8	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay				24.1								
HCM 6th LOS				C								

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Volume (vph)	878	24	39	558	0	3
Future Volume (vph)	878	24	39	558	0	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	11	15	12	12
Grade (%)	-2%			3%	-3%	
Storage Length (ft)		0	250		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950			
Satd. Flow (prot)	1765	1585	1628	1912	1827	1168
Flt Permitted			0.950			
Satd. Flow (perm)	1765	1585	1628	1912	1827	1168
Link Speed (mph)	45			45	25	
Link Distance (ft)	664			1170	512	
Travel Time (s)	10.1			17.7	14.0	
Confl. Peds. (#/hr)			1			
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	4%	0%	2%	0%	33%
Adj. Flow (vph)	924	25	41	587	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	924	25	41	587	0	3
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	878	24	39	558	0	3
Future Vol, veh/h	878	24	39	558	0	3
Conflicting Peds, #/hr	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	3	-3	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	4	0	2	0	33
Mvmt Flow	924	25	41	587	0	3
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	950	0	1594	925
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	669	-
Critical Hdwy	-	-	4.3	-	5.8	6.23
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	-	-	3	-	3	3.4
Pot Cap-1 Maneuver	-	-	558	-	166	320
Stage 1	-	-	-	-	501	-
Stage 2	-	-	-	-	642	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	557	-	154	320
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	594	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.8	16.4			
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	320	-	-	557	-
HCM Lane V/C Ratio	-	0.01	-	-	0.074	-
HCM Control Delay (s)	0	16.4	-	-	12	-
HCM Lane LOS	A	C	-	-	B	-
HCM 95th %tile Q(veh)	-	0	-	-	0.2	-

3: Schultz Road & Existing Driveway

2020 EXISTING CONDITIONS

Timing Plan: AM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	7	133	0	23	62
Future Volume (vph)	0	7	133	0	23	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	10	12	12	11
Grade (%)	0%		1%			2%
Storage Length (ft)	0	0		0	200	
Storage Lanes	0	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.865				
Flt Protected					0.950	
Satd. Flow (prot)	0	971	1639	0	1388	1672
Flt Permitted					0.950	
Satd. Flow (perm)	0	971	1639	0	1388	1672
Link Speed (mph)	45		45			25
Link Distance (ft)	457		706			356
Travel Time (s)	6.9		10.7			9.7
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	71%	2%	0%	22%	3%
Adj. Flow (vph)	0	10	193	0	33	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	10	193	0	33	90
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑		↘	↑
Traffic Vol, veh/h	0	7	133	0	23	62
Future Vol, veh/h	0	7	133	0	23	62
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	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	1	-	-	2
Peak Hour Factor	69	69	69	69	69	69
Heavy Vehicles, %	0	71	2	0	22	3
Mvmt Flow	0	10	193	0	33	90
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	193	0	-	193	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.91	-	-	4.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.7	-	-	3.2	-
Pot Cap-1 Maneuver	0	741	-	0	962	-
Stage 1	0	-	-	0	-	-
Stage 2	0	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	-	741	-	-	962	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	9.9	0	2.4			
HCM LOS	A					
Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT			
Capacity (veh/h)	-	741	962	-		
HCM Lane V/C Ratio	-	0.014	0.035	-		
HCM Control Delay (s)	-	9.9	8.9	-		
HCM Lane LOS	-	A	A	-		
HCM 95th %tile Q(veh)	-	0	0.1	-		

1: Schultz Road/South Broad Street & Morris Road

2020 EXISTING CONDITIONS

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	342	9	13	427	97	46	60	17	320	77	394
Future Volume (vph)	75	342	9	13	427	97	46	60	17	320	77	394
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	13	11	13	12	12	13	12	11	12	12
Grade (%)		2%			1%			-2%				3%
Storage Length (ft)	235		300	240		0	160		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.972			0.967				0.875
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1580	3340	0	1645	1770	0	1661	1775	0	1628	1536	0
Flt Permitted	0.314			0.538			0.412			0.466		
Satd. Flow (perm)	522	3340	0	931	1770	0	720	1775	0	799	1536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			14			11			197	
Link Speed (mph)		45			45			45			40	
Link Distance (ft)		1104			664			337			329	
Travel Time (s)		16.7			10.1			5.1			5.6	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	4%	3%	0%	0%	1%	1%
Adj. Flow (vph)	77	349	9	13	436	99	47	61	17	327	79	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	358	0	13	535	0	47	78	0	327	481	0
Turn Type	pm+pt	NA										
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	22.0		9.0	22.0		9.0	20.0		9.0	20.0	
Total Split (s)	13.0	55.0		13.0	55.0		20.0	22.0		20.0	22.0	
Total Split (%)	11.8%	50.0%		11.8%	50.0%		18.2%	20.0%		18.2%	20.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 40 (36%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Schultz Road/South Broad Street & Morris Road



1: Schultz Road/South Broad Street & Morris Road

2020 EXISTING CONDITIONS

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	342	9	13	427	97	46	60	17	320	77	394
Future Volume (veh/h)	75	342	9	13	427	97	46	60	17	320	77	394
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1778	1764	1834	1794	1837	1766	1818	1905	1832	1750	1736	1736
Adj Flow Rate, veh/h	77	349	8	13	436	90	47	61	7	327	79	359
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	0	2	2	4	3	3	0	1	1
Cap, veh/h	474	2009	46	640	845	174	149	107	12	334	42	192
Arrive On Green	0.05	0.60	0.59	0.02	0.57	0.56	0.05	0.06	0.05	0.14	0.15	0.15
Sat Flow, veh/h	1693	3349	77	1709	1477	305	1731	1678	193	1666	273	1240
Grp Volume(v), veh/h	77	174	183	13	0	526	47	0	68	327	0	438
Grp Sat Flow(s),veh/h/ln	1693	1675	1750	1709	0	1782	1731	0	1870	1666	0	1513
Q Serve(g_s), s	2.0	5.1	5.1	0.3	0.0	19.8	2.7	0.0	3.9	15.0	0.0	17.0
Cycle Q Clear(g_c), s	2.0	5.1	5.1	0.3	0.0	19.8	2.7	0.0	3.9	15.0	0.0	17.0
Prop In Lane	1.00		0.04	1.00		0.17	1.00		0.10	1.00		0.82
Lane Grp Cap(c), veh/h	474	1005	1050	640	0	1019	149	0	119	334	0	234
V/C Ratio(X)	0.16	0.17	0.17	0.02	0.00	0.52	0.32	0.00	0.57	0.98	0.00	1.87
Avail Cap(c_a), veh/h	519	1005	1050	734	0	1019	306	0	289	334	0	234
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.2	9.8	9.8	9.3	0.0	14.4	45.0	0.0	50.1	42.9	0.0	46.9
Incr Delay (d2), s/veh	0.2	0.4	0.4	0.0	0.0	1.9	1.2	0.0	4.2	43.5	0.0	409.0
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	1.2	3.2	3.4	0.2	0.0	12.2	2.1	0.0	3.4	10.0	0.0	51.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.3	10.2	10.2	9.4	0.0	16.2	46.2	0.0	54.3	86.4	0.0	455.9
LnGrp LOS	B	B	B	A	A	B	D	A	D	F	A	F
Approach Vol, veh/h		434			539			115			765	
Approach Delay, s/veh		10.2			16.1			51.0			298.0	
Approach LOS		B			B			D			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.1	67.9	20.0	12.0	7.0	71.0	10.0	22.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	49.0	14.0	16.0	7.0	49.0	14.0	16.0				
Max Q Clear Time (g_c+I1), s	4.5	21.8	17.5	5.9	2.8	7.6	5.2	19.0				
Green Ext Time (p_c), s	0.0	2.0	0.0	0.1	0.0	1.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	133.3											
HCM 6th LOS	F											

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Traffic Volume (vph)	682	4	6	521	8	61
Future Volume (vph)	682	4	6	521	8	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	11	15	12	12
Grade (%)	-2%			3%	-3%	
Storage Length (ft)		0	250		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1800	1319	1392	1912	1536	1522
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1800	1319	1392	1912	1536	1522
Link Speed (mph)	45			45	25	
Link Distance (ft)	664			1170	512	
Travel Time (s)	10.1			17.7	14.0	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	25%	17%	2%	13%	2%
Adj. Flow (vph)	703	4	6	537	8	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	703	4	6	537	8	63
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	682	4	6	521	8	61
Future Vol, veh/h	682	4	6	521	8	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	3	-3	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	1	25	17	2	13	2
Mvmt Flow	703	4	6	537	8	63
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	707	0	1252	703
Stage 1	-	-	-	-	703	-
Stage 2	-	-	-	-	549	-
Critical Hdwy	-	-	4.5	-	5.93	5.92
Critical Hdwy Stg 1	-	-	-	-	4.93	-
Critical Hdwy Stg 2	-	-	-	-	4.93	-
Follow-up Hdwy	-	-	3.2	-	3.1	3.1
Pot Cap-1 Maneuver	-	-	626	-	241	487
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	687	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	626	-	239	487
Mov Cap-2 Maneuver	-	-	-	-	397	-
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	680	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.1	13.6			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	397	487	-	-	626	-
HCM Lane V/C Ratio	0.021	0.129	-	-	0.01	-
HCM Control Delay (s)	14.3	13.5	-	-	10.8	-
HCM Lane LOS	B	B	-	-	B	-
HCM 95th %tile Q(veh)	0.1	0.4	-	-	0	-

3: Schultz Road & Existing Driveway

2020 EXISTING CONDITIONS

Timing Plan: PM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	47	70	0	3	108
Future Volume (vph)	6	47	70	0	3	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	10	12	12	11
Grade (%)	0%		1%			2%
Storage Length (ft)	0	0		0	200	
Storage Lanes	0	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				
Flt Protected	0.950				0.950	
Satd. Flow (prot)	0	1567	1655	0	1693	1723
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	0	1567	1655	0	1693	1723
Link Speed (mph)	45		45			25
Link Distance (ft)	457		706			356
Travel Time (s)	6.9		10.7			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	6%	1%	0%	0%	0%
Adj. Flow (vph)	7	52	78	0	3	120
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	52	78	0	3	120
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	2.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑		↖	↑
Traffic Vol, veh/h	6	47	70	0	3	108
Future Vol, veh/h	6	47	70	0	3	108
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	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	1	-	-	2
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	17	6	1	0	0	0
Mvmt Flow	7	52	78	0	3	120

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	204	78	0	-	78
Stage 1	78	-	-	-	-
Stage 2	126	-	-	-	-
Critical Hdwy	6.57	6.26	-	-	4.3
Critical Hdwy Stg 1	5.57	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-
Follow-up Hdwy	3.653	3.2	-	-	3
Pot Cap-1 Maneuver	752	1017	-	0	1129
Stage 1	908	-	-	0	-
Stage 2	864	-	-	0	-
Platoon blocked, %			-		-
Mov Cap-1 Maneuver	750	1017	-	-	1129
Mov Cap-2 Maneuver	750	-	-	-	-
Stage 1	908	-	-	-	-
Stage 2	861	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	0.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT
Capacity (veh/h)	- 1017	1129	-
HCM Lane V/C Ratio	- 0.051	0.003	-
HCM Control Delay (s)	- 8.7	8.2	-
HCM Lane LOS	- A	A	-
HCM 95th %tile Q(veh)	- 0.2	0	-

2025 BASE CONDITIONS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	329	743	18	28	231	292	5	107	27	164	42	89
Future Volume (vph)	329	743	18	28	231	292	5	107	27	164	42	89
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	13	11	13	12	12	13	12	11	12	12
Grade (%)		2%			1%			-2%				3%
Storage Length (ft)	235		300	240		0	160		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		1.00	0.98	
Frt		0.996			0.916			0.970				0.898
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1534	3303	0	1430	1662	0	1727	1725	0	1581	1483	0
Flt Permitted	0.146			0.338			0.669			0.501		
Satd. Flow (perm)	236	3303	0	509	1662	0	1216	1725	0	833	1483	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			81			14			94	
Link Speed (mph)		45			45			45			40	
Link Distance (ft)		1104			664			337			329	
Travel Time (s)		16.7			10.1			5.1			5.6	
Confl. Peds. (#/hr)										1		1
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	2%	6%	15%	2%	2%	0%	3%	15%	3%	5%	6%
Adj. Flow (vph)	346	782	19	29	243	307	5	113	28	173	44	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	346	801	0	29	550	0	5	141	0	173	138	0
Turn Type	pm+pt	NA										
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	22.0		9.0	22.0		9.0	20.0		9.0	20.0	
Total Split (s)	18.0	29.0		18.0	29.0		13.0	20.0		13.0	20.0	
Total Split (%)	22.5%	36.3%		22.5%	36.3%		16.3%	25.0%		16.3%	25.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

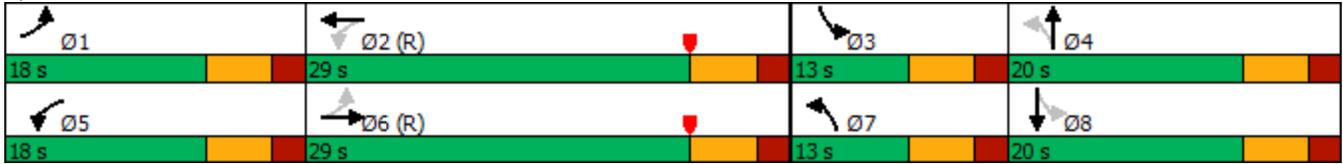
Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80

Offset: 15 (19%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Splits and Phases: 1: Schultz Road/South Broad Street & Morris Road



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	329	743	18	28	231	292	5	107	27	164	42	89
Future Volume (veh/h)	329	743	18	28	231	292	5	107	27	164	42	89
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1750	1820	1584	1837	1766	1875	1905	1832	1708	1680	1680
Adj Flow Rate, veh/h	346	782	14	29	243	271	5	113	19	173	44	65
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	2	2	15	2	2	0	3	3	3	5	5
Cap, veh/h	447	1699	30	347	304	339	259	172	29	306	117	174
Arrive On Green	0.16	0.51	0.50	0.03	0.38	0.37	0.02	0.11	0.10	0.10	0.19	0.18
Sat Flow, veh/h	1653	3341	60	1508	793	885	1785	1586	267	1626	611	903
Grp Volume(v), veh/h	346	389	407	29	0	514	5	0	132	173	0	109
Grp Sat Flow(s),veh/h/ln	1653	1662	1739	1508	0	1678	1785	0	1853	1626	0	1514
Q Serve(g_s), s	9.1	12.0	12.0	0.9	0.0	21.8	0.2	0.0	5.5	7.2	0.0	5.0
Cycle Q Clear(g_c), s	9.1	12.0	12.0	0.9	0.0	21.8	0.2	0.0	5.5	7.2	0.0	5.0
Prop In Lane	1.00		0.03	1.00		0.53	1.00		0.14	1.00		0.60
Lane Grp Cap(c), veh/h	447	845	884	347	0	644	259	0	201	306	0	291
V/C Ratio(X)	0.77	0.46	0.46	0.08	0.00	0.80	0.02	0.00	0.66	0.57	0.00	0.37
Avail Cap(c_a), veh/h	455	845	884	542	0	644	408	0	347	306	0	291
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	12.6	12.6	13.9	0.0	22.2	30.7	0.0	34.3	26.3	0.0	28.4
Incr Delay (d2), s/veh	8.0	1.8	1.7	0.1	0.0	10.0	0.0	0.0	3.6	2.4	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.4	7.5	7.8	0.5	0.0	14.4	0.1	0.0	4.5	5.1	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.8	14.4	14.4	14.0	0.0	32.1	30.7	0.0	37.9	28.7	0.0	29.2
LnGrp LOS	C	B	B	B	A	C	C	A	D	C	A	C
Approach Vol, veh/h		1142			543			137			282	
Approach Delay, s/veh		16.9			31.2			37.6			28.9	
Approach LOS		B			C			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.6	35.7	13.0	13.7	7.6	45.7	6.3	20.4				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	12.0	23.0	7.0	14.0	12.0	23.0	7.0	14.0				
Max Q Clear Time (g_c+I1), s	11.6	23.8	9.7	7.5	3.4	14.5	2.7	7.0				
Green Ext Time (p_c), s	0.1	0.0	0.0	0.2	0.0	2.0	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay			23.6									
HCM 6th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Traffic Volume (vph)	891	27	44	567	0	3
Future Volume (vph)	891	27	44	567	0	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	11	15	12	12
Grade (%)	-2%			3%	-3%	
Storage Length (ft)		0	250		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950			
Satd. Flow (prot)	1765	1585	1628	1912	1827	1168
Flt Permitted			0.950			
Satd. Flow (perm)	1765	1585	1628	1912	1827	1168
Link Speed (mph)	45			45	25	
Link Distance (ft)	664			1170	512	
Travel Time (s)	10.1			17.7	14.0	
Confl. Peds. (#/hr)			1			
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	4%	0%	2%	0%	33%
Adj. Flow (vph)	938	28	46	597	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	938	28	46	597	0	3
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	891	27	44	567	0	3
Future Vol, veh/h	891	27	44	567	0	3
Conflicting Peds, #/hr	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	3	-3	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	4	0	2	0	33
Mvmt Flow	938	28	46	597	0	3
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	967	0	1628	939
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	689	-
Critical Hdwy	-	-	4.3	-	5.8	6.23
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	-	-	3	-	3	3.4
Pot Cap-1 Maneuver	-	-	551	-	159	314
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	629	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	550	-	145	314
Mov Cap-2 Maneuver	-	-	-	-	309	-
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	576	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.9	16.6			
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	314	-	-	550	-
HCM Lane V/C Ratio	-	0.01	-	-	0.084	-
HCM Control Delay (s)	0	16.6	-	-	12.1	-
HCM Lane LOS	A	C	-	-	B	-
HCM 95th %tile Q(veh)	-	0	-	-	0.3	-

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	8	135	0	26	63
Future Volume (vph)	0	8	135	0	26	63
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	10	12	12	11
Grade (%)	0%		1%			2%
Storage Length (ft)	0	0		0	200	
Storage Lanes	0	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.865				
Flt Protected					0.950	
Satd. Flow (prot)	0	971	1639	0	1388	1672
Flt Permitted					0.950	
Satd. Flow (perm)	0	971	1639	0	1388	1672
Link Speed (mph)	45		45			25
Link Distance (ft)	457		706			356
Travel Time (s)	6.9		10.7			9.7
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	71%	2%	0%	22%	3%
Adj. Flow (vph)	0	12	196	0	38	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	12	196	0	38	91
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑		↘	↑
Traffic Vol, veh/h	0	8	135	0	26	63
Future Vol, veh/h	0	8	135	0	26	63
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	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	1	-	-	2
Peak Hour Factor	69	69	69	69	69	69
Heavy Vehicles, %	0	71	2	0	22	3
Mvmt Flow	0	12	196	0	38	91

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	196	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.91	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.7	-
Pot Cap-1 Maneuver	0	737	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	737	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	2.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT
Capacity (veh/h)	-	737	959
HCM Lane V/C Ratio	-	0.016	0.039
HCM Control Delay (s)	-	10	8.9
HCM Lane LOS	-	B	A
HCM 95th %tile Q(veh)	-	0	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	348	9	13	434	98	50	64	17	325	78	400
Future Volume (vph)	76	348	9	13	434	98	50	64	17	325	78	400
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	13	11	13	12	12	13	12	11	12	12
Grade (%)		2%			1%			-2%				3%
Storage Length (ft)	235		300	240		0	160		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.972			0.969				0.875
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1580	3340	0	1645	1770	0	1661	1778	0	1628	1536	0
Flt Permitted	0.260			0.535			0.171			0.636		
Satd. Flow (perm)	432	3340	0	926	1770	0	299	1778	0	1090	1536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			11			13				245
Link Speed (mph)		45			45			45				40
Link Distance (ft)		1104			664			337				329
Travel Time (s)		16.7			10.1			5.1				5.6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	4%	3%	0%	0%	1%	1%
Adj. Flow (vph)	78	355	9	13	443	100	51	65	17	332	80	408
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	364	0	13	543	0	51	82	0	332	488	0
Turn Type	pm+pt	NA										
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	22.0		9.0	22.0		9.0	20.0		9.0	20.0	
Total Split (s)	13.0	44.0		13.0	44.0		13.0	40.0		13.0	40.0	
Total Split (%)	11.8%	40.0%		11.8%	40.0%		11.8%	36.4%		11.8%	36.4%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	40 (36%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Natural Cycle:	70
Control Type:	Actuated-Coordinated

Splits and Phases: 1: Schultz Road/South Broad Street & Morris Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	348	9	13	434	98	50	64	17	325	78	400
Future Volume (veh/h)	76	348	9	13	434	98	50	64	17	325	78	400
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1778	1764	1834	1794	1837	1766	1818	1905	1832	1750	1736	1736
Adj Flow Rate, veh/h	78	355	8	13	443	91	51	65	7	332	80	365
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	0	2	2	4	3	3	0	1	1
Cap, veh/h	286	1482	33	464	602	124	171	482	52	511	85	390
Arrive On Green	0.05	0.44	0.43	0.02	0.41	0.40	0.04	0.28	0.28	0.07	0.31	0.31
Sat Flow, veh/h	1693	3350	75	1709	1479	304	1731	1690	182	1666	272	1241
Grp Volume(v), veh/h	78	177	186	13	0	534	51	0	72	332	0	445
Grp Sat Flow(s),veh/h/ln	1693	1675	1750	1709	0	1782	1731	0	1872	1666	0	1512
Q Serve(g_s), s	2.8	7.3	7.3	0.5	0.0	27.9	2.2	0.0	3.1	8.0	0.0	31.5
Cycle Q Clear(g_c), s	2.8	7.3	7.3	0.5	0.0	27.9	2.2	0.0	3.1	8.0	0.0	31.5
Prop In Lane	1.00		0.04	1.00		0.17	1.00		0.10	1.00		0.82
Lane Grp Cap(c), veh/h	286	741	774	464	0	726	171	0	534	511	0	476
V/C Ratio(X)	0.27	0.24	0.24	0.03	0.00	0.74	0.30	0.00	0.13	0.65	0.00	0.94
Avail Cap(c_a), veh/h	320	741	774	558	0	726	222	0	596	511	0	481
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.2	19.1	19.1	18.3	0.0	27.7	29.3	0.0	29.3	30.2	0.0	37.0
Incr Delay (d2), s/veh	0.5	0.8	0.7	0.0	0.0	6.5	1.0	0.0	0.1	2.9	0.0	25.7
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	1.9	5.1	5.3	0.3	0.0	18.2	1.7	0.0	2.5	7.3	0.0	20.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	19.9	19.9	18.4	0.0	34.2	30.2	0.0	29.4	33.1	0.0	62.8
LnGrp LOS	C	B	B	B	A	C	C	A	C	C	A	E
Approach Vol, veh/h		441			547			123			777	
Approach Delay, s/veh		20.0			33.8			29.7			50.1	
Approach LOS		C			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.8	49.8	13.0	36.3	7.0	53.7	9.8	39.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	38.0	7.0	34.0	7.0	38.0	7.0	34.0				
Max Q Clear Time (g_c+I1), s	5.3	29.9	10.5	5.1	3.0	9.8	4.7	33.5				
Green Ext Time (p_c), s	0.0	1.3	0.0	0.2	0.0	1.2	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay				37.0								
HCM 6th LOS				D								

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Traffic Volume (vph)	692	5	7	528	9	69
Future Volume (vph)	692	5	7	528	9	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	11	15	12	12
Grade (%)	-2%			3%	-3%	
Storage Length (ft)		0	250		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1800	1319	1392	1912	1536	1522
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1800	1319	1392	1912	1536	1522
Link Speed (mph)	45			45	25	
Link Distance (ft)	664			1170	512	
Travel Time (s)	10.1			17.7	14.0	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	25%	17%	2%	13%	2%
Adj. Flow (vph)	713	5	7	544	9	71
Shared Lane Traffic (%)						
Lane Group Flow (vph)	713	5	7	544	9	71
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Vol, veh/h	692	5	7	528	9	69
Future Vol, veh/h	692	5	7	528	9	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	3	-3	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	1	25	17	2	13	2
Mvmt Flow	713	5	7	544	9	71

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	718	0	1271
Stage 1	-	-	-	-	713
Stage 2	-	-	-	-	558
Critical Hdwy	-	-	4.5	-	5.93
Critical Hdwy Stg 1	-	-	-	-	4.93
Critical Hdwy Stg 2	-	-	-	-	4.93
Follow-up Hdwy	-	-	3.2	-	3.1
Pot Cap-1 Maneuver	-	-	620	-	235
Stage 1	-	-	-	-	585
Stage 2	-	-	-	-	681
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	620	-	232
Mov Cap-2 Maneuver	-	-	-	-	391
Stage 1	-	-	-	-	585
Stage 2	-	-	-	-	674

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	391	481	-	-	620	-
HCM Lane V/C Ratio	0.024	0.148	-	-	0.012	-
HCM Control Delay (s)	14.4	13.8	-	-	10.9	-
HCM Lane LOS	B	B	-	-	B	-
HCM 95th %tile Q(veh)	0.1	0.5	-	-	0	-

3: Schultz Road & Existing Driveway

2025 BASE (NO-BUILD) CONDITIONS

Timing Plan: PM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	54	71	0	3	110
Future Volume (vph)	6	54	71	0	3	110
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	10	12	12	11
Grade (%)	0%		1%			2%
Storage Length (ft)	0	0		0	200	
Storage Lanes	0	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				
Flt Protected	0.950				0.950	
Satd. Flow (prot)	0	1567	1655	0	1693	1723
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	0	1567	1655	0	1693	1723
Link Speed (mph)	45		45			25
Link Distance (ft)	457		706			356
Travel Time (s)	6.9		10.7			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	6%	1%	0%	0%	0%
Adj. Flow (vph)	7	60	79	0	3	122
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	60	79	0	3	122
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	2.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑		↘	↑
Traffic Vol, veh/h	6	54	71	0	3	110
Future Vol, veh/h	6	54	71	0	3	110
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	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	1	-	-	2
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	17	6	1	0	0	0
Mvmt Flow	7	60	79	0	3	122

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	207	79	0	-	79
Stage 1	79	-	-	-	-
Stage 2	128	-	-	-	-
Critical Hdwy	6.57	6.26	-	-	4.3
Critical Hdwy Stg 1	5.57	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-
Follow-up Hdwy	3.653	3.2	-	-	3
Pot Cap-1 Maneuver	749	1015	-	0	1128
Stage 1	908	-	-	0	-
Stage 2	862	-	-	0	-
Platoon blocked, %			-		-
Mov Cap-1 Maneuver	747	1015	-	-	1128
Mov Cap-2 Maneuver	747	-	-	-	-
Stage 1	908	-	-	-	-
Stage 2	859	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT
Capacity (veh/h)	- 1015	1128	-
HCM Lane V/C Ratio	- 0.059	0.003	-
HCM Control Delay (s)	- 8.8	8.2	-
HCM Lane LOS	- A	A	-
HCM 95th %tile Q(veh)	- 0.2	0	-

2025 PROJECTED CONDITIONS

1: Schultz Road/South Broad Street & Morris Road
 2025 PROJECTED (BUILD) CONDITIONS

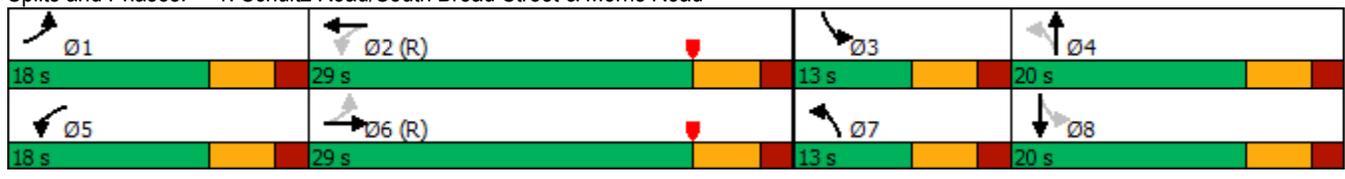
Timing Plan: AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	329	755	23	33	231	292	53	107	29	169	49	89
Future Volume (vph)	329	755	23	33	231	292	53	107	29	169	49	89
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	13	11	13	12	12	13	12	11	12	12
Grade (%)		2%			1%			-2%			3%	
Storage Length (ft)	235		300	240		0	160		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			45			40	
Link Distance (ft)		1104			664			337			329	
Travel Time (s)		16.7			10.1			5.1			5.6	
Confl. Peds. (#/hr)										1		1
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	2%	6%	15%	2%	2%	95%	3%	15%	3%	5%	6%
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA										
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	22.0		9.0	22.0		9.0	20.0		9.0	20.0	
Total Split (s)	18.0	29.0		18.0	29.0		13.0	20.0		13.0	20.0	
Total Split (%)	22.5%	36.3%		22.5%	36.3%		16.3%	25.0%		16.3%	25.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

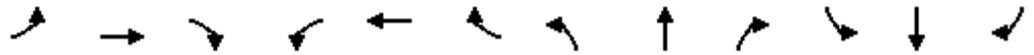
Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 15 (19%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Schultz Road/South Broad Street & Morris Road



1: Schultz Road/South Broad Street & Morris Road
 2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	329	755	23	33	231	292	53	107	29	169	49	89
Future Volume (veh/h)	329	755	23	33	231	292	53	107	29	169	49	89
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1750	1820	1584	1837	1766	524	1905	1832	1708	1680	1680
Adj Flow Rate, veh/h	346	795	19	35	243	271	56	113	22	178	52	65
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	2	2	15	2	2	95	3	3	3	5	5
Cap, veh/h	441	1655	40	340	299	333	156	176	34	310	77	97
Arrive On Green	0.16	0.50	0.49	0.04	0.38	0.36	0.10	0.11	0.10	0.10	0.11	0.10
Sat Flow, veh/h	1653	3318	79	1508	793	885	499	1545	301	1626	677	846
Grp Volume(v), veh/h	346	398	416	35	0	514	56	0	135	178	0	117
Grp Sat Flow(s),veh/h/ln	1653	1662	1735	1508	0	1678	499	0	1846	1626	0	1522
Q Serve(g_s), s	9.2	12.6	12.6	1.1	0.0	22.1	8.0	0.0	5.6	7.7	0.0	5.9
Cycle Q Clear(g_c), s	9.2	12.6	12.6	1.1	0.0	22.1	8.0	0.0	5.6	7.7	0.0	5.9
Prop In Lane	1.00		0.05	1.00		0.53	1.00		0.16	1.00		0.56
Lane Grp Cap(c), veh/h	441	829	865	340	0	632	156	0	211	310	0	174
V/C Ratio(X)	0.78	0.48	0.48	0.10	0.00	0.81	0.36	0.00	0.64	0.57	0.00	0.67
Avail Cap(c_a), veh/h	447	829	865	529	0	632	156	0	346	310	0	285
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.1	13.2	13.2	14.1	0.0	22.6	28.0	0.0	33.9	27.9	0.0	34.3
Incr Delay (d2), s/veh	8.8	2.0	1.9	0.1	0.0	10.9	1.4	0.0	3.2	2.5	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	7.9	8.1	0.6	0.0	14.7	1.7	0.0	4.6	5.5	0.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	15.2	15.1	14.2	0.0	33.6	29.4	0.0	37.2	30.5	0.0	38.7
LnGrp LOS	C	B	B	B	A	C	C	A	D	C	A	D
Approach Vol, veh/h		1160			549			191				295
Approach Delay, s/veh		17.8			32.3			34.9				33.8
Approach LOS		B			C			C				C
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	35.2	13.0	14.1	8.0	44.9	13.0	14.1				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	12.0	23.0	7.0	14.0	12.0	23.0	7.0	14.0				
Max Q Clear Time (g_c+I1), s	11.7	24.1	10.2	7.6	3.6	15.1	10.5	7.9				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	2.0	0.0	0.2				

Intersection Summary

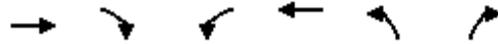
HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

2: Existing Driveway & Morris Road
 2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: AM Peak



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↓	↑	↓	↓
Traffic Volume (vph)	891	46	56	572	0	3
Future Volume (vph)	891	46	56	572	0	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	11	15	12	12
Grade (%)	-2%			3%	-3%	
Storage Length (ft)		0	250		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Link Speed (mph)	45			45	25	
Link Distance (ft)	664			1170	512	
Travel Time (s)	10.1			17.7	14.0	
Confl. Peds. (#/hr)			1			
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	4%	0%	2%	0%	33%
Shared Lane Traffic (%)						

Intersection Summary

Area Type: Other

2: Existing Driveway & Morris Road
 2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: AM Peak

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Vol, veh/h	891	46	56	572	0	3
Future Vol, veh/h	891	46	56	572	0	3
Conflicting Peds, #/hr	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	3	-3	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	4	0	2	0	33
Mvmt Flow	938	48	59	602	0	3

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	987	0	1659	939
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	720	-
Critical Hdwy	-	-	4.3	-	5.8	6.23
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	-	-	3	-	3	3.4
Pot Cap-1 Maneuver	-	-	542	-	153	314
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	611	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	541	-	136	314
Mov Cap-2 Maneuver	-	-	-	-	298	-
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	544	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	314	-	-	541	-
HCM Lane V/C Ratio	-	0.01	-	-	0.109	-
HCM Control Delay (s)	0	16.6	-	-	12.5	-
HCM Lane LOS	A	C	-	-	B	-
HCM 95th %tile Q(veh)	-	0	-	-	0.4	-

3: Schultz Road & Existing Driveway
 2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑		↓	↑
Traffic Volume (vph)	0	56	137	0	43	63
Future Volume (vph)	0	56	137	0	43	63
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	10	12	12	11
Grade (%)	0%		1%			2%
Storage Length (ft)	0	0		0	200	
Storage Lanes	0	1		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	45		45			25
Link Distance (ft)	457		706			356
Travel Time (s)	6.9		10.7			9.7
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	97%	2%	0%	22%	3%
Shared Lane Traffic (%)						
Intersection Summary						
Area Type:	Other					

3: Schultz Road & Existing Driveway
 2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: AM Peak

Intersection						
Int Delay, s/veh	3.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑		↘	↑
Traffic Vol, veh/h	0	56	137	0	43	63
Future Vol, veh/h	0	56	137	0	43	63
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	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	1	-	-	2
Peak Hour Factor	69	69	69	69	69	69
Heavy Vehicles, %	0	97	2	0	22	3
Mvmt Flow	0	81	199	0	62	91

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	199	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	7.17	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.7	-
Pot Cap-1 Maneuver	0	724	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	724	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	3.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT
Capacity (veh/h)	- 724	957	-
HCM Lane V/C Ratio	- 0.112	0.065	-
HCM Control Delay (s)	- 10.6	9	-
HCM Lane LOS	- B	A	-
HCM 95th %tile Q(veh)	- 0.4	0.2	-

1: Schultz Road/South Broad Street & Morris Road
 2025 PROJECTED (BUILD) CONDITIONS

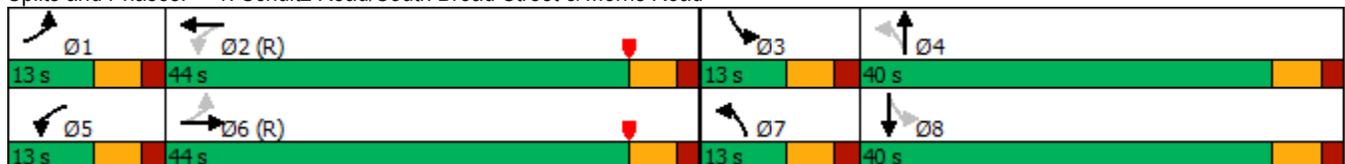
Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	348	26	34	443	100	57	74	22	325	90	400
Future Volume (vph)	76	348	26	34	443	100	57	74	22	325	90	400
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	13	11	13	12	12	13	12	11	12	12
Grade (%)		2%			1%			-2%			3%	
Storage Length (ft)	235		300	240		0	160		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			45			40	
Link Distance (ft)		1104			664			337			329	
Travel Time (s)		16.7			10.1			5.1			5.6	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	4%	3%	0%	0%	1%	1%
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA										
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	22.0		9.0	22.0		9.0	20.0		9.0	20.0	
Total Split (s)	13.0	44.0		13.0	44.0		13.0	40.0		13.0	40.0	
Total Split (%)	11.8%	40.0%		11.8%	40.0%		11.8%	36.4%		11.8%	36.4%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 40 (36%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Schultz Road/South Broad Street & Morris Road



1: Schultz Road/South Broad Street & Morris Road
 2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	348	26	34	443	100	57	74	22	325	90	400
Future Volume (veh/h)	76	348	26	34	443	100	57	74	22	325	90	400
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1778	1764	1834	1794	1837	1766	1818	1905	1832	1750	1736	1736
Adj Flow Rate, veh/h	78	355	26	35	452	93	58	76	12	332	92	365
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	1	1	0	2	2	4	3	3	0	1	1
Cap, veh/h	270	1333	97	455	590	121	173	470	74	507	97	386
Arrive On Green	0.05	0.42	0.41	0.03	0.40	0.39	0.05	0.29	0.28	0.07	0.32	0.31
Sat Flow, veh/h	1693	3167	231	1709	1478	304	1731	1606	254	1666	306	1212
Grp Volume(v), veh/h	78	187	194	35	0	545	58	0	88	332	0	457
Grp Sat Flow(s),veh/h/ln	1693	1675	1722	1709	0	1782	1731	0	1859	1666	0	1518
Q Serve(g_s), s	2.9	8.0	8.1	1.3	0.0	29.1	2.5	0.0	3.9	8.0	0.0	32.3
Cycle Q Clear(g_c), s	2.9	8.0	8.1	1.3	0.0	29.1	2.5	0.0	3.9	8.0	0.0	32.3
Prop In Lane	1.00		0.13	1.00		0.17	1.00		0.14	1.00		0.80
Lane Grp Cap(c), veh/h	270	705	725	455	0	711	173	0	544	507	0	483
V/C Ratio(X)	0.29	0.27	0.27	0.08	0.00	0.77	0.34	0.00	0.16	0.65	0.00	0.95
Avail Cap(c_a), veh/h	302	705	725	525	0	711	217	0	592	507	0	483
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.4	20.8	20.8	18.3	0.0	28.7	28.9	0.0	28.9	30.0	0.0	37.0
Incr Delay (d2), s/veh	0.6	0.9	0.9	0.1	0.0	7.7	1.1	0.0	0.1	3.0	0.0	27.9
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	2.0	5.7	5.9	0.9	0.0	19.1	1.9	0.0	3.0	7.4	0.0	21.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	21.7	21.7	18.4	0.0	36.4	30.0	0.0	29.1	33.0	0.0	64.9
LnGrp LOS	C	C	C	B	A	D	C	A	C	C	A	E
Approach Vol, veh/h		459			580			146			789	
Approach Delay, s/veh		21.7			35.3			29.5			51.5	
Approach LOS		C			D			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	48.9	13.0	37.2	8.5	51.3	10.2	40.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	38.0	7.0	34.0	7.0	38.0	7.0	34.0				
Max Q Clear Time (g_c+I1), s	5.4	31.1	10.5	5.9	3.8	10.5	5.0	34.3				
Green Ext Time (p_c), s	0.0	1.2	0.0	0.2	0.0	1.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				38.2								
HCM 6th LOS				D								

2: Existing Driveway & Morris Road
 2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: PM Peak



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	697	5	7	547	23	81
Future Volume (vph)	697	5	7	547	23	81
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	11	15	12	12
Grade (%)	-2%			3%	-3%	
Storage Length (ft)		0	250		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Link Speed (mph)	45			45	25	
Link Distance (ft)	664			1170	512	
Travel Time (s)	10.1			17.7	14.0	
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	25%	17%	2%	13%	2%
Shared Lane Traffic (%)						
Intersection Summary						
Area Type:	Other					

2: Existing Driveway & Morris Road
2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	697	5	7	547	23	81
Future Vol, veh/h	697	5	7	547	23	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	3	-3	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	1	25	17	2	13	2
Mvmt Flow	719	5	7	564	24	84

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	724	0	1297
Stage 1	-	-	-	-	719
Stage 2	-	-	-	-	578
Critical Hdwy	-	-	4.27	-	5.93
Critical Hdwy Stg 1	-	-	-	-	4.93
Critical Hdwy Stg 2	-	-	-	-	4.93
Follow-up Hdwy	-	-	2.353	-	3.617
Pot Cap-1 Maneuver	-	-	814	-	210
Stage 1	-	-	-	-	522
Stage 2	-	-	-	-	595
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	814	-	208
Mov Cap-2 Maneuver	-	-	-	-	347
Stage 1	-	-	-	-	522
Stage 2	-	-	-	-	590

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	15
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	455	-	-	814	-
HCM Lane V/C Ratio	0.068	0.184	-	-	0.009	-
HCM Control Delay (s)	16.1	14.7	-	-	9.5	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	0.7	-	-	0	-

3: Schultz Road & Existing Driveway
 2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↖		↗	↗
Traffic Volume (vph)	6	76	71	0	51	112
Future Volume (vph)	6	76	71	0	51	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	10	12	12	11
Grade (%)	0%		1%			2%
Storage Length (ft)	0	0		0	200	
Storage Lanes	0	1		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	45		45			25
Link Distance (ft)	457		706			356
Travel Time (s)	6.9		10.7			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	6%	1%	0%	97%	0%
Shared Lane Traffic (%)						

Intersection Summary

Area Type: Other

3: Schultz Road & Existing Driveway
 2025 PROJECTED (BUILD) CONDITIONS

Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	3.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑		↘	↑
Traffic Vol, veh/h	6	76	71	0	51	112
Future Vol, veh/h	6	76	71	0	51	112
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	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	1	-	-	2
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	17	6	1	0	97	0
Mvmt Flow	7	84	79	0	57	124

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	317	79	0	-	79
Stage 1	79	-	-	-	-
Stage 2	238	-	-	-	-
Critical Hdwy	6.57	6.26	-	-	5.07
Critical Hdwy Stg 1	5.57	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-
Follow-up Hdwy	3.653	3.354	-	-	3.073
Pot Cap-1 Maneuver	646	970	-	0	1084
Stage 1	908	-	-	0	-
Stage 2	768	-	-	0	-
Platoon blocked, %			-		-
Mov Cap-1 Maneuver	612	970	-	-	1084
Mov Cap-2 Maneuver	612	-	-	-	-
Stage 1	908	-	-	-	-
Stage 2	727	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	2.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT
Capacity (veh/h)	-	970	1084
HCM Lane V/C Ratio	-	0.087	0.052
HCM Control Delay (s)	-	9.1	8.5
HCM Lane LOS	-	A	A
HCM 95th %tile Q(veh)	-	0.3	0.2

APPENDIX K

PENNDOT SIGNAL PERMIT PLANS

GENERAL NOTES 1949

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

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

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 6B.

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

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

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

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

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

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 4DB.

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

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 3B, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE DECEMBER 12, 1991.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 4DB AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

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

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-78DD SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY

MUNICIPALITY: WORCESTER/UPPER GWYNEDD

INTERSECTION: MORRIS ROAD (S.R.2001) & SCHULTZ ROAD/BROAD STREET (S.R.2002)

REVIEWED: _____ DATE _____

MUNICIPAL OFFICIAL: _____ DATE _____

RECOMMENDED: *Mary E. Douglas* DATE 4-2-97

DISTRICT TRAFFIC ENGINEER: _____ DATE _____

NO. 1 New Drawing, *Added Traffic* DATE 4/2/97

NO. 2 _____ DATE _____

NO. 3 _____ DATE _____

NO. 4 _____ DATE _____

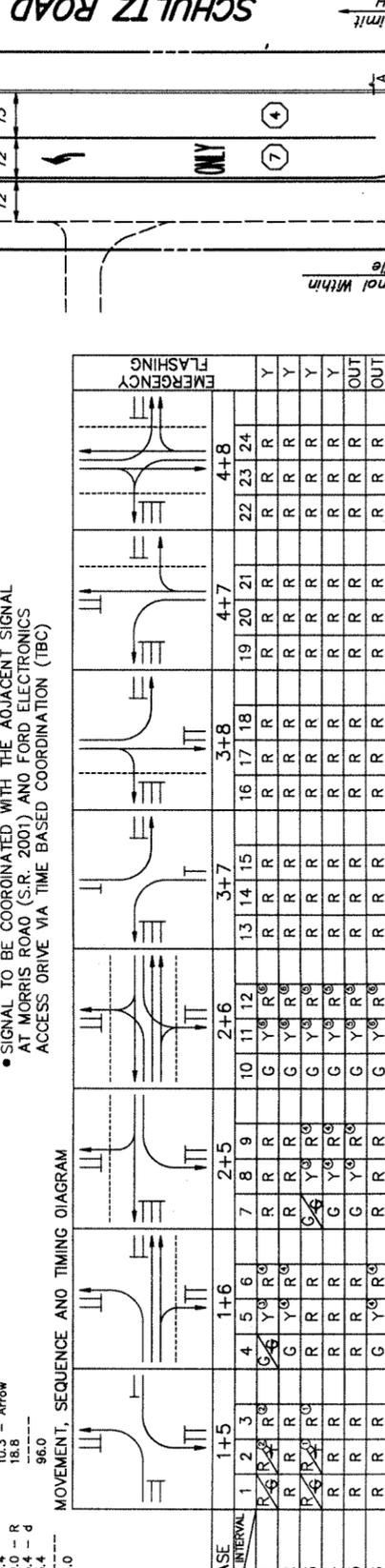
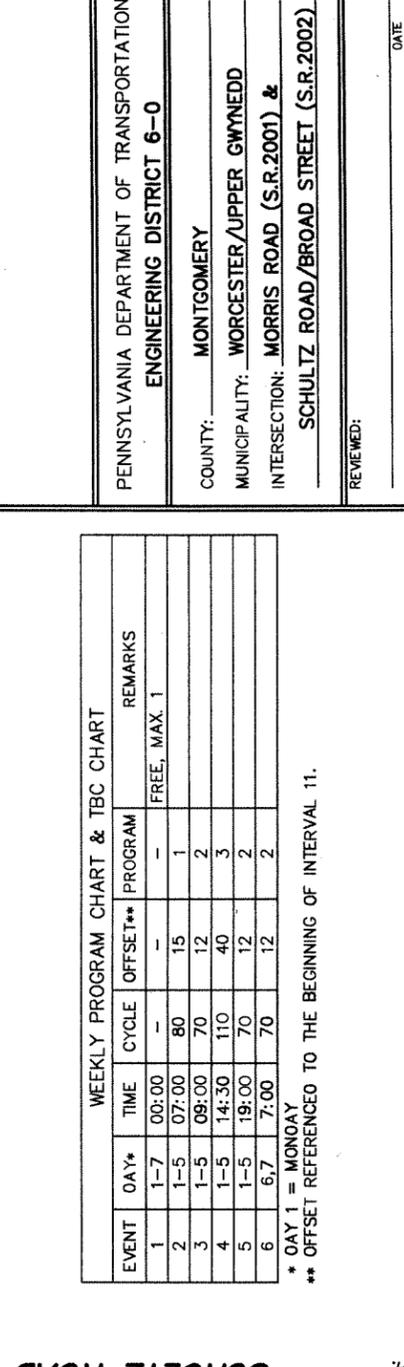
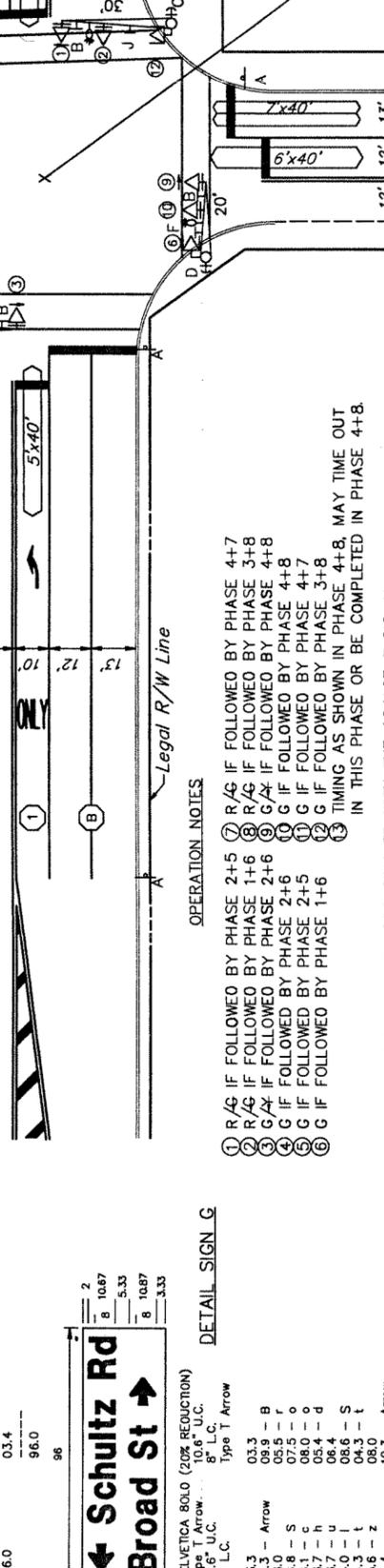
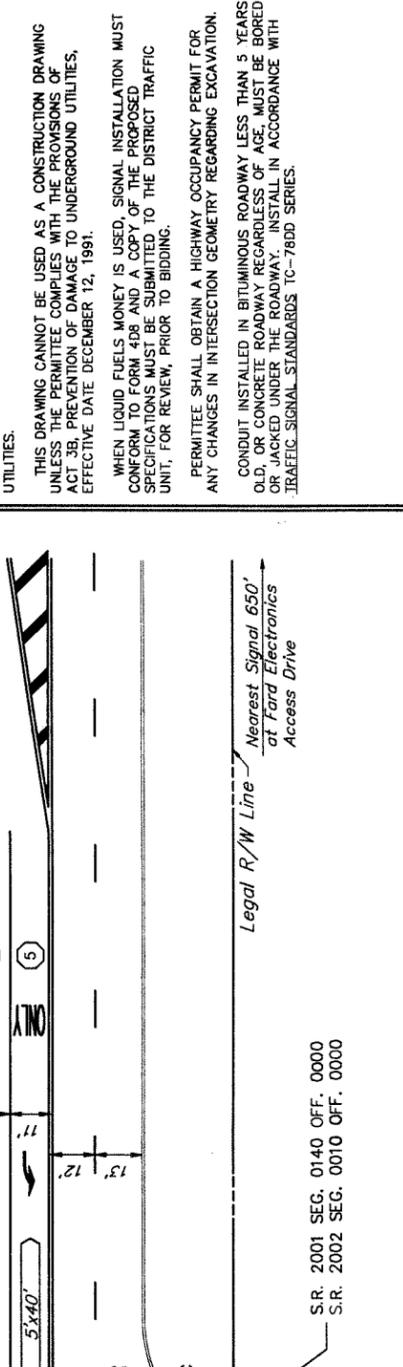
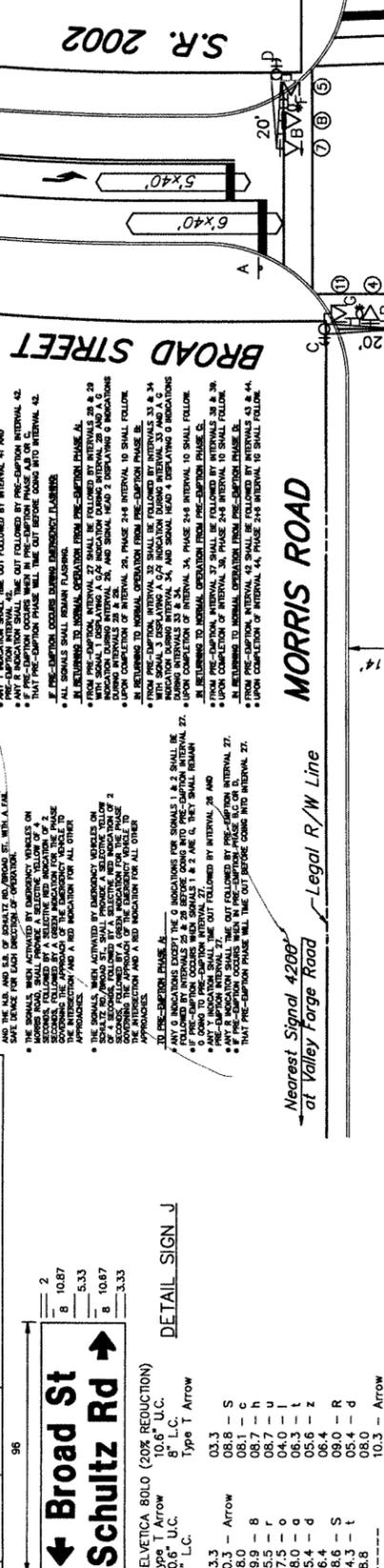
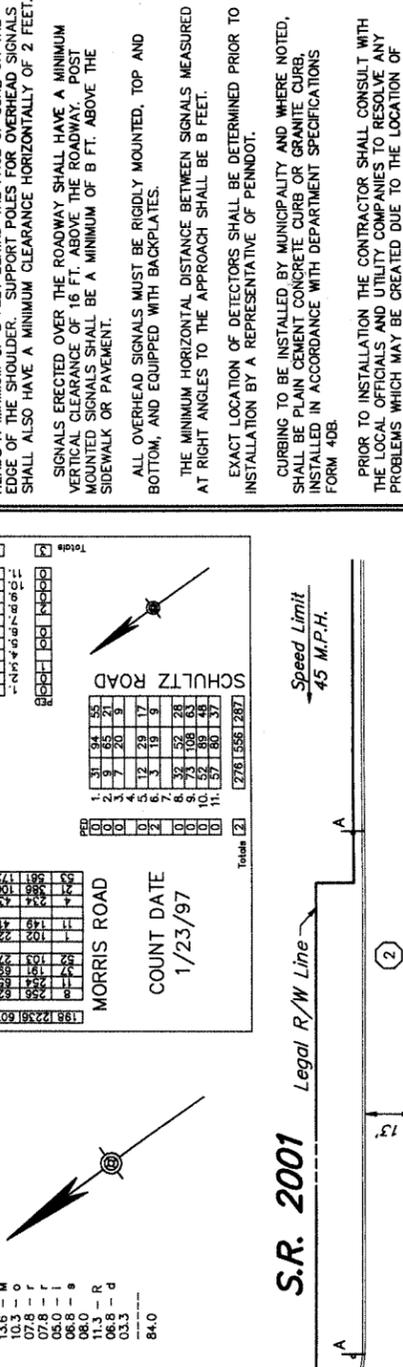
NO. 5 _____ DATE _____

NO. 6 _____ DATE _____

NO. 7 _____ DATE _____

NO. 8 _____ DATE _____

SHEET 2 OF 2 PERMIT # 64-1946 FILE # 1946



SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R3-7L	30" x 30"	LEFT LANE MUST TURN LEFT
B	R10-12	30" x 36"	LEFT TURN YIELD ON GREEN
C	R10-3	9" x 12"	PUSH BUTTON FOR GREEN LIGHT
D	R10-3	9" x 12"	PUSH BUTTON FOR GREEN LIGHT
E	W3-3	36" x 36"	SIGNAL AHEAD
F	D3-4	84" x 16"	SINGLE LINE OVERHEAD STREET NAME
G	D3-4	96" x 32"	DOUBLE LINE OVERHEAD STREET NAME
J	D3-4	96" x 32"	DOUBLE LINE OVERHEAD STREET NAME

HELVETICA BOLD (20% REDUCTION)
10.6" U.C.
8" L.C.

Type T Arrow

DETAIL SIGN J

HELVETICA BOLD (20% REDUCTION)
10.6" U.C.
8" L.C.

Type T Arrow

DETAIL SIGN G

OPERATION NOTES

- R/G IF FOLLOWED BY PHASE 2+5
- R/G IF FOLLOWED BY PHASE 4+7
- R/G IF FOLLOWED BY PHASE 3+8
- G/Y IF FOLLOWED BY PHASE 2+6
- G IF FOLLOWED BY PHASE 4+8
- G IF FOLLOWED BY PHASE 2+5
- G IF FOLLOWED BY PHASE 3+8
- G IF FOLLOWED BY PHASE 4+7
- G IF FOLLOWED BY PHASE 2+6
- G IF FOLLOWED BY PHASE 4+8
- G IF FOLLOWED BY PHASE 2+5
- G IF FOLLOWED BY PHASE 3+8
- G IF FOLLOWED BY PHASE 4+7
- G IF FOLLOWED BY PHASE 2+6
- G IF FOLLOWED BY PHASE 4+8

IN THIS PHASE OR BE COMPLETED IN PHASE 4+8.

* SIGNAL TO BE COORDINATED WITH THE ADJACENT SIGNAL AT MORRIS ROAD (S.R. 2001) AND FORD ELECTRONICS ACCESS DRIVE VIA TIME BASED COORDINATION (TBC)

WEEKLY PROGRAM CHART & TBC CHART

EVENT	OAY*	TIME	CYCLE	OFFSET**	PROGRAM	REMARKS
1	1-7	00:00	80	15	1	FREE, MAX. 1
2	1-5	07:00	80	15	1	
3	1-5	08:00	70	12	2	
4	1-5	14:30	110	40	3	
5	1-5	19:00	70	12	2	
6	6,7	7:00	70	12	2	

* OAY 1 = MONDAY
** OFFSET REFERENCED TO THE BEGINNING OF INTERVAL 11.

SIGNAL INDICATIONS

12" LENS 8" LENS

12" LENS 10" LENS

12" LENS 11,12

12" LENS 2,4,8,10

12" LENS 1,3,7,9

LEGEND

MAST ARM/IDENTIFYING LENGTH

VEHICULAR SIGNAL HEAD/DIRECTIONAL ARROW/IDENTIFYING NUMBER

PEDESTRIAN SIGNAL HEAD/IDENTIFYING NUMBER

PEDESTRIAN PUSHBUTTON/SIGN

LOOP SENSOR/SIZE

MICROWAVE DETECTOR

EMERGENCY PREEMPTION DEVICE

CURB CUT RAMP

UTILITY POLE

PHASE NUMBER

SIGN/IDENTIFYING LETTER

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS 5.6,11,12

* UPON PEDESTRIAN ACTUATION ONLY

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE TO BE MADE WITHOUT THE PRIOR APPROVAL OF THE PERMITTEE. ANY CHANGES TO THE ORIGINAL DRAWING SHALL BE MADE BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

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

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 68.

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

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

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

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

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

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

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

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 38, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE DECEMBER 12, 1991.

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

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION, CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY

MUNICIPALITY: WORCESTER/UPPER GWYNEDD

INTERSECTION: MORRIS ROAD (S.R.2001) & FORD ELECTRONICS ACCESS DRIVE

REVIEWED: _____ DATE: _____

MUNICIPAL OFFICIAL: _____ DATE: _____

RECOMMENDED: _____ DATE: 2-26-97

DISTRICT TRAFFIC ENGINEER: _____ DATE: 2/27/97

NO.	REVISION	DATE	BY	CHKD.	DATE
1	New Drawing - Change TBC	1/23/97	AW	AW	2/27/97
2					
3					
4					
5					
6					
7					
8					

7:00 AM TO 8:00 AM
8:00 AM TO 9:00 AM
9:00 AM TO 10:00 AM
10:00 AM TO 11:00 AM
11:00 AM TO 12:00 PM
12:00 PM TO 1:00 PM
1:00 PM TO 2:00 PM
2:00 PM TO 3:00 PM
3:00 PM TO 4:00 PM
4:00 PM TO 5:00 PM
5:00 PM TO 6:00 PM

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11.

S.R. 2001

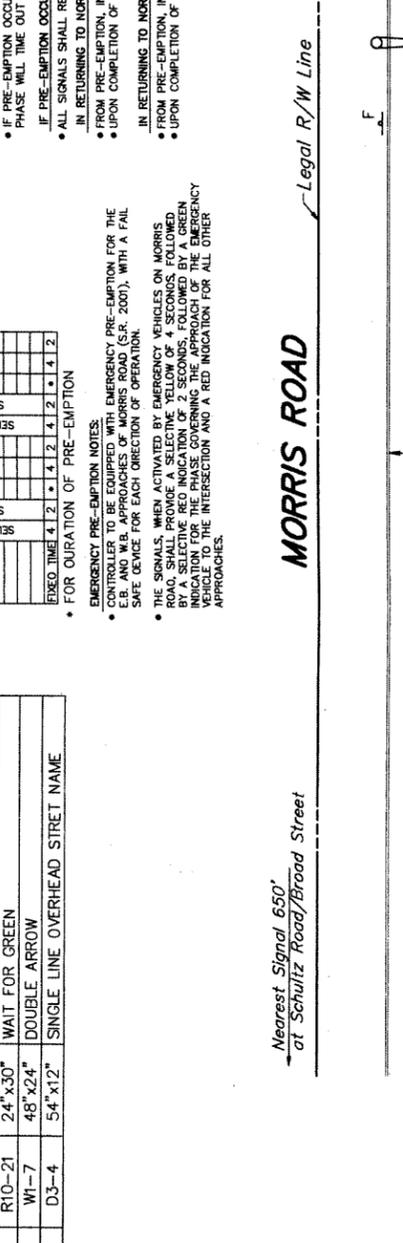
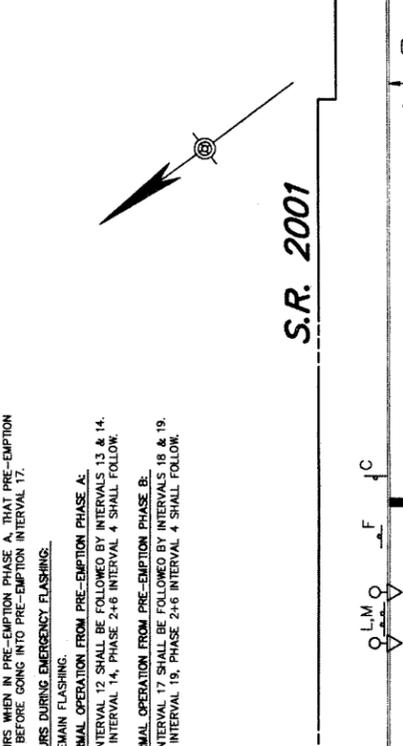
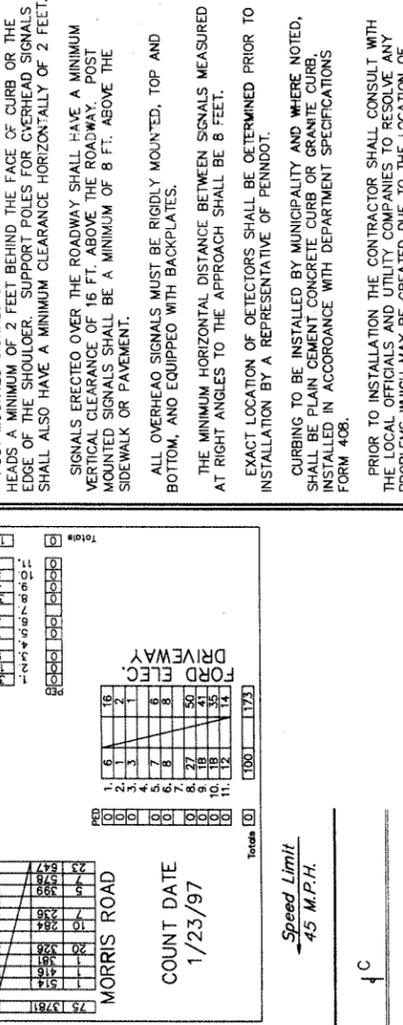
| PHASE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|--|
| 1 | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | |

COUNT DATE 1/23/97

Speed Limit 45 M.P.H.

Nearest Signal 650' at Schultiz Road/Broad Street

Nearest Signal 1730' at Barks Road



EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

| PHASE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|--|
| 1 | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | |

TO PRE-EMPTION PHASE A:

- ANY G INDICATIONS EXCEPT THE G INDICATIONS FOR SIGNALS 1 & 2 SHALL BE FOLLOWED BY INTERVALS 10 & 11 BEFORE GOING INTO PRE-EMPTION INTERVAL 12.
- IF PRE-EMPTION OCCURS WHEN SIGNALS 1 & 2 ARE G, THEY SHALL REMAIN G GOING TO PRE-EMPTION INTERVAL 12.
- ANY Y INDICATION SHALL TIME OUT FOLLOWED BY INTERVAL 11 AND PRE-EMPTION PHASE WILL TIME OUT BEFORE GOING INTO PRE-EMPTION INTERVAL 12.
- IF PRE-EMPTION OCCURS WHEN IN PRE-EMPTION PHASE B, THAT PRE-EMPTION PHASE WILL TIME OUT BEFORE GOING INTO PRE-EMPTION INTERVAL 12.

TO PRE-EMPTION PHASE B:

- ANY G INDICATIONS EXCEPT THE G INDICATIONS FOR SIGNALS 3 & 4 SHALL BE FOLLOWED BY INTERVALS 10 & 11 BEFORE GOING INTO PRE-EMPTION INTERVAL 17.
- IF PRE-EMPTION OCCURS WHEN SIGNALS 3 & 4 ARE G, THEY SHALL REMAIN G GOING TO PRE-EMPTION INTERVAL 17.
- ANY Y INDICATION SHALL TIME OUT FOLLOWED BY INTERVAL 16 AND PRE-EMPTION PHASE WILL TIME OUT BEFORE GOING INTO PRE-EMPTION INTERVAL 17.
- IF PRE-EMPTION OCCURS WHEN IN PRE-EMPTION PHASE B, THAT PRE-EMPTION PHASE WILL TIME OUT BEFORE GOING INTO PRE-EMPTION INTERVAL 17.

IF PRE-EMPTION OCCURS DURING EMERGENCY FLASHING:

- ALL SIGNALS SHALL REMAIN FLASHING.
- IN RETURNING TO NORMAL OPERATION FROM PRE-EMPTION PHASE A:
- UPON COMPLETION OF INTERVAL 12, PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- UPON COMPLETION OF INTERVAL 14, PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- IN RETURNING TO NORMAL OPERATION FROM PRE-EMPTION PHASE B:
- UPON COMPLETION OF INTERVAL 17, PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- UPON COMPLETION OF INTERVAL 19, PHASE 2+6 INTERVAL 4 SHALL FOLLOW.

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE E.B. AND W.B. APPROACHES OF MORRIS ROAD (S.R. 2001), WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLES ON MORRIS ROAD, SHALL PROVIDE A SELECTIVE YELLOW OF 4 SECONDS, FOLLOWED BY A SELECTIVE RED OF 4 SECONDS, BEFORE THE APPROACH OF THE EMERGENCY VEHICLE TO THE INTERSECTION AND A RED INDICATION FOR ALL OTHER APPROACHES.

SIGN TABULATION

| PLAN SYMBOL | SERIES NUMBER | SIZE | REMARKS |
|-------------|---------------|---------|----------------------------------|
| A | R3-5R | 30"x36" | RIGHT TURN |
| B | R3-5S | 30"x36" | STRAIGHT THROUGH |
| C | R3-7L | 30"x30" | LEFT LANE MUST TURN LEFT |
| D | R3-7R | 30"x30" | RIGHT LANE MUST TURN RIGHT |
| E | R4-7 | 24"x30" | KEEP RIGHT |
| F | R9-3 | 18"x18" | NO PEDESTRIAN CROSSING |
| G | R10-12 | 30"x36" | LEFT TURN YIELD ON GREEN |
| J | R5-2 | 30"x30" | NO TRUCKS |
| K | R10-21 | 24"x30" | WAIT FOR GREEN |
| L | W1-7 | 48"x24" | DOUBLE ARROW |
| M | D3-4 | 54"x12" | SINGLE LINE OVERHEAD STREET NAME |

OPERATION NOTES:

- SIGNAL TO BE COORDINATED WITH THE ADJACENT SIGNALS AT MORRIS ROAD (S.R. 2001) AND BROAD STREET/ SCHULTZ ROAD AND AT MORRIS ROAD AND BERKS ROAD VIA TIME BASED COORDINATION (TBC)

WEEKLY PROGRAM CHART & TBC CHART

| EVENT | DAY* | TIME | CYCLE | OFFSET | PROGRAM | REMARKS |
|-------|------|-------|-------|--------|---------|--------------|
| 1 | 1-7 | 00:00 | - | - | - | FREE, MAX. 1 |
| 2 | 1-5 | 07:00 | 80 | 28 | 1 | |
| 3 | 1-5 | 09:00 | 70 | 34 | 2 | |
| 4 | 1-5 | 14:30 | 110 | 23 | 3 | |
| 5 | 1-5 | 19:00 | 70 | 34 | 2 | |
| 6 | 6,7 | 07:00 | 70 | 34 | 2 | |

* DAY 1 = MONDAY
** OFFSET REFERENCED TO THE BEGINNING OF INTERVAL 5.

DETAIL SIGN M.

54

Morris Rd

HELVETICA BOLD
6" U.C.
4.5" L.C.

05.4 - M
07.6 - O
05.9 - R
04.4 - T
04.4 - F
02.9 - I
03.8 - S
04.0 - D
06.3 - R
03.8 - d
05.5 -

54.0

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

| PHASE | INTERVAL | 1+6 | 2+6 | 3+8 | EMERGENCY FLASHING |
|-------|----------|-----|-----|-----|--------------------|
| 1 | G | G | G | G | Y |
| 2 | G | G | G | G | Y |
| 3,4 | R | R | R | R | Y |
| 5,6 | R | R | R | R | Y |

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

| FIXED | MINIMUM PASSAGE | MAXIMUM 1 | MAXIMUM 2 | MEMORY | PROGRAM 1 | PROGRAM 2 | PROGRAM 3 |
|-------|-----------------|-----------|-----------|--------|-----------|-----------|-----------|
| 4 | 2 | 15 | 45 | 50 | MR | NL | |
| 3 | 3 | 45 | 10 | | 9 | 3 | 2 |
| 10 | 4 | 33 | 4 | | 10 | 3 | 2 |
| 15 | 4 | 73 | 4 | | 10 | 3 | 2 |
| 9 | 4 | 45 | 4 | | 9 | 3 | 2 |
| 10 | 4 | 33 | 4 | | 10 | 3 | 2 |
| 10 | 4 | 73 | 4 | | 10 | 3 | 2 |

(80 SECONDS)
(70 SECONDS)
(110 SECONDS)

LEGEND

- MAST ARM/IDENTIFYING LENGTH
- VEHICULAR SIGNAL HEAD/BACKPLATE/VISORS/DIRECTIONAL ARROW/IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/SIGN
- LOOP SENSOR/SIZE
- MICROWAVE DETECTOR
- EMERGENCY PREEMPTION DEVICE
- CURB CUT RAMP
- UTILITY POLE
- PHASE NUMBER

APPENDIX L

AUXILIARY LANE WARRANT ANALYSIS

***MORRIS ROAD (SR 2001) &
SITE DRIVEWAY***

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

| | |
|---|--|
| Municipality: <input type="text" value="Worcester Twp"/>
County: <input type="text" value="Montgomery County"/>
PennDOT Engineering District: <input type="text" value="6"/> | Analysis Date: <input type="text" value="2/4/2020"/>
Conducted By: <input type="text" value="BH"/>
Checked By: <input type="text" value="MB"/>
Agency/Company Name: <input type="text" value="Traffic Planning & Design, Inc."/> |
| Intersection & Approach Description: <input type="text" value="Morris Road (SR 2001) and Site Driveway"/> | |
| Analysis Period: <input type="text" value="2025 Build"/>
Design Hour: <input type="text" value="AM Peak Hour"/>
Intersection Control: <input type="text" value="Unsignalized"/>
Posted Speed Limit (MPH): <input type="text" value="45"/>
Type of Terrain: <input type="text" value="Level"/> | Number of Approach Lanes: <input type="text" value="1"/>
Undivided or Divided Highway: <input type="text" value="Undivided"/>
<div style="border: 1px solid red; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div>
Left or Right-Turn Lane Analysis?: <input type="text" value="Left Turn Lane"/> |

VOLUME CALCULATIONS

| Left Turn Lane Volume Calculations | | | | | | |
|-------------------------------------|----------|--------|----------|------|-----|--|
| Movement | Include? | Volume | % Trucks | PCEV | | |
| Advancing | Left | Yes | 56 | 0.0% | 56 | Advancing Volume: <input type="text" value="634"/> |
| | Through | - | 572 | 2.0% | 578 | Opposing Volume: <input type="text" value="952"/> |
| | Right | Yes | 0 | 2.0% | 0 | Left Turn Volume: <input type="text" value="56"/> |
| Opposing | Left | Yes | 0 | 2.0% | 0 | |
| | Through | - | 891 | 3.0% | 905 | |
| | Right | Yes | 46 | 4.0% | 47 | % Left Turns in Advancing Volume: <input type="text" value="8.83%"/> |
| Right Turn Lane Volume Calculations | | | | | | |
| Movement | Include? | Volume | % Trucks | PCEV | | |
| Advancing | Left | Yes | 0 | 2.0% | N/A | Advancing Volume: <input type="text" value="N/A"/> |
| | Through | - | 891 | 3.0% | N/A | Right Turn Volume: <input type="text" value="N/A"/> |
| | Right | - | 46 | 4.0% | N/A | |

TURN LANE WARRANT FINDINGS

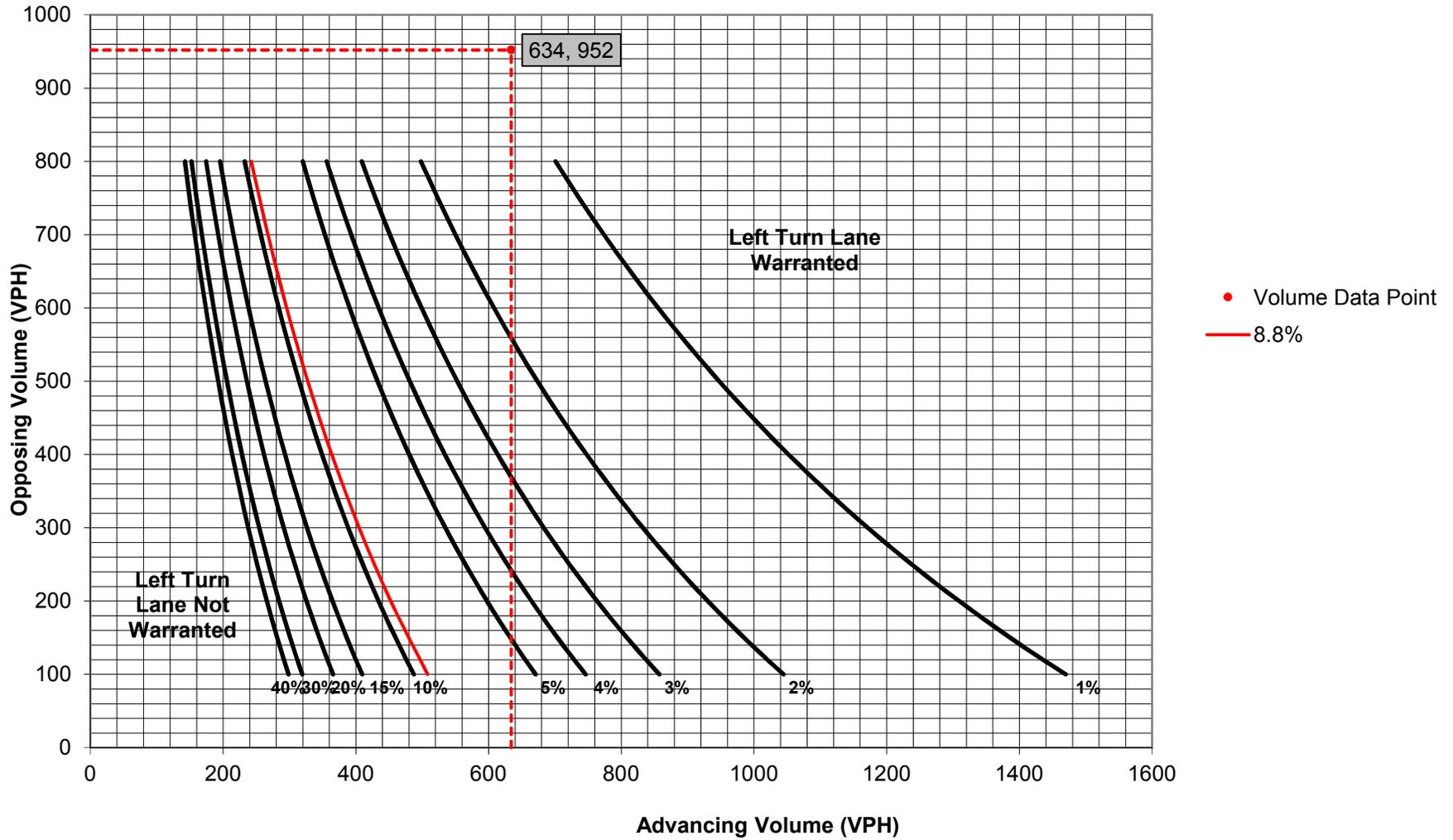
| Left Turn Lane Warrant Findings | Right Turn Lane Warrant Findings |
|--|---|
| Applicable Warrant Figure: <input type="text" value="Figure 3"/>
Warrant Met?: <input type="text" value="Yes"/> | Applicable Warrant Figure: <input type="text" value="N/A"/>
Warrant Met?: <input type="text" value="N/A"/> |

TURN LANE LENGTH CALCULATIONS

| Intersection Control: <input type="text" value="Unsignalized"/>
Design Hour Volume of Turning Lane: <input type="text" value="56"/>
Cycles Per Hour (Assumed): <input type="text" value="60"/>
Cycles Per Hour (If Known): <input type="text"/> | Average # of Vehicles/Cycle: <input type="text" value="1.0"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|-------------------------|-------------|--------|--------|--------|--|--|-------|--|-------|--|-------|--|--------------------|--|--|--|--|--|--|------|-----|------|-----|------|-----|------------|---|---|--------|--------|--------|--------|--------------|---|---|---|---|--------|---|
| PennDOT Publication 46, Exhibit 11-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3" style="width: 15%;">Type of Traffic Control</th> <th colspan="6" style="background-color: #FFDAB9;">Speed (MPH)</th> </tr> <tr> <th colspan="2" style="background-color: #FFDAB9;">25-35</th> <th colspan="2" style="background-color: #FFDAB9;">40-45</th> <th colspan="2" style="background-color: #FFDAB9;">50-60</th> </tr> <tr> <th colspan="6" style="background-color: #FFDAB9;">Turn Demand Volume</th> </tr> <tr> <th></th> <th style="background-color: #FFDAB9;">High</th> <th style="background-color: #FFDAB9;">Low</th> <th style="background-color: #FFDAB9;">High</th> <th style="background-color: #FFDAB9;">Low</th> <th style="background-color: #FFDAB9;">High</th> <th style="background-color: #FFDAB9;">Low</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td style="text-align: left;">Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td style="background-color: #FFB6C1;">B</td> <td>B or C</td> <td>B</td> </tr> </tbody> </table> | 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 |
| 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: <input type="text" value="N/A"/> Feet
Condition B: <input type="text" value="125"/> Feet
Condition C: <input type="text" value="N/A"/> Feet
Required Left Turn Lane Storage Length: <input type="text" value="125"/> Feet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Additional Findings: <input type="text" value="N/A"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Additional Comments / Justifications: <input style="width: 100%; height: 40px;" type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Figure 3. Warrant for left turn lanes on two-lane highways
(45 mph speed, unsignalized and signalized intersections)**

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

| | |
|---|---|
| Municipality: <input type="text" value="Worcester Twp"/> | Analysis Date: <input type="text" value="2/4/2020"/> |
| County: <input type="text" value="Montgomery County"/> | Conducted By: <input type="text" value="BH"/> |
| PennDOT Engineering District: <input type="text" value="6"/> | Checked By: <input type="text" value="MB"/> |
| | Agency/Company Name: <input type="text" value="Traffic Planning & Design, Inc."/> |
| Intersection & Approach Description: <input type="text" value="Morris Road (SR 2001) and 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="AM Peak Hour"/> | Undivided or Divided Highway: <input type="text" value="Undivided"/> |
| Intersection Control: <input type="text" value="Unsignalized"/> | |
| Posted Speed Limit (MPH): <input type="text" value="45"/> | Type of Analysis |
| Type of Terrain: <input type="text" value="Level"/> | 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 | 56 | 0.0% | N/A | Advancing Volume: <input type="text" value="N/A"/>
Opposing Volume: <input type="text" value="N/A"/>
Left Turn Volume: <input type="text" value="N/A"/> |
| | Through | - | 572 | 2.0% | N/A | |
| | Right | Yes | 0 | 2.0% | N/A | |
| Opposing | Left | Yes | 0 | 2.0% | N/A | % Left Turns in Advancing Volume: <input type="text" value="N/A"/> |
| | Through | - | 891 | 3.0% | N/A | |
| | Right | Yes | 46 | 4.0% | N/A | |
| Right Turn Lane Volume Calculations | | | | | | |
| Movement | Include? | Volume | % Trucks | PCEV | | |
| Advancing | Left | Yes | 0 | 2.0% | 0 | Advancing Volume: <input type="text" value="952"/>
Right Turn Volume: <input type="text" value="47"/> |
| | Through | - | 891 | 3.0% | 905 | |
| | Right | - | 46 | 4.0% | 47 | |

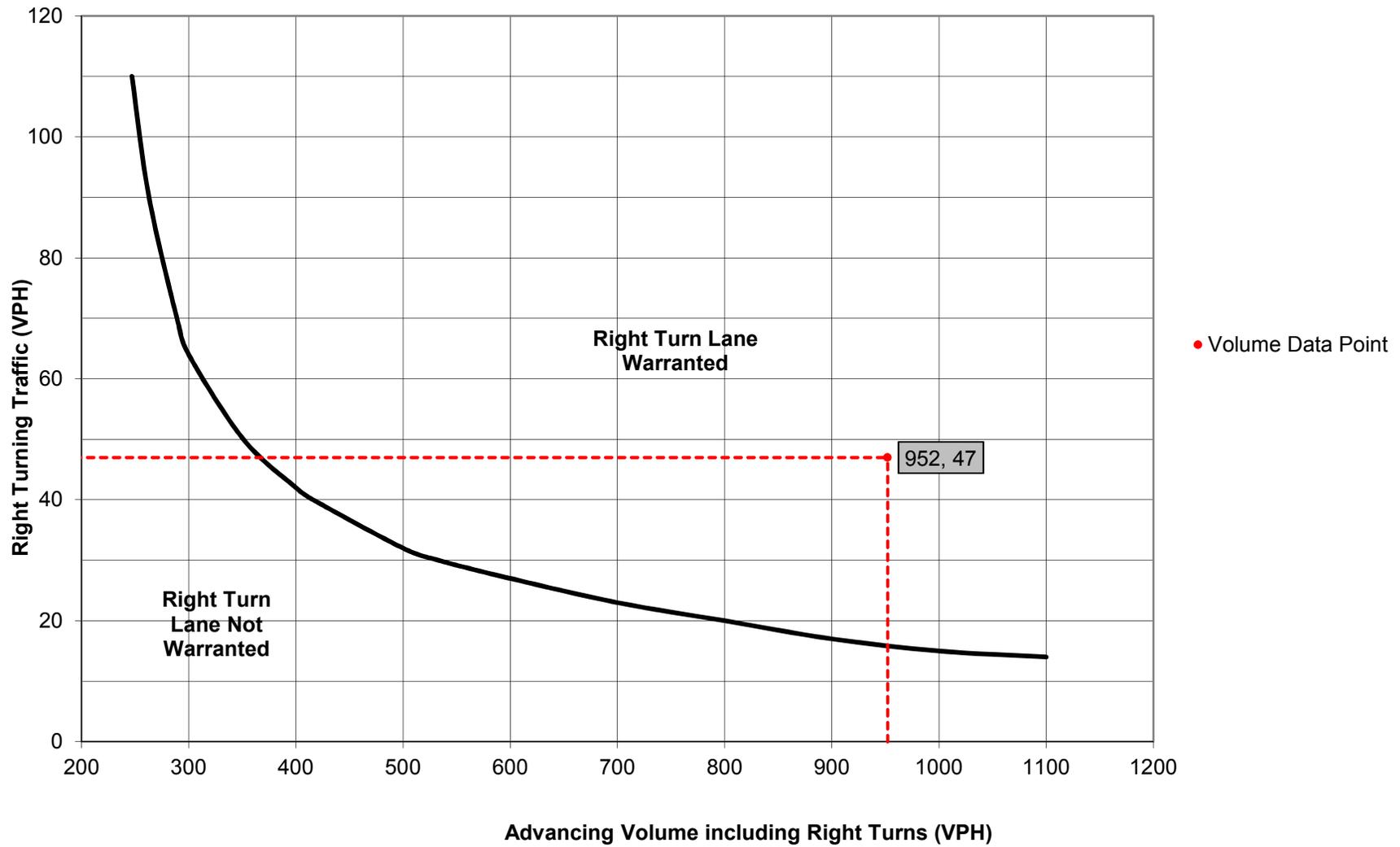
TURN LANE WARRANT FINDINGS

| 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 10"/> |
| 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="Unsignalized"/> | | | | | |
| Design Hour Volume of Turning Lane: | <input type="text" value="47"/> | | | | | |
| Cycles Per Hour (Assumed): | <input type="text" value="60"/> | | | | | |
| Cycles Per Hour (If Known): | <input type="text"/> | Average # of Vehicles/Cycle: <input type="text" value="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 |
| | | Right Turn Lane Storage Length, Condition A: | | <input type="text" value="N/A"/> | Feet | |
| | | Condition B: | | <input type="text" value="125"/> | Feet | |
| | | Condition C: | | <input type="text" value="N/A"/> | Feet | |
| | | Required Right Turn Lane Storage Length: | | <input type="text" value="125"/> | Feet | |
| Additional Findings: | | | | | | <input type="text" value="N/A"/> |
| Additional Comments / Justifications: | | | | | | |
| | | | | | | |

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

| | |
|---|--|
| Municipality: <input type="text" value="Worcester Twp"/>
County: <input type="text" value="Montgomery County"/>
PennDOT Engineering District: <input type="text" value="6"/> | Analysis Date: <input type="text" value="2/4/2020"/>
Conducted By: <input type="text" value="BH"/>
Checked By: <input type="text" value="MB"/>
Agency/Company Name: <input type="text" value="Traffic Planning & Design, Inc."/> |
| Intersection & Approach Description: <input type="text" value="Morris Road (SR 2001) and Site Driveway"/> | |
| Analysis Period: <input type="text" value="2025 Build"/>
Design Hour: <input type="text" value="PM Peak Hour"/>
Intersection Control: <input type="text" value="Unsignalized"/>
Posted Speed Limit (MPH): <input type="text" value="45"/>
Type of Terrain: <input type="text" value="Level"/> | Number of Approach Lanes: <input type="text" value="1"/>
Undivided or Divided Highway: <input type="text" value="Undivided"/>
<div style="border: 2px solid red; padding: 2px; display: inline-block;"> Type of Analysis: <input type="text" value="Left Turn Lane"/> </div>
Left or Right-Turn Lane Analysis?: <input type="text" value="Left Turn Lane"/> |

VOLUME CALCULATIONS

| Left Turn Lane Volume Calculations | | | | | | |
|-------------------------------------|----------|--------|----------|-------|-----|---|
| Movement | Include? | Volume | % Trucks | PCEV | | |
| Advancing | Left | Yes | 7 | 17.0% | 8 | Advancing Volume: <input type="text" value="561"/>
Opposing Volume: <input type="text" value="707"/>
Left Turn Volume: <input type="text" value="8"/> |
| | Through | - | 547 | 2.0% | 553 | |
| | Right | Yes | 0 | 2.0% | 0 | |
| Opposing | Left | Yes | 0 | 2.0% | 0 | % Left Turns in Advancing Volume: <input type="text" value="1.43%"/> |
| | Through | - | 697 | 1.0% | 701 | |
| | Right | Yes | 5 | 25.0% | 6 | |
| Right Turn Lane Volume Calculations | | | | | | |
| Movement | Include? | Volume | % Trucks | PCEV | | |
| Advancing | Left | Yes | 0 | 2.0% | N/A | Advancing Volume: <input type="text" value="N/A"/>
Right Turn Volume: <input type="text" value="N/A"/> |
| | Through | - | 697 | 1.0% | N/A | |
| | Right | - | 5 | 25.0% | N/A | |

TURN LANE WARRANT FINDINGS

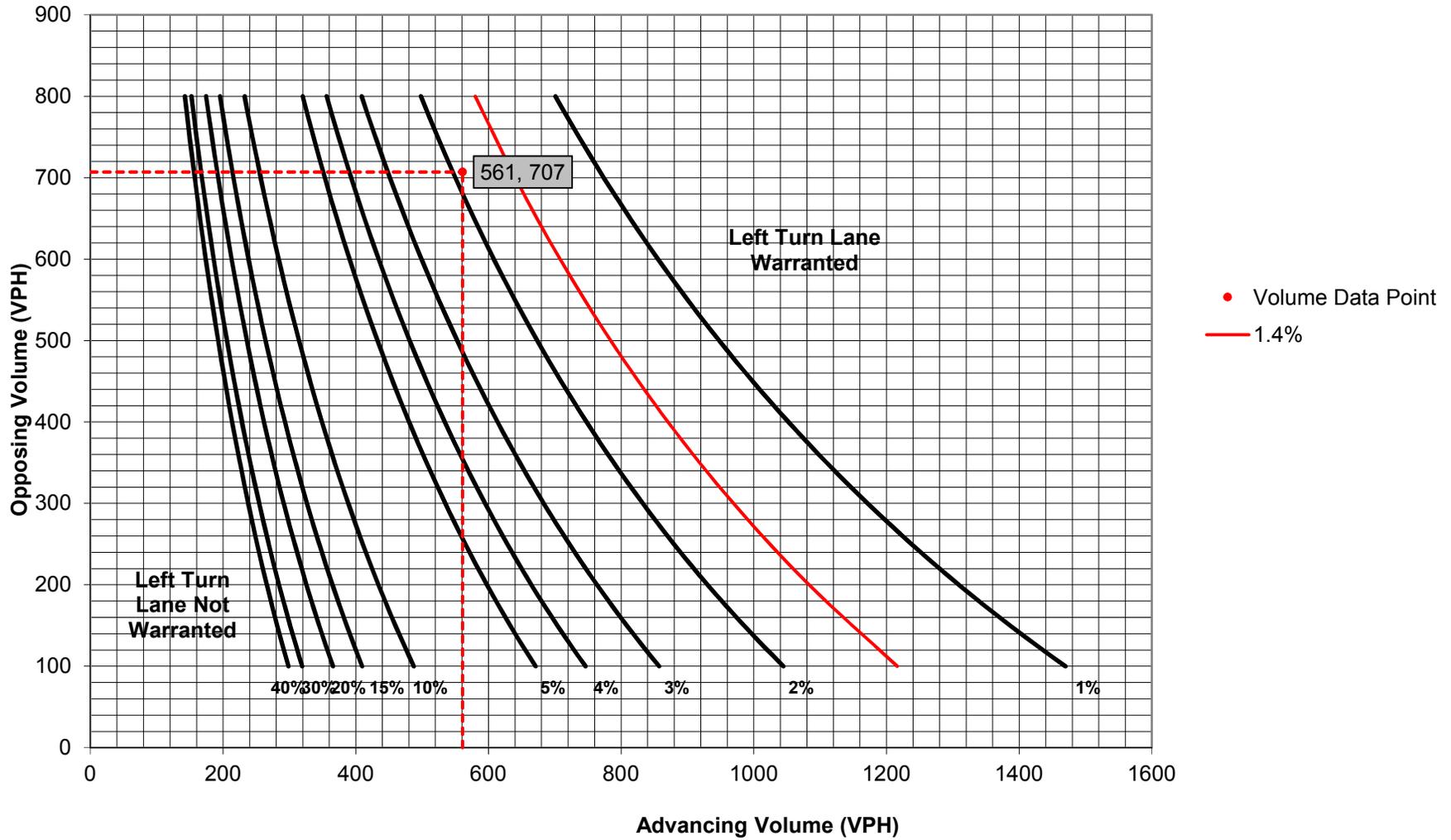
| Left Turn Lane Warrant Findings | Right Turn Lane Warrant Findings |
|---|---|
| Applicable Warrant Figure: <input type="text" value="Figure 3"/>
Warrant Met?: <input type="text" value="No"/> | Applicable Warrant Figure: <input type="text" value="N/A"/>
Warrant Met?: <input type="text" value="N/A"/> |

TURN LANE LENGTH CALCULATIONS

| Intersection Control: <input type="text" value="Unsignalized"/>
Design Hour Volume of Turning Lane: <input type="text" value="8"/>
Cycles Per Hour (Assumed): <input type="text" value="60"/>
Cycles Per Hour (If Known): <input type="text"/> | Average # of Vehicles/Cycle: <input type="text" value="N/A"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-------------------------|-------------|--------|--------|--------|--|--|-------|--|-------|--|-------|--|--------------------|--|--|--|--|--|--|------|-----|------|-----|------|-----|------------|---|---|--------|--------|--------|--------|--------------|---|---|---|---|--------|---|
| PennDOT Publication 46, Exhibit 11-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #FFDAB9;"> <th rowspan="3" style="text-align: left;">Type of Traffic Control</th> <th colspan="6" style="text-align: center;">Speed (MPH)</th> </tr> <tr style="background-color: #FFDAB9;"> <th colspan="2" style="text-align: center;">25-35</th> <th colspan="2" style="text-align: center;">40-45</th> <th colspan="2" style="text-align: center;">50-60</th> </tr> <tr style="background-color: #FFDAB9;"> <th colspan="6" style="text-align: center;">Turn Demand Volume</th> </tr> <tr> <th></th> <th style="text-align: center;">High</th> <th style="text-align: center;">Low</th> <th style="text-align: center;">High</th> <th style="text-align: center;">Low</th> <th style="text-align: center;">High</th> <th style="text-align: center;">Low</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Signalized</td> <td style="text-align: center;">A</td> <td style="text-align: center;">A</td> <td style="text-align: center;">B or C</td> </tr> <tr> <td style="text-align: center;">Unsignalized</td> <td style="text-align: center;">A</td> <td style="text-align: center;">A</td> <td style="text-align: center;">C</td> <td style="text-align: center;">B</td> <td style="text-align: center;">B or C</td> <td style="text-align: center;">B</td> </tr> </tbody> </table> | | 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 |
| 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: <input type="text" value="N/A"/> Feet
Condition B: <input type="text" value="N/A"/> Feet
Condition C: <input type="text" value="N/A"/> Feet
Required Left Turn Lane Storage Length: <input type="text" value="N/A"/> Feet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Additional Findings: <input type="text" value="N/A"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Additional Comments / Justifications: <input style="height: 40px;" type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Figure 3. Warrant for left turn lanes on two-lane highways
(45 mph speed, unsignalized and signalized intersections)**

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

| | |
|---|---|
| Municipality: <input type="text" value="Worcester Twp"/> | Analysis Date: <input type="text" value="2/4/2020"/> |
| County: <input type="text" value="Montgomery County"/> | Conducted By: <input type="text" value="BH"/> |
| PennDOT Engineering District: <input type="text" value="6"/> | Checked By: <input type="text" value="MB"/> |
| | Agency/Company Name: <input type="text" value="Traffic Planning & Design, Inc."/> |
| Intersection & Approach Description: <input type="text" value="Morris Road (SR 2001) and 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="Unsignalized"/> | |
| Posted Speed Limit (MPH): <input type="text" value="45"/> | Type of Analysis |
| Type of Terrain: <input type="text" value="Level"/> | 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 | 7 | 17.0% | N/A | Advancing Volume: <input type="text" value="N/A"/> | |
| | Through | - | 547 | 2.0% | N/A | | Opposing Volume: <input type="text" value="N/A"/> |
| | Right | Yes | 0 | 2.0% | N/A | | Left Turn Volume: <input type="text" value="N/A"/> |
| Opposing | Left | Yes | 0 | 2.0% | N/A | % Left Turns in Advancing Volume: <input type="text" value="N/A"/> | |
| | Through | - | 697 | 1.0% | N/A | | |
| | Right | Yes | 5 | 25.0% | N/A | | |

| Right Turn Lane Volume Calculations | | | | | | | |
|-------------------------------------|----------|--------|----------|-------|-----|--|---|
| Movement | Include? | Volume | % Trucks | PCEV | | | |
| Advancing | Left | Yes | 0 | 2.0% | 0 | Advancing Volume: <input type="text" value="707"/> | |
| | Through | - | 697 | 1.0% | 701 | | Right Turn Volume: <input type="text" value="6"/> |
| | Right | - | 5 | 25.0% | 6 | | |

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 10"/> |
| Warrant Met?: <input type="text" value="N/A"/> | Warrant Met?: <input type="text" value="No"/> |

TURN LANE LENGTH CALCULATIONS

| | |
|--|---|
| Intersection Control: <input type="text" value="Unsignalized"/> | |
| Design Hour Volume of Turning Lane: <input type="text" value="6"/> | |
| Cycles Per Hour (Assumed): <input type="text" value="60"/> | |
| Cycles Per Hour (If Known): <input type="text" value=""/> | Average # of Vehicles/Cycle: <input type="text" value="N/A"/> |

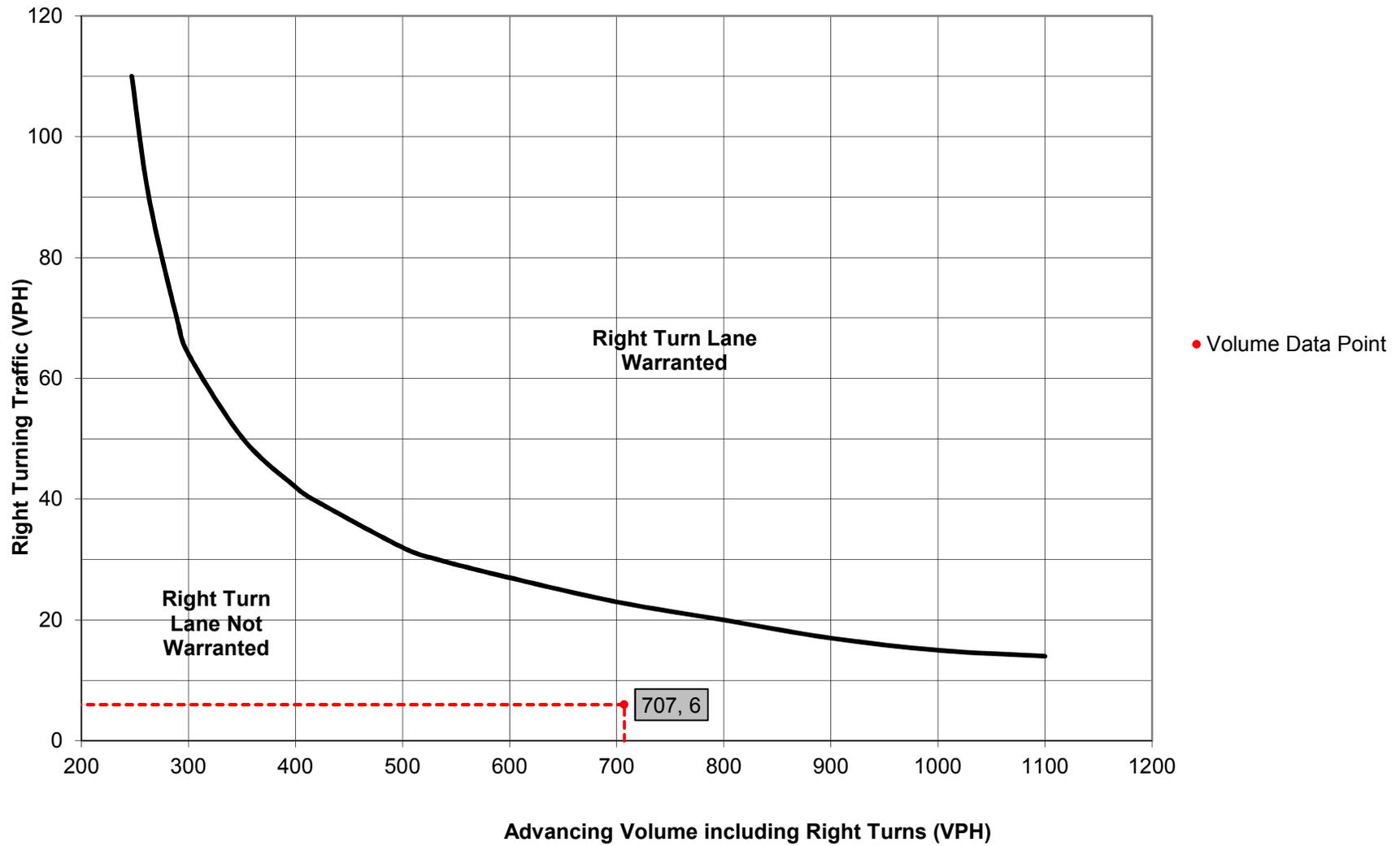
| Type of Traffic Control | PennDOT Publication 46, Exhibit 11-6 | | | | | |
|-------------------------|--------------------------------------|-----|--------|--------|--------|--------|
| | Speed (MPH) | | | | | |
| | 25-35 | | 40-45 | | 50-60 | |
| | Turn Demand Volume | | | | | |
| | High | Low | High | 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="N/A"/> | 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="N/A"/> | Feet |

Additional Findings:

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



**SCHULTZ ROAD &
SITE DRIVEWAY**

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

| | |
|---|--|
| Municipality: <input type="text" value="Worcester Twp"/>
County: <input type="text" value="Montgomery County"/>
PennDOT Engineering District: <input type="text" value="6"/> | Analysis Date: <input type="text" value="2/4/2020"/>
Conducted By: <input type="text" value="BH"/>
Checked By: <input type="text" value="MB"/>
Agency/Company Name: <input type="text" value="Traffic Planning & Design, Inc."/> |
| Intersection & Approach Description: <input style="width: 100%;" type="text" value="Shultz Road and Site Driveway"/> | |
| Analysis Period: <input type="text" value="2025 Build"/>
Design Hour: <input type="text" value="AM Peak Hour"/>
Intersection Control: <input type="text" value="Unsignalized"/>
Posted Speed Limit (MPH): <input type="text" value="45"/>
Type of Terrain: <input type="text" value="Level"/> | Number of Approach Lanes: <input type="text" value="1"/>
Undivided or Divided Highway: <input type="text" value="Undivided"/>
<div style="border: 1px solid red; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div>
Left or Right-Turn Lane Analysis?: <input type="text" value="Left Turn Lane"/> |

VOLUME CALCULATIONS

| Left Turn Lane Volume Calculations | | | | | | |
|-------------------------------------|----------|--------|----------|-------|-----|--|
| Movement | Include? | Volume | % Trucks | PCEV | | |
| Advancing | Left | Yes | 43 | 22.0% | 48 | Advancing Volume: <input type="text" value="112"/>
Opposing Volume: <input type="text" value="139"/>
Left Turn Volume: <input type="text" value="48"/> |
| | Through | - | 63 | 3.0% | 64 | |
| | Right | Yes | 0 | 0.0% | 0 | |
| Opposing | Left | Yes | 0 | 0.0% | 0 | % Left Turns in Advancing Volume: <input type="text" value="42.86%"/> |
| | Through | - | 137 | 2.0% | 139 | |
| | Right | Yes | 0 | 0.0% | 0 | |
| Right Turn Lane Volume Calculations | | | | | | |
| Movement | Include? | Volume | % Trucks | PCEV | | |
| Advancing | Left | Yes | | | N/A | Advancing Volume: <input type="text" value="N/A"/>
Right Turn Volume: <input type="text" value="N/A"/> |
| | Through | - | | | N/A | |
| | Right | - | | | N/A | |

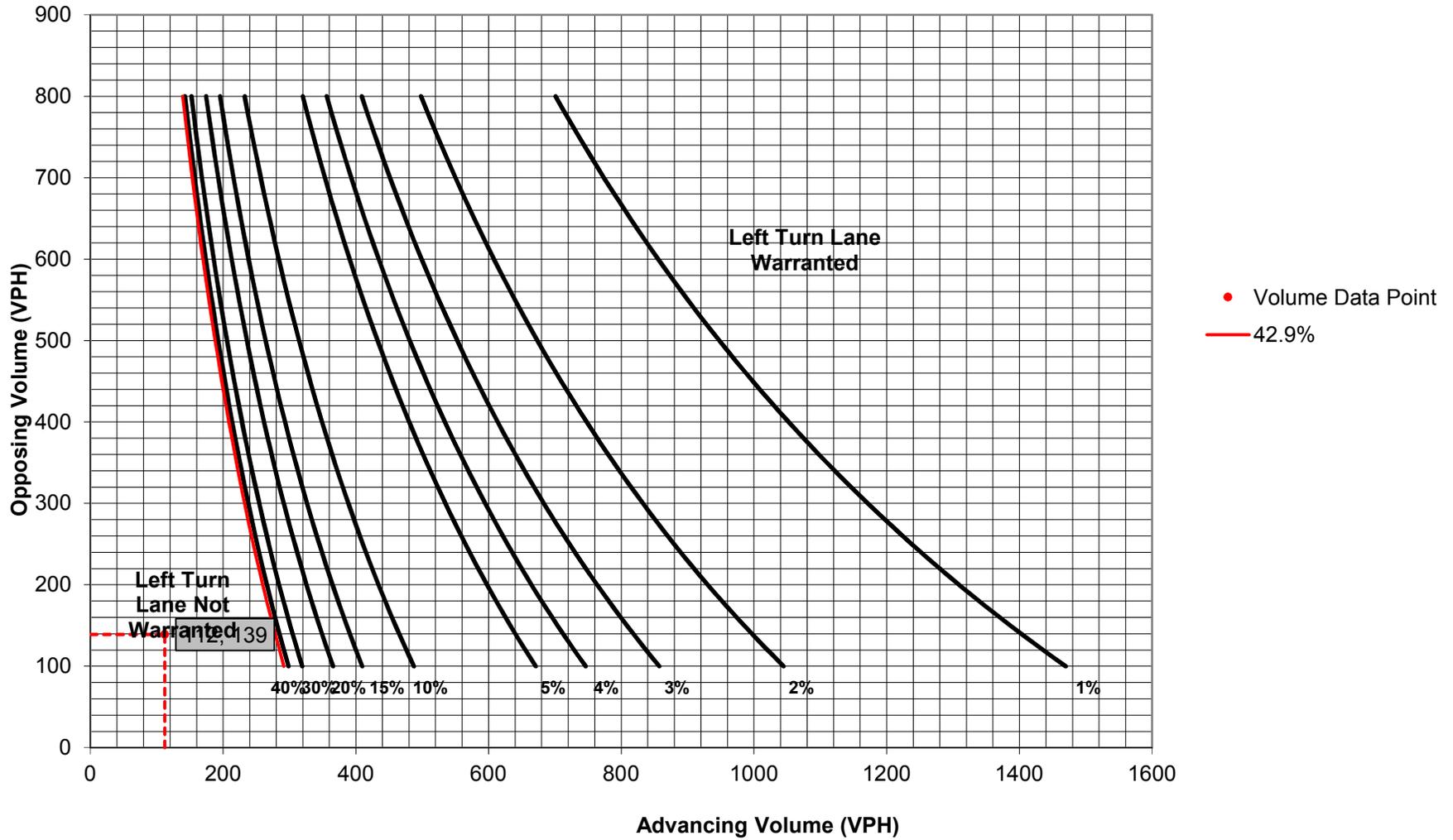
TURN LANE WARRANT FINDINGS

| Left Turn Lane Warrant Findings | Right Turn Lane Warrant Findings |
|---|---|
| Applicable Warrant Figure: <input style="width: 100px;" type="text" value="Figure 3"/>
Warrant Met?: <input style="width: 100px;" type="text" value="No"/> | Applicable Warrant Figure: <input style="width: 100px;" type="text" value="N/A"/>
Warrant Met?: <input style="width: 100px;" type="text" value="N/A"/> |

TURN LANE LENGTH CALCULATIONS

| Intersection Control: <input type="text" value="Unsignalized"/>
Design Hour Volume of Turning Lane: <input type="text" value="48"/>
Cycles Per Hour (Assumed): <input type="text" value="60"/>
Cycles Per Hour (If Known): <input type="text"/> | Average # of Vehicles/Cycle: <input style="width: 100px;" type="text" value="N/A"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-------------------------|-------------|--------|--------|--------|--|--|-------|--|-------|--|-------|--|--------------------|--|--|--|--|--|--|------|-----|------|-----|------|-----|------------|---|---|--------|--------|--------|--------|--------------|---|---|---|---|--------|---|
| PennDOT Publication 46, Exhibit 11-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th rowspan="3" style="width: 20%;">Type of Traffic Control</th> <th colspan="6" style="background-color: #FFDAB9;">Speed (MPH)</th> </tr> <tr> <th colspan="2" style="background-color: #FFDAB9;">25-35</th> <th colspan="2" style="background-color: #FFDAB9;">40-45</th> <th colspan="2" style="background-color: #FFDAB9;">50-60</th> </tr> <tr> <th colspan="6" style="background-color: #FFDAB9;">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Signalized</td> <td style="text-align: center;">A</td> <td style="text-align: center;">A</td> <td style="text-align: center;">B or C</td> </tr> <tr> <td style="text-align: center;">Unsignalized</td> <td style="text-align: center;">A</td> <td style="text-align: center;">A</td> <td style="text-align: center;">C</td> <td style="text-align: center;">B</td> <td style="text-align: center;">B or C</td> <td style="text-align: center;">B</td> </tr> </tbody> </table> | | 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 |
| 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: <input style="width: 100px;" type="text" value="N/A"/> Feet
Condition B: <input style="width: 100px;" type="text" value="N/A"/> Feet
Condition C: <input style="width: 100px;" type="text" value="N/A"/> Feet
Required Left Turn Lane Storage Length: <input style="width: 100px;" type="text" value="N/A"/> Feet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Additional Findings: <input style="width: 100px;" type="text" value="N/A"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Additional Comments / Justifications: <input style="width: 100%; height: 40px;" type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Figure 3. Warrant for left turn lanes on two-lane highways
(45 mph speed, unsignalized and signalized intersections)**
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

| | |
|--|--|
| Municipality: Worcester Twp | Analysis Date: 2/4/2020 |
| County: Montgomery County | Conducted By: BH |
| PennDOT Engineering District: 6 | Checked By: MB |
| | Agency/Company Name: Traffic Planning & Design, Inc. |
| Intersection & Approach Description: Morris Road (SR 2001) and 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): 45 | Type of Analysis |
| Type of Terrain: Level | Left or Right-Turn Lane Analysis?: Left Turn Lane |

VOLUME CALCULATIONS

| Left Turn Lane Volume Calculations | | | | | |
|------------------------------------|----------|--------|----------|------|--|
| Movement | Include? | Volume | % Trucks | PCEV | |
| Advancing | Left | 51 | 97.0% | 76 | Advancing Volume: 188 |
| | Through | - | 0.0% | 112 | Opposing Volume: 72 |
| | Right | 0 | 0.0% | 0 | Left Turn Volume: 76 |
| Opposing | Left | 0 | 0.0% | 0 | |
| | Through | - | 1.0% | 72 | |
| | Right | 0 | 0.0% | 0 | % Left Turns in Advancing Volume: 40.43% |

| Right Turn Lane Volume Calculations | | | | | |
|-------------------------------------|----------|--------|----------|------|------------------------|
| Movement | Include? | Volume | % Trucks | PCEV | |
| Advancing | Left | Yes | | N/A | Advancing Volume: N/A |
| | Through | - | | N/A | Right Turn Volume: N/A |
| | Right | - | | N/A | |

TURN LANE WARRANT FINDINGS

| Left Turn Lane Warrant Findings | Right Turn Lane Warrant Findings |
|--|---------------------------------------|
| Applicable Warrant Figure: Figure 3 | Applicable Warrant Figure: N/A |
| Warrant Met?: No | Warrant Met?: N/A |

TURN LANE LENGTH CALCULATIONS

| | |
|--|----------------------------------|
| Intersection Control: Unsignalized | |
| Design Hour Volume of Turning Lane: 76 | |
| Cycles Per Hour (Assumed): 60 | |
| Cycles Per Hour (If Known): | Average # of Vehicles/Cycle: N/A |

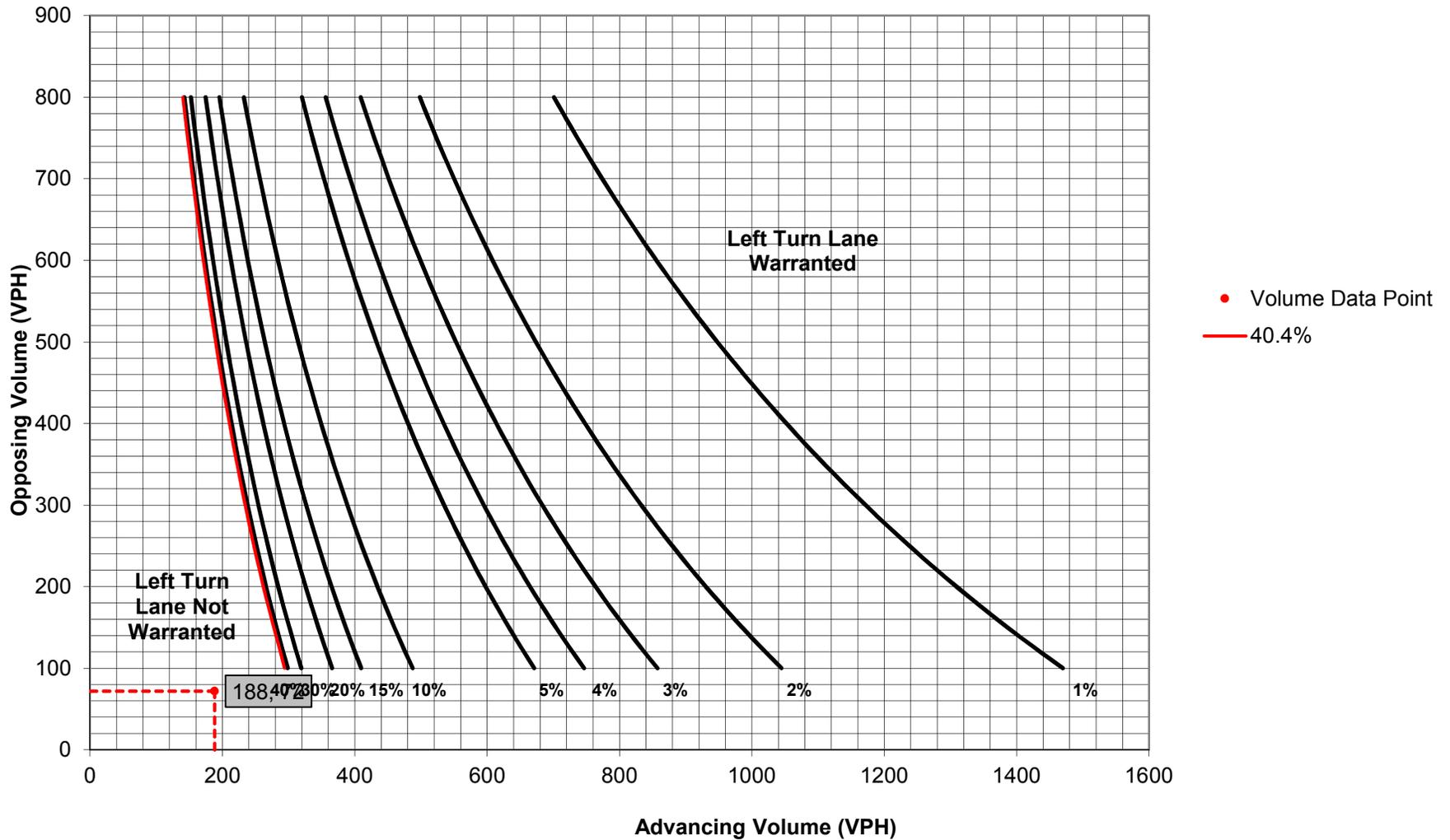
| Type of Traffic Control | PennDOT Publication 46, Exhibit 11-6 | | | | | |
|-------------------------|--------------------------------------|-----|--------|--------|--------|--------|
| | Speed (MPH) | | | | | |
| | 25-35 | | 40-45 | | 50-60 | |
| | Turn Demand Volume | | | | | |
| | High | Low | High | 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 3. Warrant for left turn lanes on two-lane highways
(45 mph speed, unsignalized and signalized intersections)**
(L = % Left Turns in Advancing Volume)



APPENDIX M

SIGNAL WARRANT ANALYSIS

Job #: ARMI.01
 Intersection: Morris Road and Site Driveway

Volume Development (2025 Projected Conditions)

2020 Existing Counts:

| Movement | Time Period | | | | | | | | | | | |
|-----------------------|-------------|-------------|-------------|------------|------------|------------|-------------|-------------|-------------|------------|-------------|--|
| | 6-7 A.M. | 7-8 A.M. | 8-9 A.M. | 9-10 A.M. | 10-11 A.M. | 11-12 P.M. | A.M. Peak | 4-5 P.M. | 5-6 P.M. | 6-7 P.M. | P.M. Peak | |
| EBL | | | | | | | | | | | | |
| EBT | 614 | 871 | 848 | 548 | 340 | 350 | 878 | 630 | 606 | 360 | 682 | |
| EBR | 16 | 26 | 29 | 10 | 6 | 7 | 24 | 2 | 3 | 2 | 4 | |
| WBL | 16 | 32 | 48 | 16 | 5 | 5 | 39 | 3 | 7 | 2 | 6 | |
| WBT | 321 | 494 | 500 | 330 | 245 | 271 | 558 | 549 | 550 | 563 | 521 | |
| WBR | | | | | | | | | | | | |
| NBL | 2 | 0 | 1 | 1 | 1 | 7 | 0 | 9 | 10 | 2 | 8 | |
| NBT | | | | | | | | | | | | |
| NBR | 1 | 2 | 2 | 1 | 4 | 2 | 3 | 43 | 41 | 15 | 61 | |
| SBL | | | | | | | | | | | | |
| SBT | | | | | | | | | | | | |
| SBR | | | | | | | | | | | | |
| Total | 970 | 1425 | 1428 | 906 | 601 | 642 | 1502 | 1236 | 1217 | 944 | 1282 | |
| K-Factor Calculations | | | | | | | | | | | | |
| EB K-Factor | 0.70 | 0.99 | 0.97 | 0.62 | 0.38 | 0.40 | --- | 0.92 | 0.89 | 0.53 | --- | |
| WB K-Factor | 0.56 | 0.88 | 0.92 | 0.58 | 0.42 | 0.46 | --- | 1.05 | 1.06 | 1.07 | --- | |
| NB K-Factor | 1.00 | 0.67 | 1.00 | 0.67 | 1.67 | 3.00 | --- | 0.75 | 0.74 | 0.25 | --- | |
| SB K-Factor | -- | -- | -- | -- | -- | -- | --- | --- | --- | --- | --- | |

K-Factor = Hourly Volume ÷ Peak Hour Volume

2025 Projected Conditions

| Movement | Time Period | | | | | | | | | | | |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|-------------|-------------|-------------|------------|--|
| | A.M. Peak | 6-7 A.M. | 7-8 A.M. | 8-9 A.M. | 9-10 A.M. | 10-11 A.M. | 11-12 P.M. | P.M. Peak | 4-5 P.M. | 5-6 P.M. | 6-7 P.M. | |
| EBL | | | | | | | | | | | | |
| EBT | 891 | 622 | 886 | 866 | 551 | 342 | 353 | 697 | 642 | 619 | 368 | |
| EBR | 46 | 32 | 46 | 45 | 28 | 18 | 18 | 5 | 5 | 4 | 3 | |
| WBL | 56 | 32 | 49 | 51 | 32 | 23 | 26 | 7 | 7 | 7 | 8 | |
| WBT | 572 | 323 | 504 | 525 | 332 | 240 | 264 | 547 | 573 | 578 | 586 | |
| WBR | | | | | | | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 17 | 17 | 6 | |
| NBT | | | | | | | | | | | | |
| NBR | 3 | 3 | 2 | 3 | 2 | 5 | 9 | 81 | 61 | 60 | 20 | |
| SBL | | | | | | | | | | | | |
| SBT | | | | | | | | | | | | |
| SBR | | | | | | | | | | | | |
| Total | 1568 | 1012 | 1487 | 1490 | 945 | 628 | 670 | 1360 | 1305 | 1285 | 991 | |

STUDY AND ANALYSIS INFORMATION

Municipality: Worcester Twp
 County: Montgomery County
 PennDOT Engineering District: 6

Analysis Date: 2/4/2020
 Conducted By: BH
 Agency/Company Name: TPD

Analysis Information

Data Collection Date: 1/14/2020
 Day of the Week: Tuesday

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

Major Street Information

Major Street Name and Route Number: Morris Road (SR 2001)
 Major Street Approach #1 Direction: E-Bound
 Major Street Approach #2 Direction: W-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach: 2 LANE(S)
 Speed Limit or 85th Percentile Speed on the Major Street: 45 MPH

Minor Street Information

Minor Street Name and Route Number: Site Driveway
 Minor Street Approach #1 Direction: N-Bound
 Minor Street Approach #2 Direction:

Number of Lanes for Moving Traffic on Each Minor Street Approach: 2 LANE(S)

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

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

| ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH | | | | | | |
|--|----------|------------------------------------|------------------------------------|-----------------------|------------------------------------|------------------------------------|
| Time Interval | | Major Street Approach #1 (E-Bound) | Major Street Approach #2 (W-Bound) | Major Street Combined | Minor Street Approach #1 (N-Bound) | Minor Street Approach #2 (S-Bound) |
| Begin At | End Of | Volume | Volume | Total Volume | Volume | Volume |
| 12:00 AM | 12:14 AM | | | 0 | | |
| 12:15 AM | 12:29 AM | | | 0 | | |
| 12:30 AM | 12:44 AM | | | 0 | | |
| 12:45 AM | 12:59 AM | | | 0 | | |
| 1:00 AM | 1:14 AM | | | 0 | | |
| 1:15 AM | 1:29 AM | | | 0 | | |
| 1:30 AM | 1:44 AM | | | 0 | | |
| 1:45 AM | 1:59 AM | | | 0 | | |
| 2:00 AM | 2:14 AM | | | 0 | | |
| 2:15 AM | 2:29 AM | | | 0 | | |
| 2:30 AM | 2:44 AM | | | 0 | | |
| 2:45 AM | 2:59 AM | | | 0 | | |
| 3:00 AM | 3:14 AM | | | 0 | | |
| 3:15 AM | 3:29 AM | | | 0 | | |
| 3:30 AM | 3:44 AM | | | 0 | | |
| 3:45 AM | 3:59 AM | | | 0 | | |
| 4:00 AM | 4:14 AM | | | 0 | | |
| 4:15 AM | 4:29 AM | | | 0 | | |
| 4:30 AM | 4:44 AM | | | 0 | | |
| 4:45 AM | 4:59 AM | | | 0 | | |
| 5:00 AM | 5:14 AM | | | 0 | | |
| 5:15 AM | 5:29 AM | | | 0 | | |
| 5:30 AM | 5:44 AM | | | 0 | | |
| 5:45 AM | 5:59 AM | | | 0 | | |
| 6:00 AM | 6:14 AM | 658 | 355 | 1013 | 3 | |
| 6:15 AM | 6:29 AM | | | 0 | | |
| 6:30 AM | 6:44 AM | | | 0 | | |
| 6:45 AM | 6:59 AM | | | 0 | | |
| 7:00 AM | 7:14 AM | 932 | 553 | 1485 | 2 | |
| 7:15 AM | 7:29 AM | | | 0 | | |
| 7:30 AM | 7:44 AM | | | 0 | | |
| 7:45 AM | 7:59 AM | | | 0 | | |
| 8:00 AM | 8:14 AM | 911 | 576 | 1487 | 3 | |
| 8:15 AM | 8:29 AM | | | 0 | | |
| 8:30 AM | 8:44 AM | | | 0 | | |
| 8:45 AM | 8:59 AM | | | 0 | | |
| 9:00 AM | 9:14 AM | 579 | 364 | 943 | 2 | |
| 9:15 AM | 9:29 AM | | | 0 | | |
| 9:30 AM | 9:44 AM | | | 0 | | |
| 9:45 AM | 9:59 AM | | | 0 | | |
| 10:00 AM | 10:14 AM | 360 | 263 | 623 | 5 | |
| 10:15 AM | 10:29 AM | | | 0 | | |
| 10:30 AM | 10:44 AM | | | 0 | | |
| 10:45 AM | 10:59 AM | | | 0 | | |
| 11:00 AM | 11:14 AM | 371 | 290 | 661 | 9 | |
| 11:15 AM | 11:29 AM | | | 0 | | |
| 11:30 AM | 11:44 AM | | | 0 | | |
| 11:45 AM | 11:59 AM | | | 0 | | |

Traffic Signal Warrant Analysis Workbook

2/4/2020

| ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH | | | | | | |
|--|----------|------------------------------------|------------------------------------|-----------------------|------------------------------------|------------------------------------|
| Time Interval | | Major Street Approach #1 (E-Bound) | Major Street Approach #2 (W-Bound) | Major Street Combined | Minor Street Approach #1 (N-Bound) | Minor Street Approach #2 (S-Bound) |
| Begin At | End Of | Volume | Volume | Total Volume | Volume | Volume |
| 12:00 PM | 12:14 PM | | | 0 | | |
| 12:15 PM | 12:29 PM | | | 0 | | |
| 12:30 PM | 12:44 PM | | | 0 | | |
| 12:45 PM | 12:59 PM | | | 0 | | |
| 1:00 PM | 1:14 PM | | | 0 | | |
| 1:15 PM | 1:29 PM | | | 0 | | |
| 1:30 PM | 1:44 PM | | | 0 | | |
| 1:45 PM | 1:59 PM | | | 0 | | |
| 2:00 PM | 2:14 PM | | | 0 | | |
| 2:15 PM | 2:29 PM | | | 0 | | |
| 2:30 PM | 2:44 PM | | | 0 | | |
| 2:45 PM | 2:59 PM | | | 0 | | |
| 3:00 PM | 3:14 PM | | | 0 | | |
| 3:15 PM | 3:29 PM | | | 0 | | |
| 3:30 PM | 3:44 PM | | | 0 | | |
| 3:45 PM | 3:59 PM | | | 0 | | |
| 4:00 PM | 4:14 PM | 647 | 580 | 1227 | 78 | |
| 4:15 PM | 4:29 PM | | | 0 | | |
| 4:30 PM | 4:44 PM | | | 0 | | |
| 4:45 PM | 4:59 PM | | | 0 | | |
| 5:00 PM | 5:14 PM | 623 | 585 | 1208 | 77 | |
| 5:15 PM | 5:29 PM | | | 0 | | |
| 5:30 PM | 5:44 PM | | | 0 | | |
| 5:45 PM | 5:59 PM | | | 0 | | |
| 6:00 PM | 6:14 PM | 371 | 594 | 965 | 26 | |
| 6:15 PM | 6:29 PM | | | 0 | | |
| 6:30 PM | 6:44 PM | | | 0 | | |
| 6:45 PM | 6:59 PM | | | 0 | | |
| 7:00 PM | 7:14 PM | | | 0 | | |
| 7:15 PM | 7:29 PM | | | 0 | | |
| 7:30 PM | 7:44 PM | | | 0 | | |
| 7:45 PM | 7:59 PM | | | 0 | | |
| 8:00 PM | 8:14 PM | | | 0 | | |
| 8:15 PM | 8:29 PM | | | 0 | | |
| 8:30 PM | 8:44 PM | | | 0 | | |
| 8:45 PM | 8:59 PM | | | 0 | | |
| 9:00 PM | 9:14 PM | | | 0 | | |
| 9:15 PM | 9:29 PM | | | 0 | | |
| 9:30 PM | 9:44 PM | | | 0 | | |
| 9:45 PM | 9:59 PM | | | 0 | | |
| 10:00 PM | 10:14 PM | | | 0 | | |
| 10:15 PM | 10:29 PM | | | 0 | | |
| 10:30 PM | 10:44 PM | | | 0 | | |
| 10:45 PM | 10:59 PM | | | 0 | | |
| 11:00 PM | 11:14 PM | | | 0 | | |
| 11:15 PM | 11:29 PM | | | 0 | | |
| 11:30 PM | 11:44 PM | | | 0 | | |
| 11:45 PM | 11:59 PM | | | 0 | | |
| Approach Totals: | | 5452 | 4160 | 9612 | 205 | 0 |

MUTCD WARRANT 1, EIGHT-HOUR VEHICULAR VOLUME

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

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

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

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

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

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

Condition A Evaluation

Number of Unique Hours Met: **0** Condition A Satisfied? **No**

Condition B Evaluation

Number of Unique Hours Met: **2** Condition B Satisfied? **No**

Combination of Condition A and Condition B Evaluation

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

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

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

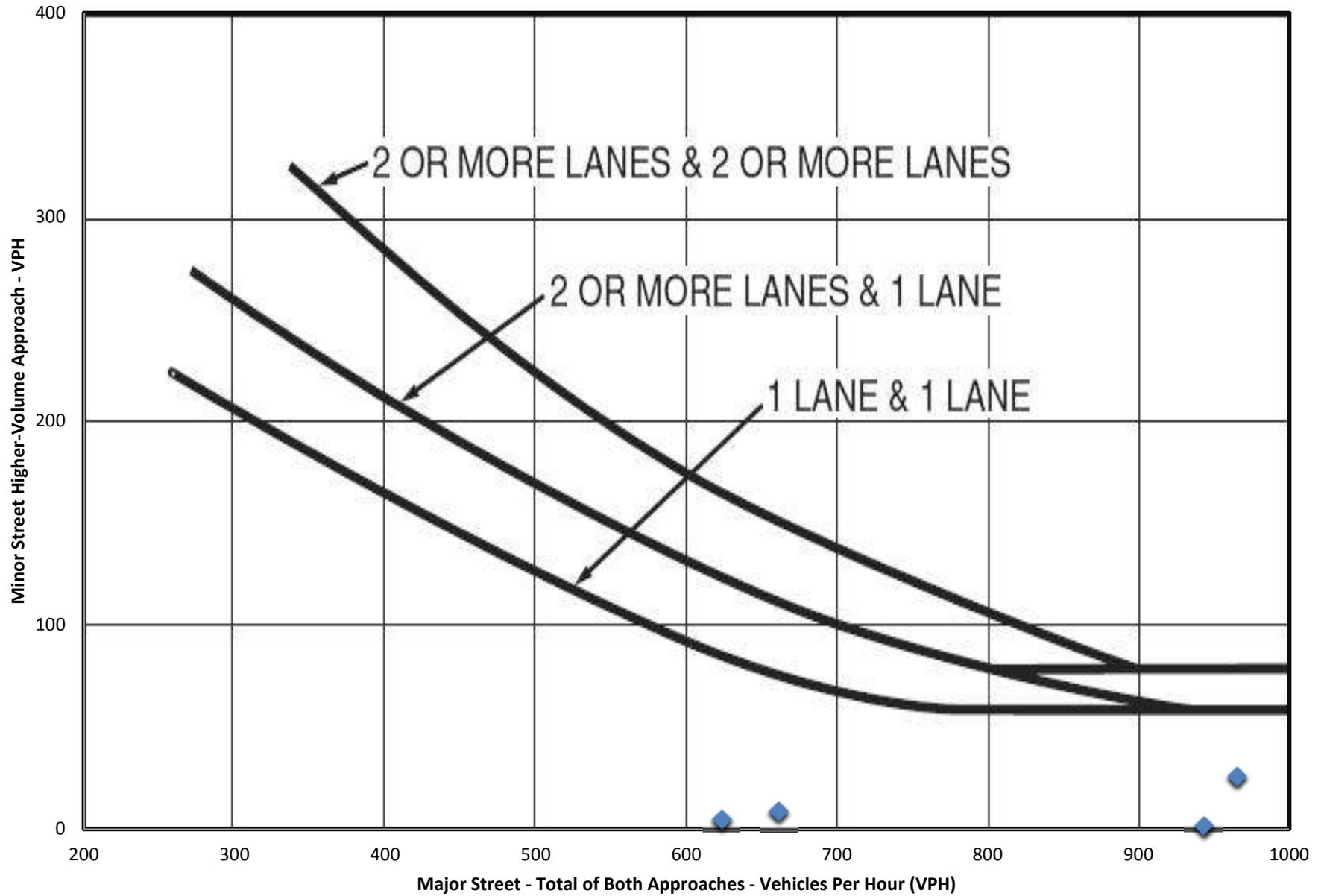
MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

| | | |
|---|-----------------|---|
| Number of Lanes for Moving Traffic on Each Approach | | Total Number of Unique Hours Met On Figure 4C-2 |
| Major Street: | 2 or More Lanes | 0 |
| Minor Street: | 2 or More Lanes | |

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

| Hour Interval Beginning At | Hourly Vehicular Volume | | Hour Met? |
|----------------------------|---|---|-----------|
| | Major Street Combined Vehicles Per Hour (VPH) | Highest Minor Street Approach Vehicles Per Hour (VPH) | |
| 12:00 AM | 0 | 0 | |
| 12:15 AM | 0 | 0 | |
| 12:30 AM | 0 | 0 | |
| 12:45 AM | 0 | 0 | |
| 1:00 AM | 0 | 0 | |
| 1:15 AM | 0 | 0 | |
| 1:30 AM | 0 | 0 | |
| 1:45 AM | 0 | 0 | |
| 2:00 AM | 0 | 0 | |
| 2:15 AM | 0 | 0 | |
| 2:30 AM | 0 | 0 | |
| 2:45 AM | 0 | 0 | |
| 3:00 AM | 0 | 0 | |
| 3:15 AM | 0 | 0 | |
| 3:30 AM | 0 | 0 | |
| 3:45 AM | 0 | 0 | |
| 4:00 AM | 0 | 0 | |
| 4:15 AM | 0 | 0 | |
| 4:30 AM | 0 | 0 | |
| 4:45 AM | 0 | 0 | |
| 5:00 AM | 0 | 0 | |
| 5:15 AM | 1013 | 3 | |
| 5:30 AM | 1013 | 3 | |
| 5:45 AM | 1013 | 3 | |
| 6:00 AM | 1013 | 3 | |
| 6:15 AM | 1485 | 2 | |
| 6:30 AM | 1485 | 2 | |
| 6:45 AM | 1485 | 2 | |
| 7:00 AM | 1485 | 2 | |
| 7:15 AM | 1487 | 3 | |
| 7:30 AM | 1487 | 3 | |
| 7:45 AM | 1487 | 3 | |
| 8:00 AM | 1487 | 3 | |
| 8:15 AM | 943 | 2 | |
| 8:30 AM | 943 | 2 | |
| 8:45 AM | 943 | 2 | |
| 9:00 AM | 943 | 2 | |
| 9:15 AM | 623 | 5 | |
| 9:30 AM | 623 | 5 | |
| 9:45 AM | 623 | 5 | |
| 10:00 AM | 623 | 5 | |
| 10:15 AM | 661 | 9 | |
| 10:30 AM | 661 | 9 | |
| 10:45 AM | 661 | 9 | |
| 11:00 AM | 661 | 9 | |
| 11:15 AM | 0 | 0 | |
| 11:30 AM | 0 | 0 | |
| 11:45 AM | 0 | 0 | |
| 12:00 PM | 0 | 0 | |
| 12:15 PM | 0 | 0 | |
| 12:30 PM | 0 | 0 | |
| 12:45 PM | 0 | 0 | |
| 1:00 PM | 0 | 0 | |
| 1:15 PM | 0 | 0 | |
| 1:30 PM | 0 | 0 | |
| 1:45 PM | 0 | 0 | |
| 2:00 PM | 0 | 0 | |
| 2:15 PM | 0 | 0 | |
| 2:30 PM | 0 | 0 | |
| 2:45 PM | 0 | 0 | |
| 3:00 PM | 0 | 0 | |
| 3:15 PM | 1227 | 78 | |
| 3:30 PM | 1227 | 78 | |
| 3:45 PM | 1227 | 78 | |
| 4:00 PM | 1227 | 78 | |
| 4:15 PM | 1208 | 77 | |
| 4:30 PM | 1208 | 77 | |
| 4:45 PM | 1208 | 77 | |
| 5:00 PM | 1208 | 77 | |
| 5:15 PM | 965 | 26 | |
| 5:30 PM | 965 | 26 | |
| 5:45 PM | 965 | 26 | |
| 6:00 PM | 965 | 26 | |
| 6:15 PM | 0 | 0 | |
| 6:30 PM | 0 | 0 | |
| 6:45 PM | 0 | 0 | |
| 7:00 PM | 0 | 0 | |
| 7:15 PM | 0 | 0 | |
| 7:30 PM | 0 | 0 | |
| 7:45 PM | 0 | 0 | |
| 8:00 PM | 0 | 0 | |
| 8:15 PM | 0 | 0 | |
| 8:30 PM | 0 | 0 | |
| 8:45 PM | 0 | 0 | |
| 9:00 PM | 0 | 0 | |
| 9:15 PM | 0 | 0 | |
| 9:30 PM | 0 | 0 | |
| 9:45 PM | 0 | 0 | |
| 10:00 PM | 0 | 0 | |
| 10:15 PM | 0 | 0 | |
| 10:30 PM | 0 | 0 | |
| 10:45 PM | 0 | 0 | |
| 11:00 PM | 0 | 0 | |

MUTCD Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)



MUTCD WARRANT 3, PEAK HOUR

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

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

| | |
|---|-----|
| Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time? | Yes |
|---|-----|

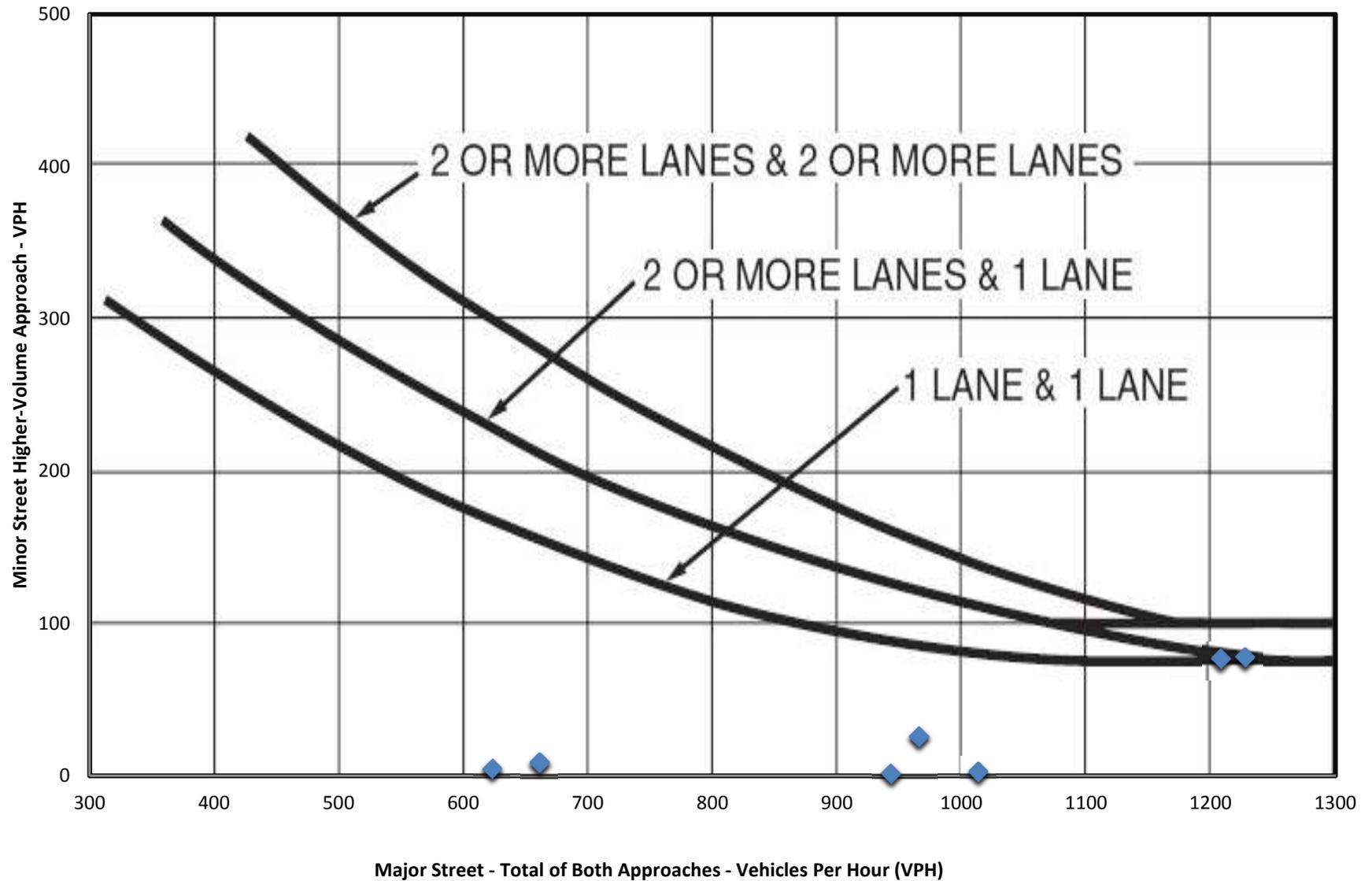
| Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present* | |
|--|-----|
| Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign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

| |
|--|
| Total Number of Unique Hours Met
On Figure 4C-4 |
| 0 |

| Hourly Vehicular Volume | | | |
|-------------------------|-------------------------|-------------------------------|-----------|
| Hour Interval | Major Street Combined | Highest Minor Street Approach | Hour Met? |
| Beginning At | Vehicles Per Hour (VPH) | Vehicles Per Hour (VPH) | |
| 12:00 AM | 0 | 0 | |
| 12:15 AM | 0 | 0 | |
| 12:30 AM | 0 | 0 | |
| 12:45 AM | 0 | 0 | |
| 1:00 AM | 0 | 0 | |
| 1:15 AM | 0 | 0 | |
| 1:30 AM | 0 | 0 | |
| 1:45 AM | 0 | 0 | |
| 2:00 AM | 0 | 0 | |
| 2:15 AM | 0 | 0 | |
| 2:30 AM | 0 | 0 | |
| 2:45 AM | 0 | 0 | |
| 3:00 AM | 0 | 0 | |
| 3:15 AM | 0 | 0 | |
| 3:30 AM | 0 | 0 | |
| 3:45 AM | 0 | 0 | |
| 4:00 AM | 0 | 0 | |
| 4:15 AM | 0 | 0 | |
| 4:30 AM | 0 | 0 | |
| 4:45 AM | 0 | 0 | |
| 5:00 AM | 0 | 0 | |
| 5:15 AM | 1013 | 3 | |
| 5:30 AM | 1013 | 3 | |
| 5:45 AM | 1013 | 3 | |
| 6:00 AM | 1013 | 3 | |
| 6:15 AM | 1485 | 2 | |
| 6:30 AM | 1485 | 2 | |
| 6:45 AM | 1485 | 2 | |
| 7:00 AM | 1485 | 2 | |
| 7:15 AM | 1487 | 3 | |
| 7:30 AM | 1487 | 3 | |
| 7:45 AM | 1487 | 3 | |
| 8:00 AM | 1487 | 3 | |
| 8:15 AM | 943 | 2 | |

| Hourly Vehicular Volume | | | |
|-------------------------|-------------------------|-------------------------------|-----------|
| Hour Interval | Major Street Combined | Highest Minor Street Approach | Hour Met? |
| Beginning At | Vehicles Per Hour (VPH) | Vehicles Per Hour (VPH) | |
| 8:30 AM | 943 | 2 | |
| 8:45 AM | 943 | 2 | |
| 9:00 AM | 943 | 2 | |
| 9:15 AM | 623 | 5 | |
| 9:30 AM | 623 | 5 | |
| 9:45 AM | 623 | 5 | |
| 10:00 AM | 623 | 5 | |
| 10:15 AM | 661 | 9 | |
| 10:30 AM | 661 | 9 | |
| 10:45 AM | 661 | 9 | |
| 11:00 AM | 661 | 9 | |
| 11:15 AM | 0 | 0 | |
| 11:30 AM | 0 | 0 | |
| 11:45 AM | 0 | 0 | |
| 12:00 PM | 0 | 0 | |
| 12:15 PM | 0 | 0 | |
| 12:30 PM | 0 | 0 | |
| 12:45 PM | 0 | 0 | |
| 1:00 PM | 0 | 0 | |
| 1:15 PM | 0 | 0 | |
| 1:30 PM | 0 | 0 | |
| 1:45 PM | 0 | 0 | |
| 2:00 PM | 0 | 0 | |
| 2:15 PM | 0 | 0 | |
| 2:30 PM | 0 | 0 | |
| 2:45 PM | 0 | 0 | |
| 3:00 PM | 0 | 0 | |
| 3:15 PM | 1227 | 78 | |
| 3:30 PM | 1227 | 78 | |
| 3:45 PM | 1227 | 78 | |
| 4:00 PM | 1227 | 78 | |
| 4:15 PM | 1208 | 77 | |
| 4:30 PM | 1208 | 77 | |
| 4:45 PM | 1208 | 77 | |
| 5:00 PM | 1208 | 77 | |
| 5:15 PM | 965 | 26 | |
| 5:30 PM | 965 | 26 | |
| 5:45 PM | 965 | 26 | |
| 6:00 PM | 965 | 26 | |
| 6:15 PM | 0 | 0 | |
| 6:30 PM | 0 | 0 | |
| 6:45 PM | 0 | 0 | |
| 7:00 PM | 0 | 0 | |
| 7:15 PM | 0 | 0 | |
| 7:30 PM | 0 | 0 | |
| 7:45 PM | 0 | 0 | |
| 8:00 PM | 0 | 0 | |
| 8:15 PM | 0 | 0 | |
| 8:30 PM | 0 | 0 | |
| 8:45 PM | 0 | 0 | |
| 9:00 PM | 0 | 0 | |
| 9:15 PM | 0 | 0 | |
| 9:30 PM | 0 | 0 | |
| 9:45 PM | 0 | 0 | |
| 10:00 PM | 0 | 0 | |
| 10:15 PM | 0 | 0 | |
| 10:30 PM | 0 | 0 | |
| 10:45 PM | 0 | 0 | |
| 11:00 PM | 0 | 0 | |

MUTCD Figure 4C-4. Warrant 3, Peak Hour (70% Factor)



MUTCD WARRANT 4, PEDESTRIAN VOLUME

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

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

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

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

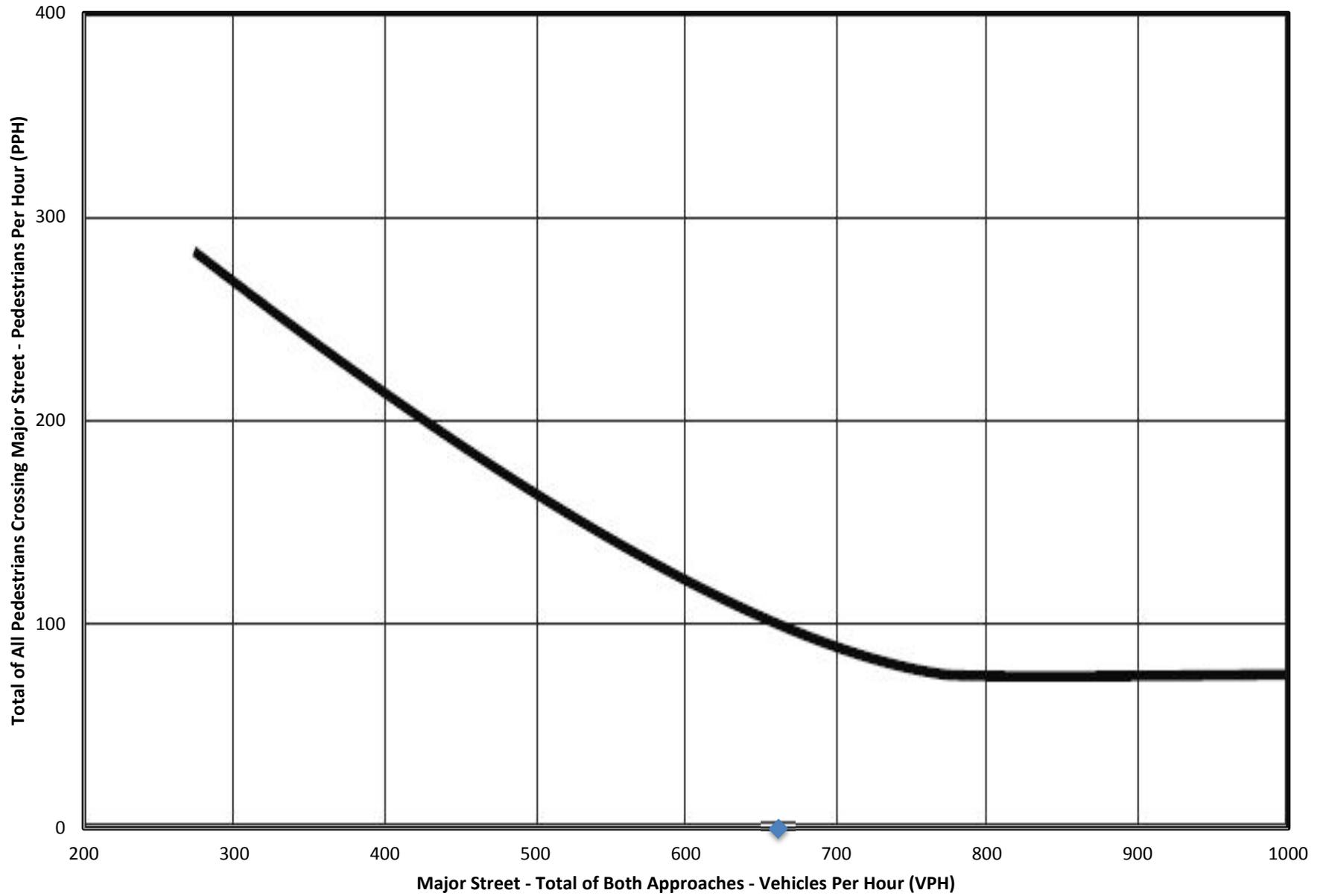
Total Number of Unique Hours Met for Criterion A: 0

Total Number of Unique Hours Met for Criterion B: 0

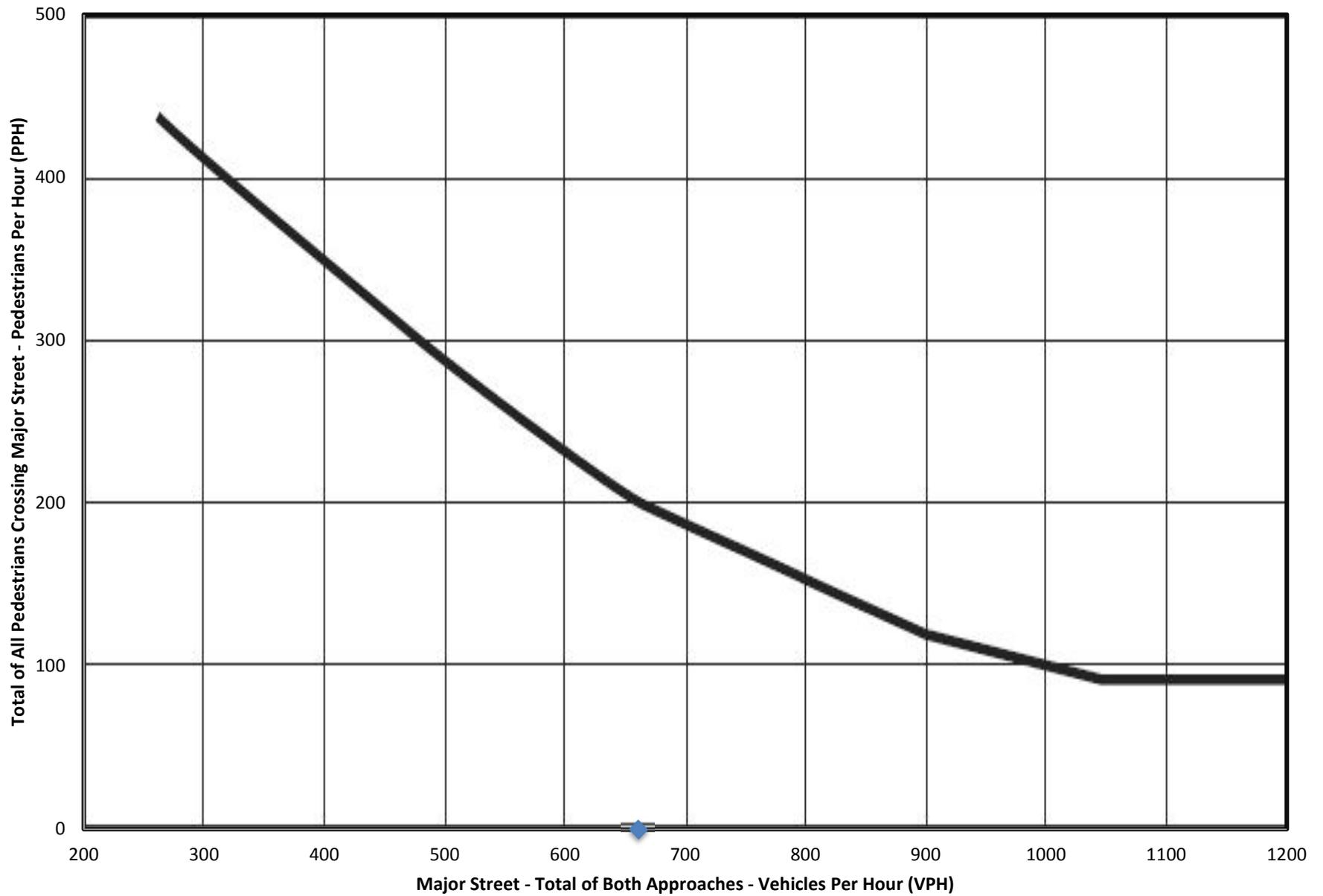
| Hourly Vehicular & Pedestrian Volume | | | | |
|--------------------------------------|-------------------------|--|--------------------------|--------------------------|
| Hour Interval | Major Street Combined | Total of All Pedestrians Crossing Major Street | Criterion A: 4-Hour | Criterion B: 1-Hour |
| Beginning At | Vehicles Per Hour (VPH) | Pedestrians Per Hour (PPH) | Hour Met on Figure 4C-6? | Hour Met on Figure 4C-8? |
| 12:00 AM | 0 | | | |
| 12:15 AM | 0 | | | |
| 12:30 AM | 0 | | | |
| 12:45 AM | 0 | | | |
| 1:00 AM | 0 | | | |
| 1:15 AM | 0 | | | |
| 1:30 AM | 0 | | | |
| 1:45 AM | 0 | | | |
| 2:00 AM | 0 | | | |
| 2:15 AM | 0 | | | |
| 2:30 AM | 0 | | | |
| 2:45 AM | 0 | | | |
| 3:00 AM | 0 | | | |
| 3:15 AM | 0 | | | |
| 3:30 AM | 0 | | | |
| 3:45 AM | 0 | | | |
| 4:00 AM | 0 | | | |
| 4:15 AM | 0 | | | |
| 4:30 AM | 0 | | | |
| 4:45 AM | 0 | | | |
| 5:00 AM | 0 | | | |
| 5:15 AM | 1013 | | | |
| 5:30 AM | 1013 | | | |
| 5:45 AM | 1013 | | | |
| 6:00 AM | 1013 | | | |
| 6:15 AM | 1485 | | | |
| 6:30 AM | 1485 | | | |
| 6:45 AM | 1485 | | | |
| 7:00 AM | 1485 | 0 | | |
| 7:15 AM | 1487 | | | |
| 7:30 AM | 1487 | | | |
| 7:45 AM | 1487 | | | |
| 8:00 AM | 1487 | 1 | | |
| 8:15 AM | 943 | | | |
| 8:30 AM | 943 | | | |
| 8:45 AM | 943 | | | |
| 9:00 AM | 943 | | | |
| 9:15 AM | 623 | | | |
| 9:30 AM | 623 | | | |
| 9:45 AM | 623 | | | |

| Hourly Vehicular & Pedestrian Volume | | | | |
|--------------------------------------|-------------------------|--|--------------------------|--------------------------|
| Hour Interval | Major Street Combined | Total of All Pedestrians Crossing Major Street | Criterion A: 4-Hour | Criterion B: 1-Hour |
| Beginning At | Vehicles Per Hour (VPH) | Pedestrians Per Hour (PPH) | Hour Met on Figure 4C-6? | Hour Met on Figure 4C-8? |
| 10:00 AM | 623 | | | |
| 10:15 AM | 661 | | | |
| 10:30 AM | 661 | | | |
| 10:45 AM | 661 | | | |
| 11:00 AM | 661 | 0 | | |
| 11:15 AM | 0 | | | |
| 11:30 AM | 0 | | | |
| 11:45 AM | 0 | | | |
| 12:00 PM | 0 | 1 | | |
| 12:15 PM | 0 | | | |
| 12:30 PM | 0 | | | |
| 12:45 PM | 0 | | | |
| 1:00 PM | 0 | | | |
| 1:15 PM | 0 | | | |
| 1:30 PM | 0 | | | |
| 1:45 PM | 0 | | | |
| 2:00 PM | 0 | | | |
| 2:15 PM | 0 | | | |
| 2:30 PM | 0 | | | |
| 2:45 PM | 0 | | | |
| 3:00 PM | 0 | | | |
| 3:15 PM | 1227 | | | |
| 3:30 PM | 1227 | | | |
| 3:45 PM | 1227 | | | |
| 4:00 PM | 1227 | 2 | | |
| 4:15 PM | 1208 | | | |
| 4:30 PM | 1208 | | | |
| 4:45 PM | 1208 | | | |
| 5:00 PM | 1208 | 1 | | |
| 5:15 PM | 965 | | | |
| 5:30 PM | 965 | | | |
| 5:45 PM | 965 | | | |
| 6:00 PM | 965 | | | |
| 6:15 PM | 0 | | | |
| 6:30 PM | 0 | | | |
| 6:45 PM | 0 | | | |
| 7:00 PM | 0 | | | |
| 7:15 PM | 0 | | | |
| 7:30 PM | 0 | | | |
| 7:45 PM | 0 | | | |
| 8:00 PM | 0 | | | |
| 8:15 PM | 0 | | | |
| 8:30 PM | 0 | | | |
| 8:45 PM | 0 | | | |
| 9:00 PM | 0 | | | |
| 9:15 PM | 0 | | | |
| 9:30 PM | 0 | | | |
| 9:45 PM | 0 | | | |
| 10:00 PM | 0 | | | |
| 10:15 PM | 0 | | | |
| 10:30 PM | 0 | | | |
| 10:45 PM | 0 | | | |
| 11:00 PM | 0 | | | |

MUTCD Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



MUTCD Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



MUTCD WARRANT 7, CRASH EXPERIENCE

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

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

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

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

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

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

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

MUTCD WARRANT 8, ROADWAY NETWORK*

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

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

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

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

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

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

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



TRAFFIC PLANNING AND DESIGN, INC.

WWW.TRAFFICPD.COM

MEMORANDUM

To: Ed Mullin, Esq. – HRMML

From: Greg Richardson, P.E.

Date: February 7, 2020

cc: Kimberley David, Esq. – Amazon.com
Kurt Padavano – Advance Realty
Mark Bush – The Davis Companies
Jeff DeZort, P.E. - CESO

Re: Sound Level Testing
Worcester Township, Montgomery County, PA
TPD# ARMI.00001

Per your request, Traffic Planning and Design, Inc. (TPD) has completed sound level testing to determine the impact of the proposed Amazon Parking Facility on surrounding properties from a noise perspective. The following are the methodology and results of the monitoring effort.

Methodology

Sound Levels were conducted during the following time periods:

- Wednesday, February 5, 2020: 6:30 – 7:00 A.M.
- Wednesday, February 5, 2020: 8:30 – 9:00 P.M.

The periods selected for monitoring were based a review of the Worcester Township Code section pertaining to Noise and representative of times when the proposed Amazon Parking Facility operations could potentially have a negative impact on surrounding residential land uses in the near vicinity.

Each sample was conducted for ten (10) minutes. Monitoring was performed using a *Quest SoundPro DL Integrating and Logging Sound Level Meter* which meets the requirements of the American National Standards Institute (ANSI) Standard Specifications S1.4-1983. This unit has been calibrated using a QUEST Sound Level Calibrator prior to the noise measurements. All equipment have been factory calibrated within the previous 12 months. Noise levels were measured in decibels on an A-weighted scale (dBA). The battery condition during the monitoring sessions were checked several times to ensure proper performance.

Additional information gathered during the monitoring process included atmospheric conditions, unusual noise events, etc. Weather conditions were found to be appropriate for noise monitoring (no precipitation and little wind, 35-45 degrees F) during the time periods selected.

Sound level readings were conducted at three (3) receptor locations along the rear and side property lines of 2247 and 2250 Berks Road as indicated on **Exhibit 1**.

Worcester Township Noise Ordinance

Noise performance standards for Worcester Township are laid forth in Chapter 111 of the Worcester Township Code. This chapter includes definitions, regulations, prohibitions, and acceptable sound levels for properties within the Township.

Per the Township of Worcester, PA Part II General Legislation code Chapter 111-2 for noise, the maximum permissible sound levels for “ongoing or constant noise at sound levels audible outdoors in excess of 65 dB(A) above the ambient noise level during weekday or weekend daytime hours and 55 dB(A) above the ambient noise level during weekday or weekend nighttime hours when measured at or outside any real property line”

Existing Noise Levels

Based on the sound level testing, the primary audible noise at each location was determined to be existing traffic travelling along Berks Road, Morris Road, and the I-476 PA Turnpike Northeast Extension. The results of the sound level monitoring are presented in Table 1.

**TABLE 1
 AMBIENT (EXISTING) SOUND LEVELS
 BERK ROAD PROPERTY LINES
 (dBA)¹**

| Receptor Location | 6:30-7:00 A.M.
(dBA) | 8:30-9:00 P.M.
(dBA) |
|---|-------------------------|-------------------------|
| 1
(260 feet from 2250 Berks Road home)
(220 feet from 2247 Berks Road home) | 52.2 | 46.2 |
| 2
(350 feet from 2250 Berks Road home)
(230 feet from 2247 Berks Road home) | 54.2 | 47.4 |
| 3
(300 feet from 2250 Berks Road home)
(170 feet from 2247 Berks Road home) | 53.5 | 47.4 |

Proposed Noise Levels Attributable to the Amazon Parking Facility

As outlined in the attached noise report completed specifically for the Amazon operation, the proposed delivery van and passenger car noise levels are very similar. 24 vans or cars idling and driving around the parking lot would produce sounds levels approximately 59 dBA at 50 feet. Therefore, the resulting noise level along the southern and eastern property lines would be approximately 53 dBA and 58 dBA,

¹ dBA = decibels measured on the A-weighted scale

respectively, if in direct line-of-sight and without any vegetation or barriers such as earthen berms. However, it should be noted there is a substantial amount of vegetation planted on an existing 4-foot high earthen berm (an effective height of 10-15 feet on the residential property side due to contouring and elevation difference) adjacent to the southern limits of the parking lot closest to the residential properties. In addition to this existing mitigation measure, distance attenuation from the lot to the homes themselves will further abate the noise produced. In total, these existing mitigation measures will result in an abatement approximately 2-5dBA.

Conclusions

Based on the sound level assessment conducted for the Amazon operation as well as the existing ambient noise levels at the proposed project site, it is our opinion that the noise levels produced will be in compliance with the Worcester Township Noise Ordinance.

Sincerely

TRAFFIC PLANNING AND DESIGN, INC.



Greg Richardson, P.E.

Executive Vice-President

grichardson@TrafficPD.com

Attachments

Exhibit 1
Property Line Sound Monitoring Locations



1 Monitoring Location

TPD, Inc.
February 5, 2020



4 February 2020

Thomas Baker
Transaction Manager, Real Estate
Amazon Services

Re: Acoustical Analyses – Noise Study
Amazon DPH6_P1 Delivery Station
NV5 Project 2019172.32

Dear Mr. Baker,

As requested, Alta Environmental (an NV5 company) has carried out a noise study to evaluate the acoustical risk of DPH6_P1. The study will only concern transportation noise sources, vans and cars to be operated onsite. No consideration of noise from other site equipment is being evaluated in this study because we have been advised that there is no other site equipment being used at this site.

Facility Description and Operations

DPH6_P1 is a proposed Parking Facility located southeast of the intersection of Morris and Schultz Roads. It is intended to provide off-site parking for a proposed Amazon Facility in Harleysville, approximately 5 miles away from the site. The site is already developed with industrial/research building(s) and associated parking. The site plan proposed for the parking layout will accommodate 278 delivery vans and 278 automobiles within an area already paved and striped for parking passenger vehicles. Access to the site is currently available via driveways on Morris Road and Schultz Road. The site is directly east of Interstate 476.

The nearest residences to the site are located on Berks Road and Morris Road, east of the site. The closest residence is about 200 feet east from the site. Bands of trees are along the south, southeast and east edges of the property. These features should provide additional noise attenuation from the site to these residences.

Based on the site's traffic count, the cars and vans traffic will be between 6am and 10pm.

Community Noise Standards

Local, county and state noise codes were reviewed.

Per the Township of Worcester, PA Part II General Legislation code Chapter 111-2 for noise, the maximum permissible sound levels for ongoing or constant noise is "ongoing or constant noise at sound levels audible outdoors in excess of 65 dB(A) above the ambient noise level during weekday or weekend daytime hours and 55 dB(A) above the ambient noise level during weekday or weekend nighttime hours when measured at or outside any real property line"

Potential Community Noise Impacts

The hours of operation at the parking facility will be between 6am and 10pm which is the daytime and nighttime per the Township of Worcester, PA noise ordinance.

Delivery van and cars noise levels are very similar. Assuming 24 vans or cars idling and driving around the parking lot with the typical noise level of 59 dB(A) at 50 feet, the resulting noise level at the south and east property lines would be about 53 dB(A) and 58dB(A) respectively, if in direct line-of-sight. In addition to the distance attenuation, bands of trees surround the parking lot providing further attenuation of about 2-5dBA. Therefore, it is expected that the noise levels will be at or below the noise criteria for both daytime and nighttime for the Township of Worcester, PA.

Based on the location of the site in a city, near an interstate, the ambient noise levels at the site and the area surrounding the site, are estimated to be in the mid 60's during the daytime and in the mid-40's at nighttime. The noise levels at the closest home (200 feet from the southeast corner) would be in the low to mid 40's. Moreover, the residences located on Berks Road and Morris Road, the closest to the site, all have large bands of trees between the parking lot and the homes which will further attenuate the noise. Therefore, it is not likely that the residences will be impacted by the activities at the site.

Conclusions and Recommendations

Based on this analysis, the site will meet the requirement of the local noise ordinance and has a low acoustical risk to the nearby residences, particularly considering the operations mainly happening during the daytime hours.

Best Regards,



Cecile Felsher, CIH
Alta Environmental, an NV5 Company
Cecile.Felsher@altaenvionmental.com