

A-40

site access designs.

Based on the turn lane and signal warrant evaluation, there are no changes from the previously recommended

Based on the alternate access configuration and resulting trip distributions, the auxiliary turn lane warrants at the accesses and the preliminary traffic signal warrant at the Street Road (S.R. 0926) access have been reevaluated per PennDOT guidelines. The various warrant/guideline analysis worksheets are contained in **Attachment 1**.

*Site Access Configurations and Traffic Control*

With removal of the U.S. Route 202 site access and relocation of the Street Road (S.R. 0926) site access opposite Bridlewood Boulevard, the site trip distributions have been reevaluated. These site traffic distributions and assignments are illustrated in **Figures 1A and 1B**.

*Site Trip Distributions*

McMahon Associates, Inc. has prepared this traffic evaluation to demonstrate the results of traffic analyses with alternate access to the Crebilly residential development, in response to comments from Westtown Township and PennDOT. Based on the *Conditional Use Subdivision Plan for Crebilly Farm Plan A/Proposed Development*, prepared by ESE Consultants, Inc. and dated October 7, 2016, access to the site is proposed via two full-movement accesses along West Pleasant Grove Road, a right-in/right-out access along U.S. Route 202, and a full-movement access along Street Road (S.R. 0926) east of Bridlewood Boulevard. A Transportation Impact Study, prepared by McMahon and dated last revised January 20, 2017, was submitted to Westtown Township, analyzing the study intersections based on this proposed access configuration. Based on comments from PennDOT and Westtown Township, an alternate access configuration is recommended, including removal of the right-in/right-out access along U.S. Route 202 and relocation of the Street Road (S.R. 926) access opposite Bridlewood Boulevard. This traffic evaluation provides the results of the traffic analyses for the study intersections with this alternate access configuration.

Dear Mr. Pingar:

RE: Crebilly Residential Development  
Conditional Use Traffic Evaluation  
McMahon Project No. 816451.11

Mr. Robert Pingar, P.E.  
Township Manager  
Westtown Township  
1039 Wilmington Pike  
West Chester, PA 19382

August 29, 2017

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Exton, PA 19341  
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*Off-Site Intersection Turn Lanes*

Based on the alternate access configuration and resulting trip distributions, the auxiliary turn lane warrants at the off-site intersections have been reevaluated per PennDOT guidelines. The various warrant/guideline analysis worksheets are contained in **Attachment 2, Tables 1A, 1B, and 1C** below summarize the turn lane warrants and recommended lengths per PennDOT guidelines under existing, future without-development, and future with-development traffic conditions. As shown in the tables below, no additional turn lanes are warranted under with-development conditions as compared to existing conditions. Additionally, the only turn lane that warrants a longer storage length under with-development conditions as compared to existing or without-development conditions is the southbound U.S. Route 202 right-turn lane at West Pleasant Grove Road with the alternate access configuration.

**Table 1A. Off-Site Intersection Turn Lanes  
 Street Road (S.R. 0926) and New Street**

Roadway	Lane		Warranted		Turn Lane Lengths	
	Eastbound Left-Turn Lane	Eastbound Right-Turn Lane	Existing	2028 with-Development	2028 without-Development	2028 with-Development
Street Road (S.R. 0926)	Yes	Yes	175'	175'	225'	225'
	No	Yes	-	150'	-	150'
	Westbound Right-Turn Lane	Westbound Left-Turn Lane	175'	175'	175'	175'
	Northbound Left-Turn Lane	Northbound Right-Turn Lane	No	No	-	-
New Street	Yes	Yes	350'	350'	400'	400'
	No	Yes	-	100'	-	100'
	Southbound Left-Turn Lane	Southbound Right-Turn Lane	No	No	-	-
	Northbound Left-Turn Lane	Northbound Right-Turn Lane	No	No	-	-

**Table 1B. Off-Site Intersection Turn Lanes  
 New Street and West Pleasant Grove Road**

Roadway	Lane		Warranted	
	Existing	2028 with-Development	Existing	2028 with-Development
New Street	Yes	Yes	350'	350'
	No	Yes	-	100'
	Southbound Left-Turn Lane	Southbound Right-Turn Lane	No	No
	Northbound Left-Turn Lane	Northbound Right-Turn Lane	No	No

**Table 1C. Off-Site Intersection Turn Lanes**  
 U.S. Route 202 and West Pleasant Grove Road

Roadway	Lane	Warranted			Turn Lane Lengths	
		Existing	Development	Existing	2028 without-Development	2028 with-Development
U.S. Route 202	Southbound Right-Turn Lane	Yes	Yes	Yes	325'	400'

*Traffic Operations and Queuing Analyses*

Based on the alternate access configuration, the traffic analyses have been revised for the future build-out (2023) and design (2028) year traffic conditions with the development. There are no substantial changes to the traffic analysis results, and therefore, the previously recommended off-site intersection improvements continue to mitigate the impact of the development. Tables 2A and 2B below summarize the overall levels of service for the study intersections under the future 2028 design year traffic conditions, including improvements necessary to mitigate the impact of the development based on PennDOT criteria.

The future build-out year (2023) and design year (2028) traffic volumes and conditions, both without and with the proposed development, are summarized in Figures 2A through 3D, respectively, while the detailed capacity/level-of-service analysis worksheets are provided in Attachments 3 through 6. It is noted that the results for the future without-development conditions remain unchanged, but are provided for comparison to with-development conditions.

**Table 2A. 2028 Design Year Overall Intersection Level-of-Service**  
 Weekday Morning Peak Hour

Intersection	Overall Level-of-Service (Delay in Seconds)		Delay Increase <sup>(2)</sup>	Mitigation Requires	Overall Level-of-Service (Delay in Seconds)
	Without Development	With Development <sup>(1)</sup>			
U.S. Route 202 (Wilmington Pike) and Street Road (S.R. 0926)	F (182.5)	F (195.7)	+13.2 seconds	Yes	F (179.0)
U.S. Route 202 (Wilmington Pike) and Pleasant Grove Road	A (1.4)	A (2.2)	No LOS Drop	No	-
Street Road (S.R. 0926) and New Street	F (60.9)	E (65.2)	No LOS Drop	No	-
Street Road (S.R. 0926) and Bridlewood Boulevard	A (1.9)	B (11.6)	+9.7 seconds	No	-
New Street and West Pleasant Grove Road	A (6.6)	A (7.5)	No LOS Drop	No	-

**Table 2B. 2028 Design Year Overall Intersection Level-of-Service  
 Weekday Afternoon Peak Hour**

Overall Level-of-Service (Delay in Seconds)	Requires Mitigation	Delay Increase <sup>(2)</sup>	Intersection		West Pleasant Grove Road
			Without Development (Delay in Seconds)	With Development <sup>(1)</sup> (Delay in Seconds)	
F (195.5)	Yes	+12.4 seconds	F (200.6)	F (213.0)	U.S. Route 202 (Williamston Pike) and Street Road (S.R. 0926)
F	No	No LOS Drop	A (2.0)	A (2.2)	U.S. Route 202 (Williamston Pike) and Pleasant Grove Road
F	No	No LOS Drop	F (83.2)	F (85.7)	Street Road (S.R. 0926) and New Street
F	No	No LOS Drop	A (2.0)	A (8.2)	Street Road (S.R. 0926) and Bridlewood Boulevard
F	No	+6.6 seconds	C (21.8)	D (28.4)	New Street and West Pleasant Grove Road

(1) With-development base conditions without improvements.  
 (2) Based on the difference in delay from without- to with-development, in accordance with PennDOT's level of service requirements.

As presented previously, the off-site study intersection of U.S. Route 202 and Street Road (S.R. 0926) does not satisfy PennDOT's mitigation criteria with the proposed development since the increase in overall intersection delay is greater than 10 seconds. If PennDOT requires traffic improvements at this intersection to mitigate the overall intersection delay, provision of a separate southbound U.S. Route 202 (Williamston Pike) right-turn lane is required. Alternatively if PennDOT requires traffic improvements to mitigate both overall and movement intersection delay, provision of a second westbound Street Road (S.R. 0926) left-turn lane is required, with traffic signal modifications to eliminate the existing split phasing along Street Road (S.R. 0926). If required by PennDOT, the applicant is committed to provide one of these intersection improvements, which mitigates the traffic impact of the development.

**Conclusion**

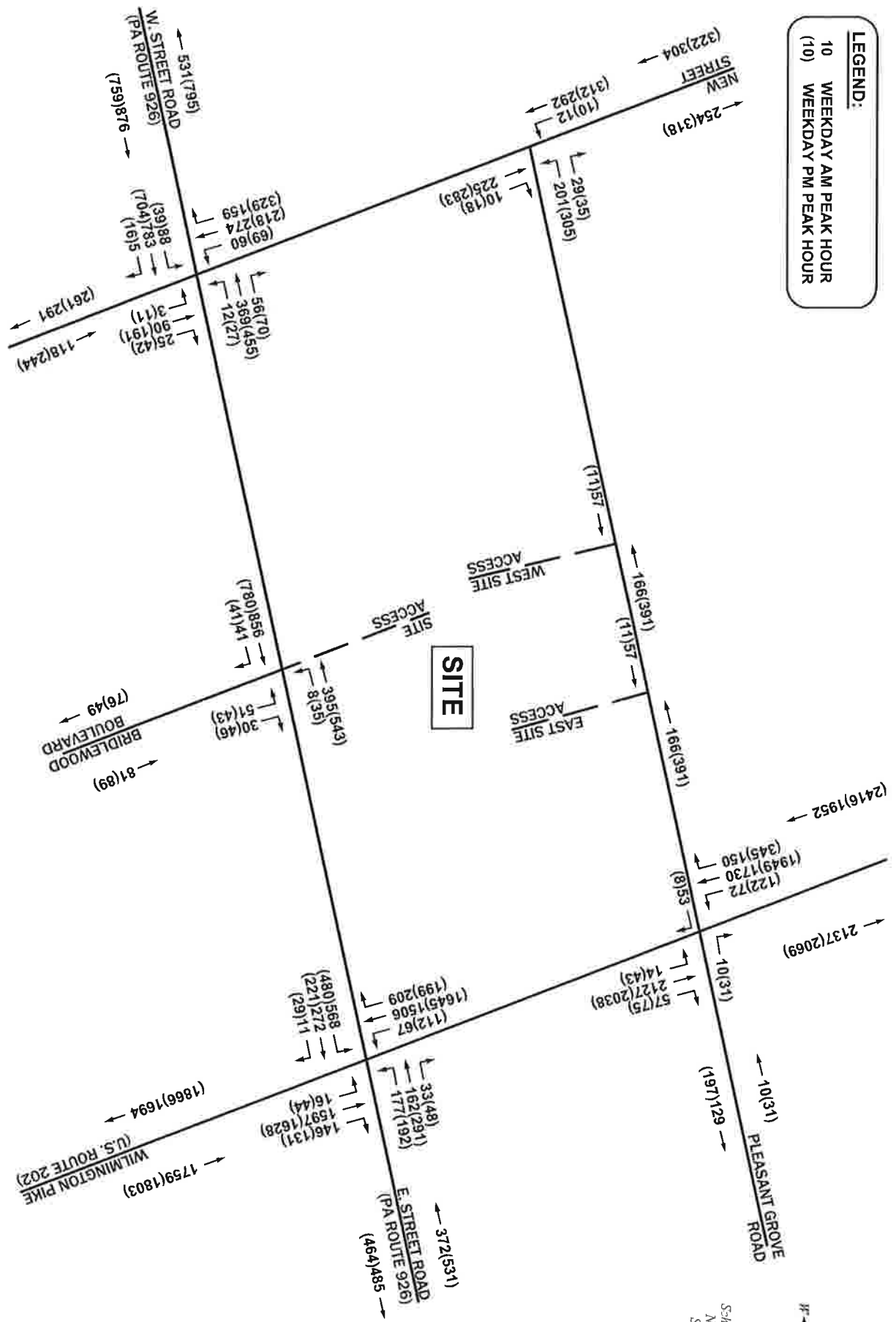
Per the revised traffic evaluation with the alternate access configuration, the previously recommended site access and off-site traffic improvements committed by the applicant are appropriate to mitigate the proposed development traffic impacts. If you should have any questions, or require further information, please feel free to contact me at 610-594-9995 or [nkline@mcmahonassociates.com](mailto:nkline@mcmahonassociates.com).

Sincerely,

*Nicole R. Kline - Elster*

Nicole R. Kline-Elster, P.E., PTOE  
 Senior Project Manager

**LEGEND:**  
 10 WEEKDAY AM PEAK HOUR  
 (10) WEEKDAY PM PEAK HOUR

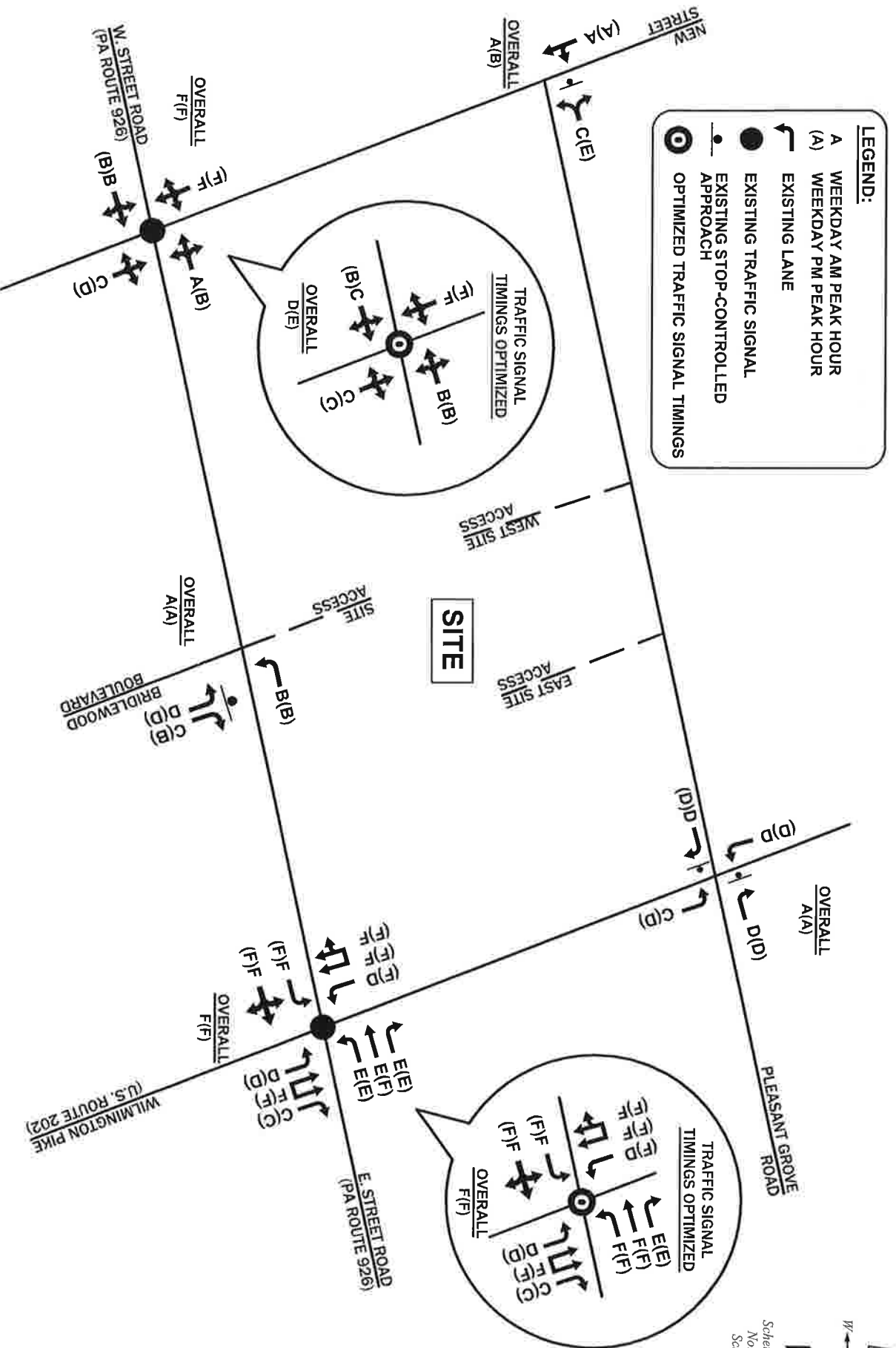


**FIGURE 2A**

2023 Future Peak Hour Traffic Volumes without Development

**CREBILLY FARM RESIDENTIAL DEVELOPMENT**  
**WESTTOWN TOWNSHIP, CHESTER COUNTY, PA**





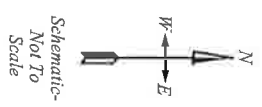
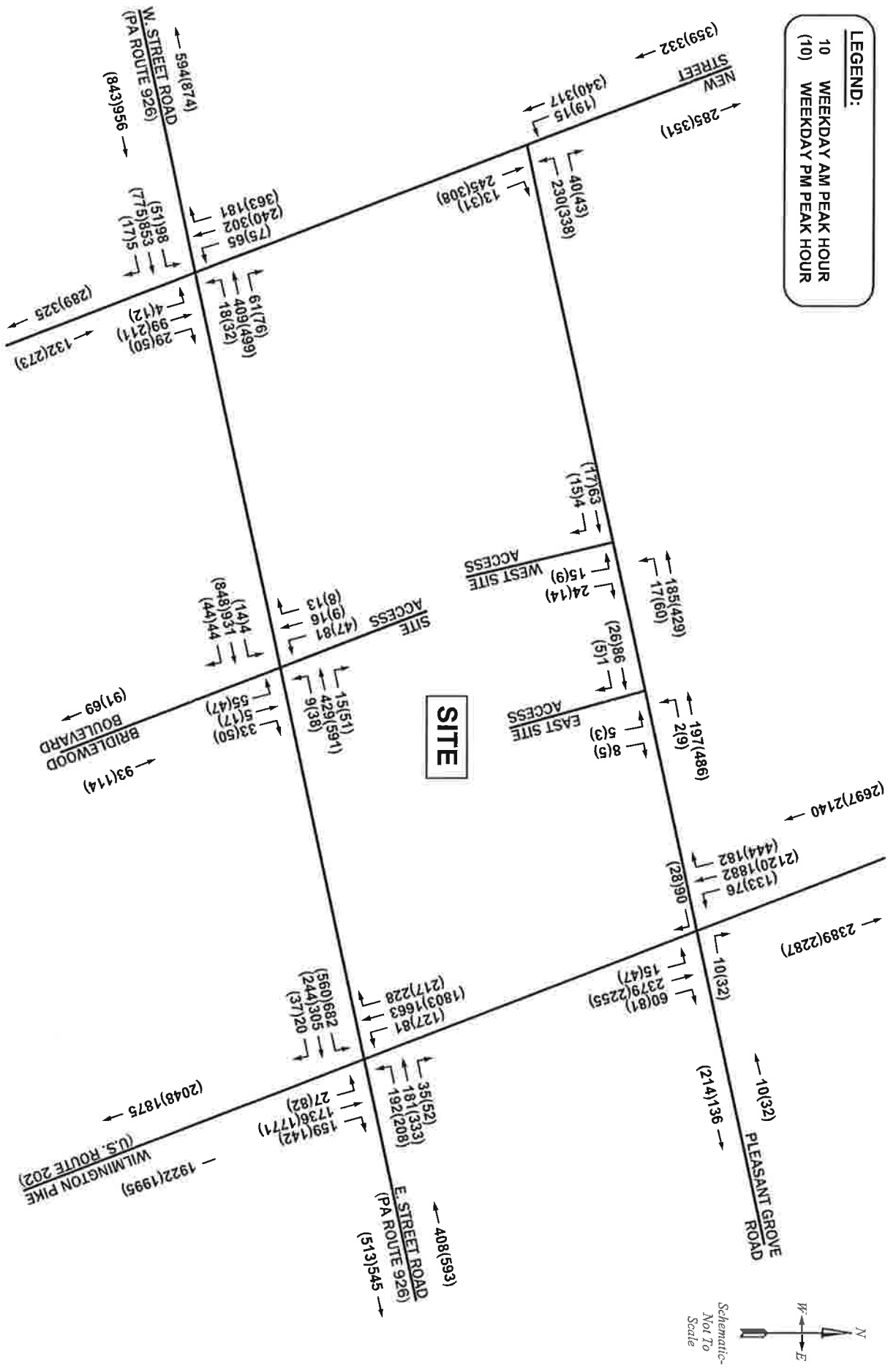
**FIGURE 2C**

2023 Future Peak Hour Levels of Service without Development

**CREBILLY FARM RESIDENTIAL DEVELOPMENT**  
**WESTTOWN TOWNSHIP, CHESTER COUNTY, PA**



**LEGEND:**  
 10 WEEKDAY AM PEAK HOUR  
 (10) WEEKDAY PM PEAK HOUR



**FIGURE 3B**

2028 Future Peak Hour Traffic Volumes with Development  
 Alternative A - 317 New Units with Access Opposite Bridlewood Boulevard

**CREBILLY FARM RESIDENTIAL DEVELOPMENT**  
**WESTTOWN TOWNSHIP, CHESTER COUNTY, PA**



Site Access Turn Lane & Traffic Signal Warrants

ATTACHMENT 1



**Street Road (S.R. 0926) Site Access**

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Period:** 2028 Design  
**Design Hour:** AM Peak Hour  
**Intersection Control:** Signalized  
**Posted Speed Limit (MPH):** 45  
**Type of Terrain:** Rolling

**Intersection & Approach Description:** S.R. 0926 and Bridlewood Blvd/Proposed Site Access - Alternative A  
 Eastbound S.R. 0926 Left-Turn Lane

**Agency/Company Name:** McMahon Associates, Inc.  
**Checked By:** BGG  
**Conducted By:** TML  
**Analysis Date:** 7/26/2017

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided

**Left or Right-Turn Lane Analysis?:** Left Turn Lane  
**Type of Analysis:** Left Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations							
Movement	Left	Through	Right	Include?	Volume	% Trucks	PCEV
Advancing	Yes	-	-	No	4	2.0%	5
	Through	931	4.0%	-	931	4.0%	987
	Right	44	3.0%	No	44	3.0%	N/A
Opposing	No	-	-	No	9	0.0%	N/A
	Through	429	9.0%	-	429	9.0%	487
	Right	15	2.0%	No	15	2.0%	N/A
% Left Turns in Advancing Volume: 0.50%							

Right Turn Lane Volume Calculations							
Movement	Left	Through	Right	Include?	Volume	% Trucks	PCEV
Advancing	No	-	-	No	0	0.0%	N/A
	Through	0	0.0%	-	0	0.0%	N/A
	Right	-	-	-	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Right Turn Volume: N/A							

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:** **Figure 3**  
**Applicable Warrant Figure:** **Figure 3**  
**Warrant Met?:** **No**

**Right Turn Lane Warrant Findings:** **N/A**  
**Applicable Warrant Figure:** **N/A**  
**Warrant Met?:** **N/A**

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Signalized  
**Design Hour Volume of Turning Lane:** 5  
**Cycles Per Hour (Assumed):** Known  
**Cycles Per Hour (If Known):** 60  
**Average # of Vehicles/Cycle:** N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)		
	25-35	40-45	50-60
Signalized	High	Low	High
	A	A	B or C
Unsignalized	High	Low	High
	A	A	B or C

**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:

Empty box for additional comments.



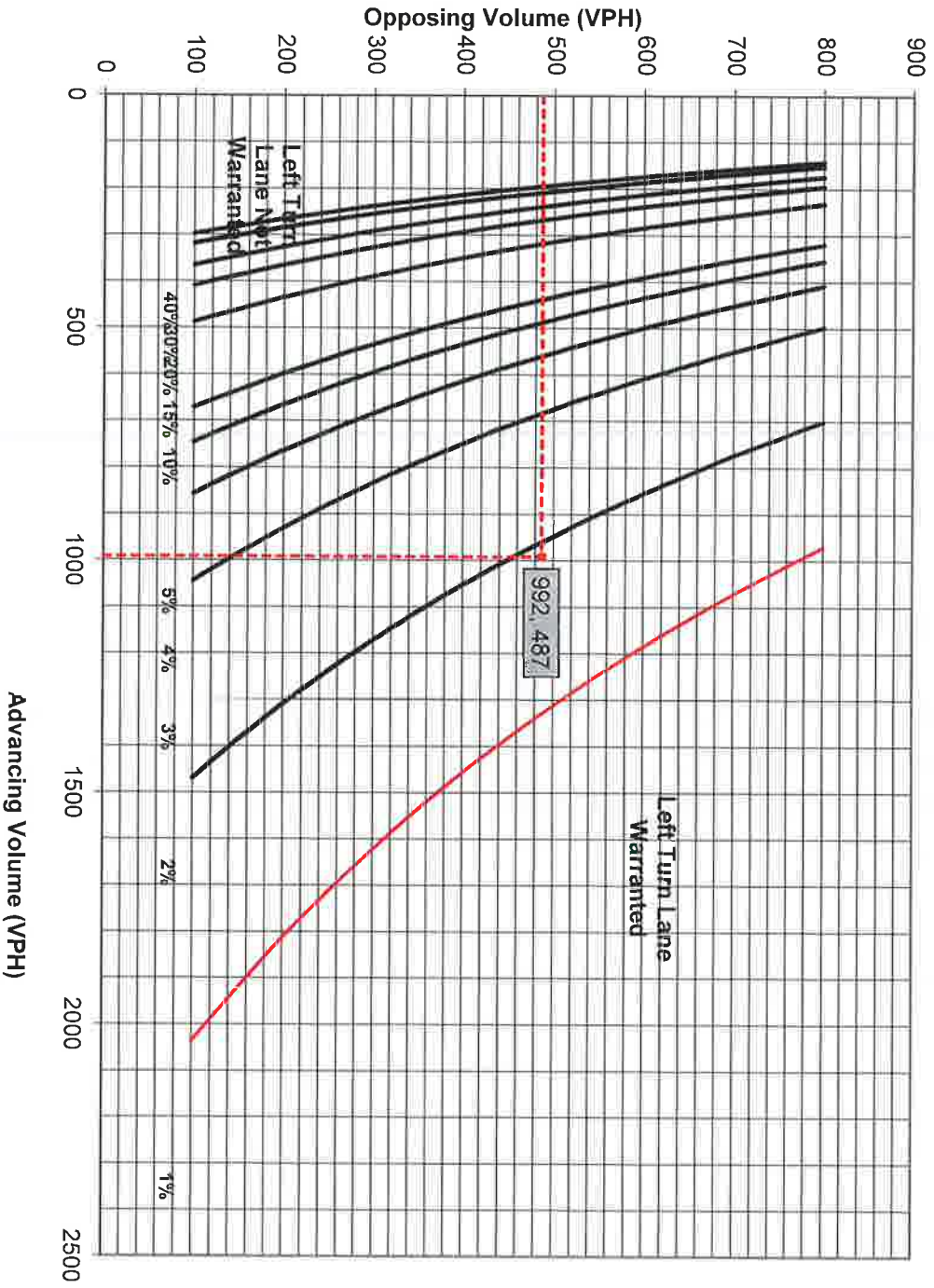


Figure 3. Warrant for left turn lanes on two-lane highways (45 mph speed, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

• Volume Data Point  
 — 0.5%

**Turn Lane Warrant and Length Analysis Workbook**

**STUDY LOCATION AND ANALYSIS INFORMATION**

Municipality:	Westtown Township	Agency/Company Name:	McMahon Associates, Inc.
County:	Chester County	Checked By:	BGG
PennDOT Engineering District:	6	Conducted By:	TML
Analysis Period:	2028 Design	Analysis Date:	7/26/2017
Design Hour:	PM Peak Hour	Number of Approach Lanes:	1
Intersection Control:	Signalized	Undivided or Divided Highway:	Undivided
Posted Speed Limit (MPH):	45	Type of Terrain:	Rolling
Left or Right-Turn Lane Analysis?:	Left Turn Lane		

Intersection & Approach Description: S.R. 0926 and Bridlewood Blvd/Proposed Site Access - Alternative A  
Eastbound S.R. 0926 Left-Turn Lane

**VOLUME CALCULATIONS**

Movement	Include?	Volume	% Trucks	PCEV	Left Turn Lane Volume Calculations		
					Advancing Volume	Opposing Volume	% Left Turns in Advancing Volume
Advancing	Left	14	2.0%	15	902	Advancing Volume:	902
	Through	-	3.0%	887	609	Opposing Volume:	609
Opposing	Right	44	0.0%	N/A	15	Left Turn Volume:	15
	Through	-	0.0%	N/A	609		
Right Turn Lane Volume Calculations							
Advancing	Left	0	0.0%	N/A		Advancing Volume:	N/A
	Through	-	0.0%	N/A		Right Turn Volume:	N/A

**TURN LANE WARRANT FINDINGS**

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <b>Figure 3</b>	Applicable Warrant Figure: <b>N/A</b>
Warrant Met?: <b>Yes</b>	Warrant Met?: <b>N/A</b>

**TURN LANE LENGTH CALCULATIONS**

Intersection Control:	Signalized	Average # of Vehicles/Cycle:	1.0
Design Hour Volume of Turning Lane:	15		
Cycles Per Hour (Assumed):	Known		
Cycles Per Hour (If Known):	60		

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)	
	25-35	40-45
Signalized	High	Low
	A	A
Unsignalized	High	Low
	A	A

Left Turn Lane Storage Length, Condition A:	<b>N/A</b>	Feet
Condition B:	<b>125</b>	Feet
Condition C:	<b>150</b>	Feet
Required Left Turn Lane Storage Length:	<b>150</b>	Feet

Additional Findings: **N/A**

Additional Comments / Justifications:

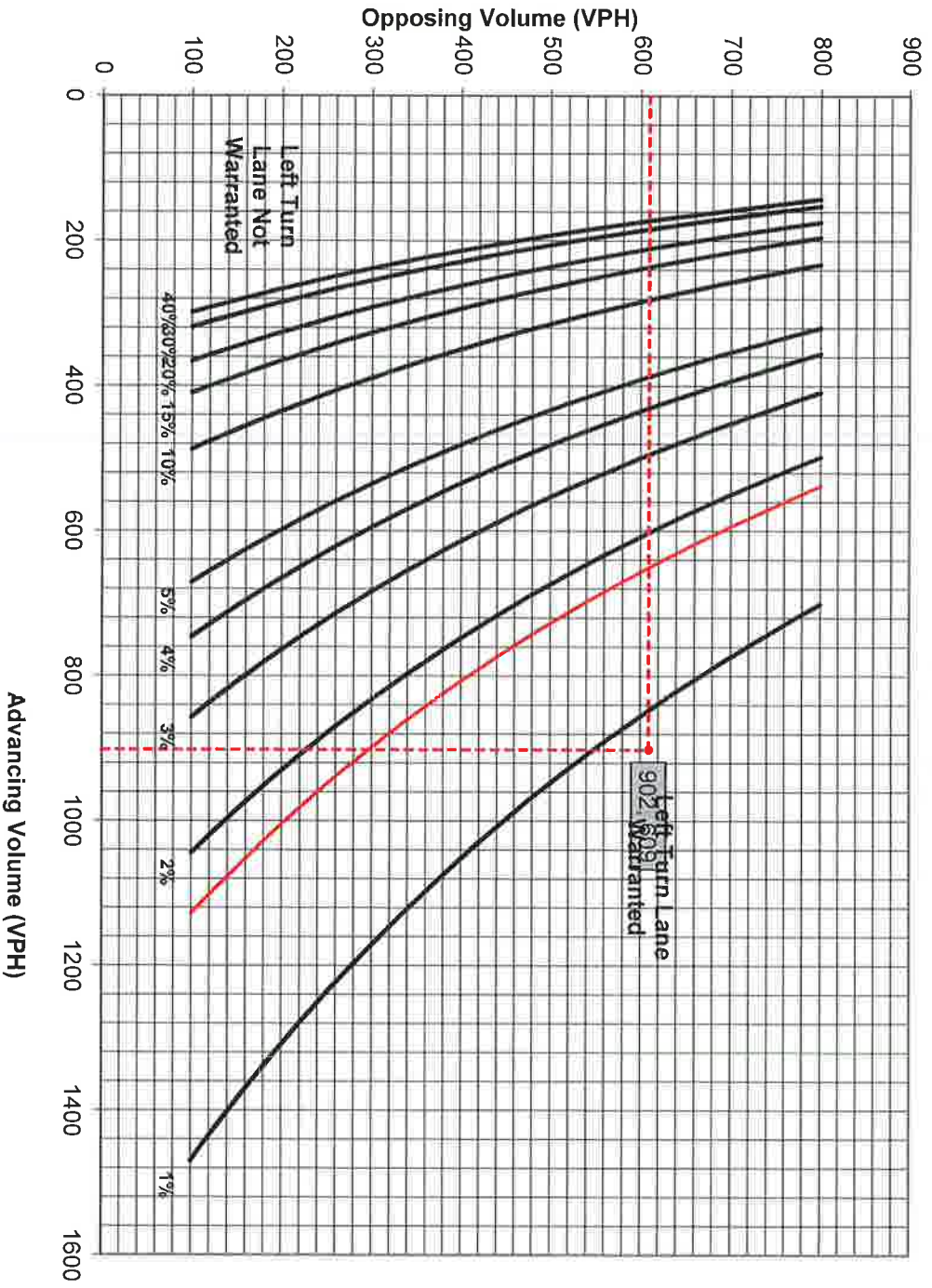


Figure 3. Warrant for left turn lanes on two-lane highways (45 mph speed, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

• Volume Data Point  
 — 1.7%

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Period:** 2028 Design  
**Design Hour:** AM Peak Hour  
**Intersection Control:** Signalized  
**Posted Speed Limit (MPH):** 45  
**Type of Terrain:** Rolling

**Intersection & Approach Description:** S.R. 0926 and Bridlewood Blvd/Proposed Site Access - Alternative A  
**Westbound S.R. 0926 Right-Turn Lane**  
**Agency/Company Name:** McMahon Associates, Inc.  
**Checked By:** BGG  
**Conducted By:** TML  
**Analysis Date:** 7/26/2017

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Type of Analysis:** Right Turn Lane

**Left or Right-Turn Lane Analysis:** Right Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Right Turn Lane Volume Calculations	
					Advancing	Opposing
Left	No	0	0.0%	N/A	Advancing Volume:	N/A
Through	-	0	0.0%	N/A	Opposing Volume:	N/A
Right	Yes	0	0.0%	N/A	Left Turn Volume:	N/A
% Left Turns in Advancing Volume: N/A						
Movement	Include?	Volume	% Trucks	PCEV	Right Turn Lane Warrant Findings	
					Advancing	Opposing
Left	No	0	0.0%	N/A	Right Turn Lane Warrant Figure:	Figure 10
Through	-	0	0.0%	N/A	Warrant Met?:	No
Right	Yes	0	0.0%	N/A	Applicable Warrant Figure:	N/A
Applicable Warrant Figure: N/A						
Warrant Met?: N/A						

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:** N/A  
**Right Turn Lane Warrant Findings:** Figure 10  
**Warrant Met?:** No

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Signalized  
**Design Hour Volume of Turning Lane:** 16  
**Cycles Per Hour (Assumed):** Known  
**Cycles Per Hour (if Known):** 60  
**Average # of Vehicles/Cycle:** N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)		Turn Demand Volume	
	25-35	40-45	High	Low
Signalized	A	A	A	A
	High	Low	High	Low
Unsignalized	A	A	B or C	B or C
	High	Low	B or C	B or C

**Right Turn Lane Storage Length, Condition A:** N/A Feet  
**Condition B:** N/A Feet  
**Condition C:** N/A Feet  
**Required Right Turn Lane Storage Length:** N/A Feet

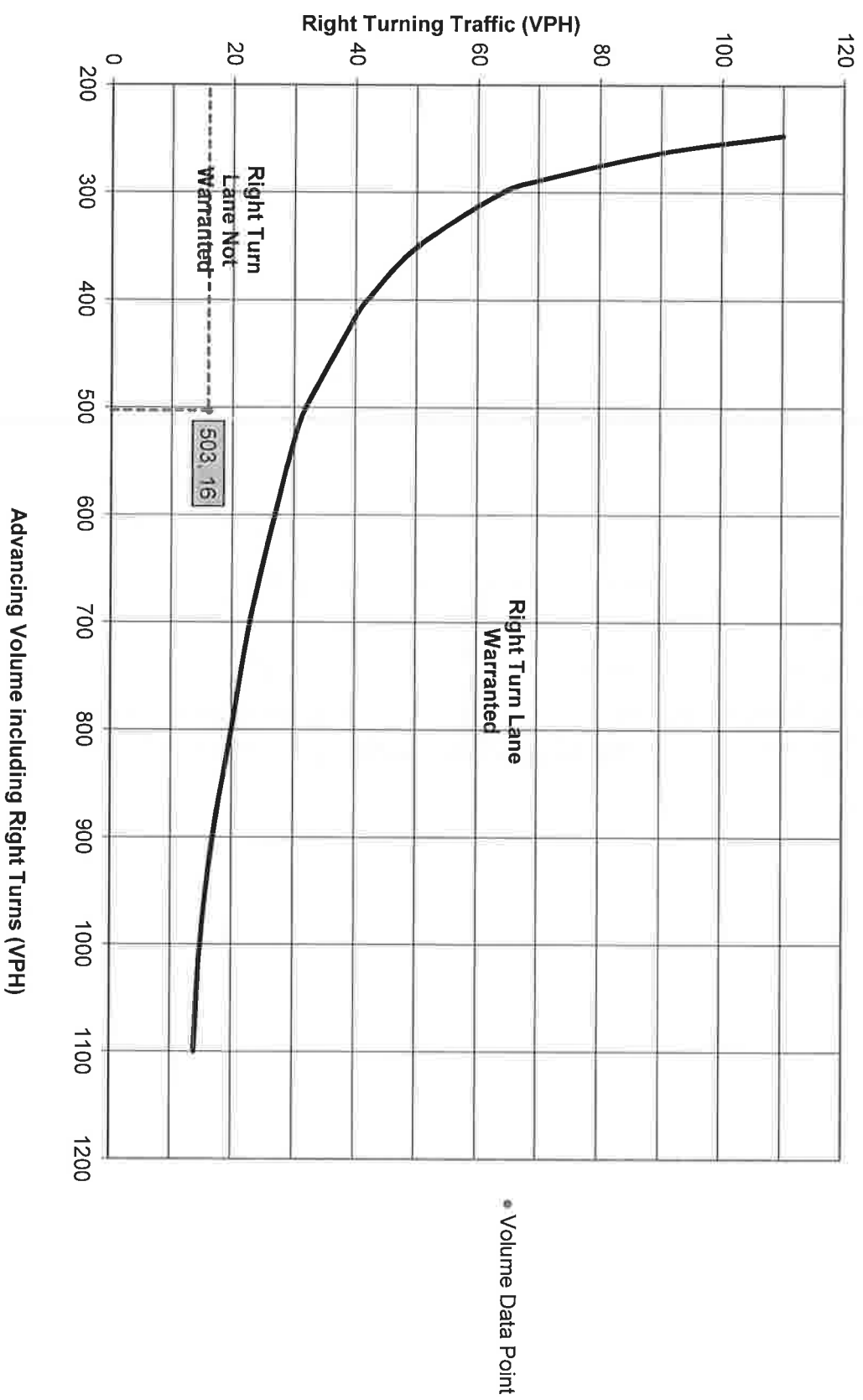
**Additional Findings:** N/A

Additional Comments / Justifications:

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:	Westtown Township	Agency/Company Name:	McMahon Associates, Inc.
County:	Chester County	Checked By:	BGG
PennDOT Engineering District:	6	Conducted By:	TML
Analysis Period:	2028 Design	Analysis Date:	7/26/2017
Design Hour:	PM Peak Hour	Number of Approach Lanes:	1
Intersection Control:	Signalized	Undivided or Divided Highway:	Undivided
Posted Speed Limit (MPH):	45	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Type of Terrain:	Rolling	Type of Analysis:	Right Turn Lane

Intersection & Approach Description: S.R. 0926 and Bridlewood Blvd/Proposed Site Access - Alternative A  
Westbound S.R. 0926 Right-Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations			
Advancing	Left	Yes	0
	Through	-	0
Opposing	Left	No	0
	Through	-	0
Right Turn Lane Volume Calculations		% Left Turns in Advancing Volume:	N/A
Advancing		Advancing Volume:	N/A
Opposing		Opposing Volume:	N/A
Left Turn Lane		Left Turn Volume:	N/A
Right Turn Lane		Right Turn Volume:	53
Movement		Include?	Volume
Advancing	Left	Yes	0
	Through	-	0
Opposing	Left	No	0
	Through	-	0
Right Turn Lane		% Trucks	2.0%
Left Turn Lane		% Trucks	2.0%
Movement		Include?	Volume
Advancing	Left	Yes	51
	Through	-	591
Opposing	Left	No	38
	Through	-	N/A
Right Turn Lane		PCV	53
Left Turn Lane		PCV	609
Advancing		Right Turn Volume:	53
Opposing		Left Turn Volume:	662

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 10
Warrant Met?: N/A	Warrant Met?: Yes

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Average # of Vehicles/Cycle:	1.0
Design Hour Volume of Turning Lane:	53		
Cycles Per Hour (Assumed):	Known		
Cycles Per Hour (If Known):	60		

PennDOT Publication 46, Exhibit 11-6

Speed (MPH)	40-45	50-60
Turn Demand Volume	High	Low
Type of Traffic Control	High	Low
Signalized	A	A
Unsignalized	A	A

Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	125	Feet
Condition C:	150	Feet
Required Right Turn Lane Storage Length:	150	Feet

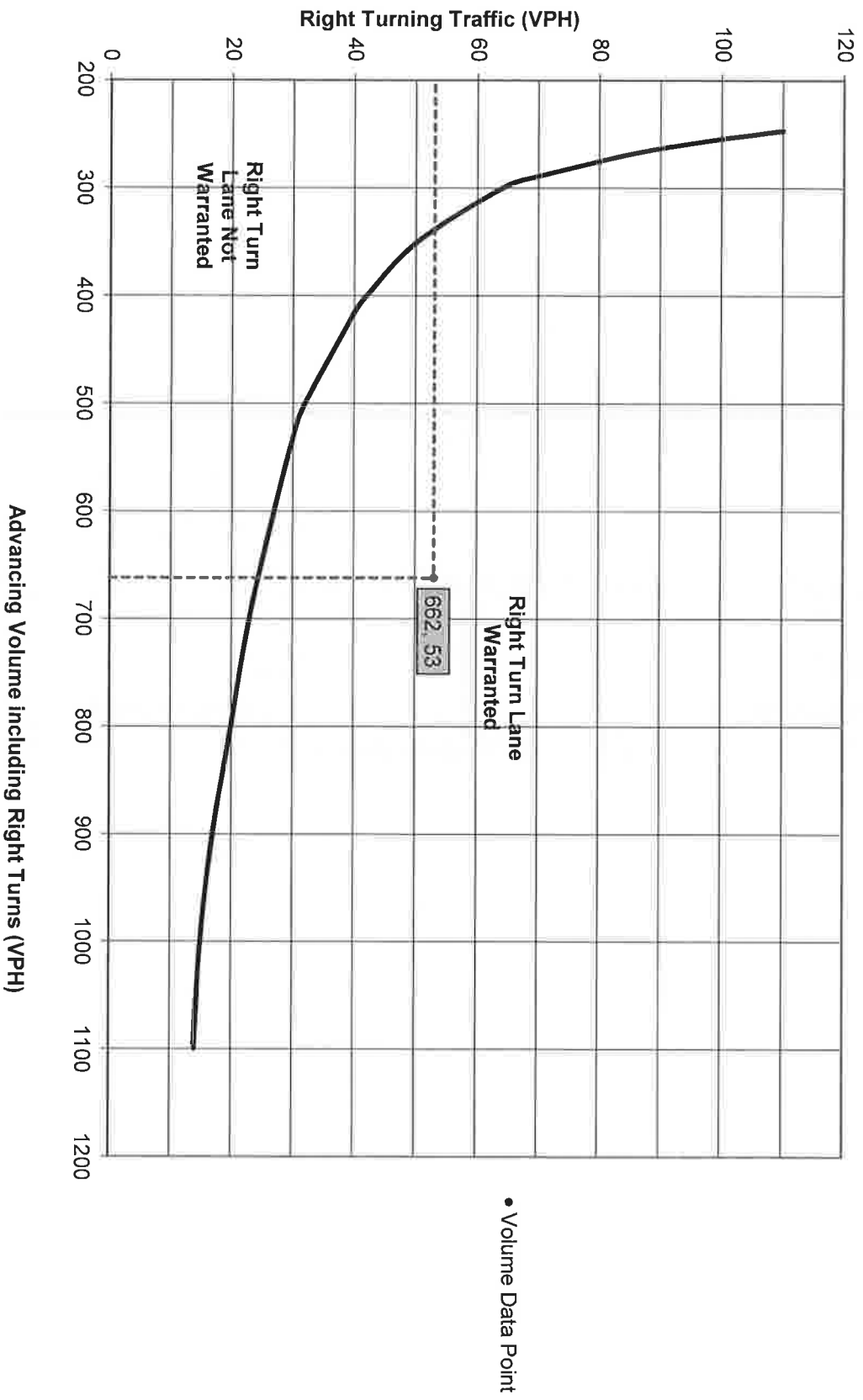
Additional Findings: N/A

Additional Comments / Justifications:





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



Traffic Signal Warrant Analysis Workbook

**STUDY AND ANALYSIS INFORMATION**

Municipality:	Westtown Township	County:	Chester County	PennDOT Engineering District:	6
Analysis Date:	7/26/2017	Conducted By:	TML	Agency/Company Name:	McMahon

**Analysis Information**

Data Collection Date:	9/8/2016	Day of the Week:	Thursday
-----------------------	----------	------------------	----------

Is the intersection in a built-up area of an isolated community of <10,000 population?

**Major Street Information**

Major Street Name and Route Number:	PA Route 926
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:	1
Speed Limit or 85th Percentile Speed on the Major Street:	45 MPH

**Minor Street Information**

Minor Street Name and Route Number:	Bridlewood Blvd/Proposed Site Access - Alternative A
Minor Street Approach #1 Direction:	S-Bound
Minor Street Approach #2 Direction:	N-Bound

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

**TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS**

Warrant 1, Eight-Hour Vehicular Volume	No	N/A
Warrant 2, Four-Hour Vehicular Volume	Yes	Yes
Warrant 3, Peak Hour	Yes	No
Warrant 4, Pedestrian Volume	No	N/A
Warrant 5, School Crossing	No	N/A
Warrant 6, Coordinated Signal System	No	N/A
Warrant 7, Crash Experience	No	N/A
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**

Minor Street Approach #2 (N-Bound)	Minor Street Approach #1 (S-Bound)	Major Street Combined	Major Street Approach #2 (W-Bound)	Major Street Approach #1 (E-Bound)	Time Interval	
					End Of	Begin At
					12:00 AM	12:14 AM
					12:15 AM	12:29 AM
					12:30 AM	12:44 AM
					12:45 AM	12:59 AM
					1:00 AM	1:14 AM
					1:15 AM	1:29 AM
					1:30 AM	1:44 AM
					1:45 AM	1:59 AM
					2:00 AM	2:14 AM
					2:15 AM	2:29 AM
					2:30 AM	2:44 AM
					2:45 AM	2:59 AM
					3:00 AM	3:14 AM
					3:15 AM	3:29 AM
					3:30 AM	3:44 AM
					3:45 AM	3:59 AM
					4:00 AM	4:14 AM
					4:15 AM	4:29 AM
					4:30 AM	4:44 AM
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					6:00 AM	6:14 AM
					6:15 AM	6:29 AM
					6:30 AM	6:44 AM
					6:45 AM	6:59 AM
					7:00 AM	7:14 AM
93	110	1432	453	979	7:15 AM	7:29 AM
					7:30 AM	7:44 AM
					7:45 AM	7:59 AM
92	108	1410	446	964	8:00 AM	8:14 AM
					8:15 AM	8:29 AM
					8:30 AM	8:44 AM
					8:45 AM	8:59 AM
					9:00 AM	9:14 AM
					9:15 AM	9:29 AM
					9:30 AM	9:44 AM
					9:45 AM	9:59 AM
					10:00 AM	10:14 AM
					10:15 AM	10:29 AM
					10:30 AM	10:44 AM
					10:45 AM	10:59 AM
					11:00 AM	11:14 AM
					11:15 AM	11:29 AM
					11:30 AM	11:44 AM
					11:45 AM	11:59 AM



**ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH**

Time Interval		Begin At	End Of	Major Street Approach #1 (E-Bound) Volume	Major Street Approach #2 (W-Bound) Volume	Major Street Combined Total Volume	Minor Street Approach #1 (S-Bound) Volume	Minor Street Approach #2 (N-Bound) 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	798	599	1397	56	100
		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	906	680	1586	64	114
		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			0		
		6:15 PM	6:29 PM			0		
		6:30 PM	6:44 PM			0		
		6:45 PM	6:59 PM			0		
		7:00 PM	7:14 PM			0		
		7:15 PM	7:29 PM			0		
		7:30 PM	7:44 PM			0		
		7:45 PM	7:59 PM			0		
		8:00 PM	8:14 PM			0		
		8:15 PM	8:29 PM			0		
		8:30 PM	8:44 PM			0		
		8:45 PM	8:59 PM			0		
		9:00 PM	9:14 PM			0		
		9:15 PM	9:29 PM			0		
		9:30 PM	9:44 PM			0		
		9:45 PM	9:59 PM			0		
		10:00 PM	10:14 PM			0		
		10:15 PM	10:29 PM			0		
		10:30 PM	10:44 PM			0		
		10:45 PM	10:59 PM			0		
		11:00 PM	11:14 PM			0		
		11:15 PM	11:29 PM			0		
		11:30 PM	11:44 PM			0		
		11:45 PM	11:59 PM			0		
<b>Approach Totals:</b>				3647	2178	5825	338	399

**MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME**

Number of Lanes for Moving Traffic on Each Approach	Major Street: 1 Lane	Minor Street: 1 Lane
---	----------------------	----------------------

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

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

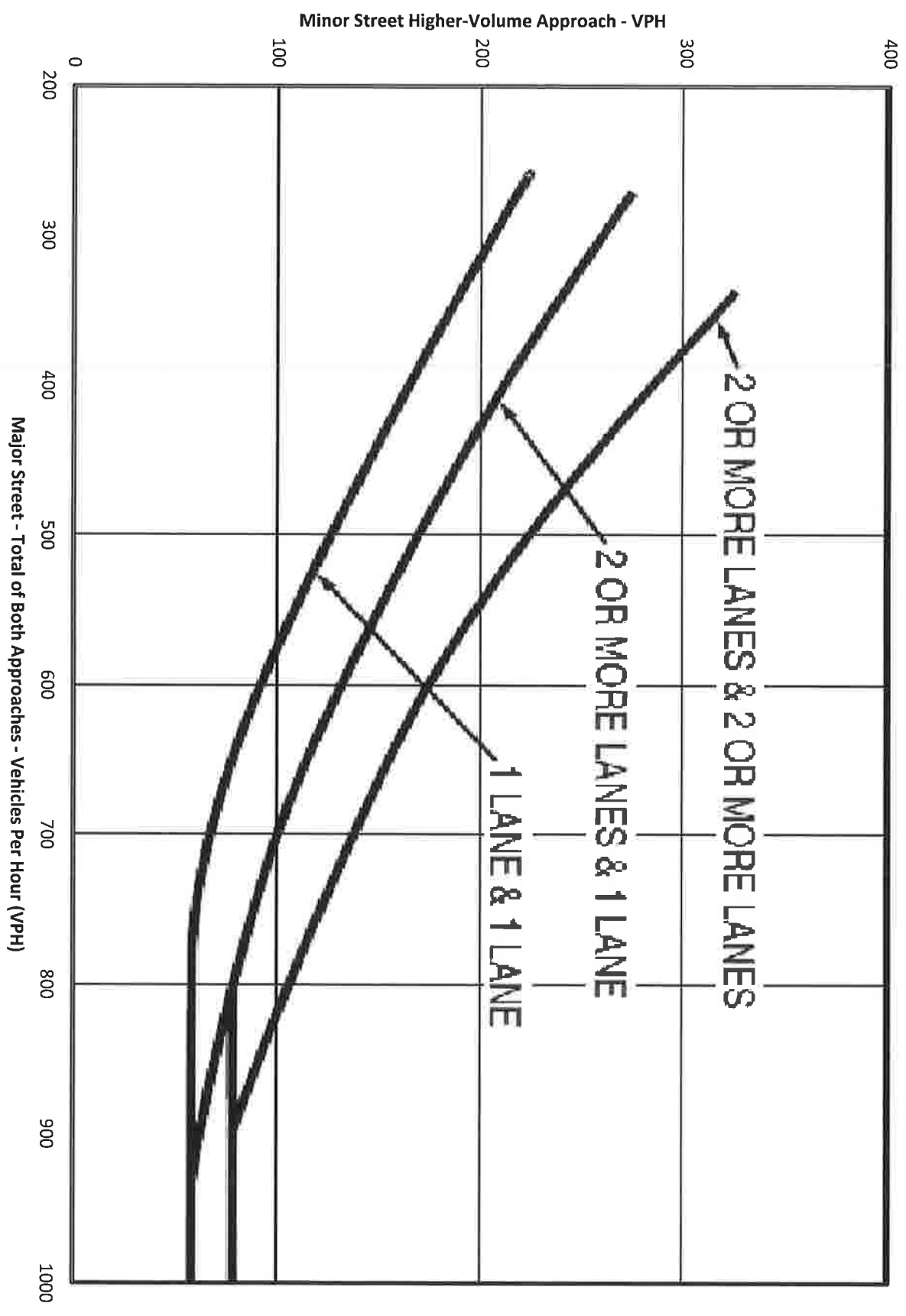
Hourly Vehicular Volume		
Hour Interval	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)
Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)
12:00 AM	0	0
12:15 AM	0	0
12:30 AM	0	0
12:45 AM	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	0	0
5:30 AM	0	0
5:45 AM	0	0
6:00 AM	0	0
6:15 AM	1432	110
6:30 AM	1432	110
6:45 AM	1432	110
7:00 AM	1432	110
7:15 AM	1410	108
7:30 AM	1410	108
7:45 AM	1410	108
8:00 AM	1410	108
8:15 AM	0	0
8:30 AM	0	0
8:45 AM	0	0
9:00 AM	0	0
9:15 AM	0	0
9:30 AM	0	0
9:45 AM	0	0
10:00 AM	0	0
10:15 AM	0	0
10:30 AM	0	0
10:45 AM	0	0
11:00 AM	0	0
11:15 AM	0	0
11:30 AM	0	0
11:45 AM	0	0
Hour Interval	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)
Hour Met?		





Hourly Vehicular Volume			
Hour Interval	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
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	1397	100	Met
3:30 PM	1397	100	Met
3:45 PM	1397	100	Met
4:00 PM	1397	100	Met
4:15 PM	1586	114	Met
4:30 PM	1586	114	Met
4:45 PM	1586	114	Met
5:00 PM	1586	114	Met
5:15 PM	0	0	
5:30 PM	0	0	
5:45 PM	0	0	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

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





Hour Interval	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
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	0	0	
5:30 AM	0	0	
5:45 AM	0	0	
6:00 AM	0	0	
6:15 AM	1432	110	Met
6:30 AM	1432	110	Met
6:45 AM	1432	110	Met
7:00 AM	1432	110	Met
7:15 AM	1410	108	Met
7:30 AM	1410	108	Met
7:45 AM	1410	108	Met
8:00 AM	1410	108	Met
8:15 AM	0	0	

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

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

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?  
N/A

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

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

**MUTCD WARRANT 3, PEAK HOUR**



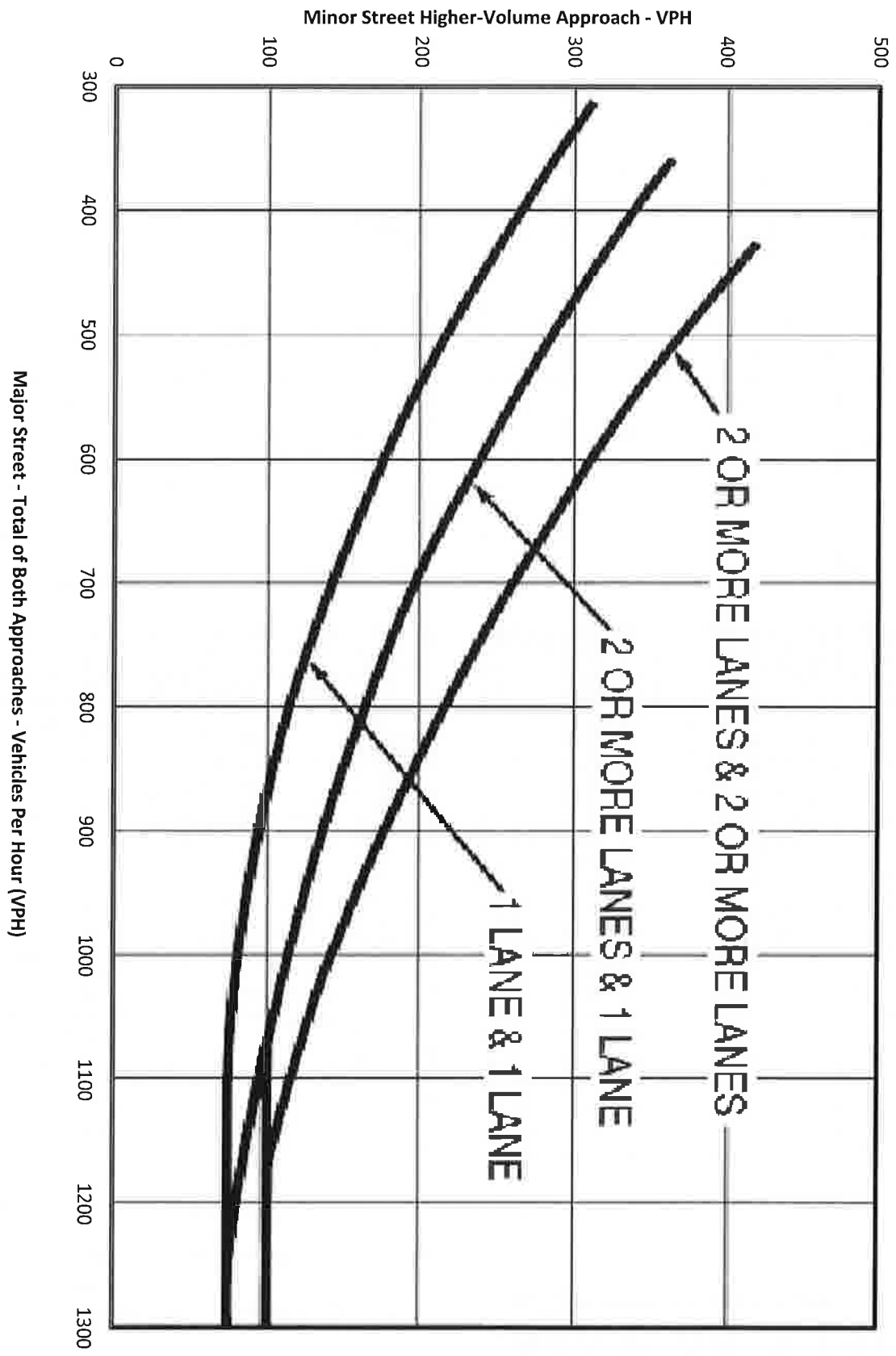


7/27/2017

Signal Warrant SR 926 and Site Access.xlsm

Hourly Vehicular Volume			
Hour Interval	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
8:30 AM	0	0	
8:45 AM	0	0	
9:00 AM	0	0	
9:15 AM	0	0	
9:30 AM	0	0	
9:45 AM	0	0	
10:00 AM	0	0	
10:15 AM	0	0	
10:30 AM	0	0	
10:45 AM	0	0	
11:00 AM	0	0	
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	1397	100	Met
3:30 PM	1397	100	Met
3:45 PM	1397	100	Met
4:00 PM	1397	100	Met
4:15 PM	1586	114	Met
4:30 PM	1586	114	Met
4:45 PM	1586	114	Met
5:00 PM	1586	114	Met
5:15 PM	0	0	
5:30 PM	0	0	
5:45 PM	0	0	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	
11:15 PM	0	0	
11:30 PM	0	0	
11:45 PM	0	0	
12:00 AM	0	0	

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



# Left Turn Conflict Worksheet

Intersection: PA Route 926 and Bridlewood Blvd/Site Access

County: Chester

Municipality: Westtown Township

Count Date: 9/8/2016

File Number: 816451



NB Approach: 0  
 Exclusive Left-Turn Lane  
 Number of Opposing Lanes  
 Include Right Turns  
 Required C.F. (Protected/Permitted)  
 50000  
 67500

Hour	NB	SB	Cycle	Turns Per	NB Conflict	L.T.P. Justified
7:00 AM	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
AM Peak	55	29	60	0.9167	1595	0
MID Peak	0	0	0	0	0	0
PM Peak	47	17	60	0.7833	799	0

EB Approach: PA Route 926  
 Exclusive Lane  
 Number of Opposing Lanes  
 Include Right Turns  
 Required C.F. (Protected/Permitted)  
 50000  
 67500

Hour	EB	WB	Cycle	Turns Per	EB Conflict	L.T.P. Justified
7:00 AM	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
AM Peak	4	429	60	0.0667	1716	0
MID Peak	0	0	0	0	0	0
PM Peak	14	591	60	0.2333	8274	0

Remarks:

Complied By TML  
 Checked By BGG  
 Date: Wednesday, July 26, 2017

SB Approach: Site Access  
 Exclusive Lane  
 Number of Opposing Lanes  
 Include Right Turns  
 Required C.F. (Protected/Permitted)  
 50000  
 67500

Hour	SB	NB	Cycle	Turns Per	SB Conflict	L.T.P. Justified
7:00 AM	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
AM Peak	81	38	60	1.35	3078	0
MID Peak	0	0	0	0	0	0
PM Peak	47	67	60	0.7833	3149	0

WB Approach: PA Route 926  
 Exclusive Lane  
 Number of Opposing Lanes  
 Include Right Turns  
 Required C.F. (Protected/Permitted)  
 50000  
 67500

Hour	WB	Left	EB	Through	Cycle	Turns Per	WB Conflict	L.T.P. Justified
7:00 AM	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0
AM Peak	9	931	60	0.15	8379	0	0	0
MID Peak	0	0	0	0	0	0	0	0
PM Peak	38	848	60	0.6333	32224	0	0	0

**West Pleasant Grove Road & West Site Access**

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Period:** 2028 Design  
**Design Hour:** AM Peak Hour  
**Intersection Control:** Unsignalized  
**Posted Speed Limit (MPH):** 35  
**Type of Terrain:** Rolling

**Intersection & Approach Description:** West Pleasant Grove Road and Proposed West Site Access - Alternative A  
 Eastbound West Pleasant Grove Road Right-Turn Lane

**Analysis Date:** 7/26/2017  
**Conducted By:** TML  
**Checked By:** BGG  
**Agency/Company Name:** McMahon Associates, Inc.

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Type of Analysis:** Right Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations		Right Turn Lane Volume Calculations	
Advancing	Left	0	0
	Through	0	0
Opposing	Left	0	0
	Through	0	0
<b>Advancing Volume:</b> N/A <b>Opposing Volume:</b> N/A <b>Left Turn Volume:</b> N/A <b>% Left Turns in Advancing Volume:</b> N/A		<b>Right Turn Lane Volume Calculations</b>	
Advancing	Left	0	0
	Through	63	4
Opposing	Left	0	0
	Through	0	0
<b>Advancing Volume:</b> 68 <b>Right Turn Volume:</b> 5		<b>Include? Volume % Trucks PCEV</b>	
		Advancing: 0.0% 0.0% 0.0% Opposing: 0.0% 0.0% 0.0% Left Turn: 0.0% 0.0% 0.0%	

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:** N/A  
**Right Turn Lane Warrant Findings:** Figure 9

**Warrant Met?:** N/A  
**Applicable Warrant Figure:** N/A

**Warrant Met?:** NO  
**Applicable Warrant Figure:** Figure 9

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Unsignalized  
**Design Hour Volume of Turning Lane:** 5  
**Cycles Per Hour (Assumed):** 60  
**Cycles Per Hour (if Known):** 60

**Average # of Vehicles/Cycle:** N/A

PennDOT Publication 46, Exhibit 11-6

Speed (MPH)	25-35	40-45	50-60
Type of Traffic Control	High	High	Low
Signalized	A	A	A
	B or C	B or C	B or C
Unsignalized	A	A	A
	B or C	B or C	B or C

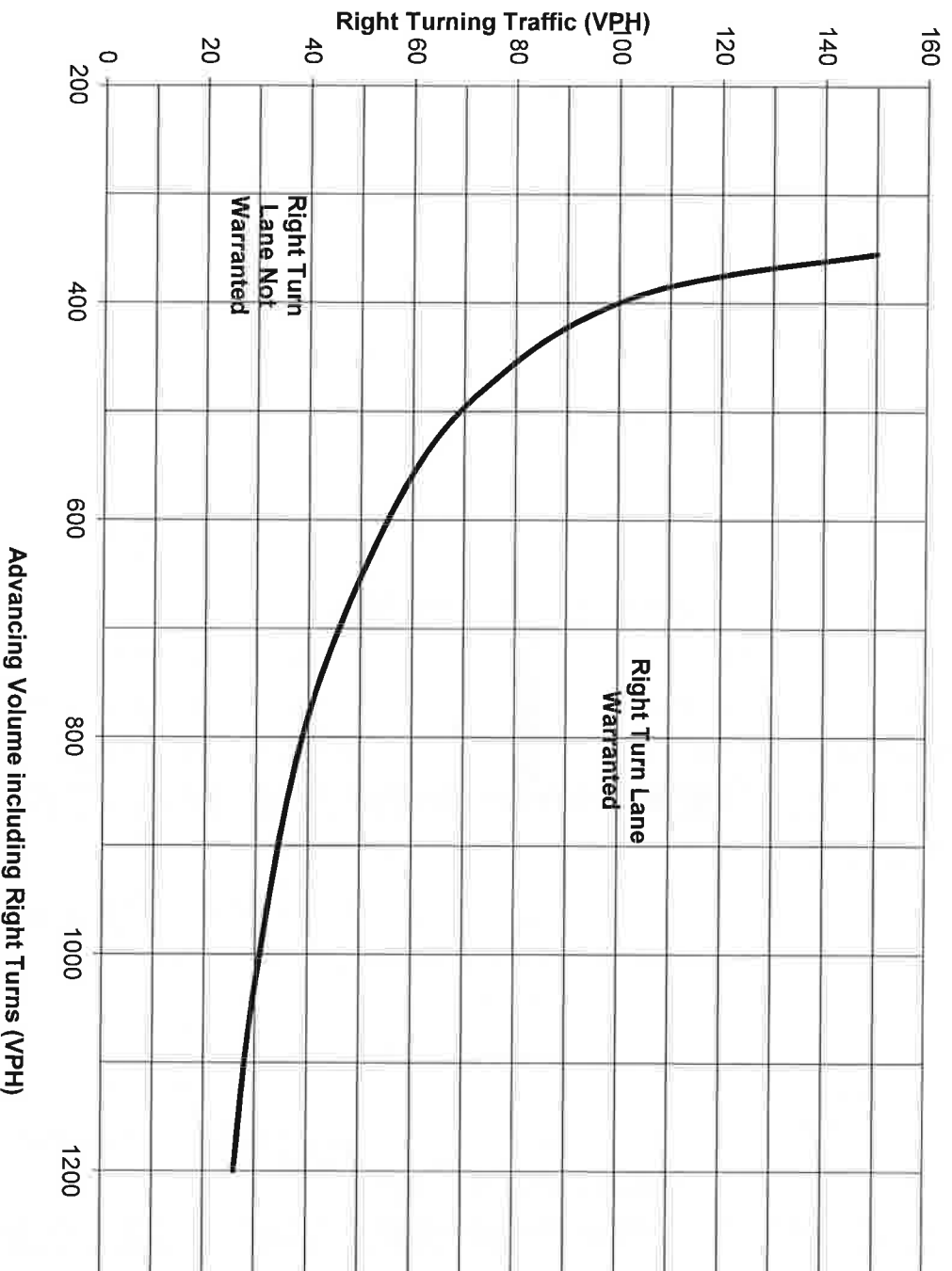
**Right Turn Lane Storage Length, Condition A:** N/A Feet  
**Condition B:** N/A Feet  
**Condition C:** N/A Feet  
**Required Right Turn Lane Storage Length:** N/A Feet

**Additional Findings:** N/A

Additional Comments / Justifications:

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways  
(40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

Turn Lane Warrant and Length Analysis  
Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.		
Intersection & Approach Description:	West Pleasant Grove Road and Proposed West Site Access - Alternative A Eastbound West Pleasant Grove Road Right-Turn Lane		
Analysis Period:	2028 Design	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized	Type of Analysis:	Right Turn Lane
Posted Speed Limit (MPH):	35	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Type of Terrain:	Rolling		

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement	Left	Through	Right	Include?	Volume	% Trucks	PCEV	Right Turn Lane Volume Calculations	
								Advancing Volume	Opposing Volume
Advancing	Left	No	0	No	0	0.0%	N/A	Advancing Volume:	N/A
	Through	-	0	-	0	0.0%	N/A	Opposing Volume:	N/A
	Right	Yes	0	Yes	0	0.0%	N/A	Left Turn Volume:	N/A
Advancing	Left	No	0	No	0	0.0%	N/A	Advancing Volume:	N/A
	Through	-	0	-	0	0.0%	N/A	Opposing Volume:	N/A
	Right	Yes	0	Yes	0	0.0%	N/A	Left Turn Volume:	N/A
Opposing	Left	No	0	No	0	0.0%	N/A	Advancing Volume:	N/A
	Through	-	0	-	0	0.0%	N/A	Opposing Volume:	N/A
	Right	Yes	0	Yes	0	0.0%	N/A	Left Turn Volume:	N/A
Advancing	Left	No	15	-	15	2.0%	16	Advancing Volume:	33
	Through	-	17	-	17	0.0%	17	Right Turn Volume:	16
	Right	No	0	No	0	0.0%	N/A		

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <b>N/A</b>	Applicable Warrant Figure: <b>Figure 9</b>
Warrant Met?: <b>N/A</b>	Warrant Met?: <b>No</b>

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	16
Cycles Per Hour (Assumed):	60
Cycles Per Hour (if Known):	
Average # of Vehicles/Cycle:	N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)		Turn Demand Volume	
	25-35	40-45	High	Low
Signalized	High	Low	A	A
	A	B or C	B or C	B or C
Unsignalized	High	Low	A	A
	A	B or C	B	B

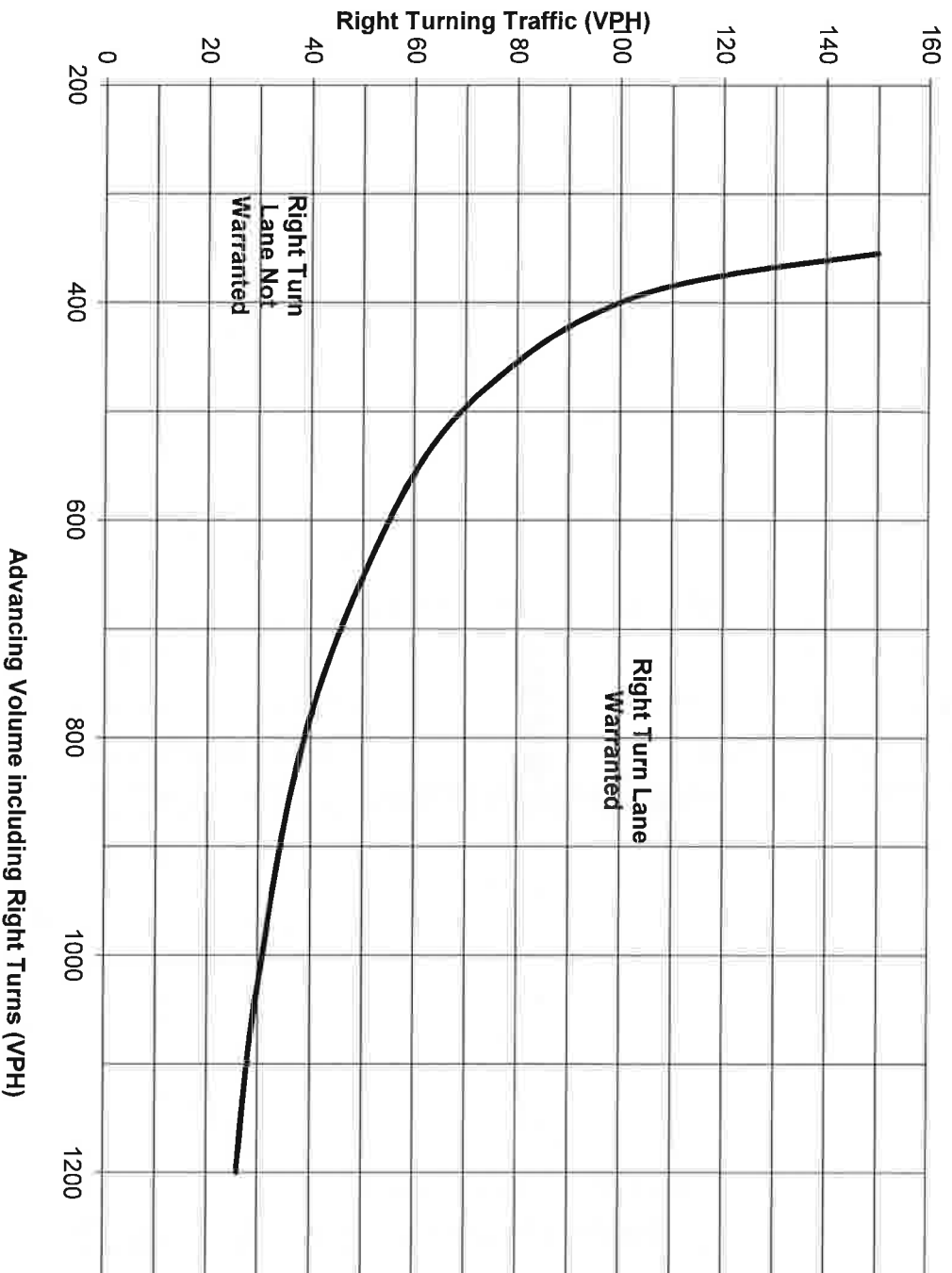
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: **N/A**

Additional Comments / Justifications:



Figure 9. Warrant for right turn lanes on two-lane roadways  
(40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point



# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Date:** 7/26/2017  
**Conducted By:** TML  
**Checked By:** BGG  
**Agency/Company Name:** McMahon Associates, Inc.

**Intersection & Approach Description:** West Pleasant Grove Road and Proposed West Site Access - Alternative A  
 Westbound West Pleasant Grove Road Left-Turn Lane

**Analysis Period:** 2028 Design  
**Design Hour:** AM Peak Hour  
**Intersection Control:** Unsignalized  
**Posted Speed Limit (MPH):** 35  
**Type of Terrain:** Rolling

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Type of Analysis:** Left or Right-Turn Lane Analysis? Left Turn Lane

## VOLUME CALCULATIONS

**Left Turn Lane Volume Calculations**

Movement	Left	Right	Through	Right
Advancing	18	17	185	199
Opposing	18	17	185	199
Advancing	Yes	Yes	No	No
Opposing	No	No	Yes	Yes
Volume	17	17	185	199
% Trucks	2.0%	2.0%	5.0%	5.0%
PCEV	18	17	199	217
Advancing Volume:	68	68	199	217
Opposing Volume:	18	18	199	217
% Left Turns in Advancing Volume:	8.29%			

**Right Turn Lane Volume Calculations**

Movement	Left	Right	Through	Right
Advancing	0	0	0	0
Opposing	0	0	0	0
Advancing	No	No	Yes	Yes
Opposing	Yes	Yes	No	No
Volume	0	0	0	0
% Trucks	0.0%	0.0%	0.0%	0.0%
PCEV	N/A	N/A	N/A	N/A
Advancing Volume:	N/A	N/A	N/A	N/A
Opposing Volume:	N/A	N/A	N/A	N/A

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:** Figure 1  
**Warrant Met?:** No

**Right Turn Lane Warrant Findings:** N/A  
**Warrant Met?:** N/A

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Unsignalized  
**Design Hour Volume of Turning Lane:** 18  
**Cycles Per Hour (Assumed):** 60  
**Average # of Vehicles/Cycle:** N/A

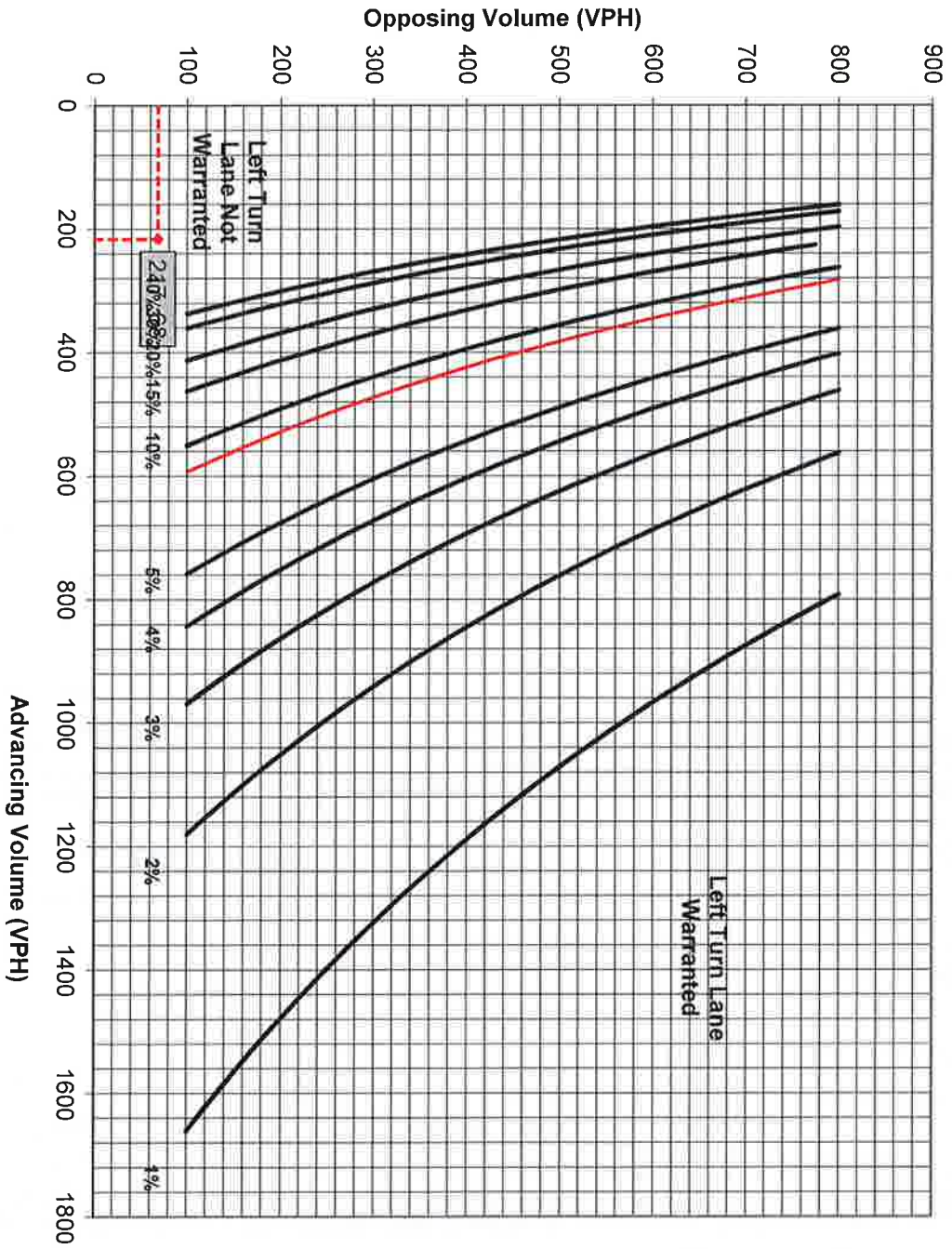
PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)		Turn Demand Volume	
	25-35	40-45	High	Low
Signalized	High	Low	A	A
	A	A	B or C	B or C
Unsignalized	High	Low	A	A
	A	A	B or C	B or C

**Left Turn Lane Storage Length, Condition A:** N/A Feet  
**Condition B:** N/A Feet  
**Condition C:** N/A Feet  
**Required Left Turn Lane Storage Length:** N/A Feet

**Additional Findings:** N/A

**Additional Comments / Justifications:**



**Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)**

• Volume Data Point  
 — 8.3%

Turn Lane Warrant and Length Analysis  
Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Westtown Township  
 County: Chester County  
 PennDOT Engineering District: 6

Analysis Date: 7/26/2017  
 Conducted By: TML  
 Checked By: BGG  
 Agency/Company Name: McMahon Associates, Inc.

Intersection & Approach Description: West Pleasant Grove Road and Proposed West Site Access - Alternative A  
 Westbound West Pleasant Grove Road Left-Turn Lane  
 Analysis Period: 2028 Design  
 Design Hour: PM Peak Hour  
 Intersection Control: Unsignalized  
 Posted Speed Limit (MPH): 35  
 Type of Terrain: Rolling

Number of Approach Lanes: 1  
 Undivided or Divided Highway: Undivided  
 Left or Right-Turn Lane Analysis?: Left Turn Lane  
 Type of Analysis: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement	Left	Thorough	Right	Include?	Volume	% Trucks	PCEV
Advancing	Yes	-	Right	Yes	60	2.0%	62
	No	-	Thorough	No	429	1.0%	436
Opposing	Yes	-	Right	Yes	15	2.0%	16
	No	-	Thorough	No	0	0.0%	N/A

Advancing Volume: 498  
 Opposing Volume: 33  
 Left Turn Volume: 62  
 % Left Turns in Advancing Volume: 12.45%

Right Turn Lane Volume Calculations

Movement	Left	Thorough	Right	Include?	Volume	% Trucks	PCEV
Advancing	Yes	-	Right	Yes	0	0.0%	N/A
	No	-	Thorough	No	0	0.0%	N/A
Opposing	Yes	-	Right	Yes	0	0.0%	N/A
	No	-	Thorough	No	0	0.0%	N/A

Advancing Volume: N/A  
 Opposing Volume: N/A  
 Right Turn Volume: N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings: **Figure 1**  
 Warrant Met?: **No**

Right Turn Lane Warrant Findings: **N/A**  
 Warrant Met?: **N/A**  
 Applicable Warrant Figure: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized  
 Design Hour Volume of Turning Lane: 62  
 Cycles Per Hour (Assumed): 60  
 Cycles Per Hour (if Known):   
 Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Speed (MPH)	25-35	40-45	50-60
Turn Demand Volume	High	Low	High
Type of Traffic Control	High	Low	High
Signalized	A	A	A
Unsignalized	A	B or C	B or C

Left Turn Lane Storage Length, Condition A: N/A Feet

Condition B: N/A Feet

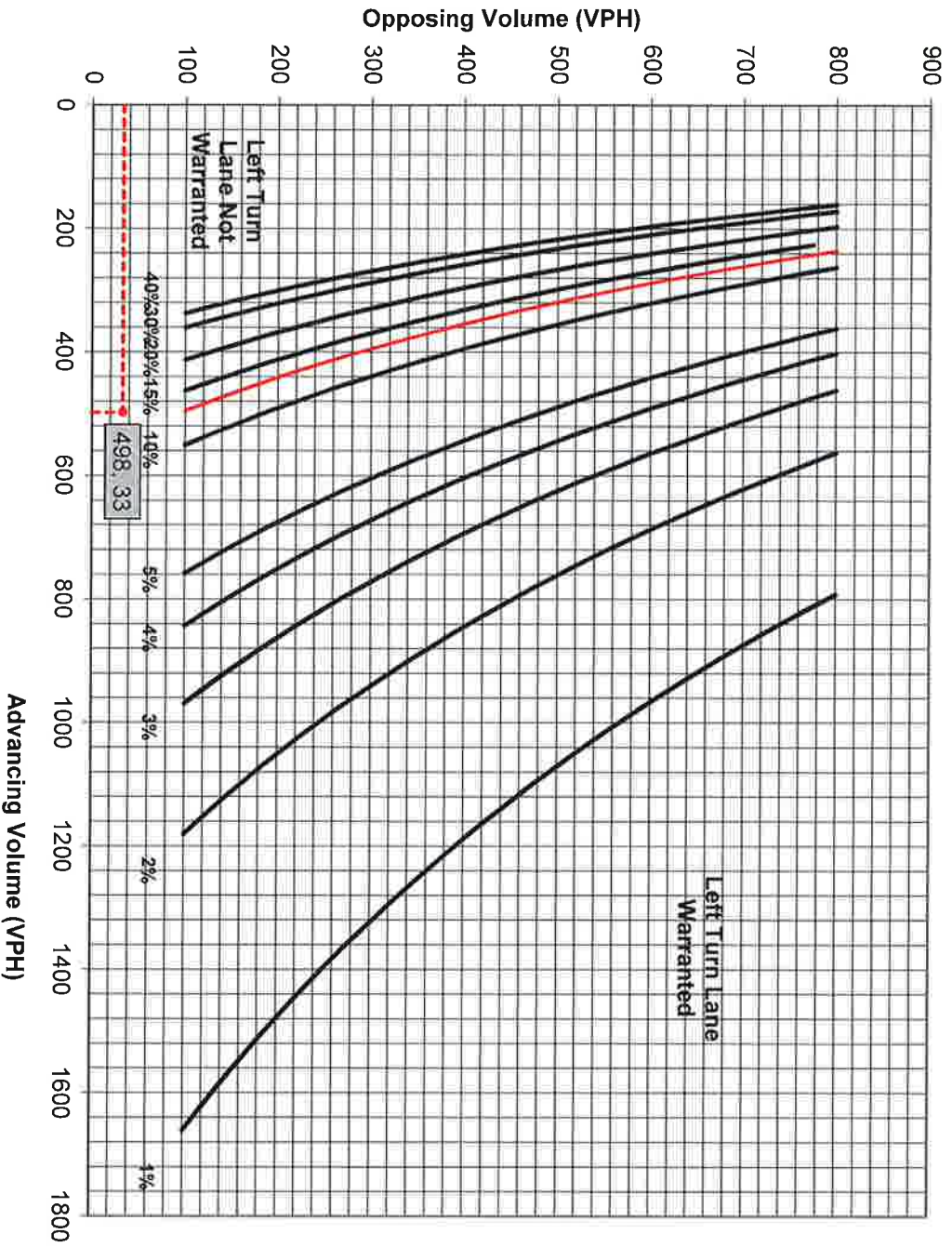
Condition C: N/A Feet

Required Left Turn Lane Storage Length: N/A Feet

Additional Findings: N/A

Additional Comments / Justifications:





**Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)**

• Volume Data Point:  
— 12.4%

**West Pleasant Grove Road & East Site Access**

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.		
Intersection & Approach Description:	West Pleasant Grove Road and Proposed East Site Access - Alternative A Eastbound West Pleasant Grove Road Right-Turn Lane		
Analysis Period:	2028 Design	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Posted Speed Limit (MPH):	35	Type of Analysis:	Right Turn Lane
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations										
Movement	Left	Right	Include?	Volume	% Trucks	PCEV	Right Turn Lane Volume Calculations			Right Turn Volume: 88
							Advancing	Thorough	Right	
Advancing	0	0	No	0	0.0%	N/A	0	0	0	88
Opposing	0	0	No	0	0.0%	N/A	0	0	0	
Advancing	0	0	Yes	0	0.0%	N/A	0	0	0	
Thorough	0	0	-	0	0.0%	N/A	0	0	0	
Right	0	0	-	0	0.0%	N/A	0	0	0	
Left	0	0	No	0	0.0%	N/A	0	0	0	
Thorough	0	0	-	0	0.0%	N/A	0	0	0	
Right	0	0	-	0	0.0%	N/A	0	0	0	
Include?	0	0	-	0	0.0%	N/A	0	0	0	
Volume	0	0	-	0	0.0%	N/A	0	0	0	
% Trucks	0	0	-	0	0.0%	N/A	0	0	0	
PCEV	0	0	-	0	0.0%	N/A	0	0	0	

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 9
Warrant Met?: N/A	Warrant Met?: NO

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized	Average # of Vehicles/Cycle:	N/A
Design Hour Volume of Turning Lane:	2		
Cycles Per Hour (Assumed):	60		
Cycles Per Hour (if known):			

PennDOT Publication 46, Exhibit 11-6	
Speed (MPH)	25-35
Turn Demand Volume	40-45
	50-60
High	Low
A	A
A	A
B or C	B or C
B	B
B or C	B or C
B	B

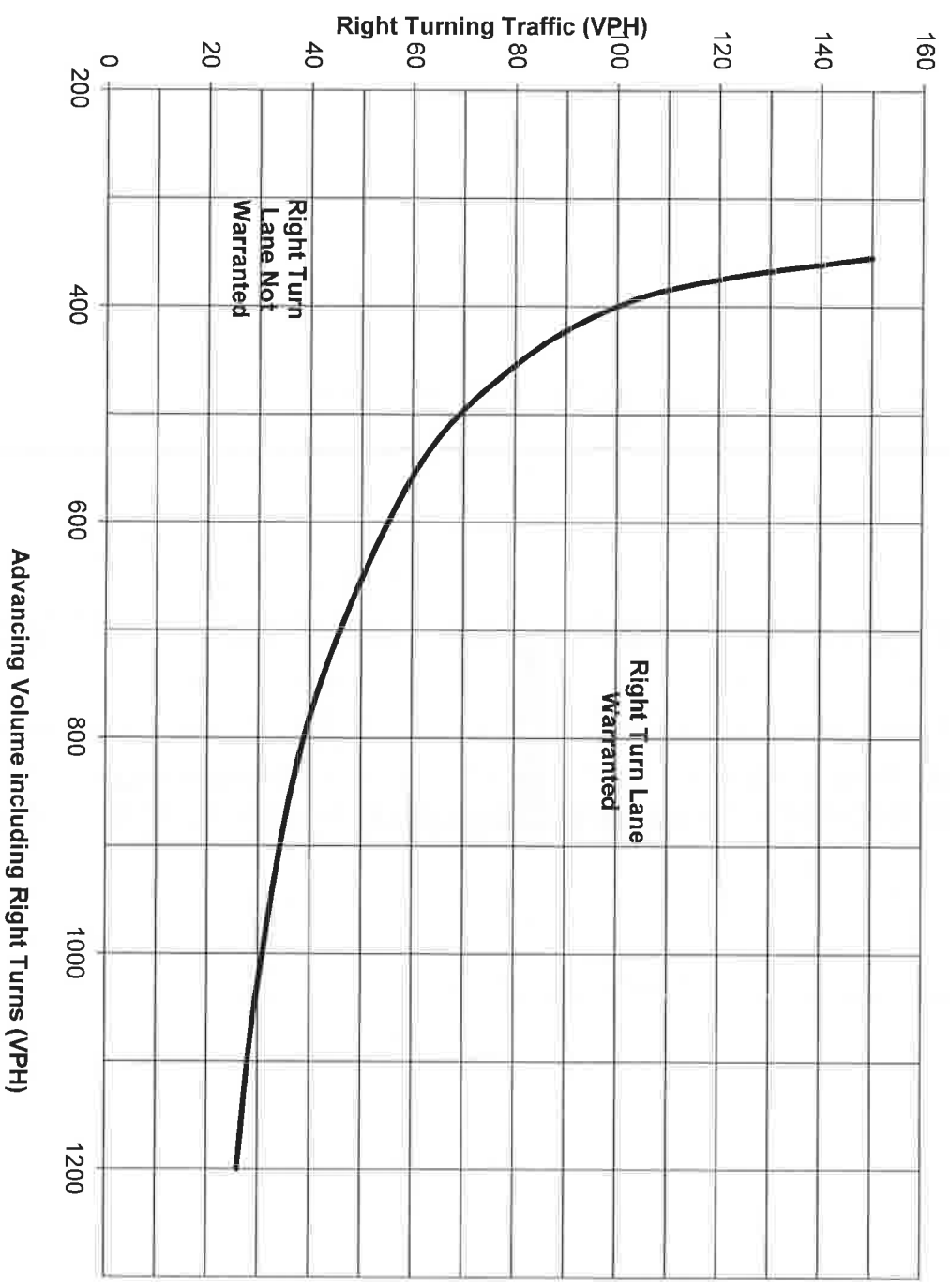
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:



Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.		
Intersection & Approach Description:	West Pleasant Grove Road and Proposed East Site Access - Alternative A Eastbound West Pleasant Grove Road Right-Turn Lane		
Analysis Period:	2028 Design	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Posted Speed Limit (MPH):	35	Type of Analysis:	Right Turn Lane
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Left	Through	Right	Include?	Volume	% Trucks
Advancing	Left	0	0	No	0	0.0%
	Through	0	0	-	0	0.0%
	Right	0	0	No	0	0.0%
Opposing	Left	0	0	No	0	0.0%
	Through	0	0	-	0	0.0%
	Right	0	0	No	0	0.0%
Right Turn Lane Volume Calculations						
Movement	Left	Through	Right	Include?	Volume	% Trucks
Advancing	Left	0	0	No	0	0.0%
	Through	0	0	-	0	0.0%
	Right	0	0	No	0	0.0%
Opposing	Left	0	0	No	0	0.0%
	Through	0	0	-	0	0.0%
	Right	0	0	No	0	0.0%
Advancing	Left	0	0	No	0	0.0%
	Through	0	0	-	0	0.0%
	Right	0	0	No	0	0.0%
Right Turn Lane Warrant Findings						
Applicable Warrant Figure:	N/A					
Warrant Met?:	N/A					

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized	Design Hour Volume of Turning Lane:	6
Cycles Per Hour (Assumed):	60	Average # of Vehicles/Cycle:	N/A
Cycles Per Hour (if Known):			

Type of Traffic Control		Speed (MPH)	Turn Demand Volume
High	Low	25-35	40-45
A	A	50-60	
B or C	B or C		
B	B		
A	A		
B or C	B or C		
B	B		

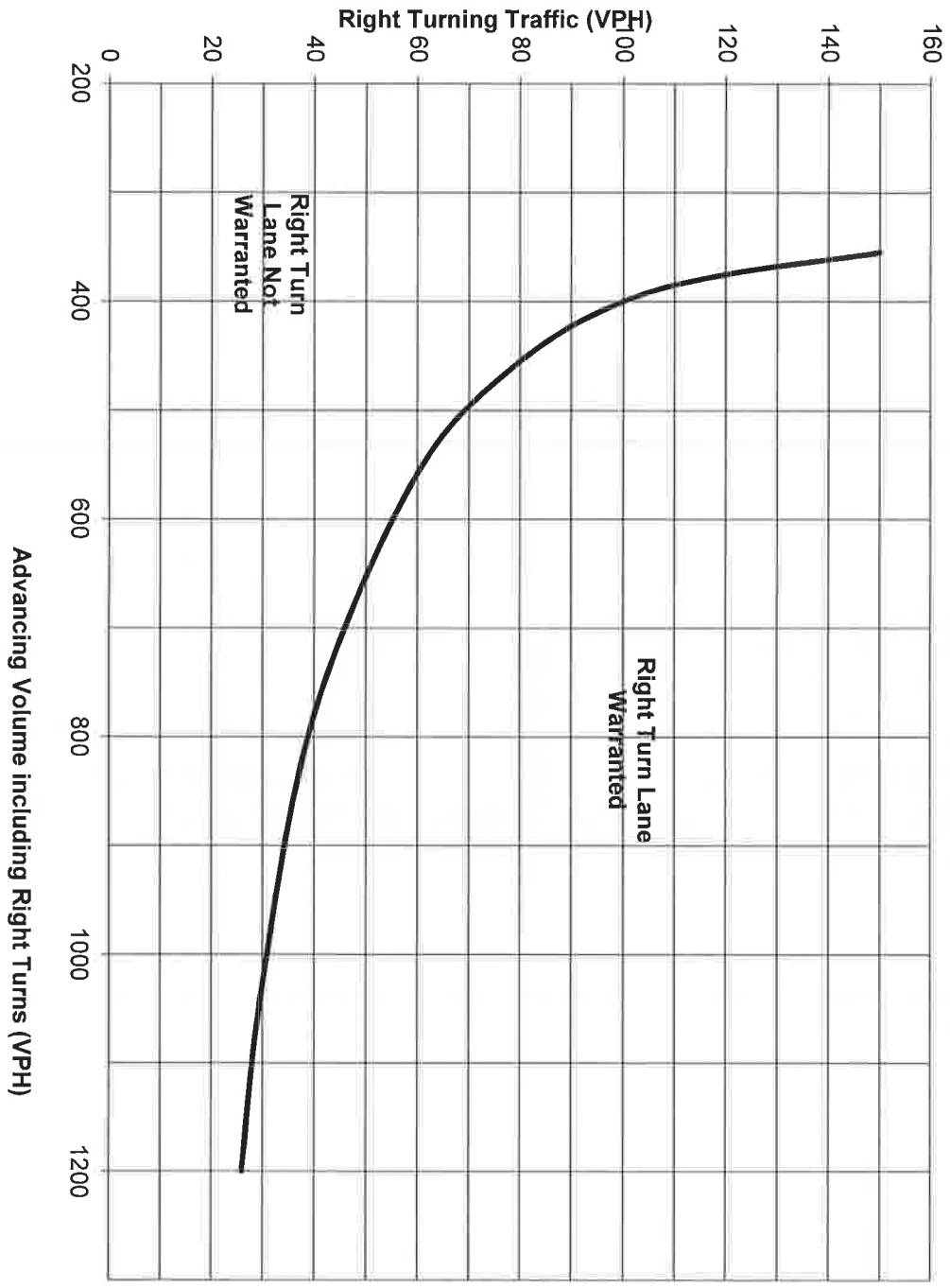
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:



Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Agency/Company Name:	McMahon Associates, Inc.
County:	Chester County	Checked By:	BGG
PennDOT Engineering District:	6	Conducted By:	TML
Analysis Period:	2028 Design	Analysis Date:	7/26/2017
Design Hour:	AM Peak Hour	Number of Approach Lanes:	1
Intersection Control:	Unsignalized	Undivided or Divided Highway:	Undivided
Posted Speed Limit (MPH):	35	Left or Right-Turn Lane Analysis?:	Left Turn Lane
Type of Terrain:	Rolling	Type of Analysis:	Left Turn Lane

Intersection & Approach Description: West Pleasant Grove Road and Proposed East Site Access - Alternative A  
Westbound West Pleasant Grove Road Left-Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Left	Yes	2	2.0%	3	215	88
Right	No	0	0.0%	N/A	Left Turn Volume: 3	
Through	No	0	0.0%	N/A	Opposing Volume: 88	
Left	-	86	0.0%	86		
Right	Yes	1	2.0%	2		
Through	-	86	0.0%	86		
% Left Turns in Advancing Volume: 1.40%						
Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Left	Yes	2	2.0%	3	215	88
Right	No	0	0.0%	N/A	Left Turn Volume: 3	
Through	No	0	0.0%	N/A	Opposing Volume: 88	
Left	-	86	0.0%	86		
Right	Yes	1	2.0%	2		
Through	-	86	0.0%	86		

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings:	Right Turn Lane Warrant Findings:
Applicable Warrant Figure: <b>Figure 1</b>	Applicable Warrant Figure: <b>N/A</b>
Warrant Met?: <b>No</b>	Warrant Met?: <b>N/A</b>

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized	Design Hour Volume of Turning Lane:	3
Cycles Per Hour (Assumed):	60	Average # of Vehicles/Cycle:	N/A
Cycles Per Hour (If Known):			

Type of Traffic Control		Speed (MPH)	Turn Demand Volume
High	Low	25-35	High
High	Low	40-45	High
High	Low	50-60	High

PennDOT Publication 46, Exhibit 11-6

Left Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	N/A	Feet

Additional Findings: **N/A**

Additional Comments / Justifications:



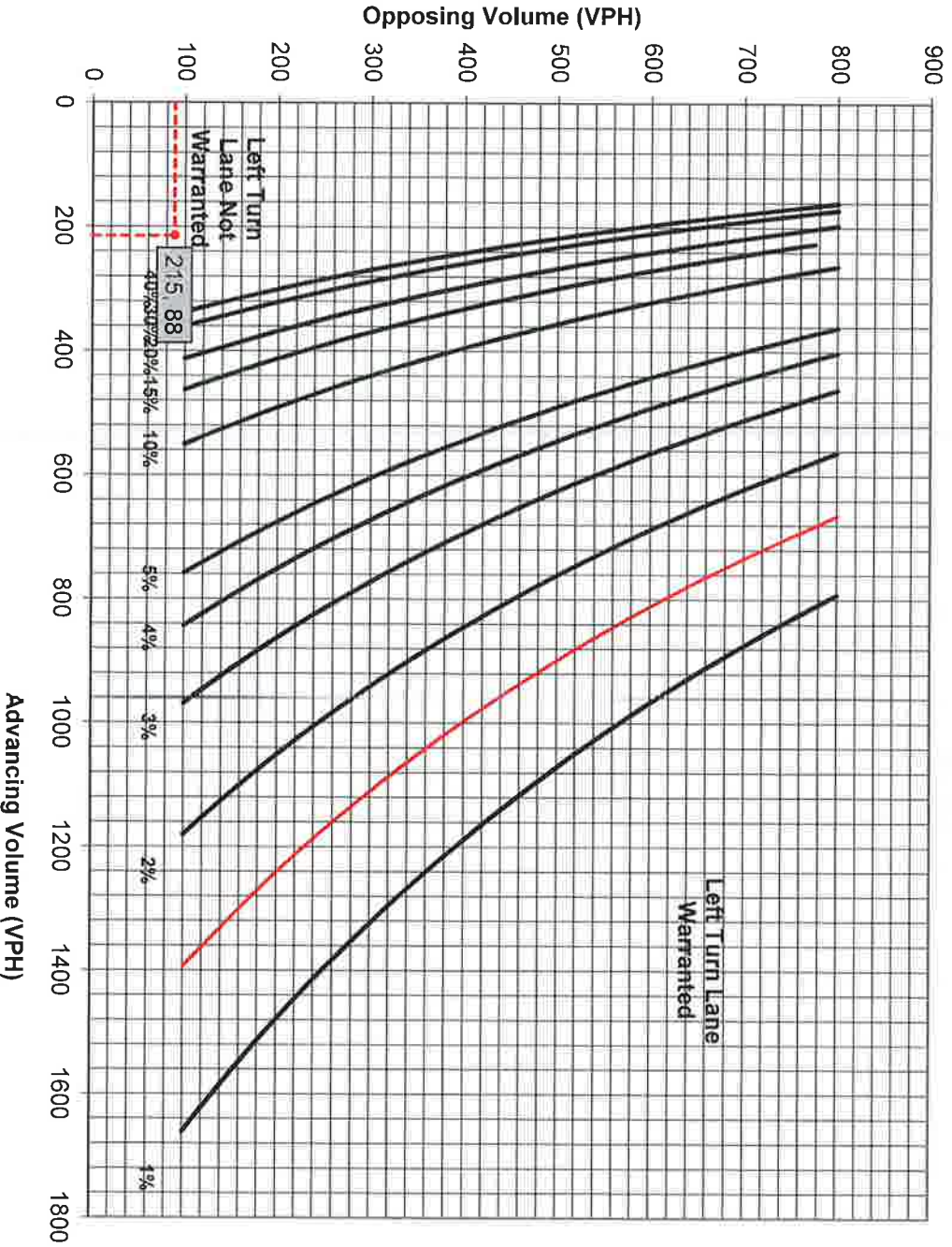


Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

• Volume Data Point  
 — 1.4%

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.	Number of Approach Lanes:	1
Intersection & Approach Description:	West Pleasant Grove Road and Proposed East Site Access - Alternative A Westbound West Pleasant Grove Road Left-Turn Lane		
Analysis Period:	2028 Design	Left or Right-Turn Lane Analysis?:	Left Turn Lane
Design Hour:	PM Peak Hour	Type of Analysis:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	35		
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement	Include?	Volume	% Trucks	PCEV	Left Turn Lane Volume Calculations				
Advancing	Left	9	2.0%	10	Advancing Volume: 504	Opposing Volume: 32	Left Turn Volume: 10	% Left Turns in Advancing Volume: 1.98%	
	Through	-	486	1.0%					
Opposing	Left	0	0.0%	N/A	Advancing Volume: N/A	Opposing Volume: N/A	Left Turn Volume: N/A	% Left Turns in Advancing Volume: N/A	
	Through	-	26	0.0%					
Advancing	Left	0	0.0%	N/A	Advancing Volume: N/A	Opposing Volume: N/A	Left Turn Volume: N/A	% Left Turns in Advancing Volume: N/A	
	Through	-	0	0.0%					
Opposing	Left	0	0.0%	N/A	Advancing Volume: N/A	Opposing Volume: N/A	Left Turn Volume: N/A	% Left Turns in Advancing Volume: N/A	
	Through	-	0	0.0%					

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <b>Figure 1</b>	Applicable Warrant Figure: <b>N/A</b>
Warrant Met?: <b>No</b>	Warrant Met?: <b>N/A</b>

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour of Turning Lane:	10
Cycles Per Hour (Assumed):	60
Cycles Per Hour (if Known):	
Average # of Vehicles/Cycle:	N/A

Type of Traffic Control	Speed (MPH)		Turn Demand Volume	
	25-35	40-45	High	Low
Signalized	A	A	A	A
	High	Low	High	Low
Unsignalized	A	A	B or C	B or C
	High	Low	B	B

Left Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	N/A	Feet

Additional Findings: **N/A**

Additional Comments / Justifications:



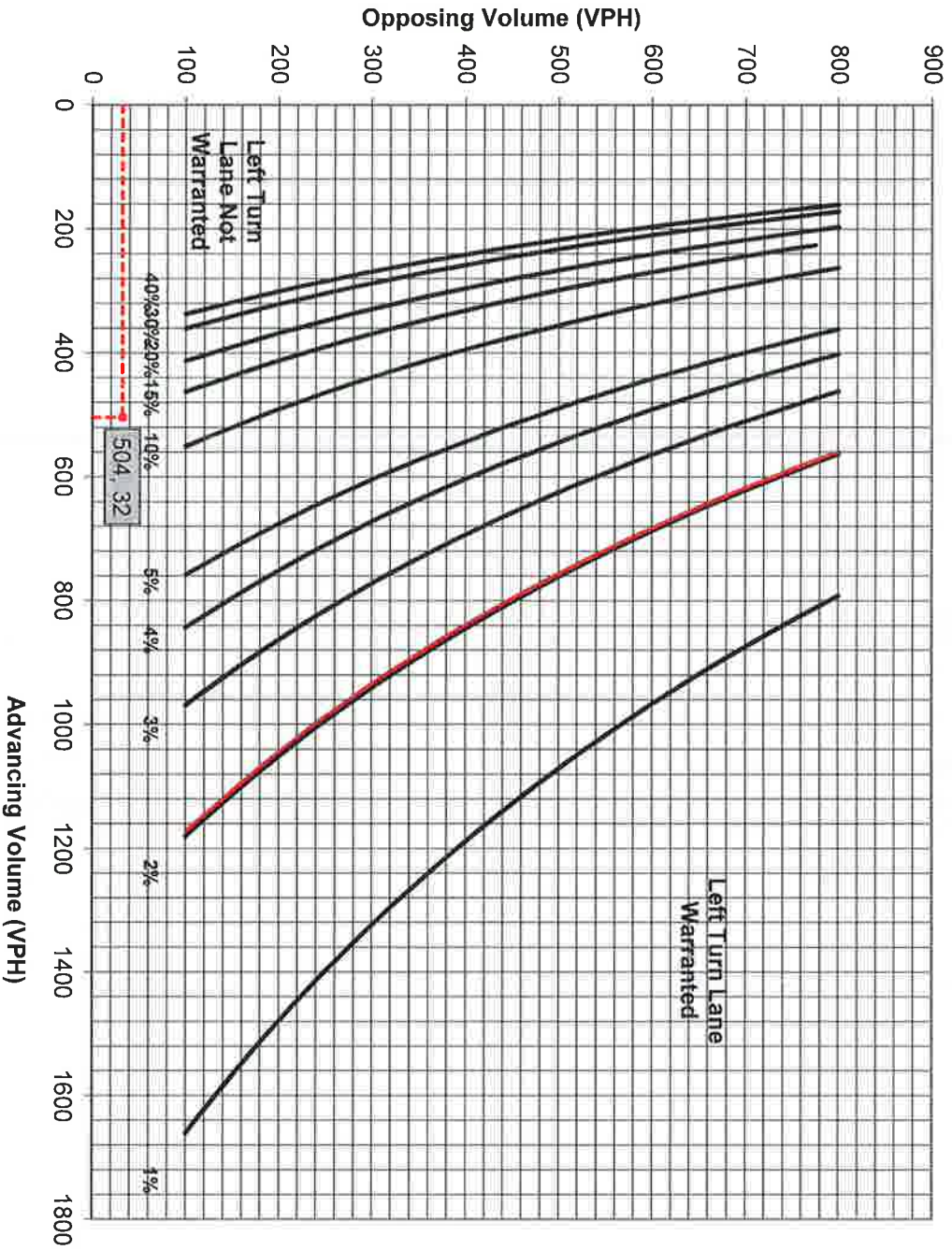


Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

• Volume Data Point  
 — 2.0%

**Off-Site Intersection Turn Lane Warrants**

**ATTACHMENT 2**

**Street Road (S.R. 0926) and New Street**

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Period:** 2028 Design  
**Design Hour:** AM Peak Hour  
**Intersection Control:** Signalized  
**Posted Speed Limit (MPH):** 45  
**Type of Terrain:** Rolling

**Street Description & Approach Description:** Street Road (S.R. 0926) and New Street - Alternative A  
 Eastbound Street Road (S.R. 0926) Left-Turn Lane

**Agency/Company Name:** McMahon Associates, Inc.  
**Analyst Date:** 7/26/2017  
**Conducted By:** TML  
**Checked By:** BGG

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Type of Analysis:** Left Turn Lane  
**Left or Right-Turn Lane Analysis?:** Left Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Left Turn Lane Volume	
					Advancing Volume	Opposing Volume
Advancing	Left	98	3.0%	103	1000	103
	Through	-	3.0%	892	552	103
Opposing	Right	5	0.0%	5		
	Through	-	27.0%	18	459	67
					% Left Turns in Advancing Volume: 10.30%	

Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Right Turn Lane Volume	
					Advancing Volume	Right Turn Volume
Advancing	Left	0	3.0%	N/A	N/A	N/A
	Through	-	3.0%	N/A	N/A	N/A
Opposing	Right	0	0.0%	N/A	N/A	N/A
	Through	-	0.0%	N/A	N/A	N/A

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:**

**Applicable Warrant Figure:**

**Warrant Met?:**

**Right Turn Lane Warrant Findings:**

**Applicable Warrant Figure:**

**Warrant Met?:**

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Signalized  
**Design Hour Volume of Turning Lane:** 103  
**Cycles Per Hour (Assumed):** Known  
**Cycles Per Hour (If Known):** 40  
**Average # of Vehicles/Cycle:**

PennDOT Publication 4b, Exhibit 11-6

Type of Traffic Control	Speed (MPH)		
	25-35	40-45	50-60
Signalized	High	High	High
	Low	Low	Low
Unsignalized	A	A	A
	A	B or C	B or C

**Left Turn Lane Storage Length, Condition A:**  Feet  
**Condition B:**  Feet  
**Condition C:**  Feet  
**Required Left Turn Lane Storage Length:**  Feet

**Additional Findings:**

Additional Comments / Justifications:





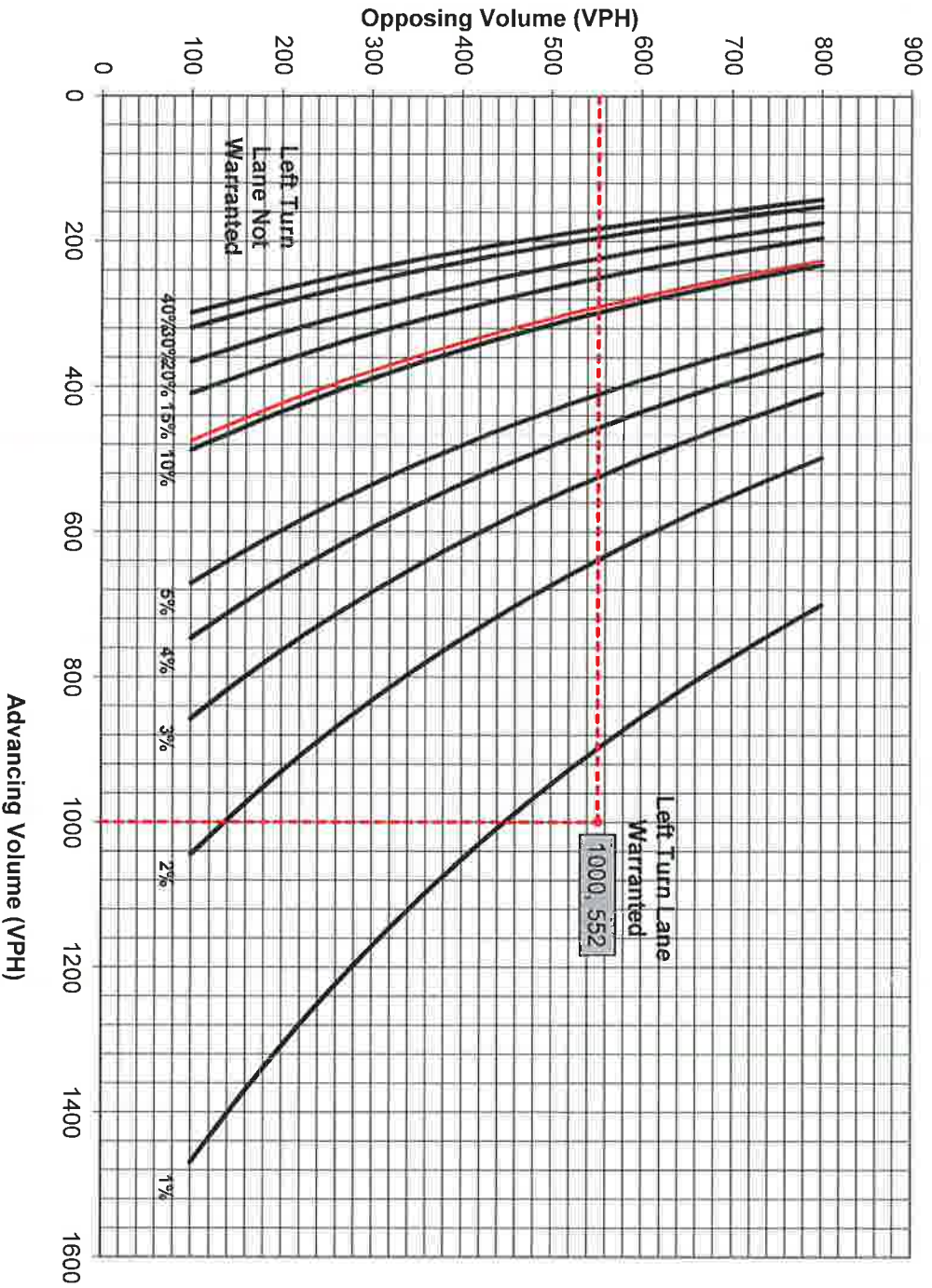


Figure 3. Warrant for left turn lanes on two-lane highways (45 mph speed, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Period:** 2028 Design  
**Design Hour:** PM Peak Hour  
**Intersection Control:** Signalized  
**Posted Speed Limit (MPH):** 45  
**Type of Terrain:** Rolling

**Street & Approach Description:** Eastbound Street Road (S.R. 0926) and New Street - Alternative A  
**Agency/Company Name:** McMahon Associates, Inc.  
**Checked By:** BGG  
**Conducted By:** TML  
**Analysis Date:** 7/26/2017

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Left or Right-Turn Lane Analysis?:** Left Turn Lane  
**Type of Analysis:** Left Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations							
Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume	Opposing Volume	% Left Turns in Advancing Volume
Advancing	Left	51	3.0%	54	810	17	6.13%
	Through	775	3.0%	810	17	32	
Opposing	Left	32	0.0%	32	499	76	6.13%
	Through	-	1.0%	507	0.0%	76	

**Right Turn Lane Volume Calculations**

Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume	Right Turn Volume
Advancing	Left	0	3.0%	N/A	0	N/A
	Through	-	3.0%	N/A	0	N/A
Right	-	0	0.0%	N/A	0	N/A

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:** **Figure 3**  
**Applicable Warrant Figure:** **Figure 3**  
**Warrant Met?:** **Yes**

**Right Turn Lane Warrant Findings:** **N/A**  
**Applicable Warrant Figure:** **N/A**  
**Warrant Met?:** **N/A**

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Signalized  
**Design Hour Volume of Turning Lane:** 54  
**Cycles Per Hour (Assumed):** Known  
**Cycles Per Hour (If Known):** 34  
**Average # of Vehicles/Cycle:** 2.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)			Turn Demand Volume		
	25-35	40-45	50-60	High	Low	High
Signalized	High	Low	High	A	A	A
	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	B	B	B	B

**Left Turn Lane Storage Length, Condition A:** N/A Feet  
**Condition B:** 125 Feet  
**Condition C:** 175 Feet  
**Required Left Turn Lane Storage Length:** 175 Feet

**Additional Findings:** N/A

Additional Comments / Justifications:



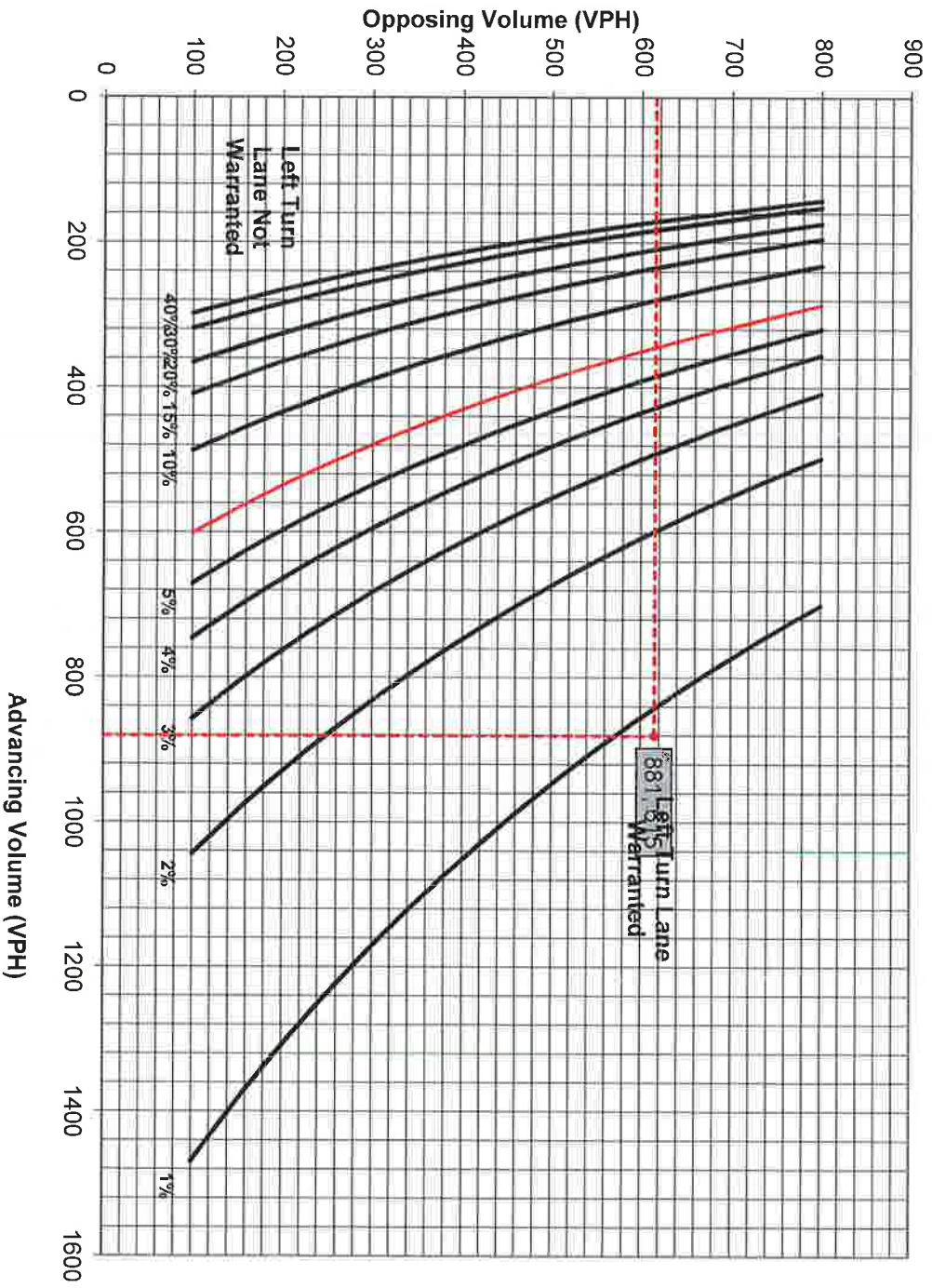


Figure 3. Warrant for left turn lanes on two-lane highways (45 mph speed, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

Volume Data Point  
6.1%

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Street Description:** Street Road (S.R. 0926) and New Street - Alternative A  
 Eastbound Street Road (S.R. 0926) Right-Turn Lane

**Analysis Period:** 2028 Design  
**Design Hour:** AM Peak Hour  
**Intersection Control:** Signalized  
**Posted Speed Limit (MPH):** 45  
**Type of Terrain:** Rolling

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Type of Analysis:** Right Turn Lane

**Agency/Company Name:** McMahon Associates, Inc.  
**Checked By:** BGG  
**Conducted By:** TML  
**Analysis Date:** 7/26/2017

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement	Include?	Volume	% Trucks	PCEV	Advancing		Opposing		% Left Turns in Advancing Volume:
					Left	Right	Left	Right	
Advancing	Yes	0	0.0%	N/A	0	0	0	0	N/A
Through	-	0	0.0%	N/A	0	0	0	0	N/A
Right	Yes	0	0.0%	N/A	0	0	0	0	N/A
Advancing	Yes	0	0.0%	N/A	0	0	0	0	N/A
Through	-	0	0.0%	N/A	0	0	0	0	N/A
Left	Yes	0	0.0%	N/A	0	0	0	0	N/A
Right	Yes	0	0.0%	N/A	0	0	0	0	N/A
Advancing	Yes	98	3.0%	PCEV	853	3.0%	892	1000	5
Through	-	5	0.0%	5	5	0.0%	5	1000	5
Right	Yes	5	0.0%	5	5	0.0%	5	1000	5

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:** N/A  
**Applicable Warrant Figure:** N/A  
**Warrant Met?:** N/A

**Right Turn Lane Warrant Findings:** Figure 10  
**Applicable Warrant Figure:** Figure 10  
**Warrant Met?:** No

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Signalized  
**Design Hour Volume of Turning Lane:** 5  
**Cycles Per Hour (Assumed):** Known  
**Cycles Per Hour (if Known):** 40  
**Average # of Vehicles/Cycle:** N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)		Turn Demand Volume	
	25-35	40-45	High	Low
Signalized	A	A	A	A
Signalized	A	A	B or C	B or C
Unsignalized	A	A	C	B
Unsignalized	A	A	B or C	B or C

**Right Turn Lane Storage Length, Condition A:** N/A Feet  
**Condition B:** N/A Feet  
**Condition C:** N/A Feet  
**Required Right Turn Lane Storage Length:** N/A Feet

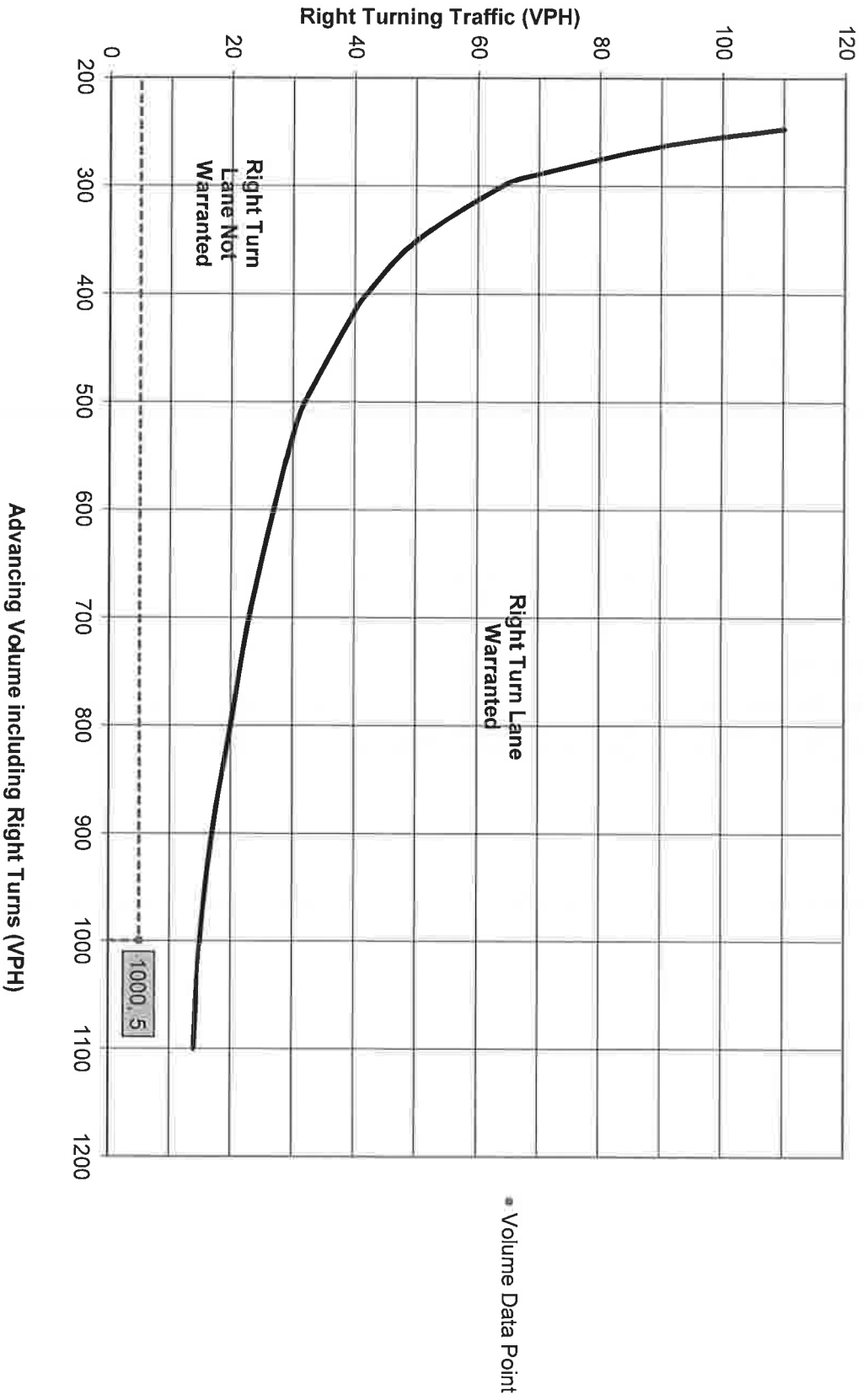
**Additional Findings:** N/A

Additional Comments / Justifications:

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:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.	Number of Approach Lanes:	1
Intersection & Approach Description:	Street Road (S.R. 0926) and New Street - Alternative A Eastbound Street Road (S.R. 0926) Right-Turn Lane		
Analysis Period:	2028 Design	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Design Hour:	PM Peak Hour	Type of Analysis:	Right Turn Lane
Intersection Control:	Signalized	Undivided or Divided Highway:	Undivided
Posted Speed Limit (MPH):	45		
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement		Include?	Volume	% Trucks	PCEV				
Advancing	Left	Yes	0	0.0%	N/A	Advancing Volume:	N/A		
	Through	-	0	0.0%	N/A		Opposing Volume:	N/A	
Opposing	Right	Yes	0	0.0%	N/A	Opposing Volume:	N/A		
	Through	-	0	0.0%	N/A		Left Turn Volume:	N/A	
Right Turn Lane Volume Calculations									
Movement		Include?	Volume	% Trucks	PCEV				
Advancing	Left	Yes	51	3.0%	54	Advancing Volume:	881		
	Right	-	17	0.0%	17		Right Turn Volume:	17	

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings:	Right Turn Lane Warrant Findings:
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 10
Warrant Met?: N/A	Warrant Met?: NO

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Design Hour Volume of Turning Lane:	17
Cycles Per Hour (Assumed):	Known		
Cycles Per Hour (If Known):	34	Average # of Vehicles/Cycle:	N/A

PennDOT Publication 46, Exhibit 11-6		Speed (MPH)	40-45	50-60
Turn Demand Volume			High	Low
Type of Traffic Control	Signalized	High	Low	High
		A	A	B or C
Signalized	A	A	B or C	B or C
	A	A	B	B
Unsignalized				

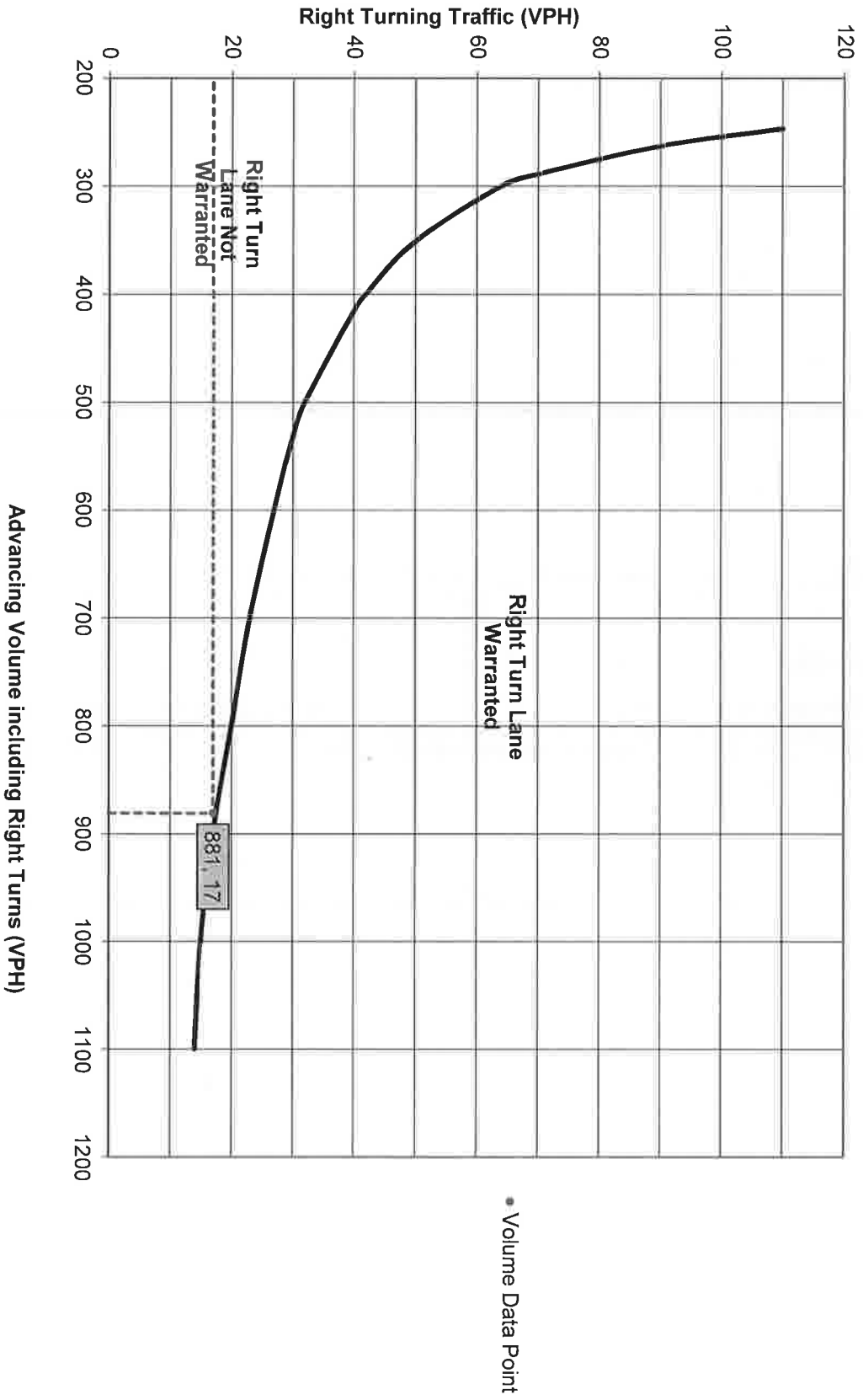
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:



Figure 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:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Period:** 2028 Design AM Peak Hour  
**Intersection Control:** Signalized  
**Posted Speed Limit (MPH):** 25  
**Type of Terrain:** Rolling

**Street & Approach Description:** Northbound New Street Left-Turn Lane  
**Agency/Company Name:** McMahon Associates, Inc.  
**Checked By:** BGG  
**Conducted By:** TML  
**Analysis Date:** 7/26/2017

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Left or Right-Turn Lane Analysis?:** Left Turn Lane  
**Type of Analysis:** Left Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement	Include?	Volume	% Trucks	PCEV	Advancing			Opposing	
					Left	Through	Right	Left	Through
Advancing	Yes	4	33.0%	6	104	33	69	302	181
Opposing	-	99	3.0%	104	33	69	302	181	187
% Left Turns in Advancing Volume: 4.20%									
Right Turn Lane Volume Calculations									
Movement	Include?	Volume	% Trucks	PCEV	Advancing			Opposing	
					Left	Through	Right	Left	Through
Advancing	Yes	4	33.0%	6	104	33	69	302	181
Opposing	-	99	3.0%	104	33	69	302	181	187
% Left Turns in Advancing Volume: 4.20%									
Left Turn Lane Warrant Findings									
<b>Left Turn Lane Warrant Figure:</b> Figure 1					<b>Right Turn Lane Warrant Figure:</b> N/A				
<b>Warrant Met?:</b> No					<b>Warrant Met?:</b> N/A				

## TURN LANE WARRANT FINDINGS

**Intersection Control:** Signalized  
**Design Hour of Turning Lane:** 6  
**Cycles Per Hour (Assumed):** Known  
**Cycles Per Hour (if Known):** 40  
**Average # of Vehicles/Cycle:** N/A

## TURN LANE LENGTH CALCULATIONS

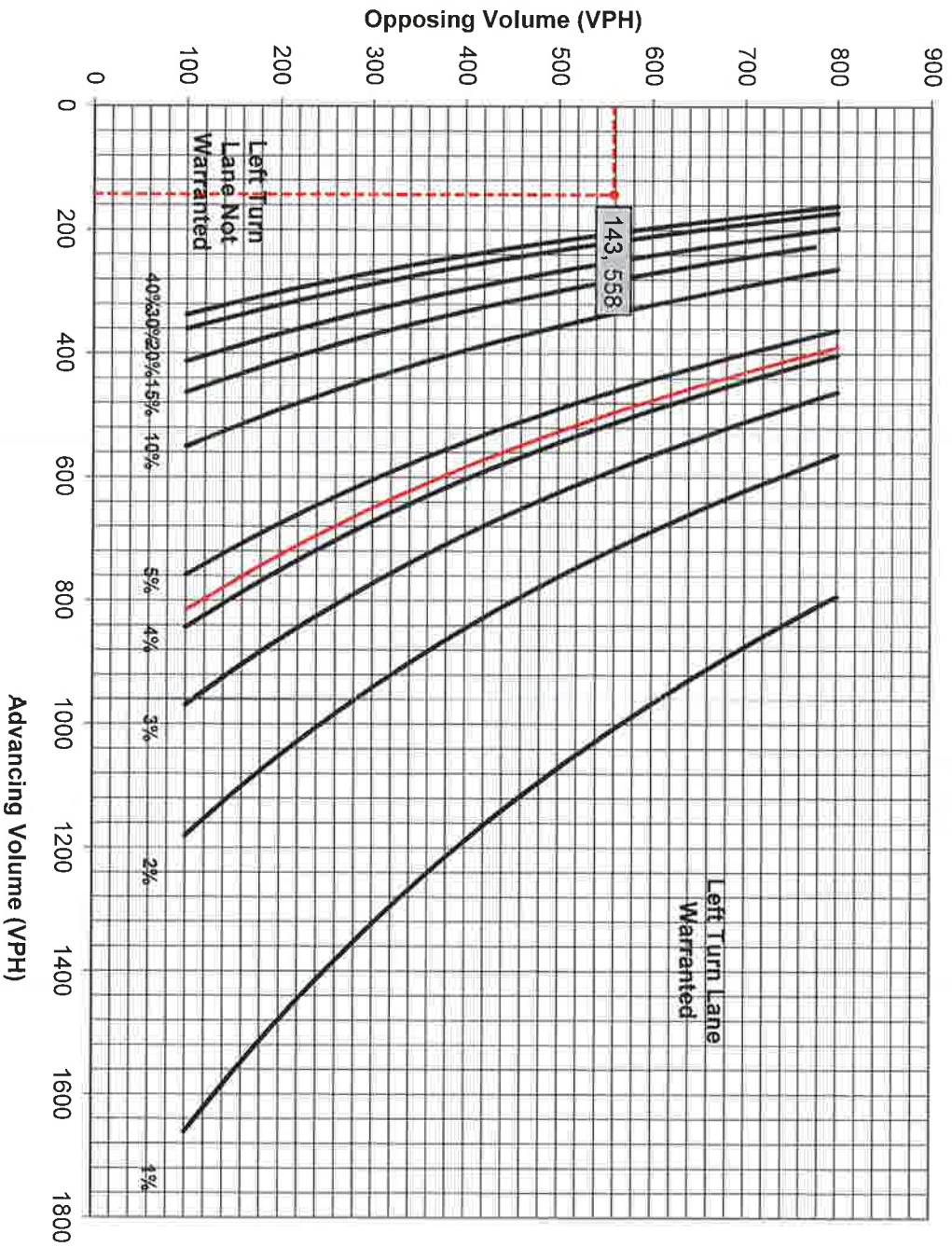
Type of Traffic Control	Speed (MPH)			Turn Demand Volume		
	25-35	40-45	50-60	High	Low	High
Signalized	A	A	A	A	A	A
Unsignalized	A	A	A	B or C	B or C	B or C

**Left Turn Lane Storage Length, Condition A:** N/A Feet  
**Condition B:** N/A Feet  
**Condition C:** N/A Feet  
**Required Left Turn Lane Storage Length:** N/A Feet

**Additional Findings:** N/A

Additional Comments / Justifications:





**Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)**

• Volume Data Point  
 — 4.2%

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6  
**Analysis Period:** 2028 Design PM Peak Hour  
**Design Hour:** 25  
**Intersection Control:** Signalized  
**Posted Speed Limit (MPH):** 25  
**Type of Terrain:** Rolling  
**Street Description:** Northbound New Street Left-Turn Lane  
**Street Name:** Street Road (S.R. 0926) and New Street - Alternative A  
**Agency/Company Name:** McMahon Associates, Inc.  
**Checked By:** BGG  
**Conducted By:** TML  
**Analysis Date:** 7/26/2017  
**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Type of Analysis:** Left or Right-Turn Lane Analysis? Left Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement	Include?	Volume	% Trucks	PCEV	Advancing		Opposing		% Left Turns in Advancing Volume: 4.35%
					Left	Right	Left	Right	
Advancing	Yes	12	0.0%	12	211	0.0%	53	244	
Through	-	211	0.0%	211	75	0.0%	240	244	
Right	Yes	50	3.0%	53	75	0.0%	240	244	
Left	Yes	363	1.0%	369	0	0.0%	0	0	
Right	-	0	0.0%	0	0	3.0%	0	0	
Through	-	0	3.0%	N/A	0	3.0%	0	0	
Left	No	0	3.0%	N/A	0	3.0%	0	0	
Right	-	0	0.0%	N/A	0	0.0%	0	0	

**Right Turn Lane Volume Calculations**  
**Advancing Volume:** 276  
**Opposing Volume:** 688  
**Left Turn Volume:** 12

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:** Figure 1  
**Warrant Met?:** NO  
**Right Turn Lane Warrant Findings:** N/A  
**Warrant Met?:** N/A

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Signalized  
**Design Hour Volume of Turning Lane:** 12  
**Cycles Per Hour (Assumed):** Known  
**Cycles Per Hour (if Known):** 34  
**Average # of Vehicles/Cycle:** N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)		Turn Demand Volume	
	25-35	40-45	High	Low
Signalized	A	A	A	A
	High	Low	High	Low
Unsignalized	A	A	B or C	B or C
	High	Low	B or C	B or C

**Left Turn Lane Storage Length, Condition A:** N/A Feet  
**Condition B:** N/A Feet  
**Condition C:** N/A Feet  
**Required Left Turn Lane Storage Length:** N/A Feet

**Additional Findings:** N/A

Additional Comments / Justifications:



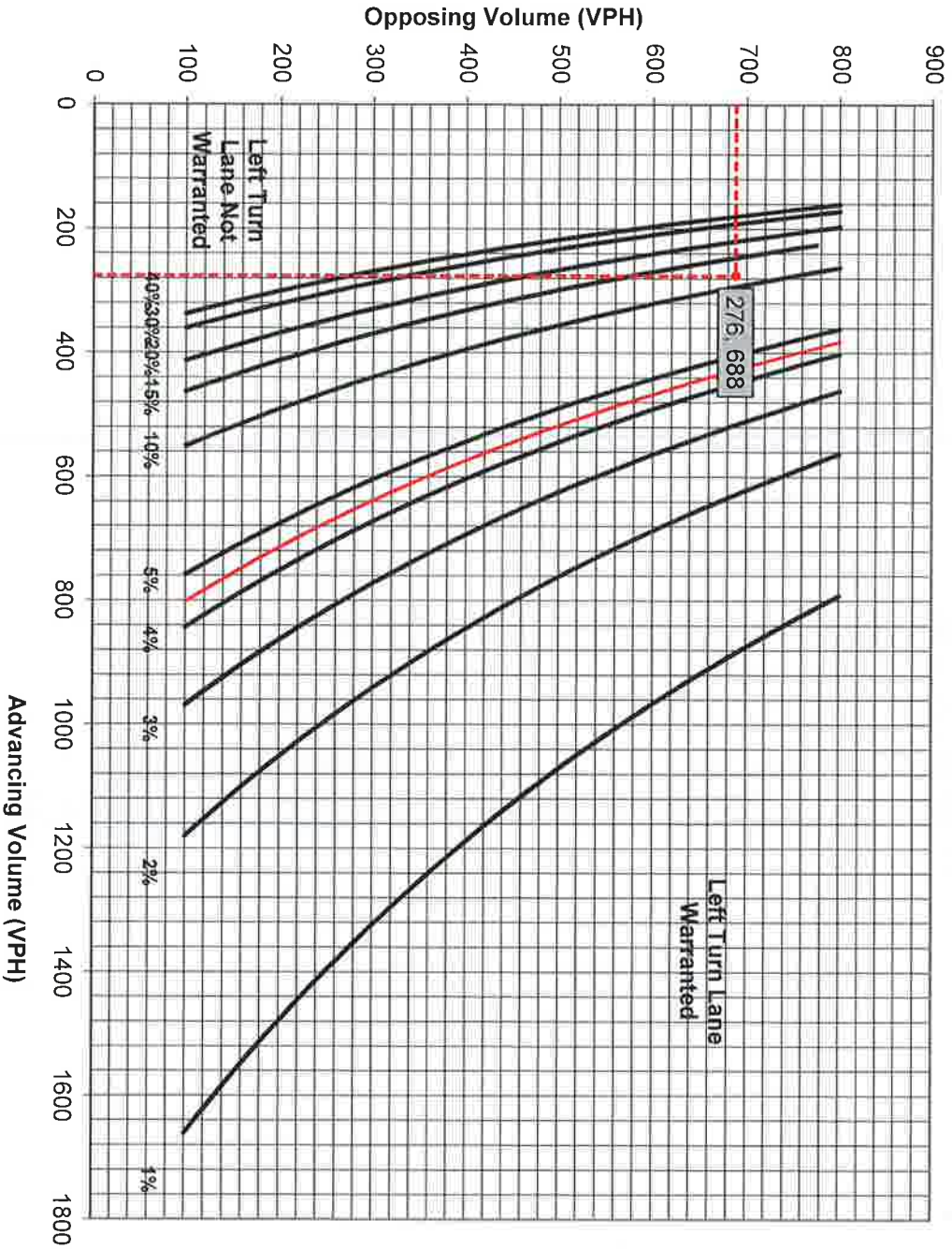


Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

• Volume Data Point  
 — 4.3%

Turn Lane Warrant and Length Analysis  
Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Checked By:	BGG
PennDOT Engineering District:	6	Agency/Company Name:	McMahon Associates, Inc.
Design Hour:	AM Peak Hour	Number of Approach Lanes:	1
Intersection Control:	Signalized	Undivided or Divided Highway:	Undivided
Posted Speed Limit (MPH):	25	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Type of Terrain:	Rolling	Street Road (S.R. 0926) and New Street - Alternative A Northbound New Street Right-Turn Lane	

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement		Include?	Volume	% Trucks	PCEV	Advancing Volume:
Advancing	Through	-	0	0.0%	N/A	N/A
	Right	Yes	0	0.0%	N/A	N/A
Opposing	Through	-	0	0.0%	N/A	N/A
	Left	Yes	0	0.0%	N/A	N/A
Advancing	Through	-	0	0.0%	N/A	N/A
	Right	Yes	0	0.0%	N/A	N/A
Opposing	Through	-	0	0.0%	N/A	N/A
	Left	Yes	0	0.0%	N/A	N/A
Right Turn Lane Volume Calculations						
Movement		Include?	Volume	% Trucks	PCEV	Advancing Volume:
Advancing	Through	-	99	3.0%	104	143
	Left	Yes	4	33.0%	6	33
Right Turn Lane Warrant Findings						
Applicable Warrant Figure: <b>N/A</b>						
Warrant Met?: <b>N/A</b>						
Applicable Warrant Figure: <b>Figure 9</b>						
Warrant Met?: <b>No</b>						

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Design Hour Volume of Turning Lane:	33
Cycles Per Hour (Assumed):	Known	Cycles Per Hour (If Known):	40
Average # of Vehicles/Cycle:	N/A	PennDOT Publication 46, Exhibit 11-6	

Type of Traffic Control	Speed (MPH)	
	25-35	40-45
Signalized	High	Low
	A	A
Unsignalized	High	Low
	A	A

Right Turn Lane Storage Length, Condition A:	N/A
Condition B:	N/A
Condition C:	N/A
Required Right Turn Lane Storage Length:	N/A

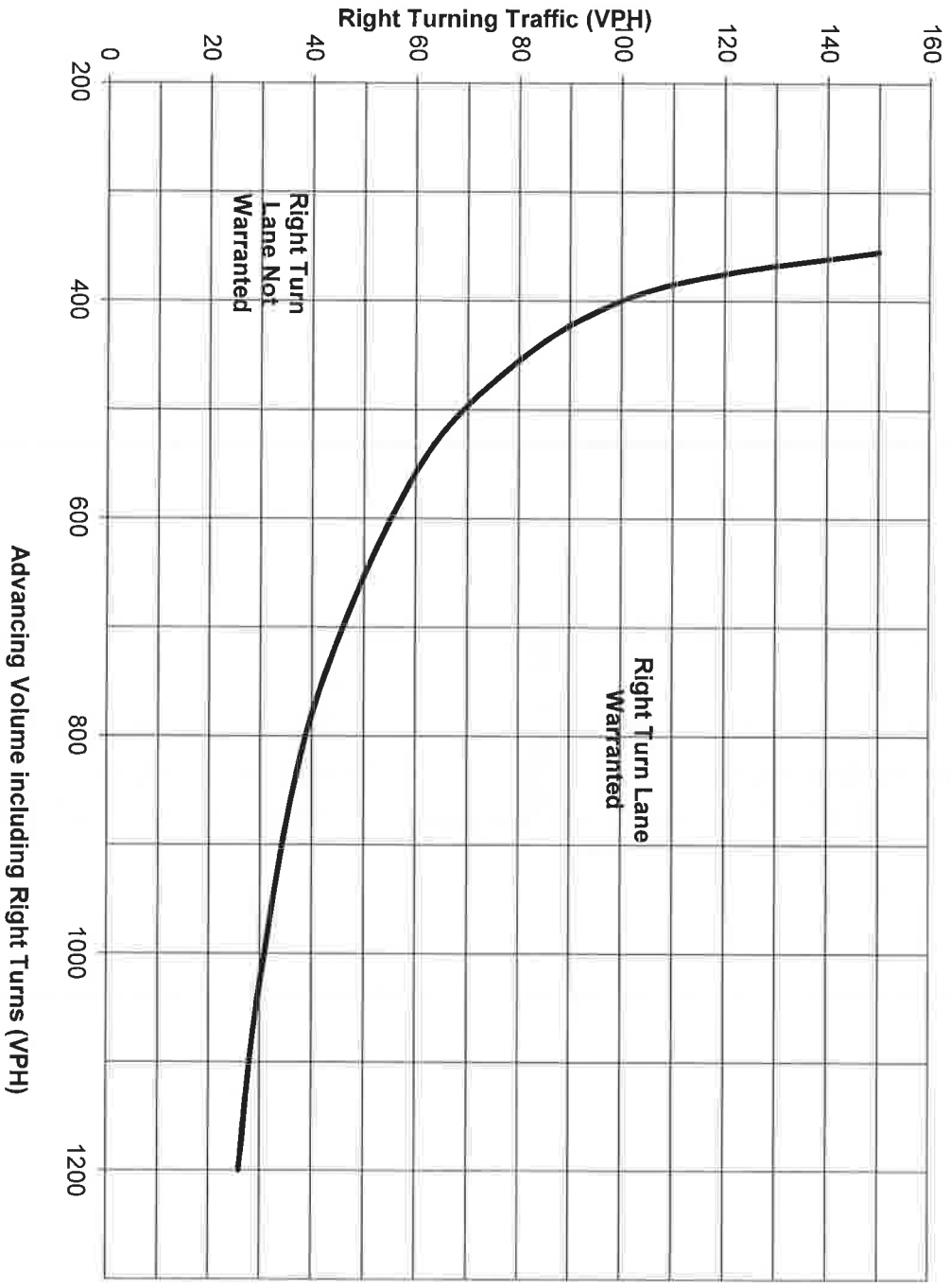
Additional Findings: **N/A**

Additional Comments / Justifications:

Additional Comments / Justifications:



Figure 9. Warrant for right turn lanes on two-lane roadways  
 (40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	PennDOT Engineering District:	6
County:	Chester County	Analysis Period:	2028 Design
Design Hour:	PM Peak Hour	Intersection Control:	Signalized
Posted Speed Limit (MPH):	25	Type of Terrain:	Rolling
Intersection & Approach Description:	Street Road (S.R. 0926) and New Street - Alternative A Northbound New Street Right-Turn Lane		
Analysis Date:	7/26/2017	Agency/Company Name:	McMahon Associates, Inc.
Conducted By:	TML	Number of Approach Lanes:	1
Checked By:	BGG	Undivided or Divided Highway:	Undivided
Right Turn Lane	Type of Analysis:	Left or Right-Turn Lane Analysis?	Right Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations												
Movement		Include?	Volume	% Trucks	PCEV	Right Turn Lane Volume Calculations						
Advancing	Left	Yes	0	0.0%	N/A	Advancing Volume:	N/A			Right Turn Volume:	276	
	Through	-	0	0.0%	N/A		% Left Turns in Advancing Volume:				53	
Opposing	Left	Yes	0	0.0%	N/A	Opposing Volume:	N/A			Right Turn Volume:	53	
	Through	-	0	0.0%	N/A		% Left Turns in Advancing Volume:				53	

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 9
Warrant Met?: N/A	Warrant Met?: No

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Design Hour Volume of Turning Lane:	53
Cycles Per Hour (Assumed):	Known	Average # of Vehicles/Cycle:	N/A
Cycles Per Hour (If Known):	34		

PennDOT Publication 46, Exhibit 11-6		Speed (MPH)		Turn Demand Volume	
25-35		40-45		50-60	
Type of Traffic Control	Signalized	High	Low	High	Low
	Unsignalized	A	A	B or C	B or C
		A	A	B	B

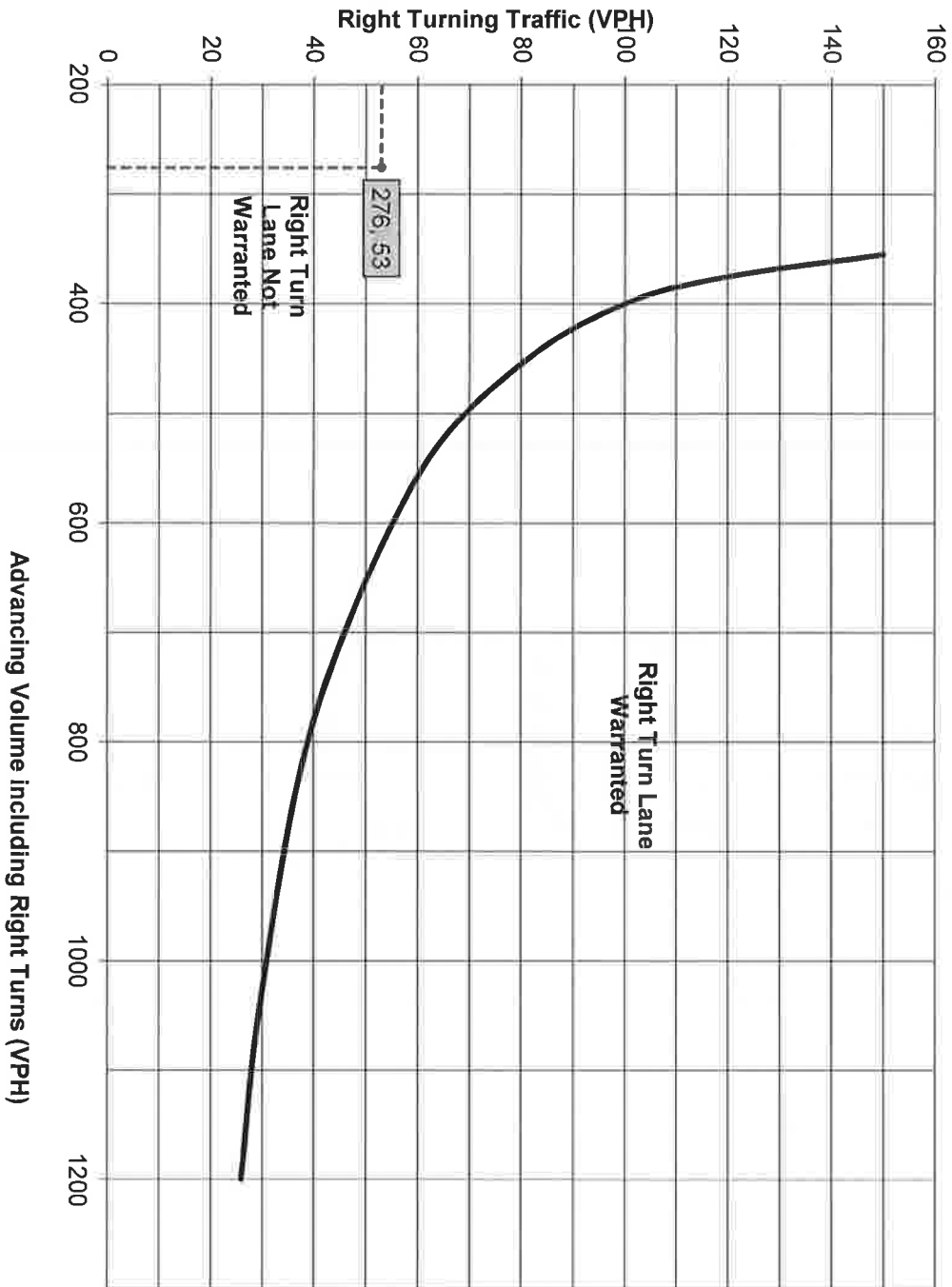
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:



Figure 9. Warrant for right turn lanes on two-lane roadways  
 (40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.		
Street Description:	Southbound New Street Left-Turn Lane		
Analysis Period:	2028 Design	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized	Type of Analysis:	Left or Right-Turn Lane Analysis?
Posted Speed Limit (MPH):	35	Left Turn Lane	
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Left	Yes	65	4.0%	69	558	
Through	-	302	0.0%	302	143	
Right	Yes	181	2.0%	187	69	
Left	Yes	4	33.0%	6		
Through	-	99	3.0%	104		
Right	Yes	29	9.0%	33		
Right Turn Lane Volume Calculations						
% Left Turns in Advancing Volume: 12.37%						
Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Left	Yes	65	4.0%	69	558	
Through	-	302	0.0%	302	143	
Right	Yes	181	2.0%	187	69	
Left	Yes	4	33.0%	6		
Through	-	99	3.0%	104		
Right	Yes	29	9.0%	33		

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <b>Figure 1</b>	Applicable Warrant Figure: <b>N/A</b>
Warrant Met?: <b>Yes</b>	Warrant Met?: <b>N/A</b>

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Average # of Vehicles/Cycle:	2.0
Design Hour Volume of Turning Lane:	69		
Cycles Per Hour (Assumed):	Known		
Cycles Per Hour (If Known):	40		

PennDOT Publication 46, Exhibit 11-6

Speed (MPH)	40-45	50-60
Turn Demand Volume	High	Low
Type of Traffic Control	High	Low
	Low	High
Signalized	A	A
Unsignalized	A or C	B or C

Left Turn Lane Storage Length, Condition A:	100	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	100	Feet

Additional Findings: **N/A**

Additional Comments / Justifications:





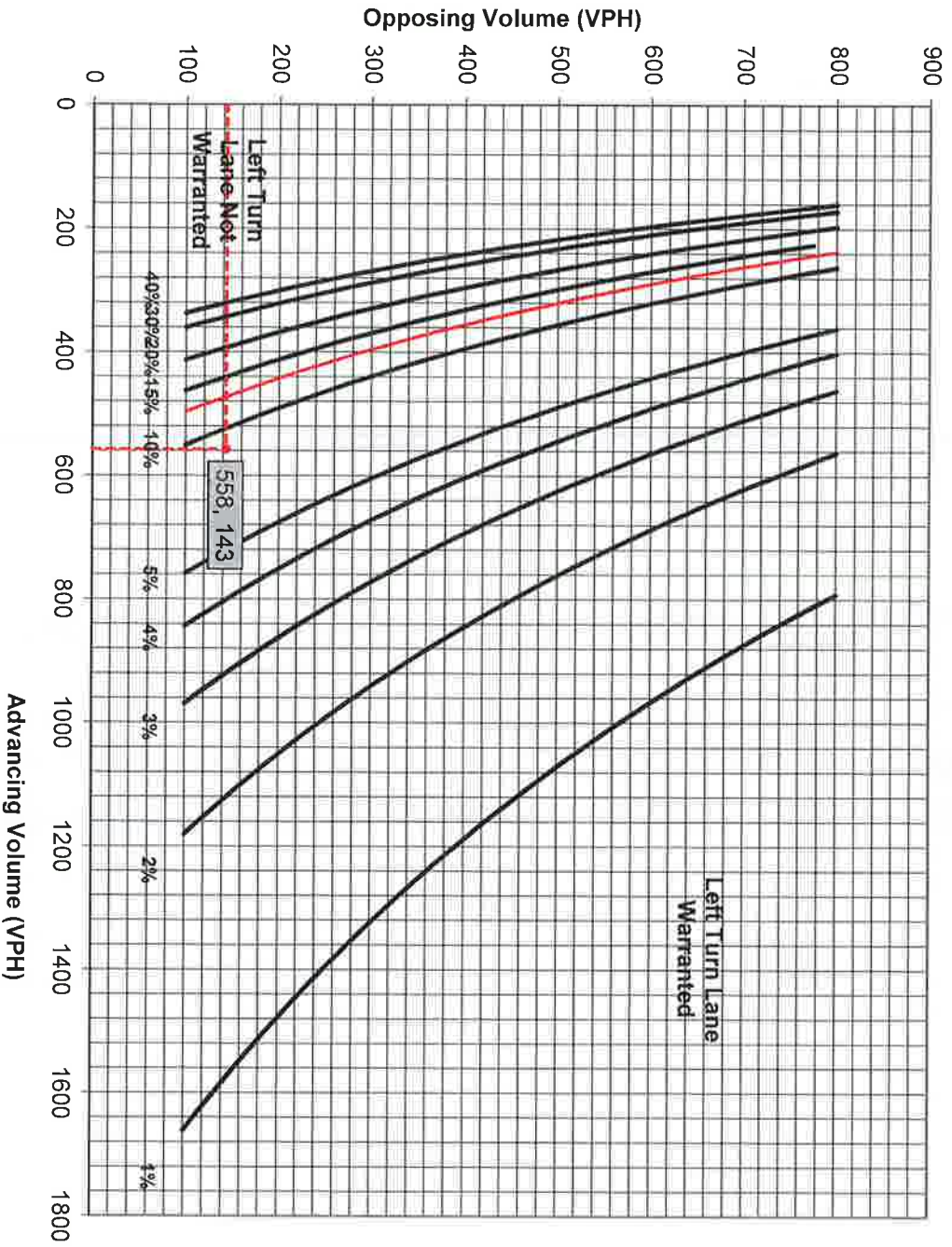


Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

• Volume Data Point  
 — 12.4%

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Date:** 7/26/2017  
**Conducted By:** TML  
**Checked By:** BGG  
**Agency/Company Name:** McMahon Associates, Inc.

**Street Road (S.R. 0926) and New Street - Alternative A**  
 Southbound New Street Left-Turn Lane

**Analysis Period:** 2028 Design  
**Design Hour:** PM Peak Hour  
**Intersection Control:** Signalized  
**Posted Speed Limit (MPH):** 35  
**Type of Terrain:** Rolling

**Left or Right-Turn Lane Analysis?:**  Left Turn Lane  Right Turn Lane  
**Type of Analysis:**

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	% Left Turns in Advancing Volume:		
				Advancing Volume	Opposing Volume	Left Turn Volume
Advancing	Left	75	0.0%	688	276	75
	Through	240	1.0%	244		
Opposing	Right	363	1.0%	369		
	Through	12	0.0%	12		
				211		
				50	3.0%	53

Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	% Left Turns in Advancing Volume:		
				Advancing Volume	Opposing Volume	Right Turn Volume
Advancing	Left	0	0.0%	N/A	N/A	N/A
	Through	0	3.0%	N/A		
Opposing	Right	0	0.0%	N/A		
	Through	0	3.0%	N/A		

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:**

**Applicable Warrant Figure:**

**Warrant Met?:**

**Right Turn Lane Warrant Findings:**

**Applicable Warrant Figure:**

**Warrant Met?:**

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Signalized  
**Design Hour of Turning Lane:** 75  
**Cycles Per Hour (Assumed):** Known  
**Cycles Per Hour (if known):** 34

**Average # of Vehicles/Cycle:**

**PennDOT Publication 46, Exhibit 11-6**  
**Speed (MPH):** 25-35, 40-45, 50-60  
**Turn Demand Volume:** High, Low  
**Type of Traffic Control:** Signalized, Unsignalized

High	Low	High	Low
A	A	B or C	B or C
A	A	B	B

**Left Turn Lane Storage Length, Condition A:**  Feet  
**Condition B:**  Feet  
**Condition C:**  Feet  
**Required Left Turn Lane Storage Length:**  Feet  
**Additional Findings:**

**Additional Comments / Justifications:**



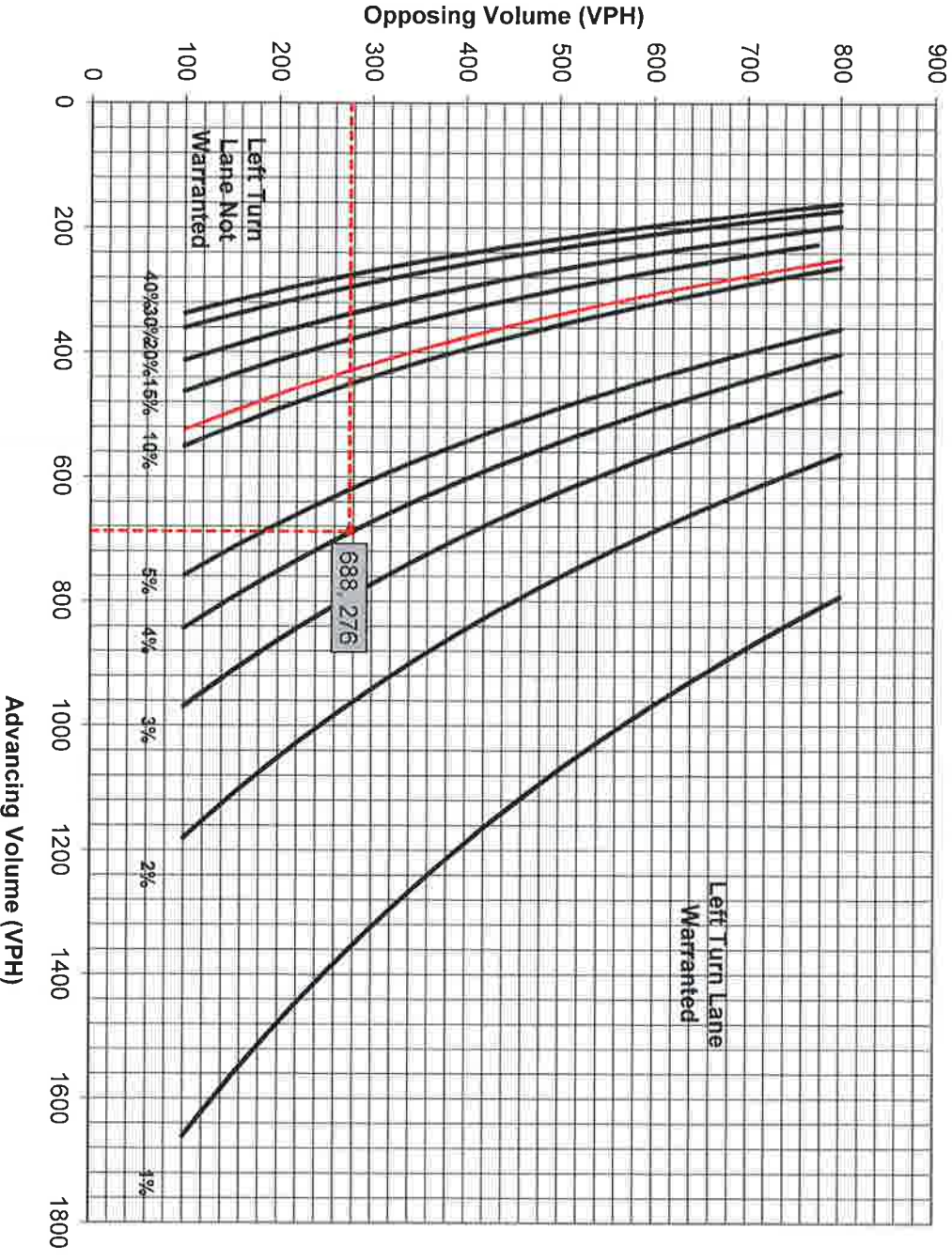


Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

• Volume Data Point  
 — 10.9%

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	PennDOT Engineering District:	6
County:	Chester County	Agency/Company Name:	McMahon Associates, Inc.
Analysis Date:	7/26/2017	Checked By:	BGG
Conducted By:	TML	Number of Approach Lanes:	1
Street Road (S.R. 0926) and New Street - Alternative A	Southbound New Street Right-Turn Lane		
Analysis Period:	2028 Design	Design Hour:	AM Peak Hour
Intersection Control:	Signalized	Posted Speed Limit (MPH):	35
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis:	Right Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement		Include?	Volume	% Trucks	PCEV				
Advancing	Left	Yes	0	0.0%	N/A	Advancing Volume:	N/A		
	Through	-	0	0.0%	N/A		Opposing Volume:	N/A	
Opposing	Left	Yes	0	0.0%	N/A	Opposing Volume:	N/A		
	Through	-	0	0.0%	N/A		Left Turn Volume:	N/A	
Right Turn Lane Volume Calculations									
Movement		Include?	Volume	% Trucks	PCEV				
Advancing	Left	Yes	65	4.0%	69	Advancing Volume:	558		
	Through	-	302	0.0%	302		Right Turn Volume:	187	
Opposing	Left	Yes	0	0.0%	N/A	Opposing Volume:	N/A		
	Through	-	0	0.0%	N/A		% Left Turns in Advancing Volume:	N/A	

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 9
Warrant Met?: N/A	Warrant Met?: Yes

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Design Hour of Turning Lane:	187
Cycles Per Hour (Assumed):	Known	Average # of Vehicles/Cycle:	5.0
Cycles Per Hour (if Known):	40		

Type of Traffic Control		Speed (MPH)		Turn Demand Volume	
Signalized	High	25-35	40-45	High	High
	Low			Low	Low
Unsignalized	A			B or C	B or C
	A			B	B

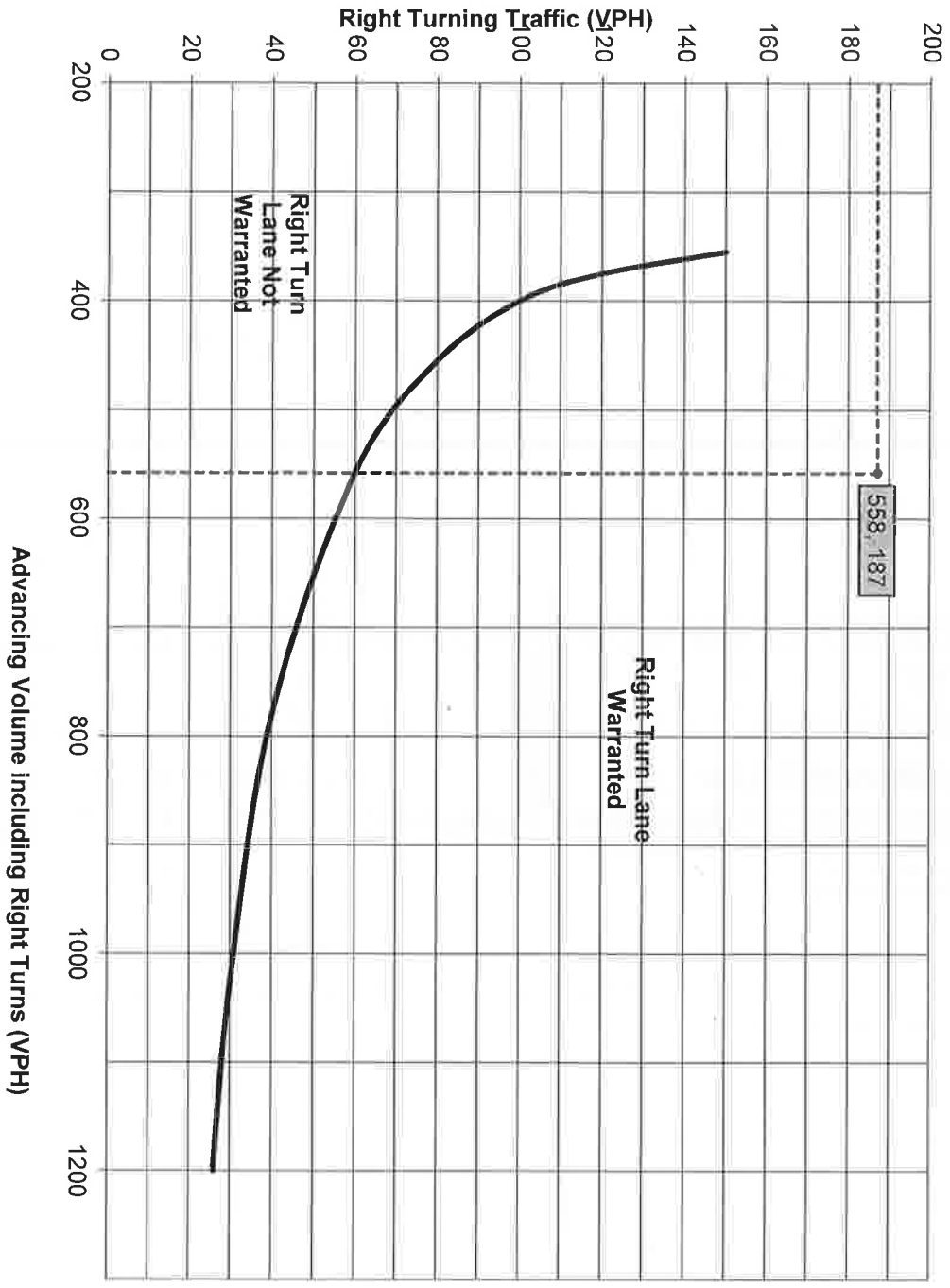
Right Turn Lane Storage Length, Condition A:	200	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	200	Feet

Additional Findings: N/A

Additional Comments / Justifications:



Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analyst Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.	Number of Approach Lanes:	1
Street Description:	Street Road (S.R. 0926) and New Street - Alternative A	Undivided or Divided Highway:	Undivided
Analysis Period:	2028 Design	Left or Right-Turn Lane Analysis?	Right Turn Lane
Design Hour:	PM Peak Hour	Type of Analysis:	Right Turn Lane
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	35		
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Left	Through	Right	Include?	Volume	% Trucks
Advancing	Yes	-	0	0.0%	N/A	N/A
Opposing	Yes	0	0	0.0%	N/A	N/A
Advancing	Yes	0	0	0.0%	N/A	N/A
Opposing	Yes	0	0	0.0%	N/A	N/A
Right Turn Lane Volume Calculations						
Movement	Left	Through	Right	Include?	Volume	% Trucks
Advancing	Yes	-	0	0.0%	N/A	N/A
Opposing	Yes	0	0	0.0%	N/A	N/A
Advancing	Yes	0	0	0.0%	N/A	N/A
Opposing	Yes	0	0	0.0%	N/A	N/A
Right Turn Lane Warrant Findings						
Applicable Warrant Figure:	Figure 9					
Warrant Met?:	Yes					

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	369
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (if known):	34
Average # of Vehicles/Cycle:	11.0

PennDOT Publication 46, Exhibit 11-6	
Speed (MPH)	25-35
Turn Demand Volume	40-45
Type of Traffic Control	High
Signalized	High
Unsignalized	High
Signalized	Low
Unsignalized	Low
Signalized	High
Unsignalized	High
Signalized	Low
Unsignalized	Low
Signalized	High
Unsignalized	High
Signalized	Low
Unsignalized	Low

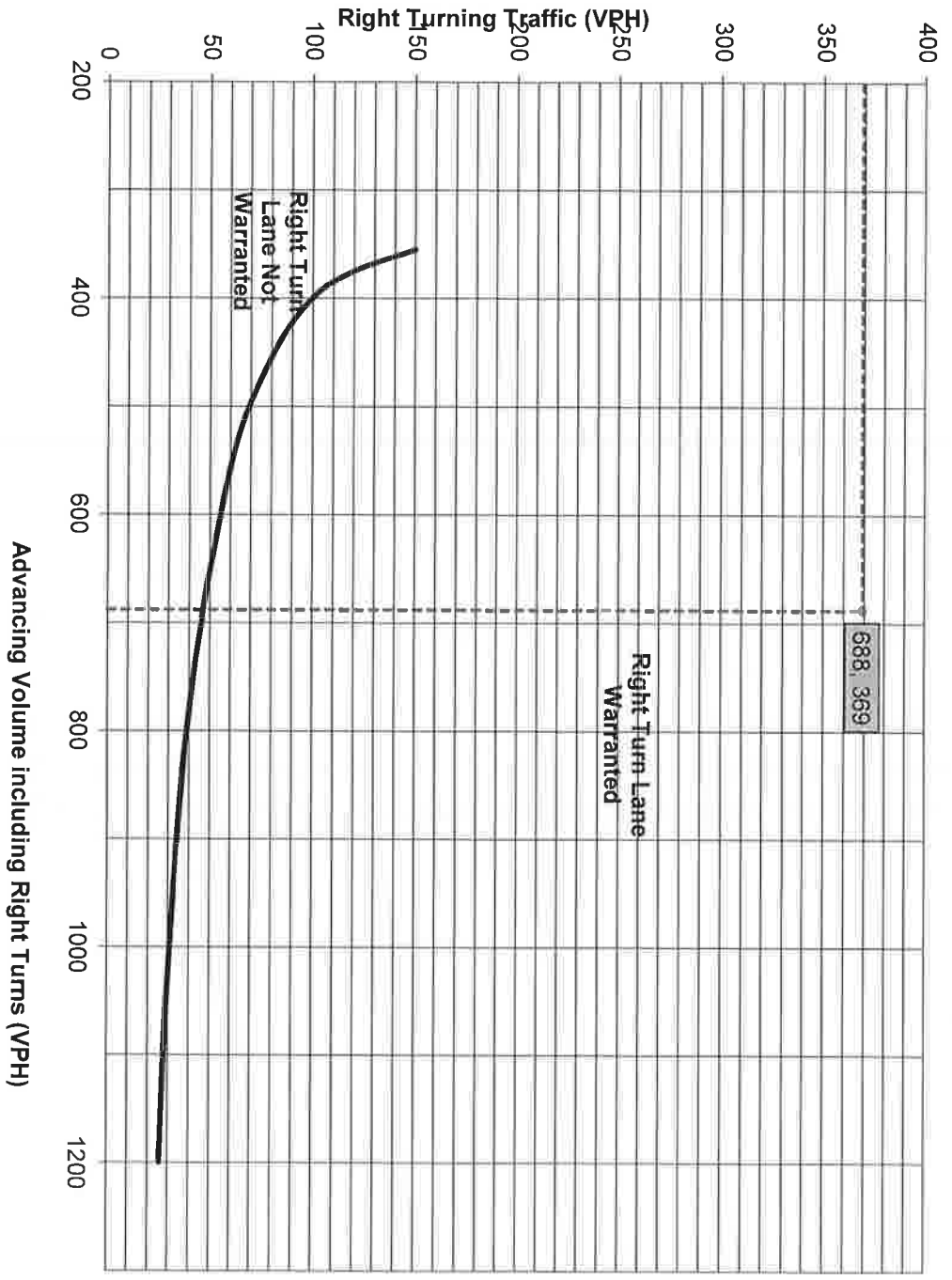
Right Turn Lane Storage Length, Condition A:	400
Condition B:	N/A
Condition C:	N/A
Required Right Turn Lane Storage Length:	400

Additional Findings: N/A

Additional Comments / Justifications:



Figure 9. Warrant for right turn lanes on two-lane roadways  
 (40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.	Number of Approach Lanes:	1
Intersection & Approach Description:	Street Road (S.R. 0926) and New Street - Alternative A Westbound Street Road (S.R. 0926) Left-Turn Lane		
Analysis Period:	2028 Design	Undivided or Divided Highway:	Undivided
Design Hour:	AM Peak Hour	Type of Analysis:	Left Turn Lane
Intersection Control:	Signalized	Left or Right-Turn Lane Analysis?:	Left Turn Lane
Posted Speed Limit (MPH):	45		
Type of Terrain:	Rolling		

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Advancing	Left	18	27.0%	26	552	
	Through	409	8.0%	459	1000	
Opposing	Right	61	6.0%	67		26
	Through	98	3.0%	103		
		853	3.0%	892		
	Yes	5	0.0%	5		
% Left Turns in Advancing Volume: 4.71%						

Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Advancing	Left	0	3.0%	N/A	N/A	
	Through	0	3.0%	N/A	N/A	
Opposing	Right	0	0.0%	N/A		N/A
	Through	0	0.0%	N/A		N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings:	Right Turn Lane Warrant Findings:
Applicable Warrant Figure: <b>Figure 3</b>	Applicable Warrant Figure: <b>N/A</b>
Warrant Met?: <b>Yes</b>	Warrant Met?: <b>N/A</b>

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	26
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	40
Average # of Vehicles/Cycle:	1.0

Speed (MPH)			
25-35	40-45	50-60	
High	Low	High	Low
A	B or C	B or C	B or C
A	A	B	B
Unsignalized	Signalized	Unsignalized	Signalized

PennDOT Publication 4B, Exhibit 11-6

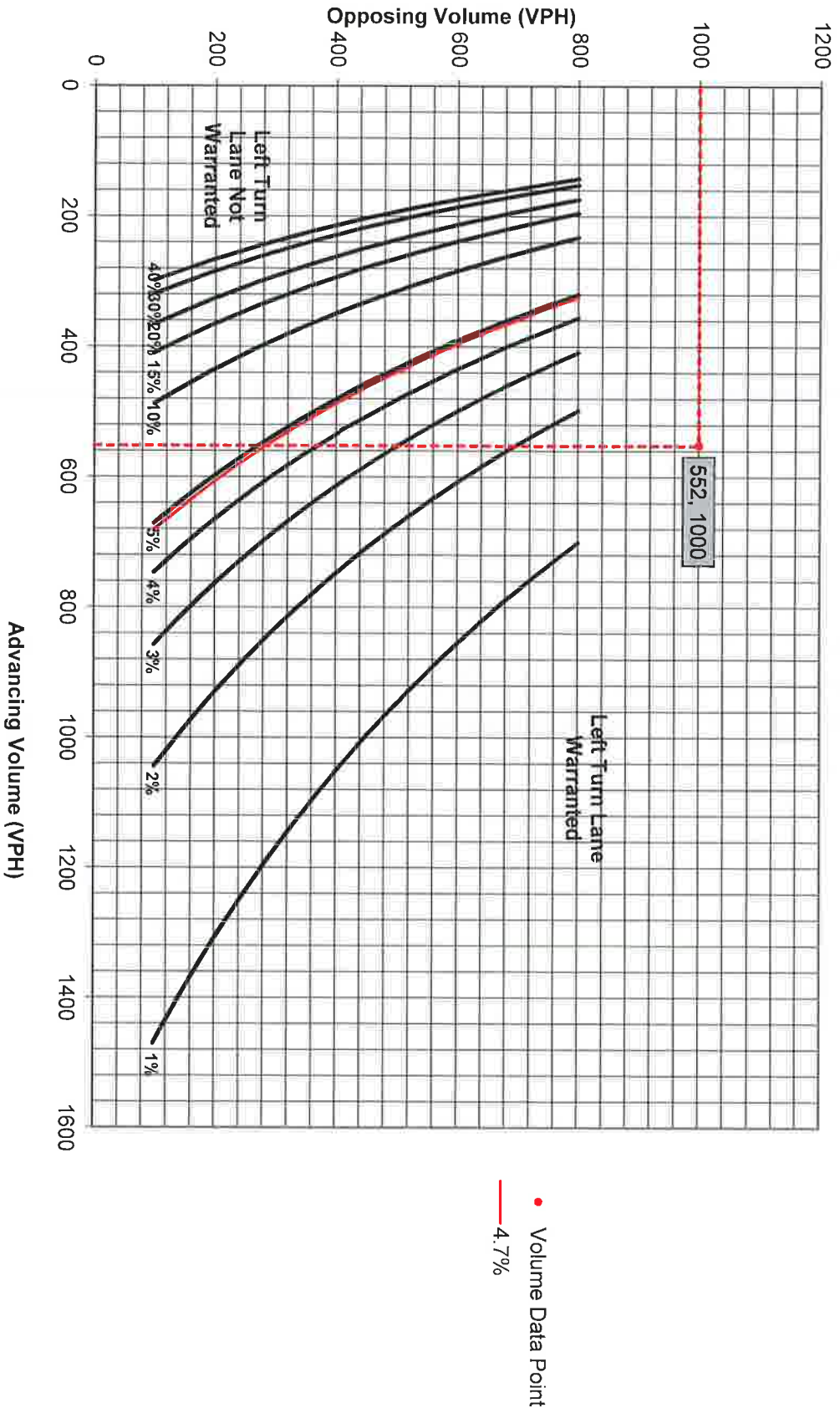
Left Turn Lane Storage Length, Condition A:	N/A
Feet	
Condition B:	125
Feet	
Condition C:	150
Feet	
Required Left Turn Lane Storage Length:	150
Feet	
Additional Findings:	N/A

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)



# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.	Number of Approach Lanes:	1
Intersection & Approach Description:	Street Road (S.R. 0926) and New Street - Alternative A Westbound Street Road (S.R. 0926) Left-Turn Lane		
Analysis Period:	2028 Design	Left or Right-Turn Lane Analysis?:	Left Turn Lane
Design Hour:	PM Peak Hour	Type of Analysis:	Left Turn Lane
Intersection Control:	Signalized	Undivided or Divided Highway:	Undivided
Posted Speed Limit (MPH):	45		
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement	Left	Right	Through	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Advancing	Yes	32	0.0%	Yes	32	0.0%	32	615	881
Opposing	Yes	76	0.0%	Yes	76	0.0%	76	32	32
Through	-	499	1.0%	-	499	1.0%	507	881	881
Left	Yes	51	3.0%	Yes	51	3.0%	54	32	32
Right	Yes	775	3.0%	-	775	3.0%	810	5.20%	5.20%
Through	-	17	0.0%	Yes	17	0.0%	17		

**Right Turn Lane Volume Calculations**

Movement	Left	Right	Through	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Advancing	Yes	0	3.0%	No	0	3.0%	N/A	N/A	N/A
Opposing	Yes	0	0.0%	-	0	0.0%	N/A	N/A	N/A
Through	-	0	0.0%	-	0	0.0%	N/A	N/A	N/A
Left	Yes	0	0.0%	Yes	0	0.0%	0	N/A	N/A
Right	Yes	0	0.0%	Yes	0	0.0%	0	N/A	N/A

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings:	Right Turn Lane Warrant Findings:
Applicable Warrant Figure: <b>Figure 3</b>	Applicable Warrant Figure: <b>N/A</b>
Warrant Met?: <b>Yes</b>	Warrant Met?: <b>N/A</b>

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Average # of Vehicles/Cycle:	1.0
Design Hour Volume of Turning Lane:	32		
Cycles Per Hour (Assumed):	Known		
Cycles Per Hour (if known):	34		

Type of Traffic Control		Speed (MPH)	Turn Demand Volume
High	High	25-35	High
Low	Low	40-45	Low
Low	High	50-60	High
Low	Low		Low
High	High		High
High	Low		Low
Low	Low		Low
High	High		High
High	Low		Low
Low	Low		Low
Low	High		High

Left Turn Lane Storage Length, Condition A:	N/A
Condition B:	125
Condition C:	150
Required Left Turn Lane Storage Length:	150

Additional Findings: **N/A**

Additional Comments / Justifications:

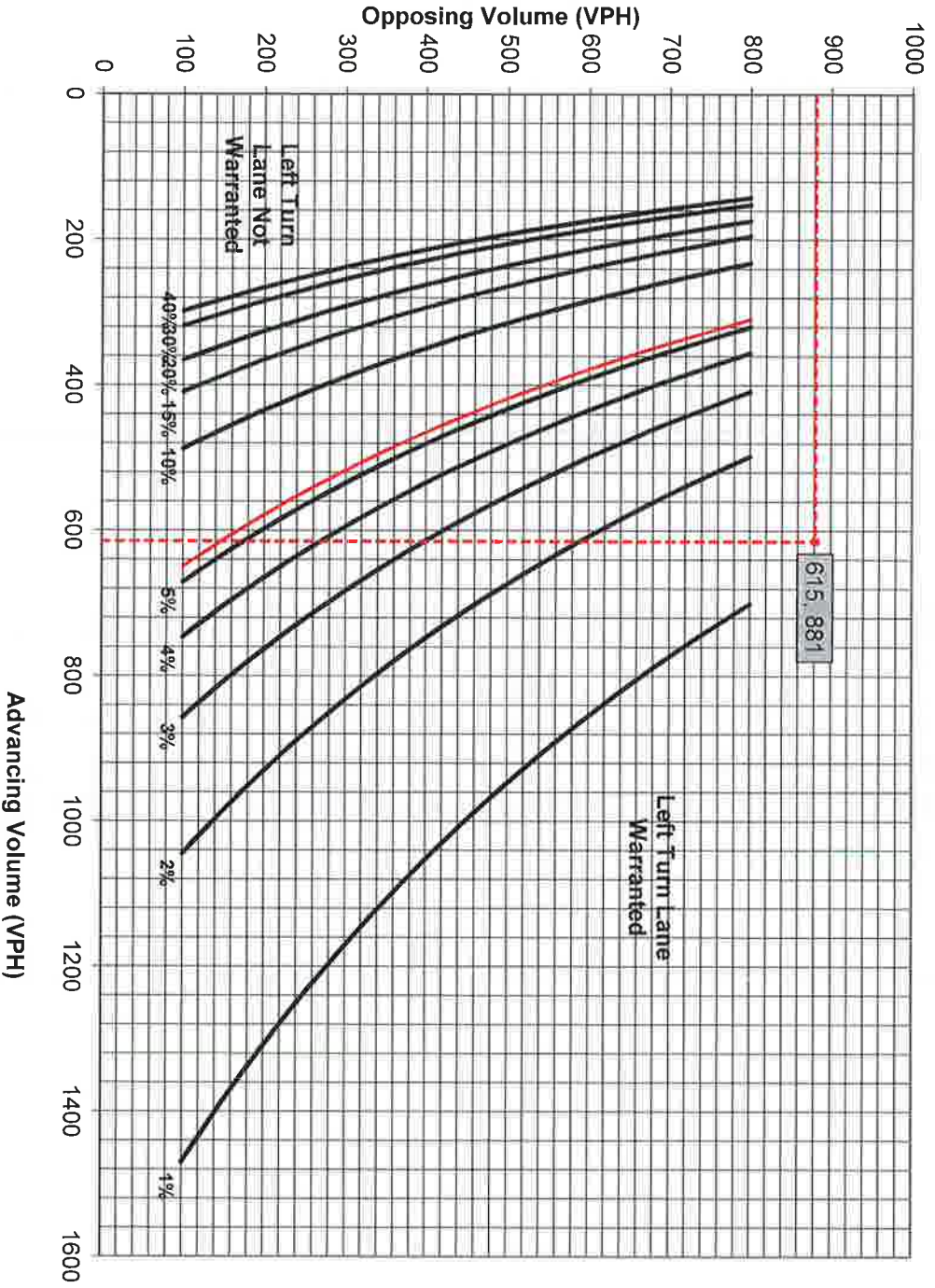


Figure 3. Warrant for left turn lanes on two-lane highways (45 mph speed, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)

Volume Data Point  
5.2%

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.	Number of Approach Lanes:	1
Street Description:	Westbound Street Road (S.R. 0926) and New Street - Alternative A	Undivided or Divided Highway:	Undivided
Analysis Period:	2028 Design	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Design Hour:	AM Peak Hour	Type of Analysis:	Right Turn Lane
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	45		
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations			
Movement	Include?	Volume	% Trucks
Advancing	Left	0	0.0%
	Through	0	0.0%
Opposing	Left	0	0.0%
	Through	0	0.0%
Right Turn Lane Volume Calculations			
Movement	Include?	Volume	% Trucks
Advancing	Left	0	0.0%
	Through	0	0.0%
Opposing	Left	0	0.0%
	Through	0	0.0%
Right Turn Lane Warrant Findings			
Advancing	Left	18	27.0%
	Through	409	8.0%
	Right	61	6.0%
Left Turn Lane Warrant Findings			
Advancing	Left	26	
	Through	459	
	Right	67	

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Warrant Met?:	N/A
Design Hour Volume of Turning Lane:	67	Applicable Warrant Figure:	N/A
Cycles Per Hour (Assumed):	Known	Warrant Met?:	Yes
Cycles Per Hour (If Known):	40	Applicable Warrant Figure:	Figure 10
Average # of Vehicles/Cycle:	2.0	Right Turn Lane Warrant Findings	

Type of Traffic Control			
Speed (MPH)	Turn Demand Volume	Signalized	Unsignalized
25-35	High	A	A
40-45	Low	A	A
50-60	High	B or C	B or C
	Low	B or C	B or C

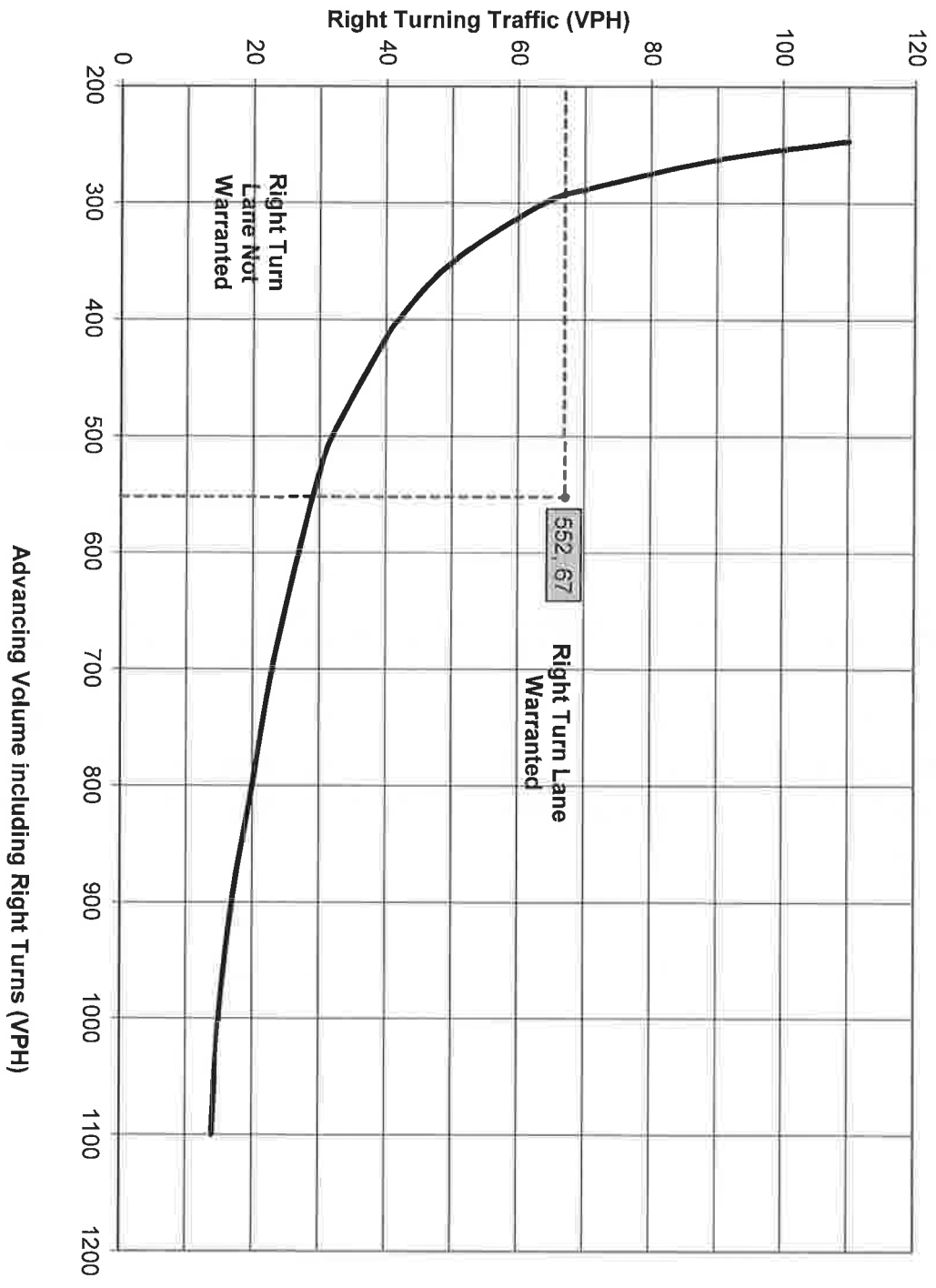
Right Turn Lane Storage Length, Condition A:	N/A
Condition B:	125
Condition C:	175
Required Right Turn Lane Storage Length:	175

Additional Findings: 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)



• Volume Data Point

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BBG
Agency/Company Name:	McMahon Associates, Inc.	Number of Approach Lanes:	1
Street Description:	Westbound Street Road (S.R. 0926) and New Street - Alternative A		
Analysis Period:	2028 Design	Undivided or Divided Highway:	Undivided
Design Hour:	PM Peak Hour	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Intersection Control:	Signalized	Type of Analysis:	Right Turn Lane
Posted Speed Limit (MPH):	45		
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Advancing	Left	0	0.0%	N/A	N/A	N/A
	Through	0	0.0%	N/A	N/A	N/A
Opposing	Right	0	0.0%	N/A	N/A	N/A
	Through	0	0.0%	N/A	N/A	N/A
Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV	Advancing Volume:	Opposing Volume:
Advancing	Left	0	0.0%	N/A	615	76
	Through	0	0.0%	N/A	507	32
Opposing	Right	0	0.0%	N/A	32	0
	Through	0	0.0%	N/A	499	0
Right Turn Lane Warrant Findings						
Advancing	Right	-	0.0%	76	615	76
Advancing	Through	-	1.0%	507	615	76

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 10
Warrant Met?: N/A	Warrant Met?: Yes

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	76
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	34

Average # of Vehicles/Cycle: 2.0

PennDOT Publication 46, Exhibit 11-6

Speed (MPH)	Turn Demand Volume	Signalized	Unsignalized
25-35	High	A	A
40-45	Low	A	A
50-60	High	B or C	B or C
	Low	B or C	B or C

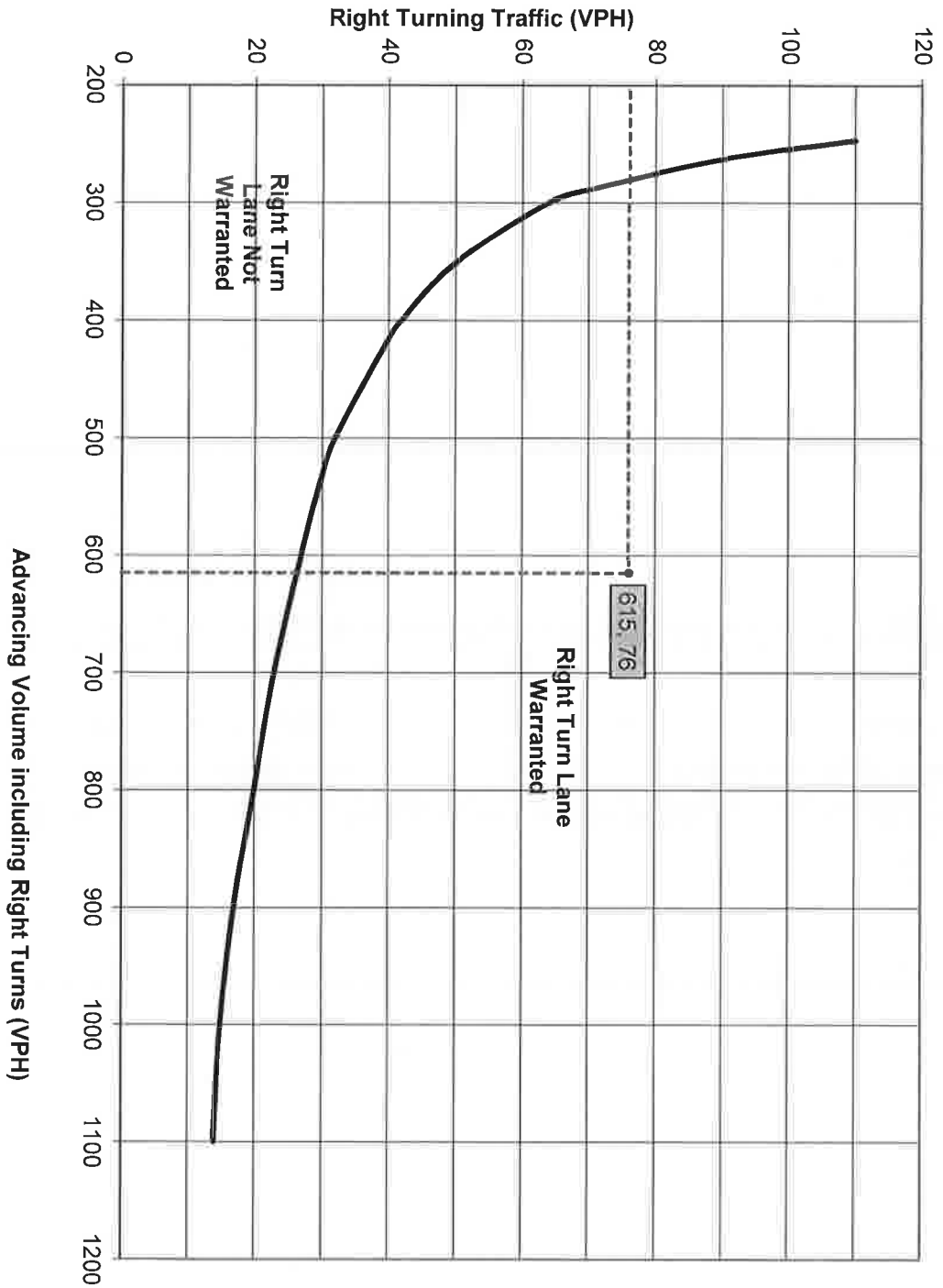
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	125	Feet
Condition C:	175	Feet
Required Right Turn Lane Storage Length:	175	Feet

Additional Findings: 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)



• Volume Data Point

**New Street and West Pleasant Grove Road**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Westtown Township  
 County: Chester County  
 PennDOT Engineering District: 6

Analysis Date: 7/26/2017  
 Conducted By: TML  
 Checked By: BGG  
 Agency/Company Name: McMahon Associates, Inc.

Intersection & Approach Description: New Street and West Pleasant Grove Road - Alternative A  
 Northbound New Street Right-Turn Lane

Analysis Period: 2028 Design Year  
 Design Hour: AM Peak Hour  
 Intersection Control: Unsignalized  
 Posted Speed Limit (MPH): 35  
 Type of Terrain: Rolling

Number of Approach Lanes: 1  
 Undivided or Divided Highway: Undivided  
 Type of Analysis: Right Turn Lane

Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations				Right Turn Lane Volume Calculations			
Advancing Movement	Left	Yes	0	Opposing Movement	Right	Yes	0
	Through	-	0		Through	-	0
Right	Yes	0	Left	Yes	0	Right	Yes
Through	-	0	Through	-	0	Through	-
Volume	0	0	Volume	0	0	Volume	0
% Trucks	0.0%	0.0%	% Trucks	0.0%	0.0%	% Trucks	0.0%
PCEV	N/A	N/A	PCEV	N/A	N/A	PCEV	N/A
Include?	Yes	Yes	Include?	Yes	Yes	Include?	Yes
Advancing Volume:	N/A	N/A	Advancing Volume:	N/A	N/A	Advancing Volume:	N/A
Opposing Volume:	N/A	N/A	Opposing Volume:	N/A	N/A	Opposing Volume:	N/A
Left Turn Volume:	N/A	N/A	Left Turn Volume:	N/A	N/A	Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A	N/A	% Left Turns in Advancing Volume:	N/A	N/A	% Left Turns in Advancing Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings: **N/A**  
 Applicable Warrant Figure: **N/A**  
 Warrant Met?: **N/A**

Right Turn Lane Warrant Findings: **Figure 9**  
 Applicable Warrant Figure: **Figure 9**  
 Warrant Met?: **No**

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized  
 Design Hour Volume of Turning Lane: 13  
 Cycles Per Hour (Assumed): 60  
 Cycles Per Hour (if Known):

Average # of Vehicles/Cycle: **N/A**

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	25-35		40-45		50-60	
	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	B

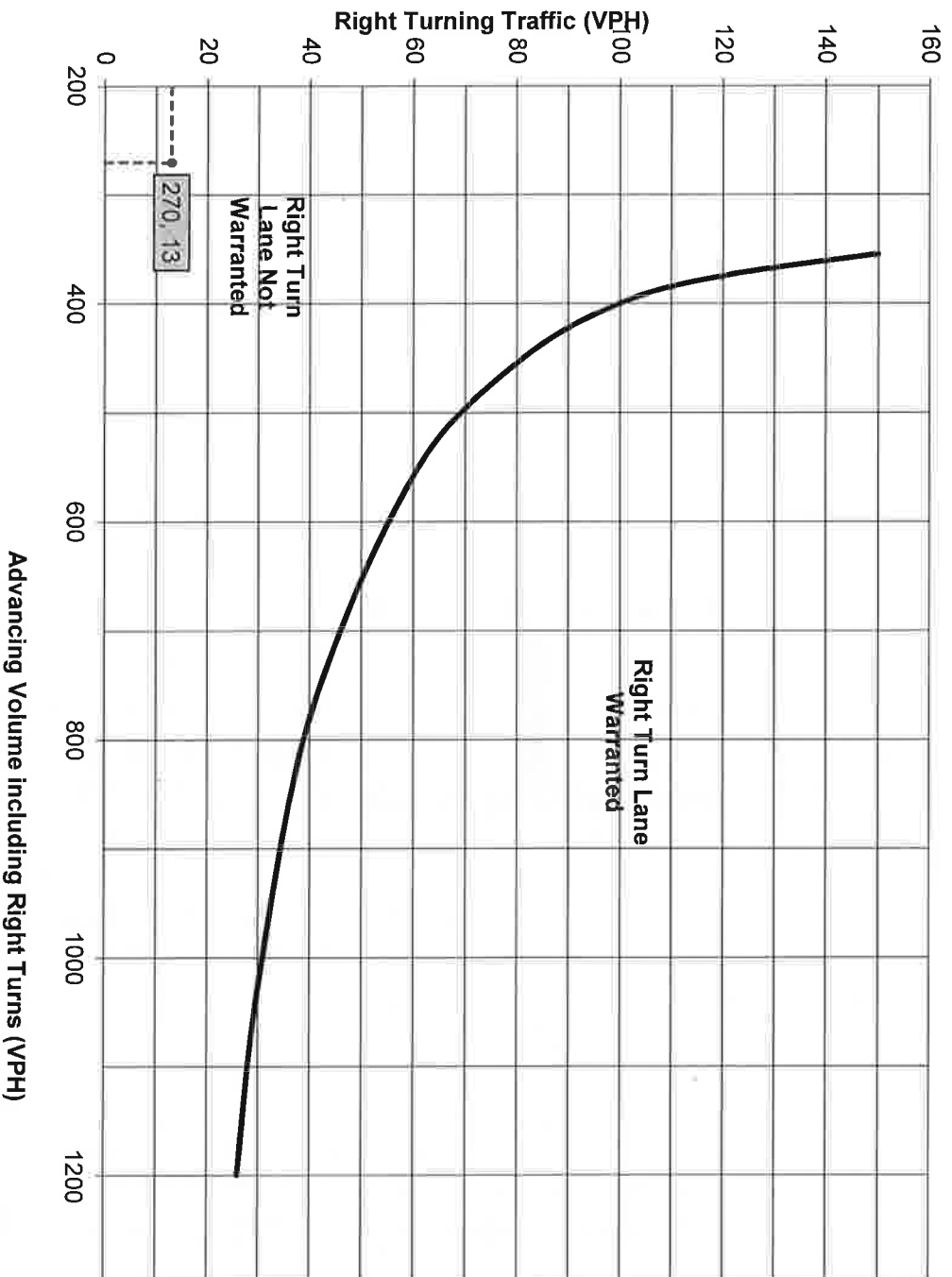
Right Turn Lane Storage Length, Condition A: **N/A** Feet  
 Condition B: **N/A** Feet  
 Condition C: **N/A** Feet  
 Required Right Turn Lane Storage Length: **N/A** Feet

Additional Findings: **N/A**

Additional Comments / Justifications:



Figure 9. Warrant for right turn lanes on two-lane roadways  
 (40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.	Number of Approach Lanes:	1
Intersection & Approach Description:	New Street and West Pleasant Grove Road - Alternative A Northbound New Street Right-Turn Lane		
Analysis Period:	2028 Design Year	Undivided or Divided Highway:	Undivided
Design Hour:	PM Peak Hour	Type of Analysis:	Right Turn Lane
Intersection Control:	Signalized	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Posted Speed Limit (MPH):	35		
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations										
Movement		Include?	Volume	% Trucks	PCEV	Right Turn Lane Volume Calculations				
Advancing	Left	Yes	0	0.0%	N/A	Advancing Volume:	Right Turn Volume:			Right Turn Volume:
	Through	-	0	0.0%	N/A		31	339		
Opposing	Left	Yes	0	0.0%	N/A	% Left Turns in Advancing Volume:				Right Turn Volume:
	Through	-	0	0.0%	N/A	N/A				

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Applicable Warrant Figure:	N/A	Warrant Met?:	N/A
Right Turn Lane Warrant Findings	Applicable Warrant Figure:	Figure 9	Warrant Met?:	No

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized	Average # of Vehicles/Cycle:	N/A
Design Hour Volume of Turning Lane:	31		
Cycles Per Hour (Assumed):	60		
Cycles Per Hour (if Known):			

PennDOT Publication 46, Exhibit 11-6	
Speed (MPH)	25-35
Turn Demand Volume	40-45
Type of Traffic Control	Signalized
	Unsignalized
High	A
	A
Low	A
	A
High	B or C
	B
Low	B or C
	B

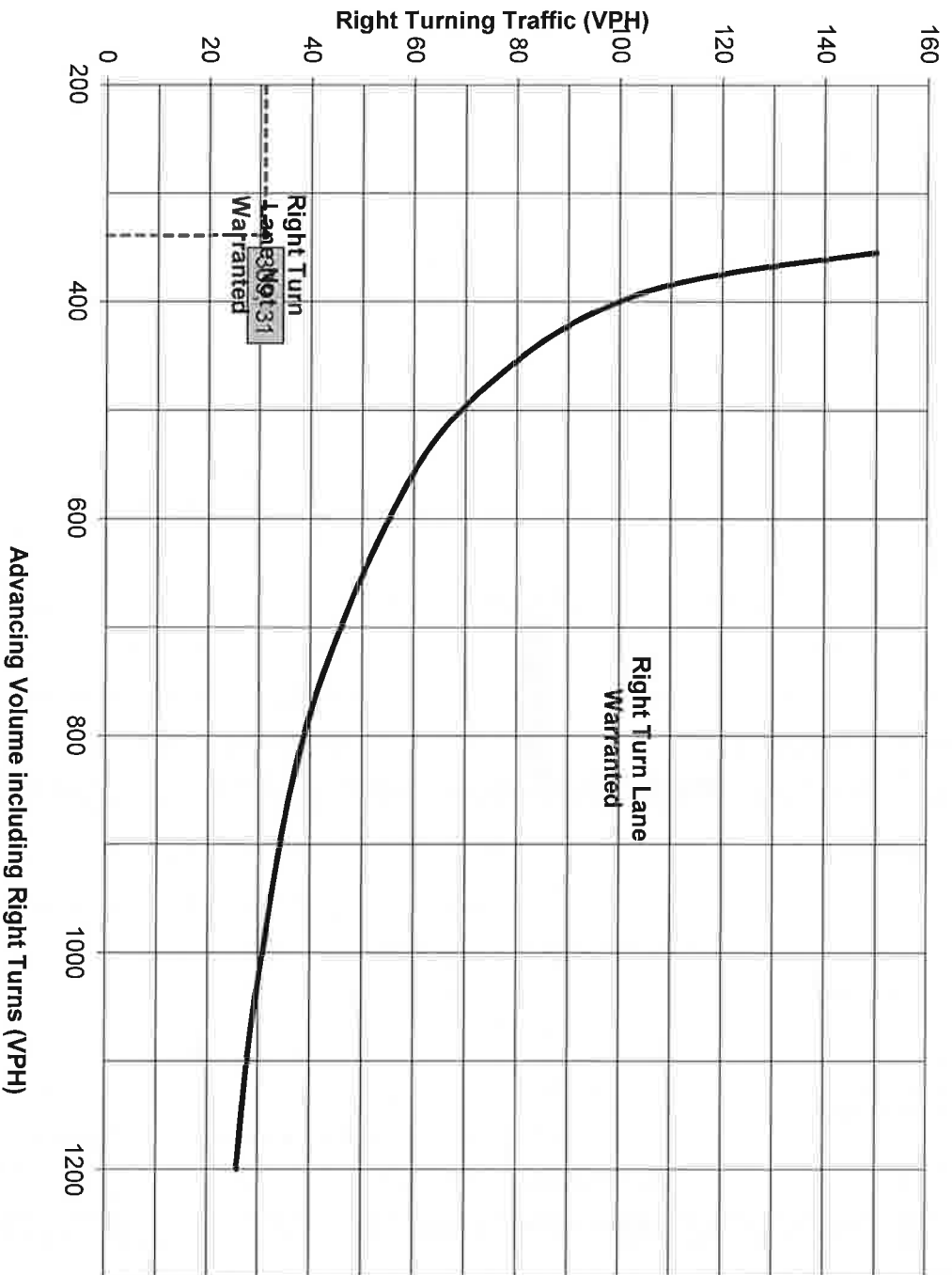
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:



Figure 9. Warrant for right turn lanes on two-lane roadways  
 (40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Date:** 7/26/2017  
**Conducted By:** TML  
**Checked By:** BGG  
**Agency/Company Name:** McMahon Associates, Inc.

**Intersection & Approach Description:** New Street and West Pleasant Grove Road - Alternative A  
 Southbound New Street Left-Turn Lane

**Analysis Period:** 2028 Design Year  
**Design Hour:** AM Peak Hour  
**Intersection Control:** Unsignalized  
**Posted Speed Limit (MPH):** 35  
**Type of Terrain:** Rolling

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Type of Analysis:** Left or Right-Turn Lane Analysis? Left Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement	Left	Right	Through	Include?	Volume	% Trucks	PCEV	% Left Turns in Advancing Volume:	
								Advancing Volume:	Opposing Volume:
Advancing	Left	Yes	0	Yes	0	0.0%	0	345	270
	Right	Yes	0	Yes	0	0.0%	0	18	
	Through	-	245	-	317	2.0%	327		
Opposing	Left	Yes	0	Yes	0	0.0%	0		
	Right	Yes	0	Yes	0	0.0%	0		
	Through	-	245	-	245	3.0%	257		
Total					13	0.0%	13		5.22%

Right Turn Lane Volume Calculations									
Movement	Left	Right	Through	Include?	Volume	% Trucks	PCEV	% Right Turns in Advancing Volume:	
								Advancing Volume:	Right Turn Volume:
Advancing	Left	Yes	0	Yes	0	0.0%	0	N/A	N/A
	Right	Yes	0	Yes	0	0.0%	0	N/A	N/A
	Through	-	0	-	0	0.0%	0		
Total					0	0.0%	0		

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:** Figure 1  
**Right Turn Lane Warrant Findings:** N/A

**Applicable Warrant Figure:** Figure 1  
**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:** 18  
**Cycles Per Hour (Assumed):** 60  
**Cycles Per Hour (if known):**

**Average # of Vehicles/Cycle:** N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)		Turn Demand Volume	
	25-35	40-45	High	Low
Signalized	High	Low	High	Low
	A	A	B or C	B or C
Unsignalized	High	Low	C	B
	A	A	B or C	B

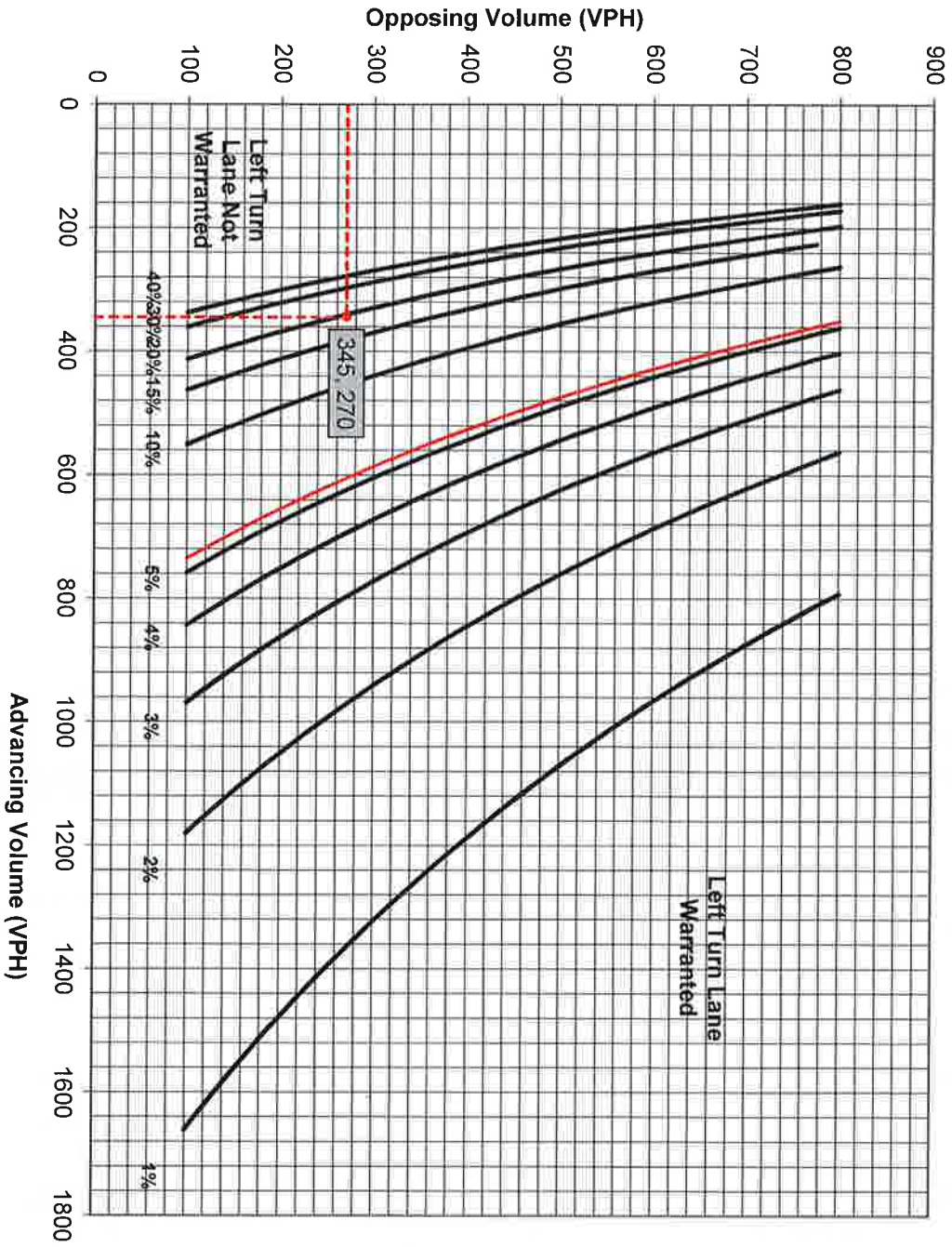
**Left Turn Lane Storage Length, Condition A:** N/A Feet  
**Condition B:** N/A Feet  
**Condition C:** N/A Feet  
**Required Left Turn Lane Storage Length:** N/A Feet

**Additional Findings:** N/A

Additional Comments / Justifications:

Additional Comments / Justifications:





**Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)**

• Volume Data Point  
 — 5.2%

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

**Municipality:** Westtown Township  
**County:** Chester County  
**PennDOT Engineering District:** 6

**Analysis Date:** 7/26/2017  
**Conducted By:** TML  
**Checked By:** BGG  
**Agency/Company Name:** McMahon Associates, Inc.

**Intersection & Approach Description:** New Street and West Pleasant Grove Road - Alternative A  
 Southbound New Street Left-Turn Lane

**Analysis Period:** 2028 Design Year  
**Design Hour:** PM Peak Hour  
**Intersection Control:** Unsignalized  
**Posted Speed Limit (MPH):** 35  
**Type of Terrain:** Rolling

**Number of Approach Lanes:** 1  
**Undivided or Divided Highway:** Undivided  
**Type of Analysis:** Left or Right-Turn Lane Analysis? Left Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Left	Through	Right	Include?	Volume	% Trucks
Advancing	Yes	-	Yes	Yes	19	0.0%
	Yes	340	Yes	Yes	340	0.0%
	Yes	0	Yes	Yes	0	0.0%
Opposing	Yes	0	Yes	Yes	0	0.0%
	Yes	0	Yes	Yes	0	0.0%
	Yes	308	-	Yes	31	0.0%
% Left Turns in Advancing Volume: 5.29%						

Right Turn Lane Volume Calculations						
Movement	Left	Through	Right	Include?	Volume	% Trucks
Advancing	Yes	0	Yes	Yes	0	0.0%
	Yes	0	Yes	Yes	0	0.0%
	Yes	0	Yes	Yes	0	0.0%
Advancing Volume: 359 Opposing Volume: 339 Left Turn Volume: 19						

## TURN LANE WARRANT FINDINGS

**Left Turn Lane Warrant Findings:** Figure 1  
**Warrant Met?:** NO

**Right Turn Lane Warrant Findings:** N/A  
**Applicable Warrant Figure:** N/A  
**Warrant Met?:** N/A

## TURN LANE LENGTH CALCULATIONS

**Intersection Control:** Unsignalized  
**Design Hour Volume of Turning Lane:** 19  
**Cycles Per Hour (Assumed):** 60  
**Cycles Per Hour (if Known):**

**Average # of Vehicles/Cycle:** N/A

PennDOT Publication 46, Exhibit 11-6

Speed (MPH)	25-35	40-45	50-60
Type of Traffic Control	High	High	High
Signalized	Low	Low	Low
	A	B or C	B or C
	A	B or C	B
Unsignalized	A	C	B

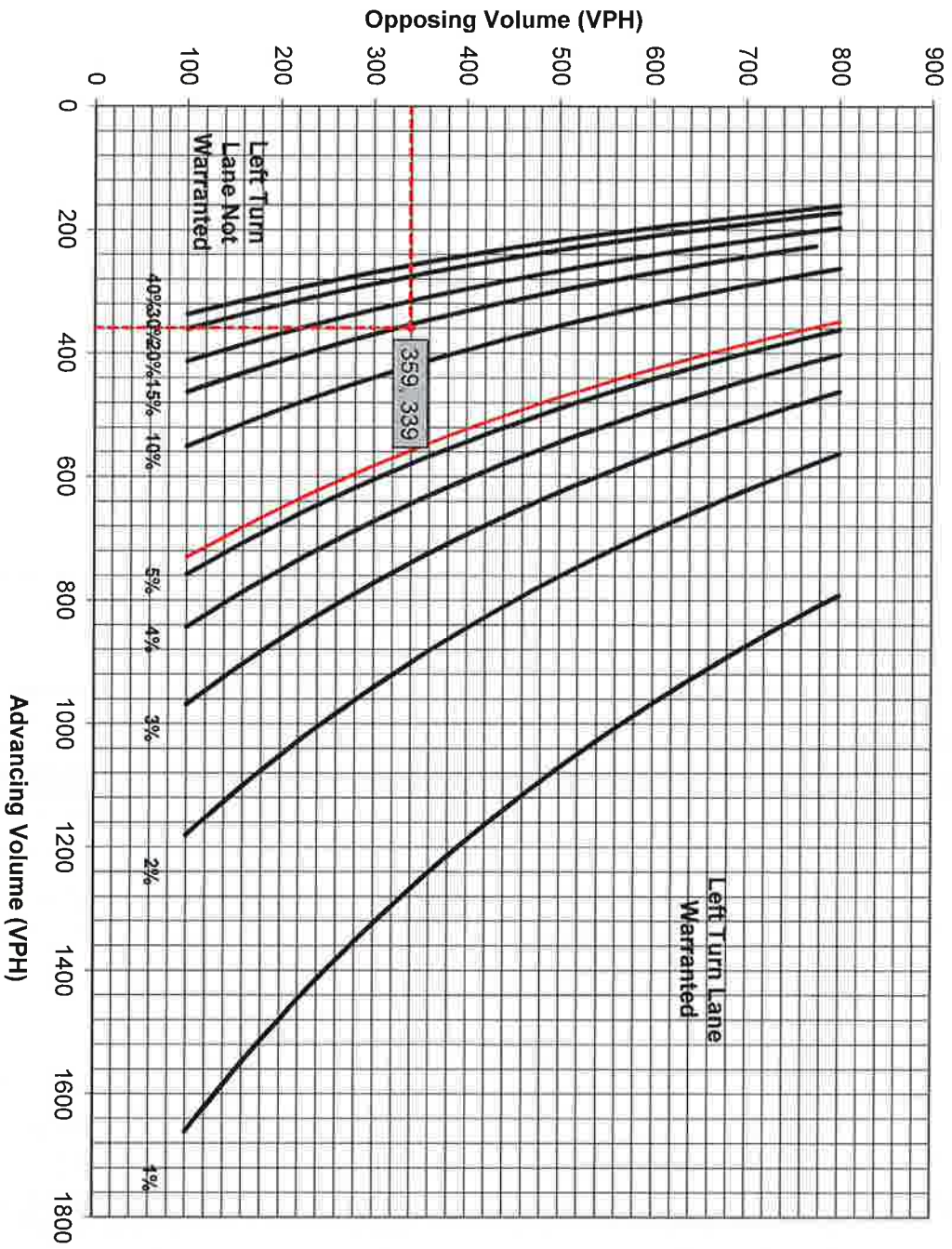
**Left Turn Lane Storage Length, Condition A:** N/A Feet  
**Condition B:** N/A Feet  
**Condition C:** N/A Feet  
**Required Left Turn Lane Storage Length:** N/A Feet

**Additional Findings:** N/A

Additional Comments / Justifications:

Additional Comments / Justifications:





**Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections) (L = % Left Turns in Advancing Volume)**

• Volume Data Point  
 — 5.3%



# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Analysis Date:	7/26/2017
County:	Chester County	Conducted By:	TML
PennDOT Engineering District:	6	Checked By:	BGG
Agency/Company Name:	McMahon Associates, Inc.	Number of Approach Lanes:	1
Intersection & Approach Description:	New Street and West Pleasant Grove Road - Alternative A Westbound West Pleasant Grove Road Right-Turn Lane		
Analysis Period:	2028 Design Year	Undivided or Divided Highway:	Undivided
Design Hour:	AM Peak Hour	Type of Analysis:	Right Turn Lane
Intersection Control:	Unsignalized	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Posted Speed Limit (MPH):	35		
Type of Terrain:	Rolling		

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Left	Through	Right	Include?	Volume	% Trucks
Advancing	Yes	-	0	Yes	0	0.0%
	-	N/A	0	Yes	0	0.0%
	N/A	N/A	N/A	Yes	0	0.0%
Opposing	Yes	-	0	Yes	0	0.0%
	-	N/A	0	Yes	0	0.0%
	N/A	N/A	N/A	Yes	0	0.0%
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A						

Right Turn Lane Volume Calculations						
Movement	Left	Through	Right	Include?	Volume	% Trucks
Advancing	Yes	-	0	Yes	0	0.0%
	-	N/A	0	Yes	0	0.0%
	N/A	N/A	N/A	Yes	0	0.0%
Opposing	Yes	-	0	Yes	0	0.0%
	-	N/A	0	Yes	0	0.0%
	N/A	N/A	N/A	Yes	0	0.0%
Advancing Volume: 282 Opposing Volume: 48 Right Turn Volume: 48						

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 9
Warrant Met?: N/A	Warrant Met?: No

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized	Average # of Vehicles/Cycle:	N/A
Design Hour Volume of Turning Lane:	48		
Cycles Per Hour (Assumed):	60		
Cycles Per Hour (if Known):			

PennDOT Publication 46, Exhibit 11-6

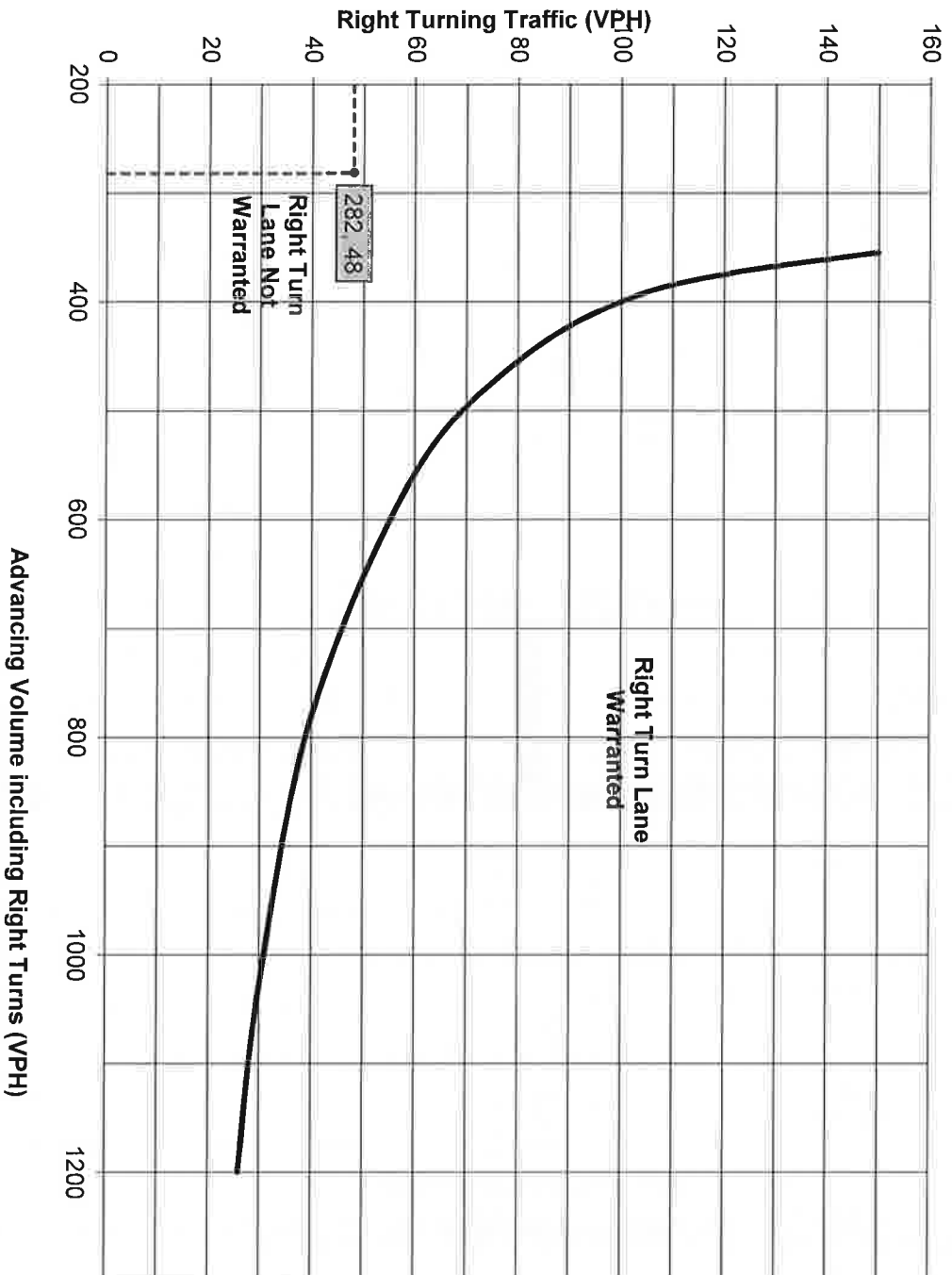
Type of Traffic Control	Speed (MPH)		Turn Demand Volume	
	25-35	40-45	Low	High
Signalized	A	A	B or C	B or C
	A	A	B or C	B or C
Unsignalized	A	A	C	B
	A	A	C	B

Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways  
 (40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Westtown Township  
 County: Chester County  
 PennDOT Engineering District: 6  
 Analysis Period: 2028 Design Year  
 Design Hour: PM Peak Hour  
 Intersection Control: Unsignalized  
 Posted Speed Limit (MPH): 35  
 Type of Terrain: Rolling  
 Intersection & Approach Description: New Street and West Pleasant Grove Road - Alternative A  
 Westbound West Pleasant Grove Road Right-Turn Lane  
 Agency/Company Name: McMahon Associates, Inc.  
 Checked By: BGG  
 Conducted By: TML  
 Analysis Date: 7/26/2017  
 Number of Approach Lanes: 1  
 Undivided or Divided Highway: Undivided  
 Left or Right-Turn Lane Analysis?: Right Turn Lane  
 Type of Analysis:

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement	Left	Through	Right	Include?	Volume	% Trucks	PCEV	% Left Turns in Advancing Volume:	
								Advancing Volume	Opposing Volume
Advancing	Yes	-	0		0	0.0%	N/A	N/A	N/A
	Through	-	0		0	0.0%	N/A	N/A	N/A
	Right	-	0		0	0.0%	N/A	N/A	N/A
Opposing	Yes	-	0		0	0.0%	N/A	N/A	N/A
	Through	-	0		0	0.0%	N/A	N/A	N/A
	Right	-	0		0	0.0%	N/A	N/A	N/A
Right Turn Lane Volume Calculations									
Movement	Left	Through	Right	Include?	Volume	% Trucks	PCEV	% Right Turns in Advancing Volume:	
								Advancing Volume	Right Turn Volume
Advancing	Yes	-	0		0	0.0%	N/A	381	43
	Through	-	0		0	0.0%	N/A	338	0
	Left	Yes	338		338	0.0%	N/A	338	0

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings: **N/A**  
 Applicable Warrant Figure: **N/A**  
 Warrant Met?: **N/A**  
 Right Turn Lane Warrant Findings: **Figure 9**  
 Applicable Warrant Figure: **Figure 9**  
 Warrant Met?: **No**

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized  
 Design Hour Volume of Turning Lane: 43  
 Cycles Per Hour (Assumed): 60  
 Cycles Per Hour (if known):  
 Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

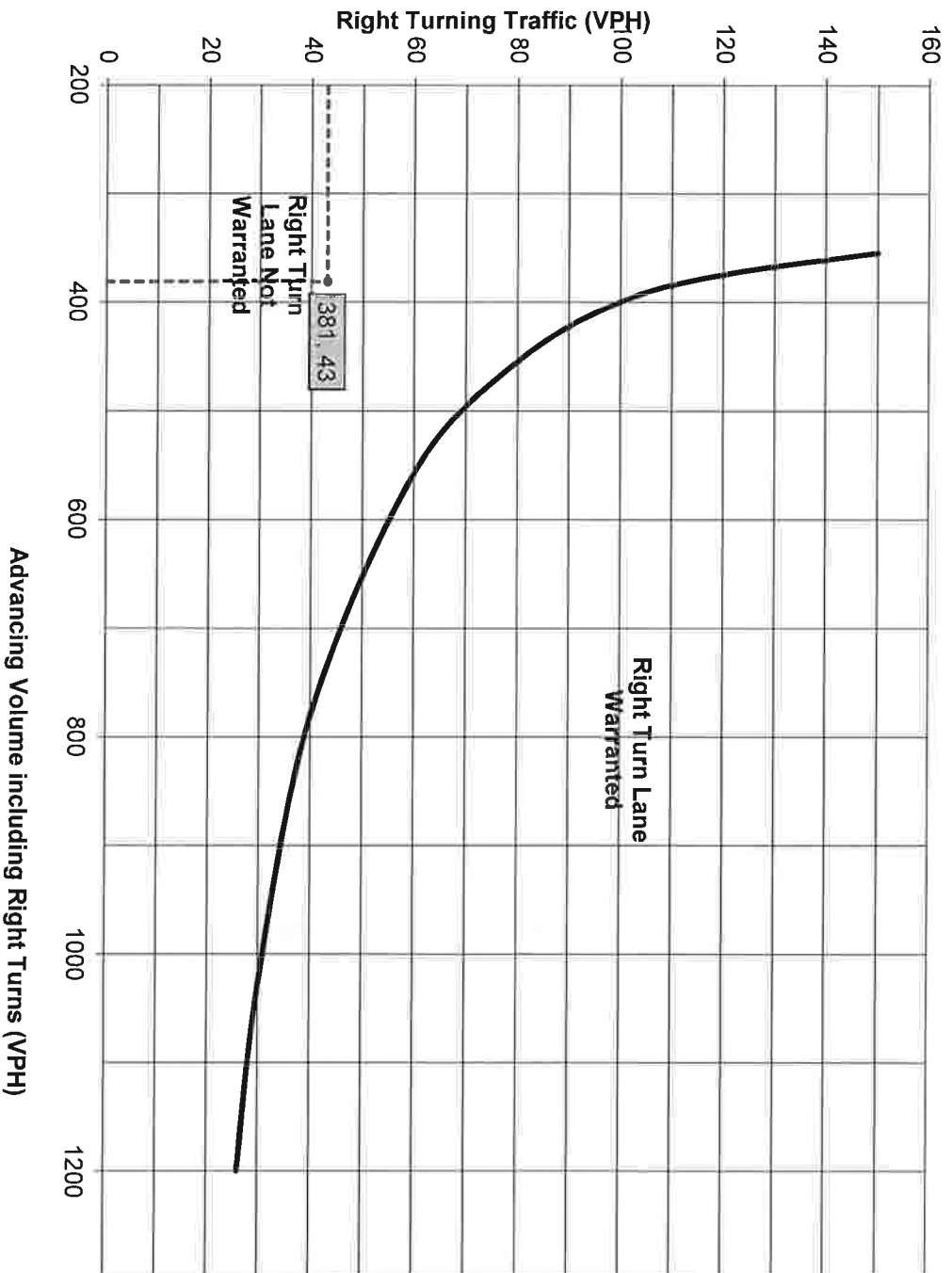
Type of Traffic Control	Speed (MPH)		Turn Demand Volume	
	25-35	40-45	Low	High
Signalized	High	Low	High	Low
	A	A	B or C	B or C
Unsignalized	High	Low	B	B or C
	A	A	B or C	B

Right Turn Lane Storage Length, Condition A: N/A Feet  
 Condition B: N/A Feet  
 Condition C: N/A Feet  
 Required Right Turn Lane Storage Length: N/A Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways  
(40 mph or lower speeds, unsignalized and signalized intersections)



• Volume Data Point

U.S. Route 202 and West Pleasant Grove Road

# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township
County:	Chester County
PennDOT Engineering District:	6
Analysis Period:	2028 Design (without Dev)
Design Hour:	AM Peak Hour
Intersection Control:	Unsignalized
Posted Speed Limit (MPH):	45
Type of Terrain:	Rolling
Intersection & Approach Description:	U.S. Route 202 and West Pleasant Grove Road - Alternative A Southbound U.S. Route 202 Right-Turn Lane
Agency/Company Name:	McMahon Associates, Inc.
Analysis Date:	7/26/2017
Conducted By:	TML
Checked By:	BGG
Number of Approach Lanes:	2
Undivided or Divided Highway:	Divided
Type of Analysis:	Right Turn Lane
Left or Right-Turn Lane Analysis?:	Right Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement	Include?	Volume	% Trucks		
Advancing	Left	0	0.0%		
	Through	0	0.0%		
Opposing	Right	0	0.0%		
	Through	0	0.0%		
% Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement	Include?	Volume	% Trucks		
Advancing	Left	0	0.0%		
	Through	0	0.0%		
Opposing	Right	0	0.0%		
	Through	0	0.0%		
Right Turn Volume: 2397					
Advancing Volume: 176					
Right Turn Volume: 176					
PCEV					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
Opposing	Right	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
% Left Turns in Advancing Volume: N/A					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
Opposing	Right	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
Right Turn Lane Warrant Findings					
Applicable Warrant Figure:		Figure 12			
Warrant Met?:		Yes			

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 12
Warrant Met?: N/A	Warrant Met?: Yes

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	176
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	
Average # of Vehicles/Cycle:	3.0

Speed (MPH)		Turn Demand Volume	
25-35	40-45	High	Low
High	High	High	High
Low	Low	Low	Low
A	A	A	A
A	A	B or C	B or C
Unsignalized	Unsignalized	B	B
Signalized	Signalized	B or C	B or C
Unsignalized	Unsignalized	B	B

Right Turn Lane Storage Length, Condition A: N/A

Condition B: N/A

Condition C: 225

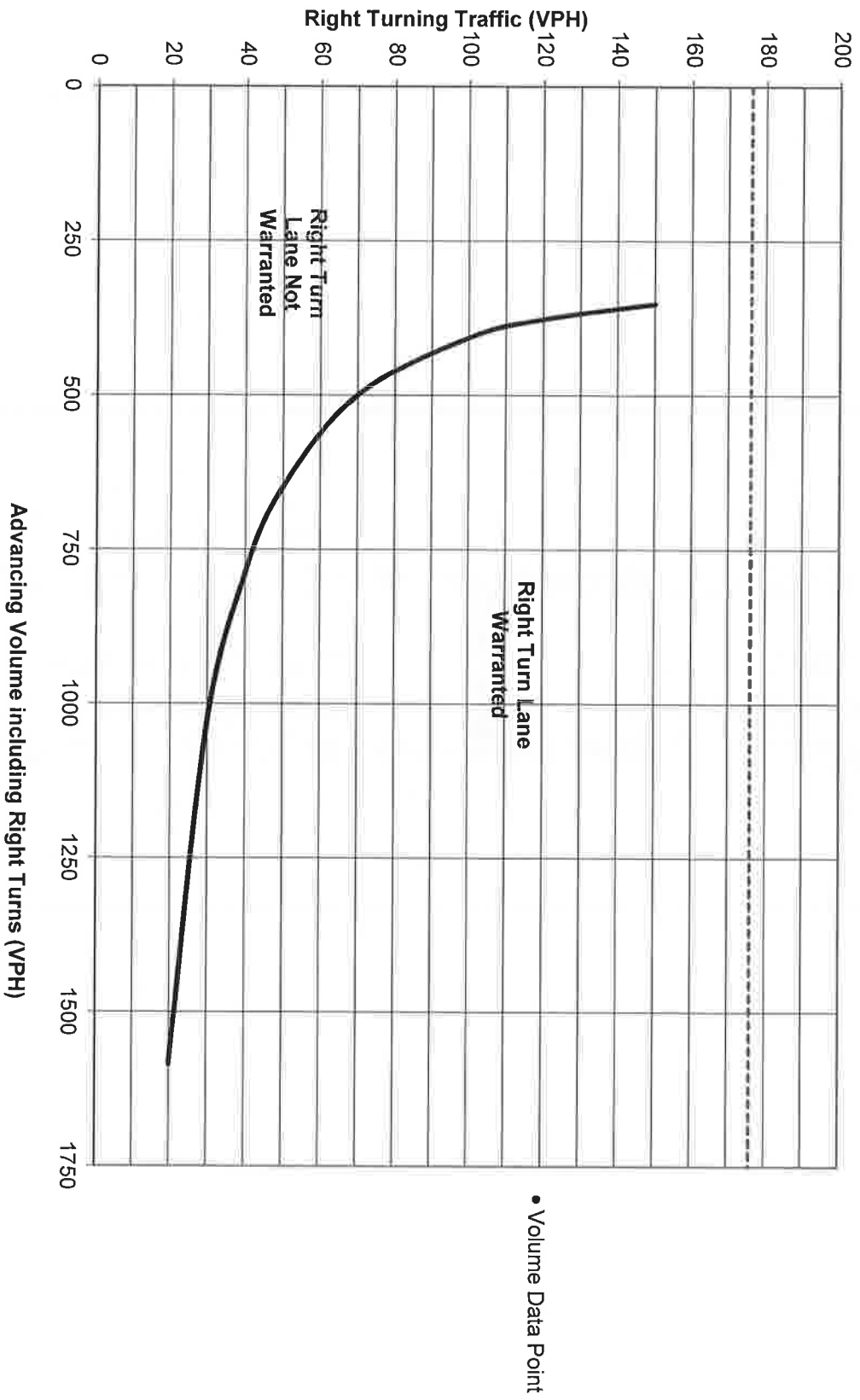
Required Right Turn Lane Storage Length: 225

Additional Findings: N/A

Additional Comments / Justifications:



Figure 12. Warrant for right turn lanes on four-lane roadways  
(45 mph or greater speeds, unsignalized and signalized intersections)



# Turn Lane Warrant and Length Analysis Workbook

## STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Westtown Township	Agency/Company Name:	McMahon Associates, Inc.
County:	Chester County	Checked By:	BGG
PennDOT Engineering District:	6	Conducted By:	TML
Analysis Period:	2028 Design (without Dev)	Analyst Date:	7/26/2017
Design Hour:	PM Peak Hour	Number of Approach Lanes:	2
Intersection Control:	Unsignalized	Undivided or Divided Highway:	Divided
Posted Speed Limit (MPH):	45	Left or Right-Turn Lane Analysis?:	Right Turn Lane
Type of Terrain:	Rolling	Type of Analysis:	Right Turn Lane

Intersection & Approach Description: U.S. Route 202 and West Pleasant Grove Road - Alternative A  
 Southbound U.S. Route 202 Right-Turn Lane

## VOLUME CALCULATIONS

Left Turn Lane Volume Calculations									
Movement		Include?	Volume	% Trucks	PCEV				
Advancing	Left	Yes	0	0.0%	N/A	Advancing Volume: N/A	Opposing Volume: N/A	Left Turn Volume: N/A	% Left Turns in Advancing Volume: N/A
	Through	-	0	0.0%	N/A				
Opposing	Left	Yes	0	0.0%	N/A				
	Through	-	0	0.0%	N/A				

Right Turn Lane Volume Calculations									
Movement		Include?	Volume	% Trucks	PCEV				
Advancing	Left	Yes	0	0.0%	N/A	Advancing Volume: 2565	Opposing Volume: 381	Right Turn Volume: 381	
	Through	-	0	0.0%	N/A				
Opposing	Left	Yes	0	0.0%	N/A				
	Through	-	0	0.0%	N/A				

## TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 12
Warrant Met?: N/A	Warrant Met?: Yes

## TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized	Design Hour Volume of Turning Lane:	381
Cycles Per Hour (Assumed):	60	Cycles Per Hour (if Known):	
Average # of Vehicles/Cycle:	6.0		

PennDOT Publication 46, Exhibit 11-6

Speed (MPH)	40-45	50-60
Turn Demand Volume	High	High
Type of Traffic Control	High	Low
Signalized	A	A
	A	A
Unsignalized	A	A
	A	A

Right Turn Lane Storage Length, Condition A:	N/A
Condition B:	N/A
Condition C:	325
Required Right Turn Lane Storage Length:	325

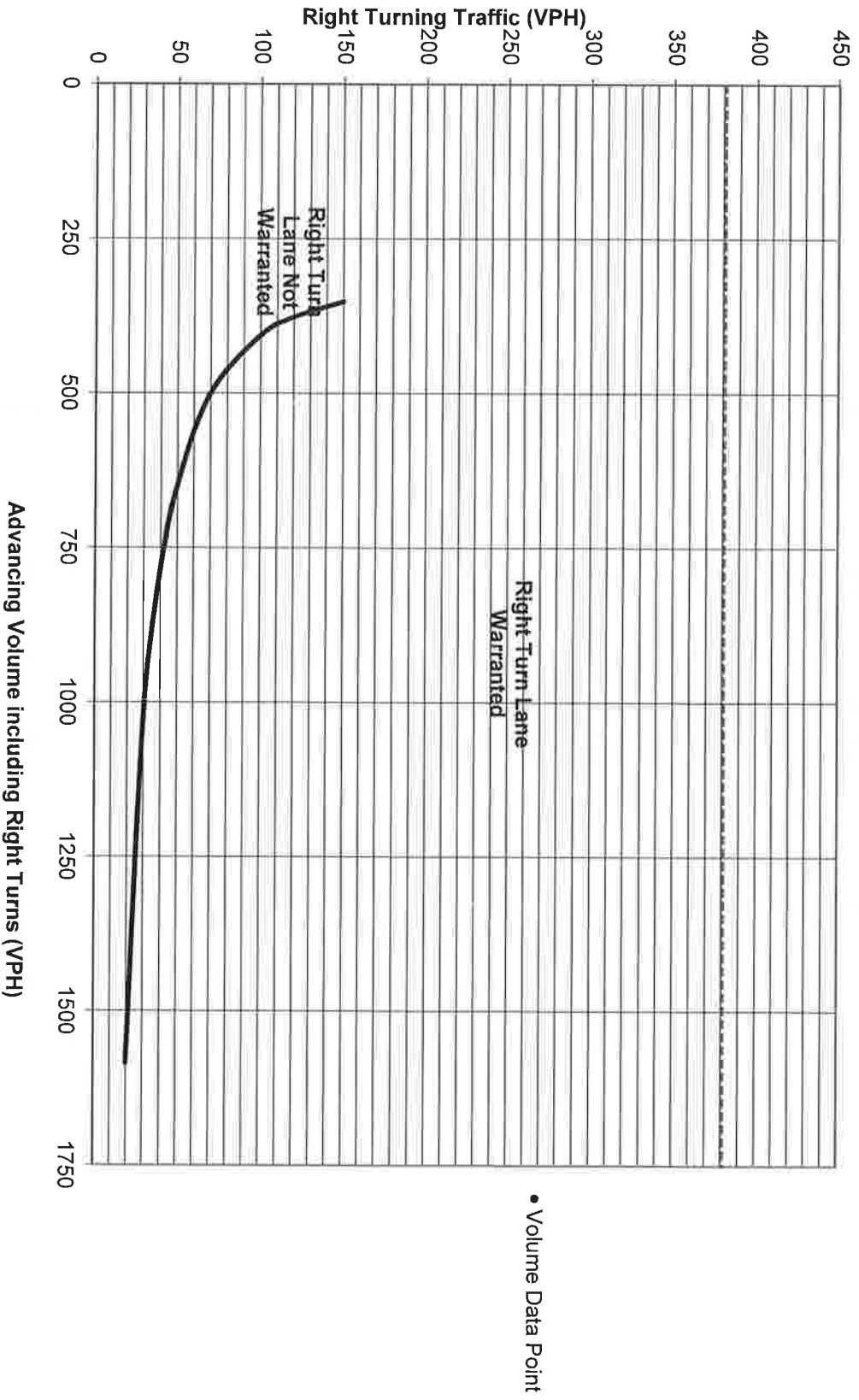
Additional Findings: N/A

Additional Comments / Justifications:





Figure 12. Warrant for right turn lanes on four-lane roadways  
(45 mph or greater speeds, unsignalized and signalized intersections)



**Future 2023 Capacity/Level-of-Service  
without-Development Analysis Worksheets**

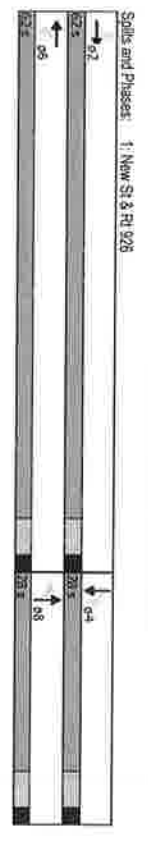
**ATTACHMENT 3**

Lane Group	EBL	EBI	EBR	WBL	WBI	WBR	NBL	NBI	NBR	SBL	SEI	SBR
Lane Configurations	88	783	5	12	369	56	3	90	25	60	274	59
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1830
Ideal Flow (vphpl)	10	10	10	10	10	10	10	10	10	10	10	10
Lane Width (ft)	-2%	-2%		1%	1%			-2%		1%		1%
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.30
Lane Util. Factor	0.999	0.999		0.983	0.999		0.971	0.971		0.996		0.956
Fit Protected	0	1638	0	1516	0	1568	0	1571	0	1571	0	1571
Satd. Flow (prot)	0.908	0.908		0.974	0.983		0.983	0.983		0.948		0.948
Fit Permitted	0	1495	0	1479	0	1479	0	1479	0	1498	0	1498
Satd. Flow (perm)	1	1	0	16	14	0	123	0	0	0	513	0
Right Turn on Red	Yes	Yes		Yes	Yes		Yes	Yes		Yes		Yes
Satd. Flow (RTOR)	45	45		45	45		45	45		45		45
Link Speed (mph)	819	819		2436	2436		714	714		826		826
Link Distance (ft)	12.4	12.4		36.9	36.9		19.5	19.5		16.1		16.1
Travel Time (s)	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Peak Hour Factor	3%	3%	0%	27%	8%	6%	3%	9%	3%	9%	0%	2%
Heavy Vehicles (%)	92	816	5	12	394	58	3	94	26	62	285	166
Adj. Flow (vph)	0	913	0	454	0	0	123	0	0	0	513	0
Shared Lane Traffic (%)	0	1		1	1		1	1		1		1
Lane Group Flow (vph)	Left	Left	Left	Left	Left	Left	Thru	Thru	Left	Thru	Left	Thru
Number of Detectors	30	6	6	30	6	30	35	30	35	30	35	35
Leading Detector (ft)	-10	0	0	-10	0	-10	-5	-10	-5	-10	-5	-5
Trailing Detector (ft)	-10	0	0	-10	0	-10	-5	-10	-5	-10	-5	-5
Detector 1 Position (ft)	-10	0	0	-10	0	-10	-5	-10	-5	-10	-5	-5
Detector 1 Size (ft)	40	6	6	40	6	40	40	40	40	40	40	40
Detector 1 Type	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	6	6	6	8	8	8	8	4	4	4
Permitted Phases												
Detector Phase	2	2	6	6	6	8	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Total Split (s)	62.0	62.0	62.0	62.0	62.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	68.9%	68.9%	68.9%	68.9%	68.9%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	56.0	56.0	56.0	56.0	56.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Maximum Green (%)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost Time (s)												
Lead/Lag												
Lead-Lag Optimizer?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Lanes, Volumes, Timings - Synchro 8  
 \heng8\6451 - Crebilly Farm\TrafficAnalysis\2017-3-1 Response to TWP Comments\2023 without dev\Weekday AM Optimized.svn

Lane Group	EBL	EBI	EBR	WBL	WBI	WBR	NBL	NBI	NBR	SBL	SEI	SBR
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduct (s)	42.0	42.0	42.0	42.0	42.0	42.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduct (s)	21.0	21.0	21.0	21.0	21.0	21.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None
v/c Ratio	0.96	0.96	0.96	0.48	0.48	0.48	0.30	0.30	0.30	0.30	0.30	0.30
Control Delay	39.3	39.3	39.3	10.5	10.5	10.5	26.3	26.3	26.3	26.3	172.1	172.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	39.3	39.3	10.5	10.5	10.5	26.3	26.3	26.3	26.3	172.1	172.1
Queue Length 50th (ft)	440	440	440	118	118	118	50	50	50	50	364	364
Queue Length 95th (ft)	#757	#757	#757	187	187	187	98	98	98	98	#961	#961
Inernal Link Dist (ft)	739	739	739	2356	2356	2356	634	634	634	634	746	746
Turn Bay Length (ft)												
Buses Capacity (vph)	947	947	947	942	942	942	404	404	404	404	402	402
Shoulder Cap Reduct	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reduct	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.96	0.96	0.48	0.48	0.48	0.30	0.30	0.30	0.30	0.30	0.30

Intersection Summary  
 Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Natural Cycle: 110  
 Control Type: Semi Act/Uncoord  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



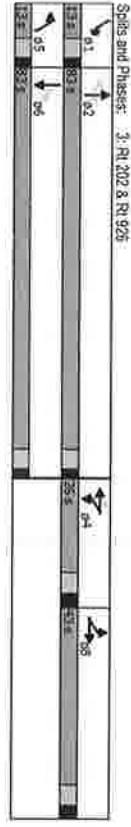
Lanes, Volumes, Timings - Synchro 8  
 \heng8\6451 - Crebilly Farm\TrafficAnalysis\2017-3-1 Response to TWP Comments\2023 without dev\Weekday AM Optimized.svn





Item	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SSR
Lead/Lag												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Cap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Red (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Node	None	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Flash Dont Walk (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Pedestrian Call (s/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Control Delay	216.6	162.1	162.1	138.2	99.5	68.8	19.9	97.0	8.3	54.6	122.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	216.6	162.1	162.1	138.2	99.5	68.8	19.9	97.0	8.3	54.6	122.5	0.0
Queue Length 95th (ft)	-657	-625	-625	-209	184	35	8	-1093	25	35	-1284	0.0
Queue Length 98th (ft)	#895	#866	#866	#382	#315	73	21	#1228	69	#108	#1428	0.0
Internal Link Dis (ft)	2269			902				1043			3074	
Turn Bay Length (ft)	450			200				170		375		
Base Capacity (kph)	335	394	394	186	209	171	119	1541	824	1111	1552	0.0
Shoulder Cap Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Reduced V/C Ratio	1.33	1.19	1.19	1.01	0.82	0.20	0.14	1.10	0.19	0.84	1.18	0.0

**Area Type:** Other  
**Cycle Length:** 165  
**Actuated Cycle Length:** 165  
**Natural Cycle:** 115  
**Control Type:** Actuated-Uncoordinated  
 - Volume exceeds capacity, queue is theoretically infinite  
 - Queue stream is maximum after 3rd cycle  
 - 95th percentile volume exceeds capacity, queue may be longer  
 - Queue shown is maximum after two cycles



**Notes and Phases:** 3: Rt 202 & Rt 926  
**Lanes:** Volumes, Timings - Synchro 8  
 [img alt="Signal timing diagram showing phases 01 through 06 and their durations"]  
 \lang816451 - Crebilly Farm\TrafficAnalysis\2017-3-1 Response to TWP Comments\2023 without dev\Weekday AM Optimized.syn  
 2023 without Dev Weekday Morning Peak Hour Optimized



Item	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SSR
Lane Configurations	668	272	11	177	162	33	16	1597	146	67	1506	209
Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16
Number	0	6	0	0	0	0	0	23	0	0	0	0
Initial Q (Qd), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Peak-Blk Adj/ln (pb1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Flow Rate, veh/h	1774	1797	1900	1732	1618	1716	1801	1607	1640	1800	1800	1800
Adj Flow Rate, veh/h	452	501	12	188	172	32	17	1699	136	71	1602	203
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh. %	3	402	3	201	211	168	72	1550	728	109	1398	174
Cap. veh/h	0.23	0.22	0.12	0.12	0.12	0.12	0.12	0.48	0.48	0.04	0.50	0.50
Arrive On Green	1689	1748	42	1650	1732	1375	1634	3290	1531	1531	2789	348
Sat Flow, veh/h	452	0	513	188	172	32	17	1899	136	71	884	921
Gap Sat Flow (s), veh/h	1689	0	1750	1650	1732	1375	1634	1630	1531	1531	1558	1579
Q Serve (s), s	37.0	0.0	37.0	18.5	15.9	3.4	0.9	76.0	8.4	3.8	82.2	82.2
Cycle Q Clear (s), s	37.0	0.0	37.0	18.5	15.9	3.4	0.9	76.0	8.4	3.8	82.2	82.2
Prop In Lane	1.00	0.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.22
Lane Cap Cap(veh)	381	0	405	201	211	168	72	1550	728	109	781	791
Avg Ratio(X)	1.19	0.00	1.27	0.93	0.81	0.19	0.19	1.10	0.55	1.13	1.13	1.13
Avail Cap(C, A), veh/h	381	0	404	201	211	168	72	1550	728	109	781	791
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.5	0.0	63.5	71.4	70.2	64.7	39.9	43.0	24.8	38.5	40.9	41.0
Incr Delay (d2), s/veh	107.3	0.0	138.3	45.3	21.2	0.5	1.7	53.8	0.6	10.6	75.1	87.5
Initial Q Delay (s), s/veh	61.0	0.0	48.9	0.0	0.0	0.0	0.0	47.3	0.0	0.0	0.0	0.0
%ile Base(QD195%), veh/h	59.5	0.0	67.0	16.4	13.7	2.4	0.8	98.5	6.5	3.4	93.0	99.1
LnGrp Delay(d), s/veh	231.8	0.0	262.7	116.8	91.4	65.3	41.5	144.1	25.3	49.0	116.0	128.5
LnGrp LOS	F	F	F	F	F	F	F	D	F	F	D	F
Approach Vol, veh/h	965	227.6	392	1013	1344	1875	1875	3290	1531	1531	2789	348
Approach Delay, s/veh	67.8	0.0	67.8	74.0	72.2	64.7	39.9	43.0	24.8	38.5	40.9	41.0
Approach LOS	F	F	F	F	F	F	F	D	F	F	D	F

**Notes:**  
 HCM 2010 CHI Delay: 146.0  
 HCM 2010 LOS: F  
 User approved pedestrian interval to be less than phase max green.

**Intersections Summary:**  
 HCM 2010 CHI Delay: 146.0  
 HCM 2010 LOS: F

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

**HCM 2010 Signalized Intersection Summary - Synchro 8**  
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 2023 without Dev Weekday Morning Peak Hour Optimized

Link Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	856	41	8	395	51	30
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (Vp/hp)	12	14	11	12	12	14
Lane Width (ft)	2%			-3%	-1%	
Grade (%)		350	120		0	0
Storage Length (ft)		1	1		1	1
Storage Length (ft)			75			75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.950					0.850
Fit Protected		0.950			0.950	
Satd. Flow (prot)	1713	1569	1678	1676	1719	1640
Fit Permitted		0.950			0.950	
Satd. Flow (perm)	1713	1569	1678	1676	1719	1640
Link Speed (mph)	45			45		25
Link Distance (ft)	2436			2349		414
Travel Time (s)	36.9			35.6		11.3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	3%	0%	9%	0%	0%
Adj. Flow (vph)	911	44	9	420	54	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	911	44	9	420	54	32
Sign Control	Free			Free	Stop	Stop

Intersection Summary  
Area Type: Other  
Control Type: Unsignalized

Intersection	EBT	EBR	WBL	WBT	NBL	NBR
Int Delay, s/veh	1.8					
Management	856	41	8	395	51	30
Vol. Weith	0	0	0	0	0	0
Conflicting Peds. #/hr	Free	Free	Free	Free	Stop	Stop
Sign Control	-	None	-	None	-	None
RT Channelized						
Storage Length		350		120		0
Van in Median Storage, #	0				0	0
Grade, %	2			-3	-1	
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	4	3	0	9	0	0
Wymt Flow	911	44	9	420	54	32

Major/Minor	Major1	Major2	Minor
Conflicting Flow All	0	311	1348
Stage 1	-	-	911
Stage 2	-	-	437
Critical Hwy	-	4.6	6.2
Critical Heavy Sig 1	-	-	5.2
Critical Heavy Sig 2	-	-	5.2
Follow-up Hwy	-	3.3	3
Pol Cap-1 Maneuver	-	502	196
Stage 1	-	-	459
Stage 2	-	-	762
Platoon blocked %	-	-	-
Mov Cap-1 Maneuver	-	502	192
Mov Cap-2 Maneuver	-	-	192
Stage 1	-	-	459
Stage 2	-	-	748

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	26.6
HCM LOS	D	D	D

Minor Lane/Signal/Mark	NBL1	NBL2	EBT	EBR	WBL	WBT	NBL	NBR
Capacity (veh/h)	192	351	-	-	-	502	-	-
HCM Lane V/C Ratio	0.283	0.091	-	-	0.017	-	-	-
HCM Control Delay (s)	31	16.3	-	-	12.3	-	-	-
HCM Lane LOS	D	C	-	-	B	-	-	-
HCM 95th %ile Q/ven	1.1	0.3	-	-	0.1	-	-	-

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 4: Rt 202 & Pleasant Grove Rd 2023 without Dev Weekday Morning Peak Hour Optimized

Area Type:	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	0	53	0	0	10	14	2127	57	72	1730	150
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	16	16	16	12	12	12	11	12	12	12	12	12
Lane Width (ft)	-1%											
Grade (%)	0	0	0	0	0	0	350	2%	0	380	0	0
Storage Length (ft)	0	0	1	0	0	1	75		0	1	75	0
Storage Lanes	75	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.985	0.985	1.00	0.988	0.988
Lane Util. Factor												
Fit Protected	0	0	1773	0	0	1344	1515	3147	0	1613	3077	0
Satd. Flow (fpm)	0	0	1773	0	0	1344	1515	3147	0	1613	3077	0
RT Permitted												
Satd. Flow (perm)	0	0	1773	0	0	1344	1515	3147	0	1613	3077	0
Link Speed (mph)	35	35	35	35	35	35	35	35	35	35	35	35
Link Distance (ft)	4354	858	858	858	858	858	858	858	858	858	858	858
Travel Time (s)	84.8	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	0	60	0	0	11	16	2417	65	82	1966	170
Shared Lane Traffic (%)	0	0	60	0	0	11	16	2417	65	82	1966	170
Lane Group Flow (vph)	0	0	60	0	0	11	16	2417	65	82	1966	170
Sign Control	Stop	Stop	Free	Stop	Stop	Free	Free	Free	Free	Free	Free	Free

Area Type: Other  
 Control Type: Unsignalized

McMahon Associates, Inc. Credibly Residential Development  
 4: Rt 202 & Pleasant Grove Rd 2023 without Dev Weekday Morning Peak Hour Optimized

Area Type:	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int. Delay, s/veh	1.1											
Movement	0	0	53	0	0	10	14	2127	57	72	1730	150
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Yield	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized												
Storage Length	-	-	0	-	-	-	0	-	-	0	-	-
Ven in Median Storage #	-	-	0	-	-	-	0	-	-	0	-	-
Grade %	-	-	-1	-	-	-	-2	-	-	2	-	-3
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles %	0	0	0	0	0	0	0	0	0	0	0	0
Manrt Flow	0	0	60	0	0	0	11	16	2417	65	82	1966

Major/Minor	Major	Minor	Major	Minor	Major	Minor
Conflicting Flow All	3455	4729	1068	3828	4781	1241
Stage 1	2215	2215	-	2481	2481	-
Stage 2	1240	2514	-	1147	2300	-
Critical Hdwy	7.3	6.3	7.5	7.1	6.1	7.3
Critical Hdwy Stp 1	6.3	5.3	-	6.1	5.1	-
Critical Hdwy Stp 2	6.3	5.3	-	6.1	5.1	-
Follow-up Hdwy	3.5	4	3.1	3.5	4	3
Plat Cap-1 Maneuver	3	1	192	3	1	155
Stage 1	52	93	-	41	79	-
Stage 2	202	66	-	244	96	-
Platnon blocked %	-	-	-	-	-	-
Major Cap-1 Maneuver	2	1	192	1	1	155
Minor Cap-2 Maneuver	48	57	-	38	73	-
Stage 1	173	61	-	102	58	-
Stage 2	-	-	-	-	-	-

Area Type:	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Control Delay, s	32.1					30.1						0.1
HCM LOS	D					D						

Area Type:	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Major Lane Delay, Min	212			192	155	209						
Capacity (veh/h)	0.075			0.314	0.073	0.391						
HCM Lane V/C Ratio	23.4			32.1	30.1	32.9						
HCM Control Delay (s)	C			D	D	D						
HCM Lane LOS	C			D	D	D						
HCM 95th %ile Cl(welt)	0.2			1.3	0.2	1.7						

Lane Group	WB	WBT	NB	NBT	SB	SBT
Lane Configurations	201	29	225	10	12	292
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vph/pl)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.983	0.994				
Fit Protected	0.958					0.998
Std. Flow (prot)	1655	0	1739	0	0	1757
Fit Permitted	0.958					0.998
Std. Flow (perm)	1655	0	1739	0	0	1757
Link Speed (mph)	35					35
Link Distance (ft)	4354					619
Travel Time (s)	84.8	12.4				12.1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	12%	3%	0%	9%	2%
Adj. Flow (vph)	226	33	253	11	13	328
Shared Lane Traffic (%)						
Lane Group Flow (vph)	259	0	264	0	0	341
Sign Control	Stop	Free	Free	Free	Free	Free

Lanes: Volumes, Timings - Synchro 8 2023 without Dev Weekday Morning Peak Hour Optimized  
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Intersection	WB	WBT	NB	NBT	SB	SBT
Int Delay, s/vch	5.6					
Movement	201	29	225	10	12	292
Vol. veh/s	0	0	0	0	0	0
Conflicting Peds. #/hr	Stop	Stop	Free	Free	Free	Free
Sign Control	-	None	-	None	-	None
RT Channelized	0					
Storage Length	0					
Veh. in Median Storage, #	0					
Grade, %	0					
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles %	1	12	3	0	9	2
Movt Flow	226	33	253	11	13	328

HCM 2010 TWSC - Synchro 8 2023 without Dev Weekday Morning Peak Hour Optimized  
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Area Type	WB	WBT	NB	NBT	SB	SBT
Area Type: Unsignalized						
Intersecting Summary						
Control Type	Stop	Free	Free	Free	Free	Free
Area Type: Other						
Area Type: Other						

Maneuver	WB	WBT	NB	NBT	SB	SBT
Conflicting Flow All	613	298	0	0	294	0
Stage 1	298					
Stage 2	355					
Critical Hwy	6.41	6.32			4.4	
Critical Hwy Sg 1	5.41					
Critical Hwy Sg 2	5.41					
Follow-up Hwy	3	3.2			3.1	
Pot Cap-1 Maneuver	514	800			940	
Stage 1	905					
Stage 2	813					
Platoon blocked, %						
Mov Cap-1 Maneuver	505	800			940	
Mov Cap-2 Maneuver	505					
Stage 1	905					
Stage 2	799					

Approach WB WBT NB NBT SB SBT  
 HCM Control Delay, s 18.1 0 0.4  
 HCM LOS C

Maneuver	WB	WBT	NB	NBT	SB	SBT
Capacity (veh/s)	-	530	940	-	-	-
HCM Lane V/C Ratio	-	0.488	0.014	-	-	-
HCM Control Delay (s)	-	18.1	8.9	-	-	-
HCM Lane LOS	-	C	A	-	-	-
HCM Ssbh Ssda Q(Veh)	-	2.6	0	-	-	-

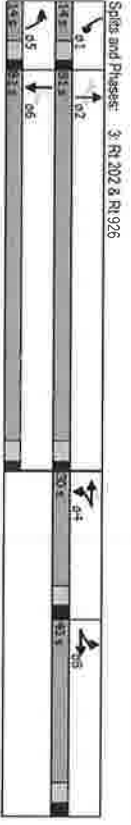






McMahon Associates, Inc. **Crebly Residential Development**  
 3: Rr 202 & Rt 926 2023 without Dev Weekday Afternoon Peak Hour Optimized

Lead/Lag	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SBT	SEB
Lead/Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Cap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Time Before Reduc (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.0	37.0	0.0	37.0	37.0
Time To Reduc (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	0.0	15.0	15.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	8.0	8.0	None	8.0	8.0
Flash Dont Walk (s)	23.0	23.0	23.0	23.0	23.0	23.0	15.0	15.0	15.0	None	15.0	15.0
Pedestrian Calc (#/h)	0	0	0	0	0	0	0	0	0	0	0	0
v/c Ratio	1.18	1.04	0.86	1.12	0.21	0.35	1.10	0.17	0.86	1.22	0.17	1.22
Control Delay	163.7	120.2	101.0	153.3	64.8	25.3	95.8	6.7	84.7	142.5	6.7	142.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	163.7	120.2	101.0	153.3	64.8	25.3	95.8	6.7	84.7	142.5	6.7	142.5
Queue Length 50th (ft)	-504	-468	212	-372	47	22	-1074	13	77	-1353	13	-1353
Queue Length 95th (ft)	#729	#696	#358	#574	92	44	#1211	55	#201	#1492	55	#1492
Internal Link Dist (ft)	2259	902	215	305	170	375	170	375	170	375	170	375
Turn Bay Length (ft)	450	314	229	257	237	138	1530	813	133	1557	813	1557
Base Capacity (Vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shoreline Cap Reduc	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reduc	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reduc	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.18	1.04	0.86	1.12	0.21	0.33	1.10	0.17	0.86	1.22	0.17	1.22



Notes:  
 Area Type: Other  
 Cycle Length: 165  
 Actuated Cycle Length: 165  
 Natural Cycle: 115  
 Control Type: Actuated-Uncoordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite  
 # Queue shown is maximum after two cycles  
 95th percentile volume exceeds capacity, queue may be longer  
 Queue shown is maximum after two cycles

Lanes, Volumes, Timings  
 2023 without Dev Weekday Afternoon Peak Hour Optimized  
 I:\eng1816451 - Crebly Farm\TrafficAnalysis\2017-1-20 TIS PennDOT & Twp\2023 without dev\Weekday PM Optimized Synchro 8 Report

McMahon Associates, Inc. **Crebly Residential Development**  
 3: Rr 202 & Rt 926 2023 without Dev Weekday Afternoon Peak Hour Optimized

Component	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SBT	SEB
Lane Configurations	480	221	29	192	291	48	44	1828	131	112	1645	189
Volume (veh/h)	8	18	7	4	14	5	2	12	2	6	16	6
Initial Q (Q0), veh	0	0	0	0	0	0	14	0	0	59	0	0
Peak Blue Adj(A, Veh)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sd Flow Rate, veh/h	1808	1677	1630	1783	1836	1872	1838	1749	1879	1755	1731	1800
Adj Flow Rate, veh/h	376	354	30	198	300	35	45	1678	100	115	1696	158
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh %	355	355	27	247	297	231	98	1530	712	135	1954	69
Arrive On Green	0.21	0.21	0.20	0.15	0.15	0.15	0.03	0.46	0.46	0.05	0.48	0.48
Sd Flow, veh/h	1723	1723	131	1698	1836	1591	1749	3322	1546	1681	3045	280
Grp Volume (v) veh/h	376	0	424	198	300	35	45	1678	100	115	1696	158
Grp Sd Flow (v) veh/h	1723	0	1854	1698	1836	1591	1749	1661	1546	1681	1644	1681
Q Serv (s), s	34.0	0.0	34.0	18.6	24.0	3.2	2.2	76.0	6.2	8.9	79.9	79.9
Cycle Q Clear (s)	1.00	0.0	0.07	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop In Lane	355	0	382	247	297	231	98	1530	712	135	1954	69
Lane Cap (Cap), veh/h	1.06	0.00	1.11	0.60	1.12	0.15	0.46	1.10	0.46	0.56	1.14	1.14
V/C Ratio(X)	3.55	0.00	0.382	2.47	2.67	2.31	1.39	15.30	7.12	1.35	7.86	6.14
Avg C/Cap (s), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Filter Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Filter(I)	65.5	0.0	65.5	63.2	70.5	61.9	39.4	44.5	25.7	45.9	42.5	42.5
Incr Delay (d2), s/veh	64.2	0.0	79.2	17.1	92.4	0.3	3.3	54.2	0.4	37.2	77.1	80.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.5	0.0	0.0	125.2	130.0
KdLr BackQ(C95%),veh/h	40.5	0.0	48.5	15.1	34.2	2.5	2.1	98.5	4.9	10.8	130.4	135.5
LnGrp Delay(d),s/veh	128.7	0.0	144.7	85.3	162.9	61.9	42.7	128.1	28.1	83.0	244.9	243.3
LnGrp LOS	F	F	F	F	F	E	D	F	F	F	F	F
Approach Vol, veh/h	800											
Approach Delay, s/veh	137.7											
Approach LOS	F											

Time	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+V+R(s)), s	14.0	81.0	30.0	10.1	84.9	40.0	7.0	40.0
Change Period (Y+R(s)), s	6.0	6.0	7.0	6.0	6.0	6.0	3.0	3.0
Max Green Setting (Gmax), s	8.0	75.0	23.0	8.0	75.0	33.0	8.0	33.0
Max Q Clear Time (g-c+1), s	9.4	78.5	26.5	9.4	82.4	36.5	9.4	36.5
Green Ext Time (g-c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes:  
 HCM 2010 CH Delay 157.8  
 HCM 2010 LOS F

User approved pedestrian interval to be less than phase max green.  
 HCM 2010 Signalized Intersection Summary  
 2023 without Dev Weekday Afternoon Peak Hour Optimized  
 I:\eng1816451 - Crebly Farm\TrafficAnalysis\2017-1-20 TIS PennDOT & Twp\2023 without dev\Weekday PM Optimized Synchro 8 Report

Area Type:	EB1	EB2	WB1	WB2	NB1	NB2
<b>Control Type:</b> Unsignalized						
<b>Intersection Summary</b>						
Lane Group	EB1	EB2	WB1	WB2	NB1	NB2
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	780	41	35	543	43	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	11	12	12	14
Grade (%)	2%			-3%	-1%	0
Storage Length (ft)	350	120	1	1	0	0
Storage Lanes	1	1	1	1	1	1
Taper Length (ft)			75		75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
RT	0.850				0.850	
RT Protected		0.950			0.950	
Satd. Flow (prot)	1730	1616	1678	1791	1719	1640
RT Permitted		0.950			0.950	
Satd. Flow (perm)	1730	1616	1678	1791	1719	1640
Link Speed (mph)	45		45		25	
Link Distance (ft)	2436		2349		414	
Travel Time (s)	36.9		35.6		11.3	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	0%	2%	0%	0%	0%
Adj. Flow (vph)	796	42	36	554	44	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	796	42	36	554	44	47
Sign Control	Free			Free	Stop	

Intersection	EB1	EB2	WB1	WB2	NB1	NB2
Int Delay, s/veh	17					
<b>Max Queue</b>	780	41	35	543	43	46
Vol, veh/h	0	0	0	0	0	0
Conflicting Peds. #/hr	Free	Free	Free	Free	Stop	Stop
Sign Control	- None	- None	- None	- None	- None	- None
RT Channelized	350		120		0	0
Storage Length	0	0	0	0	0	0
Veh in Median Storage, #	2	-	-	-	-	-
Grade, %	2	-	-	-	-	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles %	3	0	0	2	0	0
Mount Flow	796	42	36	554	44	47
<b>Max Queue</b>	0	0	796	0	1422	796
Conflicting Flow All						
Stage 1	-	-	-	-	-	-
Stage 2	-	-	4.3	-	6.2	6.1
Critical Heavy Sig 1	-	-	-	-	5.2	5.2
Critical Heavy Sig 2	-	-	-	-	3	3.1
Follow-up Heavy	-	-	3	-	3	4.16
Pol Cap. 1 Manuever	-	-	634	-	177	520
Stage 1	-	-	-	-	-	624
Stage 2	-	-	-	-	-	-
Platoon blocked %	-	-	-	-	-	-
Max Cap 1 Manuever	-	-	634	-	167	416
Max Cap 2 Manuever	-	-	-	-	167	-
Stage 1	-	-	-	-	520	-
Stage 2	-	-	-	-	589	-
<b>Approach</b>	EB1		WB1		NB1	
HCM Control Delay, s	0		0.7		24.1	
HCM LOS					C	
<b>Max Queue</b>	167	416	634			
Capacity (veh/h)	0.263	0.113	0.056			
HCM Lane V/C Ratio	34.1	14.8	11			
HCM Control Delay (s)	D	B	B			
HCM Lane LOS	D	B	B			
HCM 95th %tile Q(veh)	1	0.4				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	0	8	0	0	0	31	43	2038	75	122	1949
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (Vphpl)	16	16	16	12	12	12	11	12	12	11	12	12
Lane Width (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Grade (%)	-1%	-1%	0	-2%	-2%	2%	2%	2%	-3%	0	0	0
Storage Length (ft)	0	0	1	0	0	0	350	0	380	0	0	0
Storage Lanes	0	0	1	0	0	0	1	0	1	0	0	0
Taper Length (ft)	75	75	75	75	75	75	75	75	75	75	75	75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95
Fit Protected	0.985	0.985	0.985	0.985	0.985	0.985	0.995	0.995	0.977	0.977	0.977	0.977
Satd. Flow (prot)	0	0	1773	0	0	1443	1636	3305	0	1678	3330	0
Fit Permitted	0	0	1773	0	0	1443	1636	3305	0	1678	3330	0
Satd. Flow (perm)	0	0	1773	0	0	1443	1636	3305	0	1678	3330	0
Link Speed (mph)	35	35	35	35	35	35	35	35	35	35	35	35
Link Distance (ft)	4354	4354	4354	4354	4354	4354	4354	4354	4354	4354	4354	4354
Travel Time (s)	84.8	84.8	84.8	16.7	16.7	16.7	47.8	47.8	8.5	8.5	8.5	8.5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	2%	2%	1%
Adj. Flow (vph)	0	0	9	0	0	33	46	2191	81	131	2096	371
Shared Lane Traffic (%)	0	0	9	0	0	33	46	2272	0	131	2467	0
Lane Group Flow (vph)	0	0	9	0	0	33	46	2272	0	131	2467	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free

Area Type: Other  
 Control Type: Unsignalized

Int. Section	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int. Delay, s/veh	1.4											
Movement	0	0	8	0	0	0	31	43	2038	75	122	1949
Vol. veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Peak #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Split Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	Yield	Yield	Yield	None	None	None	None	None	None	None	None	None
Storage Length	0	0	0	0	0	0	350	0	380	0	0	0
Veh in Median Storage #	0	0	0	0	0	0	0	0	0	0	0	0
Grade, %	-1	-1	0	-2	-2	2	2	2	-3	0	0	0
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	2	2	0	2	2	1
Mvmt Flow	0	0	9	0	0	0	33	46	2191	81	131	2096

Major Minor	Major 2	Minor 2	Major 1	Minor 1	Major 2	Minor 2	Major 1	Minor 1
Conflicting Flow All	3732	4906	1233	3634	5053	1136	2467	0
Stage 1	2544	2544	-	2324	2324	-	2272	0
Stage 2	1188	2385	-	1310	2729	-	-	-
Critical Heavy	7.3	6.3	7.1	7.1	7.1	-	3.9	-
Critical Heavy Sig 1	6.3	5.3	-	6.1	5.1	-	-	-
Critical Heavy Sig 2	6.3	5.3	-	6.1	5.1	-	-	-
Follow-up Heavy	3.5	4	2.9	3.5	4	3	2.4	-
Pot Cap-1 Maneuver	2	1	172	3	1	198	211	-
Stage 1	32	64	-	51	93	-	-	-
Stage 2	217	78	-	198	60	-	-	-
Pitbon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1	0	172	1	0	198	211	-
Mov Cap-2 Maneuver	1	0	-	1	0	-	-	248
Stage 1	25	30	-	40	73	-	-	-
Stage 2	141	61	-	89	28	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27	26.8	0.5	1.8
HCM LOS	D	D		

Lane Group	WB	WBT	NBT	NBR	SB	SBT
Lane Configurations	305	35	283	18	10	312
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.986	0.992				
Fit	0.957					0.998
Fit Protected	1698	0	1786	0	0	1796
Satd. Flow (prot)	0.957					0.998
Fit Permitted	1698	0	1786	0	0	1796
Satd. Flow (perm)	1698	0	1786	0	0	1796
Link Speed (mph)	4354		636			619
Link Distance (ft)	84.8		12.4			12.1
Travel Time (s)	0.90		0.90			0.90
Peak Hour Factor	0%		0%			0%
Heavy Vehicles (%)	0%		0%			0%
Adj. Flow (vph)	339		314			347
Shared Lane Traffic (%)						
Lane Group Flow (vph)	376	0	334	0	0	358
Sign Control	Stop		Free			Free

Area Type: Unsignalized

Intersection	WB	WBT	NBT	NBR	SB	SBT
Int Delay, s/vln	12.9					
Movement	305	35	283	18	10	312
Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0					
Veh in Median Storage, #	0		0		0	
Grade, %	0		0		0	
Peak Hour Factor	90		90		90	
Heavy Vehicles, %	0		0		0	
Main Flow	339		314		20	
						11 347

Maneuver	Mano1	Mano2
Conflicting Flow All	683	324
Stage 1	324	
Stage 2	369	
Critical Hwy	6.4	6.2
Critical Hwy Sig 1	5.4	
Critical Hwy Sig 2	5.4	
Follow-up Hwy	3	3.1
Plat Cap-1 Maneuver	461	762
Stage 1	842	
Stage 2	801	
Platoon blocked, %		
Mov Cap-1 Maneuver	454	762
Mov Cap-2 Maneuver	454	
Stage 1	842	
Stage 2	789	

Approach	WB	NB	SB
HCM Control Delay, s	36.3	0	0.3
HCM LOS	E		

Level Lane/Median Match	NBT	NBR	WBT	WBR	SBT
Capacity (veh/h)	-	474	922	-	-
HCM Lane V/C Ratio	-	0.797	0.012	-	-
HCM Control Delay (s)	-	36.3	9	-	-
HCM Lane LOS	-	E	A	-	-
HCM 95th %tile Q(veh)	-	7.3	0	-	-

**Future 2023 Capacity/Level-of-Service  
with-Development Analysis Worksheets**

**ATTACHMENT 4**

Line Group	EBI	EBI	EBR	WER	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	50	785	5	17	377	56	3	31	27	60	278	167
Volume (vph)	1820	1800	1800	1820	1800	1800	1800	1800	1800	1800	1800	1800
Max Flow (vphpl)	10	10	10	10	10	10	10	10	10	10	10	10
Lane Width (ft)	-2%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Grade (%)												
Lane Util. Factor												
Fit	0.999	0.995	0	0.983	0.988	0.994	0.998	0.998	0.994	0.994	0.994	0.994
Fit Predicted												
Satd. Flow (prod)	0	1638	0	0	1512	0	0	1565	0	0	1569	0
Fit Permitted	0	1638	0	0	1512	0	0	1565	0	0	1569	0
Satd. Flow (perm)	0	1486	0	0	1450	0	0	1539	0	0	1498	0
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Link Speed (mph)	1	45	15	15	45	15	15	45	15	15	45	15
Link Distance (ft)	819	2438	19.5	714	825	16.1	714	825	16.1	714	825	16.1
Travel Time (s)	124	36.9	19.5	19.5	45	19.5	19.5	45	19.5	45	19.5	19.5
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	3%	0%	27%	8%	6%	33%	3%	9%	4%	0%	2%
Adj. Flow (vph)	94	818	5	18	393	58	3	95	28	62	290	174
Shared Lane Traffic (%)	0	917	0	0	469	0	0	126	0	0	526	0
Lane Group Flow (vph)	1	1	1	1	1	1	1	1	1	1	1	1
Number of Detectors	Left	6	30	6	30	6	30	6	30	6	30	6
Detector Template	-10	0	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Leading Detector (ft)	-10	0	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Trailing Detector (ft)	-10	0	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Detector 1 Position (ft)	40	6	40	40	6	40	40	6	40	40	6	40
Detector 1 Size(ft)	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX
Detector 1 Type												
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type												
Protected Phases	2	2	6	6	8	8	8	8	8	8	8	8
Permitted Phases	2	2	6	6	8	8	8	8	8	8	8	8
Detector Phase												
Switch Phase	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Initial (s)	28.0	28.0	28.0	28.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Minimum Split (s)	62.0	62.0	62.0	62.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	68.9%	68.9%	68.9%	68.9%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Total Split (%)												
Maximum Green (s)	56.0	56.0	56.0	56.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Line Group	EBI	EBI	EBR	WER	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Gap (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	42.0	42.0	42.0	42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	21.0	21.0	21.0	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	None	None	None	None	None	None	None	None
v/c Ratio	0.97	41.6	0.0	0.51	0.31	0.31	1.31	0.31	0.31	1.31	0.31	0.31
Control Delay	41.6	11.0	0.0	28.3	28.3	28.3	185.1	28.3	28.3	185.1	28.3	28.3
Queue Delay	0.0	41.6	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	11.0	0.0	21.0	125	200	185.1	21.0	21.0	185.1	21.0	21.0
Queue Length 60th (ft)	449	#767	0	200	634	404	402	404	404	402	402	402
Queue Length 95th (ft)	739		0	2356	634	634	634	634	634	634	634	634
Internal Link Dist (ft)												
Turn Bay Length (ft)												
Base Capacity (vph)	941	923	0	923	0	0	0	0	0	0	0	0
Saturation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Splilback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.51	0.0	0.51	0.31	0.31	1.31	0.31	0.31	1.31	0.31	0.31
Area Type:												
Intersection Summary												
Other												
Cycle Length: 90												
Actuated Cycle Length: 90												
Natural Cycle: 110												
Control Type: Semi-Actuated												
Volume exceeds capacity, queue is theoretically infinite												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Splices and Phases: 1: New St & Rt 926												
02												
05												

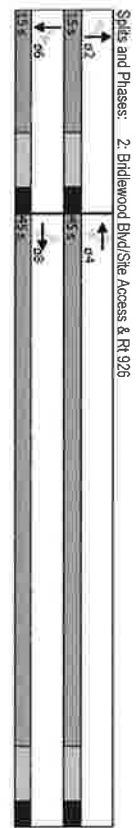




McMahon Associates, Inc. Credibly Farm Residential Development  
 2: Bridlewood Blvd/Site Access & Rt 926 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp: Bridlewood

Item Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead-Lag Optimizer?	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	0.01	0.73	0.04	0.03	0.34	0.01	0.23	0.12	0.37	0.10	0.10	0.10
Recall Mode	3.5	11.6	1.1	3.9	5.1	0.1	24.3	11.1	27.3	16.0	16.0	16.0
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	3.5	11.6	1.1	3.9	5.1	0.1	24.3	11.1	27.3	16.0	16.0	16.0
Total Delay	1	190	1	1	55	0	16	1	26	5	5	5
Queue Length 50th (ft)	3	#381	6	5	94	1	45	23	66	25	25	25
Queue Length 95th (ft)		2356		2274		150	334	100	532			
Internal Link Dist (ft)	150	1276	1183	284	1248	1148	261	334	254	334	334	334
Turn Bay Length (ft)	667	0	0	0	0	0	0	0	0	0	0	0
Base Capacity (Vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.71	0.04	0.03	0.34	0.01	0.21	0.11	0.34	0.09	0.09	0.09

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 60  
 Actuated Cycle Length: 53.8  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes: Volumes: Turnings - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp: Bridlewood  
 I:Length:18451 - Credibly Farm\TrafficAnalysis\2017-7-TWP-CU-Submission\2023 with dev\Access opp: Bridlewood\Weekday\_VAM.syn

McMahon Associates, Inc. Credibly Farm Residential Development  
 2: Bridlewood Blvd/Site Access & Rt 926 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp: Bridlewood

Item Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	898	41	8	395	15	51	5	30	81	16	13
Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Obs) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A, pct)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1747	1713	1739	1827	1676	1791	1809	1804	1881	1765	1800	1800
Adj Flow Rate, veh/h	4	911	44	9	420	16	54	5	32	86	17	14
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	4	3	0	9	2	0	2	2	2	2	2
Cap, veh/h	623	1070	955	274	1046	950	373	34	218	381	145	119
Arrive On Green	0.62	0.62	0.62	0.62	0.62	0.62	0.16	0.16	0.16	0.16	0.16	0.14
Sat Flow, veh/h	938	1713	1529	806	1676	1523	1407	212	1354	1365	896	738
Grp Volume (v) veh/h	4	911	44	9	420	16	54	5	37	86	17	14
Grp Sat Flow (s) veh/h	939	1713	1529	806	1676	1523	1407	212	1354	1365	896	738
Q Service (s) s	0.1	19.9	0.5	0.6	5.9	0.2	1.8	0.0	1.0	2.7	0.0	0.8
Cycle Q Clear (s) s	6.0	19.9	0.5	20.5	5.9	0.2	1.8	0.0	1.0	3.1	0.0	0.8
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	0.45	0.45
Lane Grp Cap (s) veh/h	623	1070	955	274	1046	950	373	0	233	361	0	264
Avail Cap (s) veh/h	0.01	0.85	0.05	0.03	0.40	0.02	0.14	0.00	0.15	0.24	0.00	0.12
HCM Pardon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d) s/veh	5.9	7.0	3.4	15.2	4.4	3.3	17.3	0.0	17.2	17.9	0.0	16.9
Initial Q Delay (d2) s/veh	0.0	3.7	0.0	0.2	0.0	0.2	0.0	0.0	0.3	0.3	0.0	0.2
%ile Back (Q) (95%) 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
LnGrp Delay (d) s/veh	5.9	10.7	3.4	15.3	4.9	3.3	17.5	0.0	17.4	18.3	0.0	17.1
Approach Vol, veh/h	859	104	445	4.8	91	117	17.5	17.5	17.5	17.5	17.5	17.5
Approach Delay, s/veh	10.4	10.4	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Approach LOS	B	B	A	A	A	A	B	B	B	B	B	B

**Intersection Summary**  
 HCM 2010 CH Delay 3.8  
 HCM 2010 LOS A

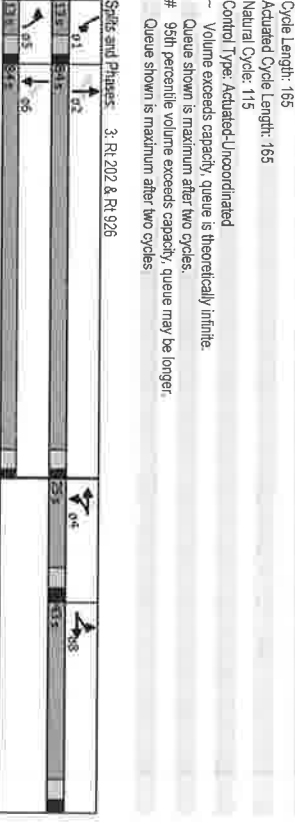
HCM 2010 Signalized Intersection Summary - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp: Bridlewood  
 I:Length:18451 - Credibly Farm\TrafficAnalysis\2017-7-TWP-CU-Submission\2023 with dev\Access opp: Bridlewood\Weekday\_AM.syn

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NET	NBR	SBL	SBT	SBR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Lane Configuration:	<table border="1"> <tr><td>Volume (vph)</td><td>633</td><td>280</td><td>19</td><td>177</td><td>167</td><td>33</td><td>26</td><td>1597</td><td>146</td><td>75</td><td>1530</td><td>209</td></tr> <tr><td>Ideal Flow (vph/pl)</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td></tr> <tr><td>Lane Width (ft)</td><td>10</td><td>14</td><td>14</td><td>10</td><td>12</td><td>14</td><td>12</td><td>12</td><td>15</td><td>12</td><td>12</td><td>12</td></tr> <tr><td>Grade (%)</td><td colspan="12">-3%</td></tr> <tr><td>Storage Length (ft)</td><td colspan="12">450</td></tr> <tr><td>Storage Lanes</td><td colspan="12">0</td></tr> <tr><td>Taper Length (ft)</td><td colspan="12">150</td></tr> <tr><td>Lane Util. Factor</td><td colspan="12">0.95</td></tr> <tr><td>Fit</td><td colspan="12">0.994</td></tr> <tr><td>Fit Protected</td><td colspan="12">0.950</td></tr> <tr><td>Satd Flow (vph)</td><td colspan="12">1494</td></tr> <tr><td>Flt Permitted</td><td colspan="12">0.950</td></tr> <tr><td>Satd Flow (perm)</td><td colspan="12">1494</td></tr> <tr><td>Right Turn on Red Satd Flow (RTOR)</td><td colspan="12">No</td></tr> <tr><td>Link Speed (mph)</td><td colspan="12">45</td></tr> <tr><td>Link Distance (ft)</td><td colspan="12">2354</td></tr> <tr><td>Travel Time (s)</td><td colspan="12">35.7</td></tr> <tr><td>Peak Hour Factor</td><td colspan="12">0.94</td></tr> <tr><td>Heavy Vehicles (%)</td><td colspan="12">3%</td></tr> <tr><td>Adj. Flow (vph)</td><td colspan="12">673</td></tr> <tr><td>Shared Lane Traffic (%)</td><td colspan="12">2%</td></tr> <tr><td>Lane Group Flow (vph)</td><td colspan="12">491</td></tr> <tr><td>Number of Detectors</td><td colspan="12">1</td></tr> <tr><td>Detector Templates</td><td colspan="12">Left Thru</td></tr> <tr><td>Leading Detector (ft)</td><td colspan="12">40</td></tr> <tr><td>Trailing Detector (ft)</td><td colspan="12">0</td></tr> <tr><td>Detector 1 Position (ft)</td><td colspan="12">0</td></tr> <tr><td>Detector 1 Size (ft)</td><td colspan="12">40</td></tr> <tr><td>Detector 1 Type</td><td colspan="12">CH-EX</td></tr> <tr><td>Detector 1 Channel</td><td colspan="12">CH-EX</td></tr> <tr><td>Detector 1 Extend (s)</td><td colspan="12">0.0</td></tr> <tr><td>Detector 1 Queue (s)</td><td colspan="12">0.0</td></tr> <tr><td>Detector 1 Delay (s)</td><td colspan="12">0.0</td></tr> <tr><td>Turn Type</td><td colspan="12">Split</td></tr> <tr><td>Protected Phases</td><td colspan="12">8</td></tr> <tr><td>Permitted Phases</td><td colspan="12">8</td></tr> <tr><td>Switch Phase</td><td colspan="12">8</td></tr> <tr><td>Minimum Initial (s)</td><td colspan="12">3.0</td></tr> <tr><td>Minimum Split (s)</td><td colspan="12">43.0</td></tr> <tr><td>Total Split (s)</td><td colspan="12">43.0</td></tr> <tr><td>Total Split (%)</td><td colspan="12">26.1%</td></tr> <tr><td>Maximum Green (s)</td><td colspan="12">36.0</td></tr> <tr><td>Yellow Time (s)</td><td colspan="12">4.0</td></tr> <tr><td>All-Red Time (s)</td><td colspan="12">3.0</td></tr> <tr><td>Last Time Adjust (s)</td><td colspan="12">-1.0</td></tr> <tr><td>Total Lost Time (s)</td><td colspan="12">6.0</td></tr> </table>												Volume (vph)	633	280	19	177	167	33	26	1597	146	75	1530	209	Ideal Flow (vph/pl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	Lane Width (ft)	10	14	14	10	12	14	12	12	15	12	12	12	Grade (%)	-3%												Storage Length (ft)	450												Storage Lanes	0												Taper Length (ft)	150												Lane Util. Factor	0.95												Fit	0.994												Fit Protected	0.950												Satd Flow (vph)	1494												Flt Permitted	0.950												Satd Flow (perm)	1494												Right Turn on Red Satd Flow (RTOR)	No												Link Speed (mph)	45												Link Distance (ft)	2354												Travel Time (s)	35.7												Peak Hour Factor	0.94												Heavy Vehicles (%)	3%												Adj. Flow (vph)	673												Shared Lane Traffic (%)	2%												Lane Group Flow (vph)	491												Number of Detectors	1												Detector Templates	Left Thru												Leading Detector (ft)	40												Trailing Detector (ft)	0												Detector 1 Position (ft)	0												Detector 1 Size (ft)	40												Detector 1 Type	CH-EX												Detector 1 Channel	CH-EX												Detector 1 Extend (s)	0.0												Detector 1 Queue (s)	0.0												Detector 1 Delay (s)	0.0												Turn Type	Split												Protected Phases	8												Permitted Phases	8												Switch Phase	8												Minimum Initial (s)	3.0												Minimum Split (s)	43.0												Total Split (s)	43.0												Total Split (%)	26.1%												Maximum Green (s)	36.0												Yellow Time (s)	4.0												All-Red Time (s)	3.0												Last Time Adjust (s)	-1.0												Total Lost Time (s)	6.0											
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Lanes, Volumes, Timings - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
 \hlang8\6451 - Credibly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Access opp. Bridlewood\Weekday AM.syn

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NET	NBR	SBL	SBT	SBR
Lead-Lag Optimizer?	3.0											
Vehicle Extension (s)	3.0											
Minimum Gap (s)	0.0											
Time Before Reduce (s)	0.0											
Time To Reduce (s)	0.0											
Recall Mode	None											
Walk Time (s)	13.0											
Flash Dont Walk (s)	23.0											
Pedestrian Calls (#/hr)	0											
v/c Ratio	1.47											
Control Delay	268.1											
Queue Delay	0.0											
Total Delay	268.1											
Queue Length 50th (ft)	~762											
Queue Length 95th (ft)	#1006											
Internal Link Dist (ft)	2274											
Turn Bay Length (ft)	450											
Base Capacity (vph)	335											
Stratton Cap Reduction	0											
Spillback Cap Reduction	0											
Storage Cap Reductn	0											
Reduced v/c Ratio	1.47											

Area Type: Other  
 Cycle Length: 165  
 Actuated Cycle Length: 165  
 Natural Cycle: 115  
 Control Type: Actuated/Uncoordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 ~ Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes, Volumes, Timings - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
 \hlang8\6451 - Credibly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Access opp. Bridlewood\Weekday AM.syn

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	633	280	19	177	167	33	26	1597	146	75	1530	209
Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qd), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Adj(A_pb1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus. Adj	1774	1798	1900	1732	1732	1618	1716	1801	1607	1640	1800	1800
Adj Sat Flow, veh/h	496	546	20	188	178	32	28	1699	136	80	1628	203
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh. %	3	7	4	6	6	18	7	7	6	12	10	10
Cap. veh/h	380	389	4	190	200	159	82	1565	735	114	1405	172
Arrive On Green	0.22	0.22	0.22	0.12	0.12	0.12	0.02	0.48	0.48	0.05	0.50	0.50
Sat Flow, veh/h	1699	1724	63	1650	1732	1375	1634	3260	1531	1531	2794	343
Grp Volume(v), veh/h	456	586	188	178	32	28	1699	136	80	86	935	935
Grp Sat Flow(s), veh/h	1699	1797	1650	1732	1375	1634	1630	1531	1531	1566	1579	1579
Q Serve(s), s	37.0	37.0	18.7	16.7	3.5	1.4	79.0	8.3	4.2	82.7	82.7	82.7
Cycle Q Clear(g), s	1.00	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop In Lane	380	404	190	200	159	82	1565	735	114	733	794	794
Lane Grp Cap(c), veh/h	1.31	1.00	0.99	0.89	0.20	0.34	1.09	0.19	0.70	1.14	1.18	1.18
V/C Ratio(X)	380	0	402	190	200	159	123	1565	735	118	783	794
Avail Cap(c-ai), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	63.8	0.0	63.8	72.7	71.8	65.9	39.6	42.8	24.4	38.5	40.9	40.9
Uniform Delay (d), s/veh	155.5	0.0	195.6	61.3	35.2	0.6	2.4	49.8	0.6	16.3	79.6	92.9
Incr Delay (d2), s/veh	55.6	0.0	37.0	0.0	0.0	0.0	0.0	47.3	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	68.5	0.0	78.3	17.4	15.1	2.4	1.2	94.8	6.5	4.1	95.0	101.6
%ile Back(Q3/95%),veh/h	274.9	0.0	296.4	134.0	107.0	66.5	42.1	139.9	25.0	54.7	120.5	133.8
LnGrp Delay(d),s/veh	F	F	F	F	F	E	D	F	C	D	F	F
LnGrp LOS	F	F	F	F	F	E	D	F	C	D	F	F
Approach Vol, veh/h		1062			398			1863			1917	
Approach Delay, s/veh		286.4			116.5			130.0			124.3	
Approach LOS		F			F			F			F	
Signal	1	2	3	4	5	6	7	8				
Assigned Pts	1	2										
Pts Duration (G+Y+Rd), s	12.6	84.0	25.0	8.8	87.7			43.0				
Change Period (Y+Rd), s	6.0	6.0	7.0	6.0	6.0			7.0				
Max Green Setting (Gmax), s	7.0	78.0	18.0	7.0	78.0			36.0				
Max Q Clear Time (q_c+1), s	6.7	81.5	21.2	3.9	85.2			39.5				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0			0.0				
<b>Intersection Summary</b>												
HCM 2010 QM Delay	158.6											
HCM 2010 LOS	F											
<b>Notes</b>												
User approved pedestrian interval to be less than phase max green.												

HCM 2010 Signalized Intersection Summary - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
[length@16451 - Credibly Farm]TrafficAnalysis2017-7-TWP CU Submission2023 with devAccess opp. Bridlewood/Weekday AM.syr

User approved volume balancing among the lanes for turning movement.

HCM 2010 Signalized Intersection Summary - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
[length@16451 - Credibly Farm]TrafficAnalysis2017-7-TWP CU Submission2023 with devAccess opp. Bridlewood/Weekday AM.syr

Area Type:	Other	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Type:	Unsignalized												
Lane Configurations		0	0	85	0	0	10	14	2162	57	72	1730	169
Volume (veh/h)		1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (veh/h)		16	16	16	12	12	11	12	12	11	12	12	12
Lane Width (ft)													
Grade (%)		0	-1%	0	0	0	0	350	2%	0	380	0	0
Storage Length (ft)		0	0	1	0	1	1	1	0	0	1	0	0
Storage Lanes		0	0	0	0	0	0	0	0	0	0	0	0
Taper Length (ft)		75	75	75	75	75	75	75	75	75	75	75	75
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95
Fit				0.885				0.996			0.950	0.987	
Fit Protected													
Satd. Flow (prot)		0	0	1773	0	0	1344	1515	3147	0	1613	3076	0
Fit Permitted													
Satd. Flow (perm)		0	0	1773	0	0	1344	1515	3147	0	1613	3076	0
Link Speed (mph)		35	35	35	35	35	35	35	35	35	35	35	35
Link Distance (ft)		678	678	678	678	678	678	678	678	678	678	678	678
Travel Time (s)		13.2	13.2	16.7	16.7	16.7	16.7	47.7	47.7	8.8	8.5	8.5	8.8
Peak Hour Factor		0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)		0%	0%	0%	0%	0%	17%	8%	7%	13%	4%	12%	5%
Adj. Flow (vph)		0	0	97	0	0	11	16	2491	65	82	1966	192
Shared Lane Traffic (%)		0	0	97	0	0	11	16	2556	0	82	2158	0
Lane Group Flow (vph)		0	0	97	0	0	11	16	2556	0	82	2158	0
Sign Control			Stop			Stop		Free			Free		

Area Type:	Other	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Type:	Unsignalized												
Lane Configurations		0	0	85	0	0	10	14	2162	57	72	1730	169
Volume (veh/h)		1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (veh/h)		16	16	16	12	12	11	12	12	11	12	12	12
Lane Width (ft)													
Grade (%)		0	-1%	0	0	0	0	350	2%	0	380	0	0
Storage Length (ft)		0	0	1	0	1	1	1	0	0	1	0	0
Storage Lanes		0	0	0	0	0	0	0	0	0	0	0	0
Taper Length (ft)		75	75	75	75	75	75	75	75	75	75	75	75
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95
Fit				0.885				0.996			0.950	0.987	
Fit Protected													
Satd. Flow (prot)		0	0	1773	0	0	1344	1515	3147	0	1613	3076	0
Fit Permitted													
Satd. Flow (perm)		0	0	1773	0	0	1344	1515	3147	0	1613	3076	0
Link Speed (mph)		35	35	35	35	35	35	35	35	35	35	35	35
Link Distance (ft)		678	678	678	678	678	678	678	678	678	678	678	678
Travel Time (s)		13.2	13.2	16.7	16.7	16.7	16.7	47.7	47.7	8.8	8.5	8.5	8.8
Peak Hour Factor		0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)		0%	0%	0%	0%	0%	17%	8%	7%	13%	4%	12%	5%
Adj. Flow (vph)		0	0	97	0	0	11	16	2491	65	82	1966	192
Shared Lane Traffic (%)		0	0	97	0	0	11	16	2556	0	82	2158	0
Lane Group Flow (vph)		0	0	97	0	0	11	16	2556	0	82	2158	0
Sign Control			Stop			Stop		Free			Free		

Lane Group	EB1	EBR	WB1	WB2	WB3	WB4	NB1	NBR
Lane Configurations	58	4	17	171	15	24		
Volume (vph)	1800	1800	1800	1800	1800	1800		
Ideal Flow (vphpl)	-1%	0%	0%	0%	0%	0%		
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00		
Lane Util. Factor	0.992							
Fit Protected	1792	0	0	1710	1587	0		
Satd. Flow (prot)	1792	0	0	0.995	0.981	0		
Fit Permitted	1792	0	0	1710	1587	0		
Satd. Flow (perm)	1792	0	0	0.995	0.981	0		
Link Speed (mph)	35			35	35			
Link Distance (ft)	2914			738	412			
Travel Time (s)	56.8			14.4	8.0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Heavy Vehicles (%)	0%	2%	2%	5%	2%	2%		
Adj. Flow (vph)	64	4	19	190	17	27		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	68	0	0	209	44	0		
Sign Control	Free			Free	Stop			
Intersection Summary								
Area Type:	Other							
Control Type:	Unsignalized							

Intersection	EB1	EBR	WB1	WB2	WB3	WB4	NB1	NBR
Int Delay, s/vph	1.7							
Movement	58	4	17	171	15	24		
Vol. Vehs.	0	0	0	0	0	0		
Conflicting Peds. #/hr	Free	Free	Free	Free	Stop	Stop		
Sign Control	-	None	-	None	-	None		
R1 Channelized								
Storage Length								
Veh in Median Storage. #	-1	-	-	0	0	0		
Grade, %	0	-	-	-	-	-		
Peak Hour Factor	90	90	90	90	90	90		
Heavy Vehicles, %	0	2	2	5	2	2		
Mant Flow	64	4	19	190	17	27		
Maneuver	Maneuver1	Maneuver2	Maneuver3	Maneuver4	Maneuver5	Maneuver6		
Conflicting Flow All	0	0	69	0	285	67		
Stage 1					67			
Stage 2					228			
Critical Hwy/ Stage 1			4.3		6.42	6.22		
Critical Hwy/ Stage 2					5.42			
Follow-up Hwy/ Stage 1				3	5.42	3.1		
Pot Cap-1 Maneuver			1137		800	1064		
Stage 1					1115			
Stage 2					935			
Platoon blocked, %					785	1064		
Mov Cap-1 Maneuver			1137		785			
Mov Cap-2 Maneuver					785			
Stage 1					1115			
Stage 2					917			
Approach	EB1		WB1		NB1			
HCM Control Delay, s	0		0.7		9			
HCM LOS			A		A			
Minor Lane Major Mvmt	WB1	EB1	EBR	WB2	WB3			
Capacity (veh/h)	935	-	1137	-	-			
HCM Lane V/C Ratio	0.046	-	0.017	-	-			
HCM Control Delay (s)	9	-	8.2	-	0			
HCM Lane LOS	A	-	A	-	A			
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	2	1	2	1	2
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Grade (%)	-1%	0%	0%	0%	0%	0%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999	0.999	0.999	0.999	0.999	0.999
Fit Protected	1807	0	0	1715	1889	0
Fit Permitted	0.980	0.980	0.980	0.980	0.980	0.980
Satd Flow (perm)	1807	0	0	1715	1589	0
Link Speed (mph)	35	35	35	35	35	35
Link Distance (ft)	738	678	493	678	493	678
Travel Time (s)	14.4	13.2	9.6	13.2	9.6	13.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	2%	5%	2%	2%
Adj. Flow (vph)	90	1	2	203	6	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	91	0	0	205	15	0
Sign Control	Free	Free	Free	Free	Stop	Stop

Area Type: Other  
 Control Type: Unsignalized  
 Lanes, Volumes, Timings - Synchro 8  
 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp Bridlewood  
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Intersection	EBT	EBR	WBL	WBT	NBL	NBR
Int Delay, s/vch	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol. vch/h	91	1	2	183	5	8
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	0
Veh in Median Storage #	0	-	-	0	0	-
Grade, %	-1	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	5	2	2
Mount Flow	90	1	2	203	6	9

Intersection Summary  
 Area Type: Other  
 Control Type: Unsignalized  
 HCM 2010 TWSC - Synchro 8  
 2023 with Dev Weekday Morning Peak Hour Alt A - Access Opp Bridlewood  
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Method	EBT	EBR	WBL	WBT	NBL	NBR
HCM Control Delay, s	0	0	0.1		9	9
HCM LOS					A	A

Method	EBT	EBR	WBL	WBT	NBL	NBR
Capacity (vch/h)	925	1118				
HCM Lane V/C Ratio	0.016	0.002				
HCM Control Delay (s)	9	8.2				
HCM Lane LOS	A	A				
HCM 95th %ile Q(vch)	0	0				

Area Type:	Other
Control Type: Unsignalized	
Area Type: Other	

Area Type:	Other
Control Type: Unsignalized	
Area Type: Other	



McMahon Associates, Inc.,  
1. New St & Rt 926

2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
Credibly Farm Residential Development

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	713	16	30	480	70	11	194	47	69	220	334
Ideal Flow (vph/pl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Grade (%)		-2%			1%			-2%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
Flt Protected	0	0	0	0	0	0	0	0	0	0	0	0
Satd. Flow (prot)	0	1638	0	0	1625	0	0	1642	0	0	1530	0
Flt Permitted	0	0	0	0	0	0	0	0	0	0	0	0
Satd. Flow (perm)	0	1542	0	0	1525	0	0	1548	0	0	1364	0
Right Turn on Red			Yes			Yes			Yes		Yes	Yes
Satd. Flow (RTOR)												
Link Speed (mph)	45	819	45	24.36	714	45	25	826	45	826	45	826
Travel Time (s)	124	124	124	36.9	0.98	0.98	19.5	0.98	0.98	0.98	16.1	0.98
Peak Hour Factor	0.96	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	3%	0%	0%	1%	0%	0%	3%	0%	0%	1%	1%
Adj. Flow (vph)	49	728	16	31	469	71	11	198	48	70	224	341
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	793	0	0	571	0	0	267	0	0	635	0
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left			Left			Left	Thru		Left	Thru	
Leading Detector (ft)	30	6	6	30	6	6	30	35	30	30	35	35
Trailing Detector (ft)	-10	0	0	-10	0	0	-10	-5	-10	-5	-5	-5
Detector 1 Position (ft)	-10	0	0	-10	0	0	-10	-5	-10	-5	-5	-5
Detector 1 Size (ft)	40	6	6	40	6	6	40	40	40	40	40	40
Detector 1 Type	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX
Detector 1 Estand (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases	2	2	2	6	6	6	8	8	8	8	4	4
Detector Phase	2	2	2	6	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	22.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	9.0	9.0	9.0	9.0	9.0	9.0
Total Split (s)	69.0	69.0	69.0	69.0	69.0	69.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	34.3%	34.3%	34.3%	34.3%	34.3%	34.3%
Maximum Green (s)	63.0	63.0	63.0	63.0	63.0	63.0	30.0	30.0	30.0	30.0	30.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0

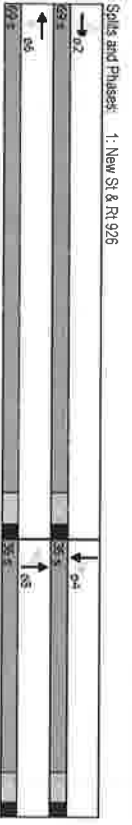
Lanes: Volumes, Timings - Synchro 8  
2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
I:\eng\16451 - Credibly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Access opp. Bridlewood\Weekday P\M\syn

McMahon Associates, Inc.,  
1. New St & Rt 926

2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
Credibly Farm Residential Development

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	42.0	42.0	42.0	42.0	42.0	42.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	21.0	21.0	21.0	21.0	21.0	21.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None
v/c Ratio	0.84	0.84	0.84	0.61	0.61	0.61	0.55	0.55	0.55	0.55	0.55	0.55
Control Delay	28.8	28.8	28.8	16.0	16.0	16.0	35.2	35.2	35.2	35.2	35.2	35.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	28.8	28.8	16.0	16.0	16.0	35.2	35.2	35.2	35.2	35.2	35.2
Queue Length 50th (ft)	396	396	396	217	217	217	139	139	139	139	139	139
Queue Length 95th (ft)	#648	#648	#648	326	326	326	222	222	222	222	222	222
Internal Link Dist (ft)	739	739	739	2356	2356	2356	634	634	634	634	634	634
Turn Bay Length (ft)												
Base Capacity (vph)	940	940	940	934	934	934	464	464	464	464	464	464
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.84	0.84	0.61	0.61	0.61	0.55	0.55	0.55	0.55	0.55	0.55

**Intersection Summary**  
Area Type: Other  
Cycle Length: 105  
Actuated Cycle Length: 105  
Natural Cycle: 80  
Control Type: Semi Act-Unicorn  
- Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.  
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Lanes: Volumes, Timings - Synchro 8  
2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
I:\eng\16451 - Credibly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Access opp. Bridlewood\Weekday P\M\syn

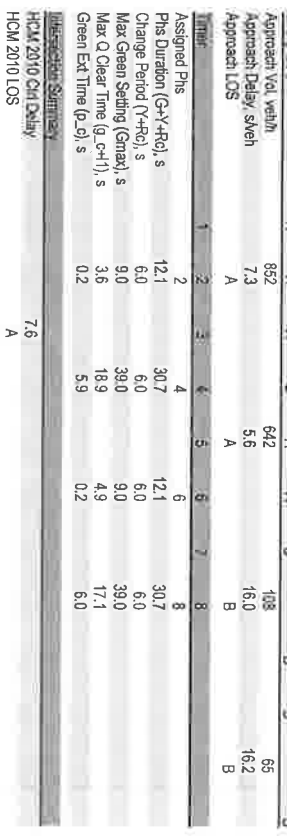


McMahon Associates, Inc.,  
 2: Bridlewood Blvd/Site Access & Rt 926 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood

Crebilly Farm Residential Development  
 2: Bridlewood Blvd/Site Access & Rt 926 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood

Lead/Lag	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	0.02	0.03	0.03	0.09	0.40	0.04	0.17	0.18	0.19	0.05	0.05	0.05
Control Delay	3.7	7.5	1.0	4.4	5.0	1.3	21.3	11.3	21.6	15.9	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	7.5	1.0	4.4	5.0	1.3	21.3	11.3	21.6	15.9	0.0	0.0
Queue Length 50th (ft)	1	127	0	3	69	0	10	4	11	2	0	0
Queue Length 95th (ft)	6	255	6	12	131	8	33	33	41	17	0	0
Internal Link Dist (ft)												
Turn Bay Length (ft)	150	1468	1379	428	1520	1300	307	400	100	297	379	0
Base Capacity (VPH)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.54	0.03	0.08	0.36	0.04	0.14	0.16	0.16	0.04	0.04	0.04

Area Type	Other
Cycle Length: 60	
Actuated Cycle Length: 46.4	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	



Lanes, Volumes, Timings - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
 |heng8|6451 - Crebilly FarmTrafficAnalysis2017-7-TWP CU Submission2023 with devAccess opp. Bridlewood/Weekday.PM.syn

Lanes, Volumes, Timings - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
 |heng8|6451 - Crebilly FarmTrafficAnalysis2017-7-TWP CU Submission2023 with devAccess opp. Bridlewood/Weekday.PM.syn

Intersection Summary	Other
Cycle Length: 60	
Actuated Cycle Length: 46.4	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	

Intersection Summary	Other
Cycle Length: 60	
Actuated Cycle Length: 46.4	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	

Lanes, Volumes, Timings - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
 |heng8|6451 - Crebilly FarmTrafficAnalysis2017-7-TWP CU Submission2023 with devAccess opp. Bridlewood/Weekday.PM.syn

Lanes, Volumes, Timings - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
 |heng8|6451 - Crebilly FarmTrafficAnalysis2017-7-TWP CU Submission2023 with devAccess opp. Bridlewood/Weekday.PM.syn

Approach Vol. veh/h	852	642	108
Approach Delay, s/veh	7.3	5.6	16.2
Approach LOS	A	A	B

Approach Vol. veh/h	852	642	108
Approach Delay, s/veh	7.3	5.6	16.2
Approach LOS	A	A	B

Lanes, Volumes, Timings - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
 |heng8|6451 - Crebilly FarmTrafficAnalysis2017-7-TWP CU Submission2023 with devAccess opp. Bridlewood/Weekday.PM.syn

Lanes, Volumes, Timings - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
 |heng8|6451 - Crebilly FarmTrafficAnalysis2017-7-TWP CU Submission2023 with devAccess opp. Bridlewood/Weekday.PM.syn



User approved volume balancing among the lanes for turning movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NET	NER	SBL	SBT	SBR
Lane Configurations	518	225	34	192	308	48	78	1628	131	117	1659	199
Volume (veh/h)	3	8	18	7	4	0	0	14	0	0	6	16
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1809	1876	1900	1783	1836	1872	1836	1749	1819	1765	1731	1800
Adj Sat Flow, veh/h/ln	400	419	35	199	318	35	80	1678	100	121	1710	158
Adj Flow Rate, veh/h	1	1	0	1	1	1	1	1	1	1	1	1
Adj No. of Lanes	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Peak Hour Factor	1	1	1	3	0	2	0	5	2	4	68	4
Percent Heavy Veh, %	355	352	29	247	267	231	121	1530	712	135	1512	68
Cap, veh/h	0.21	0.21	0.20	0.15	0.15	0.15	0.04	0.46	0.05	0.47	0.47	0.47
Arrive On Green	1723	1709	143	1595	1836	1591	1749	3322	1546	1681	3048	278
Sat Flow, veh/h	400	0	454	198	318	35	80	1678	100	121	1710	158
Gap Volume(s), veh/h/ln	1723	0	1851	1698	1836	1591	1749	1681	1546	1681	1644	1682
Q Serv(g, s), s	34.0	0.0	34.0	18.6	24.0	3.2	3.9	76.0	6.2	7.5	77.7	77.7
Cycle Q Clear(g, c), s	34.0	0.0	34.0	18.6	24.0	3.2	3.9	76.0	6.2	7.5	77.7	77.7
Pop In Lane	1.00	0.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.17
Lane Grp Cap(g), veh/h	355	0	381	247	267	231	121	1530	712	135	1512	68
V/C Ratio(X)	1.13	0.00	1.19	0.80	1.19	0.15	0.66	1.10	0.14	0.89	1.18	1.19
Avail Cap(c, a), veh/h	355	0	381	247	267	231	121	1530	712	135	1512	68
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.5	0.0	65.5	68.2	70.5	61.6	38.7	44.5	25.7	47.1	43.6	43.6
Inc Delay (d2), s/veh	86.7	0.0	108.8	17.1	116.8	0.3	9.2	54.2	0.4	47.1	93.1	97.5
Initial Q Delay(d3), s/veh	44.5	0.0	0.0	0.0	0.0	0.0	29.5	0.0	0.0	124.0	118.8	118.8
% BackOfQ(95%), veh/h	44.5	0.0	52.0	15.1	37.5	2.6	3.9	90.5	4.9	11.7	134.1	138.6
LnGrp Delay(d), s/veh	152.2	0.0	174.3	85.3	187.3	61.9	48.0	128.1	26.1	94.2	260.8	259.9
LnGrp LOS	F	F	F	F	F	E	D	F	C	F	F	F
Approach Vol, veh/h	854			551			1888			1989		
Approach Delay, s/veh	164.0			142.7			119.2			250.2		
Approach LOS	F			F			F			F		

Time	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+R), s	14.0	81.0	30.0	12.3	82.7	40.0	7.0	40.0
Change Period (Y+R), s	6.0	6.0	7.0	6.0	6.0	7.0	6.0	7.0
Max Green Setting (Gmax), s	8.0	75.0	23.0	8.0	75.0	33.0	8.0	33.0
Max Q Clear Time (g_c+1), s	10.0	78.5	28.5	6.4	80.2	36.5	8.0	36.5
Green Ext Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary:  
 HCM 2010 Ctrl Delay 178.6  
 HCM 2010 LOS F

User approved pedestrian interval to be less than phase max green.  
 HCM 2010 Signalized Intersection Summary - Synchro 8 2023 with Dev Weekday Afternoon Peak Hour Alt. A - Access Opp. Bridlewood  
 I:\eng\16451 - Crebilly Farm\TrafficAnalysis\2017-7-TWP CU Submission\2023 with dev\Access opp. Bridlewood\Weekday P.M.s\yn

User approved volume balancing among the lanes for turning movement  
 HCM 2010 Signalized Intersection Summary - Synchro 8 2023 with Dev Weekday Afternoon Peak Hour Alt. A - Access Opp. Bridlewood  
 I:\eng\16451 - Crebilly Farm\TrafficAnalysis\2017-7-TWP CU Submission\2023 with dev\Access opp. Bridlewood\Weekday P.M.s\yn

Line Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	0	27	0	0	31	43	2076	75	122	1949	414
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vph/pl)	16	16	16	12	12	12	11	12	12	11	12	12
Lane Width (ft)	-1%							2%				-3%
Grade (%)	0	0	0	0	0	0	350	0	380	0	0	0
Storage Length (ft)	0	0	1	0	0	1	1	0	0	1	0	0
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95
Fit Permitted	0	0	1773	0	0	1443	1636	3305	0	1678	3320	0
Satd. Flow (perm)	0	0	1773	0	0	1443	1636	3305	0	1678	3320	0
Link Speed (mph)	35			35			3147			45		
Link Distance (ft)	694			858			477			561		
Travel Time (s)	13.5			16.7			47.7			8.5		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	1%	1%
Adj. Flow (vph)	0	0	29	0	0	33	46	2232	81	131	2096	445
Shared Lane Traffic (%)	0	0	29	0	0	33	46	2313	0	131	2541	0
Lane Group Flow (vph)	0	0	29	0	0	33	46	2313	0	131	2541	0
Sign Control	Stop			Stop			Free			Free		

Area Type: Other  
 Control Type: Unsignalized  
 Lanes, Volumes, Timings - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp Bridlewood  
 I:\eng\816451 - Crebilly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Access opp. Bridlewood\Weekday PM.syn

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	1.8											
Maneuver	0	0	27	0	0	31	43	2076	75	122	1949	414
Vol Veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	-	None	-	-	None	-	-
Storage Length	-	-	0	-	-	0	350	-	-	380	-	-
Veh in Median Storage, #	-	-	0	-	-	0	0	-	-	0	-	-
Grade, %	-	-	-1	-	-	-2	-	-	-	2	-	-3
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	2	1
Manvl Flow	0	0	29	0	0	33	46	2232	81	131	2096	445

Maneuver	Without	With	With	With
Conflicting Flow All	3790, 4986, 1270	3675, 5188, 1156	2541	0
Stage 1	2581, 2881	2365, 2365	2241	0
Stage 2	1205, 2405	1310, 2803	0	2313
Critical Hwy	7.3, 6.3, 7	7.1, 6.1, 7.1	3.9	3.9
Critical Hwy Sig 1	6.3, 5.3, 3	6.1, 5.1, 3	2.4	2.4
Critical Hwy Sig 2	6.3, 5.3, 3	6.1, 5.1, 3	2.4	2.4
Follow-up Hwy	3.5, 4, 2.9	3.5, 4, 3	1.98	2.4
Pot Cap-1 Maneuver	31, 61, 211	48, 89, 198	198	240
Stage 1	31, 61, 211	48, 89, 198	198	240
Stage 2	211, 75	198, 55	198	240
Platoon blocked, %	1	0	168	1
Mov Cap-1 Maneuver	1	0	1	0
Mov Cap-2 Maneuver	24, 28	37, 68	68	68
Stage 1	24, 28	37, 68	68	68
Stage 2	134, 58	74, 25	25	25

Approach: EB WB NB SB  
 HCM Control Delay, s: 30.9 27.8 0.6 1.8  
 HCM LOS: D D E E  
 Min/Sec/Max/Min/Max: NBL NBT NBR EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR  
 Capacity (veh/h): 198 188 191 240  
 HCM Lane W/C Ratio: 0.234 - 0.173 0.175 0.247  
 HCM Control Delay (s): 28.6 - 30.9 27.8 36.7  
 HCM Lane LOS: D - D - E -  
 HCM 95th %ile Q(veh): 0.9 - 0.6 0.6 3

HCM 2010 TWSC - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp Bridlewood  
 I:\eng\816451 - Crebilly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Access opp. Bridlewood\Weekday PM.syn

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
1. Lane Configurations	16	15	60	394	9	14
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	-1%	0%	0%	0%	0%	0%
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.934	0.934	0.934	0.934	0.934	0.934
RT Protected	1673	0	0	1767	1587	0
Satd. Flow (prot)	0.993	0.981	0.993	0.981	0.981	0.981
RT Permitted	1673	0	0	1767	1587	0
Satd. Flow (perm)	35	35	35	35	35	35
Link Speed (mph)	3237	319	382	319	382	319
Link Distance (ft)	63.1	6.2	7.4	6.2	7.4	6.2
Travel Time (s)	0.90	0.90	0.90	0.90	0.90	0.90
Peak Hour Factor	0%	2%	1%	2%	2%	2%
Heavy Vehicles (%)	18	17	67	438	10	16
Adj. Flow (vph)	35	0	0	505	26	0
Shared Lane Traffic (%)	Free	Free	Free	Stop	Stop	Free
Lane Group Flow (vph)	Free	Free	Free	Stop	Stop	Free
Sign Control	Free	Free	Free	Stop	Stop	Free
Intersection Summary	Other					
Area Type	Other					
Control Type	Unsignalized					

Intersection	EBT	EBR	WBL	WBT	NBL	NBR
Int Delay, s/vln	14					
Max Street	16	15	80	394	9	14
Vol. vln/h	0	0	0	0	0	0
Conducting Peds. #/hr	Free	Free	Free	Free	Stop	Stop
Sign Control	- None	- None	- None	- None	None	None
RT Channelized	-	-	-	-	0	0
Storage Length	0	0	0	0	0	0
Veh. m Median Storage #	-1	-	-	-	0	0
Grade %	90	90	90	90	90	90
Peak Hour Factor	0	2	2	1	2	2
Heavy Vehicles %	18	17	67	438	10	16
Min/Max Flow						
Major/Minor	Major1	Major2	Minor1	Minor2	Minor3	Minor4
Conflicting Flow All	0	0	34	0	597	26
Stage 1	-	-	-	-	26	-
Stage 2	-	-	-	-	571	-
Critical Heavy	-	-	4.3	-	6.42	6.22
Critical Heavy Spt 1	-	-	-	-	5.42	-
Critical Heavy Spt 2	-	-	-	-	5.42	-
Following Heavy	-	-	3	-	3	3.1
Pct Cap-1 Maneuver	-	-	1169	-	525	1123
Stage 1	-	-	-	-	1166	-
Stage 2	-	-	-	-	638	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1169	-	485	1123
Mov Cap-2 Maneuver	-	-	-	-	485	-
Stage 1	-	-	-	-	1166	-
Stage 2	-	-	-	-	590	-
Approach	EB	WB	EB	NB	EB	NB
HCM Control Delay, s	0	1.1			10	10
HCM LOS					B	B
Minor Lane/Minor Movt	NBL	EBT	EBR	WBL	WBT	
Capacity (veh/h)	741	-	-	1169	-	
HCM Lane V/C Ratio	0.034	-	-	0.057	-	
HCM Control Delay (s)	10	-	-	8.3	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %ile Q(veh)	0.1	-	-	0.2	-	

McMahon Associates, Inc.,  
 9. East Site Access & Pleasant Grove Rd 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp, Bridlewood

Crebilly Farm Residential Development

Lane Group	EB1	EBR	WBL	WBT	NBL	NBR
Lane Configurations	25	5	9	451	3	5
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vph/pl)	-1%	0%	0%	0%	0%	0%
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.976			0.999	0.984	0.910
Fit Protected	1759	0	0	1780	1580	0
Satd. Flow (prot)	0.999	0.984				
Fit Permitted	1759	0	0	1780	1580	0
Satd. Flow (perm)	1759	0	0	1780	1580	0
Link Speed (mph)	35			35	35	
Link Distance (ft)	319			694	449	
Travel Time (s)	6.2			13.5	8.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	2%	1%	2%	2%
Adj. Flow (vph)	28	6	10	501	3	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	0	0	511	9	0
Sign Control	Free			Free	Stop	

Intersection	EB1	EBR	WBL	WBT	NBL	NBR
Int Delay, s/vch	0.3					
Capacity (veh/h)	807		1170			
HCM Lane V/C Ratio	0.011		0.009			
HCM Control Delay (s)	9.5		8.1			
HCM Lane LOS	A		A			
HCM 95th %ile Q(veh)	0		0			

Approach	EB1	EBR	WBL	WBT	NBL	NBR
HCM Control Delay, s	0		0.2			9.5
HCM LOS			A			A

Minor Lane/Minor Movt	NBR1	EB1	EBR	WBL	WBT	NBL	NBR
Capacity (veh/h)	807			1170			
HCM Lane V/C Ratio	0.011			0.009			
HCM Control Delay (s)	9.5			8.1			
HCM Lane LOS	A			A			
HCM 95th %ile Q(veh)	0			0			

Lanes, Volumes, Timings - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp, Bridlewood  
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McMahon Associates, Inc.,  
 9. East Site Access & Pleasant Grove Rd 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp, Bridlewood

Crebilly Farm Residential Development

Intersection	EB1	EBR	WBL	WBT	NBL	NBR
Int Delay, s/vch	0.3					
Capacity (veh/h)	807		1170			
HCM Lane V/C Ratio	0.011		0.009			
HCM Control Delay (s)	9.5		8.1			
HCM Lane LOS	A		A			
HCM 95th %ile Q(veh)	0		0			

Approach	EB1	EBR	WBL	WBT	NBL	NBR
HCM Control Delay, s	0		0.2			9.5
HCM LOS			A			A

Minor Lane/Minor Movt	NBR1	EB1	EBR	WBL	WBT	NBL	NBR
Capacity (veh/h)	807			1170			
HCM Lane V/C Ratio	0.011			0.009			
HCM Control Delay (s)	9.5			8.1			
HCM Lane LOS	A			A			
HCM 95th %ile Q(veh)	0			0			

HCM 2010 TWSC - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp, Bridlewood  
 I:\eng\16451 - Crebilly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with devAccess opp, Bridlewood\Weekday, PM.syn



Lane Group	WB	WB	NB	NB	SB	SB
Lane Configurations	312	40	283	30	18	312
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.985	0.987				
RT Protected	0.988					0.997
Satd. Flow (prot)	1699	0	1777	0	0	1795
Flt Permitted	0.988					0.997
Satd. Flow (perm)	1699	0	1777	0	0	1795
Link Speed (mph)	35		35			35
Link Distance (ft)	3237		639			492
Travel Time (s)	63.1		12.4			9.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	347	44	314	33	20	347
Shared Lane Traffic (%)						
Lane Group Flow (vph)	391	0	347	0	0	367
Sign Control	Stop		Free			Free

Intersection Summary  
 Area Type: Other  
 Control Type: Unsignalized

Intersection	WB	WB	NB	NB	SB	SB
Int Delay, s/veh	16.1					
Movement	312	40	283	30	18	312
Vol. veh/h	0	0	0	0	0	0
Conflicting Peds. #/hr	Stop	Stop	Free	Free	Free	Free
Sign Control	*	*	None	None	None	None
RT Channelized	0					
Storage Length	0					
Veh. in Median Storage #	0					
Grade %	0					
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles %	0	0	0	0	0	0
Max. Flow	347	44	314	33	20	347

Maneuver	Mano1	Mano1	Mano2	Mano2
Conflicting Flow All	718	331	0	0
Stage 1	331	387		
Stage 2	6.4	6.2		4.3
Critical Heavy	5.4			
Critical Heavy Sig 1	5.4			
Critical Heavy Sig 2	3	3.1		3
Follow-up Heavy	445	755		912
Pot Cap-1 Maneuver	836			
Stage 1	786			
Stage 2				
Platoon blocked, %				
Mov Cap-1 Maneuver	433	755		912
Mov Cap-2 Maneuver	433			
Stage 1	836			
Stage 2	765			

Approach	WB	WB	NB	NB	SB	SB
HCM Control Delay, s	45			0		0.5
HCM LOS	E					

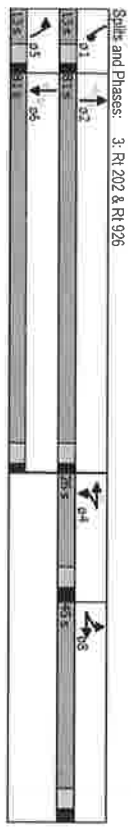
**U.S. Route 202 & Street Road (S.R. 0926) Improvements**  
**Southbound U.S. Route 202 Right-Turn Lane**

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	→	→	→	←	←	←	→	→	→	→	→	→
Volume (vph)	533	280	19	177	167	33	26	1597	146	75	1530	209
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	12	10	12	12	12	12	15	12	12	14
Grade (%)	-3%	-3%	0	4%	4%	-4%	-4%	0%	0%	0%	0%	0%
Storage Length (ft)	450	0	0	200	215	305	170	375	170	375	130	130
Storage Lanes	1	0	0	1	1	1	1	1	1	1	1	1
Taper Length (ft)	150	0	0	75	75	75	75	75	75	75	75	75
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.850	0.95	1.00	1.00	0.95	1.00
Flt. Protected	0.950	0.982	0.950	0.950	0.950	0.950	0.850	0.950	0.850	0.950	0.850	0.850
Satd. Flow (prot)	1494	1803	0	1336	1732	1323	1630	3260	1619	1527	3109	1511
Flt. Permitted	0.950	0.982	0	0.950	0.982	0.950	0.051	0.049	0.049	0.049	0.049	0.049
Satd. Flow (perm)	1494	1603	0	1536	1732	1323	88	3260	1619	79	3109	1511
Right Turn on Red			No			No		Yes		Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)	45	45	45	45	45	45	45	45	45	45	45	45
Link Distance (ft)	2354	2354	35.7	982	982	105	105	3147	477	477	477	477
Travel Time (s)	35.7	35.7	14.9	14.9	14.9	16.7	16.7	41.7	41.7	41.7	41.7	41.7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	3%	7%	10%	6%	6%	18%	7%	12%	10%	8%	10%	8%
Adj. Flow (vph)	673	298	20	188	178	35	28	1699	155	80	1628	222
Shared Lane Traffic (%)	27%	27%	0	188	178	35	28	1699	155	80	1628	222
Lane Group Flow (vph)	491	500	0	188	178	35	28	1699	155	80	1628	222
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left	Thru	Left	Thru	Thru	Right	Left	Right	Thru	Right	Thru	Right
Leading Detector (ft)	40	40	35	35	35	6	30	30	35	30	30	30
Trailing Detector (ft)	0	0	-5	-5	-5	0	-10	-10	-5	-10	-10	-10
Detector 1 Position(ft)	0	0	0	-5	-5	0	-10	-10	5	-10	-10	-10
Detector 1 Size(ft)	40	40	40	40	40	6	40	40	40	40	40	40
Detector 1 Type	CH-EX	CH-EX	CH-EX	CH-EX	CH-EX	CH-EX	CH-EX	CH-EX	CH-EX	CH-EX	CH-EX	CH-EX
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn 1 Type	Split	NA	Split	NA	Perm	pm-pt	NA	Perm	pm-pt	NA	Perm	Perm
Protected Phases	8	8	4	4	4	2	2	6	2	6	6	6
Permitted Phases	8	8	4	4	4	2	2	6	2	6	6	6
Switch Phase	8	8	4	4	4	2	2	6	2	6	6	6
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	20.0	29.0	29.0	3.0	20.0	29.0	29.0
Minimum Split (s)	43.0	43.0	10.0	10.0	10.0	9.0	29.0	29.0	9.0	29.0	29.0	
Total Split (s)	45.0	45.0	26.0	26.0	26.0	13.0	81.0	81.0	13.0	81.0	81.0	
Total Split (%)	27.3%	27.3%	15.8%	15.8%	15.8%	7.9%	49.1%	49.1%	7.9%	49.1%	49.1%	
Maximum Green (s)	38.0	38.0	19.0	19.0	19.0	7.0	75.0	75.0	7.0	75.0	75.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	

Lanes: Volumes - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - SB Right-Turn Lane  
 lengths18f451 - Credibly Farm/TrafficAnalysis2017-7 TWP CU Submission2023 with dev/ingaton/SBR/Weekday AM syn

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Leading-Lag Optimizer?	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	13.0	13.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Flash Dont Walk (s)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	1.39	1.32	1.01	0.85	0.22	0.25	1.13	0.19	1.08	0.72	1.08	0.28
v/c Ratio	237.2	209.6	138.2	103.5	69.4	23.2	109.1	8.6	65.5	81.7	13.5	13.5
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	237.2	209.6	138.2	103.5	69.4	23.2	109.1	8.6	65.5	81.7	13.5	13.5
Total Delay	-740	-731	-209	-192	35	14	-1116	26	44	-1071	69	69
Queue Length 50th (ft)	#985	#978	#382	#331	74	31	#1251	71	#135	#1210	131	131
Queue Length 95th (ft)	#274	#274	#274	#274	#274	#274	#274	#274	#274	#274	#274	#274
Internal Link Dist (ft)	450	450	200	215	305	170	375	170	375	130	130	
Turn Bay Length (ft)	353	378	186	209	160	119	1501	806	111	1530	800	
Starvation Cap Reducn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reducn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reducn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.39	1.32	1.01	0.85	0.22	0.24	1.13	0.19	0.72	1.08	0.28	

Area Type: Other  
 Cycle Length: 165  
 Actuated Cycle Length: 165  
 Natural Cycle: 115  
 Control Type: Actuated-Uncoordinated  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 - 95th percentile volume exceeds capacity, queue may be longer.  
 # Queue shown is maximum after two cycles.



Lanes: Volumes - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - SB Right-Turn Lane  
 lengths18f451 - Credibly Farm/TrafficAnalysis2017-7 TWP CU Submission2023 with dev/ingaton/SBR/Weekday AM syn

Management	EBL	EBI	EBR	WBL	WBI	WBR	NBL	NBI	NBR	SBL	SBI	SBR	
Lane Configurations	633	280	19	177	167	167	33	26	1597	146	75	1530	209
Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16	0
Number	8	6	0	0	0	0	0	0	23	0	0	0	0
Initial Q (Ob) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped.Bike Adj.(A_pb1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1774	1729	1827	1732	1732	1556	1716	1801	1607	1636	1733	1733	1733
Adj Sat Flow, veh/h	496	546	20	188	178	32	28	1699	136	80	1628	203	203
Adj Flow Rate, veh/h	1	1	0	1	1	1	1	2	1	1	2	1	1
Adj No of Lanes	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Peak Hour Factor	3	7	7	6	6	18	7	7	6	12	10	8	8
Percent Heavy Veh. %	400	404	4	200	210	161	82	1504	706	115	1507	714	714
Cap. veh/h	0.24	0.24	0.12	0.12	0.12	0.12	0.02	0.46	0.05	0.48	0.48	0.48	0.48
Arrive On Green	1699	1656	61	1650	1732	1323	1634	3260	1531	1831	3109	1473	1473
Sat Flow, veh/h	496	546	20	188	178	32	28	1699	136	80	1628	203	203
Grp Volume(Y), veh/h	1699	0	1716	1650	1732	1323	1634	1531	1531	1555	1473	1473	1473
Grp Sat Flow(Y), veh/h	39.0	0.0	39.0	18.6	16.6	3.6	1.5	76.0	8.6	4.4	79.6	13.6	13.6
O Serv(e), s	36.0	0.0	36.0	18.6	16.6	3.6	1.5	76.0	8.6	4.4	79.6	13.6	13.6
Cycle O Clear(e), s	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prog In Lane	1.24	0.00	1.39	0.94	0.85	0.20	0.34	1.13	0.19	0.59	1.08	0.28	0.28
Lane Grp Cap(e), veh/h	400	0	409	200	210	161	82	1504	706	115	1507	714	714
V/C Ratio(X)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Avail Cap(e), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	1.00
Upstream Filter(I)	62.9	0.0	62.9	71.8	70.9	85.1	38.8	44.4	26.2	38.5	42.4	25.4	25.4
Uniform Delay (d), s/veh	127.7	0.0	188.0	46.4	26.0	0.6	2.4	67.3	0.6	15.6	48.2	1.0	1.0
Incr Delay (d2), s/veh	55.7	0.0	37.0	0.0	0.0	0.0	0.0	47.2	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	66.1	0.0	77.7	16.6	14.5	2.4	1.3	98.1	5.8	4.2	79.6	9.6	9.6
Queue Backlog(Qb), veh/h	246.3	0.0	287.9	118.1	96.9	65.8	42.2	158.9	26.8	54.1	90.6	26.4	26.4
LnGrp Delay(d), s/veh	1082	268.5	104.4	398	1863	1911	147.5	82.3	1911	147.5	82.3	1911	1911
Approach Vol, veh/h	268.5	104.4	398	1863	1911	147.5	82.3	1911	147.5	82.3	1911	1911	
Approach Delay, s/veh	F	F	F	F	F	F	F	F	F	F	F	F	
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F	
Assigned Pks	1	2	3	4	5	6	7	8					
Pks Duration (G+Y+R), s	12.7	81.0	26.0	8.9	84.8	45.0							
Change Period (Y+R+C), s	6.0	6.0	7.0	6.0	6.0	7.0							
Max Green Setting (Gmax), s	7.0	75.0	19.0	7.0	75.0	38.0							
Max Q Clear Time (q_c+1), s	6.9	78.5	21.1	4.0	82.3	41.5							
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0							
Intersection Summary	HCM 2010 Ctrl Delay 145.0 HCM 2010 LOS F												

User approved pedestrian interval to be less than phase max green.  
 HCM 2010 Signalized Intersection Summary - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - SB Right-Turn Lane  
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User approved volume balancing among the lanes for turning movement.

HCM 2010 Signalized Intersection Summary - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - SB Right-Turn Lane  
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SSR
Lane Configurations	518	225	34	192	308	48	78	1628	131	117	1659	199
Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Ob), veh	0	0	0	0	0	0	0	14	0	0	69	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1809	1804	1827	1783	1836	1800	1836	1749	1819	1765	1731	1800
Adj Flow Rate, veh/h	400	419	35	198	318	35	80	1678	100	121	1710	158
Adj. No. of Lanes	1	1	0	1	1	1	1	1	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh. %	1	1	1	3	0	2	0	5	5	2	4	4
Cap. veh/h	355	339	28	247	267	223	121	1530	712	135	1549	721
Arrive On Green	0.21	0.21	0.20	0.15	0.15	0.04	0.04	0.46	0.05	0.47	0.47	0.47
Sat. Flow, veh/h	1723	1643	137	1698	1836	1530	1749	3322	1546	1681	3288	1530
Grp Volume(v), veh/h	400	0	454	198	318	35	80	1678	100	121	1710	158
Grp Sat. Flow(s), veh/h	1723	0	1790	1698	1836	1530	1749	1661	1546	1681	1644	1530
Q Served, s, s	34.0	0.0	34.0	18.6	24.0	3.3	3.9	76.0	6.2	7.5	77.7	10.1
Cycle Q Clear(t), s	34.0	0.0	34.0	18.6	24.0	3.3	3.9	76.0	6.2	7.5	77.7	10.1
Prop In Lane	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(t), veh/h	355	0	367	247	267	223	121	1530	712	135	1549	721
V/C Ratio(X)	1.13	0.00	1.24	0.80	1.19	0.66	1.10	0.89	1.10	0.72	1.10	0.22
Avail Cap(t), veh/h	355	0	367	247	267	223	139	1530	712	135	1549	721
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(t)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), sveh	65.5	0.0	65.5	68.2	70.5	61.7	38.7	44.5	25.7	47.1	43.6	25.7
Incr Delay (d2), sveh	86.7	0.0	128.3	17.1	116.8	0.3	9.2	54.2	0.4	47.1	56.9	0.7
Inhlt Q Delay(Q2), sveh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.5	0.0	0.0	132.3	0.0
Wtite Back(Q1)(35%), veh/h	44.5	0.0	53.6	15.1	37.5	2.6	3.9	90.5	4.9	11.7	120.0	7.8
LnGrp Delay(d), sveh	152.2	0.0	193.8	85.3	187.3	62.0	48.0	128.1	26.1	94.2	232.3	26.4
LnGrp LOS	F	F	F	F	F	E	D	F	C	F	F	C
Approach Vol, veh/h		854			551			1858				1989
Approach Delay, sveh		174.3			142.7			119.2				208.0
Approach LOS		F			F			F				F

Phase	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+R), s	14.0	81.0		30.0	12.3	82.7		40.0
Change Period (Y+R), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	8.0	75.0		23.0	8.0	75.0		33.0
Max Q Clear Time (q_c+1), s	10.0	78.5		26.5	6.4	80.2		36.5
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	0.0		0.0

Phase Summary  
 HCM 2010 CH Delay 164.3  
 HCM 2010 LOS F

User approved pedestrian interval to be less than phase max green.  
 HCM 2010 Signalized Intersection Summary - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - SB Right-Turn Lane  
 i:\eng\816451 - Credibly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Mfgation\SBRI\Weekday PM.svn

User approved volume balancing among the lanes for turning movement.

Phase	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+R), s	14.0	81.0		30.0	12.3	82.7		40.0
Change Period (Y+R), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	8.0	75.0		23.0	8.0	75.0		33.0
Max Q Clear Time (q_c+1), s	10.0	78.5		26.5	6.4	80.2		36.5
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	0.0		0.0

Phase Summary  
 HCM 2010 CH Delay 164.3  
 HCM 2010 LOS F

User approved volume balancing among the lanes for turning movement.  
 HCM 2010 Signalized Intersection Summary - Synchro 8  
 2023 with Dev Weekday Afternoon Peak Hour Alt A - SB Right-Turn Lane  
 i:\eng\816451 - Credibly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Mfgation\SBRI\Weekday PM.svn

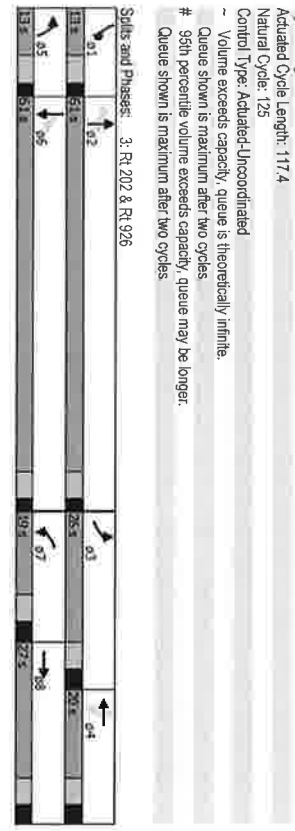
**U.S. Route 202 & Street Road (S.R. 0926) Improvements**  
**Street Road (S.R. 0926) Improvements**

Line Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Volume (vph)	633	280	19	177	167	33	26	1597	146	75	1530	209
Ideal Flow (vph/pl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	12	12	10	12	12	12	12	15	12	12	14
Grade (%)												
Storage Length (ft)	380		0	200		200	305		170	330		0
Storage Lanes	2		0	1		1	1		1	1		0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.850	1.00	0.95	1.00	1.00	0.95	0.95
Fit	0.991								0.880			0.982
Fit Protected	0.950			0.950			0.950			0.950		
Std. Flow (prot)	3051	1689	0	1536	1732	1323	1630	3260	1619	1527	3060	0
Fit Permitted	0.950			0.286			0.070		0.068			
Std. Flow (perm)	3051	1689	0	462	1732	1323	120	3260	1619	109	3060	0
Right Turn on Red			No					Yes		Yes		Yes
Std. Flow (RTOR)								155		17		45
Link Speed (mph)	45			45			45			45		45
Link Distance (ft)	2354			982			1105			3147		47.7
Travel Time (s)	35.7			14.9			16.7			49.4		0.94
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	3%	7%	10%	6%	18%	7%	7%	6%	12%	10%	8%	8%
Adj. Flow (vph)	673	298	20	188	178	35	28	1699	155	80	1628	222
Shared Lane Traffic (%)												
Lane Group Flow (vph)	673	318	0	188	178	35	28	1699	155	80	1650	0
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Right	Left	Thru		
Leading Detector (ft)	40	40		35	35	35	6	30	30	35	30	30
Trailing Detector (ft)	0	0		-5	-5	-5	0	-10	-10	-5	-10	-10
Detector 1 Position (ft)	0	0		-5	-5	-5	0	-10	-10	-5	-10	-10
Detector 1 Size (ft)	40	40		40	40	40	6	40	40	40	40	40
Detector 1 Type	CHEX	CHEX		CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX
Detector 1 Channel	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases	3	8		7	4	4	2		2		6	
Permitted Phases				4	4	4	5				1	
Detector Phase	3	8		7	4	4	5				1	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Minimum Split (s)	43.0	43.0		10.0	10.0	9.0	29.0	29.0	9.0	29.0	9.0	29.0
Total Split (s)	26.0	27.0		19.0	20.0	13.0	61.0	61.0	13.0	61.0	61.0	61.0
Total Split (%)	21.7%	22.5%		15.8%	16.7%	10.8%	50.8%	50.8%	10.8%	50.8%	50.8%	50.8%
Maximum Green (s)	19.0	20.0		12.0	13.0	7.0	55.0	55.0	7.0	55.0	55.0	55.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0		3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - PA 926 Impvts  
 \:eng\816451 - Credibly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Midigation\926 Impvts\Weekday AM.syn

Line Group	EBL	EBT	EBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead Lag Optimize?	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.5
Minimum Gap (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
Time Before Red (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.0
Time To Red (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0
Recall Mode	None	None	None	None	None	None	None	None	Max
Walk Time (s)	13.0	13.0	23.0	13.0	13.0	8.0	8.0	8.0	8.0
Flash Don't Walk (s)	23.0	23.0	23.0	23.0	23.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0
v/c Ratio	1.29	1.05	0.94	0.86	0.22	0.18	1.09	0.18	0.52
Control Delay	185.2	113.2	62.8	87.3	52.1	13.8	82.3	3.3	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	185.2	113.2	62.8	87.3	52.1	13.8	82.3	3.3	30.0
Queue Length 50th (ft)	-347	-274	110	138	25	9	-795	0	26
Queue Length 95th (ft)	#466	#457	#230	#269	58	22	#935	36	71
Internal Link Dist (ft)	2274		902				1025		3067
Turn Bay Length (ft)	380		200		200	305		170	330
Base Capacity (vph)	521	302	225	207	158	166	1559	855	155
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.29	1.05	0.84	0.86	0.22	0.17	1.09	0.18	0.52

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



Lanes, Volumes, Timings - Synchro 8 2023 with Dev Weekday Morning Peak Hour Alt A - PA 926 Impvts  
 \:eng\816451 - Credibly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2023 with dev\Midigation\926 Impvts\Weekday AM.syn



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Volume (veh/h)	633	280	19	177	167	33	26	1597	146	75	1530	209
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	8	6	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	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1774	1724	1827	1732	1732	1556	1716	1716	1801	1607	1640	1872
Adj Flow Rate, veh/h	673	298	20	188	178	32	28	1699	136	80	1628	203
Adj No. of Lanes	2	1	0	1	1	1	1	1	1	1	1	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	7	7	6	6	18	7	7	6	12	10	10
Cap, veh/h	555	299	3	243	206	157	104	1545	726	141	1396	171
Arrive On Green	0.17	0.18	0.17	0.11	0.12	0.12	0.03	0.47	0.05	0.50	0.50	0.50
Sat Flow, veh/h	3277	1880	106	1650	1732	1323	1824	3290	1531	1531	2794	343
Grp Volume, veh/h	673	0	318	188	178	32	28	1699	136	80	1628	203
Grp Sat Flow, veh/h	1639	0	1686	1690	1732	1323	1824	3290	1531	1531	2794	343
Q Serve, s	20.0	0.0	21.0	11.7	11.9	2.6	1.0	56.0	6.1	3.1	59.0	59.0
Cycle Q Clear, s	20.0	0.0	21.0	11.7	11.9	2.6	1.0	56.0	6.1	3.1	59.0	59.0
Prop In Lane	1.00	0.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.22
Large Grp Corc, veh/h	555	0	302	243	206	157	104	1545	726	141	1396	171
V/C Ratio(X)	1.21	0.00	1.05	0.77	0.87	0.20	0.27	1.10	0.19	0.57	1.15	1.18
Avail Capc, veh/h	555	0	300	247	205	157	172	1545	726	165	178	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Delay (I), s/veh	49.1	0.0	48.6	40.5	51.2	47.1	23.3	31.1	18.0	27.3	29.6	29.6
Incr Delay (d2), s/veh	111.9	0.0	66.0	13.8	30.2	0.6	1.4	55.3	0.6	3.6	82.4	95.9
Initial Q Delay(d3), s/veh	41.6	0.0	65.2	0.0	0.0	0.0	0.0	47.3	0.0	0.0	0.0	0.0
Wile Back(d3)(s/veh)	35.7	0.0	33.7	10.3	11.9	1.7	0.9	78.1	4.8	2.5	77.6	84.0
LnGrp Delay(d), s/veh	202.5	0.0	179.9	54.4	81.4	47.7	29.6	133.7	18.5	30.8	112.0	125.4
LnGrp LOS	F	F	F	D	F	D	C	F	B	C	F	F
Approach Vol, veh/h	991	1952	65.9	1883	1911	123.7	1152	1911	123.7	1152	1911	123.7
Approach Delay, s/veh	195.2	195.2	65.9	123.7	123.7	65.9	191.1	123.7	65.9	191.1	123.7	123.7
Approach LOS	F	F	E	E	E	F	F	F	F	F	F	F
Time	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Pls Duration (G+Y+R), s	11.2	61.0	26.0	20.0	8.1	64.0	19.0	27.0				
Change Period (Y+R), s	6.0	7.0	7.0	6.0	6.0	7.0	7.0	7.0				
Max Green Setting (Gmax), s	7.0	55.0	19.0	13.0	7.0	55.0	12.0	20.0				
Max Q Clear Time (q_c+1), s	5.6	58.5	22.5	14.4	3.5	61.5	14.2	23.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay												
HCM 2010 LOS												

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



Mountaint	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	518	225	34	192	308	48	78	1628	131	117	1659	199
Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6	18
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Q <sub>0</sub> ), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A <sub>pb</sub> ),	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1809	1802	1827	1733	1836	1800	1836	1749	1819	1765	1731	1872
Adj Sat Flow, veh/hln	534	232	35	199	318	35	80	1678	100	121	1710	158
Adj Flow Rate, veh/h	2	1	0	1	1	1	1	2	1	1	2	0
Adj No. of Lanes	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Peak Hour Factor	1	1	1	3	0	2	0	5	2	5	4	4
Percent Heavy Veh, %	447	243	37	287	276	230	147	1554	723	169	1550	68
Cap, veh/h	0.13	0.16	0.15	0.13	0.15	0.15	0.05	0.47	0.47	0.06	0.48	0.48
Arrive On Green	3342	1530	231	1696	1936	1530	1749	3322	1546	1681	3048	278
Sat Flow, veh/h	534	0	267	158	316	35	80	1678	100	121	912	956
Gap Volume(v), veh/h	1671	0	1761	1698	1836	1530	1749	1661	1546	1681	1644	1682
Gap Sat Flow(s),veh/hln	16.0	0.0	18.0	11.4	18.0	2.4	2.8	56.0	4.4	4.3	57.8	57.8
Q Serve(g <sub>s</sub> ), s	16.0	0.0	18.0	11.4	18.0	2.4	2.8	56.0	4.4	4.3	57.8	57.8
Cycle Q Clear(g <sub>c</sub> ), s	1.00	0.13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.17
Pop In Lane	447	0	279	287	276	230	147	1554	723	169	794	824
Lane Gap Cntrl, veh/h	1.20	0.00	0.96	0.89	1.15	0.15	0.55	1.08	0.14	0.72	1.15	1.16
V/C Ratio(x)	447	0	279	301	276	230	147	1554	723	169	794	824
Avail Cap(c <sub>a</sub> ), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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(f)	519	0.0	50.0	36.8	50.9	44.2	27.7	31.9	18.1	27.2	31.0	31.0
Uniform Delay (d), s/veh	108.1	0.0	41.8	6.2	101.7	0.3	3.1	47.7	0.4	13.1	81.4	85.5
Incr Delay (d <sub>2</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.5	0.0	0.0	124.3	119.1
Initial Q Delay (d <sub>3</sub> ), s/veh	25.2	0.0	17.7	9.8	30.3	1.9	2.6	71.4	3.5	4.7	113.7	118.3
% BackOfQ(95%),veh/h	159.9	0.0	91.9	43.1	152.5	44.5	30.9	109.1	18.5	40.3	236.7	235.5
LnGrp Delay(d),s/veh	F	F	F	D	F	D	D	F	D	D	F	F
LnGrp LOS												
Approach Vol, veh/h	801			551			1888				1989	
Approach Delay, s/veh	137.2			106.3			100.8				224.2	
Approach LOS	F			F			F				F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	12.7	61.0	22.0	24.0	10.9	62.8	21.0	25.0				
Phs Duration (G+Y+R <sub>0</sub> ), s	6.0	6.0	7.0	7.0	6.0	6.0	7.0	7.0				
Change Period (Y+R <sub>0</sub> ), s	7.0	55.0	15.0	17.0	55.0	15.0	17.0	17.0				
Max Green Setting (G <sub>max</sub> ), s	6.8	58.5	18.5	20.5	5.3	60.3	13.9	20.0				
Max Q Clear Time (g <sub>c</sub> +h <sub>1</sub> ), s	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0				
Green Ext Time (p <sub>c</sub> ), s												
Intersection Summary												
HOM 2010 CH Delay				134.2								
HOM 2010 LOS				F								

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

**Future 2028 Capacity/Level-of-Service  
without-Development Analysis Worksheets**

**ATTACHMENT 5**

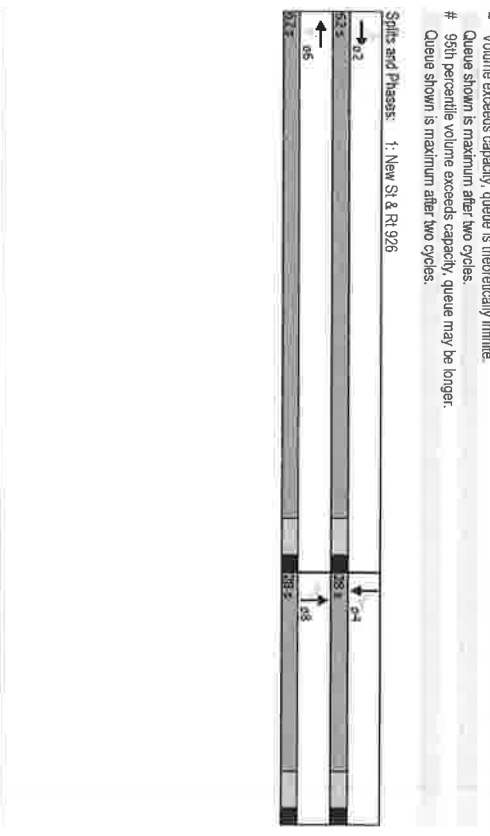
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	851	5	13	401	61	4	98	27	65	286	172
Ideal Flow (veh/h)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Grade (%)	-2%	-2%	1%	1%	-2%	1%	-2%	1%	1%	-2%	1%	1%
Lane Util. Factor	1.00	1.00	1.00	1.00	0.993	1.00	1.00	0.972	1.00	1.00	1.00	1.00
Fr	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
Flt Protected	0	1638	0	0	1516	0	0	1571	0	0	1571	0
Satd. Flow (prot)	0	899	0	0	899	0	0	970	0	0	942	0
Flt Permitted	0	1480	0	0	1469	0	0	1521	0	0	1489	0
Satd. Flow (perm)	0	45	1	16	45	1	14	25	14	25	45	1
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)												
Link Speed (mph)		819		2436		714		174		826		35
Link Distance (ft)		12.4		36.9		19.5		7.4		16.1		0.95
Travel Time (s)		0.96		0.96		0.96		0.96		0.96		0.96
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	3%	27%	8%	33%	6%	33%	9%	4%	2%	2%	2%
Adj. Flow (vph)	100	886	5	14	418	64	4	102	28	68	310	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	991	0	0	496	0	0	134	0	0	558	0
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left	Left	Left	Left	Left	Left	Thru	Left	Thru	Left	Thru	Left
Leading Detector (ft)	30	6	30	30	6	30	35	30	35	30	35	30
Trailing Detector (ft)	-10	0	-10	-10	0	-10	-5	-10	-5	-10	-5	-10
Detector 1 Position (ft)	-10	0	-10	-10	0	-10	-5	-10	-5	-10	-5	-10
Detector 1 Size (ft)	40	6	40	40	6	40	40	40	40	40	40	40
Detector 1 Type	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	6	6	8	8	8	8	8	4	4	4
Detector Phase	2	2	6	6	8	8	8	8	8	4	4	4
Switch Phase	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Minimum Initial (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Minimum Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0
Total Split (s)	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%
Total Split (%)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Medium Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)												
LeadLag												
LeadLag Optimize?	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)												

Lanes: Volumes, Timings - Synchro 8  
 #Length: 16451 - Crebilly Farm Traffic Analysis 2017-3-1 Response to TWP Comments 2028 without dev Weekday AM Optimized

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0
Time to Reduce (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None
vic Ratio	1.06	1.06	1.06	1.06	1.06	1.06	0.53	0.34	0.34	0.34	0.34	0.34
Control Delay	64.9	64.9	64.9	64.9	64.9	64.9	11.3	27.2	27.2	27.2	22.3	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.9	64.9	64.9	64.9	64.9	64.9	11.3	27.2	27.2	27.2	22.3	22.3
Queue Length 50th (ft)	-625	-625	-625	-625	-625	-625	136	55	55	55	420	420
Queue Length 95th (ft)	#885	#885	#885	#885	#885	#885	215	107	107	107	#823	#823
Internal Link Dist (ft)	739	739	739	739	739	739	2366	634	634	634	746	746
Turn Bay Length (ft)												
Base Capacity (vph)	937	937	937	936	936	936	399	399	399	399	399	399
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced vic Ratio	1.06	1.06	1.06	1.06	1.06	1.06	0.53	0.34	0.34	0.34	0.34	0.34

# 99th percentile volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 Queue shown is maximum after two cycles.  
 Queue shown is maximum after two cycles.

Spits and Phases: 1: New St & Rt 926



Lanes: Volumes, Timings - Synchro 8  
 #Length: 16451 - Crebilly Farm Traffic Analysis 2017-3-1 Response to TWP Comments 2028 without dev Weekday AM Optimized

Table with columns: Movement, EB, EB, EB, WB, WB, WB, NB, NB, SB, SB. Rows include Lane Configurations, Volume, Number, Initial Q, Peak Hour Factor, Percent Heavy Veh, etc.

HCN 2010 Signalized Intersection Summary - Synchro 8  
l:\eng\18451 - Crebilly Farm\TrafficAnalysis\2017-3-1 Response to TWP Comments\2028 without dev\Weekday AM Optimized.srn

Table with columns: Lane Group, EB, EB, EB, WB, WB, WB, NB, NB, SB, SB. Rows include Lane Configurations, Volume, Lane Width, Storage Length, etc.

HCN 2010 Signalized Intersection Summary - Synchro 8  
l:\eng\18451 - Crebilly Farm\TrafficAnalysis\2017-3-1 Response to TWP Comments\2028 without dev\Weekday AM Optimized.srn



Lane Group	EB1	EBR	WB1	WBT	NB1	NBR
Lane Configurations	931	44	9	429	55	33
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vph/pl)	12	14	11	12	12	14
Lane Width (ft)	2%			-3%	-1%	
Grade (%)						
Storage Length (ft)	350	120	1	0	0	0
Storage Lanes						
Taper Length (ft)			75			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
FI	0.850					0.850
FI Protected		0.950			0.950	
Satd. Flow (prot)	1713	1589	1678	1719	1640	1640
FI Permitted		0.950		0.950		
Satd. Flow (perm)	1713	1589	1678	1719	1640	1640
Link Speed (mi/h)	45		45	25		
Travel Time (s)	2436		2349	414		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	3%	0%	9%	0%	0%
Adj. Flow (vph)	990	47	10	456	59	35
Shared Lane Traffic (%)						
Lane Group Flow (vph)	990	47	10	456	59	35
Sign Control	Free			Free	Stop	

Intersection Summary  
 Area Type: Other  
 Control Type: Unsignalized

Intersection	EB1	EBR	WB1	WBT	NB1	NBR
Int Delay, s/vln	1.9					
Movement	931	44	9	429	55	33
Vol vln/h	0	0	0	0	0	0
Conflicting Peds. #/hr	Free	Free	Free	Free	Stop	Stop
Sign Control	-	None	-	None	-	None
RT Channelized						
Storage Length	-	350	-	120	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	2	-	-	-	-3	-1
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	4	3	0	9	0	0
Manv Flow	990	47	10	456	59	35

Approach  
 HCM Control Delay, s  
 HCM LOS

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	31.2
HCM LOS	D		D

Minor Lane/Major/Manv  
 Capacity (veh/h)  
 HCM Lane V/C Ratio  
 HCM Control Delay (s)  
 HCM Lane LOS  
 HCM Ssrn Side Q/Veh

Minor Lane/Major/Manv	NB1	NBR	EB1	EBR	WB1	WBT
Capacity (veh/h)	162	316	-	-	468	-
HCM Lane V/C Ratio	0.361	0.111	-	-	0.02	-
HCM Control Delay (s)	39.3	17.8	-	-	12.9	-
HCM Lane LOS	E	C	-	-	B	-
HCM Ssrn Side Q/Veh	1.5	0.4	-	-	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	0	58	0	0	0	10	13	2314	60	76	163
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (Vphpl)	16	16	16	12	12	12	11	12	12	11	12	12
Lane Width (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Grade (%)	-1%	-1%	-1%	-2%	-2%	-2%	2%	2%	2%	3%	3%	3%
Storage Length (ft)	0	0	0	0	0	0	350	0	0	380	0	0
Storage Lanes	0	0	1	0	0	0	1	1	0	1	0	0
Taper Length (ft)	75	75	75	75	75	75	75	75	75	75	75	75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	0.95
Fit	0.885	0.885	0.885	0.885	0.885	0.885	0.950	0.950	0.950	0.950	0.950	0.950
Fit Protected	0	0	1773	0	0	0	1344	1515	3147	0	1613	3077
Std Flow (prot)	0	0	1773	0	0	0	1344	1515	3147	0	1613	3077
Fit Permitted	0	0	0	0	0	0	0.950	0.950	0.950	0.950	0.950	0.950
Std Flow (perm)	0	0	1773	0	0	0	1344	1515	3147	0	1613	3077
Link Speed (mph)	35	35	35	35	35	35	35	35	35	35	35	35
Link Distance (ft)	4334	4334	4334	4334	4334	4334	4334	4334	4334	4334	4334	4334
Travel Time (s)	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0	11	17	2630	58	86	185
Shared Lane Traffic (%)	0	0	66	0	0	0	11	17	2698	0	86	2324
Lane Group Flow (vph)	0	0	66	0	0	0	11	17	2698	0	86	2324
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free

Area Type: **Other**  
 Control Type: **Unsignalized**

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	1.4											
Capacity (veh/h)	178	178	163	130	174							
HCM Lane V/C Ratio	0.098	0.098	0.404	0.087	0.496							
HCM Control Delay (s)	27.4	27.4	41.3	35.3	44.5							
HCM Lane LOS	D	D	E	E	E							
HCM 95th %tile Q(veh)	0.3	0.3	1.8	0.3	2.4							

Area Type: **Other**  
 Control Type: **Unsignalized**

Lane Group	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configuration	W	W	T	T	T	T
Volume (vph)	218	32	245	10	13	317
Ideal Flow (vph/pl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt. Permitted	0.998	0.995	0.998	0.998	0.998	0.998
Flt. Protected	1655	0	1741	0	0	1756
Satd. Flow (prot)	0.958	0	1741	0	0	1756
Flt. Permitted	1655	0	1741	0	0	1756
Satd. Flow (perm)	1655	0	1741	0	0	1756
Link Speed (mph)	35	35	35	35	35	35
Link Distance (ft)	4354	636	619	121	121	619
Travel Time (s)	84.8	12.4	12.4	0.89	0.89	12.1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	12%	3%	0%	9%	2%
Adj. Flow (vph)	245	36	275	11	15	356
Shared Lane Traffic (%)						
Lane Group Flow (vph)	281	0	286	0	0	371
Sign Control	Stop	Free	Free	Free	Free	Free

Intersection Summary  
 Area Type: Unsignalized  
 Control Type: Unsignalized

Intersection	WBL	WBR	NBL	NBR	SBL	SBR
Int Delay, s/vch	6.6					
Vol. veh/h	218	32	245	10	13	317
Conflicting Pckts #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	-	None	None	None	None
Storage Length	0	0	0	0	0	0
Veh in Median Storage #	0	0	0	0	0	0
Grade, %	0	0	0	0	0	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	12	3	0	9	2
Mount Flow	245	36	275	11	15	356

Major/Minor  
 Conflicting Flow All  
 Stage 1  
 Stage 2  
 Critical Hwy  
 Critical Hwy Sig 1  
 Critical Hwy Sig 2  
 Follow-up Hwy  
 Pot Cap-1 Maneuver  
 Stage 1  
 Stage 2  
 Platoon blocked, %  
 Mov Cap-1 Maneuver  
 Mov Cap-2 Maneuver  
 Stage 1  
 Stage 2

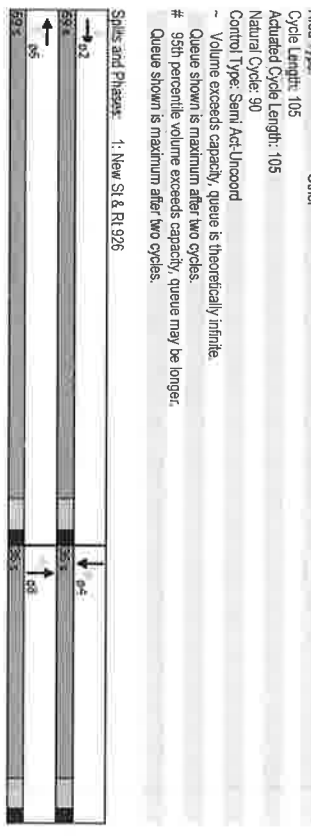
Approach	WBL	WBR	NBL	NBR	SBL	SBR
HCM Control Delay, s	21.5		0		0.4	
HCM LOS	C					

Major Lane/Minor Mount	NBL	NBR	WBL	WBR	SBL	SBR
Capacity (veh/h)	-	493	938	-	-	-
HCM Lane W/C Ratio	-	0.57	0.016	-	-	-
HCM Control Delay (s)	-	21.5	8.9	0	-	-
HCM Lane LOS	-	C	A	A	-	-
HCM 55th %ile Q(veh)	-	3.5	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	42	766	17	29	494	76	12	208	45	75
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	10	10	10	10	10	10	10	10	10	10
Lane Width (ft)	-2%	-2%	1%	1%	-2%	1%	1%	1%	1%	1%
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.997	0.997	0.998	0.998	0.997	0.998	0.998	0.998	0.998	0.998
Flt Protected	0	1638	0	1627	0	1646	0	1528	0	1528
Satd. Flow (prot)	0.947	0.947	0	0.938	0	0.924	0	0.886	0	0.886
Flt Permitted	0	1556	0	1529	0	1524	0	1332	0	1332
Satd. Flow (perm)	2	45	2	45	2	10	25	55	35	35
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	819	819	2436	2436	819	714	19.5	826	16.1	826
Link Speed (ftpl)	12.4	12.4	36.9	36.9	12.4	19.5	0.98	0.98	0.98	0.98
Link Distance (ft)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Travel Time (s)	3%	3%	0%	0%	3%	0%	3%	0%	3%	0%
Peak Hour Factor	43	782	17	30	504	78	12	212	46	77
Heavy Vehicles (%)	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	0	842	0	0	612	0	0	270	0	0
Shared Lane Traffic (%)	1	1	1	1	1	1	1	1	1	1
Lane Group Flow (vph)	Left	Left	Left	Left	Left	Left	Thru	Left	Thru	Left
Number of Detectors	30	6	30	30	6	30	35	30	35	30
Detector Template	-10	0	-10	0	-10	0	-5	-10	-5	-5
Trailing Detector (ft)	-10	0	-10	0	-10	0	-5	-10	-5	-5
Detector 1 Position (ft)	40	6	40	6	40	6	40	40	40	40
Detector 1 Size (ft)	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	2	2	6	6	2	6	8	8	4	4
Permitted Phases	2	2	6	6	2	6	8	8	4	4
Detector Phase	Switch Phase	Switch Phase	Switch Phase	Switch Phase	Switch Phase	Switch Phase	Switch Phase	Switch Phase	Switch Phase	Switch Phase
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	22.0	3.0	3.0	3.0	3.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	9.0	9.0	9.0	9.0
Total Split (s)	69.0	69.0	69.0	69.0	69.0	69.0	36.0	36.0	36.0	36.0
Total Split (%)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	34.3%	34.3%	34.3%	34.3%
Maximum Green (s)	63.0	63.0	63.0	63.0	63.0	63.0	30.0	30.0	30.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0
Lead-Lag Optimize?	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0

Lanes: Volunes, Timings  
 i:\eng\16451 - Credibly Farm\TrafficAnalysis\2017-1-20 TIS PermDOT & Twp\2028 without dev\Weekday PM Optimized\Synchro 8 Report

Area Type	Other
Cycle Length: 105	
Actuated Cycle Length: 105	
Natural Cycle: 90	
Control Type: Semi Act Uncoord	
~ Volume exceeds capacity, queue is theoretically infinite	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Lanes: Volunes, Timings  
 i:\eng\16451 - Credibly Farm\TrafficAnalysis\2017-1-20 TIS PermDOT & Twp\2028 without dev\Weekday PM Optimized\Synchro 8 Report





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configuration	←	←	←	←	←	←
Volume (vph)	848	44	38	591	47	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	11	12	12	14
Grade (%)	2%			-3%	-1%	0
Storage Length (ft)	350	120	1	1	0	0
Storage Lanes	1	1	1	1	1	1
Taper Length (ft)		75	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.850
Fit	0.850					
Fit Protected		0.950			0.950	
Satd. Flow (prot)	1730	1616	1678	1791	1719	1640
Fit Permitted		0.950			0.950	
Satd. Flow (perm)	1730	1616	1678	1791	1719	1640
Link Speed (mph)	45			45	25	
Link Distance (ft)	2436			2349	414	
Travel Time (s)	36.9			35.6	11.3	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	0%	0%	2%	0%	0%
Adj. Flow (vph)	865	45	39	603	48	51
Shared Lane Traffic (%)						
Lane Group Traffic (%)	865	45	39	603	48	51
Sign Control	Free			Free	Stop	

Area Type: Intersecting Street  
 Control Type: Unsignalized  
 Other

Intersection	EBT	EBR	WBL	WBT	NBL	NBR
Int Delay, s/veh	2					
Max Green	648	44	38	591	47	50
Vol. veh/h	0	0	0	0	0	0
Conflicting Peds. #/hr	Free	Free	Free	Free	Stop	Stop
Sign Control	- None			- None		None
RT Channelized		350	120		0	0
Storage Length	0	2	-	0	0	-1
Veh in Median Storage, #	0	-	-	-3	0	-
Grade, %	2			0	0	0
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	0	0	2	0	0
Mount Flow	865	45	39	603	48	51

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	24.5
HCM LOS	D	D	D

Minor Lane/Major Worth	NBL	NBR	EBT	EBR	WBL	WBT	NBL	NBR
Capacity (veh/h)	139	380	*	*	699	*		
HCM Lane V/C Ratio	0.345	0.134	*	0.065				
HCM Control Delay (s)	44	15.9	*	11.4				
HCM Lane LOS	E	C	*	B				
HCM SFRB %/Sfrb Q/veh	1.4	0.5	*	0.2				

Area Type: Intersecting Street  
 Control Type: Unsignalized  
 Other

Approach: EB WB NB  
 HCM Control Delay, s: 0 0.7 24.5  
 HCM LOS: D D D

Minor Lane/Major Worth: NBL NBR EBT EBR WBL WBT NBL NBR  
 Capacity (veh/h): 139 380 \* \* 699 \* \*  
 HCM Lane V/C Ratio: 0.345 0.134 \* 0.065  
 HCM Control Delay (s): 44 15.9 \* 11.4  
 HCM Lane LOS: E C \* B  
 HCM SFRB %/Sfrb Q/veh: 1.4 0.5 \* 0.2

Area Type: Intersecting Street  
 Control Type: Unsignalized  
 Other

Approach: EB WB NB  
 HCM Control Delay, s: 0 0.7 24.5  
 HCM LOS: D D D

Minor Lane/Major Worth: NBL NBR EBT EBR WBL WBT NBL NBR  
 Capacity (veh/h): 139 380 \* \* 699 \* \*  
 HCM Lane V/C Ratio: 0.345 0.134 \* 0.065  
 HCM Control Delay (s): 44 15.9 \* 11.4  
 HCM Lane LOS: E C \* B  
 HCM SFRB %/Sfrb Q/veh: 1.4 0.5 \* 0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	9	0	0	0	32	47	2217	81	133	2120	375
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1808
Ideal Flow (vphpl)	16	16	16	12	12	12	11	12	11	12	12	12
Lane Width (ft)	-1%							2%				
Grade (%)	0	0	0	0	0	0	350	0	380	0	0	0
Storage Length (ft)	0	0	1	0	0	1	1	0	1	0	0	0
Storage Lanes	75	100	100	75	100	100	75	0.95	0.95	1.00	0.95	0.95
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	0.865	0.995	0.977	0.977	0.977	0.95
Lane Util. Factor	0.865	0.865	0.865	0.865	0.865	0.865	0.950	0.950	0.950	0.950	0.950	0.95
Flt. Protected	0	0	1773	0	0	1443	1636	3305	0	1678	3330	0
Satd. Flow (prot)	0	0	1773	0	0	1443	1636	3305	0	1678	3330	0
Flt. Permitted	0	0	1773	0	0	1443	1636	3305	0	1678	3330	0
Satd. Flow (perm)	0	0	1773	0	0	1443	1636	3305	0	1678	3330	0
Link Speed (mph)	35	35	35	35	35	35	35	35	35	35	35	35
Link Distance (ft)	4354	858	16.7	47.8	8.5	561	8.5	0.93	0.93	0.93	0.93	0.93
Travel Time (s)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Peak Hour Factor	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Heavy Vehicles (%)	0	0	10	0	0	34	51	2384	87	143	2280	403
Adj. Flow (vph)	0	0	10	0	0	34	51	2384	87	143	2280	403
Shared Lane Traffic (%)	0	0	10	0	0	34	51	2471	0	143	2683	0
Lane Group Flow (vph)	0	0	10	0	0	34	51	2471	0	143	2683	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Area Type:	Other											
Control Type:	Unsignalized											

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, svehn	2											
Movement	0	0	9	0	0	0	32	47	2217	81	133	2120
Vol. vehn	0	0	9	0	0	0	32	47	2217	81	133	2120
Conflicting Flus. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	-	None	-	-	None	-	-
Storage Length	-	-	0	-	-	-	0	0	0	0	0	0
Veh. in Median Storage #	-	-	0	-	-	-	0	0	0	0	0	0
Grade, %	-	-	-1	-	-	-	-2	-	-	-	-	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Movt Flow	0	0	10	0	0	0	34	51	2384	87	143	2280
4050	5339	1341	3954	5497	1235	2683	0	0	2471	0	0	0
2767	2767	-	2528	2528	-	-	-	-	-	-	-	-
1293	2672	-	1426	2869	-	-	-	-	-	-	-	-
7.3	6.3	7.1	7.1	6.1	7.1	3.9	-	-	-	-	-	-
6.3	5.3	-	6.1	5.1	-	-	-	-	-	-	-	-
6.3	5.3	-	6.1	5.1	-	-	-	-	-	-	-	-
3.5	4	2.9	3.5	4	3	2.4	-	-	-	-	-	-
1	0	144	2	0	168	176	-	-	-	-	-	-
23	49	-	38	75	-	-	-	-	-	-	-	-
188	52	-	170	46	-	-	-	-	-	-	-	-
Platoon blocked, %	0	0	144	1	0	168	-	-	-	-	-	-
Mov Cap-1 Maneuver	0	0	0	1	0	0	-	-	-	-	-	-
Mov Cap-2 Maneuver	16	16	-	27	53	-	-	-	-	-	-	-
Stage 1	108	44	-	51	15	-	-	-	-	-	-	-
Stage 2												
Approach	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Control Delay, s	31.8			31.9			0.7					
HCM LOS	D			D								

Area Type:	Other	WB	WB	WB	WB	WB	WB
Intersection Summary							
Control Type:	Unsignalized						
Lane Group	WB	WB	WB	WB	WB	WB	WB
Lane Configurations	331	38	308	19	11	340	340
Volume (vph)	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.986	0.992					
Flt Protected	0.957					0.998	
Satd Flow (prot)	1698	0	1786	0	0	1796	
Flt Permitted	0.957					0.998	
Satd Flow (perm)	1698	0	1786	0	0	1796	
Link Speed (mph)	35					35	
Link Distance (ft)	4354					619	
Travel Time (s)	84.8					12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	368	42	342	21	12	378	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	410	0	363	0	0	390	
Sign Control	Stop		Free			Free	

Area Type:	Other	WB	WB	WB	WB	WB	WB
Intersection Summary							
Control Type:	Unsignalized						
Lane Group	WB	WB	WB	WB	WB	WB	WB
Lane Configurations	331	38	308	19	11	340	340
Volume (vph)	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.986	0.992					
Flt Protected	0.957					0.998	
Satd Flow (prot)	1698	0	1786	0	0	1796	
Flt Permitted	0.957					0.998	
Satd Flow (perm)	1698	0	1786	0	0	1796	
Link Speed (mph)	35					35	
Link Distance (ft)	4354					619	
Travel Time (s)	84.8					12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	368	42	342	21	12	378	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	410	0	363	0	0	390	
Sign Control	Stop		Free			Free	



**Future 2028 Capacity/Level-of-Service  
with-Development Analysis Worksheets**

**ATTACHMENT 6**

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	98	853	5	18	409	61	4	99	29	65	302	181
Volume (Vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (Vphpl)	10	10	10	10	10	10	10	10	10	10	10	10
Lane Width (ft)												
Grade (%)		-2%			1%			-2%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999	0.998	0.999	0.998	0.999	0.998	0.999	0.998	0.999	0.998	0.999	0.998
Frt Protected	0	1538	0	0	1512	0	0	1553	0	0	1589	0
Satd. Flow (vph)	0	0.995	0	0	0.953	0	0	0.968	0	0	0.943	0
Fit Permitted												
Satd. Flow (Perm)	0	1473	0	0	1444	0	0	1515	0	0	1488	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	1	45		15	45		15	25		27		35
Link Speed (mph)	819	819		2436	819		714	19.5		828		16.1
Travel Time (s)	12.4	12.4		36.9	12.4		36.9	19.5		35		16.1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	3%	0%	27%	8%	6%	33%	3%	9%	4%	0%	2%
Adj. Flow (Vph)	102	889	5	19	426	64	4	103	30	68	315	189
Shared Lane Traffic (%)												
Lane Group Flow (Vph)	0	996	0	0	509	0	0	137	0	0	512	0
Number of Detectors	1	1		1	1		1	1		1		1
Detector Template	Left	Left		Left	Left		Left	Thru		Left	Thru	Left
Leading Detector (ft)	30	6		30	6		30	35		30	35	30
Trailing Detector (ft)	-10	0		-10	0		-10	-5		-10	-5	-10
Detector 1 Position (ft)	-10	0		-10	0		-10	-5		-10	-5	-10
Detector 1 Start (ft)	40	6		40	6		40	40		40	40	40
Detector 1 Type	CHEX	CHEX		CHEX	CHEX		CHEX	CHEX		CHEX	CHEX	CHEX
Detector 1 Channel	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		6	6		8	8		4	4	4
Detector Phases	2			6	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	22.0	22.0		22.0	22.0		3.0	3.0		3.0	3.0	3.0
Minimum Split (s)	28.0	28.0		28.0	28.0		9.0	9.0		9.0	9.0	9.0
Total Split (s)	67.0	67.0		67.0	67.0		28.0	28.0		28.0	28.0	28.0
Total Split (%)	68.9%	68.9%		68.9%	68.9%		31.1%	31.1%		31.1%	31.1%	31.1%
Maximum Green (s)	56.0	56.0		56.0	56.0		22.0	22.0		22.0	22.0	22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
AllRed Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-1.0			-1.0			5.0			-1.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead/Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	3.0

Lanes, Volumes, Timings - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
1: New St & Rt 926 - Credibly Farm Traffic Analysis 2017-7 TWP CU Submission 2028 with devAccess opp. Bridlewood/Weekday/AM.spr

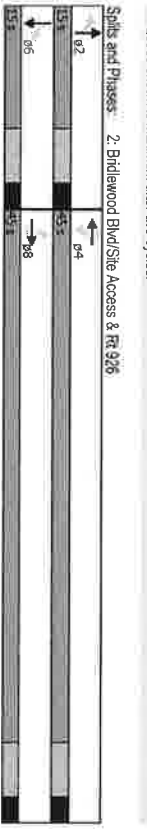
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Gap (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduc (s)	42.0	42.0		42.0	42.0		0.0	0.0		0.0	0.0	0.0
Time to Reduc (s)	21.0	21.0		21.0	21.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	Max	Max		Max	Max		None	None		None	None	None
v/c Ratio	1.07	0.55		1.18	0.55		0.34	0.34		1.43	1.43	1.43
Control Delay	68.3	11.8		11.8	68.3		27.2	27.2		235.4	235.4	235.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	68.3	11.8		11.8	68.3		27.2	27.2		235.4	235.4	235.4
Queue Length 50th (ft)	-634	142		142	-634		56	56		-437	-437	-437
Queue Length 95th (ft)	#674	227		227	#674		108	108		#641	#641	#641
Internal Link Dist (ft)	739			2356			634			746		
Turn Bay Length (ft)												
Base Capacity (Vph)	933	920		920	933		398	398		400	400	400
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.07	0.55		0.55	1.07		0.34	0.34		1.43	1.43	1.43
<b>Interpreted Summary</b>												
Area Type	Other											
Cycle Length	90											
Activated Cycle Length	90											
Natural Cycle	120											
Control Type	Semi Act-Uncoord											
- Volume exceeds capacity, queue is theoretically infinite.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Queue shown is maximum after two cycles.												
<b>Spits and Phases: 1: New St &amp; Rt 926</b>												

Lanes, Volumes, Timings - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
1: New St & Rt 926 - Credibly Farm Traffic Analysis 2017-7 TWP CU Submission 2028 with devAccess opp. Bridlewood/Weekday/AM.spr



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead Lag Optimizer?												
Vehicle Emission (g)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	0.01	0.78	0.04	0.04	0.37	0.01	None	0.26	0.13	None	0.38	0.10
v/c Ratio	3.5	13.9	1.1	4.0	5.2	0.1	25.4	10.9	28.4	16.1	0.0	0.0
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	3.5	13.9	1.1	4.0	5.2	0.1	25.4	10.9	28.4	16.1	0.0	0.0
Total Delay	1	228	0	1	61	0	19	2	28	5	25	5
Queue Length 50th (ft)	3	#530	7	5	105	1	48	24	66	25	25	25
Queue Length 95th (ft)												
Internal Link Dist (ft)												
Turn Bay Length (ft)	150	632	1268	1175	233	1240	1141	250	322	242	320	320
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Saturation Cap Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.78	0.04	0.04	0.37	0.01	0.24	0.12	0.36	0.10	0.36	0.10

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 60  
 Actuated Cycle Length: 55.9  
 Neutral Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 # 95th Percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes: Volumes, Turnings - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
 \length\6451 - Credibly Farm\TrafficAnalysis\2017-7-TWP CU Submission\2028 with devAccess opp. Bridlewood\Weekday AM syn

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	931	44	9	429	15	55	5	33	81	16	13
Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (veh)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Per-Bike Adj (A-H)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus. Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow (veh/h/m)	1747	1713	1799	1827	1676	1791	1809	1804	1881	1765	1765	1800
Adj Flow Ratio, veh/h	4	990	47	10	456	16	59	5	35	86	17	14
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh. %	2	4	3	0	9	2	0	2	2	2	2	2
Cap. veh/h	618	1121	1000	242	1096	996	343	29	205	328	135	111
Arrive On Green	0.85	0.65	0.65	0.65	0.65	0.65	0.15	0.15	0.13	0.15	0.15	0.13
Sat Flow, veh/h	909	1713	1629	561	1676	1523	1407	195	1368	1362	896	738
Grp Volume (veh)	4	990	47	10	456	16	59	0	40	86	0	31
Grp Sat Flow (veh/h)	909	1713	1629	561	1676	1523	1407	0	1563	1362	0	1634
Q Serve (s)	0.1	24.2	0.6	0.8	6.6	0.2	1.9	0.0	1.2	3.0	0.0	0.8
Cycle Q Clear (s)	6.7	24.2	0.6	24.9	6.6	0.2	2.3	0.0	1.2	3.6	0.0	0.8
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap (veh/h)	618	1121	1000	242	1096	996	343	0	235	328	0	245
V/C Ratio (X)	0.01	0.88	0.05	0.04	0.42	0.02	0.17	0.00	0.17	0.26	0.00	0.13
Avail Cap (veh/h)	735	1341	1197	315	1312	1192	407	0	306	390	0	320
HCM Platcon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.8	7.2	3.2	17.5	4.2	3.1	19.5	0.0	19.3	20.3	0.0	19.0
Incr Delay (d2), s/veh	0.0	8.4	0.0	0.1	0.3	0.0	0.2	0.0	0.3	0.4	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Delay (d95%), veh/h	0.0	18.8	0.4	0.2	5.4	0.1	1.4	0.0	0.9	2.1	0.0	0.7
LnGrp Delay/d, s/veh	5.8	13.6	3.2	17.5	4.5	3.1	19.8	0.0	19.7	20.7	0.0	19.2
LnGrp LOS	A	B	A	B	A	A	B	B	B	C	B	B
Approach Vol, veh/h		1041			432			59		117		
Approach Delay, s/veh		13.1			4.7			19.7		20.3		
Approach LOS		B			A			B		C		
Assigned Pkts	2	2	4	4	5	6	8	8	8	8	8	8
Pkts Delayed (S+Y+Rd), s	12.7	38.4	6.0	6.0	12.7	6.0	38.4	6.0	38.4	6.0	6.0	6.0
Change Period (Y+Rd), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Cmax), s	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Max Q Clear Time (q_c+1), s	4.8	27.4	4.8	4.8	6.1	6.1	26.7	6.1	26.7	6.1	6.1	6.1
Green Ext Time (g_c), s	0.3	5.0	0.3	0.3	0.2	0.2	5.2	0.2	5.2	0.2	0.2	0.2

**Intersection Summary**  
 HCM 2010 CM Delay 11.6  
 HCM 2010 LOS B

HCM 2010 Signalized Intersection Summary - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
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Motorist	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Line Configurations	622	306	20	192	181	35	27	1736	159	81	1663	228
Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	8	6	0	0	0	0	0	23	0	0	0	0
Ped-Bike Adj(A_pb1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1774	1798	1900	1732	1732	1618	1716	1801	1607	1640	1800	1800
Adj Flow Rate, veh/h	536	591	21	204	193	34	29	1847	150	86	1789	224
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh. %	3	7	7	6	6	18	7	7	6	12	10	10
Cap. veh/h	379	398	5	190	200	158	83	1562	733	117	1404	174
Arrive On Green	0.22	0.22	0.22	0.12	0.12	0.12	0.02	0.48	0.05	0.50	0.50	0.50
Sat. Flow, veh/h	1689	1726	61	1650	1732	1375	1634	3260	1531	1531	2791	346
Grp Volume(v), veh/h	536	0	612	204	193	34	29	1847	150	86	971	1022
Grp Sat. Flow(s), veh/h	1689	0	1787	1650	1732	1375	1634	1531	1531	1558	1579	1579
Q Serve(g, s)	37.0	0.0	37.0	19.0	18.3	3.7	1.5	79.0	9.3	4.6	83.0	83.0
Cycle Q Clear(g_c), s	37.0	0.0	37.0	19.0	18.3	3.7	1.5	79.0	9.3	4.6	83.0	83.0
Prop In Lane	1.00	0.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.22
Lane Grp Cap(c), veh/h	379	0	403	190	200	158	83	1562	733	117	784	795
V/C Ratio(X)	1.41	0.00	1.52	1.07	0.97	0.21	0.35	1.18	0.20	0.73	1.24	1.29
Avail Cap(c), veh/h	379	0	401	190	200	158	123	1562	733	118	784	795
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(f)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), sveh	64.0	0.0	64.0	73.0	72.6	66.2	39.7	43.0	24.8	38.4	41.0	41.0
Incr Delay (d2), sveh	201.4	0.0	246.4	86.1	54.1	0.7	2.5	88.1	0.6	20.8	118.2	138.4
Initial Q Delay(Q), sveh	51.5	0.0	34.2	0.0	0.0	0.0	0.0	43.5	0.0	0.0	0.0	0.0
%ile Back(Q)(95%), sveh	77.2	0.0	89.6	23.8	17.4	2.6	1.3	110.3	7.4	4.7	110.6	120.1
LnGrp Delay(d), sveh	316.8	0.0	344.7	159.1	126.7	65.9	42.2	175.6	25.4	59.3	159.1	179.3
LnGrp LOS	F	F	F	F	F	E	D	F	C	E	F	F
Approach Vol, veh/h		1148			431			2026		2079		
Approach Delay, sveh		331.7			137.3			162.5		164.9		
Approach LOS		F			F			F		F		

THAT	1	2	3	4	5	6	7	8
Assigned Phs	1	2						
Phs Duration (G+Y+R), s	129	84.0		25.0	8.9	88.0		43.0
Change Period (Y+R), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	7.1	78.0		18.0	7.0	78.0		36.0
Max Q Clear Time (G_c+1), s	7.1	81.5		21.5	4.0	85.5		39.5
Green Ext Time (g_c), s	0.0	0.0		0.0	0.0	0.0		0.0

Intersection Summary  
 HCM 2010 CH Delay 196.7  
 HCM 2010 LOS F

User approved pedestrian interval to be less than phase max green.  
 HCM 2010 Signalized Intersection Summary - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
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User approved volume balancing among the lanes for turning movement.

HCM 2010 Signalized Intersection Summary - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
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Area Type:	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	90	0	0	10	15	2379	60	76	1882	182	
Volume (Vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Ideal Flow (Vphpl)	16	16	16	12	12	11	12	11	11	12	12	
Lane Width (ft)	0	0	0	0	0	0	350	0	380	0	0	
Grade (%)	-1%	-1%	-1%	-2%	-2%	2%	2%	0	0	-3%	0	
Storage Length (ft)	0	0	0	0	0	0	0	0	0	0	0	
Storage Lanes	0	0	0	0	0	0	0	0	0	0	0	
Taper Length (ft)	75	75	75	75	75	75	75	75	75	75	75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	
Fit	0.985	0.985	0.985	0.885	0.885	0.996	0.996	0.950	0.950	0.987	0.950	
Fit Protected	0	0	1773	0	0	1344	1515	3147	0	1613	3076	0
Satd. Flow (prot)	0	0	1773	0	0	1344	1515	3147	0	1613	3076	0
Fit Permitted	0	0	1773	0	0	1344	1515	3147	0	1613	3076	0
Satd. Flow (perm)	0	0	1773	0	0	1344	1515	3147	0	1613	3076	0
Link Speed (mph)	35	35	35	35	35	35	35	35	35	35	35	
Link Distance (ft)	678	678	678	858	858	3147	3147	477	85	581	45	
Travel Time (s)	13.2	13.2	13.2	16.7	16.7	47.7	47.7	8.5	8.5	8.5	8.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	0	0	102	0	0	11	17	2703	68	86	2139	207
Shared Lane Traffic (%)	0	0	102	0	0	11	17	2703	68	86	2139	207
Lane Group Flow (vph)	0	0	102	0	0	11	17	2771	0	86	2346	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free

Lanes: Volumes, Timings - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
 I:\eng\816451 - Credibly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2028 with dev\Access opp. Bridlewood\Weekday AM syn

Area Type:	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Init Delay, s/veh	2.2											
Vol veh/h	0	0	90	0	0	10	15	2379	60	76	1882	182
Conflicting Peak #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Split Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	0	0	0	0	0	0
Veh in Median Storage #	-	-	0	-	-	0	0	0	0	0	0	0
Grade, %	-	-	-1	-	-	-2	-	-	-	-	-	-3
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mgmt Flow	0	0	102	0	0	11	17	2703	68	86	2139	207

HCM 2010 TNMSC - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
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McMahon Associates, Inc. Crebilly Farm Residential Development  
 8. West Site Access & Pleasant Grove Rd 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	63	4	17	185	15	24
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	-1%	0%	0%	0%	0%	0%
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.993					
Fit	0.996					
Fit Protected	1794	0	0	1712	1587	0
Satd. Flow (prot)	0.996					
Fl. Permitted	1794	0	0	1712	1587	0
Satd. Flow (geom)	1794	0	0	1712	1587	0
Link Speed (mph)	35					
Link Distance (ft)	2914					
Travel Time (s)	56.8	0.90	0.90	0.90	0.90	0.90
Peak Hour Factor	0.90	2%	2%	5%	2%	2%
Heavy Vehicles (%)	70	4	19	206	17	27
Adj. Flow (vph)						
Shared Lane Traffic (%)	74	0	0	225	44	0
Lane Group Flow (vph)	Free	Free	Free	Free	Stop	Stop

Area Type: Other  
 Control Type: Unsignalized

Lanes, Volumes, Timings - Synchro 8  
 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
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McMahon Associates, Inc. Crebilly Farm Residential Development  
 8. West Site Access & Pleasant Grove Rd 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood

Inspection	EBT	EBR	WBL	WBT	NBL	NBR
Int Delay, s/vph	1.6					
Max Delay	63	4	17	185	15	24
Vol. veh/h	0	0	0	0	0	0
Conflicting Pkts #/hr	Free	Free	Free	Free	Stop	Stop
Sign Control	None	None	None	None	None	None
RT Channelized						
Storage Length						
Veh in Median Storage #	0	-	-	0	0	0
Grade, %	-1	-	-	0	0	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	5	2	2
Mvmt Flow	70	4	19	206	17	27

Major/Minor	Major 1	Major 2	Major 3
Contracting Flow All	0	74	0
Stage 1	-	-	72
Stage 2	-	-	243
Critical Hdwy	-	4.3	-
Critical Hdwy Stg 1	-	-	6.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	3	-
Pkt Cap-1 Maneuver	-	1133	78
Stage 1	-	-	1109
Stage 2	-	-	919
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1133	763
Mov Cap-2 Maneuver	-	-	763
Stage 1	-	-	1109
Stage 2	-	-	902

Major/Minor	EBT	EBR	WBL	WBT	NBL	NBR
HCM Control Delay, s	0		0.7		9.1	A
HCM LOS						A
Major/Minor Major/Minor	NBL/L	EBT	EBR	WBL	WBT	
Capacity (veh/h)	921	-	1133	-	-	-
HCM Lane V/C Ratio	0.047	-	0.017	-	-	-
HCM Control Delay (s)	9.1	-	8.2	-	0	-
HCM Lane LOS	A	-	A	-	A	-
HCM 95th %ile (veh)	0.1	-	0.1	-	-	-

HCM 2010 TWSC - Synchro 8  
 2028 with Dev Weekday Morning Peak Hour Alt A - Access Opp. Bridlewood  
 I:\eng\16451 - Crebilly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2028 with devAccess opp. Bridlewood\Weekday AM.syn



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	35	1	2	197	5	8
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vph)	-1%	0%	0%	0%	0%	0%
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.999			0.919		
Flt Protected				0.980		
Satd. Flow (prot)	1807	0	0	1715	1589	0
Flt Permitted				0.980		
Satd. Flow (perm)	1807	0	0	1715	1589	0
Link Speed (mph)	35			35		
Link Distance (ft)	738			678		
Travel Time (s)	14.4			13.2		
Peak Hour Factor	0.90			0.90		
Heavy Vehicles (%)	0%			2%		
Adj. Flow (vph)	96	1	2	219	6	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	97	0	0	221	15	0
Sign Control	Free			Free	Stop	

Area Type: Other  
 Control Type: Unsignalized

Intersection	EBT	EBR	WBL	WBT	NBL	NBR
Int Delay (veh) 0.5						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol. veh/h	35	1	2	197	5	8
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	-
Veh in Median Storage #	0	-	-	0	0	-
Grade, %	-1	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles %	0	2	2	5	2	2
Maxt Flow	96	1	2	219	6	9

Major1 Major2 Major3  
 Conflicting Flow All 0 0 0 97 0 319 96  
 Stage 1 4.3 6.42 6.22  
 Critical Heavy 5.42  
 Critical Hwy Stg 1 5.42  
 Critical Hwy Stg 2 3 3.1  
 Follow-up Heavy 774 1025  
 Pk Cap-1 Maneuver 1081  
 Stage 1 940  
 Stage 2  
 Pk Cap-2 Maneuver 1112 772 1025  
 Mov Cap-1 Maneuver 772  
 Mov Cap-2 Maneuver 1081  
 Stage 1 938  
 Stage 2

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	9
HCM LOS	A	A	A

Minor Cap-1/Maneuver	NB	EBT	EBR	WBL	WBT
Capacity (veh/h)	910	-	-	1112	-
HCM Lane V/C Ratio	0.016	-	-	0.002	-
HCM Control Delay (s)	9	-	-	8.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %ile Q(veh)	0	-	-	0	-

Lane Group	WB	WB	NBT	NBR	SBL	SBT
Lane Configuration	230	40	245	13	15	317
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.980		0.993			
Fit	0.999		0.999			
Fit Protected	1648	0	1738	0	0	1756
Satd. Flow (prot)	0.959		0.998			
Fit Permitted	1648	0	1738	0	0	1756
Satd. Flow (perm)	1648	0	1738	0	0	1756
Link Speed (mph)	35		35			
Travel Time (s)	2914		714			812
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	12%	3%	0%	9%	2%
Adj. Flow (vph)	258	45	275	15	17	356
Shared Lane Traffic (%)						
Lane Group Flow (vph)	303	0	290	0	0	373
Sign Control	Stop		Free			Free

Intersection Summary  
 Area Type: Other  
 Control Type: Unsignalized

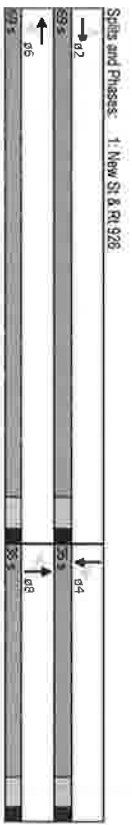
Intersection	WB	WB	NBT	NBR	SBL	SBT
Int Delay, s/veh	7.5					
Management	230	40	245	13	15	317
Vol. veh/h	0	0	0	0	0	0
Conflicting Peds. #/hr	Stop	Stop	Free	Free	Free	Free
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None
Storage Length	0					
Veh. in Median Storage, #	0		0			0
Grade, %	0		0			0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	12	3	0	9	2
Mgmt. Flow	258	45	275	15	17	356

Approach: WB NBT NBR SBL SBT  
 HCM Control Delay, s: 23.5 0 0.4  
 HCM LOS: C

Lane Group	EBL	EBT	EER	WBL	WBT	WER	NBL	NBT	SBL	SBT	SER
Lane Configurations	51	775	17	32	499	76	12	211	50	75	240
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	10	10	10	10	10	10	10	10	10	10	10
Lane Width (ft)	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
Fit Protected	0	1638	0	1625	0	1642	0	1528	0	1528	0
Satd. Flow (prot)	0.934	0.934	0	0.930	0	0.924	0	0.861	0	0.861	0
Fit Permitted	0	1535	0	1516	0	1520	0	1324	0	1324	0
Satd. Flow (perm)	2	45	13	45	11	25	56	35	35	35	35
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	12.4	819	12.4	2438	36.9	714	19.5	16.1	16.1	16.1	16.1
Travel Time (s)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Peak Hour Factor	3%	3%	0%	1%	0%	3%	0%	1%	1%	1%	1%
Heavy Vehicles (%)	52	791	17	33	509	78	12	215	51	77	245
Adj. Flow (vph)	0	860	0	620	0	0	278	0	0	692	0
Shared Lane Traffic (%)	1	1	1	1	1	1	1	1	1	1	1
Lane Group Flow (vph)	Left	Left	Left	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Number of Detectors	30	6	30	6	30	35	30	35	30	35	35
Detector Template	-10	0	-10	0	-10	-5	-10	-5	-10	-5	-5
Trailing Detector (ft)	-10	0	-10	0	-10	-5	-10	-5	-10	-5	-5
Detector 1 Position (ft)	40	6	40	6	40	40	40	40	40	40	40
Detector 1 Size (ft)	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Turn Type	2	2	2	2	2	2	2	2	2	2	2
Protected Phases	6	6	6	6	6	6	6	6	6	6	6
Permitted Phases	8	8	8	8	8	8	8	8	8	8	8
Detector Phase	2	2	2	2	2	2	2	2	2	2	2
Switch Phase	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Initial (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Minimum Split (s)	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0
Total Split (%)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%
Maximum Green (s)	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Last Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)											

Lane Group	EBL	EBT	EER	WBL	WBT	WER	NBL	NBT	SBL	SBT	SER
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Time Before Red (s)	4.20	4.20	4.20	4.20	4.20	4.20	0.0	0.0	0.0	0.0	0.0
Time To Red (s)	21.0	21.0	21.0	21.0	21.0	21.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
vic Ratio	0.92	0.92	0.92	0.92	0.92	0.92	0.61	0.61	0.61	0.61	0.61
Control Delay	35.0	35.0	35.0	17.6	17.6	17.6	37.2	37.2	37.2	37.2	37.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	35.0	35.0	17.6	17.6	17.6	37.2	37.2	37.2	37.2	37.2
Queue Length 50th (ft)	4.75	4.75	4.75	24.9	24.9	24.9	154	154	154	154	154
Queue Length 95th (ft)	#788	#788	#788	377	377	377	244	244	244	244	244
Internal Link Dist (ft)	739	739	739	2356	2356	2356	634	634	634	634	634
Turn Bay Length (ft)	929	929	929	0	0	0	456	456	456	456	456
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reducn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reducn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reducn	0	0	0	0	0	0	0	0	0	0	0
Reduced vic Ratio	0.92	0.92	0.92	0.67	0.67	0.67	0.61	0.61	0.61	0.61	0.61

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 105  
 Actuated Cycle Length: 105  
 Natural Cycle: 90  
 Control Type: Semi Act-Uncoord  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.





McMahon Associates, Inc.,  
 Crebilly Farm Residential Development  
 2: Bridlewood Blvd/Site Access & Rt 926 2028 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood

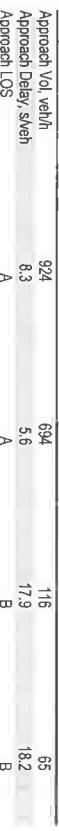
Lead/Lag Optimizer?	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	0.03	0.69	0.04	0.13	0.46	0.05	0.20	0.21	0.21	0.06	0.21	0.06
v/c Ratio	3.6	10.0	1.1	4.9	6.1	1.3	23.1	11.5	23.6	16.6	23.6	16.6
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	3.6	10.0	1.1	4.9	6.1	1.3	23.1	11.5	23.6	16.6	23.6	16.6
Total Delay	1	150	0	4	79	0	12	4	12	2	12	2
Queue Length 50th (ft)	6	307	6	14	149	8	41	34	41	17	41	17
Queue Length 95th (ft)	150	2356	360	120	1384	150	279	370	260	345	260	345
Turn Bay Length (ft)	531	1337	1261	327	1198	1198	279	370	260	345	260	345
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.69	0.04	0.12	0.44	0.04	0.17	0.18	0.18	0.05	0.18	0.05



Lanes, Volumes, Timings - Synchro 8  
 2028 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
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 2: Bridlewood Blvd/Site Access & Rt 926 2028 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood

Workpoint	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	848	44	39	591	4	51	47	17	50	47	9
Volume (veh/h)	3	0	18	7	0	14	5	2	12	1	6	16
Number	0	0	0	0	0	0	0	0	0	0	0	0
Inflow Q (Qb), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Per-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1747	1730	1853	1827	1791	1791	1809	1881	1765	1765	1800	1800
Adj Sat Flow, veh/h	14	685	45	39	603	52	48	17	51	48	9	8
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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, %	2	3	0	0	2	2	0	2	2	2	2	2
Cap, veh/h	492	1088	990	317	1126	957	378	62	187	326	135	120
Arrive On Green	0.63	0.63	0.63	0.63	0.63	0.63	0.16	0.16	0.16	0.16	0.16	0.14
Sat Flow, veh/h	767	1730	1575	632	1791	1523	1425	397	1192	1328	863	767
Gp Volume (v), veh/h	14	865	45	39	603	52	48	17	51	48	9	17
Gp Sat Flow (s), veh/h	767	1730	1575	632	1791	1523	1425	397	1192	1328	863	767
Q Serve (s), s	0.5	17.3	0.5	2.3	8.8	0.6	1.4	0.0	1.8	1.5	0.0	0.4
Cycle Q Clear (c), s	9.3	17.3	0.5	19.6	8.8	0.6	1.4	0.0	1.8	2.8	0.0	0.4
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Gp Cap (c), veh/h	492	1088	990	317	1126	957	378	62	187	326	135	120
V/C Ratio (X)	0.03	0.80	0.05	0.12	0.54	0.05	0.13	0.00	0.27	0.15	0.00	0.07
Avail Cap (c), veh/h	667	1483	1350	461	1535	1305	460	0	341	492	0	349
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 (f)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.4	6.4	3.3	13.7	4.9	3.3	17.2	0.0	17.7	18.3	0.0	17.0
Incr Delay (d2), s/veh	0.0	2.2	0.0	0.2	0.4	0.0	0.1	0.0	0.6	0.2	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back (Qd95%), veh/h	0.2	13.4	0.4	0.7	7.7	0.5	1.0	0.0	1.5	1.0	0.0	0.3
LnGp Delay (d), s/veh	7.5	8.6	3.3	13.9	5.2	3.4	17.3	0.0	18.2	18.5	0.0	17.1
LnGp LOS	A	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h	924	83	694	56	116	65	179	18.2	18.2	18.2	18.2	18.2
Approach Delay, s/veh	8.3	A	5.6	A	B	B	B	B	B	B	B	B
Approach LOS	A	A	A	A	B	B	B	B	B	B	B	B



Lanes, Volumes, Timings - Synchro 8  
 2028 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp. Bridlewood  
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User approved volume balancing among the lanes for turning movement.

Measurement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEBL	SEBT	SEBR
Lane Configurations	1	2	3	4	5	6	7	8	9	10	11	12
Volume (veh/h)	560	244	37	208	333	52	82	1771	142	127	1803	217
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	14	0	0	69	0
Ped-Bike Adj(A <sub>p</sub> ,pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1809	1676	1900	1783	1836	1872	1836	1749	1819	1785	1731	1800
Adj Flow Rate, veh/h	434	453	38	214	343	40	85	1826	111	131	1859	177
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh. %	1	1	1	3	0	2	0	5	5	2	4	4
Cap. veh/h	355	352	30	247	267	231	124	1530	712	135	1438	73
Ambie On Green	0.21	0.21	0.20	0.15	0.15	0.15	0.05	0.46	0.46	0.05	0.47	0.47
Sat Flow, veh/h	1723	1708	143	1698	1836	1591	1749	3322	1546	1681	3040	285
Gpp Volume(v), veh/h	434	0	491	214	343	40	85	1826	111	131	982	1094
Gpp Sat Flow(s), veh/h	1723	0	1851	1698	1836	1591	1749	1661	1546	1681	1644	1680
Q Serve(g, s), s	34.0	0.0	34.0	20.3	24.0	3.6	4.2	76.0	6.3	8.5	77.5	77.5
Cycle Q Clear(g, s)	34.0	0.0	34.0	20.3	24.0	3.6	4.2	76.0	6.3	8.5	77.5	77.5
Prop In Lane	1.00	0.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Gpp Cap(c), veh/h	355	0	381	247	267	231	124	1530	712	135	772	800
V/C Ratio(x)	1.22	0.00	1.29	0.87	1.28	0.17	0.69	1.19	0.16	0.97	1.29	1.31
Avail Cap(c, a), veh/h	355	0	381	247	267	231	139	1530	712	135	772	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.5	0.0	65.5	69.9	70.5	61.8	38.6	44.5	25.9	49.7	43.8	43.8
Incr Delay (d2), s/veh	122.9	0.0	147.7	26.1	153.4	0.4	11.6	39.7	0.5	67.4	136.0	146.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.1	0.0	114.0	108.7	108.7
%ile BackOfQ(95%),veh/h	50.9	0.0	59.5	16.9	42.4	2.9	4.3	105.6	5.4	13.3	151.1	158.7
LnGpp Delay(d),s/veh	188.4	0.0	213.3	95.0	223.9	62.1	50.2	165.3	26.3	117.1	295.8	299.1
LnGpp LOS	F	F	F	F	F	E	D	F	C	F	F	F
Approach Vol, veh/h	925			597			2022		2167		286.6	
Approach Delay, s/veh	201.6			166.9			152.8		286.6		286.6	
Approach LOS	F			F			F		F		F	

Time	1	2	3	4	5	6	7	8
Assigned Phse	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	81.0	30.0	12.5	82.5			40.0
Change Period (Y+Rc), s	6.0	6.0	7.0	6.0	6.0			7.0
Max Green Setting (Gmax), s	8.0	75.0	23.0	8.0	75.0			33.0
Max Q Clear Time (g_c+1), s	11.0	78.5	28.5	6.7	80.0			36.5
Green Ext Time (g_e), s	0.0	0.0	0.0	0.0	0.0			0.0

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

HCM 2010 Signalized Intersection Summary - Synchro 8 2028 with Dev Weekday Afternoon Peak Hour Alt. A - Access Opp. Bridlewood  
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HCM 2010 Signalized Intersection Summary - Synchro 8 2028 with Dev Weekday Afternoon Peak Hour Alt. A - Access Opp. Bridlewood  
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Area Type:	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	0	0	28	0	0	32	47	2255	81	133	2120	444
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	16	16	16	12	12	12	11	12	12	12	12	12
Lane Width (ft)	0	-1%	0	0	0	0	350	2%	0	380	0	0
Grade (%)	0	0	1	0	0	1	1	0	0	1	0	0
Storage Length (ft)	75	0	0	75	0	75	75	0	0	75	0	0
Storage Lanes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Lane Util. Factor	0.865	0.865	0.865	0.865	0.865	0.865	0.995	0.995	0.974	0.974	0.974	0.95
Fit Protected	0	0	1773	0	0	1443	0.950	0.950	0.950	0.950	0.950	0.950
Std. Flow (prot)	0	0	1773	0	0	1443	1636	3305	0	1678	3320	0
Fit Permitted	0	0	1773	0	0	1443	0.950	0.950	0.950	0.950	0.950	0.950
Std. Flow (perm)	0	0	1773	0	0	1443	1636	3305	0	1678	3320	0
Link Speed (mph)	35	35	35	35	35	35	45	45	45	45	45	45
Link Distance (ft)	694	694	694	888	888	888	3147	3147	3147	3147	3147	3147
Travel Time (s)	13.5	13.5	13.5	16.7	16.7	16.7	47.7	47.7	47.7	47.7	47.7	47.7
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	2%	1%	1%
Adj. Flow (vph)	0	0	30	0	0	34	51	2425	87	143	2280	477
Shared Lane Traffic (%)	0	0	30	0	0	34	51	2512	0	143	2757	0
Lane Group Flow (vph)	0	0	30	0	0	34	51	2512	0	143	2757	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free

Lanes: Volunes, Timings - Synchro 8  
 2028 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp Bridlewood  
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Area Type:	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Intersection	2.2											
Int Delay, s/vph	2.2											
Vol. veh/s	0	0	28	0	0	32	47	2255	81	133	2120	444
Conflicting Pck, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	0	0	0	0	0	0
Storage Length	-	-	0	-	-	0	350	-	None	380	-	None
Veh in Median Storage, #	-	-	0	-	-	0	0	0	0	0	0	0
Grade, %	-	-	-1	-	-	-2	-	-	-	-	-	-3
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	9	2	0	2	0	1
Manr Flow	0	0	30	0	0	34	51	2425	87	143	2280	477

Area Type:	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Mac/Major	4117	5417	1378	3995	5612	1256	2757	0	0	2912	0	0
Conflicting Flow All	2804	2804	-	2569	2569	-	-	-	-	-	-	-
Stage 1	7.3	6.3	7	7.1	6.1	7.1	3.9	-	-	-	-	-
Stage 2	1313	2613	-	1426	3043	-	-	-	-	-	-	-
Critical Heavy	6.3	5.3	-	6.1	5.1	-	-	-	-	-	-	-
Critical Heavy Stg 1	6.3	5.3	-	6.1	5.1	-	-	-	-	-	-	-
Critical Heavy Stg 2	3.5	4	2.9	3.5	4	3	2.4	-	-	2.4	-	-
Follow-up Heavy	1	0	141	2	0	163	165	-	-	203	-	-
Pot Cap-1 Maneuver	22	47	-	36	72	-	-	-	-	-	-	-
Stage 1	183	59	-	170	42	-	-	-	-	-	-	-
Platoon blocked, %	0	0	141	1	0	163	165	-	-	203	-	-
Mov Cap-1 Maneuver	0	0	0.214	1	0	-	-	-	-	-	-	-
Mov Cap-2 Maneuver	15	14	-	25	50	-	-	-	-	-	-	-
Stage 1	100	41	-	40	12	-	-	-	-	-	-	-
Stage 2												

Approach	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Control Delay, s	37.3			32.9			0.7					2.8
HCM LOS	E			D								

Minor Lane/Minor/Manr	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR
Capacity (veh/s)	165	-	-	147	183	203	-	-	-	-	-	-
HCM Lane V/C Ratio	0.306	-	-	0.214	0.211	0.704	-	-	-	-	-	-
HCM Control Delay (s)	36.2	-	-	37.3	32.9	56.5	-	-	-	-	-	-
HCM Lane LOS	E	-	-	E	D	F	-	-	-	-	-	-
HCM Sgnn Smln Q/Wrt	1.2	-	-	0.8	0.8	4.5	-	-	-	-	-	-

HCM 2010 TWSC - Synchro 8  
 2028 with Dev Weekday Afternoon Peak Hour Alt A - Access Opp Bridlewood  
 [eng8\8451 - Creditly Farm\TrafficAnalysis\2017-7 TWP CU Submission\2028 with dev\Access opp Bridlewood\Weekday.PM.syn



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	17	15	80	423	9	14
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (Vphpl)	-1%	0%	0%	0%	0%	0%
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.936					
Flt. Protected	1677	0	0	1769	1597	0
Std. Flow (prot)	0.994	0.981				
Flt. Permitted	1677	0	0	1769	1597	0
Std. Flow (perm)	0.994	0.981				
Link Speed (mph)	35	35	35	35	35	35
Link Distance (ft)	3237	319	382	7.4	0.90	0.90
Travel Time (s)	63.1	0.90	0.90	0.90	0.90	0.90
Peak Hour Factor	0%	2%	2%	1%	2%	2%
Heavy Vehicles (%)	19	17	67	477	10	16
Adj. Flow (vph)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)	36	0	0	544	26	0
Sign Control	Free			Free	Stop	

Maneuver	EBT	EBR	WBL	WBT	NBL	NBR
Vol. Vehs	17	15	80	423	9	14
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	-
Veh in Median Storage, #	0	-	0	0	0	-
Grade, %	-1	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	1	2	2
Manvl Flow	19	17	67	477	10	16

**Maneuver**

Maneuver	Man01	Man02	Man03
Conflicting Flow All	0	0	36
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hwy	-	-	4.3
Critical Hwy Sig 1	-	-	6.42
Critical Hwy Sig 2	-	-	5.42
Follow-up Hwy	-	-	3
Pol Cap-1 Maneuver	-	-	1167
Stage 1	-	-	497
Stage 2	-	-	1165
Platoon blocked %	-	-	611
Mov Cap-1 Maneuver	-	-	1167
Mov Cap-2 Maneuver	-	-	458
Stage 1	-	-	1165
Stage 2	-	-	593

**Approach**

Approach	EB	WB	NB
HCM Control Delay, s	0	1	10.2
HCM LOS			B

**Minor Lane/Maneuver**

Minor Lane/Maneuver	NBL01	EBT	EBR	WBL	WBT
Capacity (Veh/ln)	716	-	-	1167	-
HCM Lane V/C Ratio	0.036	-	-	0.057	-
HCM Control Delay (s)	10.2	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %ile Delay	0.1	-	-	0.2	-

**Major Lane/Maneuver**

Major Lane/Maneuver	NBL01	EBT	EBR	WBL	WBT
Capacity (Veh/ln)	716	-	-	1167	-
HCM Lane V/C Ratio	0.036	-	-	0.057	-
HCM Control Delay (s)	10.2	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %ile Delay	0.1	-	-	0.2	-

Area Type:	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	26	5	9	486	3	5
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	-1%	0%	0%	0%	0%	0%
Grade (%)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.977					
Fit	0.999			0.984		
Fit Protected	1761	0	0	1780	1580	0
Satd. Flow (prot)	0.999			0.984		
Fit Permitted	1761	0	0	1780	1580	0
Satd. Flow (perm)	35			35		
Link Speed (mph)	319			694	449	
Travel Time (s)	6.2			13.5	8.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	2%	1%	2%	2%
Adj. Flow (vph)	29	6	10	540	3	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	0	550	9	0
Sign Control	Free			Free	Stop	

Phase/Step Summary  
 Area Type: Other  
 Control Type: Unsignalized

Intersection	EBT	EBR	WBL	WBT	NBL	NBR
Int Delay, s/vph	0.2					
Management	EBT	EBR	WBL	WBT	NBL	NBR
Vol. veh/h	26	5	9	486	3	5
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelwood	None			None		None
Storage Length	-			-		0
Veh. in Median Storage, #	0	-	-	0	0	0
Grade, %	-1	-	-	0	0	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	1	2	2
Manv Flow	29	6	10	540	3	6
Maneuver	Maneuver	Maneuver	Maneuver	Maneuver	Maneuver	Maneuver
Conflicting Flow Alt	0	0	34	0	522	32
Stage 1	-	-	-	-	32	-
Stage 2	-	-	4.3	-	560	-
Critical Hwy	-	-	-	-	6.42	6.22
Critical Hwy Sig 1	-	-	-	-	5.42	-
Critical Hwy Sig 2	-	-	-	-	5.42	-
Follow-up Hwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	1169	-	529	1114
Stage 1	-	-	-	-	1159	-
Stage 2	-	-	-	-	646	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1169	-	523	1114
Mov Cap-2 Maneuver	-	-	-	-	523	-
Stage 1	-	-	-	-	1159	-
Stage 2	-	-	-	-	638	-
Approach	EBT	WBL	NBL			
HCM Control Delay, s	0	0.1	9.7			
HCM LOS	A	A	A			
Minor Lane/Minor Wght	NBL	EBT	EBR	WBL	WBT	NBR
Capacity (veh/h)	782	-	-	1169	-	-
HCM Lane V/C Ratio	0.011	-	-	0.009	-	-
HCM Control Delay (s)	9.7	-	-	8.1	-	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th %ile Q(veh)	0	-	-	0	-	-

Lane Group	WB	WB	NB	NB	SB	SB
Lane Configurations	338	43	308	31	19	340
Volume (vph)	1800	1800	1800	1800	1800	1800
Ideal Flow (Vp/Pl)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.985	0.988				
Fit Protected	0.958				0.997	
Stat. Flow (prot)	1699	0	1778	0	1795	
Fit Permitted	0.958				0.997	
Stat. Flow (perm)	1699	0	1778	0	1795	
Satd. Flow (perm)	1699	0	1778	0	1795	
Link Speed (mph)	35		35		35	
Link Distance (ft)	3237		639		492	
Travel Time (s)	63.1		12.4		9.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	376	48	342	34	21	378
Shared Lane Traffic (%)						
Lane Group Flow (vph)	424	0	376	0	0	399
Sign Control	Stop		Free			Free

Intersection Summary:  
 Area Type: Other  
 Control Type: Unsignalized

Intersection	WB	WB	NB	NB	SB	SB
Int Delay: s/vch	28.4					
Movement	338	43	308	31	19	340
Vol. vch/h	0	0	0	0	0	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage #	0	-	0	-	0	-
Grade %	0	-	0	-	0	-
Peak Hour Factor	50	90	90	90	90	90
Heavy Vehicles %	0	0	0	0	0	0
Minut Flow	376	48	342	34	21	378

Maneuver	Minut	Minut	Minut	Minut
Conflicting Flow All	779	359	0	377
Stage 1	359	-	-	-
Stage 2	420	-	-	-
Critical Hwy	6.4	6.2	-	4.3
Critical Hwy Sig 1	5.4	-	-	-
Critical Hwy Sig 2	5.4	-	-	-
Follow-up Hwy	3	3.1	-	3
Por. Cap-1 Maneuver	408	727	-	891
Stage 1	810	-	-	-
Stage 2	757	-	-	-
Platoon blocked %				
Mov Cap-1 Maneuver	396	727	-	891
Mov Cap-2 Maneuver	396	-	-	-
Stage 1	810	-	-	-
Stage 2	734	-	-	-

Approach	WB	WB	NB	NB	SB	SB
HCM Control Delay, s	79.9			0		0.5
HCM LOS	F					

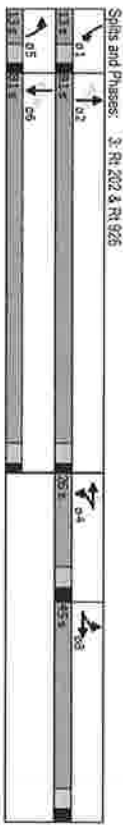
**U.S. Route 202 & Street Road (S.R. 0926) Improvements**  
**Southbound U.S. Route 202 Right-Turn Lane**

Lane Group	EBL	EAT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SAT	SBR
Lane Configurations	682	305	20	192	181	35	27	1736	159	87	1663
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	10	12	10	12	12	12	12	15	12	12	14
Lane Width (ft)	-3%			4%			4%				0%
Grade (%)	450	0	200	215	305	170	375	1	1	1	130
Storage Length (ft)	1	1	0	1	1	1	1	1	1	1	1
Storage Lanes	150	75	75	75	75	75	75	75	75	75	75
Taper Length (ft)	0.95	0.95	1.00	1.00	1.00	0.850	0.95	1.00	1.00	0.95	1.00
Lane Util. Factor	0.994	0.994	0.950	0.950	0.950	0.850	0.950	0.950	0.950	0.850	0.850
Fit Protected	0.950	0.982	0	0.950	0.982	0.950	0.950	0.950	0.950	0.950	0.950
Std. Flow (pmt)	1494	1603	0	1494	1603	1630	3260	1619	1527	3109	1511
Fit Permitted	0.950	0.982	0	0.950	0.982	0.052	0.052	0.051	0.051	0.051	0.051
Std. Flow (pmt)	1494	1603	0	1494	1603	89	3260	1619	82	3109	1511
Right Turn on Red			No			No		Yes			Yes
Std. Flow (RTOR)								112			112
Link Speed (mph)	45	45	45	45	45	45	45	45	45	45	45
Link Distance (ft)	2354	357	14.9	982	167	1105	3147	477	477	477	477
Travel Time (s)	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Peak Hour Factor	3%	7%	10%	6%	18%	7%	7%	6%	12%	10%	8%
Heavy Vehicles (%)	726	324	21	204	193	37	1847	169	1769	1769	243
Adj. Flow (vph)	27%	541	0	204	193	37	29	1847	169	86	1769
Shared Lane Traffic (%)	530	541	0	204	193	37	29	1847	169	86	1769
Lane Group Flow (vph)	1	1	1	1	1	1	1	1	1	1	1
Number of Detectors	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru
Detector Template	40	40	35	35	35	35	6	30	30	35	30
Leading Detector (ft)	0	0	-5	-5	-5	-5	0	-10	-10	-5	-10
Trailing Detector (ft)	0	0	-5	-5	-5	-5	0	-10	-10	-5	-10
Detector Position (ft)	40	40	-5	-5	-5	-5	0	-10	-10	-5	-10
Detector Size (ft)	40	40	40	40	40	40	6	40	40	40	40
Detector Type	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX
Detector Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Split	NA	Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	8	8	4	4	4	5	2	2	2	1	6
Permitted Phases	8	8	4	4	4	5	2	2	2	1	6
Detector Phase	8	8	4	4	4	5	2	2	2	1	6
Switch Phase	3.0	3.0	3.0	3.0	3.0	3.0	29.0	29.0	3.0	29.0	29.0
Minimum Initial (s)	43.0	43.0	10.0	10.0	10.0	9.0	29.0	29.0	3.0	29.0	29.0
Minimum Split (s)	45.0	45.0	26.0	26.0	26.0	13.0	81.0	81.0	13.0	81.0	81.0
Total Split (s)	27.3%	27.3%	15.8%	15.8%	15.8%	7.9%	49.1%	49.1%	7.9%	49.1%	49.1%
Maximum Green (s)	38.0	38.0	19.0	19.0	19.0	7.0	75.0	75.0	7.0	75.0	75.0
Maximum Yellow (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Maximum All-Red (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0

Lanes, Volumes, Timings - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - SB Right-Turn Lane  
 \heng816451 - Credibly Farm\TrafficAnalysis\2017-7-TWP CU Submission\2028 with dev\Mitigation\SR\Weekday AM syn

Lane Group	EBL	EAT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SAT	SBR
Lead Lag	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Flash Don't Walk (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Prestart Call (ft/min)	0	0	0	0	0	0	0	0	0	0	0
v/c Ratio	1.50	1.43	1.10	0.92	0.23	0.25	1.23	0.21	0.77	1.19	0.31
Control Delay	281.3	252.1	157.8	115.3	69.7	23.4	148.3	9.9	71.8	131.3	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	281.3	252.1	157.8	115.3	69.7	23.4	148.3	9.9	71.8	131.3	15.4
Queue Length 50th (ft)	-832	-827	-248	210	37	14	-1290	34	50	-1237	84
Queue Length 95th (ft)	#1082	#1080	#25	#359	78	32	#1422	83	#148	#1373	152
Internal Link Dist (ft)	450	378	200	215	305	170	375	170	375	3067	130
Turn Bay Length (ft)	333	378	188	209	160	120	1501	808	112	1484	780
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.50	1.43	1.10	0.92	0.23	0.24	1.23	0.21	0.77	1.19	0.31

Area Type: Other  
 Cycle Length: 165  
 Actuated Cycle Length: 165  
 Natural Cycle: 115  
 Control Type: Actuated-Uncoordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 ~ Volume shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 ~ Queue shown is maximum after two cycles.



Lanes, Volumes, Timings - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - SB Right-Turn Lane  
 \heng816451 - Credibly Farm\TrafficAnalysis\2017-7-TWP CU Submission\2028 with dev\Mitigation\SR\Weekday AM syn

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NET	NBR	SBL	SBT	SBR
Lane Configurations	682	305	20	192	181	35	27	1736	159	81	1863	228
Volume (veh/h)	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pb1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1774	1729	1827	1732	1732	1536	1716	1801	1607	1636	1733	1733
Adj Flow Rate, veh/h	536	591	21	204	193	34	29	1847	150	88	1769	224
Adj No of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh %	3	7	7	6	6	18	7	7	6	12	10	8
Cap, veh/h	399	403	5	200	210	160	83	1502	705	118	1508	715
Arrive On Green	0.24	0.24	0.23	0.12	0.12	0.12	0.02	0.46	0.05	0.49	0.49	0.49
Sat Flow, veh/h	1689	1660	59	1650	1732	1323	1634	3260	1531	3109	1473	1473
Grp Volume(v), veh/h	536	0	612	204	193	34	29	1847	150	88	1769	224
Grp Sat Flow(s), veh/h	1689	0	1719	1630	1732	1323	1524	1531	1531	1555	1473	1473
Q Serve(s), s	39.0	0.0	38.0	20.0	18.2	3.8	1.5	76.0	9.7	4.7	80.0	15.2
Cycle Q Clear(s), s	39.0	0.0	39.0	20.0	18.2	3.8	1.5	76.0	9.7	4.7	80.0	15.2
Prop In Lane	1.00	0.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(s), veh/h	399	0	408	200	210	160	83	1502	705	118	1508	715
V/C Ratio(X)	1.34	0.00	1.50	1.02	0.92	0.21	0.35	1.23	0.21	0.73	1.17	0.31
Axial Cyclic Adj, veh/h	399	0	406	209	210	160	123	1502	705	118	1508	715
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.0	0.0	63.0	72.5	71.7	65.4	39.8	44.5	28.6	38.5	42.5	25.8
Incr Delay (d2), s/veh	170.1	0.0	237.8	69.0	40.4	0.7	2.5	109.5	0.7	20.4	65.3	1.1
Initial Q Delay(d3), s/veh	51.6	0.0	34.3	0.2	0.0	0.0	0.0	43.5	0.0	0.0	0.0	0.0
%Inp Back(Q95%), veh/h	74.7	0.0	87.9	23.3	16.6	2.6	1.3	144.2	7.6	4.8	94.0	10.6
LnInp Delay(d), s/veh	284.7	0.0	335.0	141.7	112.1	65.0	42.3	197.5	27.3	58.9	127.6	28.9
LnInp LOS	F	F	F	F	F	E	D	F	C	E	F	C
Approach Vol, veh/h	1148	311.5	431	122.5	182.7	2079	182.7	114.1	144.1	144.1	144.1	144.1
Approach Delay, s/veh	311.5	182.7	122.5	182.7	182.7	182.7	182.7	182.7	182.7	182.7	182.7	182.7
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Time	1	2	3	4	5	6	7	8	9	10	11	12
Assigned Pkts	1	2	3	4	5	6	7	8	9	10	11	12
Pkts Duration (G*Y+R), s	13.0	81.0	26.0	9.0	85.0	45.0	7.0	7.0	7.0	7.0	7.0	7.0
Change Period (Y+R), s	6.0	6.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	75.0	19.0	7.0	75.0	36.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Q Clear Time (q_c+1), s	7.2	78.5	22.5	4.0	82.5	41.5	4.0	4.0	4.0	4.0	4.0	4.0
Green Ext Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary	HCM 2010 CBI Delay 179.0 F											
HCM 2010 LOS	F											
Notes	User approved pedestrian interval to be less than phase max green.											

HCM 2010 Signalized Intersection Summary - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - SB Right-Turn Lane  
[Ver]016451 - Crebilly Farm Traffic Analysis 2017-7 TWP CU Submission 2028 with devMitigation/SBR/Weekday AM syn

User approved volume balancing among the lanes for turning movement.

HCM 2010 Signalized Intersection Summary - Synchro 8 2028 with Dev Weekday Morning Peak Hour Alt A - SE Right-Turn Lane  
[Ver]016451 - Crebilly Farm Traffic Analysis 2017-7 TWP CU Submission 2028 with devMitigation/SBR/Weekday AM syn



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	560	244	37	208	333	52	82	1771	142	127	1803	217
Volume (veh/h)	3	0	18	7	4	14	5	2	12	1	6	16
Number	0	0	0	0	0	0	0	14	0	0	69	0
Initial Q (Qd), veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1809	1804	1827	1783	1836	1800	1836	1749	1819	1765	1731	1800
Adj Sat Flow, veh/h	434	453	39	214	343	40	85	1828	111	131	1859	177
Adj Flow Rate, veh/h	1	1	0	1	1	1	1	2	1	1	2	1
Adj No. of Lanes	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Peak Hour Factor	1	1	1	1	1	1	1	1	1	1	1	1
Percent Heavy Veh. %	355	338	28	247	297	223	124	1530	712	135	1544	718
Cap. veh/h	0.21	0.21	0.20	0.15	0.15	0.15	0.05	0.46	0.05	0.47	0.47	0.47
Arrive On Green	1723	1942	138	1898	1836	1530	1749	3322	1545	1581	3288	1530
Sat. Flow, veh/h	434	491	214	343	40	85	1828	111	131	1859	177	177
Grp Volume(Y), veh/h	1723	0	1780	1698	1836	1530	1749	1681	1545	1581	1844	1530
Grp Sat. Flow(S), veh/h	34.0	0.0	34.0	20.3	24.0	3.8	4.2	76.0	6.9	8.5	77.5	11.5
Q Serve(L), s	34.0	0.0	34.0	20.3	24.0	3.8	4.2	76.0	6.9	8.5	77.5	11.5
Cycle Q Clear(g), s	1.00	0.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop In Lane	355	0	367	247	267	223	124	1530	712	135	1544	718
Lane Grp Cap(c), veh/h	1.22	0.00	1.34	0.87	1.28	0.18	0.69	1.19	0.16	0.97	1.20	0.25
V/C Ratio(X)	355	0	367	247	267	223	139	1530	712	135	1544	718
Avail Cap(c-aj), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	65.5	0.0	65.5	68.9	70.5	61.9	38.6	44.5	25.9	49.7	43.8	26.3
Uniform Delay(d), s/veh	122.9	0.0	169.8	26.1	153.4	0.4	11.6	93.7	0.5	67.4	98.3	0.8
Incr Delay(d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.1	0.0	0.0	121.7	0.0
Initial Q Delay(d3), s/veh	50.9	0.0	61.2	16.9	42.4	2.9	4.3	105.6	5.4	13.3	135.7	8.6
%ile Back(Qc(95%)),veh/m	188.4	0.0	235.3	95.0	223.9	62.2	50.2	165.3	26.3	117.1	283.8	27.1
LnGrp Delay(d),s/veh	F	F	F	F	F	E	D	F	C	F	F	C
LnGrp LOS												
Approach Vol, veh/h		925			597			2022			2167	
Approach Delay, s/veh		213.3			166.9			152.8			235.6	
Approach LOS		F			F			F			F	
Time#	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+V+Rg), s	14.0	81.0	30.0	12.5	82.5	6.0	40.0	7.0				
Change Period (Y+Rg), s	6.0	6.0	7.0	6.0	6.0	6.0	7.0	33.0				
Max Green Setting (Gmax), s	8.0	75.0	23.0	8.0	75.0	3.0	38.5					
Max Q Clear Time (g-c+I), s	11.0	78.5	26.5	6.7	80.0	0.0						
Green Ext Time (g-c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Intersection Summary												
HCM 2010 Ctrl Delay		195.5										
HCM 2010 LOS		F										

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

HCM 2010 Signalized Intersection Summary - Synchro 8 2028 with Dev Weekday Afternoon Peak Hour Alt A - SB Right-Turn Lane  
I:eng1816451 - Crebilly Farm\TrafficAnalysis\2017-7\TWP CU Submission\2028 with dev\Migration\SBRW\Weekday PM.syn

User approved volume balancing among the lanes for turning movement.

HCM 2010 Signalized Intersection Summary - Synchro 8 2028 with Dev Weekday Afternoon Peak Hour Alt A - SE Right-Turn Lane  
I:eng1816451 - Crebilly Farm\TrafficAnalysis\2017-7\TWP CU Submission\2028 with dev\Migration\SBRW\Weekday PM.syn



**U.S. Route 202 & Street Road (S.R. 0926) Improvements**  
**Street Road (S.R. 0926) Improvements**



Measurement	E81	E81	E8R	W8E	W8E	W8R	N8E	N8E	N8R	S8E	S8E	S8R
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Volume (veh/h)	682	305	20	192	181	35	27	1736	159	81	1663	228
Number	3	8	18	7	4	14	5	2	12	1	6	18
Initial Q (Q <sub>0</sub> ), veh	8	6	0	0	0	0	0	23	0	0	0	0
Ped-Bike Adj(A <sub>pb</sub> ), s	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1774	1705	1827	1732	1732	1556	1716	1801	1607	1640	1872	1872
Adj Flow Rate, veh/h	726	324	21	204	193	34	29	1947	150	86	1789	224
Adj No. of Lanes	2	1	0	1	1	1	1	1	1	1	1	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	7	7	6	6	18	7	7	6	12	10	10
Cap, veh/h	583	298	3	243	205	156	105	1541	724	144	1386	173
Arrive On Green	0.17	0.18	0.17	0.11	0.12	0.12	0.03	0.47	0.47	0.05	0.50	0.50
Sat Flow, veh/h	3277	1584	103	1650	1732	1323	1634	3280	1531	1531	2791	346
Gap Volume, veh/h	726	0	345	204	193	34	29	1947	150	86	871	1022
Gap Sat Flow(s),veh/h	1639	0	1686	1650	1732	1323	1634	3280	1531	1531	1531	1578
Q Serve(g,s), s	20.0	0.0	21.0	12.9	13.1	2.8	1.1	56.0	6.8	3.3	58.3	59.3
Cycle Q Clear(g,c), s	20.0	0.0	21.0	12.9	13.1	2.8	1.1	56.0	6.8	3.3	58.3	59.3
Pop In Lane	1.00	0.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Gap Cap(c), veh/h	583	0	302	243	205	156	105	1541	724	144	1386	173
V/C Ratio(X)	1.31	0.00	1.14	0.94	0.94	0.22	0.28	1.20	0.21	0.60	1.26	1.29
Avail Cap(c, a), veh/h	583	0	299	246	205	156	105	1541	724	144	1386	173
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(f)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	0.0	48.7	41.1	51.8	47.3	28.3	31.2	18.3	27.2	28.6	28.6
Incr Delay (d <sub>2</sub> ), s/veh	153.0	0.0	96.6	21.9	46.6	0.7	1.4	39.9	0.6	4.6	12.3	141.6
Initial Q Delay (d <sub>3</sub> ), s/veh	38.5	0.0	60.1	0.0	0.0	0.0	0.0	43.5	0.0	0.0	0.0	0.0
% BackOfQ(95%),veh/h	414	0.0	38.2	11.7	13.6	1.9	0.9	53.5	5.4	2.8	92.8	102.1
LnGrp Delay(d), s/veh	240.8	0.0	205.5	63.0	98.7	46.0	29.7	170.6	18.9	31.6	150.9	171.2
LnGrp LOS	F	F	F	E	F	D	C	F	B	C	F	F
Approach Vol, veh/h	1071			431				2026			2079	
Approach Delay, s/veh	229.4			77.8				157.4			156.0	
Approach LOS	F			E				F			F	
Assigned Pkgs	1	2	3	4	5	6	7	8				
Pkgs Duration (G+Y+R <sub>0</sub> ), s	11.5	61.0	26.0	20.0	8.2	64.3	19.0	27.0				
Change Period (Y+R <sub>0</sub> ), s	6.0	6.0	7.0	7.0	6.0	7.0	7.0	7.0				
Max Green Setting (G <sub>max</sub> ), s	41.4	7.0	55.0	19.0	13.0	7.0	55.0	12.0	20.0			
Max Q Clear Time (g <sub>c</sub> +1), s	5.8	58.5	22.5	15.6	3.6	61.8	15.4	23.0				
Green Ext Time (g <sub>c</sub> ), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Intersection Summary												
HOM 2010 Grt Delay								164.5				
HOM 2010 LOS								F				

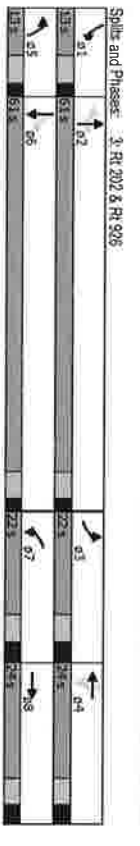
User approved pedestrian interval to be less than phase max green.

Item	EBL	EET	EBR	WEI	WER	NBL	NBT	SEI	SER
Lane Configuration	560	244	37	208	333	52	82	177	142
Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800
Idea Flow (vph/pl)	10	12	10	10	12	12	12	15	12
Lane Width (ft)	-3%		-4%		-4%				
Grade (%)	380	0	200	0	305	170	330	0	0
Storage Length (ft)	2	0	1	1	1	1	1	1	0
Storage Lanes	150	75	100	75	100	0.95	1.00	0.95	0.95
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ft	0.990	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Ft Protected	3112	1766	0	1581	1836	1744	3322	1635	1676
Sad. Flow (vph)	0.950	0.950	0.222	0.222	0.070	0.088	0.088	0.088	0.088
Ft Permitted	3112	1766	0	369	1836	1530	129	3322	1635
Sad. Flow (perm)	No	No	No	No	No	No	No	No	No
Right Turn on Red	45	45	45	45	45	45	45	45	45
Sad. Flow (RTOR)	1529	982	14.9	16.7	16.7	47.7	47.7	47.7	47.7
Link Speed (mph)	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Link Distance (ft)	1%	1%	3%	0%	2%	0%	5%	5%	2%
Travel Time (s)	23.2	25.2	38	21.4	34.3	54	85	1826	146
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	4%	0%	2%	0%	5%	5%	2%	4%
Adj. Flow (vph)	577	252	38	214	343	54	85	1826	146
Shared Lane Traffic (%)	577	290	0	214	343	54	85	1826	146
Lane Group Flow (vph)	1	1	1	1	1	1	1	1	1
Number of Detectors	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Detector Template	40	40	0	35	35	6	30	30	35
Trailing Detector (ft)	0	0	-5	-5	-5	0	-10	-10	-5
Detector 1 Position(ft)	0	0	-5	-5	-5	0	-10	-10	-5
Detector 1 Size(ft)	40	40	40	40	40	6	40	40	40
Detector 1 Type	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX	CHEX
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA	pm-prot	NA	Per	pm-prot	NA	Per	NA
Protected Phases	3	8	7	4	4	2	2	2	6
Permitted Phases	7	4	4	4	5	2	2	2	1
Switch Phase	3	8	7	4	4	5	2	2	1
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	3.0	2.0
Minimum Split (s)	43.0	43.0	10.0	10.0	9.0	29.0	9.0	29.0	29.0
Total Split (s)	22.0	24.0	24.0	24.0	13.0	61.0	13.0	61.0	61.0
Total Split (%)	18.3%	20.0%	18.3%	20.0%	10.8%	50.8%	10.8%	50.8%	50.8%
Maximum Green (s)	15.0	17.0	15.0	17.0	7.0	55.0	7.0	55.0	55.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

Lanes: Volumes, Turnings - Synchro 8 2028 with Dev Weekday Afternoon Peak Hour Alt A - PA 926 Imports  
 i:\eng18\6451 - Credibly Farm\TrafficAnalysis\2017-7-TWP CU Submission\2028 with dev\Mitigation\926 Imports\Weekday\_PM.syn

Item	EBL	EET	EBR	WEI	WER	NBL	NBT	SEI	SER
Lane Group	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead Lag Optimize?	3.0	3.0	3.0	3.0	3.0	3.0	5.5	5.5	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5
Minimum Gap (s)	0.0	0.0	0.0	0.0	0.0	0.0	37.0	0.0	37.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	15.0
Time To Reduce (s)	None	None	None	None	None	None	Max	Max	Max
Recall Mode	13.0	13.0	23.0	23.0	23.0	23.0	8.0	8.0	8.0
Walk Time (s)	13.0	13.0	23.0	23.0	23.0	23.0	8.0	8.0	8.0
Fish Don't Walk (s)	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	1.39	1.07	0.82	1.25	0.24	0.49	1.18	0.17	0.78
v/c Ratio	230.3	123.1	57.5	180.3	48.1	25.1	117.9	2.9	54.0
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	230.3	123.1	57.5	180.3	48.1	25.1	117.9	2.9	54.0
Total Delay	-307	-254	-331	37	28	-891	0	54	-1128
Queue Length 50th (ft)	#420	#430	#240	#518	78	67	#1030	32	#159
Queue Length 95th (ft)	1449	1449	902	902	200	305	1021	170	330
Turn Bay Length (ft)	380	271	200	266	275	229	176	1550	845
Base Capacity (vph)	414	271	200	266	275	229	176	1550	845
Starvation Cap Reduction	0	0	0	0	0	0	0	0	0
Saturation Cap Reduction	0	0	0	0	0	0	0	0	0
Storage Cap Reduction	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.39	1.07	0.80	1.25	0.24	0.48	1.18	0.17	0.78

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Neutral Cycle: 115  
 Control Type: Actuated-Uncoordinated  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Volume shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes: Volumes, Turnings - Synchro 8 2028 with Dev Weekday Afternoon Peak Hour Alt A - PA 926 Imports  
 i:\eng18\6451 - Credibly Farm\TrafficAnalysis\2017-7-TWP CU Submission\2028 with dev\Mitigation\926 Imports\Weekday\_PM.syn

Movement	EBL	EBR	EBR	WBR	WBR	WBR	NBR	NBR	NBR	SBL	SBR	SBR
Lane Configurations	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T
Volume (veh/h)	560	244	37	208	333	52	82	1771	142	127	1803	217
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Cb) veh	0	0	0	0	0	0	0	14	0	0	69	0
Per-Site Adj(A, job/T)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus. Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1809	1802	1827	1783	1836	1600	1636	1749	1819	1765	1731	1872
Adj Flow Rate, veh/h	577	252	38	214	343	40	35	1826	111	131	1859	177
Adj No. of Lanes	2	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh %	1	1	1	3	0	0	0	5	2	4	4	4
Cap. veh/h	446	231	35	290	275	229	180	1550	721	172	1539	75
Arrive On Green	0.73	0.75	0.14	0.73	0.75	0.15	0.75	0.47	0.07	0.48	0.48	0.48
Sat Flow, veh/h	3342	1530	231	1688	1636	1530	1749	3322	1546	1681	3040	286
Grp Volume/veh/h	577	0	280	214	343	40	35	1826	111	131	1859	1044
Grp Sat Flow(s) veh/h	1671	0	1761	1688	1836	1530	1749	1661	1546	1681	1644	1880
Q Serv(s) s	16.0	0.0	18.1	12.4	18.0	2.7	3.0	56.0	5.0	4.8	57.8	57.8
Cycle Q Clear(s) s	16.0	0.0	18.1	12.4	18.0	2.7	3.0	56.0	5.0	4.8	57.8	57.8
Prop In Lane	1.00	0.00	0.13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.17
Lane Grp Cap(s) veh/h	446	0	265	280	275	229	150	1550	721	172	793	824
V/C Ratio(X)	1.29	0.00	1.09	0.74	1.25	0.17	0.57	1.16	0.15	0.76	1.25	1.27
Avail Cap(s) veh/h	446	0	265	280	275	229	150	1550	721	172	793	810
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.0	0.0	51.0	36.7	51.0	44.5	27.7	32.0	18.4	27.8	31.1	31.1
Inc Delay (d2), s/veh	148.5	0.0	82.4	9.5	137.2	0.4	3.4	67.1	0.5	17.9	123.5	131.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.1	0.0	0.0	14.3	109.0
%ile Back(Q)(95%), veh/h	29.8	0.0	26.7	10.7	35.3	2.1	2.8	86.9	3.9	8.8	130.6	137.4
LnGrp Delay(d), s/veh	200.5	0.0	133.4	45.2	188.2	44.9	31.1	146.2	18.8	46.7	288.9	271.8
LnGrp LOS	F	F	F	D	F	F	C	F	B	D	F	F
Approach Vol, veh/h	867	178.1	597	127.7	2022	134.3	2167	256.8	2167	256.8	2167	256.8
Approach Delay, s/veh	178.1	127.7	134.3	134.3	134.3	134.3	134.3	134.3	134.3	134.3	134.3	134.3
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Time	1	2	3	4	5	6	7	8	9	10	11	12
Assigned Phs	1	2	3	4	5	6	7	8	9	10	11	12
Phs Duration (G+Y+R0) s	11.0	61.0	22.0	24.0	11.2	62.8	21.9	24.1	11.0	61.0	22.0	24.0
Change Period (Y+R0) s	6.0	6.0	7.0	7.0	6.0	7.0	7.0	7.0	6.0	6.0	7.0	7.0
Max Green Setting (Smax) s	7.0	55.0	15.0	17.0	7.0	55.0	15.0	17.0	7.0	55.0	15.0	17.0
Max Q Clear Time (G+Y+1) s	7.3	58.5	18.5	20.5	7.3	58.5	18.5	20.5	7.3	58.5	18.5	20.5
Green Ext Time (D, C) s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary	187.3											
HCM 2010 CH Delay	F											
HCM 2010 LOS	F											

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

HCM 2010 Sanitized Intersection Summary - Scenario 8  
 2028 with Dev Weekday Afternoon Peak Hour Alt A - PA 926 Impvis  
 I:\eng\16451 - Crebly Farm\TrafficAnalysis\2017 TWP CU Submission\2028 with dev\Kfigation\926 Impvis\Weekday PM syn