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TRAFFIC IMPACT STUDY

PROPOSED WAREHOUSE

***BRADFORD ROAD
PLAINFIELD, INDIANA***

PREPARED FOR

ARCO

DESIGN/BUILD

DECEMBER 2018

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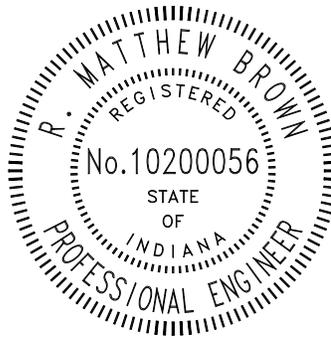
CERTIFICATION

I certify that this **TRAFFIC IMPACT STUDY** has been prepared by me and under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.

A&F ENGINEERING Co., LLC



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INTRODUCTION

This **TRAFFIC IMPACT STUDY**, prepared at the request of the Town of Plainfield on behalf of ARCO Design/Build, is for a proposed warehouse that will be located along Bradford Road between CR 900 E and Ronald Reagan Parkway in Plainfield, Indiana.

PURPOSE

The purpose of this analysis is to determine what impact the traffic generated by the proposed development will have on the existing adjacent roadway system. This analysis will identify any existing roadway deficiencies or ones that may occur when this site is developed.

Conclusions will be reached that will determine if the roadway system can accommodate the anticipated traffic volumes or will determine the modifications that will be required to the system if there are identified deficiencies.

Recommendations will be made that will address the conclusions resulting from this analysis. These recommendations will address feasible roadway system improvements to provide safe ingress and egress, to and from the proposed development, with minimal interference to traffic on the public street system.

SCOPE OF WORK

The scope of work for this analysis is as follows:

First, obtain turning movement traffic volume counts between the hours of 6:30 A.M. to 8:30 A.M. and 4:00 P.M. to 7:00 P.M. during a typical weekday at the intersection of Bradford Road & Tempur-Sealy Main Entrance.

Second, estimate the number of peak hour trips that will be generated by the proposed development.

Third, assign and distribute the generated traffic volumes from the proposed development to the study intersections.

Fourth, conduct a turn lane warrant analysis along Bradford Road at each of the proposed driveways based on the sum of existing traffic volumes and generated traffic volumes from the proposed development.

Fifth, prepare a capacity analysis and level of service analysis at the study intersections based on the sum of existing traffic volumes and generated traffic volumes from the proposed development.

Sixth, prepare recommendations for the roadway geometrics that will be needed to accommodate the total traffic volumes once the proposed development is constructed.

Finally, prepare a **TRAFFIC IMPACT STUDY** documenting all data, analyses, conclusions and recommendations to provide for the safe and efficient movement of traffic through the study area.

DESCRIPTION OF THE PROPOSED DEVELOPMENT

The subject site is located along Bradford Road between CR 900 E and Ronald Reagan Parkway in Plainfield, Indiana. The proposed development will consist of a 338,520 square foot warehouse development. As proposed, the site will be served by two full access drives along Bradford Road. The western drive will be the main entrance that will serve employee traffic. This drive will be aligned with the Tempur-Sealy main access drive. The eastern drive will serve semi-truck traffic only. **Figure 1** is an area map showing the location and general layout of the proposed site.

STUDY AREA

The study area for this analysis has been defined to include the following intersections:

- Bradford Road & Tempur-Sealy Main Entrance/Proposed Warehouse Main Entrance
- Bradford Road & Proposed Warehouse Semi-Truck Entrance

Figures 2 shows the existing intersection geometrics at the intersection of Bradford Road & Tempur-Sealy Main Entrance.

DESCRIPTION OF ABUTTING STREET SYSTEM

The proposed development will be primarily served by Bradford Road which is an east/west, three-lane roadway with a posted speed limit of 40 mph within the study area. According to the Plainfield Thoroughfare Plan, Bradford Road is classified as a Collector.



FIGURE 1
AREA MAP

TRAFFIC IMPACT STUDY
ARCO DESIGN/BUILD
PLAINFIELD, IN



**BRADFORD ROAD &
TEMPUR-SEALY MAIN ENTRANCE**

**FIGURE 2
EXISTING INTERSECTION
GEOMETRICS**

**TRAFFIC IMPACT STUDY
ARCO DESIGN/BUILD
PLAINFIELD, IN**

EXISTING TRAFFIC VOLUMES & PEAK HOURS

Turning movement traffic volume counts were collected by A&F Engineering at the intersection of Bradford Road & Tempur-Sealy Main Entrance between the hours of 6:30 AM to 8:30 AM and 4:00 PM to 7:00 PM during a typical weekday in December 2018 under good weather conditions. According to the turning movement counts, the AM peak hour occurs from 7:00 AM to 8:00 AM while the PM peak hour occurs from 4:30 PM to 5:30 PM. The intersection count output summary sheets are included in the **Appendix** and the peak hour volumes are shown on **Figure 3**.

GENERATED TRIPS FOR PROPOSED DEVELOPMENT

The estimate of newly generated traffic is a function of the development size and of the character of the land use. The *ITE Trip Generation Manual*¹ was used to calculate the number of trips that will be generated by the site. This report is a compilation of trip data for various land uses as collected by transportation professionals throughout the United States in order to establish the average number of trips generated by those land uses. **Table 1** summarizes the total trips that will be generated by the site.

TABLE 1 – TOTAL GENERATED TRIPS FOR PROPOSED DEVELOPMENT

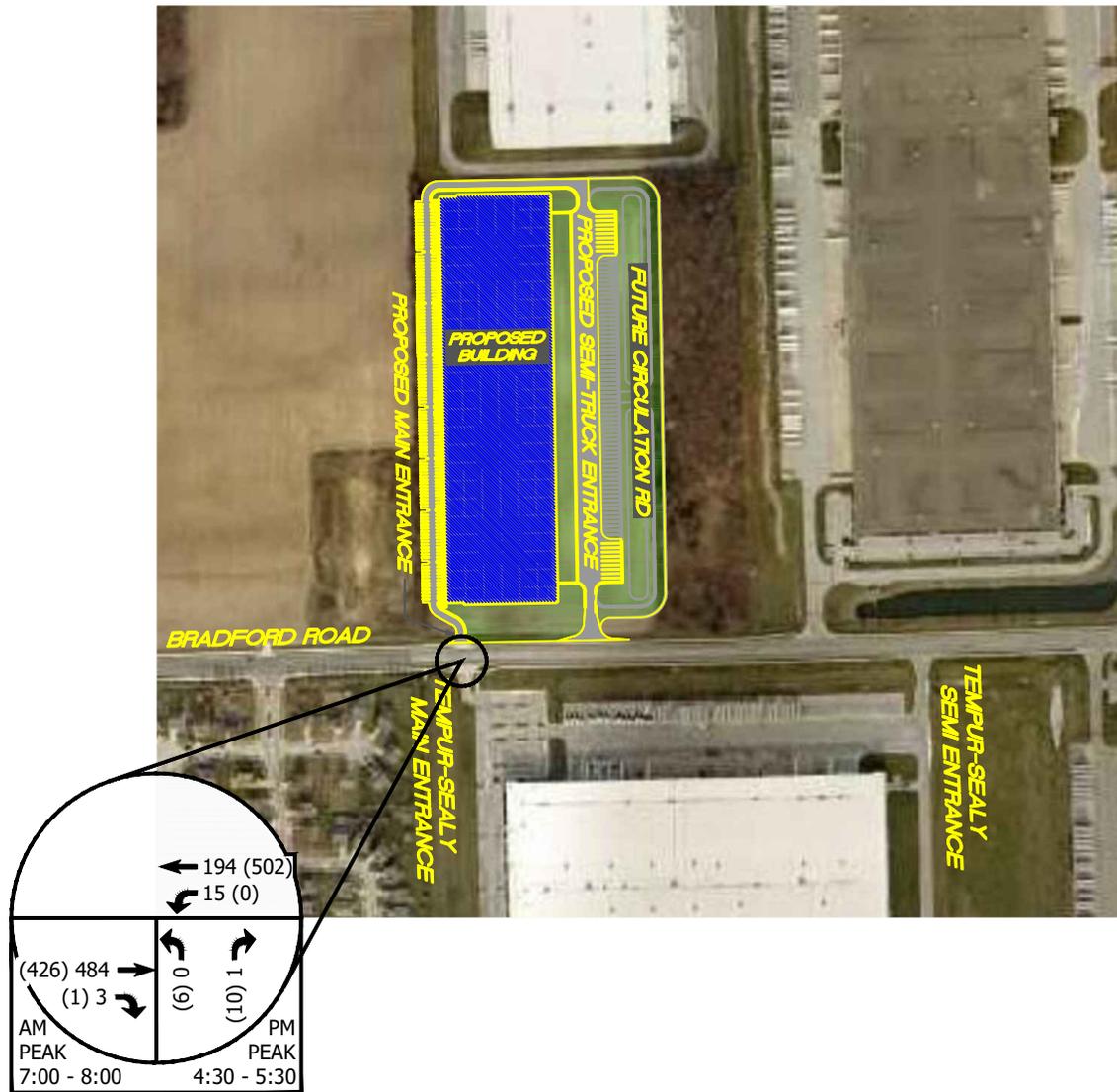
DEVELOPMENT INFORMATION			GENERATED TRIPS			
LAND USE	ITE CODE	SIZE	AM PEAK		PM PEAK	
			ENTER	EXIT	ENTER	EXIT
Warehousing	150	338,520 SF	51	15	18	50

Based on employee/semi-truck breakdown patterns at similar facilities, it was assumed that approximately 30% of the generated peak hour trips will be semi-trucks while the remaining 70% of the traffic will be employee trips (passenger cars). The following table shows the breakdown of semi-truck and passenger car vehicles using these assumptions.

TABLE 2 – TRIP BREAKDOWN FOR PROPOSED DEVELOPMENT

	GENERATED TRIPS			
	AM PEAK		PM PEAK	
	ENTER	EXIT	ENTER	EXIT
Passenger Car (Employee) Trips (70%)	36	11	13	35
Semi-Truck Trips (30%)	15	4	5	15

¹ *Trip Generation Manual*, Institute of Transportation Engineers, Tenth Edition, 2017.



LEGEND
 XX = A.M. PEAK HOUR
 (XX) = P.M. PEAK HOUR
 * = NEGLIGIBLE

FIGURE 3
EXISTING TRAFFIC VOLUMES

TRAFFIC IMPACT STUDY
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PASS-BY & INTERNAL TRIPS

Pass-by trips are trips that are already in the existing traffic stream along the adjacent public roadway system that enter a site, utilize the site, and then return back to the existing traffic stream. Warehouse developments do not typically attract a significant number of pass-by trips. Therefore, pass-by trip reductions are not included in this study.

An internal trip results when a trip is made between two or more land uses without traversing the external public roadway system. The proposed development is a single land use only. Thus, internal trip reductions are not considered in this study.

ASSIGNMENT AND DISTRIBUTION OF GENERATED TRIPS

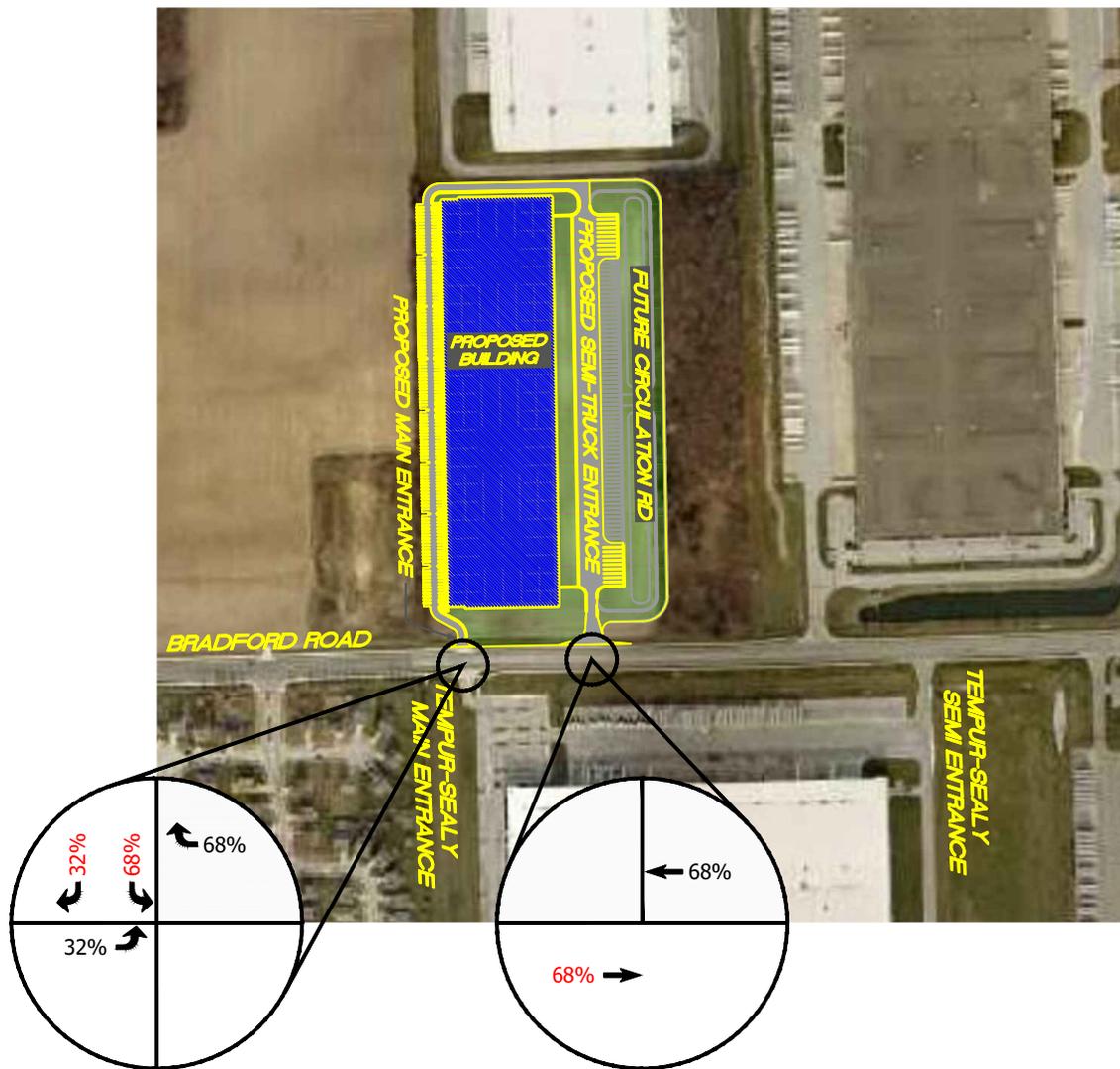
The study methodology used to determine the traffic volumes from the site that will be added to the street system is defined as follows:

1. The volume of traffic that will enter and exit the site must be assigned to the access points and to the public street system. Using the traffic volume data collected for this analysis, traffic to and from the site has been assigned to the proposed driveways and to the public street system that will be serving the site.
2. To determine the volumes of traffic that will be added to the public roadway system, the generated traffic must be distributed by direction to the public roadways at their intersection with the driveways. For the site, the trip distribution was based on the location of the development, the existing traffic patterns, and the assignment of generated traffic.

Figure 4A and **Figure 4B** illustrates the assignment and distribution of generated traffic volumes for the proposed development.

GENERATED TRIPS ADDED TO THE STREET SYSTEM

The total generated traffic volumes that can be expected from the proposed development have been assigned to each of the study intersections. These volumes were determined based on the previously discussed trip generation data, assignment of generated traffic and distribution of generated traffic. The total peak hour generated traffic volumes from the proposed development are shown in **Figure 5**. Figures showing the separated passenger car (employee) traffic volumes and semi-truck traffic are included in the **Appendix**.

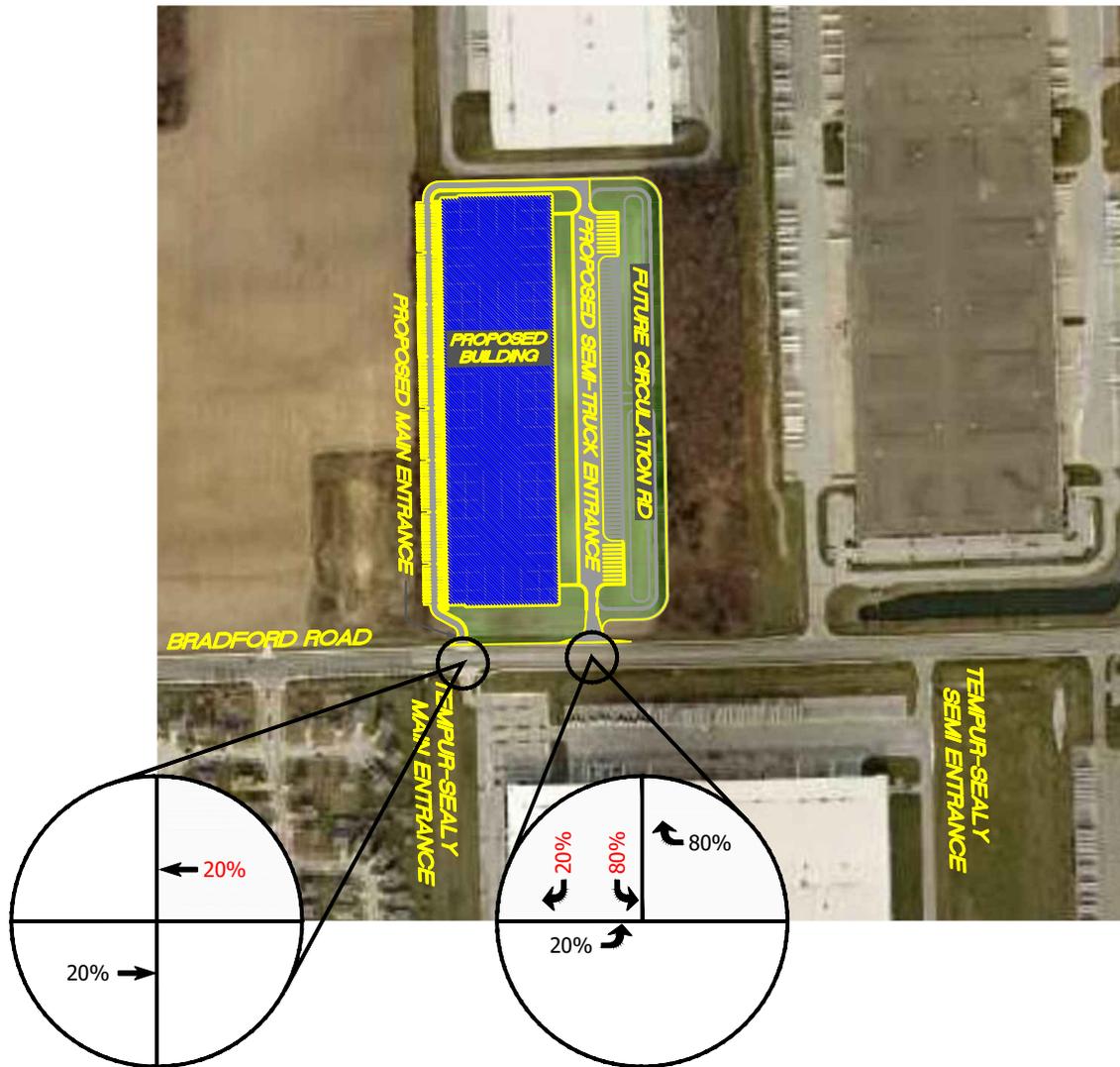


LEGEND
 XX = INBOUND TRAFFIC
 XX = OUTBOUND TRAFFIC
 * = NEGLIGIBLE

FIGURE 4A

ASSIGNMENT & DISTRIBUTION OF GENERATED TRAFFIC VOLUMES FROM PROPOSED DEVELOPMENT (PASSENGER CARS)

**TRAFFIC IMPACT STUDY
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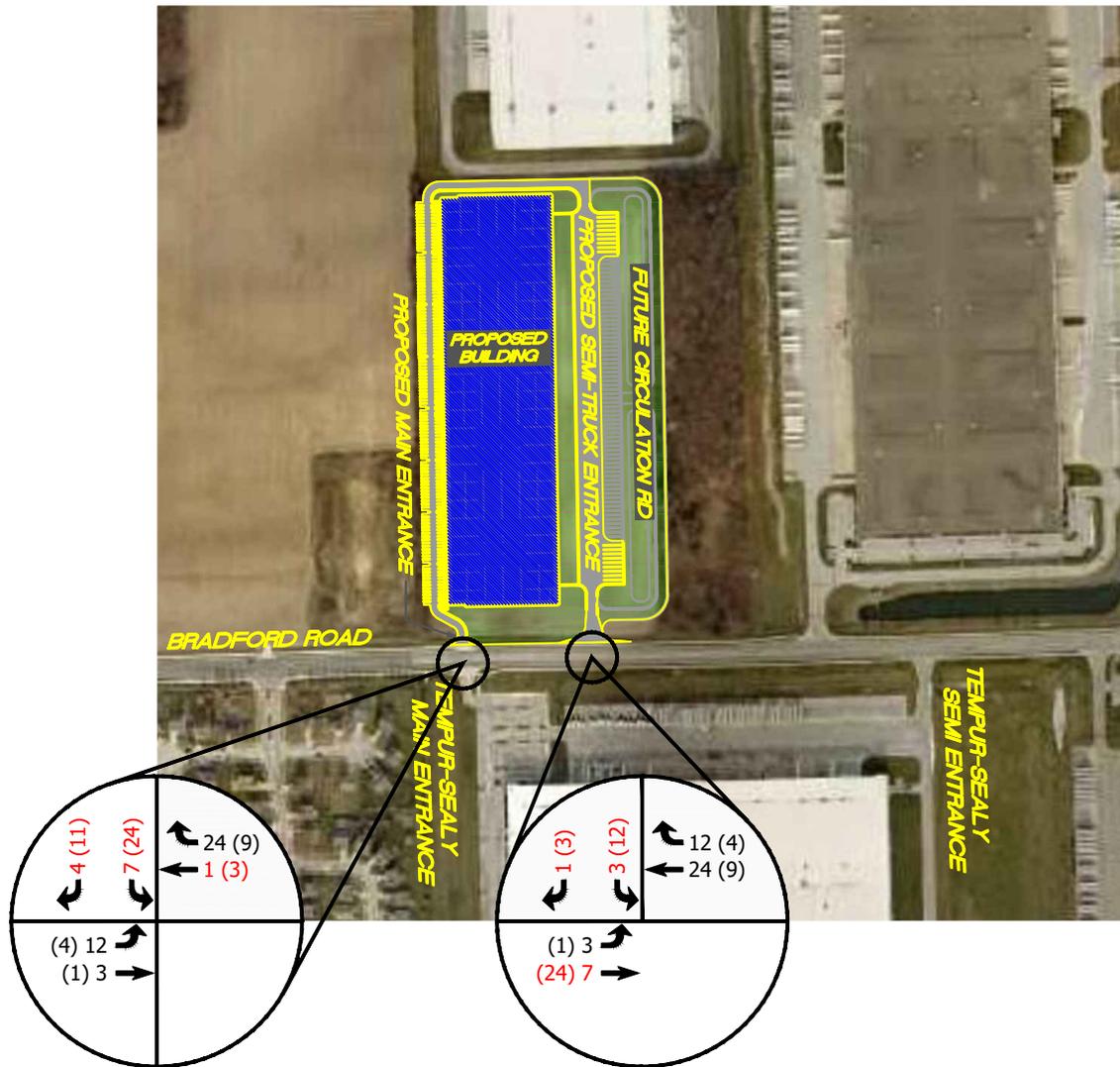


LEGEND
 XX = INBOUND TRAFFIC
 XX = OUTBOUND TRAFFIC
 * = NEGLIGIBLE

FIGURE 4B

ASSIGNMENT & DISTRIBUTION OF GENERATED TRAFFIC VOLUMES FROM PROPOSED DEVELOPMENT (SEMI-TRUCKS)

**TRAFFIC IMPACT STUDY
 ARCO DESIGN/BUILD
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LEGEND
 XX = A.M. INBOUND TRAFFIC
 (XX) = P.M. INBOUND TRAFFIC
 XX = A.M. OUTBOUND TRAFFIC
 (XX) = P.M. OUTBOUND TRAFFIC
 * = NEGLIGIBLE

FIGURE 5
TOTAL GENERATED TRAFFIC VOLUMES FROM PROPOSED DEVELOPMENT

TRAFFIC IMPACT STUDY
ARCO DESIGN/BUILD
PLAINFIELD, IN

TURN LANE ANALYSIS

The sum of existing traffic volumes and generated traffic volumes from the proposed development (shown on **Figure 6**) was analyzed to determine if right-turn lanes would be required along Bradford Road at the proposed access drives according to Section 17 of the INDOT *Driveway Permit Manual*². The turn lane warrants and figures depicting the necessary criteria from the INDOT *Driveway Permit Manual* are included in the **Appendix**. The results of the turn lane analysis are summarized below:

BRADFORD ROAD & TEMPUR-SEALY MAIN ENTRANCE/ PROPOSED MAIN ENTRANCE

- A westbound right-turn lane is not warranted.
- The existing two-way left turn lane along Bradford Road can be utilized as an exclusive eastbound left-turn lane for the proposed warehouse main entrance.

BRADFORD ROAD & PROPOSED SEMI-TRUCK ENTRANCE

- A westbound right-turn lane is not warranted.
- The existing two-way left turn lane along Bradford Road can be utilized as an exclusive eastbound left-turn lane for the proposed warehouse semi-truck entrance.

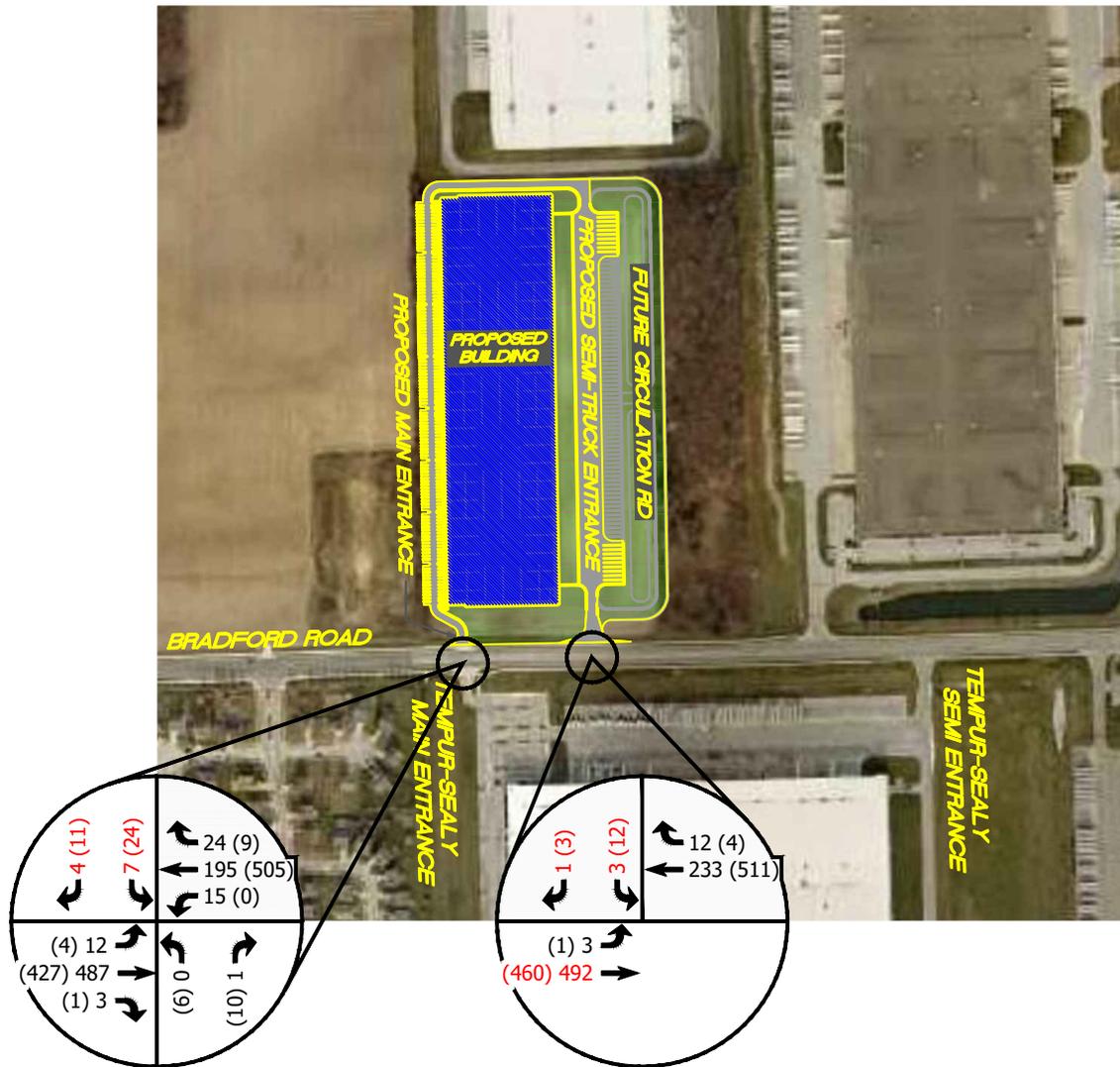
CAPACITY ANALYSIS

The "efficiency" of an intersection is based on its ability to accommodate the traffic volumes that approach the intersection. It is defined by the Level-of-Service (LOS) of the intersection. The LOS is determined by a series of calculations commonly called a "capacity analysis". Input data into a capacity analysis include traffic volumes, intersection geometry, and number and use of lanes. To determine the LOS at each of the study intersections, a capacity analysis has been made using the recognized computer program *Synchro/SimTraffic*³. This program allows intersections to be analyzed and optimized using the capacity calculation methods outlined within the *Highway Capacity Manual (HCM 6th Edition)*⁴.

² INDOT *Driveway Permit Manual*, Indiana Department of Transportation, 2018

³ *Synchro/SimTraffic 10.2*, Trafficware, 2018.

⁴ *Highway Capacity Manual (HCM), 6th Edition* Transportation Research Board, National Research Council, Washington, DC, 2016.



LEGEND
 XX = A.M. PEAK HOUR
 (XX) = P.M. PEAK HOUR
 * = NEGLIGIBLE

FIGURE 6
SUM OF EXISTING TRAFFIC VOLUMES AND GENERATED TRAFFIC VOLUMES FROM PROPOSED DEVELOPMENT

TRAFFIC IMPACT STUDY
ARCO DESIGN/BUILD
PLAINFIELD, IN

The following list shows the delays related to the levels of service for signalized, unsignalized, and roundabout intersections:

<u>Level of Service</u>	<u>Control Delay (seconds/vehicle)</u>	
	<u>UNSIGNALIZED/RAB</u>	<u>SIGNALIZED</u>
A	Less than or equal to 10	Less than or equal to 10
B	Between 10.1 and 15	Between 10.1 and 20
C	Between 15.1 and 25	Between 20.1 and 35
D	Between 25.1 and 35	Between 35.1 and 55
E	Between 35.1 and 50	Between 55.1 and 80
F	greater than 50	greater than 80

CAPACITY ANALYSIS SCENARIOS

To evaluate the proposed development's effect on the public street system, a series of traffic volume scenarios were analyzed to determine the adequacy of the existing roadway network. From this analysis, necessary recommendations can be made to improve the public street system so it will accommodate the future traffic volumes. An analysis has been made for the peak hours at each of the study intersections based on the sum of existing peak hour traffic volumes and generated traffic volumes from the proposed development (shown on **Figure 6**).

The following tables summarize the level of service results at each study intersection. The *Synchro* (*HCM 6th Edition*) intersection reports illustrating the capacity analysis results are included in the **Appendix**.

TABLE 3 – LEVEL OF SERVICE SUMMARY: BRADFORD ROAD & TEMPUR-SEALY MAIN ENTRANCE /PROPOSED WAREHOUSE MAIN ENTRANCE

MOVEMENT	AM PEAK HOUR	PM PEAK HOUR
Northbound Approach	B	C
Southbound Approach	B	C
Eastbound Left-Turn	A	A
Westbound Left-Turn	A	A

*The proposed intersection conditions include construction of a southbound approach with at least one inbound lane and one outbound lane that will stop for Bradford Road.

TABLE 4 – LEVEL OF SERVICE SUMMARY: BRADFORD ROAD & PROPOSED WAREHOUSE SEMI-TRUCK ENTRANCE

MOVEMENT	AM PEAK HOUR	PM PEAK HOUR
Southbound Approach	B	C
Eastbound Left-Turn	A	B

*The proposed intersection conditions include construction of a southbound approach with at least one inbound lane and one outbound lane that will stop for Bradford Road.

RECOMMENDATIONS

The following recommendations are based on existing traffic volume data, trip generation, assignment and distribution of generated traffic, capacity analyses/level of service results, turn lane analysis and a field review conducted at the site. These recommendations are formulated to ensure that the roadway system will accommodate the increased traffic volumes from the proposed development.

BRADFORD ROAD & TEMPUR-SEALY MAIN ENTRANCE/PROPOSED WAREHOUSE MAIN ENTRANCE

The following minimum conditions are recommended at this intersection:

- Construction of a southbound access drive with at least one inbound lane and one outbound lane.
- Stop-sign control, with the driveway stopping for Bradford Road.

BRADFORD ROAD & PROPOSED WAREHOUSE SEMI-TRUCK ENTRANCE

The following minimum conditions are recommended at this intersection:

- Construction of a southbound access drive with at least one inbound lane and one outbound lane.
- Stop-sign control, with the driveway stopping for Bradford Road.

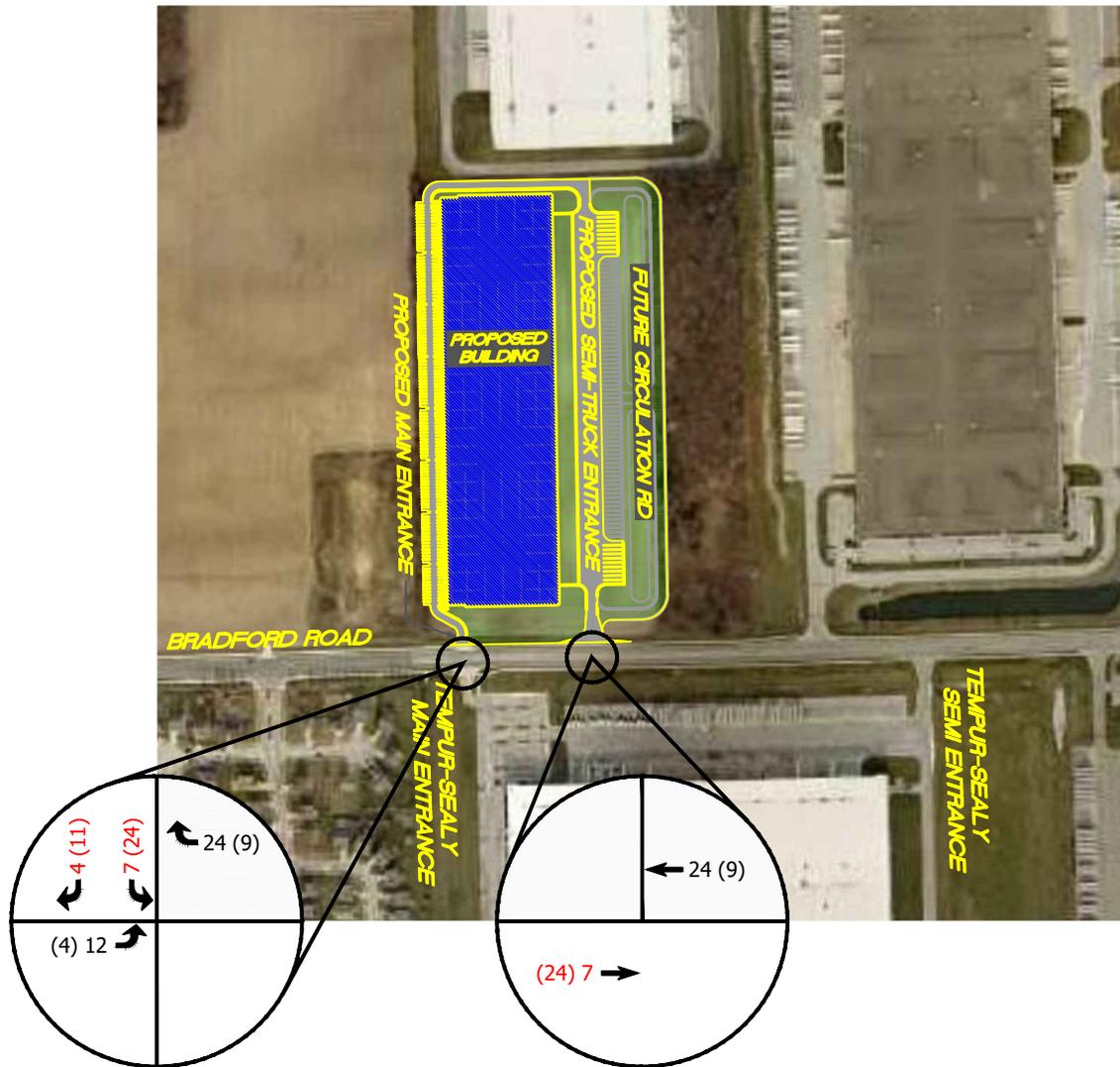
TRAFFIC IMPACT STUDY

APPENDIX



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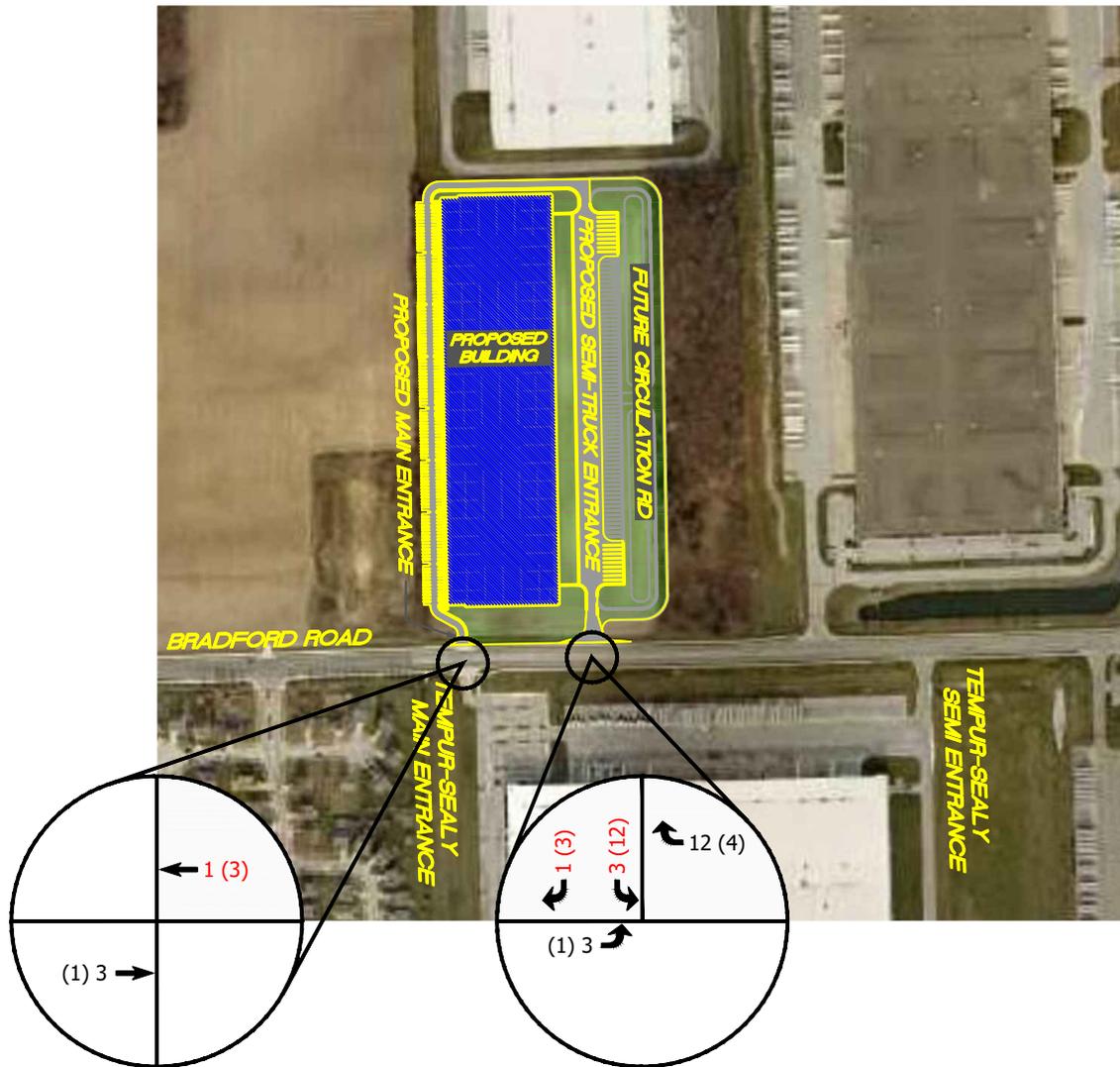
ADDITIONAL FIGURES



LEGEND	
XX	= A.M. INBOUND TRAFFIC
(XX)	= P.M. INBOUND TRAFFIC
XX	= A.M. OUTBOUND TRAFFIC
(XX)	= P.M. OUTBOUND TRAFFIC
*	= NEGLIGIBLE

FIGURE A
GENERATED TRAFFIC VOLUMES
FROM PROPOSED DEVELOPMENT
(PASSENGER CARS)

TRAFFIC IMPACT STUDY
ARCO DESIGN/BUILD
PLAINFIELD, IN



LEGEND	
XX	= A.M. INBOUND TRAFFIC
(XX)	= P.M. INBOUND TRAFFIC
XX	= A.M. OUTBOUND TRAFFIC
(XX)	= P.M. OUTBOUND TRAFFIC
*	= NEGLIGIBLE

FIGURE B
GENERATED TRAFFIC VOLUMES
FROM PROPOSED DEVELOPMENT
(SEMI-TRUCKS)

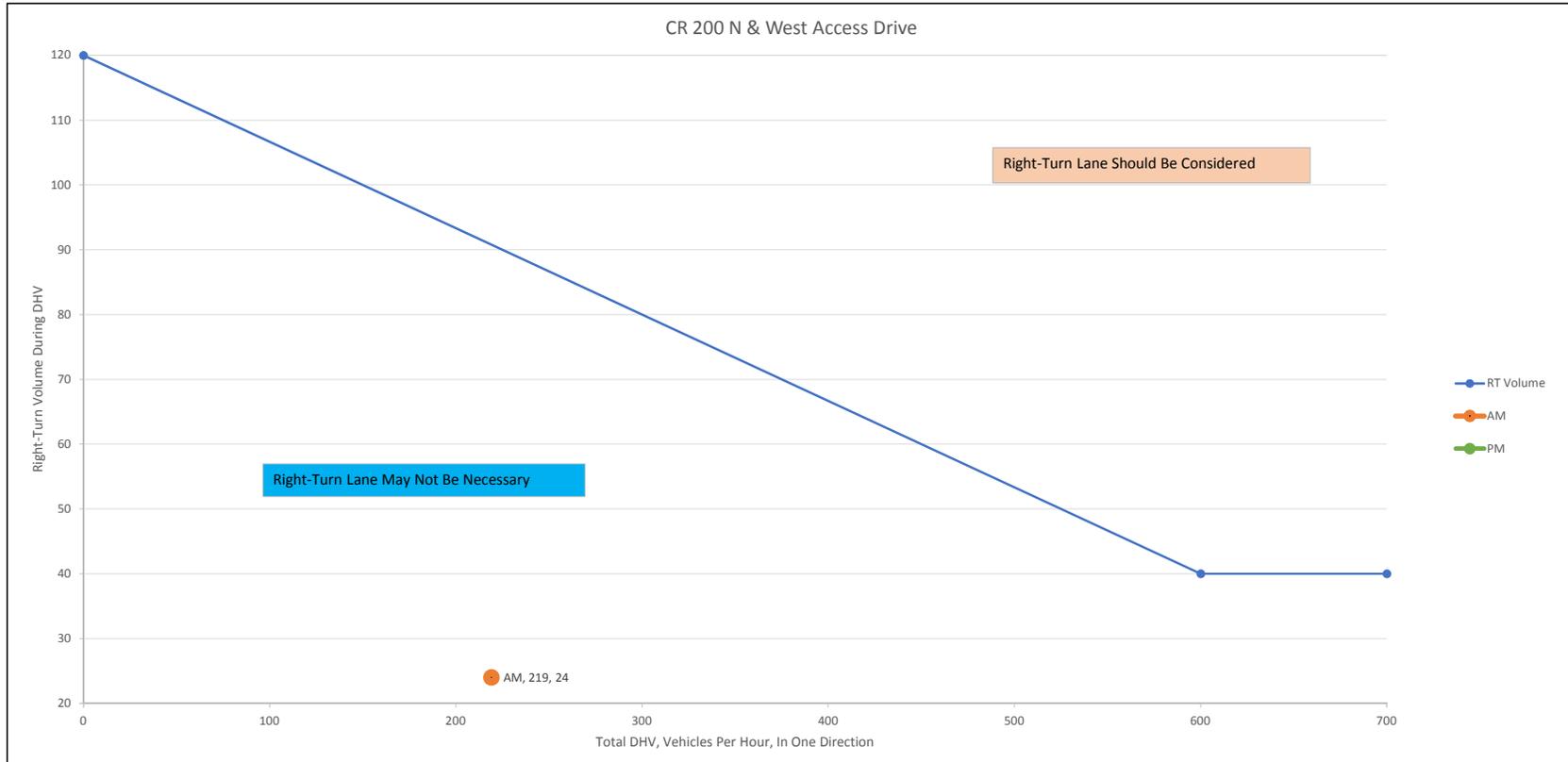
TRAFFIC IMPACT STUDY
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PLAINFIELD, IN

TURN LANE WARRANT FIGURES

Existing + Proposed - Bradford Road & Main Entrance

Total Volume	RT Volume
0	120
600	40
700	40

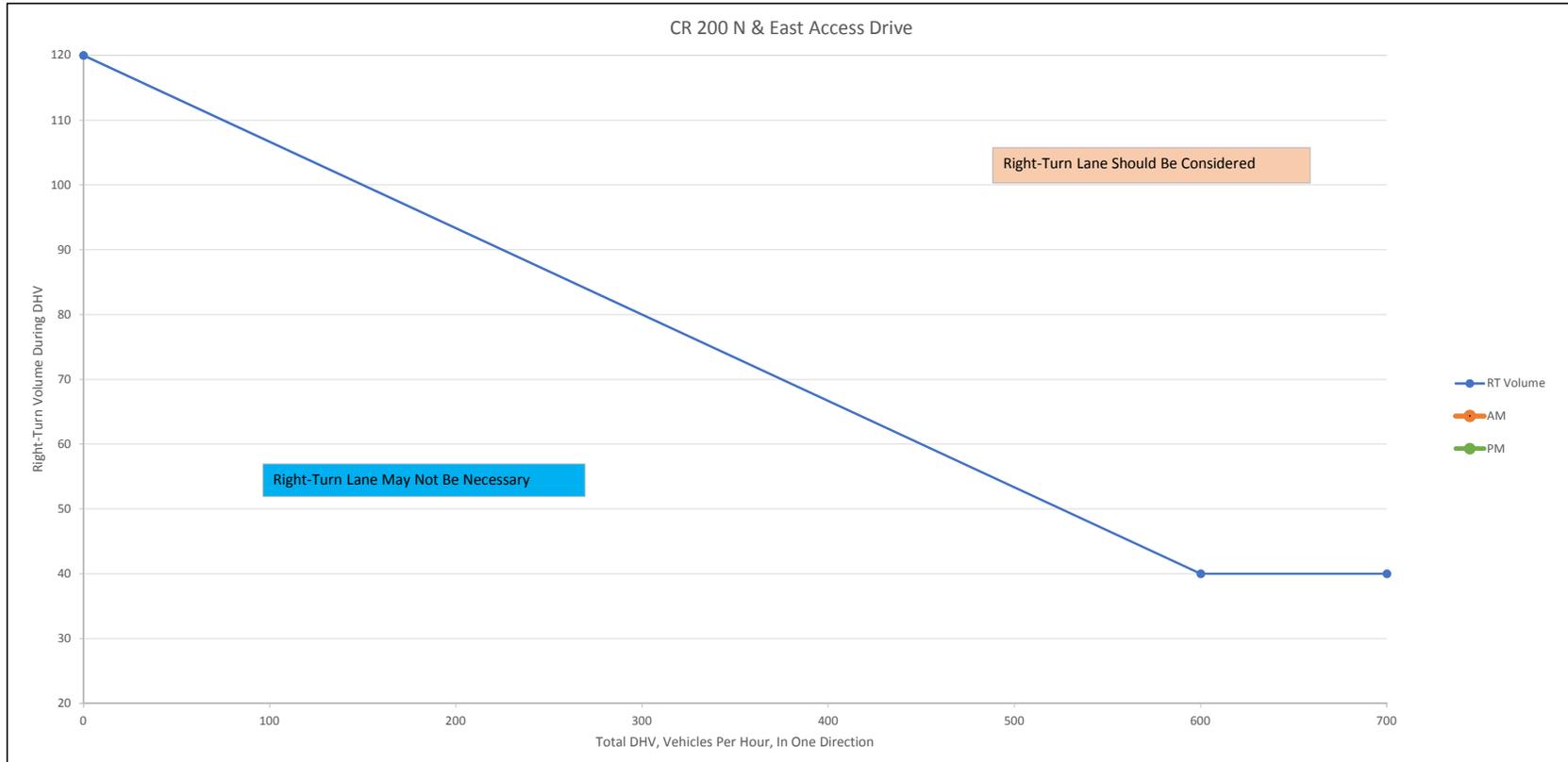
Time	Input		Met?
AM	RT Volume	24	NO
	Total Volume	219	
PM	RT Volume	9	NO
	Total Volume	513	



Existing + Proposed - Bradford Road & Proposed Semi Entrance

Total Volume	RT Volume
0	120
600	40
700	40

Time	Input		Met?
AM	RT Volume	12	NO
	Total Volume	245	
PM	RT Volume	4	NO
	Total Volume	515	



***BRADFORD ROAD & TEMPUR-SEALY MAIN
ENTRANCE/PROPOSED WAREHOUSE MAIN
ENTRANCE***

***TRAFFIC VOLUME COUNTS
CAPACITY ANALYSIS***

TEMPUR-SEALY PARKING LOT ENTRANCE - TMC

Tue Dec 4, 2018

Full Length (4PM-7PM, 6:30AM-8:30AM)

All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 596112, Location: 39.734052, -86.35451



Provided by: A&F Engineering

8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg Direction	South Northbound				West Eastbound				East Westbound				Int
	L	R	U	App	T	R	U	App	L	T	U	App	
2018-12-04 4:00PM	0	0	0	0	65	0	0	65	0	82	0	82	147
4:15PM	0	0	0	0	71	0	0	71	0	97	0	97	168
4:30PM	3	1	0	4	90	1	0	91	0	105	0	105	200
4:45PM	1	1	0	2	113	0	0	113	0	119	0	119	234
Hourly Total	4	2	0	6	339	1	0	340	0	403	0	403	749
5:00PM	2	1	0	3	121	0	0	121	0	132	0	132	256
5:15PM	0	7	0	7	102	0	0	102	0	146	0	146	255
5:30PM	2	7	0	9	60	0	0	60	0	120	0	120	189
5:45PM	1	6	0	7	78	0	0	78	0	120	0	120	205
Hourly Total	5	21	0	26	361	0	0	361	0	518	0	518	905
6:00PM	0	0	0	0	55	0	0	55	1	89	0	90	145
6:15PM	0	4	0	4	41	2	0	43	1	73	0	74	121
6:30PM	8	18	0	26	30	0	0	30	0	66	0	66	122
6:45PM	4	4	0	8	42	0	0	42	0	45	0	45	95
Hourly Total	12	26	0	38	168	2	0	170	2	273	0	275	483
7:00PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0
2018-12-05 6:30AM	0	2	0	2	103	2	0	105	17	15	0	32	139
6:45AM	0	1	1	2	99	3	0	102	21	31	0	52	156
Hourly Total	0	3	1	4	202	5	0	207	38	46	0	84	295
7:00AM	0	0	0	0	118	1	0	119	9	37	0	46	165
7:15AM	0	0	0	0	117	0	0	117	2	60	0	62	179
7:30AM	0	0	0	0	133	1	0	134	0	42	0	42	176
7:45AM	0	1	0	1	116	1	0	117	4	55	0	59	177
Hourly Total	0	1	0	1	484	3	0	487	15	194	0	209	697
8:00AM	0	0	0	0	123	0	0	123	1	33	0	34	157
8:15AM	0	0	0	0	103	1	0	104	1	29	0	30	134
Hourly Total	0	0	0	0	226	1	0	227	2	62	0	64	291
Total	21	53	1	75	1780	12	0	1792	57	1496	0	1553	3420
% Approach	28.0%	70.7%	1.3%	-	99.3%	0.7%	0%	-	3.7%	96.3%	0%	-	-
% Total	0.6%	1.5%	0%	2.2%	52.0%	0.4%	0%	52.4%	1.7%	43.7%	0%	45.4%	-
Lights and Motorcycles	21	53	1	75	1738	11	0	1749	57	1460	0	1517	3341
% Lights and Motorcycles	100%	100%	100%	100%	97.6%	91.7%	0%	97.6%	100%	97.6%	0%	97.7%	97.7%
Heavy	0	0	0	0	42	1	0	43	0	36	0	36	79
% Heavy	0%	0%	0%	0%	2.4%	8.3%	0%	2.4%	0%	2.4%	0%	2.3%	2.3%

* L: Left, R: Right, T: Thru, U: U-Turn

TEMPUR-SEALY PARKING LOT ENTRANCE - TMC

Tue Dec 4, 2018

Full Length (4PM-7PM, 6:30AM-8:30AM)

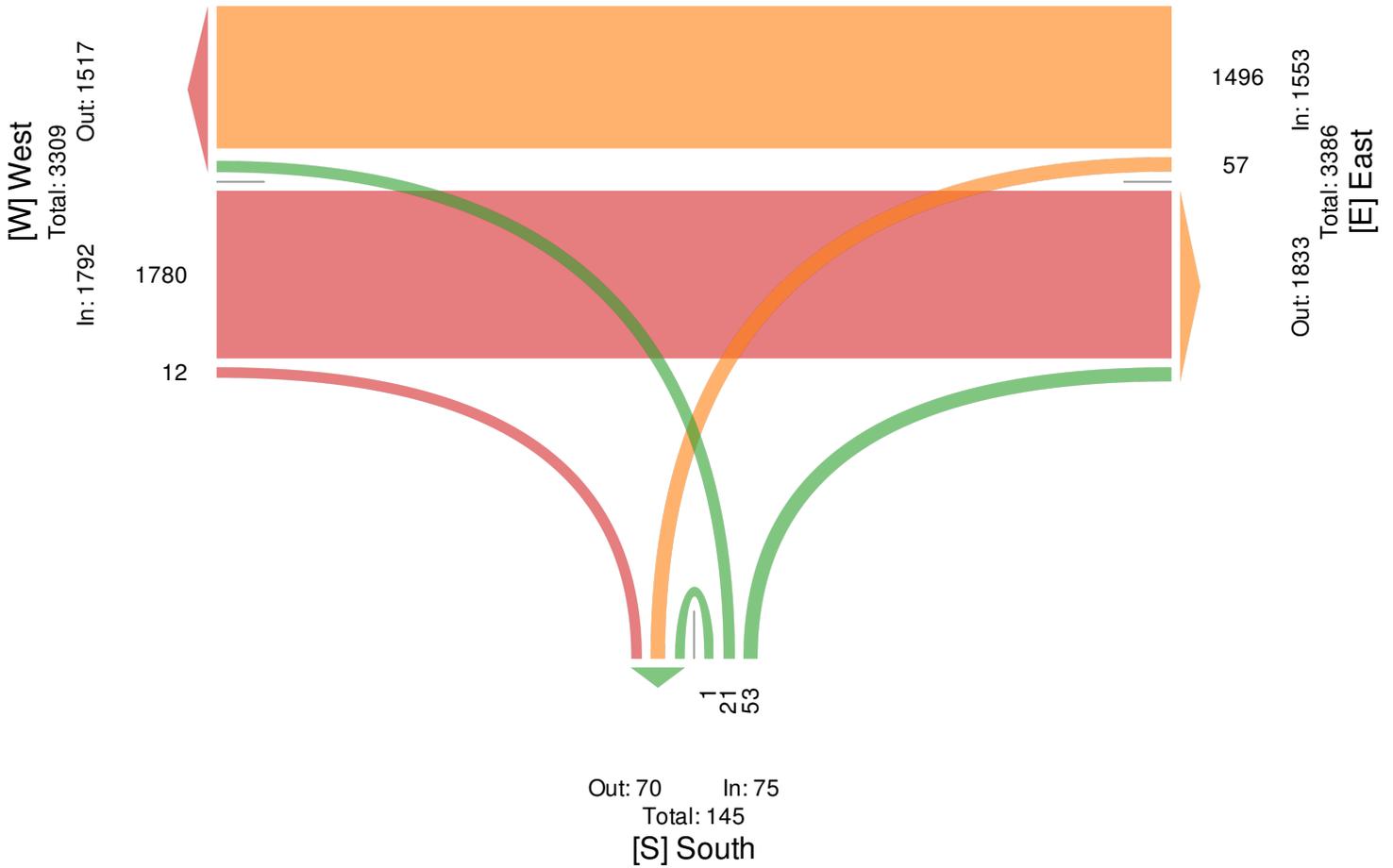
All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 596112, Location: 39.734052, -86.35451



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TEMPUR-SEALY PARKING LOT ENTRANCE - TMC

Tue Dec 4, 2018

PM Peak (Dec 04 2018 4:30PM - 5:30PM) - Overall Peak

Hour

All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 596112, Location: 39.734052, -86.35451



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Indianapolis, IN, 46240, US

Leg Direction	South Northbound				West Eastbound				East Westbound				Int
	L	R	U	App	T	R	U	App	L	T	U	App	
2018-12-04 4:30PM	3	1	0	4	90	1	0	91	0	105	0	105	200
4:45PM	1	1	0	2	113	0	0	113	0	119	0	119	234
5:00PM	2	1	0	3	121	0	0	121	0	132	0	132	256
5:15PM	0	7	0	7	102	0	0	102	0	146	0	146	255
Total	6	10	0	16	426	1	0	427	0	502	0	502	945
% Approach	37.5%	62.5%	0%	-	99.8%	0.2%	0%	-	0%	100%	0%	-	-
% Total	0.6%	1.1%	0%	1.7%	45.1%	0.1%	0%	45.2%	0%	53.1%	0%	53.1%	-
PHF	0.500	0.357	-	0.571	0.880	0.250	-	0.882	-	0.860	-	0.860	0.923
Lights and Motorcycles	6	10	0	16	418	1	0	419	0	497	0	497	932
% Lights and Motorcycles	100%	100%	0%	100%	98.1%	100%	0%	98.1%	0%	99.0%	0%	99.0%	98.6%
Heavy	0	0	0	0	8	0	0	8	0	5	0	5	13
% Heavy	0%	0%	0%	0%	1.9%	0%	0%	1.9%	0%	1.0%	0%	1.0%	1.4%

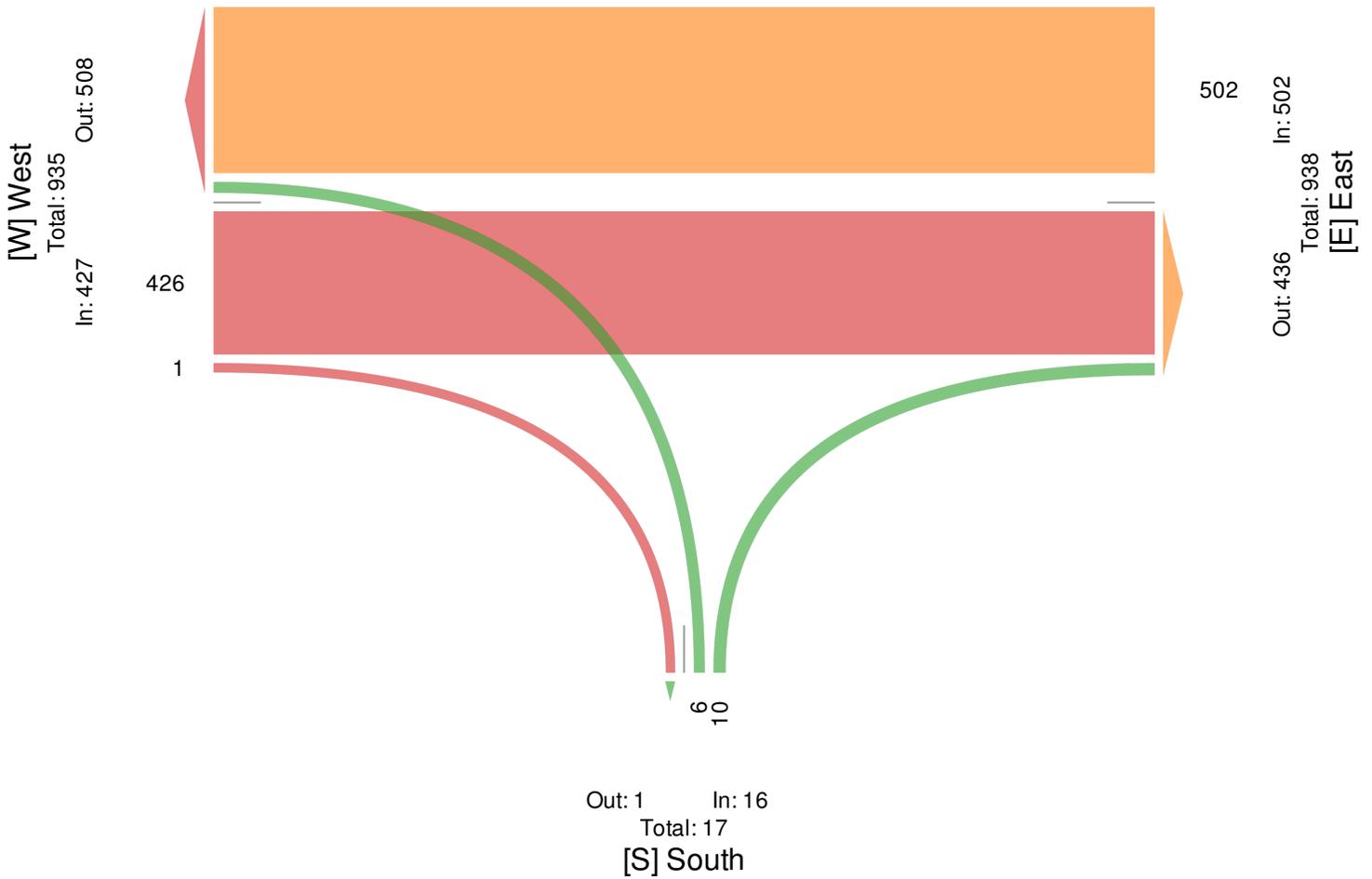
* L: Left, R: Right, T: Thru, U: U-Turn

TEMPUR-SEALY PARKING LOT ENTRANCE - TMC

Tue Dec 4, 2018
PM Peak (Dec 04 2018 4:30PM - 5:30PM) - Overall Peak Hour
All Classes (Lights and Motorcycles, Heavy)
All Movements
ID: 596112, Location: 39.734052, -86.35451



Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US



TEMPUR-SEALY PARKING LOT ENTRANCE - TMC

Wed Dec 5, 2018

AM Peak (Dec 05 2018 7AM - 8AM)

All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 596112, Location: 39.734052, -86.35451



Provided by: A&F Engineering

8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg Direction	South Northbound				West Eastbound				East Westbound				Int
	L	R	U	App	T	R	U	App	L	T	U	App	
2018-12-05 7:00AM	0	0	0	0	118	1	0	119	9	37	0	46	165
7:15AM	0	0	0	0	117	0	0	117	2	60	0	62	179
7:30AM	0	0	0	0	133	1	0	134	0	42	0	42	176
7:45AM	0	1	0	1	116	1	0	117	4	55	0	59	177
Total	0	1	0	1	484	3	0	487	15	194	0	209	697
% Approach	0%	100%	0%	-	99.4%	0.6%	0%	-	7.2%	92.8%	0%	-	-
% Total	0%	0.1%	0%	0.1%	69.4%	0.4%	0%	69.9%	2.2%	27.8%	0%	30.0%	-
PHF	-	0.250	-	0.250	0.910	0.750	-	0.909	0.417	0.808	-	0.843	0.973
Lights and Motorcycles	0	1	0	1	476	3	0	479	15	184	0	199	679
% Lights and Motorcycles	0%	100%	0%	100%	98.3%	100%	0%	98.4%	100%	94.8%	0%	95.2%	97.4%
Heavy	0	0	0	0	8	0	0	8	0	10	0	10	18
% Heavy	0%	0%	0%	0%	1.7%	0%	0%	1.6%	0%	5.2%	0%	4.8%	2.6%

*L: Left, R: Right, T: Thru, U: U-Turn

TEMPUR-SEALY PARKING LOT ENTRANCE - TMC

Wed Dec 5, 2018

AM Peak (Dec 05 2018 7AM - 8AM)

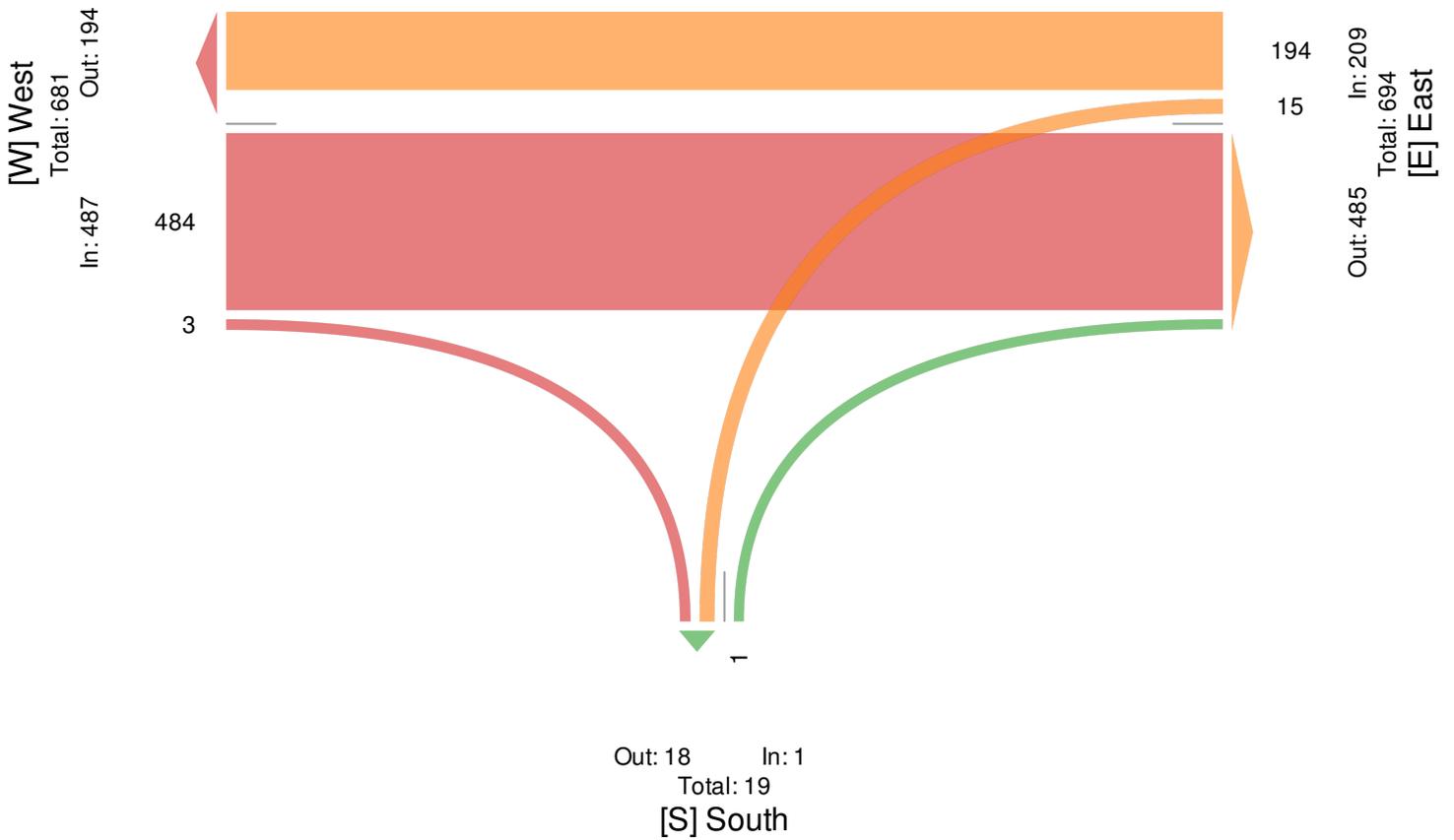
All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 596112, Location: 39.734052, -86.35451



Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US



HCM 6th TWSC
 1: Main Entrance (Tempur-Sealy) & Bradford Rd

Existing AM
 12/19/2018

Int Delay, s/veh	0.2
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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↓	↑	↓	
Traffic Vol, veh/h	484	3	15	194	0	1
Future Vol, veh/h	484	3	15	194	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	0	0	5	0	0
Mvmt Flow	499	3	15	200	0	1

	Major1	Major2	Minor		
Conflicting Flow All	0	0	502	0	731 501
Stage 1	-	-	-	-	501 -
Stage 2	-	-	-	-	230 -
Critical Hdwy	-	-	4.1	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	1073	-	392 574
Stage 1	-	-	-	-	613 -
Stage 2	-	-	-	-	813 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1073	-	387 574
Mov Cap-2 Maneuver	-	-	-	-	483 -
Stage 1	-	-	-	-	604 -
Stage 2	-	-	-	-	813 -

	EB	WB	NB
HCM Control Delay, s	0	0.6	11.3
HCM LOS			B

Minor Lane/Minor Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	574	-	-	1073	-
HCM Lane V/C Ratio	0.002	-	-	0.014	-
HCM Control Delay (s)	11.3	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC
 1: Main Entrance (Tempur-Sealy) & Bradford Rd

Existing PM
 12/19/2018

Intersection

Int Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↑	↑	↑	↑
Traffic Vol, veh/h	426	1	0	502	6	10
Future Vol, veh/h	426	1	0	502	6	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	463	1	0	546	7	11

Major/Minor	Major1	Major2	Minor
Conflicting Flow All	0	0	464
Stage 1	-	-	464
Stage 2	-	-	546
Critical Hdwy	-	4.1	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	-	2.2	3.5
Pot Cap-1 Maneuver	-	1108	268
Stage 1	-	-	637
Stage 2	-	-	584
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1108	268
Mov Cap-2 Maneuver	-	-	400
Stage 1	-	-	637
Stage 2	-	-	584

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.4
HCM LOS			B

Minor Lane/Minor Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	506	-	-	1108	-
HCM Lane V/C Ratio	0.034	-	-	-	-
HCM Control Delay (s)	12.4	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	↕	↕		↕	↕			↕			↕	↕
Traffic Vol, veh/h	12	487	3	15	195	24	0	0	1	7	0	4
Future Vol, veh/h	12	487	3	15	195	24	0	0	1	7	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	2	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	12	502	3	15	201	25	0	0	1	7	0	4

	Major1	Major2	Minor1	Minor2
Conflicting Flow All	226	0	0	505
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1354	-	-	1070
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1354	-	-	1070
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.5	11.3	14.1
HCM LOS			B	B

Minor Lane/Minor Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	572	1354	-	-	1070	-	-	405
HCM Lane V/C Ratio	0.002	0.009	-	-	0.014	-	-	0.028
HCM Control Delay (s)	11.3	7.7	-	-	8.4	-	-	14.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection

Int Delay, s/veh 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	4	427	1	0	505	9	6	0	10	24	0	11
Future Vol, veh/h	4	427	1	0	505	9	6	0	10	24	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	2	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	4	440	1	0	521	9	6	0	10	25	0	11

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	530	0	0	441
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1048	-	-	1130
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1048	-	-	1130
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	15	19.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	375	1048	-	-	1130	-	-	279
HCM Lane V/C Ratio	0.044	0.004	-	-	-	-	-	0.129
HCM Control Delay (s)	15	8.4	-	-	0	-	-	19.8
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.4

BRADFORD ROAD & PROPOSED WAREHOUSE SEMI ENTRANCE

CAPACITY ANALYSIS

HCM 6th TWSC
 3: Bradford Road & Proposed Semi Entrance

Existing + Proposed AM
 12/19/2018

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↑		↖	
Traffic Vol, veh/h	3	492	233	12	3	1
Future Vol, veh/h	3	492	233	12	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	2	2	100	100	100
Mvmt Flow	3	535	253	13	3	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	266	0	801
Stage 1	-	-	260
Stage 2	-	-	541
Critical Hdwy	5.1	-	7.4
Critical Hdwy Stg 1	-	-	6.4
Critical Hdwy Stg 2	-	-	6.4
Follow-up Hdwy	3.1	-	4.4
Pot Cap-1 Maneuver	891	-	247
Stage 1	-	-	602
Stage 2	-	-	427
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	891	-	246
Mov Cap-2 Maneuver	-	-	333
Stage 1	-	-	600
Stage 2	-	-	427

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	891	-	-	-	374
HCM Lane V/C Ratio	0.004	-	-	-	0.012
HCM Control Delay (s)	9.1	-	-	-	14.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC
 3: Bradford Road & Proposed Semi Entrance

Existing + Proposed PM
 12/19/2018

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔		↔	
Traffic Vol, veh/h	1	460	511	4	12	3
Future Vol, veh/h	1	460	511	4	12	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	2	2	100	100	100
Mvmt Flow	1	500	555	4	13	3

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	559	0	0
Stage 1	-	-	557
Stage 2	-	-	502
Critical Hdwy	5.1	-	7.4
Critical Hdwy Stg 1	-	-	6.4
Critical Hdwy Stg 2	-	-	6.4
Follow-up Hdwy	3.1	-	4.4
Pot Cap-1 Maneuver	663	-	165
Stage 1	-	-	419
Stage 2	-	-	448
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	663	-	165
Mov Cap-2 Maneuver	-	-	272
Stage 1	-	-	418
Stage 2	-	-	448

Approach	EB	WB	SB
HCM Control Delay, s	0	0	18.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	663	-	-	-	289
HCM Lane V/C Ratio	0.002	-	-	-	0.056
HCM Control Delay (s)	10.4	-	-	-	18.2
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2