

Traffic Engineering, Transportation Planning & Design

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David R. Shropshire, PE, PP
A Andrew Feranda, PE, PTOE, CME
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April 9, 2021

Mr. David Domen, P.E. (20 copies via Hand Delivery and email: david.domen@marathonconsultants.com)
Marathon Engineering & Environmental Services, Inc.
3 Killdeer Court, Suite 302
Swedesboro, New Jersey 08085

Re: **Traffic Engineering Assessment**
Atco Raceway Redevelopment
Block 5201, Lot 8
Block 5302, Lot 1
Block 5402, Lots 2-4
Jackson Road (CR 534)
Waterford Township, Camden County, New Jersey
SA Project No. 21078-A

Dear David:

In response to your request and in support of the Waterford Township and Camden County site plan applications, Shropshire Associates LLC has prepared a Traffic Engineering Assessment report to evaluate the traffic to be generated by the redevelopment of the existing Atco Raceway facility to create an automobile sales facility along westbound Jackson Road (CR 534) in Waterford Township, Camden County, NJ. The properties currently contain the existing Atco Raceway and dragstrip facility and its associated improvements, with access provided via several driveways along westbound Jackson Road, east of its intersection with Tremont Avenue.

The proposal is for the redevelopment of the site to create an automobile sales facility whose mode of sale is via online auto auctions. The facility will contain a 10,000 square-foot (SF) office building and approximately 35 acres of vehicular storage spaces for an anticipated maximum inventory of up to 6,125 vehicles. The proposed automobile auction facility development is proposed to have access via one (1) full-movement driveway along westbound Jackson Road at the eastern property line. Final approval will be required from Camden County for the future access along westbound Jackson Road.

Existing Conditions

Along the site's frontage, **Jackson Road (CR 534)** is a two-lane undivided roadway that is classified as an Urban Major Collector and under the jurisdiction of Camden County. Jackson Road has a posted speed limit of 50 MPH and an approximate cartway width of 34', containing 12' travel lanes and shoulders in both directions. For the purpose of this analysis, Jackson Road is assumed to extend in a general east-west direction.

Existing Roadway Volumes

In order to determine existing traffic volumes in the vicinity of the site, historical automated traffic recorders (ATRs) data was obtained from the Delaware Valley Regional Planning



Commission (DVRPC). The historical ATR data was collected for eastbound and westbound Jackson Road in January 2017 and January 2020, just east of the existing Atco Raceway facility.

The January 2017 and January 2021 ATR data are summarized below indicating the weekday AM and PM peak hour volumes in the vicinity of the site. In addition, the typical daily volumes are indicated below as well for comparison purposes. Copies of the historical data is attached for your review. Due to change in travel patterns with more people working from home and public schools operating with variety hybrid schedules during the COVID-19 pandemic, the 2021 volumes are reduced when compared to the 2017 roadway data. Therefore, for the purpose of our analyses, the 2017 Jackson Road volumes were utilized.

- Jackson Road – Weekday AM Peak
 - Eastbound
 - January 2017 = 266 vehicles per hour
 - January 2021 = 217 vehicles per hour
 - Westbound
 - January 2017 = 260 vehicles per hour
 - January 2021 = 159 vehicles per hour
 - Total
 - January 2017 = 526 vehicles per hour
 - January 2020 = 376 vehicles per hour
 - **Difference = 28.5% reduction**
- Jackson Road – Weekday PM Peak
 - Eastbound
 - January 2017 = 248 vehicles per hour
 - January 2021 = 208 vehicles per hour
 - Westbound
 - January 2017 = 307 vehicles per hour
 - January 2021 = 296 vehicles per hour
 - Total
 - January 2017 = 555 vehicles per hour
 - January 2020 = 504 vehicles per hour
 - **Difference = 9.2% reduction**
- Jackson Road – Weekday Daily Conditions
 - January 2017 = 5,448 vehicles per day
 - January 2021 = 4,760 vehicles per day
 - **Difference = 12.6% reduction**



Trip Generation Analysis

As indicated above, the proposal is for the redevelopment of the existing Atco Raceway facility to construct an automobile auction and sales facility. As this is a unique and specific land use category, a site-specific trip generation analysis has been done based upon operational data provided by the Applicant.

Based upon the information provided, the proposed automobile auction facility will have the following vehicular and site traffic characteristics.

- The proposed facility will have approximately 15-20 employees. For the purpose of our trip generation analysis, it is assumed that the maximum of 20 employees will all arrive during the AM peak hour and then depart during the PM peak hour.
- Based upon the delivery vehicle information provided for pick-up and drop-off activity, the proposed facility will have approximately seven (7) pick-ups/drop-offs per hour during typical weekday conditions. This was determined based upon the following operational information provided by the Applicant.
 - The 6,125 vehicles will turnover approximately five (5) times per year = 30,625 vehicles at the facility per year. Assume all vehicles enter and exit, this would be a total of 61,250 vehicles in/out during a year.
 - Average number of vehicles with each pick-up/drop-off per trip is approximately 2-3 vehicles.
 - To turnover 61,250 vehicles, you will need a total of 20,417 deliveries per year. Assume 50 work weeks per year, that equals out to approximately 408 deliveries per week, or 82 per day.
 - With an average workday of nine (9) hours, that would equal out to approximately nine (9) per hour.

To be conservative a factor of 1.7 was applied to the average number of deliveries per hour (9). Therefore, it is assumed that during peak hour operations there will be 15 pick-ups/drop-offs. This equates to 30 total trips (15 inbound & 15 outbound) during both the AM and PM peak hours.

Table 1 Trip Generation Analysis – Auto Auction Facility						
Trip Type	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Employee Vehicles	20	0	20	0	20	20
Pick-ups/Drop-offs	15	15	30	15	15	30
Total	35	15	50	15	35	50



As indicated in Table 1, based upon our “worst-case” scenario analysis, the proposed automobile auction facility will generate a total of 50 trips during both the AM and PM peak hours. This is less than one (1) total trip per minute during peak hour conditions.

It should be noted that with regards to site development, the New Jersey Department of Transportation (NJDOT) Access Code defines a significant increase in traffic to be a case in which the redevelopment of a site will add 100 or more additional peak hour trips when compared to the existing or formerly approved development. Therefore, with regards to the automobile auction facility, this redevelopment will not create a “significant increase in traffic” as defined by the NJDOT in the Access Code.

Site Traffic Distribution & Assignment

Based upon the most recent ATR data for Jackson Road in the vicinity of the site and the location of this site relative to the major roadways in southern New Jersey such as the New Jersey Turnpike, I-295, Route 73, and Route 206, it is anticipated that the future site traffic will be distributed to the existing roadway network as follows.

- To/From the West – 60%
- To/From the East – 40%

Therefore, the site traffic shown in Table 1 was assigned to the adjacent roadway network based upon the above-referenced distributions and is shown in attached Figure 1.

Future Conditions

The traffic resulting from the auto sales and online auction facility redevelopment will not affect the adjacent roadway network until the development is fully built-out, which is anticipated to be by the year 2022. It can be expected that the traffic volumes along the adjacent roadways will increase as a result of general area traffic growth. Based on the *Annual Background Growth Table* prepared by NJDOT, a 2.25% annual traffic growth will occur along the adjacent roadway network in the vicinity of the site. Therefore, in order to estimate the future roadway volumes along the site’s frontage, the NJDOT annual background growth rate of 2.25% was applied to the 2017 DVRPC weekday AM and weekday PM peak hour traffic.

The site traffic (Figure 1) was then added to the future roadway volumes in the vicinity of the to project the Build volumes, which are illustrated in Figure 2.

Operation Analysis

In order to measure the quality of the traffic flow for the adjacent roadways and intersections, capacity analyses for the study intersections have been completed based upon the methods outlined in the *2010 Highway Capacity Manual*. Capacity analysis is a procedure used to estimate the ability of the roadway network to carry traffic. Capacity analyses are performed based on a Level of Service methodology. Level of Service (LOS) is a qualitative measure that characterizes the operational conditions of a roadway or intersection based on the perceptions by motorists and passengers. LOS are defined for each type of facility (i.e. freeways, highways, signalized intersections, unsignalized intersections). These Levels of Service range from LOS A to LOS F, with a LOS A representing the best operating conditions and a LOS F representing the worst operating conditions.



The determination for the LOS for an unsignalized intersection is based upon the average control delay associated with each minor movement (i.e. yielding left-turn movements from the major roads and stop-controlled movements from the minor approaches). The Level of Service criteria for unsignalized intersections is summarized below in Table 2.

Table 2 Level of Service Criteria	
Level of Service	Unsignalized Delay (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

The future operating conditions at the site driveway location along westbound Jackson Road were evaluated using the above-described methodology and the latest Synchro computer simulation modeling software. The levels of service are illustrated on Figure 3 with the detailed printouts and capacity analyses worksheets attached for your review. A detailed description of the driveway's operating conditions is provided below.

Jackson Road (CR 534) and Site Driveway Intersection

As indicated above, access to the future auto auction facility and redevelopment is proposed via one (1) new full-movement driveway along westbound Jackson Road. The proposed driveway will be stop-controlled at its intersection with Jackson Road and consist of single inbound and outbound lanes providing for all permitted movements.

Based upon this configuration, all individual stop-controlled and conflicting left-turn movements at the future driveway location along westbound Jackson Road will operate at a LOS B or better during both the AM and PM peak hours. Final approval for this driveway is required from Camden County with regards to location, design and operations.

Conclusion

Based on the results presented in this Traffic Engineering Assessment report, the traffic resulting from the proposed auto auction facility redevelopment is summarized as follows.

- Based upon the site-specific information provided by the Applicant, under our “worst-case” scenario analysis the proposed automobile auction facility will generate a total of 50 trips during the AM and PM peak hours. This is less than one (1) total trip per minute during peak hour conditions.
- The New Jersey Department of Transportation (NJDOT) Access Code defines a significant increase in traffic to be a case in which the redevelopment of a site will add 100 or more additional peak hour trips when compared to the existing or formerly approved development. Therefore, with regards to the automobile auction facility, this redevelopment will not create a “significant increase in traffic” as defined by the NJDOT in the Access Code.



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Based upon this configuration, all individual stop-controlled and conflicting left-turn movements at the future driveway location along westbound Jackson Road will operate at a LOS B or better during both the AM and PM peak hours. Final approval for this driveway is required from Camden County with regards to location, design and operations.

Should you have any questions or require additional information, please feel free to contact us.

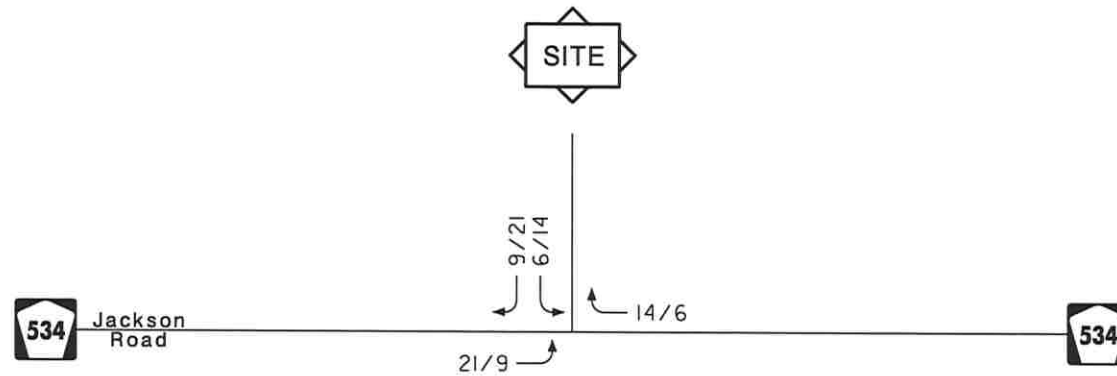
Sincerely,
Shropshire Associates LLC

A handwritten signature in black ink, appearing to read 'Nathan B. Mosley', written over a light gray background.

Nathan B. Mosley, P.E., C.M.E.
Professional Engineer
N.J. License No. #48698
NBM/jab
Attachments

cc: Dave Fleming
Rick Ricciardi

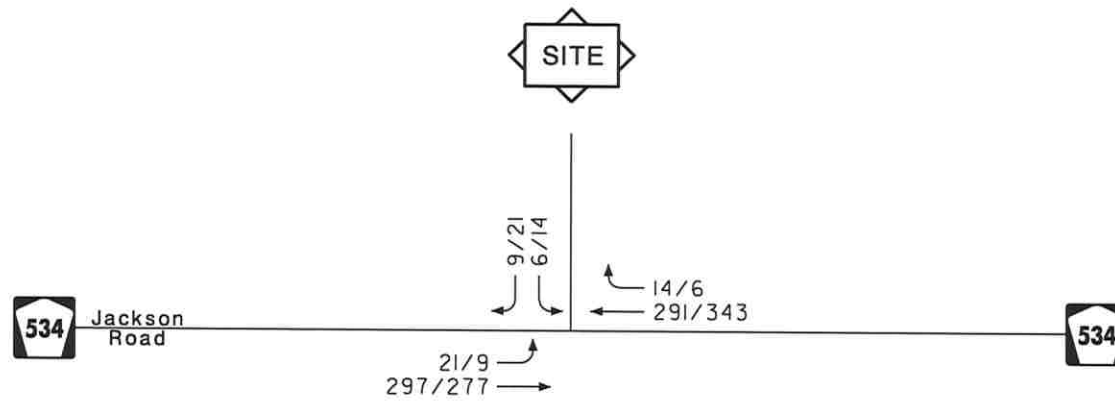
(via email: dave.fleming@marathonconsultants.com)
(via email: rricciardi@marathonconsultants.com)



Atco Dragstrip - Waterford

Waterford Township, Camden County, NJ
April 2021

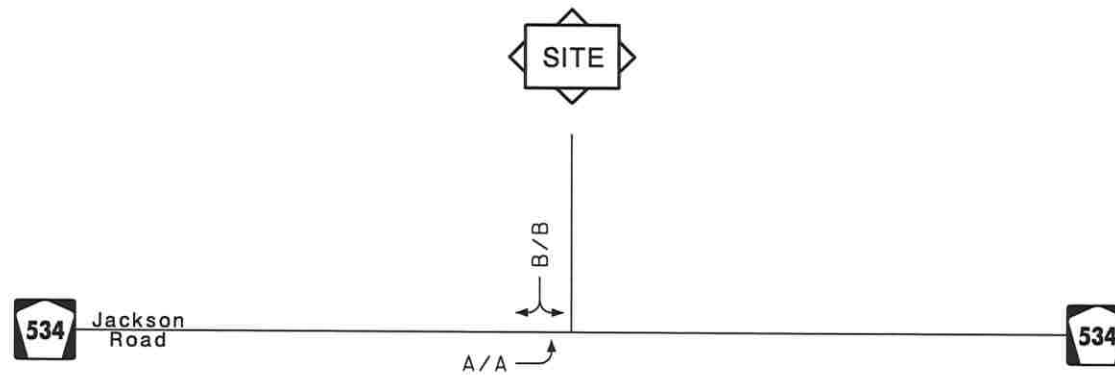
AM/PM PEAK HOUR



Atco Dragstrip – Waterford

Waterford Township, Camden County, NJ
April 2021

AM/PM PEAK HOUR



Atco Dragstrip – Waterford

Waterford Township, Camden County, NJ
April 2021

AM/PM PEAK HOUR

DVRPC - Travel Monitoring

TAKEN BY: NJ DOT **DATE:** 1/5/2017 **PROJECT:** **STATION ID:** 7-4-469
ROAD: CR 534 JACKSON RD **SRI/MP:** 00000534__/17.96
FROM: CR 714 TREMONT AVE **TO:** ATSION RD
STATE: NJ **COUNTY:** CAMDEN **MCD:** 3400777630 - WATERFORD TWP
COUNT DIR: EAST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 50 **FC:** 7
DVRPC FILE #: 146426 **COUNTER #:** **WEATHER:** **DATA SOURCE:** EXTERNAL
COMMENTS:

Hour Beginning	Wednesday 1/4/2017	Thursday 1/5/2017	Friday 1/6/2017
12 AM		14	13
1 AM		3	7
2 AM		4	5
3 AM		10	16
4 AM		21	11
5 AM		84	56
6 AM		240	200
7 AM		266	196
8 AM		183	168
9 AM		100	120
10 AM		95	103
11 AM		101	108
12 PM	115	107	
1 PM	118	142	
2 PM	151	175	
3 PM	190	214	
4 PM	241	206	
5 PM	220	248	
6 PM	173	156	
7 PM	96	104	
8 PM	62	74	
9 PM	52	55	
10 PM	42	31	
11 PM	21	15	
Total		2,648	

AXLE CORR. FACTOR: 0.976 **AADT:** 2,876 **AM Peak %:** 10.0 **Hour Beginning:** 7:00 AM
SEASONAL FACTOR: 1.113 **PM Peak %:** 9.4 **Hour Beginning:** 5:00 PM

DVRPC - Travel Monitoring

TAKEN BY: NJ DOT **DATE:** 1/5/2017 **PROJECT:** **STATION ID:** 7-4-469
ROAD: CR 534 JACKSON RD **SRI/MP:** 00000534__/17.96
FROM: CR 714 TREMONT AVE **TO:** ATSION RD
STATE: NJ **COUNTY:** CAMDEN **MCD:** 3400777630 - WATERFORD TWP
COUNT DIR: WEST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 50 **FC:** 7
DVRPC FILE #: 146427 **COUNTER #:** **WEATHER:** **DATA SOURCE:** EXTERNAL
COMMENTS:

Hour Beginning	Wednesday 1/4/2017	Thursday 1/5/2017	Friday 1/6/2017
12 AM		13	20
1 AM		5	8
2 AM		9	8
3 AM		3	8
4 AM		11	18
5 AM		33	35
6 AM		142	135
7 AM		260	203
8 AM		193	178
9 AM		135	128
10 AM		116	117
11 AM		119	92
12 PM	114	117	
1 PM	134	121	
2 PM	168	156	
3 PM	259	247	
4 PM	293	307	
5 PM	290	302	
6 PM	207	191	
7 PM	98	104	
8 PM	81	95	
9 PM	51	57	
10 PM	34	41	
11 PM	29	23	
Total		2,800	

AXLE CORR. FACTOR: 0.976 **AADT:** 3,041 **AM Peak %:** 9.3 **Hour Beginning:** 7:00 AM
SEASONAL FACTOR: 1.113 **PM Peak %:** 11.0 **Hour Beginning:** 4:00 PM

DVRPC - Travel Monitoring

TAKEN BY: BB **DATE:** 1/21/2021 **PROJECT:** 21-61-070 **STATION ID:**
ROAD: CR 534 JACKSON RD **SRI/MP:** 00000534__/17.62
FROM: FERNWOOD AVE **TO:** BURLINGTON COUNTY LINE
STATE: NJ **COUNTY:** CAMDEN **MCD:** 3400777630 - WATERFORD TWP
COUNT DIR: EAST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 50 **FC:** 7
DVRPC FILE #: 156726 **COUNTER #:** 1901 **WEATHER:** FAIR **DATA SOURCE:** EXTERNAL
COMMENTS:

Hour Beginning	Thursday 1/21/2021
12 AM	4
1 AM	7
2 AM	1
3 AM	4
4 AM	21
5 AM	104
6 AM	179
7 AM	217
8 AM	139
9 AM	102
10 AM	111
11 AM	110
12 PM	143
1 PM	120
2 PM	153
3 PM	208
4 PM	191
5 PM	181
6 PM	93
7 PM	90
8 PM	57
9 PM	42
10 PM	27
11PM	17
Total	2,321

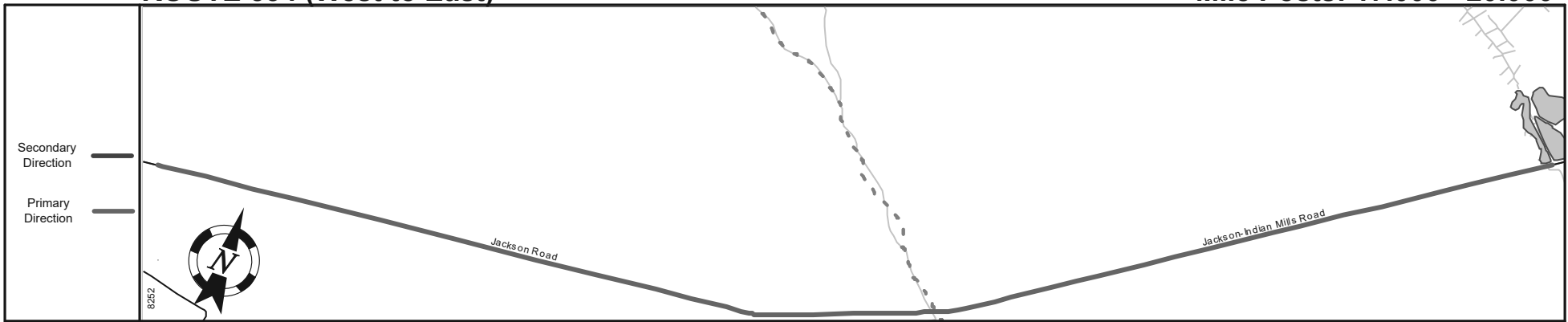
AXLE CORR. FACTOR: 1.000 **AADT:** 2,676 **AM Peak %:** 9.3 **Hour Beginning:** 7:00 AM
SEASONAL FACTOR: 1.153 **PM Peak %:** 9.0 **Hour Beginning:** 3:00 PM

DVRPC - Travel Monitoring

TAKEN BY: BB **DATE:** 1/21/2021 **PROJECT:** 21-61-070 **STATION ID:**
ROAD: CR 534 JACKSON RD **SRI/MP:** 00000534__/17.62
FROM: FERNWOOD AVE **TO:** BURLINGTON COUNTY LINE
STATE: NJ **COUNTY:** CAMDEN **MCD:** 3400777630 - WATERFORD TWP
COUNT DIR: WEST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 50 **FC:** 7
DVRPC FILE #: 156727 **COUNTER #:** 1901 **WEATHER:** FAIR **DATA SOURCE:** EXTERNAL
COMMENTS:

Hour Beginning	Thursday 1/21/2021
12 AM	16
1 AM	4
2 AM	4
3 AM	4
4 AM	12
5 AM	37
6 AM	114
7 AM	159
8 AM	147
9 AM	130
10 AM	127
11 AM	149
12 PM	145
1 PM	165
2 PM	166
3 PM	197
4 PM	296
5 PM	240
6 PM	115
7 PM	66
8 PM	52
9 PM	28
10 PM	46
11PM	20
Total	2,439

AXLE CORR. FACTOR: 1.000 **AADT:** 2,812 **AM Peak %:** 6.5 **Hour Beginning:** 7:00 AM
SEASONAL FACTOR: 1.153 **PM Peak %:** 12.1 **Hour Beginning:** 4:00 PM



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	

Interstate Route		Waterford Twp, Camden Co	Shamong Twp, Burlington Co
US Route			
NJ Route			
County Road			
Interchange Number			
Grade Separated Interchange			
Traffic Signal			
Traffic Monitoring Sites			
Road Underpass			
Road Overpass			
Secondary Direction			
Primary Direction			
Street Name			
Jurisdiction			
Functional Class			
Federal Aid - NHS Sy			
Control Section			
Speed Limit			
Number of Lanes			
Med. Type			
Med. Width			
Pavement			
Shoulder			
Traffic Volume			
Traffic Sta. ID			
Structure No.			
Enlarged Views			

Street Name	Jackson Road		Jackson-Indian Mills Road
Jurisdiction		County	
Functional Class	Urban Major Collector		Rural Major Collector
Federal Aid - NHS Sy		STP	
Control Section			
Speed Limit		50	
Number of Lanes		2	
Med. Type		None	
Med. Width		0	
Pavement	24		22
Shoulder	4		2
Traffic Volume			
Traffic Sta. ID			
Structure No.		N/A	N/A
Enlarged Views			

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	21	297	291	14	6	9
Future Vol, veh/h	21	297	291	14	6	9
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, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	0	0	50	50	50
Mvmt Flow	23	323	316	15	7	10

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	331	0	-	0	693 324
Stage 1	-	-	-	-	324 -
Stage 2	-	-	-	-	369 -
Critical Hdwy	4.6	-	-	-	6.9 6.7
Critical Hdwy Stg 1	-	-	-	-	5.9 -
Critical Hdwy Stg 2	-	-	-	-	5.9 -
Follow-up Hdwy	2.65	-	-	-	3.95 3.75
Pot Cap-1 Maneuver	1003	-	-	-	345 619
Stage 1	-	-	-	-	637 -
Stage 2	-	-	-	-	605 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1003	-	-	-	335 619
Mov Cap-2 Maneuver	-	-	-	-	335 -
Stage 1	-	-	-	-	619 -
Stage 2	-	-	-	-	605 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1003	-	-	-	462
HCM Lane V/C Ratio	0.023	-	-	-	0.035
HCM Control Delay (s)	8.7	0	-	-	13.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	9	277	343	6	14	21
Future Vol, veh/h	9	277	343	6	14	21
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, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	0	0	50	50	50
Mvmt Flow	10	301	373	7	15	23

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	380	0	-	0	698
Stage 1	-	-	-	-	377
Stage 2	-	-	-	-	321
Critical Hdwy	4.6	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	5.9
Critical Hdwy Stg 2	-	-	-	-	5.9
Follow-up Hdwy	2.65	-	-	-	3.95
Pot Cap-1 Maneuver	958	-	-	-	342
Stage 1	-	-	-	-	600
Stage 2	-	-	-	-	639
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	958	-	-	-	338
Mov Cap-2 Maneuver	-	-	-	-	338
Stage 1	-	-	-	-	592
Stage 2	-	-	-	-	639

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	13.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	958	-	-	-	449
HCM Lane V/C Ratio	0.01	-	-	-	0.085
HCM Control Delay (s)	8.8	0	-	-	13.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3