

McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

Kevin P. McDonough (1953-1994)
John H. Rea, P.E.
Jay S. Troutman, Jr., P.E.
Scott T. Kennel

October 6, 2021

Neptune Township Zoning Board of Adjustment
25 Neptune Boulevard
Neptune, NJ 07753

Re: Flex Space Office/Warehouse
Lot 3 in Block 3101
Neptune Township, Monmouth County
MRA File No. 21-249

Dear Board Members:

McDonough & Rea Associates (MRA) has been asked to provide the Zoning Board of Adjustment with a *Traffic Impact Analysis* for plans to construct a flex space office/warehouse building on the noted property. The property is located on the north side of New Jersey State Route 33, just east of its intersection with Jumping Brook Road as shown on *Figure 1*, a *Site Location Map* in the *Appendix*.

Plans prepared by InSite Engineering (ISE) show a building containing the following elements:

- 27,411 SF of warehouse space
- 15,009 SF of office space

Access to Route 33 is proposed via 2 driveway connections; 1 on the east side of the building and 1 on the west side of the building. The property is located in the *C-5 Commercial Zone*; therefore, a *Use Variance* is requested for the flex/office/warehouse space.

SCOPE OF STUDY

In order to prepare a thorough *Traffic Impact Analysis* for this proposal, MRA conducted the following tasks:

1. Made field visits to the site to establish existing roadway and traffic conditions in the area.
2. Obtained historical traffic volume data along Route 33 from the New Jersey Department of Transportation (NJDOT).

Please reply to:

- 1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
- 105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181



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3. Prepared estimates of traffic to be generated by the warehouse and office space based upon Institute of Transportation Engineers (ITE) data.
4. Distributed site generated traffic east and west along Route 33 in accordance with anticipated origins and destinations of site traffic.
5. Projected traffic volumes to a design year 2023 after consulting the NJDOT's *Historical Growth Rate* data for the area.
6. Conducted level of service capacity analyses for the site driveway in accordance with *Highway Capacity Manual* procedures.
7. Compared the traffic to be generated by the office/warehouse space to traffic that would be generated by a permitted commercial use.
8. Reviewed the *Site Plan* with respect to adherence to proper traffic engineering principles.

The following report sets forth the database accumulated and the conclusions reached with respect to the warehouse/office project.

EXISTING CONDITIONS

The subject property is located on the north side of Route 33 just east of the signalized intersection at Jumping Brook Road. It has approximately 609 feet of frontage along Route 33 and contains approximately 4.5 acres. Route 33 is an east/west State arterial highway under the jurisdiction of NJDOT. It provides for 2 travel lanes in each direction without shoulders in the vicinity of the subject property. The nearest traffic signal control is located at Jumping Brook Road just west of the subject property

EXISTING TRAFFIC VOLUMES

Traffic volume data was obtained after reviewing historical data published by the NJDOT. Specifically, automatic traffic counts conducted along Route 33 between Jumping Brook Road and West Bangs Avenue in the fall of 2018 were reviewed. *Figure 2* in the *Appendix*, illustrates existing October 2018 NJDOT traffic volumes passing the site frontage during the critical AM and PM peak street hours.



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TRIP GENERATION AND DISTRIBUTION

Estimates of traffic to be generated by the office and warehouse space were made after consulting the 10th Edition of the ITE *Trip Generation Manual*. Table I illustrates anticipated traffic generation from the property during the critical morning and afternoon peak hours.

TABLE I
TRIP GENERATION

<u>USE</u>	<u>AM PSH</u>			<u>PM PSH</u>		
	<u>IN</u>	<u>OUT</u>	<u>TOTAL</u>	<u>IN</u>	<u>OUT</u>	<u>TOTAL</u>
15,009 SF Office	15	3	18	3	15	18
27,411 SF Warehouse	22	7	29	8	23	31
Totals	37	10	47	11	38	49

With respect to the anticipated distribution of site generated traffic, a review was made of access to higher order roadways such as the Garden State Parkway, Route 33, Route 34, Route 18, etc. Based on this review, traffic was distributed as follows

- 2/3 to and from the west on Route 33
- 1/3 to and from the east on Route 33

Site generated and distributed traffic flows are shown on *Figure 3* the *Appendix*.

ANALYSIS OF FUTURE TRAFFIC

A design year of 2023 was assumed for the project (a 2 year build-out). The NJDOT's background traffic growth rate data for the area was consulted and a growth rate of 1.0 percent per year was added to base 2018 traffic volumes which were expanded to *no-build* 2023 volumes (a conservative multiplier of 1.07). Design year 2023 *no-build* traffic volumes are shown on *Figure 4* in the *Appendix*. Site generated and distributed traffic was then surcharged onto *no-build* volumes and are shown on *Figure 5* in the *Appendix*.

Traffic engineers calculate levels of service of unsignalized intersections which relate to the quality of traffic flow. Level of service is a measure of average control delay. Average control delay is the time lost due to deceleration and the amount of time from when a vehicle is stopped for a traffic control device (or at the end of the queue) to when the vehicle departs the intersection. Delay is a relative quantity of driver discomfort, frustration, fuel consumption, and loss in travel time.



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Levels of service range from “A” to “F” with “A” being the highest or best attainable level of service. Level of service “E” with average control delays of not more than 50 seconds per vehicle at an unsignalized intersection indicates near to or at capacity conditions and is generally considered the limit of acceptable level of service and delay.

Full definitions of levels of service for unsignalized intersections as well as level of service summaries are included in the *Appendix*. The intersections studied by this report were analyzed according to the procedures set forth in the *Highway Capacity Manual 2010*, using the *McTrans Highway Capacity Software (HCS7)*, release 7.9.5.

The site access points to Route 33 were analyzed for projected levels of service for the 2023 design year. Based on a review of NJDOT access control restrictions for the property, only 1 entrance/exit will be permitted to and from the property. Therefore, the west driveway was assumed to be an exit-only driveway and the east driveway, an entrance-only driveway. This access configuration will permit full access around the building and ease of loading for deliveries.

Findings were that exiting movements to Route 33 from the west driveway will operate at level of service “C” during the AM peak street hour and level of service “D” during the PM peak street hour. Left turn entry movements at the east driveway will operate at level of service “B” during both the AM and PM peak street hours. Therefore, the site driveways will operate within acceptable traffic engineering parameters.

TRIP GENERATION COMPARISON

As previously indicated, the property is located in the *C-5 Commercial Zone* and a *Use Variance* is required for the office/warehouse space. Uses in the *C-5 Commercial Zone*, which are predominantly retail in nature, will generate higher peak hour traffic volumes than the proposed use as shown on the *Table* below. A 28,500 SF retail strip center is a permitted use and can fit on the property.

TABLE II
TRIP GENERATION
PERMITTED USE (28,500 SF RETAIL) VS. PROPOSED TOTAL TRIPS

<u>USE</u>	<u>AM PSH</u>	<u>PM PSH</u>	<u>SAT. PH</u>
Permitted 28,500 SF Retail	86	215	230
Proposed. Office/Warehouse	47	49	10
Difference	-39	-166	-220



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SITE PLAN & PARKING

The *Site Plan*, prepared by ISE, shows full access around the building. A total of 53 parking spaces are required under the Neptune ordinance and 54 spaces are provided. Truck loading areas are located to the north side of the building away from primary employee/visitor/customer spaces.

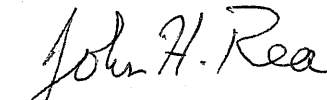
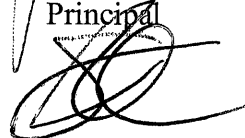
CONCLUSIONS

It is concluded, based on the analysis set forth in this report that plans to construct 27,411 SF of warehouse space and 15,009 SF of office space on the noted property can be approved without having an adverse and negative impact on traffic conditions in the area. The proposed uses will generate less peak hour traffic than a permitted use in the *C-5 Commercial Zone*. Furthermore, levels of service at the driveways to Route 33 will be within acceptable traffic engineering parameters.

The *Site Plan* itself has been properly designed with respect to ingress and egress, adequate parking, full circulation around the building and separation for truck loading areas from primary customer/visitor/employee parking spaces.

A representative of MRA will be in attendance at an upcoming Neptune Township Zoning Board of Adjustment meeting to provide expert testimony and to answer any questions board members, board experts or the public may have.

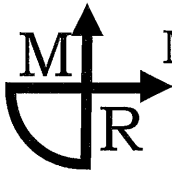
Very truly yours,


John H. Rea, PE
Principal


Scott T. Kennel
Sr. Associate

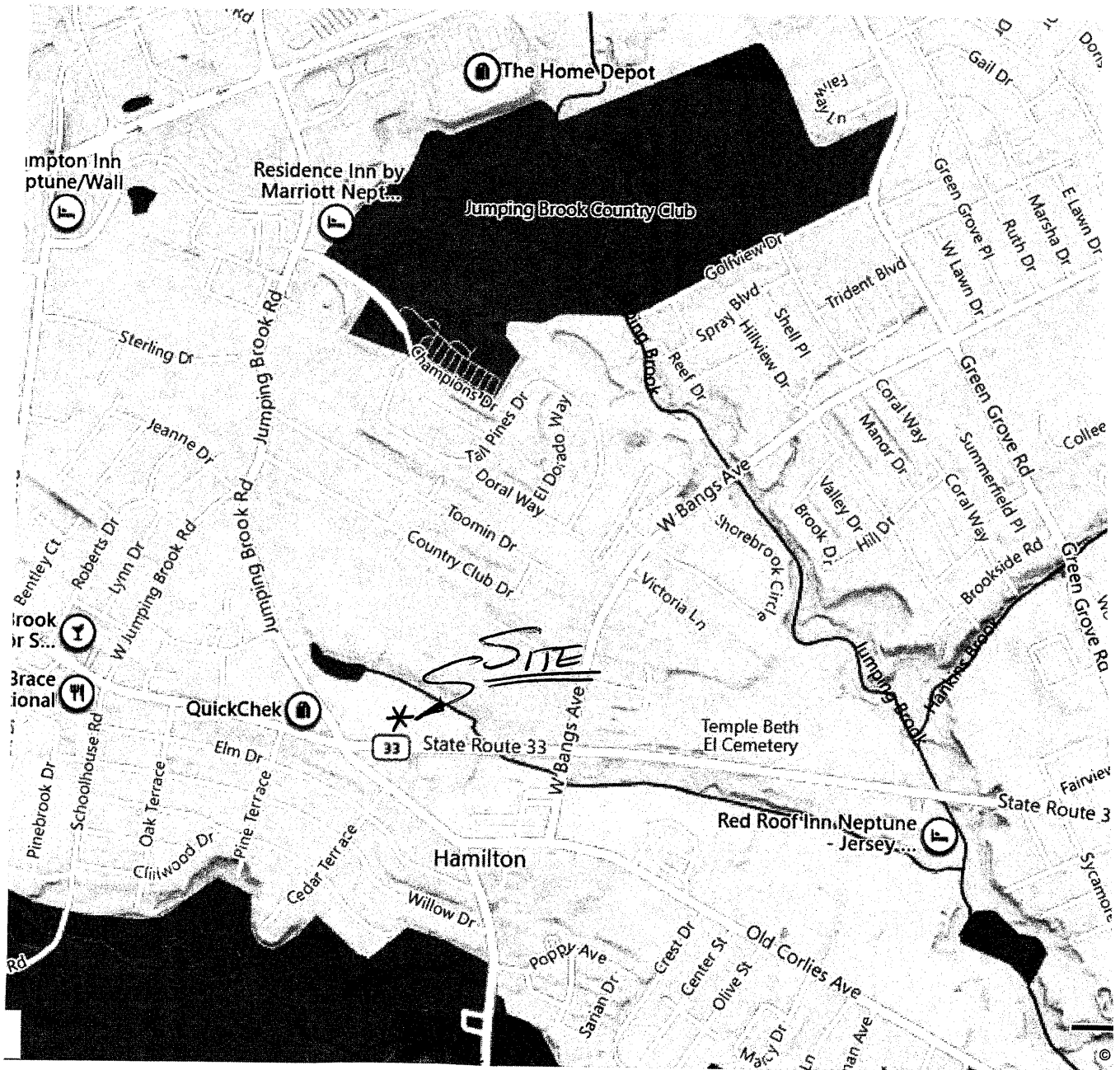
cc: Patrick Ward, PE
Jennifer S. Krimko, Esq.
Jacob Lipschitz

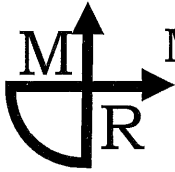
APPENDIX



SUBJECT:

NEPTUNE TWP. FLEX SPACE - ROUTE 33
SITE LOCATION MAP





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FIGURE 2

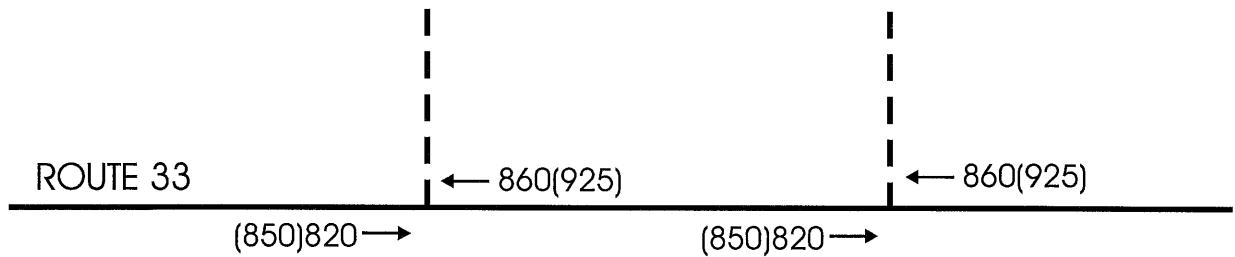
JOB NO.
21-249

DATE:
SEPT 2021

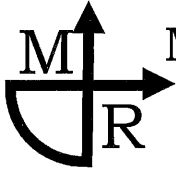
SUBJECT: NEPTUNE TWP. FLEX SPACE - ROUTE 33
EXISTING AM[8-9am] (PM)[5-6pm] OCT. 2018 NJDOT TRAFFIC VOLUMES



SITE



LEGEND: ← AM PSH(PM PSH)



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FIGURE 3

JOB NO.
21-249

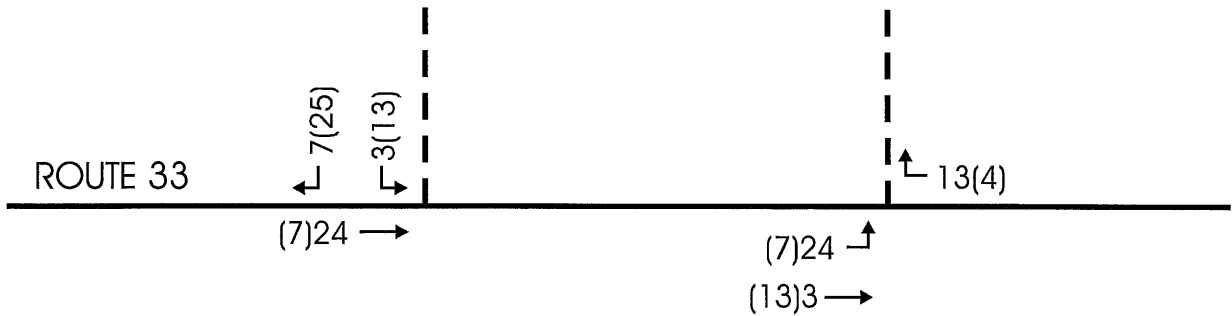
DATE:
SEPT 2021

SUBJECT:

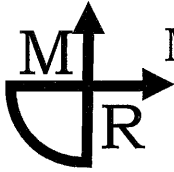
NEPTUNE TWP. FLEX SPACE - ROUTE 33
SITE GENERATED TRAFFIC VOLUMES



SITE



LEGEND: ← AM PSH(PM PSH)



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FIGURE 4

JOB NO.
21-249

DATE:
SEPT 2021

SUBJECT:

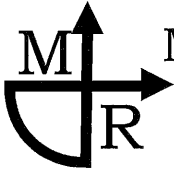
NEPTUNE TWP. FLEX SPACE - ROUTE 33
2023 NO - BUILD TRAFFIC VOLUMES



SITE



LEGEND: ← AM PSH(PM PSH)



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FIGURE 5

JOB NO.
21-249

DATE:
SEPT 2021

SUBJECT:

NEPTUNE TWP. FLEX SPACE - ROUTE 33
2023 BUILD TRAFFIC VOLUMES



SITE



LEGEND: ← AM PSH(PM PSH)

**LEVEL OF SERVICE CRITERIA
FOR
TWO-WAY STOP-CONTROLLED INTERSECTIONS¹**

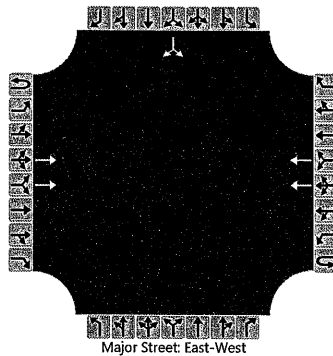
<u>Level of Service</u>	<u>Average Control Delay</u>
A	≤ 10.0 Seconds Per Vehicle
B	> 10.0 and ≤ 15.0 Seconds Per Vehicle
C	> 15.0 and ≤ 25.0 Seconds Per Vehicle
D	> 25.0 and ≤ 35.0 Seconds Per Vehicle
E	> 35.0 and ≤ 50.0 Seconds Per Vehicle
F	> 50.0 Seconds Per Vehicle

¹ Transportation Research Board, Highway Capacity Manual 2010, National Research Council, Washington, DC, 2010.

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK	Intersection	RT 33 & EGRESS				
Agency/Co.	MRA	Jurisdiction					
Date Performed	9/8/2021	East/West Street	RT 33				
Analysis Year	2023	North/South Street	EGRESS				
Time Analyzed	AM	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	21-249AFB-1						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		0	1	0
Configuration			T				T								LR	
Volume (veh/h)			899				920							3		7
Percent Heavy Vehicles (%)														10		10
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)															7.5		6.9
Critical Headway (sec)															7.00		7.10
Base Follow-Up Headway (sec)															3.5		3.3
Follow-Up Headway (sec)															3.60		3.40

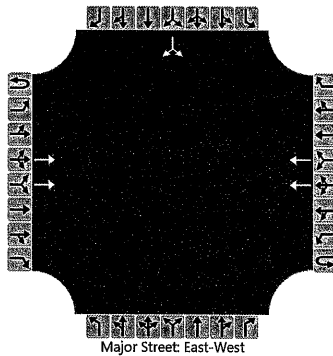
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																	11
Capacity, c (veh/h)																	227
v/c Ratio																	0.05
95% Queue Length, Q ₉₅ (veh)																	0.2
Control Delay (s/veh)																	21.7
Level of Service (LOS)																	C
Approach Delay (s/veh)	21.7																
Approach LOS	C																

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK	Intersection	RT 33 & EGRESS				
Agency/Co.	MRA	Jurisdiction					
Date Performed	9/8/2021	East/West Street	RT 33				
Analysis Year	2023	North/South Street	EGRESS				
Time Analyzed	PM	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	21-249PFB-1						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		0	1	0
Configuration			T				T								LR	
Volume (veh/h)			917				990							13		25
Percent Heavy Vehicles (%)														10		10
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)														7.5		6.9
Critical Headway (sec)														7.00		7.10
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.60		3.40

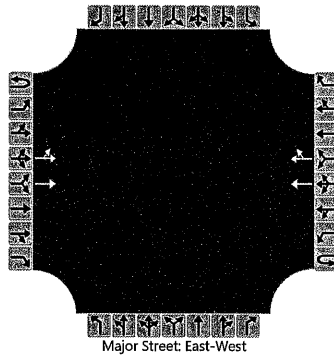
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																42
Capacity, c (veh/h)																188
v/c Ratio																0.22
95% Queue Length, Q ₉₅ (veh)																0.8
Control Delay (s/veh)																29.6
Level of Service (LOS)																D
Approach Delay (s/veh)																29.6
Approach LOS																D

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK			Intersection	RT 33 & INGRESS		
Agency/Co.	MRA			Jurisdiction			
Date Performed	9/8/2021			East/West Street	RT 33		
Analysis Year	2023			North/South Street	INGRESS		
Time Analyzed	AM			Peak Hour Factor	0.90		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	21-249AFB-2						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		0	0	0
Configuration		LT	T				T	TR								
Volume (veh/h)		24	875				920	13								
Percent Heavy Vehicles (%)		10														
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1														
Critical Headway (sec)		4.30														
Base Follow-Up Headway (sec)		2.2														
Follow-Up Headway (sec)		2.30														

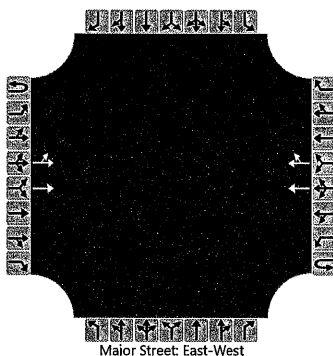
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		27														
Capacity, c (veh/h)		620														
v/c Ratio		0.04														
95% Queue Length, Q ₉₅ (veh)		0.1														
Control Delay (s/veh)		11.1														
Level of Service (LOS)		B														
Approach Delay (s/veh)		0.8														
Approach LOS																

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK	Intersection	RT 33 & INGRESS				
Agency/Co.	MRA	Jurisdiction					
Date Performed	9/8/2021	East/West Street	RT 33				
Analysis Year	2023	North/South Street	INGRESS				
Time Analyzed	PM	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	21-249PFB-2						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		0	0	0
Configuration		LT	T				T	TR								
Volume (veh/h)		7	910				990	4								
Percent Heavy Vehicles (%)		10														
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1														
Critical Headway (sec)		4.30														
Base Follow-Up Headway (sec)		2.2														
Follow-Up Headway (sec)		2.30														

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		8														
Capacity, c (veh/h)		583														
v/c Ratio		0.01														
95% Queue Length, Q ₉₅ (veh)		0.0														
Control Delay (s/veh)		11.3														
Level of Service (LOS)		B														
Approach Delay (s/veh)		0.3														
Approach LOS																

New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 10/23/2018 to 10/29/2018

Site names: p18606,NJ 37 38.47,000000037 ___
 County: MONMOUTH
 Funct Class: Urban Principal Arterial - Other
 Location: Bet West Bangs Avenue and Jumping brook Road

Seasonal Factor Grp: rg4_3U
 Daily Factor Grp: rg4_3U
 Axle Factor Grp: rg4_3U
 Growth Factor Grp: rg4_3U

	Sun, Oct 21, 2018			Mon, Oct 22, 2018			Tue, Oct 23, 2018			Wed, Oct 24, 2018			Thu, Oct 25, 2018			Fri, Oct 26, 2018			Sat, Oct 27, 2018			
	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	
00:00																						
01:00																						
02:00																						
03:00																						
04:00																						
05:00																						
06:00																						
07:00																						
08:00																						
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16:00																						
17:00																						
18:00																						
19:00																						
20:00																						
21:00																						
22:00																						
23:00																						
Total																						
AM Peak Vol																						
AM Peak Fct																						
PM Peak Hr																						
PM Peak Vol																						
PM Peak Fct																						
Seasonal Fct																						
Daily Fct																						
Axle Fct																						
Pulse Fct																						

New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 10/23/2018 to 10/29/2018

Site names: p18606,NJ 37 38.47,00000037___
 County: MONMOUTH
 Funct Class: Urban Principal Arterial - Other
 Location: Bet West Bangs Avenue and Jumping brook Road

Seasonal Factor Grp: 194_3U
 Daily Factor Grp: 194_3U
 Axle Factor Grp: 194_3U
 Growth Factor Grp: 194_3U

	Sun, Oct 28, 2018			Mon, Oct 29, 2018			Tue, Oct 30, 2018			Wed, Oct 31, 2018			Thu, Nov 1, 2018			Fri, Nov 2, 2018			Sat, Nov 3, 2018			
	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	
00:00	287	146	141	113	53	60																
01:00	228	105	123	74	34	40																
02:00	142	59	83	64	25	39																
03:00	100	45	55	69	26	43																
04:00	76	36	40	155	47	108																
05:00	100	41	59	441	141	300																
06:00	288	160	128	1,092	469	623																
07:00	452	205	247	1,563	705	858																
08:00	654	278	376	1,705	837	868																
09:00	935	438	497	1,215	573	642																
10:00	1,020	436	584	1,190	584	606																
11:00	1,256	550	706	1,075	514	561																
12:00	1,308	638	670	1,238	588	650																
13:00	1,247	566	681	1,270	622	648																
14:00	1,215	555	660	1,378	640	738																
15:00	1,203	554	649	1,704	805	899																
16:00	1,172	566	606	1,747	821	926																
17:00	980	486	494	1,725	851	874																
18:00	998	540	458	1,285	727	558																
19:00	772	356	416	978	461	517																
20:00	681	306	375	707	350	367																
21:00	395	175	220	530	256	274																
22:00	307	137	170	381	183	198																
23:00	243	121	122	242	132	110																
Total	16,059	7,499	8,560	21,941	10,444	11,497																
AM Peak Vol	1,256	550	706	1,705	837	868																
AM Peak Fct	1	1	1	1	1	1																
AM Peak Hr	11:00	11:00	11:00	8:00	8:00	8:00																
PM Peak Vol	1,308	638	681	1,747	851	926																
PM Peak Fct	1	1	1	1	1	1																
PM Peak Hr	12:00	12:00	13:00	16:00	17:00	16:00																
Seasonal Fct	1.005	1.005	1.005	1.005	1.005	1.005																
Daily Fct	1.299	1.299	1.299	1.015	1.015	1.015																
Axle Fct	.486	.486	.486	.486	.486	.486																
Pulse Fct	2.000	2.000	2.000	2.000	2.000	2.000																

ITE Land Use: 150, Warehousing		27,500 SF		10th											
Size of Development:															
Time Period	Average Rate	Studies	Avg. Size	R ²	Trips	Equation	Trips	Split							
Weekday Daily	1.74	29	285	0.93	47.9	T= 1.580 (x)+ 45.540	89.0	50 50							
AM Peak Street Hour	0.17	34	451	0.69	4.7	T= 0.120 (x)+ 25.320	28.6	77 23							
PM Peak Street Hour	0.19	47	400	0.65	5.2	T= 0.120 (x)+ 27.820	31.1	27 73							
AM Peak Hour of Generator	0.22	23	274	0.85	6.1	T= 0.110 (x)+ 30.070	33.1	65 35							
PM Peak Hour of Generator	0.24	25	275	0.91	6.6	T= 0.150 (x)+ 22.520	26.6	24 76							
Saturday Daily	0.15	3	226	NG	4.1	Not Given	N/A	50 50							
Saturday Peak Hour of Generator	0.05	2	129	NG	1.4	Not Given	N/A	64 36							
Sunday Daily	0.06	3	226	NG	1.7	Not Given	N/A	50 50							
Sunday Peak Hour of Generator	0.04	2	129	NG	1.1	Not Given	N/A	52 48							

ITE Land Use: 710, General Office Building									
Size of Development: 15,100 SF									
10th									
<u>Time Period</u>	<u>Average Rate</u>	<u>Studies</u>	<u>Avg. Size</u>	<u>R²</u>	<u>Trips</u>	<u>Equation</u>	<u>Trips</u>	<u>Split</u>	
Weekday Daily	9.74	66	171	0.83	147.1	$\ln(T) = 0.970$	$\ln(x) + 2.500$	169.6	50 50
AM Peak Street Hour	1.16	35	117	0.85	17.5	$T = 0.940$	$(x) + 26.490$	40.7	86 14
PM Peak Street Hour	1.15	32	114	0.88	17.4	$\ln(T) = 0.950$	$\ln(x) + 0.360$	18.9	16 84
AM Peak Hour of Generator	1.47	228	209	0.84	22.2	$\ln(T) = 0.880$	$\ln(x) + 1.060$	31.5	88 12
PM Peak Hour of Generator	1.42	243	205	0.82	21.4	$T = 1.100$	$(x) + 65.390$	82.0	18 82
Saturday Daily	2.21	5	94	NG	33.4	Not Given		N/A	50 50
Saturday Peak Hour of Generator	0.53	3	82	NG	8.0	Not Given		N/A	54 46
Sunday Daily	0.70	5	94	NG	10.6	Not Given		N/A	50 50
Sunday Peak Hour of Generator	0.21	3	82	NG	3.2	Not Given		N/A	58 42

