

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

November 6, 2019

Sayreville Borough Planning Board
167 Main Street
Sayreville, New Jersey 08872

Re: OEG Building Materials
Lot 1 in Block 9
Sayreville Borough, Misdlesex County
MRA File No. 19-240

Dear Board Members:

McDonough & Rea Associates (MRA) has prepared this *Traffic Study* in connection with expansion plans for a 62,430 SF warehouse at the *OEG Building Materials* complex on property known as Lot 1 in Block 9, in the Borough of Sayreville. The subject property is located on the west side of Bordentown Avenue as shown on *Figure 1* appended to this letter.

SCOPE OF STUDY

In order to prepare a thorough *Traffic Study* for the 62,430 warehouse building, MRA conducted the following tasks:

1. Made field visits to inventory existing roadway and traffic conditions in the area.
2. Collected traffic volume data by conducting typical weekday morning and afternoon peak traffic period manual turning movement counts at the 3 site driveways to Bordentown Avenue.
3. Prepared trip generation estimates for the proposed warehouse building utilizing data published by the Institute of Transportation Engineers (ITE) in the 10th Edition of the *Trip Generation* manual.
4. Prepared estimates of future traffic volume demand of anticipated construction for the design year of the proposal (2022), including background traffic growth as set forth in the New Jersey Department of Transportation (NJDOT) *Annual Background Growth Rate Table*.

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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- 5. Conducted level of service capacity analyses of the site driveways to Bordentown Avenue.
- 6. Reviewed the site plan with respect to availability and accessibility of the parking supply and conformance to proper traffic engineering principles.

The following report sets forth the database accumulated and the conclusions reached with respect to the 62,430 SF warehouse building.

EXISTING CONDITIONS/TRAFFIC VOLUMES

The subject property is located on the north side of Bordentown Avenue and east of Robert Street. The site currently contains multiple industrial buildings served by 3 driveways and 65 parking spaces.

Manual turning movement traffic counts were conducted during the morning and afternoon peak hours at the site driveways to Bordentown Avenue in October 2019. The counts were conducted on weekdays when traffic was not affected by weather, school closings, detours, etc. *Figure 2*, appended to this letter, illustrates existing morning and afternoon peak hour traffic volumes utilizing the adjacent roadway network.

Bordentown Avenue, known as County Route 615, is under the jurisdiction of Middlesex County and is a 2 lane minor arterial with a posted speed limit of 40 MPH adjacent to the site.

TRIP GENERATION

Trip generation estimates for the 62,430 SF warehouse building was made based on the data published by Institute of Transportation Engineers (ITE) in the 10th Edition of the *Trip Generation* manual. The ITE Land Use Code 150, *Warehouse*, was used to estimate the amount of traffic to be generated by the additional warehouse space. The following table illustrates the anticipated morning and afternoon peak hourly traffic generation from the proposed warehouse building.

**TRAFFIC GENERATION
62,430 SF WAREHOUSE**

<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>
9	5	14	.	4	11	15



Sayreville Borough Planning Board

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Figure 3 illustrates new site generated and distributed traffic volumes at the access driveways to the site.

ANALYSIS OF FUTURE TRAFFIC

A design year of 2022 was considered for the analysis herein. The NJDOT *Annual Background Growth Rate Table* was consulted and minor arterial roadways in Middlesex County are experiencing a growth rate of 1.0 percent per year. Therefore, the 2019 traffic volumes were expanded by 1.0 percent per year for 3 years to the 2022 design year. *Figure 4* illustrates future 2022 post-development morning and afternoon traffic volumes with background traffic growth and the site traffic from the new warehouse building.

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.

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 (HCS)*, release 7.5.

The site driveways to Bordentown Avenue are currently operating at level of service “D” or better for the AM and PM peak hours.

The 2022 post-development traffic volumes were analyzed and are projected to operate at level of service “E” for the northern driveway for both peak hours analyzed while the 2 other driveways are projected to operate at level of service “D” or better for the AM and PM peak hours.



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SITE PLAN & PARKING

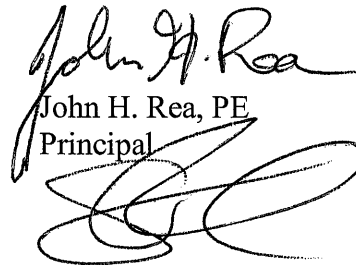
A *Site Plan*, prepared by New Lines details retaining the northerly and southerly driveways while relocating the central driveway to the north and restricting same to ingress movements only. The plans also detail the construction of 42 parking spaces along Bordentown Avenue and 71 parking spaces along the westerly portion of the site. The *Site Plan* delineates 150 parking spaces whereas the ordinance requires 146 parking spaces. The site circulation system is sound and logical for the proposed use and the aisle widths, parking stall sizes, etc., have been designed in accordance with current standards.

CONCLUSIONS

It is concluded, based on the analysis set forth in this report, that plans to construct a 62,430 SF warehouse can be approved and operate compatibly with future traffic conditions in the area. The Bordentown Avenue site driveways will operate within acceptable traffic engineering parameters.

A representative from MRA will be in attendance at an upcoming Sayreville Borough Planning Board meeting to provide expert testimony and answer questions Board members, Board experts or the public may have.

Very truly yours,

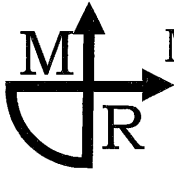


John H. Rea, PE
Principal

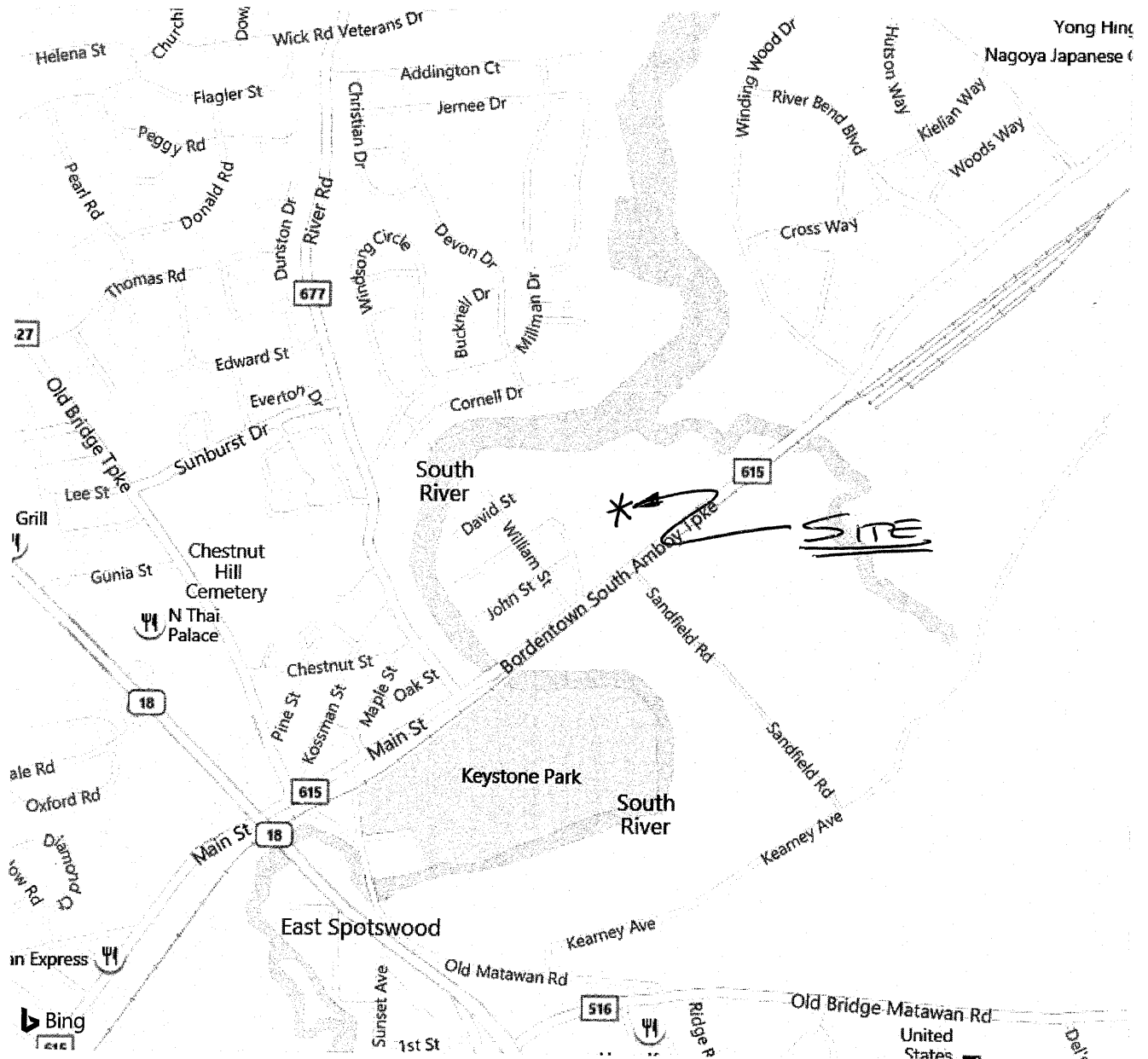
Scott T. Kennel
Sr. Associate

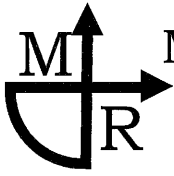
cc: Josh Schmuckler
Asher Engel

APPENDIX



SUBJECT: OEG BUILDING MATERIALS EXPANSION - SAYREVILLE TWP., MIDDLESEX CO.
SITE LOCATION MAP

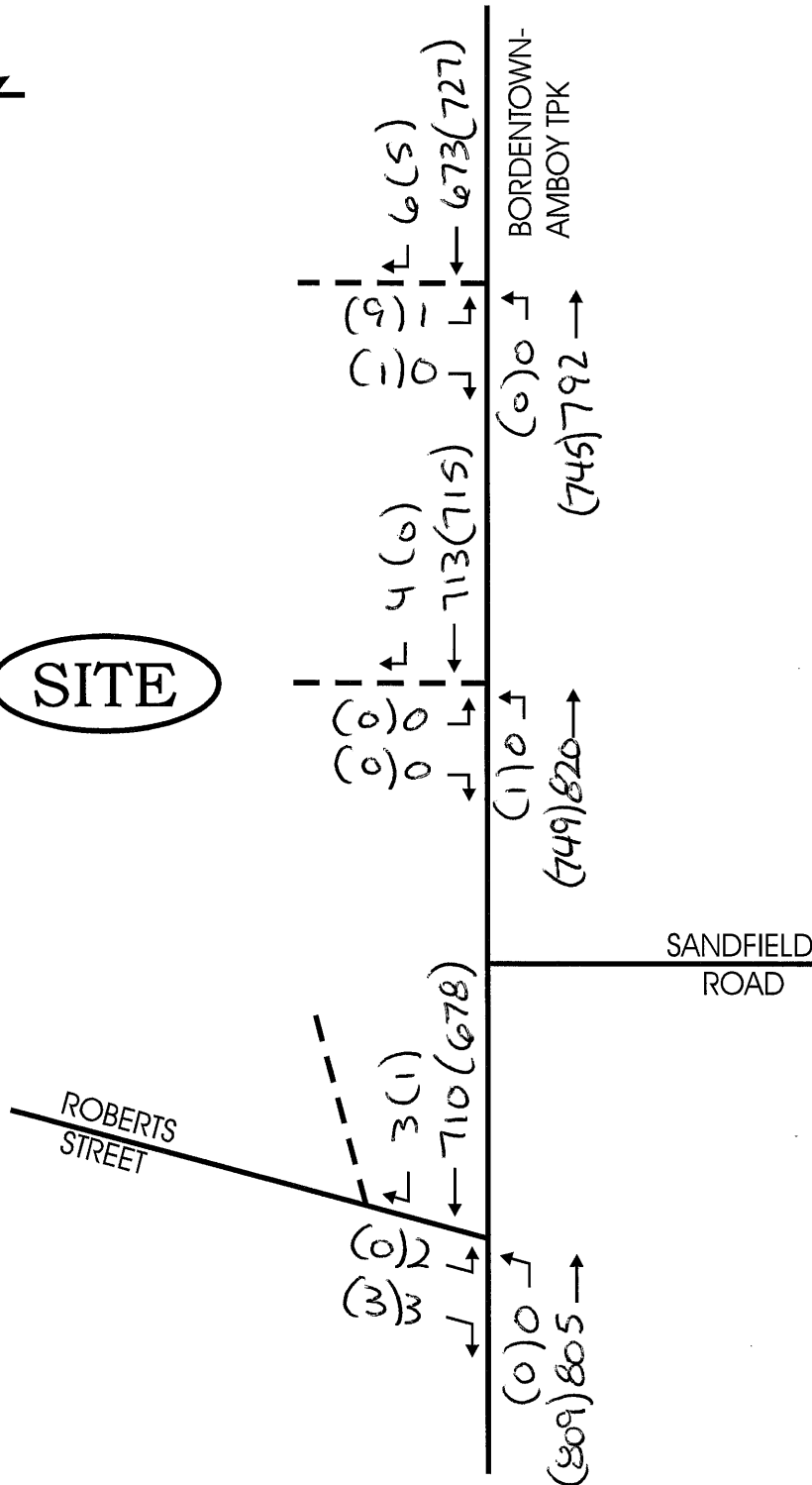




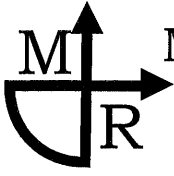
SUBJECT: OEG BUILDING MATERIALS EXPANSION - SAYREVILLE TWP., MIDDLESEX CO.
2019 EXISTING PEAK HOUR TRAFFIC VOLUMES



SITE



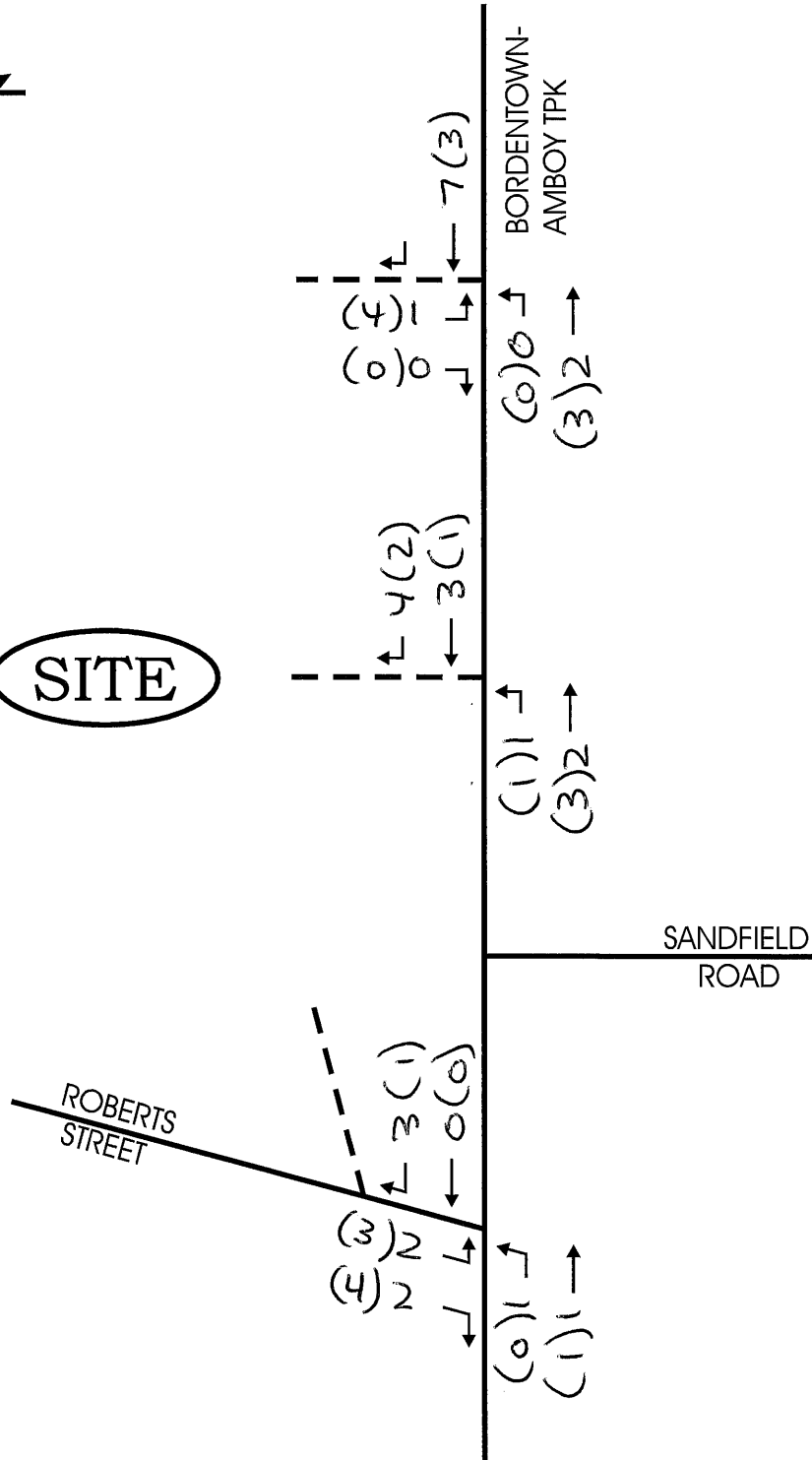
LEGEND: ← AM PSH (PM PSH)



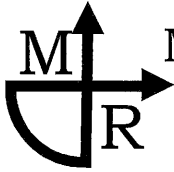
SUBJECT: OEG BUILDING MATERIALS EXPANSION - SAYREVILLE TWP., MIDDLESEX CO.
NEW SITE GENERATED TRAFFIC VOLUMES



SITE



LEGEND: ← AM PSH (PM PSH)

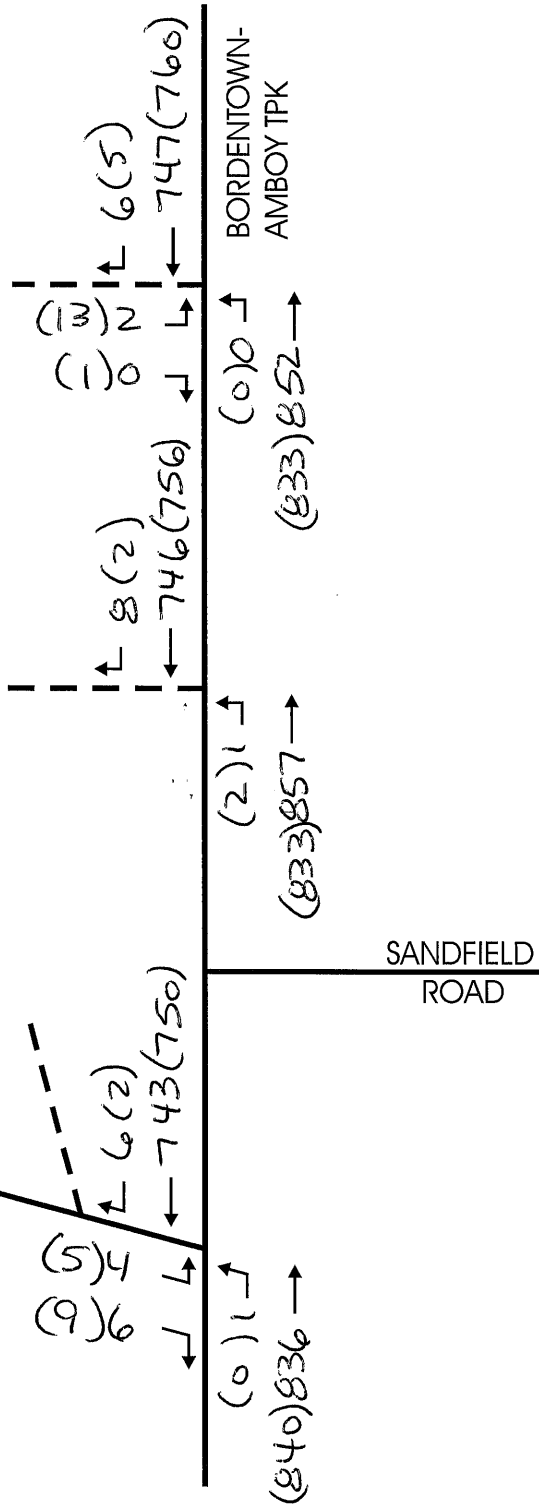


SUBJECT: OEG BUILDING MATERIALS EXPANSION - SAYREVILLE TWP., MIDDLESEX CO.
2022 FUTURE POST - DEVELOPMENT TRAFFIC VOLUMES



SITE

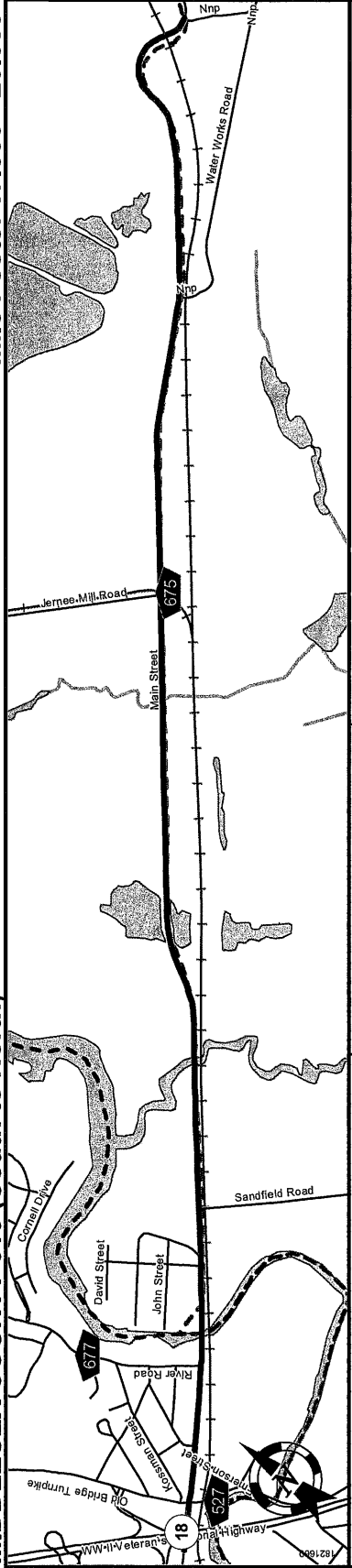
ROBERTS STREET



LEGEND: ← AM PSH(PM PSH)

MIDDLESEX COUNTY 615 (South to North)

Mile Posts: 17.000 - 20.000



Pavement	Shoulder	Number of Lanes	Speed Limit	Street Name	Mile Post	Township	County
		12		Main Street	17.000	East Brunswick Twp.	Middlesex Co
		8			17.03	East Brunswick Twp.	Middlesex Co
		1			17.09	East Brunswick Twp.	Middlesex Co
		50			17.20	East Brunswick Twp.	Middlesex Co
					17.20	East Brunswick Twp.	Middlesex Co
					17.35	East Brunswick Twp.	Middlesex Co
					17.41	East Brunswick Twp.	Middlesex Co
					17.54	East Brunswick Twp.	Middlesex Co
					17.65	Old Bridge Twp.	Middlesex Co
					17.82	Old Bridge Twp.	Middlesex Co
					18.05	Sayreville Boro.	Middlesex Co
					18.30	Sayreville Boro.	Middlesex Co
					18.48	Sayreville Boro.	Middlesex Co
					18.62	Sayreville Boro.	Middlesex Co
					18.83	Sayreville Boro.	Middlesex Co
					19.41	Old Bridge Twp.	Middlesex Co
					19.42	Old Bridge Twp.	Middlesex Co
					19.69	Old Bridge Twp.	Middlesex Co
					19.85	Old Bridge Twp.	Middlesex Co
					20.00	Old Bridge Twp.	Middlesex Co

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
Main Street	County	Urban Minor Arterial	STP		50	2	Painted/Unprotected	12	28	8	4	123076	123076	
					40	2	None	0	24	6	2	123077	123077	
					35	2	None	0	28	4	4	123078	123078	
					4	4	None	32	48	1	1	1232150	1232150	

SRI = 12000615

Date last inventoried: May 2011

OEG BUILDING SUPPLY
 NORTH EXIT & BORDENTOWN
 SAYREVILLE BORO, MIDDLESEX COUNTY
 MRA JOB 19-240 THURSDAY AM COUNT

McDonough & Rea Associates
 1431 Lakewood Road Suite C
 Manasquan NJ 08736
 (732) 528-7076

File Name : 19240 north access & bordentown am1
 Site Code : 00019240
 Start Date : 10/31/2019
 Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

Start Time	Bordentown-Amboy Tpk (CR 615)				Bordentown-Amboy Tpk (CR 615)				North Exit Eastbound						
	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Right	App. Total	Int. Total
07:00 AM	151	2	153	0	168	0	168	0	0	0	0	0	0	0	321
07:15 AM	177	0	177	0	209	0	209	0	0	0	0	0	0	0	386
07:30 AM	180	1	181	0	205	0	205	0	0	0	0	0	0	0	386
07:45 AM	150	3	153	0	193	0	193	0	0	0	0	0	0	0	346
Total	658	6	664	0	775	0	775	0	0	0	0	0	0	0	1439
08:00 AM	166	2	168	0	185	0	185	1	0	0	1	1	0	1	354
08:15 AM	167	0	167	0	183	0	183	0	0	0	0	0	0	0	350
08:30 AM	188	3	191	1	169	1	170	0	0	0	0	0	0	0	361
08:45 AM	177	5	182	0	152	0	152	1	0	0	1	1	0	1	335
Total	698	10	708	1	689	1	690	2	0	0	2	2	0	2	1400
09:00 AM	180	4	184	3	187	0	190	0	0	0	0	0	0	0	374
09:15 AM	153	0	153	2	197	0	199	0	0	0	0	0	0	0	352
09:30 AM	122	1	123	1	152	1	153	1	0	0	1	1	0	1	277
09:45 AM	137	1	138	2	147	0	149	3	1	1	4	3	1	4	291
Total	592	6	598	8	683	0	691	4	4	1	5	4	1	5	1294
Grand Total	1948	22	1970	9	2147	9	2156	6	6	1	7	6	1	7	4133
Approach %	98.9	1.1		0.4	99.6	0.2		85.7	14.3	0.0		0.1	0.0		
Total %	47.1	0.5	47.7	0.2	51.9	0.2	52.2	0.1	0.0	0.2					

Start Time	Bordentown-Amboy Tpk (CR 615)				Bordentown-Amboy Tpk (CR 615)				North Exit Eastbound						
	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Right	App. Total	Int. Total
07:15 AM	673	6	679	0	792	0	792	1	0	0	1	1	0	1	1472
07:30 Volume	180	0.9	181	0.0	100.0	0.0	205	100.0	0.0	0.0	0	0	0.0	0	386
07:30 Volume	180	1	181	0	205	0	205	0	0	0	0	0	0	0	0.953
Peak Factor High Int.	07:30 AM	180	181	0	209	0	209	08:00 AM	1	0	1	1	0	1	
Peak Factor			0.938				0.947				0.250				

OEG BUILDING SUPPLY
 NORTH EXIT & BORDENTOWN
 SAYREVILLE BORO, MIDDLESEX COUNTY
 MRA JOB 19-240 WEDNESDAY PM COUNT

McDonough & Rea Associates
 1431 Lakewood Road Suite C
 Manasquan NJ 08736
 (732) 528-7076

File Name : 19240 north access & bordentown pm1
 Site Code : 00019240
 Start Date : 10/30/2019
 Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

Start Time	Bordentown-Amboy Tpk (CR 615) Southbound			Bordentown-Amboy Tpk (CR 615) Northbound			North Exit Eastbound				
	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Right	App. Total	Int. Total
03:00 PM	129	0	129	1	124	0	125	1	0	1	255
03:15 PM	140	1	141	2	143	0	145	0	0	0	286
03:30 PM	192	0	192	0	176	0	176	0	0	2	370
03:45 PM	153	0	153	0	173	0	173	0	0	0	326
Total	614	1	615	3	616	0	619	3	0	3	1237
04:00 PM	183	0	183	0	176	0	176	0	0	0	359
04:15 PM	121	1	122	0	149	0	149	6	0	6	277
04:30 PM	175	1	176	0	154	0	154	2	0	2	332
04:45 PM	163	0	163	0	180	0	180	2	1	3	346
Total	642	2	644	0	659	0	659	10	1	11	1314
05:00 PM	197	1	198	0	209	0	209	4	0	4	411
05:15 PM	169	4	173	0	174	0	174	1	0	1	348
05:30 PM	195	0	195	0	174	0	174	3	1	4	373
05:45 PM	166	0	166	0	188	0	188	1	0	1	355
Total	727	5	732	0	745	0	745	9	1	10	1487
Grand Total	1983	8	1991	3	2020	0	2023	22	2	24	4038
Approch %	99.6	0.4		0.1	99.9	0.0		91.7	8.3		
Total %	49.1	0.2	49.3	0.1	50.0	0.0	50.1	0.5	0.0	0.6	

Start Time	Bordentown-Amboy Tpk (CR 615) Southbound			Bordentown-Amboy Tpk (CR 615) Northbound			North Exit Eastbound				
	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Right	App. Total	Int. Total
05:00 PM	727	5	732	0	745	0	745	9	1	10	1487
Percent	99.3	0.7	198	0.0	100.0	0.0	209	90.0	10.0	4	411
05:00 Volume	197	1	198	0	209	0	209	4	0	4	0.905
Peak Factor				05:00 PM				05:00 PM			
High Int. Volume	197	1	198	0	209	0	209	4	0	4	
Peak Factor			0.924				0.891			0.625	

Peak Hour From 03:00 PM to 05:45 PM - Peak 1 of 1

U

McDonough & Rea Associates
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 Manasquan NJ 08736
 (732) 528-7076

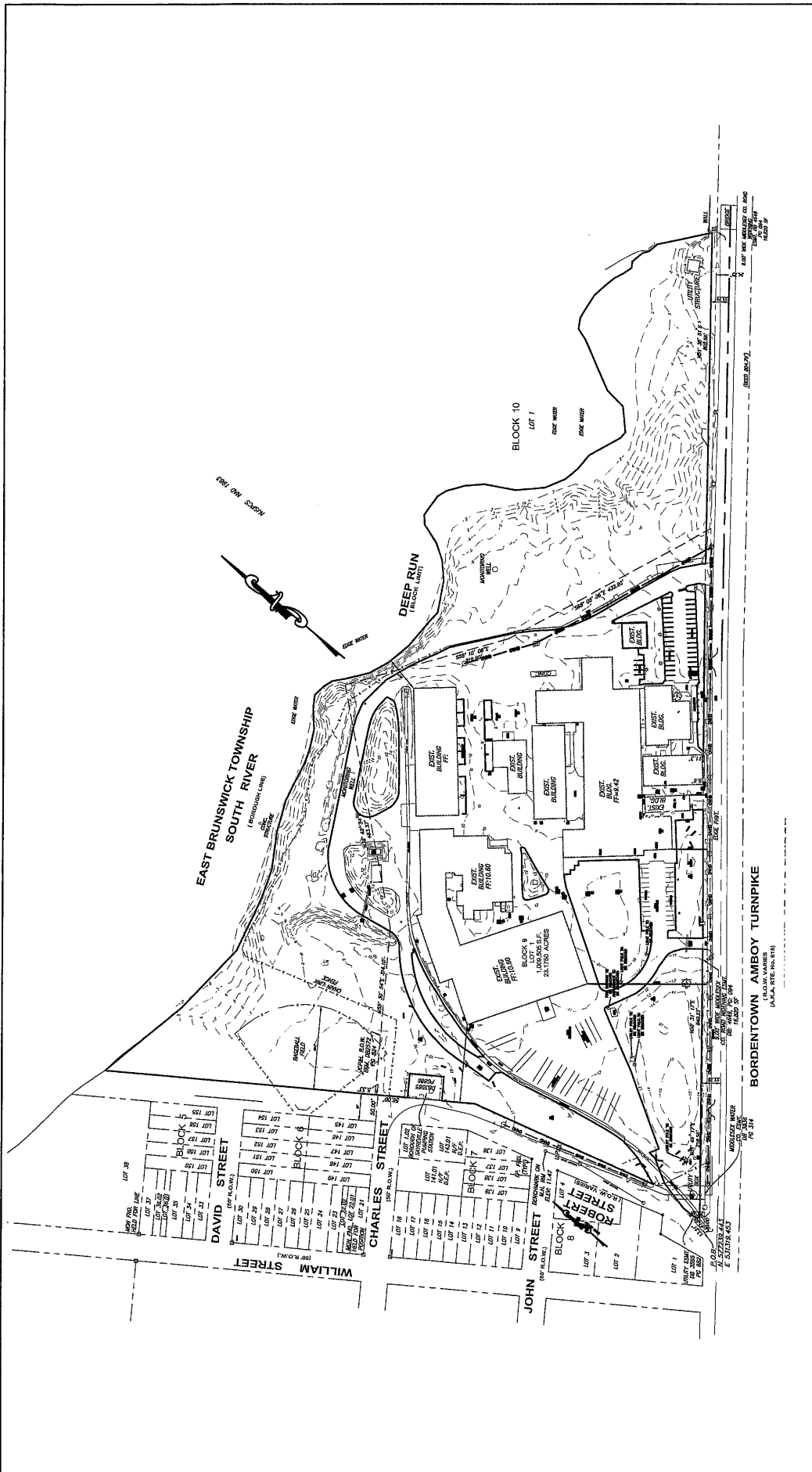
OEG BUILDING SUPPLY
 ROBERTS STREET & BORDENTOWN
 SAYREVILLE BORO, MIDDLESEX COUNTY
 MRA JOB 19-240 WEDNESDAY AM COUNT

File Name : 19240 roberts & bordentown am1
 Site Code : 00192403
 Start Date : 10/16/2019
 Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

Start Time	Bordentown-Amboy Tpk (CR 615) Southbound			Bordentown-Amboy Tpk (CR 615) Northbound			Robert Street Eastbound			
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
07:00 AM	134	1	135	1	188	189	0	0	0	324
07:15 AM	178	1	179	0	246	246	1	1	2	427
07:30 AM	195	1	196	0	204	204	0	1	1	401
07:45 AM	168	1	169	0	197	197	1	1	2	368
Total	675	4	679	1	835	836	2	3	5	1520
08:00 AM	169	0	169	0	158	158	0	0	0	327
08:15 AM	161	2	163	0	166	166	0	0	0	329
08:30 AM	183	0	183	1	161	162	4	2	6	351
08:45 AM	163	0	163	0	128	128	0	2	2	293
Total	676	2	678	1	613	614	4	4	8	1300
09:00 AM	104	1	105	0	167	167	0	1	1	273
09:15 AM	120	0	120	2	127	129	1	2	3	252
09:30 AM	137	0	137	1	144	145	1	2	3	285
09:45 AM	145	1	146	0	119	119	1	1	2	267
Total	506	2	508	3	557	560	3	6	9	1077
Grand Total	1857	8	1865	5	2005	2010	9	13	22	3897
Approch %	99.6	0.4	47.9	0.2	99.8	51.6	40.9	59.1	0.6	
Total %	47.7	0.2		0.1	51.4		0.2	0.3		

Start Time	Bordentown-Amboy Tpk (CR 615) Southbound			Bordentown-Amboy Tpk (CR 615) Northbound			Robert Street Eastbound			
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:45 AM - Peak 1 of 1										
Intersection 07:15 AM										
Volume	710	3	713	0	805	805	2	3	5	1523
Percent	99.6	0.4	179	0.0	100.0	246	40.0	60.0	2	427
07:15 Volume	178	1		0	246		1	1		
Peak Factor										0.892
High Int. 07:30 AM							07:15 AM			
Volume	195	1	196	0	246	246	1	1	2	
Peak Factor			0.909			0.818			0.625	



**SITE PLAN
EXISTING CONDITIONS PLAN**
6001 BORDENTOWN AVENUE
BORDENTOWN, NEW JERSEY

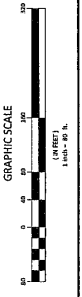
NEWLINES
ENGINEERS & ARCHITECTS, P.C.
315 Monmouth Avenue
Suite 205
Lakewood, NJ 07033
Phone: (732) 944-9871
Fax: (732) 944-9999

PROJECT: 19111
OWNER: ZEE
SCALE: 1" = 70'
DATE: 7/10/19
SHEET: 2 OF 15

GLENN D. LINES, P.E., P.P.

LICENSED PROFESSIONAL ENGINEER, NEW JERSEY
DATE OF MOST RECENT LICENSE RENEWAL: 11/14/2018

- NOTES:
- HORIZONTAL DATUM BASED ON NAD 83 AND VERTICAL DATUM BASED ON NAVD 83
 - BENCHMARK ON MAINLINE PIKE AT ELEVATION 11.47.



BORDENTOWN AMBOY TURNPIKE
(LOCAL RTE. NO. 618)

DAVID STREET
(LOCAL RTE. NO. 618)

CHARLES STREET
(LOCAL RTE. NO. 618)

JOHN STREET
(LOCAL RTE. NO. 618)

ROBERT STREET
(LOCAL RTE. NO. 618)

WILLIAM STREET
(LOCAL RTE. NO. 618)

DEEP RUN (BLOCK 10)

SOUTH RIVER (EXTENSION LINE)

BLOCK 10 LOT 1

BLOCK 9
EXIST. BUILDING
1,000,000 S.F.
23,170 ACRES

BLOCK 8
EXIST. BUILDING
P/10/00

BLOCK 7
EXIST. BUILDING
P/10/00

BLOCK 6
EXIST. BUILDING
P/10/00

BLOCK 5
EXIST. BUILDING
P/10/00

BLOCK 4
EXIST. BUILDING
P/10/00

BLOCK 3
EXIST. BUILDING
P/10/00

BLOCK 2
EXIST. BUILDING
P/10/00

ZONING DATA

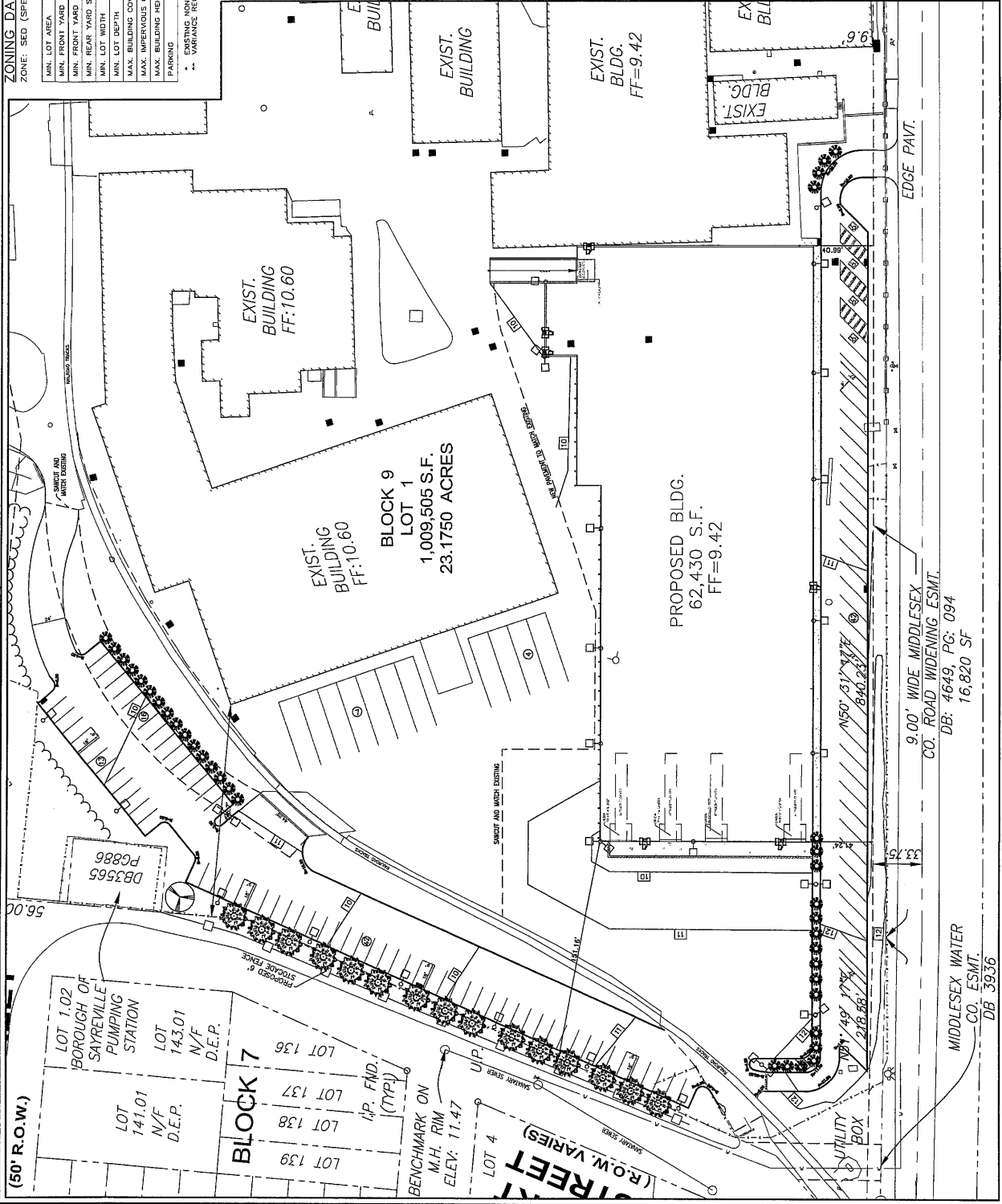
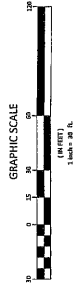
ZONE: SED (SPECIAL ECONOMIC DEVELOPMENT)

	REQUIRED	EXISTING	PROPOSED
MIN. LOT AREA	80,000 S.F.	1,009,504.80 S.F.	1,009,504.80 S.F.
MIN. FRONT YARD SETBACK	50'	0.57'-"	0.57'-"
MIN. FRONT YARD SETBACK	100'	145.7'	145.7'
MIN. REAR YARD SETBACK	40'	87.3'	87.3'
MIN. LOT WIDTH	150'	1142.85'	1142.85'
MIN. LOT DEPTH	100'	254.12'	254.12'
MAX. BUILDING COVERAGE	60%	16.25%	22.25%
MAX. IMPERVIOUS COVERAGE	85%	>46.87%	46.87%
MAX. BUILDING HEIGHT	SEE TABLE	65'	154'

SEE TABLE FOR MIN. HEIGHT
VARIANCE REQUESTED



CALL BEFORE YOU DIG
800-4-A-DIG
IT'S THE LAW
FOR YOUR PROTECTION, DISASTROUSLY,
CONTACT THE CITY OF SECAUCUS FOR INFORMATION



SITE PLAN
LAYOUT & DIMENSION PLAN
 6001 GORDENTOWN AVENUE
 BOROUGH OF SECAUCUS, MIDDLESEX COUNTY, NEW JERSEY

NEW LINES
 ENGINEERS, ARCHITECTS & PLANNERS
 315 Stormwatch Avenue
 Edison, NJ 08817
 Phone: (732) 961-9900
 Fax: (732) 961-9909

GLENN D. LINES, P.E., P.P.
 19111
 ZEE
 1" = 70'
 7/10/19
 SHEET 3 OF 15

ITE Land Use: 150, Warehousing															
Size of Development:		62,430 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	1.74	29	285	0.93	108.6	T= 1.580 (x)+ 45.540	144.2	50							
AM Peak Street Hour	0.17	34	451	0.69	10.6	T= 0.120 (x)+ 25.320	32.8	77							
PM Peak Street Hour	0.19	47	400	0.65	11.9	T= 0.120 (x)+ 27.820	35.3	27							
AM Peak Hour of Generator	0.22	23	274	0.85	13.7	T= 0.110 (x)+ 30.070	36.9	65							
PM Peak Hour of Generator	0.24	25	275	0.91	15.0	T= 0.150 (x)+ 22.520	31.9	24							
Saturday Daily	0.15	3	226	NG	9.4	Not Given	N/A	50							
Saturday Peak Hour of Generator	0.05	2	129	NG	3.1	Not Given	N/A	64							
Sunday Daily	0.06	3	226	NG	3.7	Not Given	N/A	50							
Sunday Peak Hour of Generator	0.04	2	129	NG	2.5	Not Given	N/A	52							

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

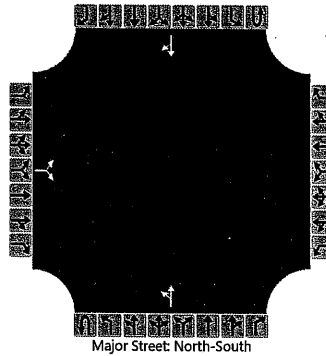
<u>Level of Service</u>	<u>Average Control Delay</u>
A	≤ 10.0 Seconds Per Vehicle
B	> 10.0 and ≤ 15.0 Seconds Per Vehicle
C	> 15.0 and ≤ 25.0 Seconds Per Vehicle
D	> 25.0 and ≤ 35.0 Seconds Per Vehicle
E	> 35.0 and ≤ 50.0 Seconds Per Vehicle
F	> 50.0 Seconds Per Vehicle

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	BORDENTOWN & NORTH ACCESS		
Agency/Co	MRA			Jurisdiction			
Date Performed	11/7/2019			East/West Street	NORTH ACCESS		
Analysis Year	2019			North/South Street	BORDENTOWN		
Time Analyzed	AM			Peak Hour Factor	0.95		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	19-240AE-1 EXIST						

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		1		0						0	792				673	6
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

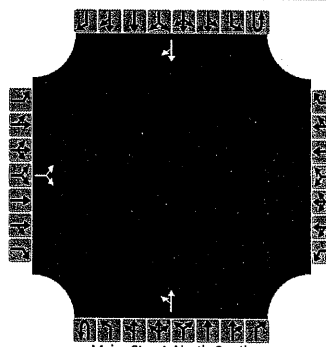
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1							0						
Capacity, c (veh/h)			125							881						
v/c Ratio			0.01							0.00						
95% Queue Length, Q ₉₅ (veh)			0.0							0.0						
Control Delay (s/veh)			34.0							9.1						
Level of Service (LOS)			D							A						
Approach Delay (s/veh)	34.0								0.0							
Approach LOS	D															

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK			Intersection	BORDENTOWN & NORTH ACCESS		
Agency/Co.	MRA			Jurisdiction			
Date Performed	11/7/2019			East/West Street	NORTH ACCESS		
Analysis Year	2019			North/South Street	BORDENTOWN		
Time Analyzed	PM			Peak Hour Factor	0.95		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	19-240PE-1 EXIST						

Lanes



Major Street: North-South

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		9		1						0	745				727	5
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

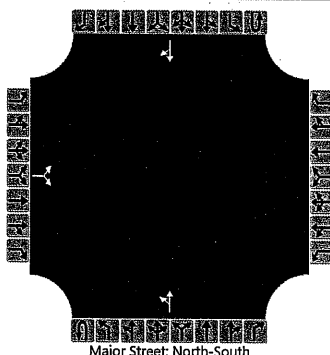
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11							0						
Capacity, c (veh/h)			133							840						
v/c Ratio			0.08							0.00						
95% Queue Length, Q ₉₅ (veh)			0.3							0.0						
Control Delay (s/veh)			34.3							9.3						
Level of Service (LOS)			D							A						
Approach Delay (s/veh)	34.3								0.0							
Approach LOS	D															

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK			Intersection	BORDENTOWN & CENTRAL ACC		
Agency/Co.	MRA			Jurisdiction			
Date Performed	11/7/2019			East/West Street	CENTRAL ACCESS		
Analysis Year	2019			North/South Street	BORDENTOWN		
Time Analyzed	AM			Peak Hour Factor	0.95		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	19-240AE-2 EXIST						

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		0		0						0	820				713	4
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

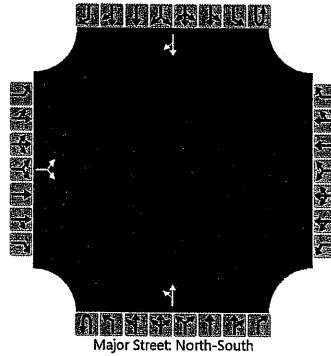
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			0							0						
Capacity, c (veh/h)										851						
v/c Ratio										0.00						
95% Queue Length, Q ₉₅ (veh)										0.0						
Control Delay (s/veh)										9.2						
Level of Service (LOS)										A						
Approach Delay (s/veh)									0.0							
Approach LOS																

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK	Intersection	BORDENTOWN & CENTRAL ACC				
Agency/Co	MRA	Jurisdiction					
Date Performed	11/7/2019	East/West Street	CENTRAL ACCESS				
Analysis Year	2019	North/South Street	BORDENTOWN				
Time Analyzed	PM	Peak Hour Factor	0.95				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	19-240PE-2 EXIST						

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		0		0						1	749				715	0
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

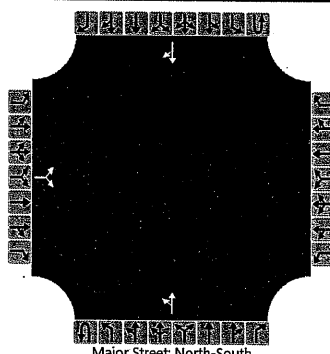
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			0							1						
Capacity, c (veh/h)										853						
v/c Ratio										0.00						
95% Queue Length, Q ₉₅ (veh)										0.0						
Control Delay (s/veh)										9.2						
Level of Service (LOS)										A						
Approach Delay (s/veh)									0.0							
Approach LOS																

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK			Intersection	BORDENTOWN & SOUTH-ROBERT		
Agency/Co.	MRA			Jurisdiction			
Date Performed	11/7/2019			East/West Street	SOUTH ACCESS-ROBERTS		
Analysis Year	2019			North/South Street	BORDENTOWN		
Time Analyzed	AM			Peak Hour Factor	0.95		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	19-240AE-3 EXIST						

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		2		3						0	805				710	3
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

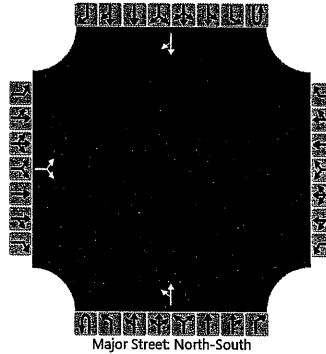
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			5							0						
Capacity, c (veh/h)			204							854						
v/c Ratio			0.03							0.00						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			23.1							9.2						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)	23.1								0.0							
Approach LOS	C															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	BORDENTOWN & SOUTH-ROBERT
Agency/Co.	MRA	Jurisdiction	
Date Performed	11/7/2019	East/West Street	SOUTH ACCESS-ROBERTS
Analysis Year	2019	North/South Street	BORDENTOWN
Time Analyzed	PM	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	19-240PE-3 EXIST		

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		0		3						0	809				678	1
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

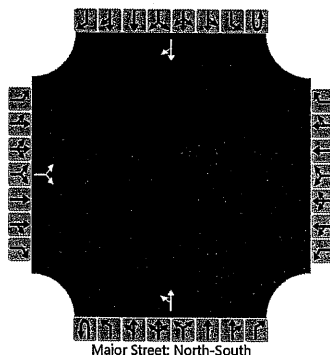
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			3							0						
Capacity, c (veh/h)			429							881						
v/c Ratio			0.01							0.00						
95% Queue Length, Q ₉₅ (Veh)			0.0							0.0						
Control Delay (s/veh)			13.4							9.1						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	13.4								0.0							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK			Intersection	BORDENTOWN & NORTH ACCESS		
Agency/Co	MRA			Jurisdiction			
Date Performed	11/7/2019			East/West Street	NORTH ACCESS		
Analysis Year	2022			North/South Street	BORDENTOWN		
Time Analyzed	AM			Peak Hour Factor	0.95		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	19-240AFB-1 BUILD						

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		2		0						0	852				747	6
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right-Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

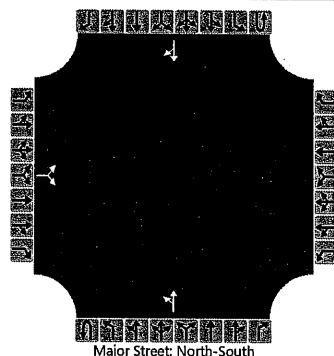
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			2							0						
Capacity, c (veh/h)			103							824						
v/c Ratio			0.02							0.00						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			40.8							9.4						
Level of Service (LOS)			E							A						
Approach Delay (s/veh)	40.8								0.0							
Approach LOS	E								A							

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK			Intersection	BORDENTOWN & NORTH ACCESS		
Agency/Co.	MRA			Jurisdiction			
Date Performed	11/7/2019			East/West Street	NORTH ACCESS		
Analysis Year	2022			North/South Street	BORDENTOWN		
Time Analyzed	PM			Peak Hour Factor	0.95		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	19-240PFB-1 BUILD						

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		13		1						0	833				760	5
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

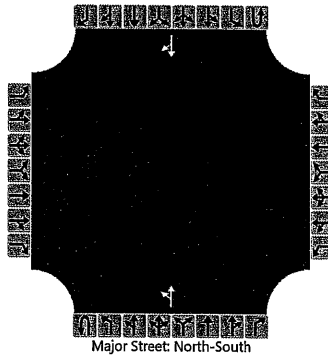
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			15							0						
Capacity, c (veh/h)			109							815						
v/c Ratio			0.13							0.00						
95% Queue Length, Q ₉₅ (veh)			0.5							0.0						
Control Delay (s/veh)			43.0							9.4						
Level of Service (LOS)			E							A						
Approach Delay (s/veh)	43.0								0.0							
Approach LOS	E															

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK			Intersection	BORDENTOWN & CENTRAL ACC		
Agency/Co	MRA			Jurisdiction			
Date Performed	11/7/2019			East/West Street	CENTRAL ACCESS		
Analysis Year	2022			North/South Street	BORDENTOWN		
Time Analyzed	AM			Peak Hour Factor	0.95		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	19-240AFB-2 BUILD						

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration										LT						TR
Volume (veh/h)										1	857				746	8
Percent Heavy Vehicles (%)										3						
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

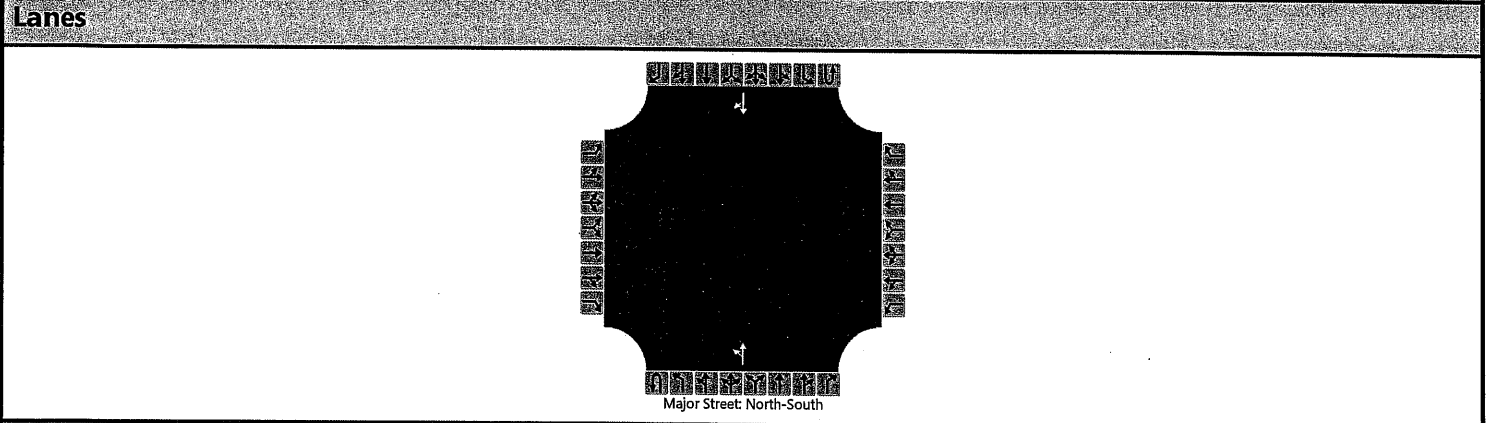
Base Critical Headway (sec)										4.1						
Critical Headway (sec)										4.13						
Base Follow-Up Headway (sec)										2.2						
Follow-Up Headway (sec)										2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)										1						
Capacity, c (veh/h)										823						
v/c Ratio										0.00						
95% Queue Length, Q ₉₅ (veh)										0.0						
Control Delay (s/veh)										9.4						
Level of Service (LOS)										A						
Approach Delay (s/veh)									0.0							
Approach LOS																

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	BORDENTOWN & CENTRAL ACC
Agency/Co	MRA	Jurisdiction	
Date Performed	11/7/2019	East/West Street	CENTRAL ACCESS
Analysis Year	2022	North/South Street	BORDENTOWN
Time Analyzed	PM	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	19-240PFB-2 BUILD		



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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration										LT						TR
Volume (veh/h)										2	833				756	2
Percent Heavy Vehicles (%)										3						
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)										4.13						
Base Follow-Up Headway (sec)										2.2						
Follow-Up Headway (sec)										2.23						

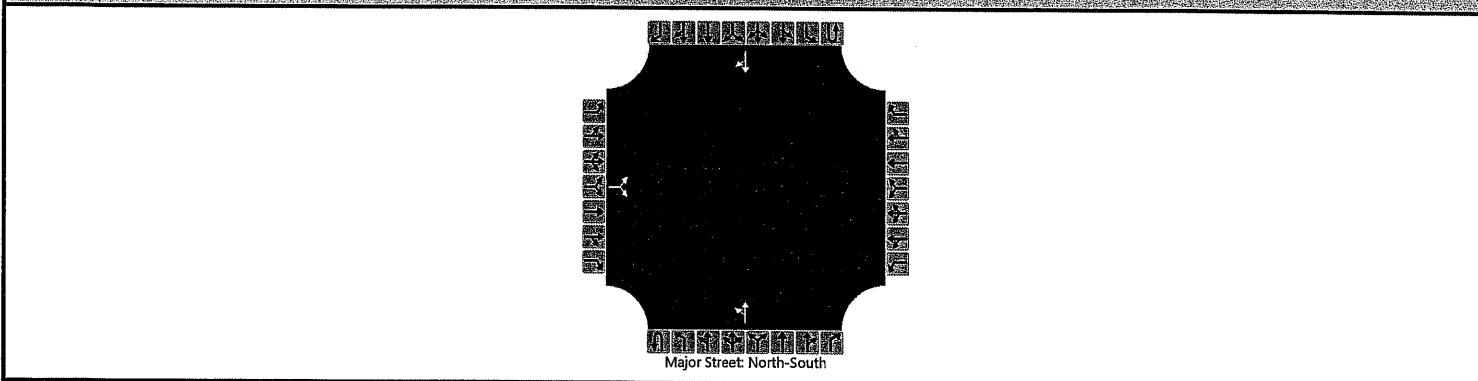
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)										2						
Capacity, c (veh/h)										820						
v/c Ratio										0.00						
95% Queue Length, Q ₉₅ (veh)										0.0						
Control Delay (s/veh)										9.4						
Level of Service (LOS)										A						
Approach Delay (s/veh)									0.1							
Approach LOS																

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	STK			Intersection	BORDENTOWN & SOUTH-ROBERT		
Agency/Co	MRA			Jurisdiction			
Date Performed	11/7/2019			East/West Street	SOUTH ACCESS-ROBERTS		
Analysis Year	2022			North/South Street	BORDENTOWN		
Time Analyzed	AM			Peak Hour Factor	0.95		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	19-240AFB-3 BUILD						

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		4		6						1	836				743	6
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

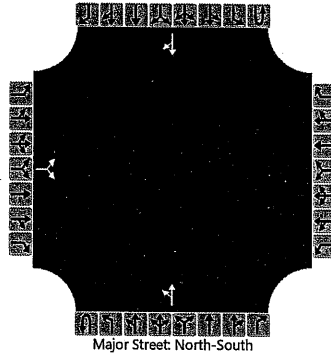
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11							1						
Capacity, c (veh/h)			188							827						
v/c Ratio			0.06							0.00						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			25.3							9.4						
Level of Service (LOS)			D							A						
Approach Delay (s/veh)	25.3								0.0							
Approach LOS	D															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	BORDENTOWN & SOUTH-ROBERT
Agency/Co	MRA	Jurisdiction	
Date Performed	11/7/2019	East/West Street	SOUTH ACCESS-ROBERTS
Analysis Year	2022	North/South Street	BORDENTOWN
Time Analyzed	PM	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	19-240PFB-3 BUILD		

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																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		5		9						0	840				750	2
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			15							0						
Capacity, c (veh/h)			197							825						
v/c Ratio			0.07							0.00						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			24.8							9.4						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)	24.8								0.0							
Approach LOS	C								A							