Traffic Impact Study

Proposed Car Wash
575 Milltown Road
Township of North Brunswick
Middlesex County, New Jersey

Prepared for:
Spark Car Wash

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John R. Corak, PE
Senior Project Manager
NJ P.E. License No. 54973

Matthew J. Seckler, PE, PP, PTOE
Principal
NJ P.E. License No. 48731

STONEFIELD
92 Park Ave
Rutherford, NJ 07070

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INTRODUCTION

This Traffic Impact Study was prepared to investigate the potential impacts of the proposed Spark Car Wash on the adjacent roadway network. The subject property has frontage along Georges Road and Milltown Road in North Brunswick Township, Middlesex County, New Jersey. The site location is shown on appended **Figure 1**.

The subject property is designated as Block 203, Lot 4 as depicted on the North Brunswick Township Tax Map. The site has approximately 194 feet of frontage along Milltown Road and approximately 113 feet of frontage along Georges Road. The existing site is occupied by a drive-in bank with four (4) windows. Access is presently provided via one (1) full-movement driveway along Milltown Road and one (1) ingress-only driveway and one (1) egress-only driveway along Georges Road. Under the proposed development program, the existing structures would be razed and a 4,841-square-foot automated car wash consisting of one (1) car wash tunnel would be constructed. Access along Georges Road is proposed to remain via one (1) ingress-only driveway and one (1) egress-only driveway and access along Milltown Road is proposed via one (1) right-in/right-out driveway.

METHODOLOGY

Stonefield Engineering & Design, LLC has prepared this Traffic Impact Study in accordance with the recommended guidelines and practices outlined by the Institute of Transportation Engineers (ITE) within Transportation Impact Analyses for Site Development. A detailed field investigation was performed to assess the existing conditions of the adjacent roadway network. A data collection effort was completed to identify the existing traffic volumes at the study intersections to serve as a base for the traffic analyses. Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the Highway Capacity Manual, 6th Edition (HCM) and the Synchro 11 Software for all study conditions to assess the roadway operations.

For an unsignalized intersection, Level of Service (LOS) A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle. The Technical Appendix contains the Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic signal timing utilized within the signalized analysis is based on timing directives provided by the New Jersey Department of Transportation (NJDOT).

2023 EXISTING CONDITION

2023 EXISTING ROADWAY CONDITIONS

The proposed Spark Car Wash has frontage along Georges Road and Milltown Road in North Brunswick Township, Middlesex County, New Jersey. The subject property is designated as Block 203, Lot 4 as depicted on the North Brunswick Township Tax Map. The site has approximately 194 feet of frontage along Milltown Road and approximately 113 feet of frontage along Georges Road. Land uses in the area are a mix of commercial, residential, and retail uses.

Milltown Road (County Route 606) is classified as an Urban Minor Arterial roadway with a general east-west orientation and is under the jurisdiction of Middlesex County. Along the site frontage, the roadway provides two (2) lanes of travel in each direction and has a posted speed limit of 35 mph. Curb is provided along both sides of the roadway, sidewalk is provided along the northerly side of the roadway, shoulders are not provided, and on-street parking is not permitted. Milltown Road provides east-west mobility throughout North Brunswick Township and surrounding municipalities and provides access to U.S. Route 1 to the east of the site for a mix of commercial, residential, and retail uses along its length.

Georges Road (NJSH 171) is classified as an Urban Minor Arterial roadway with a general north-south orientation and is under the jurisdiction of NJDOT. The roadway generally provides one (1) lane of travel in each direction, with additional lanes provided at key intersections to facilitate turning movements. The roadway has a posted speed limit of 35 mph. Curb and sidewalk are provided along both sides of the roadway, shoulders are not provided, and on-street parking is not permitted. Georges Road provides north-south mobility throughout North Brunswick Township and provides access to U.S. Route 1 to the south and NJSH Route 18 to the north for a mix of commercial, residential, and retail uses along its length.

Milltown Road and Georges Road intersect to form a T-intersection controlled by a two (2)-phase traffic signal operating on a 90-second background cycle. The westbound approach of Milltown Road provides one (1) exclusive left-turn lane and one (1) exclusive right-turn lane. The northbound approach of Georges Road provides one (1) exclusive through lane and one (1) exclusive right-turn lane and the southbound approach of Georges Road provides one (1) exclusive left-turn lane and one (1) exclusive through lane. Crosswalks, pedestrian signals, and pedestrian ramps are provided across the easterly and northerly legs of the intersection.

2023 EXISTING TRAFFIC VOLUMES

Turning movement counts were collected during the typical weekday evening and Saturday midday time periods to evaluate existing traffic conditions and identify the specific hours when traffic activity on the adjacent roadways is at a maximum and could be potentially impacted by the development of the site. Turning movement

counts were collected at the intersection of Georges Road and Milltown Road. Specifically, turning movement counts were conducted on the following dates and during the following times:

- Thursday, October 12, 2023, from 4:00 p.m. to 7:00 p.m.
- Saturday, October 14, 2023, from 11:00 a.m. to 2:00 p.m.

The study time periods were chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed development. It is noted that Spark Car Wash developments operate between 8:00 a.m. and 8:00 p.m. To assess the time-of-day distribution, data from the Spark Car Wash located at 586 Cross Keys Road in Sicklerville, New Jersey was analyzed. Based on the average hourly car counts, approximately 5% of the daily vehicle traffic occurred between 7:00 a.m. and 9:00 a.m., which is the typical weekday morning roadway peak period. As such, weekday morning counts were not included within the analysis. A summary of the Spark Car Wash time of day distributions are appended within this report.

The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. Based on the review of the count data the weekday evening peak hour occurred from 5:00 p.m. to 6:00 p.m. and the Saturday midday peak hour occurred from 12:00 p.m. to 1:00 p.m. The Technical Appendix contains a summary of the turning movement count data. The 2023 Existing weekday evening and Saturday midday peak hour volumes are summarized on appended **Figure 2**.

2023 EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2023 Existing Condition during the weekday evening and Saturday midday peak hours at the study intersection. Under the existing condition, the signalized intersection of Georges Road and Milltown Road is calculated to operate at overall Level of Service C during the weekday evening peak hour and is calculated to operate at overall Level of Service B during the Saturday midday peak hour.

2025 NO-BUILD CONDITION

BACKGROUND GROWTH

The 2023 Existing Condition traffic volume data was grown to a future horizon year of 2025, which is a conservative estimate for when the proposed car wash is expected to be fully constructed. In accordance with industry guidelines, the existing traffic volumes at the study intersections were increased by 1.00% annually for two (2) years. The 1.00% background growth rate was obtained from the NJDOT Annual Background Growth Rate Table.

OTHER PLANNED DEVELOPMENT PROJECTS

To evaluate the future traffic conditions, it is important to consider the potential site-generated traffic of other projects that could influence the traffic volume at the study intersections. Other planned development projects include those that are either in the entitlement process or have recently been approved for building permits in proximity to the proposed development. Based on consultations with the Township of North Brunswick municipal clerk, Lisa Russo, there are no planned development projects within the area of the subject site. As such, the application of the background growth rate would be adequate to account for background traffic growth.

2025 NO-BUILD TRAFFIC VOLUMES

The background growth rate was applied to the 2023 Existing Traffic Volumes to calculate the 2025 No-Build Traffic Volumes for the weekday evening and Saturday midday peak hours. These volumes are summarized on appended **Figure 3**.

2025 NO-BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2025 No-Build Condition during the weekday evening and Saturday midday peak hours at the study intersection. The signalized intersection of Georges Road and Milltown Road is calculated to operate generally consistent with the findings of the Existing Condition during the weekday evening and Saturday midday peak hours.

2025 BUILD CONDITION

The site-generated traffic volume of the proposed car wash was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project "build out" is assumed within two (2) years of the preparation of this study.

TRIP GENERATION

Trip generation projections for the proposed automated car wash were prepared utilizing ITE's Trip Generation Manual, 11th Edition. Trip generation rates associated with Land Use 948 "Automated Car Wash" were cited for the 4,841-square-foot car wash with one (1) tunnel. The ITE provides trip generation calculations based on several criteria, including number of wash tunnels and gross floor area of the facility. **Table 1** provides the weekday evening and Saturday midday trip generation volumes associated with the proposed development in terms of number of wash tunnels and gross floor area.

TABLE 1 – PROPOSED TRIP GENERATION

	Weekday Evening Peak Hour			Saturday Midday Peak Hour		
Land Use	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**
One (1) Wash Tunnel Automated Car Wash *ITE Land Use 948*	**39**	**39**	**78**	19	22	41
4,841 SF Automated Car Wash *ITE Land Use 948*	34	35	69	**74**	**73**	**147**
Highest Trip Rate	**39**	**39**	**78**	**74**	**73**	**147**

As shown in Table 1, the proposed automated car wash is expected to generate 78 trips during the weekday evening peak hour (based on the number of tunnels) and 147 trips during the Saturday midday peak hour (based on gross floor area). To maintain a conservative analysis, the maximum trip generation for each peak hour was utilized in this report. **Table 2** provides the anticipated trip generation of the proposed development using a mix of dimensional criteria.

TABLE 2 – PROPOSED TRIP GENERATION

	Weekday Evening Peak Hour			Saturday Midday Peak Hour		
Land Use	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**
Automated Car Wash *ITE Land Use 948*	39	39	78	74	73	147

TRIP ASSIGNMENT/DISTRIBUTION

The trips generated by the proposed development were distributed according to the existing travel pattern along the adjacent roadways and the access management plan of the site. The Site-Generated Traffic Volumes are illustrated on **Figure 4**.

2025 BUILD TRAFFIC VOLUMES

The site-generated trips were added to the 2025 No-Build Traffic Volumes to calculate the 2025 Build Traffic Volumes and are shown on appended **Figure 5**.

2025 BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2025 Build Condition during the weekday evening and Saturday midday peak hours at the study intersection and proposed site driveways. Appended **Table A1** compares the Existing, No-Build, and Build Conditions Level of Service and delay values.

The signalized intersection of Georges Road and Milltown Road is calculated to operate generally consistent with the findings of the No-Build Condition during the weekday evening and Saturday midday peak hours. The turning movements at the unsignalized intersection of Georges Road and the ingress site driveway are calculated to operate at Level of Service A during the weekday evening and Saturday midday peak hours. The turning movements at the unsignalized intersection of Georges Road and the egress site driveway are calculated to operate at Level of Service D or better during the weekday evening and Saturday midday peak hours. The turning movements at the unsignalized intersection of Milltown Road and the proposed right-in/right-out site driveway are calculated to operate at Level of Service B during the weekday evening and Saturday midday peak hours.

QUEUING ANALYSIS

The queuing at the signalized intersection of Georges Road and Milltown Road was analyzed to assess the amount of time the site driveway along Georges Road was blocked by the southbound queue. Specifically, the southbound queue along Georges Road during the weekday evening time period was analyzed. Based on the analysis, the site driveway was un-obstructed by the Georges Road southbound queue for approximately 55% of time during the weekday evening time period. The weekday evening time period represents the highest volume of southbound traffic along Georges Road, and, as such, it is expected that the remaining hours throughout the weekday and Saturday would be un-obstructed for over 55% of the time. As such, the existing driveway configuration and spacing along Georges Road would be sufficient to facilitate left and right turns out of the site driveway. The existing egress driveway along Georges Road provides the maximum spacing distance from the Milltown Road traffic signal. The egress-only driveway along Georges Road would provide stacking for up to six (6) vehicles, which supports the maximum 95th percentile queue of less than two (2) vehicles, and as such the driveway would have no impact on site operations. It is noted that the NJDOT granted a Letter of No Interest to maintain the existing driveway locations and movements along Georges Road on August 31, 2023.

SITE CIRCULATION/PARKING SUPPLY

A review was conducted of the proposed automated car wash using the Site Plan prepared by our office, dated November 14, 2023. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Under the proposed development program, a 4,841-square-foot car wash with one (1)-tunnel would be constructed on the subject property. Access along Georges Road is proposed to remain via one (1) ingress-only driveway and one (1) egress-only driveway and access along Milltown Road is proposed via one (1) right-in/right-out driveway. The proposed car wash would be located on the easterly portion of the site with access

to the tunnel provided on the northerly side of the proposed building. Three (3) pay stations would be provided on the northerly portion of the site. Vehicles would enter the site via the Georges Road or Milltown Road driveway and travel in a clockwise direction to the pay station lanes and the car wash tunnel. Right-angle vacuum spaces would be provided on the central portion of the site to the west of the building and employee parking spaces would be provided on the westerly portion of the site. A trash enclosure would be provided on the northwesterly portion of the site.

Regarding the parking requirements for the proposed development, it is noted that the Township of North Brunswick Ordinance does not have specific parking requirements for car wash developments. The proposed development would provide five (5) employee parking spaces and 22 vacuum spaces, inclusive of one (1) ADA accessible vacuum space. The parking spaces would be nine (9) feet wide by 18 feet deep and the vacuum spaces would be 13 feet wide and 19 feet deep.

CONCLUSIONS

This report was prepared to examine the potential traffic impact of the proposed car wash development. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network. The site driveways and on-site layout have been designed to provide for effective access to and from the subject property. The existing driveway configuration and spacing along Georges Road would be sufficient to facilitate left and right turns out of the site driveway. Based on the characteristics of the car wash, the parking supply would be sufficient to support this project.

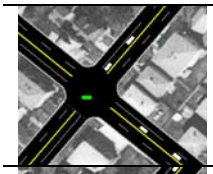
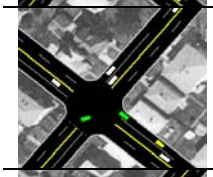
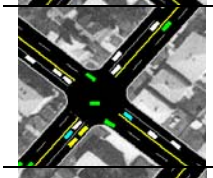
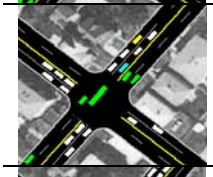
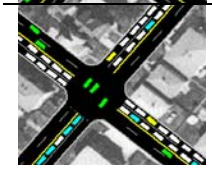
TECHNICAL APPENDIX

LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA

LEVEL OF SERVICE /AVERAGE CONTROL DELAY CRITERIA

The ability of a roadway to effectively accommodate traffic demand is determined through an assessment of the volume-to-capacity ratio, delay and Level of Service of the lane group and/or intersection. The volume-to-capacity ratio is the ratio of traffic flow rate to capacity for a given transportation facility. As defined within the Highway Capacity Manual, 6th Edition (HCM), intersection delay is the total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross section of the facility. Level of service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

For an unsignalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle and LOS F denotes operations with delay in excess of 80 seconds per vehicle.

	Level Of Service (LOS)	Signalized Delay Range (average control delay in sec/veh)	Unsignalized Delay Range (average control delay in sec/veh)
	A	<=10	<=10
	B	>10 and <=20	>10 and <=15
	C	>20 and <=35	>15 and <=25
	D	>35 and <=55	>25 and <=35
	E	>55 and <=80	>35 and <=50
	F	>80	>50

Source: Highway Capacity Manual, 6th Edition

STONEFIELD

Table A1: Comparative Level of Service (Delay) Table

Township of North Brunswick, Middlesex County, New Jersey

X (n) = Level of Service (seconds of delay)

		Weekday Evening Peak Hour			Saturday Midday Peak Hour		
Intersection	**Lane Group**	**2023 Existing Condition**	**2025 No-Build Condition**	**2025 Build Condition**	**2023 Existing Condition**	**2025 No-Build Condition**	**2025 Build Condition**
NJSH Route 171 & Milltown Road	WB Left	D (49.3)	D (49.7)	D (50.0)	D (44.2)	D (44.5)	D (44.8)
	WB Right	C (22.9)	C (22.6)	C (22.3)	C (27.1)	C (26.8)	C (26.2)
	NB Through	B (18.8)	B (19.5)	C (20.3)	B (14.8)	B (15.3)	B (16.5)
	NB Right	B (14.7)	B (15.2)	B (15.5)	B (12.2)	B (12.5)	B (13.1)
	SB Left	B (15.0)	B (16.4)	B (18.5)	B (10.5)	B (11.2)	B (13.6)
	SB Through	A (9.0)	A (9.4)	A (9.4)	A (6.9)	A (7.1)	A (7.4)
	Overall	**C (21.1)**	**C (21.6)**	**C (22.2)**	**B (17.8)**	**B (18.1)**	**B (18.8)**
NJSH Route 171 & Ingress Driveway	SB Left/Through			A (9.8)			A (9.8)
NJSH Route 171 & Egress Driveway	WB Left/Right			D (27.4)			D (29.7)
Milltown Road & Site Driveway	SB Right			B (10.9)			B (10.6)

TURNING MOVEMENT COUNT DATA

1. NJSH Route 171 and Milltown Road - TMC

Thu Oct 12, 2023
Full Length (4 PM-7 PM, 11 AM-2 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 1120852, Location: 40.467412, -74.453607, Site Code: 1

Provided by: Imperial Traffic & Data Collection
PO Box 4637, Cherry Hill, NJ, 08003, US

Leg / Direction	Route 171 Northbound						Route 171 Southbound					Milltown Road Westbound						
Time	T	R	U	RR	**App**	Ped*	L	T	U	**App**	Ped*	L	R	U	RR	**App**	Ped*	**Int**
2023-10-12 4:00PM	124	58	0	30	**212**	0	78	109	0	**187**	3	73	72	0	10	**155**	1	**554**
4:15PM	118	44	0	28	**190**	0	77	125	0	**202**	5	69	58	0	20	**147**	3	**539**
4:30PM	120	39	0	37	**196**	0	82	103	0	**185**	2	75	54	0	27	**156**	2	**537**
4:45PM	137	42	0	26	**205**	0	77	121	0	**198**	2	78	65	0	21	**164**	2	**567**
Hourly Total	499	183	0	121	**803**	0	314	458	0	**772**	12	295	249	0	78	**622**	8	**2197**
5:00PM	133	41	0	33	**207**	2	85	112	0	**197**	0	88	62	0	21	**171**	6	**575**
5:15PM	129	39	0	47	**215**	1	84	124	0	**208**	0	84	57	0	34	**175**	5	**598**
5:30PM	99	48	0	38	**185**	0	87	122	0	**209**	2	96	52	0	34	**182**	1	**576**
5:45PM	106	49	0	44	**199**	0	102	133	0	**235**	2	83	58	0	37	**178**	4	**612**
Hourly Total	467	177	0	162	**806**	3	358	491	0	**849**	4	351	229	0	126	**706**	16	**2361**
6:00PM	119	39	0	38	**196**	0	82	116	0	**198**	2	75	49	0	24	**148**	4	**542**
6:15PM	131	15	0	33	**179**	0	75	128	0	**203**	2	82	59	0	26	**167**	5	**549**
6:30PM	117	36	0	30	**183**	0	78	111	0	**189**	3	74	57	0	27	**158**	3	**530**
6:45PM	115	30	0	25	**170**	0	67	104	0	**171**	1	73	45	0	20	**138**	5	**479**
Hourly Total	482	120	0	126	**728**	0	302	459	0	**761**	8	304	210	0	97	**611**	17	**2100**
7:00PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	1	**1**	0	**1**
Hourly Total	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	1	**1**	0	**1**
2023-10-14 11:00AM	91	63	0	19	**173**	0	77	108	0	**185**	1	57	30	0	31	**118**	2	**476**
11:15AM	112	49	0	15	**176**	0	64	98	0	**162**	1	64	54	0	24	**142**	3	**480**
11:30AM	112	53	0	11	**176**	0	73	95	0	**168**	0	72	38	0	20	**130**	3	**474**
11:45AM	111	58	0	13	**182**	0	76	110	0	**186**	0	75	48	0	35	**158**	5	**526**
Hourly Total	426	223	0	58	**707**	0	290	411	0	**701**	2	268	170	0	110	**548**	13	**1956**
12:00PM	114	61	0	28	**203**	0	77	105	0	**182**	0	72	61	0	24	**157**	0	**542**
12:15PM	95	52	0	24	**171**	0	79	109	0	**188**	2	68	44	0	27	**139**	0	**498**
12:30PM	116	56	0	21	**193**	0	83	116	0	**199**	0	63	68	0	42	**173**	4	**565**
12:45PM	127	38	0	24	**189**	0	84	105	0	**189**	0	78	56	0	18	**152**	1	**530**
Hourly Total	452	207	0	97	**756**	0	323	435	0	**758**	2	281	229	0	111	**621**	5	**2135**
1:00PM	102	34	0	17	**153**	0	73	81	0	**154**	0	62	45	0	43	**150**	0	**457**
1:15PM	108	35	0	27	**170**	0	68	95	0	**163**	2	80	56	0	27	**163**	2	**496**
1:30PM	100	62	0	18	**180**	0	70	113	0	**183**	4	54	37	0	42	**133**	2	**496**
1:45PM	110	50	0	9	**169**	0	62	103	0	**165**	0	78	57	0	34	**169**	2	**503**
Hourly Total	420	181	0	71	**672**	0	273	392	0	**665**	6	274	195	0	146	**615**	6	**1952**
2:00PM	0	0	0	0	**0**	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	0	0	**0**	0	**0**
Total	2746	1091	0	635	**4472**	3	1860	2646	0	**4506**	34	1773	1282	0	669	**3724**	65	**12702**
% Approach	61.4%	24.4%	0%	14.2%	**-**	-	41.3%	58.7%	0%	**-**	-	47.6%	34.4%	0%	18.0%	**-**	-	-
% Total	21.6%	8.6%	0%	5.0%	**35.2%**	-	14.6%	20.8%	0%	**35.5%**	-	14.0%	10.1%	0%	5.3%	**29.3%**	-	-
Lights	2714	1080	0	632	**4426**	-	1847	2618	0	**4465**	-	1755	1268	0	662	**3685**	-	12576

Leg Direction	Route 171 Northbound						Route 171 Southbound					Milltown Road Westbound						
Time	T	R	U	RR	**App**	Ped*	L	T	U	**App**	Ped*	L	R	U	RR	**App**	Ped*	**Int**
% Lights	98.8%	99.0%	0%	99.5%	**99.0%**	-	99.3%	98.9%	0%	**99.1%**	-	99.0%	98.9%	0%	99.0%	**99.0%**	-	99.0%
Articulated Trucks	2	1	0	0	**3**	-	2	2	0	**4**	-	1	1	0	1	**3**	-	10
% Articulated Trucks	0.1%	0.1%	0%	0%	**0.1%**	-	0.1%	0.1%	0%	**0.1%**	-	0.1%	0.1%	0%	0.1%	**0.1%**	-	0.1%
Buses and Single-Unit Trucks	30	10	0	3	**43**	-	11	26	0	**37**	-	17	13	0	6	**36**	-	116
% Buses and Single-Unit Trucks	1.1%	0.9%	0%	0.5%	**1.0%**	-	0.6%	1.0%	0%	**0.8%**	-	1.0%	1.0%	0%	0.9%	**1.0%**	-	0.9%
Pedestrians	-	-	-	-	-	3	-	-	-	-	32	-	-	-	-	-	61	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	94.1%	-	-	-	-	-	93.8%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	2	-	-	-	-	-	4	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	5.9%	-	-	-	-	-	6.2%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

1. NJSH Route 171 and Milltown Road - TMC

Provided by: Imperial Traffic & Data Collection
PO Box 4637, Cherry Hill, NJ, 08003, US

Thu Oct 12, 2023
PM Peak (Oct 12 2023 5PM - 6 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 1120852, Location: 40.467412, -74.453607, Site Code: 1

Leg Direction	Route 171 Northbound						Route 171 Southbound					Milltown Road Westbound						
Time	T	R	U	RR	**App**	Ped*	L	T	U	**App**	Ped*	L	R	U	RR	**App**	Ped*	**Int**
2023-10-12 5:00PM	133	41	0	33	**207**	2	85	112	0	**197**	0	88	62	0	21	**171**	6	**575**
5:15PM	129	39	0	47	**215**	1	84	124	0	**208**	0	84	57	0	34	**175**	5	**598**
5:30PM	99	48	0	38	**185**	0	87	122	0	**209**	2	96	52	0	34	**182**	1	**576**
5:45PM	106	49	0	44	**199**	0	102	133	0	**235**	2	83	58	0	37	**178**	4	**612**
Total	467	177	0	162	**806**	3	358	491	0	**849**	4	351	229	0	126	**706**	16	**2361**
% Approach	57.9%	22.0%	0%	20.1%	**-**	-	42.2%	57.8%	0%	**-**	-	49.7%	32.4%	0%	17.8%	**-**	-	-
% Total	19.8%	7.5%	0%	6.9%	**34.1%**	-	15.2%	20.8%	0%	**36.0%**	-	14.9%	9.7%	0%	5.3%	**29.9%**	-	-
PHF	0.878	0.903	-	0.862	**0.937**	-	0.877	0.923	-	**0.903**	-	0.914	0.923	-	0.851	**0.970**	-	0.964
Lights	463	174	0	160	**797**	-	356	482	0	**838**	-	345	227	0	124	**696**	-	2331
% Lights	99.1%	98.3%	0%	98.8%	**98.9%**	-	99.4%	98.2%	0%	**98.7%**	-	98.3%	99.1%	0%	98.4%	**98.6%**	-	98.7%
Articulated Trucks	1	0	0	0	**1**	-	1	1	0	**2**	-	1	0	0	1	**2**	-	5
% Articulated Trucks	0.2%	0%	0%	0%	**0.1%**	-	0.3%	0.2%	0%	**0.2%**	-	0.3%	0%	0%	0.8%	**0.3%**	-	0.2%
Buses and Single-Unit Trucks	3	3	0	2	**8**	-	1	8	0	**9**	-	5	2	0	1	**8**	-	25
% Buses and Single-Unit Trucks	0.6%	1.7%	0%	1.2%	**1.0%**	-	0.3%	1.6%	0%	**1.1%**	-	1.4%	0.9%	0%	0.8%	**1.1%**	-	1.1%
Pedestrians	-	-	-	-	-	3	-	-	-	-	2	-	-	-	-	-	14	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	50.0%	-	-	-	-	-	87.5%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	2	-	-	-	-	-	2	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	50.0%	-	-	-	-	-	12.5%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

1. NJSH Route 171 and Milltown Road - TMC

Provided by: Imperial Traffic & Data Collection
PO Box 4637, Cherry Hill, NJ, 08003, US

Sat Oct 14, 2023
Midday Peak (WKND) (Oct 14 2023 12PM - 1 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 1120852, Location: 40.467412, -74.453607, Site Code: 1

Leg	Route 171						Route 171					Milltown Road						
Direction	Northbound						Southbound					Westbound						
Time	T	R	U	RR	App	Ped*	L	T	U	App	Ped*	L	R	U	RR	App	Ped*	Int
2023-10-14 12:00PM	114	61	0	28	**203**	0	77	105	0	**182**	0	72	61	0	24	**157**	0	**542**
12:15PM	95	52	0	24	**171**	0	79	109	0	**188**	2	68	44	0	27	**139**	0	**498**
12:30PM	116	56	0	21	**193**	0	83	116	0	**199**	0	63	68	0	42	**173**	4	**565**
12:45PM	127	38	0	24	**189**	0	84	105	0	**189**	0	78	56	0	18	**152**	1	**530**
Total	452	207	0	97	**756**	0	323	435	0	**758**	2	281	229	0	111	**621**	5	**2135**
% Approach	59.8%	27.4%	0%	12.8%	**-**	-	42.6%	57.4%	0%	**-**	-	45.2%	36.9%	0%	17.9%	**-**	-	-
% Total	21.2%	9.7%	0%	4.5%	**35.4%**	-	15.1%	20.4%	0%	**35.5%**	-	13.2%	10.7%	0%	5.2%	**29.1%**	-	-
PHF	0.890	0.848	-	0.866	**0.931**	-	0.961	0.938	-	**0.952**	-	0.901	0.842	-	0.661	**0.897**	-	0.945
Lights	442	207	0	97	**746**	-	320	433	0	**753**	-	280	228	0	111	**619**	-	2118
% Lights	97.8%	100%	0%	100%	**98.7%**	-	99.1%	99.5%	0%	**99.3%**	-	99.6%	99.6%	0%	100%	**99.7%**	-	99.2%
Articulated Trucks	0	0	0	0	**0**	-	1	0	0	**1**	-	0	0	0	0	**0**	-	1
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0.3%	0%	0%	**0.1%**	-	0%	0%	0%	0%	**0%**	-	0%
Buses and Single-Unit Trucks	10	0	0	0	**10**	-	2	2	0	**4**	-	1	1	0	0	**2**	-	16
% Buses and Single-Unit Trucks	2.2%	0%	0%	0%	**1.3%**	-	0.6%	0.5%	0%	**0.5%**	-	0.4%	0.4%	0%	0%	**0.3%**	-	0.7%
Pedestrians	-	-	-	-	-	0	-	-	-	-	2	-	-	-	-	-	5	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

A9

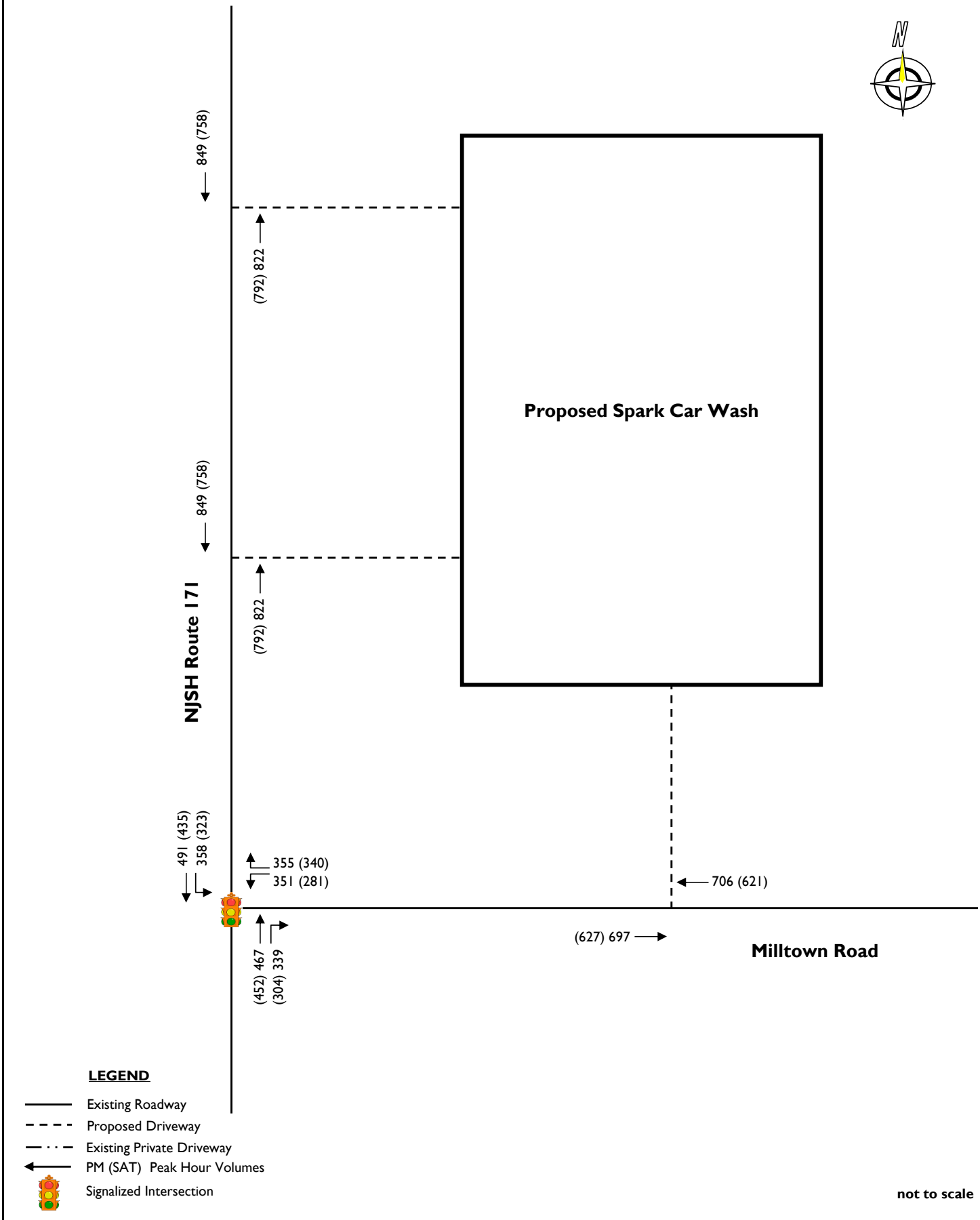
SPARK CAR WASH TIME OF DAY FACTORS

Average Hourly Car Counts - 1 year

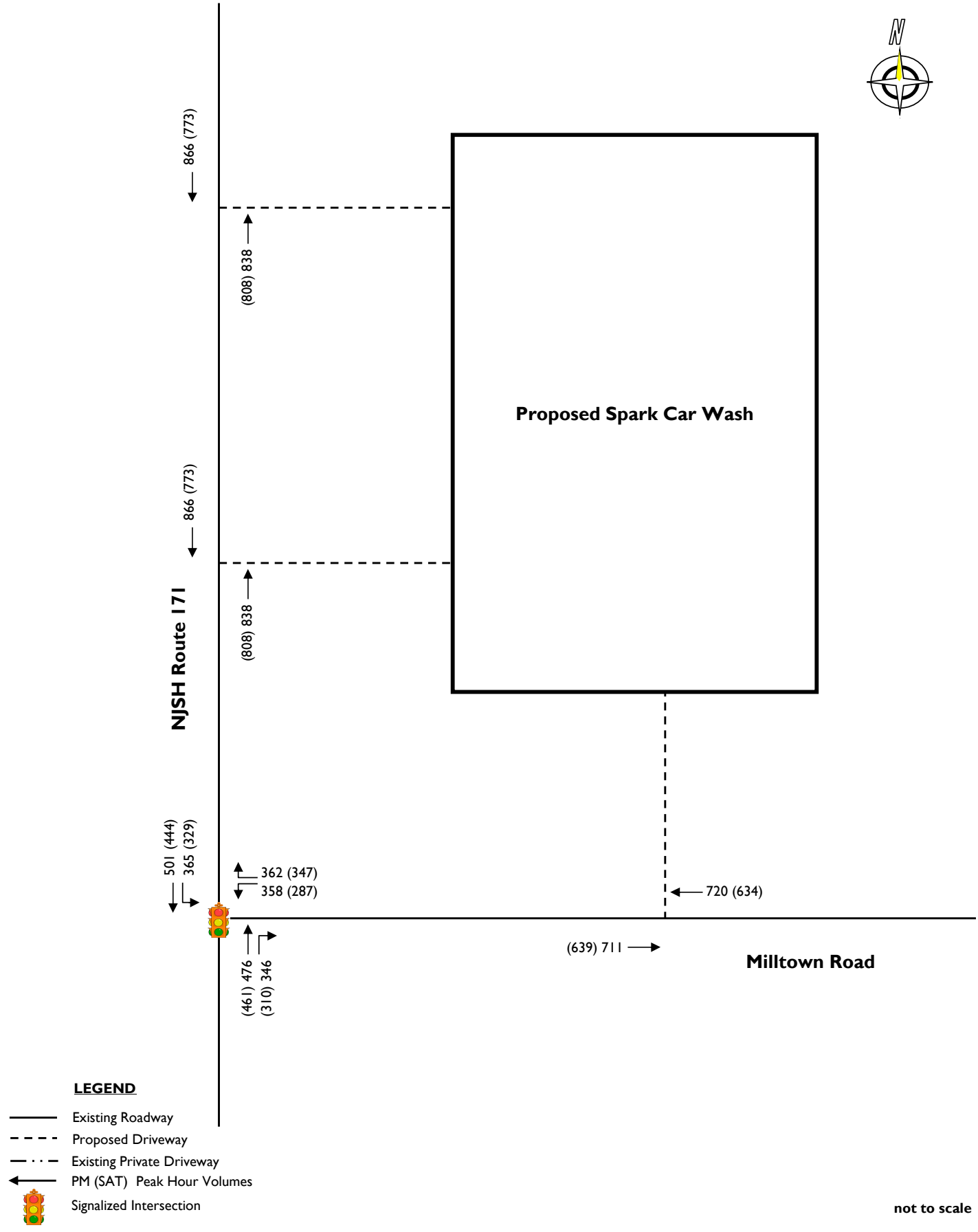
Hour	Average Daily Useage
7 am	0.00%
8 am	5.27%
9 am	7.46%
10 am	8.58%
11 am	9.57%
12 pm	9.98%
1 pm	9.93%
2 pm	9.79%
3 pm	9.97%
4 pm	9.49%
5 pm	8.08%
6 pm	6.75%
7 pm	4.52%
8 pm	0.00%

FIGURES

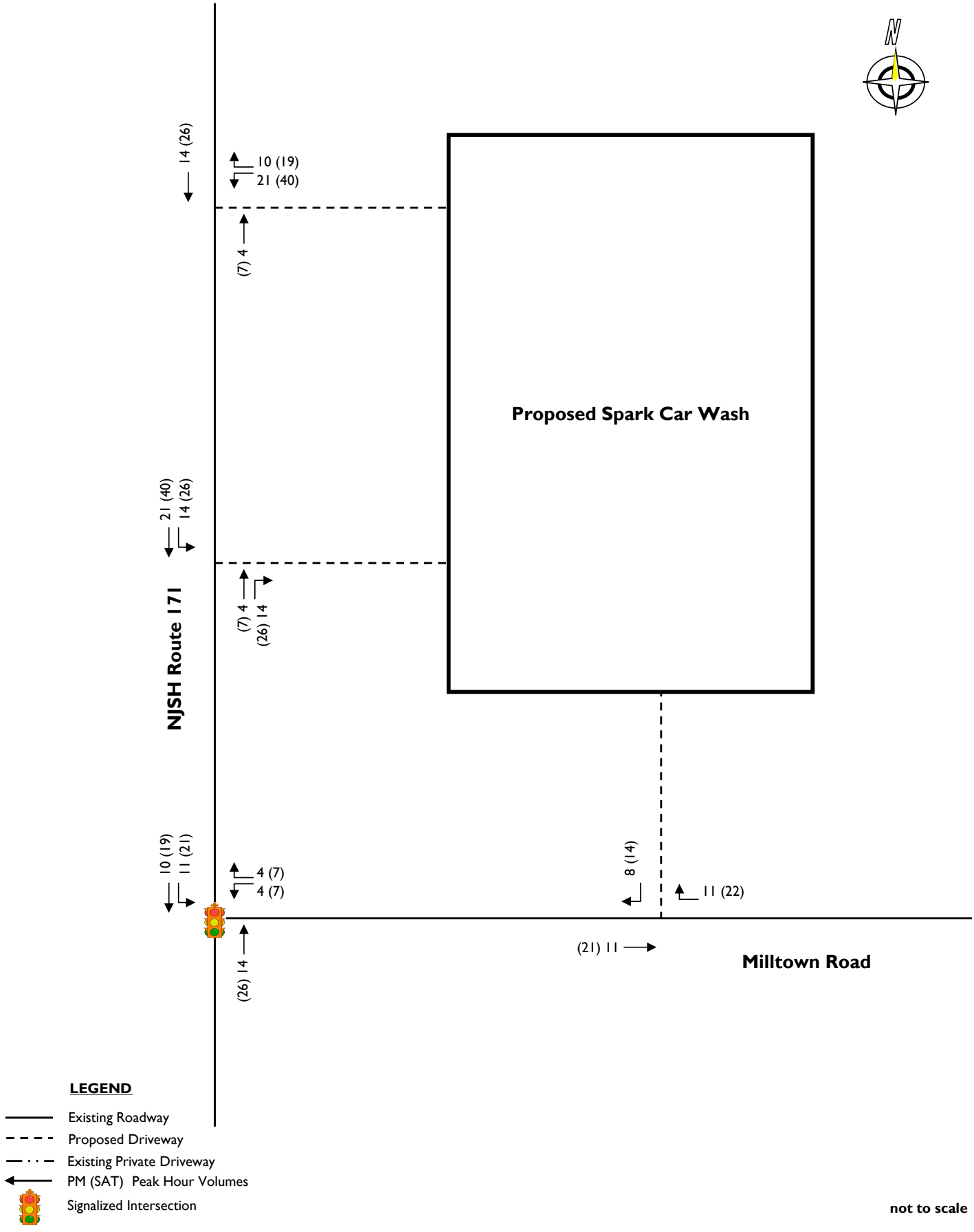
STONEFIELD	Proposed Spark Car Wash 575 Milltown Road North Brunswick, Middlesex County, New Jersey Traffic Impact Study	FIGURE 1 Site Location Map



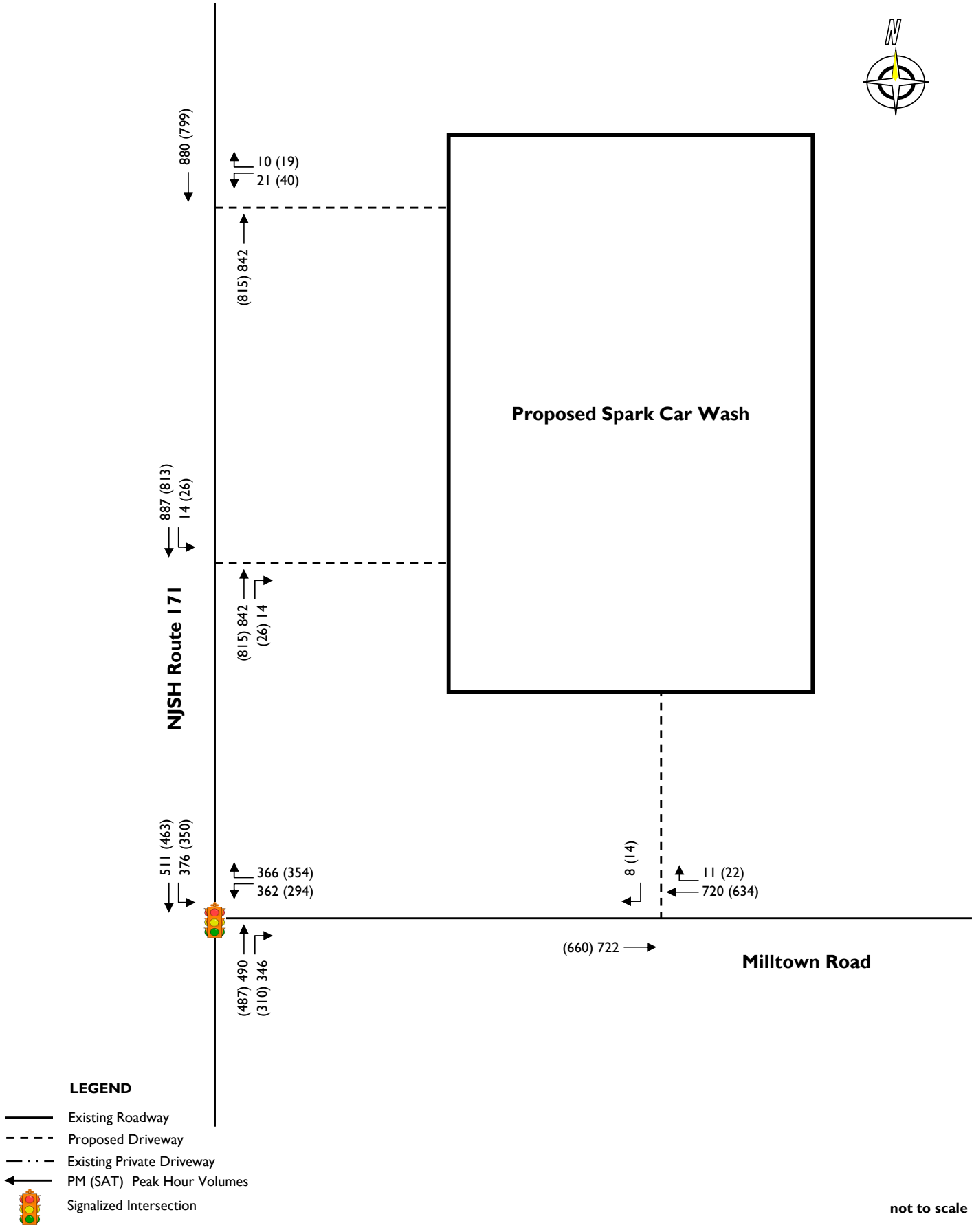
STONEFIELD	**Proposed Spark Car Wash** **575 Milltown Road** **North Brunswick, Middlesex County, New Jersey** **Traffic Impact Study**	**FIGURE 2** **2023 Existing Traffic Volumes**



STONEFIELD	**Proposed Spark Car Wash** **575 Milltown Road** **North Brunswick, Middlesex County, New Jersey** **Traffic Impact Study**	**FIGURE 3** **2025 No-Build Traffic Volumes**



STONEFIELD	Proposed Spark Car Wash 575 Milltown Road North Brunswick, Middlesex County, New Jersey Traffic Impact Study	FIGURE 4 Site-Generated Traffic Volumes



STONEFIELD	**Proposed Spark Car Wash** **575 Milltown Road** **North Brunswick, Middlesex County, New Jersey** **Traffic Impact Study**	**FIGURE 5** **2025 Build Traffic Volumes**

HIGHWAY CAPACITY ANALYSIS DETAIL SHEETS

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	351	355	467	339	358	491
Future Volume (veh/h)	351	355	467	339	358	491
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1920	1935	1935	1935	1935	1920
Adj Flow Rate, veh/h	366	239	486	184	373	511
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	1	1	1	1	2
Cap, veh/h	414	570	918	778	540	1229
Arrive On Green	0.23	0.23	0.47	0.47	0.12	0.64
Sat Flow, veh/h	1828	1640	1935	1640	1843	1920
Grp Volume(v), veh/h	366	239	486	184	373	511
Grp Sat Flow(s),veh/h/ln	1828	1640	1935	1640	1843	1920
Q Serve(g_s), s	17.4	10.0	15.9	6.0	8.7	11.7
Cycle Q Clear(g_c), s	17.4	10.0	15.9	6.0	8.7	11.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	414	570	918	778	540	1229
V/C Ratio(X)	0.88	0.42	0.53	0.24	0.69	0.42
Avail Cap(c_a), veh/h	488	636	918	778	563	1229
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.7	22.4	16.6	14.0	11.6	7.9
Incr Delay (d2), s/veh	15.6	0.5	2.2	0.7	3.4	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.2	6.8	11.4	4.0	6.3	7.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	49.3	22.9	18.8	14.7	15.0	9.0
LnGrp LOS	D	C	B	B	B	A
Approach Vol, veh/h	605		670			884
Approach Delay, s/veh	38.8		17.6			11.5
Approach LOS	D		B			B

Timer - Assigned Phs		2			5	6	8
Phs Duration (G+Y+Rc), s		63.6			14.9	48.7	26.4
Change Period (Y+Rc), s		6.0			4.0	6.0	6.0
Max Green Setting (Gmax), s		54.0			12.0	38.0	24.0
Max Q Clear Time (g_c+I1), s		13.7			10.7	17.9	19.4
Green Ext Time (p_c), s		3.5			0.2	3.5	0.9

Intersection Summary	
HCM 6th Ctrl Delay	21.1
HCM 6th LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	281	340	452	304	323	435
Future Volume (veh/h)	281	340	452	304	323	435
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1950	1950	1920	1950	1935	1935
Adj Flow Rate, veh/h	296	241	476	218	340	458
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	2	0	1	1
Cap, veh/h	351	484	1016	875	562	1311
Arrive On Green	0.19	0.19	0.53	0.53	0.10	0.68
Sat Flow, veh/h	1857	1653	1920	1653	1843	1935
Grp Volume(v), veh/h	296	241	476	218	340	458
Grp Sat Flow(s),veh/h/ln	1857	1653	1920	1653	1843	1935
Q Serve(g_s), s	13.8	10.9	14.0	6.4	7.0	9.0
Cycle Q Clear(g_c), s	13.8	10.9	14.0	6.4	7.0	9.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	351	484	1016	875	562	1311
V/C Ratio(X)	0.84	0.50	0.47	0.25	0.61	0.35
Avail Cap(c_a), veh/h	495	612	1016	875	616	1311
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.2	26.3	13.3	11.5	9.1	6.1
Incr Delay (d2), s/veh	9.0	0.8	1.6	0.7	1.5	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.2	7.6	9.9	4.2	4.5	5.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	44.2	27.1	14.8	12.2	10.5	6.9
LnGrp LOS	D	C	B	B	B	A
Approach Vol, veh/h	537		694			798
Approach Delay, s/veh	36.5		14.0			8.4
Approach LOS	D		B			A

Timer - Assigned Phs		2			5	6	8
Phs Duration (G+Y+Rc), s		67.0			13.3	53.6	23.0
Change Period (Y+Rc), s		6.0			4.0	6.0	6.0
Max Green Setting (Gmax), s		54.0			12.0	38.0	24.0
Max Q Clear Time (g_c+I1), s		11.0			9.0	16.0	15.8
Green Ext Time (p_c), s		3.1			0.3	3.7	1.2

Intersection Summary	
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	358	362	476	346	365	501
Future Volume (veh/h)	358	362	476	346	365	501
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1920	1935	1935	1935	1935	1870
Adj Flow Rate, veh/h	373	246	496	191	380	522
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	1	1	1	1	2
Cap, veh/h	420	580	906	768	531	1191
Arrive On Green	0.23	0.23	0.47	0.47	0.12	0.64
Sat Flow, veh/h	1828	1640	1935	1640	1843	1870
Grp Volume(v), veh/h	373	246	496	191	380	522
Grp Sat Flow(s),veh/h/ln	1828	1640	1935	1640	1843	1870
Q Serve(g_s), s	17.8	10.3	16.5	6.3	9.0	12.7
Cycle Q Clear(g_c), s	17.8	10.3	16.5	6.3	9.0	12.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	420	580	906	768	531	1191
V/C Ratio(X)	0.89	0.42	0.55	0.25	0.72	0.44
Avail Cap(c_a), veh/h	488	640	906	768	548	1191
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	22.1	17.1	14.4	12.1	8.2
Incr Delay (d2), s/veh	16.2	0.5	2.4	0.8	4.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.5	6.9	11.8	4.3	6.7	8.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	49.7	22.6	19.5	15.2	16.4	9.4
LnGrp LOS	D	C	B	B	B	A
Approach Vol, veh/h	619		687			902
Approach Delay, s/veh	38.9		18.3			12.4
Approach LOS	D		B			B

Timer - Assigned Phs		2			5	6	8
Phs Duration (G+Y+Rc), s		63.3			15.2	48.2	26.7
Change Period (Y+Rc), s		6.0			4.0	6.0	6.0
Max Green Setting (Gmax), s		54.0			12.0	38.0	24.0
Max Q Clear Time (g_c+I1), s		14.7			11.0	18.5	19.8
Green Ext Time (p_c), s		3.6			0.1	3.6	0.9

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	287	347	461	310	329	444
Future Volume (veh/h)	287	347	461	310	329	444
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1950	1950	1920	1950	1935	1935
Adj Flow Rate, veh/h	302	248	485	224	346	467
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	2	0	1	1
Cap, veh/h	357	493	1005	865	553	1305
Arrive On Green	0.19	0.19	0.52	0.52	0.11	0.67
Sat Flow, veh/h	1857	1653	1920	1653	1843	1935
Grp Volume(v), veh/h	302	248	485	224	346	467
Grp Sat Flow(s),veh/h/ln	1857	1653	1920	1653	1843	1935
Q Serve(g_s), s	14.1	11.1	14.5	6.7	7.2	9.3
Cycle Q Clear(g_c), s	14.1	11.1	14.5	6.7	7.2	9.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	357	493	1005	865	553	1305
V/C Ratio(X)	0.85	0.50	0.48	0.26	0.63	0.36
Avail Cap(c_a), veh/h	495	616	1005	865	603	1305
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	26.1	13.7	11.8	9.5	6.3
Incr Delay (d2), s/veh	9.4	0.8	1.7	0.7	1.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.5	7.7	10.3	4.4	4.7	6.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	44.5	26.8	15.3	12.5	11.2	7.1
LnGrp LOS	D	C	B	B	B	A
Approach Vol, veh/h	550		709			813
Approach Delay, s/veh	36.5		14.4			8.8
Approach LOS	D		B			A

Timer - Assigned Phs		2			5	6	8
Phs Duration (G+Y+Rc), s		66.7			13.5	53.1	23.3
Change Period (Y+Rc), s		6.0			4.0	6.0	6.0
Max Green Setting (Gmax), s		54.0			12.0	38.0	24.0
Max Q Clear Time (g_c+I1), s		11.3			9.2	16.5	16.1
Green Ext Time (p_c), s		3.2			0.3	3.8	1.2

Intersection Summary	
HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	362	366	490	346	376	511
Future Volume (veh/h)	362	366	490	346	376	511
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1920	1935	1935	1935	1935	1920
Adj Flow Rate, veh/h	377	250	510	191	392	532
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	1	1	1	1	2
Cap, veh/h	424	590	895	758	524	1219
Arrive On Green	0.23	0.23	0.46	0.46	0.13	0.63
Sat Flow, veh/h	1828	1640	1935	1640	1843	1920
Grp Volume(v), veh/h	377	250	510	191	392	532
Grp Sat Flow(s),veh/h/ln	1828	1640	1935	1640	1843	1920
Q Serve(g_s), s	18.0	10.4	17.3	6.4	9.4	12.6
Cycle Q Clear(g_c), s	18.0	10.4	17.3	6.4	9.4	12.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	424	590	895	758	524	1219
V/C Ratio(X)	0.89	0.42	0.57	0.25	0.75	0.44
Avail Cap(c_a), veh/h	488	647	895	758	534	1219
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	21.8	17.7	14.7	12.8	8.3
Incr Delay (d2), s/veh	16.5	0.5	2.6	0.8	5.7	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.7	7.0	12.4	4.3	7.3	8.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	50.0	22.3	20.3	15.5	18.5	9.4
LnGrp LOS	D	C	C	B	B	A
Approach Vol, veh/h	627		701			924
Approach Delay, s/veh	38.9		19.0			13.3
Approach LOS	D		B			B

Timer - Assigned Phs		2			5	6	8
Phs Duration (G+Y+Rc), s		63.1			15.5	47.6	26.9
Change Period (Y+Rc), s		6.0			4.0	6.0	6.0
Max Green Setting (Gmax), s		54.0			12.0	38.0	24.0
Max Q Clear Time (g_c+I1), s		14.6			11.4	19.3	20.0
Green Ext Time (p_c), s		3.7			0.1	3.7	0.9

Intersection Summary	
HCM 6th Ctrl Delay	22.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	842	14	14	887
Future Vol, veh/h	0	0	842	14	14	887
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	2
Mvmt Flow	0	0	877	15	15	924

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1839	885	0	0	892	0
Stage 1	885	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	84	347	-	-	769	-
Stage 1	407	-	-	-	-	-
Stage 2	377	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	82	347	-	-	769	-
Mov Cap-2 Maneuver	82	-	-	-	-	-
Stage 1	407	-	-	-	-	-
Stage 2	369	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	769	-
HCM Lane V/C Ratio	-	-	-	0.019	-
HCM Control Delay (s)	-	-	0	9.8	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	10	842	0	0	880
Future Vol, veh/h	21	10	842	0	0	880
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	2
Mvmt Flow	22	10	877	0	0	917

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1336	877	0	-	-	-
Stage 1	877	-	-	-	-	-
Stage 2	459	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	159	351	-	0	0	-
Stage 1	410	-	-	0	0	-
Stage 2	609	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	159	351	-	-	-	-
Mov Cap-2 Maneuver	159	-	-	-	-	-
Stage 1	410	-	-	-	-	-
Stage 2	609	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	27.4	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	193	-
HCM Lane V/C Ratio	-	0.167	-
HCM Control Delay (s)	-	27.4	-
HCM Lane LOS	-	D	-
HCM 95th %tile Q(veh)	-	0.6	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	722	720	11	0	8
Future Vol, veh/h	0	722	720	11	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	1	2	0	0	0
Mvmt Flow	0	752	750	11	0	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	381
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	623
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	623
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	623
HCM Lane V/C Ratio	-	-	-	0.013
HCM Control Delay (s)	-	-	-	10.9
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	294	354	487	310	350	463
Future Volume (veh/h)	294	354	487	310	350	463
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1950	1950	1920	1950	1935	1935
Adj Flow Rate, veh/h	309	256	513	224	368	487
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	2	0	1	1
Cap, veh/h	364	511	985	848	538	1297
Arrive On Green	0.20	0.20	0.51	0.51	0.11	0.67
Sat Flow, veh/h	1857	1653	1920	1653	1843	1935
Grp Volume(v), veh/h	309	256	513	224	368	487
Grp Sat Flow(s),veh/h/ln	1857	1653	1920	1653	1843	1935
Q Serve(g_s), s	14.4	11.4	16.0	6.9	7.9	10.0
Cycle Q Clear(g_c), s	14.4	11.4	16.0	6.9	7.9	10.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	364	511	985	848	538	1297
V/C Ratio(X)	0.85	0.50	0.52	0.26	0.68	0.38
Avail Cap(c_a), veh/h	495	627	985	848	576	1297
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.9	25.4	14.6	12.3	10.5	6.5
Incr Delay (d2), s/veh	9.9	0.8	2.0	0.8	3.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.7	7.8	11.2	4.5	5.5	6.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	44.8	26.2	16.5	13.1	13.6	7.4
LnGrp LOS	D	C	B	B	B	A
Approach Vol, veh/h	565		737			855
Approach Delay, s/veh	36.4		15.5			10.0
Approach LOS	D		B			B

Timer - Assigned Phs		2			5	6	8
Phs Duration (G+Y+Rc), s		66.3			14.2	52.2	23.7
Change Period (Y+Rc), s		6.0			4.0	6.0	6.0
Max Green Setting (Gmax), s		54.0			12.0	38.0	24.0
Max Q Clear Time (g_c+I1), s		12.0			9.9	18.0	16.4
Green Ext Time (p_c), s		3.3			0.3	3.9	1.2

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	815	26	26	813
Future Vol, veh/h	0	0	815	26	26	813
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	0	0	858	27	27	856

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1782	872	0	0	885	0
Stage 1	872	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	91	353	-	-	773	-
Stage 1	412	-	-	-	-	-
Stage 2	396	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	88	353	-	-	773	-
Mov Cap-2 Maneuver	88	-	-	-	-	-
Stage 1	412	-	-	-	-	-
Stage 2	382	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	773	-
HCM Lane V/C Ratio	-	-	-	0.035	-
HCM Control Delay (s)	-	-	0	9.8	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	40	19	815	0	0	799
Future Vol, veh/h	40	19	815	0	0	799
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	42	20	858	0	0	841

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1279	858	0	-	-	-
Stage 1	858	-	-	-	-	-
Stage 2	421	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	172	359	-	0	0	-
Stage 1	419	-	-	0	0	-
Stage 2	636	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	172	359	-	-	-	-
Mov Cap-2 Maneuver	172	-	-	-	-	-
Stage 1	419	-	-	-	-	-
Stage 2	636	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	29.7	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	207	-
HCM Lane V/C Ratio	-	0.3	-
HCM Control Delay (s)	-	29.7	-
HCM Lane LOS	-	D	-
HCM 95th %tile Q(veh)	-	1.2	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	660	634	22	0	14
Future Vol, veh/h	0	660	634	22	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	0	695	667	23	0	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	345
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	657
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	657
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	657
HCM Lane V/C Ratio	-	-	-	0.022
HCM Control Delay (s)	-	-	-	10.6
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

TRAFFIC SIGNAL TIMING DIRECTIVE

Directive No. 326-20
Route NJ 171 and Milltown Road
North Brunswick Township, Middlesex County

90-SECOND BACKGROUND CYCLE

Phase	Signal Indications								Time (Sec.)
	1, 2	3, 4	5	6, 7	8, 9	10, 11	12, 13	14, 15	
Vehicle Actuation									
A) Route NJ 171 ROW	G	G	G	G	R	R	W	DW	40 – 16
Pedestrian Clearance	G	G	G	G	R	R	FDW	DW	22
Change	Y	Y	Y	Y	R	R	DW	DW	4*
Clearance	R	R	R	R	R	R	DW	DW	2
B) Milltown Road ROW	R	R/-G>	R	R	G	G	DW	DW	7 – 24
Change	R	R/-Y>	R	R	Y	Y/-G>[1]	DW	DW	4
Clearance	R	R	R	R	R	R/-G>[2]	DW	DW	2
C) Route NJ 171 SB Lead	R	R	G	G/<G-	R	R/-G>	DW	DW	5 – 12
Lead Clearance	R	R	G	G/<Y-	R	R/-Y>	DW	DW	4
Pedestrian Actuation									
A) Route NJ 171 ROW	G	G	G	G	R	R	W	DW	23 – 16
Pedestrian Clearance	G	G	G	G	R	R	FDW	DW	22
Change	Y	Y	Y	Y	R	R	DW	DW	4*
Clearance	R	R	R	R	R	R	DW	DW	2
B) Milltown Road ROW	R	R/-G>	R	R	G	G	DW	W	7
Pedestrian Clearance	R	R/-G>	R	R	G	G	DW	FDW	14
Vehicle Extension	R	R/-G>	R	R	G	G	DW	DW	3
Change	R	R/-Y>	R	R	Y	Y/-G>[1]	DW	DW	4
Clearance	R	R	R	R	R	R/-G>[2]	DW	DW	2
C) Route NJ 171 SB Lead	R	R	G	G/<G-	R	R/-G>	DW	DW	5 – 12
Lead Clearance	R	R	G	G/<Y-	R	R/-Y>	DW	DW	4
Emergency Flash	Y	Y	Y	Y	R	R	DARK	DARK	-

*An offset of 0 seconds is measured from the beginning of yellow to Route NJ 171 traffic at this intersection.

The vehicular memories are to be disconnected and the vehicle extension set at 2 seconds.

The manual control cord is to be disconnected.

1 - To be "Y" if Phase C is skipped.

2 - To be "R" if Phase C is skipped.

Upon pre-emption activation, the following numbers (in seconds) represent the directional time delay before the "Transition Into" sequence

Signalized Intersection	Pre-Emption Plan #1	Pre-Emption Plan #2	Pre-Emption Plan #3	Pre-Emption Plan #4
	Along Route 171 (Georges Road) N/B	Along Route 171 (Georges Road) S/B	Fire	Police
Route US 1 NB Ramp H – Route US 130	10	35	15 (SB)	15 (SB)
Route NJ 171 (Georges Road) – Route US 1 SB Ramp F	20	25	5 (SB)	5 (SB)
Route NJ 171 (Georges Road) – Cranbury Cross Rd./Pardun Rd.	24	21	*0 (EB Side Street)	**0 (SB)
Route NJ 171 (Georges Road) – Hermann Road	31	14	7 (NB)	7 (NB)
Route NJ 171 (Georges Road) – Milltown Road	35	10	11 (NB)	11 (NB)

NOTES:

1. During the "Transition Into" pre-emption control, minimum green times, yellow change intervals, all-red clearance and pedestrian clearance (FDW) times must be satisfied. During the Route NJ 171 ROW phase, a maximum of 4 seconds of "Walk" time shall be guaranteed, following by the FDW, yellow change and all-red intervals.

2. Pre-emption control shall guarantee / hold 18 seconds of Fire / Emergency ROW. Both directions of Route NJ 171 shall remain green during pre-emption. A "Don't Walk" shall be displayed for all pedestrian indications.

3. During the "Transition Out" of pre-emption control, yellow change intervals and all-red clearance times must be satisfied. The controller shall exit to the side street following the normal sequence of phasing.

4. *Fire pre-emption run originates on the eastbound approach, since the firehouse is located on Cranbury Cross Road.

5. **Police pre-emption run originates from a southbound Route NJ 171 driveway located between Cranbury Cross Road and Hermann Road.