Bristol, Rhode Island

Mainstay/Sleep Inn Hotel

July, 2020

TRAFFIC IMPACT STUDY

BETA
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Lincoln, Rhode Island 02865
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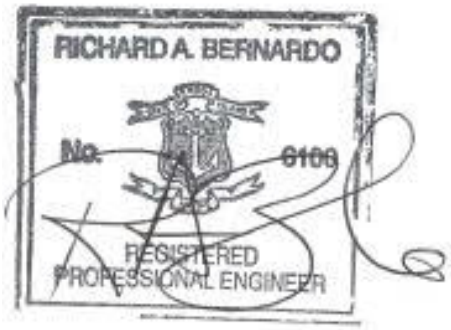
Mainstay/Sleep Inn Hotel
Bristol, Rhode Island

TRAFFIC IMPACT STUDY

Prepared by: BETA GROUP, INC.

Prepared for: Mr. Dennis DeGrazia
D&M, LLC
92 Faunce Corner Road, Suite 160
North Dartmouth, MA 02747

July, 2020



Richard A. Bernardo, PE
Vice President

July 31, 2020

Mr. Dennis DeGrazia
D&M, LLC
92 Faunce Corner Road, Suite 160
North Dartmouth, MA 02747

Re: Proposed Land Development Project
Mainstay/Sleep Inn Hotel
Bristol, Rhode Island
Traffic Engineering Services

Dear Mr. DeGrazia:

BETA Group, Inc., in accordance with our scope of services, has completed a traffic impact study for a proposed land development project in the Town of Bristol, Rhode Island. The site is located on the southerly side of Gooding Avenue just east of Broadcommon Road. The parcel is defined as Assessor's Plat 111, Lot 1 and contains approximately 9.78 acres of undeveloped and wooded land.

Based on information provided by the site engineer, *DiPrete Engineering*, and a review of the proposed development plan, it is our understanding that project includes construction of a three-story *Mainstay/Sleep Inn*, building containing 80 rooms with an associated 80 space parking lot. Access and egress to the hotel will be provided from two new driveways on Gooding Avenue with one full access and the second limited to an entrance only.

The study included herein was conducted to determine the adequacy of the existing servicing roadways to accommodate anticipated traffic to be generated by the land development project. An analysis of potential impacts to the roadway capacity and safety has been completed and is discussed in the following report.

Very truly yours,
BETA Group, Inc.

Paul J. Bannon
Associate

Richard A. Bernardo, P.E.
Vice President

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1.0 INTRODUCTION

The objective of the following study is to assess the potential traffic impacts associated with a proposed hotel development project in the Town of Bristol, Rhode Island. The property is situated on a parcel of land along the southerly side of Gooding Avenue, between Broadcommon Road and Metacom Avenue (Route 136). The subject lot contains approximately 9.78 acres of undeveloped and wooded land. Refer to Figure 1, Project Vicinity Map, on the following page for the project location within the town.

The new development will include construction of a *Mainstay/Sleep Inn* hotel containing 80 rooms. The hotel will be serviced by two new driveways on Gooding Avenue. The driveways to an 80 space parking lot will be provided at a full access curb opening on the western end of the property, and a main one-way entrance only driveway separating the combination *Main Stay* and *Sleep Inn* components of the hotel project. The one-way main driveway allows immediate access to the front entrance of these buildings.

The study summarized herein focused on both traffic flow efficiency and safety along Gooding Avenue in the immediate area, and at the proposed site driveways. The impacts associated with the site related traffic have been defined and evaluated in accordance with standard traffic engineering guidelines and procedures.

The traffic engineering study completed for this project included the following:

- A traffic counting program to define existing traffic patterns and operating characteristics along the servicing roadway including Gooding Avenue. The data collection included an automatic traffic recorder (ATR) count on Gooding Avenue and manual turning movement count (TMC) at the intersection of Gooding Avenue with Metacom Avenue (Route 136).

- An analysis of crash records obtained from the Bristol Police Department to determine if there are any safety concerns relative to the frequency, severity, or pattern of crashes in the project area.

- An inventory of the physical roadway characteristics of Gooding Avenue to determine the adequacy of the existing roadway geometric features in reference to access, safety, and operations.

- An estimate of future traffic volumes for the proposed commercial development was calculated using data from the "Trip Generation" Manual, an informational report published by the Institute of Transportation Engineers (ITE).

- Evaluation and analysis of the traffic safety and operational issues for existing and future traffic conditions.

- Development of recommendations for mitigation where necessary that would be required to maintain safe and efficient traffic flow in the project area.

Mainstay/Sleep Inn Hotel

BRISTOL, RHODE ISLAND

Figure 1 - Project Vicinity Map

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2.0 PROJECT AREA

As noted in the previous section, the subject property is situated on the southerly side of Gooding Avenue just east of Broadcommon Road. Figure 2 on the following page depicts the general project area of the study and the boundary lines of the subject property. The 9.78 acre parcel is undeveloped and wooded. Land use in the immediate area can be described predominately commercial in nature along the Gooding Avenue corridor including small commercial plazas containing food markets, restaurants, banks, automotive centers, and retail stores. Medium density residential properties are situated off intersecting side streets. Immediately abutting the subject property to the south and east is undeveloped and wooded land. To the west is a single-family residential property and to the north across Gooding Avenue are small commercial businesses. Further to the east along the Route 136 corridor are a mixture of commercial and residential properties. Further to the west along Hope Street (Route 114) are medium density residential properties. In addition, the *Roger Williams University* campus is located to the south along Route 136.

Gooding Avenue will serve as the primary access route to the new hotel. Based upon the volume of traffic serviced along the immediate servicing roadways, and the low volume of traffic anticipated by the proposed hotel use during peak daily traffic conditions, a study impact area was defined for this project. The limits of our analysis focused on Gooding Avenue between Route 136 to the east and Naomi Street to the west, with a primary focus on the Gooding Avenue intersections with Route 136 and the site driveways.

3.0 EXISTING CONDITIONS

3.1 ROADWAYS

Gooding Avenue

Gooding Avenue is classified as an urban minor arterial, running in an east/west direction extending between Metacom Avenue (Route 136) to the east and Hope Street (Route 114) to the west. In the project area, Gooding Avenue is approximately 36 feet wide with a 12-foot travel lane and a 6-foot shoulder in each direction, delineated by a double yellow centerline and white shoulder markings. The speed limit is posted at 35mph. Cement concrete curbing is provided along both sides for the entire length of the road.

Mainstay/Sleep Inn Hotel

BRISTOL, RHODE ISLAND

Figure 2 - Project Area Map

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Cement concrete sidewalks are provided along the northerly side for the entire length of Gooding Avenue, with the southerly side only having sidewalks between Route 114 and Broadcommon Road. The pavement can be classified as being in fair condition with minor longitudinal cracking. Sporadic cobra-head light fixtures on utility poles are provided along the northerly side of the roadway for nighttime illumination. The photograph on the previous page depicts the physical characteristics of Gooding Avenue looking east with the subject property to the right.

3.2 INTERSECTIONS

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road

Gooding Avenue and Narrows Road intersect Metacom Avenue (Route 136) to form a 4-way signalized intersection. The Metacom Avenue northbound approach provides a separate left turn lane and a shared thru/right turn lane. The Metacom Avenue southbound approach includes a separate left turn lane, a thru lane and a shared thru/right turn lane. The Gooding Avenue eastbound approach provides a separate left turn lane, a thru lane, and a separate right turn lane. It should be noted that a lane use control sign or a right arrow pavement marking for the separate right turn lane are not provided to designate the lane use restriction on this approach. The Narrows Road westbound approach provides a separate left turn lane, a thru lane, and a separate right turn lane. Marked crosswalks with curb ramps are provided across all approaches to the intersection.

The photograph below depicts the typical characteristics of the intersection looking east on Gooding Avenue towards Metacom Avenue. The traffic signal system appears to be in fair condition. The layout of the equipment consists of mast arm mounted signal heads with in-road vehicle loop detection. A combination of mast arm pole bracket mounted, and pedestal mounted pedestrian signal heads with pedestrian push buttons, though not ADA-compliant, are present at the intersection for pedestrian control.

The intersection was determined to operate in a fully actuated mode consisting of four phases. The Metacom Avenue northbound and southbound movements are serviced in two phases including an advanced protected left, followed by through/right concurrent movements. The Gooding Avenue eastbound and Narrows Road westbound movements are serviced under the two remaining phases including protected/permitted left turn movements, followed by through/right concurrent movements.

3.3 Traffic Flow Data

Existing traffic flow characteristics for this area were developed from a traffic counting program completed by BETA and review of record data available from the RIDOT. The data collection included Manual Turning Movement Counts (TMC) at the intersection of Route 136 with Gooding Avenue/Narrows Road and Automatic Traffic Recorder (ATR) counts on Gooding Avenue in the project area in January and March 2019, respectively.

Based upon the ATR data obtained, Gooding Avenue in the project area was found to service an Average Daily Traffic (ADT) volume of approximately 8,100 vehicles per day. On a typical weekday along Gooding Avenue, traffic volumes begin to increase at 6:00 AM with no defined morning peak hour as the volumes gradually increase hourly until the afternoon peak of approximately 800 vehicles occurring between 4:00 and 5:00 PM.

In addition to the ATR data collected, manual turning movement counts were conducted at the Route 136 intersection with Gooding Avenue/Narrows Road. Data was collected during the peak weekday morning and afternoon periods. Based upon review of the TMC data, Route 136 was found to service approximately 1,460 vehicles during the weekday morning peak hour with approximately 760 vehicles northbound and 700 vehicles southbound. During the same time period, Gooding Avenue was found to service 490 vehicles with 215 vehicles eastbound and 275 vehicles westbound. Traffic volumes recorded during weekday afternoon peak hour on Route 136 was determined to be 1,680 vehicles serviced with approximately 805 vehicles northbound and 875 vehicles southbound. During the same time period, Gooding Avenue was found to service 720 vehicles with 380 vehicles eastbound and 340 vehicles westbound. The results of the TMC data collection effort found that the weekday morning and afternoon peak hours typically occur from 7:30 to 8:30 AM and 4:30 to 5:30 PM, respectively. Figure 3 on the following page depicts the daily peak hour turning movement volumes at the study intersection. Complete count information can be found in the Appendix.

4.0 Safety Analysis

To determine if there are any limiting factors affecting safety relating to access to the proposed hotel development, the physical characteristics of Gooding Avenue in the study area were investigated. These limiting factors would potentially include horizontal or vertical alignment changes or roadside obstructions that limit sight distances for vehicles traveling along the road or entering the road from a side street or driveway location. In this instance, the sight distance standard is necessary to permit turning vehicles to safely enter and exit the site driveways.

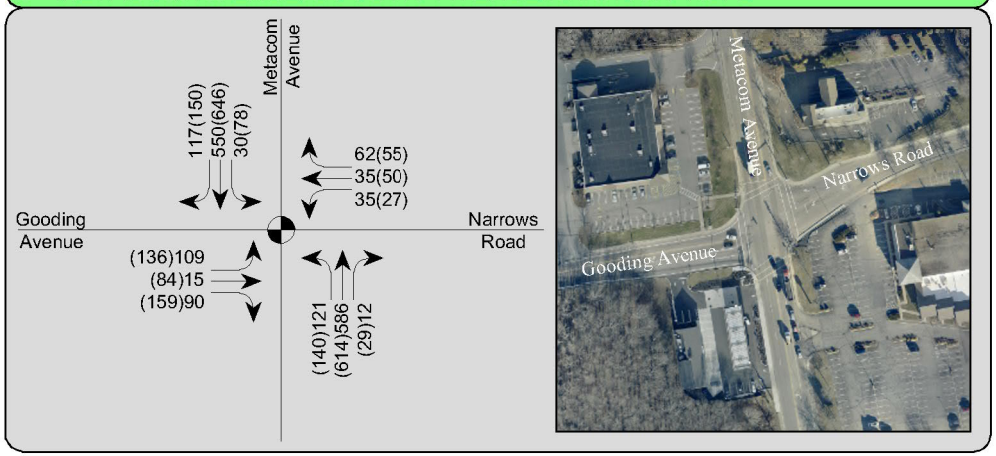
The horizontal vertical alignment of Gooding Avenue in the project area is generally straight and level east of the site with a gradual incline west of the site to a crest vertical curve approximately 400 feet west of Broadcommon Road. Based upon the existing roadway geometry as described, the available sight distances at the proposed main driveway intersection with Gooding Avenue are greater than 400 feet to the east and west. These values are in excess of AASHTO's recommended minimum sight distance of 250 feet for the posted speed limit of 35 mph and 360 feet based on the measured 85th percentile speed of 45 mph recorded along Gooding Avenue.

Mainstay/Sleep Inn Hotel

BRISTOL, RHODE ISLAND

Figure 3 - Existing Traffic Volumes

1 METACOM AVENUE/GOODING AVENUE/NARROWS ROAD



LEGEND:

- TURN LANE
- XXX AM PEAK VOLUMES (7:30 TO 8:30)
- (XXX) PM PEAK VOLUMES (4:30 TO 5:30)
- 1 STUDY INTERSECTION
- TRAFFIC SIGNAL

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As a result of the preliminary evaluation of the existing roadway geometry and physical features, it does not appear that any significant physical roadway safety deficiencies exist within the defined study area. Also, as part of our analysis, a review of crash statistics was completed. Data was reviewed from the Town of Bristol Police Department for the latest three-year period from January 2017 to December 2019 to determine if any location in the immediate vicinity of the development experienced a high frequency or pattern of crashes.

A total of twenty-five crashes (avg. eight per year) occurred over the study period (2017-2019), with four involving an injury. Summarizing the data, fifteen of the crashes, with two involving injuries, occurred at the signalized intersection of Metacom Avenue with Gooding Avenue/Narrows Road and ten of the crashes, with two involving injuries, occurred along the section of Gooding Avenue between Metacom Avenue and Naomi Street.

Eight of the crashes at the signalized junction of Metacom Avenue with Gooding Avenue/Narrows Road were rear-end collisions, five were angle collisions, one was a head-on collision, and one was a collision with an object. This is typical of signalized junctions where the majority of the crashes were rear-end collisions due to the numerous starting and stopping movements required for the signal change intervals. The angle crashes can be attributed to running red lights and drivers not yielding the right-of-way. The head-on crash involved a driver driving the vehicle on the wrong side of the road while operating under the influence. The collision with an object involved a vehicle hitting a large rock on the roadway.

Five of the crashes that occurred along Gooding Avenue between Metacom Avenue and Naomi Street were angle crashes caused by drivers not yielding the right-of-way and drivers attempting to pass a turning vehicle at a driveway or intersecting side street; three crashes were rear end collisions that can be attributed to drivers not stopping when the vehicle in front slows/stops to turn; and two involved collisions with a deer.

Based upon the historical crash data obtained from the local police department, and review of existing roadway geometry and operations, roadway or traffic related safety improvements could be considered within the study area. As previously noted, there are no indications (signing or pavement markings) for the right lane restriction on the Gooding Avenue eastbound approach to the signalized intersection with Route 136. Is it recommended that an intersection lane use control sign supplemented with arrow pavement markings on the Gooding Avenue eastbound approach to Route 136 intersection be installed to emphasize the lane use restriction. A summary of the crash data depicting the number, type, and severity is provided in the Appendix.

5.0 IMPACT ANALYSIS

5.1 TRIP GENERATION

To determine the traffic impact of a proposed development, estimates of anticipated traffic to be generated by a particular land use must be calculated. As previously discussed, this development

Mainstay/Sleep Inn Hotel

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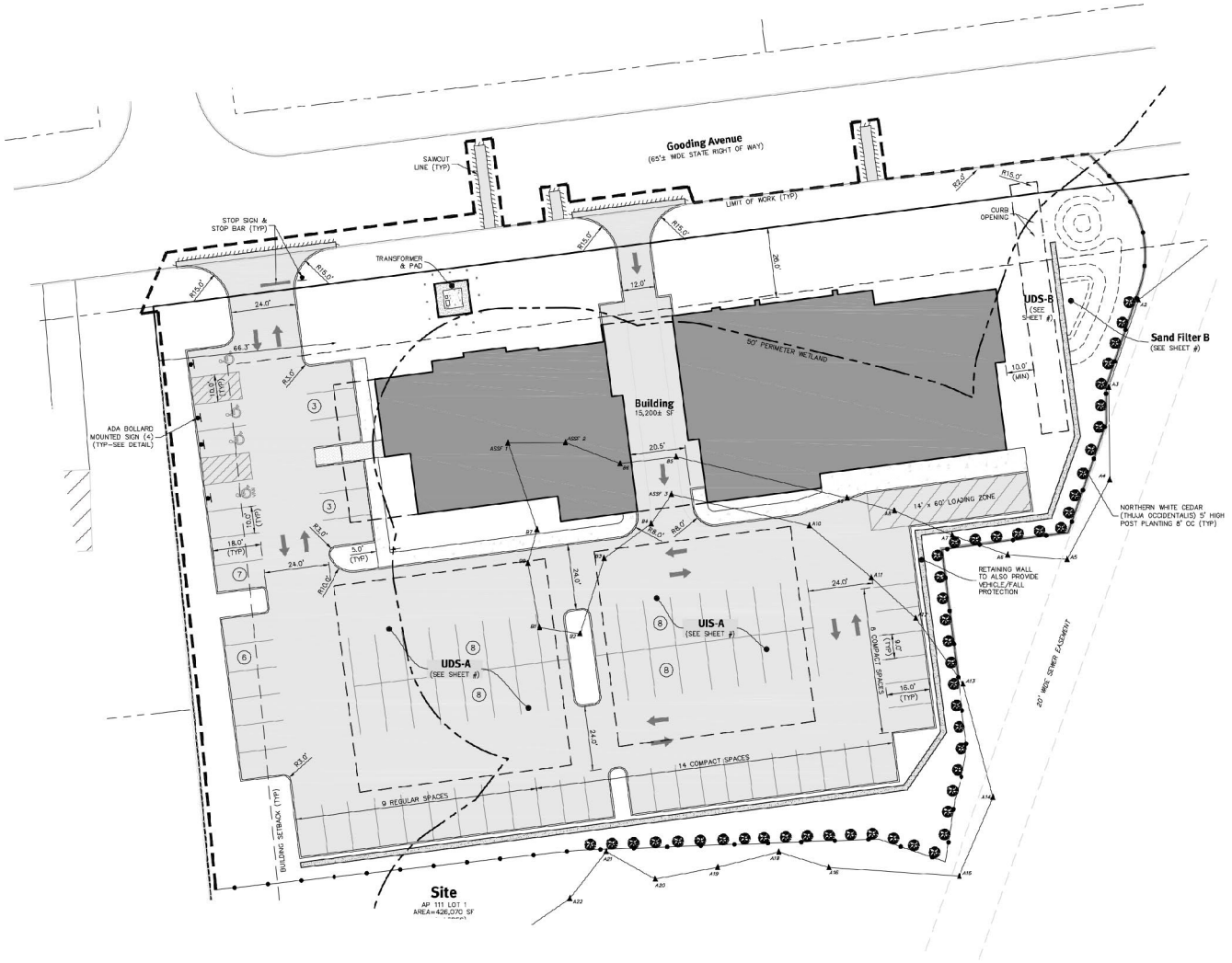
Figure 4 - Site Layout



Site Plan provided by DiPrete Engineering

proposal includes construction of a new *Mainstay/Sleep Inn* hotel with associated parking. Access and egress to the hotel will be provided from two new driveways on Gooding Avenue that include a full access driveway and a one-way entrance only driveway. Figure 4 on the following page depicts the site layout and access plan provided by *DiPrete Engineering.*

For this site, projected traffic volumes for the proposed hotel were based on use of trip generation factors. These factors are taken from the "Trip Generation" manual, an informational report published by the Institute of Transportation Engineers (ITE), a national professional organization for traffic and transportation engineers. The data provided in the ITE report are based on extensive traffic studies for various types of land uses (residential, commercial, industrial, etc.). This data has been found to be very reliable and provides a sound basis for estimating future trips to new developments.

For the new commercial development project, Land Use Code 310 Hotel was reviewed for applicability in developing an estimate of site related vehicle trips. The appropriate worksheets from the manual are included in the Appendix along with the trip estimate calculations. Table 1 summarizes the estimate trip volumes calculated for this project.

TABLE 1 – Trip Generation Estimate

	Description	Enter	Exit	Total
AM PEAK HOUR				
ITE Land Use Code 310	Hotel	29	21	50
PM PEAK HOUR				
ITE Land Use Code 310	Hotel	28	31	59

5.2 Future Traffic Volumes

In order to properly assess the impacts of a development, future traffic conditions of area roadways should be estimated for the period when the development is constructed and fully occupied. Typically, the expansion of base traffic is calculated when a project is to be constructed over an extended period (3 to 5 years). In all instances, area growth that may affect capacity results should be considered. For this project, based upon record information that has seen little to no traffic growth in the last decade, a conservative annual growth rate of 1.0 percent was utilized for the future build condition to account for any future potential developments in the vicinity of the project.

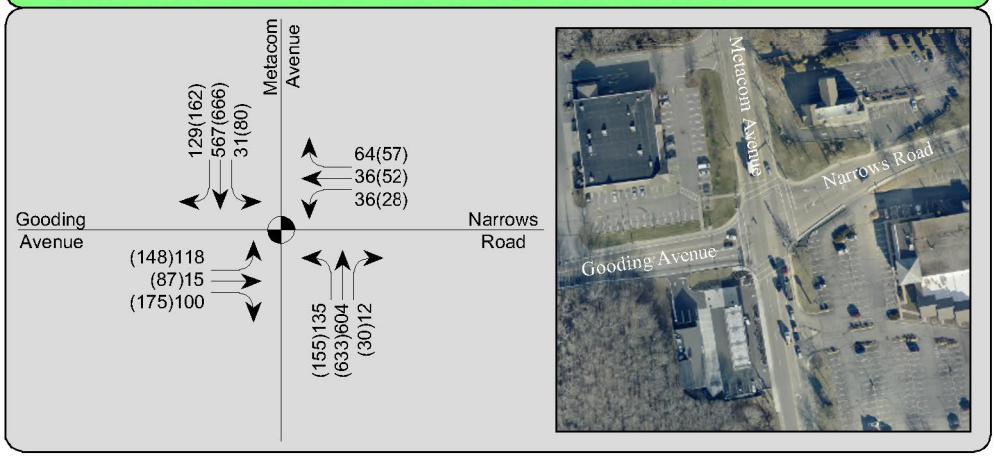
In developing the intersection volumes to be analyzed under the build condition, a directional distribution of the site traffic was estimated based upon the current traffic patterns in the project area. It is estimated that 60% of the site traffic will arrive from and depart to the east and 40% will arrive from and depart to the west during the AM and PM peak hours. Figure 4 on the following page depicts the future Build traffic conditions during the AM and PM peak hours studied for this project. Site distribution figures are provided in the Appendix.

Mainstay/Sleep Inn Hotel

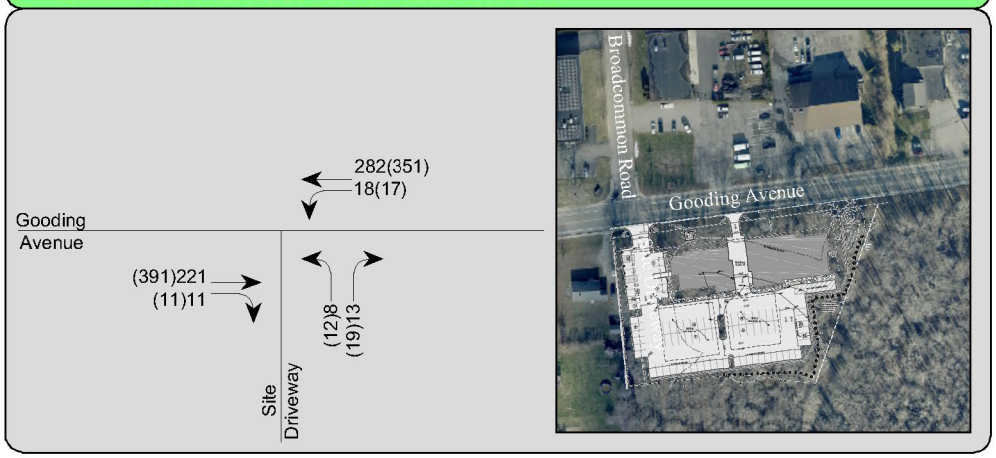
BRISTOL, RHODE ISLAND

Figure 5 - Future Traffic Volumes

1 METACOM AVENUE/GOODING AVENUE/NARROWS ROAD



2 GOODING AVENUE/MAIN SITE DRIVEWAY



LEGEND:

- TURN LANE
- XXX AM PEAK VOLUMES (7:30 TO 8:30)
- (XXX) PM PEAK VOLUMES (4:30 TO 5:30)
- 1 STUDY INTERSECTION
- TRAFFIC SIGNAL

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5.3 Operation Analysis

The key to any traffic impact analysis is the evaluation of roadway operations during peak traffic periods on the servicing roadway system. This situation would occur when the site-generated traffic, combined with the traffic volumes on the main roadway, result in the highest one-hour volume serviced along a roadway segment, or through an intersection. Review of the record traffic data found that the weekday AM and PM peak hours would represent this worst-case combination of site-generated traffic with the servicing roadway peak traffic period.

The Highway Capacity Manual methodology provides the most accurate means of evaluating traffic capacity and delays for roadways and intersections. The results of this procedure are expressed in terms of Level of Service (LOS). Level of Service is a qualitative measure of traffic flow efficiency based on anticipated vehicle delays. For example, LOS "A" represents the best condition with little or no delay, while LOS "F" indicates that the roadway/intersection is at full capacity resulting in extended vehicle delays and potential queuing. Table 2 below outlines the Level of Service delay criteria presented in the Highway Capacity Manual for signalized and unsignalized intersections.

TABLE 2 – Highway Capacity Manual Criteria

Level of Service	Unsignalized Delay Per Vehicle (sec)	Signalized Delay Per Vehicle (sec)
A	<10	<10
B	>10 and <15	>10 and <20
C	>15 and <25	>20 and <35
D	>25 and <35	>35 and <55
E	>35 and <50	>55 and <80
F	>50	>80

The Gooding Avenue intersection with Metacom Avenue (Route 136) was reviewed for Existing conditions where a No-Build condition was not determined necessary due to the short duration of construction and operation of the hotel, which is estimated at 12-18 months. The main study intersection along with the proposed site driveway were analyzed for the weekday morning and afternoon peak hour, for the Future Build condition, which would represent the periods of greatest impact of site related traffic. The capacity analysis worksheets are included in the Appendix and Tables 3 and 4 summarize the results of the analyses.

Table 3 depicts the current operating conditions at the study intersection. As can be seen in the table, the signalized intersection of Route 136 with Gooding Avenue/Narrows Road operates in an acceptable manner at an overall LOS B and LOS C during the morning and afternoon peak periods, respectively. All critical movements operate at LOS D or better, with no movement experiencing excessive delays or queueing.

TABLE 3 – Level of Service Summary (Existing Conditions)

Location / Movement	EXISTING CONDITIONS							
	AM Peak Hour				PM Peak Hour			
	LOS	Delay	95th % Queue Length (veh.)	v/c	LOS	Delay	95th % Queue Length (veh.)	v/c
Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road (S)								
Gooding Avenue EB Left	C	35.0	4	0.46	D	36.3	5	0.53
Gooding Avenue EB Thru	D	36.2	1	0.07	D	36.4	4	0.30
Gooding Avenue EB Right	A	7.6	2	0.32	A	9.6	2	0.43
Narrows Road WB Left	C	28.5	2	0.16	C	27.0	2	0.12
Narrows Road WB Thru	D	41.9	2	0.24	D	42.4	3	0.31
Narrows Road WB Right	A	4.0	1	0.27	A	2.1	1	0.23
Metacom Avenue NB Left	D	45.7	5	0.56	D	47.2	6	0.61
Metacom Avenue NB Thru/Right	B	14.9	16	0.56	C	20.3	20	0.64
Metacom Avenue SB Left	D	42.0	2	0.22	D	45.0	4	0.45
Metacom Avenue SB Thru/Right	B	14.5	8	0.39	B	16.2	9	0.47
OVERALL	B	18.8	-	-	C	22.4	-	-

(S) – Signalized
(U) – Unsignalized

TABLE 4 – Level of Service Summary (Build Conditions)

Location / Movement	2023 BUILD CONDITIONS							
	AM Peak Hour				PM Peak Hour			
	LOS	Delay	95th % Queue Length (veh.)	v/c	LOS	Delay	95th % Queue Length (veh.)	v/c
Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road (S)								
Gooding Avenue EB Left	D	36.0	4	0.50	D	38.4	5	0.59
Gooding Avenue EB Thru	D	36.1	1	0.07	D	39.7	4	0.36
Gooding Avenue EB Right	A	9.5	2	0.35	B	10.5	2	0.49
Narrows Road WB Left	C	28.5	2	0.16	C	26.9	2	0.12
Narrows Road WB Thru	D	42.0	2	0.24	D	42.4	3	0.31
Narrows Road WB Right	A	4.6	1	0.28	A	2.5	1	0.24
Metacom Avenue NB Left	D	45.4	5	0.58	D	46.9	6	0.63
Metacom Avenue NB Thru/Right	B	15.4	16	0.57	C	21.2	22	0.66
Metacom Avenue SB Left	D	42.1	2	0.23	D	45.0	4	0.45
Metacom Avenue SB Thru/Right	B	15.2	8	0.42	B	17.2	10	0.50
OVERALL	B	19.5	-	-	C	23.4	-	-
Gooding Avenue at Main Site Driveway (U)								
Gooding Avenue WB	A	7.8	1	0.02	A	8.2	1	0.01
Site Driveway NB	B	11.0	1	0.04	B	13.4	1	0.07

(S) – Signalized
(U) – Unsignalized

Table 4 presents the future build conditions at the study intersections where the analysis found that the estimated increase in traffic during the peak periods resulting from the proposed hotel development will have minimal impact on overall traffic operations along Gooding Avenue, specifically at the defined study intersections reviewed for this project. The signalized intersection of Route 136 with Gooding Avenue/Narrows Road will continue to operate in an acceptable manner at an overall LOS B and LOS C during the morning and afternoon peak periods, respectively. All critical movements operate at LOS D or better, with no movement experiencing excessive delays or queueing. In addition, the left turn entering and left/right turn exiting movement at the unsignalized intersection of the propose main site driveway with Gooding Avenue will operate efficiently at LOS B or better during the daily peak hours of traffic.

6.0 CONCLUSIONS AND RECOMMENDATIONS

In summary, the study has shown that the proposed commercial project, *Mainstay/Sleep Inn* hotel, access and circulation plan has been designed to provide a level of traffic safety and efficiency on the servicing roadway system. In reference to safety, as previously noted, we recommend installation of an intersection lane use control sign supplemented with arrow pavement markings on the Gooding Avenue eastbound approach to the signalized intersection with Route 136 to emphasize the lane use restriction.

The safety of the servicing roadways and specifically the site driveway intersections were also reviewed for geometry and sight distances. The intersections reviewed were determined to provide sufficient sight distances in accordance with AASHTO criteria for visibility and decision making of drivers attempting to enter/exit main street traffic from a side street or driveway location.

The results of the operational analysis determined that the estimated minor increase in traffic during the peak periods resulting from the proposed commercial development will have a negligible effect on overall traffic operations along the servicing roadways, particularly during the daily morning and afternoon peak hours when the new hotel would generate its highest daily traffic volumes.

Therefore, based upon the data collected on the servicing roadways, the analysis completed as part of this study, it can be concluded that the future traffic conditions resulting from the proposed commercial development, will provide for adequate and safe access to a public street, and will not have a detrimental effect on public safety and welfare in the study area.

APPENDIX

A. Traffic Volume Data

B. Traffic Crash Data

C. Trip Generation

D. Operational Analysis

APPENDIX A – Traffic Volume Data

Automatic Traffic Recorder Count

Gooding Avenue

Intersection Turning Movement Count

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road

A

Automatic Traffic Recorder Count

Gooding Avenue

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/2/2020 Time	Gooding Ave.
12:00 AM	*
1:00	*
2:00	*
3:00	*
4:00	*
5:00	*
6:00	*
7:00	*
8:00	*
9:00	*
10:00	*
11:00	*
12:00 PM	*
1:00	*
2:00	*
3:00	208
4:00	807
5:00	819
6:00	563
7:00	361
8:00	222
9:00	148
10:00	54
11:00	31
Total	3213
AM Peak	
Volume	0
PM Peak	5:00
Volume	819

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/3/2020 Time	Gooding Ave.
12:00 AM	21
1:00	13
2:00	4
3:00	6
4:00	13
5:00	57
6:00	154
7:00	440
8:00	501
9:00	595
10:00	635
11:00	643
12:00 PM	664
1:00	687
2:00	736
3:00	779
4:00	796
5:00	761
6:00	485
7:00	288
8:00	178
9:00	122
10:00	63
11:00	39
Total	8680
AM Peak	12:00 PM
Volume	664
PM Peak	4:00
Volume	796

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/4/2020 Time	Gooding Ave.
12:00 AM	26
1:00	14
2:00	8
3:00	5
4:00	18
5:00	63
6:00	185
7:00	453
8:00	524
9:00	552
10:00	602
11:00	622
12:00 PM	632
1:00	622
2:00	712
3:00	761
4:00	764
5:00	731
6:00	564
7:00	365
8:00	223
9:00	144
10:00	67
11:00	51
Total	8708
AM Peak	12:00 PM
Volume	632
PM Peak	4:00
Volume	764

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/5/2020 Time	Gooding Ave.
12:00 AM	27
1:00	15
2:00	5
3:00	6
4:00	23
5:00	44
6:00	179
7:00	487
8:00	530
9:00	547
10:00	625
11:00	593
12:00 PM	703
1:00	676
2:00	668
3:00	753
4:00	802
5:00	811
6:00	592
7:00	374
8:00	199
9:00	130
10:00	90
11:00	44
Total	8923
AM Peak	12:00 PM
Volume	703
PM Peak	5:00
Volume	811

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/6/2020 Time	Gooding Ave.
12:00 AM	24
1:00	18
2:00	11
3:00	8
4:00	23
5:00	56
6:00	154
7:00	456
8:00	517
9:00	582
10:00	653
11:00	687
12:00 PM	751
1:00	731
2:00	743
3:00	835
4:00	825
5:00	779
6:00	572
7:00	340
8:00	242
9:00	160
10:00	92
11:00	59
Total	9318
AM Peak	12:00 PM
Volume	751
PM Peak	3:00
Volume	835

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/7/2020 Time	Gooding Ave.
12:00 AM	55
1:00	23
2:00	11
3:00	13
4:00	31
5:00	23
6:00	80
7:00	186
8:00	377
9:00	620
10:00	714
11:00	755
12:00 PM	751
1:00	745
2:00	718
3:00	605
4:00	574
5:00	524
6:00	406
7:00	293
8:00	169
9:00	130
10:00	102
11:00	76
Total	7981
AM Peak	11:00
Volume	755
PM Peak	12:00 PM
Volume	751

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/8/2020 Time	Gooding Ave.
12:00 AM	38
1:00	20
2:00	0
3:00	11
4:00	3
5:00	13
6:00	38
7:00	101
8:00	249
9:00	397
10:00	536
11:00	621
12:00 PM	705
1:00	761
2:00	723
3:00	692
4:00	645
5:00	501
6:00	410
7:00	256
8:00	200
9:00	79
10:00	46
11:00	33
Total	7078
AM Peak	12:00 PM
Volume	705
PM Peak	1:00
Volume	761

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/9/2020 Time	Gooding Ave.		
12:00 AM	18		
1:00	10		
2:00	3		
3:00	6		
4:00	16		
5:00	56		
6:00	143		
7:00	414		
8:00	546		
9:00	539		
10:00	565		
11:00	687		
12:00 PM	710		
1:00	773		
2:00	742		
3:00	465		
4:00	*		
5:00	*		
6:00	*		
7:00	*		
8:00	*		
9:00	*		
10:00	*		
11:00	*		
Total	5693		
AM Peak	12:00 PM		
Volume	710		
PM Peak	1:00		
Volume	773		
Grand Total	59594		
ADT		ADT: 8,051	AADT: 8,051

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/2/2020	Monday		Tuesday		Wednesday		Thursday		Friday		Weekday Average		Saturday		Sunday	
Time	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	7	14	11	15	13	14	13	11	11	14	31	24	21	17
1:00	*	*	7	6	3	11	5	10	10	8	6	9	10	13	15	5
2:00	*	*	2	2	4	4	4	1	8	3	4	2	5	6	0	0
3:00	*	*	4	2	4	1	4	2	4	4	4	2	4	9	6	5
4:00	*	*	4	9	7	11	9	14	13	10	8	11	14	17	1	2
5:00	*	*	22	35	29	34	20	24	20	36	23	32	13	10	8	5
6:00	*	*	79	75	103	82	94	85	87	67	91	77	37	43	17	21
7:00	*	*	255	185	256	197	283	204	248	208	260	198	124	62	61	40
8:00	*	*	301	200	305	219	290	240	284	233	295	223	210	167	141	108
9:00	*	*	315	280	297	255	303	244	327	255	310	258	309	311	234	163
10:00	*	*	332	303	311	291	331	294	312	341	322	307	339	375	278	258
11:00	*	*	341	302	301	321	298	295	343	344	321	316	391	364	313	308
12:00 PM	*	*	317	347	329	303	354	349	390	361	348	340	378	373	382	323
1:00	*	*	343	344	318	304	350	326	367	364	344	334	370	375	412	349
2:00	*	*	354	382	364	348	331	337	369	374	354	360	358	360	381	342
3:00	101	107	387	392	361	400	341	412	388	447	316	352	284	321	341	351
4:00	387	420	382	414	367	397	397	405	379	446	382	416	310	264	327	318
5:00	396	423	397	364	365	366	413	398	390	389	392	388	291	233	251	250
6:00	266	297	217	268	291	273	298	294	297	275	274	281	230	176	216	194
7:00	163	198	109	179	174	191	182	192	172	168	160	186	158	135	136	120
8:00	122	100	75	103	100	123	97	102	129	113	105	108	94	75	113	87
9:00	70	78	60	62	62	82	67	63	90	70	70	71	80	50	44	35
10:00	31	23	31	32	32	35	54	36	51	41	40	33	63	39	25	21
11:00	15	16	21	18	23	28	21	23	35	24	23	22	39	37	20	13
Total	1551	1662	4362	4318	4417	4291	4559	4364	4726	4592	4463	4340	4142	3839	3743	3335
Day	3213		8680		8708		8923		9318		8803		7981		7078	
AM Peak			11:00	12:00 PM	12:00 PM	11:00	12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM	11:00	10:00	12:00 PM	12:00 PM
Volume	0	0	341	347	329	321	354	349	390	361	348	340	391	375	382	323
PM Peak	5:00	5:00	5:00	4:00	4:00	3:00	5:00	3:00	12:00 PM	3:00	5:00	4:00	12:00 PM	1:00	1:00	3:00
Volume	396	423	397	414	367	400	413	412	390	447	392	416	378	375	412	351

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

Project Name: Proposed Commercial Development
Town/City: Bristol, RI
Roadway: Gooding Avenue
Location: West of Route 136

Start Date: 3/2/2020
End Date: 3/9/2020

3/9/2020	Monday		Tuesday		Wednesday		Thursday		Friday		Weekday Average		Saturday		Sunday	
Time	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	8	10	*	*	*	*	*	*	*	*	8	10	*	*	*	*
1:00	3	7	*	*	*	*	*	*	*	*	3	7	*	*	*	*
2:00	1	2	*	*	*	*	*	*	*	*	1	2	*	*	*	*
3:00	4	2	*	*	*	*	*	*	*	*	4	2	*	*	*	*
4:00	6	10	*	*	*	*	*	*	*	*	6	10	*	*	*	*
5:00	26	30	*	*	*	*	*	*	*	*	26	30	*	*	*	*
6:00	83	60	*	*	*	*	*	*	*	*	83	60	*	*	*	*
7:00	248	166	*	*	*	*	*	*	*	*	248	166	*	*	*	*
8:00	306	240	*	*	*	*	*	*	*	*	306	240	*	*	*	*
9:00	290	249	*	*	*	*	*	*	*	*	290	249	*	*	*	*
10:00	313	252	*	*	*	*	*	*	*	*	313	252	*	*	*	*
11:00	361	326	*	*	*	*	*	*	*	*	361	326	*	*	*	*
12:00 PM	381	329	*	*	*	*	*	*	*	*	381	329	*	*	*	*
1:00	415	358	*	*	*	*	*	*	*	*	415	358	*	*	*	*
2:00	398	344	*	*	*	*	*	*	*	*	398	344	*	*	*	*
3:00	237	228	*	*	*	*	*	*	*	*	237	228	*	*	*	*
4:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
6:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
7:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
8:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
9:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	3080	2613	0	0	0	0	0	0	0	0	3080	2613	0	0	0	0
Day	5693		0		0		0		0		5693		0		0	
AM Peak	12:00 PM	12:00 PM									12:00 PM	12:00 PM				
Volume	381	329	0	0	0	0	0	0	0	0	381	329	0	0	0	0
PM Peak	1:00	1:00									1:00	1:00				
Volume	415	358	0	0	0	0	0	0	0	0	415	358	0	0	0	0
Comb Total	8906		8680		8708		8923		9318		14496		7981		7078	
ADT	ADT: 8,051		AADT: 8,051													

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island 02865

SPEED DATA ANALYSIS

Location

Gooding Avenue
West of Route 136
Bristol, RI

Analysis Time Period

Start	End
3/2/2020	3/9/2020
3:43 PM	2:35 PM

Speed Limit

35

85th Percentile Speed

42

A

Intersection Turning Movement Count

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island, 02865
P:401.333.2382

Project: Gooding Avenue Hotel
Town/City: Bristol, RI
Location: Metacom Ave at Gooding Ave
Weather: Sunny/30s

File Name : 695401 - Metacom Ave @ Gooding Ave - AM-PM
Site Code : 01292020
Start Date : 1/29/2020
Page No : 1

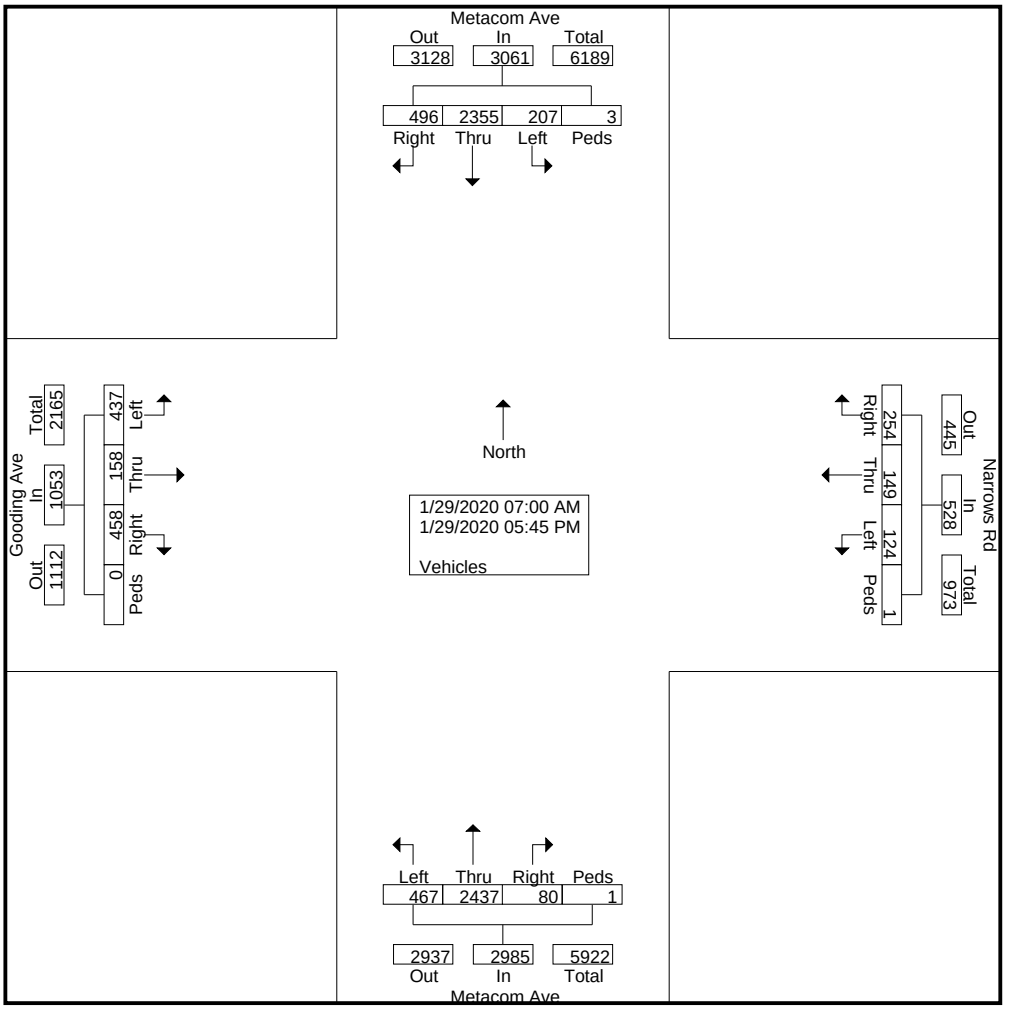
Groups Printed- Vehicles

	Metacom Ave From North					Narrows Rd From East					Metacom Ave From South					Gooding Ave From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	15	112	1	0	128	26	4	13	0	43	4	190	22	0	216	18	4	15	0	37	424
07:15 AM	26	137	4	0	167	19	8	7	0	34	1	133	24	0	158	17	1	10	0	28	387
07:30 AM	25	176	7	1	209	16	8	9	0	33	2	117	17	0	136	19	1	13	0	33	411
07:45 AM	49	160	5	0	214	15	11	10	0	36	1	134	25	0	160	29	5	34	0	68	478
Total	115	585	17	1	718	76	31	39	0	146	8	574	88	0	670	83	11	72	0	166	1700
08:00 AM	18	123	5	0	146	14	9	8	0	31	4	148	37	0	189	15	4	36	0	55	421
08:15 AM	27	124	9	0	160	17	3	6	0	26	2	160	34	0	196	19	3	20	0	42	424
08:30 AM	23	143	11	0	177	16	12	11	0	39	5	144	25	0	174	27	3	19	0	49	439
08:45 AM	37	131	12	1	181	12	13	10	0	35	4	134	26	0	164	30	8	26	0	64	444
Total	105	521	37	1	664	59	37	35	0	131	15	586	122	0	723	91	18	101	0	210	1728
*** BREAK ***																					
04:00 PM	37	135	16	0	188	14	8	4	0	26	3	195	23	0	221	39	13	33	0	85	520
04:15 PM	33	156	19	0	208	13	8	6	0	27	9	152	30	0	191	29	11	38	0	78	504
04:30 PM	38	165	22	0	225	15	6	6	1	28	6	158	35	0	199	32	13	29	0	74	526
04:45 PM	34	148	24	0	206	16	13	6	0	35	6	138	37	0	181	38	21	39	0	98	520
Total	142	604	81	0	827	58	35	22	1	116	24	643	125	0	792	138	58	139	0	335	2070
05:00 PM	31	176	17	0	224	12	18	9	0	39	11	165	38	0	214	43	20	37	0	100	577
05:15 PM	39	151	20	1	211	11	10	7	0	28	7	169	32	0	208	39	19	29	0	87	534
05:30 PM	46	171	17	0	234	16	9	5	0	30	5	142	33	0	180	39	24	31	0	94	538
05:45 PM	18	147	18	0	183	22	9	7	0	38	10	158	29	1	198	25	8	28	0	61	480
Total	134	645	72	1	852	61	46	28	0	135	33	634	132	1	800	146	71	125	0	342	2129
Grand Total	496	2355	207	3	3061	254	149	124	1	528	80	2437	467	1	2985	458	158	437	0	1053	7627
Apprch %	16.2	76.9	6.8	0.1		48.1	28.2	23.5	0.2		2.7	81.6	15.6	0		43.5	15	41.5	0		
Total %	6.5	30.9	2.7	0	40.1	3.3	2	1.6	0	6.9	1	32	6.1	0	39.1	6	2.1	5.7	0	13.8	

BETA Group, Inc.
701 George Washington Highway
Lincoln, Rhode Island, 02865
P:401.333.2382

Project: Gooding Avenue Hotel
Town/City: Bristol, RI
Location: Metacom Ave at Gooding Ave
Weather: Sunny/30s

File Name : 695401 - Metacom Ave @ Gooding Ave - AM-PM
Site Code : 01292020
Start Date : 1/29/2020
Page No : 2



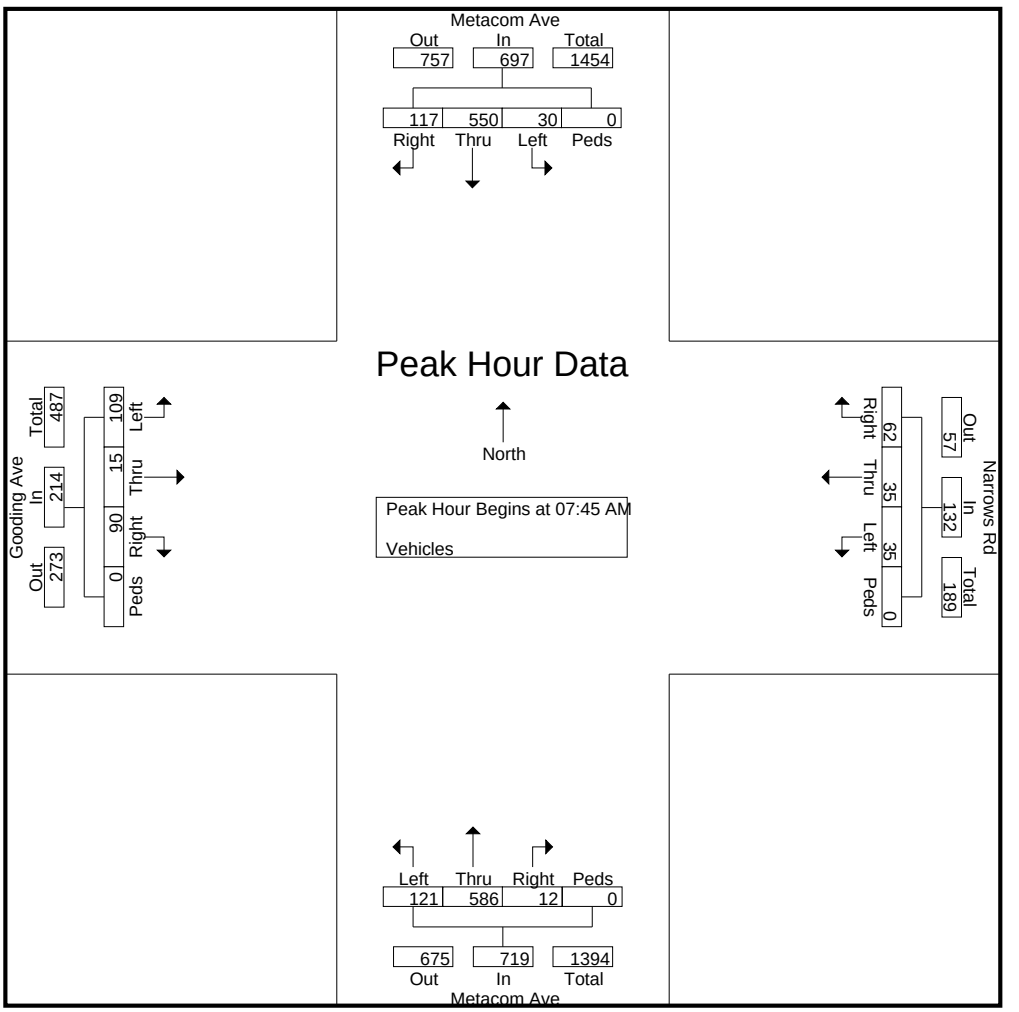
BETA Group, Inc.

701 George Washington Highway
Lincoln, Rhode Island, 02865
P:401.333.2382

Project: Gooding Avenue Hotel
Town/City: Bristol, RI
Location: Metacom Ave at Gooding Ave
Weather: Sunny/30s

File Name : 695401 - Metacom Ave @ Gooding Ave - AM-PM
Site Code : 01292020
Start Date : 1/29/2020
Page No : 3

	Metacom Ave From North					Narrows Rd From East					Metacom Ave From South					Gooding Ave From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	**49**	**160**	5	0	**214**	15	11	10	0	36	1	134	25	0	160	**29**	**5**	34	0	**68**	**478**
08:00 AM	18	123	5	0	146	14	9	8	0	31	4	148	**37**	0	189	15	4	**36**	0	55	421
08:15 AM	27	124	9	0	160	**17**	3	6	0	26	2	**160**	34	0	**196**	19	3	20	0	42	424
08:30 AM	23	143	**11**	0	177	16	**12**	**11**	0	**39**	**5**	144	25	0	174	27	3	19	0	49	439
Total Volume	117	550	30	0	697	62	35	35	0	132	12	586	121	0	719	90	15	109	0	214	1762
% App. Total	16.8	78.9	4.3	0		47	26.5	26.5	0		1.7	81.5	16.8	0		42.1	7	50.9	0		
PHF	.597	.859	.682	.000	.814	.912	.729	.795	.000	.846	.600	.916	.818	.000	.917	.776	.750	.757	.000	.787	.922



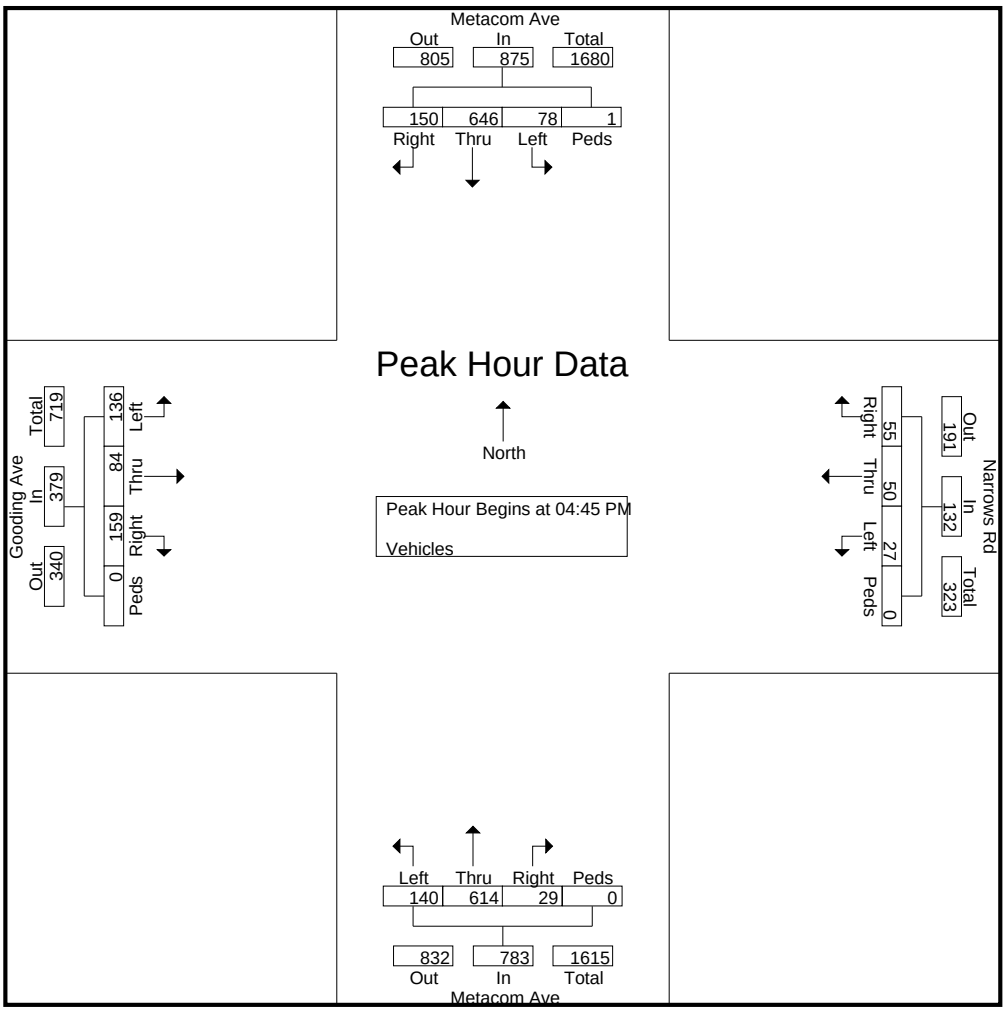
BETA Group, Inc.

701 George Washington Highway
Lincoln, Rhode Island, 02865
P:401.333.2382

Project: Gooding Avenue Hotel
Town/City: Bristol, RI
Location: Metacom Ave at Gooding Ave
Weather: Sunny/30s

File Name : 695401 - Metacom Ave @ Gooding Ave - AM-PM
Site Code : 01292020
Start Date : 1/29/2020
Page No : 4

	Metacom Ave From North					Narrows Rd From East					Metacom Ave From South					Gooding Ave From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	34	148	**24**	0	206	**16**	13	6	0	35	6	138	37	0	181	38	21	**39**	0	98	520
05:00 PM	31	**176**	17	0	224	12	**18**	**9**	0	**39**	**11**	165	**38**	0	**214**	**43**	20	37	0	**100**	**577**
05:15 PM	39	151	20	**1**	211	11	10	7	0	28	7	**169**	32	0	208	39	19	29	0	87	534
05:30 PM	**46**	171	17	0	**234**	16	9	5	0	30	5	142	33	0	180	39	**24**	31	0	94	538
Total Volume	150	646	78	1	875	55	50	27	0	132	29	614	140	0	783	159	84	136	0	379	2169
% App. Total	17.1	73.8	8.9	0.1		41.7	37.9	20.5	0		3.7	78.4	17.9	0		42	22.2	35.9	0		
PHF	.815	.918	.813	.250	.935	.859	.694	.750	.000	.846	.659	.908	.921	.000	.915	.924	.875	.872	.000	.948	.940



APPENDIX B – Traffic Crash Data

January 2017 through December 2019

Gooding Avenue

Crash Data Summary

	Year			Total	Average per Year
	2017	2018	2019		
Intersections					
Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road	1	6	8	15	5
Corridor					
Gooding Avenue	2	5	3	10	3
Total	3	11	11	25	8

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road

		2017	2018	2019	Total	Percent
Collision Type						
	Rear End	1	3	4	8	53%
	Angle	0	3	2	5	33%
	Head-On	0	0	1	1	7%
	Pedestrian	0	0	0	0	0%
	Sideswipe, Same Direction	0	0	0	0	0%
	Sideswipe, Opposite Direction	0	0	0	0	0%
	Collision with Object	0	0	1	1	7%
	Collision with Deer	0	0	0	0	0%
	Other	0	0	0	0	0%
	Unknown	0	0	0	0	0%
Accident Severity						
	Property	1	6	6	13	87%
	Injury	0	0	2	2	13%
Light Condition						
	Daylight	1	5	4	10	67%
	Dawn	0	0	0	0	0%
	Dusk	0	0	0	0	0%
	Dark - Lighted	0	1	3	4	27%
	Dark - Not Lighted	0	0	0	0	0%
	Dark - Unknown Lighting	0	0	1	1	7%
Road Condition						
	Dry	1	5	6	12	80%
	Wet	0	1	2	3	20%
	Snow	0	0	0	0	0%
	Other	0	0	0	0	0%
	Unknown	0	0	0	0	0%
Hour of Day						
	6:00 AM - 9:00 AM	0	0	0	0	0%
	9:00 AM - 3:00 PM	0	3	1	4	27%
	3:00 PM - 6:00 PM	1	2	3	6	40%
	6:00 PM - 6:00 AM	0	1	4	5	33%
	Total Accidents:	1	6	8	15	

Gooding Avenue

		2017	2018	2019	Total	Percent
Collision Type						
	Rear End	0	1	2	3	30%
	Angle	1	4	0	5	50%
	Head-On	0	0	0	0	0%
	Pedestrian	0	0	0	0	0%
	Sideswipe, Same Direction	0	0	0	0	0%
	Sideswipe, Opposite Direction	0	0	0	0	0%
	Collision with Object	1	0	1	2	20%
	Collision with Deer	0	0	0	0	0%
	Other	0	0	0	0	0%
	Unknown	0	0	0	0	0%
Accident Severity						
	Property	1	5	2	8	80%
	Injury	1	0	1	2	20%
Light Condition						
	Daylight	0	4	2	6	60%
	Dawn	0	0	0	0	0%
	Dusk	0	1	0	1	10%
	Dark - Lighted	1	0	1	2	20%
	Dark - Not Lighted	0	0	0	0	0%
	Dark - Unknown Lighting	1	0	0	1	10%
Road Condition						
	Dry	1	4	3	8	80%
	Wet	1	1	0	2	20%
	Snow	0	0	0	0	0%
	Other	0	0	0	0	0%
	Unknown	0	0	0	0	0%
Hour of Day						
	6:00 AM - 9:00 AM	0	0	0	0	0%
	9:00 AM - 3:00 PM	0	2	1	3	30%
	3:00 PM - 6:00 PM	1	3	1	5	50%
	6:00 PM - 6:00 AM	1	0	1	2	20%
	Total Accidents:	2	5	3	10	

APPENDIX C – Trip Generation

ITE Trip Generation Summary

Site Trip Distribution

ITE Land Use Code

ITE Land Use Code 310 – Hotel

C

ITE Trip Generation Summary

Trip Generation Summary

Summary;

	Description	Enter	Exit	Total
AM Peak Hour				
ITE Land Use Code 310	Hotel	29	21	50
PM Peak Hour				
ITE Land Use Code 310	Hotel	28	31	59

Calculations;

ITE Land Use Code 310 Hotel (80 Occupied Rooms)

Independent Variable (X) = Occupied Rooms X = 80

AM Peak *Directional Distribution: 58% Entering 42% Exiting*

T = 0.62 (X)
T = 0.62 80
T = 50

Enter: 29
Exit: 21
Total: 50

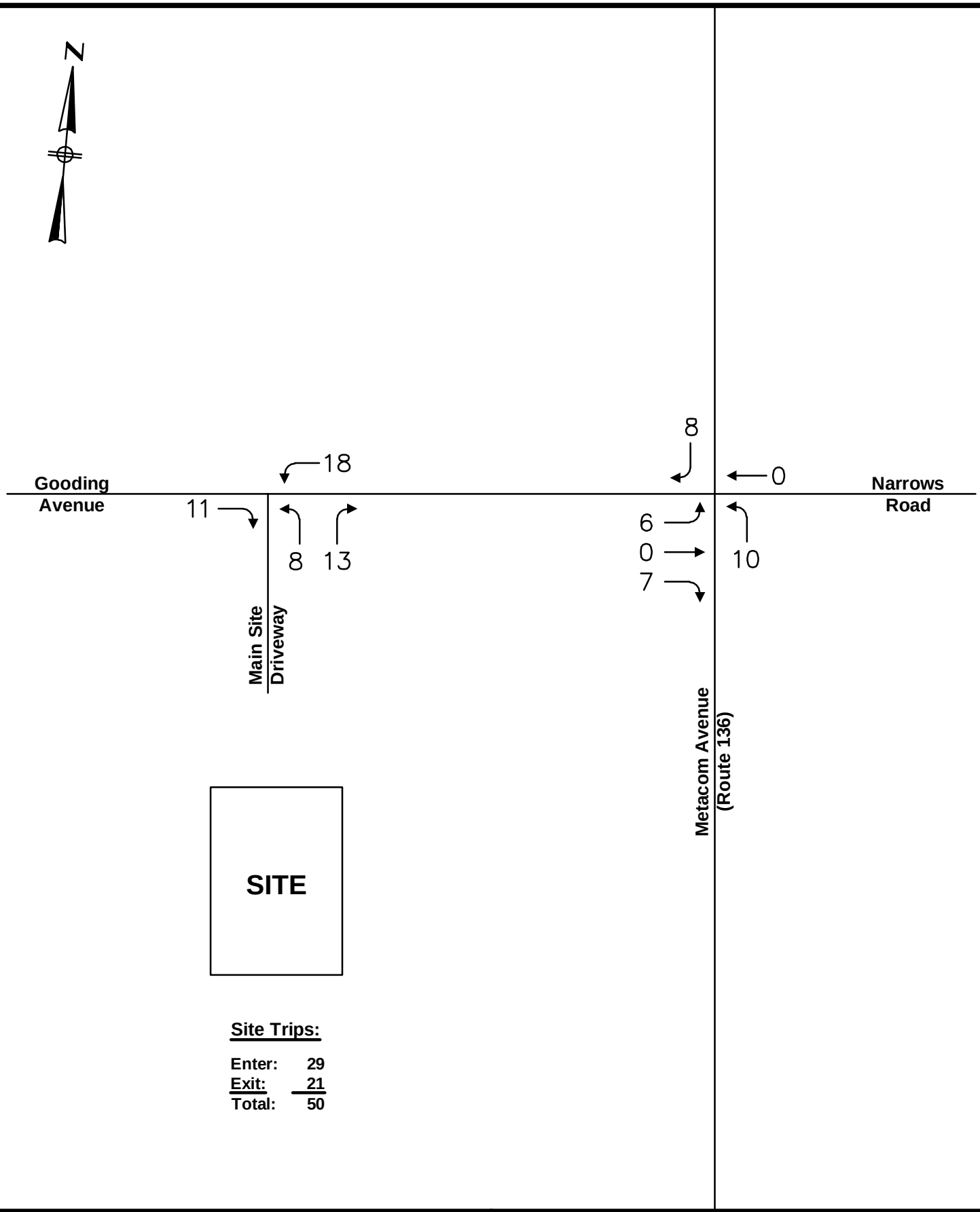
PM Peak *Directional Distribution: 49% Entering 51% Exiting*

T = 0.73 (X)
T = 0.73 80
T = 59

Enter: 28
Exit: 31
Total: 59

C

Site Trip Distribution



Site Trips:

Enter:	29
Exit:	21
Total:	50

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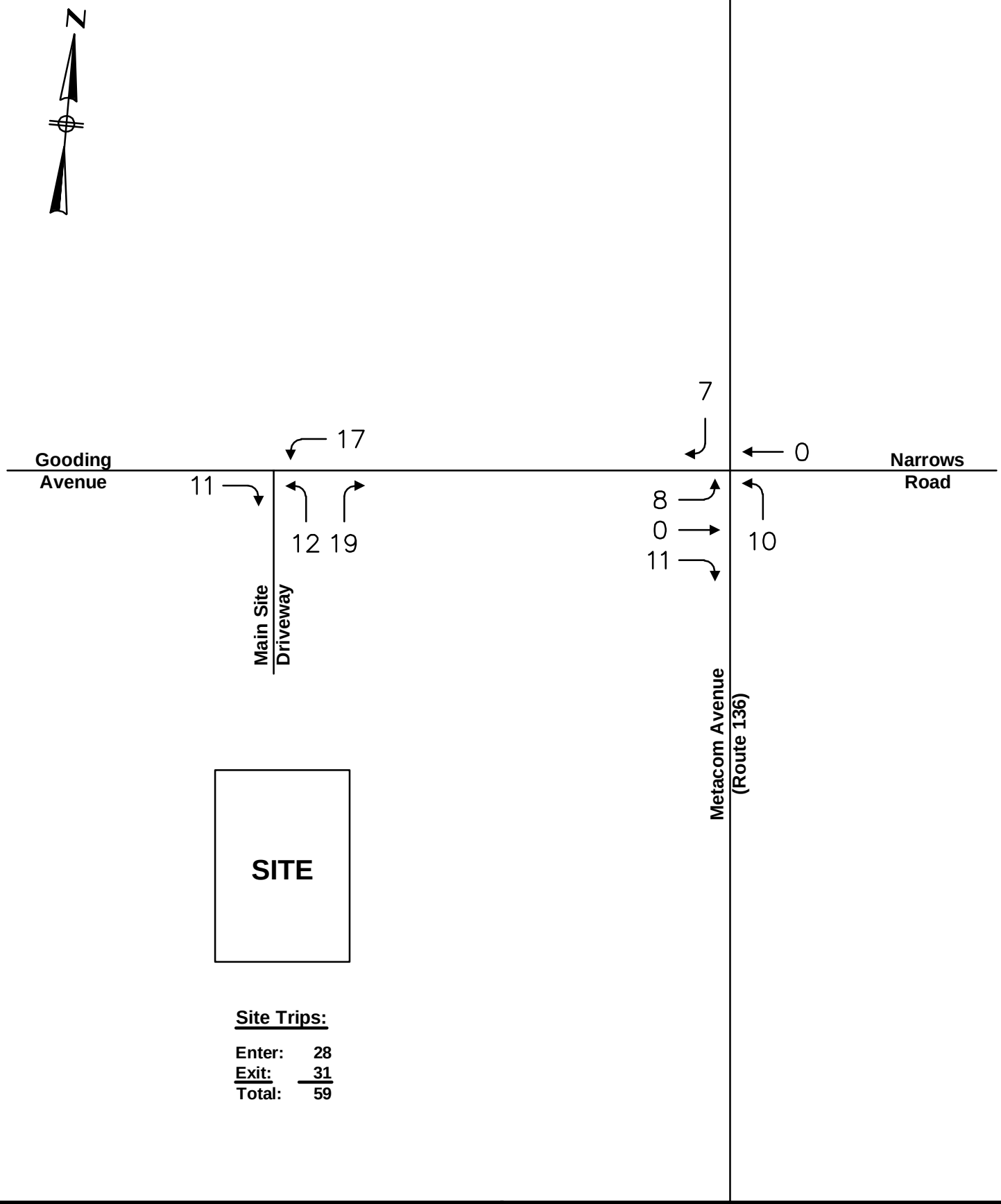
WEEKDAY TRAFFIC DISTRIBUTION
AM PEAK HOUR BUILD

MAINSTAY/SLEEP INN HOTEL
BRISTOL, RHODE ISLAND



Site Trips:

Enter:	28
Exit:	31
Total:	59

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WEEKDAY TRAFFIC DISTRIBUTION
PM PEAK HOUR BUILD

MAINSTAY/SLEEP INN HOTEL
BRISTOL, RHODE ISLAND

C

ITE Land Use Code

ITE Land Use Code 310 – Hotel

Land Use: 310
Hotel

Description

A hotel is a place of lodging that provides sleeping accommodations and supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (pool, fitness room), and/or other retail and service shops. All suites hotel (Land Use 311), business hotel (Land Use 312), motel (Land Use 320), and resort hotel (Land Use 330) are related uses.

Additional Data

Studies of hotel employment density indicate that, on the average, a hotel will employ 0.9 employees per room.[1]

Twenty-five studies provided information on occupancy rates at the time the studies were conducted. The average occupancy rate for these studies was approximately 82 percent.

Some properties contained in this land use provide guest transportation services such as airport shuttles, limousine service, or golf course shuttle service, which may have an impact on the overall trip generation rates.

Time-of-day distribution data for this land use are presented in Appendix A. For the one center city core site with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 8:30 and 9:30 a.m. and 3:15 and 4:15 p.m., respectively. On Saturday and Sunday, the peak hours were between 5:00 and 6:00 p.m. and 10:15 and 11:15 a.m., respectively.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, District of Columbia, Florida, Georgia, Indiana, Minnesota, New York, Pennsylvania, South Dakota, Texas, Vermont, Virginia, and Washington.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms in order to accurately predict trip generation characteristics for the site.

Trip generation at a hotel may be related to the presence of supporting facilities such as convention facilities, restaurants, meeting/banquet space, and retail facilities. Future data submissions should specify the presence of these amenities. Reporting the level of activity at the supporting facilities such as full, empty, partially active, number of people attending a meeting/banquet during observation may also be useful in further analysis of this land use.

Source Numbers

170, 260, 262, 277, 280, 301, 306, 357, 422, 507, 577, 728, 867, 872, 925, 951

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[1] Buttke, Carl H. Unpublished studies of building employment densities, Portland, Oregon.

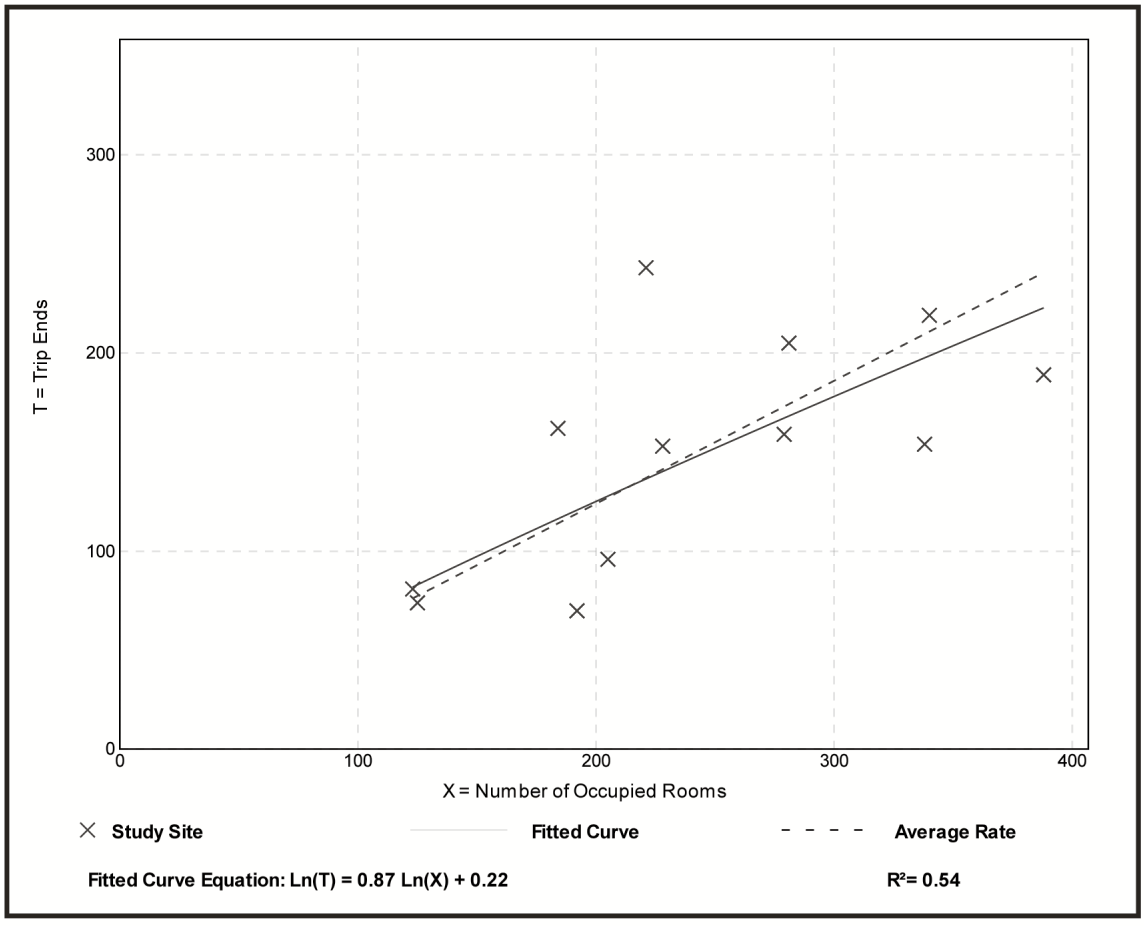
Hotel
(310)

Vehicle Trip Ends vs: **Occupied Rooms**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 12
Avg. Num. of Occupied Rooms: 242
Directional Distribution: 58% entering, 42% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
0.62	0.36 - 1.10	0.20

Data Plot and Equation



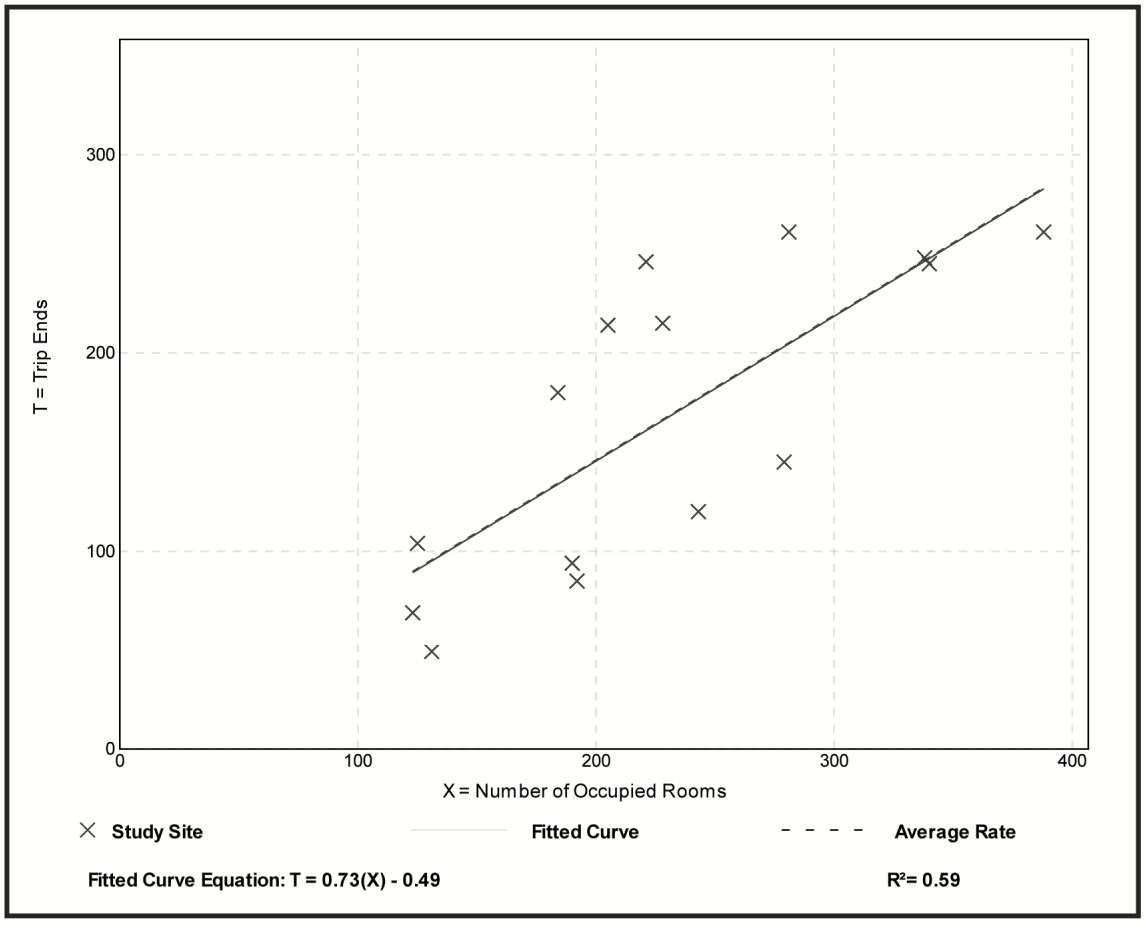
Hotel
(310)

Vehicle Trip Ends vs:	**Occupied Rooms**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	15
Avg. Num. of Occupied Rooms:	231
Directional Distribution:	49% entering, 51% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
0.73	0.37 - 1.11	0.22

Data Plot and Equation



APPENDIX D – Operational Analysis

Existing Conditions

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road

Future Build Conditions

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road
Gooding Avenue at Main Site Driveway

D

Existing Weekday AM / PM Peak Hour

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road

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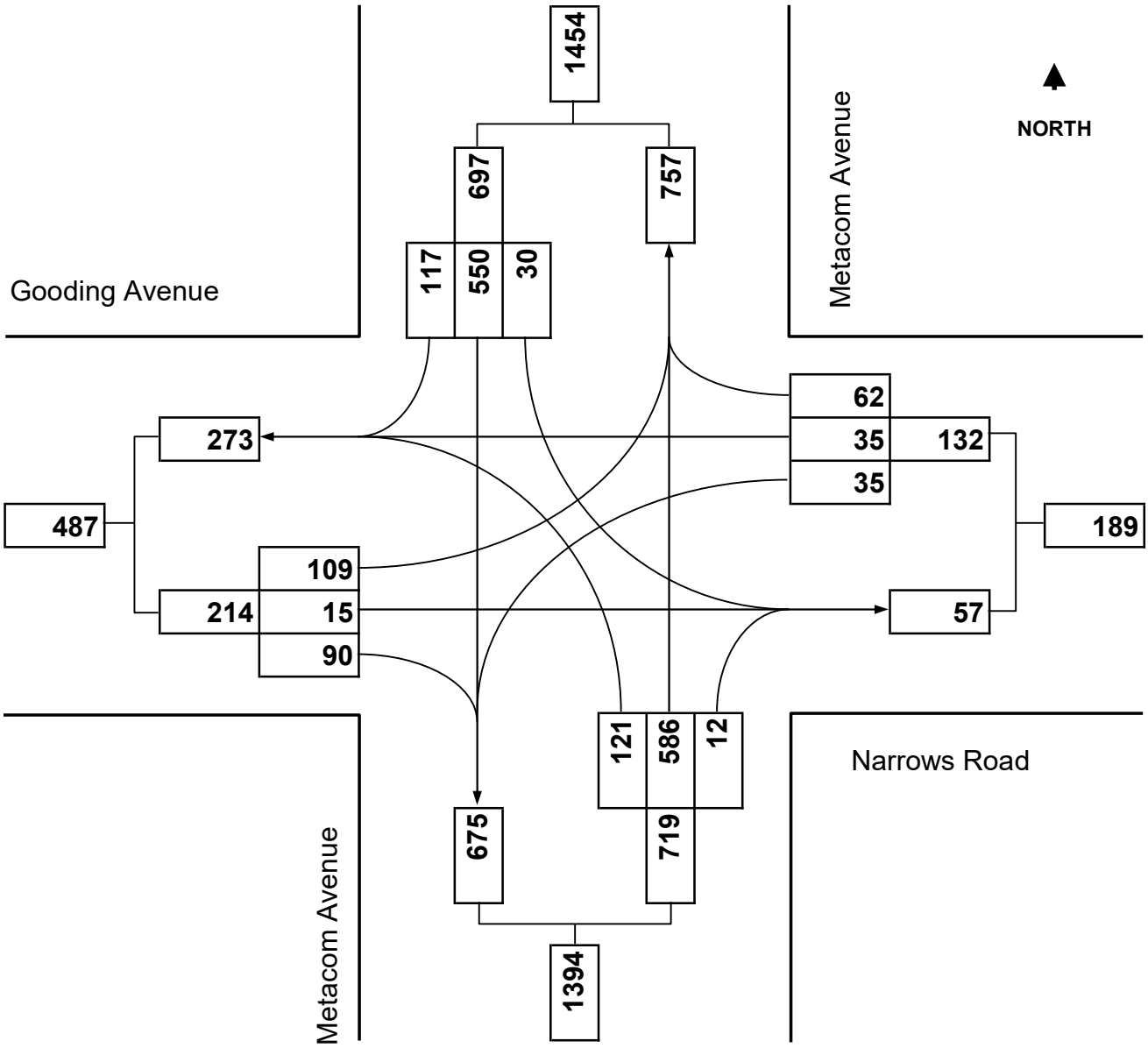
Turning Movement Diagram

Major Street:	Metacom Avenue	**Minor Street**:	Gooding Avenue
City/Town:	Bristol, RI	**Day of Week**:	Weekday
Reference No.:	6954	**Peak Period**:	7:30 AM - 8:30 AM
Existing:	AM Peak Hour	**Future**:	n/a



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	15	90	35	35	62	121	586	12	30	550	117
Future Volume (vph)	109	15	90	35	35	62	121	586	12	30	550	117
Satd. Flow (prot)	1805	1900	1615	1805	1900	1615	1805	1894	0	1805	3516	0
Flt Permitted	0.464			0.747			0.950			0.950		
Satd. Flow (perm)	882	1900	1615	1419	1900	1615	1805	1894	0	1805	3516	0
Satd. Flow (RTOR)			121			121		1			35	
Lane Group Flow (vph)	118	16	98	38	38	67	132	650	0	33	725	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4						
Total Split (s)	13.0	22.0	22.0	11.0	20.0	20.0	13.0	46.0		11.0	44.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0		4.0	5.0	
Act Effct Green (s)	17.2	11.3	11.3	13.6	7.6	7.6	11.7	55.6		7.5	47.0	
Actuated g/C Ratio	0.19	0.13	0.13	0.15	0.08	0.08	0.13	0.62		0.08	0.52	
v/c Ratio	0.46	0.07	0.32	0.16	0.24	0.27	0.56	0.56		0.22	0.39	
Control Delay	35.0	36.2	7.6	28.5	41.9	4.0	45.7	14.9		42.0	14.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	35.0	36.2	7.6	28.5	41.9	4.0	45.7	14.9		42.0	14.5	
LOS	C	D	A	C	D	A	D	B		D	B	
Approach Delay		23.5			20.6			20.1			15.7	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	56	8	0	17	21	0	71	237		18	124	
Queue Length 95th (ft)	100	27	32	41	50	8	124	390		46	191	
Internal Link Dist (ft)		343			274			231			269	
Turn Bay Length (ft)	330		150	100		100	225			140		
Base Capacity (vph)	263	377	417	244	327	378	240	1170		149	1851	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.45	0.04	0.24	0.16	0.12	0.18	0.55	0.56		0.22	0.39	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 13 (14%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 18.8 — Intersection LOS: B
Intersection Capacity Utilization 61.4% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1:

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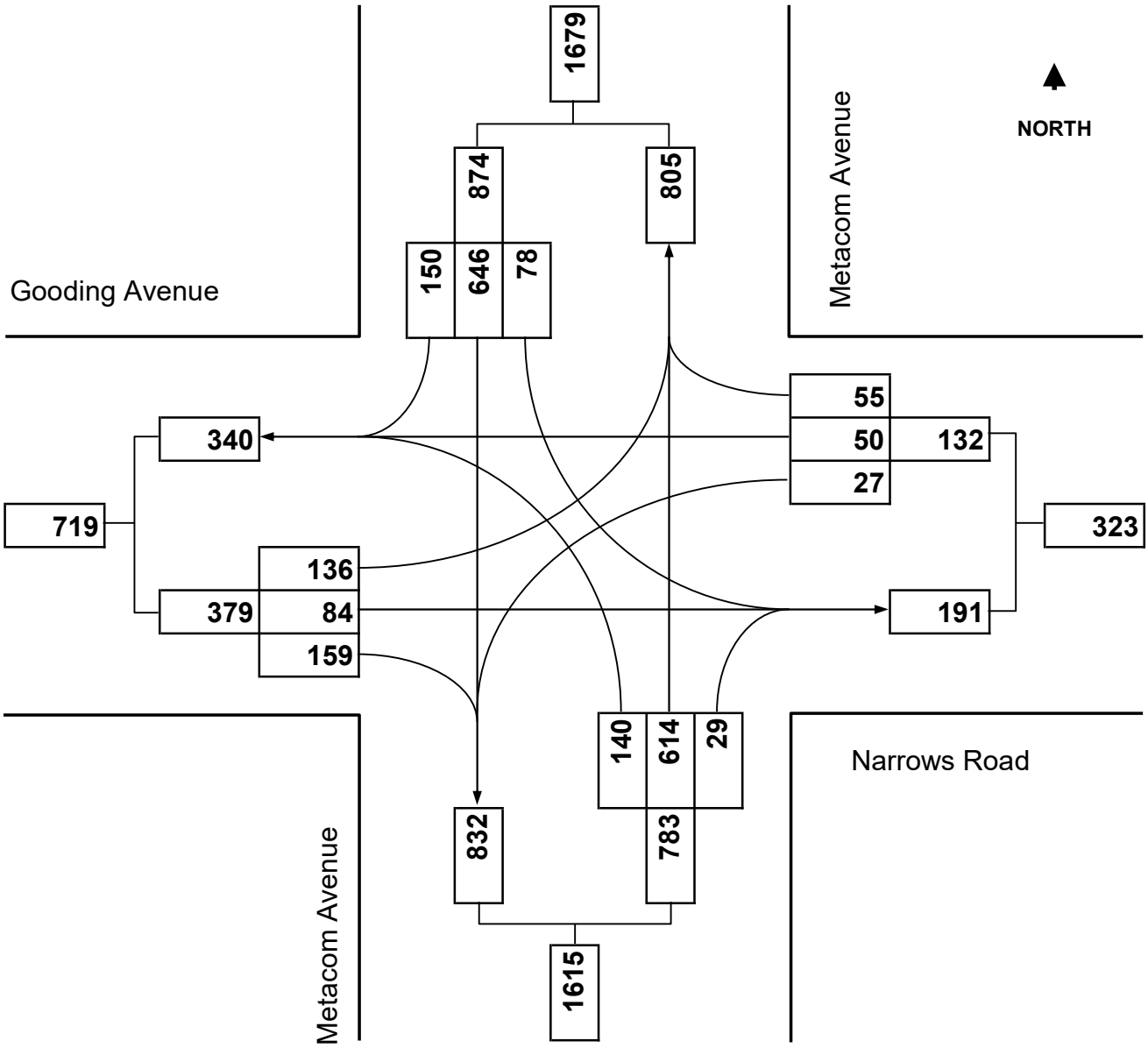
Turning Movement Diagram

Major Street:	Metacom Avenue	**Minor Street**:	Gooding Avenue
City/Town:	Bristol, RI	**Day of Week**:	Weekday
Reference No.:	6954	**Peak Period**:	4:30 PM - 5:30 PM
Existing:	PM Peak Hour	**Future**:	n/a



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	84	159	27	50	55	140	614	29	78	646	150
Future Volume (vph)	136	84	159	27	50	55	140	614	29	78	646	150
Satd. Flow (prot)	1805	1900	1615	1805	1900	1615	1805	1887	0	1805	3509	0
Flt Permitted	0.488			0.699			0.950			0.950		
Satd. Flow (perm)	927	1900	1615	1328	1900	1615	1805	1887	0	1805	3509	0
Satd. Flow (RTOR)			169			121		3			39	
Lane Group Flow (vph)	145	89	169	29	53	59	149	684	0	83	847	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4						
Total Split (s)	13.0	22.0	22.0	11.0	20.0	20.0	14.0	42.0		15.0	43.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0		4.0	5.0	
Act Effct Green (s)	18.3	14.2	14.2	14.2	8.2	8.2	12.2	50.8		9.3	45.7	
Actuated g/C Ratio	0.20	0.16	0.16	0.16	0.09	0.09	0.14	0.56		0.10	0.51	
v/c Ratio	0.53	0.30	0.43	0.12	0.31	0.23	0.61	0.64		0.45	0.47	
Control Delay	36.3	36.4	9.6	27.0	42.4	2.1	47.2	20.3		45.0	16.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	36.3	36.4	9.6	27.0	42.4	2.1	47.2	20.3		45.0	16.2	
LOS	D	D	A	C	D	A	D	C		D	B	
Approach Delay		25.1			22.4			25.1			18.8	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	69	41	0	13	29	0	80	275		45	158	
Queue Length 95th (ft)	117	91	56	33	63	2	138	#501		87	236	
Internal Link Dist (ft)		343			274			231			269	
Turn Bay Length (ft)	330		150	100		100	225			140		
Base Capacity (vph)	279	393	468	247	327	378	252	1065		226	1800	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.52	0.23	0.36	0.12	0.16	0.16	0.59	0.64		0.37	0.47	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 15 (17%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 22.4 Intersection LOS: C
Intersection Capacity Utilization 65.4% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1:

D

Future Build Weekday AM / PM Peak Hour

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road
Gooding Avenue at Site Driveway

Metacom Avenue (Route 136) at Gooding Avenue/Narrows Road

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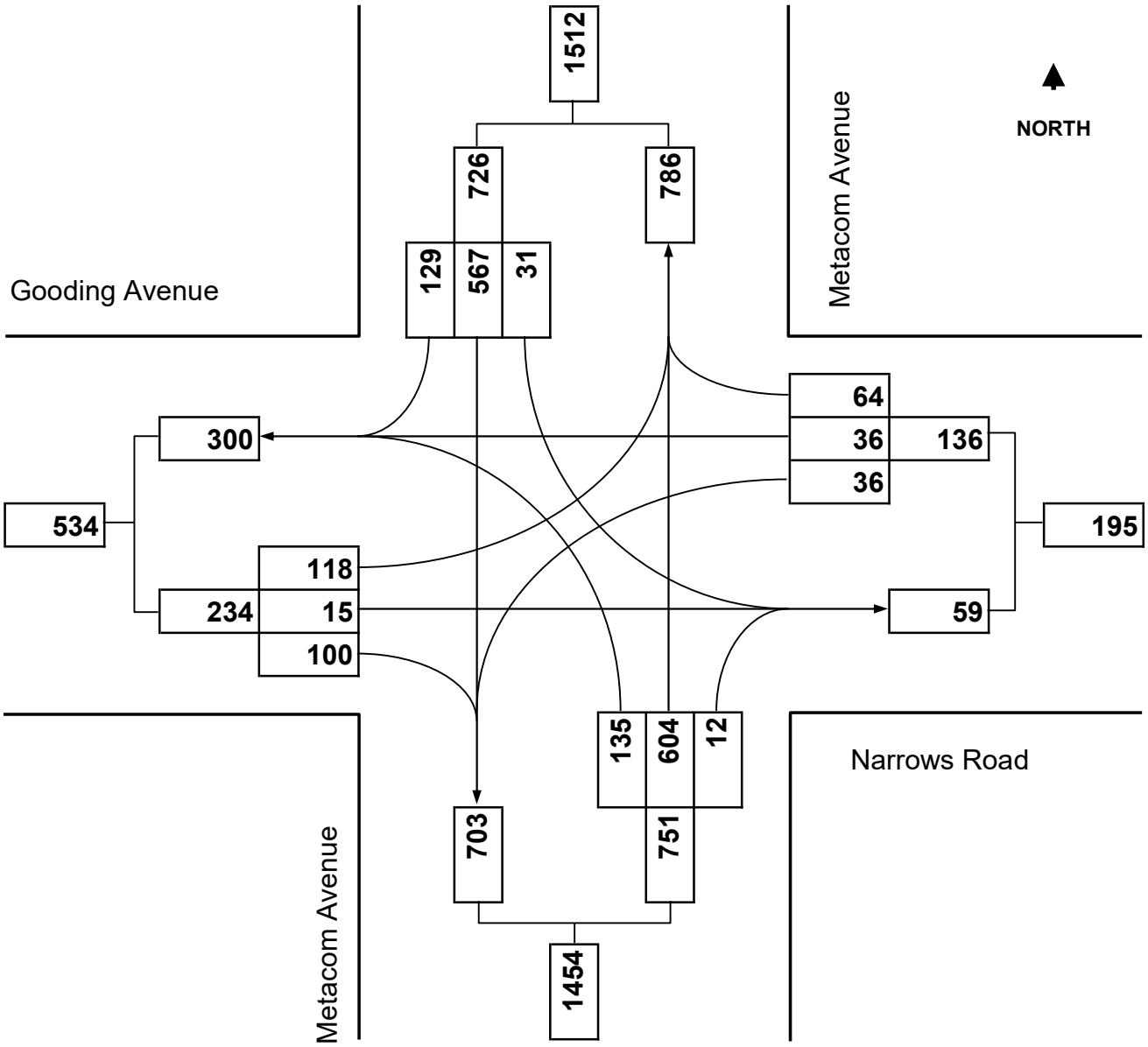
Turning Movement Diagram

Major Street:	Metacom Avenue	**Minor Street**:	Gooding Avenue
City/Town:	Bristol, RI	**Day of Week**:	Weekday
Reference No.:	6954	**Peak Period**:	AM Peak Hour
Existing:	n/a	**Future**:	2023 Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	15	100	36	36	64	135	604	12	31	567	129
Future Volume (vph)	118	15	100	36	36	64	135	604	12	31	567	129
Satd. Flow (prot)	1805	1900	1615	1805	1900	1615	1805	1894	0	1805	3509	0
Flt Permitted	0.466			0.747			0.950			0.950		
Satd. Flow (perm)	885	1900	1615	1419	1900	1615	1805	1894	0	1805	3509	0
Satd. Flow (RTOR)			121			121		1			38	
Lane Group Flow (vph)	128	16	109	39	39	70	147	670	0	34	756	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4						
Total Split (s)	13.0	22.0	22.0	11.0	20.0	20.0	13.0	46.0		11.0	44.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0		4.0	5.0	
Act Effct Green (s)	17.3	11.4	11.4	13.6	7.6	7.6	12.6	55.5		7.5	45.9	
Actuated g/C Ratio	0.19	0.13	0.13	0.15	0.08	0.08	0.14	0.62		0.08	0.51	
v/c Ratio	0.50	0.07	0.35	0.16	0.24	0.28	0.58	0.57		0.23	0.42	
Control Delay	36.0	36.1	9.5	28.5	42.0	4.6	45.4	15.4		42.1	15.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	36.0	36.1	9.5	28.5	42.0	4.6	45.4	15.4		42.1	15.2	
LOS	D	D	A	C	D	A	D	B		D	B	
Approach Delay		24.6			20.8			20.8			16.4	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	61	8	0	18	21	0	79	248		19	135	
Queue Length 95th (ft)	107	27	40	42	51	11	136	410		47	201	
Internal Link Dist (ft)		1673			274			231			269	
Turn Bay Length (ft)	330		150	100		100	225			140		
Base Capacity (vph)	264	378	418	244	327	378	254	1167		150	1809	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.48	0.04	0.26	0.16	0.12	0.19	0.58	0.57		0.23	0.42	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 13 (14%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 19.5 — Intersection LOS: B
Intersection Capacity Utilization 62.8% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1:

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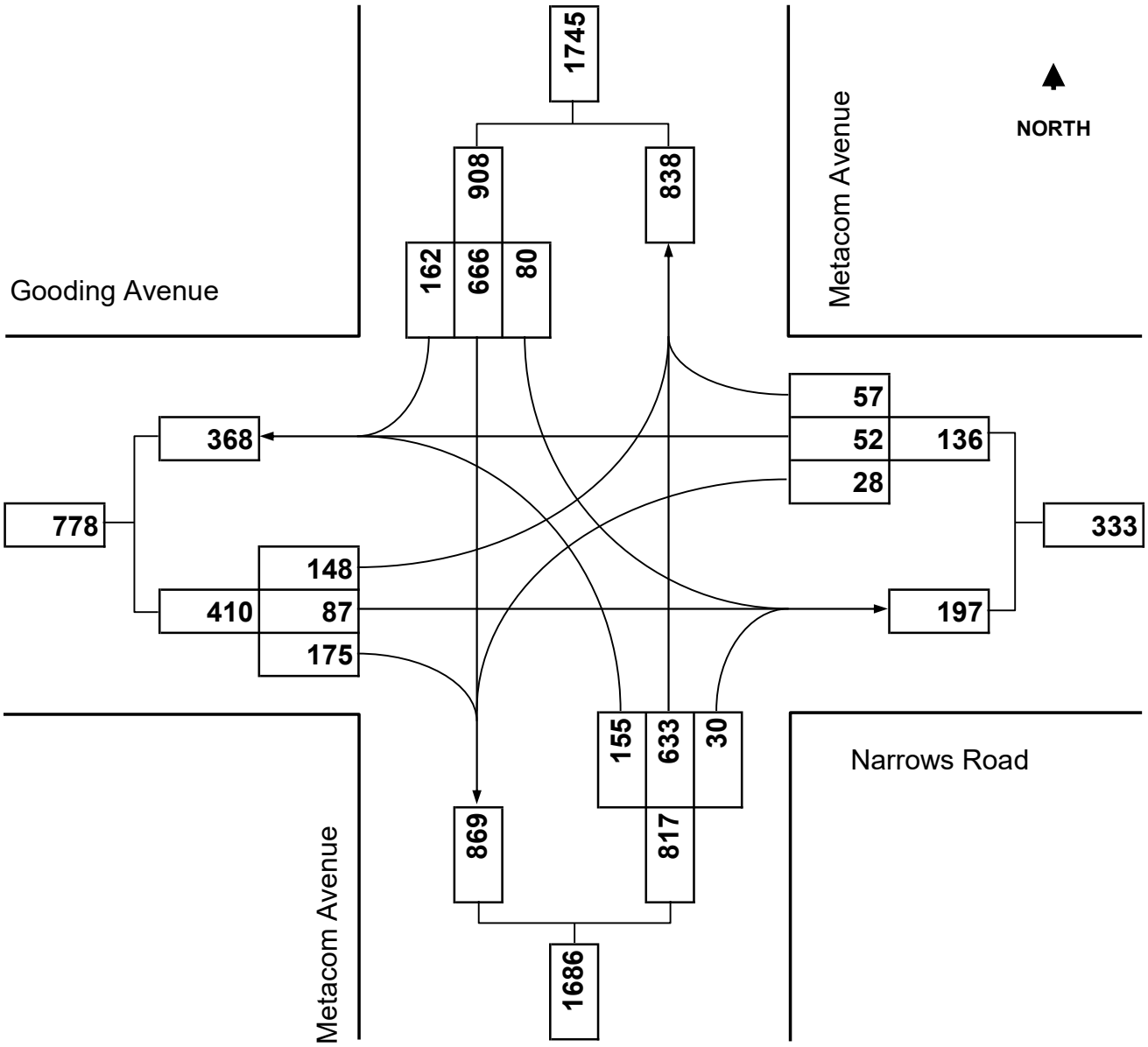
Turning Movement Diagram

Major Street:	Metacom Avenue	**Minor Street**:	Gooding Avenue
City/Town:	Bristol, RI	**Day of Week**:	Weekday
Reference No.:	6954	**Peak Period**:	PM Peak Hour
Existing:	n/a	**Future**:	2023 Build



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	87	175	28	52	57	155	633	30	80	666	162
Future Volume (vph)	148	87	175	28	52	57	155	633	30	80	666	162
Satd. Flow (prot)	1805	1900	1615	1805	1900	1615	1805	1887	0	1805	3505	0
Flt Permitted	0.472			0.697			0.950			0.950		
Satd. Flow (perm)	897	1900	1615	1324	1900	1615	1805	1887	0	1805	3505	0
Satd. Flow (RTOR)			186			121		3			41	
Lane Group Flow (vph)	157	93	186	30	55	61	165	705	0	85	881	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4						
Total Split (s)	13.0	22.0	22.0	11.0	20.0	20.0	14.0	42.0		15.0	43.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0		4.0	5.0	
Act Effct Green (s)	18.0	12.1	12.1	14.3	8.3	8.3	13.1	50.6		9.4	44.6	
Actuated g/C Ratio	0.20	0.13	0.13	0.16	0.09	0.09	0.15	0.56		0.10	0.50	
v/c Ratio	0.59	0.36	0.49	0.12	0.31	0.24	0.63	0.66		0.45	0.50	
Control Delay	38.4	39.7	10.5	26.9	42.4	2.5	46.9	21.2		45.0	17.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	38.4	39.7	10.5	26.9	42.4	2.5	46.9	21.2		45.0	17.2	
LOS	D	D	B	C	D	A	D	C		D	B	
Approach Delay		26.8			22.5			26.1			19.6	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	75	50	0	13	30	0	88	291		46	172	
Queue Length 95th (ft)	124	94	58	34	64	4	153	#557		89	248	
Internal Link Dist (ft)		1775			274			231			269	
Turn Bay Length (ft)	330		150	100		100	225			140		
Base Capacity (vph)	273	380	471	248	327	378	266	1061		227	1758	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.58	0.24	0.39	0.12	0.17	0.16	0.62	0.66		0.37	0.50	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 15 (17%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 23.4 Intersection LOS: C
Intersection Capacity Utilization 67.1% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1:

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	391	11	17	351	12	19
Future Volume (vph)	391	11	17	351	12	19
Satd. Flow (prot)	1892	0	0	1896	1709	0
Flt Permitted				0.998	0.981	
Satd. Flow (perm)	1892	0	0	1896	1709	0
Lane Group Flow (vph)	437	0	0	400	34	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 42.3%		ICU Level of Service A	
Analysis Period (min) 15			

Gooding Avenue at Main Site Driveway

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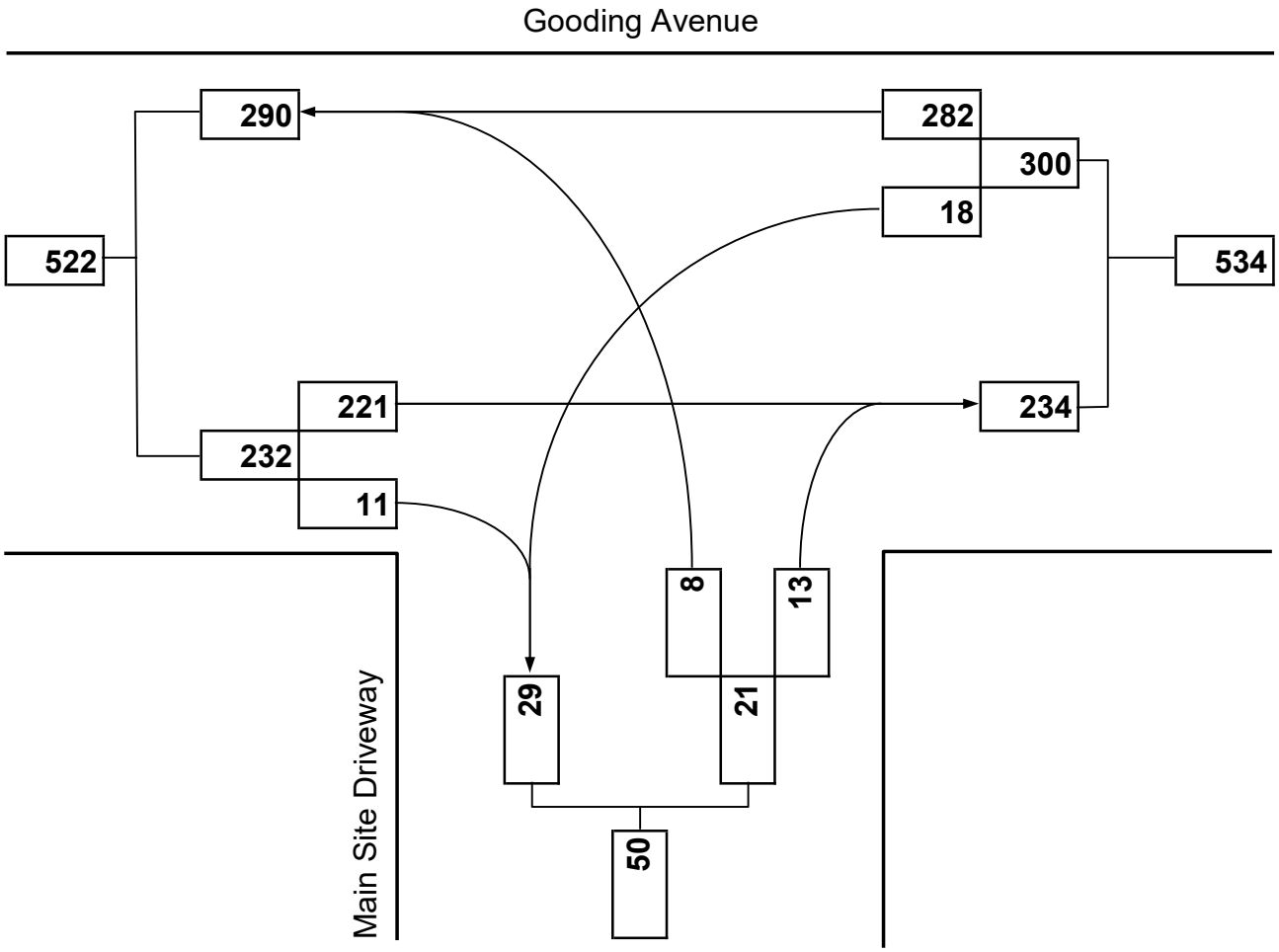
Turning Movement Diagram

Major Street:	Gooding Avenue	**Minor Street**:	Main Site Driveway
City/Town:	Bristol, RI	**Day of Week**:	Weekday
Reference No.:	6954	**Peak Period**:	AM Peak Hour
Existing:	n/a	**Future**:	2023 Build

NORTH



Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	221	11	18	282	8	13
Future Vol, veh/h	221	11	18	282	8	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	240	12	20	307	9	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	252	0	593	246
Stage 1	-	-	-	-	246	-
Stage 2	-	-	-	-	347	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1325	-	472	798
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	720	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1325	-	464	798
Mov Cap-2 Maneuver	-	-	-	-	464	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	707	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	11
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	626	-	-	1325	-
HCM Lane V/C Ratio	0.036	-	-	0.015	-
HCM Control Delay (s)	11	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

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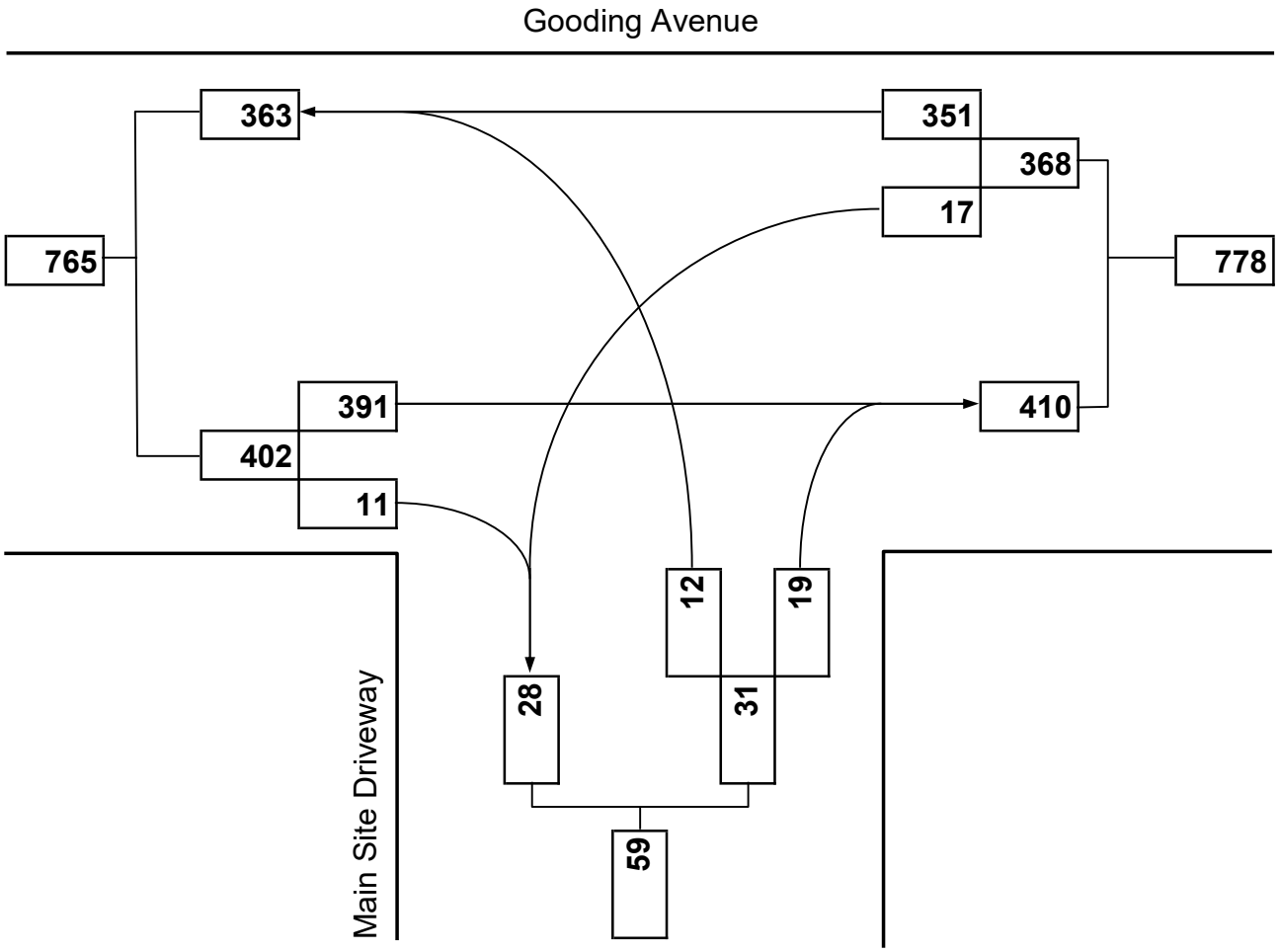
Turning Movement Diagram

Major Street:	Gooding Avenue	**Minor Street**:	Main Site Driveway
City/Town:	Bristol, RI	**Day of Week**:	Weekday
Reference No.:	6954	**Peak Period**:	PM Peak Hour
Existing:	n/a	**Future**:	2023 Build

NORTH



Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	391	11	17	351	12	19
Future Vol, veh/h	391	11	17	351	12	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	425	12	18	382	13	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	437	0	849	431
Stage 1	-	-	-	-	431	-
Stage 2	-	-	-	-	418	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1134	-	334	629
Stage 1	-	-	-	-	660	-
Stage 2	-	-	-	-	669	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1134	-	327	629
Mov Cap-2 Maneuver	-	-	-	-	327	-
Stage 1	-	-	-	-	660	-
Stage 2	-	-	-	-	656	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	463	-	-	1134	-
HCM Lane V/C Ratio	0.073	-	-	0.016	-
HCM Control Delay (s)	13.4	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-