
Traffic Impact & Access Study

***Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island***

Prepared For

Town of Smithfield, Rhode Island

February 2012

Traffic Impact & Access Study

***Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island***

February 2012

**Prepared For
Town of Smithfield, Rhode Island**

Prepared By

William J. Scully, P.E.
430 Franklin Village Drive, PMB #307
Franklin, Massachusetts 02038

In association with

Green International Affiliates, Inc.
239 Littleton Road
Westford, MA 01886

Table of Contents

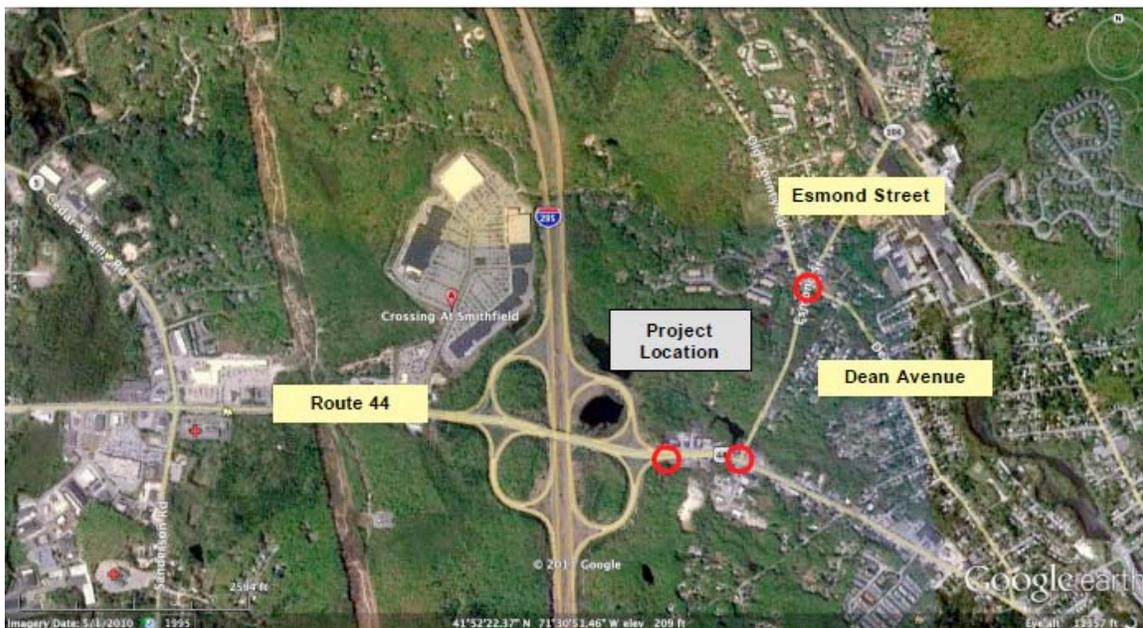
	<u>Page</u>
INTRODUCTION	1
PROJECT SUMMARY	2
EXISTING ENVIRONMENT	3
A. Existing Roadway Network	
B. Traffic Volumes	
C. Public Transportation	
D. Crash Experience	
PROBABLE IMPACTS OF THE PROJECT	11
A. No-Build Traffic Volumes	
1. Background Growth	
2. Site-Specific Development	
3. No-Build Traffic Volumes	
B. Proposed Project	
C. Site Generated Traffic Volumes	
1. Site Trip Generation	
2. Site Trip Distribution/Assignment	
3. Build Traffic Volumes	
D. Analysis	
1. Traffic Volume Increases	
2. Capacity/Level of Service (LOS) Analysis	
3. Signal Warrants – Esmond/Dean	
4. Proposed Access Plan Review	
CONCLUSIONS	35
APPENDIX	42

Introduction

This transportation study provides an assessment of the potential traffic impacts, area circulation and access plan associated with the proposed Putnam Pike Commercial Development in Smithfield, Rhode Island. This study was completed under contract to the Town of Smithfield. The project location with respect to the area roadway system is shown in Figure 1. The project is located off the Route 44 corridor just east of I-295 and bounded on the east by Esmond Street. The general area in the vicinity of the proposed project is currently developed with commercial/office uses on Route 44 and primarily residential uses on/near Esmond Street between Route 44 and Dean Avenue. While the site is zoned for business, there are concerns due to its location, the current roadway geometry and controls near the site and the existing traffic flow conditions in the project area.

As currently proposed, the project is to consist of 79,100 square feet (sf) of retail use, 60,000 square feet of office space and 10,600 sf of restaurant space. In addition, an existing 7,100 sf building that housed a restaurant/pub in the past will be renovated and reused with similar use as part of the current development plan as well. As proposed by the Applicant, the project is to be served by five (5) access/egress points to either Route 44 (2) or Esmond Street (3).

This traffic study took into account the guidelines published by the Institute of Transportation Engineers and well as guidelines for traffic studies used in the State. As the following sections of the report document, the assessment included a review of the existing traffic environment, an estimate of future traffic flow conditions and an assessment of the expected traffic operations with and without the project to determine the level of impact. The proposed access plan was reviewed and a set of actions outlined for consideration should the development move forward.



 study location

Figure 1
Project Location

Project Summary

This transportation review and assessment was completed for the purpose of assessing potential traffic impacts, area traffic circulation and access characteristics associated with the proposed Putnam Pike Commercial Development (PPCD). The development is proposed to consist of a mix of office, retail and restaurants located on Route 44 in Smithfield. It is currently planned to consist of approximately 149,700 total square footage (sf) that includes of 79,100 sf of retail use, 10,600 sf of restaurant use, and 60,000 sf of office use. The existing 7,100 sf restaurant/pub building located adjacent to Route 44 will be renovated as well. The review area focused on a set of roadways and intersections within a short distance the site in Smithfield that would be impacted by the proposed project.

The immediate vicinity of the proposed project is currently developed with commercial/office, restaurants and residential uses. Based on the transportation review and analyses, the intersections and roadway sections within the study area were identified as currently experiencing some traffic flow constraints and would be impacted by the proposed project. The proposed project is estimated to add a substantial amount of new traffic to the abutting roadway system, particularly during the afternoon peak hours and on Saturday. The currently noted issues become more pronounced as well as the study intersections begin to operate at lower or poor levels of service as a result of the development. The key findings from the analysis are as follows:

- The level of service analysis showed that the overall operating conditions of the two study intersections including the Route 44 intersection with Esmond Street were currently operating at generally acceptable peak hour levels. Although this specific section of Route 44 is less intensely developed than the west side of the highway and despite the overall LOS findings, there are issues that exist in the study section that affect the actual efficiency and safety of the traffic flow at this location. Most notably, the high volume movement between Route 44 and Esmond street, the inadequately designated exclusive turn lanes and the short distance between the I-295 NB off-ramp and the Esmond Street intersection.
- With the development project and no major improvements, the operating levels of the two study intersections reduce to LOS 'E' or LOS 'F' during the weekday afternoon or Saturday midday peak hours.
- The weaving that occurs between the highway off-ramp and intersection is high and results in a low level of service particularly during the afternoon peak hour with the project.

In relation to the proposed site plan including its layout and proposed drives, there were also a number of issues or questions. Most notably were the 5 proposed drives to serve the development which is more than needed to accommodate this size of project as well as the proximity of the drives to the Route 44/Esmond Street intersection. These and the other items should be addressed going forward.

A series of potential actions to address the project's impacts and access needs have been outlined at the end of this report. Further evaluation is required to fully assess the feasibility of these potential actions and make a determination of which ones, if any, should be implemented.

Existing Environment

The following section describes the existing transportation system in terms of physical and operational characteristics. The study area focused on the Route 44 section in relatively close proximity to the development site and Esmond Street. In developing an understanding of the existing conditions, site visits were conducted, research completed and data collected.

A. EXISTING ROADWAY NETWORK

The study area was defined by the Town at the outset of the study. Route 44 and Esmond Street abut the development site. The study focused on the evaluation of a set of roadways and intersections in the vicinity of the site that would be most impacted by the proposed project. The study area intersections included in this analysis were:

- Route 44 a I-295 Northbound Ramps
- Route 44 at Esmond Street
- Esmond Street at Dean Avenue

General descriptions of these roadways are included in the following paragraphs:

1. Route 44

Route 44 is a major, U.S. highway that runs east-west from Providence and points east to the west past the project area towards Connecticut. Route 44 is a major highway serving this section of Rhode Island. Route 44 comes under the jurisdiction of the Rhode Island Department of Transportation (RIDOT) in the project area. In the vicinity of the study area, it is generally a four lane highway with partially controlled access to abutting properties. Additional turn lanes currently exist at the signalized intersection with Esmond Street. A 230-foot left turn lane in the eastbound direction is provided.



Route 44 looking south of Esmond Street

A separate left turn lane and a 130-foot right turn lane are provided on the Esmond Street approach. There are commercial properties in the immediate vicinity of the intersection including a Hess fueling facility, and several small commercial properties. None of the commercial drives come under the signal control.



Route 44 looking north of Esmond Street

Within approximately 800 feet of Esmond Street, Route 44 intersects with the I-295 northbound on and off-ramps. There is less than 500 feet from the I-295 NB off-ramp to the beginning of the left turn taper on Route 44 at its signal with Esmond Street. I-295 provides accessibility to I-95 in Warwick to the south and to Attleboro, Massachusetts area

to the north/east. The section of Route 44 between I-295 and Esmond Street includes a 5 lane section that accommodates two lanes per direction and a center two way left turn lane (TWLTL) prior to the exclusive eastbound left turn lane.

The section of Route 44 generally has two lanes per direction for 2,000 feet east of Esmond Street continuing through the interchange area until approximately 1,800 feet west of Cedar Swamp Road (Route 5). West of I-295, Route 44 serves a highly commercial area with 'The Crossing at Smithfield' located immediately west of the I-295 southbound off-ramp. During the inventory period for the Putnam Pike Commercial Development Study, it was generally observed that the traffic signal that provides access in and out of 'The Crossing' has a significant effect on traffic flow on Route 44 through the I-295/Route 44 interchange. The I-295 interchange ramp intersections are unsignalized. Full north-south movements are allowed at the interchange.



Route 44 between I-295 NB off-ramp and Esmond Street

2. Esmond Street



Esmond Street is a two lane street that provides north-south access from its intersection with Route 44 to Route 104 approximately 0.75 miles to the north. The roadway has varying alignment characteristics including a number of gentle horizontal curves along its length. Pavement surface conditions range from average to good and generally, sidewalks do not exist between Route 44 and Dean Avenue. The roadway section between Route 44 and Dean Avenue ranges is approximately 26-28 feet.

The intersection with Dean Avenue is currently a four way ALL WAY STOP controlled location. There are single lanes on each approach (The west leg named Old County Road). The intersection is located approximately 1,000 feet north of the proposed development site. The East Smithfield Public Library exists in the northeast quadrant of the intersection as well as a number of residential homes in the area.

3. Dean Avenue

Dean Avenue is a two lane street under local jurisdiction. It runs from its intersection with Esmond Street to its intersection with Putnam Pike located 0.8 miles to the east of I-295. It is level and straight in the vicinity of Esmond Street. Sidewalks exist along both sides of the street. The westerly leg of the intersection with Esmond Street connects with Old County Road that intersects with Sebille Road (becomes Mountaindale Road) provides for an eventual connection to Walter Carey Road and Route 5 that connects with Route 44 and Route 116 on the western edge of the major retail area approximately 3,500 feet from I-295.



B. TRAFFIC VOLUMES

In developing traffic analysis networks for this study, new traffic counts were conducted at the three study intersections. The new data was collected in December 2011 through manual turning movement counts (TMC) and during the weekday morning (7AM-9AM), weekday evening (4PM-6PM) and the Saturday midday peak period (11AM-1PM) given this proposed development will contain a substantial amount of retail use. Daily traffic data for several of the study area roadways were also obtained through collected 48 hour automatic traffic recorder (ATR) counts that were conducted on Route 44, Esmond Street and Dean Avenue.

While individual intersections within a study network may experience peak traffic flow at different time periods, review of the new TMC data at the individual intersections indicated that the weekday evening peak hour occurred between either 4:30-5:30 PM or 4:45-5:45 PM and the Saturday midday peak hour occurred between 11:15 AM-12:15 PM. The weekday morning peak hour were observed to occur between either 7:30-8:30 AM or 7:45-8:45 AM. The TMC and ATR data collected as a part of this traffic study are included in the Appendix.

Table 1 summarizes some of the traffic data that was identified as part of this study. As seen in Table 1, Route 44 south of the project site carries approximately 24,050 vehicles per day (vpd) on a weekday. Esmond Street north of the project site was observed to carry approximately 11,360 vehicles on the weekday. Dean Avenue had an observed weekday volume of approximately 2,300 vehicles over the 24 hour weekday period. It needs to be noted that the traffic counts were collected during the Christmas shopping season and given the concentration of retail on Route 44, particularly west of I-295, the observed traffic volumes are likely to be above average levels, though may provide a conservative yet reasonable base for analysis purposes.

TABLE 1
SUMMARY OF OBSERVED TRAFFIC DATA

Location	Weekday (vpd)	AM Peak Hour	% of 24 hour volume	PM Peak Hour	% of 24 hour volume
Route 44 - east of Esmond Street	24,050	1,480	6.1%	1,720	7.2%
Esmond Street -north of Route 44	11,360	740	6.9%	970	8.5%
Dean Avenue - east of Esmond Street	2,320	130	5.6%	230	9.9%

Note: Data has been rounded.
Based on observed December 2011 ATR counts

Seasonal Adjustments

For this purpose, count adjustment factors developed by RIDOT for similar types of roadways found in the project area were obtained and examined. Count adjustment factors developed by RIDOT indicated that the December data tend to be slightly higher than the average volumes in general. In this particular study area with the highway and the retail/commercial developments nearby, the December data collected during the Christmas season will be above average but may also reflect a reasonable condition to analyze as the volumes will be influenced by the retail and commercial uses for much of the year. Consequently, the peak hour traffic volumes collected as part of this study were used as is and not further adjusted.

Figures 2 and 3 illustrate the existing weekday afternoon/evening peak hour and Saturday midday peak hour traffic volumes at the study intersections.

C. PUBLIC TRANSPORTATION

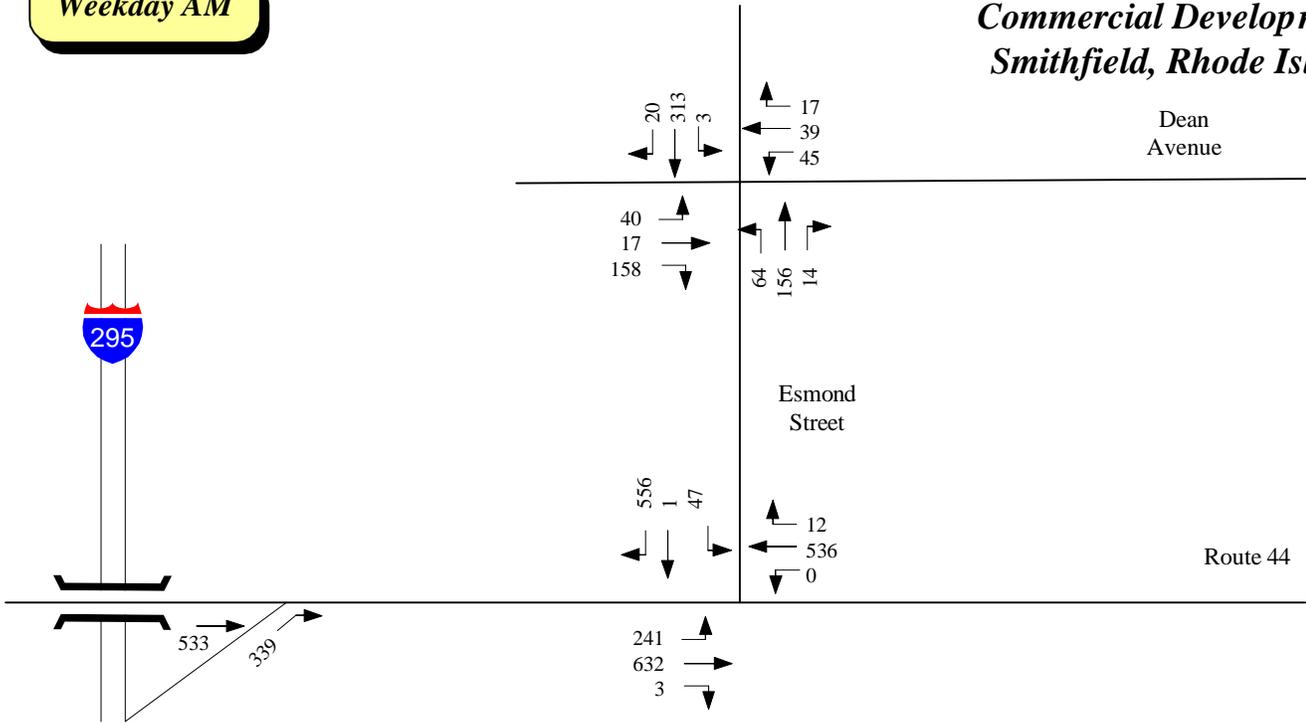
The project area is currently served by public transportation via the Rhode Island Public Transit Authority (RIPTA). The RIPTA Route No. 58 travels along Esmond Street between Route 44 and Route 104 connecting with Smithfield Crossings. The route and schedule information is included in the Appendix. The route also connects with Centerdale, runs along Mineral Spring Road and eventually reaches or starts at Kennedy Plaza. The service currently runs Monday through Friday with no Saturday or Sunday service.

D. CRASH EXPERIENCE

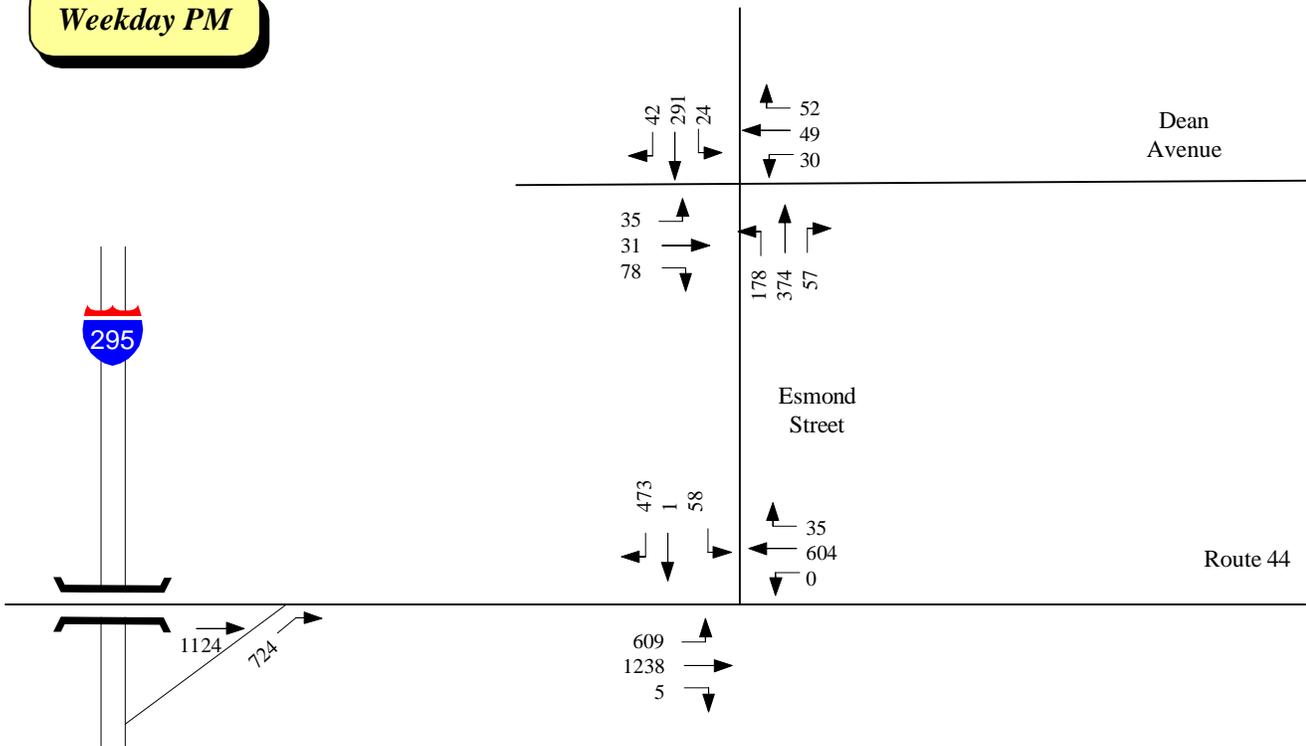
The crash experience in the project area is being researched as part of this study. Data for the most recently available three-year period (2009 to 2011) has been obtained from the Smithfield Police Department and is in the process of being compiled. The data will be reviewed and summarized in terms of # of crashes, types and severity of crashes and other characteristics. A supplemental report will be provided to the Town when completed. Also as part of this study, the RIDOT High Hazard contract #3 Study that included examining the Route 44 intersection with Esmond Street was reviewed.

**Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island**

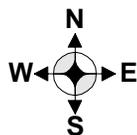
Weekday AM



Weekday PM



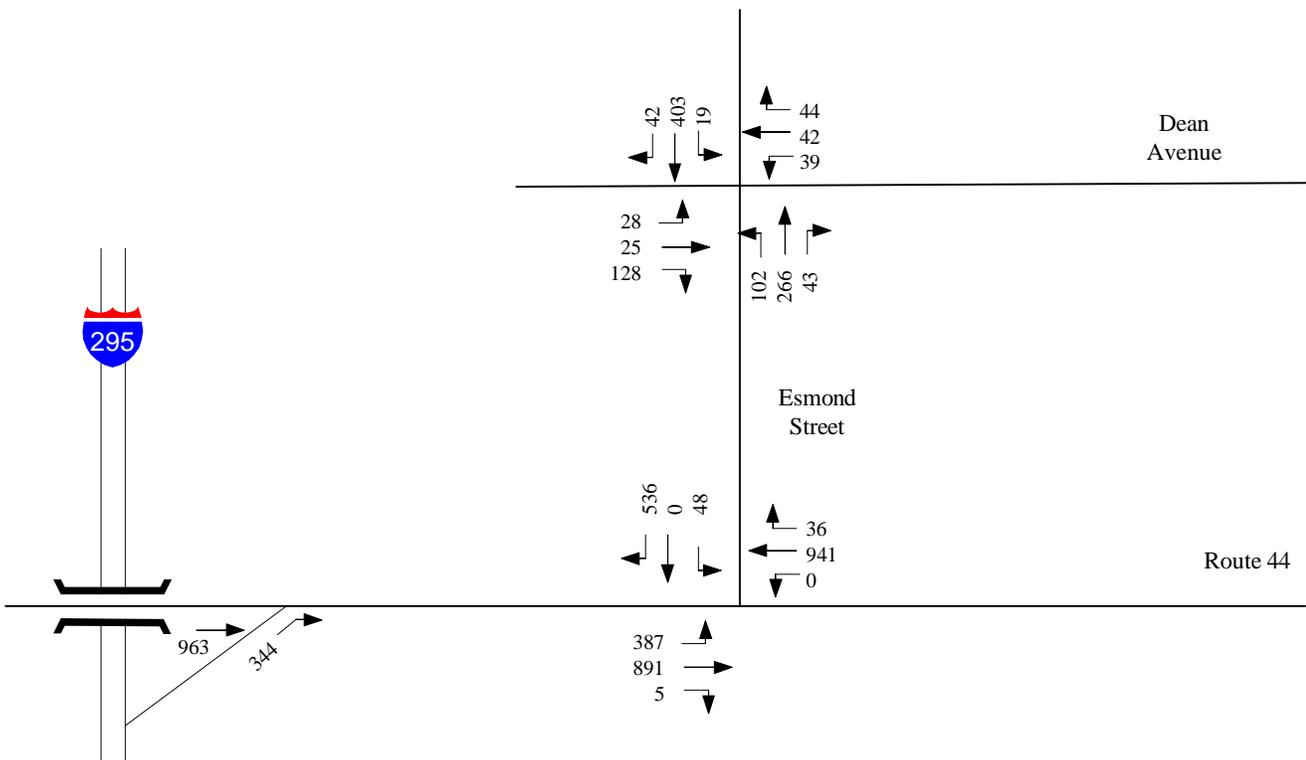
Not to Scale



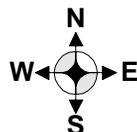
**Existing Traffic
Volume Networks
Figure 2**

**Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island**

**Saturday
Peak**



Not to Scale



**Existing Traffic
Volume Networks
Figure 3**

By 2006 when the RIDOT study was conducted, a left turn lane in the eastbound direction had been installed as well as the center TWLTL between I-295 NB and the exclusive left turn lane at Esmond Street. During the 2006 RIDOT review, it was noted that although the intersection computed to be operating at reasonable peak hour levels of service, (i.e. LOS 'C' or higher), the vehicle queuing that was occurring on Route 44 was very long, particularly related to the eastbound left turn movement - generally exceeding the defined storage lane capacity that is provided. Crash history at that time indicated approximately 15 reported crashes per year with the majority of them being rear end type crashes with 20% of the reported crashes resulting in injuries. Short term recommendations from that RIDOT study included lengthening the EB storage lane to at least 350' from the present 230' and modifying the signal timing. Current inventories indicate that storage length has not been increased at this point. RIDOT did recently (December 2011) complete a review of the signal timing and installed some minor changes (note: these have been incorporated into this analysis).

**TABLE 2
SUMMARY OF CRASH DATA
2009-2011**

Year	Total	Accident Type				Severity			Road Surface			Weather		
		ANG	RE	SS	O	PDI	INJ	Fatal	Dry	Wet	Ice/ Snow	Clear	Cloud /Rain	Ice/ Snow
<i>Route 44 at Esmond Street</i>														
2007														
2008														
2009														
Total														
Being compiled to be submitted as supplemental document														
<i>Esmond Street at Dean Avenue</i>														
2007														
2008														
2009														
Total														

Note: Based on data provided by the Massachusetts Highway Department (MHD)
^a Angle Collision ^b Rear-End ^c Head On ^d Unknown ^e Property Damage Only

Probable Impacts of the Project

In this section of the report, the impact of the proposed Putnam Pike development located off Route 44 and Esmond Street at I-295 in Smithfield on the roadway network within the defined study area is described. For analysis purposes and to comply with typical traffic analyses guidelines for major projects such as this, a future year build out condition was developed. Given the size of the proposed development, it is presumed to take 1 to 2 years to permit, construct and occupy. It is typical in the New England region that a 5 to 10 year future conditions analysis be completed when assessing the impact of a new project. Presuming the project can advance through the permit and construction tasks over the next two years, a future analysis year of 2018 was selected whereby the development would be fully built and occupied by that time. This represents a 5 year future conditions analysis from the time occupancy can actually begin.

Based on this approach, a 2018 No-Build traffic volume network was developed by taking into account existing traffic volumes, areawide background traffic volume growth, and traffic from other potential site specific (background) developments. The No-Build alternative would not include any development on the subject site other than the re-use of the former restaurant/pub that abuts Route 44. If appropriate, known transportation related improvements in the study area that would be completed within the analysis timeframe would also be assumed in the future conditions. The addition of site trips generated by the proposed development to the 2018 No-Build traffic volume networks produces the estimated 2018 Build traffic volume networks.

The impact of No-Build and Build traffic conditions during the weekday morning, weekday evening and Saturday midday peak hours were then evaluated by examining increases in traffic volumes and the operating conditions at the study intersections.

A. NO-BUILD TRAFFIC VOLUMES

In general, growth in traffic typically occurs over the years due to a combination of population and economic activity. This issue needs to be considered although overall economic activity over the past 4 to 5 years has been sluggish at best in the larger region. In developing No-Build traffic projections, both growth rate analysis and the identification of site specific developments were completed.

1. Background Traffic Growth

To establish a traffic growth rate for the study area, historical traffic count data collected in the study area as part of past studies as well as data collected obtained by RIDOT. In addition, research was conducted at the local level including examining socio-economic data. Population changes in the area communities including but not limited to Smithfield, North Smithfield, North Providence and Johnston between 2000 and 2010 indicated a change of approximately 0.2% per year with communities experiencing small increases or in the case of North Providence, a small decrease in population during this time period.

Historical data available for the corridor through previous studies^{1,2,3} were also reviewed that provided

¹ VHB, High Hazard Study Contract 3, Route 44 at Esmond Street, prepared for RIDOT, 2006.

² Pare, Traffic Impact & Access Study, Proposed Walcott Center, Smithfield, RI, 2008.

insight related to changes in traffic volumes over the past 5 to 8 years. These data when compared to the data collected as part of the study reveals comparable levels of volume (i.e. no major changes in volume between 2003 and present day).

Taking all these factors into consideration, a background traffic growth rate of 0.5% per year was selected for the next two years and a rate of 1% per year applied for the successive 5 year period to obtain future (2018) base growth in traffic volumes.

2. Site Specific Developments

Also as part of developing the 2018 No-Build traffic conditions, information on additional approved or planned projects that are anticipated within the analysis time frame in the vicinity of the proposed project were also requested from the Smithfield Planning Department.

Based on these discussions, there were several projects in close proximity to the proposed development identified and in some stage of the development process. One of these, a small commercial (5,400 sf) project on the east side of the existing Hess station, was identified. This project has the approvals to build but has not yet been initiated. In addition, a development (Walcott Village) is proposed for a site west of I-295 off Route 44 on the west side of the 'Crossings' site. That project consists of approximately 150,000 square feet of mixed office/retail uses but the Town denied the project without it creating a shared access with abutting commercial sites. A recent court decision upheld the Town's decision which has put the project in an unclear status.

In addition to the above, the reuse of the former restaurant/pub on Route 44 is anticipated to be part of the development plan was incorporated into the No-Build condition. This presumes the re-use would occur in the future regardless of the overall development progress.

Consequently, small commercial project proposed to be adjacent to Hess was included in this analysis. Given the uncertainty of the Walcott project, it was not specifically included in this the analysis. Peak hour trips were generated for the above noted site-specific development using data contained in the Institute of Transportation Engineers (ITE) Trip Generation⁴. Detailed trip generation calculations are included in the Appendix.

3. No-Build Traffic Volumes

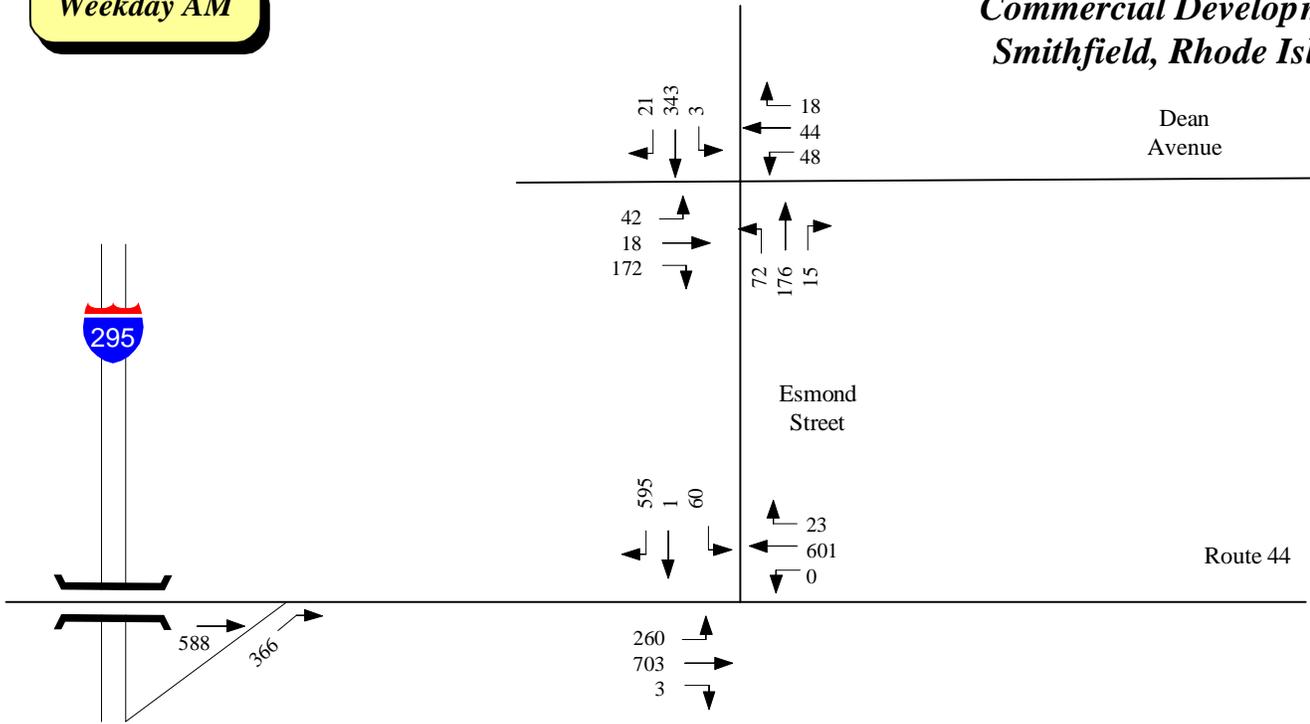
Consequently, the 2018 No-Build traffic volumes were determined by adding the seven (7) year background traffic growth rate as well as traffic from the above noted developments to the existing traffic volumes. The 2018 No-Build traffic volumes projected for the weekday morning, weekday evening and Saturday midday peak hours at the study intersections are shown in Figures 4 and 5, respectively.

³ VHB, [Traffic Impact & Access Study, Proposed Benheim Residential Development](#), 2003.

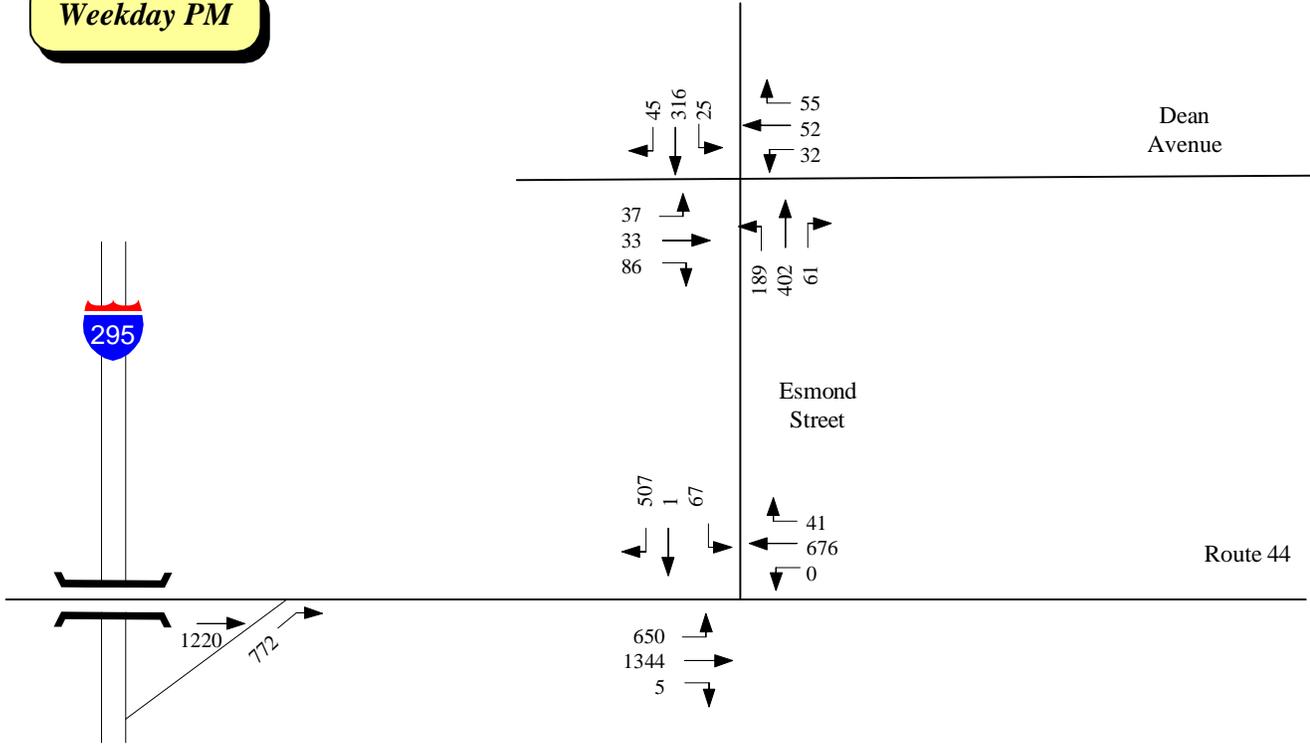
⁴ Institute of Transportation Engineers, [Trip Generation 8th Edition](#). 2008.

**Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island**

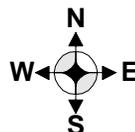
Weekday AM



Weekday PM



Not to Scale

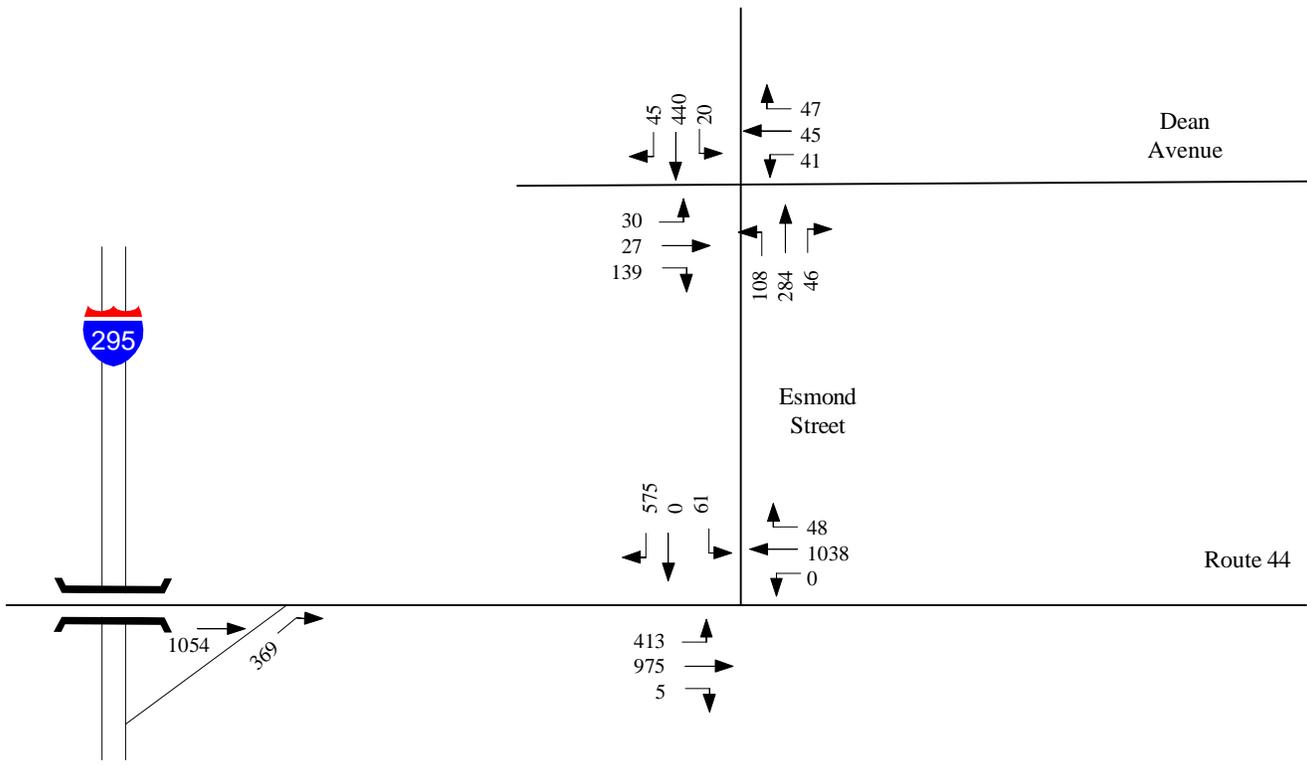


**Estimated 2018 No-Build
Traffic Volume Networks**

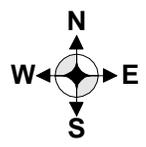
Figure 4

**Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island**

**Saturday
Peak**



Not to Scale



**Estimated 2018 No-Build
Traffic Volume Networks**

Figure 5

PROPOSED PROJECT

The proposed project represents a relatively large, mixed use development on a site that abuts Route 44, Esmond Street and I-295 as well. It is located in the northwest quadrant of the Route 44/Esmond Street intersection. In total and based on the Master Plan dated October 20, 2011, the development consists of approximately 149,700 sf of new floor space as summarized by category in Table 3. As can be seen, the project includes three components including retail, restaurant and office. In addition to the items listed in Table 4, the existing restaurant/pub building that abuts Route 44 is expected to be renovated, re-tenanted and share common driveways with the new development.

**TABLE 3
SUMMARY OF PROPOSED
PUTNAM PIKE COMMERCIAL DEVELOPMENT**

Component	Unit	Size
Retail	square foot	79,100 sf
Restaurant sit down, high turnover	square foot	10,600 sf
Office	square foot	60,000 sf

- not included in the table is the 7,100 sf former restaurant/pub that will be renovated and occupied as part of the new project.

The site in total consists of approximately 29 acres. The project layout generally stretches north-south with the retail components planned on the northern portion of the site fronting Esmond Street. The office building is located in the southwestern area of the site towards Route 44 with visibility from I-395. The two major retail buildings are proposed to front Esmond Street along with the two new restaurants and smaller retail building. As indicated previously, the former restaurant/pub abutting Route 44 will remain as part of the development.

The Applicant has proposed five (5) access drives to serve the project. A primary site roadway will intersect with Route 44 approximately 300 feet west of Esmond Street and curve through the site and connect with Esmond Street approximately 500 feet north of Route 44. This roadway is proposed to be between 24 and 36 feet in width with a sidewalk along at least one side from beginning to end. The retail parking field and the office building parcel can be accessed from this primary roadway from Route 44. The primary site roadway approaches to both Route 44 and Esmond Street are proposed to have medians to separate directional flow for a certain distance into the site. Motorists would be able to enter and exit the site from any direction as no movements are proposed to be restricted for this primary road. The intersections created by the new road with both Route 44 and with Esmond Street are currently proposed by the Applicant to be unsignalized. However, the Applicant is proposing that left turn lanes be installed on the abutting public streets at both of these two new intersections.

In addition to the primary site access road, there are three additional driveways proposed: a right in-right out on Route 44 west of the proposed main site road; a right turn out only drive on Esmond Street approximately 320 feet north of Route 44 and an egress only drive on Esmond Street approximately 300 feet north of the main site road intersection.

A total of 829 parking spaces are proposed including 67 spaces designated around the existing restaurant building. Of the total spaces, 273 spaces are located in the proximity of the office building and 58 spaces are planned for the restaurant uses on Lot 2. In total, the proposed supply exceeds by a small amount (26) what would be required by the zoning bylaw according to the Applicant.

C. SITE GENERATED TRAFFIC VOLUMES

In this section, traffic estimated to be generated by the proposed Putnam Pike Commercial Development was estimated and assigned to roadways/intersections within the study area and added to the No-Build traffic volume network to form the Build traffic condition.

1. Trip Generation

In order to estimate the number of trips that will be generated by the proposed development, statistics published by the Institute of Transportation Engineers (ITE) in Trip Generation for similar land uses were examined. ITE trip generation statistics represent compilation of data from studies/projects throughout the United States related to trip generation characteristics for different types of land uses and developments.

To estimate average daily and peak hour trips for the proposed development, the ITE trip generation data for Shopping Center (Land Use Code 820), restaurant uses (Land Use Code 932) and General Office Building use (Land Use Code 710) were used in this study. A summary of the total estimated trip generation is shown in Table 4.

**TABLE 4
SUMMARY OF TRIP GENERATION OF THE PROPOSED
PUTNAM PIKE COMMERCIAL DEVELOPMENT¹**

Time Period	Enter	Exit	Total
Weekday			
24 Hour	3,659	3,659	7,318
AM Peak	256	125	381
PM Peak	362	446	808
Saturday			
24 Hour	4,425	4,425	8,850
Midday Peak	475	434	909

¹ Based on ITE Trip Generation

As shown in Table 4, the proposed project is expected to generate 7,318 vehicle trips on a typical weekday and will include 3,659 entering and 3,659 exiting trips over the 24 hour period. During the AM peak hour, it is estimated that a total of 381 vehicle trips will be generated by the development with 256 entering trips and 125 exiting trips. The weekday evening peak hour is expected to generate 808 total trips with 362 inbound and 446 outbound trips. For a Saturday, the proposed project is estimated to generate 8,850 vehicle trips over a 24 hour period with 4,425 entering and 4,425 exiting trips. The Saturday midday peak hour is expected to generate 909 total trips with 475 inbound and 434 outbound trips. It should be noted that the potential trips from the renovated 7,100 sf restaurant are included in the Build conditions as well as the future No-Build conditions.

More detailed information on trips generated for each of the above components is presented in Table 5. Detailed trip generation calculations for each individual land use are included in the Appendix. As indicated in Table 5 shows that the retail portion of the development represents the most significant generator of traffic to and from the site as would be expected.

**TABLE 5
SUMMARY OF PROJECT TRIP GENERATION
PROPOSED PUTNAM PIKE COMMERCIAL DEVELOPMENT^{1,2}**

	24 Hour Trips			AM Peak Hour Trips			PM Peak Hour Trips		
	In	Out	Total	In	Out	Total	In	Out	Total
Weekday									
Shopping Center – 79,100 sf (ITE LUC 820; Eq.; sf)	2,916	2,916	5,832	82	52	134	267	277	544
Restaurant – sit down – 10,600 sf (ITE LUC 932; Eq.; sf)	675	675	1,350	64	58	122	70	48	118
General Office Building – 60,000 sf (ITE LUC 710; Eq.; sf)	450	450	900	110	15	125	25	121	146
Total Trips	3,659	3,659	7,318	256	125	381	362	446	808
Saturday									
Shopping Center – 79,100 sf (ITE LUC 820; Eq.; sf)	3,986	3,986	7,972	-	-	-	383	353	736
Restaurant – sit down - 10,600 sf (ITE LUC 932; Eq.; sf)	840	840	1,680	-	-	-	79	70	149
General Office Building – 60,000 sf (ITE LUC 710; Eq.; sf)	146	73	73	-	-	-	13	11	24
Total Trips	4,425	4,425	8,850	-	-	-	475	434	909

¹ Based on ITE Trip Generation

- **passby traffic/internal capture**

In general, not all the trips generated by retail and restaurant components of a project are typically new to the region's roadway system. The site traffic will tend to consist of three basic trip types. One major trip type will be *new* trips generated due solely to the project. In addition, a portion of site trips will already be on the roadway system adjacent to the project or in close proximity to the development site and would likely divert to the site. *Passby* traffic on the adjacent streets (i.e. Route 44) to the project may turn into the site on impulse as well as planned trips part of the primary trip (i.e. work to home). *Diverted* trips would be made by a motorist similar to the passby trip but the motorist diverts from their normal trip path (i.e. from Route I-295 or Route 104). It should be noted that any existing trips diverted from I-295 or Route 104 for example, would be new trips to the streets abutting the project but not new vehicle trips to the region as a whole.

In addition, there is the potential for some level of what is referred to as internal trips generated within the immediate development zone given the mix of uses. This is now referred to as *internal trip capture*. Due to the relatively small size of the individual land use components proposed, the level of internal capture is expected to be small and not substantively affect the analysis results. Internal capture would already be accounted for among retail uses based on the shopping center land use code used in developing the forecasts of retail related traffic. For the purposes of this analysis, no internal trip capture has been assumed.

Based on information collected by the ITE⁵, some insight on the passby, diverted as well as internal capture is provided. Data collected provides low to high ranges of passby rates as well as averages for a number of uses including retail centers and restaurants. In general, office related trips are considered "new" trips to the roadway system. From the ITE, the passby rates for shopping centers range from as low as 8% to more than 50% during the PM peak hours with an average rate of 34% during the PM peak hour. It generally varies by size of the center and as the center size increases, the level of passby traffic tends to decrease as the center gains a more significant regional influence. An average rate of 26% is indicated for the Saturday midday peak hour according to ITE. Sit down (high turnover) restaurant uses have been observed to have an average passby rate of approximately 44% during the PM peak hours based on a limited amount of data. RIDOT does not have any specific guidelines for application of passby rates. The Commonwealth of Massachusetts uses a maximum of 25% passby for retail and most commercial uses. For the purposes of this study, passby rates of 25% for retail and 30% for the sit-down restaurants were selected.

In relation to the passby trips, Table 6 summarizes the estimated site trips with the breakdown of 'new' versus 'passby'. In assigning the passby/diverted trips, it was assumed that they would primarily come from Route 44 and I-295 but Esmond Street as well. While the passby characteristic does not affect the amount of driveway trips, passby traffic occurrence will reduce the effective increase in traffic volumes on the abutting streets notwithstanding the site access points.

**TABLE 6
SUMMARY OF ESTIMATED
SITE TRIP GENERATION
New vs. Passby/Diverted – Peak Hours**

Time Period	New	Passby	% Passby	Total
Weekday				
AM Peak	312	69	18.1%	381
PM Peak	637	171	21.2%	808
Saturday				
Midday Peak	677	232	25.5%	909

2. Trip Distribution/Assignment

Once the number of trips projected to be generated by the development has been determined, these trips are assigned to the site driveways and study area roadways based on trip distribution patterns determined for the site and its individual components. Directional distribution of generated trips to and from the site is expected to follow existing traffic patterns which, in turn, are a function of regional population densities, shopping opportunities, areas of employment, and recreational activities.

To accomplish this, traffic flow patterns within the study area as well as access conditions relative to the site were reviewed. The trip distribution patterns were further explored considering population densities for the area cities and towns from the 2010 census data. The various transportation routes connecting with the project area were identified. Trip distribution patterns for the retail component of the proposed development was developed using a gravity type trip distribution model based on the population of surrounding cities and towns within an approximate 15 to 30 minute driving time from the proposed center

⁵ Institute of Transportation Engineers, Trip Generation - A Handbook, Washington, D.C., March 2001.

and approximate travel times to these locations. Trip distribution for the office component of the development as well as the passby traffic was based largely on the existing traffic patterns that tend to reflect existing socio-economic and population characteristics as well. Figure 6 graphically displays the results of the trip distribution analysis.

Each major project component was analyzed separately relative to trip distribution and assignment to the roadway system given the different potential patterns and locations within the site. As stated above, the retail and restaurant uses had new and passby trips. Additional assumptions used in developing the trip assignments were as follows:

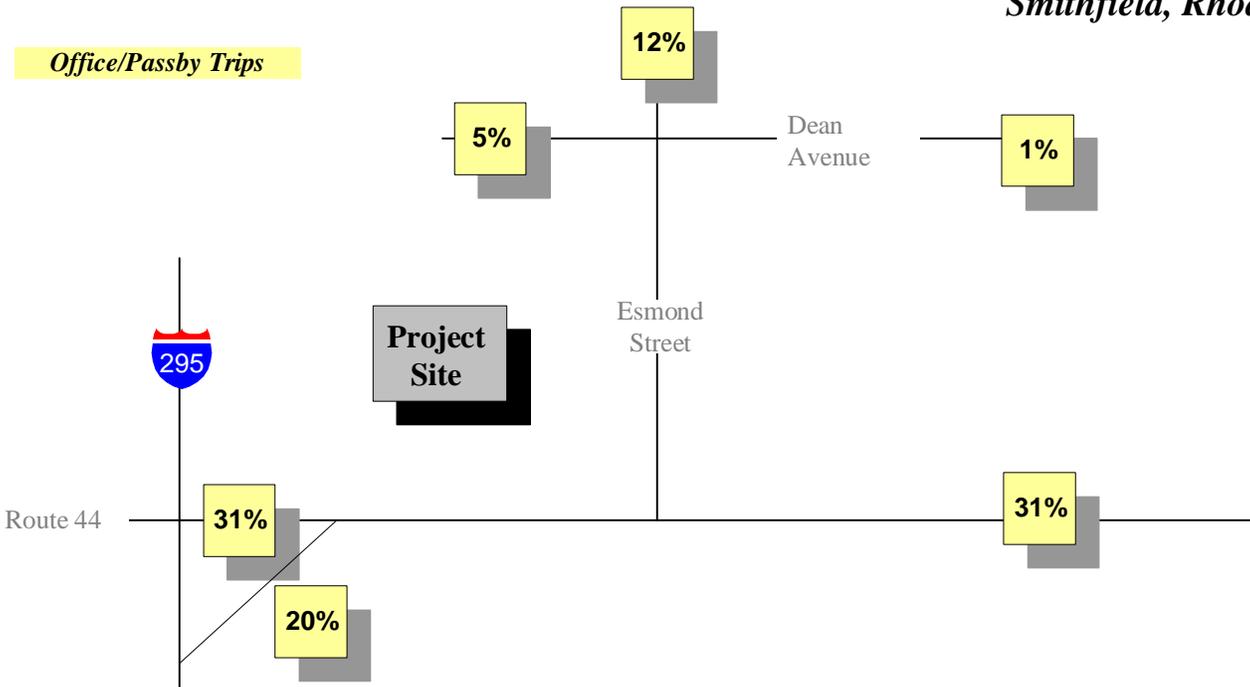
- All five proposed site drives proposed by the Applicant were used in the base projections.
- Without knowing the proposed specific tenant types, the size of the retail uses suggest a community/neighborhood level center although its synergy could build off the large amount of retail west of I-295.
- The use of particular site drives considered the overall orientation of the trip by type, the location of the use within the site, the proposed restrictions (i.e. right turn only) and the study area roadway network.

3. Build Traffic Volumes

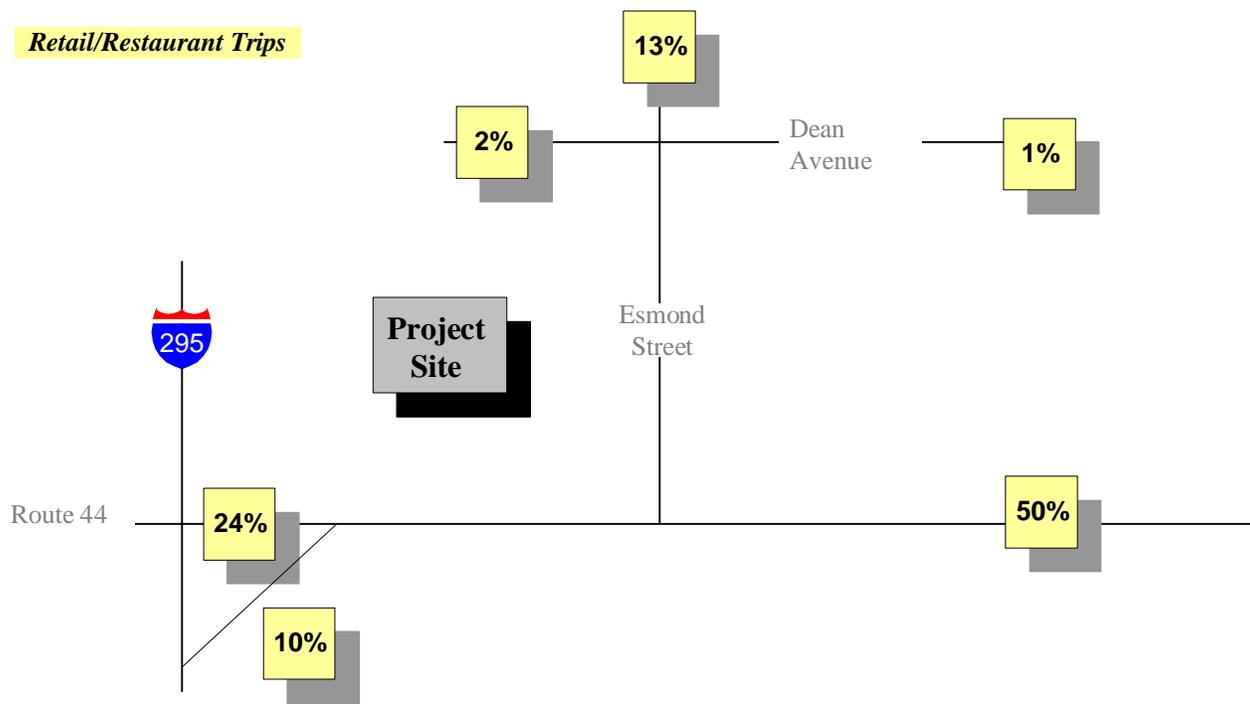
Trips that were projected for the proposed development were assigned to the site driveways and study area roadways using the distribution percentages developed in the analysis. Peak hour site traffic volumes were then added to the No-Build traffic volumes shown in Figures 4 and 5 to establish the estimated 2018 Build condition traffic volume network. Figures 7 to 9 present the Build traffic volume network for the weekday morning and evening, and the Saturday midday peak hours, respectively.

**Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island**

Office/Passby Trips

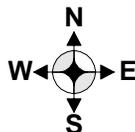


Retail/Restaurant Trips



Not to Scale

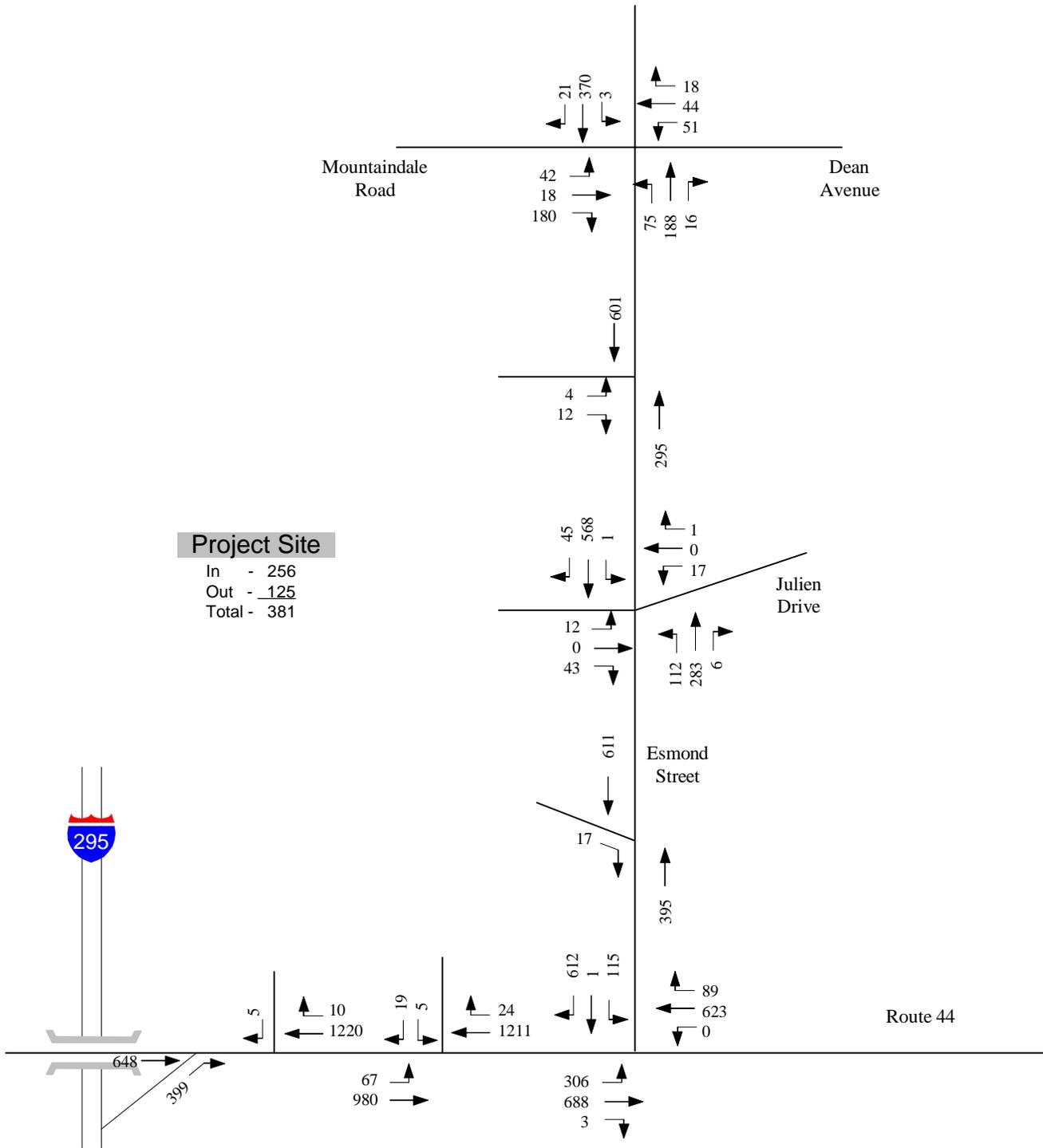
xx% - estimated site trip distribution percentage



**Estimated Trip
Distribution Pattern**

Figure 6

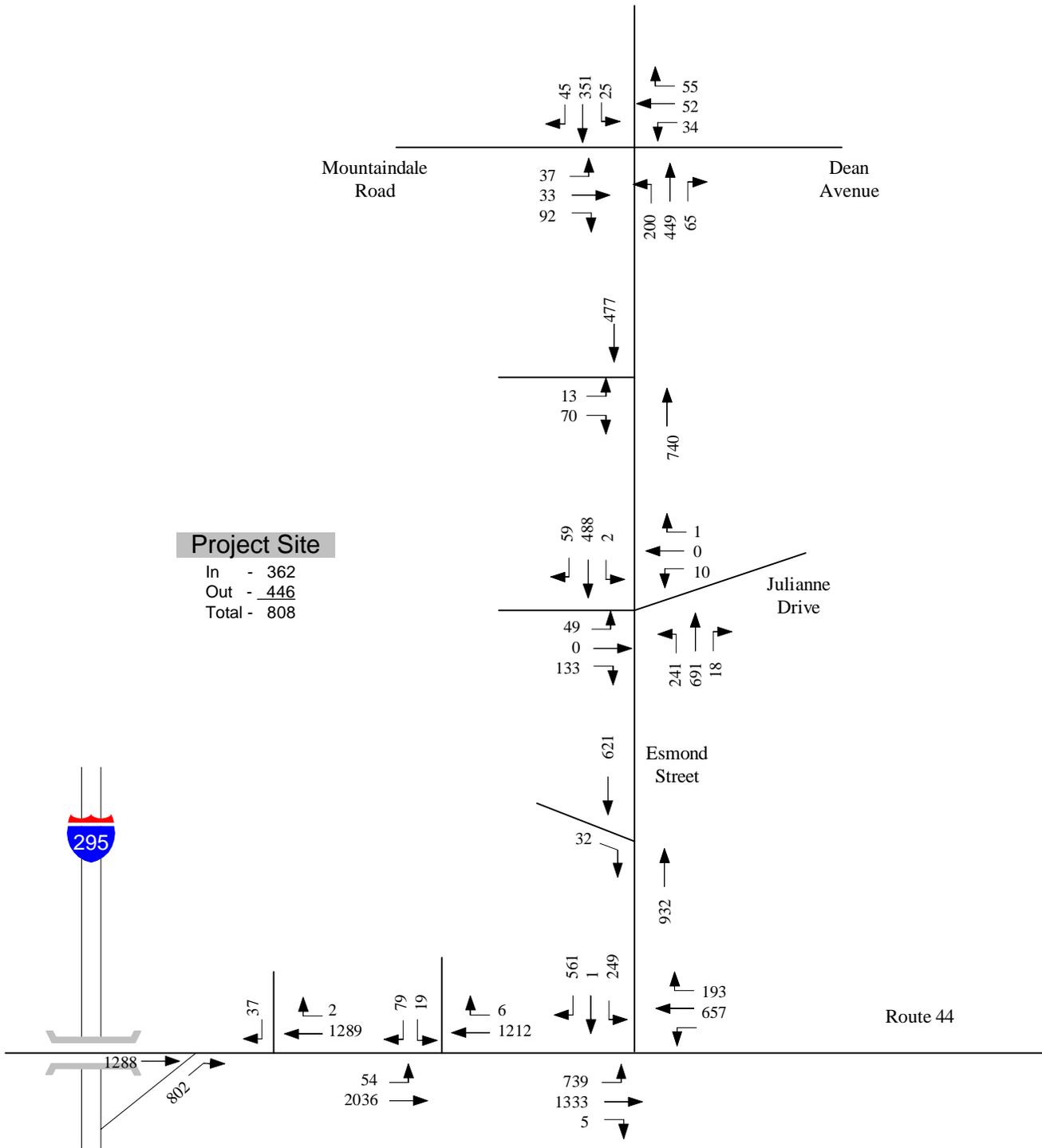
**Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island**



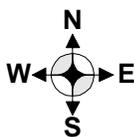
**Estimated 2018 Build AM Peak Hour
Traffic Volume Network**

Figure 7

***Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island***



Not to Scale



**Estimated 2018 Build PM Peak Hour
Traffic Volume Network**

Figure 8

D. ANALYSIS

This traffic and transportation study focused on the analysis of various roadways and intersections identified previously within the study area. Previous sections of this report discussed the current transportation system and the development of the 2018 No-Build and Build traffic volume networks.

Included in this section is an examination of the incremental increases in traffic expected on study area roadways under Build conditions, and the capacity/Level of Service (LOS) analysis for the study intersections under existing and future conditions.

1. Traffic Volume Increases

A comparison of the No-Build and Build network peak hour traffic volumes was initially completed as part of the analysis. Table 7 summarizes these increases in traffic volumes for the study area roadways. The comparison indicated that the proposed development will result in measurable traffic volume increases on the area roadway system with the largest increases along Esmond Street between the Site and Route 44.

The comparison resulted in the following noted:

- In general, the magnitude and relative effect of the traffic increases will be larger on Saturday as the project is expected to generate more trips on Saturday than on a typical weekday (particularly the AM peak period).
- Esmond Street between the site drive and Route 44 will experience a large increase in volume due to the proposed access points and having the traffic signal at Route 44 to facilitate left turns (motorists returning) back to the east. The left turns from Esmond Street onto Route 44 are estimated to increase from 47 to 58 vehicles during the existing weekday peak hours to between 115 to 248 vehicles under Build conditions.
- Route 44 east of Esmond Street is estimated to experience increases of between 11.5% and 17.6% depending on the peak period. Increases will be greatest on Saturday with the peak generation occurs.
- Assuming no diversion occurs due to additional congestion on Route 44, it is estimated that relatively small increases in traffic flow would occur on Dean Avenue and on Sibille Road. This presumes that site traffic can travel on and off Route 44 with manageable delays and levels of difficulty thereby not encouraging above anticipated use of these streets.

**TABLE 7
SUMMARY OF ESTIMATED ROADWAY TRAFFIC
INCREASES ON SELECTED SEGMENTS**

Location	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
	No-Build	Build	Δ Volume	Δ %	No-Build	Build	Δ Volume	Δ %	No-Build	Build	Δ Volume	Δ %
Route 44												
Btwn I-295 NB/Esmond	2,123	2,272	149	7.0%	3,142	3,416	274	8.7%	2,999	3,296	297	9.9%
South of Esmond Street	1,358	1,515	159	11.5%	2,100	2,432	332	15.8%	2,097	2,466	369	17.6%
Esmond Street												
North of Dean Avenue	596	642	46	7.7%	873	962	89	10.2%	859	956	97	11.3%
South of Julien Street	930	1,006	76	8.2%	1,258	1,553	295	23.4%	1,089	1,632	543	49.9%
Dean Avenue												
East of Esmond Street	146	150	4	2.7%	258	265	7	2.7%	226	232	6	2.7%
Mountindale Road												
West of Esmond Street	367	380	13	3.5%	441	459	18	4.1%	394	408	14	3.6%

2. Capacity/Level of Service (LOS) Analysis

The key part of this analysis involved the study intersections being examined with regard to flow rates, capacity and delay characteristics to determine the Level of Service (LOS) provided under existing and future (No-Build and Build) traffic conditions. Level of Service is an indicator of operating conditions which occur on a given roadway feature while accommodating varying levels of traffic volumes. It is a qualitative measure that accounts for a number of operational factors including roadway geometry, speed, traffic composition, peak hour factors, travel delay, freedom to maneuver and driver expectation. When all of these measures are assessed and a Level of Service is assigned to a roadway or intersection, it is equivalent to presenting an “index” to the operational qualities of the section under study.

Level of Service is classified in the 2000 Highway Capacity Manual (2000 HCM)⁶ into six levels that are designated ‘A’ through ‘F’ based on the control delay ranges they fall under. These are presented in Table 8 for both unsignalized and signalized intersections. In practice, any given roadway/intersection may operate at a wide LOS range depending upon time of day, day of week or period of year. It should be noted that for unsignalized intersections, the Level of Service is not computed for the intersection as a whole. Instead the level of service is determined by the computed or measured control delay for each individual critical movement. Table 9 presents criteria related to the weave analysis that is based on vehicle density and speeds. It should be noted that available analysis methods for weaving are focused on freeway type segments and given that the section under study is a major arterial with lower than freeway speeds, the results must be tempered somewhat but nonetheless, the results provide some insight as to the condition and how it could change.

The study intersection was evaluated as per techniques published in the 2000 Highway Capacity Manual. The SYNCHRO Software computer model, which produces results consistent with the procedures

⁶ Transportation Research Board. 2000 Highway Capacity Manual, Washington, D.C. 2000.

established in the HCM based on control delay, was used to analyze the study intersections. The HCS software was used to gain insight related to the weaving between I-295 NB off-ramp and Esmond Street. Using existing roadway features and intersection controls traffic operations at the study area intersections were evaluated for existing as well as future conditions with and without the Putnam Pike Commercial Development. Analysis results for the above are presented in Tables 10 - 12 for the study intersections. The weave analysis results are summarized in Table 13.

**TABLE 8
LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS**

Level of Service	Unsignalized Intersections Control Delay Range (sec)	Signalized Intersections Control Delay Range (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

Source: Transportation Research Board, 2000 Highway Capacity Manual

**TABLE 9
LEVEL OF SERVICE CRITERIA FOR WEAVE SECTIONS**

Level of Service	Density (pc/mi/ln)	
	Freeway Weave Segment	Multilane and Collector-Distributor Weave Segment
A	<= 10	<= 12
B	> 10 and <= 20	> 12 and <= 24
C	> 20 and <= 28	> 24 and <= 32
D	> 28 and <= 35	> 32 and <= 36
E	> 35 and <= 43	> 36 and <= 40
F	> 43	> 40

Source: Transportation Research Board, 2000 Highway Capacity Manual

The Level of Service analysis indicated that:

- Without the development, the signalized intersection of Route 44 and Esmond Street is computed to operate at generally acceptable overall conditions (LOS 'C' or higher) under each analysis period. However, during the afternoon peak period and Saturday as well, there is an issue with the eastbound left turn movement where the vehicle queue exceeds the capacity of the defined left turn lane. Vehicles tend to extend into the center TWLTL. In addition, the curb cut activity in relation to the Hess facility is not necessarily reflected in the analysis results.
- The Esmond Street intersection with Dean Avenue operates under 4-way STOP control and during the afternoon peak period, the northbound approach exhibits a LOS 'F' that affects the overall condition as well. This condition continues through the future No-Build and Build scenarios

**TABLE 10
SUMMARY OF LEVEL OF SERVICE ANALYSIS
AM Peak Hour**

	Existing Conditions				Future No-Build Conditions				Future Build Conditions			
	V/C ¹	Del	LOS	95 th Q	V/C	Del	LOS	95 th Q	V/C	Del	LOS	95 th Q
Route 44 at Esmond Street												
Eastbound Left	0.59	21.1	C	138	0.59	20.1	C	149	0.68	22.2	C	180
Eastbound Thru	0.30	3.2	A	51	0.34	3.4	A	58	0.33	3.3	A	57
Westbound Thru/Right	0.49	17.2	B	154	0.60	19.7	B	178	0.70	22.3	C	215+
Southbound Left	0.24	25.7	C	47	0.31	26.1	C	56	0.59	30.1	C	109+
Southbound Right	0.77	18.4	B	234	0.81	19.5	B	279	0.82	20.1	C	300+
Overall	0.64	13.7	B	-	0.71	14.5	B	-	0.76	16.6	B	
Esmond Street at Dean Avenue												
Northbound	0.46	14.1	B	-	0.55	16.9	C	-	0.60	19.2	C	-
Southbound	0.61	17.4	C	-	0.71	22.3	C	-	0.78	28.2	D	-
Eastbound	0.45	13.5	B	-	0.52	15.7	B	-	0.56	17.3	C	-
Westbound	0.24	11.6	B	-	0.28	12.7	B	-	0.30	13.5	B	-
Overall	0.54	14.8	B	-	0.58	18.0	C	-	0.61	21.3	C	-
Route 44 at Drive E²												
Southbound Right	-	-	-	-	-	-	-	-	0.01	10.8	B	-
Route 44 at Drive D²												
Eastbound Left	-	-	-	-	-	-	-	-	0.13	12.2	B	-
Southbound Left	-	-	-	-	-	-	-	-	0.11	82.8	F	-
Southbound Right	-	-	-	-	-	-	-	-	0.03	10.4	B	-
Esmond Street at Drive C²												
Eastbound Right	-	-	-	-	-	-	-	-	0.04	13.1	B	-
Esmond Street at Drive B²												
Northbound Left	-	-	-	-	-	-	-	-	0.13	9.5	A	-
Eastbound Left	-	-	-	-	-	-	-	-	0.09	31.9	D	-
Eastbound Right	-	-	-	-	-	-	-	-	0.10	13.4	B	-
Westbound Exit	-	-	-	-	-	-	-	-	0.13	38.0	E	-
Esmond Street at Drive A²												
Eastbound Exit	-	-	-	-	-	-	-	-	0.04	14.4	B	-

¹ - volume to capacity ratio

² - map is included in the Appendix that illustrates the site drive 'letter' designation

**TABLE 11
SUMMARY OF LEVEL OF SERVICE ANALYSIS
PM Peak Hour**

	Existing Conditions				Future No-Build Conditions				Future Build Conditions				
	V/C ¹	Del	LOS	95 th Q	V/C	Del	LOS	95 th Q	V/C	Del	LOS	95 th Q	
Route 44 at Esmond Street													
Eastbound Left	1.11	91.6	F	491+	1.19	120.3	F	533+	1.35	188.4	F	624+	
Eastbound Thru	0.55	4.7	A	127	0.60	5.1	A	148	0.60	5.1	A	146	
Westbound Thru/Right	0.66	23.1	C	171	0.74	25.2	C	195	0.86	31.3	C	265+	
Southbound Left	0.29	26.0	C	56	0.34	26.3	C	62	1.26	175.3	F	268+	
Southbound Right	0.58	10.5	B	184	0.64	11.5	B	215	0.70	13.2	B	254	
Overall	0.87	27.6	C	-	0.95	33.9	C	-	1.15	60.3	E		
Esmond Street at Dean Avenue													
Northbound	1.11	93.2	F	-	1.24	>100	D	-	1.56	>100	F	-	
Southbound	0.69	22.1	C	-	0.77	27.6	D	-	0.89	42.1	E	-	
Eastbound	0.32	13.5	B	-	0.36	14.4	B	-	0.44	16.5	C	-	
Westbound	0.37	14.2	B	-	0.40	15.1	C	-	0.40	15.9	C	-	
Overall	0.74	54.5	F	-	0.78	79.3	F	-	0.84	>100	F	-	
Route 44 at Drive E²													
Southbound Right	-	-	-	-	-	-	-	-	0.06	10.9	B	-	
Route 44 at Drive D²													
Eastbound Left	-	-	-	-	-	-	-	-	0.10	11.6	B	-	
Southbound Left	-	-	-	-	-	-	-	-	1.08	>100	F	-	
Southbound Right	-	-	-	-	-	-	-	-	0.11	10.1	B	-	
Esmond Street at Drive C²													
Eastbound Right	-	-	-	-	-	-	-	-	0.08	13.6	B	-	
Esmond Street at Drive B²													
Northbound Left	-	-	-	-	-	-	-	-	0.27	10.0	A	-	
Eastbound Left	-	-	-	-	-	-	-	-	1.17	>100	F	-	
Eastbound Right	-	-	-	-	-	-	-	-	0.27	14.4	B	-	
Westbound Exit	-	-	-	-	-	-	-	-	0.42	>100	F	-	
Esmond Street at Drive A²													
Eastbound Exit	-	-	-	-	-	-	-	-	0.22	16.1	C	-	

¹ - volume to capacity ratio

² - map is included in the Appendix that illustrates the site drive 'letter' designation

TABLE 12
SUMMARY OF LEVEL OF SERVICE ANALYSIS
Saturday Midday Peak Hour

	Existing Conditions				Future No-Build Conditions				Future Build Conditions			
	V/c ¹	Del	LOS	95 th Q	V/c	Del	LOS	95 th Q	V/c	Del	LOS	95 th Q
Route 44 at Esmond Street												
Eastbound Left	0.79	27.7	C	231	0.81	28.4	C	282+	0.97	49.1	D	418+
Eastbound Thru	0.39	3.6	A	76	0.42	3.8	A	87	0.40	3.7	A	81
Westbound Thru/Right	0.87	28.7	C	341+	1.04	49.8	D	396+	1.30	164.2	F	476+
Southbound Left	0.26	25.7	C	48	0.33	26.1	C	58	1.48	268.0	F	300+
Southbound Right	0.79	18.2	B	250	0.83	20.0	C	287	0.90	25.0	C	437+
Overall	0.81	18.5	B	-	0.88	26.1	C	-	1.08	88.3	F	
Esmond Street at Dean Avenue												
Northbound	0.75	25.1	D	-	0.85	36.8	E	-	0.96	56.3	F	
Southbound	0.83	31.7	D	-	0.96	54.8	F	-	1.10	93.9	F	
Eastbound	0.38	14.0	B	-	0.45	16.2	C	-	0.48	17.3	C	
Westbound	0.31	13.4	B	-	0.36	15.2	C	-	0.38	15.9	C	
Overall	0.70	24.5	C	-	0.74	37.9	E	-	0.81	60.5	F	
Route 44 at Drive E²												
Southbound Right	-	-	-	-	-	-	-	-	0.01	11.1	B	
Route 44 at Drive D²												
Eastbound Left	-	-	-	-	-	-	-	-	0.16	16.8	C	
Southbound Left	-	-	-	-	-	-	-	-	0.23	87.5	F	
Southbound Right	-	-	-	-	-	-	-	-	0.13	11.1	B	
Esmond Street at Drive C²												
Eastbound Right	-	-	-	-	-	-	-	-	0.24	19.0	C	
Esmond Street at Drive B²												
Northbound Left	-	-	-	-	-	-	-	-	0.44	12.7	B	
Eastbound Left	-	-	-	-	-	-	-	-	1.36	>100	F	
Eastbound Right	-	-	-	-	-	-	-	-	0.47	31.2	C	
Westbound Exit	-	-	-	-	-	-	-	-	1.24	>100	F	
Esmond Street at Drive A²												
Eastbound Exit	-	-	-	-	-	-	-	-	0.21	19.3	C	

¹ - volume to capacity ratio

² - map is included in the Appendix that illustrates the site drive 'letter' designation

TABLE 13
SUMMARY OF LEVEL OF SERVICE ANALYSIS
Weave Section I-295 NB Off-Ramp to Esmond Street

	Existing Conditions		Future No-Build Conditions		Future Build Conditions	
	Density	LOS	Density	LOS	Density	LOS
AM Peak Hour	14.1	B	14.3	B	15.9	B
PM Peak Hour	33.3	D	34.9	D	36.9	E
Saturday Peak Hour	22.5	B	24.8	C	27.1	C

- In an overall sense, the two study intersections are estimated to operate at acceptable levels of service during the AM peak hour under existing and future No-Build conditions. However, the Esmond Street southbound right turn lane to Route 44 is a high volume movement and the vehicle queue exceeds the capacity of that lane. Under Build conditions, the similar characteristics are anticipated at the two intersections. While the majority of site traffic is entering the site during the AM peak hour, any motorist exiting the site and turning left onto Route 44 (Drive B) will experience very long delays (LOS 'F').
- During the weekday PM peak hour, the constraints in the network become more apparent. At the Route 44 signal with Esmond Street, the eastbound left turn operates at a LOS 'F' with insufficient capacity and queue length storage. In the No-Build condition, the overall intersection congestion level is at 0.94 with the EB left turn queue length estimated at over 530 feet where the designated turn lane storage is 230 feet. The spillover occurs in the center TWLTL rather than into the through movement lanes, however, this is not the intent of the center TWLTL and the queue can affect motorists exiting sites along the north side of the street. Also during the PM period, the ALL WAY STOP intersection of Esmond Street with Dean Avenue becomes more congested, particularly related to the northbound movement.
- Under Build conditions during both the PM peak hour and the Saturday midday peak hour, the analysis has shown that without any major improvements to the abutting network, the Route 44/Esmond Street intersection will operate at very low or failing levels of service as will the Esmond Street/Dean Avenue intersection. In addition, the unsignalized site drive intersections where one would be allowed to exit and turn left, motorists will experience long delays and poor levels of service.
- Under Build conditions, the analysis also showed the added traffic due to the development results in:

- The Esmond Street southbound left turn at Route 44 becomes over capacity during the weekday PM Peak and Saturday midday peak hours with low levels of service and long vehicle queues.
- The Esmond Street southbound right turn lane vehicle queue continues to extend beyond the 130 foot turn lane.
- The eastbound left turn vehicle queue on Route 44 at the Esmond Street signal is estimated to exceed 620 feet during the afternoon peak period.
- Traffic exiting the site and trying to turn left onto Esmond Street during the weekday afternoon peak hour and the Saturday peak hour will experience long delays (LOS 'E' or 'F') although physical capacity exists on Esmond Street to accommodate the added volume. With the added volume as well as the site's primary road proposed to be located opposite Julien Street, it will become more difficult to exit and turn left onto Esmond Street from the existing residential street.
- While the weave analysis method is not an exact application for an arterial route, it does provide some indication of the impact the project will have. The analysis indicates that the weaving that takes place on Route 44 eastbound between the I-295 NB off-ramp and Esmond Street will worsen by a level of service – during the PM peak hour as a result of the project.

Based on the analysis results as well as a review of the Applicant's proposed access plan it becomes apparent that improvements are required in order to provide efficient and safe access/egress for the development while reducing its impact on the surrounding street system. A number of possible actions were identified for consideration by the Town if the project is approved and these are discussed in the final report section.

5. Traffic Signal Warrants Analysis

As part of the study scope developed by the Town, a signal warrant analysis was performed for the Esmond Street/Dean Avenue intersection in accordance with the procedures and criteria described in the manual on Uniform Traffic Control Devices (MUTCD). Traffic signal warrants have been developed over the years to guide the analyst in determining whether or not a traffic signal should be installed at a particular location. The warrants relate to volumes, safety and other factors as defined in the MUTCD. It should be noted that care and judgment needs to be taken in any decision related to installing new signals and simply satisfying one or more of the warrant criteria does not mean that a traffic signal must be installed. There are currently nine (9) warrants defined but the most relevant warrants for this study are the first three volume warrants. These are briefly described below.

- Warrant 1, Eight Hour Vehicular Volume

In order to meet the warrant, vehicle volume in each of any eight (8) hours of an average day, on the major street in both directions and the high minor street approach should be the following:

<u>A. No. of Approach Lanes</u>	<u>Volume</u>
Major street (1)/minor street (1)	major street (500)/minor street (150)
Major street (2 or more)/minor street (1)	major street (600)/minor street (150)
Major street (2 or more)/minor street (2)	major street (600)/minor street (200)
Major street (1)/minor street (2 or more)	major street (500)/minor street (200)

<u>B. No. of Approach Lanes</u>	<u>Volume</u>
Major street (1)/minor street (1)	major street (750)/minor street (75)
Major street (2 or more)/minor street (1)	major street (900)/minor street (75)
Major street (2 or more)/minor street (2)	major street (900)/minor street (100)
Major street (1)/minor street (2 or more)	major street (750)/minor street (100)

Criteria are generally reduced to 70% if travel speeds are above 40 miles per hour but this does not apply in this specific situation.

- Warrant 2, Four Hour Vehicular Volume

Vehicular volumes per hour each of any four (4) hours of an average day on major street in both directions and minor street in one direction (with higher volume) are plotted on a standard graph provided in MUTCD. If the intersecting point falls above the respective curve in terms of number of approach lanes, the warrant is met.

- Warrant 3, Peak Hour

Vehicular volumes one (1) hour of any average weekday on major street in both direction and minor street in one direction (with higher volume) are plotted on a standard graph provided in MUTCD. If the intersecting point falls above the respective curve in terms of number of approach lanes, the warrant is met.

The result of analysis, which was based on current volumes, is summarized in Table 14. As shown, the Warrant 1A criteria is not met for any hours and only 4 hours for Warrant 1B. It should be noted that the volumes on the Dean Avenue westbound approach to the intersection exceed the 75 vehicle minimum criteria for more than 8 hours. However, the major street flow remains below the minimum criteria for all but 4 hours. As volumes increase along Esmond Street in the future, particularly if the development project is built, there is an increasing chance that the minimum volumes under Warrant 1B for Esmond Street would be satisfied.

The charts for Warrants 2 and 3 are included in the Appendix.

As the analysis has shown, that under current traffic volume conditions, traffic signals at the Esmond Street intersection with Dean Avenue are not warranted as defined in the MUTCD.

In addition to the Esmond Street intersection with Dean Avenue, the site drive intersections were also reviewed relative to the potential need and justification for traffic signals. Based on the proposed access plan developed by the Applicant and the estimated peak hour traffic flows developed as part of this study, it was concluded that the minimum volume warrant criteria would not be satisfied although motorists exiting the site and turning left onto both Route 44 or Esmond Street during the peak times would experience long delays. The potential application of traffic signals was revisited in the evaluation of modifying the access plan for the proposed development and this is described in a later section.

6. Site Plan Access Review

The proposed site plan submitted by the Applicant as part of the Master Plan process was reviewed in terms of traffic flow, access and general transportation planning guidelines. The review resulted in the following being noted:

- Proposed project has five (5) driveways shown with two on Route 44 and three along Esmond Street that is, in general, more drives than are necessary to meet the estimated demands of the project.

**TABLE 14
SUMMARY OF SIGNAL WARRANT ANALYSIS (W1)**

Warrant Hours	Major Road: (Total of both approaches)	Minor Road: (Max. volume approach)	Condition A - Minimum Vehicular Volume		Condition B - Interruption of Continuous Traffic	
			>= 500 vehs.	>= 150 vehs.	>= 750 vehs.	>= 75 vehs.
Hour Begin:	Esmond Street	Dean Avenue				
6:00 AM	390	70	N	N	N	N
7:00 AM	671	111	Y	N	N	Y
8:00 AM	735	87	Y	N	N	Y
9:00 AM	634	61	Y	N	N	N
10:00 AM	642	70	Y	N	N	N
11:00 AM	712	78	Y	N	N	Y
12:00 Noon	688	80	Y	N	N	Y
1:00 PM	626	89	Y	N	N	Y
2:00 PM	737	114	Y	N	N	Y
3:00 PM	822	101	Y	N	Y	Y
4:00 PM	969	98	Y	N	Y	Y
5:00 PM	998	129	Y	N	Y	Y
6:00 PM	773	90	Y	N	Y	Y
7:00 PM	586	73	Y	N	N	N
Hours Warranted:			0		4	
Signal Warranted?			NO		NO	

- In addition to providing more driveways than are required, the distances between the site drives range from less than 200 feet to approximately 300 feet.
- Two of the driveways are located approximately 300 feet from the Route 44 intersection with Esmond Street, which given the existing operating conditions of the intersection, providing less than desirable separation.
- The internal parking layout for half the parking lot in front of the retail buildings is not

oriented in a normal manner where the aisles typically are deigned 90 degrees to the building face.

- While there is an internal sidewalk shown on the master plan, it ends approximately 20 to 50 feet from Esmond Street and not proposed to connect with the abutting neighborhoods.
- The mitigation/access plan proposed by the Applicant includes widening Route 44 and the southern portion of Esmond Street to allow for a double left turn lane in the eastbound direction approaching Esmond Street. A preliminary analysis of this action shows that providing the double left turn lane would improve the overall level of service from LOS 'E' or LOS 'F' to LOS 'C' during the PM peak or Saturday midday peak hours. The left turn queue in the eastbound direction would be substantially reduced under this option with the Saturday midday peak hour 95th percental queue reduced to 230 feet.

While this improves the level of service and reduces the left turn vehicle queuing, it requires widening on both Route 44 and Esmond Street. Not enough detail was provided by the Applicant to determine the feasibility of this action with respect to the layout and physical requirements and the effect on the access to existing commerical properties located at the intersection. The widening on Esmond Street as shown by the Applicant and would likely be required under this scenario to extend somewhat beyond the site's major drive on Esmond Street in order to accommodate the lane drop and vehicle merging.

Conclusions/Recommendations

The focus of this study has been to develop a more thorough understanding of the traffic impacts of the proposed commercial development to be located off Route 44 at Esmond Street. The preceding sections have described the data, methods, assumptions and results in detail. Existing issues in the project area that affect traffic flow operations include the high eastbound left turn volume; the active driveways at the intersection; the high volumes on Route 44; and the distance between the I-295 ramps and the signal at Esmond Street.

The proposed project is estimated to add a substantial amount of new traffic to the abutting roadway system, particularly during the weekday afternoon peak hours and on Saturday. The above noted issues become more pronounced as well as the study intersections begin to operate at lower or poor levels (LOS 'E' or 'F') of service as a result of the development and without mitigating actions. The key findings from the analysis are as follows:

- The level of service analysis showed that the overall operating conditions of the two study intersections including the Route 44 intersection with Esmond Street were currently operating at generally acceptable peak hour levels. Although this specific section of Route 44 is less intensely developed than the west side of the highway and despite the overall LOS findings, there are issues that exist in the study section that affect the actual efficiency and safety of the traffic flow at this location. Most notable, these include the high volume movement between Route 44 and Esmond street, the inadequately designated exclusive turn lanes and the short distance between the I-295 NB off-ramp and the Esmond Street intersection.
- With the development project and no major improvements, the operating levels of the two study intersections reduce to LOS 'E' or LOS 'F' during the weekday afternoon or Saturday midday peak hours.
- The weaving that occurs between the highway off-ramp and intersection is high and results in a low level of service particularly during the afternoon peak hour worsening with the proposed project.
- In relation to the proposed site plan including its layout and proposed drives, there were a number of issues or questions noted in the previous report section. Most notably were the 5 proposed drives to serve the development which is more than needed and the proximity of the drives to the Route 44/Esmond Street intersection. These and the other site design items should be addressed going forward.

Potential Mitigation/Access Actions

As indicated previously, the focus of this study was determining the potential effect of the development as a whole on the abutting street system. The analysis has shown that improvements and/or modifications to the project's access plan are required to accommodate safe access/egress and to reduce the impact on traffic flow on Esmond Street and Route 44 in the project area. However, there are a number of different actions that could be considered if development advances many of which relate to improved access

management. These include but should not be limited to the following:

The Applicant's engineers proposed in the preliminary traffic plan that a second left turn lane be added to Route 44 eastbound at Esmond Street. This action requires widening on both Route 44 and Esmond Street. Not enough detail was provided by the Applicant to determine the feasibility of this action with respect to the layout and physical requirements. Operationally, the double left turn lane will result in improve overall level of service during the PM peak hour to LOS 'C' and the estimated maximum vehicle queue would be reduced to approximately 230 feet.

Access Management

In considering transportation improvement alternatives, the overall concept of 'access management' was taken into account. *Access management* focuses on preserving the transportation resource in this case – Route 44 and to a lesser degree, Esmond Street. As defined by the Transportation Research Board (TRB),⁷ *"the purpose of access management is to provide vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system"*.

A major part of access management is locating and designing access to adjoining properties. Inadequate corridor access management has potentially significant negative impacts particularly as the corridor volumes increase, access to abutting properties becomes more intense and the ability to implement major improvements become limited. Studies have indicated that as crash experience and congestion increases on a roadway, in part due to poor access management, motorists are likely to divert to other routes or avoid the particular section in question altogether. This in turn will tend to negatively impact long term economics for the businesses located in the area while also potentially shifting traffic to other less desirable routes. Typical characteristics that have led to poor operating conditions, higher potential for incidents, and less than ideal accessibility include excessive number of driveways, too many drives per land use and the lack of or over control within a section of road. Over the years, these characteristics have become more prevalent along Route 44 between Route 5 and Dean Avenue in Smithfield.

Access management attempts to balance the movement of traffic with the access needs of the abutting land uses. Access Management tools include policies, design guidelines and regulations and highway design features. Some of the key *principles of access management* include the following:

- limit direct access to the major roadway
- locate signals to favor through movements
- preserve the functional areas of intersections
- limit the number of conflict points
- remove turning vehicles from through traffic lanes
- use non-traversable medians to control left turn movements
- provide supporting street and circulation system

Implementing corridor access management systems can, however, become complicated and difficult given the different types of land uses and areas that a street may exist within and the different functions one roadway may need to serve and the level of development that is present. Retrofitting an existing

⁷ Transportation Research Board, [Access Management Manual](#), Washington, D.C., 2003.

corridor will have different obstacles than a new roadway corridor or an existing corridor where land has yet to be highly developed.

At this time, neither the Town of Smithfield nor RIDOT has a Corridor Access Management Plan in place for specifically Route 44. The Town has developed access plans for several other corridors in the community. As indicated previously, Route 44 is owned and controlled by RIDOT. Consequently, all new access points and major changes to existing land uses require RIDOT approvals. However, that does not preclude the Town from developing and implementing a strong access management plan for the corridor. In this situation, the Town must work closely with RIDOT to achieve the results. A local access management plan for Route 44 in relation to the proposed development could consist of the following elements:

- Reducing the number of driveways serving the project. An alternative would be one major drive on Route 44 and one major drive on Esmond Street.
- The two driveways should be at least 500 feet away from the Route 44/Esmond Street intersection.
- Unless the Site's main roadway on Route 44 is controlled by a signal, consideration should be given to providing a right in/right out only drive with a barrier placed on Route 44 to prevent left turns being made in or out of the site. To reverse direction from EB to WB, u-turns could be made at the Esmond Street intersection.
- With the above option, the EB left turn lane at the Esmond Street intersection could be lengthened to better accommodate the queue without affecting the EB through movement as well as now avoiding any conflict with traffic exiting the land uses along the north side of Route 44. However, this still results in an excessively long peak hour queue and poor operating conditions.
- Given the right in/right out design of the Route 44 site drive, there will be a substantial amount of additional traffic on Esmond Street between the site and Route 44 creating a need to improve the capacity along the section of road. Widening Esmond Street between Route 44 and the site drive to 4 lanes in width is likely needed, however, the ability to do this within the layout and include shoulders and room for sidewalk has not been demonstrated.
- Another action to consider would be to create a 3rd lane on Route 44 in the westbound direction between Esmond Street and the I-295 NB on-ramp and have it function as essentially a right turn auxiliary lane. This would potentially help with the deceleration/acceleration and weaving that exists with respect to motorists turning into and out of the driveways along the north side of Route 44 in this section.
- Treatment at the intersection of the main site road and Esmond Street needs to be given more attention. The Applicant proposed a left turn lane on Esmond Street but remaining unsignalized. The left turns exiting the site and Julien Street (opposite site drive) would

experience long delays resulting in low/poor operating conditions. One option that could be examined would be a modern roundabout although the flow on the Julien Street approach is low. The roundabout option, however, would create all right turn movements and provide the ability to exit Julien Street with less delay. Traffic signal warrants do not appear to be satisfied with the project unless other changes are made to the network as noted below.

- It may be possible and also desirable to design the site's main roadway to function more like a public way and provide an asset to the Town in terms of accessibility and mobility in this particular area. With this in mind, an alternative operational treatment would be to signalize the Route 44 driveway and allow all movements at this location. However, to potentially accomplish this, the drive would need to be at least 500 feet away from Esmond Street and the I-295 NB off-ramp to Route 44. The off-ramp intersection with Route 44 would need to be signalized also as part of this option (RIDOT would likely require it be relocated to the west as well in order to increase separation from the site drive). All of this would need to be examined in greater detail on plan as well as possibly computer simulation. Modifying the I-295 ramp would also require approval from Federal Highway. Under this plan, consideration should be given to designing the site's main road as a 4-lane boulevard type facility with a raised center median wide enough to support landscaping. Treatment at the site roadway intersection with Esmond Street/Julien Street would need to be developed as noted above. The three (3) signals from the ramp to Esmond Street would need to be coordinated. To "force" greater use of this new road, removing the southbound right turn lane on Esmond Street may be given consideration. A schematic of this concept is shown in Figure 10.

A preliminary operations analysis of this access plan was completed for the PM peak hour to determine the relative merit or potential in this option providing access to the site and improving overall operations in this section while possibly addressing concerns along Esmond Street. In evaluating this option, assumptions as to the shift in turning volumes between Route 44 and Esmond Street via the new roadway were incorporated. Table 15 summarizes the estimated PM peak hour levels of service for the intersections included in this option. The analysis showed that the overall operating conditions for the three signals would work at acceptable levels of service (LOS 'C' or better) including the Route 44 intersection with Esmond Street. The vehicle queuing would be reduced for the critical movements including the left turns from Route 44 to the north at Esmond Street. In addition, if the roundabout is installed at the Esmond Street intersection with the site roadway and Julien Street, the operating conditions would be improved with more balanced volumes on the approaches – again assuming some shifting in traffic movements with an emphasized new roadway through the site and connecting between Route 44 and Esmond Street.

*Proposed Putnam Pike
Commercial Development
Smithfield, Rhode Island*



 - PROPOSED SIDEWALK
 - TRAFFIC SIGNAL

**CONCEPTUAL PLAN FOR
ILLUSTRATION PURPOSES ONLY**

NOT TO SCALE

Potential PCD Access Plan

Figure 10

**TABLE 15
SUMMARY OF LEVEL OF SERVICE
POTENTIAL ACCESS PLAN vs. BUILD NO-ACTION
PM Peak Hour Condition**

	Future Build – No Actions				Future Build with Potential Access Plan (Fig 10)				
	V/C	Del	LOS	95 th Q	V/C	Del	LOS	95 th Q	
Route 44 at Esmond Street									
Eastbound Left	1.35	188.4	F	624+	0.83	37.4	D	280+	
Eastbound Thru	0.60	5.1	A	146	0.64	2.8	A	25	
Westbound Thru/Right	0.86	31.3	C	265+	0.66	23.4	C	277	
Southbound Left	1.26	175.3	F	268+	0.72	39.2	D	200+	
Southbound Right	0.70	13.2	B	254	0.52	15.5	B	182	
Overall	1.15	60.3	E		0.69	15.8	B	-	
Esmond Street at Dean Avenue									
Northbound	1.56	>100	F	-	1.56	>100	F	-	
Southbound	0.89	42.1	E	-	0.89	42.1	E	-	
Eastbound	0.44	16.5	C	-	0.44	16.5	C	-	
Westbound	0.40	15.9	C	-	0.40	15.9	C	-	
Overall	0.84	>100	F	-	0.84	>100	F	-	
Route 44 at Drive E²									
Southbound Right	0.06	10.9	B	-	-	eliminated		-	
Route 44 at Drive D²									
Eastbound Left	0.10	11.6	B	-	0.98	58.3	E	465	
Eastbound Thru	-	-	-	-	0.69	5.9	A	252	
Westbound Thru	-	-	-	-	0.99	46.3	D	505	
Southbound Left	1.08	>100	F	-	0.22	30.7	C	70	
Southbound Right	0.11	10.1	B	-	0.37	14.1	B	145	
Overall					0.86	27.1	C	-	
Esmond Street at Drive C²									
Eastbound Right	0.08	13.6	B	-	-	eliminated		-	
Esmond Street at Drive B²									
Northbound Left	0.27	10.0	A	-	0.73	-	-	-	
Southbound Exit	-	-	-	-	0.53	-	-	-	
Eastbound Left	1.17	>100	F	-	-	-	-	-	
Eastbound Right	0.27	14.4	B	-	0.73	-	-	-	
Westbound Exit	0.42	>100	F	-	0.02	-	-	-	
Esmond Street at Drive A²									
Eastbound Exit	0.22	16.1	C	-	-	eliminated		-	
Rte 44 at I-295 NB Off-Ramp									
Eastbound Thru	-	-	-	-	0.75	6.4	A	393	
Northbound Right	-	-	-	-	0.86	32.7	C	284	
Overall	-	-	-	-	0.79	16.6	B	-	

Other actions that are worth considering in relation to the traffic impact and estimated flow patterns/operations include:

- Design internal road to accommodate transit and work with RIPTA to route bus service through the site along the new primary road.
- Along Esmond Street, create a buffer – possibly with a berm – to reduce visual impact of commercial site development on nearby residential area. May also want to locate the small buildings along the development line rather than have parking in those locations.
- Construct a sidewalk along Esmond Street from Dean Avenue to connecting into the site's sidewalk system and continuing to Route 44 intersection. Ideally, the sidewalk would be located with a substantial separation (i.e. 10 feet) to enhance safety and increase the attractiveness of the walk.
- Monitor periodically the intersection of Esmond Street with Dean Avenue to ensure acceptable operating conditions and if traffic signals become warranted as well as desired at this location.
- If the objective becomes encouraging a higher direct orientation between Route 44 and the site, the possibility of shifting retail related uses to the southern side of the site and having office development located in the northern area of the site may be available.

Appendix

- Traffic Count data
- Trip Generation Calculations
 - LOS Calculations

Appendix

- **2011 Traffic Count data**



PRECISION
DATA
INDUSTRIES, LLC

PRECISION DATA INDUSTRIES, LLC

Office: 508.481.3999 Fax: 508.545.1234

Email: datarequests@pdillc.com

Traffic Counts with Precision



Imagery Date: 4/30/2010 © 1995

© 2011 Google
41°52'12.67" N 71°30'21.90" W elev 195 ft

Eye alt 5975 ft

Client: William Scully	Engineer: William Scully	Site Code: 017	Date: Sat 12/17 and Tues 12/20/11	PDI Job Number: 112739	City, State: Smithfield, RI
----------------------------------	------------------------------------	--------------------------	---	----------------------------------	---------------------------------------



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Putnum Pike (EB)
west of Esmond Street
City, State: Smithfield, RI
Client: William Scully

112739 A VOLUME
Site Code: 017

Start Time	A.M.	EB	P.M.		Tue 20-Dec- 11
12:00	44		307		
12:15	41		278		
12:30	25		290		
12:45	20	130	287	1162	
01:00	17		292		
01:15	24		277		
01:30	18		237		
01:45	6	65	275	1081	
02:00	5		292		
02:15	4		338		
02:30	11		358		
02:45	4	24	312	1300	
03:00	12		322		
03:15	5		334		
03:30	7		350		
03:45	8	32	319	1325	
04:00	7		375		
04:15	12		418		
04:30	8		383		
04:45	19	46	378	1554	
05:00	20		401		
05:15	24		373		
05:30	26		323		
05:45	50	120	311	1408	
06:00	58		319		
06:15	85		318		
06:30	119		301		
06:45	140	402	270	1208	
07:00	181		289		
07:15	197		258		
07:30	216		215		
07:45	253	847	218	980	
08:00	218		245		
08:15	194		246		
08:30	230		218		
08:45	228	870	183	892	
09:00	193		194		
09:15	197		187		
09:30	206		152		
09:45	208	804	132	665	
10:00	215		134		
10:15	239		113		
10:30	229		103		
10:45	237	920	81	431	
11:00	255		93		
11:15	265		96		
11:30	276		81		
11:45	295	1091	52	322	
Total	5351		12328		
Percent			100.0%	0.0%	0.0%
Day Total		17679			
Peak	11:00		04:15		
Vol.	1091		1580		
P.H.F.	0.925		0.945		



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Putnum Pike (EB)
west of Esmond Street
City, State: Smithfield, RI
Client: William Scully

112739 A SPEED
Site Code: 017

EB

Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed
12/20/1																												
1	0	0	0	0	1	12	27	46	27	14	3	0	0	0	130	49	42											
01:00	0	0	0	0	5	15	23	14	6	1	0	0	1	65	48	43												
02:00	0	0	0	0	1	6	9	3	4	0	0	1	0	24	50	44												
03:00	0	0	0	1	7	8	6	9	0	1	0	0	0	32	47	40												
04:00	0	0	0	0	1	9	14	8	11	2	0	1	0	46	52	45												
05:00	0	0	0	0	8	19	41	37	13	1	1	0	0	120	49	43												
06:00	0	0	3	7	24	91	137	97	34	8	1	0	0	402	49	42												
07:00	0	0	4	8	59	228	329	157	44	15	3	0	0	847	47	42												
08:00	0	1	0	15	54	230	342	156	54	15	3	0	0	870	48	42												
09:00	1	3	1	8	49	178	334	177	43	9	1	0	0	804	48	42												
10:00	0	0	6	13	66	198	387	179	56	11	3	1	0	920	48	42												
11:00	0	2	1	20	111	355	383	151	54	9	5	0	0	1091	46	40												
12 PM	3	5	9	40	151	312	390	190	52	9	1	0	0	1162	47	40												
13:00	2	0	5	10	80	230	462	215	66	9	2	0	0	1081	48	42												
14:00	0	3	8	38	162	381	442	200	53	9	3	1	0	1300	46	40												
15:00	1	2	10	53	207	423	404	172	42	11	0	0	0	1325	45	39												
16:00	8	12	56	163	422	496	274	102	18	3	0	0	0	1554	42	36												
17:00	18	38	176	228	304	322	243	72	6	1	0	0	0	1408	42	33												
18:00	2	0	3	30	181	408	392	143	42	4	2	1	0	1208	45	39												
19:00	2	0	3	21	132	329	308	154	28	2	1	0	0	980	46	40												
20:00	0	1	1	13	113	260	301	148	49	4	2	0	0	892	47	40												
21:00	0	0	0	4	50	165	272	134	30	10	0	0	0	665	47	42												
22:00	0	0	0	1	24	94	167	100	33	10	2	0	0	431	48	43												
23:00	0	0	0	0	17	57	114	94	33	6	1	0	0	322	49	43												
Total	37	67	286	674	2240	4841	5820	2739	785	153	31	5	1	17679														
%	0.2%	0.4%	1.6%	3.8%	12.7%	27.4%	32.9%	15.5%	4.4%	0.9%	0.2%	0.0%	0.0%															
AM Peak	09:00	09:00	07:00	08:00	07:00	08:00	08:00	09:00	08:00	07:00	07:00	02:00	01:00	08:00														
Vol.	1	3	4	15	59	230	342	177	54	15	3	1	1	870														
Middy Peak	12:00	12:00	12:00	12:00	14:00	14:00	13:00	13:00	13:00	11:00	11:00	14:00		14:00														
Vol.	3	5	9	40	162	381	462	215	66	9	5	1		1300														
PM Peak	17:00	17:00	17:00	17:00	16:00	16:00	15:00	15:00	20:00	15:00	18:00	18:00		16:00														
Vol.	18	38	176	228	422	496	404	172	49	11	2	1		1554														
% ile				15th Percentile :				33 MPH																				
				50th Percentile :				40 MPH																				
				85th Percentile :				46 MPH																				
				95th Percentile :				50 MPH																				

Stats
 10 MPH Pace Speed : 35-44 MPH
 Number in Pace : 10661
 Percent in Pace : 60.3%
 Number of Vehicles > 40 MPH : 8370
 Percent of Vehicles > 40 MPH : 47.3%
 Mean Speed(Average) : 40 MPH



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Putnum Pike (Route 44)
east of Esmond Street
City, State: Smithfield, RI
Client: William Scully

112739 B VOLUME
Site Code: 017

Start Time	WB		EB		Combined		20-Dec- 11 Tue					
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.						
12:00	19	182	32	191	51	373						
12:15	19	216	26	201	45	417						
12:30	12	218	23	197	35	415						
12:45	13	63	190	806	15	96	754	28	159	355	1560	
01:00	17	195	13	207	30	402						
01:15	17	209	20	169	37	378						
01:30	11	224	16	145	27	369						
01:45	14	59	209	837	6	55	190	711	20	114	399	1548
02:00	8	197	5	222	13	419						
02:15	8	200	3	229	11	429						
02:30	10	191	9	235	19	426						
02:45	4	30	210	798	3	20	236	922	7	50	446	1720
03:00	6	207	9	211	15	418						
03:15	5	202	6	237	11	439						
03:30	4	180	4	237	8	417						
03:45	12	27	183	772	7	26	233	918	19	53	416	1690
04:00	10	220	6	189	16	409						
04:15	13	201	8	220	21	421						
04:30	16	178	5	243	21	421						
04:45	20	59	182	781	12	31	195	847	32	90	377	1628
05:00	22	155	15	209	37	364						
05:15	34	139	20	212	54	351						
05:30	68	190	21	245	89	435						
05:45	76	200	186	670	33	89	197	863	109	289	383	1533
06:00	73	181	44	207	117	388						
06:15	105	168	62	232	167	400						
06:30	127	172	97	221	224	393						
06:45	145	450	157	678	121	324	188	848	266	774	345	1526
07:00	171	146	126	207	297	353						
07:15	192	165	153	181	345	346						
07:30	229	128	162	146	391	274						
07:45	214	806	114	553	180	621	153	687	394	1427	267	1240
08:00	233	140	180	175	413	315						
08:15	217	114	132	177	349	291						
08:30	192	96	158	171	350	267						
08:45	214	856	103	453	152	622	116	639	366	1478	219	1092
09:00	197	75	140	145	337	220						
09:15	220	85	125	134	345	219						
09:30	196	74	132	114	328	188						
09:45	198	811	51	285	164	561	92	485	362	1372	143	770
10:00	197	56	142	110	339	166						
10:15	203	48	144	87	347	135						
10:30	220	43	140	78	360	121						
10:45	201	821	41	188	163	589	72	347	364	1410	113	535
11:00	203	34	172	72	375	106						
11:15	221	31	203	69	424	100						
11:30	227	23	170	62	397	85						
11:45	239	890	33	121	193	738	34	237	432	1628	67	358
Total	5072	6942	3772	8258	8844	15200						
Percent	57.3%	45.7%	42.7%	54.3%								
Day Total		12014		12030		24044						
Peak	07:30	01:15	11:00	02:00	11:00	02:30						
Vol.	893	839	738	922	1628	1729						
P.H.F.	0.958	0.936	0.909	0.977	0.942	0.969						



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

112739 B SPEED
Site Code: 017

Putnum Pike (Route 44)
east of Esmond Street
City, State: Smithfield, RI
Client: William Scully

WB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
12/20/1																
1	0	0	0	1	11	28	14	6	1	1	1	0	0	63	44	39
01:00	0	0	0	2	10	26	13	7	1	0	0	0	0	59	44	38
02:00	0	0	0	4	4	9	11	1	1	0	0	0	0	30	43	38
03:00	0	0	0	0	4	14	7	2	0	0	0	0	0	27	42	38
04:00	0	0	0	0	4	22	23	7	3	0	0	0	0	59	45	40
05:00	0	0	0	6	27	89	62	10	4	1	1	0	0	200	43	39
06:00	0	0	6	37	162	186	52	6	1	0	0	0	0	450	39	35
07:00	33	11	100	320	269	57	16	0	0	0	0	0	0	806	34	28
08:00	82	25	153	318	251	26	1	0	0	0	0	0	0	856	32	26
09:00	100	5	147	359	185	15	0	0	0	0	0	0	0	811	32	25
10:00	107	18	192	351	148	5	0	0	0	0	0	0	0	821	30	24
11:00	109	17	194	417	143	10	0	0	0	0	0	0	0	890	30	24
12 PM	107	17	166	333	173	10	0	0	0	0	0	0	0	806	31	24
13:00	113	23	171	357	162	11	0	0	0	0	0	0	0	837	31	24
14:00	50	27	143	379	178	19	1	1	0	0	0	0	0	798	32	26
15:00	27	35	201	372	127	9	1	0	0	0	0	0	0	772	30	26
16:00	53	88	331	250	57	2	0	0	0	0	0	0	0	781	28	23
17:00	19	47	264	288	50	2	0	0	0	0	0	0	0	670	29	24
18:00	16	44	202	336	76	4	0	0	0	0	0	0	0	678	29	25
19:00	18	18	183	269	63	2	0	0	0	0	0	0	0	553	29	25
20:00	8	15	83	168	103	58	15	3	0	0	0	0	0	453	35	28
21:00	0	0	1	17	90	135	36	6	0	0	0	0	0	285	39	36
22:00	0	0	1	14	36	84	48	5	0	0	0	0	0	188	42	37
23:00	0	0	0	1	18	58	35	8	1	0	0	0	0	121	43	38
Total	842	390	2538	4599	2351	881	335	62	12	2	2	0	0	12014		
%	7.0%	3.2%	21.1%	38.3%	19.6%	7.3%	2.8%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%			
AM Peak	09:00	08:00	08:00	09:00	07:00	06:00	05:00	05:00	05:00	00:00	00:00			08:00		
Vol.	100	25	153	359	269	186	62	10	4	1	1			856		
Midday Peak	13:00	14:00	11:00	11:00	14:00	14:00	14:00	14:00						11:00		
Vol.	113	27	194	417	178	19	1	1						890		
PM Peak	16:00	16:00	16:00	15:00	15:00	21:00	22:00	23:00	23:00					16:00		
Vol.	53	88	331	372	127	135	48	8	1					781		
% ile			15th Percentile :		21 MPH											
			50th Percentile :		27 MPH											
			85th Percentile :		33 MPH											
			95th Percentile :		38 MPH											

Stats
 10 MPH Pace Speed : 20-29 MPH
 Number in Pace : 7137
 Percent in Pace : 59.4%
 Number of Vehicles > 35 MPH : 1117
 Percent of Vehicles > 35 MPH : 9.3%
 Mean Speed(Average) : 27 MPH



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

112739 B SPEED
Site Code: 017

Putnum Pike (Route 44)
east of Esmond Street
City, State: Smithfield, RI
Client: William Scully

EB

Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed	
12/20/1																													
1	0	0	0	0	3	27	40	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96	42	37	
01:00	0	0	1	2	18	19	9	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	43	37	
02:00	0	0	0	0	2	11	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	43	39	
03:00	0	0	1	2	6	12	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	40	36	
04:00	0	0	0	2	4	10	9	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	45	39	
05:00	0	0	0	5	9	33	32	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	44	39	
06:00	0	0	3	24	99	134	52	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	324	41	36	
07:00	0	0	32	192	244	131	20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	621	37	31	
08:00	1	1	41	183	290	97	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	622	35	31	
09:00	1	1	38	192	254	67	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	561	34	30	
10:00	4	4	48	227	238	65	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	589	34	30	
11:00	2	5	71	361	244	47	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	738	33	29	
12 PM	1	2	93	334	260	62	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	754	34	29	
13:00	1	7	72	328	240	59	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	711	34	29	
14:00	3	16	124	552	202	24	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	922	32	27	
15:00	0	14	197	499	191	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	918	31	27	
16:00	25	16	345	403	56	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	847	29	25	
17:00	85	59	373	269	70	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	863	29	23	
18:00	0	3	142	452	220	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	848	32	28	
19:00	5	7	132	338	170	33	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	687	32	28	
20:00	0	1	69	271	207	81	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	639	34	30	
21:00	0	0	3	66	206	169	39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	485	39	34	
22:00	0	1	5	31	101	142	58	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	347	41	35	
23:00	0	0	0	10	49	108	49	19	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	237	43	37	
Total	128	137	1790	4746	3407	1400	341	72	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12030			
%	1.1%	1.1%	14.9%	39.5%	28.3%	11.6%	2.8%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	08:00	08:00	08:00	07:00	08:00	06:00	06:00	06:00	06:00	05:00	01:00															08:00			
Vol.	1	1	41	192	290	134	52	11	2	2																622			
Midday Peak	14:00	14:00	14:00	14:00	12:00	12:00	11:00																			14:00			
Vol.	3	16	124	552	260	62	8																			922			
PM Peak	17:00	17:00	17:00	15:00	18:00	21:00	22:00	23:00	23:00																	15:00			
Vol.	85	59	373	499	220	169	58	19	2																	918			
% ile				15th Percentile :			24 MPH																						
				50th Percentile :			29 MPH																						
				85th Percentile :			35 MPH																						
				95th Percentile :			39 MPH																						

Stats
 10 MPH Pace Speed : 25-34 MPH
 Number in Pace : 8153
 Percent in Pace : 67.8%
 Number of Vehicles > 35 MPH : 1542
 Percent of Vehicles > 35 MPH : 12.8%
 Mean Speed(Average) : 29 MPH



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Esmond Street
north of Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

112739 C volume
Site Code: 017

Start Time	SB		NB		Combined		20-Dec-11 Tue					
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.						
12:00	8	95	10	79	18	174						
12:15	4	97	10	84	14	181						
12:30	2	98	8	74	10	172						
12:45	4	18	80	370	6	34	81	318	10	52	161	688
01:00	5	90	4	64	9	154						
01:15	6	88	5	95	11	183						
01:30	6	100	5	64	11	164						
01:45	3	20	61	339	2	16	64	287	5	36	125	626
02:00	3	106	2	83	5	189						
02:15	0	93	1	68	1	161						
02:30	2	86	2	104	4	190						
02:45	4	9	96	381	0	5	101	356	4	14	197	737
03:00	1	101	3	80	4	181						
03:15	2	113	0	93	2	206						
03:30	4	102	0	101	4	203						
03:45	2	9	108	424	3	6	124	398	5	15	232	822
04:00	9	109	1	125	10	234						
04:15	4	109	2	148	6	257						
04:30	8	100	3	162	11	262						
04:45	10	31	91	409	3	9	125	560	13	40	216	969
05:00	16	106	5	155	21	261						
05:15	17	93	5	183	22	276						
05:30	28	98	5	156	33	254						
05:45	40	101	86	383	14	29	121	615	54	130	207	998
06:00	36	98	7	110	43	208						
06:15	69	90	20	97	89	187						
06:30	95	93	27	77	122	170						
06:45	109	309	82	363	27	81	86	370	136	390	168	733
07:00	124	72	35	92	159	164						
07:15	107	64	43	81	150	145						
07:30	123	70	56	81	179	151						
07:45	119	473	58	264	64	198	68	322	183	671	126	586
08:00	149	55	57	83	206	138						
08:15	140	35	45	84	185	119						
08:30	119	41	61	73	180	114						
08:45	111	519	38	169	53	216	64	304	164	735	102	473
09:00	99	32	58	65	157	97						
09:15	105	39	56	55	161	94						
09:30	108	20	46	41	154	61						
09:45	109	421	20	111	53	213	45	206	162	634	65	317
10:00	93	33	59	41	152	74						
10:15	98	15	66	32	164	47						
10:30	85	23	72	21	157	44						
10:45	102	378	13	84	67	264	19	113	169	642	32	197
11:00	119	16	54	25	173	41						
11:15	103	9	69	29	172	38						
11:30	85	12	72	22	157	34						
11:45	115	422	7	44	95	290	21	97	210	712	28	141
Total	2710	3341	1361	3946	4071	7287						
Percent	66.6%	45.8%	33.4%	54.2%								
Day Total	6051		5307		11358							
Peak	07:30	03:15	11:00	04:30	07:45	04:30						
Vol.	531	432	290	625	754	1015						
P.H.F.	0.891	0.956	0.763	0.854	0.915	0.919						



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Esmond Street
north of Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

112739 C speed
Site Code: 017

SB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
12/20/1																
1	0	0	0	3	4	10	1	0	0	0	0	0	0	18	38	35
01:00	0	0	0	6	9	4	1	0	0	0	0	0	0	20	36	32
02:00	0	0	1	1	5	2	0	0	0	0	0	0	0	9	35	32
03:00	0	0	1	4	2	0	1	1	0	0	0	0	0	9	44	31
04:00	0	0	1	6	15	8	1	0	0	0	0	0	0	31	36	32
05:00	0	0	2	17	46	29	5	2	0	0	0	0	0	101	38	33
06:00	0	0	23	99	136	47	3	1	0	0	0	0	0	309	35	31
07:00	41	25	82	107	156	55	6	1	0	0	0	0	0	473	34	27
08:00	13	19	43	187	191	59	6	1	0	0	0	0	0	519	34	29
09:00	3	27	65	192	107	25	2	0	0	0	0	0	0	421	33	27
10:00	2	10	36	127	160	40	2	1	0	0	0	0	0	378	34	29
11:00	20	25	56	130	145	40	5	1	0	0	0	0	0	422	34	28
12 PM	4	7	44	113	132	58	11	1	0	0	0	0	0	370	36	30
13:00	6	5	22	80	143	71	11	1	0	0	0	0	0	339	37	31
14:00	3	9	51	101	140	65	11	1	0	0	0	0	0	381	36	30
15:00	3	10	42	149	134	74	9	3	0	0	0	0	0	424	36	30
16:00	4	8	31	139	150	71	5	1	0	0	0	0	0	409	36	30
17:00	8	15	44	142	131	39	3	0	0	1	0	0	0	383	34	29
18:00	7	20	45	136	121	28	4	2	0	0	0	0	0	363	34	28
19:00	0	3	25	104	96	31	4	0	1	0	0	0	0	264	34	30
20:00	0	0	7	58	72	24	6	2	0	0	0	0	0	169	36	31
21:00	0	0	5	27	50	27	2	0	0	0	0	0	0	111	36	32
22:00	0	0	4	23	37	14	6	0	0	0	0	0	0	84	37	32
23:00	0	0	1	11	16	12	4	0	0	0	0	0	0	44	38	33
Total	114	183	631	1962	2198	833	109	19	1	1	0	0	0	6051		
%	1.9%	3.0%	10.4%	32.4%	36.3%	13.8%	1.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	09:00	07:00	09:00	08:00	08:00	07:00	05:00						08:00		
Vol.	41	27	82	192	191	59	6	2						519		
Midday Peak	11:00	11:00	11:00	11:00	11:00	13:00	12:00	11:00						11:00		
Vol.	20	25	56	130	145	71	11	1						422		
PM Peak	17:00	18:00	18:00	15:00	16:00	15:00	15:00	15:00	19:00	17:00				15:00		
Vol.	8	20	45	149	150	74	9	3	1	1				424		

% ile	15th Percentile :	24 MPH
	50th Percentile :	30 MPH
	85th Percentile :	35 MPH
	95th Percentile :	38 MPH

Stats	10 MPH Pace Speed :	25-34 MPH
	Number in Pace :	4160
	Percent in Pace :	68.7%
	Number of Vehicles > 30 MPH :	2721
	Percent of Vehicles > 30 MPH :	45.0%
	Mean Speed(Average) :	29 MPH



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Esmond Street
north of Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

112739 C speed
Site Code: 017

NB

Start Time	14	15	19	20	24	25	29	30	34	35	39	40	44	45	49	50	54	55	59	60	64	65	69	70	9999	Total	85th % ile	Ave Speed	
12/20/1																													
1	0	0	0	1	16	12	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	34	30	
01:00	0	0	0	4	5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	32	28	
02:00	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	34	29	
03:00	0	1	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	28	25	
04:00	0	0	0	0	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	33	30	
05:00	0	0	0	3	15	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	33	29	
06:00	0	0	0	11	40	24	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	33	29	
07:00	0	4	29	98	63	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	198	32	28	
08:00	1	2	26	102	78	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	216	33	28	
09:00	3	14	83	96	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	213	29	25	
10:00	1	1	33	173	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	264	31	27	
11:00	1	1	37	171	77	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	290	32	28	
12 PM	0	1	20	194	96	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	318	32	28	
13:00	0	2	20	148	103	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	33	29	
14:00	0	3	17	207	120	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	356	33	29	
15:00	0	1	25	240	124	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	398	32	28	
16:00	0	1	69	348	137	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	560	32	28	
17:00	0	0	88	396	124	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	615	31	27	
18:00	0	0	39	241	87	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	370	31	28	
19:00	0	1	39	187	94	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	322	32	28	
20:00	0	1	37	181	76	8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	304	32	28	
21:00	0	1	11	105	81	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	206	33	29	
22:00	0	0	7	54	43	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	113	33	29	
23:00	0	1	8	47	38	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97	33	29	
Total	6	35	607	3076	1471	105	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5307			
%	0.1%	0.7%	11.4%	58.0%	27.7%	2.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	09:00	09:00	09:00	08:00	08:00	08:00	06:00																				08:00		
Vol.	3	14	83	102	78	7	2																				216		
Midday Peak	11:00	14:00	11:00	14:00	14:00	13:00																					14:00		
Vol.	1	3	37	207	120	14																					356		
PM Peak		15:00	17:00	17:00	16:00	20:00	22:00	15:00																			17:00		
Vol.		1	88	396	137	8	2	1																			615		
% ile				15th Percentile :			25 MPH																						
				50th Percentile :			28 MPH																						
				85th Percentile :			32 MPH																						
				95th Percentile :			34 MPH																						

Stats
 10 MPH Pace Speed : 25-34 MPH
 Number in Pace : 4547
 Percent in Pace : 85.7%
 Number of Vehicles > 30 MPH : 1288
 Percent of Vehicles > 30 MPH : 24.3%
 Mean Speed(Average) : 28 MPH



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Dean Avenue
east of Esmond Street
City, State: Smithfield, RI
Client: William Scully

112739 D volume
Site Code: 017

Start Time	WB		EB		Combined		20-Dec- 11 Tue
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
12:00	2	17	1	9	3	26	
12:15	1	21	3	9	4	30	
12:30	2	21	5	16	7	37	
12:45	1	6	21	80	2	11	126
01:00	1	20	1	10	2	30	
01:15	0	18	2	19	2	37	
01:30	1	29	0	6	1	35	
01:45	1	3	22	89	1	4	153
02:00	1	32	0	14	1	46	
02:15	0	29	0	12	0	41	
02:30	1	22	0	18	1	40	
02:45	1	3	31	114	0	0	168
03:00	0	16	1	14	1	30	
03:15	0	24	0	23	0	47	
03:30	0	31	1	15	1	46	
03:45	0	0	30	101	0	2	187
04:00	0	28	0	16	0	44	
04:15	0	20	0	23	0	43	
04:30	1	28	0	29	1	57	
04:45	1	2	22	98	0	0	192
05:00	2	41	1	22	3	63	
05:15	9	27	1	34	10	61	
05:30	6	36	1	23	7	59	
05:45	12	29	25	129	3	6	233
06:00	10	29	0	25	10	54	
06:15	17	16	4	11	21	27	
06:30	22	25	5	21	27	46	
06:45	21	70	20	90	4	13	156
07:00	22	24	3	19	25	43	
07:15	25	20	7	12	32	32	
07:30	31	15	4	7	35	22	
07:45	33	111	14	73	8	22	120
08:00	30	11	7	16	37	27	
08:15	20	9	10	8	30	17	
08:30	17	8	8	15	25	23	
08:45	20	87	18	46	6	31	98
09:00	17	12	8	14	25	26	
09:15	10	7	4	14	14	21	
09:30	15	7	10	10	25	17	
09:45	19	61	6	32	7	29	80
10:00	15	7	6	6	21	13	
10:15	21	9	15	1	36	10	
10:30	15	15	8	6	23	21	
10:45	19	70	14	45	8	37	62
11:00	13	6	14	2	27	8	
11:15	19	1	14	7	33	8	
11:30	22	5	6	4	28	9	
11:45	24	78	5	17	5	39	34
Total	520	914	194	695	714	1609	
Percent	72.8%	56.8%	27.2%	43.2%			
Day Total	1434		889		2323		
Peak	07:15	05:00	10:15	04:30	07:15	05:00	
Vol.	119	129	45	111	145	233	
P.H.F.	0.902	0.787	0.750	0.816	0.884	0.925	



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 A
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Esmond Street From North			Putnum Pike (Route 44) From East			Plaza Driveway From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
07:00 AM	128	0	7	6	166	0	0	0	0	0	121	44	472
07:15 AM	119	0	7	1	187	0	0	0	0	0	152	49	515
07:30 AM	134	0	11	3	234	0	0	0	0	1	173	54	610
07:45 AM	126	1	11	3	191	0	1	0	0	2	195	68	598
Total	507	1	36	13	778	0	1	0	0	3	641	215	2195
08:00 AM	139	0	19	4	222	0	0	0	0	0	170	56	610
08:15 AM	157	0	6	2	189	0	0	0	0	0	151	47	552
08:30 AM	119	0	14	3	185	0	1	0	0	0	157	66	545
08:45 AM	109	0	13	5	182	0	0	0	0	0	161	52	522
Total	524	0	52	14	778	0	1	0	0	0	639	221	2229
Grand Total	1031	1	88	27	1556	0	2	0	0	3	1280	436	4424
Apprch %	92.1	0.1	7.9	1.7	98.3	0	100	0	0	0.2	74.5	25.4	
Total %	23.3	0	2	0.6	35.2	0	0	0	0	0.1	28.9	9.9	
Cars	1004	1	84	25	1508	0	2	0	0	3	1210	407	4244
% Cars	97.4	100	95.5	92.6	96.9	0	100	0	0	100	94.5	93.3	95.9
Heavy Vehicles	27	0	4	2	48	0	0	0	0	0	70	29	180
% Heavy Vehicles	2.6	0	4.5	7.4	3.1	0	0	0	0	0	5.5	6.7	4.1

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	134	0	11	145	3	234	0	237	0	0	0	0	1	173	54	228	610
07:45 AM	126	1	11	138	3	191	0	194	1	0	0	1	2	195	68	265	598
08:00 AM	139	0	19	158	4	222	0	226	0	0	0	0	0	170	56	226	610
08:15 AM	157	0	6	163	2	189	0	191	0	0	0	0	0	151	47	198	552
Total Volume	556	1	47	604	12	836	0	848	1	0	0	1	3	689	225	917	2370
% App. Total	92.1	0.2	7.8		1.4	98.6	0		100	0	0		0.3	75.1	24.5		
PHF	.885	.250	.618	.926	.750	.893	.000	.895	.250	.000	.000	.250	.375	.883	.827	.865	.971
Cars	539	1	45	585	10	808	0	818	1	0	0	1	3	649	207	859	2263
% Cars	96.9	100	95.7	96.9	83.3	96.7	0	96.5	100	0	0	100	100	94.2	92.0	93.7	95.5
Heavy Vehicles	17	0	2	19	2	28	0	30	0	0	0	0	0	40	18	58	107
% Heavy Vehicles	3.1	0	4.3	3.1	16.7	3.3	0	3.5	0	0	0	0	0	5.8	8.0	6.3	4.5



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 A
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars

Start Time	Esmond Street From North			Putnum Pike (Route 44) From East			Plaza Driveway From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
07:00 AM	124	0	7	6	161	0	0	0	0	0	117	37	452
07:15 AM	119	0	7	1	185	0	0	0	0	0	145	46	503
07:30 AM	131	0	11	3	222	0	0	0	0	1	165	52	585
07:45 AM	120	1	10	3	186	0	1	0	0	2	184	63	570
Total	494	1	35	13	754	0	1	0	0	3	611	198	2110
08:00 AM	134	0	18	2	216	0	0	0	0	0	154	50	574
08:15 AM	154	0	6	2	184	0	0	0	0	0	146	42	534
08:30 AM	114	0	12	3	177	0	1	0	0	0	148	66	521
08:45 AM	108	0	13	5	177	0	0	0	0	0	151	51	505
Total	510	0	49	12	754	0	1	0	0	0	599	209	2134
Grand Total	1004	1	84	25	1508	0	2	0	0	3	1210	407	4244
Apprch %	92.2	0.1	7.7	1.6	98.4	0	100	0	0	0.2	74.7	25.1	
Total %	23.7	0	2	0.6	35.5	0	0	0	0	0.1	28.5	9.6	

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	131	0	11	142	3	222	0	225	0	0	0	0	1	165	52	218	585
07:45 AM	120	1	10	131	3	186	0	189	1	0	0	1	2	184	63	249	570
08:00 AM	134	0	18	152	2	216	0	218	0	0	0	0	0	154	50	204	574
08:15 AM	154	0	6	160	2	184	0	186	0	0	0	0	0	146	42	188	534
Total Volume	539	1	45	585	10	808	0	818	1	0	0	1	3	649	207	859	2263
% App. Total	92.1	0.2	7.7		1.2	98.8	0		100	0	0		0.3	75.6	24.1		
PHF	.875	.250	.625	.914	.833	.910	.000	.909	.250	.000	.000	.250	.375	.882	.821	.862	.967



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 A
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Esmond Street From North			Putnum Pike (Route 44) From East			Plaza Driveway From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
07:00 AM	4	0	0	0	5	0	0	0	0	0	4	7	20
07:15 AM	0	0	0	0	2	0	0	0	0	0	7	3	12
07:30 AM	3	0	0	0	12	0	0	0	0	0	8	2	25
07:45 AM	6	0	1	0	5	0	0	0	0	0	11	5	28
Total	13	0	1	0	24	0	0	0	0	0	30	17	85
08:00 AM	5	0	1	2	6	0	0	0	0	0	16	6	36
08:15 AM	3	0	0	0	5	0	0	0	0	0	5	5	18
08:30 AM	5	0	2	0	8	0	0	0	0	0	9	0	24
08:45 AM	1	0	0	0	5	0	0	0	0	0	10	1	17
Total	14	0	3	2	24	0	0	0	0	0	40	12	95
Grand Total	27	0	4	2	48	0	0	0	0	0	70	29	180
Apprch %	87.1	0	12.9	4	96	0	0	0	0	0	70.7	29.3	
Total %	15	0	2.2	1.1	26.7	0	0	0	0	0	38.9	16.1	

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	3	0	0	3	0	12	0	12	0	0	0	0	0	8	2	10	25
07:45 AM	6	0	1	7	0	5	0	5	0	0	0	0	0	11	5	16	28
08:00 AM	5	0	1	6	2	6	0	8	0	0	0	0	0	16	6	22	36
08:15 AM	3	0	0	3	0	5	0	5	0	0	0	0	0	5	5	10	18
Total Volume	17	0	2	19	2	28	0	30	0	0	0	0	0	40	18	58	107
% App. Total	89.5	0	10.5		6.7	93.3	0		0	0	0		0	69	31		
PHF	.708	.000	.500	.679	.250	.583	.000	.625	.000	.000	.000	.000	.000	.625	.750	.659	.743



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 A
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																	

Start Time	Esmond Street From North					Putnum Pike (Route 44) From East					Plaza Driveway From South					Putnum Pike (Route 44) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



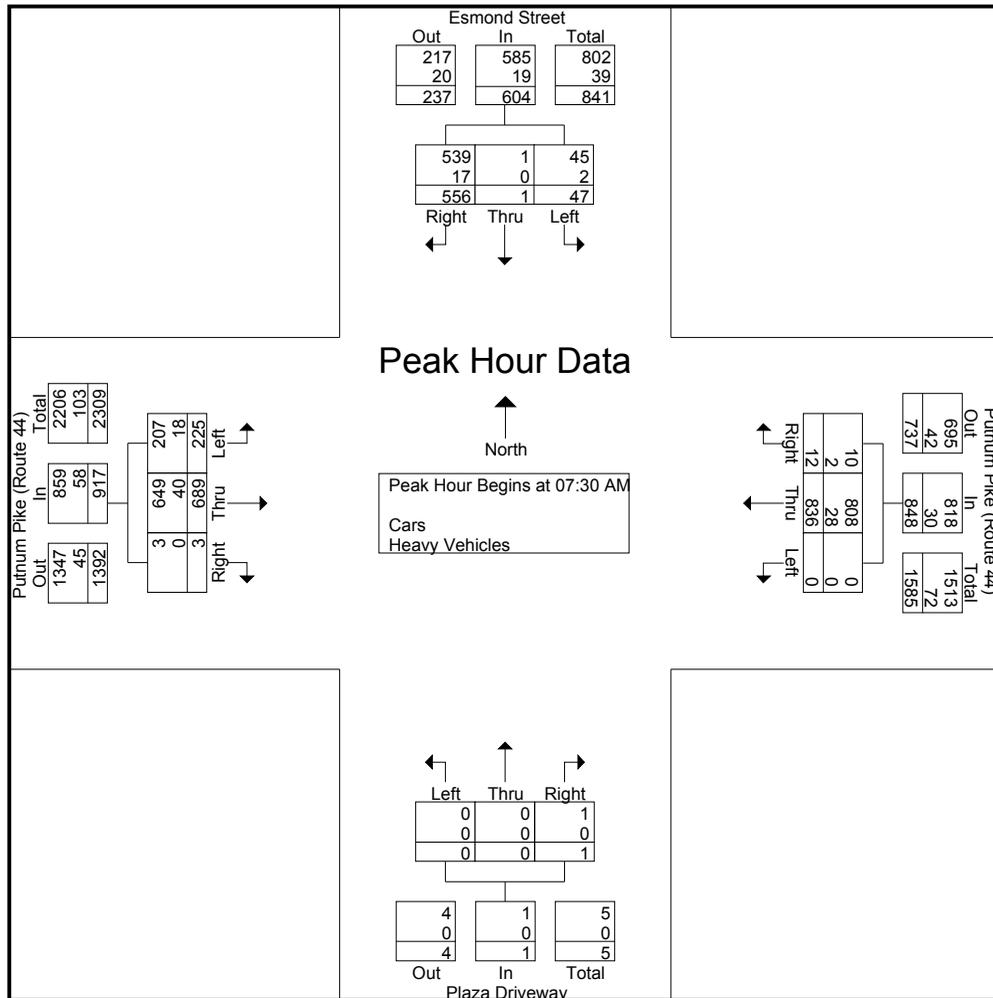
PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 A
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	134	0	11	145	3	234	0	237	0	0	0	0	1	173	54	228	610
07:45 AM	126	1	11	138	3	191	0	194	1	0	0	1	2	195	68	265	598
08:00 AM	139	0	19	158	4	222	0	226	0	0	0	0	0	170	56	226	610
08:15 AM	157	0	6	163	2	189	0	191	0	0	0	0	0	151	47	198	552
Total Volume	556	1	47	604	12	836	0	848	1	0	0	1	3	689	225	917	2370
% App. Total	92.1	0.2	7.8		1.4	98.6	0		100	0	0		0.3	75.1	24.5		
PHF	.885	.250	.618	.926	.750	.893	.000	.895	.250	.000	.000	.250	.375	.883	.827	.865	.971
Cars	539	1	45	585	10	808	0	818	1	0	0	1	3	649	207	859	2263
% Cars	96.9	100	95.7	96.9	83.3	96.7	0	96.5	100	0	0	100	100	94.2	92.0	93.7	95.5
Heavy Vehicles	17	0	2	19	2	28	0	30	0	0	0	0	0	40	18	58	107
% Heavy Vehicles	3.1	0	4.3	3.1	16.7	3.3	0	3.5	0	0	0	0	0	5.8	8.0	6.3	4.5





PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AA
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Esmond Street From North			Putnum Pike (Route 44) From East			Plaza Driveway From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
04:00 PM	118	0	9	10	232	0	0	0	0	0	261	119	749
04:15 PM	131	0	10	6	228	0	0	0	0	0	302	143	820
04:30 PM	100	1	19	3	240	0	1	0	0	2	312	151	829
04:45 PM	107	0	16	6	240	0	0	0	0	1	259	124	753
Total	456	1	54	25	940	0	1	0	0	3	1134	537	3151
05:00 PM	135	0	11	18	214	0	0	0	0	2	288	154	822
05:15 PM	131	0	13	8	210	0	1	0	0	0	343	163	869
05:30 PM	89	0	5	8	182	0	1	0	0	0	299	150	734
05:45 PM	102	1	15	1	175	0	0	0	0	1	214	133	642
Total	457	1	44	35	781	0	2	0	0	3	1144	600	3067
Grand Total	913	2	98	60	1721	0	3	0	0	6	2278	1137	6218
Apprch %	90.1	0.2	9.7	3.4	96.6	0	100	0	0	0.2	66.6	33.2	
Total %	14.7	0	1.6	1	27.7	0	0	0	0	0.1	36.6	18.3	
Cars	901	2	98	59	1682	0	3	0	0	6	2239	1118	6108
% Cars	98.7	100	100	98.3	97.7	0	100	0	0	100	98.3	98.3	98.2
Heavy Vehicles	12	0	0	1	39	0	0	0	0	0	39	19	110
% Heavy Vehicles	1.3	0	0	1.7	2.3	0	0	0	0	0	1.7	1.7	1.8

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	100	1	19	120	3	240	0	243	1	0	0	1	2	312	151	465	829
04:45 PM	107	0	16	123	6	240	0	246	0	0	0	0	1	259	124	384	753
05:00 PM	135	0	11	146	18	214	0	232	0	0	0	0	2	288	154	444	822
05:15 PM	131	0	13	144	8	210	0	218	1	0	0	1	0	343	163	506	869
Total Volume	473	1	59	533	35	904	0	939	2	0	0	2	5	1202	592	1799	3273
% App. Total	88.7	0.2	11.1		3.7	96.3	0		100	0	0		0.3	66.8	32.9		
PHF	.876	.250	.776	.913	.486	.942	.000	.954	.500	.000	.000	.500	.625	.876	.908	.889	.942
Cars	470	1	59	530	35	887	0	922	2	0	0	2	5	1183	580	1768	3222
% Cars	99.4	100	100	99.4	100	98.1	0	98.2	100	0	0	100	100	98.4	98.0	98.3	98.4
Heavy Vehicles	3	0	0	3	0	17	0	17	0	0	0	0	0	19	12	31	51
% Heavy Vehicles	0.6	0	0	0.6	0	1.9	0	1.8	0	0	0	0	0	1.6	2.0	1.7	1.6



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AA
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars

Start Time	Esmond Street From North			Putnum Pike (Route 44) From East			Plaza Driveway From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
04:00 PM	112	0	9	10	221	0	0	0	0	0	255	117	724
04:15 PM	128	0	10	5	220	0	0	0	0	0	295	141	799
04:30 PM	100	1	19	3	238	0	1	0	0	2	306	147	817
04:45 PM	105	0	16	6	231	0	0	0	0	1	256	124	739
Total	445	1	54	24	910	0	1	0	0	3	1112	529	3079
05:00 PM	135	0	11	18	209	0	0	0	0	2	285	149	809
05:15 PM	130	0	13	8	209	0	1	0	0	0	336	160	857
05:30 PM	89	0	5	8	182	0	1	0	0	0	297	148	730
05:45 PM	102	1	15	1	172	0	0	0	0	1	209	132	633
Total	456	1	44	35	772	0	2	0	0	3	1127	589	3029
Grand Total	901	2	98	59	1682	0	3	0	0	6	2239	1118	6108
Apprch %	90	0.2	9.8	3.4	96.6	0	100	0	0	0.2	66.6	33.2	
Total %	14.8	0	1.6	1	27.5	0	0	0	0	0.1	36.7	18.3	

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	100	1	19	120	3	238	0	241	1	0	0	1	2	306	147	455	817
04:45 PM	105	0	16	121	6	231	0	237	0	0	0	0	1	256	124	381	739
05:00 PM	135	0	11	146	18	209	0	227	0	0	0	0	2	285	149	436	809
05:15 PM	130	0	13	143	8	209	0	217	1	0	0	1	0	336	160	496	857
Total Volume	470	1	59	530	35	887	0	922	2	0	0	2	5	1183	580	1768	3222
% App. Total	88.7	0.2	11.1		3.8	96.2	0		100	0	0		0.3	66.9	32.8		
PHF	.870	.250	.776	.908	.486	.932	.000	.956	.500	.000	.000	.500	.625	.880	.906	.891	.940



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AA
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Esmond Street From North			Putnum Pike (Route 44) From East				Plaza Driveway From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
04:00 PM	6	0	0	0	11	0	0	0	0	0	6	2	25	
04:15 PM	3	0	0	1	8	0	0	0	0	0	7	2	21	
04:30 PM	0	0	0	0	2	0	0	0	0	0	6	4	12	
04:45 PM	2	0	0	0	9	0	0	0	0	0	3	0	14	
Total	11	0	0	1	30	0	0	0	0	0	22	8	72	
05:00 PM	0	0	0	0	5	0	0	0	0	0	3	5	13	
05:15 PM	1	0	0	0	1	0	0	0	0	0	7	3	12	
05:30 PM	0	0	0	0	0	0	0	0	0	0	2	2	4	
05:45 PM	0	0	0	0	3	0	0	0	0	0	5	1	9	
Total	1	0	0	0	9	0	0	0	0	0	17	11	38	
Grand Total	12	0	0	1	39	0	0	0	0	0	39	19	110	
Apprch %	100	0	0	2.5	97.5	0	0	0	0	0	67.2	32.8		
Total %	10.9	0	0	0.9	35.5	0	0	0	0	0	35.5	17.3		

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	6	0	0	6	0	11	0	11	0	0	0	0	0	6	2	8	25
04:15 PM	3	0	0	3	1	8	0	9	0	0	0	0	0	7	2	9	21
04:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	6	4	10	12
04:45 PM	2	0	0	2	0	9	0	9	0	0	0	0	0	3	0	3	14
Total Volume	11	0	0	11	1	30	0	31	0	0	0	0	0	22	8	30	72
% App. Total	100	0	0		3.2	96.8	0		0	0	0		0	73.3	26.7		
PHF	.458	.000	.000	.458	.250	.682	.000	.705	.000	.000	.000	.000	.000	.786	.500	.750	.720



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AA
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East					Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds		
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																		

Start Time	Esmond Street From North					Putnum Pike (Route 44) From East					Plaza Driveway From South					Putnum Pike (Route 44) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



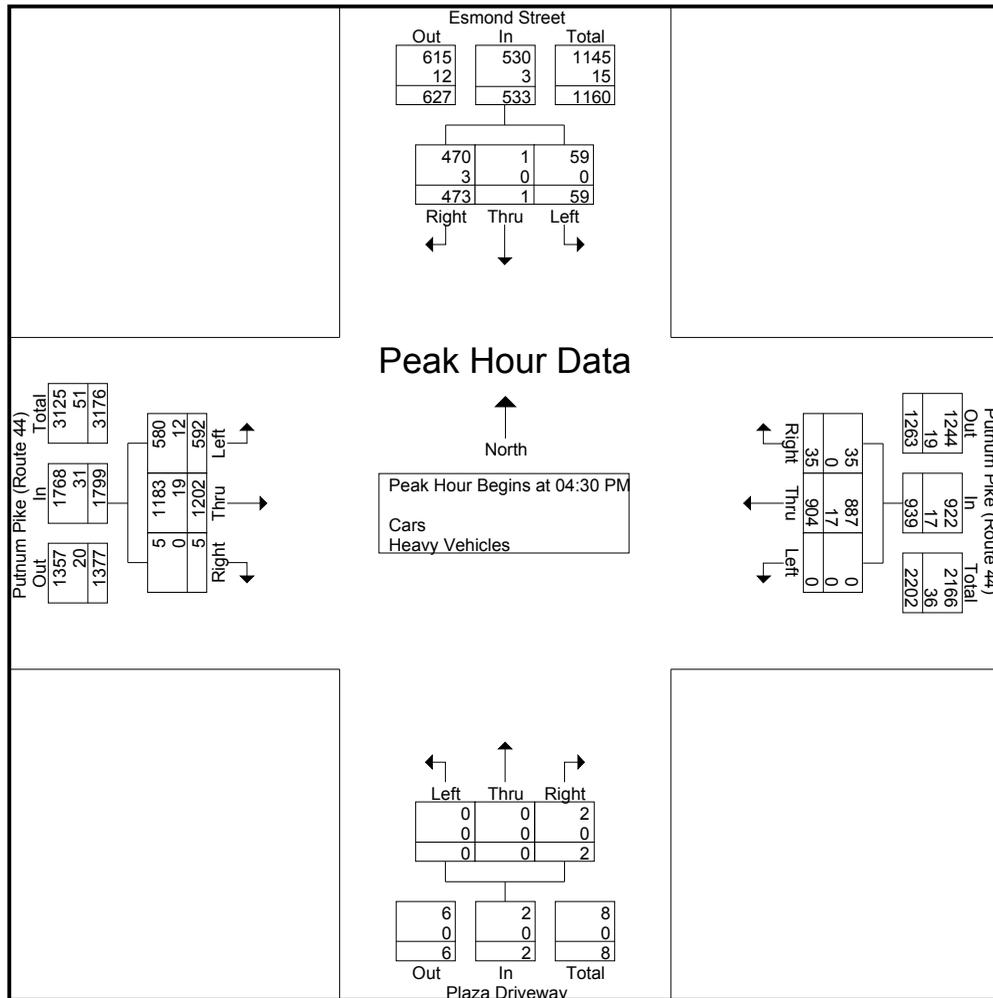
PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AA
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	100	1	19	120	3	240	0	243	1	0	0	1	2	312	151	465	829
04:45 PM	107	0	16	123	6	240	0	246	0	0	0	0	1	259	124	384	753
05:00 PM	135	0	11	146	18	214	0	232	0	0	0	0	2	288	154	444	822
05:15 PM	131	0	13	144	8	210	0	218	1	0	0	1	0	343	163	506	869
Total Volume	473	1	59	533	35	904	0	939	2	0	0	2	5	1202	592	1799	3273
% App. Total	88.7	0.2	11.1		3.7	96.3	0		100	0	0		0.3	66.8	32.9		
PHF	.876	.250	.776	.913	.486	.942	.000	.954	.500	.000	.000	.500	.625	.876	.908	.889	.942
Cars	470	1	59	530	35	887	0	922	2	0	0	2	5	1183	580	1768	3222
% Cars	99.4	100	100	99.4	100	98.1	0	98.2	100	0	0	100	100	98.4	98.0	98.3	98.4
Heavy Vehicles	3	0	0	3	0	17	0	17	0	0	0	0	0	19	12	31	51
% Heavy Vehicles	0.6	0	0	0.6	0	1.9	0	1.8	0	0	0	0	0	1.6	2.0	1.7	1.6





PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AAA
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Esmond Street From North			Putnum Pike (Route 44) From East			Plaza Driveway From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
11:00 AM	101	0	14	5	200	0	0	0	0	0	209	92	621
11:15 AM	119	0	13	11	245	0	0	0	0	1	208	76	673
11:30 AM	129	0	6	7	239	0	0	0	0	2	242	108	733
11:45 AM	152	0	15	13	218	0	0	0	0	1	232	96	727
Total	501	0	48	36	902	0	0	0	0	4	891	372	2754
12:00 PM	136	0	14	5	239	0	0	0	0	1	209	107	711
12:15 PM	108	0	14	8	206	0	0	0	0	1	215	87	639
12:30 PM	122	0	8	3	235	0	0	0	0	3	233	87	691
12:45 PM	128	0	14	9	209	0	0	0	0	3	246	94	703
Total	494	0	50	25	889	0	0	0	0	8	903	375	2744
Grand Total	995	0	98	61	1791	0	0	0	0	12	1794	747	5498
Apprch %	91	0	9	3.3	96.7	0	0	0	0	0.5	70.3	29.3	
Total %	18.1	0	1.8	1.1	32.6	0	0	0	0	0.2	32.6	13.6	
Cars	988	0	93	60	1772	0	0	0	0	11	1777	736	5437
% Cars	99.3	0	94.9	98.4	98.9	0	0	0	0	91.7	99.1	98.5	98.9
Heavy Vehicles	7	0	5	1	19	0	0	0	0	1	17	11	61
% Heavy Vehicles	0.7	0	5.1	1.6	1.1	0	0	0	0	8.3	0.9	1.5	1.1

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	119	0	13	132	11	245	0	256	0	0	0	0	1	208	76	285	673
11:30 AM	129	0	6	135	7	239	0	246	0	0	0	0	2	242	108	352	733
11:45 AM	152	0	15	167	13	218	0	231	0	0	0	0	1	232	96	329	727
12:00 PM	136	0	14	150	5	239	0	244	0	0	0	0	1	209	107	317	711
Total Volume	536	0	48	584	36	941	0	977	0	0	0	0	5	891	387	1283	2844
% App. Total	91.8	0	8.2		3.7	96.3	0		0	0	0		0.4	69.4	30.2		
PHF	.882	.000	.800	.874	.692	.960	.000	.954	.000	.000	.000	.000	.625	.920	.896	.911	.970
Cars	533	0	47	580	36	932	0	968	0	0	0	0	4	885	379	1268	2816
% Cars	99.4	0	97.9	99.3	100	99.0	0	99.1	0	0	0	0	80.0	99.3	97.9	98.8	99.0
Heavy Vehicles	3	0	1	4	0	9	0	9	0	0	0	0	1	6	8	15	28
% Heavy Vehicles	0.6	0	2.1	0.7	0	1.0	0	0.9	0	0	0	0	20.0	0.7	2.1	1.2	1.0



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AAA
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Cars

Start Time	Esmond Street From North			Putnum Pike (Route 44) From East			Plaza Driveway From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
11:00 AM	101	0	13	5	195	0	0	0	0	0	207	91	612
11:15 AM	117	0	13	11	243	0	0	0	0	1	207	72	664
11:30 AM	128	0	6	7	236	0	0	0	0	2	239	107	725
11:45 AM	152	0	14	13	217	0	0	0	0	1	230	94	721
Total	498	0	46	36	891	0	0	0	0	4	883	364	2722
12:00 PM	136	0	14	5	236	0	0	0	0	0	209	106	706
12:15 PM	106	0	12	8	206	0	0	0	0	1	213	86	632
12:30 PM	121	0	8	3	232	0	0	0	0	3	231	86	684
12:45 PM	127	0	13	8	207	0	0	0	0	3	241	94	693
Total	490	0	47	24	881	0	0	0	0	7	894	372	2715
Grand Total	988	0	93	60	1772	0	0	0	0	11	1777	736	5437
Apprch %	91.4	0	8.6	3.3	96.7	0	0	0	0	0.4	70.4	29.2	
Total %	18.2	0	1.7	1.1	32.6	0	0	0	0	0.2	32.7	13.5	

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	117	0	13	130	11	243	0	254	0	0	0	0	1	207	72	280	664
11:30 AM	128	0	6	134	7	236	0	243	0	0	0	0	2	239	107	348	725
11:45 AM	152	0	14	166	13	217	0	230	0	0	0	0	1	230	94	325	721
12:00 PM	136	0	14	150	5	236	0	241	0	0	0	0	0	209	106	315	706
Total Volume	533	0	47	580	36	932	0	968	0	0	0	0	4	885	379	1268	2816
% App. Total	91.9	0	8.1		3.7	96.3	0		0	0	0		0.3	69.8	29.9		
PHF	.877	.000	.839	.873	.692	.959	.000	.953	.000	.000	.000	.000	.500	.926	.886	.911	.971



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AAA
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Esmond Street From North			Putnum Pike (Route 44) From East			Plaza Driveway From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
11:00 AM	0	0	1	0	5	0	0	0	0	0	2	1	9
11:15 AM	2	0	0	0	2	0	0	0	0	0	1	4	9
11:30 AM	1	0	0	0	3	0	0	0	0	0	3	1	8
11:45 AM	0	0	1	0	1	0	0	0	0	0	2	2	6
Total	3	0	2	0	11	0	0	0	0	0	8	8	32
12:00 PM	0	0	0	0	3	0	0	0	0	1	0	1	5
12:15 PM	2	0	2	0	0	0	0	0	0	0	2	1	7
12:30 PM	1	0	0	0	3	0	0	0	0	0	2	1	7
12:45 PM	1	0	1	1	2	0	0	0	0	0	5	0	10
Total	4	0	3	1	8	0	0	0	0	1	9	3	29
Grand Total	7	0	5	1	19	0	0	0	0	1	17	11	61
Apprch %	58.3	0	41.7	5	95	0	0	0	0	3.4	58.6	37.9	
Total %	11.5	0	8.2	1.6	31.1	0	0	0	0	1.6	27.9	18	

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	1	1	0	5	0	5	0	0	0	0	0	2	1	3	9
11:15 AM	2	0	0	2	0	2	0	2	0	0	0	0	0	1	4	5	9
11:30 AM	1	0	0	1	0	3	0	3	0	0	0	0	0	3	1	4	8
11:45 AM	0	0	1	1	0	1	0	1	0	0	0	0	0	2	2	4	6
Total Volume	3	0	2	5	0	11	0	11	0	0	0	0	0	8	8	16	32
% App. Total	60	0	40		0	100	0		0	0	0		0	50	50		
PHF	.375	.000	.500	.625	.000	.550	.000	.550	.000	.000	.000	.000	.000	.667	.500	.800	.889



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AAA
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	2	5
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	1	0	0	0	0	0	0	0	0	0	0	2	0	0	1	2	6
Apprch %	100	0	0	0	0	0	0	0	0	0	0	100	0	0	33.3	66.7	
Total %	16.7	0	0	0	0	0	0	0	0	0	0	33.3	0	0	16.7	33.3	

Start Time	Esmond Street From North					Putnum Pike (Route 44) From East					Plaza Driveway From South					Putnum Pike (Route 44) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:00 AM																					
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	1	2	3	5
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	100		0	0	33.3	66.7		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.250	.250	.375	.625



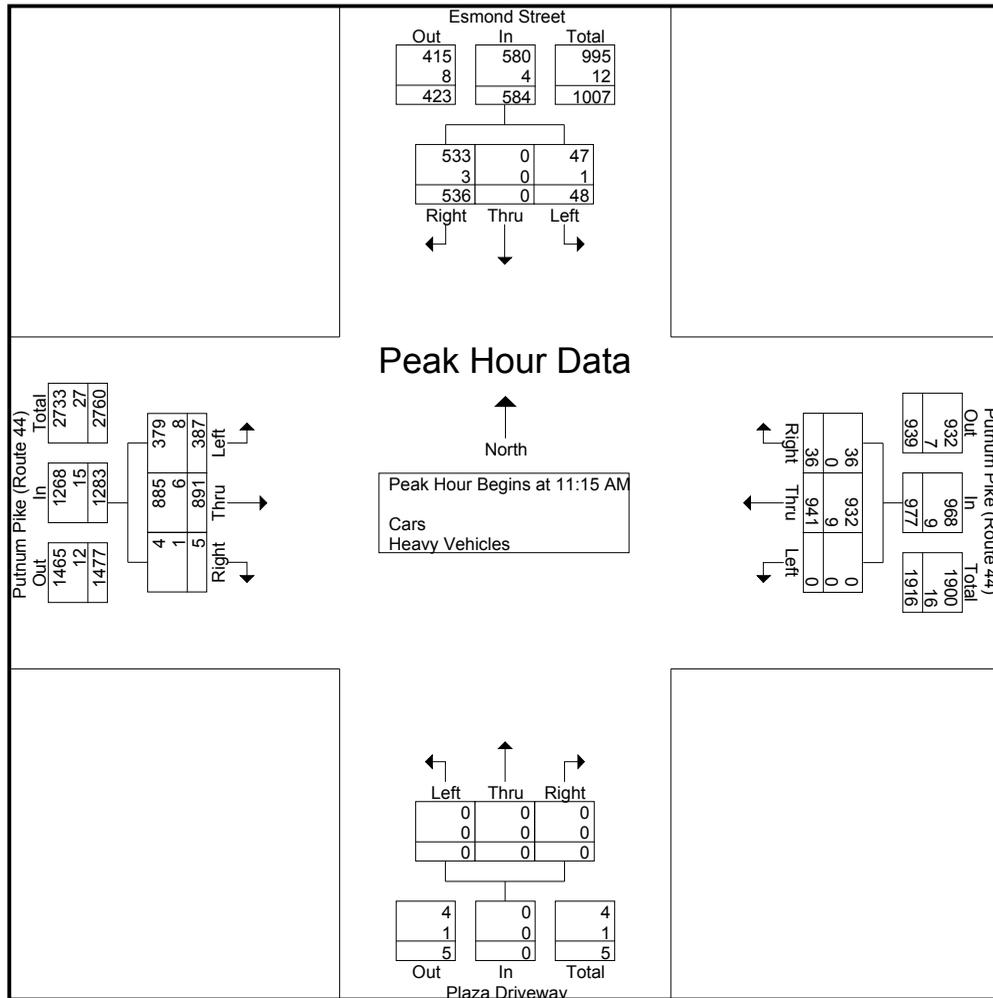
PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street/ Plaza Driveway
E/W: Putnum Pike (Route 44)
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 AAA
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Start Time	Esmond Street From North				Putnum Pike (Route 44) From East				Plaza Driveway From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	119	0	13	132	11	245	0	256	0	0	0	0	1	208	76	285	673
11:30 AM	129	0	6	135	7	239	0	246	0	0	0	0	2	242	108	352	733
11:45 AM	152	0	15	167	13	218	0	231	0	0	0	0	1	232	96	329	727
12:00 PM	136	0	14	150	5	239	0	244	0	0	0	0	1	209	107	317	711
Total Volume	536	0	48	584	36	941	0	977	0	0	0	0	5	891	387	1283	2844
% App. Total	91.8	0	8.2		3.7	96.3	0		0	0	0		0.4	69.4	30.2		
PHF	.882	.000	.800	.874	.692	.960	.000	.954	.000	.000	.000	.000	.625	.920	.896	.911	.970
Cars	533	0	47	580	36	932	0	968	0	0	0	0	4	885	379	1268	2816
% Cars	99.4	0	97.9	99.3	100	99.0	0	99.1	0	0	0	0	80.0	99.3	97.9	98.8	99.0
Heavy Vehicles	3	0	1	4	0	9	0	9	0	0	0	0	1	6	8	15	28
% Heavy Vehicles	0.6	0	2.1	0.7	0	1.0	0	0.9	0	0	0	0	20.0	0.7	2.1	1.2	1.0





PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Seville Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 B
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Esmond Street From North			Dean Avenue From East			Esmond Street From South			Seville Road From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
07:00 AM	7	70	0	0	7	15	2	33	15	28	2	2	181
07:15 AM	13	65	1	5	10	11	2	34	12	29	1	6	189
07:30 AM	7	60	0	6	9	16	5	39	9	39	1	13	204
07:45 AM	4	74	1	10	11	12	4	43	13	29	3	8	212
Total	31	269	2	21	37	54	13	149	49	125	7	29	786
08:00 AM	3	83	0	2	12	15	3	40	15	51	7	12	243
08:15 AM	10	85	0	3	7	12	4	27	17	42	4	10	221
08:30 AM	3	71	2	2	9	6	3	46	19	36	3	10	210
08:45 AM	5	69	1	4	6	9	4	39	14	32	3	5	191
Total	21	308	3	11	34	42	14	152	65	161	17	37	865
Grand Total	52	577	5	32	71	96	27	301	114	286	24	66	1651
Apprch %	8.2	91	0.8	16.1	35.7	48.2	6.1	68.1	25.8	76.1	6.4	17.6	
Total %	3.1	34.9	0.3	1.9	4.3	5.8	1.6	18.2	6.9	17.3	1.5	4	
Cars	49	559	5	31	69	94	25	276	108	278	23	60	1577
% Cars	94.2	96.9	100	96.9	97.2	97.9	92.6	91.7	94.7	97.2	95.8	90.9	95.5
Heavy Vehicles	3	18	0	1	2	2	2	25	6	8	1	6	74
% Heavy Vehicles	5.8	3.1	0	3.1	2.8	2.1	7.4	8.3	5.3	2.8	4.2	9.1	4.5

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Seville Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	4	74	1	79	10	11	12	33	4	43	13	60	29	3	8	40	212
08:00 AM	3	83	0	86	2	12	15	29	3	40	15	58	51	7	12	70	243
08:15 AM	10	85	0	95	3	7	12	22	4	27	17	48	42	4	10	56	221
08:30 AM	3	71	2	76	2	9	6	17	3	46	19	68	36	3	10	49	210
Total Volume	20	313	3	336	17	39	45	101	14	156	64	234	158	17	40	215	886
% App. Total	6	93.2	0.9		16.8	38.6	44.6		6	66.7	27.4		73.5	7.9	18.6		
PHF	.500	.921	.375	.884	.425	.813	.750	.765	.875	.848	.842	.860	.775	.607	.833	.768	.912
Cars	19	301	3	323	16	37	44	97	12	142	60	214	152	17	36	205	839
% Cars	95.0	96.2	100	96.1	94.1	94.9	97.8	96.0	85.7	91.0	93.8	91.5	96.2	100	90.0	95.3	94.7
Heavy Vehicles	1	12	0	13	1	2	1	4	2	14	4	20	6	0	4	10	47
% Heavy Vehicles	5.0	3.8	0	3.9	5.9	5.1	2.2	4.0	14.3	9.0	6.3	8.5	3.8	0	10.0	4.7	5.3



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 B
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars

Start Time	Esmond Street From North			Dean Avenue From East			Esmond Street From South			Sebille Road From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
07:00 AM	7	68	0	0	7	14	2	27	13	27	1	2	168
07:15 AM	12	64	1	5	10	11	2	32	12	28	1	4	182
07:30 AM	6	59	0	6	9	16	5	38	9	39	1	13	201
07:45 AM	4	69	1	9	10	12	4	40	13	28	3	7	200
Total	29	260	2	20	36	53	13	137	47	122	6	26	751
08:00 AM	3	80	0	2	12	15	2	34	12	49	7	9	225
08:15 AM	9	84	0	3	6	11	3	23	16	42	4	10	211
08:30 AM	3	68	2	2	9	6	3	45	19	33	3	10	203
08:45 AM	5	67	1	4	6	9	4	37	14	32	3	5	187
Total	20	299	3	11	33	41	12	139	61	156	17	34	826
Grand Total	49	559	5	31	69	94	25	276	108	278	23	60	1577
Apprch %	8	91.2	0.8	16	35.6	48.5	6.1	67.5	26.4	77	6.4	16.6	
Total %	3.1	35.4	0.3	2	4.4	6	1.6	17.5	6.8	17.6	1.5	3.8	

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	4	69	1	74	9	10	12	31	4	40	13	57	28	3	7	38	200
08:00 AM	3	80	0	83	2	12	15	29	2	34	12	48	49	7	9	65	225
08:15 AM	9	84	0	93	3	6	11	20	3	23	16	42	42	4	10	56	211
08:30 AM	3	68	2	73	2	9	6	17	3	45	19	67	33	3	10	46	203
Total Volume	19	301	3	323	16	37	44	97	12	142	60	214	152	17	36	205	839
% App. Total	5.9	93.2	0.9		16.5	38.1	45.4		5.6	66.4	28		74.1	8.3	17.6		
PHF	.528	.896	.375	.868	.444	.771	.733	.782	.750	.789	.789	.799	.776	.607	.900	.788	.932



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 B
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Esmond Street From North			Dean Avenue From East			Esmond Street From South			Sebille Road From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
07:00 AM	0	2	0	0	0	1	0	6	2	1	1	0	13
07:15 AM	1	1	0	0	0	0	0	2	0	1	0	2	7
07:30 AM	1	1	0	0	0	0	0	1	0	0	0	0	3
07:45 AM	0	5	0	1	1	0	0	3	0	1	0	1	12
Total	2	9	0	1	1	1	0	12	2	3	1	3	35
08:00 AM	0	3	0	0	0	0	1	6	3	2	0	3	18
08:15 AM	1	1	0	0	1	1	1	4	1	0	0	0	10
08:30 AM	0	3	0	0	0	0	0	1	0	3	0	0	7
08:45 AM	0	2	0	0	0	0	0	2	0	0	0	0	4
Total	1	9	0	0	1	1	2	13	4	5	0	3	39
Grand Total	3	18	0	1	2	2	2	25	6	8	1	6	74
Apprch %	14.3	85.7	0	20	40	40	6.1	75.8	18.2	53.3	6.7	40	
Total %	4.1	24.3	0	1.4	2.7	2.7	2.7	33.8	8.1	10.8	1.4	8.1	

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	5	0	5	1	1	0	2	0	3	0	3	1	0	1	2	12
08:00 AM	0	3	0	3	0	0	0	0	1	6	3	10	2	0	3	5	18
08:15 AM	1	1	0	2	0	1	1	2	1	4	1	6	0	0	0	0	10
08:30 AM	0	3	0	3	0	0	0	0	0	1	0	1	3	0	0	3	7
Total Volume	1	12	0	13	1	2	1	4	2	14	4	20	6	0	4	10	47
% App. Total	7.7	92.3	0		25	50	25		10	70	20		60	0	40		
PHF	.250	.600	.000	.650	.250	.500	.250	.500	.500	.583	.333	.500	.500	.000	.333	.500	.653



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 B
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
08:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
08:30 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2
Total	0	0	0	5	0	0	0	1	0	0	0	1	0	1	0	0	8
Grand Total	0	0	0	7	0	0	0	1	0	0	0	1	0	1	0	0	10
Apprch %	0	0	0	100	0	0	0	100	0	0	0	100	0	100	0	0	
Total %	0	0	0	70	0	0	0	10	0	0	0	10	0	10	0	0	

Start Time	Esmond Street From North					Dean Avenue From East					Esmond Street From South					Sebille Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
08:00 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
08:30 AM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	0	0	7	7	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	8
% App. Total	0	0	0	100		0	0	0	100		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.583	.583	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.667



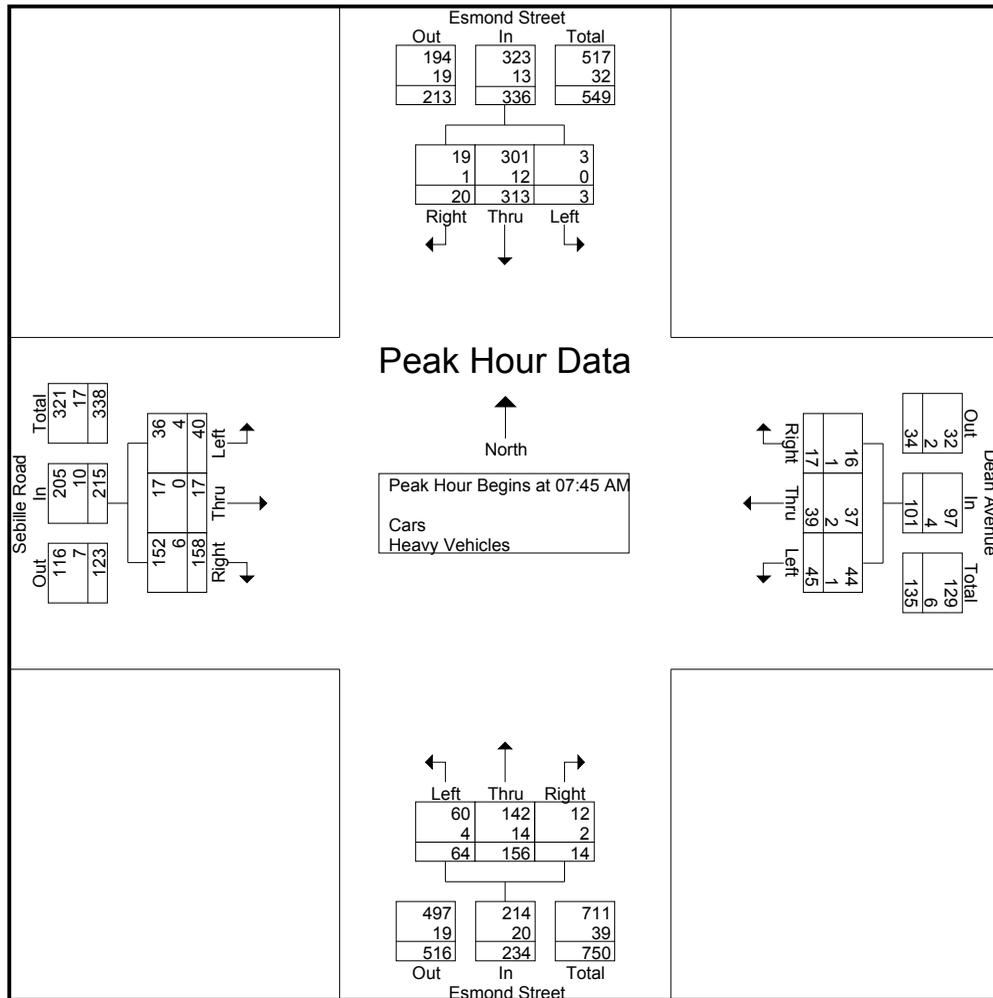
PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 B
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	4	74	1	79	10	11	12	33	4	43	13	60	29	3	8	40	212
08:00 AM	3	83	0	86	2	12	15	29	3	40	15	58	51	7	12	70	243
08:15 AM	10	85	0	95	3	7	12	22	4	27	17	48	42	4	10	56	221
08:30 AM	3	71	2	76	2	9	6	17	3	46	19	68	36	3	10	49	210
Total Volume	20	313	3	336	17	39	45	101	14	156	64	234	158	17	40	215	886
% App. Total	6	93.2	0.9		16.8	38.6	44.6		6	66.7	27.4		73.5	7.9	18.6		
PHF	.500	.921	.375	.884	.425	.813	.750	.765	.875	.848	.842	.860	.775	.607	.833	.768	.912
Cars	19	301	3	323	16	37	44	97	12	142	60	214	152	17	36	205	839
% Cars	95.0	96.2	100	96.1	94.1	94.9	97.8	96.0	85.7	91.0	93.8	91.5	96.2	100	90.0	95.3	94.7
Heavy Vehicles	1	12	0	13	1	2	1	4	2	14	4	20	6	0	4	10	47
% Heavy Vehicles	5.0	3.8	0	3.9	5.9	5.1	2.2	4.0	14.3	9.0	6.3	8.5	3.8	0	10.0	4.7	5.3





PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Seville Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BB
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Esmond Street From North			Dean Avenue From East			Esmond Street From South			Seville Road From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
04:00 PM	7	74	4	9	8	8	9	82	36	28	3	10	278
04:15 PM	8	88	3	6	13	4	14	92	33	22	7	6	296
04:30 PM	10	73	5	8	12	4	16	92	33	22	6	7	288
04:45 PM	16	78	5	8	8	6	12	79	43	19	10	8	292
Total	41	313	17	31	41	22	51	345	145	91	26	31	1154
05:00 PM	8	75	5	21	12	13	20	105	31	18	2	9	319
05:15 PM	12	62	7	7	14	4	18	93	55	24	9	8	313
05:30 PM	6	76	7	16	15	7	7	97	49	17	10	10	317
05:45 PM	7	70	8	7	8	7	7	92	38	13	10	6	273
Total	33	283	27	51	49	31	52	387	173	72	31	33	1222
Grand Total	74	596	44	82	90	53	103	732	318	163	57	64	2376
Apprch %	10.4	83.5	6.2	36.4	40	23.6	8.9	63.5	27.6	57.4	20.1	22.5	
Total %	3.1	25.1	1.9	3.5	3.8	2.2	4.3	30.8	13.4	6.9	2.4	2.7	
Cars	72	590	44	82	89	53	101	716	312	160	57	61	2337
% Cars	97.3	99	100	100	98.9	100	98.1	97.8	98.1	98.2	100	95.3	98.4
Heavy Vehicles	2	6	0	0	1	0	2	16	6	3	0	3	39
% Heavy Vehicles	2.7	1	0	0	1.1	0	1.9	2.2	1.9	1.8	0	4.7	1.6

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Seville Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	16	78	5	99	8	8	6	22	12	79	43	134	19	10	8	37	292
05:00 PM	8	75	5	88	21	12	13	46	20	105	31	156	18	2	9	29	319
05:15 PM	12	62	7	81	7	14	4	25	18	93	55	166	24	9	8	41	313
05:30 PM	6	76	7	89	16	15	7	38	7	97	49	153	17	10	10	37	317
Total Volume	42	291	24	357	52	49	30	131	57	374	178	609	78	31	35	144	1241
% App. Total	11.8	81.5	6.7		39.7	37.4	22.9		9.4	61.4	29.2		54.2	21.5	24.3		
PHF	.656	.933	.857	.902	.619	.817	.577	.712	.713	.890	.809	.917	.813	.775	.875	.878	.973
Cars	41	288	24	353	52	48	30	130	56	368	175	599	77	31	34	142	1224
% Cars	97.6	99.0	100	98.9	100	98.0	100	99.2	98.2	98.4	98.3	98.4	98.7	100	97.1	98.6	98.6
Heavy Vehicles	1	3	0	4	0	1	0	1	1	6	3	10	1	0	1	2	17
% Heavy Vehicles	2.4	1.0	0	1.1	0	2.0	0	0.8	1.8	1.6	1.7	1.6	1.3	0	2.9	1.4	1.4



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BB
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars

Start Time	Esmond Street From North			Dean Avenue From East			Esmond Street From South			Sebille Road From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
04:00 PM	6	72	4	9	8	8	9	81	36	27	3	9	272
04:15 PM	8	87	3	6	13	4	14	91	31	21	7	6	291
04:30 PM	10	73	5	8	12	4	15	86	32	22	6	6	279
04:45 PM	16	77	5	8	8	6	12	79	43	19	10	8	291
Total	40	309	17	31	41	22	50	337	142	89	26	29	1133
05:00 PM	7	75	5	21	12	13	19	103	29	17	2	9	312
05:15 PM	12	61	7	7	14	4	18	91	55	24	9	7	309
05:30 PM	6	75	7	16	14	7	7	95	48	17	10	10	312
05:45 PM	7	70	8	7	8	7	7	90	38	13	10	6	271
Total	32	281	27	51	48	31	51	379	170	71	31	32	1204
Grand Total	72	590	44	82	89	53	101	716	312	160	57	61	2337
Apprch %	10.2	83.6	6.2	36.6	39.7	23.7	8.9	63.4	27.6	57.6	20.5	21.9	
Total %	3.1	25.2	1.9	3.5	3.8	2.3	4.3	30.6	13.4	6.8	2.4	2.6	

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	16	77	5	98	8	8	6	22	12	79	43	134	19	10	8	37	291
05:00 PM	7	75	5	87	21	12	13	46	19	103	29	151	17	2	9	28	312
05:15 PM	12	61	7	80	7	14	4	25	18	91	55	164	24	9	7	40	309
05:30 PM	6	75	7	88	16	14	7	37	7	95	48	150	17	10	10	37	312
Total Volume	41	288	24	353	52	48	30	130	56	368	175	599	77	31	34	142	1224
% App. Total	11.6	81.6	6.8		40	36.9	23.1		9.3	61.4	29.2		54.2	21.8	23.9		
PHF	.641	.935	.857	.901	.619	.857	.577	.707	.737	.893	.795	.913	.802	.775	.850	.888	.981



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BB
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Esmond Street From North			Dean Avenue From East			Esmond Street From South			Sebille Road From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
04:00 PM	1	2	0	0	0	0	0	1	0	1	0	1	6
04:15 PM	0	1	0	0	0	0	0	1	2	1	0	0	5
04:30 PM	0	0	0	0	0	0	1	6	1	0	0	1	9
04:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	1	4	0	0	0	0	1	8	3	2	0	2	21
05:00 PM	1	0	0	0	0	0	1	2	2	1	0	0	7
05:15 PM	0	1	0	0	0	0	0	2	0	0	0	1	4
05:30 PM	0	1	0	0	1	0	0	2	1	0	0	0	5
05:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	2
Total	1	2	0	0	1	0	1	8	3	1	0	1	18
Grand Total	2	6	0	0	1	0	2	16	6	3	0	3	39
Apprch %	25	75	0	0	100	0	8.3	66.7	25	50	0	50	
Total %	5.1	15.4	0	0	2.6	0	5.1	41	15.4	7.7	0	7.7	

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	1	0	1	0	0	0	0	0	1	2	3	1	0	0	1	5
04:30 PM	0	0	0	0	0	0	0	0	1	6	1	8	0	0	1	1	9
04:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	1	0	0	1	0	0	0	0	1	2	2	5	1	0	0	1	7
Total Volume	1	2	0	3	0	0	0	0	2	9	5	16	2	0	1	3	22
% App. Total	33.3	66.7	0		0	0	0		12.5	56.2	31.2		66.7	0	33.3		
PHF	.250	.500	.000	.750	.000	.000	.000	.000	.500	.375	.625	.500	.500	.000	.250	.750	.611



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BB
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
05:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	4
Grand Total	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	2	5
Apprch %	0	0	0	100	0	50	0	50	0	0	0	0	0	0	0	100	
Total %	0	0	0	20	0	20	0	20	0	0	0	0	0	0	0	40	

Start Time	Esmond Street From North					Dean Avenue From East					Esmond Street From South					Sebille Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
05:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	2	2	4
% App. Total	0	0	0	0		0	50	0	50		0	0	0	0		0	0	0	100		
PHF	.000	.000	.000	.000	.000	.000	.250	.000	.250	.500	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.500



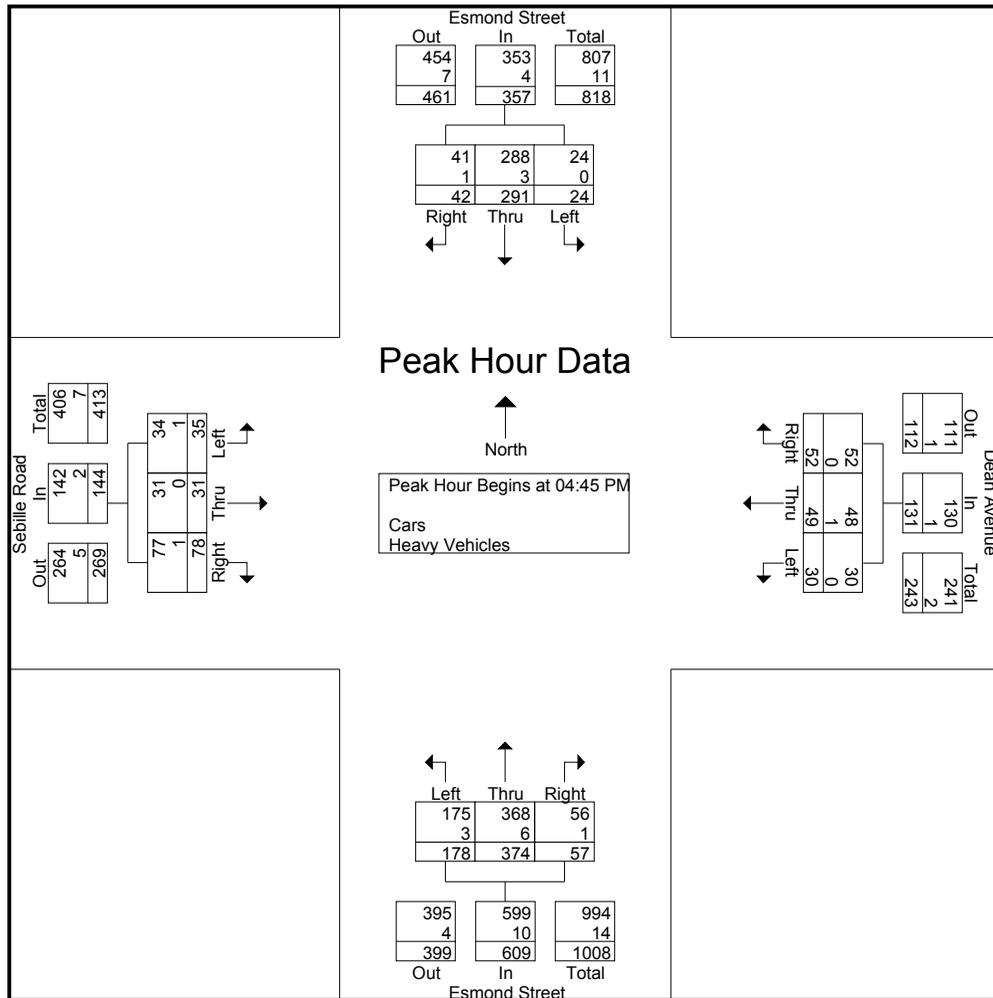
PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BB
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	16	78	5	99	8	8	6	22	12	79	43	134	19	10	8	37	292
05:00 PM	8	75	5	88	21	12	13	46	20	105	31	156	18	2	9	29	319
05:15 PM	12	62	7	81	7	14	4	25	18	93	55	166	24	9	8	41	313
05:30 PM	6	76	7	89	16	15	7	38	7	97	49	153	17	10	10	37	317
Total Volume	42	291	24	357	52	49	30	131	57	374	178	609	78	31	35	144	1241
% App. Total	11.8	81.5	6.7		39.7	37.4	22.9		9.4	61.4	29.2		54.2	21.5	24.3		
PHF	.656	.933	.857	.902	.619	.817	.577	.712	.713	.890	.809	.917	.813	.775	.875	.878	.973
Cars	41	288	24	353	52	48	30	130	56	368	175	599	77	31	34	142	1224
% Cars	97.6	99.0	100	98.9	100	98.0	100	99.2	98.2	98.4	98.3	98.4	98.7	100	97.1	98.6	98.6
Heavy Vehicles	1	3	0	4	0	1	0	1	1	6	3	10	1	0	1	2	17
% Heavy Vehicles	2.4	1.0	0	1.1	0	2.0	0	0.8	1.8	1.6	1.7	1.6	1.3	0	2.9	1.4	1.4





PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BBB
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Esmond Street From North			Dean Avenue From East			Esmond Street From South			Sebille Road From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
11:00 AM	7	75	0	3	10	13	6	64	22	21	3	8	232
11:15 AM	15	102	7	12	15	2	9	61	26	26	4	7	286
11:30 AM	6	86	4	15	13	11	9	71	23	40	3	8	289
11:45 AM	9	109	2	7	6	17	15	70	23	35	6	6	305
Total	37	372	13	37	44	43	39	266	94	122	16	29	1112
12:00 PM	12	106	6	10	8	9	10	64	30	27	12	7	301
12:15 PM	8	77	4	8	8	9	6	55	24	26	5	7	237
12:30 PM	8	79	4	5	5	13	8	50	35	19	7	8	241
12:45 PM	7	83	6	8	12	18	6	65	33	34	5	8	285
Total	35	345	20	31	33	49	30	234	122	106	29	30	1064
Grand Total	72	717	33	68	77	92	69	500	216	228	45	59	2176
Apprch %	8.8	87.2	4	28.7	32.5	38.8	8.8	63.7	27.5	68.7	13.6	17.8	
Total %	3.3	33	1.5	3.1	3.5	4.2	3.2	23	9.9	10.5	2.1	2.7	
Cars	72	710	33	66	74	92	68	492	212	224	43	58	2144
% Cars	100	99	100	97.1	96.1	100	98.6	98.4	98.1	98.2	95.6	98.3	98.5
Heavy Vehicles	0	7	0	2	3	0	1	8	4	4	2	1	32
% Heavy Vehicles	0	1	0	2.9	3.9	0	1.4	1.6	1.9	1.8	4.4	1.7	1.5

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	15	102	7	124	12	15	2	29	9	61	26	96	26	4	7	37	286
11:30 AM	6	86	4	96	15	13	11	39	9	71	23	103	40	3	8	51	289
11:45 AM	9	109	2	120	7	6	17	30	15	70	23	108	35	6	6	47	305
12:00 PM	12	106	6	124	10	8	9	27	10	64	30	104	27	12	7	46	301
Total Volume	42	403	19	464	44	42	39	125	43	266	102	411	128	25	28	181	1181
% App. Total	9.1	86.9	4.1		35.2	33.6	31.2		10.5	64.7	24.8		70.7	13.8	15.5		
PHF	.700	.924	.679	.935	.733	.700	.574	.801	.717	.937	.850	.951	.800	.521	.875	.887	.968
Cars	42	400	19	461	44	40	39	123	42	260	101	403	126	23	28	177	1164
% Cars	100	99.3	100	99.4	100	95.2	100	98.4	97.7	97.7	99.0	98.1	98.4	92.0	100	97.8	98.6
Heavy Vehicles	0	3	0	3	0	2	0	2	1	6	1	8	2	2	0	4	17
% Heavy Vehicles	0	0.7	0	0.6	0	4.8	0	1.6	2.3	2.3	1.0	1.9	1.6	8.0	0	2.2	1.4



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Seville Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BBB
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Cars

Start Time	Esmond Street From North			Dean Avenue From East			Esmond Street From South			Seville Road From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
11:00 AM	7	75	0	3	9	13	6	64	21	21	3	7	229
11:15 AM	15	101	7	12	14	2	8	59	25	25	3	7	278
11:30 AM	6	84	4	15	12	11	9	70	23	39	3	8	284
11:45 AM	9	109	2	7	6	17	15	69	23	35	6	6	304
Total	37	369	13	37	41	43	38	262	92	120	15	28	1095
12:00 PM	12	106	6	10	8	9	10	62	30	27	11	7	298
12:15 PM	8	76	4	6	8	9	6	53	23	24	5	7	229
12:30 PM	8	78	4	5	5	13	8	50	34	19	7	8	239
12:45 PM	7	81	6	8	12	18	6	65	33	34	5	8	283
Total	35	341	20	29	33	49	30	230	120	104	28	30	1049
Grand Total	72	710	33	66	74	92	68	492	212	224	43	58	2144
Apprch %	8.8	87.1	4	28.4	31.9	39.7	8.8	63.7	27.5	68.9	13.2	17.8	
Total %	3.4	33.1	1.5	3.1	3.5	4.3	3.2	22.9	9.9	10.4	2	2.7	

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Seville Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	15	101	7	123	12	14	2	28	8	59	25	92	25	3	7	35	278
11:30 AM	6	84	4	94	15	12	11	38	9	70	23	102	39	3	8	50	284
11:45 AM	9	109	2	120	7	6	17	30	15	69	23	107	35	6	6	47	304
12:00 PM	12	106	6	124	10	8	9	27	10	62	30	102	27	11	7	45	298
Total Volume	42	400	19	461	44	40	39	123	42	260	101	403	126	23	28	177	1164
% App. Total	9.1	86.8	4.1		35.8	32.5	31.7		10.4	64.5	25.1		71.2	13	15.8		
PHF	.700	.917	.679	.929	.733	.714	.574	.809	.700	.929	.842	.942	.808	.523	.875	.885	.957



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Seville Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BBB
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Esmond Street From North			Dean Avenue From East			Esmond Street From South			Seville Road From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
11:00 AM	0	0	0	0	1	0	0	0	1	0	0	1	3
11:15 AM	0	1	0	0	1	0	1	2	1	1	1	0	8
11:30 AM	0	2	0	0	1	0	0	1	0	1	0	0	5
11:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	0	3	0	0	3	0	1	4	2	2	1	1	17
12:00 PM	0	0	0	0	0	0	0	2	0	0	1	0	3
12:15 PM	0	1	0	2	0	0	0	2	1	2	0	0	8
12:30 PM	0	1	0	0	0	0	0	0	1	0	0	0	2
12:45 PM	0	2	0	0	0	0	0	0	0	0	0	0	2
Total	0	4	0	2	0	0	0	4	2	2	1	0	15
Grand Total	0	7	0	2	3	0	1	8	4	4	2	1	32
Apprch %	0	100	0	40	60	0	7.7	61.5	30.8	57.1	28.6	14.3	
Total %	0	21.9	0	6.2	9.4	0	3.1	25	12.5	12.5	6.2	3.1	

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Seville Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	1	3
11:15 AM	0	1	0	1	0	1	0	1	1	2	1	4	1	1	0	2	8
11:30 AM	0	2	0	2	0	1	0	1	0	1	0	1	1	0	0	1	5
11:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Volume	0	3	0	3	0	3	0	3	1	4	2	7	2	1	1	4	17
% App. Total	0	100	0		0	100	0		14.3	57.1	28.6		50	25	25		
PHF	.000	.375	.000	.375	.000	.750	.000	.750	.250	.500	.500	.438	.500	.250	.250	.500	.531



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BBB
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
11:00 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	3
11:15 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
11:30 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
11:45 AM	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	3
Total	0	0	0	5	1	0	0	0	0	1	0	1	0	1	0	0	9
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Grand Total	0	1	0	5	1	0	0	1	0	1	0	1	0	1	0	0	11
Apprch %	0	16.7	0	83.3	50	0	0	50	0	50	0	50	0	100	0	0	
Total %	0	9.1	0	45.5	9.1	0	0	9.1	0	9.1	0	9.1	0	9.1	0	0	

Start Time	Esmond Street From North					Dean Avenue From East					Esmond Street From South					Sebille Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:00 AM																					
11:00 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	3
11:15 AM	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:30 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:45 AM	0	0	0	1	1	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	3
Total Volume	0	0	0	5	5	1	0	0	0	1	0	1	0	1	2	0	1	0	0	1	9
% App. Total	0	0	0	100		100	0	0	0		0	50	0	50		0	100	0	0		
PHF	.000	.000	.000	.625	.625	.250	.000	.000	.000	.250	.000	.250	.000	.250	.500	.000	.250	.000	.000	.250	.750



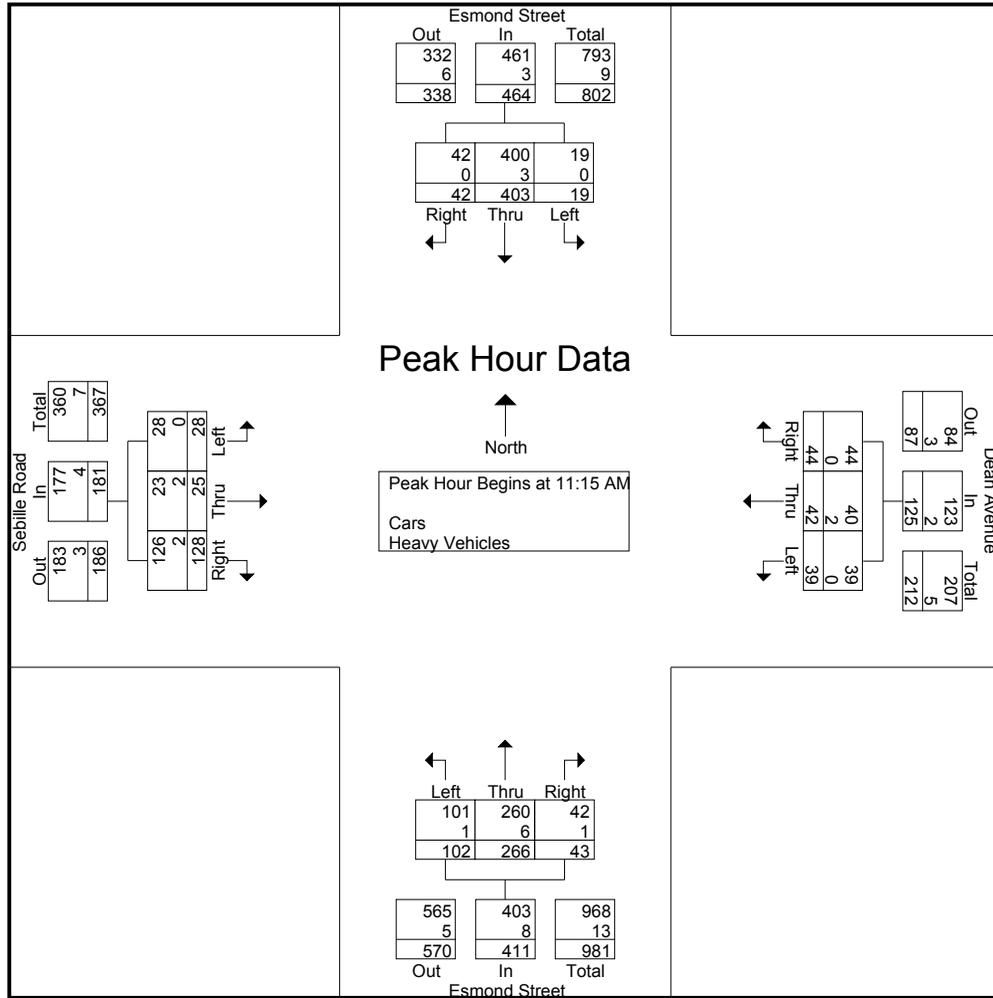
PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Esmond Street
E/W: Dean Avenue/ Sebille Road
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 BBB
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Start Time	Esmond Street From North				Dean Avenue From East				Esmond Street From South				Sebille Road From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	15	102	7	124	12	15	2	29	9	61	26	96	26	4	7	37	286
11:30 AM	6	86	4	96	15	13	11	39	9	71	23	103	40	3	8	51	289
11:45 AM	9	109	2	120	7	6	17	30	15	70	23	108	35	6	6	47	305
12:00 PM	12	106	6	124	10	8	9	27	10	64	30	104	27	12	7	46	301
Total Volume	42	403	19	464	44	42	39	125	43	266	102	411	128	25	28	181	1181
% App. Total	9.1	86.9	4.1		35.2	33.6	31.2		10.5	64.7	24.8		70.7	13.8	15.5		
PHF	.700	.924	.679	.935	.733	.700	.574	.801	.717	.937	.850	.951	.800	.521	.875	.887	.968
Cars	42	400	19	461	44	40	39	123	42	260	101	403	126	23	28	177	1164
% Cars	100	99.3	100	99.4	100	95.2	100	98.4	97.7	97.7	99.0	98.1	98.4	92.0	100	97.8	98.6
Heavy Vehicles	0	3	0	3	0	2	0	2	1	6	1	8	2	2	0	4	17
% Heavy Vehicles	0	0.7	0	0.6	0	4.8	0	1.6	2.3	2.3	1.0	1.9	1.6	8.0	0	2.2	1.4





PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 C
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Weave to Esmond Street From North			Putnum Pike (Route 44) From East			I-295 NB Offramp From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
07:00 AM	0	0	0	0	0	0	41	17	0	0	105	0	163
07:15 AM	0	0	0	0	0	0	57	16	0	0	136	0	209
07:30 AM	0	0	0	0	0	0	64	17	0	0	115	0	196
07:45 AM	0	0	0	0	0	0	87	27	0	0	143	0	257
Total	0	0	0	0	0	0	249	77	0	0	499	0	825
08:00 AM	0	0	0	0	0	0	69	22	0	0	119	0	210
08:15 AM	0	0	0	0	0	0	61	12	0	0	137	0	210
08:30 AM	0	0	0	0	0	0	73	11	0	0	170	0	254
08:45 AM	0	0	0	0	0	0	52	13	0	0	155	0	220
Total	0	0	0	0	0	0	255	58	0	0	581	0	894
Grand Total	0	0	0	0	0	0	504	135	0	0	1080	0	1719
Apprch %	0	0	0	0	0	0	78.9	21.1	0	0	100	0	
Total %	0	0	0	0	0	0	29.3	7.9	0	0	62.8	0	
Cars	0	0	0	0	0	0	478	123	0	0	1019	0	1620
% Cars	0	0	0	0	0	0	94.8	91.1	0	0	94.4	0	94.2
Heavy Vehicles	0	0	0	0	0	0	26	12	0	0	61	0	99
% Heavy Vehicles	0	0	0	0	0	0	5.2	8.9	0	0	5.6	0	5.8

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	0	0	0	87	27	0	114	0	143	0	143	257
08:00 AM	0	0	0	0	0	0	0	0	69	22	0	91	0	119	0	119	210
08:15 AM	0	0	0	0	0	0	0	0	61	12	0	73	0	137	0	137	210
08:30 AM	0	0	0	0	0	0	0	0	73	11	0	84	0	170	0	170	254
Total Volume	0	0	0	0	0	0	0	0	290	72	0	362	0	569	0	569	931
% App. Total	0	0	0	0	0	0	0	0	80.1	19.9	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.833	.667	.000	.794	.000	.837	.000	.837	.906
Cars	0	0	0	0	0	0	0	0	271	65	0	336	0	534	0	534	870
% Cars	0	0	0	0	0	0	0	0	93.4	90.3	0	92.8	0	93.8	0	93.8	93.4
Heavy Vehicles	0	0	0	0	0	0	0	0	19	7	0	26	0	35	0	35	61
% Heavy Vehicles	0	0	0	0	0	0	0	0	6.6	9.7	0	7.2	0	6.2	0	6.2	6.6



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 C
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars

Start Time	Weave to Esmond Street From North			Putnum Pike (Route 44) From East			I-295 NB Offramp From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
07:00 AM	0	0	0	0	0	0	40	13	0	0	99	0	152
07:15 AM	0	0	0	0	0	0	56	15	0	0	129	0	200
07:30 AM	0	0	0	0	0	0	60	17	0	0	108	0	185
07:45 AM	0	0	0	0	0	0	83	25	0	0	132	0	240
Total	0	0	0	0	0	0	239	70	0	0	468	0	777
08:00 AM	0	0	0	0	0	0	59	20	0	0	107	0	186
08:15 AM	0	0	0	0	0	0	59	9	0	0	132	0	200
08:30 AM	0	0	0	0	0	0	70	11	0	0	163	0	244
08:45 AM	0	0	0	0	0	0	51	13	0	0	149	0	213
Total	0	0	0	0	0	0	239	53	0	0	551	0	843
Grand Total	0	0	0	0	0	0	478	123	0	0	1019	0	1620
Apprch %	0	0	0	0	0	0	79.5	20.5	0	0	100	0	
Total %	0	0	0	0	0	0	29.5	7.6	0	0	62.9	0	

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	0	0	0	83	25	0	108	0	132	0	132	240
08:00 AM	0	0	0	0	0	0	0	0	59	20	0	79	0	107	0	107	186
08:15 AM	0	0	0	0	0	0	0	0	59	9	0	68	0	132	0	132	200
08:30 AM	0	0	0	0	0	0	0	0	70	11	0	81	0	163	0	163	244
Total Volume	0	0	0	0	0	0	0	0	271	65	0	336	0	534	0	534	870
% App. Total	0	0	0	0	0	0	0	0	80.7	19.3	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.816	.650	.000	.778	.000	.819	.000	.819	.891



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 C
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Weave to Esmond Street From North			Putnum Pike (Route 44) From East			I-295 NB Offramp From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
07:00 AM	0	0	0	0	0	0	1	4	0	0	6	0	11
07:15 AM	0	0	0	0	0	0	1	1	0	0	7	0	9
07:30 AM	0	0	0	0	0	0	4	0	0	0	7	0	11
07:45 AM	0	0	0	0	0	0	4	2	0	0	11	0	17
Total	0	0	0	0	0	0	10	7	0	0	31	0	48
08:00 AM	0	0	0	0	0	0	10	2	0	0	12	0	24
08:15 AM	0	0	0	0	0	0	2	3	0	0	5	0	10
08:30 AM	0	0	0	0	0	0	3	0	0	0	7	0	10
08:45 AM	0	0	0	0	0	0	1	0	0	0	6	0	7
Total	0	0	0	0	0	0	16	5	0	0	30	0	51
Grand Total	0	0	0	0	0	0	26	12	0	0	61	0	99
Apprch %	0	0	0	0	0	0	68.4	31.6	0	0	100	0	
Total %	0	0	0	0	0	0	26.3	12.1	0	0	61.6	0	

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	4	0	0	4	0	7	0	7	11
07:45 AM	0	0	0	0	0	0	0	0	4	2	0	6	0	11	0	11	17
08:00 AM	0	0	0	0	0	0	0	0	10	2	0	12	0	12	0	12	24
08:15 AM	0	0	0	0	0	0	0	0	2	3	0	5	0	5	0	5	10
Total Volume	0	0	0	0	0	0	0	0	20	7	0	27	0	35	0	35	62
% App. Total	0	0	0	0	0	0	0	0	74.1	25.9	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.500	.583	.000	.563	.000	.729	.000	.729	.646



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 C
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																	

Start Time	Weave to Esmond Street From North					Putnum Pike (Route 44) From East					I-295 NB Offramp From South					Putnum Pike (Route 44) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



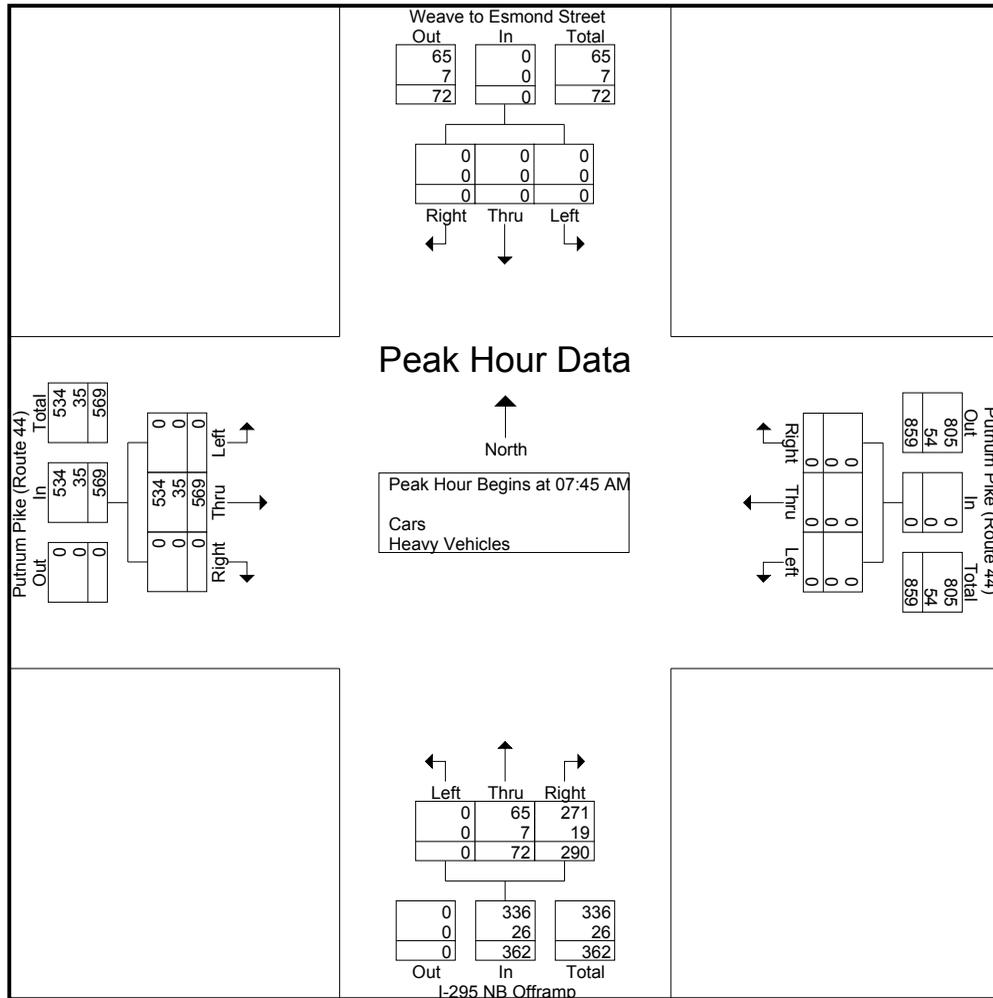
PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 C
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	0	0	0	87	27	0	114	0	143	0	143	257
08:00 AM	0	0	0	0	0	0	0	0	69	22	0	91	0	119	0	119	210
08:15 AM	0	0	0	0	0	0	0	0	61	12	0	73	0	137	0	137	210
08:30 AM	0	0	0	0	0	0	0	0	73	11	0	84	0	170	0	170	254
Total Volume	0	0	0	0	0	0	0	0	290	72	0	362	0	569	0	569	931
% App. Total	0	0	0	0	0	0	0	0	80.1	19.9	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.833	.667	.000	.794	.000	.837	.000	.837	.906
Cars	0	0	0	0	0	0	0	0	271	65	0	336	0	534	0	534	870
% Cars	0	0	0	0	0	0	0	0	93.4	90.3	0	92.8	0	93.8	0	93.8	93.4
Heavy Vehicles	0	0	0	0	0	0	0	0	19	7	0	26	0	35	0	35	61
% Heavy Vehicles	0	0	0	0	0	0	0	0	6.6	9.7	0	7.2	0	6.2	0	6.2	6.6





PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CC
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Weave to Esmond Street From North			Putnum Pike (Route 44) From East			I-295 NB Offramp From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
04:00 PM	0	0	0	0	0	0	100	37	0	0	238	0	375
04:15 PM	0	0	0	0	0	0	114	53	0	0	276	0	443
04:30 PM	0	0	0	0	0	0	130	51	0	0	295	0	476
04:45 PM	0	0	0	0	0	0	110	55	0	0	269	0	434
Total	0	0	0	0	0	0	454	196	0	0	1078	0	1728
05:00 PM	0	0	0	0	0	0	122	49	0	0	289	0	460
05:15 PM	0	0	0	0	2	0	174	54	0	0	303	0	533
05:30 PM	0	0	0	0	2	0	137	67	0	0	257	0	463
05:45 PM	0	0	0	0	0	0	76	23	0	0	259	0	358
Total	0	0	0	0	4	0	509	193	0	0	1108	0	1814
Grand Total	0	0	0	0	4	0	963	389	0	0	2186	0	3542
Apprch %	0	0	0	0	100	0	71.2	28.8	0	0	100	0	
Total %	0	0	0	0	0.1	0	27.2	11	0	0	61.7	0	
Cars	0	0	0	0	4	0	941	378	0	0	2162	0	3485
% Cars	0	0	0	0	100	0	97.7	97.2	0	0	98.9	0	98.4
Heavy Vehicles	0	0	0	0	0	0	22	11	0	0	24	0	57
% Heavy Vehicles	0	0	0	0	0	0	2.3	2.8	0	0	1.1	0	1.6

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	130	51	0	181	0	295	0	295	476
04:45 PM	0	0	0	0	0	0	0	0	110	55	0	165	0	269	0	269	434
05:00 PM	0	0	0	0	0	0	0	0	122	49	0	171	0	289	0	289	460
05:15 PM	0	0	0	0	0	2	0	2	174	54	0	228	0	303	0	303	533
Total Volume	0	0	0	0	0	2	0	2	536	209	0	745	0	1156	0	1156	1903
% App. Total	0	0	0	0	0	100	0	0	71.9	28.1	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.770	.950	.000	.817	.000	.954	.000	.954	.893
Cars	0	0	0	0	0	2	0	2	528	201	0	729	0	1143	0	1143	1874
% Cars	0	0	0	0	0	100	0	100	98.5	96.2	0	97.9	0	98.9	0	98.9	98.5
Heavy Vehicles	0	0	0	0	0	0	0	0	8	8	0	16	0	13	0	13	29
% Heavy Vehicles	0	0	0	0	0	0	0	0	1.5	3.8	0	2.1	0	1.1	0	1.1	1.5



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CC
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Cars

Start Time	Weave to Esmond Street From North			Putnum Pike (Route 44) From East			I-295 NB Offramp From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
04:00 PM	0	0	0	0	0	0	98	36	0	0	236	0	370
04:15 PM	0	0	0	0	0	0	107	52	0	0	272	0	431
04:30 PM	0	0	0	0	0	0	126	46	0	0	292	0	464
04:45 PM	0	0	0	0	0	0	110	55	0	0	267	0	432
Total	0	0	0	0	0	0	441	189	0	0	1067	0	1697
05:00 PM	0	0	0	0	0	0	120	46	0	0	288	0	454
05:15 PM	0	0	0	0	2	0	172	54	0	0	296	0	524
05:30 PM	0	0	0	0	2	0	135	67	0	0	253	0	457
05:45 PM	0	0	0	0	0	0	73	22	0	0	258	0	353
Total	0	0	0	0	4	0	500	189	0	0	1095	0	1788
Grand Total	0	0	0	0	4	0	941	378	0	0	2162	0	3485
Apprch %	0	0	0	0	100	0	71.3	28.7	0	0	100	0	
Total %	0	0	0	0	0.1	0	27	10.8	0	0	62	0	

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	126	46	0	172	0	292	0	292	464
04:45 PM	0	0	0	0	0	0	0	0	110	55	0	165	0	267	0	267	432
05:00 PM	0	0	0	0	0	0	0	0	120	46	0	166	0	288	0	288	454
05:15 PM	0	0	0	0	0	2	0	2	172	54	0	226	0	296	0	296	524
Total Volume	0	0	0	0	0	2	0	2	528	201	0	729	0	1143	0	1143	1874
% App. Total	0	0	0	0	0	100	0	0	72.4	27.6	0	0	0	100	0	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.767	.914	.000	.806	.000	.965	.000	.965	.894



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CC
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Weave to Esmond Street From North			Putnum Pike (Route 44) From East			I-295 NB Offramp From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
04:00 PM	0	0	0	0	0	0	2	1	0	0	2	0	5
04:15 PM	0	0	0	0	0	0	7	1	0	0	4	0	12
04:30 PM	0	0	0	0	0	0	4	5	0	0	3	0	12
04:45 PM	0	0	0	0	0	0	0	0	0	0	2	0	2
Total	0	0	0	0	0	0	13	7	0	0	11	0	31
05:00 PM	0	0	0	0	0	0	2	3	0	0	1	0	6
05:15 PM	0	0	0	0	0	0	2	0	0	0	7	0	9
05:30 PM	0	0	0	0	0	0	2	0	0	0	4	0	6
05:45 PM	0	0	0	0	0	0	3	1	0	0	1	0	5
Total	0	0	0	0	0	0	9	4	0	0	13	0	26
Grand Total	0	0	0	0	0	0	22	11	0	0	24	0	57
Apprch %	0	0	0	0	0	0	66.7	33.3	0	0	100	0	
Total %	0	0	0	0	0	0	38.6	19.3	0	0	42.1	0	

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	0	0	0	0	7	1	0	8	0	4	0	4	12
04:30 PM	0	0	0	0	0	0	0	0	4	5	0	9	0	3	0	3	12
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
05:00 PM	0	0	0	0	0	0	0	0	2	3	0	5	0	1	0	1	6
Total Volume	0	0	0	0	0	0	0	0	13	9	0	22	0	10	0	10	32
% App. Total	0	0	0	0	0	0	0	0	59.1	40.9	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.464	.450	.000	.611	.000	.625	.000	.625	.667



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CC
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																	

Start Time	Weave to Esmond Street From North					Putnum Pike (Route 44) From East					I-295 NB Offramp From South					Putnum Pike (Route 44) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



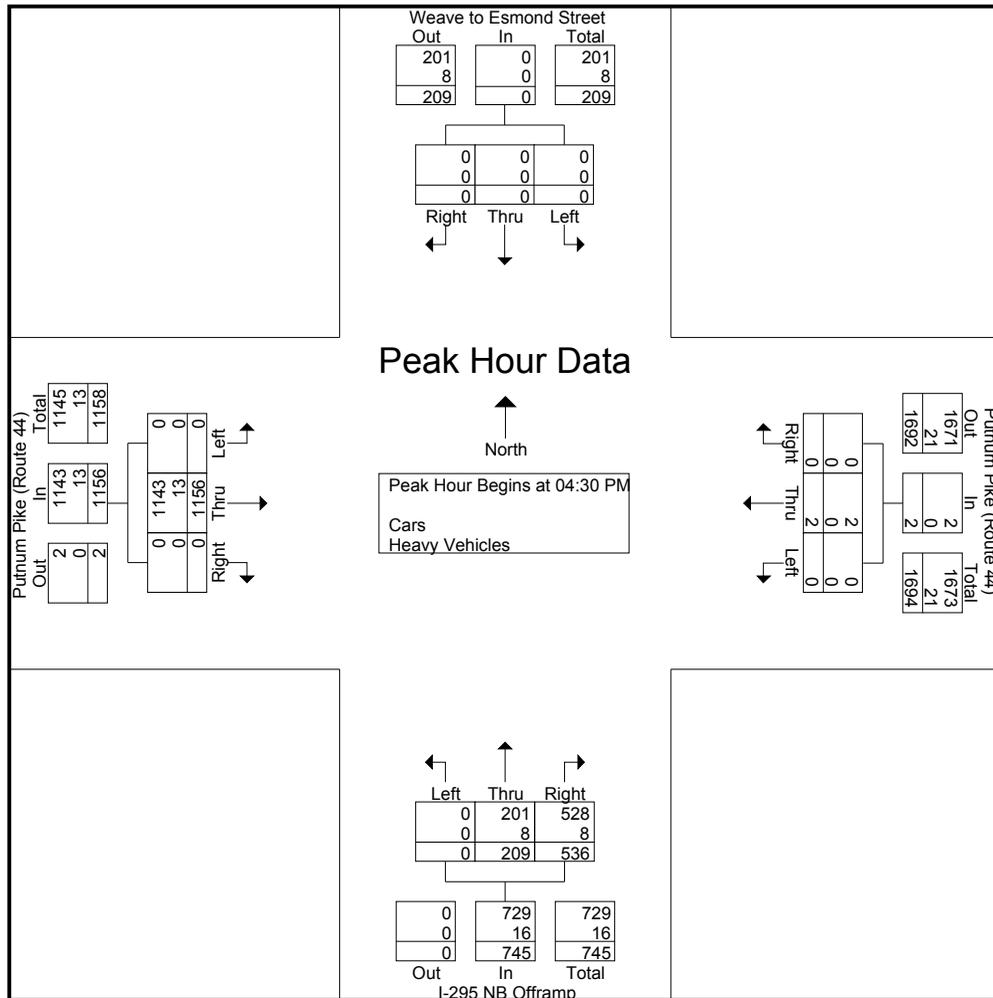
PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CC
Site Code : 017
Start Date : 12/20/2011
Page No : 1

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	130	51	0	181	0	295	0	295	476
04:45 PM	0	0	0	0	0	0	0	0	110	55	0	165	0	269	0	269	434
05:00 PM	0	0	0	0	0	0	0	0	122	49	0	171	0	289	0	289	460
05:15 PM	0	0	0	0	0	2	0	2	174	54	0	228	0	303	0	303	533
Total Volume	0	0	0	0	0	2	0	2	536	209	0	745	0	1156	0	1156	1903
% App. Total	0	0	0	0	0	100	0	0	71.9	28.1	0	0	0	100	0	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.770	.950	.000	.817	.000	.954	.000	.954	.893
Cars	0	0	0	0	0	2	0	2	528	201	0	729	0	1143	0	1143	1874
% Cars	0	0	0	0	0	100	0	100	98.5	96.2	0	97.9	0	98.9	0	98.9	98.5
Heavy Vehicles	0	0	0	0	0	0	0	0	8	8	0	16	0	13	0	13	29
% Heavy Vehicles	0	0	0	0	0	0	0	0	1.5	3.8	0	2.1	0	1.1	0	1.1	1.5





PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CCC
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Weave to Esmond Street From North			Putnum Pike (Route 44) From East			I-295 NB Offramp From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
11:00 AM	0	0	0	0	0	0	56	13	0	0	216	0	285
11:15 AM	0	0	0	0	0	0	64	21	0	0	203	0	288
11:30 AM	0	0	0	0	0	0	61	34	0	0	250	0	345
11:45 AM	0	0	0	0	0	0	57	37	0	0	245	0	339
Total	0	0	0	0	0	0	238	105	0	0	914	0	1257
12:00 PM	0	0	0	0	0	0	52	25	0	0	250	0	327
12:15 PM	0	0	0	0	0	0	57	21	0	0	218	0	296
12:30 PM	0	0	0	0	0	0	58	32	0	0	223	0	313
12:45 PM	0	0	0	0	0	0	71	33	0	0	245	0	349
Total	0	0	0	0	0	0	238	111	0	0	936	0	1285
Grand Total	0	0	0	0	0	0	476	216	0	0	1850	0	2542
Apprch %	0	0	0	0	0	0	68.8	31.2	0	0	100	0	
Total %	0	0	0	0	0	0	18.7	8.5	0	0	72.8	0	
Cars	0	0	0	0	0	0	467	211	0	0	1832	0	2510
% Cars	0	0	0	0	0	0	98.1	97.7	0	0	99	0	98.7
Heavy Vehicles	0	0	0	0	0	0	9	5	0	0	18	0	32
% Heavy Vehicles	0	0	0	0	0	0	1.9	2.3	0	0	1	0	1.3

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	0	0	0	0	0	0	0	0	61	34	0	95	0	250	0	250	345
11:45 AM	0	0	0	0	0	0	0	0	57	37	0	94	0	245	0	245	339
12:00 PM	0	0	0	0	0	0	0	0	52	25	0	77	0	250	0	250	327
12:15 PM	0	0	0	0	0	0	0	0	57	21	0	78	0	218	0	218	296
Total Volume	0	0	0	0	0	0	0	0	227	117	0	344	0	963	0	963	1307
% App. Total	0	0	0	0	0	0	0	0	66	34	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.930	.791	.000	.905	.000	.963	.000	.963	.947
Cars	0	0	0	0	0	0	0	0	223	113	0	336	0	958	0	958	1294
% Cars	0	0	0	0	0	0	0	0	98.2	96.6	0	97.7	0	99.5	0	99.5	99.0
Heavy Vehicles	0	0	0	0	0	0	0	0	4	4	0	8	0	5	0	5	13
% Heavy Vehicles	0	0	0	0	0	0	0	0	1.8	3.4	0	2.3	0	0.5	0	0.5	1.0



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CCC
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Cars

Start Time	Weave to Esmond Street From North			Putnum Pike (Route 44) From East			I-295 NB Offramp From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
11:00 AM	0	0	0	0	0	0	56	13	0	0	212	0	281
11:15 AM	0	0	0	0	0	0	63	20	0	0	199	0	282
11:30 AM	0	0	0	0	0	0	60	34	0	0	247	0	341
11:45 AM	0	0	0	0	0	0	55	35	0	0	244	0	334
Total	0	0	0	0	0	0	234	102	0	0	902	0	1238
12:00 PM	0	0	0	0	0	0	52	24	0	0	249	0	325
12:15 PM	0	0	0	0	0	0	56	20	0	0	218	0	294
12:30 PM	0	0	0	0	0	0	55	32	0	0	222	0	309
12:45 PM	0	0	0	0	0	0	70	33	0	0	241	0	344
Total	0	0	0	0	0	0	233	109	0	0	930	0	1272
Grand Total	0	0	0	0	0	0	467	211	0	0	1832	0	2510
Apprch %	0	0	0	0	0	0	68.9	31.1	0	0	100	0	
Total %	0	0	0	0	0	0	18.6	8.4	0	0	73	0	

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	0	0	0	0	0	0	0	0	60	34	0	94	0	247	0	247	341
11:45 AM	0	0	0	0	0	0	0	0	55	35	0	90	0	244	0	244	334
12:00 PM	0	0	0	0	0	0	0	0	52	24	0	76	0	249	0	249	325
12:15 PM	0	0	0	0	0	0	0	0	56	20	0	76	0	218	0	218	294
Total Volume	0	0	0	0	0	0	0	0	223	113	0	336	0	958	0	958	1294
% App. Total	0	0	0	0	0	0	0	0	66.4	33.6	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.929	.807	.000	.894	.000	.962	.000	.962	.949



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CCC
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Weave to Esmond Street From North			Putnum Pike (Route 44) From East			I-295 NB Offramp From South			Putnum Pike (Route 44) From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
11:00 AM	0	0	0	0	0	0	0	0	0	0	4	0	4
11:15 AM	0	0	0	0	0	0	1	1	0	0	4	0	6
11:30 AM	0	0	0	0	0	0	1	0	0	0	3	0	4
11:45 AM	0	0	0	0	0	0	2	2	0	0	1	0	5
Total	0	0	0	0	0	0	4	3	0	0	12	0	19
12:00 PM	0	0	0	0	0	0	0	1	0	0	1	0	2
12:15 PM	0	0	0	0	0	0	1	1	0	0	0	0	2
12:30 PM	0	0	0	0	0	0	3	0	0	0	1	0	4
12:45 PM	0	0	0	0	0	0	1	0	0	0	4	0	5
Total	0	0	0	0	0	0	5	2	0	0	6	0	13
Grand Total	0	0	0	0	0	0	9	5	0	0	18	0	32
Apprch %	0	0	0	0	0	0	64.3	35.7	0	0	100	0	
Total %	0	0	0	0	0	0	28.1	15.6	0	0	56.2	0	

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	4
11:15 AM	0	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4
11:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0	3
11:45 AM	0	0	0	0	0	0	0	0	0	2	2	0	4	0	1	0	1
Total Volume	0	0	0	0	0	0	0	0	0	4	3	0	7	0	12	0	12
% App. Total	0	0	0	0	0	0	0	0	0	57.1	42.9	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.375	.000	.438	.000	.750	.000	.792



PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CCC
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																	

Start Time	Weave to Esmond Street From North					Putnum Pike (Route 44) From East					I-295 NB Offramp From South					Putnum Pike (Route 44) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:00 AM																					
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



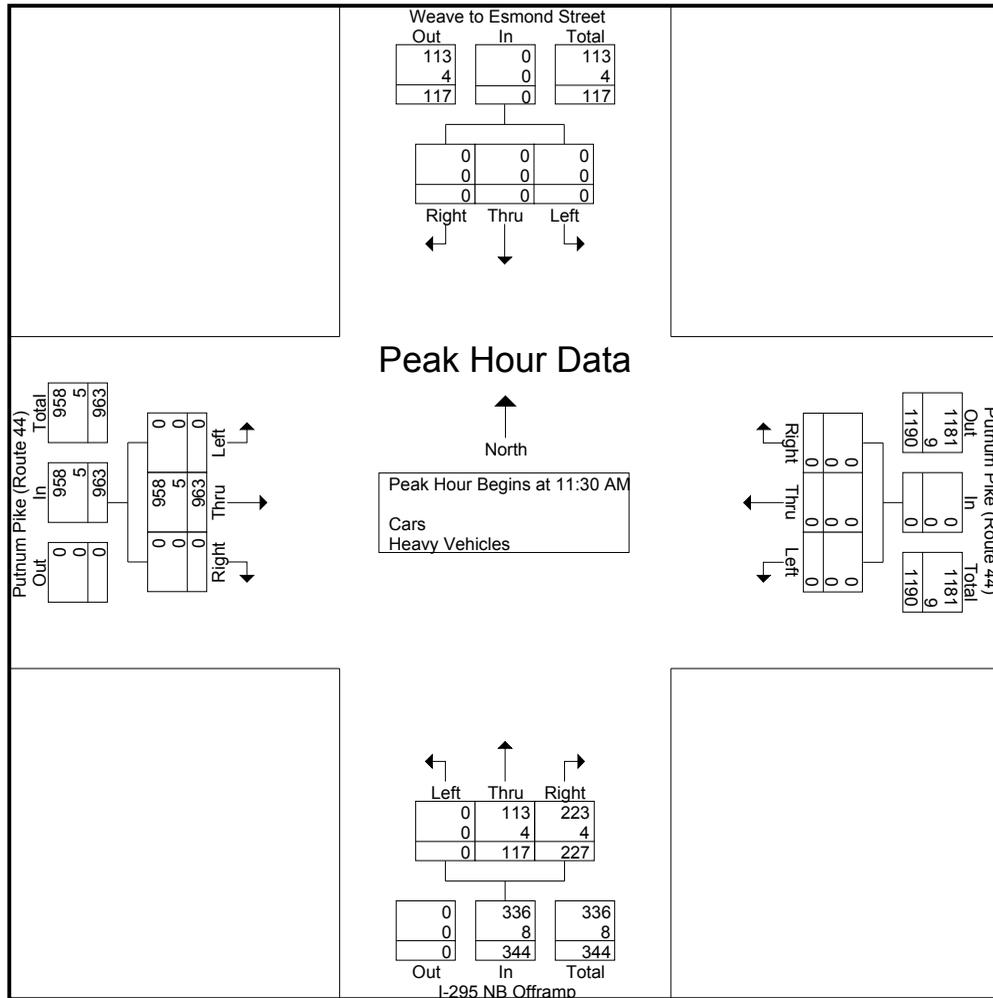
PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

I-295 NB Offramp weave to
Esmond Street NB
City, State: Smithfield, RI
Client: William Scully

File Name : 112739 CCC
Site Code : 017
Start Date : 12/17/2011
Page No : 1

Start Time	Weave to Esmond Street From North				Putnum Pike (Route 44) From East				I-295 NB Offramp From South				Putnum Pike (Route 44) From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	0	0	0	0	0	0	0	0	61	34	0	95	0	250	0	250	345
11:45 AM	0	0	0	0	0	0	0	0	57	37	0	94	0	245	0	245	339
12:00 PM	0	0	0	0	0	0	0	0	52	25	0	77	0	250	0	250	327
12:15 PM	0	0	0	0	0	0	0	0	57	21	0	78	0	218	0	218	296
Total Volume	0	0	0	0	0	0	0	0	227	117	0	344	0	963	0	963	1307
% App. Total	0	0	0	0	0	0	0	0	66	34	0	100	0	100	0	100	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.930	.791	.000	.905	.000	.963	.000	.963	.947
Cars	0	0	0	0	0	0	0	0	223	113	0	336	0	958	0	958	1294
% Cars	0	0	0	0	0	0	0	0	98.2	96.6	0	97.7	0	99.5	0	99.5	99.0
Heavy Vehicles	0	0	0	0	0	0	0	0	4	4	0	8	0	5	0	5	13
% Heavy Vehicles	0	0	0	0	0	0	0	0	1.8	3.4	0	2.3	0	0.5	0	0.5	1.0



Appendix

- **Trip Generation Calculations**

TRIP GENERATION WORKSHEET

LAND USE: *High Turnover (Sit Down) Restaurant*
 LAND USE CODE: 932 Independent Variable---1000 SF GFA
 PROJECT NAME: Smithfield Rt 44-Esmond Street Development
 PROJECT #: #017 Gross Floor Area (KSF): 7.1
 existing building

WEEKDAY

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	127.15	73.51	246.00	50%	50%	14
AM PEAK	11.52	2.83	25.60	52%	48%	18
PM PEAK	11.15	2.80	62.00	59%	41%	46
PK GEN AM	13.53	3.00	54.09	52%	48%	21
PK GEN PM	18.49	5.60	69.20	54%	46%	31

TRIPS:

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	903	452	452	<---- Not Given ---->		
AM PEAK	82	43	39	<---- Not Given ---->		
PM PEAK	79	47	32	<---- Not Given ---->		
PK GEN AM	96	50	46	<---- Not Given ---->		
PK GEN PM	131	71	60	<---- Not Given ---->		

SATURDAY

CAUTION - Use carefully - Small Sample Size

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	158.37	144.6	172.71	50%	50%	2
PEAK HR	14.07	4.44	50.4	53%	47%	8

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	1124	562	562	<---- Not Given ---->		
PEAK HR	100	53	47	<---- Not Given ---->		

SUNDAY

CAUTION - Use carefully - Small Sample Size

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	131.84	119.38	143.8	50%	50%	2
PEAK HR	18.46	9.79	43.2	55%	45%	3

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	936	468	468	<---- Not Given ---->		
PEAK HR	131	72	59	<---- Not Given ---->		

TRIP GENERATION WORKSHEET

LAND USE: *Shopping Center*
 LAND USE CODE: 820 Independent Variable---Trips per 1000 SF GLA
 PROJECT NAME: Smithfield Rt 44-Esmond Street Development
 PROJECT # : #017
 Gross Leasable Area (KSF): 79.1

NOTE: LOT 3

WEEKDAY

RATES:

	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	42.94	12.50	270.89	50%	50%	302
AM PEAK HOUR	1.00	0.10	9.05	61%	39%	101
PM PEAK HOUR	3.73	0.68	29.27	49%	51%	412

TRIPS:

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R ²
DAILY	3397	1699	1699	5831	2916	2916	0.78
AM PEAK	79	48	31	134	82	52	0.52
PM PEAK	295	145	150	544	267	277	0.81

SATURDAY

RATES:

	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	49.97	16.70	227.50	50%	50%	123
GEN PEAK HR	4.89	1.46	18.32	52%	48%	127

TRIPS:

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R ²
DAILY	3953	1977	1977	7971	3986	3986	0.82
PEAK HR	387	201	186	736	383	353	0.83

SUNDAY

RATES:

	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	25.24	4.15	148.15	50%	50%	77
PEAK HR	3.12	0.39	12.40	49%	51%	39

TRIPS:

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R ²
DAILY	1996	998	998	5451	2726	2726	0.52
PEAK HR	247	121	126	<---- NOT GIVEN ---->			

WEEKDAY - Christmas Season

RATES:

	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
PM PEAK HOUR	3.76	2.16	10.01	50%	50%	24

TRIPS:

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R ²
PM PEAK	297	149	149	676	338	338	0.68

SATURDAY - Christmas Season

RATES:

	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
GEN PEAK HR	5.88	4.33	7.57	51%	49%	10

TRIPS:

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R ²
PEAK HR	465	237	228	903	461	442	0.77

SOURCE: Trip Generation, 8th Edition, Institute of Transportation Engineers, 2008.

TRIP GENERATION WORKSHEET

LAND USE: *General Office Building*
 LAND USE CODE: 710 Independent Variable---1000 SF GFA
 PROJECT NAME: Smithfield Rt 44-Esmond Street Development
 PROJECT #: #017 Gross Floor Area (KSF): 60

NOTE: LOT 1

WEEKDAY

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	11.01	3.58	28.80	50%	50%	78
AM PEAK HR/GEN	1.55	0.60	5.98	88%	12%	217
PM PEAK HR/GEN	1.49	0.49	6.39	17%	83%	235

TRIPS:

BY AVERAGE			
Total	Enter	Exit	
DAILY	661	331	331
AM PEAK	93	82	11
PM PEAK	89	15	74

BY REGRESSION				
Total	Enter	Exit	R ²	
DAILY	900	450	450	0.80
AM PEAK	125	110	15	0.83
PM PEAK	146	25	121	0.82

SATURDAY

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	2.37	0.59	14.67	50%	50%	17
GEN PEAK HR	0.41	0.16	1.57	54%	46%	10

TRIPS:

BY AVERAGE			
Total	Enter	Exit	
DAILY	142	71	71
PEAK HR	25	14	12

BY REGRESSION				
Total	Enter	Exit	R ²	
DAILY	147	73	73	0.66
PEAK HR	24	13	11	0.59

SUNDAY

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	0.98	0.19	7.33	50%	50%	17
GEN PEAK HR	0.14	0.06	0.37	58%	42%	10

BY AVERAGE			
Total	Enter	Exit	
DAILY	59	30	30
PEAK HR	8	5	3

BY REGRESSION				
Total	Enter	Exit	R ²	
DAILY	46	23	23	0.66
PEAK HR	10	6	4	0.59

TRIP GENERATION WORKSHEET

LAND USE: *High Turnover (Sit Down) Restaurant*
 LAND USE CODE: 932 Independent Variable---1000 SF GFA
 PROJECT NAME: Smithfield Rt 44-Esmond Street Development
 PROJECT #: #017 Gross Floor Area (KSF): 6

WEEKDAY

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	127.15	73.51	246.00	50%	50%	14
AM PEAK	11.52	2.83	25.60	52%	48%	18
PM PEAK	11.15	2.80	62.00	59%	41%	46
PK GEN AM	13.53	3.00	54.09	52%	48%	21
PK GEN PM	18.49	5.60	69.20	54%	46%	31

TRIPS:

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	763	382	382	<---- Not Given ---->		
AM PEAK	69	36	33	<---- Not Given ---->		
PM PEAK	67	40	27	<---- Not Given ---->		
PK GEN AM	81	42	39	<---- Not Given ---->		
PK GEN PM	111	60	51	<---- Not Given ---->		

SATURDAY

CAUTION - Use carefully - Small Sample Size

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	158.37	144.6	172.71	50%	50%	2
PEAK HR	14.07	4.44	50.4	53%	47%	8

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	950	475	475	<---- Not Given ---->		
PEAK HR	84	45	39	<---- Not Given ---->		

SUNDAY

CAUTION - Use carefully - Small Sample Size

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	131.84	119.38	143.8	50%	50%	2
PEAK HR	18.46	9.79	43.2	55%	45%	3

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	791	396	396	<---- Not Given ---->		
PEAK HR	111	61	50	<---- Not Given ---->		

TRIP GENERATION WORKSHEET

LAND USE: *High Turnover (Sit Down) Restaurant*
 LAND USE CODE: 932 Independent Variable---1000 SF GFA
 PROJECT NAME: Smithfield Rt 44-Esmond Street Development
 PROJECT #: #017 Gross Floor Area (KSF): 4.6

WEEKDAY

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	127.15	73.51	246.00	50%	50%	14
AM PEAK	11.52	2.83	25.60	52%	48%	18
PM PEAK	11.15	2.80	62.00	59%	41%	46
PK GEN AM	13.53	3.00	54.09	52%	48%	21
PK GEN PM	18.49	5.60	69.20	54%	46%	31

TRIPS:

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	585	293	293	<---- Not Given ---->		
AM PEAK	53	28	25	<---- Not Given ---->		
PM PEAK	51	30	21	<---- Not Given ---->		
PK GEN AM	62	32	30	<---- Not Given ---->		
PK GEN PM	85	46	39	<---- Not Given ---->		

SATURDAY

CAUTION - Use carefully - Small Sample Size

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	158.37	144.6	172.71	50%	50%	2
PEAK HR	14.07	4.44	50.4	53%	47%	8

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	729	365	365	<---- Not Given ---->		
PEAK HR	65	34	31	<---- Not Given ---->		

SUNDAY

CAUTION - Use carefully - Small Sample Size

RATES:	Total Trip Ends			Directional Dist.		Number of Studies
	Average	Low	High	Enter	Exit	
DAILY	131.84	119.38	143.8	50%	50%	2
PEAK HR	18.46	9.79	43.2	55%	45%	3

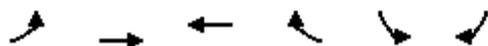
	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	606	303	303	<---- Not Given ---->		
PEAK HR	85	47	38	<---- Not Given ---->		

Appendix

- **LOS Calculations**

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

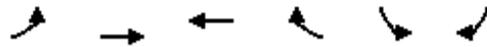
1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	241	632	536	12	47	556
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.997			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1616	3292	3373	0	1678	1516
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1616	3292	3373	0	1678	1516
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			3			75
Link Speed (mph)		45	45		35	
Link Distance (ft)		185	989		130	
Travel Time (s)		2.8	15.0		2.5	
Peak Hour Factor	0.87	0.87	0.90	0.90	0.93	0.93
Heavy Vehicles (%)	8%	6%	3%	10%	4%	3%
Adj. Flow (vph)	277	726	596	13	51	598
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	726	609	0	51	598
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011

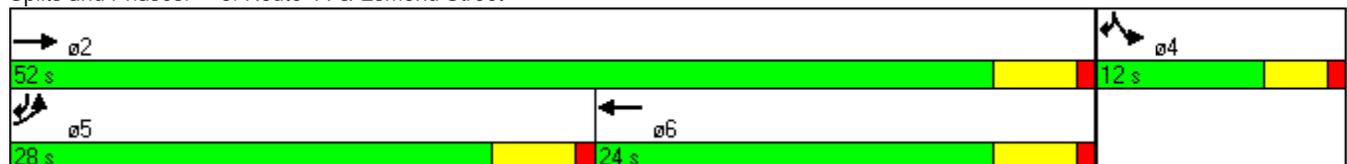


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	12.0	24.0	24.0		12.0	
Total Split (s)	28.0	52.0	24.0	0.0	12.0	40.0
Total Split (%)	43.8%	81.3%	37.5%	0.0%	18.8%	62.5%
Maximum Green (s)	23.0	47.0	19.0		8.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	18.7	47.0	23.3		8.0	31.7
Actuated g/C Ratio	0.29	0.73	0.36		0.12	0.50
v/c Ratio	0.59	0.30	0.50		0.24	0.76
Control Delay	23.7	3.3	18.8		28.6	17.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	23.7	3.3	18.8		28.6	17.6
LOS	C	A	B		C	B
Approach Delay		8.9	18.8		18.5	
Approach LOS		A	B		B	

Intersection Summary

Area Type:	Other
Cycle Length:	64
Actuated Cycle Length:	64
Natural Cycle:	55
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	14.3
Intersection LOS:	B
Intersection Capacity Utilization:	57.1%
ICU Level of Service:	B
Analysis Period (min):	15

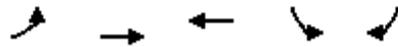
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	277	726	609	51	598
v/c Ratio	0.59	0.30	0.50	0.24	0.76
Control Delay	23.7	3.3	18.8	28.6	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	3.3	18.8	28.6	17.6
Queue Length 50th (ft)	86	37	100	18	139
Queue Length 95th (ft)	138	51	154	47	234
Internal Link Dist (ft)		105	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	581	2418	1230	210	886
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.48	0.30	0.50	0.24	0.67

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Route 44 & Esmond Street

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	241	632	536	12	47	556
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1616	3292	3372		1678	1516
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1616	3292	3372		1678	1516
Peak-hour factor, PHF	0.87	0.87	0.90	0.90	0.93	0.93
Adj. Flow (vph)	277	726	596	13	51	598
RTOR Reduction (vph)	0	0	2	0	0	39
Lane Group Flow (vph)	277	726	607	0	51	559
Heavy Vehicles (%)	8%	6%	3%	10%	4%	3%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	18.7	47.0	23.3		8.0	30.7
Effective Green, g (s)	18.7	47.0	23.3		8.0	30.7
Actuated g/C Ratio	0.29	0.73	0.36		0.12	0.48
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	472	2418	1228		210	727
v/s Ratio Prot	0.17	0.22	c0.18		0.03	c0.37
v/s Ratio Perm						
v/c Ratio	0.59	0.30	0.49		0.24	0.77
Uniform Delay, d1	19.3	2.9	15.8		25.3	13.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.7	0.3	1.4		0.4	4.7
Delay (s)	21.1	3.2	17.2		25.7	18.4
Level of Service	C	A	B		C	B
Approach Delay (s)		8.2	17.2		19.0	
Approach LOS		A	B		B	

Intersection Summary			
HCM Average Control Delay		13.7	HCM Level of Service B
HCM Volume to Capacity ratio		0.64	
Actuated Cycle Length (s)		64.0	Sum of lost time (s) 9.0
Intersection Capacity Utilization		57.1%	ICU Level of Service B
Analysis Period (min)		15	
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

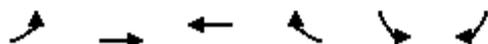
9: Esmond Street & Dean Avenue

1/13/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	64	156	14	3	313	20	40	17	158	45	39	17
Peak Hour Factor	0.86	0.86	0.86	0.88	0.88	0.88	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	74	181	16	3	356	23	52	22	205	58	51	22
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	272	382	279	131								
Volume Left (vph)	74	3	52	58								
Volume Right (vph)	16	23	205	22								
Hadj (s)	0.16	0.03	-0.32	0.05								
Departure Headway (s)	6.1	5.8	5.8	6.5								
Degree Utilization, x	0.46	0.61	0.45	0.24								
Capacity (veh/h)	545	595	554	464								
Control Delay (s)	14.1	17.4	13.5	11.6								
Approach Delay (s)	14.1	17.4	13.5	11.6								
Approach LOS	B	C	B	B								
Intersection Summary												
Delay			14.8									
HCM Level of Service			B									
Intersection Capacity Utilization			54.0%	ICU Level of Service	A							
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

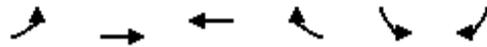
1/13/2012



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	609	1238	604	35	58	473
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.992			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1711	3421	3398	0	1745	1546
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1711	3421	3398	0	1745	1546
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			9			62
Link Speed (mph)		45	45		35	
Link Distance (ft)		185	989		130	
Travel Time (s)		2.8	15.0		2.5	
Peak Hour Factor	0.89	0.89	0.95	0.95	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	0%	0%	1%
Adj. Flow (vph)	684	1391	636	37	64	520
Shared Lane Traffic (%)						
Lane Group Flow (vph)	684	1391	673	0	64	520
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2012

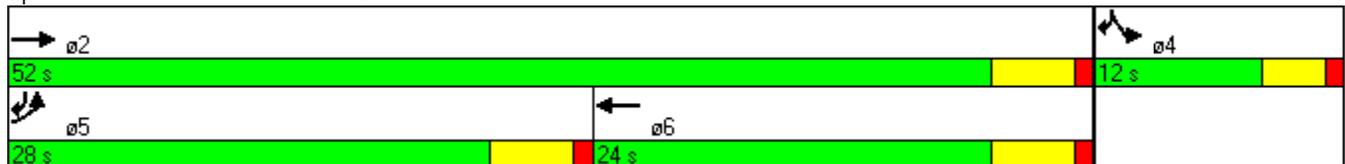


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	28.0	52.0	24.0		12.0	
Total Split (s)	28.0	52.0	24.0	0.0	12.0	40.0
Total Split (%)	43.8%	81.3%	37.5%	0.0%	18.8%	62.5%
Maximum Green (s)	23.0	47.0	19.0		8.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	23.0	47.0	19.0		8.0	36.0
Actuated g/C Ratio	0.36	0.73	0.30		0.12	0.56
v/c Ratio	1.11	0.55	0.66		0.29	0.58
Control Delay	94.9	4.8	23.2		29.4	11.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	94.9	4.8	23.2		29.4	11.1
LOS	F	A	C		C	B
Approach Delay		34.5	23.2		13.1	
Approach LOS		C	C		B	

Intersection Summary

Area Type:	Other
Cycle Length:	64
Actuated Cycle Length:	64
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.11
Intersection Signal Delay:	28.5
Intersection LOS:	C
Intersection Capacity Utilization:	68.2%
ICU Level of Service:	C
Analysis Period (min):	15

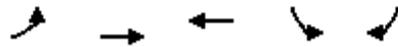
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2012



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	684	1391	673	64	520
v/c Ratio	1.11	0.55	0.66	0.29	0.58
Control Delay	94.9	4.8	23.2	29.4	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	94.9	4.8	23.2	29.4	11.1
Queue Length 50th (ft)	~314	94	117	23	102
Queue Length 95th (ft)	#491	127	171	56	184
Internal Link Dist (ft)		105	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	615	2512	1015	218	897
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.11	0.55	0.66	0.29	0.58

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Route 44 & Esmond Street

1/13/2012



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	609	1238	604	35	58	473
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3397		1745	1546
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1711	3421	3397		1745	1546
Peak-hour factor, PHF	0.89	0.89	0.95	0.95	0.91	0.91
Adj. Flow (vph)	684	1391	636	37	64	520
RTOR Reduction (vph)	0	0	6	0	0	28
Lane Group Flow (vph)	684	1391	667	0	64	492
Heavy Vehicles (%)	2%	2%	2%	0%	0%	1%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	23.0	47.0	19.0		8.0	35.0
Effective Green, g (s)	23.0	47.0	19.0		8.0	35.0
Actuated g/C Ratio	0.36	0.73	0.30		0.12	0.55
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	615	2512	1008		218	845
v/s Ratio Prot	c0.40	0.41	c0.20		0.04	c0.32
v/s Ratio Perm						
v/c Ratio	1.11	0.55	0.66		0.29	0.58
Uniform Delay, d1	20.5	3.8	19.7		25.4	9.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	71.1	0.9	3.4		0.5	0.9
Delay (s)	91.6	4.7	23.1		26.0	10.5
Level of Service	F	A	C		C	B
Approach Delay (s)		33.3	23.1		12.2	
Approach LOS		C	C		B	

Intersection Summary

HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

9: Esmond Street & Dean Avenue

1/13/2012

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	178	374	57	24	291	42	35	31	78	30	49	52
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.88	0.88	0.88	0.71	0.71	0.71
Hourly flow rate (vph)	193	407	62	27	323	47	40	35	89	42	69	73
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	662	397	164	185								
Volume Left (vph)	193	27	40	42								
Volume Right (vph)	62	47	89	73								
Hadj (s)	0.04	-0.04	-0.25	-0.18								
Departure Headway (s)	6.1	6.3	7.1	7.1								
Degree Utilization, x	1.11	0.69	0.32	0.37								
Capacity (veh/h)	596	555	454	468								
Control Delay (s)	95.2	22.1	13.5	14.2								
Approach Delay (s)	95.2	22.1	13.5	14.2								
Approach LOS	F	C	B	B								
Intersection Summary												
Delay			54.5									
HCM Level of Service			F									
Intersection Capacity Utilization			73.6%	ICU Level of Service	D							
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

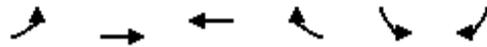
1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	387	891	941	36	48	536
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.994			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1711	3455	3436	0	1711	1546
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1711	3455	3436	0	1711	1546
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			11
Link Speed (mph)		45	45		35	
Link Distance (ft)		185	989		130	
Travel Time (s)		2.8	15.0		2.5	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.87	0.87
Heavy Vehicles (%)	2%	1%	1%	0%	2%	1%
Adj. Flow (vph)	425	979	991	38	55	616
Shared Lane Traffic (%)						
Lane Group Flow (vph)	425	979	1029	0	55	616
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011

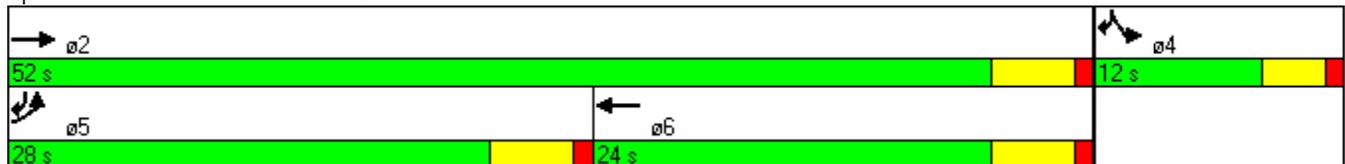


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	28.0	24.0	24.0		12.0	
Total Split (s)	28.0	52.0	24.0	0.0	12.0	40.0
Total Split (%)	43.8%	81.3%	37.5%	0.0%	18.8%	62.5%
Maximum Green (s)	23.0	47.0	19.0		8.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.7	2.7	2.7		2.4	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	20.1	47.0	21.9		8.0	33.1
Actuated g/C Ratio	0.31	0.73	0.34		0.12	0.52
v/c Ratio	0.79	0.39	0.87		0.26	0.77
Control Delay	31.1	3.7	32.3		28.8	18.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	31.1	3.7	32.3		28.8	18.9
LOS	C	A	C		C	B
Approach Delay		12.0	32.3		19.7	
Approach LOS		B	C		B	

Intersection Summary

Area Type:	Other
Cycle Length:	64
Actuated Cycle Length:	64
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	20.4
Intersection LOS:	C
Intersection Capacity Utilization:	67.8%
ICU Level of Service:	C
Analysis Period (min):	15

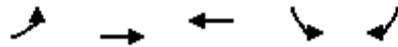
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	425	979	1029	55	616
v/c Ratio	0.79	0.39	0.87	0.26	0.77
Control Delay	31.1	3.7	32.3	28.8	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	3.7	32.3	28.8	18.9
Queue Length 50th (ft)	140	55	204	20	158
Queue Length 95th (ft)	231	76	#341	48	250
Internal Link Dist (ft)		105	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	615	2537	1178	214	874
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.69	0.39	0.87	0.26	0.70

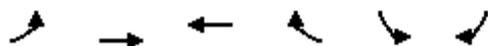
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Route 44 & Esmond Street

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	387	891	941	36	48	536
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3455	3437		1711	1546
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1711	3455	3437		1711	1546
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.87	0.87
Adj. Flow (vph)	425	979	991	38	55	616
RTOR Reduction (vph)	0	0	4	0	0	5
Lane Group Flow (vph)	425	979	1025	0	55	611
Heavy Vehicles (%)	2%	1%	1%	0%	2%	1%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	20.1	47.0	21.9		8.0	32.1
Effective Green, g (s)	20.1	47.0	21.9		8.0	32.1
Actuated g/C Ratio	0.31	0.73	0.34		0.12	0.50
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.7	2.7	2.7		2.4	
Lane Grp Cap (vph)	537	2537	1176		214	775
v/s Ratio Prot	0.25	0.28	c0.30		0.03	c0.39
v/s Ratio Perm						
v/c Ratio	0.79	0.39	0.87		0.26	0.79
Uniform Delay, d1	20.0	3.2	19.7		25.3	13.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	7.7	0.4	9.0		0.4	5.1
Delay (s)	27.7	3.6	28.7		25.7	18.2
Level of Service	C	A	C		C	B
Approach Delay (s)		10.9	28.7		18.9	
Approach LOS		B	C		B	

Intersection Summary

HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

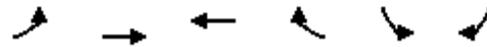
9: Esmond Street & Dean Avenue

1/13/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	102	266	43	19	403	42	28	25	128	39	42	44
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.89	0.89	0.89	0.80	0.80	0.80
Hourly flow rate (vph)	107	280	45	20	429	45	31	28	144	49	52	55
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	433	494	203	156								
Volume Left (vph)	107	20	31	49								
Volume Right (vph)	45	45	144	55								
Hadj (s)	0.02	-0.03	-0.35	-0.12								
Departure Headway (s)	6.2	6.0	6.8	7.2								
Degree Utilization, x	0.75	0.83	0.38	0.31								
Capacity (veh/h)	556	574	466	436								
Control Delay (s)	25.1	31.7	14.0	13.4								
Approach Delay (s)	25.1	31.7	14.0	13.4								
Approach LOS	D	D	B	B								
Intersection Summary												
Delay			24.5									
HCM Level of Service			C									
Intersection Capacity Utilization			69.9%	ICU Level of Service	C							
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

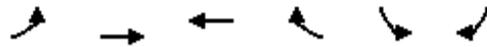
1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	260	706	601	23	60	596
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.994			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1616	3292	3359	0	1678	1516
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1616	3292	3359	0	1678	1516
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			53
Link Speed (mph)		45	45		35	
Link Distance (ft)		185	989		130	
Travel Time (s)		2.8	15.0		2.5	
Peak Hour Factor	0.87	0.87	0.90	0.90	0.93	0.93
Heavy Vehicles (%)	8%	6%	3%	10%	4%	3%
Adj. Flow (vph)	299	811	668	26	65	641
Shared Lane Traffic (%)						
Lane Group Flow (vph)	299	811	694	0	65	641
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011

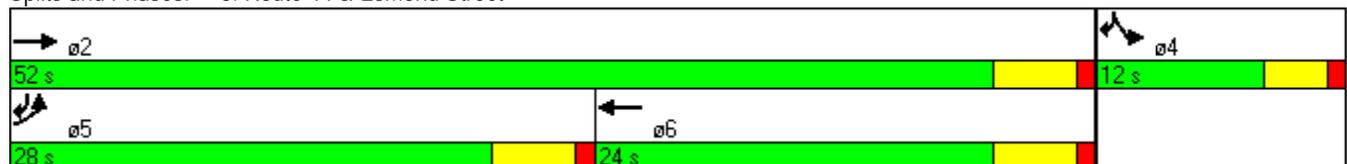


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	12.0	24.0	24.0		12.0	
Total Split (s)	28.0	52.0	24.0	0.0	12.0	40.0
Total Split (%)	43.8%	81.3%	37.5%	0.0%	18.8%	62.5%
Maximum Green (s)	23.0	47.0	19.0		8.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	20.1	47.0	21.9		8.0	33.1
Actuated g/C Ratio	0.31	0.73	0.34		0.12	0.52
v/c Ratio	0.59	0.34	0.60		0.31	0.79
Control Delay	23.0	3.4	20.9		29.9	19.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	23.0	3.4	20.9		29.9	19.4
LOS	C	A	C		C	B
Approach Delay		8.7	20.9		20.4	
Approach LOS		A	C		C	

Intersection Summary

Area Type:	Other
Cycle Length:	64
Actuated Cycle Length:	64
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	15.4
Intersection LOS:	B
Intersection Capacity Utilization:	61.7%
ICU Level of Service:	B
Analysis Period (min):	15

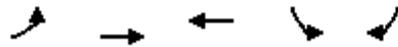
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	299	811	694	65	641
v/c Ratio	0.59	0.34	0.60	0.31	0.79
Control Delay	23.0	3.4	20.9	29.9	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	3.4	20.9	29.9	19.4
Queue Length 50th (ft)	90	43	122	24	154
Queue Length 95th (ft)	149	58	178	56	279
Internal Link Dist (ft)		105	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	581	2418	1154	210	876
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.51	0.34	0.60	0.31	0.73

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Route 44 & Esmond Street

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶		↶	↷
Volume (vph)	260	706	601	23	60	596
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1616	3292	3360		1678	1516
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1616	3292	3360		1678	1516
Peak-hour factor, PHF	0.87	0.87	0.90	0.90	0.93	0.93
Adj. Flow (vph)	299	811	668	26	65	641
RTOR Reduction (vph)	0	0	4	0	0	26
Lane Group Flow (vph)	299	811	690	0	65	615
Heavy Vehicles (%)	8%	6%	3%	10%	4%	3%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	20.1	47.0	21.9		8.0	32.1
Effective Green, g (s)	20.1	47.0	21.9		8.0	32.1
Actuated g/C Ratio	0.31	0.73	0.34		0.12	0.50
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	508	2418	1150		210	760
v/s Ratio Prot	0.19	0.25	c0.21		0.04	c0.41
v/s Ratio Perm						
v/c Ratio	0.59	0.34	0.60		0.31	0.81
Uniform Delay, d1	18.5	3.0	17.4		25.5	13.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.4	2.3		0.6	6.2
Delay (s)	20.1	3.4	19.7		26.1	19.5
Level of Service	C	A	B		C	B
Approach Delay (s)		7.9	19.7		20.1	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay		14.6	HCM Level of Service B
HCM Volume to Capacity ratio		0.71	
Actuated Cycle Length (s)		64.0	Sum of lost time (s) 9.0
Intersection Capacity Utilization		61.7%	ICU Level of Service B
Analysis Period (min)		15	
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

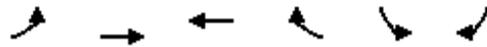
9: Esmond Street & Dean Avenue

1/13/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	72	176	15	3	343	21	42	18	172	48	44	18
Peak Hour Factor	0.86	0.86	0.86	0.88	0.88	0.88	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	84	205	17	3	390	24	55	23	223	62	57	23
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	306	417	301	143								
Volume Left (vph)	84	3	55	62								
Volume Right (vph)	17	24	223	23								
Hadj (s)	0.16	0.04	-0.33	0.05								
Departure Headway (s)	6.4	6.1	6.2	7.0								
Degree Utilization, x	0.55	0.71	0.52	0.28								
Capacity (veh/h)	518	558	524	426								
Control Delay (s)	16.9	22.3	15.7	12.7								
Approach Delay (s)	16.9	22.3	15.7	12.7								
Approach LOS	C	C	C	B								
Intersection Summary												
Delay			18.0									
HCM Level of Service			C									
Intersection Capacity Utilization			58.4%	ICU Level of Service	B							
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

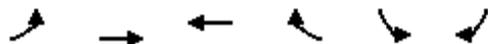
1/13/2012



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	650	1349	676	41	67	508
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.991			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1711	3421	3394	0	1745	1546
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1711	3421	3394	0	1745	1546
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			10			43
Link Speed (mph)		45	45		35	
Link Distance (ft)		185	989		130	
Travel Time (s)		2.8	15.0		2.5	
Peak Hour Factor	0.89	0.89	0.95	0.95	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	0%	0%	1%
Adj. Flow (vph)	730	1516	712	43	74	558
Shared Lane Traffic (%)						
Lane Group Flow (vph)	730	1516	755	0	74	558
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2012

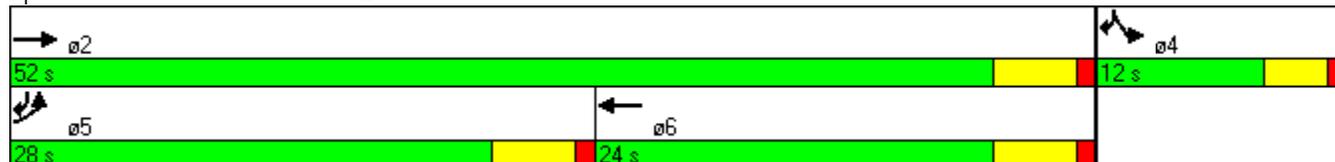


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	28.0	52.0	24.0		12.0	
Total Split (s)	28.0	52.0	24.0	0.0	12.0	40.0
Total Split (%)	43.8%	81.3%	37.5%	0.0%	18.8%	62.5%
Maximum Green (s)	23.0	47.0	19.0		8.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	23.0	47.0	19.0		8.0	36.0
Actuated g/C Ratio	0.36	0.73	0.30		0.12	0.56
v/c Ratio	1.19	0.60	0.74		0.34	0.63
Control Delay	123.4	5.3	25.4		30.4	12.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	123.4	5.3	25.4		30.4	12.6
LOS	F	A	C		C	B
Approach Delay		43.7	25.4		14.7	
Approach LOS		D	C		B	

Intersection Summary

Area Type:	Other
Cycle Length:	64
Actuated Cycle Length:	64
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.19
Intersection Signal Delay:	34.8
Intersection LOS:	C
Intersection Capacity Utilization:	72.7%
ICU Level of Service:	C
Analysis Period (min):	15

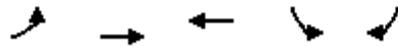
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2012



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	730	1516	755	74	558
v/c Ratio	1.19	0.60	0.74	0.34	0.63
Control Delay	123.4	5.3	25.4	30.4	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	123.4	5.3	25.4	30.4	12.6
Queue Length 50th (ft)	~352	110	136	27	120
Queue Length 95th (ft)	#533	148	195	62	215
Internal Link Dist (ft)		105	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	615	2512	1015	218	888
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.19	0.60	0.74	0.34	0.63

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Route 44 & Esmond Street

1/13/2012



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗↗	↖↗		↖	↗
Volume (vph)	650	1349	676	41	67	508
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3396		1745	1546
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1711	3421	3396		1745	1546
Peak-hour factor, PHF	0.89	0.89	0.95	0.95	0.91	0.91
Adj. Flow (vph)	730	1516	712	43	74	558
RTOR Reduction (vph)	0	0	7	0	0	19
Lane Group Flow (vph)	730	1516	748	0	74	539
Heavy Vehicles (%)	2%	2%	2%	0%	0%	1%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	23.0	47.0	19.0		8.0	35.0
Effective Green, g (s)	23.0	47.0	19.0		8.0	35.0
Actuated g/C Ratio	0.36	0.73	0.30		0.12	0.55
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	615	2512	1008		218	845
v/s Ratio Prot	c0.43	0.44	c0.22		0.04	c0.35
v/s Ratio Perm						
v/c Ratio	1.19	0.60	0.74		0.34	0.64
Uniform Delay, d1	20.5	4.1	20.3		25.6	10.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	99.8	1.1	4.9		0.7	1.4
Delay (s)	120.3	5.1	25.2		26.3	11.5
Level of Service	F	A	C		C	B
Approach Delay (s)		42.6	25.2		13.2	
Approach LOS		D	C		B	

Intersection Summary

HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

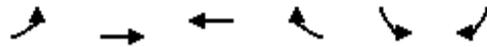
9: Esmond Street & Dean Avenue

1/13/2012

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	189	402	61	25	316	45	37	33	86	32	52	55
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.88	0.88	0.88	0.71	0.71	0.71
Hourly flow rate (vph)	205	437	66	28	351	50	42	38	98	45	73	77
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	709	429	177	196								
Volume Left (vph)	205	28	42	45								
Volume Right (vph)	66	50	98	77								
Hadj (s)	0.04	-0.04	-0.26	-0.18								
Departure Headway (s)	6.3	6.4	7.3	7.3								
Degree Utilization, x	1.24	0.77	0.36	0.40								
Capacity (veh/h)	579	545	443	453								
Control Delay (s)	144.6	27.6	14.4	15.1								
Approach Delay (s)	144.6	27.6	14.4	15.1								
Approach LOS	F	D	B	C								
Intersection Summary												
Delay			79.3									
HCM Level of Service			F									
Intersection Capacity Utilization			78.3%		ICU Level of Service	D						
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	413	980	1038	48	61	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1711	3455	3432	0	1711	1546
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1711	3455	3432	0	1711	1546
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			7			7
Link Speed (mph)		45	45		35	
Link Distance (ft)		185	989		130	
Travel Time (s)		2.8	15.0		2.5	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.87	0.87
Heavy Vehicles (%)	2%	1%	1%	0%	2%	1%
Adj. Flow (vph)	454	1077	1093	51	70	661
Shared Lane Traffic (%)						
Lane Group Flow (vph)	454	1077	1144	0	70	661
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011

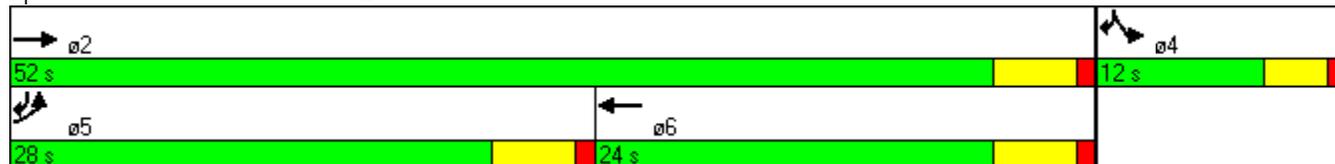


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	28.0	24.0	24.0		12.0	
Total Split (s)	28.0	52.0	24.0	0.0	12.0	40.0
Total Split (%)	43.8%	81.3%	37.5%	0.0%	18.8%	62.5%
Maximum Green (s)	23.0	47.0	19.0		8.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.7	2.7	2.7		2.4	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	20.9	47.0	21.1		8.0	33.9
Actuated g/C Ratio	0.33	0.73	0.33		0.12	0.53
v/c Ratio	0.81	0.42	1.01		0.33	0.80
Control Delay	32.3	3.9	54.8		30.2	20.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	32.3	3.9	54.8		30.2	20.9
LOS	C	A	D		C	C
Approach Delay		12.3	54.8		21.8	
Approach LOS		B	D		C	

Intersection Summary

Area Type:	Other
Cycle Length:	64
Actuated Cycle Length:	64
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	28.6
Intersection LOS:	C
Intersection Capacity Utilization:	73.3%
ICU Level of Service:	D
Analysis Period (min):	15

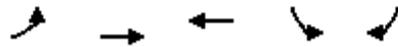
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	454	1077	1144	70	661
v/c Ratio	0.81	0.42	1.01	0.33	0.80
Control Delay	32.3	3.9	54.8	30.2	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	3.9	54.8	30.2	20.9
Queue Length 50th (ft)	150	62	~277	25	174
Queue Length 95th (ft)	#282	87	#396	58	287
Internal Link Dist (ft)		105	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	615	2537	1134	214	873
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.74	0.42	1.01	0.33	0.76

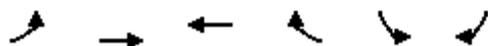
Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Route 44 & Esmond Street

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	413	980	1038	48	61	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3455	3434		1711	1546
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1711	3455	3434		1711	1546
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.87	0.87
Adj. Flow (vph)	454	1077	1093	51	70	661
RTOR Reduction (vph)	0	0	5	0	0	3
Lane Group Flow (vph)	454	1077	1139	0	70	658
Heavy Vehicles (%)	2%	1%	1%	0%	2%	1%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	20.9	47.0	21.1		8.0	32.9
Effective Green, g (s)	20.9	47.0	21.1		8.0	32.9
Actuated g/C Ratio	0.33	0.73	0.33		0.12	0.51
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.7	2.7	2.7		2.4	
Lane Grp Cap (vph)	559	2537	1132		214	795
v/s Ratio Prot	0.27	0.31	c0.33		0.04	c0.43
v/s Ratio Perm						
v/c Ratio	0.81	0.42	1.01		0.33	0.83
Uniform Delay, d1	19.8	3.3	21.4		25.5	13.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	8.7	0.5	28.3		0.6	6.9
Delay (s)	28.4	3.8	49.8		26.1	20.0
Level of Service	C	A	D		C	C
Approach Delay (s)		11.1	49.8		20.6	
Approach LOS		B	D		C	

Intersection Summary			
HCM Average Control Delay		26.1	HCM Level of Service C
HCM Volume to Capacity ratio		0.88	
Actuated Cycle Length (s)		64.0	Sum of lost time (s) 9.0
Intersection Capacity Utilization		73.3%	ICU Level of Service D
Analysis Period (min)		15	
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

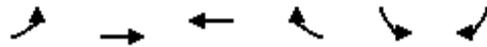
9: Esmond Street & Dean Avenue

1/13/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	108	284	46	20	440	45	30	27	139	41	45	47
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.89	0.89	0.89	0.80	0.80	0.80
Hourly flow rate (vph)	114	299	48	21	468	48	34	30	156	51	56	59
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	461	537	220	166								
Volume Left (vph)	114	21	34	51								
Volume Right (vph)	48	48	156	59								
Hadj (s)	0.02	-0.03	-0.35	-0.12								
Departure Headway (s)	6.7	6.5	7.4	7.8								
Degree Utilization, x	0.85	0.96	0.45	0.36								
Capacity (veh/h)	534	537	453	429								
Control Delay (s)	36.8	54.8	16.2	15.2								
Approach Delay (s)	36.8	54.8	16.2	15.2								
Approach LOS	E	F	C	C								
Intersection Summary												
Delay			37.9									
HCM Level of Service			E									
Intersection Capacity Utilization			74.4%	ICU Level of Service	D							
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

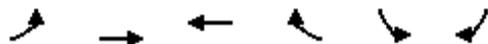
1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	306	688	623	89	115	612
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.981			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1616	3292	3296	0	1678	1516
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1616	3292	3296	0	1678	1516
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			25			48
Link Speed (mph)		45	45		35	
Link Distance (ft)		185	989		576	
Travel Time (s)		2.8	15.0		11.2	
Peak Hour Factor	0.87	0.87	0.90	0.90	0.93	0.93
Heavy Vehicles (%)	8%	6%	3%	10%	4%	3%
Adj. Flow (vph)	352	791	692	99	124	658
Shared Lane Traffic (%)						
Lane Group Flow (vph)	352	791	791	0	124	658
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011

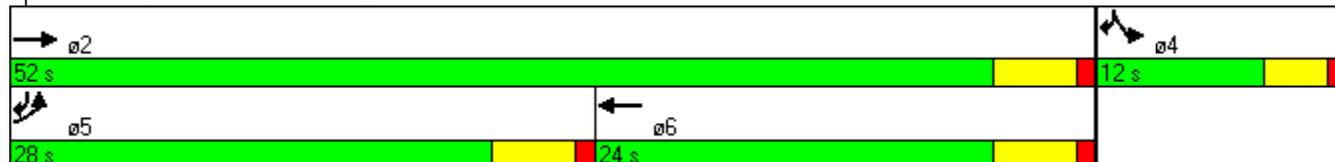


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	12.0	24.0	24.0		12.0	
Total Split (s)	28.0	52.0	24.0	0.0	12.0	40.0
Total Split (%)	43.8%	81.3%	37.5%	0.0%	18.8%	62.5%
Maximum Green (s)	23.0	47.0	19.0		8.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	20.6	47.0	21.4		8.0	33.6
Actuated g/C Ratio	0.32	0.73	0.33		0.12	0.52
v/c Ratio	0.68	0.33	0.71		0.59	0.80
Control Delay	25.5	3.4	23.4		39.8	20.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	25.5	3.4	23.4		39.8	20.1
LOS	C	A	C		D	C
Approach Delay		10.2	23.4		23.3	
Approach LOS		B	C		C	

Intersection Summary

Area Type:	Other
Cycle Length:	64
Actuated Cycle Length:	64
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.80
Intersection Signal Delay:	17.8
Intersection LOS:	B
Intersection Capacity Utilization:	65.5%
ICU Level of Service:	C
Analysis Period (min):	15

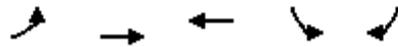
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	352	791	791	124	658
v/c Ratio	0.68	0.33	0.71	0.59	0.80
Control Delay	25.5	3.4	23.4	39.8	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	3.4	23.4	39.8	20.1
Queue Length 50th (ft)	110	41	143	47	161
Queue Length 95th (ft)	180	57	#215	#109	#300
Internal Link Dist (ft)		105	909	496	
Turn Bay Length (ft)					
Base Capacity (vph)	581	2418	1119	210	874
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.61	0.33	0.71	0.59	0.75

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Route 44 & Esmond Street

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗↗	↖↗		↖	↗
Volume (vph)	306	688	623	89	115	612
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1616	3292	3296		1678	1516
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1616	3292	3296		1678	1516
Peak-hour factor, PHF	0.87	0.87	0.90	0.90	0.93	0.93
Adj. Flow (vph)	352	791	692	99	124	658
RTOR Reduction (vph)	0	0	17	0	0	24
Lane Group Flow (vph)	352	791	774	0	124	634
Heavy Vehicles (%)	8%	6%	3%	10%	4%	3%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	20.6	47.0	21.4		8.0	32.6
Effective Green, g (s)	20.6	47.0	21.4		8.0	32.6
Actuated g/C Ratio	0.32	0.73	0.33		0.12	0.51
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	520	2418	1102		210	772
v/s Ratio Prot	0.22	0.24	c0.23		0.07	c0.42
v/s Ratio Perm						
v/c Ratio	0.68	0.33	0.70		0.59	0.82
Uniform Delay, d1	18.8	3.0	18.5		26.5	13.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.4	0.4	3.8		3.7	6.9
Delay (s)	22.2	3.3	22.3		30.1	20.1
Level of Service	C	A	C		C	C
Approach Delay (s)		9.1	22.3		21.7	
Approach LOS		A	C		C	

Intersection Summary

HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

22: Route 44 & E

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↗
Volume (veh/h)	0	399	1220	10	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	434	1326	11	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			543			
pX, platoon unblocked	0.85				0.85	0.85
vC, conflicting volume	1337				1548	668
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1051				1299	268
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	561				131	623

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	217	217	884	453	5
Volume Left	0	0	0	0	0
Volume Right	0	0	0	11	5
cSH	1700	1700	1700	1700	623
Volume to Capacity	0.13	0.13	0.52	0.27	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	10.8
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.8
Approach LOS					B

Intersection Summary					
Average Delay			0.0		
Intersection Capacity Utilization			44.0%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis

9: Esmond Street & Dean Avenue

1/13/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	75	188	16	3	370	21	42	18	180	51	44	18
Peak Hour Factor	0.86	0.86	0.86	0.88	0.88	0.88	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	87	219	19	3	420	24	55	23	234	66	57	23
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	324	448	312	147								
Volume Left (vph)	87	3	55	66								
Volume Right (vph)	19	24	234	23								
Hadj (s)	0.16	0.04	-0.33	0.06								
Departure Headway (s)	6.7	6.3	6.5	7.4								
Degree Utilization, x	0.60	0.78	0.56	0.30								
Capacity (veh/h)	500	544	502	416								
Control Delay (s)	19.2	28.2	17.3	13.5								
Approach Delay (s)	19.2	28.2	17.3	13.5								
Approach LOS	C	D	C	B								
Intersection Summary												
Delay			21.3									
HCM Level of Service			C									
Intersection Capacity Utilization			61.0%	ICU Level of Service	B							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

24: Route 44 & D

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	67	980	1211	24	5	19
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	73	1065	1316	26	5	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			323			
pX, platoon unblocked	0.83				0.83	0.83
vC, conflicting volume	1342				2008	671
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	998				1801	187
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				89	97
cM capacity (veh/h)	571				51	681

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	73	533	533	878	465	5	21
Volume Left	73	0	0	0	0	5	0
Volume Right	0	0	0	0	26	0	21
cSH	571	1700	1700	1700	1700	51	681
Volume to Capacity	0.13	0.31	0.31	0.52	0.27	0.11	0.03
Queue Length 95th (ft)	11	0	0	0	0	8	2
Control Delay (s)	12.2	0.0	0.0	0.0	0.0	83.4	10.4
Lane LOS	B					F	B
Approach Delay (s)	0.8			0.0		25.6	
Approach LOS						D	

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

16: Esmond Street & C

1/13/2011

						
Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Volume (veh/h)	0	395	611	0	0	17
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	429	664	0	0	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		576				
pX, platoon unblocked						
vC, conflicting volume	664			1093	664	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	664			1093	664	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	96	
cM capacity (veh/h)	925			237	461	
Direction, Lane #	NB 1	SB 1	SE 1			
Volume Total	429	664	18			
Volume Left	0	0	0			
Volume Right	0	0	18			
cSH	1700	1700	461			
Volume to Capacity	0.25	0.39	0.04			
Queue Length 95th (ft)	0	0	3			
Control Delay (s)	0.0	0.0	13.1			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	13.1			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			42.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: B & Esmond Street

1/13/2011



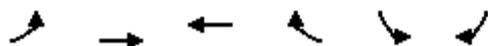
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗			↗	
Volume (veh/h)	12	0	43	17	0	1	79	316	6	0	568	28
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	0	47	18	0	1	86	343	7	0	617	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1292				
pX, platoon unblocked												
vC, conflicting volume	1149	1154	633	1198	1166	347	648			350		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1149	1154	633	1198	1166	347	648			350		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	100	90	86	100	100	91			100		
cM capacity (veh/h)	163	179	480	136	176	696	938			1209		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	13	47	20	86	350	648
Volume Left	13	0	18	86	0	0
Volume Right	0	47	1	0	7	30
cSH	163	480	143	938	1700	1700
Volume to Capacity	0.08	0.10	0.14	0.09	0.21	0.38
Queue Length 95th (ft)	6	8	12	8	0	0
Control Delay (s)	29.0	13.3	34.2	9.2	0.0	0.0
Lane LOS	D	B	D	A		
Approach Delay (s)	16.7		34.2	1.8		0.0
Approach LOS	C		D			

Intersection Summary		
Average Delay		2.1
Intersection Capacity Utilization	53.6%	ICU Level of Service
Analysis Period (min)		15
		A

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

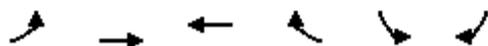
1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	739	1333	657	193	249	561
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.966			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1711	3421	3320	0	1745	1546
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1711	3421	3320	0	1745	1546
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			61			48
Link Speed (mph)		45	45		35	
Link Distance (ft)		185	989		576	
Travel Time (s)		2.8	15.0		11.2	
Peak Hour Factor	0.89	0.89	0.95	0.95	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	0%	0%	1%
Adj. Flow (vph)	830	1498	692	203	274	616
Shared Lane Traffic (%)						
Lane Group Flow (vph)	830	1498	895	0	274	616
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	12.0	24.0	24.0		12.0	
Total Split (s)	28.0	52.0	24.0	0.0	12.0	40.0
Total Split (%)	43.8%	81.3%	37.5%	0.0%	18.8%	62.5%
Maximum Green (s)	23.0	47.0	19.0		8.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	23.0	47.0	19.0		8.0	36.0
Actuated g/C Ratio	0.36	0.73	0.30		0.12	0.56
v/c Ratio	1.35	0.60	0.87		1.26	0.69
Control Delay	191.0	5.2	31.2		176.7	14.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	191.0	5.2	31.2		176.7	14.3
LOS	F	A	C		F	B
Approach Delay		71.5	31.2		64.3	
Approach LOS		E	C		E	

Intersection Summary

Area Type:	Other
Cycle Length:	64
Actuated Cycle Length:	64
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.35
Intersection Signal Delay:	61.1
Intersection LOS:	E
Intersection Capacity Utilization:	90.7%
ICU Level of Service:	E
Analysis Period (min):	15

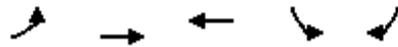
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	830	1498	895	274	616
v/c Ratio	1.35	0.60	0.87	1.26	0.69
Control Delay	191.0	5.2	31.2	176.7	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	191.0	5.2	31.2	176.7	14.3
Queue Length 50th (ft)	~436	107	161	~138	142
Queue Length 95th (ft)	#624	146	#265	#268	254
Internal Link Dist (ft)		105	909	496	
Turn Bay Length (ft)					
Base Capacity (vph)	615	2512	1029	218	891
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.35	0.60	0.87	1.26	0.69

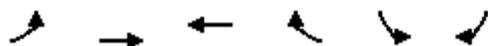
Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Route 44 & Esmond Street

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	739	1333	657	193	249	561
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3320		1745	1546
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1711	3421	3320		1745	1546
Peak-hour factor, PHF	0.89	0.89	0.95	0.95	0.91	0.91
Adj. Flow (vph)	830	1498	692	203	274	616
RTOR Reduction (vph)	0	0	43	0	0	22
Lane Group Flow (vph)	830	1498	852	0	274	594
Heavy Vehicles (%)	2%	2%	2%	0%	0%	1%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	23.0	47.0	19.0		8.0	35.0
Effective Green, g (s)	23.0	47.0	19.0		8.0	35.0
Actuated g/C Ratio	0.36	0.73	0.30		0.12	0.55
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	615	2512	986		218	845
v/s Ratio Prot	c0.49	0.44	c0.26		c0.16	0.38
v/s Ratio Perm						
v/c Ratio	1.35	0.60	0.86		1.26	0.70
Uniform Delay, d1	20.5	4.0	21.3		28.0	10.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	167.9	1.1	10.0		147.3	2.5
Delay (s)	188.4	5.1	31.3		175.3	13.2
Level of Service	F	A	C		F	B
Approach Delay (s)		70.4	31.3		63.1	
Approach LOS		E	C		E	
Intersection Summary						
HCM Average Control Delay			60.3		HCM Level of Service	E
HCM Volume to Capacity ratio			1.15			
Actuated Cycle Length (s)			64.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			90.7%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

22: Route 44 & E

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Volume (veh/h)	0	802	1289	2	0	37
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	872	1401	2	0	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			543			
pX, platoon unblocked	0.83				0.83	0.83
vC, conflicting volume	1403				1838	702
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1070				1596	222
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	94
cM capacity (veh/h)	535				81	646

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	436	436	934	469	40
Volume Left	0	0	0	0	0
Volume Right	0	0	0	2	40
cSH	1700	1700	1700	1700	646
Volume to Capacity	0.26	0.26	0.55	0.28	0.06
Queue Length 95th (ft)	0	0	0	0	5
Control Delay (s)	0.0	0.0	0.0	0.0	10.9
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.9
Approach LOS					B

Intersection Summary					
Average Delay			0.2		
Intersection Capacity Utilization			45.7%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis

4: Route 44 &

1/13/2011



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑↑			↑↑		↗
Volume (veh/h)	1288	0	0	1346	0	802
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1400	0	0	1463	0	872
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	655					
pX, platoon unblocked					0.85	
vC, conflicting volume	1400			2132	700	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1400			1974	700	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	0	
cM capacity (veh/h)	484			46	382	

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NE 1
Volume Total	700	700	732	732	872
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	872
cSH	1700	1700	1700	1700	382
Volume to Capacity	0.41	0.41	0.43	0.43	2.28
Queue Length 95th (ft)	0	0	0	0	1655
Control Delay (s)	0.0	0.0	0.0	0.0	608.4
Lane LOS	F				
Approach Delay (s)	0.0		0.0		608.4
Approach LOS	F				

Intersection Summary						
Average Delay	142.0					
Intersection Capacity Utilization	91.9%			ICU Level of Service	F	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

8: B & Esmond Street

1/13/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔		↔	↔			↔	
Volume (veh/h)	49	0	133	10	0	1	170	762	18	2	488	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	0	145	11	0	1	185	828	20	2	530	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1292				
pX, platoon unblocked												
vC, conflicting volume	1745	1764	542	1898	1765	838	553			848		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1745	1764	542	1898	1765	838	553			848		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	8	100	73	67	100	100	82			100		
cM capacity (veh/h)	58	69	540	33	68	366	1017			790		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	53	145	12	185	848	555
Volume Left	53	0	11	185	0	2
Volume Right	0	145	1	0	20	23
cSH	58	540	36	1017	1700	790
Volume to Capacity	0.92	0.27	0.33	0.18	0.50	0.00
Queue Length 95th (ft)	105	27	27	17	0	0
Control Delay (s)	210.8	14.1	147.8	9.3	0.0	0.1
Lane LOS	F	B	F	A		A
Approach Delay (s)	67.0		147.8	1.7		0.1
Approach LOS	F		F			

Intersection Summary		
Average Delay		9.3
Intersection Capacity Utilization	85.5%	ICU Level of Service
Analysis Period (min)		15
		E

HCM Unsignalized Intersection Capacity Analysis

9: Esmond Street & Dean Avenue

1/13/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	200	449	65	25	351	45	37	33	92	34	52	55
Peak Hour Factor	0.86	0.86	0.86	0.88	0.88	0.88	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	233	522	76	28	399	51	48	43	119	44	68	71
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	830	478	210	183								
Volume Left (vph)	233	28	48	44								
Volume Right (vph)	76	51	119	71								
Hadj (s)	0.15	0.01	-0.22	-0.11								
Departure Headway (s)	6.8	6.7	7.6	7.8								
Degree Utilization, x	1.56	0.89	0.44	0.40								
Capacity (veh/h)	535	531	439	430								
Control Delay (s)	280.5	42.1	16.5	15.9								
Approach Delay (s)	280.5	42.1	16.5	15.9								
Approach LOS	F	E	C	C								
Intersection Summary												
Delay			152.4									
HCM Level of Service			F									
Intersection Capacity Utilization			83.6%	ICU Level of Service	E							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

16: Esmond Street & C

1/13/2011

						
Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Volume (veh/h)	0	932	621	0	0	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1013	675	0	0	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		576				
pX, platoon unblocked						
vC, conflicting volume	675				1688	675
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	675				1688	675
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	92
cM capacity (veh/h)	916				103	454
Direction, Lane #	NB 1	SB 1	SE 1			
Volume Total	1013	675	35			
Volume Left	0	0	0			
Volume Right	0	0	35			
cSH	1700	1700	454			
Volume to Capacity	0.60	0.40	0.08			
Queue Length 95th (ft)	0	0	6			
Control Delay (s)	0.0	0.0	13.6			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	13.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			52.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

20: A & Esmond Street

1/13/2011

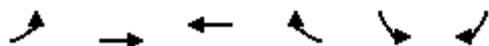


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	13	70	71	740	439	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	76	77	804	477	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1457	498	518			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1457	498	518			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	87	93			
cM capacity (veh/h)	132	572	1048			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	90	882	518			
Volume Left	14	77	0			
Volume Right	76	0	41			
cSH	376	1048	1700			
Volume to Capacity	0.24	0.07	0.30			
Queue Length 95th (ft)	23	6	0			
Control Delay (s)	17.6	1.9	0.0			
Lane LOS	C	A				
Approach Delay (s)	17.6	1.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization		83.3%		ICU Level of Service		E
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

22: Route 44 & E

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↗
Volume (veh/h)	0	802	1289	2	0	37
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	872	1401	2	0	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			543			
pX, platoon unblocked	0.83				0.83	0.83
vC, conflicting volume	1403				1838	702
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1070				1596	222
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	94
cM capacity (veh/h)	535				81	646

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	436	436	934	469	40
Volume Left	0	0	0	0	0
Volume Right	0	0	0	2	40
cSH	1700	1700	1700	1700	646
Volume to Capacity	0.26	0.26	0.55	0.28	0.06
Queue Length 95th (ft)	0	0	0	0	5
Control Delay (s)	0.0	0.0	0.0	0.0	10.9
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.9
Approach LOS					B

Intersection Summary					
Average Delay			0.2		
Intersection Capacity Utilization			45.7%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis

24: Route 44 & D

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	54	2036	1212	6	19	79
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	2213	1317	7	21	86
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			323			
pX, platoon unblocked	0.79				0.79	0.79
vC, conflicting volume	1324				2545	662
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	886				2426	51
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				0	89
cM capacity (veh/h)	602				19	797

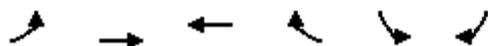
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	59	1107	1107	878	446	21	86
Volume Left	59	0	0	0	0	21	0
Volume Right	0	0	0	0	7	0	86
cSH	602	1700	1700	1700	1700	19	797
Volume to Capacity	0.10	0.65	0.65	0.52	0.26	1.08	0.11
Queue Length 95th (ft)	8	0	0	0	0	72	9
Control Delay (s)	11.6	0.0	0.0	0.0	0.0	516.0	10.1
Lane LOS	B					F	B
Approach Delay (s)	0.3			0.0		108.1	
Approach LOS						F	

Intersection Summary							
Average Delay			3.3				
Intersection Capacity Utilization			66.3%		ICU Level of Service		C
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

24: Route 44 & D

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	54	2036	1212	6	19	79
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	2213	1317	7	21	86
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			323			
pX, platoon unblocked	0.79				0.79	0.79
vC, conflicting volume	1324				2545	662
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	886				2426	51
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				0	89
cM capacity (veh/h)	602				19	797

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	59	1107	1107	878	446	21	86
Volume Left	59	0	0	0	0	21	0
Volume Right	0	0	0	0	7	0	86
cSH	602	1700	1700	1700	1700	19	797
Volume to Capacity	0.10	0.65	0.65	0.52	0.26	1.08	0.11
Queue Length 95th (ft)	8	0	0	0	0	72	9
Control Delay (s)	11.6	0.0	0.0	0.0	0.0	516.0	10.1
Lane LOS	B					F	B
Approach Delay (s)	0.3			0.0		108.1	
Approach LOS						F	

Intersection Summary							
Average Delay			3.3				
Intersection Capacity Utilization		66.3%		ICU Level of Service		C	
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

16: Esmond Street & C

1/13/2011

						
Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Volume (veh/h)	0	932	621	0	0	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1013	675	0	0	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		576				
pX, platoon unblocked						
vC, conflicting volume	675			1688	675	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	675			1688	675	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	92	
cM capacity (veh/h)	916			103	454	
Direction, Lane #	NB 1	SB 1	SE 1			
Volume Total	1013	675	35			
Volume Left	0	0	0			
Volume Right	0	0	35			
cSH	1700	1700	454			
Volume to Capacity	0.60	0.40	0.08			
Queue Length 95th (ft)	0	0	6			
Control Delay (s)	0.0	0.0	13.6			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	13.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			52.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: B & Esmond Street

1/13/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗			↗	
Volume (veh/h)	49	0	133	10	0	1	170	762	18	2	488	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	0	145	11	0	1	185	828	20	2	530	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1292				
pX, platoon unblocked												
vC, conflicting volume	1745	1764	542	1898	1765	838	553			848		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1745	1764	542	1898	1765	838	553			848		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	8	100	73	67	100	100	82			100		
cM capacity (veh/h)	58	69	540	33	68	366	1017			790		

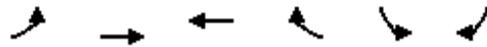
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	53	145	12	185	848	555
Volume Left	53	0	11	185	0	2
Volume Right	0	145	1	0	20	23
cSH	58	540	36	1017	1700	790
Volume to Capacity	0.92	0.27	0.33	0.18	0.50	0.00
Queue Length 95th (ft)	105	27	27	17	0	0
Control Delay (s)	210.8	14.1	147.8	9.3	0.0	0.1
Lane LOS	F	B	F	A		A
Approach Delay (s)	67.0		147.8	1.7		0.1
Approach LOS	F		F			

Intersection Summary

Average Delay	9.3
Intersection Capacity Utilization	85.5%
ICU Level of Service	E
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

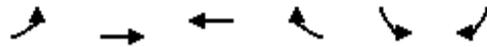
1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	543	928	1005	257	276	663
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.969			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1711	3455	3355	0	1711	1546
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1711	3455	3355	0	1711	1546
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			51			8
Link Speed (mph)		45	45		35	
Link Distance (ft)		185	989		576	
Travel Time (s)		2.8	15.0		11.2	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.87	0.87
Heavy Vehicles (%)	2%	1%	1%	0%	2%	1%
Adj. Flow (vph)	597	1020	1058	271	317	762
Shared Lane Traffic (%)						
Lane Group Flow (vph)	597	1020	1329	0	317	762
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011

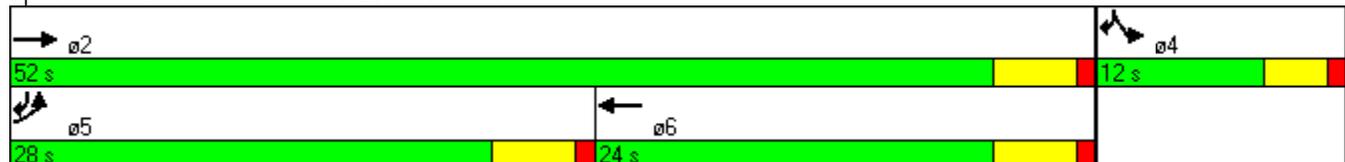


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	12.0	24.0	24.0		12.0	
Total Split (s)	28.0	52.0	24.0	0.0	12.0	40.0
Total Split (%)	43.8%	81.3%	37.5%	0.0%	18.8%	62.5%
Maximum Green (s)	23.0	47.0	19.0		8.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	23.0	47.0	19.0		8.0	36.0
Actuated g/C Ratio	0.36	0.73	0.30		0.12	0.56
v/c Ratio	0.97	0.40	1.29		1.48	0.87
Control Delay	53.3	3.8	160.4		266.7	25.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	53.3	3.8	160.4		266.7	25.8
LOS	D	A	F		F	C
Approach Delay		22.1	160.4		96.6	
Approach LOS		C	F		F	

Intersection Summary

Area Type:	Other
Cycle Length:	64
Actuated Cycle Length:	64
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.48
Intersection Signal Delay:	87.7
Intersection LOS:	F
Intersection Capacity Utilization:	93.0%
ICU Level of Service:	F
Analysis Period (min):	15

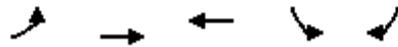
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	597	1020	1329	317	762
v/c Ratio	0.97	0.40	1.29	1.48	0.87
Control Delay	53.3	3.8	160.4	266.7	25.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	3.8	160.4	266.7	25.8
Queue Length 50th (ft)	223	58	~352	~175	227
Queue Length 95th (ft)	#418	81	#476	#300	#437
Internal Link Dist (ft)		105	909	496	
Turn Bay Length (ft)					
Base Capacity (vph)	615	2537	1032	214	873
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.97	0.40	1.29	1.48	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
6: Route 44 & Esmond Street

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	543	928	1005	257	276	663
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3455	3356		1711	1546
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1711	3455	3356		1711	1546
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.87	0.87
Adj. Flow (vph)	597	1020	1058	271	317	762
RTOR Reduction (vph)	0	0	36	0	0	4
Lane Group Flow (vph)	597	1020	1293	0	317	758
Heavy Vehicles (%)	2%	1%	1%	0%	2%	1%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	23.0	47.0	19.0		8.0	35.0
Effective Green, g (s)	23.0	47.0	19.0		8.0	35.0
Actuated g/C Ratio	0.36	0.73	0.30		0.12	0.55
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	615	2537	996		214	845
v/s Ratio Prot	0.35	0.30	c0.39		c0.19	c0.49
v/s Ratio Perm						
v/c Ratio	0.97	0.40	1.30		1.48	0.90
Uniform Delay, d1	20.2	3.2	22.5		28.0	12.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	28.9	0.5	141.7		240.0	12.1
Delay (s)	49.1	3.7	164.2		268.0	25.0
Level of Service	D	A	F		F	C
Approach Delay (s)		20.4	164.2		96.4	
Approach LOS		C	F		F	

Intersection Summary			
HCM Average Control Delay		88.3	HCM Level of Service F
HCM Volume to Capacity ratio		1.08	
Actuated Cycle Length (s)		64.0	Sum of lost time (s) 9.0
Intersection Capacity Utilization		93.0%	ICU Level of Service F
Analysis Period (min)		15	
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

22: Route 44 & E

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Volume (veh/h)	0	1546	1747	1	0	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1680	1899	1	0	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			543			
pX, platoon unblocked	0.73				0.73	0.73
vC, conflicting volume	1900				2740	950
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1498				2644	200
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	325				14	591

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	840	840	1266	634	3
Volume Left	0	0	0	0	0
Volume Right	0	0	0	1	3
cSH	1700	1700	1700	1700	591
Volume to Capacity	0.49	0.49	0.74	0.37	0.01
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	11.1
Lane LOS					B
Approach Delay (s)	0.0		0.0		11.1
Approach LOS					B

Intersection Summary					
Average Delay			0.0		
Intersection Capacity Utilization			58.3%	ICU Level of Service	B
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis

9: Esmond Street & Dean Avenue

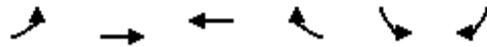
1/13/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	114	327	49	20	487	45	30	27	147	44	45	47
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.89	0.89	0.89	0.80	0.80	0.80
Hourly flow rate (vph)	120	344	52	21	518	48	34	30	165	55	56	59
Direction, Lane #	NB 1	SB 1	SE 1	NW 1								
Volume Total (vph)	516	587	229	170								
Volume Left (vph)	120	21	34	55								
Volume Right (vph)	52	48	165	59								
Hadj (s)	0.02	-0.03	-0.36	-0.11								
Departure Headway (s)	6.7	6.7	7.5	8.0								
Degree Utilization, x	0.96	1.10	0.48	0.38								
Capacity (veh/h)	530	534	452	425								
Control Delay (s)	56.3	93.9	17.3	15.9								
Approach Delay (s)	56.3	93.9	17.3	15.9								
Approach LOS	F	F	C	C								
Intersection Summary												
Delay			60.5									
HCM Level of Service			F									
Intersection Capacity Utilization			80.6%	ICU Level of Service	D							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

24: Route 44 & D

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	54	149	1665	3	12	83
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	162	1810	3	13	90
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			323			
pX, platoon unblocked	0.72				0.72	0.72
vC, conflicting volume	1813				2010	907
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1353				1626	96
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				77	87
cM capacity (veh/h)	364				56	679

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	59	81	81	1207	607	13	90
Volume Left	59	0	0	0	0	13	0
Volume Right	0	0	0	0	3	0	90
cSH	364	1700	1700	1700	1700	56	679
Volume to Capacity	0.16	0.05	0.05	0.71	0.36	0.23	0.13
Queue Length 95th (ft)	14	0	0	0	0	20	11
Control Delay (s)	16.8	0.0	0.0	0.0	0.0	87.5	11.1
Lane LOS	C					F	B
Approach Delay (s)	4.5			0.0		20.8	
Approach LOS						C	

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization		57.9%	ICU Level of Service B
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis

16: Esmond Street & C

1/13/2011

						
Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Volume (veh/h)	0	800	832	0	0	73
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	870	904	0	0	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		576				
pX, platoon unblocked						
vC, conflicting volume	904				1774	904
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	904				1774	904
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	76
cM capacity (veh/h)	752				91	335
Direction, Lane #	NB 1	SB 1	SE 1			
Volume Total	870	904	79			
Volume Left	0	0	0			
Volume Right	0	0	79			
cSH	1700	1700	335			
Volume to Capacity	0.51	0.53	0.24			
Queue Length 95th (ft)	0	0	23			
Control Delay (s)	0.0	0.0	19.0			
Lane LOS			C			
Approach Delay (s)	0.0	0.0	19.0			
Approach LOS			C			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			55.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: B & Esmond Street

1/13/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗			↗	
Volume (veh/h)	37	0	177	13	0	1	237	563	15	0	655	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	0	192	14	0	1	258	612	16	0	712	29
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1292				
pX, platoon unblocked												
vC, conflicting volume	1855	1870	727	2054	1877	620	741			628		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1855	1870	727	2054	1877	620	741			628		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	7	100	55	18	100	100	70			100		
cM capacity (veh/h)	43	51	424	17	50	488	866			954		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	40	192	15	258	628	741
Volume Left	40	0	14	258	0	0
Volume Right	0	192	1	0	16	29
cSH	43	424	18	866	1700	1700
Volume to Capacity	0.93	0.45	0.83	0.30	0.37	0.44
Queue Length 95th (ft)	92	58	55	31	0	0
Control Delay (s)	257.8	20.3	433.2	10.9	0.0	0.0
Lane LOS	F	C	F	B		
Approach Delay (s)	61.4		433.2	3.2		0.0
Approach LOS	F		F			

Intersection Summary

Average Delay	12.6
Intersection Capacity Utilization	66.7%
ICU Level of Service	C
Analysis Period (min)	15

Weave Analysis

- Existing
- Future No-Build
 - Build

FREEWAY WEAVING WORKSHEET									
General Information					Site Information				
Analyst	wjs				Freeway/Dir of Travel	Eastbound			
Agency/Company					Weaving Seg Location	Route 44 I-295 to Esmond Stree			
Date Performed	1/29/2012				Jurisdiction	RIDOT/Smithfield			
Analysis Time Period	AM Peak				Analysis Year	Existing			
Inputs									
Freeway free-flow speed, S_{FF} (mi/h)	45				Weaving type	B			
Weaving number of lanes, N	2				Volume ratio, VR	0.52			
Weaving seg length, L (ft)	490				Weaving ratio, R	0.15			
Terrain	Level								
Conversions to pc/h Under Base Conditions									
(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	153	0.92	0	0	1.5	1.2	1.000	1.00	166
V_{o2}	290	0.92	2	0	1.5	1.2	0.990	1.00	318
V_{w1}	416	0.92	2	0	1.5	1.2	0.990	1.00	456
V_{w2}	72	0.92	0	0	1.5	1.2	1.000	1.00	78
V_w				534	V_{nw}				484
V									1018
Weaving and Non-Weaving Speeds									
	Unconstrained				Constrained				
	Weaving (i = w)		Non-Weaving (i = nw)		Weaving (i = w)		Non-Weaving (= nw)		
a (Exhibit 24-6)	0.08		0.00						
b (Exhibit 24-6)	2.20		6.00						
c (Exhibit 24-6)	0.70		1.00						
d (Exhibit 24-6)	0.50		0.50						
Weaving intensity factor, W_i	0.72		0.58						
Weaving and non-weaving speeds, S_i (mi/h)	35.38		37.19						
Number of lanes required for unconstrained operation, N_w					1.80				
Maximum number of lanes, N_w (max)					3.50				
<input checked="" type="checkbox"/> If $N_w < N_w(\text{max})$ unconstrained operation					<input type="checkbox"/> if $N_w > N_w(\text{max})$ constrained operation				
Weaving Segment Speed, Density, Level of Service, and Capacity									
Weaving segment speed, S (mi/h)	36.22								
Weaving segment density, D (pc/mi/ln)	14.05								
Level of service, LOS	B								
Capacity of base condition, c_b (pc/h)									
Capacity as a 15-minute flow rate, c (veh/h)									
Capacity as a full-hour volume, c_h (veh/h)									
Notes									
a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions". b. Capacity constrained by basic freeway capacity. c. Capacity occurs under constrained operating conditions. d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases. e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases. f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C). g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases. i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.									

FREEWAY WEAVING WORKSHEET									
General Information					Site Information				
Analyst	wjs				Freeway/Dir of Travel	Eastbound			
Agency/Company					Weaving Seg Location	Route 44 I-295 to Esmond Stree			
Date Performed	1/29/2012				Jurisdiction	RIDOT/Smithfield			
Analysis Time Period	SAT Peak				Analysis Year	Existing			
Inputs									
Freeway free-flow speed, S_{FF} (mi/h)	45				Weaving type	B			
Weaving number of lanes, N	2				Volume ratio, VR	0.62			
Weaving seg length, L (ft)	490				Weaving ratio, R	0.14			
Terrain	Level								
Conversions to pc/h Under Base Conditions									
(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	270	0.92	0	0	1.5	1.2	1.000	1.00	293
V_{o2}	227	0.92	2	0	1.5	1.2	0.990	1.00	249
V_{w1}	693	0.92	2	0	1.5	1.2	0.990	1.00	760
V_{w2}	117	0.92	0	0	1.5	1.2	1.000	1.00	127
V_w				887	V_{nw}				542
V									1429
Weaving and Non-Weaving Speeds									
	Unconstrained				Constrained				
	Weaving (i = w)		Non-Weaving (i = nw)		Weaving (i = w)		Non-Weaving (= nw)		
a (Exhibit 24-6)	0.08		0.00						
b (Exhibit 24-6)	2.20		6.00						
c (Exhibit 24-6)	0.70		1.00						
d (Exhibit 24-6)	0.50		0.50						
Weaving intensity factor, W_i	1.04		1.17						
Weaving and non-weaving speeds, S_i (mi/h)	32.15		31.13						
Number of lanes required for unconstrained operation, N_w					2.04				
Maximum number of lanes, N_w (max)					3.50				
<input checked="" type="checkbox"/> If $N_w < N_w(\text{max})$ unconstrained operation					<input type="checkbox"/> if $N_w > N_w(\text{max})$ constrained operation				
Weaving Segment Speed, Density, Level of Service, and Capacity									
Weaving segment speed, S (mi/h)	31.76								
Weaving segment density, D (pc/mi/ln)	22.50								
Level of service, LOS	B								
Capacity of base condition, c_b (pc/h)									
Capacity as a 15-minute flow rate, c (veh/h)									
Capacity as a full-hour volume, c_h (veh/h)									
Notes									
a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions". b. Capacity constrained by basic freeway capacity. c. Capacity occurs under constrained operating conditions. d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases. e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases. f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C). g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases. i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.									

FREEWAY WEAVING WORKSHEET									
General Information					Site Information				
Analyst	wjs				Freeway/Dir of Travel	Eastbound			
Agency/Company					Weaving Seg Location	Route 44 I-295 to Esmond Stree			
Date Performed	1/29/2012				Jurisdiction	RIDOT/Smithfield			
Analysis Time Period	SAT Peak				Analysis Year	Future No Build			
Inputs									
Freeway free-flow speed, S_{FF} (mi/h)	45				Weaving type	B			
Weaving number of lanes, N	2				Volume ratio, VR	0.63			
Weaving seg length, L (ft)	490				Weaving ratio, R	0.14			
Terrain	Level								
Conversions to pc/h Under Base Conditions									
(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	288	0.92	0	0	1.5	1.2	1.000	1.00	313
V_{o2}	242	0.92	2	0	1.5	1.2	0.990	1.00	265
V_{w1}	757	0.92	2	0	1.5	1.2	0.990	1.00	831
V_{w2}	123	0.92	0	0	1.5	1.2	1.000	1.00	133
V_w				964	V_{nw}				578
V									1542
Weaving and Non-Weaving Speeds									
	Unconstrained				Constrained				
	Weaving (i = w)		Non-Weaving (i = nw)		Weaving (i = w)		Non-Weaving (= nw)		
a (Exhibit 24-6)	0.08		0.00						
b (Exhibit 24-6)	2.20		6.00						
c (Exhibit 24-6)	0.70		1.00						
d (Exhibit 24-6)	0.50		0.50						
Weaving intensity factor, W_i	1.10		1.28						
Weaving and non-weaving speeds, S_i (mi/h)	31.64		30.33						
Number of lanes required for unconstrained operation, N_w					2.05				
Maximum number of lanes, N_w (max)					3.50				
<input checked="" type="checkbox"/> If $N_w < N_w(\text{max})$ unconstrained operation					<input type="checkbox"/> if $N_w > N_w(\text{max})$ constrained operation				
Weaving Segment Speed, Density, Level of Service, and Capacity									
Weaving segment speed, S (mi/h)	31.13								
Weaving segment density, D (pc/mi/ln)	24.76								
Level of service, LOS	C								
Capacity of base condition, c_b (pc/h)									
Capacity as a 15-minute flow rate, c (veh/h)									
Capacity as a full-hour volume, c_h (veh/h)									
Notes									
a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions". b. Capacity constrained by basic freeway capacity. c. Capacity occurs under constrained operating conditions. d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases. e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases. f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C). g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases. i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.									

FREEWAY WEAVING WORKSHEET									
General Information					Site Information				
Analyst	wjs				Freeway/Dir of Travel	Eastbound			
Agency/Company					Weaving Seg Location	Route 44 I-295 to Esmond Stree			
Date Performed	1/29/2012				Jurisdiction	RIDOT/Smithfield			
Analysis Time Period	PM Peak				Analysis Year	Future No Build			
Inputs									
Freeway free-flow speed, S_{FF} (mi/h)	45				Weaving type	B			
Weaving number of lanes, N	2				Volume ratio, VR	0.51			
Weaving seg length, L (ft)	490				Weaving ratio, R	0.22			
Terrain	Level								
Conversions to pc/h Under Base Conditions									
(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	421	0.92	0	0	1.5	1.2	1.000	1.00	457
V_{o2}	543	0.92	2	0	1.5	1.2	0.990	1.00	596
V_{w1}	791	0.92	2	0	1.5	1.2	0.990	1.00	868
V_{w2}	226	0.92	0	0	1.5	1.2	1.000	1.00	245
V_w				1113	V_{nw}				1053
V									2166
Weaving and Non-Weaving Speeds									
	Unconstrained				Constrained				
	Weaving (i = w)		Non-Weaving (i = nw)		Weaving (i = w)		Non-Weaving (= nw)		
a (Exhibit 24-6)	0.08		0.00						
b (Exhibit 24-6)	2.20		6.00						
c (Exhibit 24-6)	0.70		1.00						
d (Exhibit 24-6)	0.50		0.50						
Weaving intensity factor, W_i	1.20		1.18						
Weaving and non-weaving speeds, S_i (mi/h)	30.92		31.07						
Number of lanes required for unconstrained operation, N_w					1.85				
Maximum number of lanes, N_w (max)					3.50				
<input checked="" type="checkbox"/> If $N_w < N_w(max)$ unconstrained operation					<input type="checkbox"/> if $N_w > N_w(max)$ constrained operation				
Weaving Segment Speed, Density, Level of Service, and Capacity									
Weaving segment speed, S (mi/h)	31.00								
Weaving segment density, D (pc/mi/ln)	34.94								
Level of service, LOS	D								
Capacity of base condition, c_b (pc/h)									
Capacity as a 15-minute flow rate, c (veh/h)									
Capacity as a full-hour volume, c_h (veh/h)									
Notes									
a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions". b. Capacity constrained by basic freeway capacity. c. Capacity occurs under constrained operating conditions. d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases. e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases. f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C). g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases. i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.									

FREEWAY WEAVING WORKSHEET									
General Information					Site Information				
Analyst	wjs				Freeway/Dir of Travel	Eastbound			
Agency/Company					Weaving Seg Location	Route 44 I-295 to Esmond Stree			
Date Performed	2/06/2012				Jurisdiction	RIDOT/Smithfield			
Analysis Time Period	SAT Peak				Analysis Year	Future Build			
Inputs									
Freeway free-flow speed, S_{FF} (mi/h)	45				Weaving type	B			
Weaving number of lanes, N	2				Volume ratio, VR	0.59			
Weaving seg length, L (ft)	490				Weaving ratio, R	0.20			
Terrain	Level								
Conversions to pc/h Under Base Conditions									
(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	412	0.92	0	0	1.5	1.2	1.000	1.00	447
V_{o2}	222	0.92	2	0	1.5	1.2	0.990	1.00	243
V_{w1}	729	0.92	2	0	1.5	1.2	0.990	1.00	800
V_{w2}	183	0.92	0	0	1.5	1.2	1.000	1.00	198
V_w				998	V_{nw}				690
V									1688
Weaving and Non-Weaving Speeds									
	Unconstrained				Constrained				
	Weaving (i = w)		Non-Weaving (i = nw)		Weaving (i = w)		Non-Weaving (= nw)		
a (Exhibit 24-6)	0.08		0.00						
b (Exhibit 24-6)	2.20		6.00						
c (Exhibit 24-6)	0.70		1.00						
d (Exhibit 24-6)	0.50		0.50						
Weaving intensity factor, W_i	1.12		1.24						
Weaving and non-weaving speeds, S_i (mi/h)	31.49		30.64						
Number of lanes required for unconstrained operation, N_w					1.99				
Maximum number of lanes, N_w (max)					3.50				
<input checked="" type="checkbox"/> If $N_w < N_w(\text{max})$ unconstrained operation					<input type="checkbox"/> if $N_w > N_w(\text{max})$ constrained operation				
Weaving Segment Speed, Density, Level of Service, and Capacity									
Weaving segment speed, S (mi/h)	31.14								
Weaving segment density, D (pc/mi/ln)	27.11								
Level of service, LOS	C								
Capacity of base condition, c_b (pc/h)									
Capacity as a 15-minute flow rate, c (veh/h)									
Capacity as a full-hour volume, c_h (veh/h)									
Notes									
a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions". b. Capacity constrained by basic freeway capacity. c. Capacity occurs under constrained operating conditions. d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases. e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases. f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C). g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases. i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.									

FREEWAY WEAVING WORKSHEET									
General Information					Site Information				
Analyst	wjs				Freeway/Dir of Travel	Eastbound			
Agency/Company					Weaving Seg Location	Route 44 I-295 to Esmond Stree			
Date Performed	2/06/2012				Jurisdiction	RIDOT/Smithfield			
Analysis Time Period	PM Peak				Analysis Year	Future Build			
Inputs									
Freeway free-flow speed, S_{FF} (mi/h)	45				Weaving type	B			
Weaving number of lanes, N	2				Volume ratio, VR	0.50			
Weaving seg length, L (ft)	490				Weaving ratio, R	0.26			
Terrain	Level								
Conversions to pc/h Under Base Conditions									
(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	516	0.92	0	0	1.5	1.2	1.000	1.00	560
V_{o2}	528	0.92	2	0	1.5	1.2	0.990	1.00	579
V_{w1}	772	0.92	2	0	1.5	1.2	0.990	1.00	847
V_{w2}	274	0.92	0	0	1.5	1.2	1.000	1.00	297
V_w				1144	V_{nw}				1139
V									2283
Weaving and Non-Weaving Speeds									
	Unconstrained				Constrained				
	Weaving (i = w)		Non-Weaving (i = nw)		Weaving (i = w)		Non-Weaving (= nw)		
a (Exhibit 24-6)	0.08		0.00						
b (Exhibit 24-6)	2.20		6.00						
c (Exhibit 24-6)	0.70		1.00						
d (Exhibit 24-6)	0.50		0.50						
Weaving intensity factor, W_i	1.22		1.18						
Weaving and non-weaving speeds, S_i (mi/h)	30.77		31.06						
Number of lanes required for unconstrained operation, N_w					1.82				
Maximum number of lanes, N_w (max)					3.50				
<input checked="" type="checkbox"/> If $N_w < N_w(\text{max})$ unconstrained operation					<input type="checkbox"/> if $N_w > N_w(\text{max})$ constrained operation				
Weaving Segment Speed, Density, Level of Service, and Capacity									
Weaving segment speed, S (mi/h)	30.91								
Weaving segment density, D (pc/mi/ln)	36.93								
Level of service, LOS	E								
Capacity of base condition, c_b (pc/h)									
Capacity as a 15-minute flow rate, c (veh/h)									
Capacity as a full-hour volume, c_h (veh/h)									
Notes									
a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions". b. Capacity constrained by basic freeway capacity. c. Capacity occurs under constrained operating conditions. d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases. e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases. f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C). g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases. i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.									

FREEWAY WEAVING WORKSHEET									
General Information					Site Information				
Analyst	wjs				Freeway/Dir of Travel	Eastbound			
Agency/Company					Weaving Seg Location	Route 44 I-295 to Esmond Stree			
Date Performed	2/06/2012				Jurisdiction	RIDOT/Smithfield			
Analysis Time Period	AM Peak				Analysis Year	Future Build			
Inputs									
Freeway free-flow speed, S_{FF} (mi/h)	45				Weaving type	B			
Weaving number of lanes, N	2				Volume ratio, VR	0.50			
Weaving seg length, L (ft)	490				Weaving ratio, R	0.23			
Terrain	Level								
Conversions to pc/h Under Base Conditions									
(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	246	0.92	0	0	1.5	1.2	1.000	1.00	267
V_{o2}	276	0.92	2	0	1.5	1.2	0.990	1.00	302
V_{w1}	402	0.92	2	0	1.5	1.2	0.990	1.00	441
V_{w2}	123	0.92	0	0	1.5	1.2	1.000	1.00	133
V_w				574	V_{nw}				569
V									1143
Weaving and Non-Weaving Speeds									
	Unconstrained				Constrained				
	Weaving (i = w)		Non-Weaving (i = nw)		Weaving (i = w)		Non-Weaving (= nw)		
a (Exhibit 24-6)	0.08		0.00						
b (Exhibit 24-6)	2.20		6.00						
c (Exhibit 24-6)	0.70		1.00						
d (Exhibit 24-6)	0.50		0.50						
Weaving intensity factor, W_i	0.75		0.59						
Weaving and non-weaving speeds, S_i (mi/h)	34.97		36.97						
Number of lanes required for unconstrained operation, N_w					1.76				
Maximum number of lanes, N_w (max)					3.50				
<input checked="" type="checkbox"/> If $N_w < N_w(\text{max})$ unconstrained operation					<input type="checkbox"/> if $N_w > N_w(\text{max})$ constrained operation				
Weaving Segment Speed, Density, Level of Service, and Capacity									
Weaving segment speed, S (mi/h)	35.94								
Weaving segment density, D (pc/mi/ln)	15.90								
Level of service, LOS	B								
Capacity of base condition, c_b (pc/h)									
Capacity as a 15-minute flow rate, c (veh/h)									
Capacity as a full-hour volume, c_h (veh/h)									
Notes									
a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions". b. Capacity constrained by basic freeway capacity. c. Capacity occurs under constrained operating conditions. d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases. e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases. f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C). g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases. i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.									

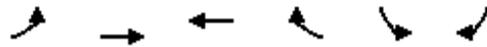
FREEWAY WEAVING WORKSHEET									
General Information					Site Information				
Analyst	wjs				Freeway/Dir of Travel	Eastbound			
Agency/Company					Weaving Seg Location	Route 44 I-295 to Esmond Stree			
Date Performed	1/29/2012				Jurisdiction	RIDOT/Smithfield			
Analysis Time Period	AM Peak				Analysis Year	Future No Build			
Inputs									
Freeway free-flow speed, S_{FF} (mi/h)	45				Weaving type	B			
Weaving number of lanes, N	2				Volume ratio, VR	0.52			
Weaving seg length, L (ft)	490				Weaving ratio, R	0.17			
Terrain	Level								
Conversions to pc/h Under Base Conditions									
(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	174	0.92	0	0	1.5	1.2	1.000	1.00	189
V_{o2}	281	0.92	2	0	1.5	1.2	0.990	1.00	308
V_{w1}	410	0.92	2	0	1.5	1.2	0.990	1.00	450
V_{w2}	82	0.92	0	0	1.5	1.2	1.000	1.00	89
V_w				539	V_{nw}				497
V									1036
Weaving and Non-Weaving Speeds									
	Unconstrained				Constrained				
	Weaving (i = w)		Non-Weaving (i = nw)		Weaving (i = w)		Non-Weaving (= nw)		
a (Exhibit 24-6)	0.08		0.00						
b (Exhibit 24-6)	2.20		6.00						
c (Exhibit 24-6)	0.70		1.00						
d (Exhibit 24-6)	0.50		0.50						
Weaving intensity factor, W_i	0.72		0.58						
Weaving and non-weaving speeds, S_i (mi/h)	35.33		37.18						
Number of lanes required for unconstrained operation, N_w					1.79				
Maximum number of lanes, N_w (max)					3.50				
<input checked="" type="checkbox"/> If $N_w < N_w(\text{max})$ unconstrained operation					<input type="checkbox"/> if $N_w > N_w(\text{max})$ constrained operation				
Weaving Segment Speed, Density, Level of Service, and Capacity									
Weaving segment speed, S (mi/h)	36.20								
Weaving segment density, D (pc/mi/ln)	14.31								
Level of service, LOS	B								
Capacity of base condition, c_b (pc/h)									
Capacity as a 15-minute flow rate, c (veh/h)									
Capacity as a full-hour volume, c_h (veh/h)									
Notes									
a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions". b. Capacity constrained by basic freeway capacity. c. Capacity occurs under constrained operating conditions. d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases. e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases. f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C). g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases. i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.									

Level of Service

**Route 44 at Esmond Street
Double Left Turn EB Lane**

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	306	688	623	89	115	612
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	0.97	0.95	0.95	0.95	1.00	1.00
Frt			0.981			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3134	3292	3296	0	1678	1516
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3134	3292	3296	0	1678	1516
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			26			101
Link Speed (mph)		45	45		35	
Link Distance (ft)		230	989		130	
Travel Time (s)		3.5	15.0		2.5	
Peak Hour Factor	0.87	0.87	0.90	0.90	0.93	0.93
Heavy Vehicles (%)	8%	6%	3%	10%	4%	3%
Adj. Flow (vph)	352	791	692	99	124	658
Shared Lane Traffic (%)						
Lane Group Flow (vph)	352	791	791	0	124	658
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		22	22		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	12.0	24.0	24.0		12.0	
Total Split (s)	18.0	50.0	32.0	0.0	20.0	38.0
Total Split (%)	25.7%	71.4%	45.7%	0.0%	28.6%	54.3%
Maximum Green (s)	13.0	45.0	27.0		16.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	12.2	45.0	27.8		16.0	33.2
Actuated g/C Ratio	0.17	0.64	0.40		0.23	0.47
v/c Ratio	0.64	0.37	0.60		0.32	0.85
Control Delay	32.6	6.5	18.7		25.3	26.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	32.6	6.5	18.7		25.3	26.5
LOS	C	A	B		C	C
Approach Delay		14.6	18.7		26.3	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	19.1
Intersection LOS:	B
Intersection Capacity Utilization:	65.5%
ICU Level of Service:	C
Analysis Period (min):	15

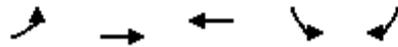
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	352	791	791	124	658
v/c Ratio	0.64	0.37	0.60	0.32	0.85
Control Delay	32.6	6.5	18.7	25.3	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	6.5	18.7	25.3	26.5
Queue Length 50th (ft)	72	72	135	45	198
Queue Length 95th (ft)	108	96	191	89	#409
Internal Link Dist (ft)		150	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	582	2116	1323	384	788
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.60	0.37	0.60	0.32	0.84

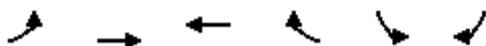
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Route 44 & Esmond Street

1/13/2011



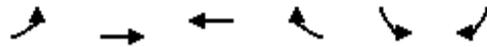
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	306	688	623	89	115	612
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	0.97	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3134	3292	3296		1678	1516
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3134	3292	3296		1678	1516
Peak-hour factor, PHF	0.87	0.87	0.90	0.90	0.93	0.93
Adj. Flow (vph)	352	791	692	99	124	658
RTOR Reduction (vph)	0	0	16	0	0	55
Lane Group Flow (vph)	352	791	775	0	124	603
Heavy Vehicles (%)	8%	6%	3%	10%	4%	3%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	12.2	45.0	27.8		16.0	32.2
Effective Green, g (s)	12.2	45.0	27.8		16.0	32.2
Actuated g/C Ratio	0.17	0.64	0.40		0.23	0.46
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	546	2116	1309		384	697
v/s Ratio Prot	0.11	0.24	c0.24		0.07	c0.40
v/s Ratio Perm						
v/c Ratio	0.64	0.37	0.59		0.32	0.87
Uniform Delay, d1	26.9	5.9	16.6		22.5	17.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.5	0.5	2.0		0.4	10.8
Delay (s)	29.4	6.4	18.6		22.8	27.8
Level of Service	C	A	B		C	C
Approach Delay (s)		13.5	18.6		27.0	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

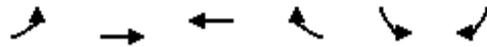
1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	739	1333	657	193	249	561
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	0.97	0.95	0.95	0.95	1.00	1.00
Frt			0.966			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3319	3421	3320	0	1745	1546
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3319	3421	3320	0	1745	1546
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			68			68
Link Speed (mph)		45	45		35	
Link Distance (ft)		230	989		130	
Travel Time (s)		3.5	15.0		2.5	
Peak Hour Factor	0.89	0.89	0.95	0.95	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	0%	0%	1%
Adj. Flow (vph)	830	1498	692	203	274	616
Shared Lane Traffic (%)						
Lane Group Flow (vph)	830	1498	895	0	274	616
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		22	22		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	12.0	24.0	24.0		12.0	
Total Split (s)	20.0	45.0	25.0	0.0	15.0	35.0
Total Split (%)	33.3%	75.0%	41.7%	0.0%	25.0%	58.3%
Maximum Green (s)	15.0	40.0	20.0		11.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	15.0	40.0	20.0		11.0	31.0
Actuated g/C Ratio	0.25	0.67	0.33		0.18	0.52
v/c Ratio	1.00	0.66	0.78		0.86	0.74
Control Delay	56.9	7.7	22.4		51.8	17.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	56.9	7.7	22.4		51.8	17.0
LOS	E	A	C		D	B
Approach Delay		25.2	22.4		27.7	
Approach LOS		C	C		C	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	25.1
Intersection LOS:	C
Intersection Capacity Utilization:	70.9%
ICU Level of Service:	C
Analysis Period (min):	15

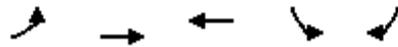
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	830	1498	895	274	616
v/c Ratio	1.00	0.66	0.78	0.86	0.74
Control Delay	56.9	7.7	22.4	51.8	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	7.7	22.4	51.8	17.0
Queue Length 50th (ft)	~154	136	138	97	141
Queue Length 95th (ft)	#260	188	203	#216	#271
Internal Link Dist (ft)		150	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	830	2281	1152	320	832
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.00	0.66	0.78	0.86	0.74

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Route 44 & Esmond Street

1/13/2011



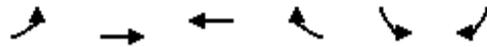
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	739	1333	657	193	249	561
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	0.97	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3319	3421	3320		1745	1546
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3319	3421	3320		1745	1546
Peak-hour factor, PHF	0.89	0.89	0.95	0.95	0.91	0.91
Adj. Flow (vph)	830	1498	692	203	274	616
RTOR Reduction (vph)	0	0	45	0	0	34
Lane Group Flow (vph)	830	1498	850	0	274	582
Heavy Vehicles (%)	2%	2%	2%	0%	0%	1%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	15.0	40.0	20.0		11.0	30.0
Effective Green, g (s)	15.0	40.0	20.0		11.0	30.0
Actuated g/C Ratio	0.25	0.67	0.33		0.18	0.50
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	830	2281	1107		320	773
v/s Ratio Prot	c0.25	0.44	c0.26		c0.16	0.38
v/s Ratio Perm						
v/c Ratio	1.00	0.66	0.77		0.86	0.75
Uniform Delay, d1	22.5	5.9	17.9		23.7	12.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	31.2	1.5	5.1		19.3	4.0
Delay (s)	53.7	7.4	23.0		43.1	16.0
Level of Service	D	A	C		D	B
Approach Delay (s)		23.9	23.0		24.3	
Approach LOS		C	C		C	

Intersection Summary

HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

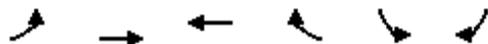
1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	543	928	1005	257	276	663
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Lane Util. Factor	0.97	0.95	0.95	0.95	1.00	1.00
Frt			0.969			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3319	3455	3355	0	1711	1546
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3319	3455	3355	0	1711	1546
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			53			26
Link Speed (mph)		45	45		35	
Link Distance (ft)		230	989		130	
Travel Time (s)		3.5	15.0		2.5	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.87	0.87
Heavy Vehicles (%)	2%	1%	1%	0%	2%	1%
Adj. Flow (vph)	597	1020	1058	271	317	762
Shared Lane Traffic (%)						
Lane Group Flow (vph)	597	1020	1329	0	317	762
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		22	22		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (ft)	20	100	100		20	20
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	6	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Detector Phase	5	2	6		4	4 5
Switch Phase						

Lanes, Volumes, Timings
6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	5.0	7.0	7.0		6.0	
Minimum Split (s)	12.0	24.0	24.0		12.0	
Total Split (s)	18.0	50.0	32.0	0.0	20.0	38.0
Total Split (%)	25.7%	71.4%	45.7%	0.0%	28.6%	54.3%
Maximum Green (s)	13.0	45.0	27.0		16.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Recall Mode	None	Max	Max		None	
Walk Time (s)		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	
Act Effect Green (s)	13.0	45.0	27.0		16.0	34.0
Actuated g/C Ratio	0.19	0.64	0.39		0.23	0.49
v/c Ratio	0.97	0.46	1.00		0.81	1.00
Control Delay	60.3	7.2	47.8		44.2	52.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	60.3	7.2	47.8		44.2	52.3
LOS	E	A	D		D	D
Approach Delay		26.8	47.8		49.9	
Approach LOS		C	D		D	

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	39.9
Intersection LOS:	D
Intersection Capacity Utilization	84.5%
ICU Level of Service	E
Analysis Period (min)	15

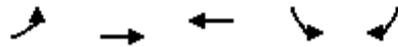
Splits and Phases: 6: Route 44 & Esmond Street



Queues

6: Route 44 & Esmond Street

1/13/2011



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	597	1020	1329	317	762
v/c Ratio	0.97	0.46	1.00	0.81	1.00
Control Delay	60.3	7.2	47.8	44.2	52.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	60.3	7.2	47.8	44.2	52.3
Queue Length 50th (ft)	132	100	~285	130	301
Queue Length 95th (ft)	#230	137	#439	#241	#517
Internal Link Dist (ft)		150	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	616	2221	1327	391	764
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.97	0.46	1.00	0.81	1.00

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Route 44 & Esmond Street

1/13/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	543	928	1005	257	276	663
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	0.97	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3319	3455	3356		1711	1546
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3319	3455	3356		1711	1546
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.87	0.87
Adj. Flow (vph)	597	1020	1058	271	317	762
RTOR Reduction (vph)	0	0	33	0	0	14
Lane Group Flow (vph)	597	1020	1296	0	317	748
Heavy Vehicles (%)	2%	1%	1%	0%	2%	1%
Turn Type	Prot					pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	13.0	45.0	27.0		16.0	33.0
Effective Green, g (s)	13.0	45.0	27.0		16.0	33.0
Actuated g/C Ratio	0.19	0.64	0.39		0.23	0.47
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	616	2221	1294		391	729
v/s Ratio Prot	0.18	0.30	c0.39		0.19	c0.48
v/s Ratio Perm						
v/c Ratio	0.97	0.46	1.00		0.81	1.03
Uniform Delay, d1	28.3	6.3	21.5		25.6	18.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	28.3	0.7	25.5		11.7	40.2
Delay (s)	56.6	7.0	47.0		37.3	58.7
Level of Service	E	A	D		D	E
Approach Delay (s)		25.3	47.0		52.4	
Approach LOS		C	D		D	

Intersection Summary

HCM Average Control Delay	39.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Level of Service

**3 Signal Option Test
PM Peak Hour**

Timings
6: Route 44 & Esmond Street

Rt 44 Signal Option with vol shift
2/18/12



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↘	↑↑	↑↑	↘	↗
Volume (vph)	309	1377	657	222	391
Turn Type	Prot				pt+ov
Protected Phases	5	2	6	4	4 5
Permitted Phases					
Detector Phase	5	2	6	4	4 5
Switch Phase					
Minimum Initial (s)	5.0	7.0	7.0	6.0	
Minimum Split (s)	12.0	24.0	24.0	12.0	
Total Split (s)	28.0	63.0	35.0	22.0	50.0
Total Split (%)	32.9%	74.1%	41.2%	25.9%	58.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	Max C-Max	None		
Act Effct Green (s)	20.8	59.6	33.8	16.4	42.2
Actuated g/C Ratio	0.24	0.70	0.40	0.19	0.50
v/c Ratio	0.83	0.64	0.66	0.72	0.53
Control Delay	41.6	3.0	23.6	45.1	13.7
Queue Delay	0.0	0.1	0.4	0.0	0.2
Total Delay	41.6	3.1	24.0	45.1	13.9
LOS	D	A	C	D	B
Approach Delay		10.2	24.0	25.2	
Approach LOS		B	C	C	

Intersection Summary

Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 10 (12%), Referenced to phase 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 16.7
 Intersection Capacity Utilization 65.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 6: Route 44 & Esmond Street

→ 02	↘ 04
63 s	22 s
↗ 05	← 06
28 s	35 s

Queues
6: Route 44 & Esmond Street

Rt 44 Signal Option with vol shift
2/18/12



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	347	1547	895	244	430
v/c Ratio	0.83	0.64	0.66	0.72	0.53
Control Delay	41.6	3.0	23.6	45.1	13.7
Queue Delay	0.0	0.1	0.4	0.0	0.2
Total Delay	41.6	3.1	24.0	45.1	13.9
Queue Length 50th (ft)	152	22	203	122	108
Queue Length 95th (ft)	#280	25	277	#200	182
Internal Link Dist (ft)		105	909	50	
Turn Bay Length (ft)					
Base Capacity (vph)	464	2399	1352	370	828
Starvation Cap Reductn	0	170	0	0	0
Spillback Cap Reductn	0	0	123	0	64
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.75	0.69	0.73	0.66	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
6: Route 44 & Esmond Street

Rt 44 Signal Option with vol shift
2/18/12

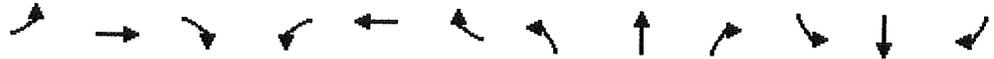


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↗	↑↑	↑↖		↙	↘
Volume (vph)	309	1377	657	193	222	391
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Flt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3320		1745	1546
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1711	3421	3320		1745	1546
Peak-hour factor, PHF	0.89	0.89	0.95	0.95	0.91	0.91
Adj. Flow (vph)	347	1547	692	203	244	430
RTOR Reduction (vph)	0	0	30	0	0	41
Lane Group Flow (vph)	347	1547	865	0	244	389
Heavy Vehicles (%)	2%	2%	2%	0%	0%	1%
Turn Type	Prot				pt+ov	
Protected Phases	5	2	6		4	4 5
Permitted Phases						
Actuated Green, G (s)	20.8	59.6	33.8		16.4	41.2
Effective Green, g (s)	20.8	59.6	33.8		16.4	41.2
Actuated g/C Ratio	0.24	0.70	0.40		0.19	0.48
Clearance Time (s)	5.0	5.0	5.0		4.0	
Vehicle Extension (s)	2.8	2.8	2.8		2.5	
Lane Grp Cap (vph)	419	2399	1320		337	749
v/s Ratio Prot	c0.20	c0.45	0.26		c0.14	0.25
v/s Ratio Perm						
v/c Ratio	0.83	0.64	0.66		0.72	0.52
Uniform Delay, d1	30.4	6.9	20.9		32.2	15.1
Progression Factor	0.91	0.26	1.00		1.00	1.00
Incremental Delay, d2	9.8	1.0	2.5		7.1	0.5
Delay (s)	37.4	2.8	23.4		39.2	15.5
Level of Service	D	A	C		D	B
Approach Delay (s)		9.2	23.4		24.1	
Approach LOS		A	C		C	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
8: B & Esmond Street

Rt 44 Signal Option with vol shift
2/18/12



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Right Turn Channelized													
Volume (veh/h)	403	0	189	10	0	1	166	350	18	2	268	209	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	438	0	205	11	0	1	180	380	20	2	291	227	
Approach Volume (veh/h)	643		12			580			521				
Crossing Volume (veh/h)	304		999			440			191				
High Capacity (veh/h)	1091		623			979			1192				
High v/c (veh/h)	0.59		0.02			0.59			0.44				
Low Capacity (veh/h)	895		483			795			986				
Low v/c (veh/h)	0.72		0.02			0.73			0.53				
Intersection Summary													
Maximum v/c High			0.59										
Maximum v/c Low			0.73										
Intersection Capacity Utilization	98.1%		ICU Level of Service			F							

HCM Unsignalized Intersection Capacity Analysis
 9: Esmond Street & Dean Avenue

Rt 44 Signal Option with vol shift
 2/18/12



Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		⇕			⇕			⇕			⇕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	200	449	65	25	351	45	37	33	92	34	52	55
Peak Hour Factor	0.86	0.86	0.86	0.88	0.88	0.88	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	233	522	76	28	399	51	48	43	119	44	68	71

Direction, Lane #	NB 1	SB 1	SE 1	NW 1
Volume Total (vph)	830	478	210	183
Volume Left (vph)	233	28	48	44
Volume Right (vph)	76	51	119	71
Hadj (s)	0.15	0.01	-0.22	-0.11
Departure Headway (s)	6.8	6.7	7.6	7.8
Degree Utilization, x	1.56	0.89	0.44	0.40
Capacity (veh/h)	535	531	439	430
Control Delay (s)	280.5	42.1	16.5	15.9
Approach Delay (s)	280.5	42.1	16.5	15.9
Approach LOS	F	E	C	C

Intersection Summary			
Delay		152.4	
HCM Level of Service		F	
Intersection Capacity Utilization	83.6%		ICU Level of Service E
Analysis Period (min)		15	

Timings
24: Route 44 & D

Rt 44 Signal Option with vol shift
2/18/12



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑↑	↑↑	↖	↗
Volume (vph)	470	1620	1210	66	286
Turn Type	Prot			pm+ov	
Protected Phases	5	2	6	4	5
Permitted Phases					4
Detector Phase	5	2	6	4	5
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	8.0
Total Split (s)	29.0	65.0	36.0	20.0	29.0
Total Split (%)	34.1%	76.5%	42.4%	23.5%	34.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag		Lead
Lead-Lag Optimize?	Yes		Yes		Yes
Recall Mode	None	C-Max	C-Max	Max	None
Act Effct Green (s)	25.0	61.0	32.0	16.0	45.0
Actuated g/C Ratio	0.29	0.72	0.38	0.19	0.53
v/c Ratio	0.98	0.69	0.99	0.22	0.37
Control Delay	60.8	6.1	47.7	31.2	12.9
Queue Delay	43.2	1.8	9.7	0.0	0.0
Total Delay	104.0	7.9	57.4	31.2	12.9
LOS	F	A	E	C	B
Approach Delay		29.5	57.4	16.4	
Approach LOS		C	E	B	

Intersection Summary

Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 37.5
 Intersection Capacity Utilization 73.4%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service D

Splits and Phases: 24: Route 44 & D

→ ø2	↖ ø4
65 s	20 s
↖ ø5	← ø6
29 s	36 s



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	511	1761	1324	72	311
v/c Ratio	0.98	0.69	0.99	0.22	0.37
Control Delay	60.8	6.1	47.7	31.2	12.9
Queue Delay	43.2	1.8	9.7	0.0	0.0
Total Delay	104.0	7.9	57.4	31.2	12.9
Queue Length 50th (ft)	282	125	270	33	88
Queue Length 95th (ft)m#465		252	#505	70	145
Internal Link Dist (ft)		261	149	201	
Turn Bay Length (ft)	150				
Base Capacity (vph)	521	2540	1332	333	842
Starvation Cap Reductn	62	579	45	0	0
Spillback Cap Reductn	0	13	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.11	0.90	1.03	0.22	0.37

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
24: Route 44 & D

Rt 44 Signal Option with vol shift
2/18/12



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↗		↖	↗
Volume (vph)	470	1620	1210	8	66	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Flt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3536		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3536		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	1761	1315	9	72	311
RTOR Reduction (vph)	0	0	1	0	0	5
Lane Group Flow (vph)	511	1761	1323	0	72	306
Turn Type	Prot				pm+ov	
Protected Phases	5	2	6		4	5
Permitted Phases						4
Actuated Green, G (s)	25.0	61.0	32.0		16.0	41.0
Effective Green, g (s)	25.0	61.0	32.0		16.0	41.0
Actuated g/C Ratio	0.29	0.72	0.38		0.19	0.48
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	521	2540	1331		333	838
v/s Ratio Prot	c0.29	0.50	c0.37		0.04	c0.11
v/s Ratio Perm						0.09
v/c Ratio	0.98	0.69	0.99		0.22	0.37
Uniform Delay, d1	29.8	6.7	26.4		29.2	13.8
Progression Factor	1.06	0.72	0.93		1.00	1.00
Incremental Delay, d2	26.7	1.0	21.7		1.5	0.3
Delay (s)	58.3	5.9	46.3		30.7	14.1
Level of Service	E	A	D		C	B
Approach Delay (s)		17.7	46.3		17.2	
Approach LOS		B	D		B	

Intersection Summary

HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



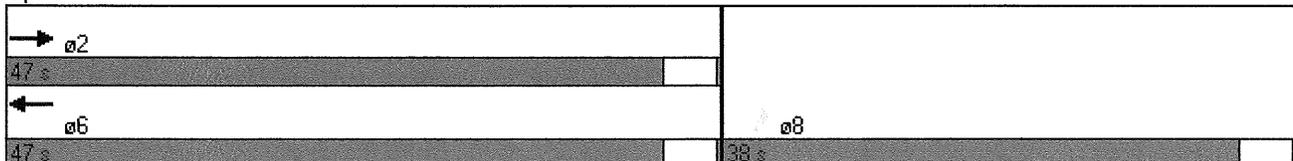
Lane Group	EBT	WBT	NBR
Lane Configurations	↑↑	↑↑	↑↑
Volume (vph)	1288	1326	802
Turn Type		custom	
Protected Phases	2	6	
Permitted Phases			8
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0
Total Split (s)	47.0	47.0	38.0
Total Split (%)	55.3%	55.3%	44.7%
Yellow Time (s)	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Min	C-Max	Min
Act Effct Green (s)	46.1	46.1	30.9
Actuated g/C Ratio	0.54	0.54	0.36
v/c Ratio	0.73	0.75	0.86
Control Delay	18.3	6.7	34.3
Queue Delay	0.1	0.4	1.8
Total Delay	18.4	7.1	36.2
LOS	B	A	D
Approach Delay	18.4	7.1	
Approach LOS	B	A	

Intersection Summary

Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 82 (96%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 18.2
 Intersection Capacity Utilization 70.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 15: Int





Lane Group	EBT	WBT	NBR
Lane Group Flow (vph)	1400	1441	872
v/c Ratio	0.73	0.75	0.86
Control Delay	18.3	6.7	34.3
Queue Delay	0.1	0.4	1.8
Total Delay	18.4	7.1	36.2
Queue Length 50th (ft)	290	75	233
Queue Length 95th (ft)	393	m81	307
Internal Link Dist (ft)	318	261	
Turn Bay Length (ft)			
Base Capacity (vph)	1918	1918	1115
Starvation Cap Reductn	0	127	0
Spillback Cap Reductn	43	0	118
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.75	0.80	0.87

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑↑
Volume (vph)	1288	0	0	1326	0	802
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.95			0.95		0.88
Flt	1.00			1.00		0.85
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	3539			3539		2787
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	3539			3539		2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1400	0	0	1441	0	872
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1400	0	0	1441	0	872
Turn Type					custom	
Protected Phases	2			6		
Permitted Phases						8
Actuated Green, G (s)	46.1			46.1		30.9
Effective Green, g (s)	46.1			46.1		30.9
Actuated g/C Ratio	0.54			0.54		0.36
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	3.0			3.0		3.0
Lane Grp Cap (vph)	1919			1919		1013
v/s Ratio Prot	0.40			c0.41		
v/s Ratio Perm						c0.31
v/c Ratio	0.73			0.75		0.86
Uniform Delay, d1	14.7			15.0		25.1
Progression Factor	1.00			0.34		1.00
Incremental Delay, d2	2.5			1.3		7.6
Delay (s)	17.2			6.4		32.7
Level of Service	B			A		C
Approach Delay (s)	17.2			6.4	32.7	
Approach LOS	B			A	C	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			