Traffic Impact & Access Study

Proposed Park Central
40B Residential Development
Southborough, Massachusetts

Prepared for
Capital Group Properties, LLC

March 2013

GREEN INTERNATIONAL AFFILIATES, INC.
Civil - Structural – Transportation Engineers, Westford, MA

Traffic Impact and Access Study

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Prepared By

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Introduction & Executive Summary

This transportation study provides an analysis of the traffic impacts, area circulation and access impacts associated with the proposed 180 unit residential development in the Park Central site in Southborough, Massachusetts. The site abuts Route 9 and I-495 with current access provided from Route 9 as shown on Figure 1.

This traffic analysis for the Park Central site is focused on the current proposal to construct a multi-family apartment complex consisting of 180 units of housing. The study area chosen for the study considered previous work in the area, the proposal and general knowledge of the project area. The study area focuses on the site drive interface with Flagg Road and its intersection with Route 9. In addition, the overall Flagg Road roadway link and the northern section of Deerfoot Road were reviewed.

During the course of this planning analysis, alternative configurations and access options were explored, As a result, the proposed Park Central development site access plan included in this study consists of converting the existing Park Central Drive to a one way enter only roadway from Route 9 and providing full access via a new roadway link between the site and Flagg Road. The Flagg Road access way would be located approximately 300 feet from Route 9 and allow full two-way movement.

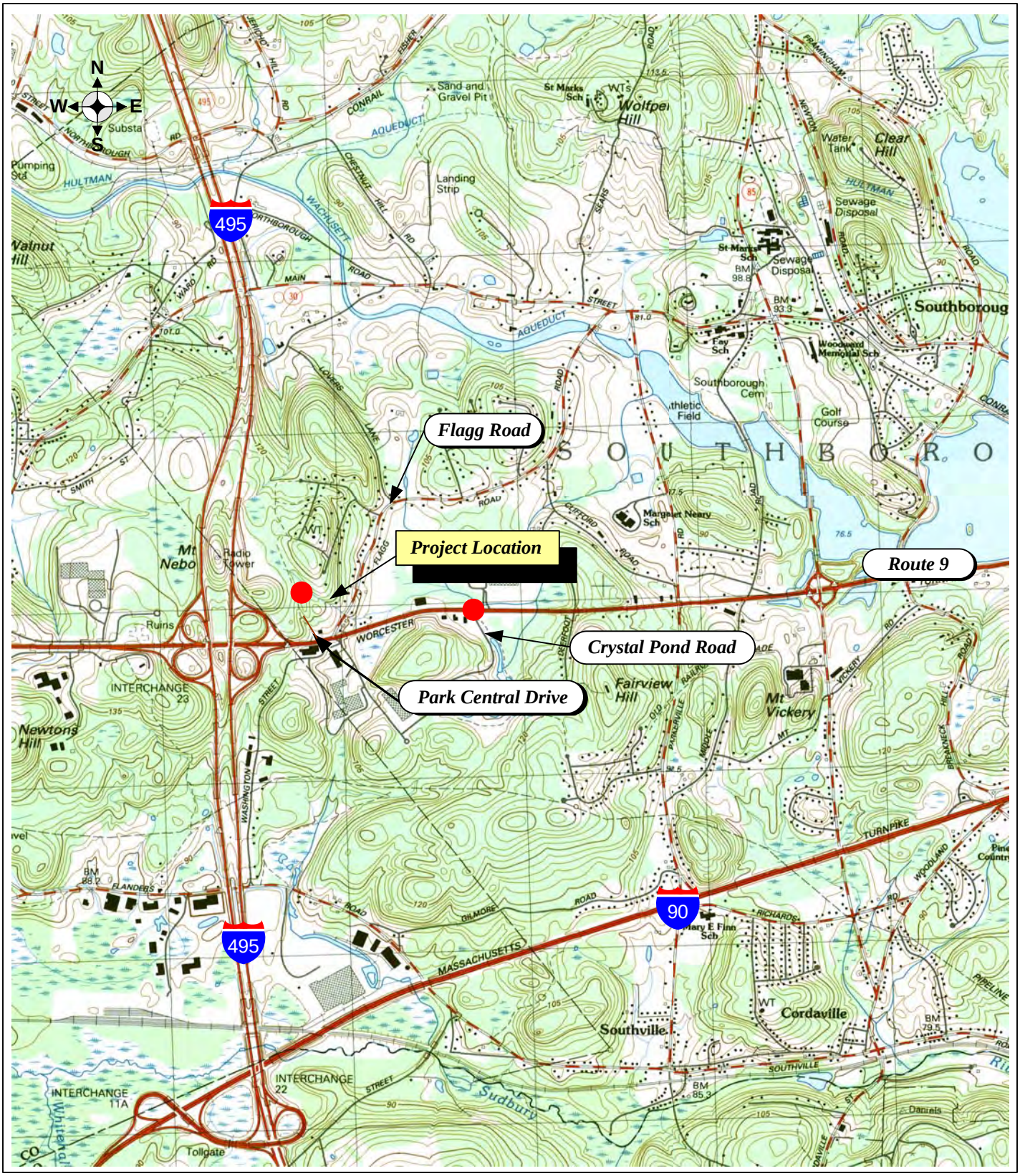
This study includes an evaluation of existing and future (No-Build and Build) traffic volume networks, roadway/site access, traffic circulation and safety considerations. In general, the traffic study follows guidelines established by the Massachusetts Department of Transportation and the Institute of Transportation Engineers (ITE). The project will require an access permit from MassDOT. As part of the study, a series of traffic counts were collected, safety aspects of the abutting roadway system were evaluated, and forecasts of project traffic completed. The following sections of the report describe the data, analysis methods and results of the analysis.

Existing Conditions

The study area was selected based on previous work, and knowledge of the project area. The study area intersections for this analysis included the intersections of Route 9 with Flagg Road; Route 9 at Park Central Drive; and Route 9 at Crystal Pond Road. In addition, the traffic movements between Flagg Road and the I-495 Northbound on-ramp were examined.

Route 9 is a major highway arterial is maintained by the MassDOT in the project area. In the vicinity of the project, it has a general east/west alignment and partially controlled access. In the project area, Route 9 provides access between I-495 and connections to Westborough (west of site) and Framingham and points east.

Recent daily traffic volume data collected on Route 9 in this area showed the roadway to be carrying approximately 54,500 vehicles per day (vpd). Under existing conditions, the most significant constraint in the study network is the Route 9 signalized intersection with Crystal Pond Road. Route 9 can also be affected by the operating conditions of I-495.



Source: USGS Tag Image Graphic (TIFF) from MassGIS. /1 : 25,000

Project Location

Proposed Park Central 40B
Southborough, Massachusetts

Figure 1

Future Conditions

The analysis of the proposed residential development focused on the year 2018. Forecasts of the project were based on guidelines and trip models published in the Institute of Transportation Engineers (ITE). The project is to consist of 180 units of housing. Access to the development site is proposed to consist of a new two-way access drive from Flagg Road located approximately 300 feet north of Route 9. In addition, Park Central Drive is proposed under this plan to be converted to one way north from some point north of Route 9 that would allow traffic to enter the site via Park Central but all exiting traffic would be via the new drive. There are details to work our as to the level of restriction as the recently renovated Cumberland Farms gas station may need to retain its current access/egress plan. Some of this will depend on how MassDOT moves to implement the ultimate Route 9 improvement in the future. For base analysis purposes, the current configuration has been assumed.

The proposed development in total is estimated to generate an increase of 1,214 vehicle trips on a typical weekday. The added trips include 607 entering and 607 exiting trips over the 24-hour period. The weekday morning peak hour is expected to generate 92 new vehicle trips with 18 inbound and 74 outbound trips. The weekday evening peak hour is expected to generate 117 new vehicle trips with 76 inbound and 41 outbound.

The future conditions analysis takes into account background growth for the next 5 years as well as a major site-specific development project (Madison Place) in close proximity of the proposed Park Central development that is currently under construction. Based on the analysis, the following conclusions were developed:

- Regardless of the development of the Park Central project, the traffic flow conditions in the Route 9 corridor experiences certain levels of congestion and delay during the peak commuter hours. The State and regional planning agencies continue to explore long-term improvements for Route 9 corridor to help alleviate current and anticipated travel delays to the extent practical.

- Flagg Road and Deerfoot Road currently experience relatively low volumes and can accommodate additional traffic volume.

- The proposed residential development will generate new vehicle trips over the course of the day, however, given the project's location near Route 9 and I-495, most of the vehicle trips will be oriented to the regional highways and the increase in trips should be manageable.

- With the majority of new site traffic oriented towards Route 9, the larger volume increases will occur on the short section of Flagg Road between Route 9 and the site drive. Without any improvements to Route 9, there would also be some increase in vehicle delay to motorists exiting Flagg Road onto Route 9 with the right turn movement remaining at LOS 'E' or 'F' during the peak hours. However, existing or future Flagg Road residents can use Flagg Road to reach the center of Town, the schools, and Route 85 instead of using Route 9 during the peak hours and thus not add to or be further delayed at the Route 9 intersection.

- Providing a 3rd westbound travel lane on Route 9 from Deerfoot Road thru I-495 as proposed by MassDOT in its transportation improvement plan for this area is expected to significantly improve exiting Flagg Road and the ability for motorists to safely merge or weave into the Route 9 westbound traffic stream.

- Importantly, the proposed development results in relatively small incremental effects on traffic operations related to the Route 9 intersection with Crystal Pond Road under its present configuration and essentially no change in operating condition at this location, although during peak hours, it is recognized that long delays are currently incurred by motorists at this location and this will not change until MassDOT implements its long range improvements at this location.

Recommended Mitigation Plan

Recognizing that the project will generate a higher amount of new traffic in the immediate area, a set of recommended mitigating actions developed to reduce the project's impact and enhance the safety and overall operating conditions of the roadway system. The proposed actions are as follows:

- Construct the proposed new link to Flagg Road that would provide for traffic entering the new development and all exiting traffic from the Park Central land uses. The new roadway should meet Town standards in terms of width, include a sidewalk along one side of the new link and have 30 foot corner radii.

- The existing section of Flagg Road between the site drive and Route 9 should be improved to include providing a consistent 22 to 26 foot wide pavement section depending on feasibility.

- STOP control should be installed on the new road approach to Flagg Road. Constructing the new site road will include clearing vegetation and re-grading to assume adequate visibility at its intersection with Flagg Road is created.

- Extend Park Central Drive to the new segment from Flagg Road and control the movement on Park Central Drive from Route 9 to the extent feasible, with the goal to restrict the drive to site inbound trips only. At a minimum, the office and motel related exiting trips could shift to the new link.

- At a minimum with the project, Install 'Do Not Enter" sign on Park Central Drive at beginning of office and motel to inform motorists exiting either land use to exit via the new link to Flagg Road. This should be coupled with one-way signage in this same area as well as 'TO ROUTE 9' guide signs for the office and motel traffic. If Cumberland Farms can be added to the restriction, then an EXIT-RIGHT ONLY sign would need to be added at their driveway to Park Central Drive.

- While no significant safety deficiency was noted in the analysis, to further enhance safe traffic flow along Flagg Road, install advance curve warning signs, a 'STOP Ahead' sign, and an

advance intersection warning sign approaching Route 9 and Deerfoot Road.

- It is recommended the Applicant work with the regional business groups and planning agencies to continue encouraging the MassDOT to improve the westbound section of Route 9 in the project area. An alternative was presented in the recent recommendations by MassDOT for improving Route 9 in this area. This would include of the construction of the consistent 3rd lane on Route 9 westbound from Deerfoot Road east of Crystal Pond Road through the I-495 interchange. The lane, which will facilitate improved exiting from the side streets and driveways between Crystal Pond Road and I-495, largely involves reconstructing the existing Route 9 shoulder.

Existing Conditions

To begin to understand the impacts of a potential development, an understanding of the area transportation system is needed. Inventories were completed to identify the physical and operational characteristics of the system. The following sections describe the existing transportation system.

A. EXISTING ROADWAY NETWORK

The study area was selected based on previous work and knowledge of the project area. It has also considered traffic related issues that have been raised in the past at the State as well as regional planning levels. The study area intersections for this analysis included:

- Flagg Road at Route 9,
- Crystal Pond Road at Route 9,
- Route 9 and the I-495 ramps, and
- Park Central Drive at Route 9.

Figure 2 illustrates the study area roadways and intersections while subsequent photographs show the current conditions of the study network. In addition to the intersections, the Flagg Road and Deerfoot Road roadway segments were reviewed. A general description of these roadways follows:

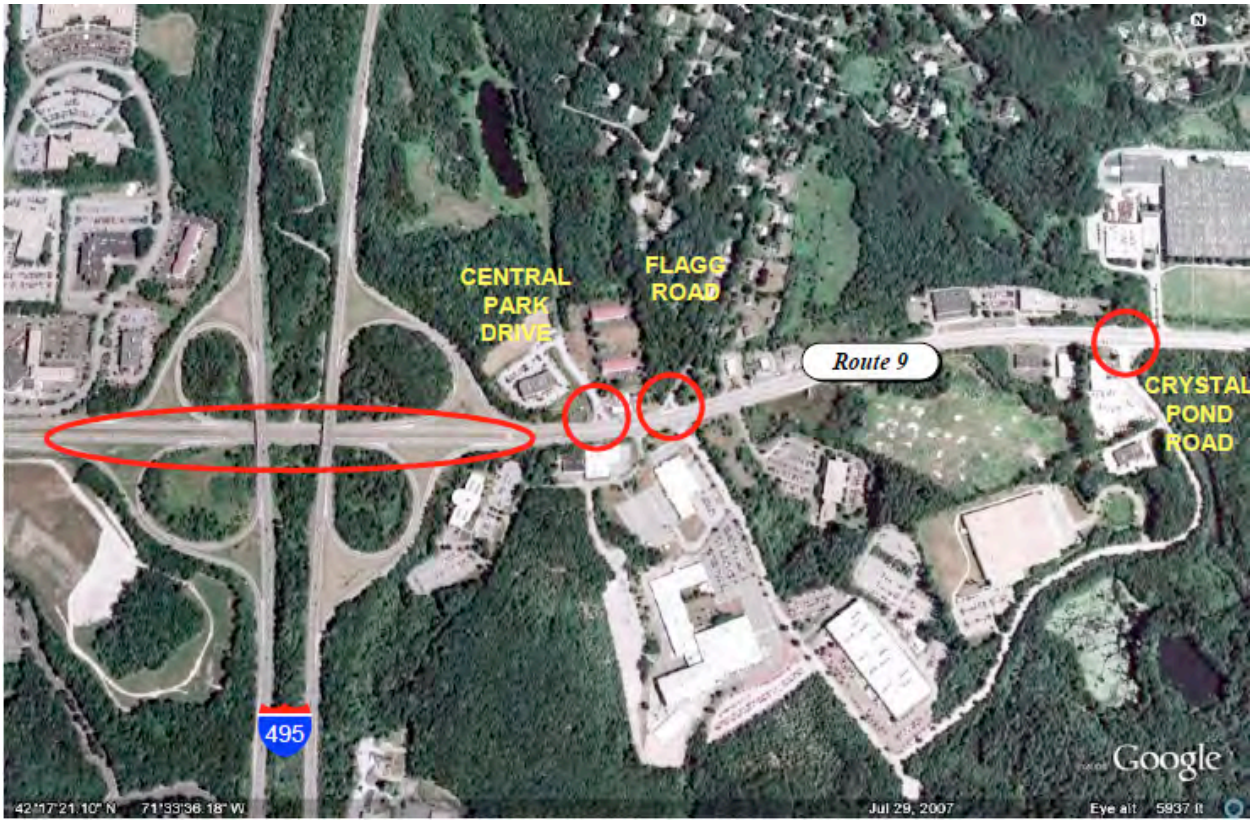


Figure 2 - Study Area Intersections

1. Route 9

Route 9, which is under the jurisdiction of the MassDOT, runs in a general east-west direction within the area. It is a major State highway that extends from Pittsfield to Boston. Within the Southborough area, Route 9 is a major arterial roadway providing connections to I-495 and the Massachusetts Turnpike (I-90) in Framingham.

Route 9, near Park Central Drive and Flagg Road has a total width of approximately 98 feet at the site drive. Eastbound and westbound traffic is divided by a 14-foot median in the immediate project area along with a shoulder that is up to 15 feet in width. Pavement markings along both the eastbound and westbound sections currently consist of a single yellow inside edge line, broken white lane lines, and single white outside edge lines. The westbound section contains a two through lanes with a 12 foot wide turning lane into Flagg Road. West of Flagg Road, the additional lane does not exist though there is a shoulder provided in varying widths to I-495. The bituminous pavement surface in the area was generally in good condition. Route 9 contains sloped edging and a sidewalk exists between The Wendy's Restaurant and Flagg Road.

Route 9 at Flagg Road

Flagg Road forms an unsignalized three way intersection with Route 9. The Route 9 westbound approach at this location contains two through lanes and a deceleration lane/turn lane at Flagg Road. The right turn exit on the Flagg Road approach is under "STOP" control. A small triangular shaped island separates the entering and exiting traffic on Flagg Road.

Photograph 1: Intersection of Flagg Road with Route 9 Westbound

Photograph 2: Park Central Drive Looking East on westbound side

2. Flagg Road

Flagg Road is a two lane roadway in Southborough under local jurisdiction and is oriented in a general north-south direction though the middle portion curves into an east-west alignment. Flagg Road connects with Deerfoot Road and Main Street (Route 30) in the north and Route 9 to the south. It functions as a minor collector and local roadway intersecting with a number of subdivision roads. These include Eastbrook Farm Road, Blackthorn Drive, Lovers Lane, Red Gate Lane, Orchard Road and Strawberry Hill Road. Flagg Road also connects with Deerfoot Road to form a three-way unsignalized intersection with an acute angle of intersection.

Flagg Road north of its intersection with Route 9 is approximately 20-22 feet wide and narrows to 17-18 feet in some portions of the roadway north of the proposed site drive with a single travel lane in each direction. North of the proposed site drive is a culvert crossing with guardrail in place along each side of the road. There were no pavement markings including a centerline observed along the roadway. There are no sidewalks along Flagg Road. Trees and utility poles exist along the roadway in close proximity to the pavement edge. Posted speed limit signs on Flagg Road near Route 9 were noted observed but a 25 mph sign was posted in the northbound direction approximately 0.1 miles from Route 9.

Land use along Flagg Road consists of primarily residential homes with some wooded undeveloped parcels.

2. Deerfoot Road

Deerfoot Road is a two-lane roadway in Southborough under local jurisdiction aligned in a general north-south direction connecting Route 9 in the south to Main Street (Route 30) in the north. Deerfoot Road north of its intersection with Flagg Road is approximately 22 to 24 feet wide and is relatively straight with some gentle changes in vertical alignment. No pavement markings were observed along Deerfoot Road with the exception of near the school. There are no sidewalks along Deerfoot Road. The roadway is in fairly good condition. Trees and utility poles exist along the roadway in close proximity to the pavement edge. The intersection of Flagg Road with Deerfoot Road is at more of a skewed angle, however, there are multiple legs and traffic control that accommodate all turning movements.

There are three painted crosswalks and one “School” word pavement marking on the Deerfoot Road segment. All these pavement markings are in fairly good condition. Signage

along the roadway consist of speed limit signs (posted speed limit is 25 mph, and in school zone is 20 mph when flashing), pedestrian crossing signs and school area signs. Along Deerfoot Road flashing signals were installed to warn of speed limits in school zone. Most of the signs and flashing signals are in very good condition with one noted issue that one tree partially blocks the school zone sign (S1-1) along Deerfoot Road northbound.

Along Deerfoot Road from Flagg Road to Main Street segment, the majority of the area is residential, and P. Brent Trottier Middle School locates on the east side of the segment.

4. Park Central Drive

Park Central Drive is a two-lane driveway that runs in a general north-south direction. Park Central Drive is the current access roadway for the existing office building and the Red Roof Inn. In addition, the gas station that was recently reconstructed and converted to a new Cumberland Farms uses Park Central Drive for its exiting traffic. Park Central Drive is approximately 44 feet wide with a single travel lane in each direction although there are no pavement markings such as double yellow centerline to separate directional flows. A 4 to 5 foot bituminous sidewalk exists along the east side of Park Central Drive with granite curbing.

Route 9 at Park Central Drive

Park Central Drive forms an unsignalized "T" type intersection with Route 9 and is located approximately 325 feet east of the I-495 northbound on-ramp. It is currently a two-way drive with one travel lane per direction. The southbound approach of Park Central Drive to Route 9 is under "STOP" control and all exiting traffic from Park Central Drive is restricted to right turns. Currently, there is a short deceleration/turn lane on Route 9 between Park Central Drive and the I-495 northbound on-ramp.

5. Crystal Pond Road

Crystal Pond Road is a two-lane roadway in Southborough under local jurisdiction, which runs in a general north-south direction. Crystal Pond Road connects with Route 9 on the south side approximately 2,500 feet east of Flagg Road. The street connects with Coslin Drive to the south that also provides access to the existing industrial/office uses on the south side of Route 9 and east of I-495.

Crystal Pond Road is approximately 48 feet wide at of the Route 9 intersection where turn lanes are provided at the intersection. The roadway reduces to 26 feet with a single travel lane in each direction 300 feet south of Route 9. There were no pavement markings on Crystal Pond Road beyond the immediate intersection with the exception of edge lines. The edges of the roadway are marked with white edge lines and provide approximately 2 foot paved shoulders adjacent to granite curbing. A sidewalk exists along the west side rounding at the Crystal Pond Road intersection with Route 9.

Route 9 at Crystal Pond Road

The Route 9 signalized intersection with Crystal Pond Road is a "3-way" intersection, with Crystal Pond Road providing the northbound approaches and Route 9 providing the eastbound and westbound approaches. The eastbound and westbound approaches to this intersection each contain a left turn/U-turn lane, two through travel lanes, and a shared through/right travel lane. The traffic signal is a fully

actuated signal with protected and overlapping movements. The northbound approach contains exclusive two left turn lanes and channelized right turn lane for Route 9 eastbound. Potential improvements have been studied for this location including in the Final EIR for EMC[1], as well as the recent MassDOT study of I-495/I-90 and Route 9.

In general, land uses currently along Crystal Pond Road south of Route 9 include office space, business and R&D space. Just east of Crystal Pond Road on the westbound side of the highway is the former Verizon site, which currently functions largely as a warehouse. West of Crystal Pond Road, the Madison Place apartment complex is currently under construction. Access from Madison Place will be via Crystal Pond Road.

Route 9 at Crystal Pond Road looking eastbound

B. TRAFFIC VOLUMES

Historical traffic data was used for the basis of this study including the 2011 volumes collected at the Route 9/Crystal Pond Road intersection as part of the Madison Place development traffic study[2]. In addition, data collected at Flagg Road and Park Central Drive as part of previous analyses[3] completed for this subject site were used as well. New traffic was collected along Flagg Road and Deerfoot Road as part of this study. Adjustments were made using the Crystal Pond road intersection volumes as a control. In general, volumes in the section of Route 9 have decreased to an extent between 2008 and 2011. Historical data is included in the Appendix. Table 1 summarizes the recent volume data collected on Flagg Road and Deerfoot Road.

[1] Vollmer Associates, Draft Environmental Impact Report – EMC Corporation, Southborough & Westborough, MA, September 29, 2006.

[2] Bristol Traffic & Transportation Consulting, LLC, Traffic Impact Study, Proposed Madison Place 40B Development, 2011.

[3] MS Transportation Systems, Inc., Traffic Impact & Access Study, Proposed Park Central Expansion, 2008.

TABLE 1
SUMMARY OF TRAFFIC VOLUMES
Flagg Road & Deerfoot Road

Roadway	Date of Count	24 Hour Weekday	AM Peak Hour	Peak %	PM Peak Hour	Peak %
Flagg Road (near Route 9)						
	2/5/13	944	102	10.8%	80	8.0%
	2/6/13	978	80	8.2%	90	9.2%
	Average	961	91	9.5%	85	8.8%
Deerfoot Road (near Main Street)						
	2/5/13	1620	251	15.5%	160	9.9%
	2/6/13	1882	251	13.3%	179	9.5%
	Average	1751	251	14.4%	170	9.7%

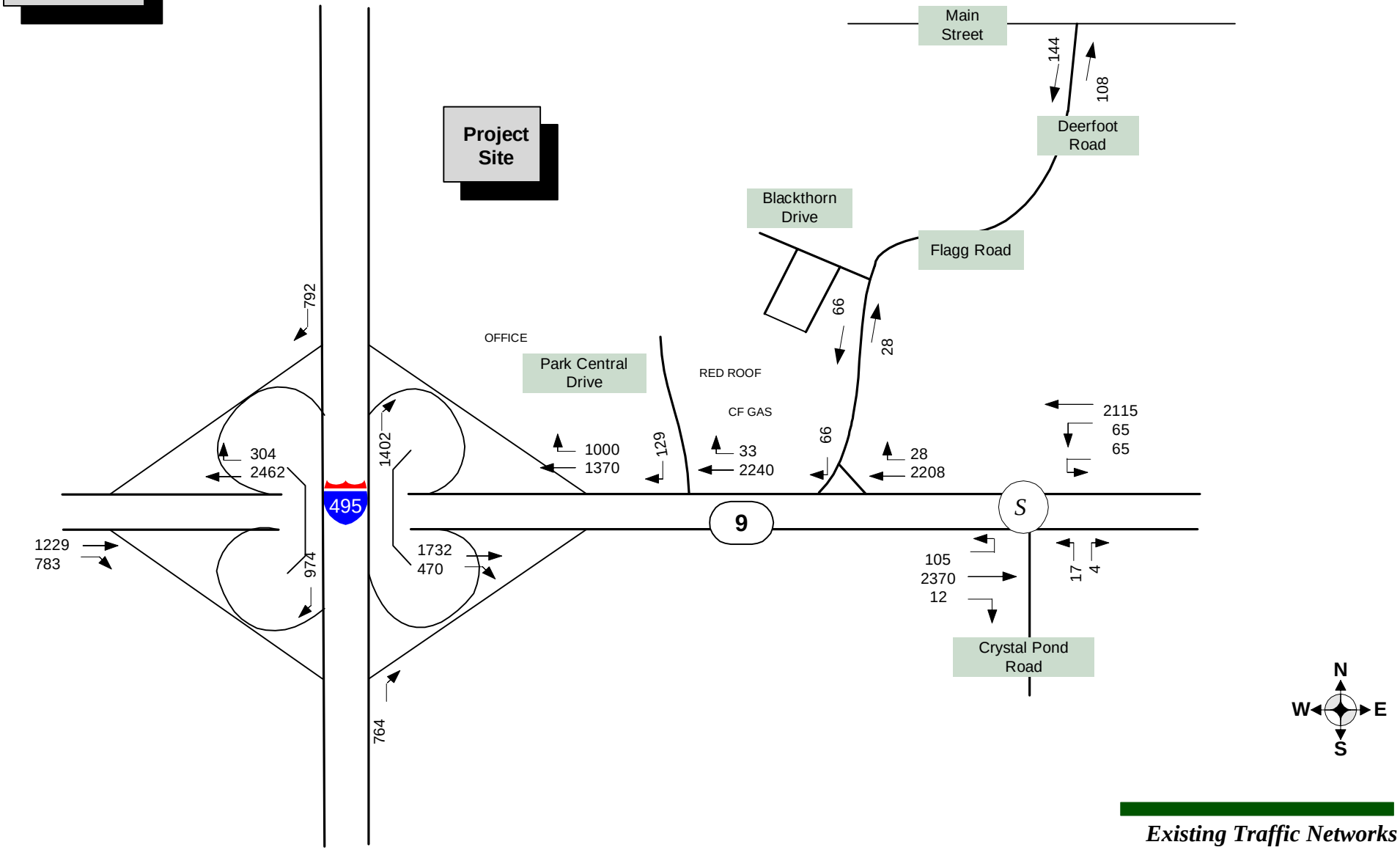
Figures 3 and 4 illustrate the existing weekday morning and weekday evening peak hour traffic volumes at the study intersections.

C. CRASH DATA REVIEW

As part of the updated analysis, updated crash history was compiled and reviewed for the study locations for the 2008 to 2010 period. The review focused on Route 9 at Crystal Pond Road; Route 9 at Flagg Road; and Route 9 at Central Park Drive. The data are summarized in Table 2. Accident data for the Town of Southborough were obtained from the MassDOT Crash Record System (CRS), which is compiled with information from the Registry of Motor Vehicles (RMV).

Review of intersection crash data summarized in Table 1 indicated that the intersection of Crystal Pond Road and Route 9 reported a total of twenty (20) crashes for an average of 6.7 accidents per year over the three year period. Most of the reported crashes were classified as rear-end type. Of the 20 total crashes at this location, 13 were reported as property damage only crashes. There were only four reported crashes on Flagg Road at Route 9 and no crashes reported at the existing drive for Park Central during this period.

Proposed Park Central 40B
Residential Development
Southborough, Massachusetts



Existing Traffic Networks

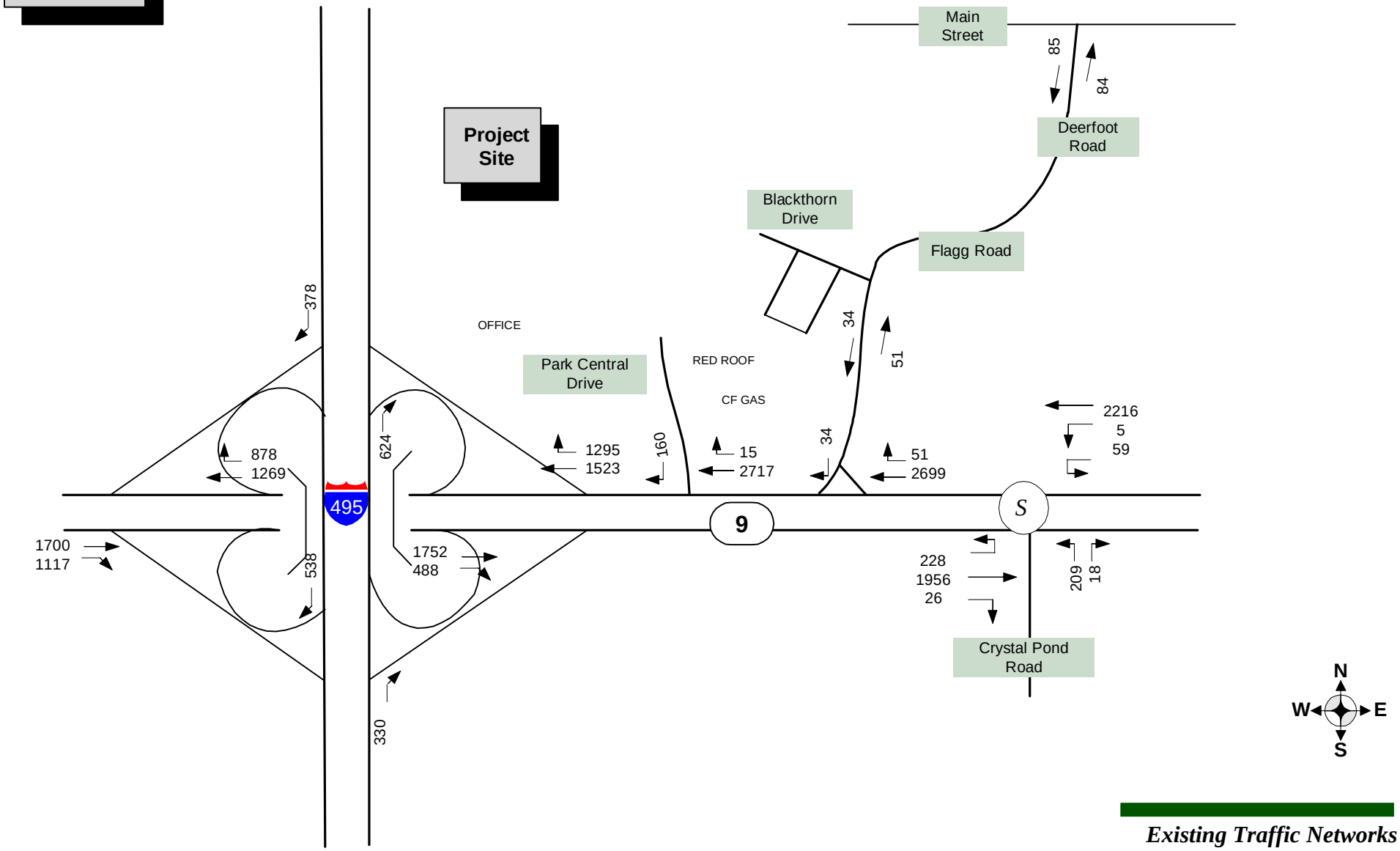
Figure 3

Green International Affiliates, Inc.

S - Signalized Study Intersection

NOT TO SCALE

Proposed Park Central 40B
Residential Development
Southborough, Massachusetts



Existing Traffic Networks

Figure 4

Green International Affiliates, Inc.

S - Signalized Study Intersection

NOT TO SCALE

TABLE 2
SUMMARY OF INTERSECTION CRASH DATA (2008-2010)

Year	Total Acc.	Crash Type				Severity			Pavement		Weather		
		AC[a]	RE[b]	HO[c]	U[d]	PD[e]	PI[f]	F[g]	Dry	Wet[h]	Clear	Snow	Rain[i]
Crystal Pond Road at Route 9													
2008	9	0	9	0	0	7	2	0	8	1	7	0	2
2009	7	0	7	0	0	4	2	0	6	1	4	0	3
2010	4	0	3	1	0	2	2	0	4	0	4	0	0
Flagg Road at Route 9													
2008	2	0	2	0	0	2	0	0	1	1	1	0	1
2009	2	1	1	0	0	2	0	0	1	0	1	0	1
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
Park Central Drive at Route 9													
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: Based on data provided by the MassDOT
[a] Angle Collision [b] Rear-End [c] Head On [d] Unknown [e] Property Damage Only [f] Personal Injury [g] Fatality
[h] Wet, Snowy or Icy [i] Rain, Cloudy or Foggy

As part of this safety review, the "crash rate" for the study intersections was also determined. The calculation of the crash rate accounts for the amount of traffic that enters the intersection, and relates the number of accidents at a location directly to the amount of traffic that passes through the location. It becomes a more comprehensive measure for identifying potentially hazardous locations compared to simple averages. The calculated rate is compared to the District wide averages. Intersections experiencing crash rates greater than the above averages are potentially experiencing an unusually high number or higher than expected number of crashes relative to traffic volumes at that particular location and may warrant further investigation or improvements. For the MassDOT District 3 area, which covers the study area Cities and Towns, has an average crash rate of 0.66 crashes per MEV for unsignalized intersections and 0.90 crashes per MEV for signalized intersections. Table 3 summarizes the results.

TABLE 3
SUMMARY OF INTERSECTION CRASH RATE (2008-2010)

Intersection	Type of Control	Total No. of Crashes (3 Years)	Average No. of Crashes/Yr.	Crash Rate (per MEV)
Park Central Drive at Route 9	Unsignalized	0	0	0
Flagg Road at Route 9	Unsignalized	4	1.3	0.13
Crystal Pond Road at Route 9	Signalized	20	6.7	0.33

Note: Unsignalized intersections: MassDOT District 3 average crash rate: 0.66.
Signalized intersections: MassDOT District 3 average crash rate: 0.90.

All unsignalized intersections had substantially lower crash rates than the current MassDOT District 3 averages. The Crystal Pond Road signalized intersection with Route 9 experienced 6.7 reported crashes per year and had a crash rate slightly lower than the average. Detailed intersection crash rate worksheets for the study intersections are included in the Appendix.

Based on the review of crash frequency and crash rates, it was concluded that the study intersections that have the strongest relation to the proposed project including Route 9 with Flagg Road are not deficient in terms of crash experience. The Route 9/Crystal Pond Road intersection though well below the MassDOT average rate has been the subject of further study – most recently by MassDOT as part of the I-495/I-90/Route 9 study.

In addition to the study intersections, a review of the data showed that there were five (5) reported crashes along the Flagg Road segment at various locations over the three year period while two (2) crashes were reported for the Deerfoot Road segment between Flagg Road and Main Street over the same period. In total, approximately two reported crashes per year for the combined length of Flagg Road and the northern portion of Deerfoot Road ((between Flagg Road and Main Street). The majority of reported crashes were single vehicle type crashes and property damage only. Given the length of roadway section, the volumes and number of crashes, the analysis of the crash data has not indicated any specific safety deficiency.

Probable Impacts of the Project

In this section of the report, the impacts of the proposed Park Central 40B residential development on the roadway network within the study area are described. For the purpose of this study, a Build year of 2018 was selected which presumes a 5 year forecast from the approval would be anticipated in 2018. The No-Build traffic volume network was developed by taking into account existing traffic volumes, area traffic volume growth for five years, and traffic from potential site specific (background) developments together. The impact of No-Build and Build traffic conditions during the weekday morning and evening peak hours were then evaluated.

A. NO-BUILD TRAFFIC VOLUMES

In general, growth in traffic is expected to occur over the years due to a combination of population and economic activity. In the project area, there is one definitive project of size currently underway. A number of projects have been put on hold or possibly abandoned as a result of the economy over the past 4 to 5 years. 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 from the MassDOT Traffic Count Reports. Historical traffic data from the MASSDOT permanent count station (listed previously) indicated an annual traffic growth rate for the area of virtually no change and in some cases, decreasing traffic for the past 4 to 5 years. The group data from MASSDOT shows virtually no recent substantive change on volumes across the District 3 region.

However, to account for growth that will eventually return and may occur outside the project area, growth rates of ½% per year for 3 years and 1% per year for the following 3 years were selected as being reasonable for analysis purposes at this time. In addition to the background growth rate, site-specific developments as noted below in the area were also identified and associated trips applied to the networks.

2. Site Specific Developments

As part of developing the No-Build traffic conditions, information on additional approved or planned projects that are anticipated within the build-out time frame of five (5) years in the vicinity of the proposed project (that could impact the study area/intersections) was researched. As indicated previously, the Madison Place development that includes 140 apartment units was approved in 2012 and is presently under construction. The development will be accessed entirely from Crystal Pond Road until MassDOT begins to implement major improvements at the Route 9 intersection with Crystal Pond Road.

It would appear that the EMC plans that include development of a new corporate campus to the west of Madison Place continue to be on hold. There is no indication at this point when that project will be initiated. For the purposes of this analysis, only Madison Place was specifically incorporated into the networks.

3. No-Build Traffic Volumes

Consequently, the (No-Build) traffic networks were developed based on the above items extending the network to the Year 2018. Peak hour trips estimated for Madison Place were taken from the traffic study completed for that project.

The year 2018 No-Build traffic volumes reflect traffic from the above noted site-specific development and background growth added to the present traffic volumes. The estimated year 2018 No-Build traffic volumes projected for the weekday morning and weekday evening peak hours at the study intersections are shown in Figures 5 and 6.

B. SITE GENERATED TRAFFIC VOLUMES

In this section, traffic forecasts related to the proposed Park Central development are described. The proposed development includes a total of 180 apartment units. Access to the site could be via both the existing Park Central Drive and a proposed new link from Flagg Road into the site. This new link would allow for both entering and exiting trips. Under this currently proposed access, no site exiting trips could exit from Park Central Drive. Under the current plan, the new intersection of Flagg Road with the site drive would allow all turn movements.

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[4] for similar land uses were examined. ITE trip generation statistics represent a compilation of trip data from studies/projects throughout the United States for different types of land uses and developments.

To estimate daily and peak hour trips for the proposed Park Central residential development, the ITE trip generation data and models for Apartments (Land Use Code 220) were used in this study. The estimated trips generated for the proposed park expansion are presented in Table 4. Detailed trip generation calculations are included in the Appendix.

[4] Institute of Transportation Engineers. Trip Generation, 9th Edition. 2012.

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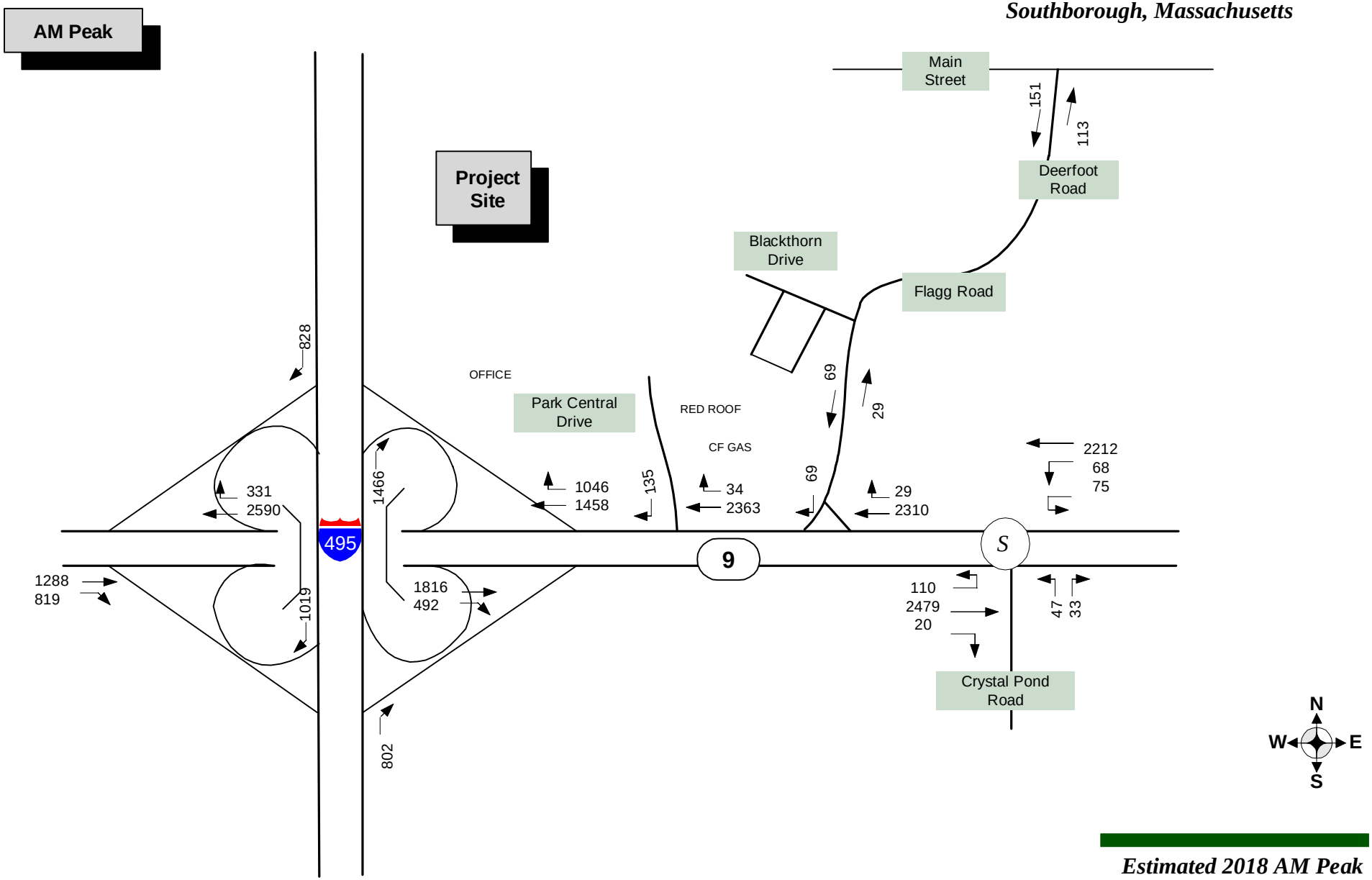


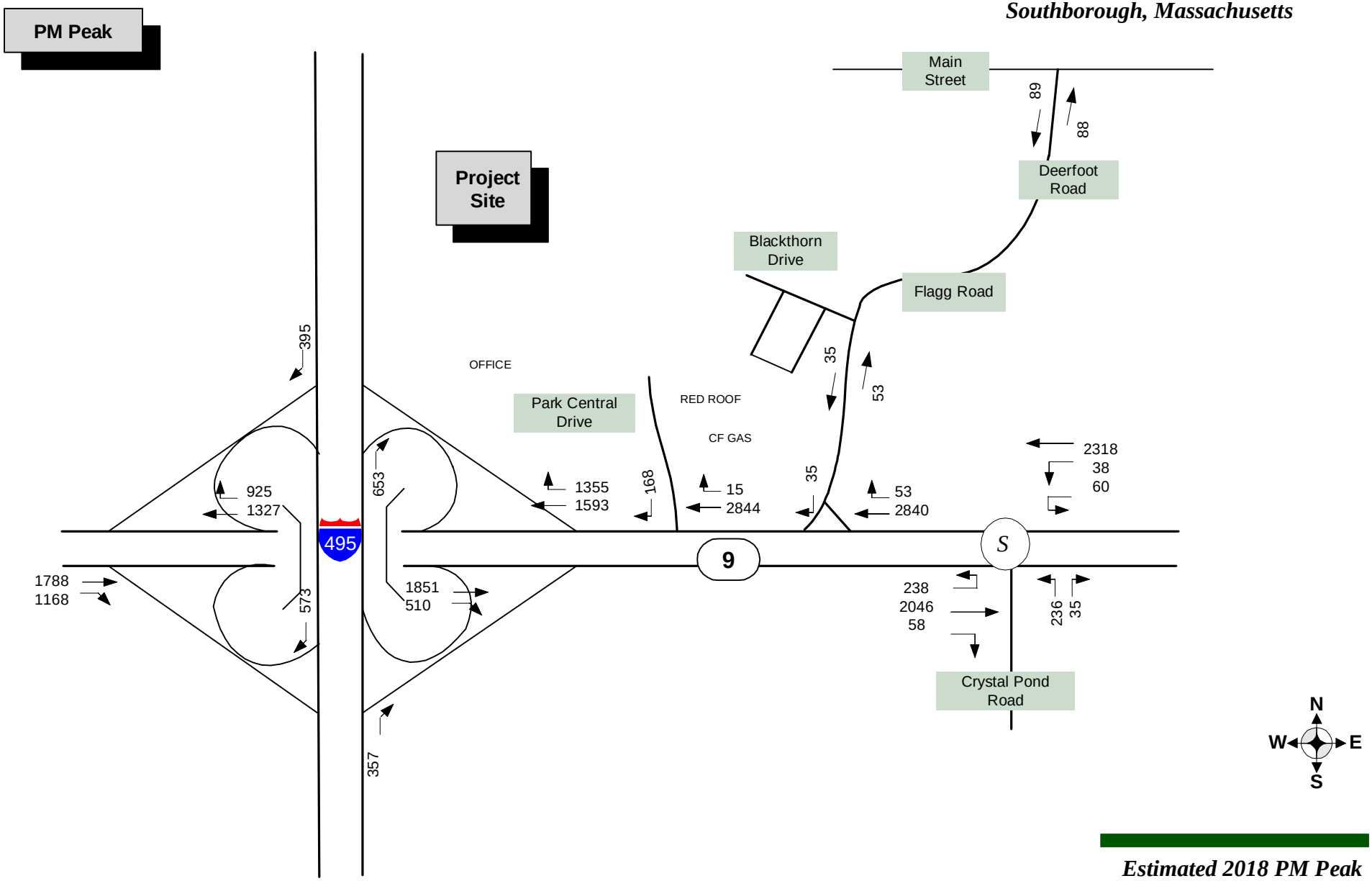
Estimated 2018 AM Peak
No-Build Traffic Networks

Green International Affiliates, Inc.

S - Signalized Study Intersection

Figure 5
NOT TO SCALE

Proposed Park Central 40B
Residential Development
Southborough, Massachusetts



Estimated 2018 PM Peak
No-Build Traffic Networks

Green International Affiliates, Inc.

S - Signalized Study Intersection

Figure 6
NOT TO SCALE

TABLE 4
SUMMARY OF ESTIMATED PROJECT TRIP GENERATION

		In	Out	Total
Time Period				
Weekday – 24 hrs		607	607	1,214
AM Peak Hour		18	74	92
PM Peak Hour		76	41	117

Source: ITE Trip Generation 9th Edition – LUC 220

As shown in Table 4, the proposed Park Central apartment development is expected to generate 1,214 vehicle trips on a typical weekday. The added trips include 607 entering and 607 exiting trips over the 24 hour period. The weekday morning peak hour is expected to generate 92 more external trips with 18 inbound and 74 outbound trips. The weekday evening peak hour is expected to generate 117 more external trips with 76 inbound and 41 outbound.

2. Trip Distribution/Assignment

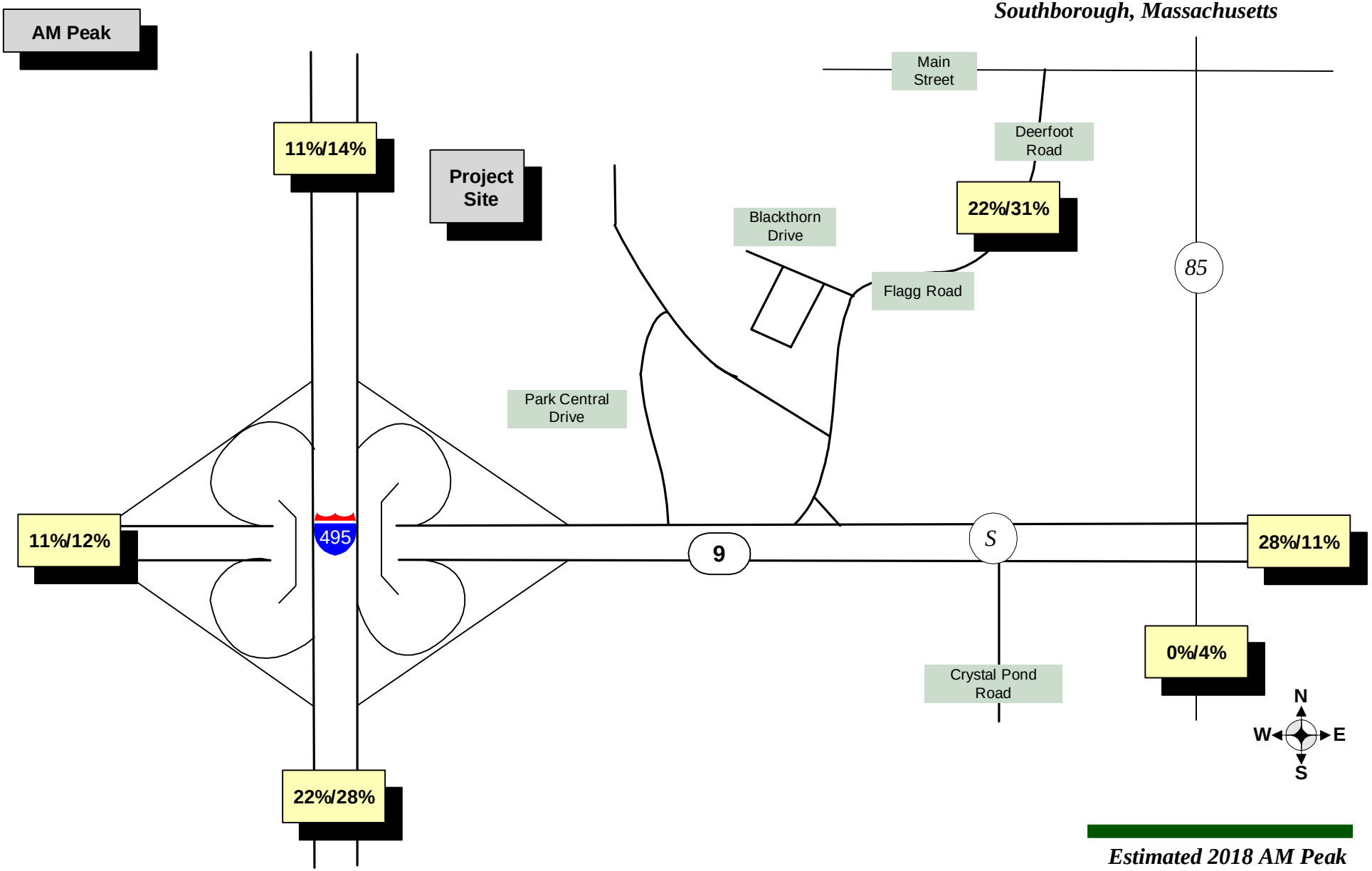
Once the number of trips projected to be generated by the development has been determined, these trips are then assigned to the site driveways and study area roadways based on trip distribution patterns determined for the proposed development. Directional distribution of generated trips to and from the 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.

For this study, traffic flow patterns within the study area as well as access options to the site were reviewed. Employment trip origin patterns for Southborough residents from the most recently available census data were also reviewed and became the basis for the traffic assignments. In addition to the census data, consideration of the abutting roadway network, typical peak hour conditions and the work place location, the trip distribution percentages were used to assign the project trips. The overall arrival/departure trip distribution percentages are presented in Figures 7 and 8.

3. Build Traffic Volumes

Trips projected for the proposed project were assigned to the study area roadways using the trip distribution percentages shown in Figures 7 (morning arrival/departure) and 8 (afternoon arrival/departure). Estimated peak hour site traffic volumes were then added to the No-Build traffic volumes shown in Figures 5 and 6 to establish the 2018 Build condition traffic volume network. Figures 9 and 10 present the Build traffic volume network for the weekday morning and evening peak hours, respectively.

Proposed Park Central 40B
Residential Development
Southborough, Massachusetts



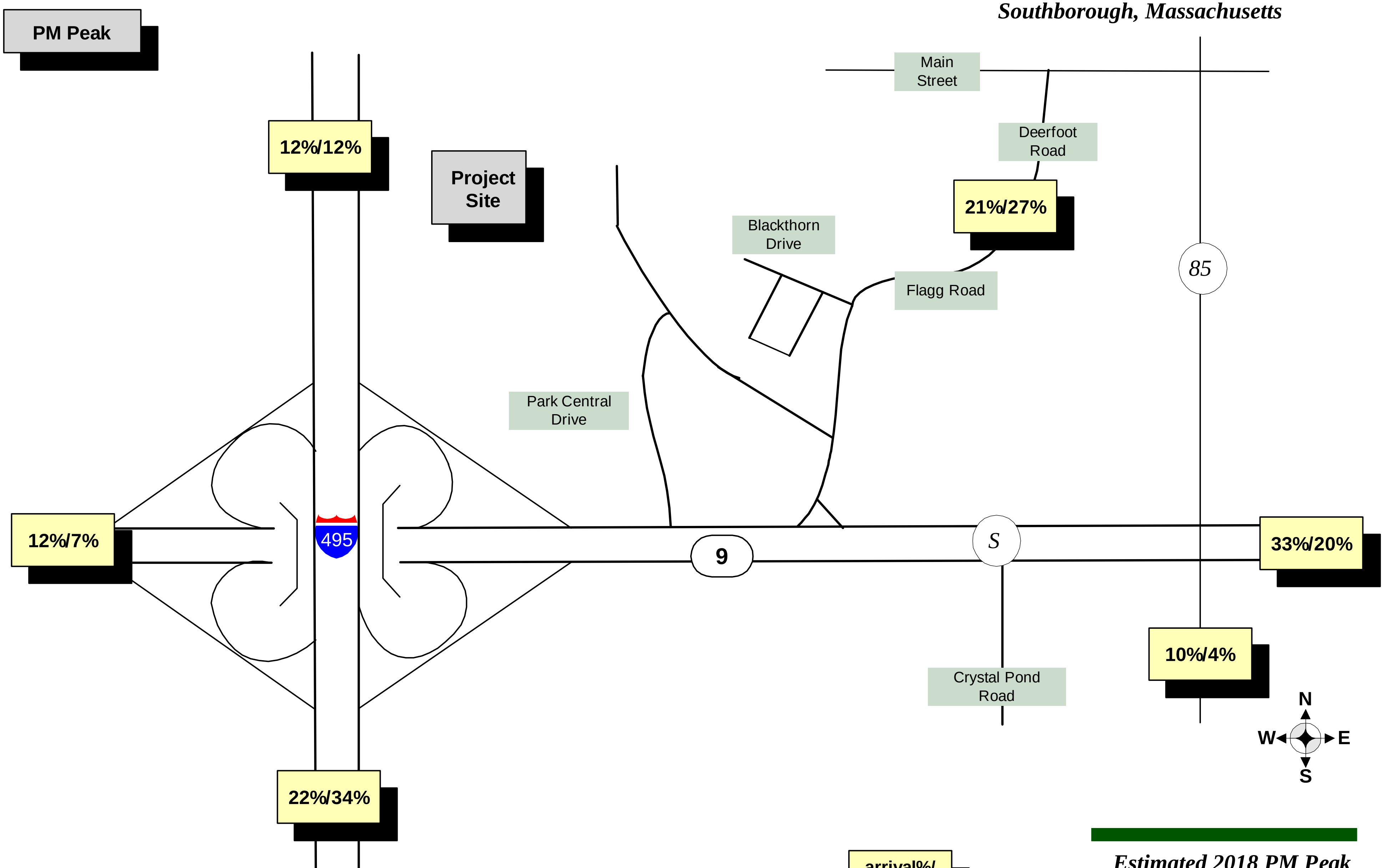
Estimated 2018 AM Peak
Trip Distribution Pattern

arrival%/depart %

S - Signalized Study Intersection

Figure 7
NOT TO SCALE

Proposed Park Central 40B
Residential Development
Southborough, Massachusetts



arrival%/ depart %

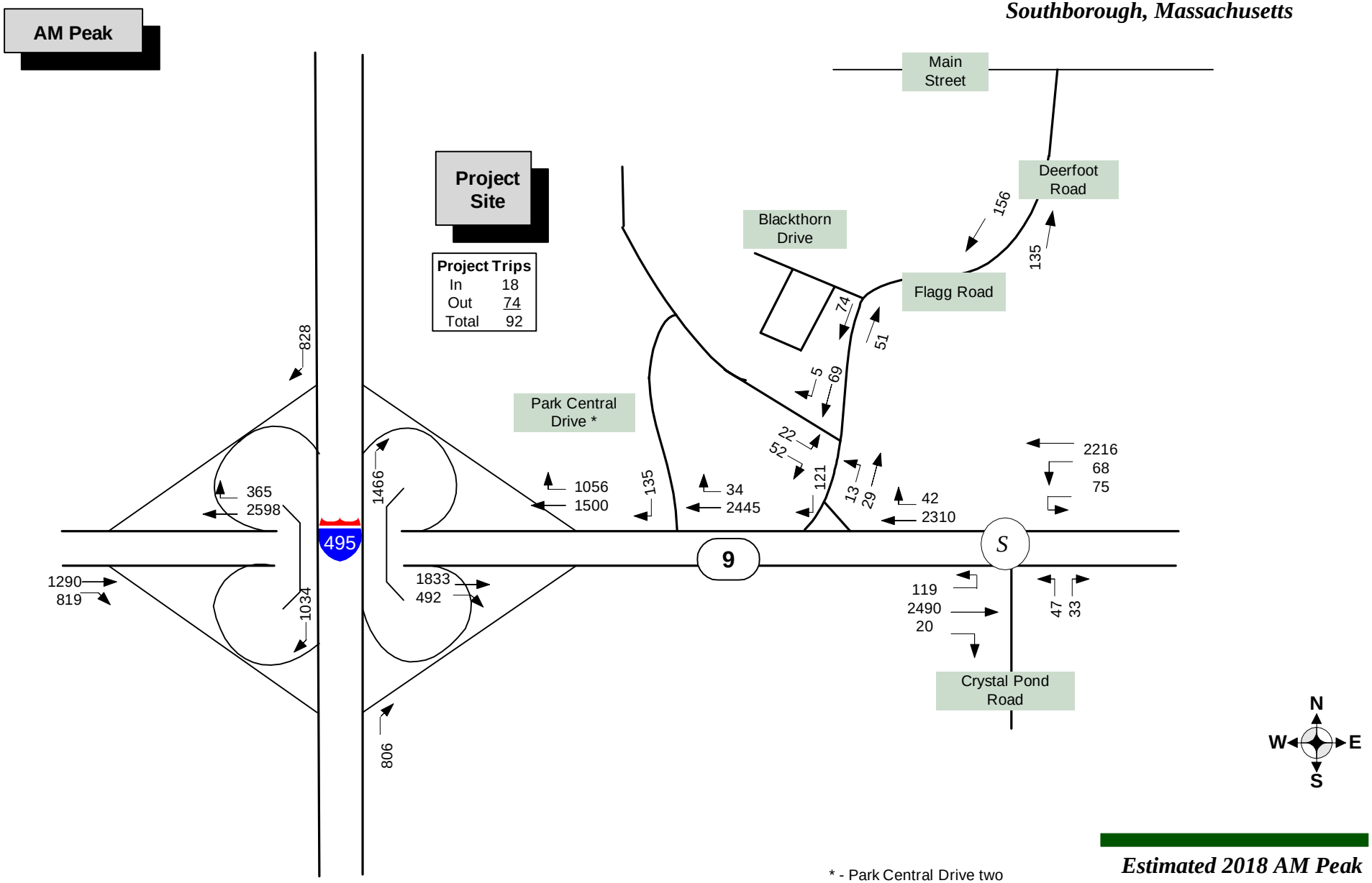
S - Signalized Study Intersection

Estimated 2018 PM Peak Trip Distribution Pattern

Figure 8

NOT TO SCALE

Proposed Park Central 40B
Residential Development
Southborough, Massachusetts



* - Park Central Drive two way in base condition

S - Signalized Study Intersection

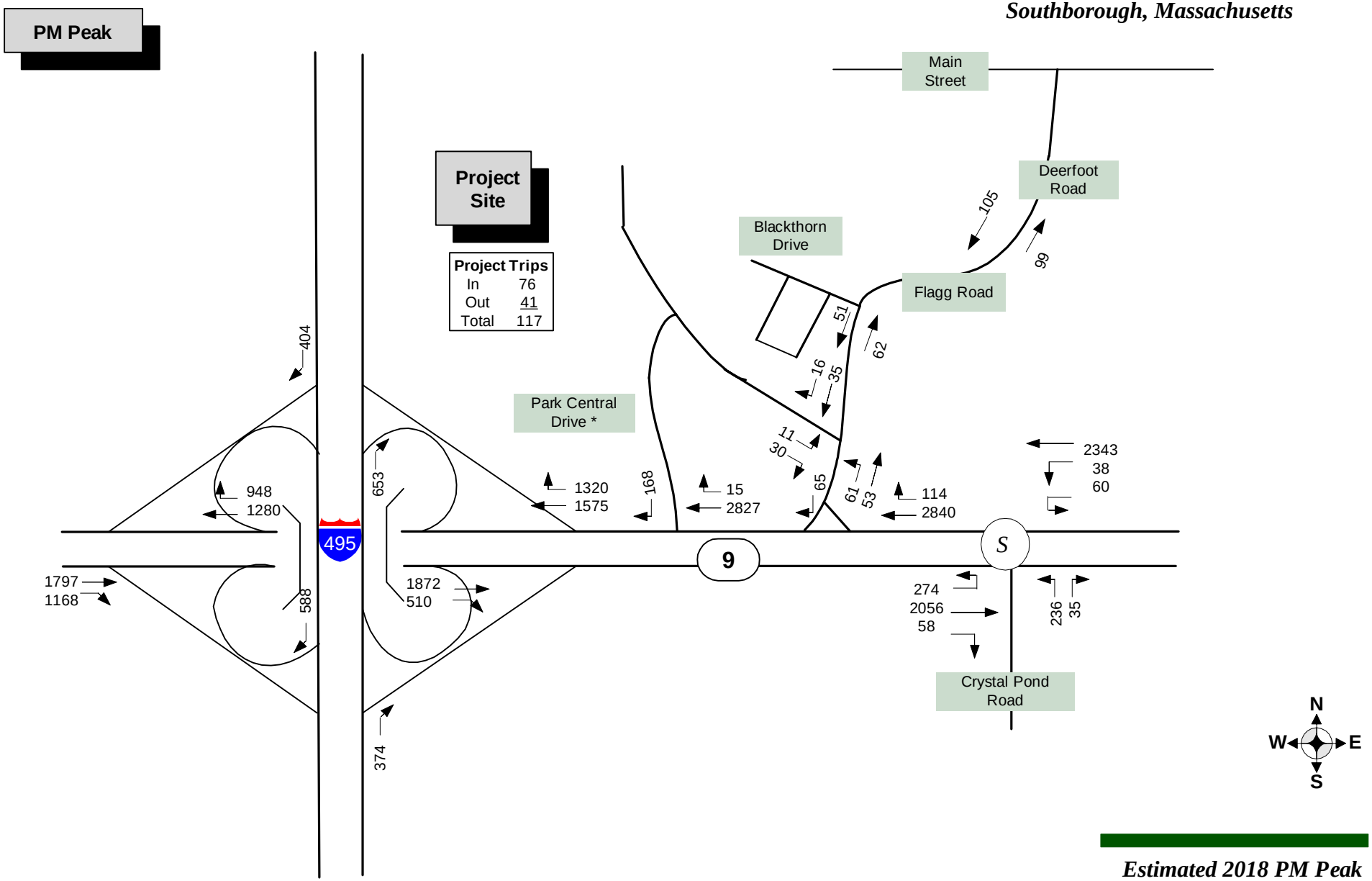
Estimated 2018 AM Peak
Build Traffic Networks

Figure 9

NOT TO SCALE

Green International Affiliates, Inc.

Proposed Park Central 40B
Residential Development
Southborough, Massachusetts



* - Park Central Drive two way in base condition

S - Signalized Study Intersection

Green International Affiliates, Inc.

Estimated 2018 PM Peak Build Traffic Networks

Figure 10

NOT TO SCALE

D. ANALYSIS

This traffic study focused on the analysis of various roadways and intersections identified previously within the study area. Previous sections of this report described the development of the 2018 No-Build and 2018 Build traffic volume network considering site-specific developments and estimated site traffic. Included in this section is an examination of the incremental increases in traffic expected on study area roadways under Build conditions, capacity/Level of Service (LOS) analysis for the study intersections under all scenarios and sight distance evaluation at the site access location.

- **Traffic Volume Increases**

A comparison of No-Build and Build volumes on the surrounding roadway system was completed. The increases will largely be concentrated on Route 9 given the existing highway median, the expected orientation of site trips and the proposed access-egress plan for the development. There will be some increase in traffic on Flagg Road north of the proposed site drive as it connects to Route 30 via Deerfoot and one can access the center of town, the local schools and Route 85. However, the increases to Flagg Road volume during the peak hours are expected to be manageable and well within the roadway's capacity, which is examined in the next section of the report. Table 5 summarizes these increases in traffic volumes for the study area roadways.

TABLE 5
SUMMARY OF ESTIMATED ROADWAY TRAFFIC INCREASES*

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Location	**No-Build**	**Build**	**Δ Volume**	**No-Build**	**Build**	**Δ Volume**
Flagg Road						
North of Site Drive	98	125	27	86	113	27
Between Route 9 and Site Drive						
Deerfoot Road						
Between Flagg and Main	264	291	27	177	204	27
Route 9 Eastbound						
East of Crystal Pond Road	2587	2598	12	2141	2151	10
West of Park Central Drive	2618	2639	21	2208	2246	38
Route 9 Westbound						
East of Crystal Pond Road	2355	2359	4	2416	2441	25
West of Park Central Drive	2504	2556	51	2865	2895	30
I-495 Exit 23 SB Ramps						
Off-Ramp to Route 9 EB	1021	1034	13	573	588	15
On-Ramp from Route 9 WB	331	365	34	925	948	23
I-495 Exit 23 NB Ramps						
On-Ramp from Route 9 WB	1046	1056	10	1315	1320	5
Off-Ramp to Route 9 EB	802	806	4	357	374	17

* - assumes no traffic pattern restrictions to Park Central Drive

The key findings from Table 5 include the following:

- As expected, the largest traffic effect of the project will be on Route 9 between Flagg Road and the I-495 Interchange with traffic reaching I-495, Route 9 WB or using the interchange to reverse direction to reach Route 9 EB.

- The section of Route 9 westbound between Crystal Pond Road and Flagg Road would also experience measurable increases due to the project in relation to traffic entering the site from the east on Route 9. This includes residents traveling from via I-495 or Route 9 west of I-495 who would first travel east on Route 9, reverse direction at the Crystal Pond Road intersection and then travel Route 9 westbound to reach the site.

- There will be measurable increases to peak hour traffic volumes on Flagg Road north of the site and on Deerfoot Road, however, it is estimated that these increases will be on the order of less than one vehicle trip per minute and at that level, it would not be generally noticeable by the average motorist.

2. Capacity/Level of Service (LOS) Analysis

For this analysis, the study intersections on Route 9 in the immediate vicinity of the project were 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. These included Route 9 at Crystal Pond Road; Route 9 at Flagg Road and Route 9 at Park Central Drive. Additionally, the capacities of the road segments were examined.

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 and traffic composition. When all of these measures are assessed and a Level of Service is assigned to a roadway or intersection, presenting a qualitative "index" to the operational qualities of the section under study. Level of Service is classified in the Highway Capacity Manual[5] into six levels that are designated 'A' through 'F' based on the control delay ranges they fall under. These are presented in Table 6 for both unsignalized and signalized intersections.

TABLE 6
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: Highway Capacity Manual

In practice, any given roadway/intersection may operate at a wide range of levels of service depending upon time of day, day of week or period of year. It should also 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.

[5] Transportation Research Board. Highway Capacity Manual, Washington, D.C. 2010.

The study intersections were evaluated as per techniques published in the Highway Capacity Manual (HCM). The HCS computer model that follows the procedures established in the HCM, were used to analyze the study intersections. Using existing roadway features and intersection controls, traffic operations at the study area intersections were evaluated for existing as well as future conditions. Analysis results are presented in Tables 7 and 8 for the study intersections and summarized as follows:

The Level of Service analysis indicated that:

- Traffic can enter and exit the site drive on Flagg Road safely and efficiently.

- The Route 9/Flagg Road intersection is estimated to operate at LOS 'E' (40.6 seconds delay) in the AM peak hour and LOS 'E' (41.0 seconds delay) during the PM peak hour under the Build condition. While the traffic signal at Crystal Pond Road provides some gaps in the traffic stream, there are times when motorists exiting Flagg Road have increased difficulty merging or weaving into the Route 9 westbound traffic stream. The MassDOT is proposing improvements to Route 9 westbound to improve this condition up through the I-495 interchange. This action coupled with reducing or restricting exiting from Park Central Drive would provide a continuous 3rd westbound lane and longer length to merge and weave into the desired travel lane enhancing safe movement although there could be some added delay.

- The Route 9/Crystal Pond Road intersection currently and is estimated to operate at LOS 'E/F' during the peak hours with relatively long delays and vehicle queuing in the peak direction of flow with no change between No-Build and Build conditions. The proposed development is anticipated to have minimal effect on the operations at this location although adding traffic in both Route 9 directions. MassDOT has identified long term improvements at this location.

- There would be no change in operations at the Route 9/Park Central intersection between the No-Build and Build conditions which is estimated to operate at LOS 'F' with long delays.

Traffic flow improvements at the Route 9/Crystal Pond Road intersection are expected to be addressed in the long range by MassDOT possibly as part of the EMC campus plan when it is initiated. A number of options were identified in the past studies including instituting a jughandle design and constructing a flyover ramp. Signal timing optimization could also be employed in the short term that would reduce the overall vehicle delays at the intersection.

In addition to the intersection analyses, the roadway segments of Flagg Road north of the site and Deerfoot Road north of Flagg Road were also evaluated. While the available capacity techniques are geared more to major roads and two lane highways, the method for two lane facilities was used to provide an approximate level of capacity for both these two roadways. The method takes into account roadway width, travel speeds, volumes, directional flow rates and the availability of passing zones.

Table 7
Summary of Level of Service Analysis
Unsignalized Intersections

Intersection		Existing			2018 No Build			2018 Build		
		V/C	Avg Del	LOS	V/C	Avg Del	LOS	V/C	Avg Del	LOS
AM Peak Hour										
Route 9 at Flagg Road										
Right turn exit		0.29	25.9	D	0.32	28.7	D	0.57	40.6	E
Route 9 at Park Central Dr										
Right turn exit		0.64	44.3	E	0.73	57.5	F	0.96	>100	F
Flagg Road at Site										
Eastbound Exit		-	-	-	-	-	-	0.08	9.1	A
Northbound Left		-	-	-	-	-	-	0.01	7.4	A
PM Peak Hour										
Route 9 at Flagg Road										
Right turn exit		0.21	31.8	D	0.24	35.6	E	0.41	41.0	E
Route 9 at Park Central Dr										
Right turn exit		1.14	>100	F	1.32	>100	F	1.26	>100	F
Flagg Road at Site										
Eastbound Exit		-	-	-	-	-	-	0.05	9.1	A
Northbound Left		-	-	-	-	-	-	0.04	7.4	A

Table 8
Summary of Level of Service Analysis
Route 9 at Crystal Pond Road

	Existing Conditions				Future No-Build				Future Build			
	v/c	Delay	LOS	95TH Q	v/c	Delay	LOS	95TH Q	v/c	Delay	LOS	95TH Q
AM PEAK HOUR												
Eastbound Thru	1.11	74.3	E	1151	1.21	117.1	F	1238	1.21	120.0	F	1241
Eastbound Left	1.44	>200	F	210	1.55	>200	F	219	1.67	>200	F	235
Westbound	0.09	12.2	B	406	0.75	15.0	B	444	0.75	15.1	B	446
Westbound Left	1.79	>200	F	253	2.01	>200	F	280	2.01	>200	F	280
Northbound Left	0.18	46.9	D	17	0.24	45.0	D	35	0.24	44.9	D	35
Northbound Right	0.00	45.9	D	11	0.02	44.0	D	34	0.02	43.9	D	31
Overall	**1.20**	**61.1**	**E**	**-**	**1.28**	**87.7**	**F**	**-**	**1.28**	**90.8**	**F**	**-**
PM PEAK HOUR												
Eastbound Thru	0.98	39.0	D	1131	1.04	54.7	D	1243	1.05	58.4	E	1254
Eastbound Left	4.20	>200	F	558	4.39	>200	F	585	5.05	>200	F	663
Westbound	0.77	19.3	B	613	0.82	21.4	C	688	0.83	21.8	C	702
Westbound Left	1.17	>200	F	173	1.80	>200	F	261	1.80	>200	F	264
Northbound Left	0.62	57.0	E	135	0.65	57.6	E	152	0.65	57.6	E	152
Northbound Right	0.01	50.5	D	25	0.02	50.1	D	34	0.02	50.1	D	34
Overall	**1.46**	**105.3**	**F**	**-**	**1.53**	**121.2**	**F**	**-**	**1.64**	**147.8**	**F**	**-**

A peak hour capacity is determined and compared with the volume traveling the roadway. The analysis results indicated that the volume to capacity ratio for Flagg Road is below 0.10 while the Deerfoot Road section in the vicinity of Main Street is below 0.20. In other words, ten percent or less of the Flagg Road capacity is being used and 20 percent or less of the northern section of Deerfoot Road capacity is being utilized. Calculation sheets are included in the Appendix while Table 9 summarizes the analysis results for the future No-Build and Build conditions. As can be seen, there is no expected change in operating conditions with the project and the additional traffic added to these roadway segments due to the proposed residential project will be easily accommodated.

TABLE 9
SUMMARY OF ROADWAY LINK
PEAK HOUR LOS/CAPACITY ANALYSIS
No-Build vs. Build

	No-Build						Build					
Roadway	**AM Peak**			**PM Peak**			**AM Peak**			**PM Peak**		
	Cap	**V/C**	**LOS**	**Cap**	**V/C**	**LOS**	**Cap**	**V/C**	**LOS**	**Cap**	**V/C**	**LOS**
Flagg Road	1,656	0.05	A	1,685	0.04	A	1,656	0.05	A	1,685	0.04	A
Deerfoot Road	1,675	0.16	C	1,685	0.06	B	1,680	0.17	C	1,685	0.07	B

3. Sight Distance Analysis

Adequate sight distance is an important safety consideration at intersections including proposed new intersections formed by site drive roadways. As part of this study, a sight distance analysis was conducted at the proposed new site drive on Flagg Road. The study examined stopping sight distance (SSD) and corner sight distance (CSD).

SSD, which is the more important of the two, is the distance required for an approaching driver at a height of 3.5 feet to perceive and react accordingly to an object 2 feet high at the driveway. The values are based on a perception and reaction time of 2.5 seconds and braking distance required under wet, level pavements. Corner or intersection sight distance (CSD) is based on the time required to perceive, react, and complete desired exiting maneuver from a driveway once the driver decides to execute the maneuver. Values for exiting sight distance represent the time to (1) turn left or right, in addition to accelerating to the operating speed of the roadway, without causing approaching vehicles to reduce speed by more than 10 mph, and (2) upon turning left, to clear the near half of the intersection without conflicting with the vehicles approaching from the left.

Corner sight distance is more related to operations and to some degree, the convenience or inconvenience of on-coming motorists. When the roadway is either on an upgrade or downgrade, grade correction factors may be applied. Minimum criteria are defined by the American Association of State and

Highway and Transportation Officials (AASHTO)[6]. SSD relates specifically to safety. As indicated by AASHTO, if the CSD at least meets or exceeds the SSD criteria, then there is adequate safe sight distance available for motorists to avoid collisions.

The posted speed limit noted in the area of the proposed site drive was 25 miles per hour (mph). Given the location of the proposed site drive on Flagg Road, motorists approaching Route 9 actually begin to reduce speeds as STOP control exists on the approach to Route 9. Approaching the site drive from Route 9 will also have motorists traveling slower than 25 mph as the turn from Route 9 and the grade of Flagg Road affects the acceleration and travel speeds. For analysis purposes speed criteria for 25 mph and 30 mph were evaluated. Table 10 presents the AASHTO criteria and a summary of the sight distance analysis for the proposed site driveways.

TABLE 10
SUMMARY OF SIGHT DISTANCE ANALYSIS
Site Drive at Flagg Road

Sight Distance	Criteria (ft) 25 mph	Criteria (ft) 30 mph	Measured Distance (ft)
Stopping Sight Distance			
Approaching from North	155	200	350+
Approaching from South	155	200	260+
Corner Sight Distance – Left Turn			
Looking North	280	335	350+
Looking South	280	335	275+
Corner Sight Distance – Right Turn			
Looking North	240	290	350+
Looking South	240	290	275+

As shown in Table 9, stopping sight distances are expected to be easily satisfied with regard to both the posted speed of 25 mph on Flagg Road as well as the higher 30 mph. Assuming clearing and grading anticipated with the construction of the proposed site drive, the corner sight distance will also be satisfied as more than 350 feet will be available looking north while the Route 9 intersection located approximately 290 to 300 feet to the south is clearly visible from the proposed site drive.

[6] American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, Washington, D.C., 2011.

Conclusion/Recommendations

The previous sections have presented information on the existing transportation network, the estimated traffic forecasts and the analysis results related to the proposed development project in Southborough. As previously indicated, the proposed development consists of 180 residential apartment units. The analysis has shown that the project will not create any new deficiencies, will have a small impact on existing locations that experience peak hour constraints, and can be safely accessed from Flagg Road.

Based on the analysis, the following conclusions were developed:

- The proposed development will generate approximately 1,214 vehicle trips over the course of the 24 hour day with 607 entering trips and 607 exiting trips. Peak hour vehicle trip estimates are 92 and 117 vehicle trips during the AM and PM peak hours, respectively, or an average of two (2) or less trips per minute.

- Regardless of the development of the Park Central project, the traffic flow conditions in the Route 9 corridor experiences certain levels of congestion and delay during the peak commuter hours. The State and regional planning agencies continue to explore long-term improvements for Route 9 corridor to help alleviate current and anticipated travel delays to the extent practical.

- Flagg Road and Deerfoot Road currently experience relatively low volumes and can accommodate additional traffic volume.

- The proposed residential development will generate new vehicle trips over the course of the day, however, given the project's location near Route 9 and I-495, most of the vehicle trips will be oriented to the regional highway system and the increase in trips should be manageable.

- With the majority of new site traffic oriented towards Route 9, the larger volume increases will occur on the short section of Flagg Road between Route 9 and the site drive. There would be an expected increase in vehicle delay to motorists exiting Flagg Road onto Route 9 although residents of the new development as well as current residents could use Flagg Road to reach the cent of town, the schools and uses on Route 85 without having to travel Route 9 during the peak hours.

Recommendations

Recognizing that the project will generate an increase of traffic on Route 9 area, a set of recommended mitigating actions developed to reduce the project's impact and enhance the safety and overall operating conditions of the roadway system. The proposed actions are as follows:

- Construct the proposed new link to Flagg Road that would provide for traffic entering the new development and all exiting traffic from the Park Central land uses. The new roadway should meet Town standards in terms of width, include a sidewalk along one side of the new link and

have a 20 foot corner radii.

- The existing section of Flagg Road between the proposed site drive and Route 9 should be improved to include providing a consistent 22 to 26 foot wide pavement section depending on available right of way and physical characteristics.

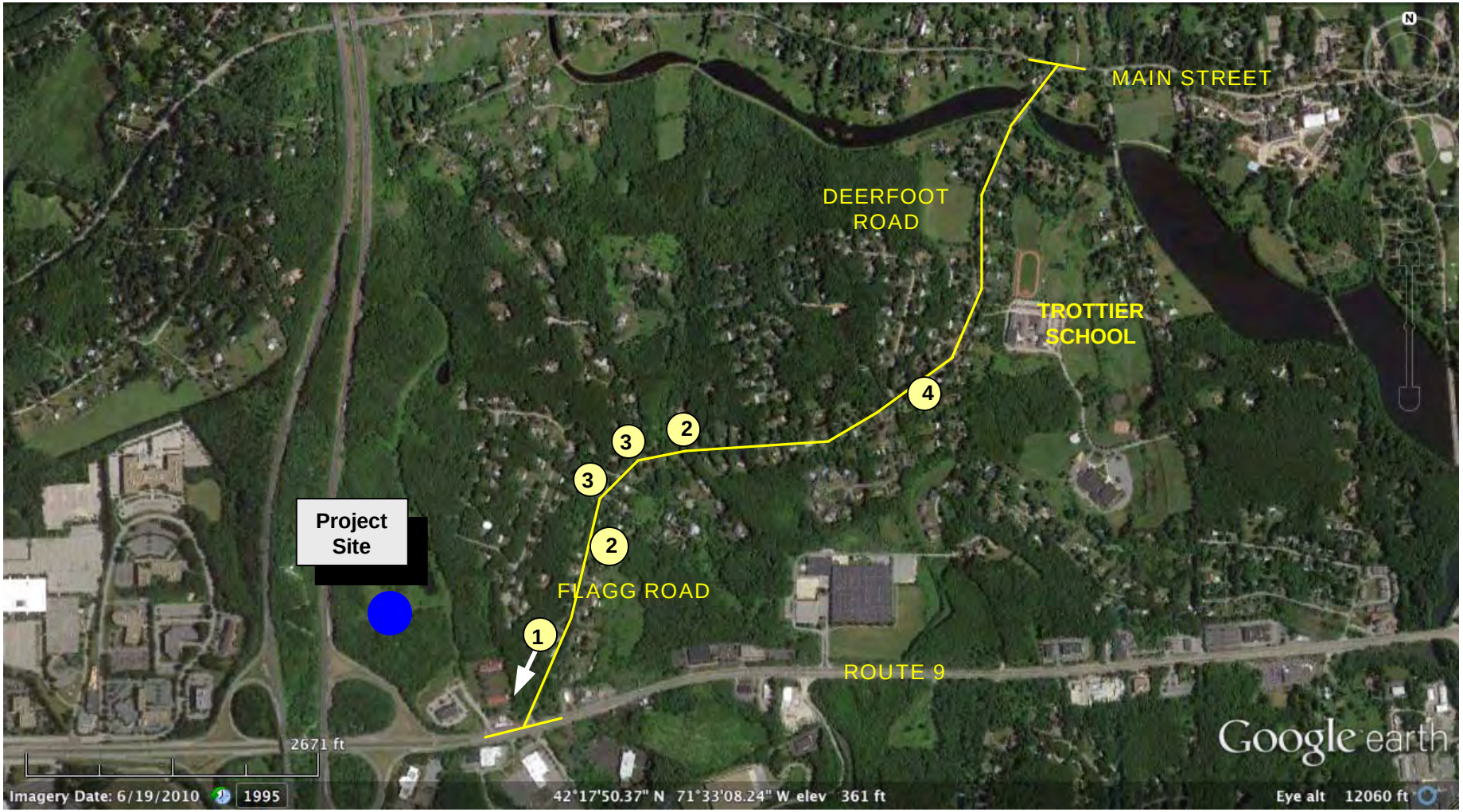
- STOP control should be installed on the new road approach to Flagg Road.

- Extend Park Central Drive to the new segment from Flagg Road and control the movement on Park Central Drive from Route 9 to the extent feasible, with the goal to restrict the drive to site inbound trips only. At a minimum, the office and motel related exiting traffic could be shifted to the new link.

- Install 'Do Not Enter" sign on Park Central Drive at beginning of office and motel to inform motorists exiting either land use to exit via the new link to Flagg Road. This should be coupled with one-way signage in this same area as well as 'TO ROUTE 9' guide signs for the office and motel traffic.

- To enhance safe traffic flow along Flagg Road, install advance curve warning signs, a 'STOP Ahead' sign, and an advance intersection warning signs approaching Route 9 and Deerfoot Road. Figure 11 illustrates possible signs and locations.

- It is recommended the Applicant work with the regional business groups and planning agencies to continue encouraging the MassDOT to improve the westbound section of Route 9 in the project area. An alternative was presented in the recent recommendations by MassDOT for improving Route 9 in this area. This would include of the construction of the consistent 3rd lane on Route 9 westbound from Deerfoot Road east of Crystal Pond Road through the I-495 interchange. The lane, which will facilitate improved exiting from the side streets and driveways between Crystal Pond Road and I-495, largely involves reconstructing the existing Route 9 shoulder.



Green International Affiliates, Inc.

Potential Sign Plan
Flagg Road

Figure 11
NOT TO SCALE

Appendix

- **TMC data**
- **ATR data**
- **Seasonal Adjustments/Traffic Growth Data**
- **MASSDOT Crash Rate Calculations**
- **Trip Generation Summaries**
- **Trip Assignment**
- **LOS Calculations**
  - Existing Conditions
  - No-Build Conditions
  - Build Conditions

Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

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

133207 A volume
Site Code: TBA

Start	05-Feb-13		06-Feb-13		07-Feb-13		08-Feb-13		09-Feb-13		10-Feb-13		11-Feb-13		Week Average	
Time	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	0	0	0	0	*	*	*	*	*	*	*	*	*	*	0	0
01:00	0	1	2	0	*	*	*	*	*	*	*	*	*	*	1	0
02:00	0	0	0	0	*	*	*	*	*	*	*	*	*	*	0	0
03:00	1	0	0	0	*	*	*	*	*	*	*	*	*	*	0	0
04:00	1	1	0	0	*	*	*	*	*	*	*	*	*	*	0	0
05:00	2	10	2	15	*	*	*	*	*	*	*	*	*	*	2	12
06:00	4	35	9	34	*	*	*	*	*	*	*	*	*	*	6	34
07:00	12	81	11	63	*	*	*	*	*	*	*	*	*	*	12	72
08:00	15	**87**	12	**68**	*	*	*	*	*	*	*	*	*	*	14	**78**
09:00	**20**	32	14	33	*	*	*	*	*	*	*	*	*	*	17	32
10:00	16	29	**20**	22	*	*	*	*	*	*	*	*	*	*	**18**	26
11:00	17	25	20	26	*	*	*	*	*	*	*	*	*	*	18	26
12:00 PM	31	37	27	26	*	*	*	*	*	*	*	*	*	*	29	32
01:00	14	21	29	33	*	*	*	*	*	*	*	*	*	*	22	27
02:00	24	30	29	**54**	*	*	*	*	*	*	*	*	*	*	26	**42**
03:00	37	**49**	37	31	*	*	*	*	*	*	*	*	*	*	37	40
04:00	29	33	29	36	*	*	*	*	*	*	*	*	*	*	29	34
05:00	**42**	38	**45**	45	*	*	*	*	*	*	*	*	*	*	**44**	42
06:00	35	20	41	39	*	*	*	*	*	*	*	*	*	*	38	30
07:00	32	22	36	18	*	*	*	*	*	*	*	*	*	*	34	20
08:00	15	7	20	9	*	*	*	*	*	*	*	*	*	*	18	8
09:00	19	5	17	6	*	*	*	*	*	*	*	*	*	*	18	6
10:00	5	3	10	3	*	*	*	*	*	*	*	*	*	*	8	3
11:00	5	2	2	5	*	*	*	*	*	*	*	*	*	*	4	4
Total	376	568	412	566	0	0	0	0	0	0	0	0	0	0	395	568
Day	944		978		0		0		0		0		0		963	
AM Peak	09:00	08:00	10:00	08:00											10:00	08:00
Vol.	20	87	20	68											18	78
PM Peak	17:00	15:00	17:00	14:00											17:00	14:00
Vol.	42	49	45	54											44	42

Comb. Total	944	978	0	0	0	0	0	963

ADT ADT 961 AADT 961

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

Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A volume
Site Code: TBA

Start	NB				SB				Combined				05-Feb-13
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	0		12		0		8		0		20		
12:15	0		10		0		15		0		25		
12:30	0		6		0		7		0		13		
12:45	0	0	3	31	0	0	7	37	0	0	10	68	
01:00	0		5		0		8		0		13		
01:15	0		0		0		4		0		4		
01:30	0		4		1		5		1		9		
01:45	0	0	5	14	0	1	4	21	0	1	9	35	
02:00	0		6		0		4		0		10		
02:15	0		4		0		5		0		9		
02:30	0		4		0		10		0		14		
02:45	0	0	10	24	0	0	11	30	0	0	21	54	
03:00	0		11		0		18		0		29		
03:15	1		8		0		8		1		16		
03:30	0		9		0		7		0		16		
03:45	0	1	9	37	0	0	16	49	0	1	25	86	
04:00	0		11		0		12		0		23		
04:15	0		8		0		5		0		13		
04:30	1		5		0		11		1		16		
04:45	0	1	5	29	1	1	5	33	1	2	10	62	
05:00	1		7		2		9		3		16		
05:15	0		9		1		12		1		21		
05:30	1		18		2		8		3		26		
05:45	0	2	8	42	5	10	9	38	5	12	17	80	
06:00	1		9		4		2		5		11		
06:15	1		6		4		4		5		10		
06:30	0		13		13		6		13		19		
06:45	2	4	7	35	14	35	8	20	16	39	15	55	
07:00	1		10		16		9		17		19		
07:15	2		6		20		5		22		11		
07:30	2		8		20		6		22		14		
07:45	7	12	8	32	25	81	2	22	32	93	10	54	
08:00	3		3		16		1		19		4		
08:15	4		8		18		3		22		11		
08:30	2		4		24		2		26		6		
08:45	6	15	0	15	29	87	1	7	35	102	1	22	
09:00	3		9		6		2		9		11		
09:15	4		2		7		2		11		4		
09:30	8		5		10		1		18		6		
09:45	5	20	3	19	9	32	0	5	14	52	3	24	
10:00	6		1		9		1		15		2		
10:15	2		0		10		1		12		1		
10:30	2		1		4		0		6		1		
10:45	6	16	3	5	6	29	1	3	12	45	4	8	
11:00	3		3		5		2		8		5		
11:15	6		1		5		0		11		1		
11:30	4		1		7		0		11		1		
11:45	4	17	0	5	8	25	0	2	12	42	0	7	
Total	88		288		301		267		389		555		
Percent	22.6%		51.9%		77.4%		48.1%						
Day Total		376				568				944			
Peak	09:15		05:15		08:00		03:00		08:00		03:00		
Vol.	23		44		87		49		102		86		
P.H.F.	0.719		0.611		0.750		0.681		0.729		0.741		

PRECISION
D A T A
INDUSTRIES, LLC
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Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A volume
Site Code: TBA

Start	NB				SB				Combined				06-Feb-13
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Wed
12:00	0		3		0		6		0		9		
12:15	0		4		0		5		0		9		
12:30	0		7		0		9		0		16		
12:45	0	0	13	27	0	0	6	26	0	0	19	53	
01:00	1		3		0		7		1		10		
01:15	1		9		0		11		1		20		
01:30	0		8		0		6		0		14		
01:45	0	2	9	29	0	0	9	33	0	2	18	62	
02:00	0		6		0		10		0		16		
02:15	0		9		0		12		0		21		
02:30	0		6		0		17		0		23		
02:45	0	0	8	29	0	0	15	54	0	0	23	83	
03:00	0		11		0		6		0		17		
03:15	0		11		0		9		0		20		
03:30	0		8		0		5		0		13		
03:45	0	0	7	37	0	0	11	31	0	0	18	68	
04:00	0		5		0		6		0		11		
04:15	0		7		0		12		0		19		
04:30	0		11		0		10		0		21		
04:45	0	0	6	29	0	0	8	36	0	0	14	65	
05:00	1		11		3		11		4		22		
05:15	0		10		8		14		8		24		
05:30	1		9		3		15		4		24		
05:45	0	2	15	45	1	15	5	45	1	17	20	90	
06:00	3		11		4		12		7		23		
06:15	1		11		3		13		4		24		
06:30	3		9		12		9		15		18		
06:45	2	9	10	41	15	34	5	39	17	43	15	80	
07:00	1		3		15		7		16		10		
07:15	2		12		7		4		9		16		
07:30	3		11		22		4		25		15		
07:45	5	11	10	36	19	63	3	18	24	74	13	54	
08:00	3		5		15		1		18		6		
08:15	3		6		19		1		22		7		
08:30	3		5		17		4		20		9		
08:45	3	12	4	20	17	68	3	9	20	80	7	29	
09:00	0		4		11		2		11		6		
09:15	8		6		5		1		13		7		
09:30	2		2		5		2		7		4		
09:45	4	14	5	17	12	33	1	6	16	47	6	23	
10:00	3		5		8		2		11		7		
10:15	2		3		2		1		4		4		
10:30	6		1		3		0		9		1		
10:45	9	20	1	10	9	22	0	3	18	42	1	13	
11:00	5		0		8		1		13		1		
11:15	6		0		5		2		11		2		
11:30	4		2		4		1		8		3		
11:45	5	20	0	2	9	26	1	5	14	46	1	7	
Total	90		322		261		305		351		627		
Percent	25.6%		51.4%		74.4%		48.6%						
Day Total		412				566				978			
Peak	10:30		05:30		07:30		02:00		07:30		05:15		
Vol.	26		46		75		54		89		91		
P.H.F.	0.722		0.767		0.852		0.794		0.890		0.948		

PRECISION
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Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A class
Site Code: TBA

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/05/1														
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
06:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
07:00	0	8	1	1	2	0	0	0	0	0	0	0	0	12
08:00	0	12	3	0	0	0	0	0	0	0	0	0	0	15
09:00	0	16	2	0	2	0	0	0	0	0	0	0	0	20
10:00	0	13	2	0	1	0	0	0	0	0	0	0	0	16
11:00	0	16	1	0	0	0	0	0	0	0	0	0	0	17
12 PM	0	25	5	0	0	1	0	0	0	0	0	0	0	31
13:00	0	11	2	0	1	0	0	0	0	0	0	0	0	14
14:00	0	21	2	0	1	0	0	0	0	0	0	0	0	24
15:00	0	22	13	1	1	0	0	0	0	0	0	0	0	37
16:00	0	23	5	0	1	0	0	0	0	0	0	0	0	29
17:00	0	34	8	0	0	0	0	0	0	0	0	0	0	42
18:00	0	31	4	0	0	0	0	0	0	0	0	0	0	35
19:00	0	27	5	0	0	0	0	0	0	0	0	0	0	32
20:00	0	12	3	0	0	0	0	0	0	0	0	0	0	15
21:00	0	15	3	0	1	0	0	0	0	0	0	0	0	19
22:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
23:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
Total	0	300	63	2	10	1	0	0	0	0	0	0	0	376
Percent	0.0%	79.8%	16.8%	0.5%	2.7%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		09:00	08:00	07:00	07:00									09:00
Vol.		16	3	1	2									20
Midday Peak		12:00	12:00		13:00	12:00								12:00
Vol.		25	5		1	1								31
PM Peak		17:00	15:00	15:00	15:00									17:00
Vol.		34	13	1	1									42

PRECISION
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Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A class
Site Code: TBA

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/06/1														
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	1	0	1	0	0	0	0	0	0	0	0	2
06:00	0	9	0	0	0	0	0	0	0	0	0	0	0	9
07:00	0	9	1	1	0	0	0	0	0	0	0	0	0	11
08:00	0	11	1	0	0	0	0	0	0	0	0	0	0	12
09:00	0	8	4	0	2	0	0	0	0	0	0	0	0	14
10:00	1	14	3	0	1	1	0	0	0	0	0	0	0	20
11:00	0	18	2	0	0	0	0	0	0	0	0	0	0	20
12 PM	1	22	3	0	1	0	0	0	0	0	0	0	0	27
13:00	0	19	8	1	1	0	0	0	0	0	0	0	0	29
14:00	0	21	7	0	1	0	0	0	0	0	0	0	0	29
15:00	0	27	8	1	1	0	0	0	0	0	0	0	0	37
16:00	0	18	9	0	2	0	0	0	0	0	0	0	0	29
17:00	1	36	8	0	0	0	0	0	0	0	0	0	0	45
18:00	0	33	7	0	1	0	0	0	0	0	0	0	0	41
19:00	0	31	5	0	0	0	0	0	0	0	0	0	0	36
20:00	0	15	5	0	0	0	0	0	0	0	0	0	0	20
21:00	0	14	3	0	0	0	0	0	0	0	0	0	0	17
22:00	0	7	3	0	0	0	0	0	0	0	0	0	0	10
23:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Total	3	315	79	3	11	1	0	0	0	0	0	0	0	412
Percent	0.7%	76.5%	19.2%	0.7%	2.7%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	09:00	07:00	09:00									09:00
Vol.		11	4	1	2									14
Midday Peak	12:00	12:00	13:00	13:00	12:00									13:00
Vol.	1	22	8	1	1									29
PM Peak	17:00	17:00	16:00	15:00	16:00									17:00
Vol.	1	36	9	1	2									45

PRECISION
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Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A class
Site Code: TBA

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/05/1														
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00	0	9	1	0	0	0	0	0	0	0	0	0	0	10
06:00	0	28	6	0	1	0	0	0	0	0	0	0	0	35
07:00	0	61	20	0	0	0	0	0	0	0	0	0	0	81
08:00	0	61	21	0	4	0	0	1	0	0	0	0	0	87
09:00	0	25	7	0	0	0	0	0	0	0	0	0	0	32
10:00	0	20	6	0	3	0	0	0	0	0	0	0	0	29
11:00	0	16	8	0	1	0	0	0	0	0	0	0	0	25
12 PM	0	31	6	0	0	0	0	0	0	0	0	0	0	37
13:00	0	13	5	1	2	0	0	0	0	0	0	0	0	21
14:00	0	20	5	1	2	1	0	0	1	0	0	0	0	30
15:00	0	30	18	0	1	0	0	0	0	0	0	0	0	49
16:00	0	22	11	0	0	0	0	0	0	0	0	0	0	33
17:00	0	30	8	0	0	0	0	0	0	0	0	0	0	38
18:00	0	13	5	0	2	0	0	0	0	0	0	0	0	20
19:00	0	16	6	0	0	0	0	0	0	0	0	0	0	22
20:00	0	5	2	0	0	0	0	0	0	0	0	0	0	7
21:00	0	3	2	0	0	0	0	0	0	0	0	0	0	5
22:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
23:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	408	139	2	16	1	0	1	1	0	0	0	0	568
Percent	0.0%	71.8%	24.5%	0.4%	2.8%	0.2%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak		07:00	08:00		08:00			08:00						08:00
Vol.		61	21		4			1						87
Midday Peak		12:00	11:00	13:00	13:00	14:00			14:00					12:00
Vol.		31	8	1	2	1			1					37
PM Peak		15:00	15:00		18:00									15:00
Vol.		30	18		2									49

PRECISION
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Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A class
Site Code: TBA

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/06/1														
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	13	2	0	0	0	0	0	0	0	0	0	0	15
06:00	0	25	7	0	2	0	0	0	0	0	0	0	0	34
07:00	0	48	14	0	1	0	0	0	0	0	0	0	0	63
08:00	0	53	14	0	1	0	0	0	0	0	0	0	0	68
09:00	0	28	5	0	0	0	0	0	0	0	0	0	0	33
10:00	0	15	4	0	2	0	0	0	1	0	0	0	0	22
11:00	0	15	6	2	3	0	0	0	0	0	0	0	0	26
12 PM	0	16	10	0	0	0	0	0	0	0	0	0	0	26
13:00	0	23	9	0	1	0	0	0	0	0	0	0	0	33
14:00	0	35	16	2	1	0	0	0	0	0	0	0	0	54
15:00	0	22	9	0	0	0	0	0	0	0	0	0	0	31
16:00	0	29	3	0	3	0	0	0	1	0	0	0	0	36
17:00	0	34	9	0	1	1	0	0	0	0	0	0	0	45
18:00	0	31	8	0	0	0	0	0	0	0	0	0	0	39
19:00	0	13	4	0	1	0	0	0	0	0	0	0	0	18
20:00	0	7	2	0	0	0	0	0	0	0	0	0	0	9
21:00	0	4	2	0	0	0	0	0	0	0	0	0	0	6
22:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
23:00	0	2	3	0	0	0	0	0	0	0	0	0	0	5
Total	0	416	127	4	16	1	0	0	2	0	0	0	0	566
Percent	0.0%	73.5%	22.4%	0.7%	2.8%	0.2%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	07:00		06:00									08:00
Vol.		53	14		2									68
Midday Peak		14:00	14:00	11:00	11:00									14:00
Vol.		35	16	2	3									54
PM Peak		17:00	15:00		16:00	17:00			16:00					17:00
Vol.		34	9		3	1			1					45

PRECISION
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Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A speed
Site Code: TBA

NB

Start Time	1 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
02/05/1																
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	*	32
04:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	*	32
05:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2	*	29
06:00	0	0	0	1	3	0	0	0	0	0	0	0	0	4	31	31
07:00	0	0	3	4	4	1	0	0	0	0	0	0	0	12	32	28
08:00	0	0	3	**5**	**7**	0	0	0	0	0	0	0	0	15	32	28
09:00	0	**1**	**5**	4	6	**3**	**1**	0	0	0	0	0	0	**20**	35	29
10:00	0	0	2	8	3	3	0	0	0	0	0	0	0	16	34	29
11:00	**1**	1	1	7	5	2	0	0	0	0	0	0	0	17	33	26
12 PM	0	1	**5**	**8**	**13**	**4**	0	0	0	0	0	0	0	**31**	33	29
13:00	1	0	4	4	3	2	0	0	0	0	0	0	0	14	31	26
14:00	0	**2**	1	6	12	3	0	0	0	0	0	0	0	24	34	29
15:00	0	**3**	6	14	13	1	0	0	0	0	0	0	0	37	32	27
16:00	0	0	1	6	16	6	0	0	0	0	0	0	0	29	35	32
17:00	0	0	3	**16**	**19**	3	**1**	0	0	0	0	0	0	**42**	33	30
18:00	0	1	1	12	14	**7**	0	0	0	0	0	0	0	35	35	30
19:00	0	1	**8**	12	7	3	1	0	0	0	0	0	0	32	33	28
20:00	0	0	0	5	7	2	1	0	0	0	0	0	0	15	34	32
21:00	0	1	1	8	8	1	0	0	0	0	0	0	0	19	32	28
22:00	0	0	0	1	3	1	0	0	0	0	0	0	0	5	32	32
23:00	0	0	1	1	3	0	0	0	0	0	0	0	0	5	31	29
Total	2	11	45	123	149	42	4	0	0	0	0	0	0	376		
%	0.5%	2.9%	12.0%	32.7%	39.6%	11.2%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak		09:00	09:00	08:00	08:00	09:00	09:00							09:00		
Vol.		1	5	5	7	3	1							20		
Midday Peak	11:00	14:00	12:00	12:00	12:00	12:00								12:00		
Vol.	1	2	5	8	13	4								31		
PM Peak		15:00	19:00	17:00	17:00	18:00	17:00							17:00		
Vol.		3	8	16	19	7	1							42		

% iles

15th Percentile : 22 MPH
50th Percentile : 29 MPH
85th Percentile : 34 MPH
95th Percentile : 37 MPH

Stats

10 MPH Pace Speed : 25-34 MPH
Number in Pace : 245
Percent in Pace : 65.2%
Number of Vehicles > 30 MPH : 161
Percent of Vehicles > 30 MPH : 42.9%
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

Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A speed
Site Code: TBA

NB

Start Time	1 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
02/06/1																
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	2	0	0	0	0	0	0	0	0	0	2	*	27
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	0	1	1	0	0	0	0	0	0	0	0	0	2	*	24
06:00	0	0	0	6	1	**2**	0	0	0	0	0	0	0	9	29	30
07:00	0	0	**3**	4	3	1	0	0	0	0	0	0	0	11	31	28
08:00	0	0	0	4	**6**	2	0	0	0	0	0	0	0	12	34	31
09:00	0	0	2	**8**	3	1	0	0	0	0	0	0	0	**14**	31	28
10:00	2	0	1	6	10	1	0	0	0	0	0	0	0	20	33	27
11:00	0	**1**	2	8	8	0	**1**	0	0	0	0	0	0	20	32	28
12 PM	**2**	1	**6**	7	6	**4**	1	0	0	0	0	0	0	27	35	26
13:00	0	0	5	5	**14**	4	1	0	0	0	0	0	0	**29**	34	30
14:00	0	1	2	**10**	12	4	0	0	0	0	0	0	0	29	34	29
15:00	0	0	**6**	11	17	1	**2**	0	0	0	0	0	0	37	32	30
16:00	0	0	3	10	12	**4**	0	0	0	0	0	0	0	29	34	30
17:00	0	**2**	6	13	**20**	4	0	0	0	0	0	0	0	**45**	33	29
18:00	**1**	2	3	**18**	11	4	2	0	0	0	0	0	0	41	34	28
19:00	0	1	1	14	16	4	0	0	0	0	0	0	0	36	33	30
20:00	0	0	2	5	9	3	0	**1**	0	0	0	0	0	20	34	31
21:00	0	1	0	4	10	2	0	0	0	0	0	0	0	17	33	30
22:00	0	0	0	4	5	1	0	0	0	0	0	0	0	10	33	30
23:00	0	0	0	2	0	0	0	0	0	0	0	0	0	2	*	27
Total	5	9	43	142	163	42	7	1	0	0	0	0	0	412		
%	1.2%	2.2%	10.4%	34.5%	39.6%	10.2%	1.7%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak			07:00	09:00	08:00	06:00								09:00		
Vol.			3	8	6	2								14		
Midday Peak	12:00	11:00	12:00	14:00	13:00	12:00	11:00							13:00		
Vol.	2	1	6	10	14	4	1							29		
PM Peak	18:00	17:00	15:00	18:00	17:00	16:00	15:00	20:00						17:00		
Vol.	1	2	6	18	20	4	2	1						45		

% iles

15th Percentile : 23 MPH
50th Percentile : 28 MPH
85th Percentile : 34 MPH
95th Percentile : 37 MPH

Stats

10 MPH Pace Speed : 25-34 MPH
Number in Pace : 273
Percent in Pace : 66.3%
Number of Vehicles > 30 MPH : 176
Percent of Vehicles > 30 MPH : 42.8%
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

Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A speed
Site Code: TBA

SB

Start Time	1 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
02/05/1																
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	*	27
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	*	27
05:00	0	0	0	3	4	3	0	0	0	0	0	0	0	10	35	32
06:00	0	0	1	6	18	8	2	0	0	0	0	0	0	35	36	33
07:00	0	0	**4**	10	**35**	20	**10**	**2**	0	0	0	0	0	81	39	34
08:00	**1**	0	3	**14**	31	**29**	9	0	0	0	0	0	0	**87**	38	33
09:00	0	0	3	5	13	9	2	0	0	0	0	0	0	32	37	32
10:00	1	1	2	6	9	10	0	0	0	0	0	0	0	29	37	30
11:00	0	**1**	1	4	11	5	2	0	1	0	0	0	0	25	37	32
12 PM	0	0	1	8	**15**	**10**	0	**1**	**2**	0	0	0	0	**37**	36	33
13:00	0	0	**2**	3	6	7	3	0	0	0	0	0	0	21	39	33
14:00	0	1	1	**11**	7	5	**4**	1	0	0	0	0	0	30	39	32
15:00	0	1	**3**	**7**	**22**	**13**	2	**1**	0	0	0	0	0	**49**	36	32
16:00	0	0	0	6	13	10	**4**	0	0	0	0	0	0	33	38	34
17:00	0	**3**	2	6	13	12	2	0	0	0	0	0	0	38	37	31
18:00	0	0	1	5	8	4	2	0	0	0	0	0	0	20	37	32
19:00	**1**	1	1	5	10	4	0	0	0	0	0	0	0	22	35	29
20:00	1	1	0	2	3	0	0	0	0	0	0	0	0	7	31	23
21:00	0	0	1	0	3	1	0	0	0	0	0	0	0	5	32	31
22:00	0	0	0	0	2	1	0	0	0	0	0	0	0	3	*	34
23:00	0	0	0	0	2	0	0	0	0	0	0	0	0	2	*	32
Total	4	9	26	103	225	151	42	5	3	0	0	0	0	568		
%	0.7%	1.6%	4.6%	18.1%	39.6%	26.6%	7.4%	0.9%	0.5%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00		07:00	08:00	07:00	08:00	07:00	07:00						08:00		
Vol.	1		4	14	35	29	10	2						87		
Midday Peak		11:00	13:00	14:00	12:00	12:00	14:00	12:00	12:00					12:00		
Vol.		1	2	11	15	10	4	1	2					37		
PM Peak	19:00	17:00	15:00	15:00	15:00	15:00	16:00	15:00						15:00		
Vol.	1	3	3	7	22	13	4	1						49		

% iles

15th Percentile : 26 MPH
50th Percentile : 32 MPH
85th Percentile : 37 MPH
95th Percentile : 41 MPH

Stats

10 MPH Pace Speed : 29-38 MPH
Number in Pace : 353
Percent in Pace : 62.1%
Number of Vehicles > 30 MPH : 371
Percent of Vehicles > 30 MPH : 65.4%
Mean Speed(Average) : 32 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

Flagg Road approx. 1200' north of
Turnpike Road (Route 9)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 A speed
Site Code: TBA

SB

Start Time	1 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
02/06/1																
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	0	**1**	9	5	0	0	0	0	0	0	0	0	15	31	28
06:00	1	0	0	**11**	12	10	0	0	0	0	0	0	0	34	36	31
07:00	0	0	0	8	25	**22**	**8**	0	0	0	0	0	0	63	39	34
08:00	**2**	0	1	9	**27**	21	8	0	0	0	0	0	0	**68**	39	33
09:00	1	0	0	3	8	17	3	**1**	0	0	0	0	0	33	39	34
10:00	0	1	1	2	6	10	2	0	0	0	0	0	0	22	38	33
11:00	0	0	1	4	8	11	2	0	0	0	0	0	0	26	37	34
12 PM	0	**1**	**3**	3	5	11	3	0	0	0	0	0	0	26	38	33
13:00	0	1	1	7	8	9	**5**	**1**	**1**	0	0	0	0	33	40	34
14:00	0	0	3	**17**	**16**	**16**	2	0	0	0	0	0	0	**54**	37	32
15:00	0	0	1	8	8	11	2	1	0	0	0	0	0	31	37	33
16:00	0	1	**3**	2	16	**14**	0	0	0	0	0	0	0	36	37	32
17:00	0	1	0	**11**	**19**	9	**3**	**2**	0	0	0	0	0	**45**	37	33
18:00	0	**3**	2	9	17	6	2	0	0	0	0	0	0	39	35	30
19:00	**1**	0	2	6	4	3	2	0	0	0	0	0	0	18	36	29
20:00	0	0	0	3	5	1	0	0	0	0	0	0	0	9	33	31
21:00	0	0	0	1	2	3	0	0	0	0	0	0	0	6	36	34
22:00	0	0	0	0	2	1	0	0	0	0	0	0	0	3	*	34
23:00	0	0	0	0	3	2	0	0	0	0	0	0	0	5	33	34
Total	5	8	19	113	196	177	42	5	1	0	0	0	0	566		
%	0.9%	1.4%	3.4%	20.0%	34.6%	31.3%	7.4%	0.9%	0.2%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00		05:00	06:00	08:00	07:00	07:00	09:00						08:00		
Vol.	2		1	11	27	22	8	1						68		
Midday Peak		12:00	12:00	14:00	14:00	14:00	13:00	13:00	13:00					14:00		
Vol.		1	3	17	16	16	5	1	1					54		
PM Peak	19:00	18:00	16:00	17:00	17:00	16:00	17:00	17:00						17:00		
Vol.	1	3	3	11	19	14	3	2						45		

% iles	
15th Percentile :	26 MPH
50th Percentile :	32 MPH
85th Percentile :	38 MPH
95th Percentile :	41 MPH

Stats	
10 MPH Pace Speed :	29-38 MPH
Number in Pace :	347
Percent in Pace :	61.3%
Number of Vehicles > 30 MPH :	374
Percent of Vehicles > 30 MPH :	66.0%
Mean Speed(Average) :	32 MPH

Deerfoot Road
approx 1600' south of Main Street (Route 30)
City, State: Southborough, MA
Client: Green International/ S. Musto

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

133207 B volume
Site Code: TBA

Start	05-Feb-13		06-Feb-13		07-Feb-13		08-Feb-13		09-Feb-13		10-Feb-13		11-Feb-13		Week Average	
Time	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	0	0	0	1	*	*	*	*	*	*	*	*	*	*	0	0
01:00	1	1	1	0	*	*	*	*	*	*	*	*	*	*	1	0
02:00	0	0	0	0	*	*	*	*	*	*	*	*	*	*	0	0
03:00	0	0	0	0	*	*	*	*	*	*	*	*	*	*	0	0
04:00	2	1	3	1	*	*	*	*	*	*	*	*	*	*	2	1
05:00	9	1	12	7	*	*	*	*	*	*	*	*	*	*	10	4
06:00	31	21	38	24	*	*	*	*	*	*	*	*	*	*	34	22
07:00	**102**	**149**	**113**	**138**	*	*	*	*	*	*	*	*	*	*	**108**	**144**
08:00	73	81	73	67	*	*	*	*	*	*	*	*	*	*	73	74
09:00	38	48	49	36	*	*	*	*	*	*	*	*	*	*	44	42
10:00	36	24	36	22	*	*	*	*	*	*	*	*	*	*	36	23
11:00	37	32	44	31	*	*	*	*	*	*	*	*	*	*	40	32
12:00 PM	39	26	45	36	*	*	*	*	*	*	*	*	*	*	42	31
01:00	32	31	47	45	*	*	*	*	*	*	*	*	*	*	40	38
02:00	**84**	52	**95**	66	*	*	*	*	*	*	*	*	*	*	**90**	59
03:00	63	76	76	70	*	*	*	*	*	*	*	*	*	*	70	73
04:00	71	**82**	60	67	*	*	*	*	*	*	*	*	*	*	66	74
05:00	83	77	86	**93**	*	*	*	*	*	*	*	*	*	*	84	**85**
06:00	42	38	52	78	*	*	*	*	*	*	*	*	*	*	47	58
07:00	43	33	75	65	*	*	*	*	*	*	*	*	*	*	59	49
08:00	11	15	25	35	*	*	*	*	*	*	*	*	*	*	18	25
09:00	15	9	30	22	*	*	*	*	*	*	*	*	*	*	22	16
10:00	2	5	9	4	*	*	*	*	*	*	*	*	*	*	6	4
11:00	2	2	1	4	*	*	*	*	*	*	*	*	*	*	2	3
Total	816	804	970	912	0	0	0	0	0	0	0	0	0	0	894	857
Day	1620		1882		0		0		0		0		0		1751	
AM Peak	07:00	07:00	07:00	07:00											07:00	07:00
Vol.	102	149	113	138											108	144
PM Peak	14:00	16:00	14:00	17:00											14:00	17:00
Vol.	84	82	95	93											90	85

Comb. Total	1620	1882	0	0	0	0	0	1751

ADT ADT 1,751 AADT 1,751

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

Deerfoot Road
approx 1600' south of Main Street (Route 30)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 B volume
Site Code: TBA

Start	NB				SB				Combined				05-Feb-13
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	0		8		0		8		0		16		
12:15	0		12		0		12		0		24		
12:30	0		5		0		1		0		6		
12:45	0	0	14	39	0	0	5	26	0	0	19	65	
01:00	0		11		0		8		0		19		
01:15	0		6		0		7		0		13		
01:30	1		7		1		6		2		13		
01:45	0	1	8	32	0	1	10	31	0	2	18	63	
02:00	0		7		0		10		0		17		
02:15	0		10		0		20		0		30		
02:30	0		43		0		15		0		58		
02:45	0	0	24	84	0	0	7	52	0	0	31	136	
03:00	0		13		0		15		0		28		
03:15	0		12		0		21		0		33		
03:30	0		18		0		19		0		37		
03:45	0	0	20	63	0	0	21	76	0	0	41	139	
04:00	0		25		0		15		0		40		
04:15	0		15		0		13		0		28		
04:30	2		16		1		18		3		34		
04:45	0	2	15	71	0	1	36	82	0	3	51	153	
05:00	1		28		0		22		1		50		
05:15	0		25		1		17		1		42		
05:30	3		17		0		16		3		33		
05:45	5	9	13	83	0	1	22	77	5	10	35	160	
06:00	2		12		3		16		5		28		
06:15	8		15		1		7		9		22		
06:30	8		6		6		6		14		12		
06:45	13	31	9	42	11	21	9	38	24	52	18	80	
07:00	13		18		16		11		29		29		
07:15	17		6		27		14		44		20		
07:30	29		13		28		6		57		19		
07:45	43	102	6	43	78	149	2	33	121	251	8	76	
08:00	31		4		29		1		60		5		
08:15	17		3		19		8		36		11		
08:30	13		1		14		4		27		5		
08:45	12	73	3	11	19	81	2	15	31	154	5	26	
09:00	10		7		17		5		27		12		
09:15	12		4		13		1		25		5		
09:30	9		3		12		2		21		5		
09:45	7	38	1	15	6	48	1	9	13	86	2	24	
10:00	10		0		7		1		17		1		
10:15	5		1		4		0		9		1		
10:30	10		1		6		1		16		2		
10:45	11	36	0	2	7	24	3	5	18	60	3	7	
11:00	9		0		8		0		17		0		
11:15	15		0		8		1		23		1		
11:30	8		2		8		0		16		2		
11:45	5	37	0	2	8	32	1	2	13	69	1	4	
Total	329		487		358		446		687		933		
Percent	47.9%		52.2%		52.1%		47.8%						
Day Total		816				804				1620			
Peak	07:15		02:30		07:15		04:30		07:15		04:30		
Vol.	120		92		162		93		282		177		
P.H.F.	0.698		0.535		0.519		0.646		0.583		0.868		

PRECISION
D A T A
INDUSTRIES, LLC
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Deerfoot Road
approx 1600' south of Main Street (Route 30)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 B volume
Site Code: TBA

Start	NB				SB				Combined				06-Feb-13
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Wed
12:00	0		9		1		9		1		18		
12:15	0		12		0		10		0		22		
12:30	0		17		0		10		0		27		
12:45	0	0	7	45	0	1	7	36	0	1	14	81	
01:00	1		11		0		10		1		21		
01:15	0		15		0		12		0		27		
01:30	0		9		0		6		0		15		
01:45	0	1	12	47	0	0	17	45	0	1	29	92	
02:00	0		6		0		16		0		22		
02:15	0		14		0		24		0		38		
02:30	0		53		0		17		0		70		
02:45	0	0	22	95	0	0	9	66	0	0	31	161	
03:00	0		22		0		16		0		38		
03:15	0		15		0		16		0		31		
03:30	0		12		0		8		0		20		
03:45	0	0	27	76	0	0	30	70	0	0	57	146	
04:00	0		19		0		16		0		35		
04:15	0		12		0		18		0		30		
04:30	2		14		0		9		2		23		
04:45	1	3	15	60	1	1	24	67	2	4	39	127	
05:00	0		18		1		23		1		41		
05:15	1		32		1		22		2		54		
05:30	6		18		2		27		8		45		
05:45	5	12	18	86	3	7	21	93	8	19	39	179	
06:00	2		14		4		21		6		35		
06:15	8		12		2		13		10		25		
06:30	7		8		3		15		10		23		
06:45	21	38	18	52	15	24	29	78	36	62	47	130	
07:00	28		15		19		15		47		30		
07:15	13		32		18		15		31		47		
07:30	17		15		33		25		50		40		
07:45	55	113	13	75	68	138	10	65	123	251	23	140	
08:00	26		2		28		11		54		13		
08:15	14		10		11		7		25		17		
08:30	15		1		14		10		29		11		
08:45	18	73	12	25	14	67	7	35	32	140	19	60	
09:00	11		2		13		11		24		13		
09:15	12		16		8		6		20		22		
09:30	10		8		9		3		19		11		
09:45	16	49	4	30	6	36	2	22	22	85	6	52	
10:00	12		2		7		2		19		4		
10:15	9		2		8		1		17		3		
10:30	7		3		3		1		10		4		
10:45	8	36	2	9	4	22	0	4	12	58	2	13	
11:00	9		1		8		2		17		3		
11:15	18		0		7		1		25		1		
11:30	10		0		10		1		20		1		
11:45	7	44	0	1	6	31	0	4	13	75	0	5	
Total	369		601		327		585		696		1186		
Percent	53.0%		50.7%		47.0%		49.3%						
Day Total		970				912				1882			
Peak	07:00		02:30		07:15		04:45		07:15		04:45		
Vol.	113		112		147		96		258		179		
P.H.F.	0.514		0.528		0.540		0.889		0.524		0.639		

PRECISION
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Deerfoot Road
approx 1600' south of Main Street (Route 30)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 B class
Site Code: TBA

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/05/1														
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
05:00	0	7	1	0	1	0	0	0	0	0	0	0	0	9
06:00	0	26	4	0	1	0	0	0	0	0	0	0	0	31
07:00	0	87	11	1	3	0	0	0	0	0	0	0	0	102
08:00	0	52	18	0	3	0	0	0	0	0	0	0	0	73
09:00	0	31	5	0	1	1	0	0	0	0	0	0	0	38
10:00	0	23	12	0	1	0	0	0	0	0	0	0	0	36
11:00	0	26	8	0	3	0	0	0	0	0	0	0	0	37
12 PM	0	29	9	0	1	0	0	0	0	0	0	0	0	39
13:00	0	26	4	0	2	0	0	0	0	0	0	0	0	32
14:00	0	61	21	0	2	0	0	0	0	0	0	0	0	84
15:00	0	45	15	1	2	0	0	0	0	0	0	0	0	63
16:00	0	51	17	0	3	0	0	0	0	0	0	0	0	71
17:00	0	67	14	0	2	0	0	0	0	0	0	0	0	83
18:00	0	31	11	0	0	0	0	0	0	0	0	0	0	42
19:00	0	29	13	0	1	0	0	0	0	0	0	0	0	43
20:00	0	5	6	0	0	0	0	0	0	0	0	0	0	11
21:00	0	10	5	0	0	0	0	0	0	0	0	0	0	15
22:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
23:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Total	0	610	177	2	26	1	0	0	0	0	0	0	0	816
Percent	0.0%	74.8%	21.7%	0.2%	3.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		07:00	08:00	07:00	07:00	09:00								07:00
Vol.		87	18	1	3	1								102
Midday Peak		14:00	14:00		11:00									14:00
Vol.		61	21		3									84
PM Peak		17:00	16:00	15:00	16:00									17:00
Vol.		67	17	1	3									83

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133207 B class
Site Code: TBA

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/06/1														
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
05:00	0	7	3	0	2	0	0	0	0	0	0	0	0	12
06:00	0	26	8	0	4	0	0	0	0	0	0	0	0	38
07:00	1	90	20	0	1	0	0	1	0	0	0	0	0	113
08:00	0	60	11	0	2	0	0	0	0	0	0	0	0	73
09:00	0	34	12	0	3	0	0	0	0	0	0	0	0	49
10:00	0	27	8	0	1	0	0	0	0	0	0	0	0	36
11:00	0	29	15	0	0	0	0	0	0	0	0	0	0	44
12 PM	0	29	15	0	0	1	0	0	0	0	0	0	0	45
13:00	0	38	9	0	0	0	0	0	0	0	0	0	0	47
14:00	0	74	19	0	2	0	0	0	0	0	0	0	0	95
15:00	1	52	18	1	4	0	0	0	0	0	0	0	0	76
16:00	0	41	18	0	1	0	0	0	0	0	0	0	0	60
17:00	0	58	26	0	2	0	0	0	0	0	0	0	0	86
18:00	0	40	9	0	3	0	0	0	0	0	0	0	0	52
19:00	0	54	18	0	3	0	0	0	0	0	0	0	0	75
20:00	0	18	7	0	0	0	0	0	0	0	0	0	0	25
21:00	0	19	9	0	1	0	0	1	0	0	0	0	0	30
22:00	0	6	3	0	0	0	0	0	0	0	0	0	0	9
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	2	706	229	1	29	1	0	2	0	0	0	0	0	970
Percent	0.2%	72.8%	23.6%	0.1%	3.0%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	07:00	07:00		06:00			07:00						07:00
Vol.	1	90	20		4			1						113
Midday Peak		14:00	14:00		14:00	12:00								14:00
Vol.		74	19		2	1								95
PM Peak	15:00	17:00	17:00	15:00	15:00			21:00						17:00
Vol.	1	58	26	1	4			1						86

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133207 B class
Site Code: TBA

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/05/1														
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	0	18	3	0	0	0	0	0	0	0	0	0	0	21
07:00	0	126	17	1	5	0	0	0	0	0	0	0	0	149
08:00	0	64	12	1	3	0	0	1	0	0	0	0	0	81
09:00	0	35	10	0	2	1	0	0	0	0	0	0	0	48
10:00	0	17	7	0	0	0	0	0	0	0	0	0	0	24
11:00	0	24	8	0	0	0	0	0	0	0	0	0	0	32
12 PM	0	23	3	0	0	0	0	0	0	0	0	0	0	26
13:00	0	23	6	0	2	0	0	0	0	0	0	0	0	31
14:00	0	41	9	0	1	1	0	0	0	0	0	0	0	52
15:00	0	61	14	1	0	0	0	0	0	0	0	0	0	76
16:00	0	72	9	0	1	0	0	0	0	0	0	0	0	82
17:00	0	61	16	0	0	0	0	0	0	0	0	0	0	77
18:00	0	29	8	0	1	0	0	0	0	0	0	0	0	38
19:00	0	25	8	0	0	0	0	0	0	0	0	0	0	33
20:00	0	12	3	0	0	0	0	0	0	0	0	0	0	15
21:00	0	5	4	0	0	0	0	0	0	0	0	0	0	9
22:00	0	3	2	0	0	0	0	0	0	0	0	0	0	5
23:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Total	0	641	142	3	15	2	0	1	0	0	0	0	0	804
Percent	0.0%	79.7%	17.7%	0.4%	1.9%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		07:00	07:00	07:00	07:00	09:00		08:00						07:00
Vol.		126	17	1	5	1		1						149
Midday Peak		14:00	14:00		13:00	14:00								14:00
Vol.		41	9		2	1								52
PM Peak		16:00	17:00	15:00	16:00									16:00
Vol.		72	16	1	1									82

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Deerfoot Road
approx 1600' south of Main Street (Route 30)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 B class
Site Code: TBA

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/06/1														
3	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00	0	4	2	0	1	0	0	0	0	0	0	0	0	7
06:00	0	18	6	0	0	0	0	0	0	0	0	0	0	24
07:00	0	114	22	1	0	0	0	1	0	0	0	0	0	138
08:00	0	55	9	1	2	0	0	0	0	0	0	0	0	67
09:00	0	24	9	0	3	0	0	0	0	0	0	0	0	36
10:00	0	17	4	0	1	0	0	0	0	0	0	0	0	22
11:00	0	21	8	1	1	0	0	0	0	0	0	0	0	31
12 PM	0	28	7	0	0	1	0	0	0	0	0	0	0	36
13:00	0	39	5	0	1	0	0	0	0	0	0	0	0	45
14:00	0	47	17	0	2	0	0	0	0	0	0	0	0	66
15:00	0	50	18	1	1	0	0	0	0	0	0	0	0	70
16:00	0	52	12	0	2	0	0	0	1	0	0	0	0	67
17:00	0	76	16	0	1	0	0	0	0	0	0	0	0	93
18:00	0	59	15	0	3	1	0	0	0	0	0	0	0	78
19:00	0	51	14	0	0	0	0	0	0	0	0	0	0	65
20:00	0	24	11	0	0	0	0	0	0	0	0	0	0	35
21:00	0	18	4	0	0	0	0	0	0	0	0	0	0	22
22:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
23:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
Total	0	704	182	4	18	2	0	1	1	0	0	0	0	912
Percent	0.0%	77.2%	20.0%	0.4%	2.0%	0.2%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak		07:00	07:00	07:00	09:00			07:00						07:00
Vol.		114	22	1	3			1						138
Midday Peak		14:00	14:00	11:00	14:00	12:00								14:00
Vol.		47	17	1	2	1								66
PM Peak		17:00	15:00	15:00	18:00	18:00			16:00					17:00
Vol.		76	18	1	3	1			1					93

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Deerfoot Road
approx 1600' south of Main Street (Route 30)
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Client: Green International/ S. Musto

133207 B speed
Site Code: TBA

NB

Start Time	1 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
02/05/1																
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	*	32
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	1	1	0	0	0	0	0	0	2	*	39
05:00	0	**1**	1	1	4	0	1	**1**	0	0	0	0	0	9	32	30
06:00	0	1	3	13	7	7	0	0	0	0	0	0	0	31	35	29
07:00	0	0	4	**29**	**45**	**22**	2	0	0	0	0	0	0	**102**	35	31
08:00	0	0	**7**	19	30	13	**4**	0	0	0	0	0	0	73	36	31
09:00	0	0	0	7	19	11	1	0	0	0	0	0	0	38	36	33
10:00	0	1	4	5	12	12	2	0	0	0	0	0	0	36	37	32
11:00	**1**	0	0	5	11	**18**	1	**1**	0	0	0	0	0	37	37	33
12 PM	0	0	2	10	12	11	**4**	0	0	0	0	0	0	39	38	33
13:00	0	0	2	8	9	12	1	0	0	0	0	0	0	32	37	32
14:00	0	0	**5**	**28**	**34**	13	4	0	0	0	0	0	0	**84**	35	31
15:00	0	0	**5**	**19**	22	13	4	0	0	0	0	0	0	63	36	31
16:00	0	0	2	11	32	21	4	**1**	0	0	0	0	0	71	37	33
17:00	0	0	3	12	**36**	**28**	3	1	0	0	0	0	0	**83**	37	33
18:00	0	0	1	7	19	14	1	0	0	0	0	0	0	42	37	33
19:00	0	**3**	2	5	15	12	**5**	0	**1**	0	0	0	0	43	38	32
20:00	0	0	0	5	4	1	0	1	0	0	0	0	0	11	32	32
21:00	0	0	0	5	5	5	0	0	0	0	0	0	0	15	36	32
22:00	0	0	0	1	0	1	0	0	0	0	0	0	0	2	*	32
23:00	0	0	0	1	0	1	0	0	0	0	0	0	0	2	*	32
Total	1	6	41	191	317	216	38	5	1	0	0	0	0	816		
%	0.1%	0.7%	5.0%	23.4%	38.8%	26.5%	4.7%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%			
AM Peak		05:00	08:00	07:00	07:00	07:00	08:00	05:00						07:00		
Vol.		1	7	29	45	22	4	1						102		
Midday Peak	11:00		14:00	14:00	14:00	11:00	12:00	11:00						14:00		
Vol.	1		5	28	34	18	4	1						84		
PM Peak		19:00	15:00	15:00	17:00	17:00	19:00	16:00	19:00					17:00		
Vol.		3	5	19	36	28	5	1	1					83		

% iles

15th Percentile :	25 MPH
50th Percentile :	31 MPH
85th Percentile :	37 MPH
95th Percentile :	40 MPH

Stats

10 MPH Pace Speed :	28-37 MPH
Number in Pace :	521
Percent in Pace :	63.8%
Number of Vehicles > 35 MPH :	220
Percent of Vehicles > 35 MPH :	26.9%
Mean Speed(Average) :	32 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

Deerfoot Road
approx 1600' south of Main Street (Route 30)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 B speed
Site Code: TBA

NB

Start Time	1 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
02/06/1																
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	1	*	37
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	3	0	0	0	0	0	0	0	0	3	31	32
05:00	0	**1**	1	5	3	1	1	0	0	0	0	0	0	12	30	28
06:00	0	0	**3**	16	10	9	0	0	0	0	0	0	0	38	35	30
07:00	0	0	2	**34**	**54**	21	2	0	0	0	0	0	0	**113**	35	31
08:00	0	0	1	14	31	**23**	4	0	0	0	0	0	0	73	37	33
09:00	0	1	0	6	20	16	**6**	0	0	0	0	0	0	49	39	34
10:00	0	0	1	3	17	11	4	0	0	0	0	0	0	36	38	34
11:00	0	0	5	3	10	**18**	**8**	0	0	0	0	0	0	44	40	34
12 PM	0	0	2	8	14	17	3	**1**	0	0	0	0	0	45	38	34
13:00	0	**1**	3	6	16	16	3	1	**1**	0	0	0	0	47	38	33
14:00	0	0	**6**	**29**	**40**	17	3	0	0	0	0	0	0	**95**	35	31
15:00	0	0	2	**18**	30	23	3	0	0	0	0	0	0	76	36	32
16:00	0	**2**	2	8	18	24	**5**	**1**	0	0	0	0	0	60	38	33
17:00	0	0	**3**	13	37	**29**	4	0	0	0	0	0	0	**86**	37	33
18:00	0	0	3	11	20	13	5	0	0	0	0	0	0	52	38	33
19:00	0	0	2	10	**42**	18	3	0	0	0	0	0	0	75	36	33
20:00	0	0	0	7	8	10	0	0	0	0	0	0	0	25	37	33
21:00	0	0	1	6	19	3	1	0	0	0	0	0	0	30	34	32
22:00	0	0	0	0	4	4	0	1	0	0	0	0	0	9	36	36
23:00	0	0	0	0	0	1	0	0	0	0	0	0	0	1	*	37
Total	0	5	37	197	396	275	55	4	1	0	0	0	0	970		
%	0.0%	0.5%	3.8%	20.3%	40.8%	28.4%	5.7%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%			
AM Peak		05:00	06:00	07:00	07:00	08:00	09:00							07:00		
Vol.		1	3	34	54	23	6							113		
Midday Peak		13:00	14:00	14:00	14:00	11:00	11:00	12:00	13:00					14:00		
Vol.		1	6	29	40	18	8	1	1					95		
PM Peak		16:00	17:00	15:00	19:00	17:00	16:00	16:00						17:00		
Vol.		2	3	18	42	29	5	1						86		

% iles

15th Percentile : 26 MPH
50th Percentile : 32 MPH
85th Percentile : 37 MPH
95th Percentile : 40 MPH

Stats

10 MPH Pace Speed : 28-37 MPH
Number in Pace : 638
Percent in Pace : 65.8%
Number of Vehicles > 35 MPH : 284
Percent of Vehicles > 35 MPH : 29.3%
Mean Speed(Average) : 33 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

Deerfoot Road
approx 1600' south of Main Street (Route 30)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 B speed
Site Code: TBA

SB

Start Time	1 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
02/05/1																
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	1	*	37
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	*	27
05:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	*	27
06:00	0	0	0	9	9	3	0	0	0	0	0	0	0	21	33	31
07:00	0	0	**6**	**36**	**69**	**34**	**4**	0	0	0	0	0	0	**149**	36	32
08:00	0	0	6	17	34	22	2	0	0	0	0	0	0	81	36	32
09:00	0	**1**	2	6	17	17	4	**1**	0	0	0	0	0	48	38	33
10:00	0	1	1	5	10	7	0	0	0	0	0	0	0	24	36	31
11:00	0	**1**	0	10	6	10	4	1	0	0	0	0	0	32	39	33
12 PM	0	0	1	5	5	**13**	0	**2**	0	0	0	0	0	26	38	34
13:00	0	0	0	5	9	11	**5**	1	0	0	0	0	0	31	40	35
14:00	0	0	**2**	**17**	**18**	10	5	0	0	0	0	0	0	**52**	37	32
15:00	0	**1**	2	12	35	23	3	0	0	0	0	0	0	76	37	33
16:00	0	0	**5**	8	**38**	**25**	**6**	0	0	0	0	0	0	**82**	37	33
17:00	0	0	2	**13**	32	24	6	0	0	0	0	0	0	77	37	33
18:00	0	0	0	3	17	14	4	0	0	0	0	0	0	38	38	35
19:00	0	0	1	6	17	7	2	0	0	0	0	0	0	33	36	32
20:00	0	0	2	7	4	2	0	0	0	0	0	0	0	15	33	29
21:00	0	0	1	0	5	3	0	0	0	0	0	0	0	9	35	33
22:00	0	0	1	0	3	1	0	0	0	0	0	0	0	5	32	31
23:00	0	0	0	1	0	1	0	0	0	0	0	0	0	2	*	32
Total	0	4	32	162	328	228	45	5	0	0	0	0	0	804		
%	0.0%	0.5%	4.0%	20.1%	40.8%	28.4%	5.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak		09:00	07:00	07:00	07:00	07:00	07:00	09:00						07:00		
Vol.		1	6	36	69	34	4	1						149		
Midday Peak		11:00	14:00	14:00	14:00	12:00	13:00	12:00						14:00		
Vol.		1	2	17	18	13	5	2						52		
PM Peak		15:00	16:00	17:00	16:00	16:00	16:00							16:00		
Vol.		1	5	13	38	25	6							82		

% iles

15th Percentile :	26 MPH
50th Percentile :	32 MPH
85th Percentile :	37 MPH
95th Percentile :	40 MPH

Stats

10 MPH Pace Speed :	28-37 MPH
Number in Pace :	528
Percent in Pace :	65.7%
Number of Vehicles > 35 MPH :	236
Percent of Vehicles > 35 MPH :	29.3%
Mean Speed(Average) :	33 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

Deerfoot Road
approx 1600' south of Main Street (Route 30)
City, State: Southborough, MA
Client: Green International/ S. Musto

133207 B speed
Site Code: TBA

SB

Start Time	1 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
02/06/1																
3	0	0	0	0	0	1	0	0	0	0	0	0	0	1	*	37
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1	*	22
05:00	0	0	1	5	1	0	0	0	0	0	0	0	0	7	28	27
06:00	0	0	1	7	9	6	1	0	0	0	0	0	0	24	36	32
07:00	0	0	6	**25**	**68**	**32**	**7**	0	0	0	0	0	0	**138**	36	32
08:00	0	**1**	**9**	11	14	27	5	0	0	0	0	0	0	67	38	32
09:00	0	0	2	9	11	13	1	0	0	0	0	0	0	36	37	32
10:00	0	0	0	3	8	8	3	0	0	0	0	0	0	22	38	34
11:00	0	0	1	4	12	12	2	0	0	0	0	0	0	31	37	34
12 PM	0	0	0	4	17	11	**4**	0	0	0	0	0	0	36	38	34
13:00	0	0	0	6	14	**22**	3	0	0	0	0	0	0	45	38	34
14:00	0	0	**6**	**14**	**23**	17	4	**2**	0	0	0	0	0	**66**	37	32
15:00	0	0	1	**17**	26	20	**6**	0	0	0	0	0	0	70	37	33
16:00	0	0	1	10	34	13	5	**4**	0	0	0	0	0	67	38	34
17:00	0	0	**3**	12	**48**	**25**	5	0	0	0	0	0	0	**93**	37	33
18:00	0	0	0	13	33	25	3	2	**2**	0	0	0	0	78	37	34
19:00	0	0	1	13	25	22	4	0	0	0	0	0	0	65	37	33
20:00	0	0	0	7	14	10	4	0	0	0	0	0	0	35	38	34
21:00	0	0	1	5	5	7	3	0	0	0	**1**	0	0	22	39	35
22:00	0	0	0	1	2	0	1	0	0	0	0	0	0	4	*	33
23:00	0	0	0	0	1	3	0	0	0	0	0	0	0	4	36	36
Total	0	1	34	166	365	274	61	8	2	0	1	0	0	912		
%	0.0%	0.1%	3.7%	18.2%	40.0%	30.0%	6.7%	0.9%	0.2%	0.0%	0.1%	0.0%	0.0%			
AM Peak		08:00	08:00	07:00	07:00	07:00	07:00							07:00		
Vol.		1	9	25	68	32	7							138		
Midday Peak			14:00	14:00	14:00	13:00	12:00	14:00						14:00		
Vol.			6	14	23	22	4	2						66		
PM Peak			17:00	15:00	17:00	17:00	15:00	16:00	18:00		21:00			17:00		
Vol.			3	17	48	25	6	4	2		1			93		

% iles
15th Percentile : 27 MPH
50th Percentile : 32 MPH
85th Percentile : 37 MPH
95th Percentile : 41 MPH

Stats
10 MPH Pace Speed : 29-38 MPH
Number in Pace : 601
Percent in Pace : 65.9%
Number of Vehicles > 35 MPH : 295
Percent of Vehicles > 35 MPH : 32.3%
Mean Speed(Average) : 33 MPH

Transportation Data Corporation
P.O. Box 334 Wakefield, MA 01880
Tel. (781) 587-0086 Fax (781) 587-0189
Email: mperone1@verizon.net

Park Central Drive just north of Turnpike Road (Route 9)
City/State: Southborough, MA
Client: MSTS/H. Hamandi

Start	SB				NB				Combined				21-Oct-08
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	0		15		0		8		0		23		
12:15	1		4		1		6		2		10		
12:30	0		11		0		**12**		0		23		
12:45	0	1	12	42	0	1	**12**	38	0	2	24	80	
01:00	0		8		0		**10**		0		18		
01:15	1		10		2		**9**		3		19		
01:30	2		7		1		6		3		13		
01:45	0	3	5	30	0	3	8	33	0	6	13	63	
02:00	0		6		0		8		0		14		
02:15	0		7		0		7		0		14		
02:30	0		8		0		10		0		18		
02:45	0	0	6	27	0	0	6	31	0	0	12	58	
03:00	0		8		0		5		0		13		
03:15	0		7		0		6		0		13		
03:30	0		8		0		4		0		12		
03:45	0	0	7	30	0	0	3	18	0	0	10	48	
04:00	0		11		0		4		0		15		
04:15	0		10		0		8		0		18		
04:30	3		4		2		5		5		9		
04:45	2	5	6	31	1	3	7	24	3	8	13	55	
05:00	0		13		0		8		0		21		
05:15	3		**11**		2		8		5		**19**		
05:30	0		**15**		0		7		0		**22**		
05:45	2	5	**10**	49	2	4	10	33	4	9	**20**	82	
06:00	3		**14**		3		14		6		**28**		
06:15	1		4		1		2		2		6		
06:30	4		7		6		6		10		13		
06:45	0	8	4	29	0	10	6	28	0	18	10	57	
07:00	3		4		4		4		7		8		
07:15	6		3		6		7		12		10		
07:30	6		2		11		3		17		5		
07:45	10	25	4	13	9	30	4	18	19	55	8	31	
08:00	5		2		6		2		11		4		
08:15	**11**		3		**16**		5		**27**		8		
08:30	**6**		4		**14**		2		**20**		6		
08:45	**9**	31	2	11	**12**	48	4	13	**21**	79	6	24	
09:00	**15**		2		**17**		4		**32**		6		
09:15	7		3		9		3		16		6		
09:30	4		1		3		4		7		5		
09:45	9	35	2	8	7	36	4	15	16	71	6	23	
10:00	5		1		3		3		8		4		
10:15	5		0		6		1		11		1		
10:30	3		0		1		4		4		4		
10:45	8	21	2	3	9	19	4	12	17	40	6	15	
11:00	10		2		8		1		18		3		
11:15	6		1		7		3		13		4		
11:30	5		1		3		0		8		1		
11:45	10	31	0	4	14	32	0	4	24	63	0	8	
Total	165		277		186		267		351		544		
Percent	47.0%		50.9%		53.0%		49.1%						
Day Total		442				453				895			
Peak	08:15		05:15		08:15		00:30		08:15		05:15		
Vol.	41		50		59		43		100		89		
P.H.F.	0.683		0.833		0.868		0.768		0.781		0.795		

Transportation Data Corporation
P.O. Box 334 Wakefield, MA 01880
Tel. (781) 587-0086 Fax (781) 587-0189
Email: mperone1@verizon.net

Flagg Road just north of
Turnpike Road (Route 9)
City/State: Southborough, MA
Client: MSTS/H. Hamandi

Start	NB				SB				Combined				21-Oct-08
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	0		10		1		6		1		16		
12:15	0		10		0		4		0		14		
12:30	0		11		0		8		0		19		
12:45	2	2	8	39	0	1	8	26	2	3	16	65	
01:00	0		5		0		4		0		9		
01:15	1		8		0		12		1		20		
01:30	0		12		0		10		0		22		
01:45	0	1	5	30	0	0	11	37	0	1	16	67	
02:00	0		11		0		5		0		16		
02:15	0		11		1		**11**		1		22		
02:30	0		6		0		**17**		0		23		
02:45	0	0	8	36	0	1	**9**	42	0	1	17	78	
03:00	0		9		0		**9**		0		18		
03:15	0		8		0		8		0		16		
03:30	1		14		0		8		1		22		
03:45	0	1	5	36	1	1	10	35	1	2	15	71	
04:00	0		12		0		10		0		22		
04:15	0		9		0		14		0		23		
04:30	1		7		1		8		2		15		
04:45	0	1	5	33	0	1	5	37	0	2	10	70	
05:00	0		10		4		8		4		18		
05:15	1		12		0		7		1		19		
05:30	1		6		2		7		3		13		
05:45	0	2	**16**	44	4	10	5	27	4	12	**21**	71	
06:00	2		**12**		3		11		5		**23**		
06:15	0		**15**		4		8		4		**23**		
06:30	0		**8**		12		10		12		**18**		
06:45	7	9	11	46	11	30	8	37	18	39	19	83	
07:00	1		3		16		4		17		7		
07:15	7		13		17		4		24		17		
07:30	8		13		19		6		27		19		
07:45	7	23	8	37	14	66	4	18	**21**	89	12	55	
08:00	8		5		**13**		3		**21**		8		
08:15	6		5		**17**		1		**23**		6		
08:30	7		8		**22**		2		**29**		10		
08:45	6	27	4	22	**15**	67	1	7	21	94	5	29	
09:00	5		5		7		2		12		7		
09:15	3		6		7		2		10		8		
09:30	4		6		10		3		14		9		
09:45	2	14	3	20	11	35	1	8	13	49	4	28	
10:00	4		6		5		0		9		6		
10:15	7		3		8		2		15		5		
10:30	6		7		7		0		13		7		
10:45	5	22	4	20	7	27	2	4	12	49	6	24	
11:00	**7**		2		12		0		19		2		
11:15	**5**		0		6		1		11		1		
11:30	**13**		2		13		1		26		3		
11:45	**16**	41	1	5	6	37	1	3	22	78	2	8	
Total	143		368		276		281		419		649		
Percent	34.1%		56.7%		65.9%		43.3%						
Day Total		511				557				1068			
Peak	11:00		05:45		08:00		02:15		07:45		05:45		
Vol.	41		51		67		46		94		85		
P.H.F.	0.641		0.797		0.761		0.676		0.810		0.924		

Transportation Data Corporation
P.O. Box 334 Wakefield, MA 01880
Tel. (781) 587-0086 Fax (781) 587-0189
Email: mperone1@verizon.net

03866Avolume
Site Code: 991

Flagg Road north of
Blackthorn Drive
City/State: Southborough, MA
Client: MSTS/H. Hamandi

Start	NB				SB				Combined				21-Oct-08
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	0		9		1		7		1		16		
12:15	0		7		0		4		0		11		
12:30	0		14		0		10		0		24		
12:45	2	2	8	38	0	1	9	30	2	3	17	68	
01:00	0		7		0		4		0		11		
01:15	1		10		0		10		1		20		
01:30	0		12		0		10		0		22		
01:45	0	1	10	39	0	0	**12**	36	0	1	22	75	
02:00	0		13		0		**9**		0		22		
02:15	0		6		1		**10**		1		16		
02:30	0		8		0		**16**		0		24		
02:45	0	0	7	34	0	1	10	45	0	1	17	79	
03:00	0		9		0		10		0		19		
03:15	0		9		0		8		0		17		
03:30	1		14		0		11		1		25		
03:45	0	1	4	36	0	0	9	38	0	1	13	74	
04:00	0		10		0		12		0		22		
04:15	0		7		0		14		0		21		
04:30	0		5		1		11		1		16		
04:45	1	1	8	30	0	1	9	46	1	2	17	76	
05:00	0		11		3		11		3		22		
05:15	1		8		1		11		2		19		
05:30	0		**7**		1		9		1		**16**		
05:45	2	3	**13**	39	3	8	11	42	5	11	**24**	81	
06:00	1		**11**		3		10		4		**21**		
06:15	3		**15**		4		12		7		**27**		
06:30	5		7		6		9		11		16		
06:45	7	16	10	43	8	21	6	37	15	37	16	80	
07:00	2		4		10		9		12		13		
07:15	12		9		19		7		**31**		16		
07:30	**14**		11		14		6		**28**		17		
07:45	**15**	43	10	34	16	59	6	28	**31**	102	16	62	
08:00	**12**		6		**13**		5		**25**		11		
08:15	**14**		4		**15**		2		29		6		
08:30	10		4		**16**		3		26		7		
08:45	6	42	3	17	**19**	63	0	10	25	105	3	27	
09:00	3		3		7		2		10		5		
09:15	5		4		7		3		12		7		
09:30	5		5		6		2		11		7		
09:45	2	15	3	15	8	28	0	7	10	43	3	22	
10:00	6		2		2		2		8		4		
10:15	7		3		6		3		13		6		
10:30	5		4		9		0		14		4		
10:45	8	26	3	12	8	25	1	6	16	51	4	18	
11:00	7		1		8		0		15		1		
11:15	11		0		8		0		19		0		
11:30	9		1		10		1		19		2		
11:45	8	35	1	3	8	34	0	1	16	69	1	4	
Total	185		340		241		326		426		666		
Percent	43.4%		51.1%		56.6%		48.9%						
Day Total		525				567				1092			
Peak	07:30		05:30		08:00		01:45		07:15		05:30		
Vol.	55		46		63		47		115		88		
P.H.F.	0.917		0.767		0.829		0.734		0.927		0.815		

Transportation Data Corporation
P.O. Box 334 Wakefield, MA 01880
Tel. (781) 587-0086 Fax (781) 587-0189
Email: mperone1@verizon.net

Flagg Road north of
Blackthorn Drive
City/State: Southborough, MA
Client: MSTS/H. Hamandi
Northbound

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
10/21/0 8	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
01:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
04:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
05:00	0	0	0	0	0	0	1	0	0	1	1	0	0	0	3
06:00	0	0	0	0	0	2	1	8	4	0	1	0	0	0	16
07:00	0	0	0	0	0	0	3	7	18	10	4	1	0	0	43
08:00	1	0	0	0	1	3	1	8	11	13	3	1	0	0	42
09:00	0	0	0	0	0	1	1	5	3	4	1	0	0	0	15
10:00	0	0	0	0	0	2	3	3	7	6	5	0	0	0	26
11:00	0	0	0	0	2	0	6	1	14	7	4	1	0	0	35
12 PM	0	0	0	0	0	2	3	9	12	7	5	0	0	0	38
13:00	0	0	0	0	0	1	5	8	11	9	2	3	0	0	39
14:00	0	0	0	0	0	1	3	3	7	15	3	2	0	0	34
15:00	0	0	0	0	0	0	4	7	13	5	6	1	0	0	36
16:00	1	0	0	0	0	1	0	5	7	10	4	2	0	0	30
17:00	0	0	0	1	0	2	3	5	15	7	5	1	0	0	39
18:00	0	0	0	0	0	0	5	14	15	5	4	0	0	0	43
19:00	0	0	0	0	0	1	5	11	11	2	3	1	0	0	34
20:00	0	0	0	0	0	1	1	4	4	4	3	0	0	0	17
21:00	0	0	0	0	0	0	1	3	4	5	1	1	0	0	15
22:00	0	0	0	0	0	0	1	3	1	4	2	1	0	0	12
23:00	0	0	0	0	0	0	1	1	1	0	0	0	0	0	3
Total	2	0	0	1	3	17	48	105	160	114	59	16	0	0	525

Daily

15th Percentile :	22 MPH
50th Percentile :	26 MPH
85th Percentile :	30 MPH
95th Percentile :	33 MPH
Mean Speed(Average) :	26 MPH
10 MPH Pace Speed :	22-31 MPH
Number in Pace :	399
Percent in Pace :	76.0%
Number of Vehicles > 25 MPH :	295
Percent of Vehicles > 25 MPH :	56.2%

Grand Total	2	0	0	1	3	17	48	105	160	114	59	16	0	0	525

Overall

15th Percentile :	22 MPH
50th Percentile :	26 MPH
85th Percentile :	30 MPH
95th Percentile :	33 MPH
Mean Speed(Average) :	26 MPH
10 MPH Pace Speed :	22-31 MPH
Number in Pace :	399
Percent in Pace :	76.0%
Number of Vehicles > 25 MPH :	295
Percent of Vehicles > 25 MPH :	56.2%

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Flagg Road north of Blackthorn Drive
City/State: Southborough, MA
Client: MSTS/H. Hamandi
Southbound

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
10/21/0 8	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
05:00	0	0	0	0	0	1	2	1	2	2	0	0	0	0	8
06:00	0	0	0	0	0	2	2	3	7	6	1	0	0	0	21
07:00	0	0	0	0	2	0	5	12	29	10	1	0	0	0	59
08:00	0	0	0	1	2	2	8	7	14	17	9	1	0	0	61
09:00	0	0	0	0	0	0	2	3	5	11	6	1	0	0	28
10:00	0	0	0	0	1	3	2	3	7	8	1	0	0	0	25
11:00	1	0	0	0	0	1	4	6	15	3	3	1	0	0	34
12 PM	0	0	0	0	0	1	4	6	7	11	1	0	0	0	30
13:00	0	0	0	0	0	2	4	8	11	8	3	0	0	0	36
14:00	0	0	0	0	1	1	6	12	18	4	3	0	0	0	45
15:00	0	0	0	0	0	0	6	5	9	15	2	0	1	0	38
16:00	0	0	0	0	0	1	5	6	12	14	6	2	0	0	46
17:00	1	0	0	0	0	1	6	12	14	6	1	1	0	0	42
18:00	0	0	0	0	0	0	5	9	8	11	4	0	0	0	37
19:00	0	0	0	0	0	1	5	6	11	5	0	0	0	0	28
20:00	0	0	0	0	0	1	2	0	3	2	2	0	0	0	10
21:00	0	0	0	0	0	0	0	1	3	2	1	0	0	0	7
22:00	0	0	0	0	0	0	1	0	3	1	1	0	0	0	6
23:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	2	0	0	1	6	17	69	101	178	138	46	6	1	0	565

Daily

15th Percentile :	21 MPH
50th Percentile :	26 MPH
85th Percentile :	30 MPH
95th Percentile :	32 MPH
Mean Speed(Average) :	26 MPH
10 MPH Pace Speed :	21-30 MPH
Number in Pace :	440
Percent in Pace :	77.9%
Number of Vehicles > 25 MPH :	309
Percent of Vehicles > 25 MPH :	54.7%

Grand Total	2	0	0	1	6	17	69	101	178	138	46	6	1	0	565

Overall

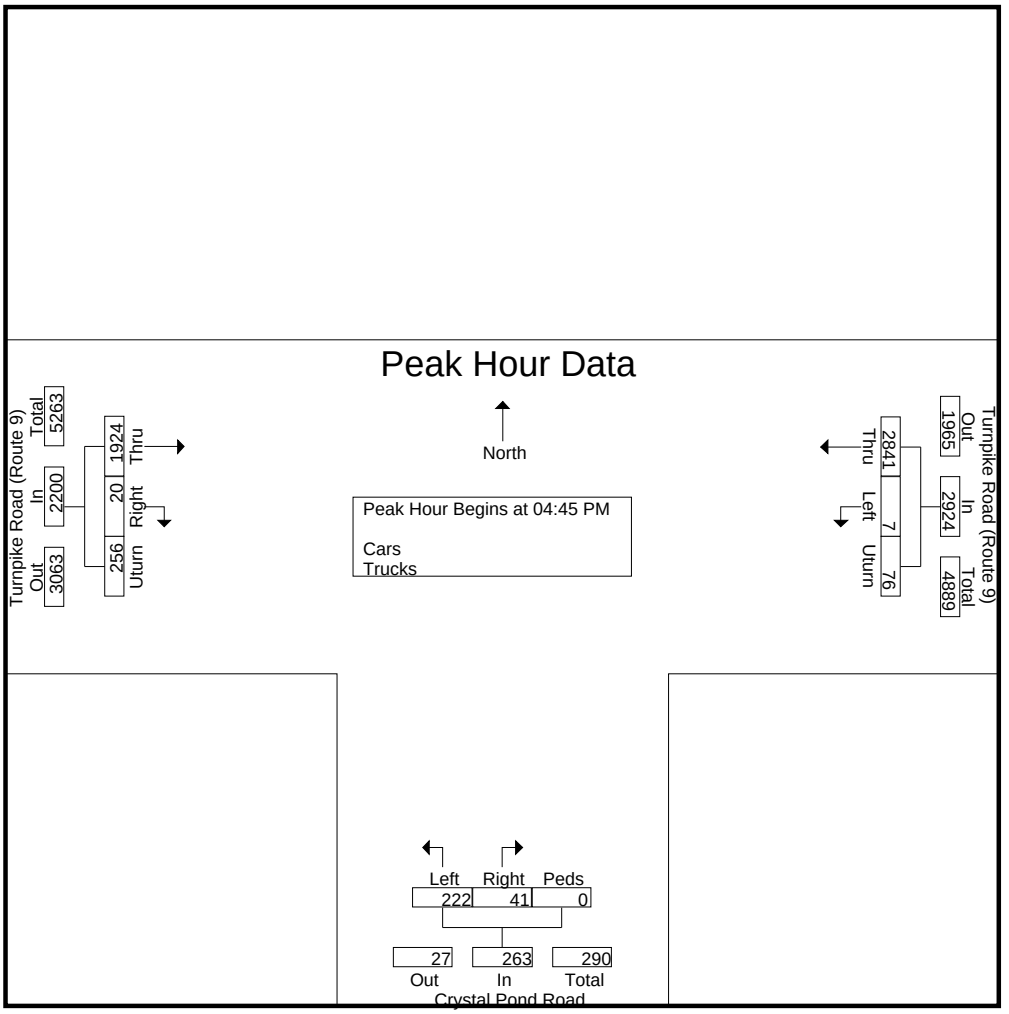
15th Percentile :	21 MPH
50th Percentile :	26 MPH
85th Percentile :	30 MPH
95th Percentile :	32 MPH
Mean Speed(Average) :	26 MPH
10 MPH Pace Speed :	21-30 MPH
Number in Pace :	440
Percent in Pace :	77.9%
Number of Vehicles > 25 MPH :	309
Percent of Vehicles > 25 MPH :	54.7%

Transportation Data Corporation
Mario Perone, mperone1@verizon.net
Tel. (781) 587-0086 Fax (781) 587-0189

S: Crystal Pond Road
E/W: Turnpike Road (Route 9)
City/State: Southborough, MA
Client: MSTS/H. Hamandi

File Name : 03866AA
Site Code : 991
Start Date : 10/21/2008
Page No : 1

	Turnpike Road (Route 9) From East				Crystal Pond Road From South				Turnpike Road (Route 9) From West				
Start Time	Thru	Left	Uturn	App. Total	Right	Left	Peds	App. Total	Right	Thru	Uturn	App. Total	Int. 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	699	1	19	719	6	43	0	49	6	469	40	515	1283
05:00 PM	**743**	2	15	**760**	13	**70**	0	**83**	6	**514**	59	**579**	**1422**
05:15 PM	722	1	**26**	749	**14**	50	0	64	1	500	74	575	1388
05:30 PM	677	**3**	16	696	8	59	0	67	**7**	441	**83**	531	1294
Total Volume	2841	7	76	2924	41	222	0	263	20	1924	256	2200	5387
% App. Total	97.2	0.2	2.6		15.6	84.4	0		0.9	87.5	11.6		
PHF	.956	.583	.731	.962	.732	.793	.000	.792	.714	.936	.771	.950	.947



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Tel. (781) 587-0086 Fax (781) 587-0189

S: Crystal Pond Road
E/W: Turnpike Road (Route 9)
City/State: Southborough, MA
Client: MSTS/H. Hamandi

File Name : 03866AA
Site Code : 991
Start Date : 10/21/2008
Page No : 1

Groups Printed- Trucks

	Turnpike Road (Route 9) From East			Crystal Pond Road From South			Turnpike Road (Route 9) From West			
Start Time	Thru	Left	Uturn	Right	Left	Peds	Right	Thru	Uturn	Int. Total
04:00 PM	6	0	0	0	1	0	0	7	0	14
04:15 PM	8	0	0	0	2	0	2	8	0	20
04:30 PM	7	0	0	1	1	0	1	5	0	15
04:45 PM	7	0	0	0	0	0	1	9	0	17
Total	28	0	0	1	4	0	4	29	0	66
05:00 PM	4	0	0	1	2	0	2	4	0	13
05:15 PM	5	0	0	1	0	0	0	5	0	11
05:30 PM	2	0	0	0	0	0	0	3	0	5
05:45 PM	2	0	0	0	0	0	0	3	0	5
Total	13	0	0	2	2	0	2	15	0	34
Grand Total	41	0	0	3	6	0	6	44	0	100
Apprch %	100	0	0	33.3	66.7	0	12	88	0	
Total %	41	0	0	3	6	0	6	44	0	

	Turnpike Road (Route 9) From East				Crystal Pond Road From South				Turnpike Road (Route 9) From West				
Start Time	Thru	Left	Uturn	App. Total	Right	Left	Peds	App. Total	Right	Thru	Uturn	App. Total	Int. 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	1	0	1	0	7	0	7	14
04:15 PM	**8**	0	0	**8**	0	**2**	0	**2**	**2**	8	0	**10**	**20**
04:30 PM	7	0	0	7	**1**	1	0	2	1	5	0	6	15
04:45 PM	7	0	0	7	0	0	0	0	1	**9**	0	10	17
Total Volume	28	0	0	28	1	4	0	5	4	29	0	33	66
% App. Total	100	0	0		20	80	0		12.1	87.9	0		
PHF	.875	.000	.000	.875	.250	.500	.000	.625	.500	.806	.000	.825	.825

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S: Crystal Pond Road
E/W: Turnpike Road (Route 9)
City/State: Southborough, MA
Client: MSTS/H. Hamandi

File Name : 03866AA
Site Code : 991
Start Date : 10/21/2008
Page No : 1

Groups Printed- Cars - Trucks

	Turnpike Road (Route 9) From East			Crystal Pond Road From South			Turnpike Road (Route 9) From West			
Start Time	Thru	Left	Uturn	Right	Left	Peds	Right	Thru	Uturn	Int. Total
04:00 PM	616	0	10	1	27	0	8	396	49	1107
04:15 PM	650	1	19	3	27	0	7	431	41	1179
04:30 PM	643	2	12	3	33	0	2	453	41	1189
04:45 PM	699	1	19	6	43	0	6	469	40	1283
Total	2608	4	60	13	130	0	23	1749	171	4758
05:00 PM	743	2	15	13	70	0	6	514	59	1422
05:15 PM	722	1	26	14	50	0	1	500	74	1388
05:30 PM	677	3	16	8	59	0	7	441	83	1294
05:45 PM	655	1	15	2	44	0	3	419	67	1206
Total	2797	7	72	37	223	0	17	1874	283	5310
Grand Total	5405	11	132	50	353	0	40	3623	454	10068
Apprch %	97.4	0.2	2.4	12.4	87.6	0	1	88	11	
Total %	53.7	0.1	1.3	0.5	3.5	0	0.4	36	4.5	
Cars	5364	11	132	47	347	0	34	3579	454	9968
% Cars	99.2	100	100	94	98.3	0	85	98.8	100	99
Trucks	41	0	0	3	6	0	6	44	0	100
% Trucks	0.8	0	0	6	1.7	0	15	1.2	0	1

	Turnpike Road (Route 9) From East				Crystal Pond Road From South				Turnpike Road (Route 9) From West				
Start Time	Thru	Left	Uturn	App. Total	Right	Left	Peds	App. Total	Right	Thru	Uturn	App. Total	Int. 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	699	1	19	719	6	43	0	49	6	469	40	515	1283
05:00 PM	**743**	2	15	**760**	13	**70**	0	**83**	6	**514**	59	**579**	**1422**
05:15 PM	722	1	**26**	749	**14**	50	0	64	1	500	74	575	1388
05:30 PM	677	**3**	16	696	8	59	0	67	**7**	441	**83**	531	1294
Total Volume	2841	7	76	2924	41	222	0	263	20	1924	256	2200	5387
% App. Total	97.2	0.2	2.6		15.6	84.4	0		0.9	87.5	11.6		
PHF	.956	.583	.731	.962	.732	.793	.000	.792	.714	.936	.771	.950	.947

Transportation Data Corporation
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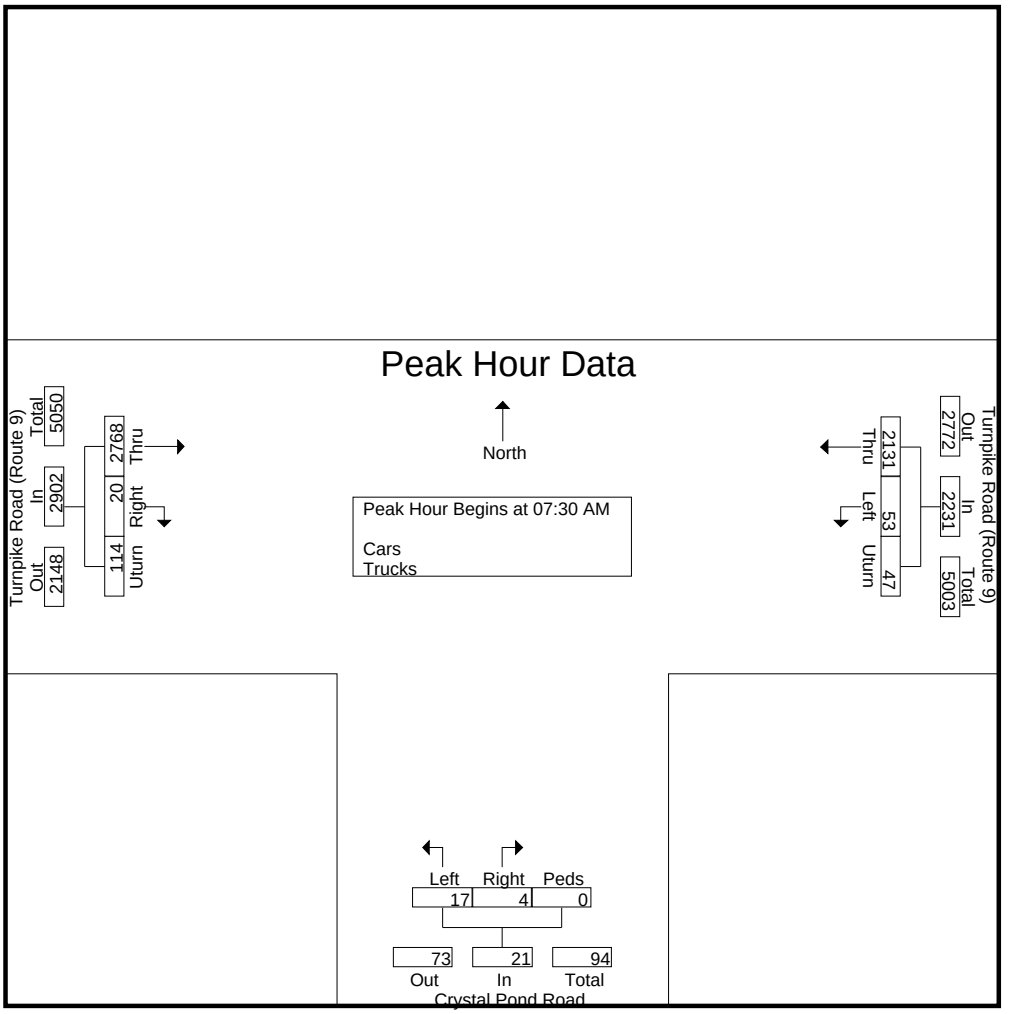
S: Crystal Pond Road
E/W: Turnpike Road (Route 9)
City/State: Southborough, MA
Client: MSTS/H. Hamandi

File Name : 03866A
Site Code : 991
Start Date : 10/21/2008
Page No : 1

	Turnpike Road (Route 9) From East				Crystal Pond Road From South				Turnpike Road (Route 9) From West				
Start Time	Thru	Left	Uturn	App. Total	Right	Left	Peds	App. Total	Right	Thru	Uturn	App. Total	Int. 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	473	10	**14**	497	**1**	**5**	0	**6**	3	**757**	22	**782**	1285
07:45 AM	561	12	11	584	1	3	0	4	5	727	33	765	**1353**
08:00 AM	**571**	14	9	**594**	1	5	0	6	3	658	24	685	1285
08:15 AM	526	**17**	13	556	1	4	0	5	**9**	626	**35**	670	1231
Total Volume	2131	53	47	2231	4	17	0	21	20	2768	114	2902	5154
% App. Total	95.5	2.4	2.1		19	81	0		0.7	95.4	3.9		
PHF	.933	.779	.839	.939	1.000	.850	.000	.875	.556	.914	.814	.928	.952



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S: Crystal Pond Road
E/W: Turnpike Road (Route 9)
City/State: Southborough, MA
Client: MSTS/H. Hamandi

File Name : 03866A
Site Code : 991
Start Date : 10/21/2008
Page No : 1

Groups Printed- Trucks

	Turnpike Road (Route 9) From East			Crystal Pond Road From South			Turnpike Road (Route 9) From West			
Start Time	Thru	Left	Uturn	Right	Left	Peds	Right	Thru	Uturn	Int. Total
07:00 AM	7	0	0	0	0	0	0	6	0	13
07:15 AM	6	0	0	0	0	0	0	5	0	11
07:30 AM	9	0	0	0	1	0	0	10	0	20
07:45 AM	12	0	0	0	2	0	1	8	1	24
Total	34	0	0	0	3	0	1	29	1	68
08:00 AM	14	0	0	1	0	0	1	8	0	24
08:15 AM	11	0	0	0	2	0	2	12	1	28
08:30 AM	15	0	0	0	1	0	0	7	0	23
08:45 AM	12	0	0	0	1	0	1	9	0	23
Total	52	0	0	1	4	0	4	36	1	98
Grand Total	86	0	0	1	7	0	5	65	2	166
Apprch %	100	0	0	12.5	87.5	0	6.9	90.3	2.8	
Total %	51.8	0	0	0.6	4.2	0	3	39.2	1.2	

	Turnpike Road (Route 9) From East				Crystal Pond Road From South				Turnpike Road (Route 9) From West				
Start Time	Thru	Left	Uturn	App. Total	Right	Left	Peds	App. Total	Right	Thru	Uturn	App. Total	Int. 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	12	0	0	12	0	**2**	0	**2**	1	8	**1**	10	24
08:00 AM	14	0	0	14	**1**	0	0	1	1	8	0	9	24
08:15 AM	11	0	0	11	0	2	0	2	**2**	**12**	1	**15**	**28**
08:30 AM	**15**	0	0	**15**	0	1	0	1	0	7	0	7	23
Total Volume	52	0	0	52	1	5	0	6	4	35	2	41	99
% App. Total	100	0	0		16.7	83.3	0		9.8	85.4	4.9		
PHF	.867	.000	.000	.867	.250	.625	.000	.750	.500	.729	.500	.683	.884

Transportation Data Corporation
Mario Perone, mperone1@verizon.net
Tel. (781) 587-0086 Fax (781) 587-0189

S: Crystal Pond Road
E/W: Turnpike Road (Route 9)
City/State: Southborough, MA
Client: MSTS/H. Hamandi

File Name : 03866A
Site Code : 991
Start Date : 10/21/2008
Page No : 1

Groups Printed- Cars - Trucks

	Turnpike Road (Route 9) From East			Crystal Pond Road From South			Turnpike Road (Route 9) From West			
Start Time	Thru	Left	Uturn	Right	Left	Peds	Right	Thru	Uturn	Int. Total
07:00 AM	334	7	6	0	3	0	2	666	14	1032
07:15 AM	388	8	10	2	2	0	1	773	20	1204
07:30 AM	473	10	14	1	5	0	3	757	22	1285
07:45 AM	561	12	11	1	3	0	5	727	33	1353
Total	1756	37	41	4	13	0	11	2923	89	4874
08:00 AM	571	14	9	1	5	0	3	658	24	1285
08:15 AM	526	17	13	1	4	0	9	626	35	1231
08:30 AM	549	22	10	0	6	0	5	586	31	1209
08:45 AM	524	19	8	2	4	0	4	543	21	1125
Total	2170	72	40	4	19	0	21	2413	111	4850
Grand Total	3926	109	81	8	32	0	32	5336	200	9724
Apprch %	95.4	2.6	2	20	80	0	0.6	95.8	3.6	
Total %	40.4	1.1	0.8	0.1	0.3	0	0.3	54.9	2.1	
Cars	3840	109	81	7	25	0	27	5271	198	9558
% Cars	97.8	100	100	87.5	78.1	0	84.4	98.8	99	98.3
Trucks	86	0	0	1	7	0	5	65	2	166
% Trucks	2.2	0	0	12.5	21.9	0	15.6	1.2	1	1.7

	Turnpike Road (Route 9) From East				Crystal Pond Road From South				Turnpike Road (Route 9) From West				
Start Time	Thru	Left	Uturn	App. Total	Right	Left	Peds	App. Total	Right	Thru	Uturn	App. Total	Int. 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	473	10	**14**	497	**1**	**5**	0	**6**	3	**757**	22	**782**	1285
07:45 AM	561	12	11	584	1	3	0	4	5	727	33	765	**1353**
08:00 AM	**571**	14	9	**594**	1	5	0	6	3	658	24	685	1285
08:15 AM	526	**17**	13	556	1	4	0	5	**9**	626	**35**	670	1231
Total Volume	2131	53	47	2231	4	17	0	21	20	2768	114	2902	5154
% App. Total	95.5	2.4	2.1		19	81	0		0.7	95.4	3.9		
PHF	.933	.779	.839	.939	1.000	.850	.000	.875	.556	.914	.814	.928	.952

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Southborough COUNT DATE : 2011

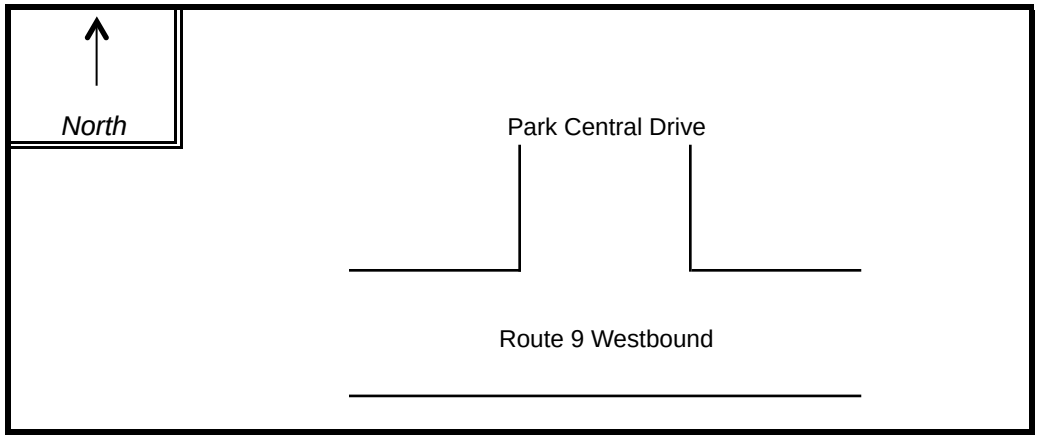
DISTRICT : 3 UNSIGNALIZED : √ SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Route 9

MINOR STREET(S) : Park Central Drive

INTERSECTION DIAGRAM (Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (AM/PM) :	0	102	0	2,274		**2,376**

" K " FACTOR : **0.085** APPROACH ADT : **27,953** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES :	0	# OF YEARS :	3	AVERAGE # OF CRASHES (**A**) :	**0.00**

CRASH RATE CALCULATION :

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(ADT * 365)}$$

Comments : below District 3 crash rate average

Project Title & Date: Proposed Central Park 40B Residential Project

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Southborough COUNT DATE : 2011

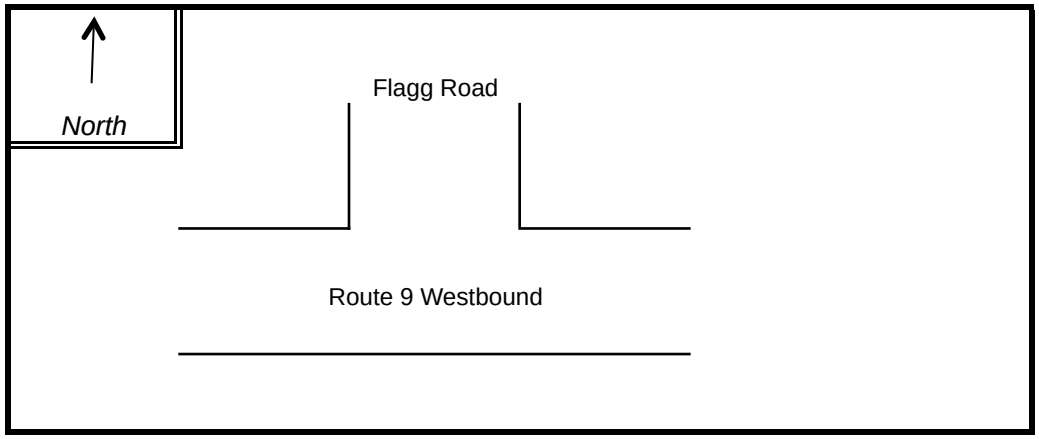
DISTRICT : 3 UNSIGNALIZED : √ SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Route 9

MINOR STREET(S) : Flagg Road

INTERSECTION DIAGRAM (Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (AM/PM) :	0	66	0	2,245		2,311

" K " FACTOR : **0.085** APPROACH ADT : **27,188** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES :	4	# OF YEARS :	3	AVERAGE # OF CRASHES (**A**) :	**1.33**

CRASH RATE CALCULATION : **0.13** RATE = $\frac{(A * 1{,}000{,}000)}{ADT * 365}$ (

Comments : below District 3 crash rate average

Project Title & Date: Proposed Central Park 40B Residential Project

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Southborough COUNT DATE : 2011

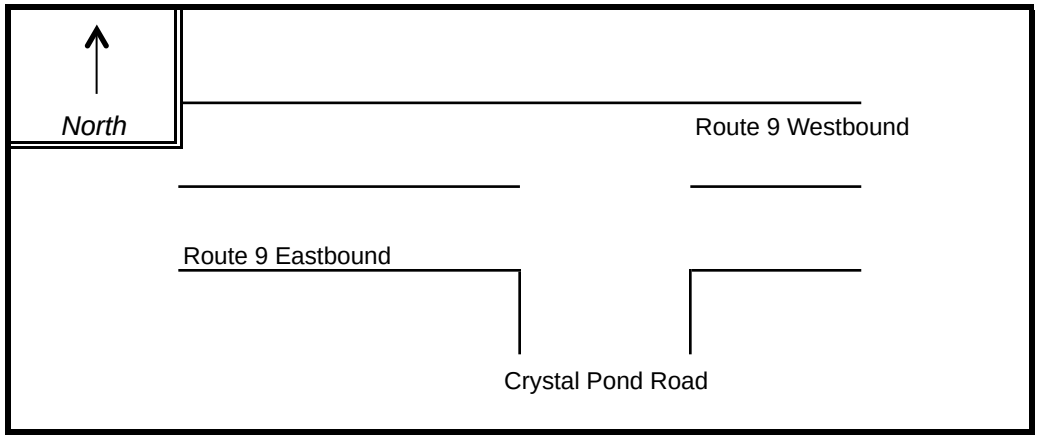
DISTRICT : 3 UNSIGNALIZED : SIGNALIZED : √

~ INTERSECTION DATA ~

MAJOR STREET : Route 9

MINOR STREET(S) : Crystal Pond Road

INTERSECTION DIAGRAM (Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (AM/PM) :	21	0	2,487	2,245		**4,753**

" K " FACTOR : **0.085** APPROACH ADT : **55,918** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES :	20	# OF YEARS :	3	AVERAGE # OF CRASHES (**A**) :	**6.67**

CRASH RATE CALCULATION : **0.33** RATE = $\frac{(A * 1{,}000{,}000)}{ADT * 365}$ (

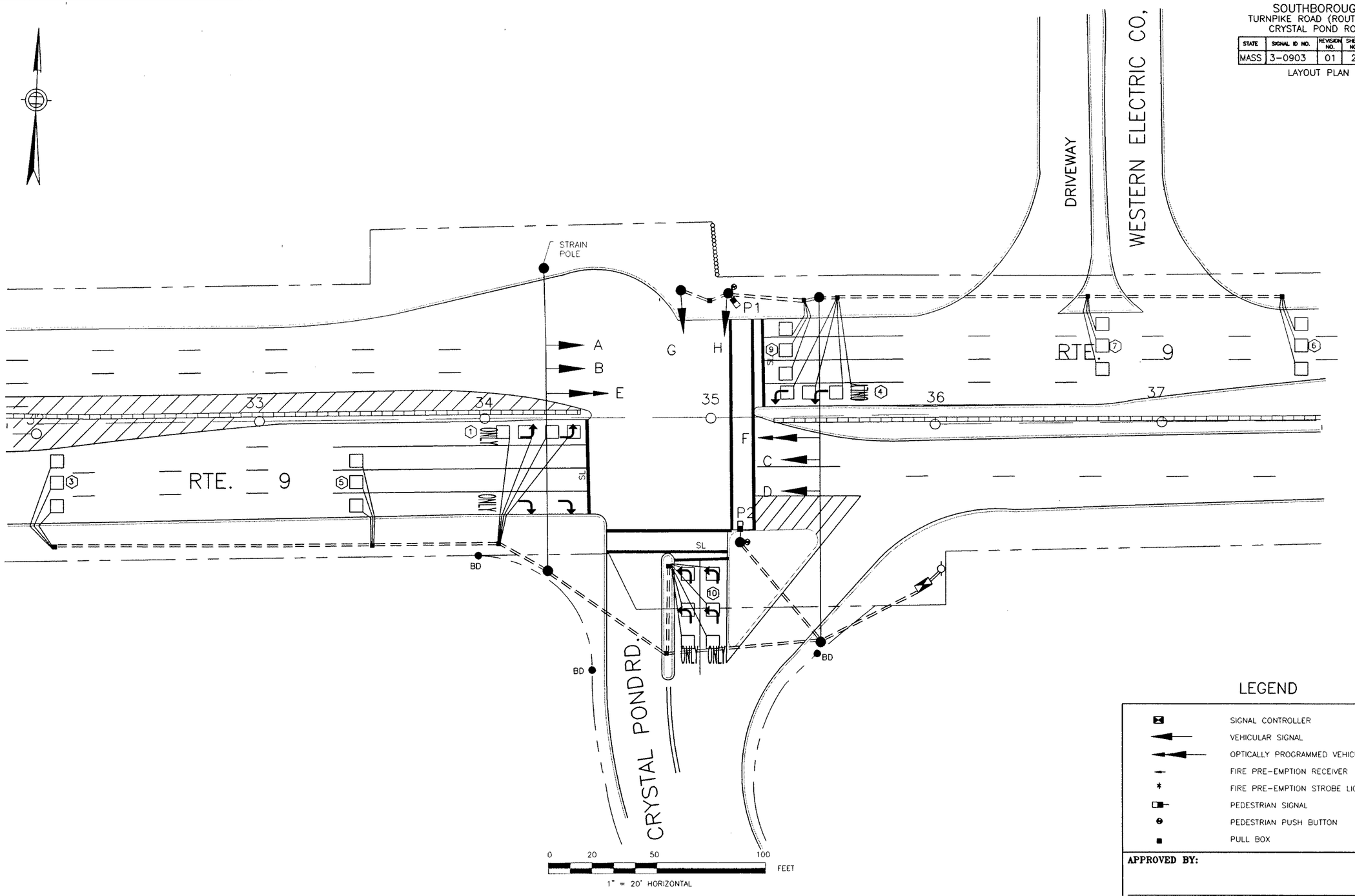
Comments : below District 3 crash rate average

Project Title & Date: Proposed Central Park 40B Residential Project

SOUTHBOROUGH
TURNPIKE ROAD (ROUTE 9) &
CRYSTAL POND ROAD

STATE	SIGNAL ID NO.	REVISION NO.	SHEET NO.	TOTAL SHEETS
MASS	3-0903	01	2	3

LAYOUT PLAN



LEGEND

- SIGNAL CONTROLLER
- VEHICULAR SIGNAL
- OPTICALLY PROGRAMMED VEHICULAR SIGNAL
- FIRE PRE-EMPTION RECEIVER
- FIRE PRE-EMPTION STROBE LIGHT
- PEDESTRIAN SIGNAL
- PEDESTRIAN PUSH BUTTON
- PULL BOX

APPROVED BY:

STATE TRAFFIC ENGINEER **Date**

01.DWG

APPROX. NORTH

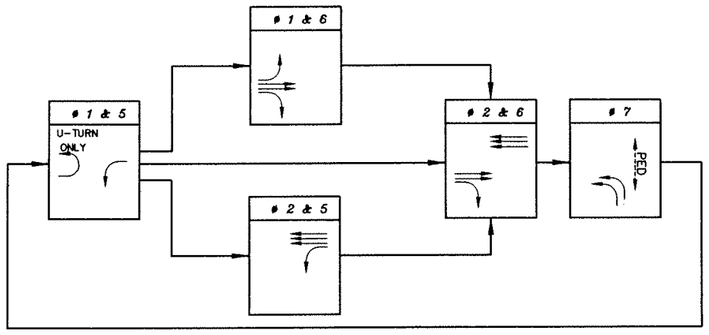
ø 1	ø 2	ø 3	ø 4	ø 5	ø 6	ø 7	ø 8
U-TURN ONLY						PED	

SEQUENCE AND TIMING FOR FULLY-ACTUATED CONTROL (ISOLATED)

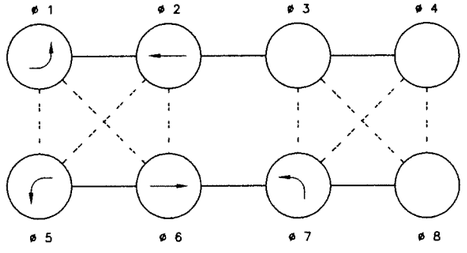
STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	PHASE DARK
TURNPIKE ROAD (ROUTE 9)	EB	F	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FRL
TURNPIKE ROAD (ROUTE 9)	EB	C,D	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FY
TURNPIKE ROAD (ROUTE 9)	WB	E	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FRL
TURNPIKE ROAD (ROUTE 9)	WB	A,B	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
CRYSTAL POND ROAD	NB	G,H,J	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
PEDESTRIAN		ALL	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	DW	DW	DW	OFF
TIMING IN SECONDS																											
MINIMUM GREEN (INITIAL)			6			15									6			15			8						
PASSAGE TIME (VEHICLE)			3			3									3			3			3						
MAXIMUM 1			15			60									15			60			17						
MAXIMUM 2			18			85									18			85			20						
YELLOW CLEARANCE				4			5.5									4			5.5			4					
RED CLEARANCE					1			2									1			2			1				
WALK (W)																					4						
PEDESTRIAN CLEARANCE																						25	0				
RECALL						SOFT												SOFT				MAX					
MEMORY			NON-LOCK			LOCKING									NON-LOCK			LOCKING				LOCKING					

VOLT AGE SEQUENCE

PREFERENTIAL PHASING SEQUENCE



NEMA DUAL RING PHASING NOTES:

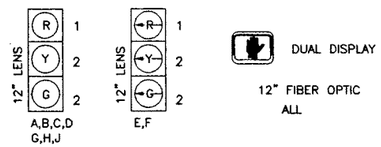


LOOP DETECTOR DATA

DETECTOR NUMBER	NUMBER OF SEGMENTS	LOOP SIZE	NUM. OF TURNS	ø CALLED	ø EXT.	MODE PULSE PRESENCE	DELAY TIME	EXT. TIME
1	4	6'X6'	3	ø1	ø1	PRESENCE	0	0
2	2	6'X6'	3	ø6	ø6	PRESENCE	0	0
3	3	6'X6'	3	ø6	ø6	PRESENCE	0	0
4	4	6'X6'	3	ø5	ø5	PRESENCE	0	0
5	3	6'X6'	3	ø6	ø6	PRESENCE	0	0
6	3	6'X6'	3	ø2	ø2	PRESENCE	0	0
7	3	6'X6'	3	ø2	ø2	PRESENCE	0	0
8	2	6'X6'	3	ø2	ø2	PRESENCE	0	0
9	3	6'X6'	3	ø2	ø2	PRESENCE	0	0
10	6	6'X6'	3	ø7	ø7	PRESENCE	0	0

SIGNAL IDENTIFICATION

1: LED 2: INCANDESCENT 3: FIBEROPTIC



MAJOR ITEMS REQUIRED

QUANTITY	ITEM
1	CONTROLLER TYPE 8DW, CAB. & FDN.
1	SERVICE CONNECTION
2	SPANWIRE ASSEMBLY BASE & FDN.
	8' SIGNAL POLE, BASE, & FDN.
3	10' SIGNAL POLE, BASE, & FDN.
	MAST ARM ASSEMBLY, BASE, & FDN.
9	1 WAY, 3 SECTION, SIGNAL HOUSING (12" LENS)
	1 WAY, 4 SECTION SIGNAL HOUSING (12" LENS)
	2 WAY, 3 SECTION SIGNAL HOUSING (12" LENS)
2	PEDESTRIAN HOUSING
2	PEDESTRIAN PUSH BUTTON, SIGN, & SADDLES
5	LOOP DETECTOR AMPLIFIER
33	ROADWAY LOOP DETECTOR
12	12" x 12" PULL BOX
	MAGNETIC DETECTOR
	MAGNETOMETER
	MAGNETIC AMPLIFIER
	OPTICOM RECEIVERS
	OPTICOM DUAL CHANNEL PHASE SELECTOR
	OPTICOM STROBE LIGHT
	Necessary duct, cable, labor, miscellaneous
	material and equipment to complete the installation.

SOUTHBOROUGH
TURNPIKE ROAD (ROUTE 9) &
CRYSTAL POND ROAD

STATE	SIGNAL ID NO.	REVISION NO.	SHEET NO.	TOTAL SHEETS
MASS	3-0903	01	3	3

TRAFFIC SIGNAL DATA

NOTES:

SEQUENCE AND TIMING NOTES:

1. CONCURRENT PEDESTRIAN TO BE ACTIVATED ONLY BY PEDESTRIAN ACTUATED PUSH BUTTON.
2. PHASES ø3, ø4 AND ø8 ARE NOT USED.

NEMA DUAL RING PHASING NOTES:

1. PHASES ASSOCIATED BY A SOLID LINE SHALL NOT OPERATE CONCURRENTLY.
2. PHASES ASSOCIATED BY A DASHED LINE MAY OPERATE CONCURRENTLY.
3. THROUGH MOVEMENTS MAY INCLUDE RIGHT TURNS.
4. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT SHALL NOT CHANGE DURING THE CHANGE INTERVAL(S) UNLESS OTHERWISE NOTED.

LOOP DETECTOR NOTES:

1. SEE LOOP DETECTOR DETAIL SHEET FROM DESIGN DOCUMENT FOR SPLICE PATTERN AND OTHER INFORMATION.
2. DELAY AND EXTENSION TIMES ARE IN SECONDS.
3. DELAY TIME SHALL BE EFFECTIVE ONLY DURING THE RED PORTION OF THE PHASE THAT IS CALLED BY THE DETECTOR.

SIGNAL IDENTIFICATION NOTES:

1. ALL SIGNAL HEADS DO NOT HAVE 5" LOUVERED BACKPLATES.
2. ALL SIGNAL LENSES ARE 12" DIA.
3. ALL SIGNAL HEADS ARE FIXED-MOUNTED.

FIELD NOTES:

SOUTHERN PEDESTRIAN HEAD DW/FDW IS INOPERABLE.

CONTROLLER MAKE & MODEL: EPAC 300
UTILITY POLE No. MECO 132-1
METER No. 12 484 817
EMERGENCY PRE-EMPTION (TYPE): NONE

APPROVED BY:

STATE TRAFFIC ENGINEER **Date**

01.DWG

TRIP GENERATION WORKSHEET

LAND USE: *Apartment*
LAND USE CODE: 220 Independent Variable---Dwelling Units

PROJECT NAME: Park Central 40B
PROJECT #: 12059 Number of Units: 180

WEEKDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	6.65	1.27	12.50	50%	50%	88
AM PEAK	0.51	0.10	1.02	20%	80%	78
PM PEAK	0.62	0.10	1.64	65%	35%	90
PK GEN AM	0.55	0.10	1.08	29%	71%	83
PK GEN PM	0.67	0.10	1.64	61%	39%	85

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	1197	599	599	1214	607	607	0.87
AM PEAK	92	18	74	92	18	74	0.83
PM PEAK	112	73	39	117	76	41	0.77
PK GEN AM	99	29	70	100	29	71	0.82
PK GEN PM	121	74	47	123	75	48	0.80

SATURDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	6.39	2.84	8.40	50%	50%	16
PEAK HR	0.52	0.26	1.05	-	-	14

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	1150	575	575	1157	579	579	0.85
PEAK HR	94	-	-	93	-	-	0.56

SUNDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	5.86	3.21	7.53	50%	50%	14
PEAK HR	0.51	0.26	1.43	-	50%	13

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	1055	528	528	1054	527	527	0.82
PEAK HR	92	-	-	*** Not Given ***			

SOURCE: Trip Generation, 9th Edition, Institute of Transportation Engineers, 2012.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*wjs*	Intersection	*Flagg Road at Rt 9*
Agency/Co.	*Green*	Jurisdiction	*Southborough*
Date Performed	*11/11/12*	Analysis Year	*Existing Conditions*
Analysis Time Period	*AM Peak Hour*		

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Route 9* | North/South Street: *Flagg Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2208*	*28*
Peak-Hour Factor, PHF	*1.00*	*0.90*	*0.90*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*2324*	*29*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*66*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*0.90*	*1.00*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*69*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*69*
C (m) (veh/h)								*240*
v/c								*0.29*
95% queue length								*1.15*
Control Delay (s/veh)								*25.9*
LOS								*D*
Approach Delay (s/veh)	--	--				*25.9*		
Approach LOS	--	--				*D*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*wjs*
Agency/Co.	*Green*
Date Performed	*11/11/12*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Route 9 at Flagg*
Jurisdiction	*Southborough*
Analysis Year	*Existing Conditions*

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Route 9* | North/South Street: *Flagg Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2699*	*51*
Peak-Hour Factor, PHF	*1.00*	*0.90*	*0.90*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*2841*	*53*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*34*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*0.90*	*1.00*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*35*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*35*
C (m) (veh/h)								*169*
v/c								*0.21*
95% queue length								*0.75*
Control Delay (s/veh)								*31.8*
LOS								*D*
Approach Delay (s/veh)	--	--				*31.8*		
Approach LOS	--	--				*D*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*wjs*	Intersection	*Route 9 at Park Central*
Agency/Co.	*Green*	Jurisdiction	*Southborough*
Date Performed	*3/1/13*	Analysis Year	*Existing Conditions*
Analysis Time Period	*AM Peak Hour*		

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Route 9* | North/South Street: *Park Central*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2240*	*33*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.95*	*0.85*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*2357*	*38*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*129*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*151*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*151*
C (m) (veh/h)								*235*
v/c								*0.64*
95% queue length								*3.93*
Control Delay (s/veh)								*44.3*
LOS								*E*
Approach Delay (s/veh)	--	--				*44.3*		
Approach LOS	--	--				*E*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*wjs*
Agency/Co.	*Green*
Date Performed	*3/1/13*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Route 9 at Park Central*
Jurisdiction	*Southborough*
Analysis Year	*Existing Conditions*

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Route 9* | North/South Street: *Park Central*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2717*	*15*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*2985*	*16*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*160*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*175*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*175*
C (m) (veh/h)								*153*
v/c								*1.14*
95% queue length								*9.59*
Control Delay (s/veh)								*175.6*
LOS								*F*
Approach Delay (s/veh)	--	--				*175.6*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*wjs*
Agency/Co.	*Green*
Date Performed	*03/17/13*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Flagg Road at Rt 9*
Jurisdiction	*Southborough*
Analysis Year	*2018 No Build*

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Route 9* | North/South Street: *Flagg Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2310*	*29*
Peak-Hour Factor, PHF	*1.00*	*0.90*	*0.90*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*2431*	*30*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*69*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*0.90*	*1.00*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*72*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*72*
C (m) (veh/h)								*223*
v/c								*0.32*
95% queue length								*1.34*
Control Delay (s/veh)								*28.7*
LOS								*D*
Approach Delay (s/veh)	--	--				*28.7*		
Approach LOS	--	--				*D*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	wjs	Intersection	Route 9 at Flagg
Agency/Co.	Green	Jurisdiction	Southborough
Date Performed	3/17/13	Analysis Year	No Build Conditions
Analysis Time Period	PM Peak Hour		

Project Description 12059 Park Central 40B Southborough

East/West Street: Route 9 | North/South Street: Flagg Road

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					2840	53
Peak-Hour Factor, PHF	1.00	0.90	0.90	1.00	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	2989	55
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	0	0	0	2	1
Configuration					T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						35
Peak-Hour Factor, PHF	1.00	1.00	0.90	1.00	1.00	0.95
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	0	36
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	1
Configuration						R

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								36
C (m) (veh/h)								153
v/c								0.24
95% queue length								0.87
Control Delay (s/veh)								35.6
LOS								E
Approach Delay (s/veh)	--	--				35.6		
Approach LOS	--	--				E		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*wjs*
Agency/Co.	*Green*
Date Performed	*3/17/13*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Route 9 at Park Central*
Jurisdiction	*Southborough*
Analysis Year	*No Build*

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Route 9* | North/South Street: *Park Central*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2363*	*34*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.95*	*0.85*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*2487*	*39*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*135*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*158*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*158*
C (m) (veh/h)								*215*
v/c								*0.73*
95% queue length								*4.92*
Control Delay (s/veh)								*57.5*
LOS								*F*
Approach Delay (s/veh)	--	--				*57.5*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*wjs*
Agency/Co.	*Green*
Date Performed	*03/17/13*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Route 9 at Park Central*
Jurisdiction	*Southborough*
Analysis Year	*2018 No Build*

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Route 9* | North/South Street: *Park Central*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2844*	*15*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*3125*	*16*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*168*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*184*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*184*
C (m) (veh/h)								*139*
v/c								*1.32*
95% queue length								*11.58*
Control Delay (s/veh)								*247.7*
LOS								*F*
Approach Delay (s/veh)	--	--				*247.7*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*wjs*
Agency/Co.	*Green*
Date Performed	*3/17/13*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Flagg Road at Rt 9*
Jurisdiction	*Southborough*
Analysis Year	*2018 Build*

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Route 9* | North/South Street: *Flagg Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2310*	*42*
Peak-Hour Factor, PHF	*1.00*	*0.90*	*0.90*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*2431*	*44*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*121*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*0.90*	*1.00*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*127*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*127*
C (m) (veh/h)								*223*
v/c								*0.57*
95% queue length								*3.14*
Control Delay (s/veh)								*40.6*
LOS								*E*
Approach Delay (s/veh)	--	--				*40.6*		
Approach LOS	--	--				*E*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*wjs*
Agency/Co.	*Green*
Date Performed	*03/17/13*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Route 9 at Flagg*
Jurisdiction	*Southborough*
Analysis Year	*2018 Build*

Project Description *12059 Park Central 40B Southborough rev*

East/West Street: *Route 9* | North/South Street: *Flagg Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2840*	*114*
Peak-Hour Factor, PHF	*1.00*	*0.90*	*0.90*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*2989*	*120*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*65*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*0.90*	*1.00*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*68*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*-2*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*68*
C (m) (veh/h)								*166*
v/c								*0.41*
95% queue length								*1.81*
Control Delay (s/veh)								*41.0*
LOS								*E*
Approach Delay (s/veh)	--	--				*41.0*		
Approach LOS	--	--				*E*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*wjs*
Agency/Co.	*Green*
Date Performed	*03/17/13*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Route 9 at Park Central*
Jurisdiction	*Southborough*
Analysis Year	*2018 Build*

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Route 9* | North/South Street: *Park Central*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					*2445*	*34*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*2876*	*39*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*2*	*1*
Configuration					*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*135*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*158*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*158*
C (m) (veh/h)								*165*
v/c								*0.96*
95% queue length								*7.27*
Control Delay (s/veh)								*114.7*
LOS								*F*
Approach Delay (s/veh)	--	--				*114.7*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	wjs	Intersection	Route 9 at Park Central
Agency/Co.	Green	Jurisdiction	Southborough
Date Performed	03/17/13	Analysis Year	2018 Build
Analysis Time Period	PM Peak Hour		

Project Description 12059 Park Central 40B Southborough

East/West Street: Route 9 | North/South Street: Park Central

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					2827	15
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	3072	16
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	0	0	0	2	1
Configuration					T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						168
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	0	182
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	1
Configuration						R

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								182
C (m) (veh/h)								144
v/c								1.26
95% queue length								10.97
Control Delay (s/veh)								222.6
LOS								F
Approach Delay (s/veh)	--	--				222.6		
Approach LOS	--	--				F		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*wjs*	Intersection	*Flagg Road at Site Drive*
Agency/Co.	*Green*	Jurisdiction	*Southborough*
Date Performed	*3/17/13*	Analysis Year	*2018 Build*
Analysis Time Period	*AM Peak Hour*		

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Site Drive* | North/South Street: *Flagg Road*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*13*	*29*			*69*	*5*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*14*	*31*	*0*	*0*	*74*	*5*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*22*		*52*			
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*23*	*0*	*56*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*14*						*79*	
C (m) (veh/h)	*1532*						*947*	
v/c	*0.01*						*0.08*	
95% queue length	*0.03*						*0.27*	
Control Delay (s/veh)	*7.4*						*9.1*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*9.1*		
Approach LOS	--	--				*A*		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*wjs*
Agency/Co.	*Green*
Date Performed	*03/17/13*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Flagg Road at Site Drive*
Jurisdiction	*Southborough*
Analysis Year	*2018 Build*

Project Description *12059 Park Central 40B Southborough*

East/West Street: *Site Drive* | North/South Street: *Flagg Road*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*61*	*53*			*35*	*16*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*66*	*57*	*0*	*0*	*38*	*17*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*11*		*30*			
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*11*	*0*	*32*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*66*						*43*	
C (m) (veh/h)	*1563*						*930*	
v/c	*0.04*						*0.05*	
95% queue length	*0.13*						*0.15*	
Control Delay (s/veh)	*7.4*						*9.1*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--					*9.1*	
Approach LOS	--	--					*A*	

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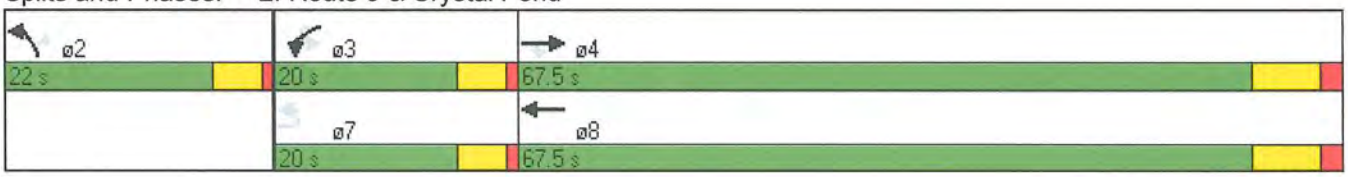
Lane Group	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	105	2370	12	65	65	2115	17	4
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Detector Phase	7	4	4	3	3	8	2	2
Switch Phase								
Minimum Initial (s)	6.0	15.0	15.0	6.0	6.0	15.0	8.0	8.0
Minimum Split (s)	11.0	50.0	50.0	20.0	20.0	50.0	13.0	13.0
Total Split (s)	20.0	67.5	67.5	20.0	20.0	67.5	22.0	22.0
Total Split (%)	18.3%	61.6%	61.6%	18.3%	18.3%	61.6%	20.1%	20.1%
Yellow Time (s)	4.0	5.5	5.5	4.0	4.0	5.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	5.0	7.5	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	None	None	Min	None	None
Act Effct Green (s)	15.1	62.0	62.0		15.1	62.0	8.0	8.0
Actuated g/C Ratio	0.16	0.66	0.66		0.16	0.66	0.08	0.08
v/c Ratio	1.41	1.07	0.01		1.72	0.67	0.07	0.03
Control Delay	272.5	61.0	5.4		400.4	12.1	42.1	27.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	272.5	61.0	5.4		400.4	12.1	42.1	27.8
LOS	F	E	A		F	B	D	C
Approach Delay		69.7				34.5	39.6	
Approach LOS		E				C	D	

Intersection Summary

Cycle Length: 109.5
Actuated Cycle Length: 94.5
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.72
Intersection Signal Delay: 52.9 Intersection LOS: D
Intersection Capacity Utilization 94.0% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: Route 9 & Crystal Pond



Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	111	2495	13	136	2226	19	4
v/c Ratio	1.41	1.07	0.01	1.72	0.67	0.07	0.03
Control Delay	272.5	61.0	5.4	400.4	12.1	42.1	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	272.5	61.0	5.4	400.4	12.1	42.1	27.8
Queue Length 50th (ft)	~79	~782	1	~109	217	5	0
Queue Length 95th (ft)	#210	#1151	9	#253	406	17	11
Internal Link Dist (ft)		740			805	273	
Turn Bay Length (ft)	150		250	150			100
Base Capacity (vph)	79	2323	1041	79	3337	620	289
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.41	1.07	0.01	1.72	0.67	0.03	0.01

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.

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	105	2370	12	65	65	2115	17	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1787	3539	1583		1778	5085	3433	1583
Flt Permitted	0.26	1.00	1.00		0.26	1.00	0.95	1.00
Satd. Flow (perm)	498	3539	1583		496	5085	3433	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	111	2495	13	68	68	2226	19	4
RTOR Reduction (vph)	0	0	3	0	0	0	0	4
Lane Group Flow (vph)	111	2495	10	0	136	2226	19	0
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%	2%	2%
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Actuated Green, G (s)	15.1	62.0	62.0		15.1	62.0	3.0	3.0
Effective Green, g (s)	15.1	62.0	62.0		15.1	62.0	3.0	3.0
Actuated g/C Ratio	0.15	0.64	0.64		0.15	0.64	0.03	0.03
Clearance Time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	77	2248	1006		77	3230	106	49
v/s Ratio Prot		c0.70				0.44	c0.01	
v/s Ratio Perm	0.22		0.01		c0.27			0.00
v/c Ratio	1.44	1.11	0.01		1.77	0.69	0.18	0.00
Uniform Delay, d1	41.2	17.8	6.5		41.2	11.5	46.1	45.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	257.6	56.5	0.0		392.2	0.6	0.8	0.0
Delay (s)	298.8	74.3	6.5		433.4	12.2	46.9	45.9
Level of Service	F	E	A		F	B	D	D
Approach Delay (s)		83.5				36.4	46.7	
Approach LOS		F				D	D	

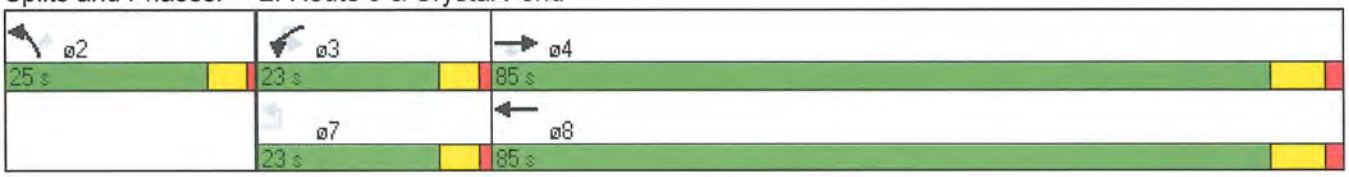
Intersection Summary			
HCM Average Control Delay	61.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	97.6	Sum of lost time (s)	17.5
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	228	1956	26	59	5	2216	209	18
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Detector Phase	7	4	4	3	3	8	2	2
Switch Phase								
Minimum Initial (s)	6.0	4.0	4.0	6.0	6.0	4.0	8.0	8.0
Minimum Split (s)	11.0	50.0	50.0	11.0	11.0	50.0	15.0	15.0
Total Split (s)	23.0	85.0	85.0	23.0	23.0	85.0	25.0	25.0
Total Split (%)	17.3%	63.9%	63.9%	17.3%	17.3%	63.9%	18.8%	18.8%
Yellow Time (s)	4.0	5.5	5.5	4.0	4.0	5.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	5.0	7.5	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	None	None	Min	None	None
Act Effct Green (s)	18.0	77.5	77.5		18.0	77.5	13.6	13.6
Actuated g/C Ratio	0.14	0.61	0.61		0.14	0.61	0.11	0.11
v/c Ratio	4.20	0.98	0.03		1.17	0.77	0.61	0.11
Control Delay	1481.6	40.0	5.9		216.9	20.6	61.4	20.4
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	1481.6	40.0	5.9		216.9	20.6	61.4	20.4
LOS	F	D	A		F	C	E	C
Approach Delay		188.4				26.1	58.1	
Approach LOS		F				C	E	

Intersection Summary	
Cycle Length: 133	
Actuated Cycle Length: 126.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 4.20	
Intersection Signal Delay: 103.7	Intersection LOS: F
Intersection Capacity Utilization 80.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Route 9 & Crystal Pond



Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	248	2126	28	69	2409	227	20
v/c Ratio	4.20	0.98	0.03	1.17	0.77	0.61	0.11
Control Delay	1481.6	40.0	5.9	216.9	20.6	61.4	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1481.6	40.0	5.9	216.9	20.6	61.4	20.4
Queue Length 50th (ft)	~372	839	3	~67	502	93	0
Queue Length 95th (ft)	#558	#1131	17	#173	613	135	25
Internal Link Dist (ft)		740			805	273	
Turn Bay Length (ft)	250		250	250			100
Base Capacity (vph)	59	2166	976	59	3112	542	267
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	4.20	0.98	0.03	1.17	0.77	0.42	0.07

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.

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	228	1956	26	59	5	2216	209	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1787	3539	1583		1786	5085	3433	1583
Flt Permitted	0.22	1.00	1.00		0.22	1.00	0.95	1.00
Satd. Flow (perm)	418	3539	1583		418	5085	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	248	2126	28	64	5	2409	227	20
RTOR Reduction (vph)	0	0	7	0	0	0	0	18
Lane Group Flow (vph)	248	2126	21	0	69	2409	227	2
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%	2%	2%
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Actuated Green, G (s)	18.0	77.5	77.5		18.0	77.5	13.6	13.6
Effective Green, g (s)	18.0	77.5	77.5		18.0	77.5	13.6	13.6
Actuated g/C Ratio	0.14	0.61	0.61		0.14	0.61	0.11	0.11
Clearance Time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	59	2166	969		59	3113	369	170
v/s Ratio Prot		c0.60				0.47	c0.07	
v/s Ratio Perm	c0.59		0.01		0.17			0.00
v/c Ratio	4.20	0.98	0.02		1.17	0.77	0.62	0.01
Uniform Delay, d1	54.3	23.9	9.6		54.3	18.1	54.0	50.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1480.5	15.1	0.0		170.5	1.2	3.0	0.0
Delay (s)	1534.8	39.0	9.7		224.8	19.3	57.0	50.5
Level of Service	F	D	A		F	B	E	D
Approach Delay (s)		193.1				25.1	56.5	
Approach LOS		F				C	E	

Intersection Summary			
HCM Average Control Delay	105.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	126.6	Sum of lost time (s)	17.5
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

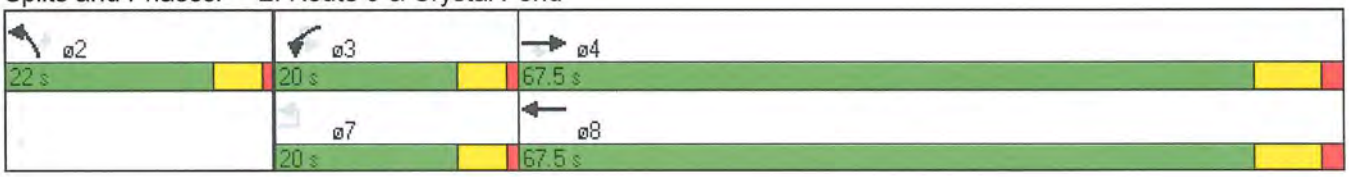
c Critical Lane Group

Lane Group	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	110	2479	20	75	68	2212	47	33
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Detector Phase	7	4	4	3	3	8	2	2
Switch Phase								
Minimum Initial (s)	6.0	15.0	15.0	6.0	6.0	15.0	8.0	8.0
Minimum Split (s)	11.0	50.0	50.0	20.0	20.0	50.0	13.0	13.0
Total Split (s)	20.0	67.5	67.5	20.0	20.0	67.5	22.0	22.0
Total Split (%)	18.3%	61.6%	61.6%	18.3%	18.3%	61.6%	20.1%	20.1%
Yellow Time (s)	4.0	5.5	5.5	4.0	4.0	5.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	5.0	7.5	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	None	None	Min	None	None
Act Effct Green (s)	15.0	61.2	61.2		15.0	61.2	8.1	8.1
Actuated g/C Ratio	0.15	0.62	0.62		0.15	0.62	0.08	0.08
v/c Ratio	1.53	1.19	0.02		1.99	0.74	0.19	0.23
Control Delay	323.4	113.6	5.4		513.4	15.9	44.9	17.9
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	323.4	113.6	5.4		513.4	15.9	44.9	17.9
LOS	F	F	A		F	B	D	B
Approach Delay		121.7				46.2	33.7	
Approach LOS		F				D	C	

Intersection Summary

Cycle Length: 109.5
Actuated Cycle Length: 99
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.99
Intersection Signal Delay: 85.0 Intersection LOS: F
Intersection Capacity Utilization 97.7% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: Route 9 & Crystal Pond



Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	116	2609	21	151	2328	52	37
v/c Ratio	1.53	1.19	0.02	1.99	0.74	0.19	0.23
Control Delay	323.4	113.6	5.4	513.4	15.9	44.9	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	323.4	113.6	5.4	513.4	15.9	44.9	17.9
Queue Length 50th (ft)	~105	~1095	2	~153	376	16	0
Queue Length 95th (ft)	#219	#1238	12	#280	444	35	31
Internal Link Dist (ft)		740			805	273	
Turn Bay Length (ft)	150		250	150			100
Base Capacity (vph)	76	2186	982	76	3141	590	303
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.53	1.19	0.02	1.99	0.74	0.09	0.12

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.

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	110	2479	20	75	68	2212	47	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1787	3539	1583		1779	5085	3433	1583
Flt Permitted	0.27	1.00	1.00		0.27	1.00	0.95	1.00
Satd. Flow (perm)	502	3539	1583		499	5085	3433	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	116	2609	21	79	72	2328	52	37
RTOR Reduction (vph)	0	0	5	0	0	0	0	35
Lane Group Flow (vph)	116	2609	16	0	151	2328	52	2
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%	2%	2%
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Actuated Green, G (s)	15.0	61.1	61.1		15.0	61.1	6.4	6.4
Effective Green, g (s)	15.0	61.1	61.1		15.0	61.1	6.4	6.4
Actuated g/C Ratio	0.15	0.61	0.61		0.15	0.61	0.06	0.06
Clearance Time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	75	2162	967		75	3107	220	101
v/s Ratio Prot		c0.74				0.46	c0.02	
v/s Ratio Perm	0.23		0.01		c0.30			0.00
v/c Ratio	1.55	1.21	0.02		2.01	0.75	0.24	0.02
Uniform Delay, d1	42.5	19.4	7.6		42.5	14.0	44.5	43.9
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	301.4	97.7	0.0		499.5	1.0	0.6	0.1
Delay (s)	343.9	117.1	7.7		542.0	15.0	45.0	44.0
Level of Service	F	F	A		F	B	D	D
Approach Delay (s)		125.9				47.1	44.6	
Approach LOS		F				D	D	

Intersection Summary			
HCM Average Control Delay	87.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	238	2046	58	60	38	2318	236	35
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Detector Phase	7	4	4	3	3	8	2	2
Switch Phase								
Minimum Initial (s)	6.0	4.0	4.0	6.0	6.0	4.0	8.0	8.0
Minimum Split (s)	11.0	50.0	50.0	11.0	11.0	50.0	15.0	15.0
Total Split (s)	23.0	85.0	85.0	23.0	23.0	85.0	25.0	25.0
Total Split (%)	17.3%	63.9%	63.9%	17.3%	17.3%	63.9%	18.8%	18.8%
Yellow Time (s)	4.0	5.5	5.5	4.0	4.0	5.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	5.0	7.5	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	None	None	Min	None	None
Act Effct Green (s)	18.0	77.6	77.6		18.0	77.6	14.8	14.8
Actuated g/C Ratio	0.14	0.61	0.61		0.14	0.61	0.12	0.12
v/c Ratio	4.39	1.04	0.06		1.80	0.82	0.65	0.18
Control Delay	1577.4	55.3	5.6		452.1	22.9	61.9	16.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	1577.4	55.3	5.6		452.1	22.9	61.9	16.7
LOS	F	E	A		F	C	E	B
Approach Delay		208.9				40.2	56.1	
Approach LOS		F				D	E	

Intersection Summary

Cycle Length: 133
Actuated Cycle Length: 127.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 4.39
Intersection Signal Delay: 119.6 Intersection LOS: F
Intersection Capacity Utilization 83.3% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Route 9 & Crystal Pond

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	259	2224	63	106	2520	257	38
v/c Ratio	4.39	1.04	0.06	1.80	0.82	0.65	0.18
Control Delay	1577.4	55.3	5.6	452.1	22.9	61.9	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1577.4	55.3	5.6	452.1	22.9	61.9	16.7
Queue Length 50th (ft)	~395	~1042	8	~132	563	106	0
Queue Length 95th (ft)	#585	#1243	28	#261	688	152	34
Internal Link Dist (ft)		740			805	273	
Turn Bay Length (ft)	250		250	250			100
Base Capacity (vph)	59	2146	975	59	3084	537	280
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	4.39	1.04	0.06	1.80	0.82	0.48	0.14

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.

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	238	2046	58	60	38	2318	236	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1787	3539	1583		1780	5085	3433	1583
Flt Permitted	0.22	1.00	1.00		0.22	1.00	0.95	1.00
Satd. Flow (perm)	418	3539	1583		416	5085	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	259	2224	63	65	41	2520	257	38
RTOR Reduction (vph)	0	0	15	0	0	0	0	34
Lane Group Flow (vph)	259	2224	48	0	106	2520	257	4
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%	2%	2%
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Actuated Green, G (s)	18.0	77.5	77.5		18.0	77.5	14.8	14.8
Effective Green, g (s)	18.0	77.5	77.5		18.0	77.5	14.8	14.8
Actuated g/C Ratio	0.14	0.61	0.61		0.14	0.61	0.12	0.12
Clearance Time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	59	2146	960		59	3084	398	183
v/s Ratio Prot		c0.63				0.50	c0.07	
v/s Ratio Perm	c0.62		0.03		0.25			0.00
v/c Ratio	4.39	1.04	0.05		1.80	0.82	0.65	0.02
Uniform Delay, d1	54.9	25.1	10.2		54.9	19.6	54.0	50.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1564.0	29.6	0.0		417.5	1.8	3.6	0.1
Delay (s)	1618.9	54.7	10.2		472.4	21.4	57.6	50.1
Level of Service	F	D	B		F	C	E	D
Approach Delay (s)		212.7				39.6	56.6	
Approach LOS		F				D	E	

Intersection Summary			
HCM Average Control Delay	121.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	127.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

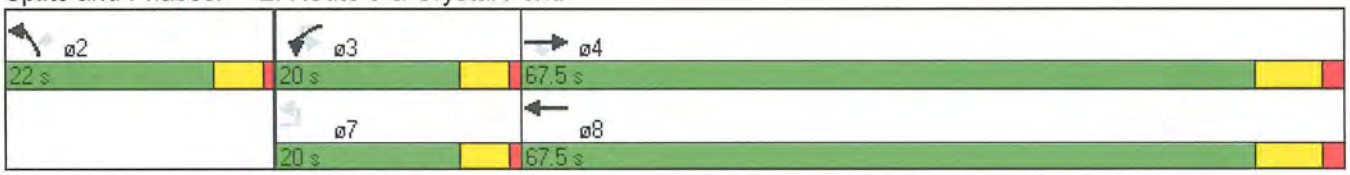
c Critical Lane Group

Lane Group	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	119	~~2518~~ 2490	20	75	68	~~2221~~ 2216	47	33
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Detector Phase	7	4	4	3	3	8	2	2
Switch Phase								
Minimum Initial (s)	6.0	15.0	15.0	6.0	6.0	15.0	8.0	8.0
Minimum Split (s)	11.0	50.0	50.0	20.0	20.0	50.0	13.0	13.0
Total Split (s)	20.0	67.5	67.5	20.0	20.0	67.5	22.0	22.0
Total Split (%)	18.3%	61.6%	61.6%	18.3%	18.3%	61.6%	20.1%	20.1%
Yellow Time (s)	4.0	5.5	5.5	4.0	4.0	5.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	5.0	7.5	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	None	None	Min	None	None
Act Effct Green (s)	15.0	60.9	60.9		15.0	60.9	8.1	8.1
Actuated g/C Ratio	0.15	0.62	0.62		0.15	0.62	0.08	0.08
v/c Ratio	1.62	1.21	0.02		1.99	0.75	0.19	0.23
Control Delay	366.5	122.8	5.4		511.1	16.0	44.9	17.9
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	366.5	122.8	5.4		511.1	16.0	44.9	17.9
LOS	F	F	A		F	B	D	B
Approach Delay		132.8				46.0	33.7	
Approach LOS		F				D	C	

Intersection Summary

Cycle Length: 109.5
Actuated Cycle Length: 98.7
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.99
Intersection Signal Delay: 91.0 Intersection LOS: F
Intersection Capacity Utilization 98.8% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: Route 9 & Crystal Pond



Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	125	2651	21	151	2338	52	37
v/c Ratio	1.62	1.21	0.02	1.99	0.75	0.19	0.23
Control Delay	366.5	122.8	5.4	511.1	16.0	44.9	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	366.5	122.8	5.4	511.1	16.0	44.9	17.9
Queue Length 50th (ft)	~117	~1125	2	~153	379	16	0
Queue Length 95th (ft)	#235	#1267	12	#280	447	35	31
Internal Link Dist (ft)		740			805	273	
Turn Bay Length (ft)	150		250	150			100
Base Capacity (vph)	77	2183	981	76	3136	592	304
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.62	1.21	0.02	1.99	0.75	0.09	0.12

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.

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	119	2518	20	75	68	2221	47	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1787	3539	1583		1779	5085	3433	1583
Flt Permitted	0.27	1.00	1.00		0.27	1.00	0.95	1.00
Satd. Flow (perm)	502	3539	1583		499	5085	3433	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	125	2651	21	79	72	2338	52	37
RTOR Reduction (vph)	0	0	5	0	0	0	0	35
Lane Group Flow (vph)	125	2651	16	0	151	2338	52	2
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%	2%	2%
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Actuated Green, G (s)	15.0	60.9	60.9		15.0	60.9	6.4	6.4
Effective Green, g (s)	15.0	60.9	60.9		15.0	60.9	6.4	6.4
Actuated g/C Ratio	0.15	0.61	0.61		0.15	0.61	0.06	0.06
Clearance Time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	75	2160	966		75	3103	220	102
v/s Ratio Prot		c0.75				0.46	c0.02	
v/s Ratio Perm	0.25		0.01		c0.30			0.00
v/c Ratio	1.67	1.23	0.02		2.01	0.75	0.24	0.02
Uniform Delay, d1	42.4	19.4	7.7		42.4	14.0	44.4	43.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	351.2	106.6	0.0		499.5	1.1	0.6	0.1
Delay (s)	393.6	126.1	7.7		541.9	15.1	44.9	43.9
Level of Service	F	F	A		F	B	D	D
Approach Delay (s)		137.1				47.1	44.5	
Approach LOS		F				D	D	

Intersection Summary			
HCM Average Control Delay	93.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	274	2056	58	60	38	2343	236	35
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Detector Phase	7	4	4	3	3	8	2	2
Switch Phase								
Minimum Initial (s)	6.0	4.0	4.0	6.0	6.0	4.0	8.0	8.0
Minimum Split (s)	11.0	50.0	50.0	11.0	11.0	50.0	15.0	15.0
Total Split (s)	23.0	85.0	85.0	23.0	23.0	85.0	25.0	25.0
Total Split (%)	17.3%	63.9%	63.9%	17.3%	17.3%	63.9%	18.8%	18.8%
Yellow Time (s)	4.0	5.5	5.5	4.0	4.0	5.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	5.0	7.5	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	None	None	Min	None	None
Act Effct Green (s)	18.0	77.6	77.6		18.0	77.6	14.8	14.8
Actuated g/C Ratio	0.14	0.61	0.61		0.14	0.61	0.12	0.12
v/c Ratio	5.05	1.04	0.06		1.80	0.83	0.65	0.18
Control Delay	1871.8	56.9	5.6		452.1	23.2	61.9	16.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	1871.8	56.9	5.6		452.1	23.2	61.9	16.7
LOS	F	E	A		F	C	E	B
Approach Delay		264.0				40.4	56.1	
Approach LOS		F				D	E	

Intersection Summary

Cycle Length: 133
Actuated Cycle Length: 127.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 5.05
Intersection Signal Delay: 145.9 Intersection LOS: F
Intersection Capacity Utilization 83.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Route 9 & Crystal Pond

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	298	2235	63	106	2547	257	38
v/c Ratio	5.05	1.04	0.06	1.80	0.83	0.65	0.18
Control Delay	1871.8	56.9	5.6	452.1	23.2	61.9	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1871.8	56.9	5.6	452.1	23.2	61.9	16.7
Queue Length 50th (ft)	~462	~1052	8	~132	575	106	0
Queue Length 95th (ft)	#663	#1254	28	#261	702	152	34
Internal Link Dist (ft)		740			805	273	
Turn Bay Length (ft)	250		250	250			100
Base Capacity (vph)	59	2146	975	59	3084	537	280
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	5.05	1.04	0.06	1.80	0.83	0.48	0.14

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.

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	274	2056	58	60	38	2343	236	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1787	3539	1583		1780	5085	3433	1583
Flt Permitted	0.22	1.00	1.00		0.22	1.00	0.95	1.00
Satd. Flow (perm)	418	3539	1583		416	5085	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	298	2235	63	65	41	2547	257	38
RTOR Reduction (vph)	0	0	15	0	0	0	0	34
Lane Group Flow (vph)	298	2235	48	0	106	2547	257	4
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%	2%	2%
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Actuated Green, G (s)	18.0	77.5	77.5		18.0	77.5	14.8	14.8
Effective Green, g (s)	18.0	77.5	77.5		18.0	77.5	14.8	14.8
Actuated g/C Ratio	0.14	0.61	0.61		0.14	0.61	0.12	0.12
Clearance Time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	59	2146	960		59	3084	398	183
v/s Ratio Prot		c0.63				0.50	c0.07	
v/s Ratio Perm	c0.71		0.03		0.25			0.00
v/c Ratio	5.05	1.04	0.05		1.80	0.83	0.65	0.02
Uniform Delay, d1	54.9	25.1	10.2		54.9	19.8	54.0	50.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1860.2	31.2	0.0		417.5	1.9	3.6	0.1
Delay (s)	1915.1	56.4	10.2		472.4	21.8	57.6	50.1
Level of Service	F	E	B		F	C	E	D
Approach Delay (s)		268.6				39.8	56.6	
Approach LOS		F				D	E	

Intersection Summary			
HCM Average Control Delay	147.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.64		
Actuated Cycle Length (s)	127.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	119	2490	20	75	68	2216	47	33
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Detector Phase	7	4	4	3	3	8	2	2
Switch Phase								
Minimum Initial (s)	6.0	15.0	15.0	6.0	6.0	15.0	8.0	8.0
Minimum Split (s)	11.0	50.0	50.0	20.0	20.0	50.0	13.0	13.0
Total Split (s)	12.0	51.0	51.0	20.0	20.0	59.0	14.0	14.0
Total Split (%)	14.1%	60.0%	60.0%	23.5%	23.5%	69.4%	16.5%	16.5%
Yellow Time (s)	4.0	5.5	5.5	4.0	4.0	5.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	5.0	7.5	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	None	None	Min	None	None
Act Effct Green (s)	7.0	45.1	45.1		15.0	53.1	8.0	8.0
Actuated g/C Ratio	0.08	0.54	0.54		0.18	0.64	0.10	0.10
v/c Ratio	1.37	1.36	0.02		1.68	0.72	0.16	0.20
Control Delay	256.8	187.8	6.0		372.6	12.2	36.2	15.2
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	256.8	187.8	6.0		372.6	12.2	36.2	15.2
LOS	F	F	A		F	B	D	B
Approach Delay		189.6				34.1	27.4	
Approach LOS		F				C	C	

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 82.9	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.68	
Intersection Signal Delay: 114.6	Intersection LOS: F
Intersection Capacity Utilization 98.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: Route 9 & Crystal Pond

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	125	2621	21	151	2333	52	37
v/c Ratio	1.37	1.36	0.02	1.68	0.72	0.16	0.20
Control Delay	256.8	187.8	6.0	372.6	12.2	36.2	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	256.8	187.8	6.0	372.6	12.2	36.2	15.2
Queue Length 50th (ft)	~89	~997	1	~118	291	13	0
Queue Length 95th (ft)	#196	#1136	12	#234	351	30	28
Internal Link Dist (ft)		740			805	273	
Turn Bay Length (ft)	150		250	150			100
Base Capacity (vph)	91	1926	868	90	3258	373	205
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.37	1.36	0.02	1.68	0.72	0.14	0.18

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.

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	119	2490	20	75	68	2216	47	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1787	3539	1583		1779	5085	3433	1583
Flt Permitted	0.57	1.00	1.00		0.27	1.00	0.95	1.00
Satd. Flow (perm)	1075	3539	1583		499	5085	3433	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	125	2621	21	79	72	2333	52	37
RTOR Reduction (vph)	0	0	7	0	0	0	0	34
Lane Group Flow (vph)	125	2621	14	0	151	2333	52	3
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%	2%	2%
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Actuated Green, G (s)	7.0	45.1	45.1		15.0	53.1	6.3	6.3
Effective Green, g (s)	7.0	45.1	45.1		15.0	53.1	6.3	6.3
Actuated g/C Ratio	0.08	0.54	0.54		0.18	0.63	0.08	0.08
Clearance Time (s)	5.0	7.5	7.5		5.0	7.5	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	90	1902	851		89	3218	258	119
v/s Ratio Prot		c0.74				0.46	c0.02	
v/s Ratio Perm	0.12		0.01		c0.30			0.00
v/c Ratio	1.39	1.38	0.02		1.70	0.72	0.20	0.02
Uniform Delay, d1	38.5	19.4	9.1		34.5	10.4	36.4	35.9
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	229.5	173.5	0.0		356.8	0.8	0.4	0.1
Delay (s)	267.9	192.9	9.1		391.2	11.3	36.8	36.0
Level of Service	F	F	A		F	B	D	D
Approach Delay (s)		194.9				34.4	36.5	
Approach LOS		F				C	D	

Intersection Summary			
HCM Average Control Delay	117.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	83.9	Sum of lost time (s)	17.5
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	275	2056	58	60	38	2343	236	35
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Detector Phase	7	4	4	3	3	8	2	2
Switch Phase								
Minimum Initial (s)	6.0	4.0	4.0	6.0	6.0	4.0	8.0	8.0
Minimum Split (s)	11.0	50.0	50.0	11.0	11.0	50.0	15.0	15.0
Total Split (s)	50.0	80.0	80.0	24.0	24.0	54.0	16.0	16.0
Total Split (%)	41.7%	66.7%	66.7%	20.0%	20.0%	45.0%	13.3%	13.3%
Yellow Time (s)	3.0	5.5	5.5	3.0	3.0	5.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.5	7.5	4.0	4.0	7.5	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	None	None	Min	None	None
Act Effct Green (s)	46.0	72.5	72.5		20.0	46.5	11.0	11.0
Actuated g/C Ratio	0.38	0.60	0.60		0.17	0.39	0.09	0.09
v/c Ratio	4.75	1.05	0.06		1.68	1.29	0.82	0.21
Control Delay	1732.8	56.9	4.2		398.5	168.1	74.4	18.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	1732.8	56.9	4.2		398.5	168.1	74.4	18.5
LOS	F	E	A		F	F	E	B
Approach Delay		248.6				177.3	67.2	
Approach LOS		F				F	E	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 4.75
Intersection Signal Delay: 204.8 Intersection LOS: F
Intersection Capacity Utilization 82.7% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Route 9 & Crystal Pond

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	299	2235	63	106	2547	257	38
v/c Ratio	4.75	1.05	0.06	1.68	1.29	0.82	0.21
Control Delay	1732.8	56.9	4.2	398.5	168.1	74.4	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1732.8	56.9	4.2	398.5	168.1	74.4	18.5
Queue Length 50th (ft)	~390	~988	5	~120	~921	102	0
Queue Length 95th (ft)	#572	#1124	23	#238	#1013	#169	35
Internal Link Dist (ft)		740			805	273	
Turn Bay Length (ft)	250		250	250			100
Base Capacity (vph)	63	2138	974	63	1970	315	180
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	4.75	1.05	0.06	1.68	1.29	0.82	0.21

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.

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	275	2056	58	60	38	2343	236	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.5	7.5		4.0	7.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1787	3539	1583		1780	5085	3433	1583
Flt Permitted	0.09	1.00	1.00		0.20	1.00	0.95	1.00
Satd. Flow (perm)	164	3539	1583		375	5085	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	299	2235	63	65	41	2547	257	38
RTOR Reduction (vph)	0	0	18	0	0	0	0	35
Lane Group Flow (vph)	299	2235	45	0	106	2547	257	3
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%	2%	2%
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Actuated Green, G (s)	46.0	72.5	72.5		20.0	46.5	11.0	11.0
Effective Green, g (s)	46.0	72.5	72.5		20.0	46.5	11.0	11.0
Actuated g/C Ratio	0.38	0.60	0.60		0.17	0.39	0.09	0.09
Clearance Time (s)	4.0	7.5	7.5		4.0	7.5	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	63	2138	956		63	1970	315	145
v/s Ratio Prot		0.63				c0.50	c0.07	
v/s Ratio Perm	c1.83		0.03		0.28			0.00
v/c Ratio	4.75	1.05	0.05		1.68	1.29	0.82	0.02
Uniform Delay, d1	37.0	23.8	9.7		50.0	36.8	53.5	49.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1721.2	32.6	0.0		366.2	135.7	14.9	0.1
Delay (s)	1758.2	56.3	9.7		416.2	172.5	68.4	49.7
Level of Service	F	E	A		F	F	E	D
Approach Delay (s)		251.1				182.2	66.0	
Approach LOS		F				F	E	

Intersection Summary			
HCM Average Control Delay	208.3	HCM Level of Service	F
HCM Volume to Capacity ratio	2.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	275	2056	58	60	38	2343	236	35
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Detector Phase	7	4	4	3	3	8	2	2
Switch Phase								
Minimum Initial (s)	6.0	4.0	4.0	6.0	6.0	4.0	8.0	8.0
Minimum Split (s)	11.0	50.0	50.0	11.0	11.0	50.0	15.0	15.0
Total Split (s)	15.0	53.0	53.0	12.0	12.0	50.0	15.0	15.0
Total Split (%)	18.8%	66.3%	66.3%	15.0%	15.0%	62.5%	18.8%	18.8%
Yellow Time (s)	3.0	5.5	5.5	3.0	3.0	5.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.5	7.5	4.0	4.0	7.5	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	None	None	Min	None	None
Act Effct Green (s)	11.0	45.5	45.5		8.0	42.5	9.6	9.6
Actuated g/C Ratio	0.14	0.57	0.57		0.10	0.53	0.12	0.12
v/c Ratio	3.18	1.10	0.07		1.13	0.94	0.62	0.17
Control Delay	1018.8	74.8	2.6		168.0	26.1	40.4	13.1
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	1018.8	74.8	2.6		168.0	26.1	40.4	13.1
LOS	F	E	A		F	C	D	B
Approach Delay		181.8				31.8	36.9	
Approach LOS		F				C	D	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 79.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 3.18	
Intersection Signal Delay: 102.3	Intersection LOS: F
Intersection Capacity Utilization 82.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Route 9 & Crystal Pond

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	299	2235	63	106	2547	257	38
v/c Ratio	3.18	1.10	0.07	1.13	0.94	0.62	0.17
Control Delay	1018.8	74.8	2.6	168.0	26.1	40.4	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1018.8	74.8	2.6	168.0	26.1	40.4	13.1
Queue Length 50th (ft)	~266	~683	0	~63	409	63	0
Queue Length 95th (ft)	#416	#820	16	#160	#558	101	26
Internal Link Dist (ft)		740			805	273	
Turn Bay Length (ft)	250		250	250			100
Base Capacity (vph)	94	2023	931	94	2714	431	232
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	3.18	1.10	0.07	1.13	0.94	0.60	0.16

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.

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations								
Volume (vph)	275	2056	58	60	38	2343	236	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.5	7.5		4.0	7.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1787	3539	1583		1780	5085	3433	1583
Flt Permitted	0.36	1.00	1.00		0.50	1.00	0.95	1.00
Satd. Flow (perm)	684	3539	1583		937	5085	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	299	2235	63	65	41	2547	257	38
RTOR Reduction (vph)	0	0	26	0	0	0	0	33
Lane Group Flow (vph)	299	2235	37	0	106	2547	257	5
Heavy Vehicles (%)	1%	2%	2%	1%	2%	2%	2%	2%
Turn Type	custom		Perm	custom	Prot			Perm
Protected Phases		4			3	8	2	
Permitted Phases	7		4	3				2
Actuated Green, G (s)	11.0	45.5	45.5		8.0	42.5	9.6	9.6
Effective Green, g (s)	11.0	45.5	45.5		8.0	42.5	9.6	9.6
Actuated g/C Ratio	0.14	0.57	0.57		0.10	0.53	0.12	0.12
Clearance Time (s)	4.0	7.5	7.5		4.0	7.5	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	95	2023	905		94	2715	414	191
v/s Ratio Prot		c0.63				0.50	c0.07	
v/s Ratio Perm	c0.44		0.02		0.11			0.00
v/c Ratio	3.15	1.10	0.04		1.13	0.94	0.62	0.02
Uniform Delay, d1	34.3	17.0	7.5		35.8	17.3	33.3	30.9
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	993.3	55.2	0.0		131.4	7.1	2.9	0.1
Delay (s)	1027.6	72.2	7.5		167.2	24.4	36.2	30.9
Level of Service	F	E	A		F	C	D	C
Approach Delay (s)		180.7				30.1	35.5	
Approach LOS		F				C	D	

Intersection Summary			
HCM Average Control Delay	100.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/4/2013
Analysis Time Period	Weekday AM Peak Hour
Highway	Flagg Road, Southborough, MA
From/To	From Lovers Lane to Rt. 9
Jurisdiction	
Analysis Year	2013
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.82	
Shoulder width	0.0	ft	% Trucks and buses	3	%
Lane width	9.5	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd	77	veh/h
Opposing direction volume, Vo	15	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.979		0.979	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	96	pc/h	19	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	33	mi/h
Observed total demand,(note-3) V	0	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	33.0	mi/h
Adjustment for no-passing zones, fnp	0.0*	mi/h
Average travel speed, ATSd	32.1	mi/h
Percent Free Flow Speed, PFFS	97.3	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.979		0.979	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	96	pc/h	19	pc/h
Base percent time-spent-following,(note-4) BPTSFd	11.2	%		
Adjustment for no-passing zones, fnp	46.3			
Percent time-spent-following, PTSFd	49.9	%		

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.06	
Peak 15-min vehicle-miles of travel, VMT15	12	veh-mi
Peak-hour vehicle-miles of travel, VMT60	39	veh-mi
Peak 15-min total travel time, TT15	0.4	veh-h
Capacity from ATS, CdATS	1656	veh/h
Capacity from PTSF, CdPTSF	1695	veh/h
Directional Capacity	1656	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	32.1	mi/h
Percent time-spent-following, PTSFd (from above)	49.9	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	93.9
Effective width of outside lane, We	15.34
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	2.87
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/4/2013
Analysis Time Period	Weekday PM Peak Hour
Highway	Flagg Road, Southborough, MA
From/To	From Rt. 9 to Lovers Lane
Jurisdiction	
Analysis Year	2013
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.85	
Shoulder width	0.0	ft	% Trucks and buses	1	%
Lane width	9.5	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd 44 veh/h
Opposing direction volume, Vo 42 veh/h

Average Travel Speed

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adj. factor,(note-5) fHV	0.993	0.993
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	52 pc/h	50 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	30	mi/h
Observed total demand,(note-3) V	0	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	30.0	mi/h
Adjustment for no-passing zones, fnp	0.0*	mi/h
Average travel speed, ATSd	29.2	mi/h
Percent Free Flow Speed, PFFS	97.4	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	52 pc/h	50 pc/h
Base percent time-spent-following,(note-4) BPTSFd	6.3 %	
Adjustment for no-passing zones, fnp	52.7	
Percent time-spent-following, PTSFd	33.2 %	

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.03	
Peak 15-min vehicle-miles of travel, VMT15	6	veh-mi
Peak-hour vehicle-miles of travel, VMT60	22	veh-mi
Peak 15-min total travel time, TT15	0.2	veh-h
Capacity from ATS, CdATS	1685	veh/h
Capacity from PTSF, CdPTSF	1698	veh/h
Directional Capacity	1685	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	29.2	mi/h
Percent time-spent-following, PTSFd (from above)	33.2	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	51.8
Effective width of outside lane, We	16.91
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	2.05
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/4/2013
Analysis Time Period	Weekday AM Peak Hour
Highway	Deerfoot Rd, Southborough, MA
From/To	From Main St to Flagg Rd
Jurisdiction	
Analysis Year	2013
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.55	
Shoulder width	0.0	ft	% Trucks and buses	3	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd	155	veh/h
Opposing direction volume, Vo	115	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.979		0.979	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	288	pc/h	214	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	32	mi/h
Observed total demand,(note-3) V	0	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	32.0	mi/h
Adjustment for no-passing zones, fnp	3.5*	mi/h
Average travel speed, ATSd	24.6	mi/h
Percent Free Flow Speed, PFFS	76.9	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.979	0.979
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	288 pc/h	213 pc/h
Base percent time-spent-following,(note-4) BPTSFd	30.5 %	
Adjustment for no-passing zones, fnp	56.9	
Percent time-spent-following, PTSFd	63.2 %	

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.17	
Peak 15-min vehicle-miles of travel, VMT15	42	veh-mi
Peak-hour vehicle-miles of travel, VMT60	93	veh-mi
Peak 15-min total travel time, TT15	1.7	veh-h
Capacity from ATS, CdATS	1675	veh/h
Capacity from PTSF, CdPTSF	1695	veh/h
Directional Capacity	1675	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.6	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	24.6	mi/h
Percent time-spent-following, PTSFd (from above)	63.2	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	281.8
Effective width of outside lane, We	14.70
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	3.52
Bicycle LOS	D

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/4/2013
Analysis Time Period	Weekday PM Peak Hour
Highway	Deerfoot Rd, Southborough, MA
From/To	From Main St to Flagg Rd
Jurisdiction	
Analysis Year	2013
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.92	
Shoulder width	0.0	ft	% Trucks and buses	1	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd	94	veh/h
Opposing direction volume, Vo	84	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.993		0.993	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	103	pc/h	92	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	33	mi/h
Observed total demand,(note-3) V	0	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	33.0	mi/h
Adjustment for no-passing zones, fnp	3.5*	mi/h
Average travel speed, ATSd	28.0	mi/h
Percent Free Flow Speed, PFFS	84.8	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	103 pc/h	92 pc/h
Base percent time-spent-following,(note-4) BPTSFd	11.9 %	
Adjustment for no-passing zones, fnp	52.9	
Percent time-spent-following, PTSFd	39.8 %	

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.06	
Peak 15-min vehicle-miles of travel, VMT15	15	veh-mi
Peak-hour vehicle-miles of travel, VMT60	56	veh-mi
Peak 15-min total travel time, TT15	0.5	veh-h
Capacity from ATS, CdATS	1685	veh/h
Capacity from PTSF, CdPTSF	1698	veh/h
Directional Capacity	1685	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.6	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	28.0	mi/h
Percent time-spent-following, PTSFd (from above)	39.8	
Level of service, LOSd (from above)	B	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	102.2
Effective width of outside lane, We	18.36
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	2.14
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/21/2013
Analysis Time Period	No Build Weekday AM Peak Hour
Highway	Flagg Road, Southborough, MA
From/To	From Lovers Lane to Rt. 9
Jurisdiction	
Analysis Year	2018
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.82	
Shoulder width	0.0	ft	% Trucks and buses	3	%
Lane width	9.5	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd	69	veh/h
Opposing direction volume, Vo	29	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.979		0.979	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	86	pc/h	36	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	33	mi/h
Observed total demand,(note-3) V	0	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	33.0	mi/h
Adjustment for no-passing zones, fnp	0.0*	mi/h
Average travel speed, ATSd	32.1	mi/h
Percent Free Flow Speed, PFFS	97.1	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.979		0.979	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	86	pc/h	36	pc/h
Base percent time-spent-following,(note-4) BPTSFd	10.1	%		
Adjustment for no-passing zones, fnp	49.0			
Percent time-spent-following, PTSFd	44.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.05	
Peak 15-min vehicle-miles of travel, VMT15	11	veh-mi
Peak-hour vehicle-miles of travel, VMT60	35	veh-mi
Peak 15-min total travel time, TT15	0.3	veh-h
Capacity from ATS, CdATS	1656	veh/h
Capacity from PTSF, CdPTSF	1695	veh/h
Directional Capacity	1656	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	32.1	mi/h
Percent time-spent-following, PTSFd (from above)	44.6	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	84.1
Effective width of outside lane, We	15.72
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	2.75
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/21/2013
Analysis Time Period	No Build Weekday PM Peak Hour
Highway	Flagg Road, Southborough, MA
From/To	From Rt. 9 to Lovers Lane
Jurisdiction	
Analysis Year	2018
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.85	
Shoulder width	0.0	ft	% Trucks and buses	1	%
Lane width	9.5	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd 53 veh/h
Opposing direction volume, Vo 35 veh/h

Average Travel Speed

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adj. factor,(note-5) fHV	0.993	0.993
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	63 pc/h	41 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	30	mi/h
Observed total demand,(note-3) V	0	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	30.0	mi/h
Adjustment for no-passing zones, fnp	0.0*	mi/h
Average travel speed, ATSd	29.2	mi/h
Percent Free Flow Speed, PFFS	97.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	63 pc/h	41 pc/h
Base percent time-spent-following,(note-4) BPTSFd	7.6 %	
Adjustment for no-passing zones, fnp	53.4	
Percent time-spent-following, PTSFd	39.9 %	

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.04	
Peak 15-min vehicle-miles of travel, VMT15	8	veh-mi
Peak-hour vehicle-miles of travel, VMT60	27	veh-mi
Peak 15-min total travel time, TT15	0.3	veh-h
Capacity from ATS, CdATS	1685	veh/h
Capacity from PTSF, CdPTSF	1698	veh/h
Directional Capacity	1685	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	29.2	mi/h
Percent time-spent-following, PTSFd (from above)	39.9	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	62.4
Effective width of outside lane, We	16.48
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	2.21
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/21/2013
Analysis Time Period	No Build Weekday AM Peak Hour
Highway	Deerfoot Rd, Southborough, MA
From/To	From Main St to Flagg Rd
Jurisdiction	
Analysis Year	2018
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.55	
Shoulder width	0.0	ft	% Trucks and buses	3	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd 151 veh/h
Opposing direction volume, Vo 113 veh/h

Average Travel Speed

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adj. factor,(note-5) fHV	0.979	0.979
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	280 pc/h	210 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	32	mi/h
Observed total demand,(note-3) V	0	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	32.0	mi/h
Adjustment for no-passing zones, fnp	3.5*	mi/h
Average travel speed, ATSd	24.7	mi/h
Percent Free Flow Speed, PFFS	77.2	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.979	0.979
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	280 pc/h	210 pc/h
Base percent time-spent-following,(note-4) BPTSFd	28.2 %	
Adjustment for no-passing zones, fnp	57.3	
Percent time-spent-following, PTSFd	60.9 %	

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	41	veh-mi
Peak-hour vehicle-miles of travel, VMT60	91	veh-mi
Peak 15-min total travel time, TT15	1.7	veh-h
Capacity from ATS, CdATS	1675	veh/h
Capacity from PTSF, CdPTSF	1695	veh/h
Directional Capacity	1675	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.6	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	24.7	mi/h
Percent time-spent-following, PTSFd (from above)	60.9	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	274.5
Effective width of outside lane, We	14.94
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	3.47
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/21/2013
Analysis Time Period	No Build Weekday PM Peak Hour
Highway	Deerfoot Rd, Southborough, MA
From/To	From Main St to Flagg Rd
Jurisdiction	
Analysis Year	2018
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.92	
Shoulder width	0.0	ft	% Trucks and buses	1	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd	89	veh/h
Opposing direction volume, Vo	88	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.993		0.993	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	97	pc/h	96	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	33	mi/h
Observed total demand,(note-3) V	0	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	33.0	mi/h
Adjustment for no-passing zones, fnp	3.5*	mi/h
Average travel speed, ATSd	28.0	mi/h
Percent Free Flow Speed, PFFS	84.9	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	97 pc/h	96 pc/h
Base percent time-spent-following,(note-4) BPTSFd	11.3 %	
Adjustment for no-passing zones, fnp	52.6	
Percent time-spent-following, PTSFd	37.7 %	

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.06	
Peak 15-min vehicle-miles of travel, VMT15	15	veh-mi
Peak-hour vehicle-miles of travel, VMT60	53	veh-mi
Peak 15-min total travel time, TT15	0.5	veh-h
Capacity from ATS, CdATS	1685	veh/h
Capacity from PTSF, CdPTSF	1698	veh/h
Directional Capacity	1685	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.6	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	28.0	mi/h
Percent time-spent-following, PTSFd (from above)	37.7	
Level of service, LOSd (from above)	B	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	96.7
Effective width of outside lane, We	18.66
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	2.06
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/21/2013
Analysis Time Period	Build Weekday AM Peak Hour
Highway	Flagg Road, Southborough, MA
From/To	From Lovers Lane to Rt. 9
Jurisdiction	
Analysis Year	2018
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.82	
Shoulder width	0.0	ft	% Trucks and buses	3	%
Lane width	9.5	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd	74	veh/h
Opposing direction volume, Vo	51	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.979		0.979	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	92	pc/h	64	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	33	mi/h
Observed total demand,(note-3) V	0	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	33.0	mi/h
Adjustment for no-passing zones, fnp	0.0*	mi/h
Average travel speed, ATSd	31.8	mi/h
Percent Free Flow Speed, PFFS	96.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.979	0.979
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	92 pc/h	64 pc/h
Base percent time-spent-following,(note-4) BPTSFd	10.8 %	
Adjustment for no-passing zones, fnp	53.4	
Percent time-spent-following, PTSFd	42.3 %	

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.05	
Peak 15-min vehicle-miles of travel, VMT15	11	veh-mi
Peak-hour vehicle-miles of travel, VMT60	37	veh-mi
Peak 15-min total travel time, TT15	0.3	veh-h
Capacity from ATS, CdATS	1656	veh/h
Capacity from PTSF, CdPTSF	1695	veh/h
Directional Capacity	1656	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	31.8	mi/h
Percent time-spent-following, PTSFd (from above)	42.3	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	90.2
Effective width of outside lane, We	15.48
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	2.82
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/21/2013
Analysis Time Period	Build Weekday PM Peak Hour
Highway	Flagg Road, Southborough, MA
From/To	From Rt. 9 to Lovers Lane
Jurisdiction	
Analysis Year	2018
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.85	
Shoulder width	0.0	ft	% Trucks and buses	1	%
Lane width	9.5	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd 62 veh/h
Opposing direction volume, Vo 51 veh/h

Average Travel Speed

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adj. factor,(note-5) fHV	0.993	0.993
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	73 pc/h	60 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	30	mi/h
Observed total demand,(note-3) V	0	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	30.0	mi/h
Adjustment for no-passing zones, fnp	0.0*	mi/h
Average travel speed, ATSd	29.0	mi/h
Percent Free Flow Speed, PFFS	96.6	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	73 pc/h	60 pc/h
Base percent time-spent-following,(note-4) BPTSFd	8.7 %	
Adjustment for no-passing zones, fnp	53.0	
Percent time-spent-following, PTSFd	37.8 %	

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.04	
Peak 15-min vehicle-miles of travel, VMT15	9	veh-mi
Peak-hour vehicle-miles of travel, VMT60	31	veh-mi
Peak 15-min total travel time, TT15	0.3	veh-h
Capacity from ATS, CdATS	1685	veh/h
Capacity from PTSF, CdPTSF	1698	veh/h
Directional Capacity	1685	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	29.0	mi/h
Percent time-spent-following, PTSFd (from above)	37.8	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	72.9
Effective width of outside lane, We	16.06
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	2.36
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

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E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/21/2013
Analysis Time Period	Build Weekday AM Peak Hour
Highway	Deerfoot Rd, Southborough, MA
From/To	From Main St to Flagg Rd
Jurisdiction	
Analysis Year	2018
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.55	
Shoulder width	0.0	ft	% Trucks and buses	3	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd	156	veh/h
Opposing direction volume, Vo	135	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.979		0.979	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	290	pc/h	251	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	32	mi/h
Observed total demand,(note-3) V	0	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	32.0	mi/h
Adjustment for no-passing zones, fnp	3.5*	mi/h
Average travel speed, ATSd	24.3	mi/h
Percent Free Flow Speed, PFFS	75.9	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.979	0.979
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	290 pc/h	251 pc/h
Base percent time-spent-following,(note-4) BPTSFd	30.9 %	
Adjustment for no-passing zones, fnp	57.9	
Percent time-spent-following, PTSFd	61.9 %	

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.17	
Peak 15-min vehicle-miles of travel, VMT15	43	veh-mi
Peak-hour vehicle-miles of travel, VMT60	94	veh-mi
Peak 15-min total travel time, TT15	1.8	veh-h
Capacity from ATS, CdATS	1680	veh/h
Capacity from PTSF, CdPTSF	1695	veh/h
Directional Capacity	1680	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.6	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	24.3	mi/h
Percent time-spent-following, PTSFd (from above)	61.9	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	283.6
Effective width of outside lane, We	14.64
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	3.53
Bicycle LOS	D

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	YC
Agency/Co.	Green Intl Affiliates, Inc.
Date Performed	3/21/2013
Analysis Time Period	Build Weekday PM Peak Hour
Highway	Deerfoot Rd, Southborough, MA
From/To	From Main St to Flagg Rd
Jurisdiction	
Analysis Year	2018
Description	Prop Park Central 40B

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.92	
Shoulder width	0.0	ft	% Trucks and buses	1	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	40	/mi

Analysis direction volume, Vd	105	veh/h
Opposing direction volume, Vo	99	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7*		1.7*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.993		0.993	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	115	pc/h	108	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	33	mi/h
Observed total demand,(note-3) V	0	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access point density,(note-3) fA	-	mi/h
Free-flow speed, FFSd	33.0	mi/h
Adjustment for no-passing zones, fnp	3.5*	mi/h
Average travel speed, ATSd	27.8	mi/h
Percent Free Flow Speed, PFFS	84.2	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.7*	1.7*
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	115 pc/h	108 pc/h
Base percent time-spent-following,(note-4) BPTSFd	13.2 %	
Adjustment for no-passing zones, fnp	54.1	
Percent time-spent-following, PTSFd	41.1 %	

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.07	
Peak 15-min vehicle-miles of travel, VMT15	17	veh-mi
Peak-hour vehicle-miles of travel, VMT60	63	veh-mi
Peak 15-min total travel time, TT15	0.6	veh-h
Capacity from ATS, CdATS	1685	veh/h
Capacity from PTSF, CdPTSF	1698	veh/h
Directional Capacity	1685	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.6	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	27.8	mi/h
Percent time-spent-following, PTSFd (from above)	41.1	
Level of service, LOSd (from above)	B	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	25
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	114.1
Effective width of outside lane, We	17.70
Effective speed factor, St	2.61
Bicycle LOS Score, BLOS	2.31
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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