
Recommendations Report: Crosswalk Improvements at Arnold Arboretum and Upper Arborway



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Prepared for the Department of Conservation and Recreation
Boston, MA



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Introduction

This project is about enhancing access and creating safer, high quality pedestrian and bicyclist connections to the Arnold Arboretum urban park within the Emerald Necklace. Toole Design Group (TDG) has prepared this report for the Department of Conservation and Recreation (DCR) to document existing conditions, data collection results, and proposed recommendations for the midblock crossing near the northern most entrance to Arnold Arboretum. The midblock crossing spans the Arborway Northbound, Arborway Southbound, and the Upper Arborway.

This project presents the opportunity to better connect people traveling between the Arnold Arboretum and parklands within the Emerald Necklace to the surrounding neighborhoods and multi-modal transportation network. The goals of this project are to improve safety and operations for all users and improve access to the Arnold Arboretum at Upper Arborway.

Study Area

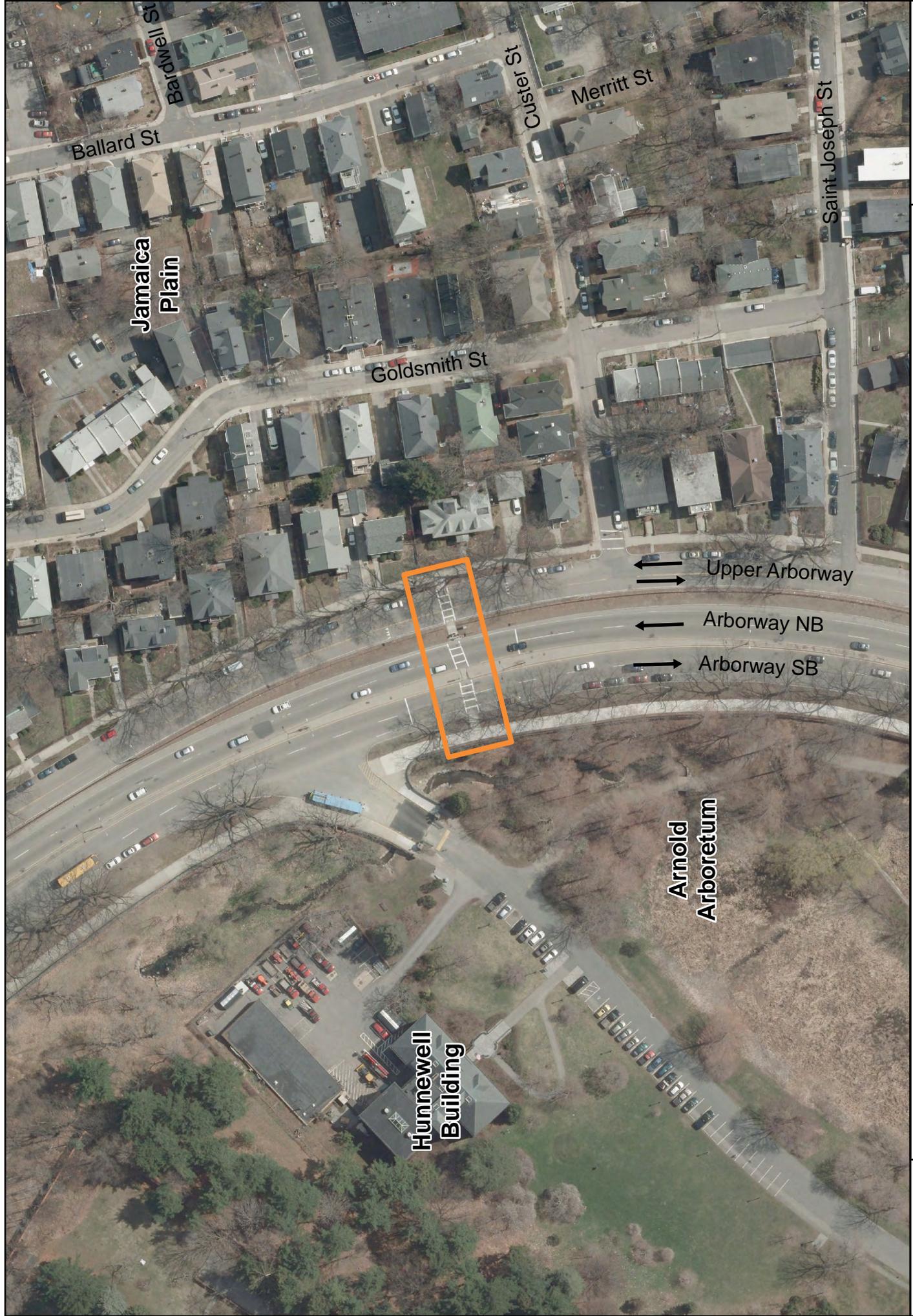
The study area for this project consists of the midblock crossing near the northern most entrance to Arnold Arboretum. The midblock crossing spans the Arborway Northbound, Arborway Southbound, and the Upper Arborway service road. The study area is shown in **Figure 1**.

Data Collection and Background

TDG has collected and analyzed data through field site visits, observations, videos, and from stakeholders. In addition to data collected and provided in this report, DCR has provided TDG with the following:

- Crosswalk and Pathway Treatment Guidelines for the Emerald Necklace Parks (2012);
- Parkways Preservation Treatment Guidelines (2006);
- “Gateway to the Arborway” Landscape Treatment Plans (2008);
- Arborway Master Plan (2004);
- Emerald Necklace Master Plan (2001); and
- The recently updated traffic volumes on DCR roadways.

These guidelines and data will be used throughout this report and remaining aspects of the project as needed.



Jamaica Plain

Goldsmith St

Upper Arborway

Arborway NB

Arborway SB

Arnold Arboretum

Hunnewell Building

Figure 1: Study Area

Existing Conditions

The existing conditions collected and reviewed for this report are:

- Existing pedestrians, bicyclists, and vehicular volumes;
- Existing motor vehicle speeds on the Upper Arborway service road;
- User conflicts;
- User desire lines;
- Geometric conditions;
- ADA compliance of ramps and sidewalks;
- Intersection elements including signals, signs and pavement markings;
- Existing landscape elements;
- Behavioral observations of users; and
- Stakeholder input.

This section of the report contains details of the study area including a description of roadway conditions, intersection conditions, geometric conditions, traffic data, safety analysis, user observations, and landscape elements.

Roadway Conditions

The **Arborway** is classified by the Massachusetts Department of Transportation (MassDOT) Bureau of Transportation Planning and Development as a principal arterial under the jurisdiction of the Department of Conservation and Recreation (DCR). The posted speed limit for the Arborway is 30 mph. As defined by Code of Massachusetts Regulations (CMR 350), Section 4.01, trucks, buses, campers, trailers, and other large vehicles are not permitted to use DCR owned roadways including the Arborway. The Arborway generally runs in a north-south direction along the eastern border of the Arnold Arboretum Parkway. The Arborway begins at Jamaica Pond and terminates at Shea Circle and Franklin Park. Note in the future the Casey Overpass will be removed and all legs of the Arborway will intersect at grade with South Street as a part of the Casey Arborway project.

Separated by a concrete center median that is approximately 10 feet wide; the Arborway is divided creating one-way pairs and are referred to throughout this report as Arborway Northbound and Arborway Southbound. Both Arborway Northbound and Arborway Southbound have two travel lanes with shoulders; at the crossing location, Arborway Southbound is approximately 30 feet wide, and Arborway Northbound is approximately 25 feet wide. A sidewalk is provided on the western side of the Arborway Southbound adjacent to the Arnold Arboretum. On-street parking is not provided on the Arborway Northbound. Unrestricted on-street parking was observed on the western side of the Arborway Southbound.

The **Upper Arborway** is classified by the MassDOT Bureau of Transportation Planning and Development as a local road under the jurisdiction of the Department of Conservation and Recreation. As previously mentioned, trucks, buses, campers, trailers, and other large vehicles are not permitted use of the Upper Arborway. This two-way

roadway runs in a north-south direction and parallels the Arborway Northbound separated by a grass median that is approximately 16 feet wide. Operating as a service road to the Arborway, the Upper Arborway begins at South Street at the southern limit and terminates at Centre Street at the northern limit. The posted speed limit for the Upper Arborway is 30 mph. With a pavement width of 30 feet, the Upper Arborway has one travel lane in each direction with unrestricted on-street parking permitted on the eastern side of the roadway. A sidewalk is provided on the eastern side of the Upper Arborway adjacent to the neighborhood.

Crossing Conditions

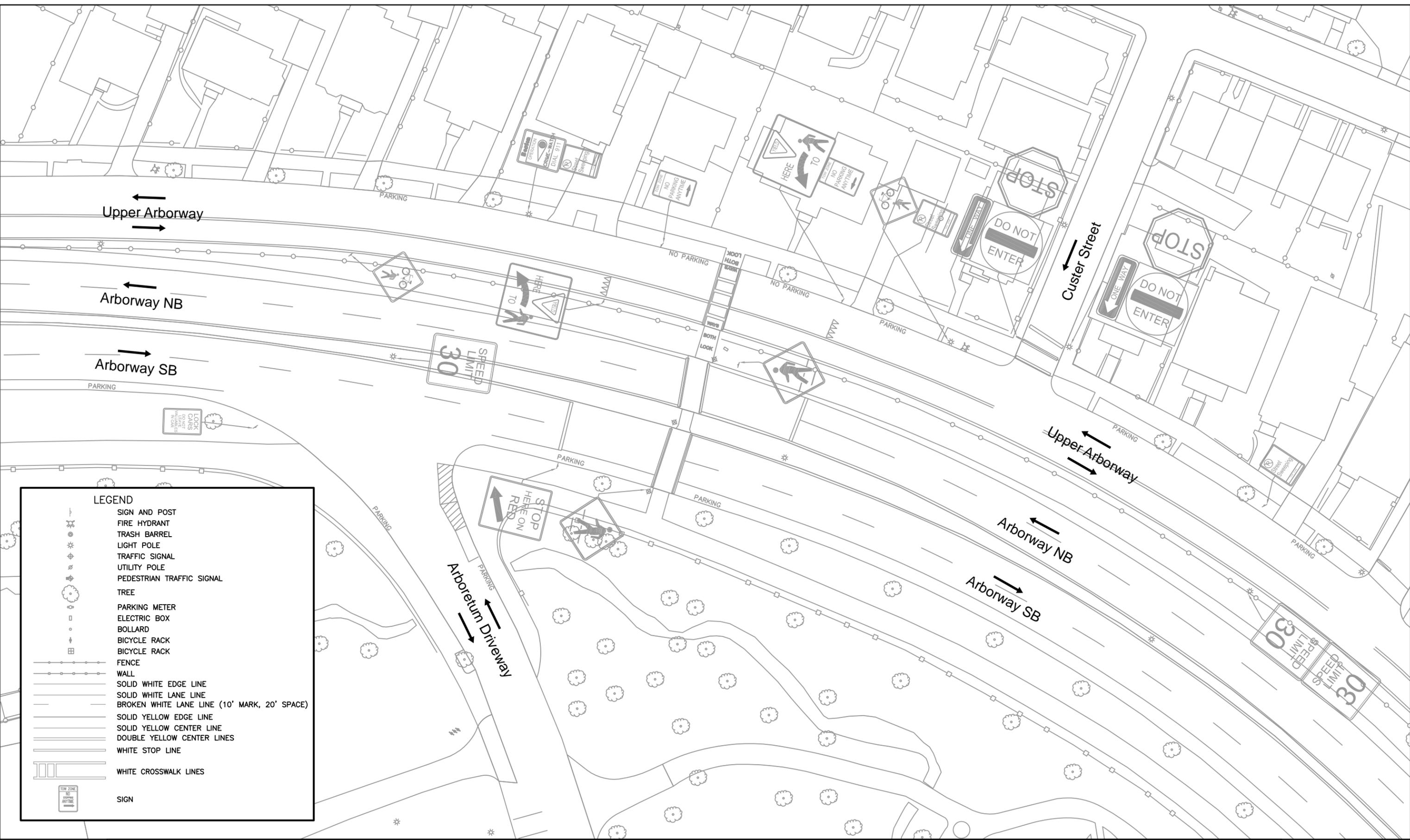
Arborway/Upper Arborway Midblock Crosswalk

The midblock crossing crosses the Arborway Northbound, Arborway Southbound, and the Upper Arborway, connecting the parkland of the Arnold Arboretum to the surrounding neighborhood. These legs vary in traffic control. The Arborway Northbound and Arborway Southbound are signalized while the Upper Arborway is unsignalized. The signalized crossing of the Arborway Northbound and Southbound contain vehicular and pedestrian indications. The pedestrian phase is activated by push buttons. Pavement and pavement markings appear to be in good condition. The crosswalk is marked with longitudinal white lines and is 10 feet wide. Curb ramps are provided for the crosswalk with a median break. No detectable warning surfaces are provided on the ramps.

The Upper Arborway crossing is unsignalized with pedestrian warning signs. The ladder style crosswalk is in fair condition. There are existing yield lines with “Yield Here to Pedestrians” sign approximately 47 feet north of the crosswalk and approximately 49 feet south of the crosswalk. Curb ramps are provided for the crosswalk and there are no detectable warning surfaces provided on the ramps. Approaching the Upper Arborway crosswalk, faded pavement marking symbols stating “LOOK BOTH WAYS” are provided on both curb ramps. Unrestricted on-street parking is prohibited near the crosswalk by signage. Curb ramps are not ADA compliant.

Geometric Conditions

TDG has conducted a thorough field investigation to document the geometric conditions of the Arborway and Upper Arborway midblock crosswalk. This field visit, which was conducted on July 31, 2013, reviewed sight distances, grades, horizontal and vertical alignment, ADA compliance, drainage, and street lighting. The geometric conditions are shown in **Figure 2**.



LEGEND

	SIGN AND POST
	FIRE HYDRANT
	TRASH BARREL
	LIGHT POLE
	TRAFFIC SIGNAL
	UTILITY POLE
	PEDESTRIAN TRAFFIC SIGNAL
	TREE
	PARKING METER
	ELECTRIC BOX
	BOLLARD
	BICYCLE RACK
	BICYCLE RACK
	FENCE
	WALL
	SOLID WHITE EDGE LINE
	SOLID WHITE LANE LINE
	BROKEN WHITE LANE LINE (10' MARK, 20' SPACE)
	SOLID YELLOW EDGE LINE
	SOLID YELLOW CENTER LINE
	DOUBLE YELLOW CENTER LINES
	WHITE STOP LINE
	WHITE CROSSWALK LINES
	SIGN

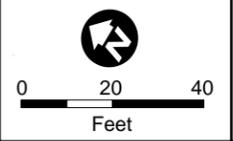


Figure 2: Geometric Conditions

Sight Distance and Alignment

Within the grass median located between the Arborway Northbound and the Upper Arborway is a steel picket fence. The fence is offset from the curb of the Upper Arborway by approximately 4 feet. Due to the fence location, there is restricted visibility for motorists and pedestrians at the crosswalk on the Upper Arborway. For motorists traveling on the Upper Arborway, the southbound direction has a sight distance of approximately 280 feet and the northbound direction has a sight distance of approximately 235 feet. These distances are based on field observations and were determined as the point a motorist driver can spot a pedestrian waiting to cross the Upper Arborway in the median between the Arborway Northbound and Upper Arborway. According to the latest edition of American Associates of State and Highway Transportation Official's (AASHTO) A Policy on Geometric Design of Highways and Streets (Green Book), the stopping sight distance on a local level roadway with a speed limit of 30 mph is 200 feet. In addition, the horizontal alignment of the Arborway (including Northbound, Southbound, and Upper) is curvilinear compounding the sight distance. According to AASHTO's Green Book, a 10 foot clear line of sight should be provided on the western side of the Upper Arborway due to the curvature of the roadway.

ADA compliance

Curb ramps are provided for the crosswalks at the north and south sides of the Upper Arborway and Arborway Southbound respectively. Median cut-throughs are provided at the crosswalks between the Arborway Southbound and Arborway Northbound, as well as the Arborway Northbound and the Upper Arborway. ADA compliance was tested at each of these sites. The median between the Arborway Southbound and Arborway Northbound does not meet ADA slope requirements as it exceeds 2% and does not provide a level landing. No detectable warning surfaces are provided on any ramps or at the two median cut-throughs.

Grading and Drainage

The project site is relatively flat, with the roadway appearing to drain toward Custer Street south of the crossing to the existing drainage infrastructure provided on both sides of the roadway. There is one catch basin on Arborway Southbound and another on Arborway Northbound, approximately 80 feet south and 70 feet south of the crossing, respectively.

Street Lighting

All street lights appear to be standard cobra style fixtures within the study area. On the median between Arborway Southbound and Arborway Northbound, there are two street lights near the project site: one is located approximately 140 feet north of the crosswalk in the center median; and the second is located approximately 50 feet south of the crosswalk in the center median.

On Upper Arborway, there are two street lights on the eastern side of the street in the existing landscaped buffer to the sidewalk: one is located approximately 100 feet north

of the crosswalk; and the second is located approximately 110 feet south of the crosswalk. Pedestrian scale lighting is not provided along any leg of the crossing.

Traffic Data

Multimodal traffic data was collected in September for the Upper Arborway and the Arborway and Upper Arborway midblock crosswalk. This section of the report will discuss the traffic data collected including traffic volumes, speed and classification. All traffic data is provided in **Appendix A**.

Traffic Counts

Traffic data was collected using an Automatic Traffic Recorder (ATR) and manual user movement counts. The locations of the data collection are shown in **Figure 3**. To determine the daily traffic and hourly variation, an ATR was used to collect traffic data on Upper Arborway for two days on September 11th and 12th, 2013. The data for Wednesday and Thursday were averaged to estimate the daily traffic. The Upper Arborway has an average daily traffic of 2,653 vehicles per day. Average daily traffic variation is shown in **Figure 4**.

Pedestrian, bicycle, and motor vehicle movements were collected on the Arborway and Upper Arborway on Thursday, September 12th, 2013 and Saturday, September 14th, 2013 at the Arborway and Upper Arborway midblock crosswalk. Pedestrian counts include any user that utilizes the crosswalk, including bicyclists. Bicyclist counts indicate any on-road bicyclists. Therefore, due to the count methodology there may be a difference in the number of pedestrian counts for different legs of the crossing where bicyclists may have transitioned from the roadway to the crosswalk or vice versa.

For a weekday, the results of the counts indicated that the a.m. peak hour occurs between 7:30 a.m. and 8:30 a.m., the midday peak hour occurs between 11:45 a.m. and 12:45 p.m., and the p.m. peak hour occurs between 4:30 p.m. and 5:30 p.m. For a Saturday, the results of the counts indicated that the midday peak hour occurs between 12:00 noon and 1:00 p.m. and the p.m. peak hour occurs between 4:15 p.m. and 5:15 p.m. The weekday peak hour motor vehicle, pedestrian, and bicycle volumes are shown in **Figure 5**. The weekend peak hour motor vehicle, pedestrian, and bicycle volumes are shown in **Figure 6**.

As shown in **Figure 5** and **Figure 6**, the pedestrian counts were collected separately for the Arborway crosswalk and the Upper Arborway crosswalk. Although these crosswalks are continuous pedestrian facilities, the number of pedestrians crossing the Arborway and Upper Arborway differ. This is due to the count methodology mentioned above and confirmed by observations. Observations indicated that on-road bicyclists are entering the Arborway crosswalk from the Upper Arborway roadway and continuing across the Arborway as a pedestrian in the crosswalk.



Figure 3: Observations and Data Collection Location Map

Legend	
	ATR Traffic Counts
	User Movement Counts
	Video Analysis
	Study Area



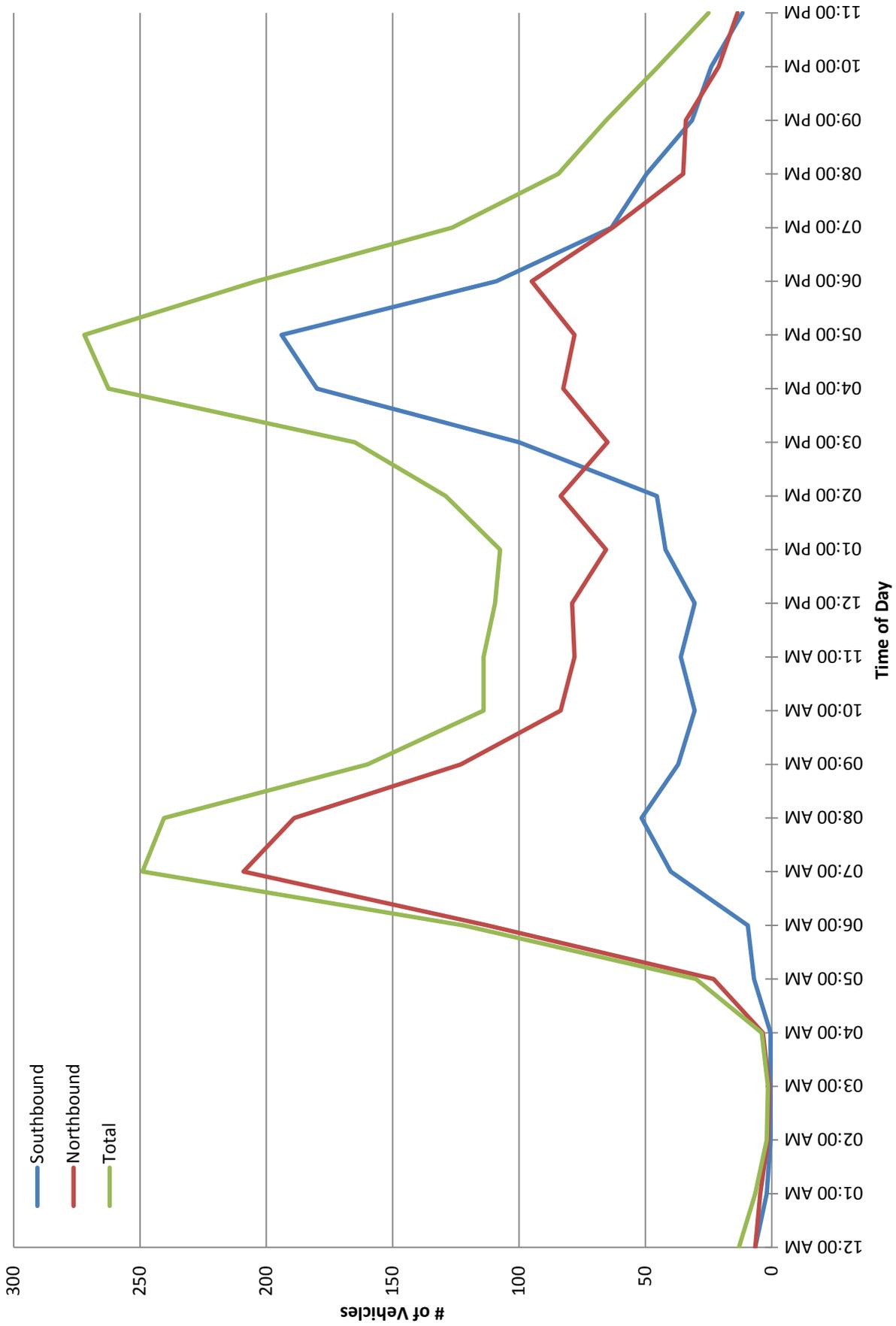
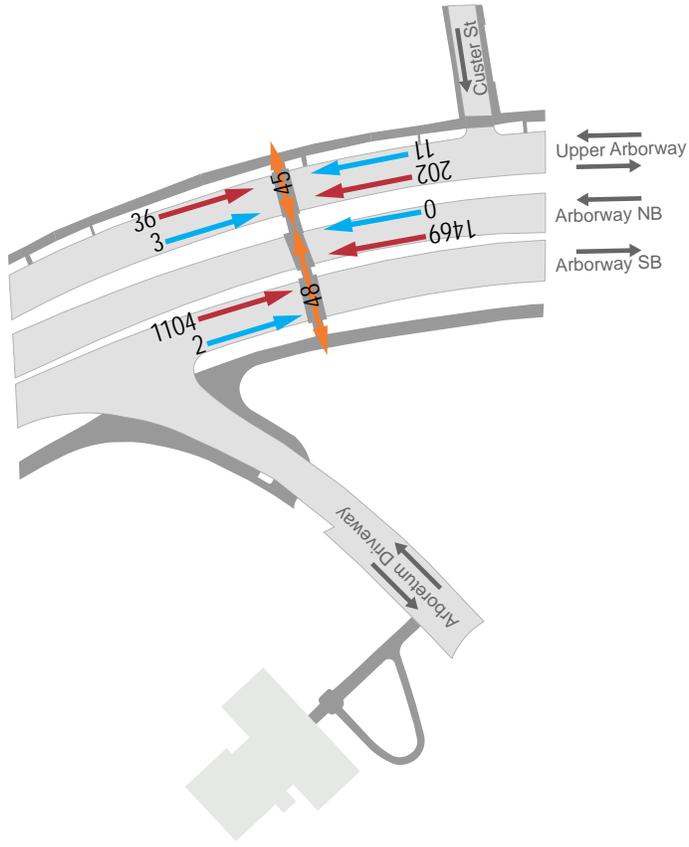
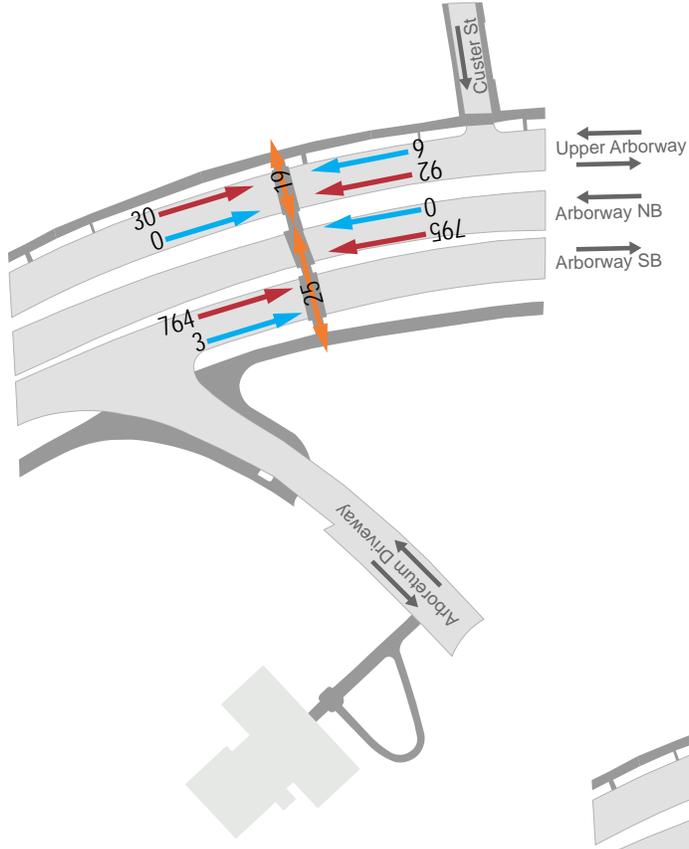



Figure 4: Upper Arborway Traffic Variations

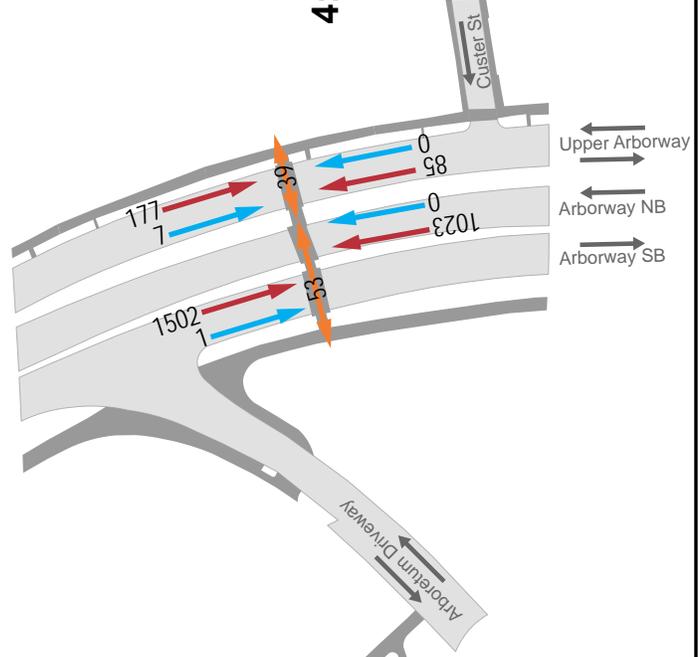
7:30 am - 8:30 am



11:45 am - 12:45 pm



4:30 pm - 5:30 pm



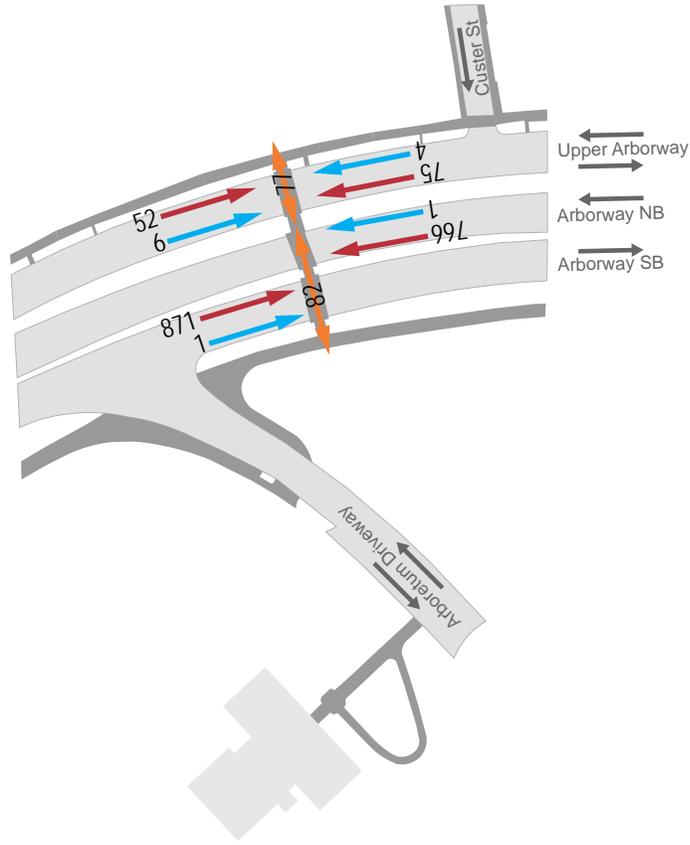
Legend	
	vehicle volume
	on-road bicycle volume
	bicycle/pedestrian volume



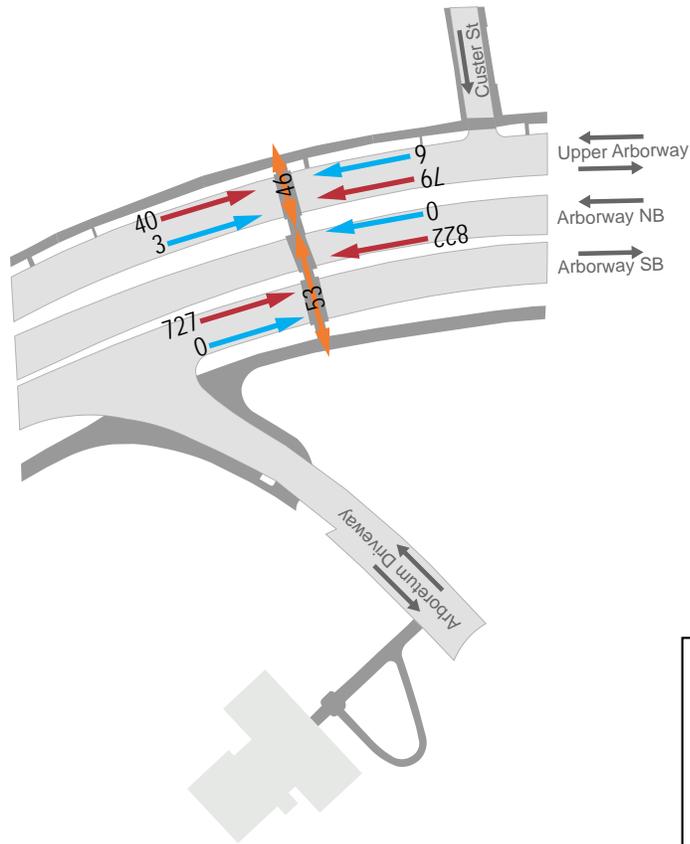
Not to Scale

Figure 5: Weekday Peak-hour Movement Counts

4:15 pm - 5:15 pm



12:00 pm - 1:00 pm



Legend	
	vehicle volume
	on-road bicycle volume
	bicycle/pedestrian volume



Not to Scale

Figure 6: Weekend Peak-hour Movement Counts

Speed Data

Speed data was collected on the Upper Arborway as part of the ATR data collection. A breakdown of the volumes with speed data is shown in **Figure 7**. The speed data determined the 85th percentile speed to be 33 mph which is above the speed limit. Although the 85th percentile speed is slightly above the speed limit, **Figure 7** shows that vehicles are traveling above the speed limit throughout the day along the Upper Arborway. Based on the speed breakdown, vehicles traveling 35 mph and above typically occur during the a.m. peak hour for the northbound direction and p.m. peak hour for the southbound direction. Note this is consistent with stakeholder concern that the Upper Arborway is being used by vehicles as a cut through to avoid traffic on the Arborway.

Vehicular Classification

As previously mentioned, trucks, buses, campers, trailers, and other large vehicles are restricted from the Arborway and Upper Arborway. Data collected on the Upper Arborway determined that 3.4% of the vehicles utilizing the roadway were restricted vehicles as shown in **Figure 8**.

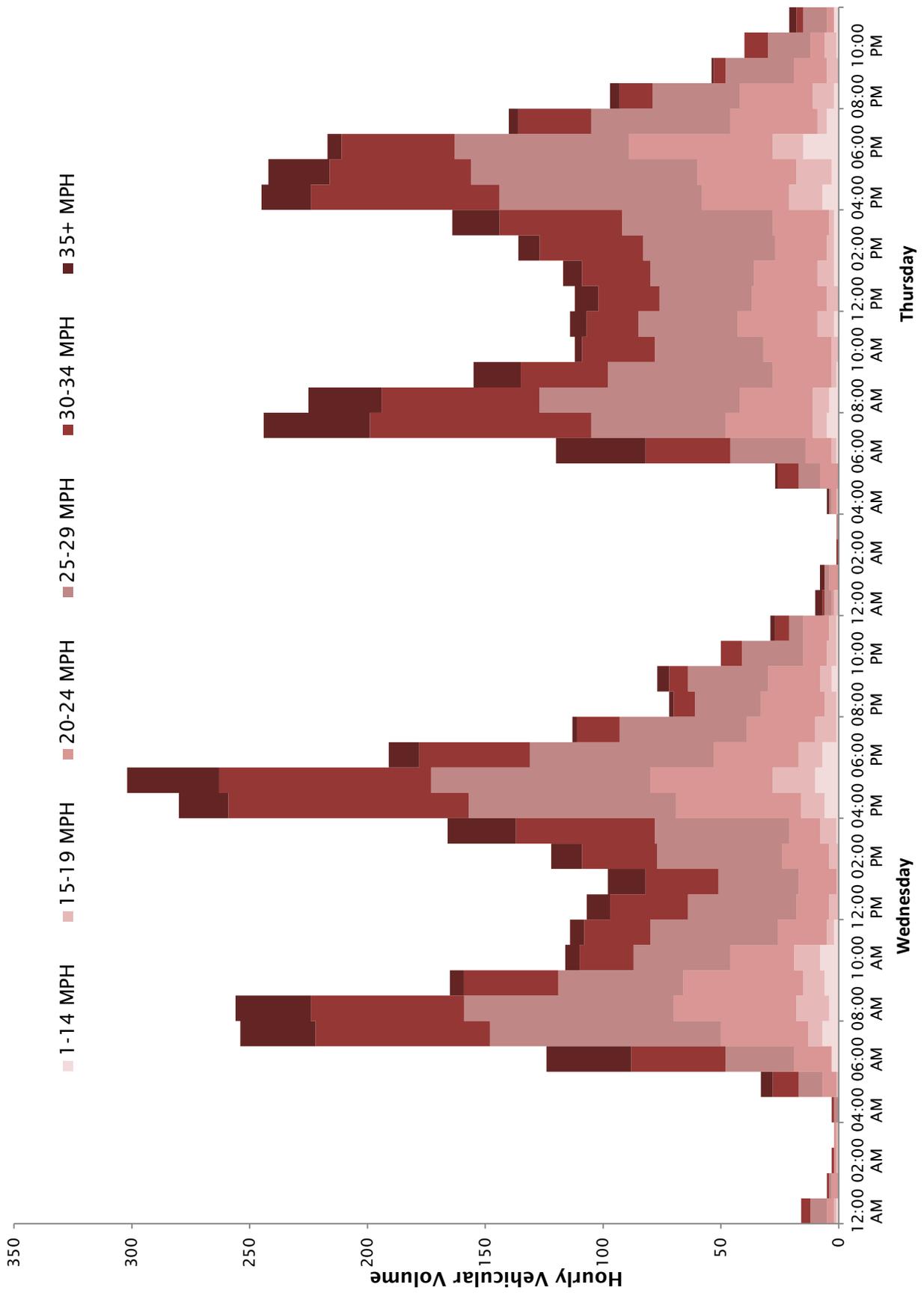


Figure 7: Upper Arborway Volumes with Speed Breakdown

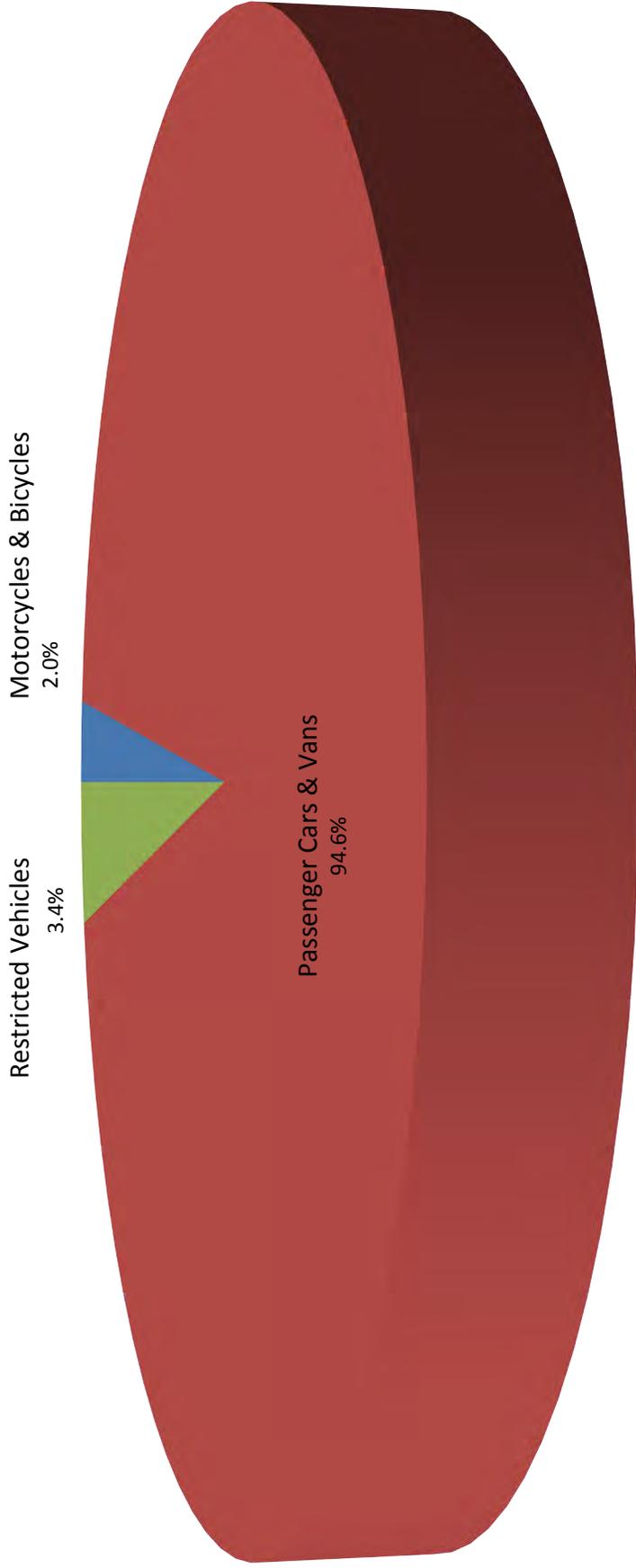


Figure 8: Upper Arborway Vehicle Classification

Safety Analysis

The crash history of the study area locations was evaluated to identify safety deficiencies and determine if any location experiences a higher crash frequency. The crash data was obtained from MassDOT's Highway Division for the five most recent years available (2006-2010) and includes only reported crashes. The safety data are summarized in **Table 1**. Two crashes were reported at the study area midblock crosswalk from 2006 to 2010. Neither of the reported crashes included non-motorized users. Stakeholders noted additional crashes that may not have been reported or occurred after 2010, the most recent crash data available for analysis.

	Arborway at midblock crosswalk	Upper Arborway at midblock crosswalk
Traffic Control:	Signalized	Unsignalized
Year		
2006	0	0
2007	1	0
2008	0	0
2009	0	0
2010	0	1
Total	1	1
Type		
Angle	1	0
Rear-End	0	1
Head-on	0	0
Sideswipe	0	0
Single Vehicle	0	0
Total	1	1
Severity		
Property Damage Only	1	1
Personal Injury	0	0
Fatality	0	0
Other	0	0
Total	1	1
Weather		
Clear	1	1
Cloudy	0	0
Rain	0	0
Snow	0	0
Unknown/Other	0	0
Total	1	1
Time		
7:00 a.m. to 9:00 a.m.	0	0
9:00 a.m. to 4:00 p.m.	0	1
4:00 p.m. to 6:00 p.m.	1	0
6:00 p.m. to 7:00 a.m.	0	0
Total	1	1

Table 1: Crash Summary: 2006 - 2010

User Observations

In addition to collecting traffic data, TDG obtained 12 hours of video analysis at the Upper Arborway crosswalk. TDG viewed the videos for all five peak hours to document user behaviors.

The video analysis reviewed desire lines and user yielding behaviors. The crosswalk users do use the existing crosswalk location, which may be attributed to the fence restricting passage to only the crosswalk. Motorists yielded to pedestrian approximately half of the observed instances when pedestrians were attempting to cross Upper Arborway while motorists were approaching simultaneously. General observations indicated that motorists were yielding to pedestrians at the crosswalk rather than at the yield lines.

Pedestrians crossing from the Arnold Arboretum were observed utilizing the signalized crosswalk at the Arborway and then looking for vehicles approaching prior to crossing at the unsignalized crosswalk at the Upper Arborway.

Bicyclists traveling on the Upper Arborway roadway were observed turning into the crossing from both travel lanes. They then activated the pushbutton and waited in the median before proceeding across the Arborway Northbound and Arborway Southbound.

Stakeholders expressed concerns about near miss crashes occurring on the Upper Arborway. Near misses were observed during fieldwork and during video analysis of motorists and pedestrians failing to yield to each other.

Landscape Elements

Within the study area, the existing landscape elements include street trees. Street trees are currently provided on the eastern side of the Upper Arborway within the landscape buffer between the roadway and the sidewalk. In addition, street trees are also provided within the landscape buffer on the western side of the Arborway Southbound. At the back of sidewalk on the western side of the Arborway Southbound, a stone wall is provided along the edge of the Arnold Arboretum. In July 2014, new oak trees were planted in the median. As the trees mature, they may impact sight lines and visibility.

Summary of Existing Conditions

Concerns have been expressed about the safety of the midblock crossing of the Upper Arborway due to restricted sight lines, speeding motor vehicles, and the near miss crashes due to the lack of yielding behaviors both on behalf of motorists and pedestrians. Stakeholders have also expressed concerns about user confusion for yielding behavior between the signalized one-way, median-separated segments at the Arborway Northbound and Southbound, and the unsignalized crossing of the two-way Upper Arborway.

Based on the existing conditions analysis, TDG concludes there is restricted visibility for motorists and pedestrians at the crosswalk on the Upper Arborway because of the curvature of the roadway and location of the fence in the median separating the Upper Arborway and Arborway Northbound. The existing traffic data also reveals that the 85th percentile speed is 3 mph over the speed limit; however, there are motorists speeding throughout the day along the Upper Arborway and speeding is still of concern. Additionally, near misses were observed during fieldwork and during video analysis of motorists and pedestrians failing to yield to each other; however TDG observed a majority of non-motorized users looking for vehicles at the approach to the Upper Arborway from the Arboretum.

Bicyclists were observed typically pressing the pushbutton to activate the pedestrian phase and utilizing the crosswalks to cross the Arborway Northbound and Southbound. Bicyclists would then transition to the roadway on the Upper Arborway. The existing signal for the crossing of the Arborway Northbound and Southbound is activated within 8 seconds of pushing the pushbutton; however the signal equipment does not meet current Manual on Uniform Traffic Control Devices (MUTCD) standards for timing and pedestrian countdown indications. The curb ramps do not meet current ADA standards.

The existing conditions data and analysis collected at the midblock crosswalk on the Arborway and Upper Arborway will be used to develop the recommendations that follow in this report.

Proposed Recommendations

The following portion of the report describes the proposed recommendations and improvements at the midblock crossing at the northern entrance to the Arnold Arboretum. The following sections include a discussion of the improvements methodology, previous planning projects, guidelines and best practices, objectives, and recommendations.

Improvements Methodology

For the proposed recommendations, TDG developed an improvements methodology to determine which treatments would achieve the goals and objectives of the project. The improvements methodology is summarized below:

1. Conducted existing conditions analysis;
2. Met with and gathered stakeholder input;
3. Reviewed previous planning projects for recommendations;
4. Referenced guidelines and best practices to develop recommendations alternatives;
5. Reviewed project goals to develop objectives for determining recommendations alternatives;
6. Worked with DCR, Arborway Coalition, key stakeholders and the public to refine the preferred recommendations; and
7. Prepared final recommendations report.

Stakeholders Input

TDG worked with DCR to actively engage stakeholder in an effort to ensure the improved crossing at the Arboretum and Upper Arborway respond to the context and character of the local neighborhood while maintaining the historic landscape. To gather necessary background information for this project, a stakeholders meeting was held on August 19th, 2013. The following provides a summary of the stakeholders meeting.

August 19th Stakeholder Meeting Summary

The stakeholders meeting involved representatives from DCR, Emerald Necklace Conservancy, Jamaica Pond Association, Jamaica Hills Association, the Arborway Coalition, the Arnold Arboretum, elected officials, the surrounding neighborhood, and TDG. The goal of the meeting was to listen to the concerns of the stakeholders on the Arborway and Upper Arborway midblock crossing. In addition to a discussion, other meeting topics included the project goals and deliverables, summary of initial fieldwork and observations, discussion of next steps, and project schedule. A summary of the stakeholder concerns and suggestions is described below.

1. Safety, Operations, and Geometric Factors
 - a. The fence was installed in 2009 to separate the Arborway from the Upper Arborway which restricts sight lines for both crosswalk users and motorists.
 - b. The roadway alignment also restricts sight lines for both crosswalk users and motorists.

- c. The median width at the crosswalk does not provide enough time or space for a pedestrian to check both travel directions on the Upper Arborway.
 - d. Traffic calming in the area should be considered to increase pedestrian safety and decrease vehicular speeds. Some suggestions included in-pavement crosswalk lights, raised crossing, rumble strips, or speed humps to slow vehicle traffic.
 - e. Signalizing the crosswalk on the Upper Arborway may increase awareness for all users.
2. User Compliance and Enforcement
 - a. There seems to be a lack of jurisdictional clarity in enforcing existing facilities and whether the area is patrolled by City of Boston police or the State Police.
 - b. It was suggested that the future design be “self-enforcing”.
 - c. Compliance concerns were expressed about lack of yielding between all modes including pedestrians, motorists, runners, and cyclists.
 3. ADA compliance
 - a. The recommendations should be universally accessible.
 4. Drainage and Street Lighting
 - a. Drainage issues on the neighborhood side of the Arborway were of concern.
 - b. Improve street lighting. Although the Arnold Arboretum closes at dusk, pedestrians and bicyclists continue to use the crosswalk at night.
 5. Future Traffic Impacts
 - a. The forthcoming Casey Arborway project may affect traffic conditions in this area especially on the Upper Arborway.
 - b. There is an increasing number of pedestrians especially children and bicyclists using the crosswalk.
 - c. The crossing should be upgraded to meet accessibility standards.
 - d. Maintain efficiency of vehicular movements on the Arborway to reduce neighborhood cut through.
 - e. There is demand for parking adjacent to the Arboretum. Residents have expressed a desire for permit parking on the Upper Arborway.

The meeting agenda and sign in sheet are provided in **Appendix B**.

Summary of Previous Planning Projects

Previous planning projects were reviewed to assess earlier recommendations for the project site. These planning projects include the following:

- Crosswalk and Pathway Treatment Guidelines for the Emerald Necklace Parks (2012);
- Parkways Preservation Treatment Guidelines (2006);
- “Gateway to the Arborway” Landscape Treatment Plans (2008);
- Arborway Master Plan (2004); and
- Emerald Necklace Master Plan (2001).

These previous planning projects were considered in the development of alternative and preferred recommendations. These guidelines and earlier recommendations are summarized below.

Crosswalk and Pathway Treatment Guidelines for the Emerald Necklace Parks

The Crosswalk and Pathway Treatment Guidelines provided the following recommendations for the crossing of the Arborway at the Arboretum:

- Consider raised crosswalk at Upper Arborway/Arborway Crossing;
- Upgrade crosswalks and install park identification signage according to design guidelines and details;
- Upgrade the path along the Arboretum to a 10 foot wide shared-use path with pathway signage;
- Maintain and repair as needed the concrete sidewalk along residential neighborhood; and

Arborway Master Plan

The Arborway Master Plan recommended the following for the crossing of the Arborway at the Arboretum:

- Signalizing the Upper Arborway is not recommended. If the crossing were signalized there are two alternatives for signal timing:
 - Allow pedestrians to cross the entire corridor (approximately 110 feet) in a single phase; this may reduce compliance for the signal due to excessive delay for motorists (approximately 35 seconds); or
 - Install a second pedestrian signal for the Upper Arborway only, and require pedestrian to press two pushbuttons; this may increase confusion about the crossing due to expectations to cross the entire corridor in one phase. Additionally, due to low traffic volumes on the Upper Arborway, pedestrian will likely find gaps and may not activate the signal or wait for the light to change;
- Leave the Upper Arborway unsignalized, but provide pedestrians and motorists better notice about the crossing by installation signs in the wide median between the Arborway Northbound and Upper Arborway in each direction to notify pedestrian about the upcoming crossing;; and
- Install a raised crosswalk and enhanced pavement markings to make the crossing more visible to drivers.

Gateway to the Arborway

The Gateway to the Arborway recommended the following for the crossing of the Arborway at the Arboretum:

- Install a 12 foot wide multiuse path along the west side of the Arborway;
- Remove the existing chain-link fence at the Arboretum crosswalk and replace with a black steel picket fence;
- Plant low shrub plantings and street trees;
- Install a new sidewalk for the Arborway Hillside, along the east side of the Arborway; and

Of the plans proposed in the Gateway to the Arborway, the concrete sidewalk along the Arboretum was repaved and a new steel picket fence was implemented.

Emerald Necklace Master Plan (1989, updated 2001)

The Emerald Necklace Master Plan Update does not have specific recommendations for this crossing of the Arborway at the Arboretum. It does recommend the Arborway from Kelly Circle to Murray Circle be resurfaced, to install new crosswalks and historic pendent light standards, and blocks of formalized parkway trees.

Guidelines and Best Practices Review

To determine potential recommendations, TDG reviewed the latest national, state, and local guidelines and best practices to develop recommendations for the project site including:

- Manual on Uniform Traffic Control Devices (MUTCD), (2009);
- American Associates of State and Highway Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets (Green Book), (2004);
- AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities (2004);
- AASHTO Guide for the Development of Bicycle Facilities (2012);
- Institute of Transportation Engineers (ITE) and Congress for New Urbanism's (CNU) Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (2010);
- National Associate of City Transportation Officials (NACTO) Urban Street Design Guide (2013);
- NACTO Urban Bikeway Design Guide (2012);
- Federal Highway Administration (FHWA) Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE);
- FHWA Bicycle Countermeasure Selection System (BIKESAFE);
- City of Boulder, Pedestrian Crossing Treatment Installation Guidelines (2011);
- Massachusetts Department of Transportation (MassDOT) Project Development & Design Guide (2006); and
- City of Boston, Boston Complete Streets (2013).

Considered Treatments

Based on stakeholder input, the existing conditions analysis, review of previous planning projects, and best practices and guidelines below is a compilation of all of the considered improvements and treatments for the crossing:

- Pavement Markings
 - High visibility crosswalk
 - Yield lines
 - Zig-zag markings
- Signs
 - Warning signs
 - In-Street Pedestrian Crossing sign
- Traffic Control
 - Signalize
 - Stop control
 - Pedestrian beacon
 - Rapid flash beacon
- Sight Distance
 - Adjust fence
 - Relocate crossing
- Geometric
 - ADA compliance
 - Modify median
- Traffic Calming
 - Curb extension
 - Raised crosswalk
 - Speed tables
 - Rumble strips
 - Chicane parking
 - In pavement lights
 - Speed enforcement
- Other
 - Drainage
 - Lighting

Traffic Control Warrant Analysis

After compiling the list of potential treatments, TDG conducted analyses to determine if the midblock crosswalk warranted a traffic control device, and if so, which type. Federal warrants established in the MUTCD and national best practices were used for the analyses. For this location, three potential traffic control devices were evaluated: a traffic signal, a pedestrian hybrid beacon, and a rectangular rapid flash beacon.

Traffic Signal Analysis

As a traffic signal yields the highest rate of compliance, the location was reviewed to determine if a traffic signal was an acceptable control at this location. Warrants found in the MUTCD define the minimum conditions under which installing traffic control signals may be justified; these warrants are established to maintain effectiveness of traffic signals. The analysis used for this location is based on the highest pedestrian and vehicle volumes per hour, 77 and 127 respectively, collected during the existing conditions analysis, to evaluate if a traffic signal is warranted. Based on the user volumes, a traffic control signal is not warranted at this location. The warrant analysis used from the MUTCD is found in **Figure 9** below.

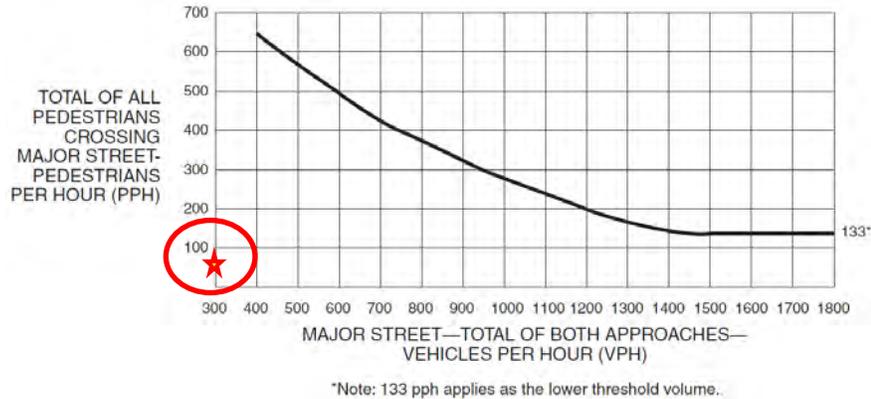


Figure 9: Pedestrian Peak Hour Warrant 4, MUTCD

Pedestrian Hybrid Beacon Analysis

A pedestrian hybrid beacon may be considered at a location that does not meet traffic signal warrants. A pedestrian hybrid beacon is a type of hybrid beacon used to warn and control traffic at an unsignalized location with a marked crosswalk, shown in **Figure 10**. The hybrid beacon is an on-demand pedestrian beacon that can be activated through a pushbutton or automatic detection, and is typically mast-arm mounted. When activated, the hybrid beacon begins with a flashing yellow phase, progresses to a steady yellow phase, and then a steady red phase during the pedestrian WALK interval. The red phase requires motorists to stop.



Figure 10: Photograph of Pedestrian Hybrid Beacon, Toole Design Group

Similar to the traffic signal analysis, the analysis for pedestrian hybrid beacon installation is based on the highest pedestrian and vehicle volumes per hour, 77 and 127 respectively. Based on the user volumes, a pedestrian hybrid beacon is not warranted at this location. The warrant analysis used from the MUTCD is found in **Figure 11** below.

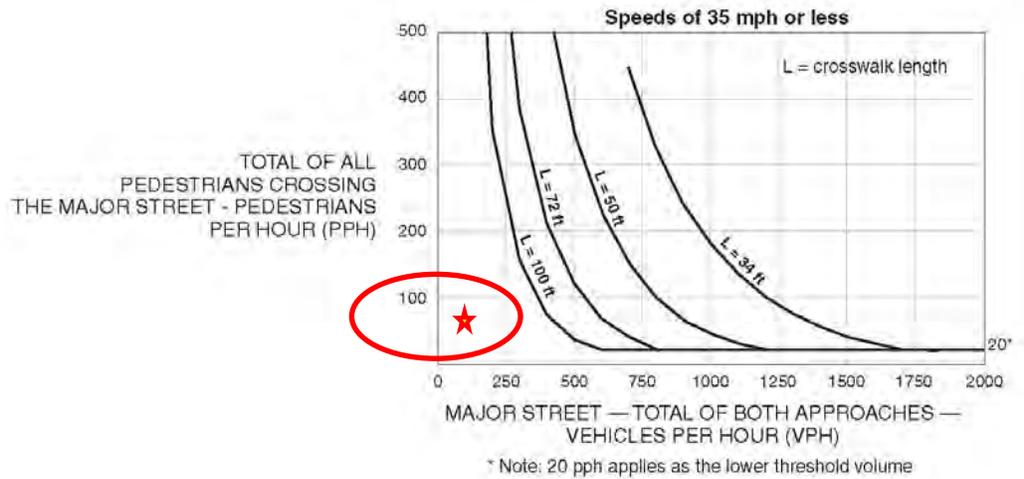


Figure 11: Guidelines for the Installation of Pedestrian Hybrid Beacons on Low Speed Roadways, MUTCD

Rectangular Rapid Flash Beacon Analysis

Another potential treatment analyzed for this location is a rectangular rapid flash beacon (RRFB). The RRFB is a warning sign equipped with an on-demand rapid-flashing pedestrian beacon, as shown in **Figure 12**. The RRFB can be activated through a pushbutton or automatic detection. The RRFB is typically solar-powered and post-mounted and has shown a high rate of yielding compliance by motorists.



Figure 12: Photograph of Rectangular Rapid Flash Beacon, Michael Frederick, Pedestrian and Bicycle Information Center Image Library

The RRFB currently has interim approval by FHWA and the Commonwealth of Massachusetts. The interim approval allows the use of an RRFB only to supplement pedestrian warning signs located adjacent to a marked crosswalk, and shall not be used for crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.

National guidelines and best practices were used to analyze if an RRFB would be an acceptable control at this locations. The City of Boulder’s Pedestrian Crossing Treatment Installation Guidelines (2011) guidance for the installation of RRFBs based on user volumes was used for this study. Based on the latest research, a RRFB is warranted at this location. The analysis is found in **Figure 13** below.

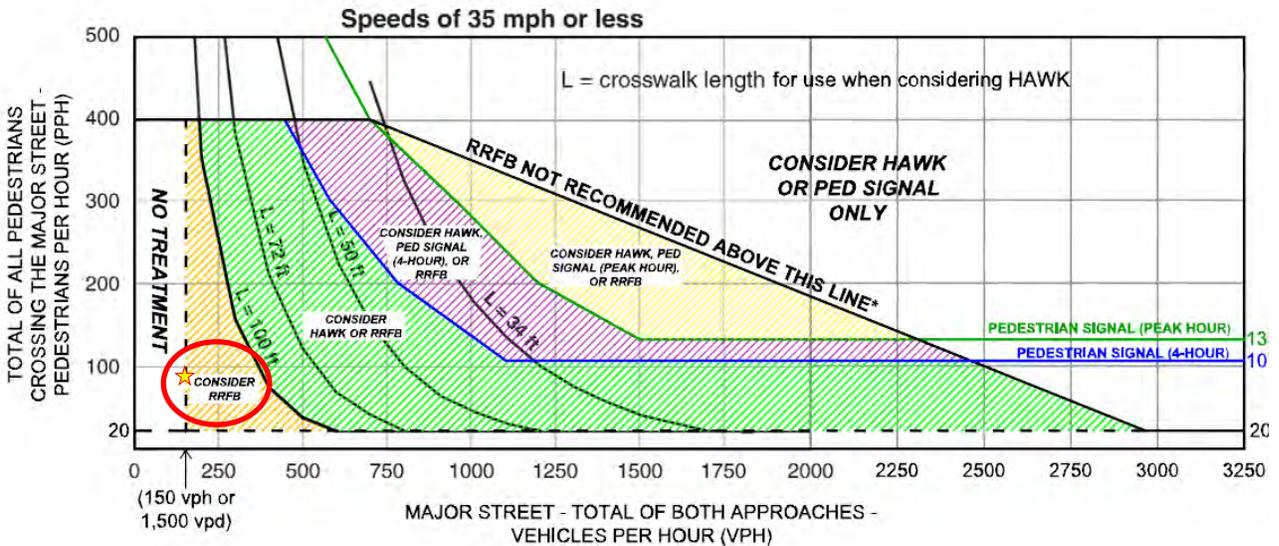


Figure 13: Guidelines for the Installation of Pedestrian Hybrid (HAWK) Beacons, Pedestrian Signal, or Rectangular Rapid Flash Beacon (RRFB) Signs on Low-Speed Roadways, City of Boulder

Recommendations Development

The goals and key findings from the existing conditions report were used to develop the objectives used to assess the alternative treatments and recommendations. The objectives are listed below:

- Improve yielding compliance between users;
- Improve visibility between users;
- Indicate clearly any change in control, if applicable;
- Provide behavior indications to all users;
- Reduce crossing distance;
- Reduce vehicular speeds on Upper Arborway; and
- Feasibility of installation, short and long term implementation strategies, and costs.

Using the improvements methodology discussed previously, the goals, key findings, and objectives of the project, TDG developed a three tiered approach for implementing recommendations. Evaluation was recommended between each tier to access the

effectiveness of treatments and to determine additional treatments were necessary to meet the goals and objectives of the project. Based on stakeholder feedback from the public meeting, summarized later in this report, the tiered approach was consolidated into short term and long term recommendations.

Design recommendations were developed following federal, state, and local guidelines and standards. The recommendations were developed using aerials with field verifications. No drainage or right-of-way assessments were conducted as part of this project.

Short Term Recommendations

The short term recommendations, shown in **Figure 14**, involve maintenance of pavement markings, signals, and signs. The short term recommendations include:

- Reinstall the pavement markings on the Upper Arborway and Arborway Southbound;
- Upgrade the crosswalk pavement markings on the Arborway Southbound and Northbound to ladder style;
- Upgrade the traffic signal to meet current MUTCD standards including pedestrian countdown signals, audible and tactile warnings, and adjusting signal timings;
- Remove the existing pedestrian warning signs for the Arborway Southbound and Northbound as they are not recommended for signalized approaches;
- Restrict parking at the approach to the crosswalk on the Arborway Southbound adjacent to the Arboretum gate to increase visibility;
- Upgrade and widen (min. 10 foot opening) curb ramps to meet current ADA guidelines. Angle the cut-through at the median between the Upper Arborway and Arborway Southbound to angle pedestrians to look at oncoming vehicles;
- Install In-Street Pedestrian Crossing sign to improve yielding compliance; and
- Adjust the fence to provide a minimum 200 foot sight distance, with a 10 foot horizontal clear line of sight in both directions on the western side of the Upper Arborway. Based on preliminary review, the fence will need to be relocated approximately 200' to the north and 125' to the south.

For any proposed fence adjustments, further analysis is necessary to determine the location of existing underground utilities. If relocation is not feasible, consideration should be given to tapering the fence height at the approach to the crossing to increase visibility between users.

An opinion of probable costs was prepared for the short term improvements and is shown in **Table 2**.

Conceptual Design Opinion of Probable Construction				
Short Term Recommendations			Prepared By:	JLM
			Checked By:	MLD
			Date:	8/29/2014
DESCRIPTION	QTY	UNIT	UNIT PRICE	AMOUNT
Pavement Milling & Overlay	2500	SY	\$24.44	\$61,100
Pavement Markings Symbols	30	SF	\$2.00	\$60
Pavement Markings for Stop Lines and Crosswalks	215	FT	\$2.00	\$430
Pavement Markings Lane Lines	1950	FT	\$1.00	\$1,950
In-Street Sign	2	EA	\$300.00	\$600
Traffic Signs Removed and Stacked	2	EA	\$50.00	\$100
Traffic Signs & Posts	3	EA	\$165.00	\$495
Traffic Signal Modifications	1	LS	\$7,000.00	\$7,000
Fence Removed and Reset	325	LF	\$50.00	\$16,250
Erosion Control	1	LS	\$5,000.00	\$5,000
Utility Adjustments	1	LS	\$5,871.00	\$5,871
Traffic Controls	1	LS	\$19,920.00	\$19,920
Police Details/Flagger	40	MD	\$360.00	\$14,400
Project Start-Up	1	LS	\$3,563.28	\$3,563

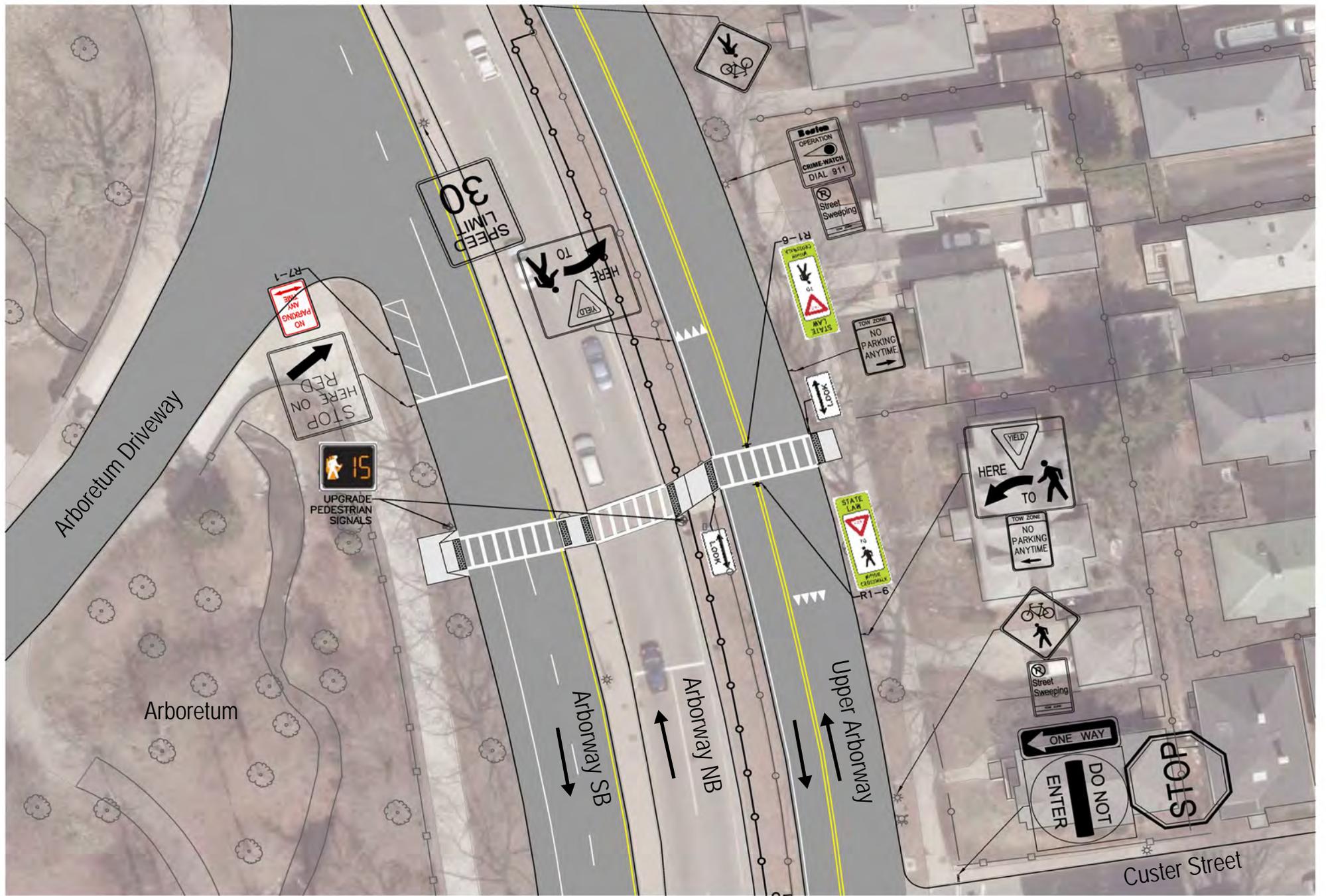
SUBTOTAL = \$136,739

25% CONTINGENCY & CONSTRUCTION ENGINEERING = \$34,185

TOTAL COST = \$170,924

SY - Square Yard LS - Lump Sum
 SF - Square Feet LF - Linear Foot
 MD - Month Days FT - Foot
 EA - Each

Table 2: Conceptual Design Opinion of Probable Construction: Short Term Recommendations



Not to Scale

Figure 14: Short Term Recommendations

Long Term Recommendations

Long term recommendations, shown in **Figure 15**, involve geometric modifications and include the following:

- Install a curb extension on the western side of the Upper Arborway to create a chicane to slow vehicular traffic and provide additional queuing space in the median;
- Install pavement markings to alert users of the chicane, including solid white edge lines and hatching to deflect users from hitting the curb extension and realigning the double yellow center line and yield lines;
- Remove and reinstall no parking signs on the eastern side of Upper Arborway to restrict approximately one parking space to provide adequate transition lengths for the curb extension /chicane;
- Remove the In-Street Pedestrian Crossing sign;
- Install a raised crosswalk across the Upper Arborway and adjust drainage as needed;
- Install Rectangular Rapid Flash Beacons for the Upper Arborway; and
- Provide pushbutton activation signage with custom pedestrian “Look” signs on both sides of the Upper Arborway.

Additional long term recommendations include lowering the speed limit on the Upper Arborway. In order to lower the speed limit, it is recommended geometric alterations such as raised crossing, speed tables, and/or curb extensions be installed. The target speed should be used for geometric changes in order to reinforce the speed limit through the design and construction of the roadway. Speed enforcement strategies should also be considered. Lowering the speed limit through geometric alternations and/or enforcement efforts may also help to reduce cut-through traffic along the Upper Arborway.

Additional analysis should be conducted to determine if pedestrian scale lighting is warranted to improve safety at this crossing.

An opinion of probable costs was prepared for the long term improvements and is shown in **Table 3**.

Conceptual Design Opinion of Probable Construction				
Long Term Recommendations			Prepared By:	JLM
			Checked By:	MLD
			Date:	11/19/2014
DESCRIPTION	QTY	UNIT	UNIT PRICE	AMOUNT
Eradication	25	SY	\$1.00	\$25
Roadway Excavation	25	SY	\$46.00	\$1,150
Raised Intersection	65	SY	\$37.67	\$2,448
ADA Ramps	5	EA	\$3,500.00	\$17,500
Curbing	50	FT	\$52.62	\$2,631
Rectangular Rapid Flash Beacon	1	LS	\$30,000.00	\$30,000
Drainage Modifications	1	LS	\$39,818.33	\$39,818
Pavement Markings Symbols	50	SF	\$2.00	\$100
Pavement Markings for Stop Lines and Crosswalks	100	FT	\$2.00	\$200
Pavement Markings Lane Lines	550	FT	\$1.00	\$550
Erosion Control	1	LS	\$5,000.00	\$5,000
Traffic Signs Remove and Relocate	4	LS	\$150.00	\$600
Traffic Signs and Posts	5	EA	\$165.00	\$825
Loam & Seed	20	SY	\$6.44	\$129
Traffic Controls	1	LS	\$28,720.00	\$28,720
Police Details/Flagger	80	MD	\$360.00	\$28,800
Project Start-Up	1	LS	\$4,754.90	\$4,755

SUBTOTAL = \$163,252

25% CONTINGENCY & CONSTRUCTION ENGINEERING = \$40,813

TOTAL COST = \$204,064

SY - Square Yard LS - Lump Sum
 SF - Square Feet LF - Linear Foot
 MD - Month Days FT - Foot
 EA - Each

**Table 3: Conceptual Design Opinion of Probable Construction:
 Long Term Recommendations**

May 5th Arborway Public Meeting

To gather feedback for the recommendations for this project, a public meeting was held on May 5, 2014. A presentation was given by DCR, the Arborway Coalition, and TDG presenting the proposed recommendations for the project. The presentation proposed a three tiered approach with evaluation to access the effectiveness of the treatments in between each tier. The tiers are listed below:

- Tier 1 involved upgrading the traffic signal, pavement markings and signage to meet current standards; relocating the fence to improve visibility; and installing in-street yield to pedestrian signs.
- Tier 2 involved installing a Rectangular Rapid Flash Beacon.
- Tier 3 involved upgrading all curb ramps to meet ADA compliance and installing a curb extension and raised crosswalk.

*Note: Based on comments from the public meeting, the tiered approach was revised to combine different treatments for short term and long term recommendations.

Following the presentation, a discussion and question and answer period followed. Below is a summary of the discussion, with answers by the client and consultant team in italics:

- Fence and Pedestrian Queue Space between Upper Arborway and Arborway Northbound
 - When installed, the fence location was restricted due to utilities. It was suggested to not hold up the project due to utility issues and to consider removing the fence instead or relocating it.
 - There are concerns about narrow median strip between Arborway and Upper Arborway. There is not enough room for pedestrians to queue between the Arborway and Upper Arborway, especially with bicyclists using the crossing. It was recommended to widen the queue space and potentially remove the fence.
 - *The fence was installed to restrict vehicles from crossing the median and direct pedestrians to use the crosswalk.*
- Signalization of Upper Arborway
 - People do not realize Upper Arborway is not signalized. Should it be treated as a single road and signalized for the entire length?
 - *Based on warrants in the MUTCD the crossing does not warrant a signal. It is not recommended to signalize the entire crossing as it may decrease compliance and increase delay for motorists.*
 - There should be signs to warn pedestrians of the change in operations from signalized to unsignalized.

- Residents regularly do not observe pedestrians looking for vehicles in both directions at the approach to the Upper Arborway from the Arboretum.
- What is the effectiveness for RRFB?
 - Resident noted the Longwood installation is very visible and effective.
- Speed limit
 - 30 mph is too high. There needs to be traffic calming on whole corridor.
 - Rumble strips or pavement markings such as stop bars were suggested to reduce speeds.
 - Pond Avenue in Brookline was sighted as a good example for the use of optical speed bars.
- Consider connections to the other projects within the area including the Casey Arborway project.
- Curb Ramps
 - Residents desire wider ramps at the crossing.
 - Ramps should be added to Tier 1
- Additional recommendations by attendees include:
 - There should be education for drivers and cyclists.
 - Attendees expressed a desire for enforcement of speed limits by state police for Upper Arborway.
 - Increase width of median.
 - Install the curb extension on inside of the curve.
 - *There would be parking impacts.*
 - There may be potential impact to traffic volumes on Upper Arborway and Arborway due to the Casey Arborway project.
 - There is support for bike lanes on the Arborway.
- Why aren't there ladder style crosswalks on Arborway?
 - *To reinforce the change in control, it is recommended to maintain the transverse crosswalk markings for the signalized portion of the crossing on the Arborway Northbound and Southbound.*

*Note: It was determined during the development of final recommendations that ladder style crosswalks are the preferred crosswalk style for the entire crossing.

- Can the RRFB be coordinated with the signal?
 - *Most likely not; the RRFBs tend to be solar powered and not connected to the existing grid and traffic system.*

The meeting agenda and written comments received via email are provided in **Appendix C**.

Next Steps

The next steps for improving the midblock crossing at the northern gate to the Arboretum require identifying funding for implementation. Short term recommendations should be installed using existing contractors and contracts for maintenance items. The implementation of short term recommendations will also require locating the existing underground utilities to assess the feasibility of relocating the fence.

The long term recommendations will require survey for construction. Additional traffic calming measures should be investigated along the Upper Arborway in order to lower the speed limit. It is recommended to conduct a before and after study to evaluate the effectiveness of the short term recommendations and assess if the long term recommendations are necessary to achieve the goals and objectives of the project.

Appendix A: Traffic Data

Arborway Carriage Road
north of Custer Street
City, State: Boston, MA
Client: Toole Design Group / M. Danilla



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

133500 C Class
Site Code: 6033
Date Start: 11-Sep-13

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
09/11/1														
3	0	5	2	0	0	0	0	0	0	0	0	0	0	7
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	3	3	0	0	0	0	0	0	0	0	0	0	6
06:00	0	7	0	0	0	0	0	0	0	0	0	0	0	7
07:00	0	32	8	0	1	1	0	0	0	0	0	0	0	42
08:00	0	51	4	1	3	0	0	0	0	0	0	0	0	59
09:00	1	29	9	0	2	0	0	0	0	0	0	0	0	41
10:00	1	29	3	0	0	0	0	0	0	0	0	0	0	33
11:00	2	34	2	0	1	0	0	0	0	0	0	0	0	39
12 PM	0	27	7	0	0	0	0	2	0	0	0	0	0	36
13:00	1	32	6	0	1	0	0	0	0	0	0	0	0	40
14:00	1	30	8	1	1	0	0	0	0	0	0	0	0	41
15:00	3	83	15	0	2	1	0	0	0	0	0	0	0	104
16:00	6	173	14	1	6	0	0	0	0	0	0	0	0	200
17:00	3	204	19	0	1	0	0	0	0	0	0	0	0	227
18:00	6	98	11	0	0	0	0	0	0	0	0	0	0	115
19:00	3	58	2	0	1	0	0	0	0	0	0	0	0	64
20:00	3	34	0	0	0	0	0	0	0	0	0	0	0	37
21:00	1	32	1	0	0	0	0	0	0	0	0	0	0	34
22:00	3	22	2	0	0	0	0	0	0	0	0	0	0	27
23:00	0	14	1	0	0	0	0	0	0	0	0	0	0	15
Total	34	1001	117	3	19	2	0	2	0	0	0	0	0	1178
Percent	2.9%	85.0%	9.9%	0.3%	1.6%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	11:00	08:00	09:00	08:00	08:00	07:00								08:00
Vol.	2	51	9	1	3	1								59
PM Peak	16:00	17:00	17:00	14:00	16:00	15:00		12:00						17:00
Vol.	6	204	19	1	6	1		2						227

Arborway Carriage Road
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09/12/1														
3	0	4	2	0	0	0	0	0	0	0	0	0	0	6
01:00	0	1	1	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	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	6	2	0	0	0	0	0	0	0	0	0	0	8
06:00	0	9	2	0	1	0	0	0	0	0	0	0	0	12
07:00	0	32	5	0	1	0	0	0	0	0	0	0	0	38
08:00	1	40	2	1	0	0	0	0	0	0	0	0	0	44
09:00	0	26	7	0	0	0	0	0	0	0	0	0	0	33
10:00	0	22	6	0	0	0	0	0	0	0	0	0	0	28
11:00	1	27	4	0	1	0	0	0	0	0	0	0	0	33
12 PM	1	19	5	0	0	0	0	0	0	0	0	0	0	25
13:00	0	38	6	0	0	0	0	0	0	0	0	0	0	44
14:00	1	40	9	0	0	0	0	0	0	0	0	0	0	50
15:00	1	75	17	0	3	0	0	0	0	0	0	0	0	96
16:00	11	126	20	1	2	0	0	0	0	0	0	0	0	160
17:00	4	139	17	0	1	0	0	0	0	0	0	0	0	161
18:00	5	87	8	0	0	1	0	1	0	0	0	0	0	102
19:00	3	58	2	0	0	0	0	0	0	0	0	0	0	63
20:00	4	57	0	0	0	0	0	1	0	0	0	0	0	62
21:00	1	28	0	0	0	0	0	0	0	0	0	0	0	29
22:00	1	17	3	0	0	0	0	0	0	0	0	0	0	21
23:00	1	5	2	0	0	0	0	0	0	0	0	0	0	8
Total	35	857	120	2	9	1	0	2	0	0	0	0	0	1026
Percent	3.4%	83.5%	11.7%	0.2%	0.9%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	09:00	08:00	06:00									08:00
Vol.	1	40	7	1	1									44
PM Peak	16:00	17:00	16:00	16:00	15:00	18:00		18:00						17:00
Vol.	11	139	20	1	3	1		1						161
Total		1858	237	5	28	3	0	4	0	0	0	0	0	2204

Arborway Carriage Road
north of Custer Street
City, State: Boston, MA
Client: Toole Design Group / M. Danilla



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09/11/1														
3	0	6	2	0	0	1	0	0	0	0	0	0	0	9
01:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
05:00	0	21	4	0	2	0	0	0	0	0	0	0	0	27
06:00	4	80	30	0	3	0	0	0	0	0	0	0	0	117
07:00	1	148	50	2	11	0	0	0	0	0	0	0	0	212
08:00	3	132	56	1	4	0	0	1	0	0	0	0	0	197
09:00	1	74	33	0	13	0	0	2	0	0	0	0	0	123
10:00	1	65	15	0	1	1	0	0	0	0	0	0	0	83
11:00	0	64	7	2	2	0	0	0	0	0	0	0	0	75
12 PM	1	54	10	1	4	0	0	0	0	0	1	0	0	71
13:00	0	47	9	1	1	0	0	0	0	0	0	0	0	58
14:00	0	61	15	1	3	1	0	0	0	0	0	0	0	81
15:00	0	45	12	2	3	0	0	0	0	0	0	0	0	62
16:00	0	62	15	0	2	0	0	0	0	0	0	0	0	79
17:00	0	67	7	0	1	0	0	0	0	0	0	0	0	75
18:00	1	65	9	0	0	0	0	0	0	0	0	0	0	75
19:00	0	48	1	0	0	0	0	0	0	0	0	0	0	49
20:00	1	31	3	0	0	0	0	0	0	0	0	0	0	35
21:00	2	37	4	0	0	0	0	0	0	0	0	0	0	43
22:00	0	22	1	0	0	0	0	0	0	0	0	0	0	23
23:00	0	12	2	0	0	0	0	0	0	0	0	0	0	14
Total	15	1148	287	10	50	3	0	3	0	0	1	0	0	1517
Percent	1.0%	75.7%	18.9%	0.7%	3.3%	0.2%	0.0%	0.2%	0.0%	0.0%	0.1%	0.0%	0.0%	
AM Peak	06:00	07:00	08:00	07:00	09:00	00:00		09:00						07:00
Vol.	4	148	56	2	13	1		2						212
PM Peak	21:00	17:00	14:00	15:00	12:00	14:00					12:00			14:00
Vol.	2	67	15	2	4	1					1			81

Arborway Carriage Road
north of Custer Street
City, State: Boston, MA
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Email: datarequests@pdillc.com

133500 C Class
Site Code: 6033
Date Start: 11-Sep-13

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
09/12/1														
3	0	4	0	0	0	0	0	0	0	0	0	0	0	4
01:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
05:00	0	17	2	0	0	0	0	0	0	0	0	0	0	19
06:00	2	81	21	0	4	0	0	0	0	0	0	0	0	108
07:00	1	161	32	3	9	0	0	0	0	0	0	0	0	206
08:00	4	127	37	2	9	0	0	2	0	0	0	0	0	181
09:00	0	97	18	0	7	0	0	0	0	0	0	0	0	122
10:00	0	66	13	1	4	0	0	0	0	0	0	0	0	84
11:00	2	58	13	1	5	1	0	1	0	0	0	0	0	81
12 PM	2	64	19	1	1	0	0	0	0	0	0	0	0	87
13:00	0	50	14	2	6	0	0	1	0	0	0	0	0	73
14:00	0	69	13	0	4	0	0	0	0	0	0	0	0	86
15:00	3	48	14	1	2	0	0	0	0	0	0	0	0	68
16:00	1	63	19	0	2	0	0	0	0	0	0	0	0	85
17:00	0	71	9	0	0	1	0	0	0	0	0	0	0	81
18:00	2	92	17	0	2	2	0	0	0	0	0	0	0	115
19:00	0	66	11	0	0	0	0	0	0	0	0	0	0	77
20:00	0	31	3	0	0	1	0	0	0	0	0	0	0	35
21:00	0	21	4	0	0	0	0	0	0	0	0	0	0	25
22:00	0	17	2	0	0	0	0	0	0	0	0	0	0	19
23:00	0	11	2	0	0	0	0	0	0	0	0	0	0	13
Total	17	1224	265	11	55	5	0	4	0	0	0	0	0	1581
Percent	1.1%	77.4%	16.8%	0.7%	3.5%	0.3%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	07:00	08:00	07:00	07:00	11:00		08:00						07:00
Vol.	4	161	37	3	9	1		2						206
PM Peak	15:00	18:00	12:00	13:00	13:00	18:00		13:00						18:00
Vol.	3	92	19	2	6	2		1						115
Total		2372	552	21	105	8	0	7	0	0	1	0	0	3098

Arborway Carriage Road
north of Custer Street
City, State: Boston, MA
Client: Toole Design Group / M. Danilla



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133500 C Speed
Site Code: 6033
Date Start: 11-Sep-13

SB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
09/11/13	1	0	1	3	2	0	0	0	0	0	0	0	0	7	31	23
01:00	0	0	2	0	0	0	0	0	0	0	0	0	0	2	23	22
02:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18	15
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	0	0	2	2	2	0	0	0	0	0	0	0	6	36	32
06:00	1	0	0	3	3	0	0	0	0	0	0	0	0	7	32	25
07:00	0	0	4	22	15	1	0	0	0	0	0	0	0	42	32	29
08:00	0	4	12	23	16	3	1	0	0	0	0	0	0	59	32	27
09:00	5	1	9	11	12	3	0	0	0	0	0	0	0	41	32	24
10:00	3	3	9	11	5	2	0	0	0	0	0	0	0	33	30	23
11:00	1	0	6	24	8	0	0	0	0	0	0	0	0	39	30	26
12 PM	0	1	5	20	9	1	0	0	0	0	0	0	0	36	31	27
13:00	0	1	6	12	15	6	0	0	0	0	0	0	0	40	34	29
14:00	0	2	5	15	14	4	1	0	0	0	0	0	0	41	33	29
15:00	1	5	5	34	35	17	7	0	0	0	0	0	0	104	36	30
16:00	5	7	41	52	81	14	0	0	0	0	0	0	0	200	33	27
17:00	8	17	32	63	71	34	2	0	0	0	0	0	0	227	34	27
18:00	5	8	17	47	32	6	1	0	0	0	0	0	0	116	32	26
19:00	1	5	14	32	11	1	0	0	0	0	0	0	0	64	30	25
20:00	1	2	16	15	3	0	0	0	0	0	0	0	0	37	28	24
21:00	1	0	12	12	6	3	0	0	0	0	0	0	0	34	32	26
22:00	0	3	5	15	4	0	0	0	0	0	0	0	0	27	29	25
23:00	0	1	5	5	4	0	0	0	0	0	0	0	0	15	31	26

%	2.8%	5.2%	17.5%	35.7%	29.6%	8.2%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
AM Peak Vol.	5	4	12	24	16	3	1								59	
PM Peak Vol.	8	17	41	63	81	34	7								227	
Total	33	61	206	421	349	97	12	0	0	0	0	0	0	0	1179	712

Percent
15th Percentile : 19 MPH
50th Percentile : 27 MPH
85th Percentile : 33 MPH
95th Percentile : 36 MPH

Stats
10 MPH Pace Speed : 24-33 MPH
Number in Pace : 691
Percent in Pace : 58.6%
Number of Vehicles > 30 MPH : 350
Percent of Vehicles > 30 MPH : 29.7%
Mean Speed(Average) : 27 MPH

Arborway Carriage Road
north of Custer Street
City, State: Boston, MA
Client: Toole Design Group / M. Danilla



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133500 C Speed
Site Code: 6033
Date Start: 11-Sep-13

SB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th %ile	Ave Speed
09/12/13	14	19	24	29	34	39	44	49	54	59	64	69	9999			
01:00	0	1	1	2	1	0	1	0	0	0	0	0	0	6	37	27
02:00	0	0	0	2	0	0	0	0	0	0	0	0	0	2	28	27
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	23	22
05:00	0	0	3	1	4	0	0	0	0	0	0	0	0	8	32	28
06:00	0	0	3	6	2	1	0	0	0	0	0	0	0	12	31	27
07:00	3	2	6	8	16	1	2	0	0	0	0	0	0	38	33	26
08:00	3	3	2	22	14	0	0	0	0	0	0	0	0	44	31	25
09:00	1	1	4	16	9	2	0	0	0	0	0	0	0	33	32	27
10:00	0	0	5	12	11	0	0	0	0	0	0	0	0	28	32	28
11:00	1	3	9	10	9	1	0	0	0	0	0	0	0	33	31	25
12 PM	0	1	5	13	5	1	0	0	0	0	0	0	0	25	31	27
13:00	2	2	6	17	14	3	0	0	0	0	0	0	0	44	32	26
14:00	1	2	8	18	18	3	0	0	0	0	0	0	0	50	32	27
15:00	0	1	10	34	36	10	5	0	0	0	0	0	0	96	34	30
16:00	7	11	22	47	58	14	1	0	0	0	0	0	0	160	33	27
17:00	3	9	27	58	45	19	0	0	0	0	0	0	0	161	33	27
18:00	10	8	22	37	23	0	2	0	0	0	0	0	0	102	30	23
19:00	3	2	15	31	11	1	0	0	0	0	0	0	0	63	30	25
20:00	2	6	20	22	9	3	0	0	0	0	0	0	0	62	30	24
21:00	0	4	7	14	3	1	0	0	0	0	0	0	0	29	29	24
22:00	1	1	2	9	8	0	0	0	0	0	0	0	0	21	31	26
23:00	1	0	1	3	3	0	0	0	0	0	0	0	0	8	31	24

%	3.7%	5.6%	17.4%	37.2%	29.1%	5.8%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
AM Peak	07:00	08:00	11:00	08:00	07:00	09:00	07:00								08:00	
Vol.	3	3	9	22	16	2	2								44	
PM Peak	18:00	16:00	17:00	17:00	16:00	17:00	15:00								17:00	
Vol.	10	11	27	58	58	19	5								161	
Total	38	57	179	382	299	60	11	0	0	0	0	0	0	1026	686	

Percent
15th Percentile : 18 MPH
50th Percentile : 26 MPH
85th Percentile : 32 MPH
95th Percentile : 35 MPH

Stats
10 MPH Pace Speed : 24-33 MPH
Number in Pace : 607
Percent in Pace : 59.2%
Number of Vehicles > 30 MPH : 274
Percent of Vehicles > 30 MPH : 26.7%
Mean Speed(Average) : 26 MPH

Arborway Carriage Road
north of Custer Street
City, State: Boston, MA
Client: Toole Design Group / M. Danilla



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133500 C Speed
Site Code: 6033
Date Start: 11-Sep-13

NB	Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
		14	19	24	29	34	39	44	49	54	59	64	69	9999			
09/11/																	
13	0	1	2	4	2	0	0	0	0	0	0	0	0	0	9	30	25
01:00	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3	31	27
02:00	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2	22	18
03:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	23	22
04:00	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3	31	29
05:00	0	1	6	8	9	2	1	0	0	0	0	0	0	0	27	33	28
06:00	2	0	16	26	37	22	12	2	0	0	0	0	0	0	117	38	31
07:00	7	6	33	76	59	25	4	2	0	0	0	0	0	0	212	34	28
08:00	4	10	40	66	49	22	5	1	0	0	0	0	0	0	197	34	27
09:00	1	8	42	42	28	2	1	0	0	0	0	0	0	0	124	31	25
10:00	5	8	18	30	18	2	2	0	0	0	0	0	0	0	83	31	24
11:00	1	3	15	30	20	4	1	1	0	0	0	0	0	0	75	32	27
12 PM	0	3	9	26	24	5	3	1	0	0	0	0	0	0	71	34	29
13:00	0	0	10	22	16	8	1	1	0	0	0	0	0	0	58	35	29
14:00	0	2	15	38	18	8	0	0	0	0	0	0	0	0	81	32	28
15:00	0	2	8	23	24	4	1	0	0	0	0	0	0	0	62	33	29
16:00	1	3	12	36	21	5	2	0	0	0	0	0	0	0	80	32	27
17:00	2	1	20	30	19	2	1	0	0	0	0	0	0	0	75	31	26
18:00	2	2	19	31	15	4	2	0	0	0	0	0	0	0	75	32	26
19:00	0	4	15	22	7	1	0	0	0	0	0	0	0	0	49	29	25
20:00	0	3	11	13	6	2	0	0	0	0	0	0	0	0	35	31	25
21:00	2	5	10	22	2	2	0	0	0	0	0	0	0	0	43	28	23
22:00	1	1	5	11	5	0	0	0	0	0	0	0	0	0	23	30	25
23:00	1	2	6	1	2	1	1	0	0	0	0	0	0	0	14	33	23

%	1.9%	4.3%	20.7%	36.9%	25.2%	8.0%	2.4%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%		
AM Peak	07:00	08:00	09:00	07:00	07:00	07:00	06:00	06:00					07:00		
Vol.	7	10	42	76	59	25	12	2					212		
PM Peak	17:00	21:00	17:00	14:00	12:00	13:00	12:00	12:00					14:00		
Vol.	2	5	20	38	24	8	3	1					81		
Total	29	66	315	560	383	121	37	8	0	0	0	0	0	1519	750

Percent
15th Percentile : 20 MPH
50th Percentile : 26 MPH
85th Percentile : 33 MPH
95th Percentile : 37 MPH

Stats
10 MPH Pace Speed : 23-32 MPH
Number in Pace : 885
Percent in Pace : 58.3%
Number of Vehicles > 30 MPH : 438
Percent of Vehicles > 30 MPH : 28.9%
Mean Speed(Average) : 27 MPH

Arborway Carriage Road
north of Custer Street
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133500 C Speed
Site Code: 6033
Date Start: 11-Sep-13

NB

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
09/12/13	0	1	0	1	0	0	2	0	0	0	0	0	0	4	42	30
01:00	0	0	4	0	0	1	1	0	0	0	0	0	0	6	39	28
02:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
03:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	28	27
04:00	0	1	1	1	0	1	0	0	0	0	0	0	0	4	35	24
05:00	0	0	5	8	5	1	0	0	0	0	0	0	0	19	32	28
06:00	1	2	8	26	34	23	13	1	0	0	0	0	0	108	38	32
07:00	2	4	31	49	78	38	4	0	0	0	0	0	0	206	35	30
08:00	1	4	29	63	53	21	8	2	0	0	0	0	0	181	35	29
09:00	0	1	21	54	28	17	1	0	0	0	0	0	0	122	34	29
10:00	0	3	24	34	20	3	0	0	0	0	0	0	0	84	31	27
11:00	1	4	25	32	13	6	0	0	0	0	0	0	0	81	31	26
12 PM	0	4	27	26	21	9	0	0	0	0	0	0	0	87	33	27
13:00	0	5	21	27	15	5	0	0	0	0	0	0	0	73	31	26
14:00	1	1	14	38	26	5	1	0	0	0	0	0	0	86	32	28
15:00	2	1	14	30	16	5	0	0	0	0	0	0	0	68	32	27
16:00	0	3	15	39	22	5	1	0	0	0	0	0	0	85	32	28
17:00	0	6	15	38	15	5	2	0	0	0	0	0	0	81	32	27
18:00	5	5	39	37	25	4	0	0	0	0	0	0	0	115	31	25
19:00	2	2	22	28	20	3	0	0	0	0	0	0	0	77	31	26
20:00	0	3	11	15	5	1	0	0	0	0	0	0	0	35	29	25
21:00	0	1	7	15	2	0	0	0	0	0	0	0	0	25	28	25
22:00	0	4	4	9	2	0	0	0	0	0	0	0	0	19	28	23
23:00	1	0	2	7	0	3	0	0	0	0	0	0	0	13	35	26

%	1.0%	3.5%	21.4%	36.6%	25.4%	9.9%	2.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%		
AM Peak	07:00	07:00	07:00	08:00	07:00	07:00	06:00	08:00					07:00		
Vol.	2	4	31	63	78	38	13	2					206		
PM Peak	18:00	17:00	18:00	16:00	14:00	12:00	17:00						18:00		
Vol.	5	6	39	39	26	9	2						115		
Total	16	55	339	578	401	156	33	3	0	0	0	0	0	1581	787

Percent
15th Percentile : 20 MPH
50th Percentile : 27 MPH
85th Percentile : 33 MPH
95th Percentile : 37 MPH

Stats
10 MPH Pace Speed : 23-32 MPH
Number in Pace : 931
Percent in Pace : 58.9%
Number of Vehicles > 30 MPH : 483
Percent of Vehicles > 30 MPH : 30.6%
Mean Speed(Average) : 28 MPH

Arborway Carriage Road
north of Custer Street
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Client: Toole Design Group / M. Danilla



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133500 C Volume
Site Code: 6033
Date Start: 11-Sep-13

Start Time	SB		NB		Combin ed		11-Sep-13 Wed							
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.								
12:00	2	10	0	16	2	26								
12:15	1	8	3	25	4	33								
12:30	2	11	4	16	6	27								
12:45	2	7	7	36	2	9	14	71	4	16	21	107		
01:00	1	14	3	14	4	28								
01:15	0	11	0	20	0	31								
01:30	1	5	0	12	1	17								
01:45	0	2	10	40	0	3	12	58	0	5	22	98		
02:00	0	8	0	22	0	30								
02:15	1	8	0	25	1	33								
02:30	0	9	2	21	2	30								
02:45	0	1	16	41	0	2	13	81	0	3	29	122		
03:00	1	15	1	15	2	30								
03:15	0	22	0	11	0	33								
03:30	0	26	0	20	0	46								
03:45	0	1	41	104	0	1	16	62	0	2	57	166		
04:00	0	50	0	20	0	70								
04:15	0	41	2	23	2	64								
04:30	0	40	1	18	1	58								
04:45	0	0	69	200	0	3	19	80	0	3	88	280		
05:00	0	49	4	19	4	68								
05:15	2	61	3	10	5	71								
05:30	2	66	11	20	13	86								
05:45	2	6	51	227	9	27	26	75	11	33	77	302		
06:00	1	44	17	24	18	68								
06:15	1	25	15	17	16	42								
06:30	2	29	35	15	37	44								
06:45	3	7	18	116	50	117	19	75	53	124	37	191		
07:00	13	14	55	13	68	27								
07:15	8	22	58	16	66	38								
07:30	13	19	47	13	60	32								
07:45	8	42	9	64	52	212	7	49	60	254	16	113		
08:00	11	12	60	13	71	25								
08:15	12	10	49	5	61	15								
08:30	18	9	47	10	65	19								
08:45	18	59	6	37	41	197	7	35	59	256	13	72		
09:00	12	11	40	16	52	27								
09:15	8	9	28	8	36	17								
09:30	11	4	28	7	39	11								
09:45	10	41	10	34	28	124	12	43	38	165	22	77		
10:00	16	8	24	10	40	18								
10:15	3	14	20	2	23	16								
10:30	9	1	19	5	28	6								
10:45	5	33	4	27	20	83	6	23	25	116	10	50		
11:00	12	2	14	4	26	6								
11:15	5	0	19	2	24	2								
11:30	12	6	18	5	30	11								
11:45	10	39	7	15	24	75	3	14	34	114	10	29		
Total	238	941	853	666	1091	1607								
Percent	21.8%	58.6%	78.2%	41.4%										
Day Total		1179		1519		2698								
Peak Vol.	08:15	-	04:45	-	07:15	-	05:30	-	07:15	-	04:45	-	-	-
P.H.F.	0.833		0.888		0.904		0.837		0.905		0.889			

Arborway Carriage Road
north of Custer Street
City, State: Boston, MA
Client: Toole Design Group / M. Danilla



PRECISION
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INDUSTRIES, LLC

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

133500 C Volume
Site Code: 6033
Date Start: 11-Sep-13

Start Time	SB		NB		Combined		12-Sep-13 Thu								
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.									
12:00	2	9	1	21	3	30									
12:15	2	6	1	19	3	25									
12:30	0	7	2	26	2	33									
12:45	2	3	25	0	4	21	87	2	10	24	112				
01:00	0	8	2	11	2	19									
01:15	2	16	1	20	3	36									
01:30	0	8	3	25	3	33									
01:45	0	2	12	44	0	6	17	73	0	8	29	117			
02:00	0	9	1	19	1	28									
02:15	0	11	0	29	0	40									
02:30	0	13	0	22	0	35									
02:45	0	0	17	50	0	1	16	86	0	1	33	136			
03:00	0	15	0	11	0	26									
03:15	0	21	0	22	0	43									
03:30	0	26	1	21	1	47									
03:45	0	0	34	96	0	1	14	68	0	1	48	164			
04:00	0	33	0	24	0	57									
04:15	0	34	0	19	0	53									
04:30	0	43	1	19	1	62									
04:45	1	1	50	160	3	4	23	85	4	5	73	245			
05:00	1	42	3	18	4	60									
05:15	1	48	5	21	6	69									
05:30	2	32	5	21	7	53									
05:45	4	8	39	161	6	19	21	81	10	27	60	242			
06:00	1	44	12	32	13	76									
06:15	3	23	17	36	20	59									
06:30	1	15	31	29	32	44									
06:45	7	12	20	102	48	108	18	115	55	120	38	217			
07:00	4	19	56	27	60	46									
07:15	12	17	52	16	64	33									
07:30	10	20	57	16	67	36									
07:45	12	38	7	63	41	206	18	77	53	244	25	140			
08:00	8	14	50	10	58	24									
08:15	12	16	55	7	67	23									
08:30	11	16	32	8	43	24									
08:45	13	44	16	62	44	181	10	35	57	225	26	97			
09:00	9	7	27	8	36	15									
09:15	11	10	38	4	49	14									
09:30	5	4	25	5	30	9									
09:45	8	33	8	29	32	122	8	25	40	155	16	54			
10:00	8	9	23	4	31	13									
10:15	6	7	22	9	28	16									
10:30	5	4	17	3	22	7									
10:45	9	28	1	21	22	84	3	19	31	112	4	40			
11:00	10	4	19	3	29	7									
11:15	10	1	14	6	24	7									
11:30	5	0	22	0	27	0									
11:45	8	33	3	8	26	81	4	13	34	114	7	21			
Total	205	821	817	764	1022	1585									
Percent	20.1%	51.8%	79.9%	48.2%											
Day Total		1026		1581		2607									
Peak Vol.	08:15	-	04:30	-	06:45	-	05:45	-	06:45	-	04:30	-	-	-	
P.H.F.	0.865		0.915		0.934		0.819		0.918		0.246		0.264		0.904



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File Name : 133500 C
Site Code : 6033
Start Date : 9/12/2013
Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway (Route 203) From North				From East				Arborway (Route 203) From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
07:00 AM	0	236	0	0	0	0	0	0	0	355	0	0	0	0	0	0	0	591
07:15 AM	0	231	0	0	0	0	0	0	0	359	0	0	0	0	0	0	0	590
07:30 AM	0	293	0	0	0	0	0	0	0	379	0	0	0	0	0	0	0	672
07:45 AM	0	251	0	0	0	0	0	0	0	371	0	0	0	0	0	0	0	622
Total	0	1011	0	0	0	0	0	0	0	1464	0	0	0	0	0	0	0	2475
08:00 AM	0	252	0	0	0	0	0	0	0	382	0	0	0	0	0	0	0	634
08:15 AM	0	308	0	0	0	0	0	0	0	337	0	0	0	0	0	0	0	645
08:30 AM	0	261	0	0	0	0	0	0	0	343	0	0	0	0	0	0	0	604
08:45 AM	0	215	0	0	0	0	0	0	0	317	0	0	0	0	0	0	0	532
Total	0	1036	0	0	0	0	0	0	0	1379	0	0	0	0	0	0	0	2415
Grand Total	0	2047	0	0	0	0	0	0	0	2843	0	0	0	0	0	0	0	4890
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	41.9	0	0	0	0	0	0	0	58.1	0	0	0	0	0	0	0	
Cars	0	2008	0	0	0	0	0	0	0	2809	0	0	0	0	0	0	0	4817
% Cars	0	98.1	0	0	0	0	0	0	0	98.8	0	0	0	0	0	0	0	98.5
Heavy Vehicles	0	39	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	73
% Heavy Vehicles	0	1.9	0	0	0	0	0	0	0	1.2	0	0	0	0	0	0	0	1.5

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	293	0	0	293	0	0	0	0	0	0	379	0	0	379	0	0	0	0	0	672
07:45 AM	0	251	0	0	251	0	0	0	0	0	0	371	0	0	371	0	0	0	0	0	622
08:00 AM	0	252	0	0	252	0	0	0	0	0	0	382	0	0	382	0	0	0	0	0	634
08:15 AM	0	308	0	0	308	0	0	0	0	0	0	337	0	0	337	0	0	0	0	0	645
Total Volume	0	1104	0	0	1104	0	0	0	0	0	0	1469	0	0	1469	0	0	0	0	0	2573
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.896	.000	.000	.896	.000	.000	.000	.000	.000	.000	.961	.000	.000	.961	.000	.000	.000	.000	.000	.957
Cars	0	1082	0	0	1082	0	0	0	0	0	0	1453	0	0	1453	0	0	0	0	0	2535
% Cars	0	98.0	0	0	98.0	0	0	0	0	0	0	98.9	0	0	98.9	0	0	0	0	0	98.5
Heavy Vehicles	0	22	0	0	22	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	38
% Heavy Vehicles	0	2.0	0	0	2.0	0	0	0	0	0	0	1.1	0	0	1.1	0	0	0	0	0	1.5



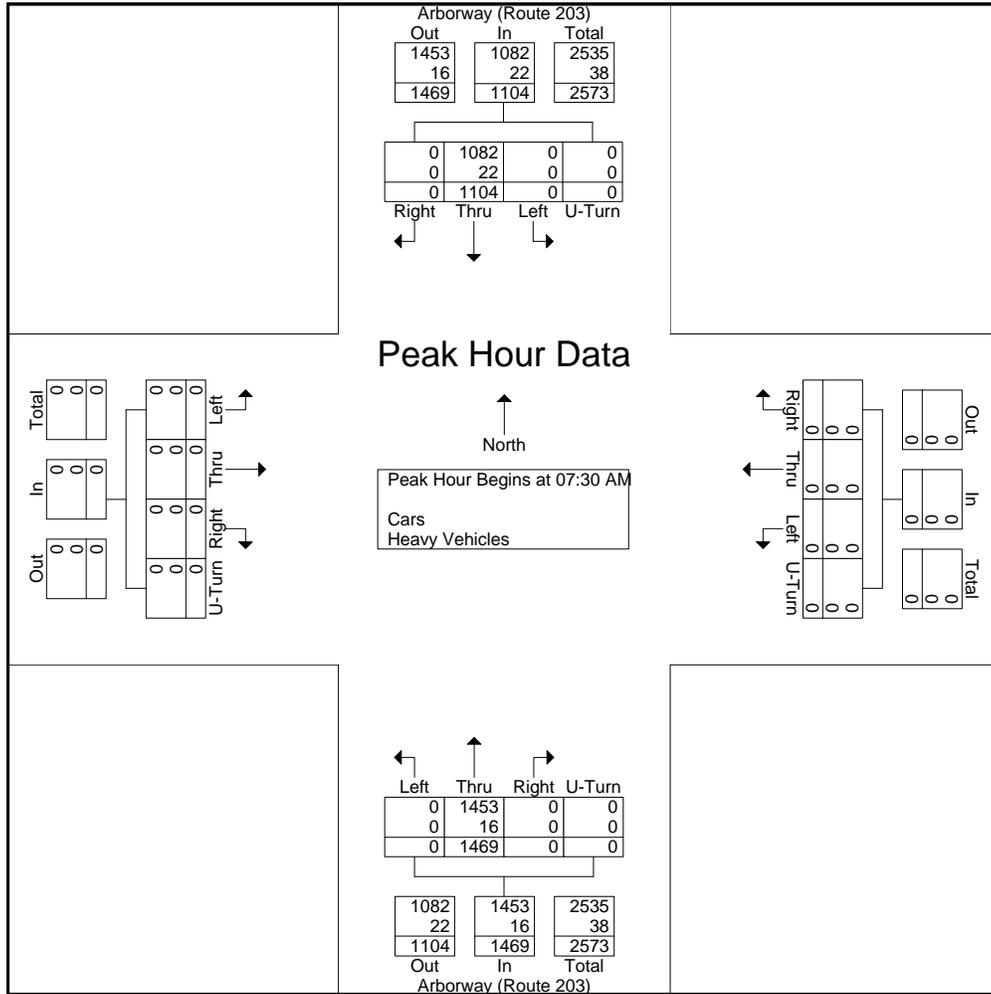
PRECISION
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File Name : 133500 C
Site Code : 6033
Start Date : 9/12/2013
Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	293	0	0	293	0	0	0	0	0	0	379	0	0	379	0	0	0	0	0	672
07:45 AM	0	251	0	0	251	0	0	0	0	0	0	371	0	0	371	0	0	0	0	0	622
08:00 AM	0	252	0	0	252	0	0	0	0	0	0	382	0	0	382	0	0	0	0	0	634
08:15 AM	0	308	0	0	308	0	0	0	0	0	0	337	0	0	337	0	0	0	0	0	645
Total Volume	0	1104	0	0	1104	0	0	0	0	0	0	1469	0	0	1469	0	0	0	0	0	2573
% App. Total	0	100	0	0	100	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	100
PHF	.000	.896	.000	.000	.896	.000	.000	.000	.000	.000	.000	.961	.000	.000	.961	.000	.000	.000	.000	.000	.957
Cars	0	1082	0	0	1082	0	0	0	0	0	0	1453	0	0	1453	0	0	0	0	0	2535
% Cars	0	98.0	0	0	98.0	0	0	0	0	0	0	98.9	0	0	98.9	0	0	0	0	0	98.5
Heavy Vehicles	0	22	0	0	22	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	38
% Heavy Vehicles	0	2.0	0	0	2.0	0	0	0	0	0	0	1.1	0	0	1.1	0	0	0	0	0	1.5





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File Name : 133500 CC
Site Code : 6033
Start Date : 9/12/2013
Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway (Route 203) From North				From East				Arborway (Route 203) From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
11:00 AM	0	163	0	0	0	0	0	0	0	190	0	0	0	0	0	0	0	353
11:15 AM	0	207	0	0	0	0	0	0	0	217	0	0	0	0	0	0	0	424
11:30 AM	0	174	0	0	0	0	0	0	0	178	0	0	0	0	0	0	0	352
11:45 AM	0	196	0	0	0	0	0	0	0	193	0	0	0	0	0	0	0	389
Total	0	740	0	0	0	0	0	0	0	778	0	0	0	0	0	0	0	1518
12:00 PM	0	200	0	0	0	0	0	0	0	171	0	0	0	0	0	0	0	371
12:15 PM	0	163	0	0	0	0	0	0	0	221	0	0	0	0	0	0	0	384
12:30 PM	0	205	0	0	0	0	0	0	0	210	0	0	0	0	0	0	0	415
12:45 PM	0	171	0	0	0	0	0	0	0	171	0	0	0	0	0	0	0	342
Total	0	739	0	0	0	0	0	0	0	773	0	0	0	0	0	0	0	1512
Grand Total	0	1479	0	0	0	0	0	0	0	1551	0	0	0	0	0	0	0	3030
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	48.8	0	0	0	0	0	0	0	51.2	0	0	0	0	0	0	0	
Cars	0	1450	0	0	0	0	0	0	0	1530	0	0	0	0	0	0	0	2980
% Cars	0	98	0	0	0	0	0	0	0	98.6	0	0	0	0	0	0	0	98.3
Heavy Vehicles	0	29	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	50
% Heavy Vehicles	0	2	0	0	0	0	0	0	0	1.4	0	0	0	0	0	0	0	1.7

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	196	0	0	196	0	0	0	0	0	0	193	0	0	193	0	0	0	0	0	389
12:00 PM	0	200	0	0	200	0	0	0	0	0	0	171	0	0	171	0	0	0	0	0	371
12:15 PM	0	163	0	0	163	0	0	0	0	0	0	221	0	0	221	0	0	0	0	0	384
12:30 PM	0	205	0	0	205	0	0	0	0	0	0	210	0	0	210	0	0	0	0	0	415
Total Volume	0	764	0	0	764	0	0	0	0	0	0	795	0	0	795	0	0	0	0	0	1559
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.932	.000	.000	.932	.000	.000	.000	.000	.000	.000	.899	.000	.000	.899	.000	.000	.000	.000	.000	.939
Cars	0	745	0	0	745	0	0	0	0	0	0	786	0	0	786	0	0	0	0	0	1531
% Cars	0	97.5	0	0	97.5	0	0	0	0	0	0	98.9	0	0	98.9	0	0	0	0	0	98.2
Heavy Vehicles	0	19	0	0	19	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	28
% Heavy Vehicles	0	2.5	0	0	2.5	0	0	0	0	0	0	1.1	0	0	1.1	0	0	0	0	0	1.8



PRECISION
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INDUSTRIES, LLC

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File Name : 133500 CC
Site Code : 6033
Start Date : 9/12/2013
Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Groups Printed- Peds and Bikes

Start Time	Arborway (Route 203) From North				From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	7
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	4	3	0	0	0	0	0	7
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	6
11:45 AM	0	3	0	0	0	0	0	0	0	0	0	0	3	5	0	0	0	0	0	11
Total	0	3	0	0	0	0	0	0	0	0	0	0	16	12	0	0	0	0	0	31
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	6	3	0	0	0	0	0	9
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	5
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	3
Total	0	0	0	0	0	0	0	0	0	0	0	0	11	9	0	0	0	0	0	20
Grand Total	0	3	0	0	0	0	0	0	0	0	0	0	27	21	0	0	0	0	0	51
Apprch %	0	100	0	0	0	0	0	0	0	0	0	0	56.2	43.8	0	0	0	0	0	
Total %	0	5.9	0	0	0	0	0	0	0	0	0	0	52.9	41.2	0	0	0	0	0	

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left		Peds NB	Peds SB	App. Total		
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 11:15 AM																										
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	7	0	0	0	0	0	0	0	0	7
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6	0	0	0	0	0	0	0	0	6
11:45 AM	0	3	0	0	3	0	0	0	0	0	0	0	0	0	3	5	8	0	0	0	0	0	0	0	0	11
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	9	0	0	0	0	0	0	0	0	9
Total Volume	0	3	0	0	3	0	0	0	0	0	0	0	0	0	16	14	30	0	0	0	0	0	0	0	0	33
% App. Total	0	100	0	0		0	0	0	0	0		0	0	0	53.3	46.7		0	0	0	0	0	0	0	0	
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.667	.700	.833	.000	.000	.000	.000	.000	.000	.000	.000	.750



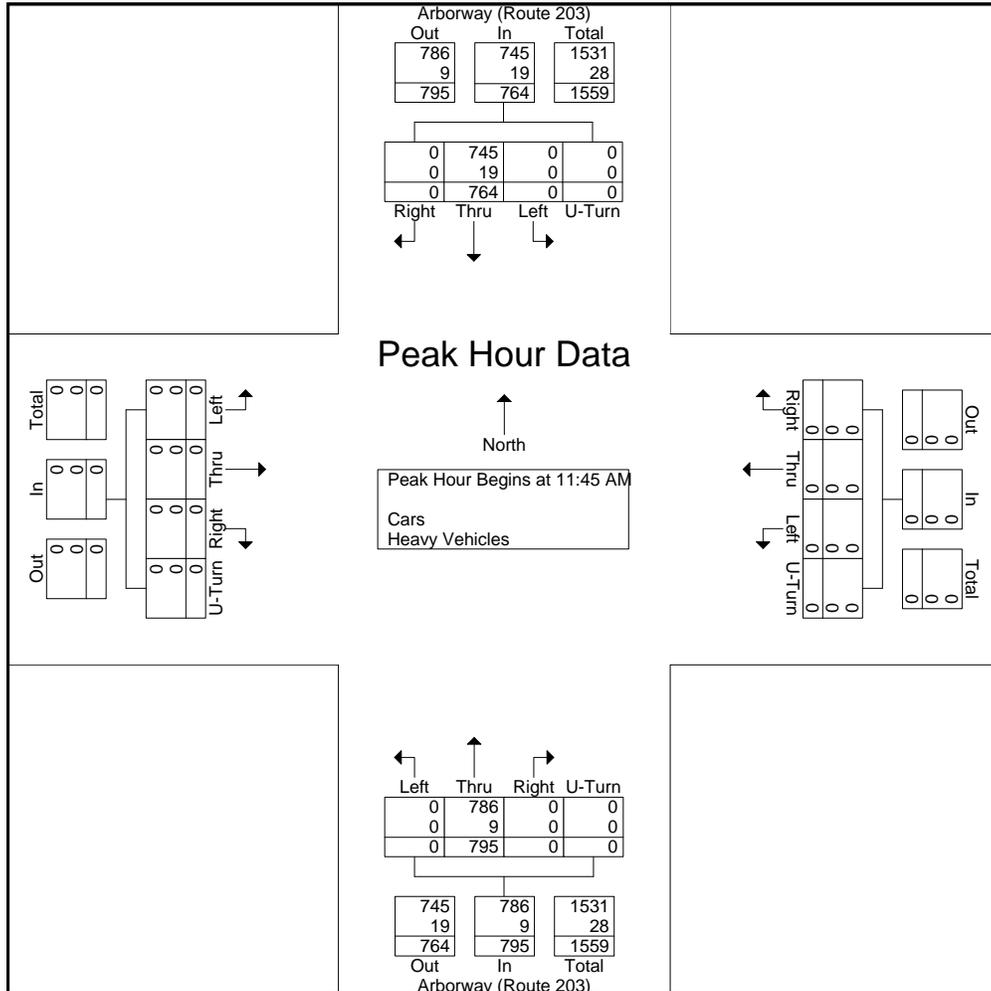
PRECISION
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File Name : 133500 CC
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N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	196	0	0	196	0	0	0	0	0	0	193	0	0	193	0	0	0	0	0	389
12:00 PM	0	200	0	0	200	0	0	0	0	0	0	171	0	0	171	0	0	0	0	0	371
12:15 PM	0	163	0	0	163	0	0	0	0	0	0	221	0	0	221	0	0	0	0	0	384
12:30 PM	0	205	0	0	205	0	0	0	0	0	0	210	0	0	210	0	0	0	0	0	415
Total Volume	0	764	0	0	764	0	0	0	0	0	0	795	0	0	795	0	0	0	0	0	1559
% App. Total	0	100	0	0	100	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	100
PHF	.000	.932	.000	.000	.932	.000	.000	.000	.000	.000	.000	.899	.000	.000	.899	.000	.000	.000	.000	.000	.939
Cars	0	745	0	0	745	0	0	0	0	0	0	786	0	0	786	0	0	0	0	0	1531
% Cars	0	97.5	0	0	97.5	0	0	0	0	0	0	98.9	0	0	98.9	0	0	0	0	0	98.2
Heavy Vehicles	0	19	0	0	19	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	28
% Heavy Vehicles	0	2.5	0	0	2.5	0	0	0	0	0	0	1.1	0	0	1.1	0	0	0	0	0	1.8





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Site Code : 6033
Start Date : 9/12/2013
Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway (Route 203) From North				From East				Arborway (Route 203) From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
04:00 PM	0	379	0	0	0	0	0	0	0	234	0	0	0	0	0	0	0	613
04:15 PM	0	379	0	0	0	0	0	0	0	238	0	0	0	0	0	0	0	617
04:30 PM	0	359	0	0	0	0	0	0	0	260	0	0	0	0	0	0	0	619
04:45 PM	0	375	0	0	0	0	0	0	0	274	0	0	0	0	0	0	0	649
Total	0	1492	0	0	0	0	0	0	0	1006	0	0	0	0	0	0	0	2498
05:00 PM	0	400	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	655
05:15 PM	0	368	0	0	0	0	0	0	0	234	0	0	0	0	0	0	0	602
05:30 PM	0	350	0	0	0	0	0	0	0	249	0	0	0	0	0	0	0	599
05:45 PM	0	380	0	0	0	0	0	0	0	293	0	0	0	0	0	0	0	673
Total	0	1498	0	0	0	0	0	0	0	1031	0	0	0	0	0	0	0	2529
Grand Total	0	2990	0	0	0	0	0	0	0	2037	0	0	0	0	0	0	0	5027
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	59.5	0	0	0	0	0	0	0	40.5	0	0	0	0	0	0	0	
Cars	0	2957	0	0	0	0	0	0	0	2010	0	0	0	0	0	0	0	4967
% Cars	0	98.9	0	0	0	0	0	0	0	98.7	0	0	0	0	0	0	0	98.8
Heavy Vehicles	0	33	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	60
% Heavy Vehicles	0	1.1	0	0	0	0	0	0	0	1.3	0	0	0	0	0	0	0	1.2

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	379	0	0	379	0	0	0	0	0	0	238	0	0	238	0	0	0	0	0	617
04:30 PM	0	359	0	0	359	0	0	0	0	0	0	260	0	0	260	0	0	0	0	0	619
04:45 PM	0	375	0	0	375	0	0	0	0	0	0	274	0	0	274	0	0	0	0	0	649
05:00 PM	0	400	0	0	400	0	0	0	0	0	0	255	0	0	255	0	0	0	0	0	655
Total Volume	0	1513	0	0	1513	0	0	0	0	0	0	1027	0	0	1027	0	0	0	0	0	2540
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.946	.000	.000	.946	.000	.000	.000	.000	.000	.000	.937	.000	.000	.937	.000	.000	.000	.000	.000	.969
Cars	0	1495	0	0	1495	0	0	0	0	0	0	1013	0	0	1013	0	0	0	0	0	2508
% Cars	0	98.8	0	0	98.8	0	0	0	0	0	0	98.6	0	0	98.6	0	0	0	0	0	98.7
Heavy Vehicles	0	18	0	0	18	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	32
% Heavy Vehicles	0	1.2	0	0	1.2	0	0	0	0	0	0	1.4	0	0	1.4	0	0	0	0	0	1.3



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File Name : 133500 CCC
Site Code : 6033
Start Date : 9/12/2013
Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Groups Printed- Peds and Bikes

Start Time	Arborway (Route 203) From North				From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	9	6	0	0	0	0	0	16
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	10	5	0	0	0	0	0	15
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	5	8	0	0	0	0	0	13
Total	0	0	0	0	0	0	0	0	0	0	1	0	26	19	0	0	0	0	0	46
05:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	5	3	0	0	0	0	0	9
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	6	11	0	0	0	0	0	17
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	3	5	0	0	0	0	0	8
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	8	11	0	0	0	0	0	19
Total	0	1	0	0	0	0	0	0	0	0	0	0	22	30	0	0	0	0	0	53
Grand Total	0	1	0	0	0	0	0	0	0	0	1	0	48	49	0	0	0	0	0	99
Apprch %	0	100	0	0	0	0	0	0	0	0	1	0	49	50	0	0	0	0	0	
Total %	0	1	0	0	0	0	0	0	0	0	1	0	48.5	49.5	0	0	0	0	0	

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left		Peds NB	Peds SB	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:30 PM																										
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5	15	0	0	0	0	0	0	0	0	0	15
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	13	0	0	0	0	0	0	0	0	0	13
05:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	5	3	8	0	0	0	0	0	0	0	0	0	9
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	6	11	17	0	0	0	0	0	0	0	0	0	17
Total Volume	0	1	0	0	1	0	0	0	0	0	0	0	0	26	27	53	0	0	0	0	0	0	0	0	0	54
% App. Total	0	100	0	0		0	0	0	0	0	0	0	0	49.1	50.9		0	0	0	0	0	0	0	0	0	
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.650	.614	.779	.000	.000	.000	.000	.000	.000	.000	.000	.794	



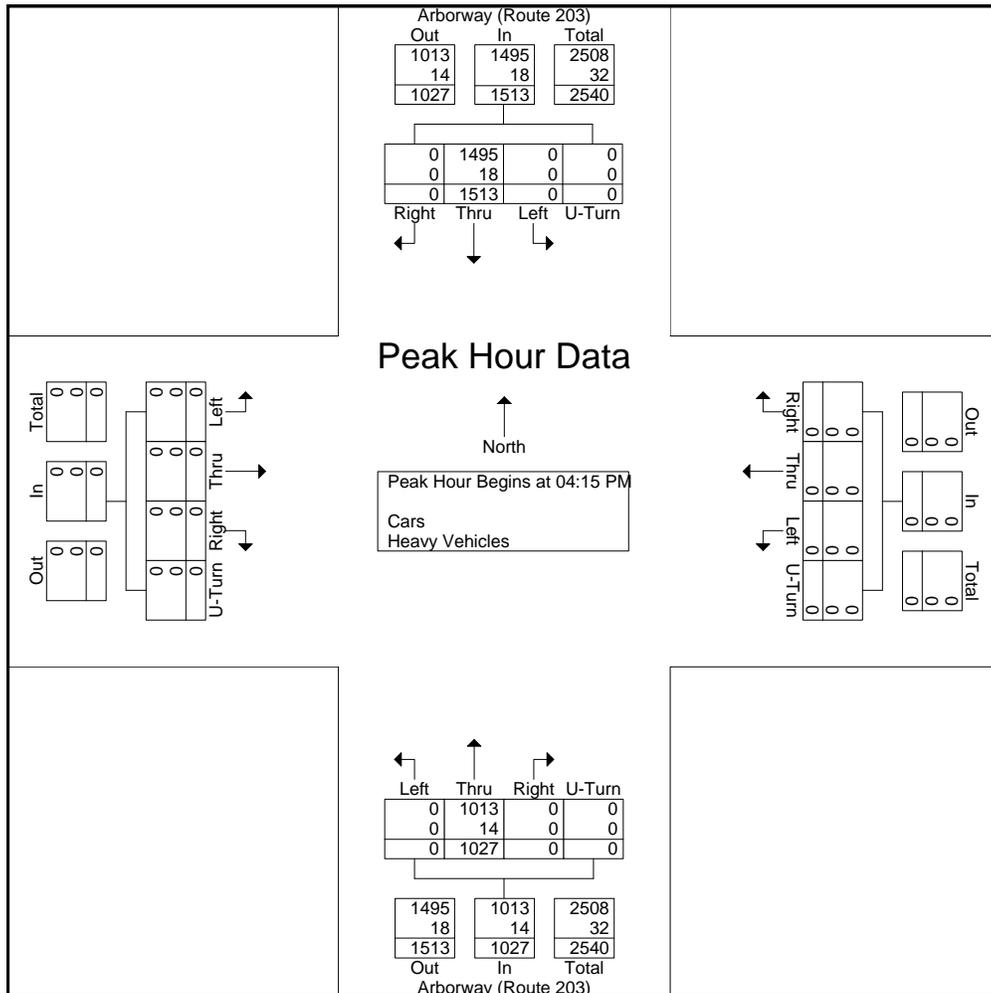
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File Name : 133500 CCC
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N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	379	0	0	379	0	0	0	0	0	0	238	0	0	238	0	0	0	0	0	617
04:30 PM	0	359	0	0	359	0	0	0	0	0	0	260	0	0	260	0	0	0	0	0	619
04:45 PM	0	375	0	0	375	0	0	0	0	0	0	274	0	0	274	0	0	0	0	0	649
05:00 PM	0	400	0	0	400	0	0	0	0	0	0	255	0	0	255	0	0	0	0	0	655
Total Volume	0	1513	0	0	1513	0	0	0	0	0	0	1027	0	0	1027	0	0	0	0	0	2540
% App. Total	0	100	0	0	100	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	100
PHF	.000	.946	.000	.000	.946	.000	.000	.000	.000	.000	.000	.937	.000	.000	.937	.000	.000	.000	.000	.000	.969
Cars	0	1495	0	0	1495	0	0	0	0	0	0	1013	0	0	1013	0	0	0	0	0	2508
% Cars	0	98.8	0	0	98.8	0	0	0	0	0	0	98.6	0	0	98.6	0	0	0	0	0	98.7
Heavy Vehicles	0	18	0	0	18	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	32
% Heavy Vehicles	0	1.2	0	0	1.2	0	0	0	0	0	0	1.4	0	0	1.4	0	0	0	0	0	1.3





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File Name : 133500 D
Site Code : 6033
Start Date : 9/12/2013
Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway Carriage Road From North				From East				Arborway Carriage Road From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
07:00 AM	0	3	0	0	0	0	0	0	0	56	0	0	0	0	0	0	0	59
07:15 AM	0	12	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	62
07:30 AM	0	7	0	0	0	0	0	0	0	55	0	0	0	0	0	0	0	62
07:45 AM	0	11	0	0	0	0	0	0	0	41	0	0	0	0	0	0	0	52
Total	0	33	0	0	0	0	0	0	0	202	0	0	0	0	0	0	0	235
08:00 AM	0	7	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	57
08:15 AM	0	11	0	0	0	0	0	0	0	56	0	0	0	0	0	0	0	67
08:30 AM	0	8	0	0	0	0	0	0	0	31	0	0	0	0	0	0	0	39
08:45 AM	0	12	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	57
Total	0	38	0	0	0	0	0	0	0	182	0	0	0	0	0	0	0	220
Grand Total	0	71	0	0	0	0	0	0	0	384	0	0	0	0	0	0	0	455
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	15.6	0	0	0	0	0	0	0	84.4	0	0	0	0	0	0	0	
Cars	0	70	0	0	0	0	0	0	0	372	0	0	0	0	0	0	0	442
% Cars	0	98.6	0	0	0	0	0	0	0	96.9	0	0	0	0	0	0	0	97.1
Heavy Vehicles	0	1	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	13
% Heavy Vehicles	0	1.4	0	0	0	0	0	0	0	3.1	0	0	0	0	0	0	0	2.9

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	7	0	0	7	0	0	0	0	0	0	55	0	0	55	0	0	0	0	0	62
07:45 AM	0	11	0	0	11	0	0	0	0	0	0	41	0	0	41	0	0	0	0	0	52
08:00 AM	0	7	0	0	7	0	0	0	0	0	0	50	0	0	50	0	0	0	0	0	57
08:15 AM	0	11	0	0	11	0	0	0	0	0	0	56	0	0	56	0	0	0	0	0	67
Total Volume	0	36	0	0	36	0	0	0	0	0	0	202	0	0	202	0	0	0	0	0	238
% App. Total	0	100	0	0	100	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	
PHF	.000	.818	.000	.000	.818	.000	.000	.000	.000	.000	.000	.902	.000	.000	.902	.000	.000	.000	.000	.000	.888
Cars	0	36	0	0	36	0	0	0	0	0	0	198	0	0	198	0	0	0	0	0	234
% Cars	0	100	0	0	100	0	0	0	0	0	0	98.0	0	0	98.0	0	0	0	0	0	98.3
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	4
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	2.0	0	0	2.0	0	0	0	0	0	1.7



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File Name : 133500 D
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Start Date : 9/12/2013
Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Groups Printed- Heavy Vehicles

Start Time	Arborway Carriage Road From North				From East				Arborway Carriage Road From South				From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
07:15 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5
08:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	1	0	0	0	0	0	0	0	4	0	0	0	0	0	0	5
Total	0	1	0	0	0	0	0	0	0	7	0	0	0	0	0	0	8
Grand Total	0	1	0	0	0	0	0	0	0	12	0	0	0	0	0	0	13
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	
Total %	0	7.7	0	0	0	0	0	0	0	92.3	0	0	0	0	0	0	

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	1	0	0	1	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	5
Total Volume	0	1	0	0	1	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	8
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.438	.000	.000	.438	.000	.000	.000	.000	.000	.400



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Groups Printed- Peds and Bikes

Start Time	Arborway Carriage Road From North				From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
07:00 AM	0	0	0	0	0	0	0	0	0	0	4	0	4	7	0	0	0	0	0	15
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	9
07:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	5	6	0	0	0	0	0	13
07:45 AM	0	0	0	0	0	0	0	0	0	0	5	0	6	3	0	0	0	0	0	14
Total	0	2	0	0	0	0	0	0	0	0	9	0	23	17	0	0	0	0	0	51
08:00 AM	0	1	0	0	0	0	0	0	0	0	2	0	10	4	0	0	0	0	0	17
08:15 AM	0	0	0	0	0	0	0	0	0	0	4	0	4	7	0	0	0	0	0	15
08:30 AM	0	1	0	0	0	0	0	0	0	0	3	0	5	5	0	0	0	0	0	14
08:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	4	5	0	0	0	0	0	11
Total	0	2	0	0	0	0	0	0	0	0	11	0	23	21	0	0	0	0	0	57
Grand Total	0	4	0	0	0	0	0	0	0	0	20	0	46	38	0	0	0	0	0	108
Apprch %	0	100	0	0	0	0	0	0	0	0	19.2	0	44.2	36.5	0	0	0	0	0	
Total %	0	3.7	0	0	0	0	0	0	0	0	18.5	0	42.6	35.2	0	0	0	0	0	

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total						
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left		Peds NB	Peds SB	App. Total			
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																											
Peak Hour for Entire Intersection Begins at 07:45 AM																											
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	5	0	6	3	14	0	0	0	0	0	0	0	0	0	14
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	2	0	10	4	16	0	0	0	0	0	0	0	0	0	17
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	7	15	0	0	0	0	0	0	0	0	0	15
08:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	3	0	5	5	13	0	0	0	0	0	0	0	0	0	14
Total Volume	0	2	0	0	2	0	0	0	0	0	0	0	14	0	25	19	58	0	0	0	0	0	0	0	0	0	60
% App. Total	0	100	0	0		0	0	0	0	0		0	24.1	0	43.1	32.8		0	0	0	0	0		0	0	0	
PHF	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.000	.700	.000	.625	.679	.906	.000	.000	.000	.000	.000	.000	.000	.000	.000	.882



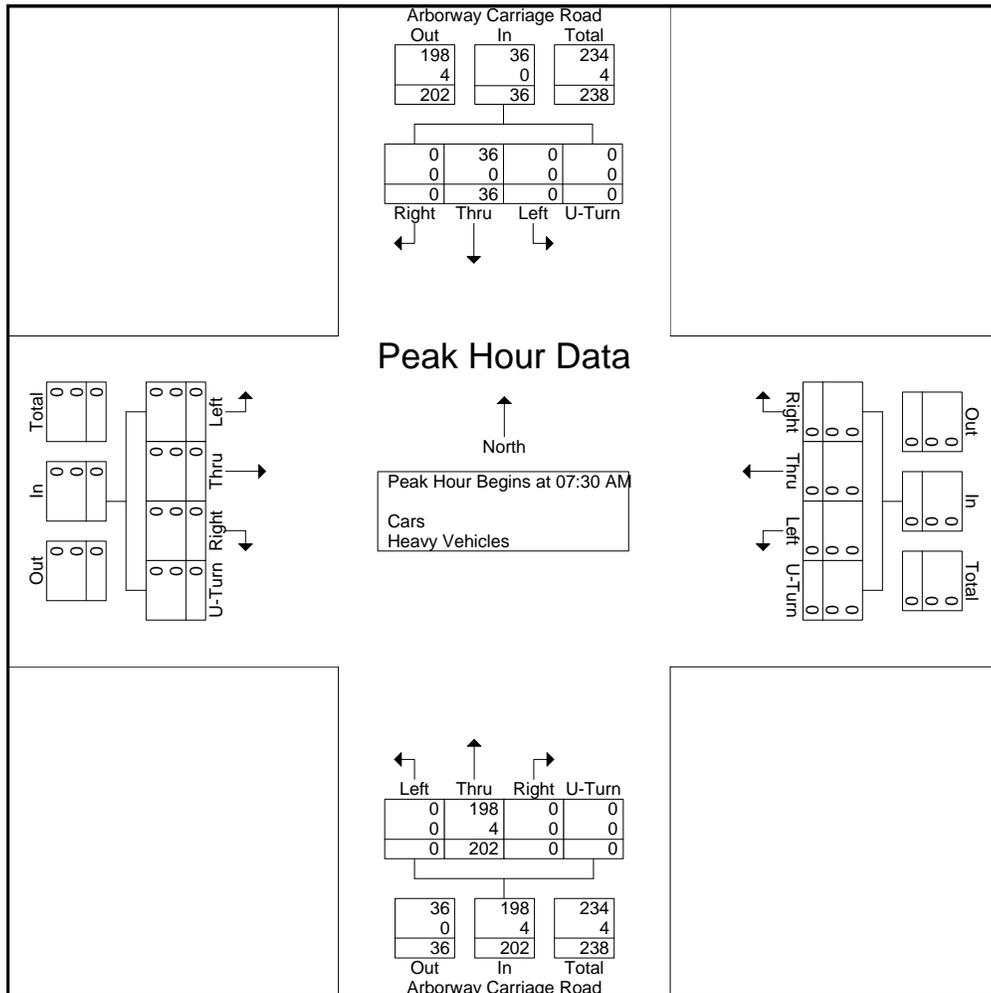
PRECISION
D A T A
INDUSTRIES, LLC

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

File Name : 133500 D
Site Code : 6033
Start Date : 9/12/2013
Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	7	0	0	7	0	0	0	0	0	0	55	0	0	55	0	0	0	0	0	62
07:45 AM	0	11	0	0	11	0	0	0	0	0	0	41	0	0	41	0	0	0	0	0	52
08:00 AM	0	7	0	0	7	0	0	0	0	0	0	50	0	0	50	0	0	0	0	0	57
08:15 AM	0	11	0	0	11	0	0	0	0	0	0	56	0	0	56	0	0	0	0	0	67
Total Volume	0	36	0	0	36	0	0	0	0	0	0	202	0	0	202	0	0	0	0	0	238
% App. Total	0	100	0	0		0	0	0	0	0	0	100	0	0		0	0	0	0	0	
PHF	.000	.818	.000	.000	.818	.000	.000	.000	.000	.000	.000	.902	.000	.000	.902	.000	.000	.000	.000	.000	.888
Cars	0	36	0	0	36	0	0	0	0	0	0	198	0	0	198	0	0	0	0	0	234
% Cars	0	100	0	0	100	0	0	0	0	0	0	98.0	0	0	98.0	0	0	0	0	0	98.3
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	4
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	2.0	0	0	2.0	0	0	0	0	0	1.7





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File Name : 133500 DD
Site Code : 6033
Start Date : 9/12/2013
Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway Carriage Road From North				From East				Arborway Carriage Road From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
11:00 AM	0	8	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	26
11:15 AM	0	8	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	23
11:30 AM	0	4	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	26
11:45 AM	0	9	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	36
Total	0	29	0	0	0	0	0	0	0	82	0	0	0	0	0	0	0	111
12:00 PM	0	8	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	28
12:15 PM	0	6	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	25
12:30 PM	0	7	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	33
12:45 PM	0	2	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	23
Total	0	23	0	0	0	0	0	0	0	86	0	0	0	0	0	0	0	109
Grand Total	0	52	0	0	0	0	0	0	0	168	0	0	0	0	0	0	0	220
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	23.6	0	0	0	0	0	0	0	76.4	0	0	0	0	0	0	0	
Cars	0	50	0	0	0	0	0	0	0	164	0	0	0	0	0	0	0	214
% Cars	0	96.2	0	0	0	0	0	0	0	97.6	0	0	0	0	0	0	0	97.3
Heavy Vehicles	0	2	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	6
% Heavy Vehicles	0	3.8	0	0	0	0	0	0	0	2.4	0	0	0	0	0	0	0	2.7

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	9	0	0	9	0	0	0	0	0	0	27	0	0	27	0	0	0	0	0	36
12:00 PM	0	8	0	0	8	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	28
12:15 PM	0	6	0	0	6	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	25
12:30 PM	0	7	0	0	7	0	0	0	0	0	0	26	0	0	26	0	0	0	0	0	33
Total Volume	0	30	0	0	30	0	0	0	0	0	0	92	0	0	92	0	0	0	0	0	122
% App. Total	0	100	0	0	100	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	
PHF	.000	.833	.000	.000	.833	.000	.000	.000	.000	.000	.000	.852	.000	.000	.852	.000	.000	.000	.000	.000	.847
Cars	0	30	0	0	30	0	0	0	0	0	0	89	0	0	89	0	0	0	0	0	119
% Cars	0	100	0	0	100	0	0	0	0	0	0	96.7	0	0	96.7	0	0	0	0	0	97.5
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	3
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	3.3	0	0	3.3	0	0	0	0	0	2.5



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Email: datarequests@pdillc.com

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

File Name : 133500 DD
Site Code : 6033
Start Date : 9/12/2013
Page No : 1

Groups Printed- Peds and Bikes

Start Time	Arborway Carriage Road From North				From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
11:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	1	0	0	0	0	0	5
11:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	4
11:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	3	3	0	0	0	0	0	7
Total	0	0	0	0	0	0	0	0	0	0	4	0	9	6	0	0	0	0	0	19
12:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	5	3	0	0	0	0	0	9
12:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	4
12:30 PM	0	0	0	0	0	0	0	0	0	0	3	0	1	1	0	0	0	0	0	5
12:45 PM	0	0	0	0	0	0	0	0	0	0	3	0	1	1	0	0	0	0	0	5
Total	0	0	0	0	0	0	0	0	0	0	8	0	10	5	0	0	0	0	0	23
Grand Total	0	0	0	0	0	0	0	0	0	0	12	0	19	11	0	0	0	0	0	42
Apprch %	0	0	0	0	0	0	0	0	0	0	28.6	0	45.2	26.2	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	28.6	0	45.2	26.2	0	0	0	0	0	

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total						
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left		Peds NB	Peds SB	App. Total			
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																											
Peak Hour for Entire Intersection Begins at 11:15 AM																											
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1	5	0	0	0	0	0	0	0	0	0	5
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	4	0	0	0	0	0	0	0	0	0	4
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	3	7	0	0	0	0	0	0	0	0	0	7
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	5	3	9	0	0	0	0	0	0	0	0	0	9
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	5	0	11	9	25	0	0	0	0	0	0	0	0	0	25
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	20	0	44	36		0	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.625	.000	.550	.750	.694	.000	.000	.000	.000	.000	.000	.000	.000	.000	.694



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Email: datarequests@pdillc.com

File Name : 133500 DDD

Site Code : 6033

Start Date : 9/12/2013

Page No : 1

N/S: Arborway Carriage Road

E/W: north of Custer Street

City, State: Boston, MA

Client: Toole Design Group/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway Carriage Road From North				From East				Arborway Carriage Road From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
04:00 PM	0	33	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	57
04:15 PM	0	29	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	49
04:30 PM	0	42	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	62
04:45 PM	0	48	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	71
Total	0	152	0	0	0	0	0	0	0	87	0	0	0	0	0	0	0	239
05:00 PM	0	41	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	60
05:15 PM	0	46	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	69
05:30 PM	0	32	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	54
05:45 PM	0	38	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	59
Total	0	157	0	0	0	0	0	0	0	85	0	0	0	0	0	0	0	242
Grand Total	0	309	0	0	0	0	0	0	0	172	0	0	0	0	0	0	0	481
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	64.2	0	0	0	0	0	0	0	35.8	0	0	0	0	0	0	0	
Cars	0	304	0	0	0	0	0	0	0	168	0	0	0	0	0	0	0	472
% Cars	0	98.4	0	0	0	0	0	0	0	97.7	0	0	0	0	0	0	0	98.1
Heavy Vehicles	0	5	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	9
% Heavy Vehicles	0	1.6	0	0	0	0	0	0	0	2.3	0	0	0	0	0	0	0	1.9

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	42	0	0	42	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	62
04:45 PM	0	48	0	0	48	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	71
05:00 PM	0	41	0	0	41	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	60
05:15 PM	0	46	0	0	46	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	69
Total Volume	0	177	0	0	177	0	0	0	0	0	0	85	0	0	85	0	0	0	0	0	262
% App. Total	0	100	0	0	99.4	0	0	0	0	0	0	100	0	0	97.6	0	0	0	0	0	98.9
PHF	.000	.922	.000	.000	.922	.000	.000	.000	.000	.000	.000	.924	.000	.000	.924	.000	.000	.000	.000	.000	.923
Cars	0	176	0	0	176	0	0	0	0	0	0	83	0	0	83	0	0	0	0	0	259
% Cars	0	99.4	0	0	99.4	0	0	0	0	0	0	97.6	0	0	97.6	0	0	0	0	0	98.9
Heavy Vehicles	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
% Heavy Vehicles	0	0.6	0	0	0.6	0	0	0	0	0	0	2.4	0	0	2.4	0	0	0	0	0	1.1



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File Name : 133500 DDD
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Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Groups Printed- Peds and Bikes

Start Time	Arborway Carriage Road From North				From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
04:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	4
04:15 PM	0	4	0	0	0	0	0	0	0	0	2	0	5	5	0	0	0	0	0	16
04:30 PM	0	2	0	0	0	0	0	0	0	0	0	0	8	5	0	0	0	0	0	15
04:45 PM	0	4	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	11
Total	0	11	0	0	0	0	0	0	0	0	2	0	18	15	0	0	0	0	0	46
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	8
05:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	5	6	0	0	0	0	0	12
05:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	8
05:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	8	11	0	0	0	0	0	20
Total	0	3	0	0	0	0	0	0	0	0	0	0	19	26	0	0	0	0	0	48
Grand Total	0	14	0	0	0	0	0	0	0	0	2	0	37	41	0	0	0	0	0	94
Apprch %	0	100	0	0	0	0	0	0	0	0	2.5	0	46.2	51.2	0	0	0	0	0	
Total %	0	14.9	0	0	0	0	0	0	0	0	2.1	0	39.4	43.6	0	0	0	0	0	

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total									
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left		Peds NB	Peds SB	App. Total						
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																														
Peak Hour for Entire Intersection Begins at 04:15 PM																														
04:15 PM	0	4	0	0	4	0	0	0	0	0	0	0	2	0	5	5	12	0	0	0	0	0	0	0	0	0	0	0	0	16
04:30 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	8	5	13	0	0	0	0	0	0	0	0	0	0	0	0	15
04:45 PM	0	4	0	0	4	0	0	0	0	0	0	0	0	0	2	5	7	0	0	0	0	0	0	0	0	0	0	0	0	11
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	8	0	0	0	0	0	0	0	0	0	0	0	0	8
Total Volume	0	10	0	0	10	0	0	0	0	0	0	0	2	0	19	19	40	0	0	0	0	0	0	0	0	0	0	0	0	50
% App. Total	0	100	0	0		0	0	0	0	0		0	5	0	47.5	47.5		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.625	.000	.000	.625	.000	.000	.000	.000	.000	.000	.000	.250	.000	.594	.950	.769	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.781	



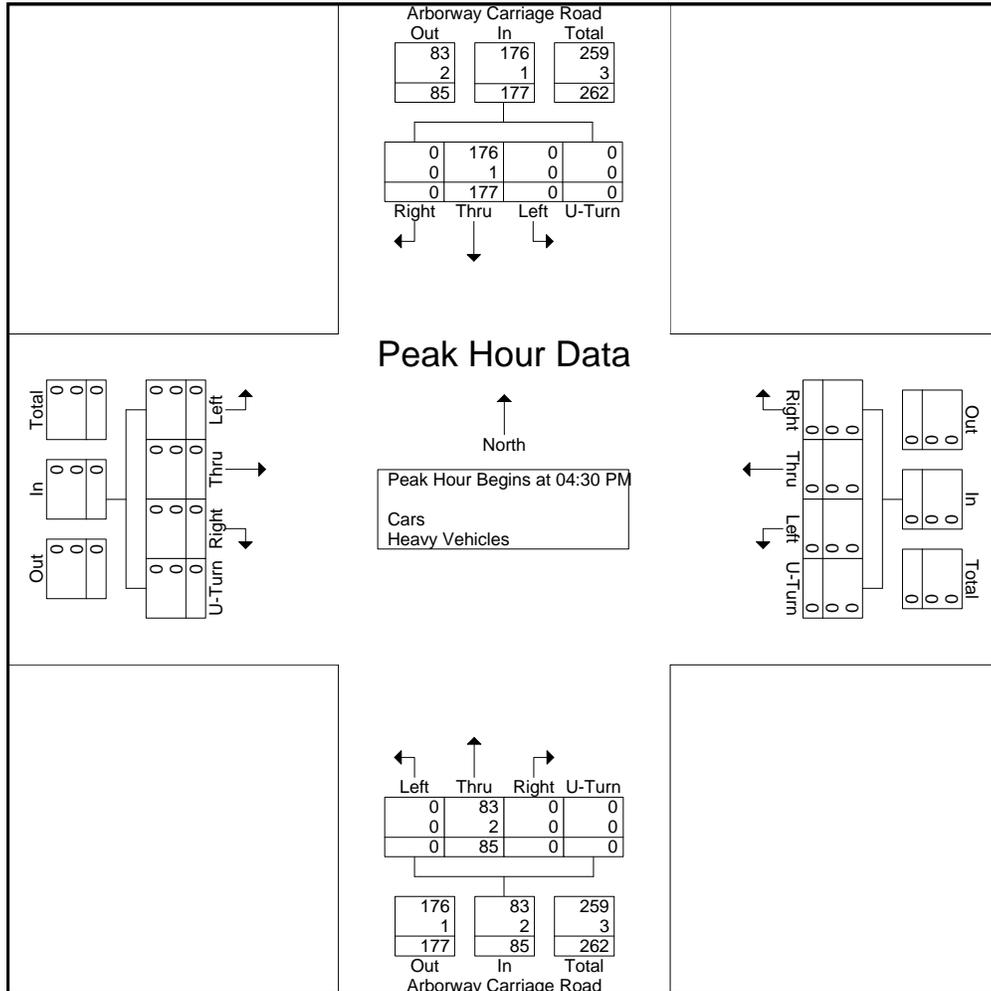
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	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 04:30 PM																						
04:30 PM	0	42	0	0	42	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	0	62
04:45 PM	0	48	0	0	48	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	71
05:00 PM	0	41	0	0	41	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	0	60
05:15 PM	0	46	0	0	46	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	69
Total Volume	0	177	0	0	177	0	0	0	0	0	0	85	0	0	85	0	0	0	0	0	0	262
% App. Total	0	100	0	0	100	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	0	100
PHF	.000	.922	.000	.000	.922	.000	.000	.000	.000	.000	.000	.924	.000	.000	.924	.000	.000	.000	.000	.000	.000	.923
Cars	0	176	0	0	176	0	0	0	0	0	0	83	0	0	83	0	0	0	0	0	0	259
% Cars	0	99.4	0	0	99.4	0	0	0	0	0	0	97.6	0	0	97.6	0	0	0	0	0	0	98.9
Heavy Vehicles	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3
% Heavy Vehicles	0	0.6	0	0	0.6	0	0	0	0	0	0	2.4	0	0	2.4	0	0	0	0	0	0	1.1





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File Name : 133500 CCCC
Site Code : 6033
Start Date : 9/14/2013
Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway (Route 203) From North				From East				Arborway (Route 203) From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
07:00 AM	0	76	0	0	0	0	0	0	0	106	0	0	0	0	0	0	0	182
07:15 AM	0	100	0	0	0	0	0	0	0	107	0	0	0	0	0	0	0	207
07:30 AM	0	116	0	0	0	0	0	0	0	151	0	0	0	0	0	0	0	267
07:45 AM	0	124	0	0	0	0	0	0	0	163	0	0	0	0	0	0	0	287
Total	0	416	0	0	0	0	0	0	0	527	0	0	0	0	0	0	0	943
08:00 AM	0	136	0	0	0	0	0	0	0	133	0	0	0	0	0	0	0	269
08:15 AM	0	113	0	0	0	0	0	0	0	168	0	0	0	0	0	0	0	281
08:30 AM	0	116	0	0	0	0	0	0	0	185	0	0	0	0	0	0	0	301
08:45 AM	0	136	0	0	0	0	0	0	0	221	0	0	0	0	0	0	0	357
Total	0	501	0	0	0	0	0	0	0	707	0	0	0	0	0	0	0	1208
Grand Total	0	917	0	0	0	0	0	0	0	1234	0	0	0	0	0	0	0	2151
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	42.6	0	0	0	0	0	0	0	57.4	0	0	0	0	0	0	0	
Cars	0	913	0	0	0	0	0	0	0	1224	0	0	0	0	0	0	0	2137
% Cars	0	99.6	0	0	0	0	0	0	0	99.2	0	0	0	0	0	0	0	99.3
Heavy Vehicles	0	4	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	14
% Heavy Vehicles	0	0.4	0	0	0	0	0	0	0	0.8	0	0	0	0	0	0	0	0.7

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	136	0	0	136	0	0	0	0	0	0	133	0	0	133	0	0	0	0	0	269
08:15 AM	0	113	0	0	113	0	0	0	0	0	0	168	0	0	168	0	0	0	0	0	281
08:30 AM	0	116	0	0	116	0	0	0	0	0	0	185	0	0	185	0	0	0	0	0	301
08:45 AM	0	136	0	0	136	0	0	0	0	0	0	221	0	0	221	0	0	0	0	0	357
Total Volume	0	501	0	0	501	0	0	0	0	0	0	707	0	0	707	0	0	0	0	0	1208
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.921	.000	.000	.921	.000	.000	.000	.000	.000	.000	.800	.000	.000	.800	.000	.000	.000	.000	.000	.846
Cars	0	500	0	0	500	0	0	0	0	0	0	703	0	0	703	0	0	0	0	0	1203
% Cars	0	99.8	0	0	99.8	0	0	0	0	0	0	99.4	0	0	99.4	0	0	0	0	0	99.6
Heavy Vehicles	0	1	0	0	1	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	5
% Heavy Vehicles	0	0.2	0	0	0.2	0	0	0	0	0	0	0.6	0	0	0.6	0	0	0	0	0	0.4



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File Name : 133500 CCCCC

Site Code : 6033

Start Date : 9/14/2013

Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway (Route 203) From North				From East				Arborway (Route 203) From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
11:00 AM	0	160	0	0	0	0	0	0	0	204	0	0	0	0	0	0	0	364
11:15 AM	0	173	0	0	0	0	0	0	0	209	0	0	0	0	0	0	0	382
11:30 AM	0	161	0	0	0	0	0	0	0	193	0	0	0	0	0	0	0	354
11:45 AM	0	143	0	0	0	0	0	0	0	196	0	0	0	0	0	0	0	339
Total	0	637	0	0	0	0	0	0	0	802	0	0	0	0	0	0	0	1439
12:00 PM	0	168	0	0	0	0	0	0	0	209	0	0	0	0	0	0	0	377
12:15 PM	0	180	0	0	0	0	0	0	0	182	0	0	0	0	0	0	0	362
12:30 PM	0	188	0	0	0	0	0	0	0	209	0	0	0	0	0	0	0	397
12:45 PM	0	191	0	0	0	0	0	0	0	222	0	0	0	0	0	0	0	413
Total	0	727	0	0	0	0	0	0	0	822	0	0	0	0	0	0	0	1549
Grand Total	0	1364	0	0	0	0	0	0	0	1624	0	0	0	0	0	0	0	2988
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	45.6	0	0	0	0	0	0	0	54.4	0	0	0	0	0	0	0	
Cars	0	1352	0	0	0	0	0	0	0	1608	0	0	0	0	0	0	0	2960
% Cars	0	99.1	0	0	0	0	0	0	0	99	0	0	0	0	0	0	0	99.1
Heavy Vehicles	0	12	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	28
% Heavy Vehicles	0	0.9	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.9

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	168	0	0	168	0	0	0	0	0	0	209	0	0	209	0	0	0	0	0	377
12:15 PM	0	180	0	0	180	0	0	0	0	0	0	182	0	0	182	0	0	0	0	0	362
12:30 PM	0	188	0	0	188	0	0	0	0	0	0	209	0	0	209	0	0	0	0	0	397
12:45 PM	0	191	0	0	191	0	0	0	0	0	0	222	0	0	222	0	0	0	0	0	413
Total Volume	0	727	0	0	727	0	0	0	0	0	0	822	0	0	822	0	0	0	0	0	1549
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.952	.000	.000	.952	.000	.000	.000	.000	.000	.000	.926	.000	.000	.926	.000	.000	.000	.000	.000	.938
Cars	0	720	0	0	720	0	0	0	0	0	0	813	0	0	813	0	0	0	0	0	1533
% Cars	0	99.0	0	0	99.0	0	0	0	0	0	0	98.9	0	0	98.9	0	0	0	0	0	99.0
Heavy Vehicles	0	7	0	0	7	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	16
% Heavy Vehicles	0	1.0	0	0	1.0	0	0	0	0	0	0	1.1	0	0	1.1	0	0	0	0	0	1.0



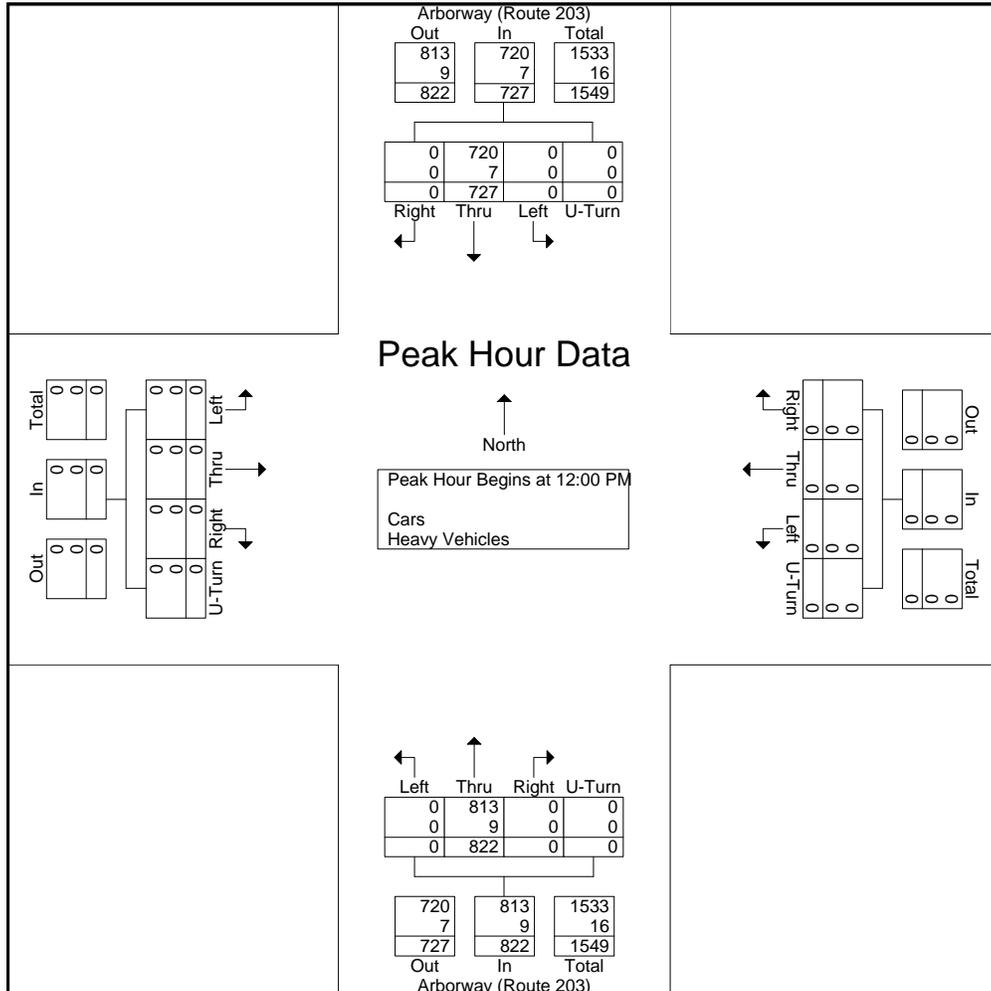
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File Name : 133500 CCCCC
Site Code : 6033
Start Date : 9/14/2013
Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	168	0	0	168	0	0	0	0	0	0	209	0	0	209	0	0	0	0	0	377
12:15 PM	0	180	0	0	180	0	0	0	0	0	0	182	0	0	182	0	0	0	0	0	362
12:30 PM	0	188	0	0	188	0	0	0	0	0	0	209	0	0	209	0	0	0	0	0	397
12:45 PM	0	191	0	0	191	0	0	0	0	0	0	222	0	0	222	0	0	0	0	0	413
Total Volume	0	727	0	0	727	0	0	0	0	0	0	822	0	0	822	0	0	0	0	0	1549
% App. Total	0	100	0	0		0	0	0	0	0	0	100	0	0		0	0	0	0	0	
PHF	.000	.952	.000	.000	.952	.000	.000	.000	.000	.000	.000	.926	.000	.000	.926	.000	.000	.000	.000	.000	.938
Cars	0	720	0	0	720	0	0	0	0	0	0	813	0	0	813	0	0	0	0	0	1533
% Cars	0	99.0	0	0	99.0	0	0	0	0	0	0	98.9	0	0	98.9	0	0	0	0	0	99.0
Heavy Vehicles	0	7	0	0	7	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	16
% Heavy Vehicles	0	1.0	0	0	1.0	0	0	0	0	0	0	1.1	0	0	1.1	0	0	0	0	0	1.0





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File Name : 133500 CCCCCC

Site Code : 6033

Start Date : 9/14/2013

Page No : 1

N/S: Arborway (Route 203)

E/W: north of Custer Street

City, State: Boston, MA

Client: Toole Design Group/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway (Route 203) From North				From East				Arborway (Route 203) From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
04:00 PM	0	203	0	0	0	0	0	0	0	191	0	0	0	0	0	0	0	394
04:15 PM	0	236	0	0	0	0	0	0	0	207	0	0	0	0	0	0	0	443
04:30 PM	0	215	0	0	0	0	0	0	0	209	0	0	0	0	0	0	0	424
04:45 PM	0	220	0	0	0	0	0	0	0	167	0	0	0	0	0	0	0	387
Total	0	874	0	0	0	0	0	0	0	774	0	0	0	0	0	0	0	1648
05:00 PM	0	200	0	0	0	0	0	0	0	183	0	0	0	0	0	0	0	383
05:15 PM	0	216	0	0	0	0	0	0	0	178	0	0	0	0	0	0	0	394
05:30 PM	0	183	0	0	0	0	0	0	0	176	0	0	0	0	0	0	0	359
05:45 PM	0	172	0	0	0	0	0	0	0	171	0	0	0	0	0	0	0	343
Total	0	771	0	0	0	0	0	0	0	708	0	0	0	0	0	0	0	1479
Grand Total	0	1645	0	0	0	0	0	0	0	1482	0	0	0	0	0	0	0	3127
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	52.6	0	0	0	0	0	0	0	47.4	0	0	0	0	0	0	0	
Cars	0	1634	0	0	0	0	0	0	0	1471	0	0	0	0	0	0	0	3105
% Cars	0	99.3	0	0	0	0	0	0	0	99.3	0	0	0	0	0	0	0	99.3
Heavy Vehicles	0	11	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	22
% Heavy Vehicles	0	0.7	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0.7

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	203	0	0	203	0	0	0	0	0	0	191	0	0	191	0	0	0	0	0	394
04:15 PM	0	236	0	0	236	0	0	0	0	0	0	207	0	0	207	0	0	0	0	0	443
04:30 PM	0	215	0	0	215	0	0	0	0	0	0	209	0	0	209	0	0	0	0	0	424
04:45 PM	0	220	0	0	220	0	0	0	0	0	0	167	0	0	167	0	0	0	0	0	387
Total Volume	0	874	0	0	874	0	0	0	0	0	0	774	0	0	774	0	0	0	0	0	1648
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.926	.000	.000	.926	.000	.000	.000	.000	.000	.000	.926	.000	.000	.926	.000	.000	.000	.000	.000	.930
Cars	0	867	0	0	867	0	0	0	0	0	0	767	0	0	767	0	0	0	0	0	1634
% Cars	0	99.2	0	0	99.2	0	0	0	0	0	0	99.1	0	0	99.1	0	0	0	0	0	99.2
Heavy Vehicles	0	7	0	0	7	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	14
% Heavy Vehicles	0	0.8	0	0	0.8	0	0	0	0	0	0	0.9	0	0	0.9	0	0	0	0	0	0.8



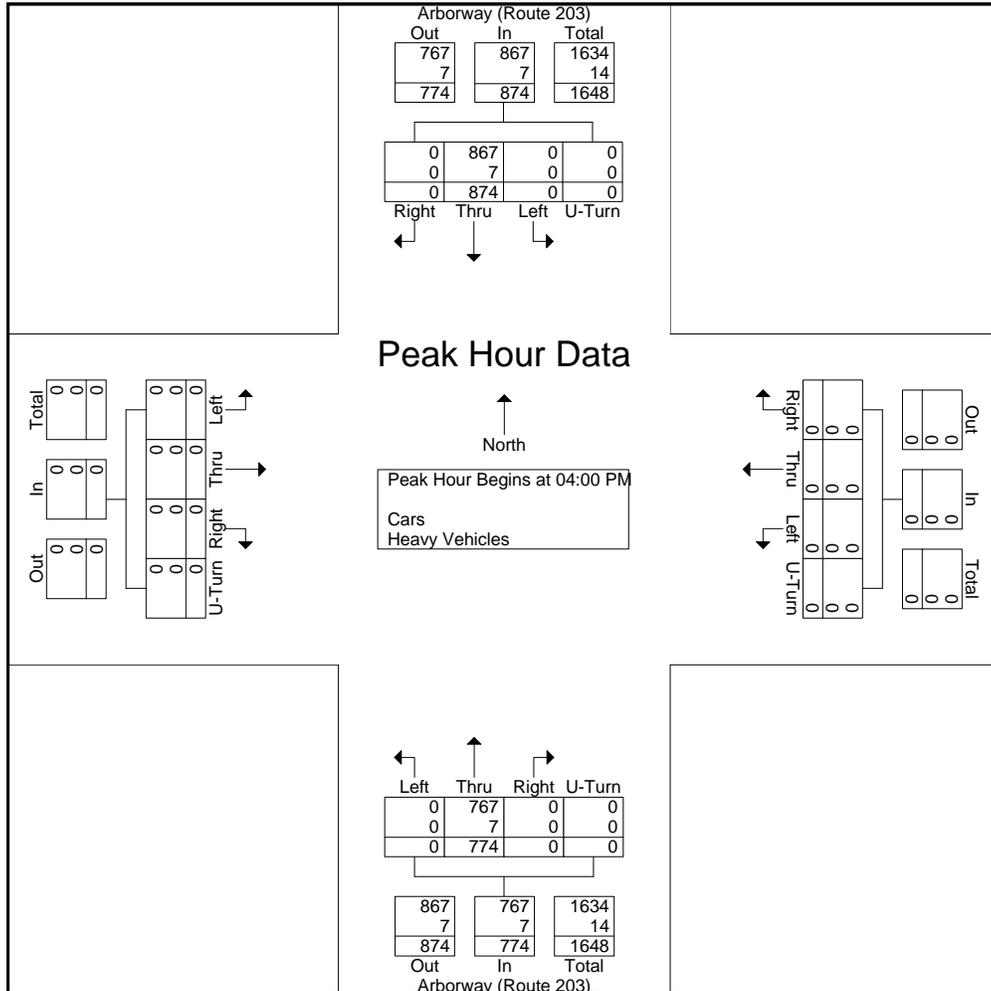
PRECISION
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File Name : 133500 CCCCCC
Site Code : 6033
Start Date : 9/14/2013
Page No : 1

N/S: Arborway (Route 203)
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Start Time	Arborway (Route 203) From North					From East					Arborway (Route 203) From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	203	0	0	203	0	0	0	0	0	0	191	0	0	191	0	0	0	0	0	394
04:15 PM	0	236	0	0	236	0	0	0	0	0	0	207	0	0	207	0	0	0	0	0	443
04:30 PM	0	215	0	0	215	0	0	0	0	0	0	209	0	0	209	0	0	0	0	0	424
04:45 PM	0	220	0	0	220	0	0	0	0	0	0	167	0	0	167	0	0	0	0	0	387
Total Volume	0	874	0	0	874	0	0	0	0	0	0	774	0	0	774	0	0	0	0	0	1648
% App. Total	0	100	0	0		0	0	0	0	0	0	100	0	0		0	0	0	0	0	
PHF	.000	.926	.000	.000	.926	.000	.000	.000	.000	.000	.000	.926	.000	.000	.926	.000	.000	.000	.000	.000	.930
Cars	0	867	0	0	867	0	0	0	0	0	0	767	0	0	767	0	0	0	0	0	1634
% Cars	0	99.2	0	0	99.2	0	0	0	0	0	0	99.1	0	0	99.1	0	0	0	0	0	99.2
Heavy Vehicles	0	7	0	0	7	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	14
% Heavy Vehicles	0	0.8	0	0	0.8	0	0	0	0	0	0	0.9	0	0	0.9	0	0	0	0	0	0.8





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File Name : 133500 DDDD
Site Code : 6033
Start Date : 9/14/2013
Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Groups Printed- Heavy Vehicles

Start Time	Arborway Carriage Road From North				From East				Arborway Carriage Road From South				From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	
Total %	0	50	0	0	0	0	0	0	0	50	0	0	0	0	0	0	

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% App. Total	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.250



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File Name : 133500 DDDD
Site Code : 6033
Start Date : 9/14/2013
Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

Groups Printed- Peds and Bikes

Start Time	Arborway Carriage Road From North				From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	3
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	0	0	0	8
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	5
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	6
Total	0	0	0	0	0	0	0	0	0	0	0	0	13	9	0	0	0	0	0	22
08:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	4	0	0	0	0	0	8
08:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	10	4	0	0	0	0	0	17
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	6	8	0	0	0	0	0	14
08:45 AM	0	0	0	0	0	0	0	0	0	0	5	0	6	5	0	0	0	0	0	16
Total	0	3	0	0	0	0	0	0	0	0	7	0	24	21	0	0	0	0	0	55
Grand Total	0	3	0	0	0	0	0	0	0	0	7	0	37	30	0	0	0	0	0	77
Apprch %	0	100	0	0	0	0	0	0	0	0	9.5	0	50	40.5	0	0	0	0	0	
Total %	0	3.9	0	0	0	0	0	0	0	0	9.1	0	48.1	39	0	0	0	0	0	

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total						
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left		Peds NB	Peds SB	App. Total			
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																											
Peak Hour for Entire Intersection Begins at 08:00 AM																											
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	4	8	0	0	0	0	0	0	0	0	0	8
08:15 AM	0	3	0	0	3	0	0	0	0	0	0	0	0	0	10	4	14	0	0	0	0	0	0	0	0	0	17
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8	14	0	0	0	0	0	0	0	0	0	14
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	5	0	6	5	16	0	0	0	0	0	0	0	0	0	16
Total Volume	0	3	0	0	3	0	0	0	0	0	0	0	7	0	24	21	52	0	0	0	0	0	0	0	0	0	55
% App. Total	0	100	0	0		0	0	0	0	0		0	13.5	0	46.2	40.4		0	0	0	0	0	0	0	0	0	
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.350	.000	.600	.656	.813	.000	.000	.000	.000	.000	.000	.000	.000	.000	.809



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File Name : 133500 DDDDD

Site Code : 6033

Start Date : 9/14/2013

Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway Carriage Road From North				From East				Arborway Carriage Road From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
11:00 AM	0	15	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	38
11:15 AM	0	4	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	24
11:30 AM	0	13	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	37
11:45 AM	0	12	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	44
Total	0	44	0	0	0	0	0	0	0	99	0	0	0	0	0	0	0	143
12:00 PM	0	5	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	20
12:15 PM	0	11	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	31
12:30 PM	0	14	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	39
12:45 PM	0	10	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	29
Total	0	40	0	0	0	0	0	0	0	79	0	0	0	0	0	0	0	119
Grand Total	0	84	0	0	0	0	0	0	0	178	0	0	0	0	0	0	0	262
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	32.1	0	0	0	0	0	0	0	67.9	0	0	0	0	0	0	0	
Cars	0	84	0	0	0	0	0	0	0	173	0	0	0	0	0	0	0	257
% Cars	0	100	0	0	0	0	0	0	0	97.2	0	0	0	0	0	0	0	98.1
Heavy Vehicles	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	2.8	0	0	0	0	0	0	0	1.9

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:00 AM																					
11:00 AM	0	15	0	0	15	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	38
11:15 AM	0	4	0	0	4	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	24
11:30 AM	0	13	0	0	13	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	37
11:45 AM	0	12	0	0	12	0	0	0	0	0	0	32	0	0	32	0	0	0	0	0	44
Total Volume	0	44	0	0	44	0	0	0	0	0	0	99	0	0	99	0	0	0	0	0	143
% App. Total	0	100	0	0	100	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	
PHF	.000	.733	.000	.000	.733	.000	.000	.000	.000	.000	.000	.773	.000	.000	.773	.000	.000	.000	.000	.000	.813
Cars	0	44	0	0	44	0	0	0	0	0	0	97	0	0	97	0	0	0	0	0	141
% Cars	0	100	0	0	100	0	0	0	0	0	0	98.0	0	0	98.0	0	0	0	0	0	98.6
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	2.0	0	0	2.0	0	0	0	0	0	1.4



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File Name : 133500 DDDDD
Site Code : 6033
Start Date : 9/14/2013
Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Groups Printed- Heavy Vehicles

Start Time	Arborway Carriage Road From North				From East				Arborway Carriage Road From South				From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
Total	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
Grand Total	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5
Apprch %	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total Volume	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	4
% App. Total	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.500



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File Name : 133500 DDDDD

Site Code : 6033

Start Date : 9/14/2013

Page No : 1

N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Groups Printed- Peds and Bikes

Start Time	Arborway Carriage Road From North				From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	5
11:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	4	7	0	0	0	0	0	13
11:30 AM	0	1	0	0	0	0	0	0	0	0	1	0	7	8	0	0	0	0	0	17
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	11	3	0	0	0	0	0	14
Total	0	1	0	0	0	0	0	0	0	0	3	0	26	19	0	0	0	0	0	49
12:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	6	4	0	0	0	0	0	12
12:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	5	7	0	0	0	0	0	14
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	12	0	0	0	0	0	14
12:45 PM	0	3	0	0	0	0	0	0	0	0	2	0	7	3	0	0	0	0	0	15
Total	0	3	0	0	0	0	0	0	0	0	6	0	20	26	0	0	0	0	0	55
Grand Total	0	4	0	0	0	0	0	0	0	0	9	0	46	45	0	0	0	0	0	104
Apprch %	0	100	0	0	0	0	0	0	0	0	9	0	46	45	0	0	0	0	0	
Total %	0	3.8	0	0	0	0	0	0	0	0	8.7	0	44.2	43.3	0	0	0	0	0	

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left		Peds NB	Peds SB	App. Total		
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 11:30 AM																										
11:30 AM	0	1	0	0	1	0	0	0	0	0	0	1	0	7	8	16	0	0	0	0	0	0	0	0	0	17
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	11	3	14	0	0	0	0	0	0	0	0	0	14
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	6	4	12	0	0	0	0	0	0	0	0	0	12
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	5	7	14	0	0	0	0	0	0	0	0	0	14
Total Volume	0	1	0	0	1	0	0	0	0	0	0	5	0	29	22	56	0	0	0	0	0	0	0	0	0	57
% App. Total	0	100	0	0		0	0	0	0	0	0	8.9	0	51.8	39.3		0	0	0	0	0	0	0	0	0	
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.625	.000	.659	.688	.875	.000	.000	.000	.000	.000	.000	.000	.000	.838	



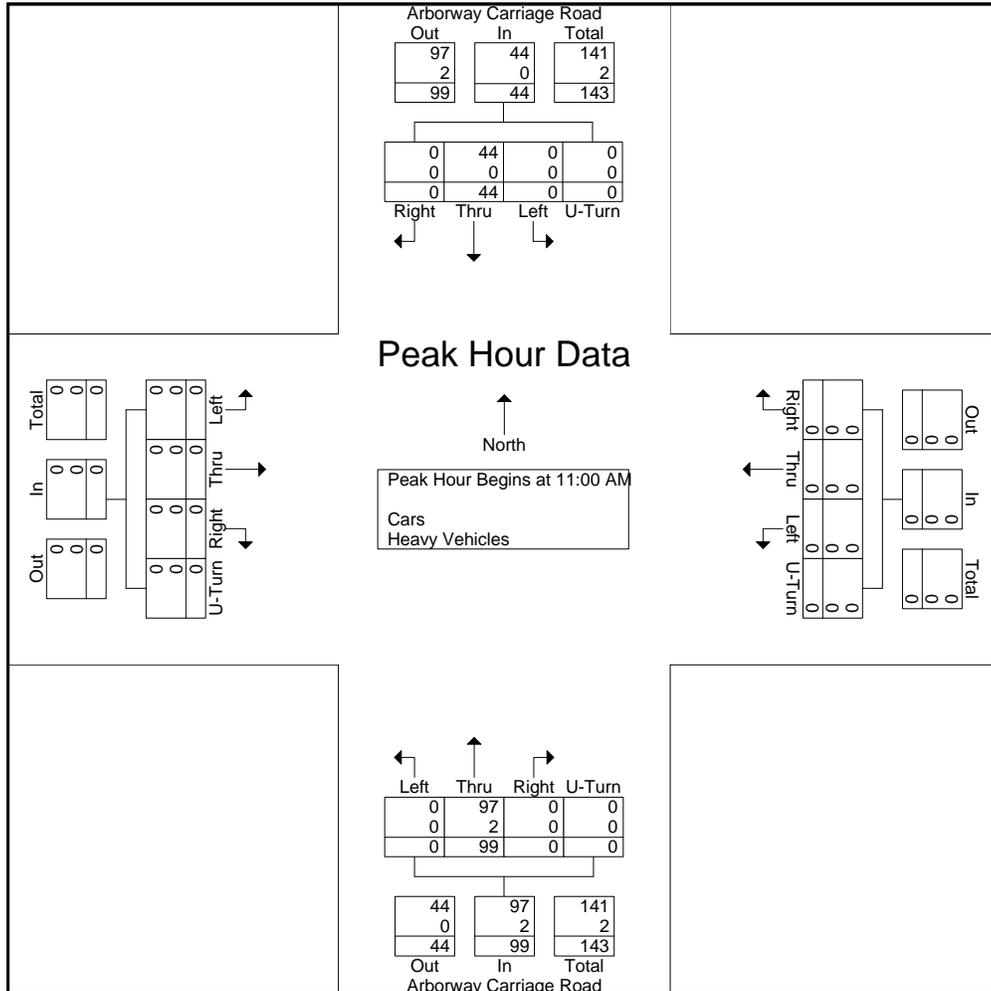
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N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design/ M. Danila

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total	
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total		
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 11:00 AM																						
11:00 AM	0	15	0	0	15	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	38
11:15 AM	0	4	0	0	4	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	0	24
11:30 AM	0	13	0	0	13	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	0	37
11:45 AM	0	12	0	0	12	0	0	0	0	0	0	32	0	0	32	0	0	0	0	0	0	44
Total Volume	0	44	0	0	44	0	0	0	0	0	0	99	0	0	99	0	0	0	0	0	0	143
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		0	
PHF	.000	.733	.000	.000	.733	.000	.000	.000	.000	.000	.000	.773	.000	.000	.773	.000	.000	.000	.000	.000	.000	.813
Cars	0	44	0	0	44	0	0	0	0	0	0	97	0	0	97	0	0	0	0	0	0	141
% Cars	0	100	0	0	100	0	0	0	0	0	0	98.0	0	0	98.0	0	0	0	0	0	0	98.6
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	2.0	0	0	2.0	0	0	0	0	0	0	1.4





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N/S: Arborway Carriage Road
E/W: north of Custer Street
City, State: Boston, MA
Client: Toole Design Group/ M. Danila

File Name : 133500 DDDDDD
Site Code : 6033
Start Date : 9/14/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Arborway Carriage Road From North				From East				Arborway Carriage Road From South				From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
04:00 PM	0	13	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	33
04:15 PM	0	20	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	40
04:30 PM	0	11	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	30
04:45 PM	0	9	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	27
Total	0	53	0	0	0	0	0	0	0	77	0	0	0	0	0	0	0	130
05:00 PM	0	12	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	30
05:15 PM	0	16	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	35
05:30 PM	0	11	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	26
05:45 PM	0	6	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	22
Total	0	45	0	0	0	0	0	0	0	68	0	0	0	0	0	0	0	113
Grand Total	0	98	0	0	0	0	0	0	0	145	0	0	0	0	0	0	0	243
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	40.3	0	0	0	0	0	0	0	59.7	0	0	0	0	0	0	0	
Cars	0	98	0	0	0	0	0	0	0	144	0	0	0	0	0	0	0	242
% Cars	0	100	0	0	0	0	0	0	0	99.3	0	0	0	0	0	0	0	99.6
Heavy Vehicles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0.4

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	13	0	0	13	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	33
04:15 PM	0	20	0	0	20	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	40
04:30 PM	0	11	0	0	11	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	30
04:45 PM	0	9	0	0	9	0	0	0	0	0	0	18	0	0	18	0	0	0	0	0	27
Total Volume	0	53	0	0	53	0	0	0	0	0	0	77	0	0	77	0	0	0	0	0	130
% App. Total	0	100	0	0	100	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	
PHF	.000	.663	.000	.000	.663	.000	.000	.000	.000	.000	.000	.963	.000	.000	.963	.000	.000	.000	.000	.000	.813
Cars	0	53	0	0	53	0	0	0	0	0	0	76	0	0	76	0	0	0	0	0	129
% Cars	0	100	0	0	100	0	0	0	0	0	0	98.7	0	0	98.7	0	0	0	0	0	99.2
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	1.3	0	0	1.3	0	0	0	0	0	0.8



PRECISION
D A T A
INDUSTRIES, LLC

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Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 133500 DDDDDD

Site Code : 6033

Start Date : 9/14/2013

Page No : 1

N/S: Arborway Carriage Road

E/W: north of Custer Street

City, State: Boston, MA

Client: Toole Design Group/ M. Danila

Groups Printed- Heavy Vehicles

Start Time	Arborway Carriage Road From North				From East				Arborway Carriage Road From South				From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Apprch %	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	

Start Time	Arborway Carriage Road From North					From East					Arborway Carriage Road From South					From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% App. Total	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.250

Appendix B: Stakeholder's Meeting



MEETING AGENDA

Subject: "Upper Arborway" at the Arboretum
Project: Emerald Necklace Crosswalk Improvements
Date: 8/19/2013
Time: 6 PM
Location: Arboretum

1. Introductions
2. Introductions of project team
3. Project goals and deliverables
4. Summary of initial fieldwork and observations
5. Discussion
6. Next steps and schedule

Emerald Necklace Crosswalk Improvements at Three Locations
Stakeholders Meeting
 Arboretum - 8/19/2013 - 6:00 PM

NUM	NAME	COMPANY/ORG.	TELEPHONE	EMAIL
1	Ann + Jim Stillman		617-524-2387	astillman@hotmail.com
2	Dottie FARRELL		617 893 2024	dottiefarrell@gmail.com
3	Sarah freeman		617-524-0602	freemansherwood@hotmail.com
4	John Crockett		617-522-2700	jcrockett@emeraldnecklace.org
5	John P. Jappini		617 451-2292	John.Jappini@verizon.net
6	John PMA		617 824 4444	jk4004@aol.com
7	Celeste Walker		617-524-7449	walker.c@verizon.net
8	Andrea Howley		617-571-4159	andhowcc@aol.com
9	Shannon Olin		617 512-4197	olinshannon@gmail.com

10	MARY HICKIE	ENC	617 522-2700	mhickie@emeraldnecklace.org.
11	Beth Worell	164 Arborway	617 522 7316	beth@bawarchitects.com
12	Michael Baker	Rep Sanchez	617-722-2130	Michael.Baker@mahouse.gov
13	KEVIN MOLONEY	JPA	617.522 .3588	KEVINFMOLONEY@CMGASV.VER
14	Steve Schneider	Arnold Arboretum		stephen-schneider@harvard.edu
15				
16				
17				
18				
19				
20				

Appendix C: Public Meeting



Department of Conservation and Recreation
Commonwealth of Massachusetts



The Arborway Coalition
<http://gatewaytothearborway.blogspot.com/>

Public Meeting

Arborway Crosswalk Improvements at the Arboretum

Tuesday, May 6, 2014 – 7 p.m. – 8:30 p.m.
First Church in Jamaica Plain, Unitarian Universalist
Six Eliot Street (Across from the Monument)

AGENDA

- 7:00 p.m. – 7:05 p.m. Welcome/Introduction
Patrice Kish, DCR Director of Office of Cultural Resources
Sarah Freeman, The Arborway Coalition
- 7:05 p.m. – 7:35 p.m. Presentation
Nick Jackson, Regional Office Director, Toole Design Group
Jessica Mortell, EIT, Toole Design Group
- 7:35 p.m. – 8:25 p.m. Q&A/Discussion
Moderated by Patrice Kish
- 8:25 p.m. – 8:30 p.m. Closing Remarks
Patrice Kish
Sarah Freeman

Join us on Twitter @ [MassDCR!](#)

To view tonight's presentation, visit <http://www.mass.gov/eea/agencies/dcr/public-outreach/public-meetings/>. If you have comments regarding the project, please email DCR.Updates@state.ma.us, noting "Arborway Crossing" in the subject line or write to the DCR Office of Public Outreach, 251 Causeway St., 6th Floor, Boston, MA 02114. The deadline for comments is Tuesday, May 20, 2014.

If you have questions or concerns or would like to be added to an email list to receive DCR project-related or general announcements, please email mass.parks@state.ma.us or call 617-626-4973.

From: Kevin Handly [<mailto:khandly@hotmail.com>]
Sent: Tuesday, May 20, 2014 5:09 PM
To: Updates, DCR (DCR)
Cc: SARAH FREEMAN; Wendy Landman; Don Eunson
Subject: Arboretum Crossing Improvements

Dear DCR,

You are right to focus on this heavily used and very dangerously designed pedestrian crossing. In its present configuration, it is similar to the hazardous adjacent but not integrated crossings of the Rose Kennedy Greenway Surface Road and I-93 Northbound entrance ramp at South Street. **VERY DANGEROUS AND CONFUSING FOR PEDESTRIANS.** The crossing of the "Outer" (two way street) Arborway and the "Major" (4-lane highway) Arborway should clearly be a single integrated crossing controlled by a single set of lights. There is not a sufficient spacial or line of sight break between the two adjoining roadways for the crossing of both not to be integrated. For them not to be integrated is confusing in the extreme for pedestrians and an inducement for impatient vehicles to speed on the Outer Arborway. As long as the crossings of these adjacent roadways are not integrated, rush hour traffic will continue to use the "Street" Arborway as a cut-through to avoid the crossing light on the highway Arborway, and pedestrians crossing both will continue to be surprised when cars whiz through the crossing on the street Arborway even the walk signal is showing on the highway side.

Just properly controlling the Arboretum crossing is not enough to assure even a modicum of pedestrian and bicyclist safety, however. You must also redesign and realign the intersection of the Arborway and Centre Street, which is currently extremely dangerous and confusing for pedestrians attempting to cross either the Arborway or Centre Street. You should make the following improvements:

1. Realign the "street" Arborway so it aligns properly with the opening of Orchard Street onto the north side of Centre Street.
2. Eliminate the rounded corners and safety island at the intersection of Arborway Street and Centre Street, reducing Arborway Street to normal width (same as Orchard) at that intersection and making the intersection corners sharp right angle turns for cars.
3. Clearly mark and protect a pedestrian crossing of Centre Street on the east (Monument) side of Arborway/Orchard Street and pedestrian crossings of (i) Orchard Street and (ii) Arborway Street on the north and south sides of Centre Street.
4. Eliminate the rounded curve and mini "safety" island where the Arborway (highway) meets Centre Street. Replace with a single clearly marked crosswalk and sharp square corners.
5. Allow cars exiting Prince Street to take a left turn onto Centre Street, taking full advantage of their green light and the red lights and no turn on red sign facing Centre Street traffic.
6. Realign the Arborway Highway so that it directs commuting northbound traffic into and through Murray Circle and into the center carriageway of the Arborway above Murray Circle. Make it difficult for northbound Arborway commuting traffic to enter the outer Arborway carriage road (adjacent to our homes).
7. Post noise/car horn/siren abatement signs up and down both sides of the Arborway and Centre Street. The siren noise is deafening and constant here.
8. Reduce the posted speed limit on the Arborway (all roadways) to 25 MPH.
9. ENFORCE the speed limit.
10. ENFORCE the truck and bus exclusion (new signs are needed. They've been knocked out by illegal trucks and buses.)
11. Remove the iron picket fence separating the Street Arborway from the Highway Arborway. It is a death trap for pedestrians caught crossing the Arborway highway and blocks the vision of both pedestrians and drivers.
12. Add two more stoplight controlled pedestrian crossings of the Arborway highway: 1 at what is now the northern (western?) terminus of the Casey Overpass; a 2nd half way between the two Arboretum entrances.

13. Post SLOW DENSELY POPULATED RESIDENTIAL AREA signs up and down the Arborway, especially on the northbound side between Casey Overpass and Kelly Circle.
14. Reconfigure Murray and Kelly Circles as square, light controlled intersections similar to the light controlled intersections crossing the Commonwealth Mall.
15. Reduce the center Arborway between Centre Street and the J-way to 3 traffic lanes with the center lane changing direction to accommodate rush hour traffic.
16. Reduce the outer Arborway between Centre Street and the J-way to single traffic lanes with well marked and protected bicycle/recreation lanes.

That would be a good start.

Thank you for thinking about pedestrian safety on the Arborway. As you can see from the above comments, I believe the plans you presented need to be revised substantially to make significant improvement in pedestrian (and bicyclist and resident) safety on the Arborway.

By the way, when will you finally repair the damage done to the Frances Parkman Drive and Kelly Circle greens by the contractors who used the park greens as staging areas for the Eliot Street and France Parkman Drive crossings improvements? It's going on 2 years now that I have been complaining about the damage done to the historic stone wall and the gravel left on the greens by your landscaping contractor. Before you start the next project can you at least properly complete the first one?

Sincerely,

Kevin Handly
26 Arborway
Jamaica Plain MA 02130
Tel. 617-448-6515
khandly@hotmail.com

Please sponsor me in the 2014 Boston Marathon and help WalkBoston promote pedestrian safety in Massachusetts. Go to: <http://www.crowdrise.com/walkboston2014bostonmarathon/fundraiser/PondRunner>

From: Michael Frank [<mailto:mfrank8888@gmail.com>]

Sent: Tuesday, May 20, 2014 4:43 PM

To: Updates, DCR (DCR)

Subject: Arborway Crossing

I regret that I could not attend the meeting May 6, but have reviewed the plans presented by DCR to improve the conditions for pedestrian crossing of the Arborway. I am very concerned about the concept of a "tiered approach" for fear that after implementing the initial improvements, the State will make no more improvements until someone is injured in an accident.

Therefore, I would urge the State of Massachusetts to make whatever improvements to the signs, road markings, movement of the existing fence AS WELL AS make plans to install the "Rectangular Rapid Flash Beacon" described in the presentation.

Thank you,

Michael Frank
45 Aldworth St.
Jamaica Plain, MA 02130

From: Updates, DCR (DCR) [<mailto:dcr.updates@state.ma.us>]

Sent: Tuesday, May 20, 2014 3:38 PM

To: Kish, Patrice (DCR); Jessica Mortell

Cc: Boogdanian, Dolores (DCR)

Subject: Input on Arborway Crossing

Passing along input on Arborway Crossing submitted by Dolores Boogdanian on the DCR Updates phone line:

The curb extensions and edging must be painted in a bright color. Otherwise they are a hazard to people in cars and other users on the road.

From: claire@barker.net

To: DCR.Updates@state.ma.us

Subject: Comments on Upper Arborway Crossing Planning

Date: Wed, 7 May 2014 12:27:04 -0400

Thank you for working with our community to improve safety at these crossings. I use them regularly, both on foot and on bike. I was not able to attend the May 6 presentation, and offer these comments by email:

Speed and ignoring pedestrians is a very serious problem, as already documented. Particularly in the afternoon rush hour, I often see cars accelerating to 50mph as they round the Kelly Circle and head past the Arborway. The only way to cross at the light is to wait for the walk signal and then make eye contact with drivers to make sure they see you and are stopped.

A pedestrian countdown for the crossing light is a good idea.

Signage just adds to the existing roadside clutter and it doesn't seem as though it will help much, but I can understand if it's a required first step.

In my experience, auto lane rumble strips and raised pavements are much more effective, and don't need to cause inordinate problems for emergency vehicles as is sometimes claimed. I recently drove 1200km in rural northern Spain (posted speeds between [30-120](#)km/hr), where these are very common in the 50-70 km/hr zones. They certainly get the driver's attention!

Thank you,

Claire Barker

[32 Orchard St](#)

[Jamaica Plain MA 02130](#)

[617-522-2657](tel:617-522-2657)

From: Bill Thompson [<mailto:billtstudio@verizon.net>]

Sent: Sunday, May 18, 2014 10:14 PM

To: Updates, DCR (DCR)

Subject: Arborway Crossing

We own a home on Jamaica Street and visit the Arboretum on a daily basis. Regarding the safety upgrade for the crossing, our first choice would be Tier 3, second choice Tier 1.

Thanks,

Bill Thompson
Natalie Pangaro

41 Jamaica Street
Jamaica Plain, MA 02130

home: 617.524.4974
mobile: 617.645.8011

From: barron.patrick@gmail.com [<mailto:barron.patrick@gmail.com>] **On Behalf Of** Patrick Barron

Sent: Monday, May 12, 2014 10:17 PM

To: Updates, DCR (DCR)

Subject: Re: Arborway Crossing

Our apologies, but we overlooked the link to the May 6th presentation. We support geometrical modifications as a first choice, ideally with the flashing beacon (and of course upgraded fence, signal and signage).

the first tier option of a simple sign in the middle of the road seems as if it would be ineffective.

On Monday, May 12, 2014, Patrick Barron <patrick.barron@umb.edu> wrote:

Although we were unable to attend the May 6th meeting to discuss design solutions for the troublesome Arborway Crossing (our second child was born that evening), we are writing to voice my support for the whatever option makes it safest for pedestrians and bikers. An extension of the traffic signal to stop all vehicular traffic makes most sense to us, along with the lowering or the removal of the metal fence that restricts pedestrian-car line-of-sight. Speed bumps are another possibility. Clearly, additional signage alone will be ineffective. In order to give more specific input, we would find it useful to have some idea of what the proposed design solutions are, since these are not described in your follow-up email.

Thank you,

Patrick Barron and Manuela Mariani

45 Jamaica Street

Boston, MA 02130

From: barron.patrick@gmail.com [<mailto:barron.patrick@gmail.com>] **On Behalf Of** Patrick Barron

Sent: Tuesday, May 13, 2014 12:34 PM

To: Updates, DCR (DCR)

Subject: Re: Arborway Crossing

For what it's worth, here's an article from today's New York Times on infrastructure's role in pedestrian and cyclist safety--comparing Sweden and New York City.

From: Claire Barker [<mailto:claire@barker.net>]

Sent: Wednesday, May 07, 2014 12:27 PM

To: Updates, DCR (DCR)

Subject: Comments on Upper Arborway Crossing Planning

Thank you for working with our community to improve safety at these crossings. I use them regularly, both on foot and on bike. I was not able to attend the May 6 presentation, and offer these comments by email:

1. Speed and ignoring pedestrians is a very serious problem, as already documented. Particularly in the afternoon rush hour, I often see cars accelerating to 50mph as they round the Kelly Circle and head past the Arborway. The only way to cross at the light is to wait for the walk signal and then make eye contact with drivers to make sure they see you and are stopped.
2. A pedestrian countdown for the crossing light is a good idea.
3. Signage just adds to the existing roadside clutter and it doesn't seem as though it will help much, but I can understand if it's a required first step.
4. In my experience, auto lane rumble strips and raised pavements are much more effective, and don't need to cause inordinate problems for emergency vehicles as is sometimes claimed. I recently drove 1200km in rural northern Spain (posted speeds between 30-120km/hr), where these are very common in the 50-70 km/hr zones. They certainly get the driver's attention!

Thank you,
Claire Barker
32 Orchard St
Jamaica Plain MA 02130
617-522-2657

From: Ajay S [<mailto:ajay99@gmail.com>]

Sent: Tuesday, May 06, 2014 11:24 PM

To: Updates, DCR (DCR)

Subject: Arborway Crossing

Hi,

I was one of the many who attended tonight's public meeting. While I am heartened to see that the crossing will be made less dangerous, I still have many concerns.

The architects said that people who used the crossing stopped and looked both ways before crossing the Upper Arborway. Since many of the people using the crossing live in the area and are aware of the danger, I'm not surprised that this is true. However, I have seen parents let their little kids on bikes ride ahead of them across the entire crossing, the kids failing to look for traffic. Coming upon such scenes, I wince and hope I don't see those children die. While these incidents are not the norm, it is not acceptable for even one person to be injured or killed at this crossing.

I understand that a signal is not "warranted" by federal guidelines, but the presentation did not make clear why it could not go in anyway. As was brought up a couple times by the public, this seems like the easiest and safest solution.

Please consider such a signal. And remove the fence immediately.

Thank you.

Ajay

From: Beth Worell [<mailto:beth@bawarchitects.com>]

Sent: Tuesday, May 20, 2014 4:23 PM

To: Updates, DCR (DCR)

Cc: Beth Worell; Joe Pryse; freemansherwood@hotmail.com FREEMAN

Subject: Arborway Crossing

To Whom It May Concern:

We are 25-year residents of 164 Arborway, located on the Upper Arborway a few houses away from the Arborway crosswalk. We are daily users of the crosswalk. We attended the neighborhood meeting on May 6 and are writing to submit comments for the Arborway Crossing improvements.

Overall, we are in support of the proposed improvements. We strongly support the ultimate goal of a *raised crosswalk* combined with rumble strips to warn drivers as they approach, along with better signage.

However, we have some concerns with the proposed interim "improvements."

1. Removing sections of the fence. This would have likely negative repercussions for two reasons.

Pedestrians: It has been our observation that pedestrians will cross at the shortest route, as soon as they perceive an opening. They frequently cross diagonally mid-Parkway (both the Upper and the main road), before the fence starts at the end of the Upper Arborway toward Centre Street, rather than walking down to the crosswalk. Our concern is that if the Arborway crossing opening is widened, some pedestrians will not walk all the way to the marked crosswalk at the Upper Arborway, but will cross diagonally from either direction as soon as they get close to the widened opening. Many will therefore not use the crosswalk at all, increasing the risk of an accident. The wider the opening, the wider the perceived crosswalk, whether it's within the markings or not.

Cars: Prior to installation and extension of the fencing, drivers notoriously and relentlessly drove over the median to avoid backed-up traffic on the main road (once even ending up in a neighbor's front yard). A wider opening will be an invitation, a "roadway" in effect, to encourage this dangerous behavior. Bollards will be critical in this case.

2. Rapid flash beacons. This is a residential neighborhood. Having seen the rapid flash beacons in other areas, we are concerned that the flashing lights would be very disturbing to all of the nearby neighbors and abutters. We feel this may be very disruptive to our families in our homes. This needs to be seriously considered and discussed with those living nearby.

3. Maintenance: It's wonderful to see action being taken to improve safety at the crosswalk, but it's discouraging to see the lack of adequate maintenance of the current fencing. A section of the fence was hit by a car quite some time ago, and still it sits there, a mangled eyesore. Could something be done about this?

Lastly, regarding markings on the crosswalks. I brought up the lack of markings on the main Arborway crosswalk at the meeting and was told that this was "a DCR standard." However, the new crosswalks at Eliot Street, also on the Arborway and DCR, are very well marked with bold, noticeable patterns. This should be the case for the entire Arborway crossing as well.

Thank you for the opportunity to submit our comments.

Beth Worell and Joe Pryse
164 Arborway
Jamaica Plain, MA 02130

From: SARAH FREEMAN [<mailto:freemansherwood@hotmail.com>]

Sent: Tuesday, May 20, 2014 3:55 PM

To: Updates, DCR (DCR)

Subject: Arborway crossing - comments

Importance: High

To: MA DCR DCR.updates@state.ma.us

Thank you for all you have done on this Partnership Matching Funds project for Pedestrian & Bicycle Safety Improvements at the Arboretum Crosswalk. It has been a pleasure working with you and the consultants from Toole Design, and we look forward to seeing some significant safety improvements implemented soon.

Through the Arborway Coalition's role as a partner in this project, I have received several questions and comments which also may have been submitted to you directly. Please see the summary/excerpts below in case I was the only recipient.

In general, residents are enthusiastic about improvements at this location. There are some questions that I wasn't able to answer, e.g.:

- * In a tiered approach, what is the trigger to go from phase 1 to phase 2, or from phase 2 to phase 3?
- * Re: light from the rectangular rapid flash beacons: if these are installed, can they be shielded and/or directed away from the houses nearby? How can the impact be minimized?
- * What are the guidelines that rule out a fully-signalized intersection? (request for the references)
- * If flashing lights are sufficient, why not install them now?

Excerpts from correspondence are below. There are a variety of opinions - I appreciate that so many local residents have attended the presentation or seen it on line and are continuing to think about the best possible outcome. It is now up to DCR to consider these comments and move forward. Thank you in advance for any improvements that come to fruition. Please let me know if you have any questions or if there's anything else I can do to help.

Submitted on behalf of the Arborway Coalition,
Sarah Freeman
22 Arborway, JP

Comment #1: From someone who was not able to attend the meeting:

- * Did any residents ask for general speed control, rather than just at the crosswalk?
- * Did anyone mention adding a fog line on the side of "Little Arborway" where the parking is? ... the next time there is restriping they could move to 10ft lanes.
- * ... they probably can't make at least part of the street one way, and reclaim the lane for greenspace. That would solve the speeding problem.
- * "Barring those solutions, they should just move ahead with phase 3. The big problem is that the crosswalk is in the shade of a big tree, and pedestrians are also hidden from view because of the tree trunk and the fence. Without slowed traffic and more visibility, any fix is a band-aid."

Comment #2: From a resident who lives near the crosswalk:

- * Concern about bright lights from Rectangular Rapid Flash beacon. Have these been used in proximity to residences? If implemented, is there a way to minimize the impact, e.g. direct the light away from the homes?

Comment #3: From someone who attended the meeting. He hadn't noticed rectangular Rapid Flash beacons in action prior to the presentation, but then noticed several shortly afterwards:

- * He believes the Rectangular Rapid Flash Beacons can work very well on the Upper Arborway.
- * In Wayland: two crosswalks with the square Rapid Flash Beacons on Main Street. Large solar panels on top, "making for a fair amount of hardware, but not a crazy amount."
- * "a child was riding a bike down the sidewalk. When he got to the crosswalk, the lights started flashing emphatically, I dutifully stopped at the line as the signage told me to do, and the kid crossed over without really breaking stride. As soon as he was a few feet beyond the crosswalk, the lights stopped flashing and I proceeded merrily on my way. Functional, effective, safe." I was

very impressed and have become an instant convert... They'd be perfect for the Arborway crosswalk on safety grounds.

* re: bright lights near homes at night: wouldn't be a problem at a crosswalk on the uphill side of St. Rose; side shields on the lights or somehow pointing them towards the road they are trying to communicate with might reduce that perception (if it is one).

* could really work if applied sensitively.

Comment #4: From a resident who could not attend the meeting, but uses the crosswalk regularly, both on foot and on bike & has ideas from recent travels:

* Speed and ignoring pedestrians is a very serious problem... Particularly in the afternoon rush hour, I often see cars accelerating... The only way to cross at the light is to wait for the walk signal and then make eye contact with drivers to make sure they see you and are stopped.

* "A pedestrian countdown for the crossing light is a good idea.

* Signage just adds to the existing roadside clutter and it doesn't seem as though it will help much, but I can understand if it's a required first step.

* In my experience, auto lane rumble strips and raised pavements are much more effective, and don't need to cause inordinate problems for emergency vehicles as is sometimes claimed. I recently drove 1200km in rural northern Spain (posted speeds between 30-120km/hr), where these are very common in the 50-70 km/hr zones. They certainly get the driver's attention!"

Comment #5: From a resident who was at the meeting very briefly, but couldn't stay for the presentation or Q & A:

* Treat as one crossing, not 2 (with signal)... it appears that the consultant has already determined that under published and accepted crossing design guidelines, the amount of foot traffic crossing the upper Arborway does not warrant a signal light. He requests a copy of the guidelines on which that conclusion is based.

* "As a pedestrian and bicyclist that uses that crossing regularly, it is obvious that a single set of integrated traffic and crossing lights should control the entire pedestrian and bicycle crossing at that location. Treating the crossing of the Upper Arborway as separate from the crossing of the Arborway Proper at the same location is illogical and confusing and therefore very dangerous."

* "Unless the same light controls all 6 lanes of traffic at that location, impatient rush hour drivers will continue to use the Upper Arborway as a speed-around to avoid the light on the Arborway Proper. Sensible pedestrians new to that location of course think (quite logically) that a white crossing light on the Arborway Proper gives them the go-ahead to safely cross all six lanes of traffic until they reach the relative safety of the sidewalk on the other side. The confluence of these two natural impulses inevitably yields motorist-pedestrian conflicts and confusion, which we both know means pedestrian casualties."

* " 'improvements' vs. cosmetics... This plan needs substantial modification to be worthy of neighborhood support."

* "There is a very similar pedestrian crossing situation at the intersection of South Street and the Greenway surface road and the I-93 northbound entrance ramp, downtown. It is a pedestrian death trap."

Comment #6: Neighborhood discussion:

* From someone initially hoping for a signal, but in light of the insufficient numbers/ warrants:

"Rapid flash beacons may be a fine solution for that crossing.. but concerned if the plan is to begin with markings, signs, and fence adjustments... **What is the trigger**" (for evaluation and moving to the next phase?)

If the flashing lights are sufficient, why not install them now?

Re: fence and visibility issues: it appears the fence could now be moved out since no underground gas lines appear in play...(thought to be an issue in the past).

Comment #7: From a resident who did not attend the meeting (I've heard the same question from others)

* Re: Damaged sections of the fence in the median across from Arnold Arboretum:

Please replace this portion of the fence; in the mean time, why not remove the damaged sections? It's a depressing view for the abutters and it sends a negative message to all who drive by it.

From: Jk4004@aol.com [<mailto:Jk4004@aol.com>]

Sent: Tuesday, May 20, 2014 2:47 PM

To: Updates, DCR (DCR)

Subject: Arborway crossing

To: MA Department of Conservation and Recreation

Subject: Comments on the Arborway-Arboretum crossing

The Jamaica Pond Association (JPA) submits the following comments in response to the presentation regarding the crossing at the public meeting held May 6th. First, the JPA would like to thank the Arborway Coalition and the MA DCR along with its consultant for the work done thus far. As noted at the meeting, one of the major issues relates to the black fence along the Arborway that significantly impacts the site lines for cars, bikers, and people walking to the Arboretum. The JPA supports the possible removal of one section of fence and relocating the fence line a few feet closer to the main Arborway. This should allow walkers and bikers to safely stay on the median yet be more visible to drivers along the adjacent Arborway hill road and also allow crossers to see oncoming cars. Overall, the JPA supports the tiered approach recommended by the consultants be implemented

Jack Fay Jr
JPA Chairperson

From: joanna werman [<mailto:joriginalbeadwork@gmail.com>]

Sent: Monday, May 19, 2014 12:13 PM

To: Updates, DCR (DCR)

Subject: Cross walk to arboretum

Hi

There used to be a sign in the middle of the street making drivers aware to stop for pedestrians in walk way. Where did it go and can we get a new one before all the building signage etc happens?

Joanna
617 999-5278

From: Hollenbeck, Kevin (DCR)

Sent: Monday, May 19, 2014 3:21 PM

To: Fiesinger, Anne (DCR)

Subject: RE: Cross walk to arboretum

Anne,

Sign was stolen. Replacement cost is not in this FY operation budget. This one of the suggestions of the study and hopefully capital money can be found to implement.

Kevin R. Hollenbeck

Stony Brook Neponset District Manager, MassParks

MA Department of Conservation and Recreation

12 Brainard Street

Hyde Park, MA 02136

617.333.7404 x 105

From: Klauber, Adam [<mailto:Adam.Klauber@icfi.com>]
Sent: Tuesday, May 13, 2014 12:52 PM
To: Updates, DCR (DCR)
Subject: Arborway Crossing Comments - please add to public record

To DCR,

I am submitting my comments for the public record and was not able to attend the public meeting on May 6th.

On August 11th, 2011 my wife Rebecca was struck in the crosswalk, on the Upper Arborway, returning from the Arboretum by a vehicle driven by Jamaica Plain resident Michael Novaria. She was hit as she left the median heading to the residential side of the street.

Rebecca was launched into the air and suffered a traumatic brain injury, a shattered humerus, multiple pelvic fractures, broken ribs, head and leg lacerations, and a punctured lung. Her trauma surgeon at Brigham and Women's hospital stated that the vehicle was likely traveling faster than 30mph and she is lucky to have survived. Rebecca spent one week in the trauma unit and another three at Spaulding Rehabilitation hospital. She was confined to a wheel chair for over four months and had over a year of physical and occupational therapy. Our three and five year sons went through the ordeal with us.

Based on our assessment of the crossing we believe that the primary cause of the accident is the roadway design. Visibility is obscured for eastbound traffic approaching the crossing due to the combined height of the fence line and curvature of the road.

My family would like other individuals to avoid our experience and also know that the next time an incident happens death could be a likely result.

Given my understanding of road safety from eight years working at the US Department of Transportation I understand that a crossing light might not be the appropriate safety measure for this particular crossing.

Based on the presentation materials – my family supports the full presented “Tier 3 Geometric Modifications” with these additions:

- 1) **Reduced Speed:** Reducing the speed limit to 20 mph and making modifications to road design to encourage slower driving so reduced speeds do not rely solely on posted signage
- 2) **Fence:** Moving (or removing) the fence so that it does not obstruct driver's vision
- 3) **Chichane alternative:** Reversing the chichanes as presented so that there is a new “bulb-out” from the median protected by vehicle bollards – this would require vehicles to turn to avoid it
- 4) **Additional chicanes:** Adding “approach” chichane bulb-outs on either side of the crossing so that vehicles are already slowed and turning before they reach the crossing
- 5) **Speed light:** Adding a “speed-light” camera to record travel speed/behavior. This might be the single best way for drivers to comply with the traffic requirements.
- 6) **Vision Zero:** Incorporating design concepts from “Vision Zero” that reduces cultural acceptance of avoidable traffic related pedestrian/bicycle deaths and engineers solutions that don't rely on driver compliance.

The statistical value of a human life according to the US Environmental Protection Agency is \$7.9 million – if these measures reduces the chance of one person dying on the Upper Arborway crossing all installation costs up to that amount at least are justified.

Hope that DCR understands the human toll of an extremely dangerous crossing and makes a good decision on steps to address.

Sincerely,

Adam Klauber

Adam Klauber, LEED AP, CEM | Senior Manager | office: 1.617.218.3525 | cell: 1.917.499.6494

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Please consider the environment before printing this email

From: clay_harper@comcast.net [mailto:clay_harper@comcast.net]

Sent: Monday, May 12, 2014 6:51 PM

To: freemansherwood@hotmail.com; Updates, DCR (DCR); clay_harper@comcast.net

Subject: Re: Arborway Crossing

Since writing the comments below, I have had occasion to experience Rapid Flash Beacons in action: two different ones in Wayland, and one quite nearby, south on Washington Street just beyond the Forest Hills T-station and the new Harvest Market.

At two of these locations, I witnessed families and young children crossing safely and without incident across otherwise dangerous roads thanks to these very effective beacons. I'm now quite convinced of their appropriateness for the Arborway Crosswalk location, and urge DCR to take no half-measures in improving this crosswalk, particularly with all the improvements to the Arborway that are coming.

Thank you for your consideration,

Clayton Harper
44 Hampstead Rd
Jamaica Plain

----- Original Message -----

From: Clay_Harper@comcast.net

To: DCR.updates@state.ma.us

Bcc: freemansherwood@hotmail.com

Sent: Wed May 7 04:13:59 UTC 2014

Subject: Arborway Crossing

Thank you for considering improvements to this dangerous crosswalk and for your presentation 5/6/14.

I believe moving the fence toward the main Arborway traffic (and perhaps removing a section from each side of the median queuing zone) will improve sight-lines along the Upper Arborway for bikes and pedestrians, but I remain quite concerned that new paint and improved signals on the main Arborway will do little to calm traffic or improve safety on the Upper Arborway.

As a close neighbor of the site, it is my impression that the largest contributor to westbound/northbound speeding on the Upper Arborway is essentially gravity as through traffic comes down Arborway Hillside from St. Rose and beyond. As your data shows, the Upper Arborway is a significant rush-hour cut-through for eastbound traffic, and will become even more so when the Casey Arborway construction begins. I truly feel that more needs to be done to define this road as a

residential street rather than as Parkway, with significant traffic calming implemented as soon as possible. Speed is certainly an issue in your data, and it is one factor not particularly addressed in your Tier 1 recommendation. The Rapid Flash beacons surely would achieve that goal in terms of immediate pedestrian safety. Additional signage and perhaps another crosswalk up the hill would too (see below re: Gateway path).

I feel strongly that another contributing factor is that the Arboretum is a regional attraction, with many non-locals coming to appreciate its serene beauty. They are unaware of the quirks in local safety factors, and their safety (as well as that of local motorists) shouldn't be compromised by that lack. Particularly when crossing from the Arboretum to the Upper Arborway, there is little expectation that they have left the control of the crosswalk light when they get to the Upper Arborway. If the median queuing space can be expanded somewhat via the removal of fence sections or the relocation of the large signal control box there, I urge you to offset the crosswalk paint on the Upper Arborway, so that the transit of the whole is not perceived to be a continuous one — achieving the effect of your more substantial zig-zag Tier 3 scheme without large expense.

As one attendee mentioned, I find the traffic humps and cascading striping along Pond Ave in Brookline to be very effective in calming traffic and in reducing cut-through traffic. There the sight-lines are better than here, but my impression is that the cascading striping and color differentiation leads to fewer problems than humps might usually create, and that striping seems more effective to me than your proposed triangle pointers in slowing traffic gradually.

Two more things while I have your attention:

1. Kudos to the three gentlemen from DCR who manually filled approximately 8 of the 12-15 potholes along the Upper Arborway last Friday. That attention is greatly appreciated as the road is deteriorating rapidly after a harsh winter and vigorous plowing. I wish they had filled all of them. In my view it would be very sensible to repave the whole length before construction on the Casey increases the load here dramatically later this year.

2. As you know, the Casey Arborway Project calls for a new sidewalk along the northern edge of the Arborway, from South Street to a new pedestrian-activated signal at the Forest Hills Gate of the Arboretum. The 2008 Gateway to the Arborway plan called for the creation of a rambling wooded path northward/westward through the Arborway Hillside towards the area of the crosswalk in question here. Much of that woodland path exists already as a primitive track, used by local dog walkers, bird watchers and tree lovers. If the DCR could consider adding another Crosswalk with signage on the eastern side of St. Rose Street (where this track exits the woods) and then simply lays down gravel on the woodland path all the way to the soon-to-be Forest Hills Gate crosswalk, this portion of the Emerald Necklace would be near complete on both sides of the Arborway. And that would be a fabulous way to leverage the value of the State's \$60+ million Casey effort, creating lasting, once-in-a-lifetime improvement for the community and the city.

Thank you so much for your efforts and your consideration of these matters,

Clayton Harper
44 Hampstead Rd #1
Jamaica Plain, MA 02130
617-388-4568

From: Klauber, Adam [mailto:Adam.Klauber@icfi.com]
Sent: Thursday, May 08, 2014 11:32 AM
To: Nick Jackson; Jessica Mortell
Cc: Catherine Duffy
Subject: FW: Arborway crossing?

Nick and Jessica,

Unfortunately I wasn't able to attend the public meeting on Tuesday night regarding the Arborway crossing designs.

I live ¼ mile from the Arboretum and my wife Rebecca was struck in that crosswalk returning from a run in the Arboretum on August 11, 2011. The trauma surgeons estimated that the vehicle was traveling in excess of 30mph when it struck her. After multiple surgeries, weeks at Spaulding rehab hospital and months in a wheelchair she is now mostly recovered. My hope is to reduce the chances of this happening again.

From my own understanding of traffic engineering (work at the US DOT) and personal near miss experience at the same location – I believe the roadway design was the primary factor in the crash. The limited visibility and lack of space between the start of the crosswalk and the fenceline is very dangerous and from my calculations the required stopping distance required for vehicles traveling over the speed limit makes the safety margin low to non-existent.

Completely understand that the traffic signal is not viable – pedestrians who are in a rush may not activate it anyway.

Three questions:

- 1) Does the state police have full records of the pedestrian/bicyclist collisions?
- 2) Who funds the crossing safety improvements (actual design and construction)?
- 3) Would a chicane extension be possible on the median side of the crossing to augment the visibility improvements for East bound traffic that could potentially offer the possibility of safety bollards for pedestrians stepping out? – This would also create a forced turn around the barrier with associated speed reductions?

Many thanks in advance,

-Adam

Adam Klauber, LEED AP, CEM | Senior Manager | office: 1.617.218.3525 | cell: 1.917.499.6494
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